Twenty-Year Review
of the
Pacific Halibut and Sablefish
Individual Fishing Quota Management Program

October 2016

Table of Contents

List of Tables

List of Figures

List of Acronyms

ADF&G – Alaska Department of Fish and Game

AFSC – Alaska Fisheries Science Center

AKFIN – Alaska Fisheries Information Network

CDQ – Community Development Quota

CQE – Community Quota Entity

DCCED – Alaska Department of Commerce, Community, and Economic Development

IFQ – Individual Fishing Quota

IPHC – International Pacific Halibut Commission

LAPP – Limited Access Privilege Program

MSA – Magnuson-Stevens Act

NMFS – National Marine Fisheries Service

NMFS RAM – National Marine Fisheries Service Restricted Access Management

NMFS SF – National Marine Fisheries Service Sustainable Fisheries

NOAA OLE – National Oceanic and Atmospheric Administration Office of Law Enforcement

QS – Quota Share(s)

RQE – Recreational Quota Entity

USCG – U.S. Coast Guard

1. BACKGROUND INFORMATION

1.1 INTRODUCTION

The intent of this review is to evaluate the IFQ Program as required by the MSA and within the framework of the scope requested by the Council and its advisory bodies. Primarily, the IFQ Program is examined with respect to how well it has met its 10 original policy objectives and how it is providing entry opportunities for new participants, an objective that the Council has sought to provide through numerous revisions since the IFQ Program was implemented. The Council, its Advisory Panel (AP), Scientific and Statistical Committee (SSC), and IFQ Implementation Committee all provided feedback on the proposed structure and policy scope of this review at the December 2015 and February 2016 Council meetings. Their comments on the scope and methodology used in this review have been incorporated throughout this review.

This section describes the requirement for a comprehensive program review, the guidance utilized for developing a policy scope for the review, the organization of the review, the data sources utilized to inform the review, and the inherent limitations to making conclusive statements about the impacts of the program.

In December of 2014, NMFS recommended that the Council initiate a formal and comprehensive review of the Halibut and Sablefish IFQ Program. Section 303A(i)(1)(B) of the MSA requires the Council and NMFS to review all LAPPs that have been approved by the Secretary of Commerce, including those programs approved prior to the enactment of the reauthorized MSA in 2007. Furthermore, Section 303A(c)(1)(G) of the MSA specifies that reviews of these LAPPs should occur no less frequently than once every 7 years. NMFS recommended that the IFQ Program Review be initiated by 2017 to meet the requirements of the MSA. Because the IFQ Program was enacted prior to the 2007 reauthorization of the MSA, it has not been subject to the mandatory review process for LAPPs under the Act. In the 20 years since implementation of the IFQ Program, this will be the first formal and comprehensive review of the program.

Although this will be the first comprehensive review of the IFQ Program, there have been numerous regulatory impact reviews and reports[1] produced by Council and NMFS staff that provide relevant information about QS ownership and transfers, IFQ use and landings, and with respect to specific provisions in the program. This IFQ Program Review will synthesize much of the information provided in these previous reports and analyses.

1.1.1 The requirement for a comprehensive program review

Sections 303A(i) and 303A(c)(1)(G) of the MSA require that the IFQ Program be subject to a formal and detailed review on a regular basis. Section 303A(i), provides that Section 303A of the MSA does not apply to the IFQ Program, with an exception that the IFQ Program "shall be subject to review under subsection (c)(1)(G) of this section [Section 303A]." Section 303A(c)(1)(G) of the MSA requires that any LAPP, (the IFQ Program is included in the MSA definition of a LAPP), must have "a formal and detailed review 5 years after the implementation of the program and thereafter to coincide with scheduled Council review of the relevant fishery management plan (but no less frequently than once every 7 years)." The IFQ Program was implemented in 1995, well before the provisions of Section 303A became law in

[1] See for example "Changes under Alaska's halibut and sablefish IFQ Program 1995 through 2014: Halibut and Sablefish" and the "Report to the Fleet" for 2012. The Report to the Fleet is also available for previous years online as well: http://alaskafisheries.noaa.gov/ram/ifqreports.htm

2007 under the MSA (Pub. L. 109-479). Therefore, the requirement to conduct a review within 5 years of implementation does not apply to the IFQ Program. However, the requirement to conduct a review of the IFQ Program "no less frequently than once every 7 years" does apply.

In December of 2014, NMFS recommended that the Council initiate a formal and comprehensive review of the IFQ Program to meet the requirements of Section 303A of the MSA. In the 20 years since implementation of the IFQ Program, this will be the first formal and comprehensive review of the program. Although this will be the first comprehensive review of the IFQ Program, there have been numerous regulatory impact reviews and reports[2] produced by Council and NMFS staff that provide relevant information about QS ownership and transfers, IFQ use and landings, and other provisions in the program. This IFQ Program Review will synthesize much of the information provided in these previous reports and analyses, and provide new information where applicable.

1.1.2 Establishing a policy scope for the review

Section 303A(c)(1)(G) of the MSA does not specify a checklist of required elements for LAPP reviews. The Council and NMFS have the flexibility to evaluate whatever information they deem necessary to evaluate the IFQ Program. Although the MSA does not specify program review requirements, the Council and NMFS can use several sources to guide the scope of this review. First, two provisions of the MSA, the National Standards in Section 301 and LAPP requirements found in Section 303A provide a description of issues that could be useful in considering a LAPP review. Second, NOAA has produced a Catch Share Policy document[3] that provides policy recommendation for nine guiding principles in the development and evaluation of catch share (or LAPP) programs.[4] Third, the Council and NMFS have conducted several MSA-required reviews for other LAPPs (e.g., BSAI Crab Rationalization and Amendment 80). The issues considered in those reviews can help guide the review process. Fourth, public comment is another informative and important resource to influence the policy scope of issues highlighted for the review. Finally, when the Council recommended the IFQ Program, the Council identified 10 policy objectives that it intended to address through specific elements of the IFQ Program.

Because the Council and NMFS have broad discretion in how this review is conducted, the analysts proposed a workplan that described how they intended to conduct the review. The objective of the workplan was to describe the proposed scope of the IFQ Program Review and to serve as a starting point for a discussion of what should be included in the review. At the December 2015 Council meeting, the Council and IFQ Implementation Committee provided feedback on the proposed structure and scope of the workplan. Based on these comments, the proposed workplan was revised and was presented to the AP, SSC, and Council in February 2016. Public comment was also received on the workplan at the IFQ Committee meeting, and during the December 2015 and February 2016 Council meetings.

In the workplan, the analysts recommended that the most appropriate criteria for reviewing the IFQ Program would be to compare the performance of the IFQ Program relative to the 10 policy objectives that the Council identified when it recommended the IFQ Program. In addition, the analysts recommended reviewing how the IFQ Program has provided for entry-level opportunities since this has been the focus of numerous regulatory amendments over the year.

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[2] See for example "Changes under Alaska's halibut and sablefish IFQ Program 1995 through 2014: Halibut and Sablefish" and the "Report to the Fleet" for 2012. The Report to the Fleet is also available for previous years online as well: http://alaskafisheries.noaa.gov/ram/ifqreports.htm

[3] See: http://www.nmfs.noaa.gov/sfa/management/catch_shares/about/documents/noaa_cs_policy.pdf

[4] NMFS is currently in the process of developing guidance for conducting reviews of catch share programs in coordination with all regional fishery management councils.

During discussion of the workplan in February 2016, the analysts noted that by focusing the review on the 10 original objectives of the IFQ Program and entry-level opportunities, many of the elements and issues addressed in the MSA, the NOAA Catch Share Policy, other LAPP reviews, and comments received by the public would also be addressed. For example, one of the objectives of the IFQ Program was to "broadly distribute quota share to prevent excessively large quota share from being given to some persons (Objective 3)." National Standard 4 of the MSA states that if it becomes necessary to allocate fishing privileges, those allocations should be "carried out in such a manner that no particular individual, corporation, or other entity acquires an excessive share of such privileges (Section 301(a)(4))." Section 303A(c)(5)(D) of the MSA also states that allocations should not be made in a manner that results in quota holders acquiring an excessive share. The NOAA Catch Share Policy guidance also suggests that the Council and NMFS review allocations made under LAPPs and whether those allocations could result in excessive shares. Other LAPP reviews have reviewed quota holdings, and the public has consistently raised questions about quota holdings in the IFQ Program. Therefore, focusing the scope of the review on the 10 original objectives and entry-level opportunities would broadly address the range of potential issues appropriate for review that are highlighted in the MSA, NOAA policy guidance, past reviews, and public comments. For reference, MSA, NOAA Catch Share Policy, other review criteria, and public comments are provided in the appendix to this section. At its February 2016 meeting, the SSC and Council reviewed and supported the scope of the review provided in the workplan.

1.1.2.1 The Goals of the Halibut and Sablefish IFQ Program

In 1991, the Council recommended an IFQ Program for management of the fixed gear (hook and line) halibut and sablefish fisheries off of Alaska. The Secretary of Commerce approved the Council's IFQ Program as a regulatory amendment in 1993, and the program was implemented by NMFS for the fishing season in 1995 (58 FR 215). The fundamental component of the IFQ Program is QS, issued to participants as a percentage of the QS pool for a species-specific IFQ regulatory area, which is translated into annual IFQ allocations in the form of fishable pounds.

The IFQ Program was developed to address issues associated with the race-for-fish that had resulted from the open-access and effort control management of the halibut and sablefish fisheries. Specifically, the Council identified several problems that emerged in these fisheries due to the previous management regime, including increased harvesting capacity, decreased product quality, increased conflicts among fishermen, adverse effects on halibut and sablefish stocks, and unintended distributions of benefits and costs from the fisheries.[5]

In the original Supplemental Environmental Impact Statement for the IFQ Program, the Council identified 10 policy objectives that it intended to address through specific elements of the IFQ Program. Specifically, in selecting the elements of the IFQ Program the Council attempted to do the following:

1) Address the problems that occurred with the open-access management regime.
    - The Council identified 10 specific problems: Allocation conflicts, gear conflicts, deadloss from lost gear, bycatch loss, discard mortality, excess harvesting capacity, product wholesomeness, safety, economic stability in the fisheries and communities, and rural coastal community development of a small boat fleet.
2) Link the initial QS allocations to recent dependence on the halibut and sablefish fixed gear fisheries.
3) Broadly distribute QS to prevent excessively large QS from being given to some persons.

[5] See Footnote 1 for the location of the final SEIS/EA for the IFQ management alternative.

4) Maintain the diversity in the fleet with respect to vessel categories.
5) Maintain the existing business relationships among vessel owners, crews, and processors.
6) Assure that those directly involved in the fishery benefit from the IFQ Program by assuring that these two fisheries are dominated by owner/operator operations.
7) Limit the concentration of quota share ownership and IFQ usage that will occur over time.
8) Limit the adjustment cost to current participants including Alaskan coastal communities.
9) Increase the ability of rural coastal communities adjacent to the Bering Sea and Aleutian Islands to share in the wealth generated by the IFQ Program.
10) Achieve previously stated Council goals and objectives and meet MSA requirements.

The intent of this review is to assess the impacts of the IFQ Program with respect to these initial 10 policy objectives. In addition, the review examines the impacts of the program on providing opportunities for new entrants. Although not an explicit objective of the program as specified in the SEIS, providing entry opportunities for new participants (i.e. non-initial recipients of QS) is implicit to many of the objectives of the IFQ Program (e.g., rural coastal community development of a small boat fleet, owner-operator characteristic of the fleet, limiting consolidation, maintaining fleet diversity).

1.1.3 Organization of this review

The remainder of the review is organized as follows. The following section describes the IFQ management program, including amendments to the program since implementation. This is followed by the Analytical Section, which is comprised of sub-sections that assess the impacts of the IFQ Program with respect to its 10 original policy objectives and to providing new entry opportunities. Because many of these objectives are overlapping or address similar aspects of the IFQ management regime, they are grouped together under these sub-sections where appropriate. The analytical section is followed by the key findings and conclusions, summarizing the findings of the review with respect to how the IFQ Program is meeting the original objectives for the program and highlighting areas that appear to contain the largest challenges in reaching these objectives.

1.1.4 Data

This review relies on data sources utilized in analyses for FMP and regulatory amendments and previous programmatic reviews for the Council. These data sources include NMFS's Restricted Access Management program's harvest and administrative data, AKFIN's fisheries landings data, ADF&G's COAR data, Alaska DCCED's loan data, NMFS's IFQ loan program data, IPHC's halibut biological management data, AFSC's biological management data, NMFS's Office of Law Enforcement data, USCG enforcement and safety data, and NIOSH's safety data. These quantitative data sources are augmented with qualitative information solicited from an IFQ crew workshop and gathered from personal communication with individuals who have experience in the fisheries. Findings from relevant literature are also used whenever possible.

Throughout this review, the baseline period is the average of values of the three years preceding the implementation of the IFQ Program (1992 through 1994). Baseline years could have been defined in many ways. No years would be completely representative of pre-IFQ Program fisheries, as there are a multitude of exogenous factors that have influenced the operations of the fisheries overtime. However, since history was determined from activity between 1988 and 1990, it is likely there was less strategic fishing behavior in the baseline years chosen. Furthermore, there are concerns about the reliability of the data further back in time.

1.1.5 Drawing conclusions about the impacts of the IFQ Program

The analysts considered the range of comments by the Council, public, and SSC about drawing specific conclusions based on this review. As noted by the SSC during its review of the workplan for the IFQ Program Review, it would be unreasonable to expect the review to make causal claims regarding the impact of the IFQ Program for many (if not all) Council objectives. In order to make such claims, the analysts would need to construct a counterfactual of what the trends would have looked like in the absence of the program. Creating such a hypothetical fishery for purposes of comparison would be well beyond the scope of the review and would have to be based on verifiable assumptions. In addition, the IFQ Program has been repeatedly amended in the 20 years since its implementation and IFQ participants and the IFQ fisheries are influenced by changes that are external to the management regime itself. This poses an overall challenge to the analysts' capacity to ascribe any observed trends to the program itself.

Conclusive statements about the success of the IFQ Program at meeting its original objectives are also difficult in light of the nature of the objectives themselves. The objectives are broad and generally not measurable. Furthermore, many of the objectives inherently conflict, so that progress on contradictory objectives would be inversely related. For example, Objective 2 seeks to "link the initial QS allocations to recent dependence on the halibut and sablefish fixed gear fisheries", whereas Objective 9 seeks to "increase the ability of rural coastal communities adjacent to the Bering Sea and Aleutian Islands to share in the wealth generated by the IFQ Program." These two objectives could be considered in conflict if allocations to initial issuees limited the ability of specific BSAI communities to increase their ability to share in the wealth generated by the IFQ Program. The analysts examine trends in metrics, which are consistent with programmatic objectives, to evaluate whether there is indication that the objective is being realized in the program.

The SSC also noted that for some measures the extent or degree of the change is more important than the direction. For example, with respect to providing opportunities for new entrants into the IFQ fisheries, it is more useful to discuss the rate of new entry rather than to assert that new entry is happening. The SSC noted that, as a result, it may be more informative for some program objectives to discuss similar measures from similar fisheries for comparison to the IFQ fisheries. In the case of new entry, this would mean comparing entry rates between the IFQ and the Alaskan salmon fisheries, for example. What may be considered a "similar fishery" to serve as a counterfactual for comparison likely differs based on the objective being evaluated and thus does not make for a consistent assessment. Furthermore, a counterfactual analysis, when properly conducted, necessitates an in-depth understanding of the alternative fishery and changes in its management regime over time. Comparing descriptive statistics or trends across fisheries under different management regimes may be more problematic than meaningful without complete information. Therefore, the analysts have largely focused on providing a comparison within the IFQ fishery itself (i.e., trends in the halibut IFQ fishery and in the sablefish IFQ fishery) and, where appropriate, between the halibut and sablefish IFQ fisheries.

Appendix A1.1

The goals and requirements of a LAPP as stated in the MSA

Section 303A(c)(1) of the MSA states the requirements of a LAPP approved by the Secretary of Commerce. The IFQ Program was implemented prior to the reauthorization of the MSA in 2006 and is not subject to most of the requirements in Section 303A of the MSA. Nevertheless, Section 303A may still inform the review of the IFQ Program because it specifies the current requirements for the development of new LAPPs. The following list summarizes issues derived from language in the MSA that appear relevant to the IFQ Program Review. The MSA states that a Section 303A LAPP program shall:

1) Contribute to reducing overcapacity if the fishery is overcapitalized.
2) Promote fishing safety.
3) Promote fishery conservation and management.
4) Promote social and economic benefits.
5) Include an effective system for enforcement, monitoring, and management of the program, including the use of observers or an electronic monitoring system.

The MSA also includes mandates with respect to allocations under a Section 303A LAPP that may be relevant to this review to the degree that they provide guidance for consideration of the distribution of fishing privileges or the sustained participation of stakeholder groups, rather than just initial allocations. This language may also be relevant to the degree that it aligns with the Council's original objectives for the IFQ Program. Policies and criteria for transferability of fishing privileges in a Section 303A LAPP are also supposed to be consistent with the allocation provisions. Specifically, the MSA states that in developing a LAPP a Council or Secretary shall:

1) Consider the basic cultural and social framework of the fishery, especially through
    a. The development of policies to promote the sustained participation of small owner-operated fishing vessels and fishing communities that depend on the fisheries, including regional or port-specific landing requirements, and
    b. Procedures to address concerns over excessive geographic or other consolidation in the harvesting or processing sectors in the fishery.
2) Include measures to assist, when necessary or appropriate, entry-level and small vessel owner-operators, captains, crew, and fishing communities through set-asides of harvesting allocations, including providing privileges, which may include set-asides or allocations of harvesting privileges, or economic assistance in the purchase of limited access privileges.
3) Ensure that limited access privilege holders do not acquire an excessive share of the total limited access privileges in the program.
4) Authorize limited access privileges to harvest fish to be held, acquired, used by, or issued under the system to persons who substantially participate in the fishery, including in a specific sector of such fishery, as specified by the Council.

A discussion of the IFQ Program with respect to these MSA provisions have been integrated into the relevant sections of the review.

MSA National Standards

The 10 National Standards contained in Section 301(a) of the MSA provide authoritative direction for species managed under an FMP. These National Standards apply to the Bering Sea and Aleutian Islands groundfish and Gulf of Alaska groundfish FMPs, which encompass the sablefish IFQ fisheries. The halibut IFQ fisheries are managed under the authority of the Halibut Act of 1982 (Halibut Act). At the time of IFQ Program implementation, the Council and NMFS determined that the IFQ Program for both the halibut and sablefish fisheries was consistent with the MSA and the Halibut Act. The 10 National Standards are:

1) Conservation and management measures shall prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery.
2) Conservation and management measures shall be based on the best scientific information available.
3) To the extent practicable, an individual stock of fish shall be managed as a unit throughout its range, and interrelated stocks of fish shall be managed as a unit or in close coordination.
4) Conservation and management measures shall not discriminate between residents of different states. If it becomes necessary to allocate or assign fishing privileges among various U.S.

fishermen, such allocation shall be (A) fair and equitable to all such fishermen, (B) reasonably calculated to promote conservation, and (C) carried out in such a manner that no particular individual, corporation, or other entity acquires an excessive share of such privileges.

5) Conservation and management measures shall, where practicable, consider efficiency in the utilization of fishery resources, except that no such measure shall have economic allocation as its sole purpose.
6) Conservation and management measures shall take into account and allow for variations among, and contingencies in, fisheries, fishery resources, and catches.
7) Conservation and management measures shall, where practicable, minimize costs and avoid unnecessary duplication.
8) Conservation and management measures shall, consistent with the conservation requirements of this Act (including the prevention of overfishing and rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities in order to (A) provide for the sustained participation of such communities, and (B) to the extent practicable, minimize adverse economic impacts on such communities.
9) Conservation and management measures shall, to the extent practicable, (A) minimize bycatch, and (B) to the extent bycatch cannot be avoided, minimize the mortality of such bycatch.
10) Conservation and management measures shall, to the extent practicable, promote the safety of human life at sea.

NOAA Catch Share Policy Document

The NOAA Catch Share Policy is a document meant to serve as additional guidance on the development and evaluation of catch share programs in the U.S. (see Footnote 5). Based on the MSA requirements for Section 303A LAPPs, NOAA's Catch Share Policy document identifies guiding principles for design of a catch share program and considerations for a program review. (For clarification, the term "catch share" is inclusive of LAPPs and other types of programs like IFQs and territorial use right fisheries (TURFs). So that all LAPPs are considered catch shares but not all catch shares are considered LAPPs).

The elements of the catch share design from NOAA's Catch Share Policy document include: setting specific management goals for the program, considering a broad range of participation criteria when setting initial allocations of privileges, establishing a criteria for the transferability of limited access privileges, creating distinctions among sectors for which the catch share program may not be the appropriate management fit, consider the duration of the catch share program, develop policies to promote fishing community stability, consider the use of auctions or other means to collect royalties from the initial allocation or subsequent distribution of privileges, design a cost recovery program to support the direct management, data collection, analysis and enforcement activity related to that program, and establish an outlet for periodical reviews of the program.

The NOAA Catch Share Policy recommends the re-evaluation of many of these elements in a program review. Furthermore, whenever possible, catch share program management goals should be measurable and linked back with the initial objectives specified in the FMP. The review of a LAPP should serve to identify whether the goals of the program are being met and the potential steps to be taken to ensure that the program is meeting its goals and objectives.

The NOAA Catch Share Policy document highlights that harvesting privileges under a LAPP are not granted in perpetuity. As such, the Council can revisit underlying program allocations between sectors of a fishery and program mechanisms to ensure the sustained participation of fishing communities, to promote accessibility to new entrants, and to discourage the acquisition of harvesting privileges by those who are not fishery participants, amongst others. The NOAA Catch Share Policy describes that the MSA is clear that harvesting privileges are revocable and that regular and detailed monitoring of a LAPP will help discern if the fishery is performing as expected at the implementation of the program.

The concepts of collecting royalties and cost recovery may be included in a program review; however, more emphasis is placed on the consideration of these components in the development of a LAPP. NMFS has implemented a cost recovery program to recover the incremental costs of management, data collection, and enforcement of the IFQ Program, and this review includes a discussion of this cost recovery program (Section 2.11.4). Additionally, while it is still possible to consider the use of auctions or other means to collect royalties for the subsequent distribution of privileges, this may present equity considerations among program participants because many of the initial recipients who received QS allocations at no cost have sold their QS in the 20 years since program implementation.

The NOAA Catch Share Policy document is meant to serve as a reference for what a comprehensive program review could evaluate. The Council and its advisory bodies considered the guidance in the Catch Share Policy document when determining the appropriate scope of an IFQ Program Review.

Other Program Reviews

The most recent program review completed by the Council in the North Pacific region was the 10-year BSAI Crab Rationalization Program review. This program has undergone regular reviews since its implementation, including an 18-month program review, a 3-year program review, and a 5-year program review.[6] Additional reviews for North Pacific fisheries include a 5-year review of the Amendment 80 program, a 1-Year Review of the Central Gulf of Alaska Rockfish Pilot Program in 2008 and a review of impacts from implementation of the American Fisheries Act (AFA) in a report to U.S. Congress and the Secretary of Commerce one year after program implementation.[7] An updated AFA Program review is also currently in development.

Although a formal review of the Halibut and Sablefish IFQ Program has not been conducted, the Council and NMFS reviewed the Community Quota Entity (CQE) Program in 2010, which was five years after implementation.[8] The CQE Program authorized eligible communities in the Gulf of Alaska to purchase commercial halibut and sablefish QS and lease the resulting IFQ to community residents.[9]

Of particular relevance to the IFQ Program Review may be a 2014 review of the Pacific Coast Sablefish Permit Stacking Program by the Pacific Fishery Management Council.10 The Sablefish Permit Stacking Program is similar to the Halibut and Sablefish IFQ Program in that it includes numerous provisions intended to protect the small business and owner-operated nature of the fishing fleet as well as fishing communities that rely on the sablefish fishery. For example, the program includes an owner-on-board mandate for permit holders and a prohibition on the acquisition of permits by non-individual business entities, with a grandfather clause for those who were permit holders prior to implementation of the

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[6] All three CR program reviews are available on the Council's website: http://www.npfmc.org/crabrationalization/
[7] The Amendment 80 Five-Year Review is available here: https://alaskafisheries.noaa.gov/sites/default/files/amd805yrreview1014.pdf The Central Gulf Rockfish pilot program is available at: http://www.npfmc.org/wp-content/PDFdocuments/catch_shares/Rockfish/RPPreview508.pdf. The AFA report to Congress is available at: http://alaskafisheries.noaa.gov/sustainablefisheries/afa/congress202.pdf
[8] The CQE Program review is available at: http://www.npfmc.org/wp-content/PDFdocuments/halibut/CQEreport210.pdf
[9] The Council recommended a CQE Program for the Aleutian Islands in 2012, which was implemented in 2014.
[10] The permit stacking program review can be found here: http://www.pcouncil.org/wp-content/uploads/2015/06/Final_FGSPS_PrgmRev.pdf

program. Furthermore, the Sablefish Permit Stacking Program was implemented in 2001, prior to the reauthorization of the MSA and its mandate for programmatic reviews of LAPPs in 2007. The 2014 review marked the first comprehensive review of the Sablefish Permit Stacking Program, 13 years after its implementation. In other words, another similarity between the Sablefish Permit Stacking Program review and the IFQ Program Review is a significant length in time from program implementation to the first comprehensive review.

Public Comment

Public comment is a valuable tool in shaping the Council's priorities for the Halibut and Sablefish IFQ Program. Written and oral testimony was received from the public during the presentations of the outline and workplan to the Council, AP, and SSC in December of 2015 and February of 2016. During this testimony, the public requested that the review include a discussion of entry opportunities for new participants. The analysts have included this discussion in the review but note that the Council did not specify new entry opportunities in the original goals of the program. Representatives from the Native Village of Eyak also submitted written and oral testimony during the February 2016 Council meeting requesting the Council to consult with Eyak as part of the IFQ Program Review to "determine a means by which the Tribe can be allocated a reasonable number of IFQ shares." The Council passed a motion requesting the analysts to address the issues raised by the Native Village of Eyak in the IFQ Program Review. Section 2.12 examines the Native Village of Eyak's request.

It is important to clarify for the public that while this program review seeks to provide enough information to highlight potential areas that appear to contain the largest challenges in reaching programmatic objectives, a review is not a program amendment. Should the Council choose to amend the IFQ Program to address an area of concern, a proposed amendment would go through the standard analytical process including an environmental assessment, which investigates the environmental impacts of an action and its reasonable alternatives; a regulatory impact review, which assesses the economic benefits and costs of the action alternatives, as well as their distribution effects; and a regulatory flexibility analysis, which considers the impacts of the action on directly regulated small entities. This analytical process typically goes through an initial review draft stage and a public review draft stage before the Council determines whether to take final action on an amendment.

1.2 DESCRIPTION OF MANAGEMENT

1.2.1 Direct and indirect harvest of halibut and sablefish

Pacific halibut (*Hippoglossus stenolepis*) and sablefish (*Anoplopoma fimbria*) are both demersal species, living on or near the seabed. Halibut are typically harvested in waters from 300 to 2,000 feet, whereas sablefish are harvested in deeper waters from 1,300 to 3,200 feet on the continental slope and in or near underwater canyons and gullies. In the directed commercial halibut fishery, halibut has been prosecuted with longline gear. Longline gear includes hook-and-line, handline, jig, and troll gear. The directed commercial sablefish fishery has been prosecuted by longline, pot, and trawl gear. Participants in the halibut and sablefish fisheries have generally used longline hook-and-line gear because it is more efficient than jig, troll, or handline gear. Both species are also caught as bycatch in other longline fisheries (e.g., Pacific cod) and in the trawl fisheries. The IFQ fleet receives 80% of the TAC in the Western and Central Gulf of Alaska sablefish IFQ areas, 95% of the TAC in the Eastern Gulf of Alaska, 50% of the TAC in the Bering Sea, and 75% of the TAC in the Aleutian Islands. Halibut is also a popular recreational species and significant subsistence and personal use species.

The accessibility of halibut, which in many parts of Alaska can be harvested off of small boats with limited gear, contributes to it being a target species for a variety of user groups and vessel sizes. Harvest of sablefish is more gear intensive and necessitates larger vessels, so that the group of prosecuting fishermen is much less diverse. As described in more detail below, the provisions of the IFQ Program reflect these differences between the user groups. For example, the IFQ Program includes an additional vessel class designation for halibut QS and authorizes halibut IFQ transfers from the commercial to the charter sector.

1.2.2 The Underlying Management Authority for the IFQ Fisheries

The International Pacific Halibut Commission (IPHC) and National Marine Fisheries Service (NMFS) manage fishing for Pacific halibut through regulations established under authority of the Northern Pacific Halibut Act of 1982 (Halibut Act). The IPHC promulgates regulations governing the Pacific halibut fishery under the Convention between the United States and Canada for the Preservation of the Halibut Fishery of the North Pacific Ocean and Bering Sea (Convention) (signed on March 2, 1953) as amended by a Protocol Amending the Convention (signed on March 29, 1979). Regulations developed by the IPHC are subject to approval by the Secretary of State with concurrence from the Secretary of Commerce (Secretary). After approval by the Secretary of State and the Secretary, the IPHC regulations are published in the *Federal Register* as annual management measures.

The Halibut Act also provides the North Pacific Fishery Management Council (Council) with authority to develop regulations, including limited access regulations that are in addition to, and not in conflict with, approved IPHC regulations. Such Council–developed regulations may be implemented by NMFS only after approval by the Secretary. The Council has exercised this authority most notably in the development of its IFQ Program. Congressional action is not required to modify the IFQ Program.[11]

In federal waters, the Alaska sablefish fishery is managed through the Council's Gulf of Alaska and Bering Sea and Aleutian Islands Groundfish Fishery Management Plans (FMPs), subject to MSA and corresponding federal regulations. The Council may amend the sablefish IFQ Program through amendments to the Gulf of Alaska and Bering Sea and Aleutian Islands Groundfish FMPs, as well as connected or independent federal regulations. Such amendments must be approved by the Secretary before they can be implemented by NMFS.

1.2.3 Management prior to the IFQ Program

The IFQ Program was implemented in response to growing concerns about issues that had emerged from management of the sablefish and halibut fisheries under the open access regime. In both fisheries, growth in fishing effort under open access had necessitated large reductions in length of the fishing seasons and caused a host of undesirable biological, economic, and social effects. In some areas the halibut fishery, in particular, had been reduced to a few short “derby-like” openings each year. The congestion on the fishing grounds during the relatively short openings also led to gear conflicts, gear loss, and resource wastage. Short fishing seasons also led to gluts at processing plants and coupled with what was often hurriedly handled fish resulted in a mostly frozen product and lower ex-vessel prices for fishermen.

For the halibut fishery, the IFQ Program was implemented after nearly two decades of discussions beginning in the late 1970s about developing a limited entry program to address management concerns with open access. There were divisions within the halibut fleet about the potential limited entry program. Whereas the Seattle-based fleet favored a limited entry program, the Alaska-based fleet largely opposed such a program and wanted to ensure that, if passed, it was not expeditiously implemented (Pautzke and

[11] CDQ allocations are specified in the MSA and changes to the CDQ allocations would require Congressional action.

Oliver, 1997). The Alaska fleet was concerned that the Seattle fleet had greater historical catches and would likely receive a substantial proportion of the initial allocations (ibid.).

In the sablefish fishery, fleet overcapacity and congestion on fishing grounds did not severely impact the fishery until the late 1980s, following a decade of rapid growth in the fleet. In response to this growth, the sablefish TAC was allocated between the gear types prosecuting the fishery – fixed gear and trawl gear. By the late 1980s, the Council adopted a Statement of Commitment declaring its intent to pursue development of a license limitation or IFQ Program for the sablefish fishery, in response to requests from the sablefish fleet to address issues with overcapacity. In 1990, halibut was added to the discussion of alternatives for implementing a license limitation or IFQ Program for the sablefish fishery.

1.2.4 Description of the IFQ Program

In December of 1991, the Council chose an IFQ Program as the preferred management alternative for both halibut and sablefish fixed gear fisheries. The IFQ Program was approved as a regulatory amendment by the Secretary of Commerce in 1993 and implemented by NMFS in 1995.

The overall management context of the IFQ Program for the 20 years since its implementation has largely been one of decreasing restrictions over time. For example, within the first year of the IFQ management regime, the Council added the “fish down” provision allowing IFQ designated for larger vessel classes to be fished on smaller class vessels and increased the allowable “sweep up” limit to allow larger amounts of IFQ to be swept up into QS blocks. Over the course of the IFQ Program, the Council has also allowed for some inter-area harvest of QS, increased the number of QS blocks that a shareholder may hold, and allowed for “fishing up” in some areas, amongst others.

The one overarching exception the general trend of decreasing restrictions has been with respect to the owner-operator characteristic of the fleet. The Council has repeatedly re-asserted its position on limiting hired master use for the harvest of catcher vessel IFQ and the acquisition of catcher vessel QS by non-individual entities in an effort to continue progress toward an owner-operator catcher vessel fleet, as described in Section 2.5. At the same time, however, the Council elected to authorize certain communities to be able to form community quota entities (CQEs), which can purchase halibut and sablefish QS and ease the resultant IFQ to their residents, and more recently to allow the halibut charter sector to lease IFQ as guided angler fish (GAF) from the commercial halibut IFQ sector.

1.2.4.1 The stated goals/expected impacts of the IFQ Program

The Council and NMFS identified 10 objectives for the original IFQ Program in the final SEIS for the program (NPFMC & NMFS, 1992). These objectives informed the Council’s selection of specific components or provisions of the IFQ Program. Specifically, the Council sought to:

1) Address the problems that had occurred with the previous management regime.
    a. The Council identified 10 components of the allocation problem associated with the previous open access management regime that it sought to address with the implementation of IFQs: 1) allocation conflicts; 2) gear conflicts; 3) fishing mortality due to lost gear; 4) bycatch loss of halibut and sablefish in other fisheries; 5) discard mortality for halibut and other retainable species in the halibut and sablefish fisheries; 6) excess harvesting capacity; 7) product wholesomeness as reflected in halibut and sablefish prices; 8) safety; 9) economic stability in the fixed gear halibut and sablefish fisheries and communities; and 10) rural coastal community development of a small boat fishery.
2) Link the initial quota share allocations to recent dependence on the halibut and sablefish fixed gear fisheries.

3) Broadly distribute quota share to prevent excessively large quota share from being given to some persons.
4) Maintain the diversity in the fleet with respect to vessel categories.
5) Maintain the existing business relationships among vessel owners, crews, and processors.
6) Assure that those directly involved in the fishery benefit from the IFQ Program by assuring that these two fisheries are dominated by owner/operator operations.
7) Limit the concentration of quota share ownership and IFQ usage that will occur over time.
8) Limit the adjustment cost to current participants including Alaskan coastal communities.
9) Increase the ability of rural coastal communities adjacent to the Bering Sea and Aleutian Islands to share in the wealth generated by the IFQ Program.
10) Achieve previously stated Council goals and objectives and meet MSA requirements.

Each of these objectives is addressed in a specific section of this review. The objective being assessed is provided at the beginning of each section.

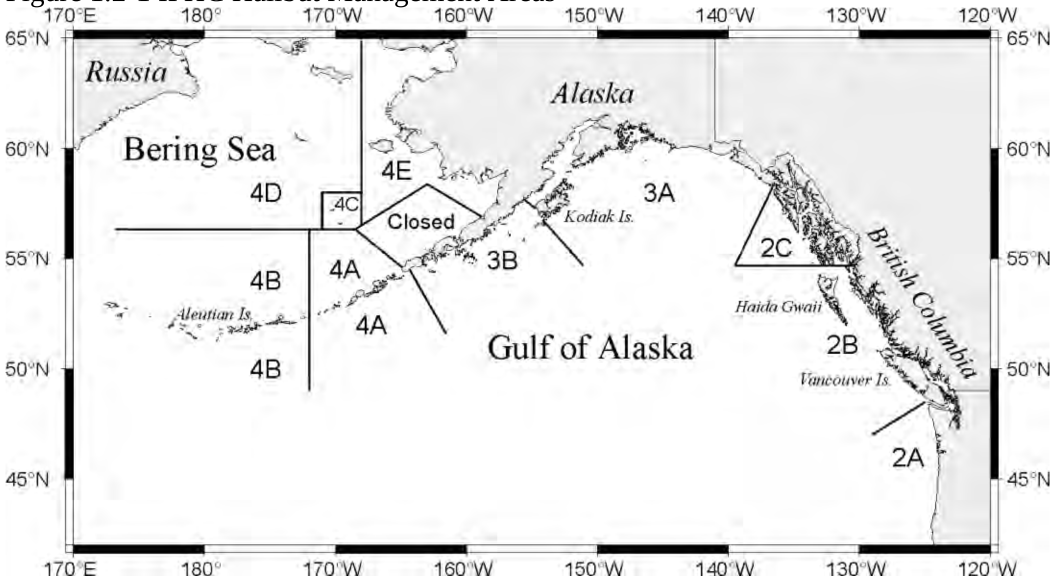
Objective 9 refers to the CDQ Program first implemented in 1992. The CDQ Program was incorporated into the MSA in 1996, through the Sustainable Fisheries Act (Pub. L. 104–297) and is intended to provide economic opportunities and achieve social benefits for western Alaska communities. In addition to allocations of crab and groundfish, the CDQ groups receive allocations of the TACs in IPHC halibut regulatory Areas 4B, 4C, 4D, and 4E and the Bering Sea and Aleutian Islands regulatory areas for the sablefish fishery. Because the CDQ Program is separate from the IFQ Program, the CDQ Program will not be reviewed as part of the IFQ Program Review. Under the MSA, the CDQ Program is subject to a decennial review process coordinated through the State of Alaska.

1.2.4.2 **Total allowable catch**

The primary component of the IFQ Program is the total allowable catch (TAC) established for the IFQ fisheries. In both the halibut and the sablefish fisheries, TACs are established for discrete management areas.

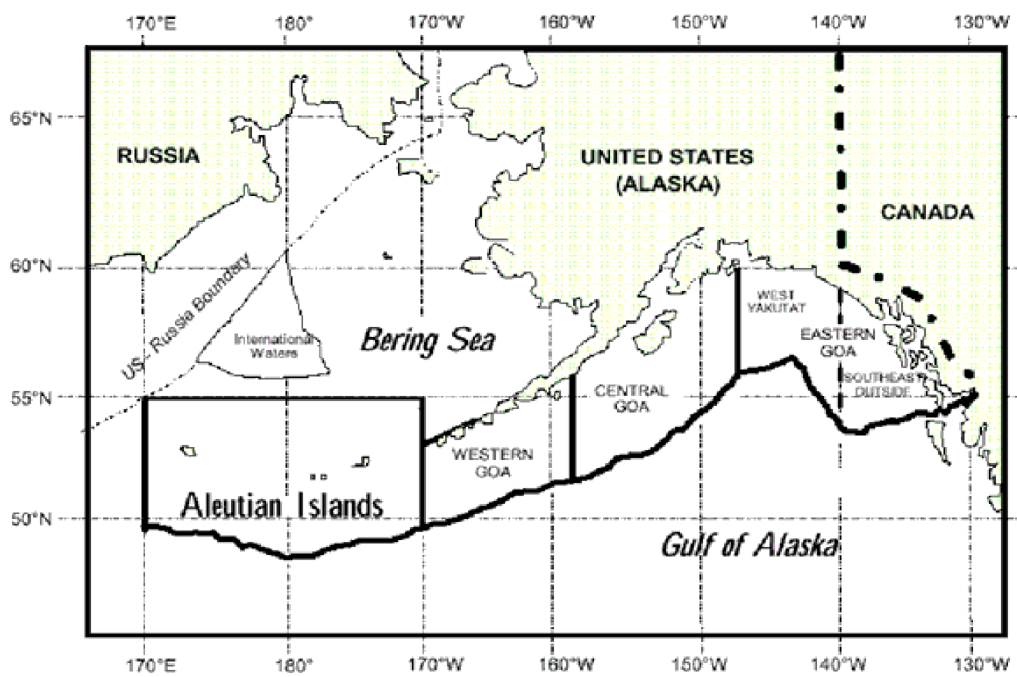
The IPHC determines the TACs for the halibut fishery under the authority of the Halibut Act. There are eight halibut IFQ regulatory areas (Figure 1.2-1), inclusive of Areas 2C through Area 4E, although all of the Area 4E TAC is allocated to the CDQ Program. Areas 2A and 2B are not part of the IFQ Program. Area 2B is in Canadian waters and the Area 2A TAC is split among the States of Washington, Oregon, and California.

Figure 1.2-1 IPHC Halibut Management Areas



For the sablefish IFQ fishery, the Secretary of Commerce determines the TAC available for the directed sablefish fishery, based on the recommendations of the Council. There are six sablefish regulatory areas in the IFQ Program (Figure 1.2-2).

Figure 1.2-2 Sablefish IFQ Regulatory Areas



(Throughout this document the sablefish regulatory areas may be referred to as SE – Southeast Outside District, WY – Western Yakutat, CG – Central Gulf of Alaska, WG – Western Gulf of Alaska, AI – Aleutian Islands, and BS – Bering Sea).

1.2.4.3 QS – initial allocation

QS are the basic long-term use privilege in the IFQ Program. QS were initially issued to "qualified persons", natural persons (hereinafter individuals) or non-individual entities (e.g., partnerships, corporations, etc.), who owned or leased a vessel that made fixed gear halibut or sablefish landings during the qualifying years 1988, 1989, and 1990 from any IFQ regulatory area. Qualified persons had to apply for their initial QS allocations in 1994. There was also a U.S. citizenship mandate for initial QS recipients. A non-individual entity qualified as a U.S. citizen if it owned a vessel that was registered in the U.S. during the qualifying years.

QS are specific to a management area and a vessel class. The initially allocated QS units were determined on the basis of the person's qualifying landings - during the best five of seven years (1984 to 1990) in the halibut fishery and the best five of six years (1985 to 1990) in the sablefish fishery. QS were assigned to a vessel class based upon the overall length of the vessel upon which the qualifying person made halibut or sablefish landings in the most recent year of participation and based upon whether that person processed fish on board the vessel. For purposes of the vessel class assignment the most recent year of participation was 1988, 1989, 1990 or calendar year 1991 prior to September 26, 1991. The vessel class designations for QS specify the maximum length of the vessel upon which the IFQ resulting from that QS can be landed and whether IFQ species can be processed on board the vessel, as described in more detail in Section 1.3.4.1 below. QS were assigned to an area based on the person's qualifying landings in each IPHC regulatory area for halibut and in each sablefish regulatory area for sablefish.

QS are a permit, the amount of which is used as the basis for the calculation of a person's annual IFQ – the pounds of IFQ fish (species, area, and vessel class specific) that the person may harvest in a given season. The QS pool (QSP) is the total of all QS units for each respective IFQ regulatory area. The QSP for each IFQ regulatory area was determined at initial allocation and has only been changed since through administrative adjustments. A person's annual IFQ is determined by accounting for the area QSP and the annual area-specific TAC, such that:

$$(QS/QSP) * TAC = IFQ$$

1.2.4.3.1 CDQ compensation QS

Because portions of the TACs in Areas 4B, 4C, 4D, and 4E of the halibut fishery and the Bering Sea and Aleutian Islands areas of the sablefish fishery were allocated to the CDQ Program, some initial recipients received additional QS in other IFQ regulatory areas to compensate them for these foregone fishing privileges. These initial recipients received "CDQ compensation" QS in Areas 2C, 3A, 3B, and 4A of the halibut fishery and in the Gulf of Alaska areas of the sablefish fisheries in proportion to the amount of halibut and/or sablefish QS foregone due to the CDQ allocation. CDQ compensation QS increased the QSP in these areas.

Some persons who received CDQ compensation QS in Areas 2C, 3A, 3B, and 4A were issued QS in one or more of those areas. When this occurred, their CDQ compensation was rolled into their existing QS holdings.

However, in many cases persons received CDQ compensation QS in areas where they had not previously fished or been issued regular QS. When this occurred, a person's catcher vessel[12] CDQ compensation QS were "swappable" to another catcher vessel category upon the first transfer. Moreover, "swappable"

[12] Catcher vessel QS results in IFQ that cannot be processed on board. See section 1.2.4.4.1

catcher vessel CDQ compensation QS can be used on any size catcher vessel until it is swapped or transferred. These rules were intended to facilitate the transfer and use of CDQ compensation QS.

1.2.4.3.2 Blocked and unblocked QS

In an effort to constrain consolidation, QS were either issued as blocked or unblocked. Persons received their QS in a non-severable block at initial allocation if their QS would have resulted in less than 20,000 pounds of IFQ in 1994. A QS block had to be transferred as a whole and the IFQ Program established a limit on the number of blocked and unblocked QS a person can hold.

If a person who received CDQ compensation QS were issued QS in Areas 2C, 3A, 3B, and 4A the person's total QS were either issued as "blocked" or "unblocked", depending upon the size of the person's combined holdings in an area. If a person received CDQ compensation QS in areas where they had not previously fished or been issued regular QS, a person's catcher vessel CDQ compensation was issued as unblocked. Because the block provision constrains how QS can be transferred, it is described in more detail under the "QS – transferability" section below.

1.2.4.4 QS and IFQ – use provisions

The use privilege associated with QS is specific to an area, vessel class, and participant type (e.g., initial recipient or second-generation shareholder, individual or non-individual entity). This section describes these various QS use provisions and how they differ across participant groups.

1.2.4.4.1 Area and vessel class categorizations

All halibut and sablefish QS have regulatory area designations, which specify the area in which the IFQ derived from those shares may be harvested. These area designations correspond with the areas illustrated in Figure 1.2-1 and Figure 1.2-2. The only exception to this is noted under section 1.3.4.1.2 below.

There are four vessel classes in the halibut IFQ fishery (A through D) and three in the sablefish IFQ fishery (A through C). Table 1.2-1 shows the vessel class QS designations in the halibut and sablefish IFQ fisheries at the time of the implementation of the IFQ Program. Class A shares in both fisheries are designated for vessels that process at sea or catcher-processors (i.e. for the directed sablefish and halibut fisheries, these constitute freezer longliner vessels) and do not have a vessel length restriction. In both fisheries, Class B shares were designated to be fished on vessels greater than 60 feet LOA. In the sablefish IFQ fishery, Class C shares were designated to be fished on vessels equal to or less than 60 feet LOA. In the halibut fishery, Class C shares were designated to be fished on vessels greater than 35 feet but less than or equal to 60 feet LOA and Class D shares were designated to be fished on vessels less than or equal to 35 feet LOA. Class D vessels had not historically operated in the sablefish fishery, due to the fact that this fishery is primarily prosecuted in offshore and deeper waters. These vessel class designations were intended to maintain the diversity of the IFQ fleets, and the Council intended for the Class D QS to be the most likely entry-level opportunity.

Table 1.2-1 Vessel length associations by QS class at IFQ implementation

IFQ Species	QS Class	Vessel Length Designation
Halibut	A	Any length
	B	> 60 feet
	C	> 35 feet to 60 feet
	D	≤ 35 feet
Sablefish	A	Any length
	B	> 60 feet
	C	≤ 60 feet

1.2.4.4.1.1 Fish Up and Fish Down

Since the implementation of the IFQ Program, there have been numerous amendments lifting the vessel length landing restrictions of the QS vessel class designations. In 1996, in order to increase the flexibility of QS transfers for catcher vessels and to alleviate a scarcity of large to medium size QS blocks in some areas, the Council implemented Amendment 42 to the Bering Sea and Aleutian Islands and Gulf of Alaska groundfish FMPs (known as the "Fish Down" provision). This Amendment allowed IFQ derived from larger class QS to be fished on smaller class vessels, except in Area 2C of the halibut fishery and the Southeast Outside District of the sablefish fishery, unless the IFQ in those areas was derived from a QS block of 5,000 pounds or less. Because Area 2C and the Southeast Outside District are dominated by small vessel owners, the Council did not initially allow shareholders in these areas to "fish down" in order to prevent excessive consolidation of QS among owners of smaller vessels. In 2007, the Council amended this restriction on fishing down in Area 2C and the Southeast Outside District, allowing IFQ derived from Class B QS to be fished on vessels equal to or less than 60 feet LOA.

The Council has also amended the IFQ Program to allow "fishing up" in some areas – the landing of IFQ derived from smaller class QS on larger class vessels. In 2007, an amendment was implemented to the IFQ Program to allow IFQ derived from Class D QS to be fished on vessels less than or equal to 60 feet LOA in Areas 3B and 4C. In 2014, an amendment was implemented allowing IFQ derived from Class D QS to be fished on vessels in the Class C category in Area 4B. Table 1.2-2 shows the current (as of October 2015) vessel length associations by QS class.

Table 1.2-2 Current vessel length associations by QS class

IFQ Species	QS Class	Vessel Length Designation
Halibut	A	Any length
	B	Any length
	C	≤ 60 feet
	D	≤ 35 feet (except in halibut Areas 3B, 4B, and 4C where Class D IFQ may be harvested on a vessel ≤ 60 feet)
Sablefish	A	Any length
	B	Any length
	C	≤ 60 feet

Table note: Current as of November 2015

1.2.4.4.1.2 Fishing IFQ across regulatory areas

QS in the IFQ Program are designated by regulatory area (see Figure 1.2-1 and Figure 1.2-2). The QS or IFQ specified for one IFQ regulatory area must not be used in a different IFQ regulatory area, except all or part of the QS and IFQ specified for regulatory area 4C may be harvested in either Area 4C or Area 4D. The IPHC considers Areas 4C, 4D, and 4E to be one halibut stock, so that using Area 4C, 4D, or 4E IFQ across areas does not interfere with the biological management of the stock. The intent of allowing the harvest of Area 4C IFQ in Area 4D was to provide for increased harvesting opportunities for halibut IFQ fishermen, in response to localized stock depletion around Area 4C.

1.2.4.4.2 Owner-on-board mandate and hired master use privilege

In developing the Alaska halibut and sablefish IFQ Program the Council was concerned with the potential for the emergence of a class of absentee catcher vessel shareholders. The Council stated that absentee QS holder would be in opposition to its intent that benefits from the fishery flow to those directly involved in it. Therefore, the Council included an owner-on-board requirement for catcher vessel QS holders in the IFQ Program. The intent of the owner-on-board requirement was to provide for a transition of the catcher vessel fleet to becoming fully owner-operated. Class A shares were exempt from the owner-on-board requirement, because these shares were already largely corporate owned at the time the IFQ Program was being implemented and comprise a very small percentage of the total QS in the two fisheries.

The Council included an exemption to the owner-on-board mandate for individual initial recipients of catcher vessel shares, allowing these initial recipients to use hired masters to land their IFQ. A hired master is anyone designated by a qualified shareholder to land that shareholder’s IFQ. Because some catcher vessel QS recipients had used hired masters prior to implementation of the IFQ Program, the Council intended the exemption from the owner-on-board requirement to provide initial recipients with the latitude to continue in the business practices that they had had prior to the implementation of the IFQ Program.

In halibut Area 2C and the Southeast Outside District of the sablefish fishery, the Council prohibited hired master use by any individuals (including initial recipients). In other words, in these areas the use of hired masters was restricted to non-individual entities only. The intent of this additional restriction on hired master use in Area 2C and the Southeast Outside District was to maintain what had historically been an owner-operated fleet in these areas. Table 1.2-3 shows the hired master use privilege by QS type and QS holder type and area.

Table 1.2-3 Hired master use privilege by QS type, QS holder type, and area

	Initial Recipient Individuals	Second Generation Individuals (i.e. non-initial recipients)	Non-Individual Entities
Halibut Areas – 3A, 3B, 4A, 4B, 4C, & 4D	Yes	No	Yes, must use a hired master
Halibut Area – 2C	No	No	Yes, must use a hired master
Sablefish Areas – WY, CGOA, WGOA, AI, & BS	Yes	No	Yes, must use a hired master
Sablefish Area – Southeast Outside District	No	No	Yes, must use a hired master

Table note: Current as of November 2015

The hired master use provision has been amended on several occasions since the implementation of the IFQ Program to address Council objectives for the IFQ Program and the emergence of de facto leasing relationships between some initial recipients and their hired masters. The increasing use of hired masters is explored extensively in Section 2.5 of the Analytical Section. Herein we note the amendments to the hired master use provision.

1999 regulatory amendment: 20% vessel ownership requirement (64 FR 24960)

In 1999, an amendment to the IFQ Program was implemented to require a shareholder to have at least a 20% ownership interest in the vessel upon which their IFQ is being fished in order to be permitted to use a hired master. This amendment was intended to address testimony to the Council that some shareholders had only a nominal ownership interest in the vessel upon which their IFQ was being fished. Although nominal vessel ownership met the vessel ownership regulatory requirements at the time, the Council determined that revisions to the program were necessary to further promote its intent for an owner-operator fishery in which shareholders actually participate in harvesting operations. The 20% ownership interest requirement does not apply to any individual who received an initial allocation of catcher vessel QS and who, prior to April 17, 1997 employed a hired master to fish any of the IFQ issued to that individual, provided the individual continues to own the vessel from which the IFQ is being fished at no lesser percentage of ownership interest than that person held on April 17, 1997 and provided that that this individual has not acquired additional QS through transfer after September 23, 1997.

2002 regulatory amendment: indirect ownership of a vessel through corporate ties (67 FR 20915)

In 2002, the IFQ Program was amended to modify the hired master provision to allow shareholders to substitute indirect ownership of a vessel through an ownership interest in a corporation or other non-individual entity for direct vessel ownership by the shareholder for purposes of using a hired master to land that shareholder's IFQ. Under this amendment, an individual who has an ownership interest in a non-individual entity is allowed to employ a hired master on a vessel owned by that entity, as long as the individual maintains the minimum 20% ownership interest requirement in the vessel. An individual's interest in a vessel is determined by the percentage ownership by the individual of a non-individual entity that has an ownership interest in the vessel multiplied by the percentage of ownership of the vessel by the non-individual entity. This amendment codified the existing management policy and methodology that was being employed by NMFS at the time to determine the ownership interest a shareholder had in a vessel. Furthermore, it accommodated the fact that many persons move vessel ownership to limited liability companies to protect personal assets.

2007 regulatory amendment: documentation requirement for 20% vessel ownership (72 FR 44795)

In 2007, the IFQ Program was amended to specify the formal, government-issued documents that shareholders must submit to NMFS to demonstrate the 20% vessel ownership interest requisite for using a hired master. The Council concluded that the previous regulatory requirement simply for written documentation was inadequate and that some shareholders were abusing the hired master provision through vessel ownership arrangements that were informal and unverifiable.

2014 regulatory amendment: the 12/20 Rule (79 FR 9995)

In 2014, the IFQ Program was amended to impose a 12-month vessel ownership requirement (of the minimum 20% interest) for shareholders who wish to use a hired master. That is, for the 12-month period prior to applying use a hired master, an individual shareholder must own a minimum 20% interest in the vessel that the hired master will use to fish the IFQ on behalf of the individual shareholder. This rule also applies to individuals meeting their vessel ownership interest indirectly through interest in a non-individual entity. That is, an individual who is a shareholder of a non-individual entity is allowed to employ a hired master on a vessel owned by that entity, as long as the individual maintains the minimum 20% ownership interest requirement in the vessel for the 12-month period prior to applying to use a hired master. The duration element for the vessel ownership interest requirement was implemented to prevent initial recipients from meeting the ownership interest requirement only for the duration of the IFQ fishing trip. Such practices ran counter to the Council's intent that individual shareholders have an ongoing ownership interest in the vessel that a hired master will use, if the shareholder intends to use a hired master.

2014 regulatory amendment: prohibition on hired master use on QS transferred after February 12, 2010 (70 FR 43679)

In 2014, an amendment to the IFQ Program was implemented prohibiting initial QS recipients from using a hired master to harvest IFQ derived from catcher vessel QS received by transfer after February 12, 2010. This amendment was implemented because the Council was concerned that initial recipients were consolidating QS and increasingly utilizing hired masters to fish the resultant IFQ, delaying the transition to a predominantly owner-operated catcher vessel fleet and reducing opportunities for new entrants to the fisheries. The February 12, 2010 date was chosen because that was the date when the Council announced its interest in addressing this issue. It was recognized that this amendment would likely reduce the initial recipient's incentive to purchase additional QS, if the shareholder intended to use a hired master to fish the resultant IFQ.

The Council recognized that there were administrative difficulties with applying this rule to QS blocks, because NMFS could not readily differentiate what portion of the block should be attributed to QS with the hired master privilege and what portion of the block should be attributed to QS without the hired master privilege. Therefore, if QS transferred after February 12, 2010 were consolidated into a block prior to the effective date of the final rule (December 1, 2014), the IFQ resulting from that consolidated QS block could be fished by a hired master. If the QS were consolidated into a QS block after the effective date of the final rule, the IFQ resulting from that consolidated QS block could not be fished by a hired master, and the QS holder was required to be on board the vessel during the harvest of their IFQ.

After December 1, 2014 (the effective date of the final rule), individual and non-individual entities could sell catcher vessel QS that they received through transfer after February 12, 2010. Individuals could also choose to be on-board the vessel during the harvest of their IFQ derived from catcher vessel QS transferred after February 12, 2010. Because non-individual entities have to use a hired master to harvest their IFQ, non-individual entities are unable to use the IFQ resulting from catcher vessel QS that they received through transfer after February 12, 2010.

1.2.4.4.3 Overage/underage

There are two provisions (overage and underage) in the IFQ Program, which allow shareholders to have a margin of error in how they harvest their annual QS allocations. If a person does not harvest their full annual IFQ allocation, an underage of up to 10% of that person's total IFQ account for a current fishing year will be added to that person's annual IFQ account in the year following determination of the underage. If a person lands IFQ species in excess of their annual IFQ allocation, their account will be debited in the following year by the amount of the overage, by up to 10% of the amount remaining in the person's IFQ account at the time of landing. Any overage greater than 10% is subject to confiscation and potentially an enforcement action, depending on the degree of overage, which is described in more detail in Section 2.11.3.

1.2.4.5 **QS – transferability**

1.2.4.5.1 Persons eligible to acquire QS by transfer

When the IFQ Program was implemented, the Council restricted who was eligible to receive (by transfer) QS by vessel class and regulatory area. The intent of these restrictions was to achieve various management and social objectives, discussed in more detail below. These eligibility mandates changed with the implementation of the December 1, 2014 rule, which restricted hired master use to QS that were transferred prior to February 12, 2010. The IFQ Program provisions on QS acquisition before and after the December 1, 2014 rule are summarized in **Error! Reference source not found.** below.

The rules on eligibility to receive Class A QS by transfer have not changed since the implementation of the IFQ Program. Acquisition of Class A shares across all areas is virtually unconstrained. Any individual or non-individual entity that meets the U.S. citizenship requirement is eligible to receive Class A QS by transfer in the IFQ fisheries.

Table 1.2-4 Eligibility to receive QS by transfer by area and vessel class

	Prior to December 1, 2014		Post December 1, 2014	
	Class A	Class B, C, and D	Class A	Class B, C, and D
Halibut Area 2C and Sablefish Southeast Outside Area	Any individual or non-individual entity that meets the U.S. citizenship requirement	IFQ crewmembers*	Any individual or non-individual entity that meets the U.S. citizenship requirement	IFQ crewmembers*
All Other Halibut and Sablefish Regulatory Areas	Any individual or non-individual entity that meets the U.S. citizenship requirement	IFQ crewmembers* and non-individual entities that were initial recipients of catcher vessel QS	Any individual or non-individual entity that meets the U.S. citizenship requirement	IFQ crewmembers*

Table notes: Current as of November 2015
*Except that individual initial recipients of catcher vessel shares may transfer initially issued QS to a corporation that is solely-owned by that same individual and CQEs may receive catcher vessel QS by transfer in Areas 2C, 3A, 3B, and 4B and the SE, WY, CG, WG, and AI of the sablefish fishery (except that CQEs may not receive by transfer Class D QS in Area 2C).

At implementation of the IFQ Program, the Council limited catcher vessel QS acquisition by transfer to non-individual entities that were initial recipients of catcher vessel QS and to IFQ crewmembers. An IFQ crewmember is any individual who has at least 150 days experience working as part of the harvesting crew in any U.S. commercial fishery, or any individual who received an initial allocation of QS in the IFQ fisheries. As described in more detail in Section 1.4, CQEs may also purchase catcher vessel QS in certain areas. The intent of this provision was to provide for an eventual transition of the catcher vessel fleet to becoming individual holders of QS through the attrition of non-individual entities that were initial recipients of catcher vessel QS. In halibut Area 2C and the sablefish Southeast Outside area, all non-individual entities (including initial recipients) were prohibited from acquiring catcher vessel QS by transfer. This additional restriction in these two areas was intended to protect what had historically been a small vessel, owner-operated fleet from potential competition for catcher vessel shares by non-individual entities. One exception to this is that individual initial recipients of catcher vessel shares may transfer initially issued QS to a corporation that is solely-owned by that same individual.

The December 1, 2014 rule prohibiting hired master use for IFQ derived from QS transferred after February 12, 2010 also prohibited all non-individual entities (except CQEs) from acquiring catcher vessel QS by transfer. In essence, this rule equalizes catcher vessel QS transfer restrictions across all areas, applying the restriction on catcher vessel QS acquisition by non-individual entities that had been in place in halibut Area 2C and the Southeast Outside area of the sablefish fishery to all IFQ regulatory areas. Currently, catcher vessel QS acquisition by transfer is restricted to individual IFQ crewmembers (and in some areas CQEs). As described above, an IFQ crewmember is a person with a minimum of 150 days experience working as part of the harvesting crew in any U.S. commercial fishery, or any individual who received an initial allocation of QS in the IFQ fisheries.

1.2.4.5.2 QS leasing/ IFQ transfers

As previously mentioned, the Council intended to provide for the ultimate transition of the catcher vessel fleet to becoming fully individual-owned and owner-operated. Therefore, the Council included an owner-on-board mandate for individual catcher vessel shareholders and an overall prohibition on leasing of IFQ derived from catcher vessel QS upon implementation of the program. Section 1.3.4.2 discusses the owner-on-board mandate as a QS/IFQ use provision. This section focuses on QS leasing or IFQ transfers.

Class A QS are not subject to the same active participation mandates as catcher vessel QS. Since the implementation of the IFQ Program, IFQ derived from halibut and sablefish Class A QS can be leased. In other words, there is no owner-on-board mandate for any Class A QS holders. The owner-on-board mandate was applied to catcher vessels that deliver to shoreside processing plants and tend to be more tied to coastal communities than catcher processors that process on board and were already largely corporate owned when the IFQ Program was being developed.

Leasing of IFQ derived from catcher vessel QS was allowed for the first three years of the IFQ Program, 1995 to 1998. During this period, catcher vessel shareholders could lease up to 10% of the IFQ derived from their catcher vessel shares for a given area. The regulations allowing leasing of IFQ derived from catcher vessel QS expired on January 2, 1998 and have not been renewed.

There are several exemptions to the overall prohibition on leasing of IFQ derived from catcher vessel QS. These include survivorship or beneficiary IFQ leases, medical leases, military leases, IFQ leases from CQEs to residents, and annual transfers of commercial halibut IFQ as GAF to charter halibut permit holders. The CQE IFQ leases and GAF transfers will be discussed under the sections describing the CQE Program (Section 1.4) and the Halibut Charter Sector (Section 1.5).

Following a QS holder's death, the IFQ Program allows a beneficiary to lease IFQ derived from catcher vessel QS that they received as a descendent of a QS holder for a limited period of time. In 1996, the Council implemented a provision into the IFQ Program providing for the transfer of all QS to a surviving spouse upon the death of QS holder, unless the shareholder had expressed contrary intent in a will. The surviving spouse could then lease the IFQ resulting from those QS for up to three calendar years after the date of the death of the deceased QS holder, including any unfished IFQ for the current year. In 2001, the Council extended the survivorship QS transfer provision to allow the temporary transfer of a deceased QS holder's QS and IFQ to a surviving spouse or designated beneficiary who is an immediate family member. Under current regulations, the surviving spouse or beneficiary may lease IFQ derived from QS transferred to them as a descendent for up to three calendar years after the death of the shareholder. After the three years, the surviving spouse or beneficiary must transfer the QS to an individual that qualifies as an IFQ crewmember, unless the beneficiary meets the IFQ crewmember qualifications.

In 2007, a medical IFQ transfer provision was implemented into the IFQ Program allowing catcher vessel QS holders to lease catcher vessel IFQ if the shareholder could demonstrate a medical condition affecting the shareholder or their immediate family member, which prevents the shareholder from being able to participate in the IFQ fishery. The QS holder must not otherwise be eligible to use a hired master, so the medical transfer provision applies to shareholders in halibut Area 2C and the sablefish Southeast Outside district, non-initial individual recipients of catcher vessel shares, initial recipients of QS that do not meet the 20% minimum vessel ownership requirements to hire a master to harvest their IFQ, and to holders of QS transferred after February 12, 2010. Furthermore, a medical transfer will not be granted if the applicant received a medical transfer in any two of the previous five years for the same medical condition. There is no limit to the total number of medical transfers that a shareholder may receive.

In 2008, a military IFQ transfer provision was implemented into the IFQ Program allowing the leasing of catcher vessel IFQ if the shareholder could demonstrate that he or she is a member of the branch of the National Guard or a member of a reserve component, unable to participate in the IFQ fishery for which he or she holds QS because of military mobilizations, order to report for military service, or active duty military service. As with medical transfers, military IFQ leasing is only allowed for shareholders who are otherwise not eligible to use a hired master to fish their IFQ.

1.2.4.5.3 The Block Program and Sweep Ups

As described in Section 1.2.4.3.2, QS in the IFQ Program were issued as either blocked or unblocked. Regulations restrict how many QS blocks a person may hold in an area and how many units of unblocked QS a person may hold if they hold any blocked QS. The intent of the block program was to ensure that small amounts of QS would always be available, facilitating entry for new participants and preventing excessive consolidation.

The block program has been amended on several occasions to address the program being overly constraining on IFQ participants. At the onset of the IFQ Program, a person who did not hold any unblocked QS could hold up to two QS blocks for an IFQ area. A person who held unblocked QS could hold only one QS block for an area. Small QS blocks could be “swept up” into larger blocks. At the implementation of the IFQ Program, QS blocks resulting in less than 1,000 pounds of IFQ for halibut or 3,000 pounds of IFQ for sablefish could be combined as long as they did not exceed 1,000 pounds for halibut or 3,000 pounds for sablefish. In 1996, these sweep-up levels were raised from 1,000 to 3,000 pounds for halibut and from 3,000 to 5,000 pounds for sablefish in order to provide for economically fishable amounts of IFQ for small QS holders and to facilitate entry for new participants into the IFQ fisheries. The block program was amended again in 2007 with three provisions that apply only to the halibut IFQ fishery: 1) allowing a QS holder to hold three blocks rather than two; 2) dividing halibut blocks in Areas 3B and 4A that yield more than 20,000 pounds based on the 2004 harvest figures into a block of 20,000 pounds and the remainder unblocked; and 3) increasing the halibut sweep-up levels in Area 2C and 3A to 5,000 pounds. Table 1.2-5 summarizes the current (2015) QS block limits for the halibut and sablefish IFQ fisheries.

Table 1.2-5 QS block limits

Fishery	If you hold:	Then you may purchase (up to the QS use cap limits)
Halibut	Unblocked QS	More unblocked QS or 1 QS block
	Unblocked QS and 1 block	Unblocked QS only
	1 block	2 additional blocks
	2 blocks	1 additional block
	3 blocks	To purchase additional QS, you would need to sell one or more blocks
Sablefish	Unblocked QS	More unblocked QS or 1 QS block
	Unblocked QS and 1 block	Unblocked QS only
	1 block	1 additional block
	2 blocks	To purchase additional QS, you would need to sell one or more blocks

Table note: Current as of November 2015

1.2.4.5.4 QS use and vessel IFQ caps

The IFQ Program includes QS use and vessel IFQ caps intended to prevent excessive consolidation of harvesting privileges. QS and vessel IFQ caps are area specific. QS use caps limit the amount of QS that a person may hold individually or collectively (i.e. through their ownership interests in a quota holding entity). Vessel IFQ caps limit the percentage of the TAC that may be landed on a vessel in a given season. The only exception to these caps is, that if a shareholder was initially allocated more than the amount of the QS use cap, that shareholder can continue to hold that amount above the cap; however, they are not permitted to acquire more quota greater than the cap. In addition, an individual that was 'grandfathered in' with QS holdings above the QS use cap may harvest this amount on one vessel, even if this amount exceeds the vessel IFQ cap. However, two or more IFQ permit holders may not catch and retain their IFQs with one vessel in excess of these limitations.

Initially QS use caps were expressed as a percentage of the QS pool. In 1997 for the halibut IFQ fishery and in 2002 for the sablefish IFQ fishery, the QS use caps were amended to be expressed as constant QS units rather than as a percentage of the QS pool to ensure a QS holder was not bumped over use cap due to changes in the overall QS pool. The relevant QS pools for calculating the use caps for both halibut and sablefish are the 1996 QS pools. Table 1.2-6 summarizes the current (2015) QS use and vessel IFQ caps in the halibut and sablefish IFQ fisheries.

Table 1.2-6 QS use and vessel IFQ caps

QS use caps		
Fishery	**Area of holdings**	**QS use cap**
Halibut	2C only	599,799 QS units
	2C, 3A, and 3B combined	1,502,823 QS units
	All of Area 4	495,044 QS units
Sablefish	Southeast Outside District only	688,485 QS units
	All sablefish areas combined	3,229,721 QS units
Vessel IFQ caps		
Fishery	**Area of holdings**	**Vessel use cap**
Halibut	Area 2C	1% of 2C halibut IFQ TAC
	All halibut areas combined	0.5% of all halibut IFQ TAC
Sablefish	Southeast Outside District only	1% of SE sablefish IFQ TAC
	All sablefish areas combined	1% of all sablefish IFQ TAC

Table note: Current as of November 2015

1.2.5 Consideration of allocation to communities in the IFQ Program

During development of the IFQ Program, the Council considered a number of different options for allocations of fixed gear halibut and sablefish to communities or entities representing communities. The following section describes the information available in NMFS and Council written records about the options the Council considered and its eventual decision to allocate a portion of fixed gear halibut and sablefish quotas to communities in the CDQ Program.

For many years during the development of the IFQ Program, the limited access proposals for halibut and fixed gear sablefish were considered separately by the Council and on slightly different schedules. Although initial proposals for limited access in the halibut fisheries were made earlier than proposals for limited access in the sablefish fisheries, the Council initially developed alternatives for limited access in the fixed gear sablefish fisheries at a faster pace. Therefore, references to the development of alternatives for allocations to communities often occurred first in the Council's discussion of management of the fixed gear sablefish fisheries, and were later incorporated into alternatives for limited access in the halibut fisheries. A detailed history of the sequence of events in the development of the IFQ Program is contained in the final rule (58 FR 59375; November 9, 1993).

The first record in NMFS's administrative files of a proposal to allocate a portion of a total allowable catch to communities is in a March 1988 proposal to the Council for "Community Development Quotas" from Paul Fuhs, Mayor of Unalaska/Dutch Harbor. This proposal addressed concerns that the benefits of rapid development of the domestic groundfish fisheries off Alaska would not be realized in the small communities located adjacent to these fisheries, and that any opportunity to participate in these fisheries in the future would be foreclosed by the limited access programs that were under discussion at the time. The CDQ proposal requested direct allocations to western Alaska communities of 10% of the total allowable catch for any Bering Sea groundfish included in a future limited access program.

The initial CDQ proposal and other later proposals focused on ways to include Western Alaska communities, which had little or no historic participation in the fisheries or harvesting or processing capacity due to the high capital investment needed to enter these fisheries. In addition, the CDQ proposal focused on the groundfish fisheries of the Bering Sea because of their proximity to the Western Alaska communities and the high value of the Bering Sea fisheries. The Council's Future of Groundfish Committee discussed the CDQ proposal in April 1988, where, among other issues, concern was expressed about the consistency of allocations to communities with MSA National Standard (NS) 4.[13] Concern about consistency with NS 4 would continue to be an important consideration for the Council in future discussions of alternatives for allocations to communities or entities representing communities.

Other communities expressed interest in the CDQ proposal. For example, in September 1988, the Southwest Municipal Conference submitted a resolution to the Council supporting "a Community Development Quota to Bering Sea and Gulf of Alaska communities for the purposes of ensuring community participation in the development of the Alaskan bottom fishery."[14]

In December 1988, the Council created a Sablefish Management Committee and requested that it develop recommendations for fixed gear sablefish management measures. The Council specifically requested that the committee develop options for "some kind of community development share." The Sablefish Management Committee's report to the Council in January 1989 provided recommendations for "decision points" for two limited access alternatives, an "IFQ Management System" and a "License Management System."[15] The recommendations for both limited access alternatives included options for consideration of "coastal communities" and reference to allocations of licenses or quota to individuals in a community, the community itself, a corporation, or a coastal development organization, and the potential need for an administrating body to "remove local conflicts and provide cohesion." These recommendations did not include options for specific communities or geographic areas.

Later analyses and Council discussions addressed the eligibility criteria for the communities, the amount and nature of the proposed allocations, and the entities to which the allocations would be made. Although many of the people supporting allocations to communities were Alaska Natives or represented communities comprised of predominantly Alaska Native residents, review of the historical documents thus far has not identified any requests that the Council consider direct allocations to Federally-recognized tribes.

The proposals for limited access alternatives for both the halibut and fixed gear sablefish fisheries were discussed by the Council at its April 1989 meeting. At that time, both fisheries included analysis of the same general alternatives for a license limitation program or individual transferable quotas, with options for allocations of licenses or QS to communities. In addition, at the same time the Council was

[13] National Standard 4 states that "[C]onservation and management measures shall not discriminate between residents of different States. If it becomes necessary to allocate or assign fishing privileges among various United States fishermen, such allocation shall be (A) fair and equitable to all such fishermen; (B) reasonably calculated to promote conservation; and (C) carried out in such manner that no particular individual, corporation, or other entity acquires an excessive share of such privileges."
[14] Southwest Alaska Municipal Conference Resolution 88-35.
[15] North Pacific Fishery Management Council. Minutes from the January 4, 1989, meeting of the Sablefish Management Committee, Agenda Items (C-5(a), C-5(c), and C-5(d) at the January 1989 Council meeting.

considering limited access in the halibut and fixed gear sablefish fisheries, it also was discussing limited access in all groundfish and crab fisheries. Written materials prepared for the April 1989 Council meeting referred to community allocations, noting discussion about the "difficulty … in trying to define coastal communities," and that "[O]ptions included limiting community development programs to just western Alaska, all small Alaskan communities, or all communities." A proposal developed by Larry Cotter in May 1989 referred to "the development needs of specific communities," and recommended distinguishing between communities "which have developed" ("Kodiak, Unalaska, Akutan, Sitka, etc."), and communities which have "not developed an industry."[16]

In June 1989, the allocation of pollock in the Bering Sea and Aleutian Islands management area between the inshore and offshore processing sectors began to emerge as a Council priority ("inshore/offshore"). Public comment and proposals to the Council included requests to analyze allocations of Bering Sea pollock to Western Alaska communities though a community development quota. Under a separate agenda item at the June 1989 meeting, the Council also discussed generally how to "treat coastal communities for purposes of analyzing limited access systems."[17] Council staff summarized discussions by the Council's Fishery Planning Committee that "community dependence on the resource was not restricted to local communities and that several communities in Washington and Oregon also are heavily dependent on the fishery resources in the EEZ off Alaska." Staff requested input on how to "treat the coastal community issue for purposes of the sablefish and halibut analyses?"

Meanwhile, the Council continued to further develop alternatives for management of the fixed gear halibut and sablefish fisheries. During the next few years, these alternatives continued to focus on "disadvantaged coastal communities" (communities that did not have developed harvesting or processing sectors) and, at times, considered allocations of fixed gear sablefish in the GOA and BSAI to disadvantaged communities ranging from Oregon, Washington, and Alaska. The approach to allocating a portion of groundfish total allowable catches and the halibut quotas to communities focused primarily on developing eligibility criteria for economically disadvantaged communities. In January 1990, the Council adopted a concept for the fixed gear sablefish analysis that included eligibility criteria such as location proximate to the sablefish fishing grounds, limited options for economic development other than fishing, traditional dependence on fishing, no previous development of fish harvesting and processing capabilities, and lack of sufficient funds for investment in harvesting or processing equipment. For a time, the Council considered allocations of fixed gear sablefish to any community that could meet these eligibility criteria. One of the important considerations in analyzing the impact of allocations to communities from Oregon, Washington, and throughout Alaska was the desire to not prematurely narrow the options geographically to ensure that the Council's eventual recommendations would be fair and equitable, not discriminatory, and would be consistent with NS 4.

In the early 1990's, the inshore/offshore allocation issue was advancing through the Council process faster than the halibut and sablefish IFQ Program. Therefore, the structure of the CDQ Program was developed first as a component of the BSAI pollock allocations. Ultimately, the Council first implemented allocations to communities through the inshore/offshore/CDQ allocations of pollock under Amendment 18 to the Fishery Management Plan for Groundfish of the BSAI management area. The Council's final action on Amendment 18 occurred at its June 1991 meeting and the final rule implementing the inshore/offshore/CDQ pollock allocations was published on June 3, 1992 (57 FR 23322). Communities eligible for the CDQ allocations of BSAI pollock were required to (1) be located

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[16] Cotter, Larry. Memorandum dated May 26, 1989, to Dick Tremaine of the North Pacific Fishery Management Council staff regarding "Open Access/Community Quota Concept."
[17] North Pacific Fishery Management Council. June 1989. Action memorandum for agenda C-6(e) regarding "Coastal communities under limited access."

within 50 nautical miles from the Bering Sea coast from the Bering Strait to the western most of the Aleutian Islands, or on an island in the Bering Sea; (2) be certified as a native village under the Alaska Native Claims Settlement Act; (3) be composed of residents that conducted more than half of their commercial or subsistence fishing in the BSAI: and (4) not have previously developed harvesting or processing capability sufficient to support substantial groundfish fisheries participation in the BSAI" (57 FR 54936; November 23, 1992).

During the same time period, the Council continued to evaluate options for allocations of fixed gear halibut and sablefish to communities. Throughout these discussions, the Council recognized the importance of the communities that already were dependent on the fisheries because residents of these communities participated in either the harvesting or processing sectors. They also recognized and distinguished the interests of communities located adjacent to the fisheries that did not have developed harvesting or processing sectors, and the need to balance the interests of all fishery participants and communities. For example, at its April 1990 meeting, one Council member requested that the analysis of limited access for the fixed gear sablefish fisheries consider the economic impact of proposed community allocations "on the part of the fleet which will be giving up income potential for these community development allocations." This discussion indicated the concern that allocations to communities would reduce allocations to commercial fishermen, some of whom were residents of those same communities.

At its August 1991 meeting, the Council voted to focus its consideration of community allocations of fixed gear sablefish to the communities eligible for the CDQ Program so that these allocations would work in conjunction with the program recently recommended for BSAI pollock. In early 1991, the Council "decided to consider similar alternative IFQ systems for the halibut fishery with the intent that a single IFQ Program would be applied to both" the halibut and fixed gear sablefish fisheries (58 FR 59375; November 9, 1993). From this point forward, consideration of allocations of fixed gear halibut and sablefish to disadvantaged communities was developed as a component of the CDQ Program (58 FR 59375; November 9, 1993).

1.2.6 The CQE Program

In first several years of the IFQ Program, there was evidence of the out-migration of QS out of small Gulf of Alaska coastal communities.[18,19,20] In response to concerns about the potential impacts from this out-migration, including loss of income, income diversification opportunities, and employment, the Council decided to revise the IFQ Program to allow specific communities to purchase sablefish and halibut QS through the CQE Program. The CQE Program was also intended as a way to promote QS ownership by individual residents, as individuals can lease annual IFQ from the CQE and gradually build up the capital and experience to purchase their own QS.

The CQE Program was implemented in 2004 to allow a distinct set of 42 coastal communities to purchase halibut catcher vessel QS in Areas 2C, 3A, and 3B and sablefish catcher vessel QS in the SE, WY, CG, and WG areas (69 FR 23681). Organizations representing communities, such as CQEs, were authorized to purchase Class A QS prior to the implementation of the CQE Program, since acquisition of Class A QS

[18] "Smaller Gulf of Alaska Communities: Alaska Peninsula Subgroup: Holdings of Limited Entry Permits, Sablefish Quota Shares, and Halibut Quota Shares Through 1997 and Data On Fishery Gross Earnings, CFEC Report 98-SPAKPEN-N Alaska Commercial Fisheries Entry Commission Juneau, Alaska 99801.
[19] "Access Restrictions in Alaska's Commercial Fisheries: Trends and Considerations." Prepared by DORY Associates for Alaska Marine Conservation Council and Gulf of Alaska Coastal Communities Coalition, January 2009, Kodiak, AK.
[20] Carothers, C., Lew, D. K., & Sepez, J. (2010). Fishing rights and small communities: Alaska halibut IFQ transfer patterns. *Ocean & Coastal Management 53*(9): 518-523.

by transfer is allowed for non-individual entities. Eligibility to participate in the CQE Program was limited to communities with fewer than 1,500 people, documented historical participation in the IFQ fisheries (at least one landing of halibut or sablefish), direct access to saltwater on the Gulf of Alaska coast, and no road access to a larger community. In order to acquire catcher vessel QS by transfer, eligible communities must form non-profit corporations called CQEs. In order to use their catcher vessel QS, the CQEs must annually lease the IFQ resulting from the shares to community residents.

Since 2004, there have been several changes to the CQE Program intended to provide greater fishing opportunities for coastal communities in Alaska. Four communities have been added to the CQE Program. The communities of Cold Bay, Game Creek, and Naukati Bay were added in 2013 to the Gulf of Alaska CQE Program. In 2014, a CQE Program was implemented for halibut IFQ regulatory Area 4B and the sablefish Aleutian Islands regulatory area, and the community of Adak formed a CQE. In 2013, the CQE Program was amended to allow CQEs to purchase Class D QS in Area 3A.

The CQE Program includes provisions on QS holdings and use that are both more and less strict than provisions for other IFQ Program participants. There are several constraints on which CQEs may purchase catcher vessel QS in which areas.[21] For example, only the Adak CQE may acquire by transfer catcher vessel QS in halibut Area 4B or in the Aleutian Islands area of the sablefish fishery. Only CQEs located within Area 3A may acquire Class D QS in that area. Only CQEs located within Area 2C may acquire catcher vessel QS in that area and a CQE in Area 2C may not acquire catcher vessel QS in Area 3B. For a comprehensive list of which CQEs may acquire which types of shares in what areas, see Table 21 in 50 CFR 679. Additionally, CQE holdings must not exceed a number of QS use caps: QS caps set by CQE and area or a specific QS use cap for any D class QS holdings.[22] Participants using CQE-derived IFQ must adhere to the same vessel IFQ cap limits established for the IFQ fishery. The initial CQE Program also outlined provisions for acquisition of blocked and unblocked QS. After the program began, block restrictions were found to be particularly constraining on the ability of a CQE to acquire QS. The program was amended in 2014 to relax some of the block provisions for the CQE Program.

The CQE Program has been expanded to allow CQEs to purchase access rights to fisheries other than halibut and sablefish IFQ. In 2010, the CQE Program was expanded to allow CQEs to receive charter halibut limited access permits at no cost. CQEs may also purchase a specified number of charter halibut limited access permits. And, since 2011 the CQEs have been able to receive non-trawl groundfish limited license permits (LLPs) endorsed for Pacific cod in the central or western Gulf of Alaska at no cost.

1.2.7 The Halibut Charter Sector

Over the last several years, there have been significant changes to the management of the halibut charter sector, which can have implications for IFQ participants. Those changes are summarized in the following section and potential impacts on IFQ participants are addressed in the Analytical Section, Sections 2.5 and 2.6.

From 1984 through 1997, the IPHC required charter vessels to have IPHC licenses. The Council has discussed the expansion of the charter halibut sector since 1993. The issue gained prominence when representatives from several coastal communities, in particular Sitka, expressed concerns about local depletion of the halibut resource and the potential reallocation of a greater percentage of the halibut

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[21] See GOA Amendment 96 RIR, available:
https://alaskafisheries.noaa.gov/sites/default/files/analyses/goa96ririrfa1014.pdf

[22] When implemented, the GOA CQE Program also contained a cumulative community use cap that limited the communities in a region as a whole from acquiring and using more than three percent of the Area 2C, 3A, or 3B halibut quota share in the first seven years of the program.

constant exploitation yield, from the commercial IFQ fishery to the charter fishery. A final rule implementing a guideline harvest level (GHL) for each Area 2C and Area 3A was promulgated by NMFS on August 3, 2003 (68 FR 47256). The GHLs represented pre-season specifications of acceptable annual harvests in the charter halibut fisheries in Areas 2C and 3A; however, it did not represent a 'hard cap' on charter halibut harvests.

Until 2007, both Area 2C and Area 3A angler harvest restrictions matched that off the unguided angler; i.e., two fish daily bag limit with no size restrictions. Between 2003 and 2007, the Area 3A only exceeded the GHL by 1% in 2005. However, between 2003 and 2007, the Area 2C charter sector exceeded the GHL three out of the four years. Beginning in 2007, following Council recommendations, the Secretary of Commerce, through NMFS designed and adopted new regulatory measures in Area 2C to limit charter halibut harvest to the Area 2C GHL, including a two fish bag limit and a size limits on one of the fish to be under 32 inches. These measures went into effect in 2007 in conjunction with a State of Alaska emergency order prohibiting retention of halibut by charter captains and crew. Between 2007 and 2010, despite a number of more restrictive management measures, Area 2C charter harvests remained over the GHL. In 2011, the IPHC believed Area 2C would likely exceed the GHL once more, with the potential to result in total harvest exceeding the total constant exploitation yield. Consequently, the IPHC recommended, and the Secretary of State, with the concurrence of the Secretary of Commerce approved, a daily bag limit for the Area 2C charter sector anglers of one fish with a maximum length of 37 inches. The 37-inch fish proved too restrictive and only 44% of the GHL was harvested in Area 2C in 2011. In 2012 and 2013, the Council and its advisory bodies evaluated and recommend a 'reverse slot' management measure (i.e., on fish below a certain length or above a certain length) to recommend to the IPHC, the Secretary of State, and the Secretary of Commerce. The recommendations were adopted and allowed for harvest closer to, but still considerably below the GHL.

In Area 3A, charter anglers continued to be managed by the same harvest restrictions as unguided anglers, i.e., a two-fish daily bag limit with no size restrictions until 2014. Between the implementation of the GHL (in 2003) through 2014, the GHL has dropped only once in 2012 and once in 2013. Throughout this period, Area 3A harvest remained under the GHL in every year, expect for a 1% overage in 2005 and a 10% overage in 2007.

In response to concerns that growth in the charter halibut fishery was resulting in overcrowding in productive halibut grounds and uncertainty in the prediction of harvest, the Council recommended, and the Secretary of Commerce adopted, a limited access program for Areas 2C and 3A. The charter halibut limited access program (CHLAP) was implemented in 2011, capping the number of charter businesses that could operate in Areas 2C and 3A to limit further expansion of the industry. The CHLAP established federal charter halibut permits (CHPs) issued to businesses based on historical and recent participation in the charter halibut fishery. The CHLAP is intended to provide stability for the charter halibut fishery.

Beginning in 2008, the Council recommended a catch sharing plan (CSP) for the charter and commercial halibut fisheries in Areas 2C and 3A, intended to provide a comprehensive management program for the charter halibut fisheries in these two areas. The CSP was fully implemented in 2014. The CSP replaced the GHL with a percentage allocation to the charter halibut fishery, calculated from the annual combined catch limit for the commercial and charter sectors and based on halibut abundance. The CSP also endorsed a public process by which the Council develops recommendations to the IPHC for charter angler management measures that are intended to limit harvest to the annual charter halibut fishery catch limit in each area.

The CSP also authorized limited annual leases of commercial IFQ for use in the charter fishery as guided angler fish (GAF). NMFS implemented the GAF program in 2014 with the CSP. The GAF Program was intended to provide flexibility for individual commercial and charter halibut fishery participants, by authorizing annual transfers of commercial halibut IFQ as GAF to CHP holders for harvest in the charter halibut fishery. GAF offer charter halibut permit holders in Areas 2C and 3A an opportunity to lease a limited amount of IFQ from commercial QS holders to provide charter anglers the opportunity to catch one (or one additional) fish of any size. Charter anglers may use GAF to harvest halibut up the limits in place for unguided sport anglers in that area. Any time a charter angler harvests a halibut that would be legal for an unguided angler to harvest, but not a charter angler, they would need to use a GAF to legally retain that halibut.

Some members of the halibut charter sector have put forward a proposal for a Recreational Quota Entity (RQE) to hold commercial halibut QS on behalf of guided recreational halibut anglers. The RQE would acquire commercial halibut QS only through compensating willing commercial shareholders for the transfers of their QS. The intent of this proposal is to allow for an opportunity for the charter halibut sector to reduce the restrictiveness of annual management measures for the charter sector as a whole, in Area 2C and Area 3A, by providing a market-based mechanism for the guided halibut recreational sector to supplement their annual allocations. This proposal is currently undergoing the Council's regular review process for proposals for regulatory amendments.

References

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2. ANALYTICAL SECTION

Section 2 of the IFQ Program Review is the evaluation of the impacts of the IFQ Program with respect to its 10 original policy objectives, entry opportunities, and other issues. Because there is substantial overlap between many of these objectives, they have been aggregated into single sections in the table of contents, with sub-sections discussing specific issues as summarized in the paragraphs below each section heading.

Specifically, Section 2.1 highlights some of the overarching trends in the IFQ fisheries since IFQ implementation with respect to season duration, TACs, and revenues as well as summarizing some influences on IFQ participants external to the IFQ management regime itself. Sections 2.2 through 2.9 evaluate the program with respect to its 10 original policy objectives and providing entry opportunities (Section 2.6). Sections 2.10 through 2.12 examine other issues that affect IFQ participants but do not immediately overlap with a programmatic objective and other areas of interest or concern that have been raised by NMFS, the Council, or public comment with respect to the management of the IFQ Program.

2.1 OVERARCHING TRENDS AND EXTERNAL IMPACTS ON IFQ PARTICIPANTS

Prior to presenting the analytical section of the review, addressing the impacts of the IFQ Program with respect to its 10 original objectives, this section is intended to provide some overall context to examining IFQ management impacts. This section discusses overarching trends in season durations, TACs, and revenues in the IFQ fisheries and changes in fisheries external to the IFQ management regime itself, which could affect IFQ participants. This section also provides a discussion of external factors such as the dynamic state of other fishing opportunities in Alaska during the same time period, and some of the changes in operational costs that have been anecdotally reported. Although these overall trends and any resultant impacts from these changes are woven throughout the IFQ Program Review, they are highlighted here as some of the most important changes since IFQ implementation that have affected how fishermen participate in the IFQ fisheries.

2.1.1 Changes in season duration, TAC, and revenues

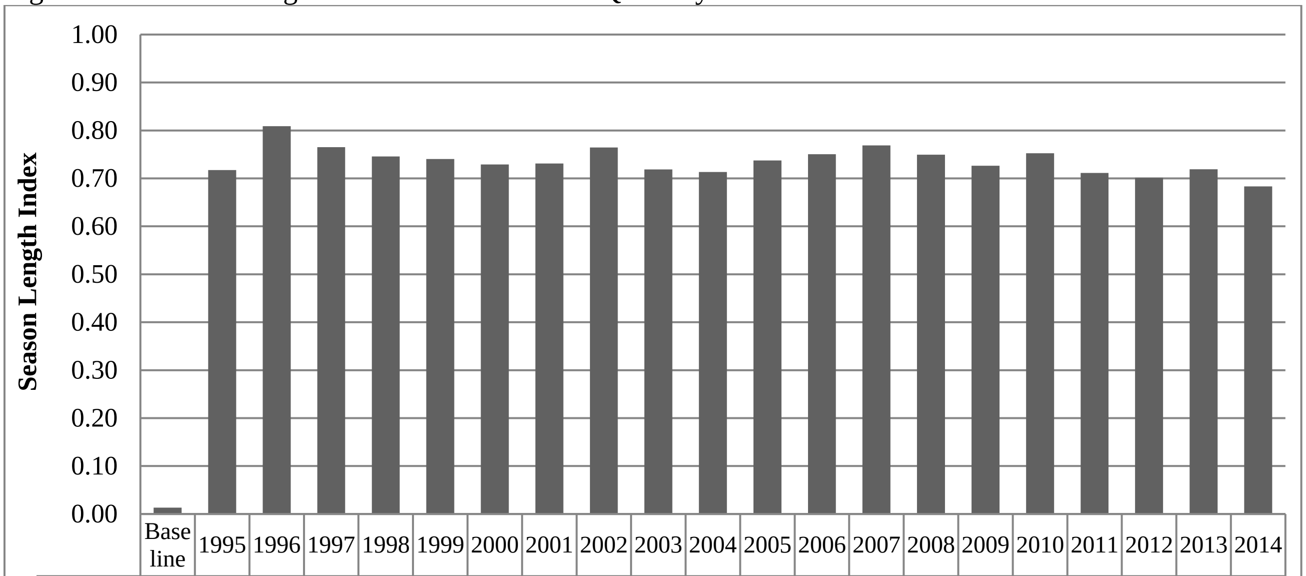
NOAA’s Office of Science and Technology has created standardized performance indicators for federally-managed catch share programs across the country.[23] These indicators use catch and landings, effort, revenue, accumulation limits, and cost recovery as standard performance measures. AFSC has generated these indicators for the North Pacific catch share fisheries. This section incorporates several of these performance indicators to demonstrate changes in the IFQ fisheries since the implementation of the IFQ Program. As in all other sections of the IFQ Program Review, the baseline used for the evaluation is the average of the three years preceding the institution of the IFQ Program (1992 through 1994).

One of the greatest impacts of the IFQ Program has been the complete elimination of the derby-style fishery that previously existed, especially for halibut, and the transition to long seasons. The prolongation of the fishing season was made possible by the allocation of exclusive harvesting privileges through QS. In turn, the longer fishing seasons have allowed for better handling of fish, a change in product form from frozen to fresh halibut, the removal of unused fishing gear from grounds, and likely fewer IFQ gear conflicts. Figure 2.1-1 and Figure 1.2-2 demonstrate the prolongation of the halibut and sablefish fishing seasons, respectively, since IFQ implementation. The season length index (SLI) represents the proportion of days when fishing actually occurred compared to the maximum number of days when fishing was allowed. For halibut, during the baseline period the SLI was 0.01, under the IFQ Program the SLI has

[23] See: https://www.st.nmfs.noaa.gov/Assets/economics/catch-shares/documents/Catch_Shares_Report_FINAL.pdf

ranged from 0.68 to 0.75. The SLI was 0.07 for sablefish during the baseline period, and has ranged from 0.93 to 0.98 since then.

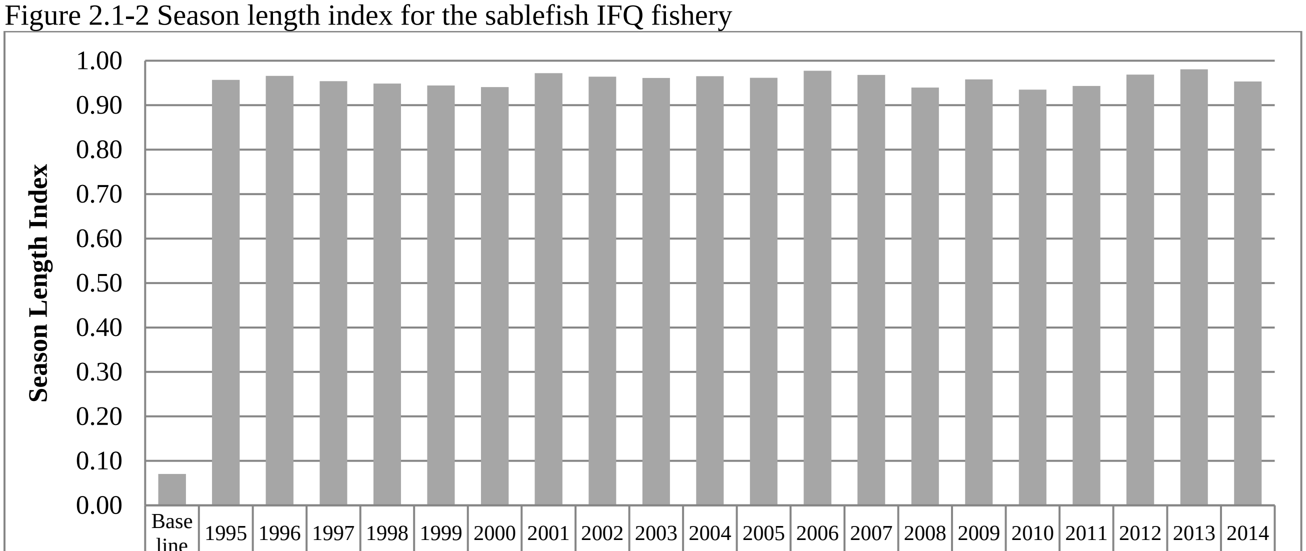
Figure 2.1-1 Season length index for the halibut IFQ fishery



	Base line	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Halibut	0.01	0.72	0.81	0.77	0.75	0.74	0.73	0.73	0.76	0.72	0.71	0.74	0.75	0.77	0.75	0.73	0.75	0.71	0.70	0.72	0.68

Source: AFSC

Figure 2.1-2 Season length index for the sablefish IFQ fishery



	Base line	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Sablefish	0.07	0.96	0.97	0.95	0.95	0.94	0.94	0.97	0.96	0.96	0.97	0.96	0.98	0.97	0.94	0.96	0.93	0.94	0.97	0.98	0.95

Source: AFSC

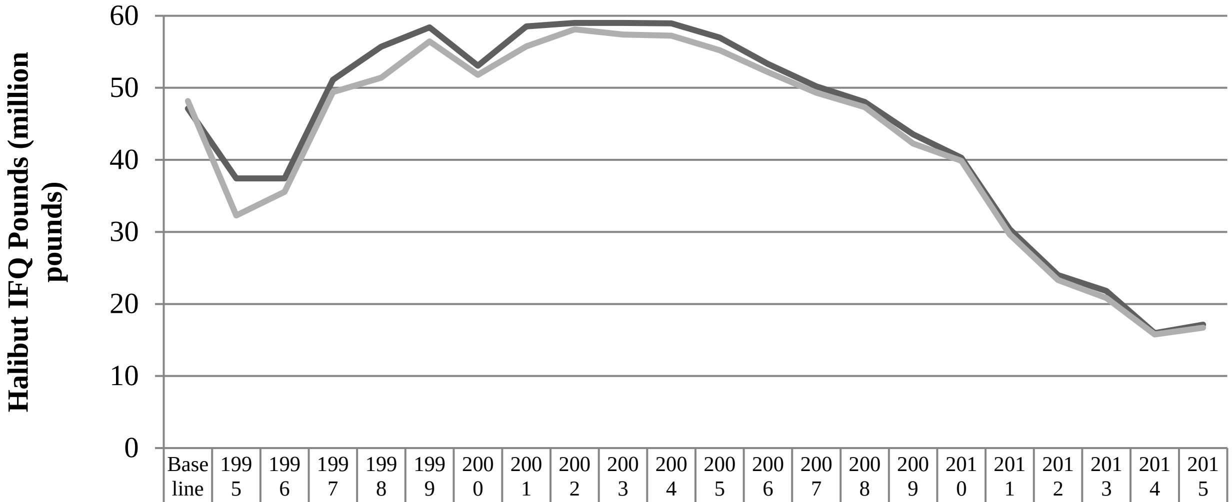
Perhaps one of the most significant impacts on IFQ participants has been the changing TACs in the halibut and sablefish fisheries since IFQ implementation (see Figure 2.1-3 and Figure 2.1-4). Since biologists have not found any direct linkages between overall stock abundance and the IFQ Program (see Section 2.9), changes in the TACs are understood to be external to the IFQ Program itself. The impacts of TAC changes are woven throughout the relevant sections of this review; this section provides a brief summary of how decreasing TACs may be impacting IFQ participants.

Whereas, the TACs in the halibut fishery increased in the first several years following IFQ implementation, they decreased in the sablefish fishery. Increasing TACs in the halibut fishery may have mitigated the consolidation that would have otherwise occurred by allowing for greater earnings expectations and incentivizing shareholders to remain in the fishery and others to enter. For both IFQ fisheries, the TACs began to decline in 2004. Over the last two years the halibut TACs have rebounded slightly whereas the sablefish TACs have continued to decline.

Decreasing TACs may change how QS holders and hired masters participate in the IFQ fisheries. For example, since decreasing TACs result in QS holders having fewer IFQ pounds to harvest, they may choose to consolidate QS onto fewer vessels by coordinating with other QS holders to fish on one vessel, selling their QS, leasing in IFQ or acting as a hired master for eligible shareholders, or purchasing additional QS to increase their holdings. Hired masters with fewer IFQ pounds on their vessel may also choose to lease in IFQ, bring on more IFQ for harvest as a hired master, or purchase QS. The aggregation of QS holders onto fewer vessels could also eliminate some crew jobs, assuming the QS holder participates in the fishing activity, as discussed in Section 2.4.1.

Figure 2.1-3 and Figure 2.1-4 also show the halibut and sablefish landings from the baseline period through 2015. The utilization of the halibut and sablefish TACs, or the percentages of the TACs that were harvested, have decreased since IFQ implementation. It should be noted, however, that the halibut TAC was actually being overharvested during the baseline period and that the IFQ Program has effectively maintained harvests within the TACs. Furthermore, after the first year of the IFQ Program, wherein participants were likely adjusting to the new management regime and consolidating QS holdings, the utilization of the halibut TAC has been in the upper 90% for halibut. This is likely indicative of fishermen giving themselves a margin of error to not over-harvest their annual IFQ allocations. (Section 2.3.4 discusses under and over harvest of annual IFQ allocations in the IFQ fisheries.) Since IFQ implementation, the utilization of the sablefish TACs has been lower than the utilization of the halibut TACs and in the lower 90%. This is likely due to continued under-harvest of the TACs in the sablefish Bering Sea and Aleutian Islands regulatory areas, wherein the opportunity costs of harvest in remote fishing areas may be high. For both IFQ fisheries, under-harvest of the TACs may also be due to QS holders having uneconomically fishable amounts of IFQ due to small initial QS allocations, exacerbated by declining catch limits, and other opportunity costs of participating in the IFQ fisheries (foregone earnings from participating in other fisheries or other types of employment).

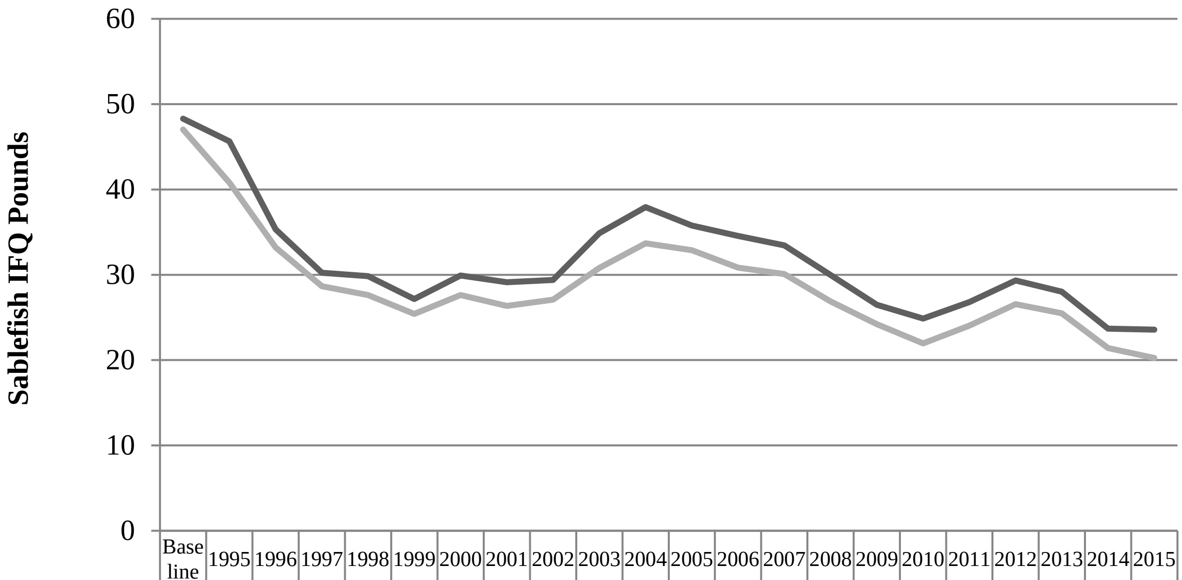
Figure 2.1-3 Annual halibut TACs and landings



	Base line	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TAC	47.1	37.4	37.4	51.1	55.7	58.4	53.1	58.5	59	59	58.9	57	53.3	50.2	48	43.5	40.3	30.4	24	21.8	16	17.1
Landings	48.2	32.3	35.6	49.4	51.4	56.4	51.8	55.8	58.1	57.4	57.2	55.2	52.2	49.3	47.3	42.3	39.9	29.6	23.3	20.8	15.8	16.7

Source: AFSC

Figure 2.1-4 Annual sablefish TACs and landings



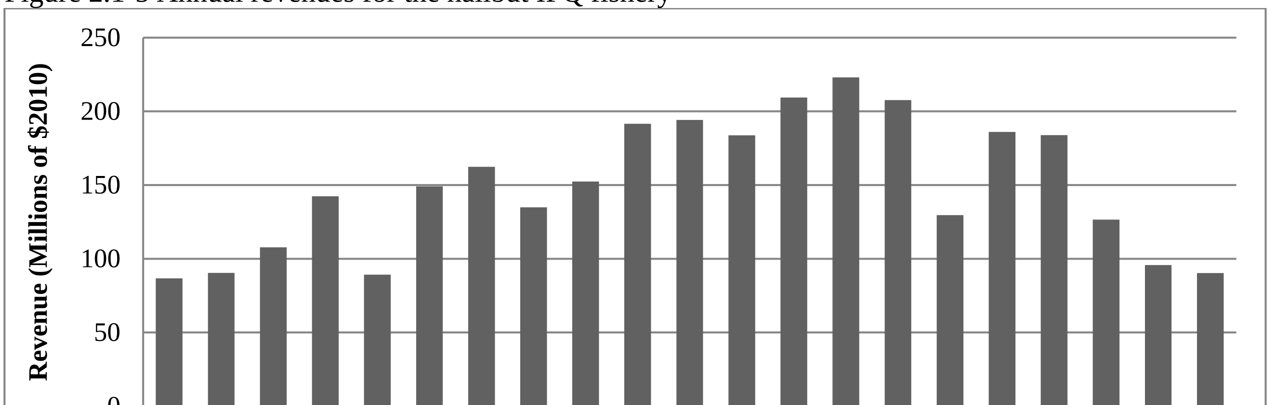
	Base line	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TAC	48.3	45.6	35.3	30.2	29.8	27.2	29.9	29.1	29.4	34.9	37.9	35.8	34.5	33.5	30	26.5	24.9	26.8	29.3	28	23.7	23.6
Landings	47	40.8	33.2	28.7	27.6	25.4	27.6	26.4	27.1	30.8	33.7	32.9	30.8	30.1	26.9	24.2	22	24	26.6	25.5	21.4	20.2

Source: AFSC

For the sablefish fishery decreasing TACs also contributed to declining revenues after the several years following program implementation (Figure 2.1-6). Total revenue in the sablefish fishery, was lower than the baseline period from 2007 until 2011. In the halibut fishery, revenues increased until the late 2000s despite TAC declines beginning in 2004 (Figure 2.1-5). Invariably these trends contributed to much more dramatic increases in the numbers of shareholders per vessel in the first decade following IFQ implementation in the sablefish than in the halibut IFQ fishery (see Section 2.4.1) as shareholders chose to consolidate QS onto fewer vessels to make economically worthwhile fishing trips. (Consolidation trends are discussed in more detail in Section 2.3.6).

Despite TAC declines in both IFQ fisheries beginning in 2004, revenues remained stable or even rose in some years for both fisheries. This is indicative of rising ex-vessel prices largely making up for TAC decreases. However, in the last several years, revenues have begun to decrease in both fisheries as a result of declining ex-vessel prices. Ex-vessel prices peaked for both fisheries in 2011 and have decreased since then.

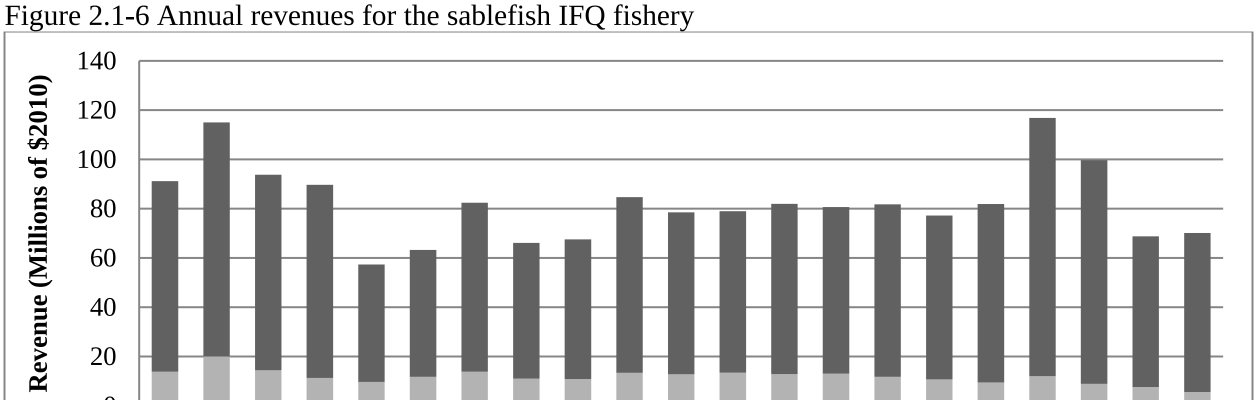
Figure 2.1-5 Annual revenues for the halibut IFQ fishery



	Base line	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Halibut	87	90	108	142	89	149	162	135	152	192	194	184	209	223	208	130	186	184	127	96	90

Source: AFSC

Figure 2.1-6 Annual revenues for the sablefish IFQ fishery



	Base line	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
CV	77.3	95.0	79.4	78.4	47.6	51.5	68.5	55.1	56.7	71.3	65.7	65.6	69.1	67.6	70.0	66.5	72.4	104.	90.8	61.2	64.6
CP	13.9	20.0	14.4	11.3	9.7	11.8	13.9	11.0	10.9	13.4	12.8	13.4	12.9	13.1	11.8	10.7	9.5	12.0	8.9	7.6	5.6

Source: AFSC

2.1.2 Impacts on IFQ fishermen external to the IFQ Program

In the years since the implementation of the IFQ Program, perhaps some of the most important influences on IFQ participants have been external to the management framework of the IFQ Program itself. It is important to keep this broader context in mind when reviewing the IFQ Program, as changes in the IFQ fisheries may impact fishermen more or less depending on changes in these other fisheries management regimes.

With the increasing implementation of catch share and limited-entry programs across Alaska's federal and State fisheries, IFQ fishermen are now more limited in the fisheries that they participate. These changes have potentially made IFQ fishermen more vulnerable to inter-annual variability in revenues from the IFQ fisheries or programmatic changes that make those revenues less stable. For example, prior to IFQ management in response to low earnings in the halibut fishery fishermen could potentially participate in the federal or some State sablefish fishery, some State crab or shrimp fisheries. However, since IFQ implementation fishermen need sablefish QS to be able to harvest sablefish in federal waters and limited-entry permits have been instituted for additional State fisheries, including numerous crab, shrimp, and dive fisheries. Furthermore, the (real) prices of some limited entry permits in other State fisheries like the salmon and the sablefish Southeast inside waters permits have increased (Gho and Farrington, 2016). Researchers have also documented an out-migration of fishing permits from rural communities local to the fisheries, as increasing profitability of the fisheries incentivizes entry from non-rural and non-Alaska residents (Robards and Greenberg, 2007; Knapp, 2011; Gho and Farrington, 2016).

Other alternative fisheries for IFQ fishermen, like herring, have had decreasing harvests and ex-vessel values since the mid-1990s (ADF&G, 2016) and several State crab fisheries have closed due to low abundance. Thus alternative fishing opportunities have become much more limited over the last 20 years.

As Kasperski and Holland (2013) note, diversification of fishing portfolios has become much more difficult to achieve for fishermen as a result of the institution of limited entry and catch share programs, even though such diversification is important for reducing risk from inter-annual variability in the health of any one species and ex-vessel prices. IFQ fishermen have, therefore, potentially become more reliant on their IFQ fishing income over the course of the IFQ Program, even as revenues from both IFQ fisheries have decreased over the last several years (see Section 2.1.3 below for an extensive discussion of diversification). Decreasing options for diversification may also be limiting opportunities for new entry into the IFQ fisheries as income diversification has become more important for qualifying for loans to purchase QS and as fishermen become less able to generate revenue from other fisheries that they can use to buy halibut or sablefish QS (see Section 2.6 for more information on entry opportunities).

Anecdotally, IFQ fishermen have also reported that increasing regulations have led to rising operating costs. Over the 20 years since IFQ implementation, the USCG and the EPA have implemented increasing regulations on fishing operations, leading to increasing costs of maintaining fishing vessels and gear. IFQ fishermen state that these regulations have also increased the time that they spend on filing paperwork and ensuring that they are in compliance. Coupled with declining revenues, uncertainty about the status of both IFQ fishery resources, and fewer options for buffering years of poor revenues from the IFQ fisheries with income from other fisheries, these rising costs have likely made participation in the IFQ fisheries more difficult and entry more tenuous.

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2.2 INITIAL ALLOCATION PROCESS

This section addresses Objectives 2 and 3 of the original EIS for the IFQ Program.

- Objective 2: Link the initial quota share allocations to recent dependence on the halibut and sablefish fixed gear fisheries
- Objective 3: Broadly distribute quota share to prevent excessively large quota share from being given to some persons.

In developing the IFQ Program and conferring QS, the Council intended to link the initial allocations to recent dependence on the halibut and sablefish fixed gear fisheries (Objective 2) and to broadly distribute QS to prevent excessively large QS amounts from being allocated to some persons (Objective 3). At the same time, the Council sought to minimize the number of potential initial QS recipients so as to address overcapacity in the fisheries. The mechanisms by which initial allocations were administered in the IFQ Program are discussed under Section 1.2. This section focuses on the underlying rationale for these allocations with respect to Objectives 2 and 3. Furthermore, this section discusses the potential implications of these allocation decisions, especially with respect to immediate fleet consolidation and regulatory changes that followed implementation of the program.

Many of the impacts of the IFQ Program can be directly attributed to initial allocation decisions, as a result of the fact that some participants are necessarily excluded from receiving an allocation (e.g., crewmembers, processors, future generations of fishermen). Although these impacts flow directly from initial allocations, they are discussed thoroughly under other sections of the review (e.g., Sections 2.3.2, 2.4.1, 2.4.2, 2.6). This section focuses only on the impacts of broadly distributed initial QS allocations.

The Council limited initial QS recipients to those who had owned or leased a vessel with legal fixed gear halibut or sablefish landings from 1988 to 1990. By limiting the eligibility to three years, the Council limited the pool of potential participants; however, this meant that QS were allocated to a larger number of participants than would have been fishing in any one year. The 1990 cut-off also allowed the Council to distribute allocations to recent participants, while not exacerbating the race for fish during development of the program. Without the 1990 cut-off, the anticipation of an IFQ Program could have incentivized participants to increase their fishing activity and for new participants to enter the IFQ fisheries with an intent to establish a history of landings that would translate to QS allocations under the program.

At the same time, the Council provided that QS allocations would be based on the sum of the best five years of landings as a portion of total landings between 1984 to 1990 for halibut and 1985 to 1990 for sablefish. This resulted in QS allocations that were broadly distributed to recent participants in the halibut and sablefish fixed-gear fisheries, but these allocations resulted in small amounts of IFQ-equivalent pounds per QS unit for most QS recipients.

Data

The data utilized for this section was provided by the NMFS RAM Division. This data was previously published in the NMFS Transfer Reports (NMFS 2015a, 2015b).

Table 2.2-1 shows the distribution of QS holders by the amount of initially allocated QS as a percentage of total QS. This table shows that a large portion of shareholders in both IFQ fisheries received initial allocations that were less than 0.25% of the total QS units in a given area (92% in the halibut fishery and 76% in the sablefish fishery). In the halibut fishery, the spread of QS over a larger number of participants than would have participated in any given year likely exacerbated what would have already been small allocations to fishermen with relatively limited history. In many parts of Alaska, halibut are located close to shore and are accessible to small vessels, so that this fishery has historically had many more participants than the sablefish fishery. This fact, coupled with program criteria to use the best five years of landings for initial allocations, provided some fishermen with QS allocations that did not yield enough IFQ pounds to make economically worthwhile fishing trips. In a survey of halibut IFQ participants immediately following the implementation of the IFQ Program, Knapp (1997) found that the most frequently mentioned negative effect of the IFQ Program was “QS allocation too small/uneconomic.” Unlike the halibut fishery, the sablefish fishery does not have a large contingent of small vessels. Sablefish inhabit more offshore, deeper waters and therefore participation in the fishery necessitates larger vessels. There were fewer sablefish fishermen than halibut fishermen with landing history at the time of IFQ implementation, and the QS allocations were spread over fewer participants.

Table 2.2-1 Distribution of QS holders by amount of initially allocated QS

Percent of Area QS	Number of Initial Halibut QS Holders	Percent of Halibut QS holders by percentage of Area QS held	Number of Initial Sablefish QS Holders	Percent of sablefish QS holders by percentage of Area QS held
Less than 0.25%	6,860	92%	1,766	76%
0.25% to less than 0.5%	309	4%	259	11%
0.5% to less than 1.0%	142	2%	170	7%
1.0% to less than 2.0%	83	1%	90	4%
2.0% to less than 3.0%	25	0.3%	20	1%
Greater than 3.0%	34	0.5%	22	1%

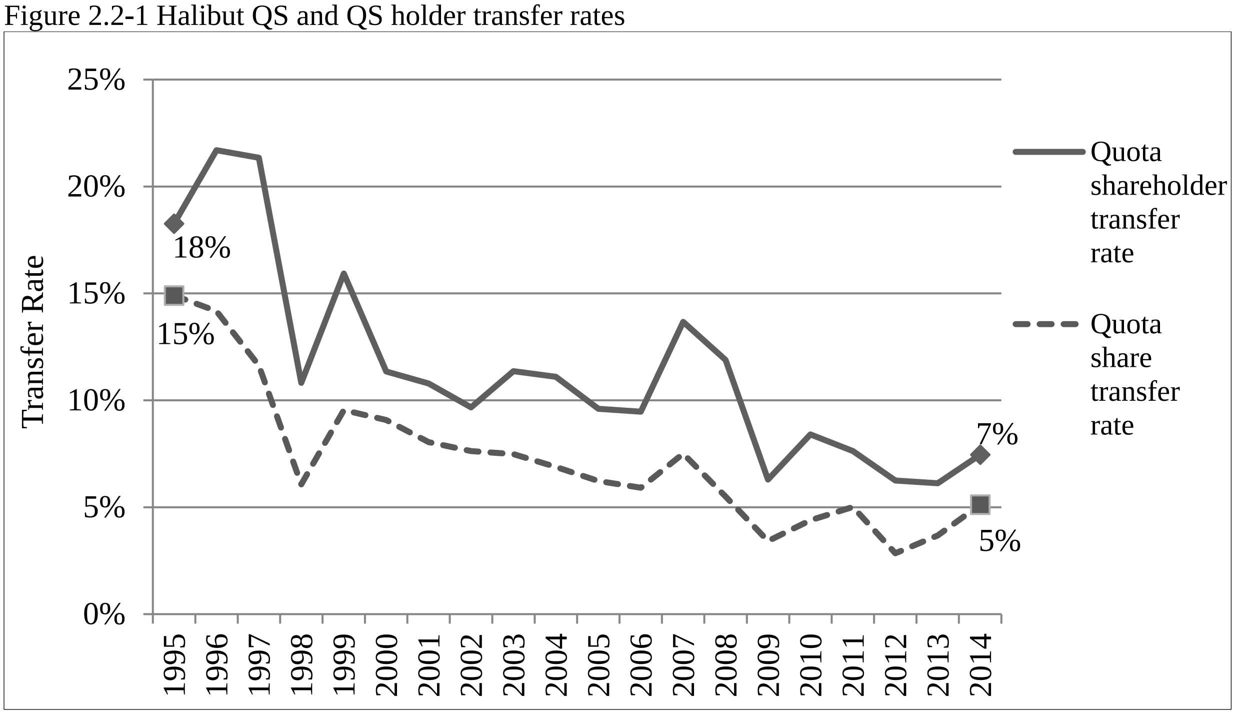
Source: NMFS 2015a, 2015b

In response to concerns over IFQ allocations that were too small to fish economically, the Council decided to lift some of the restrictions on consolidation immediately following implementation of the IFQ

Program. In 1996, the Council opted to allow IFQ fishermen to "fish down" QS, or fish IFQ derived from larger class QS on smaller class vessels (e.g., IFQ from Class B QS on Class C and D vessels). In Area 2C of the halibut fishery and the Southeast Outside district of the sablefish fishery fishing down was not allowed until 2007, except for blocks of 5,000 pounds or less, in order to prevent excessive consolidation of QS among owners of smaller vessels. The Council did not authorize fishermen in these areas to fish down immediately following program implementation because the fleets in these areas were composed of a larger portion of smaller vessels relative to other areas. The 1996 fish down amendment provided for increased flexibility in moving QS across vessel classes and, thereby, consolidating QS in order to yield IFQ in amounts that could be fished economically by more participants. In 1996, the Council also raised the sweep-up levels from 1,000 to 3,000 pounds for halibut and from 3,000 to 5,000 pounds for sablefish. This was intended to increase the availability of fishable amounts of IFQ for various participants (small shareholders, new entrants, etc.).

Figure 2.2-1 and Figure 2.2-2 show the QS and shareholder transfer rates for the halibut and sablefish IFQ fisheries. The QS transfer rates are the ratios of QS transferred to total QS held at the end of the year, expressed as a percentage. The QS *holder* transfer rate is the ratio of QS transferors to total QS holders at the end of the year, expressed as a percentage. These data reflect total units transferred even if a particular unit is transferred more than once. The amount of QS in each of the two IFQ fisheries was determined at the onset of the IFQ Program and has been increased only minimally (by 1.4% and 3.1% in the halibut and sablefish fisheries, respectively) in response to administrative changes.

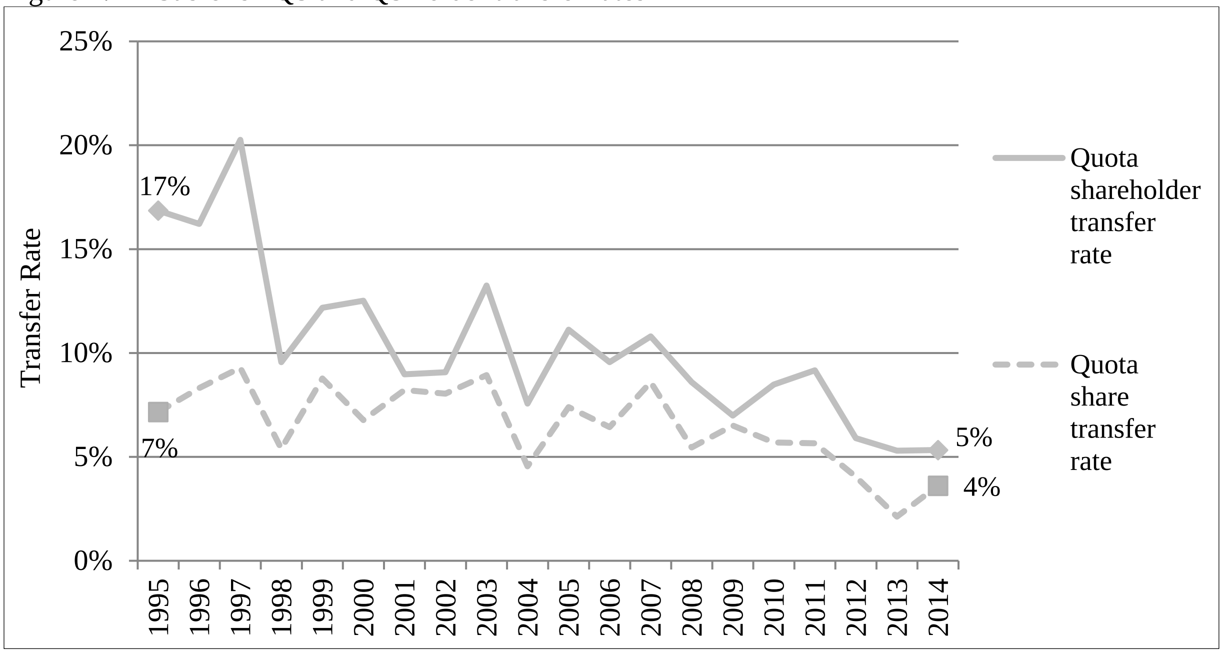
Figure 2.2-1 Halibut QS and QS holder transfer rates



Source: NMFS 2015a

Figure 2.2-1 shows that the QS holder transfer rates in the halibut fishery peaked in the first several years following IFQ implementation. Given the broad distribution of small amounts of QS, this is aligned with theoretical expectations about immediate consolidation following IFQ implementation. Furthermore, the spike in the QS holder transfer rates in 1996 and 1997 may have been in response to the Council relaxing some of the constraints on QS consolidation through the fish down and sweep-up provisions. The trend lines for the QS holder and QS transfer rates are generally aligned with each other over the 20 years of the program. A broad distribution of small amounts of QS likely contributed to the QS transfer rate in the halibut fishery being closely aligned with the QS holder transfer rate. There was another spike in QS transfer rates in 2007, which may have been in response to the Council passing a motion in 2006 to revoke QS that were initially issued to persons who had not participated in the IFQ fisheries since initial issuance, by either fishing their IFQ or engaging in transfers.

Figure 2.2-2 Sablefish QS and QS holder transfer rates



Source: NMFS 2015b

Figure 2.2-2 shows that similar to the halibut fishery, the QS holder transfer rate for the sablefish fishery peaked in the first several years after IFQ implementation. Furthermore, the trend lines for the QS holder and QS transfer rates are generally aligned with each other over the 20 years of the program. However, the QS transfer rate was comparatively lower at the onset of the program, and did not have an obvious peak. Recall that the sablefish IFQ fishermen were facing a different set of conditions at the onset of the IFQ Program than the halibut IFQ fishermen, since there were fewer participants in the sablefish fishery and each QS unit was worth comparatively more IFQ pounds. Therefore, there were likely fewer economic incentives for immediate consolidation following IFQ implementation.

Summary

The way in which initial allocations were determined under the IFQ Program – using the best several years of landings and a three-year qualifying period – allowed the Council to more broadly distribute the benefits of the program to a greater number of participants. However, this broad distribution also resulted in many participants, especially in the halibut IFQ fleet, receiving quantities of QS that yielded economically unfishable amounts of IFQ. The history of participation particularly contributed to this outcome in the halibut IFQ fishery. The halibut fishery had been relatively accessible to small boat fishermen and was utilized by many fishermen to generate extra revenue in lean years or between other fisheries. As a result of the broad distribution of QS among a relatively large number of participants, the Council decided to reduce some of the regulatory constraints on consolidation immediately following IFQ implementation. This reduction in constraints contributed to a substantial amount of consolidation within the halibut IFQ fleet in the first several years after program implementation. The sablefish fishery had never been as readily accessible as the halibut fishery and included just over 5,000 fewer QS holders at the outset. Therefore, consolidation following IFQ implementation was much lower in the sablefish fishery.

Appendix A2.2

Tables A2.2.1 through A2.2.4 show the QS and QS holder transfer rates by IFQ regulatory area for both IFQ fisheries. The data reveal considerable variability in the transfer rates across areas and years. Because Areas 2C and 3A in the halibut fishery and the SE and CG areas in the sablefish fishery have the largest number of QS holders and amounts of QS, they drive the trends in the fisheries.

Table A2.2.2. QS transfer rate by halibut IFQ regulatory area from 1995 to 2014.

	2C	3A	3B	4A	4B	4C	4D	4E
1995	18%	16%	14%	12%	5%	3%	2%	0%
1996	15%	14%	14%	14%	5%	15%	9%	0%
1997	10%	10%	13%	24%	19%	10%	24%	1%
1998	6%	6%	6%	6%	6%	5%	7%	0%
1999	10%	9%	12%	9%	12%	6%	8%	0%
2000	11%	8%	7%	20%	21%	6%	15%	0%
2001	8%	7%	8%	11%	14%	18%	17%	0%
2002	8%	7%	7%	12%	7%	0%	20%	0%
2003	8%	6%	9%	10%	15%	12%	12%	0%
2004	7%	6%	6%	15%	14%	9%	7%	0%
2005	8%	4%	8%	19%	8%	11%	2%	0%
2006	7%	5%	7%	13%	6%	1%	0%	0%
2007	7%	6%	7%	25%	13%	10%	10%	0%
2008	7%	5%	4%	12%	12%	12%	1%	0%
2009	4%	3%	2%	4%	13%	14%	1%	0%
2010	7%	3%	3%	10%	6%	9%	8%	0%
2011	2%	5%	5%	9%	15%	14%	19%	0%
2012	4%	2%	3%	7%	7%	1%	2%	0%
2013	5%	3%	5%	4%	4%	7%	6%	0%
2014	5%	5%	6%	3%	13%	7%	3%	0%

Source: NMFS 2015a

Table A2.2.3. QS holder transfer rate by sablefish IFQ regulatory area from 1995 to 2014.

	SE	WY	CG	WG	BS	AI
1995	21%	16%	17%	12%	9%	11%
1996	20%	19%	17%	10%	6%	7%
1997	19%	24%	23%	22%	8%	14%
1998	10%	9%	8%	13%	5%	14%
1999	11%	16%	12%	10%	10%	13%
2000	10%	13%	12%	15%	17%	18%
2001	7%	6%	8%	16%	11%	16%
2002	10%	8%	8%	9%	12%	9%
2003	14%	11%	14%	11%	20%	10%
2004	7%	6%	8%	14%	6%	5%
2005	12%	11%	12%	10%	10%	11%
2006	9%	10%	8%	13%	11%	10%
2007	11%	9%	10%	13%	11%	14%
2008	8%	3%	11%	9%	13%	11%
2009	6%	4%	6%	9%	12%	12%
2010	7%	5%	8%	11%	18%	11%
2011	8%	9%	8%	10%	17%	11%
2012	5%	4%	5%	6%	7%	16%
2013	4%	2%	7%	7%	6%	9%
2014	10%	0%	6%	0%	5%	8%

Source: NMFS 2015b

Table A2.2.4. QS transfer rate by sablefish IFQ regulatory area from 1995 to 2014.

	SE	WY	CG	WG	BS	AI
1995	9%	6%	7%	5%	6%	7%
1996	9%	7%	9%	10%	8%	7%
1997	8%	8%	10%	7%	7%	16%
1998	5%	4%	4%	6%	13%	8%
1999	8%	7%	7%	8%	16%	16%
2000	5%	5%	8%	6%	12%	7%
2001	4%	4%	9%	16%	13%	11%
2002	9%	5%	7%	8%	13%	13%
2003	9%	4%	7%	8%	29%	12%
2004	5%	2%	3%	8%	9%	4%
2005	9%	4%	4%	9%	8%	19%
2006	5%	2%	7%	9%	7%	13%
2007	5%	7%	7%	13%	6%	17%
2008	4%	3%	5%	8%	11%	9%
2009	3%	2%	4%	16%	8%	17%
2010	4%	1%	3%	9%	28%	9%
2011	4%	5%	3%	5%	14%	18%
2012	3%	1%	3%	3%	4%	17%
2013	2%	0%	2%	4%	9%	3%
2014	4%	0%	3%	0%	4%	15%

Source: NMFS 2015b

References

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2.3 HARVESTING FLEXIBLITY, CAPACITY, AND CONSOLIDATION

This section addresses Objectives 1, 4, and 7 of the original EIS for the IFQ Program.

- Objective 1: Address the problems that have occurred with the current management regime – excess harvesting capacity, allocation conflicts, gear conflicts, product wholesomeness

- Objective 4: Maintain the diversity in the fleet with respect to vessel categories.
- Objective 7: Limit the concentration of quota share ownership and IFQ usage that will occur over time.

Because Objectives 1, 4, and 7 affect similar components of the IFQ Program and are achieved through the same mechanisms (e.g., harvesting flexibility and QS transferability), Section 2.3 includes several sub-headings, including gear conflicts, allocation conflicts, product wholesomeness, harvesting capacity, and fleet diversity.

2.3.1 Gear conflicts

It was anticipated that the IFQ Program would reduce gear conflicts within and between the halibut and sablefish fisheries both by guaranteeing IFQ participants an allocation of the TAC and providing greater flexibility in when they fish, eliminating congestion of fishing grounds and the incentive to set gear on top of each other. Reductions in interactions between participants could also stem from decreases in the numbers of vessels in the fisheries as a result of consolidation under the IFQ Program. However, it was also anticipated that longer halibut and sablefish fishing seasons could potentially increase gear conflicts with the groundfish trawl fisheries, because the trawl fleet could not as easily avoid halibut and sablefish hook-and-line gear if the latter's season increased from two weeks to eight months. This section summarizes the history of gear conflicts in the fixed-gear sablefish and halibut fisheries pre and post IFQ implementation and the associated regulatory history, the context for gear conflicts between the fixed-gear and trawl sectors, and the relevant literature, analyses, and information for assessing the impacts of IFQ management on gear conflicts.

2.3.1.1 Gear conflicts in the halibut and sablefish fixed-gear fisheries prior to IFQ

Prior to the IFQ Program, there was historical conflict between longline pot gear and hook-and-line fishermen. Under the race for fish that existed prior to the implementation of the IFQ Program, operators of different vessels sometimes deployed hook-and-line and pot gear in the same fishing areas. This resulted in gear conflicts and the loss of gear on fishing grounds. Although this was largely an issue within the sablefish fishery, wherein vessel operators using different gear target the same fishing grounds and at the same depth, there could also have been some interactions between halibut hook-and-line and sablefish long line pot gear fishermen. Longline pot gear was not and is not used in the directed commercial halibut fishery.

The groundline on longline pot gear (i.e., the line attaching the pots together) is heavier and stronger than the groundline used to attach the series of hooks on hook-and-line gear. If longline pot gear is set over previously deployed hook-and-line gear, the weaker hook-and-line gear can be damaged or lost as it is being retrieved. Deployment of hook-and-line and pot gear in the same fishing areas also resulted in grounds preemption under the race for fish. Fishing grounds preemption occurs when marked gear is set in an area which prevents other fishery participants from setting gear in the same area. Fishing grounds can be preempted for an extended period of time, for example, when a vessel hauls, re-baits, and redeploys the gear in the same area while they return to port to make a landing. Longline pot gear can sit in the water for longer periods on average than hook-and-line gear, because the fish caught in pot gear are not subject to sand fleas or general degradation to the same degree as fish that are caught on hook-and-line gear and sit directly on the ocean floor.

In response to these historical conflicts between longline pot gear and hook-and-line fishermen, the Council implemented a series of prohibitions on pot gear prior to IFQ implementation. In 1986, NMFS implemented a phased-in prohibition of pot gear in the GOA sablefish fishery (50 FR 43193, October 24, 1985) to eliminate gear conflicts between hook-and-line and pot gear. The sablefish pot fishery was phased out in the Central GOA and the Western GOA over one and three year periods, respectively. There was also some concern that allowing both gear types in the GOA would eliminate fishing opportunities for small vessel hook-and-line fishermen, who would have difficulty competing with longline pot gear fishermen, which would in turn have impacts on the coastal communities wherein those hook-and-line fishermen resided. In 1985, three large catcher-processors began fishing for sablefish using pot gear in Southeast Alaska, one of which used 600 pots and fished an area ranging from 15 to 45 miles (NMFS/NPFMC, 1985). That year the sablefish catch by pot gear was approximately a 15-fold increase over the entire 1984 sablefish pot catch, and analysts estimated the potential revenue loss to Southeast communities as a result of this shift at $1.64 million because these vessels delivered to ports outside of Alaska (in 1985 dollars, equivalent to $3.67 million in 2016) (ibid.). Analysts also cited "several" gear conflicts between the pot fishermen and those using longline gear that year in the sablefish fishery (ibid.). It is important to note that these conflicts were understood to have in large part emerged from the derby-style fishery that existed at the time, wherein fishery participants were competing on increasingly congested fishing grounds and in increasingly shorter fishing seasons for a limited allowable harvest.

In 1992, the Council recommended, and NMFS approved, a prohibition on the use of longline pot gear in the sablefish fishery in the Bering Sea subarea to prevent longline pot gear from preempting access to fishing grounds by hook-and-line gear (57 FR 37906, August 21, 1992). The Council did not recommend a prohibition on longline pot gear in the Aleutian Islands subarea because gear conflicts were not a concern in that sablefish area.

2.3.1.2 Gear conflicts in the IFQ fisheries following IFQ implementation

The implementation of the IFQ Program fundamentally changed how and how many participants operate within the IFQ fisheries, which likely affected the probability of gear conflicts within and between the IFQ fisheries. The IFQ Program extended the fishing season and allowed the sablefish and halibut fleets to spread out fishing operations over time and space. Increasing consolidation and cooperation between QS holders fishing their IFQ on fewer vessels (described in Sections 2.3.5 and 2.4.1, respectively) also invariably resulted in reduced congestion on fishing grounds. Taken together, the increased flexibility afforded by IFQ management and the substantial consolidation that followed likely reduced the possibility of gear conflicts and preemption of common fishing grounds. Furthermore, the limitation of QS acquisition to initial QS recipients and those with 150 days of sea time experience in a commercial fishery (as described in more detail in Sections 2.5 and 2.6) provided that experienced persons would be present on fishing grounds, which was anticipated to provide for fewer conflicts than if inexperienced persons were participating. However, as analysts for the final EIS to the program noted (NPFMC/NMFS, 1992), initial allocations of QS to as many people with qualifying history as possible increased the number of participants on grounds to more than had ever fished in a single year and allocations to the CDQ communities provided that some inexperienced individuals may still have access to the fisheries. Nevertheless, many initial recipients received such small amounts of IFQ that it was not economically worthwhile to fish, thus promoting rapid consolidation within the first years following the IFQ Program (see Section 2.2).

In response to industry requests for regulatory changes on gear types and to the likelihood of overall gear conflict reductions under the IFQ Program, the Council has incrementally reduced the restrictions on longline pot gear in the sablefish IFQ fishery since IFQ implementation. The following regulatory history on allowable gear types in the IFQ fisheries focuses on changes within the sablefish IFQ fishery, wherein there is a history of conflict between longline pot and hook-and-line gear fishermen. However, it should be noted that the aforementioned changes in the IFQ fisheries from implementation of the program would also likely reduce gear conflicts between hook-and-line fishermen.

In response to concerns over whale depredation on sablefish on hook-and-line gear and the reductions in gear conflicts and preemption of fishing grounds following IFQ, the Council determined that a complete prohibition on longline pot gear in the Bering Sea sablefish fishery was not necessary. On September 18, 1996, NMFS published a final rule to replace the year-round longline pot gear prohibition in the sablefish fishery in the Bering Sea with a regulation that allowed the use of longline pot gear except during the month of June (61 FR 49076). The Council wanted to provide participants with increased flexibility in the fishing methods that they use to harvest sablefish to avoid loss of catch to whales. The Council and NMFS decided to retain the prohibition on longline pot gear in June because that month generally has fair weather, and small vessels using hook-and-line gear tend to operate primarily during June. Thus the continued prohibition on use of longline pot gear in June was intended to provide the small vessel sablefish fleet in the Bering Sea with an opportunity to harvest their sablefish quotas without competition from vessels deploying longline pot gear.

In October 2004, a representative for sablefish longline pot fishermen in the Bering Sea proposed that gear competition between the sablefish longline pot fleet and the hook-and-line fleet had not occurred in June, and asserted that the regulatory prohibition on the use of longline pot gear during June was unnecessary and burdensome. After review of an analysis and public testimony, the Council recommended, and NMFS implemented, a regulation to remove the prohibition on the use of longline pot gear during June in the Bering Sea sablefish fishery (73 FR 28733, May 19, 2008). The Council expected that lifting the ban on longline pot gear in June in the Bering Sea would increase revenues by bringing harvests closer to the optimal yield and increase economic efficiency by eliminating the interruption in the fishing season for longline pot gear fishermen and the need for removing and storing this gear for June. It was also believed that there was no gear conflict or fishing grounds pre-emption happening in the Bering Sea. Beginning in May of 2008, both longline pot and hook-and-line gear has been authorized during the entire year in both the Bering Sea and Aleutian Islands sablefish fisheries.

In 2015, in response to whale interactions with the sablefish IFQ fleet in the Gulf of Alaska the Council recommended Amendment 101 to the Gulf of Alaska FMP to authorize pot longline gear in the Gulf of Alaska sablefish IFQ fisheries.[24] The Council determined that authorizing longline pot gear in the Gulf of Alaska sablefish IFQ fishery was appropriate because the IFQ Program provides participants with substantially more flexibility on when and where to harvest sablefish and because consolidation under the IFQ Program had resulted in fewer total participants in both IFQ fisheries resulting in fewer potential conflicts. The IFQ Program makes it unlikely that hook-and-line and longline pot gear conflicts would occur or that fishing grounds would be preempted for extended periods in the same manner as prior to IFQ. To minimize the potential for grounds preemption by multiple vessels using the same longline pot gear, Amendment 101 requires vessels using longline pot gear in the Gulf of Alaska sablefish IFQ fishery to redeploy or remove their gear within a specified time period after deployment or when leaving the fishing grounds to make a landing. The Council recommended area-specific requirements related to gear retrieval because vessel operations and fishing grounds vary by management areas.

The Council also created area-specific pot limits to account for the physical nature of the sablefish fishing grounds and the composition of the IFQ sablefish fleet in each sablefish area. The Council determined that smaller pot limits are appropriate in the Southeast Outside District and Western Yakutat fisheries because these sablefish areas have more spatially concentrated fishing grounds than the Central Gulf of Alaska and Western Gulf of Alaska sablefish areas.

Amendment 101 authorizes only longline pot gear in the Gulf of Alaska sablefish IFQ fishery, as opposed to single pot-and-line gear. Pot-and-line gear may have a greater potential for conflict with hook-and-line

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[24] NMFS published a proposed rule to implement Amendment 101 on August 19, 2016 (81 FR 55408).

gear because the former has a larger number of anchor lines and buoys than longline pot gear. In addition, pots deployed in a pot-and-line format are larger and heavier than longline pot gear because a single pot is more likely to drift than pots deployed in a longline configuration. Drifting pot-and-line could result in greater gear entanglement and conflicts.

2.3.1.3 Interactions between the IFQ and trawl fleets

The trawl fleet has received an allocation of the sablefish TACs in the Gulf of Alaska since 1988 and in the Bering Sea and Aleutian Islands since 1990. The harvest specifications generally apportion to the trawl fleet 20% of the sablefish TAC in the Western and Central Gulf of Alaska, 5% of the TAC in the Eastern Gulf of Alaska, 50% of the TAC in the Bering Sea, and 25% of the TAC in the Aleutian Islands.[25] Because both the fixed-gear and the trawl fleets have sablefish allocations, they could potentially be on the same fishing grounds targeting the same species. However, as described in Section 2.10, most trawl gear fisheries are closed for directed fishing for sablefish, and the entire trawl gear sablefish TAC is used for incidental catch of sablefish in trawl fisheries targeting other species. This reduces the opportunities for interactions between the IFQ and trawl fleets, especially as economically viable amounts of trawl-able sablefish may co-occur with high halibut abundance and halibut is a limiting species for the trawl sector, which is bound by a halibut PSC limit.

Gear conflict interactions between halibut and sablefish fixed-gear fishermen and groundfish trawl fishermen could occur during the setting, soaking, and retrieving of fixed gear if trawlers were fishing concurrently on the same grounds, or anytime if fixed gear were lost or abandoned and inadvertently snagged during a trawl. Prior to IFQ management, gear conflicts were in part limited by the short halibut and sablefish fishing seasons, because fixed-gear fishermen were on the fishing grounds for only several days at a time for the whole year. However, prior to IFQ Program, the short fishing seasons and congested fishing grounds also sometimes resulted in lost or abandoned gear, which could have increased gear conflicts with the trawl sector (Pautzke and Oliver, 1997).

Under the IFQ Program, the prolongation of the fishing seasons for halibut and sablefish was anticipated to potentially increase gear conflicts between IFQ fishermen and the groundfish trawl sector. However, the elimination of the derby-style fishery also decreased the amount of lost or abandoned gear from the IFQ fleet (see Section 2.9) thus reducing the probability of trawlers accidentally snagging this gear.

2.3.1.4 Assessing gear conflicts in the IFQ fisheries

Gear conflicts between IFQ fishermen and those participating in other fisheries are not tracked. Therefore, there is a fundamental data gap in the information that could be used to inform an analysis of the impacts of the IFQ Program on such conflicts. The following section is limited to summarizing relevant research, previous analyses on gear conflicts, and anecdotal information.

Sigler and Lunsford (2001) examined changes in fishing behavior in the sablefish fishery following IFQ implementation, by comparing four years of pre and post IFQ data from 1990 to 1998. They found that more areas were fished during the open-access fishery compared with the IFQ fishery, because crowding on productive sablefish fishing grounds on the upper continental slope during the short fishing seasons of the pre-IFQ fishery prevented more fishermen from being able to fish there. Under the IFQ fishery, more fishermen were able to target the more productive fishing grounds due to the prolonged fishing seasons and guaranteed QS, which in turn contributed to higher catch rates and larger fish landed. The authors

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[25] Annual harvest specifications can be found here: https://alaskafisheries.noaa.gov/harvest-specifications.

also measured crowding on fishing grounds, as a factor of the distance between sets by the same vessel,[26] to the nearest set during the same day and during the previous week. They found that the frequency distributions of the minimum distances for sets during the same day were similar for the open-access and IFQ fisheries. However, during the open-access fishery, sets during the previous week usually were closer than under IFQ and an average of 47% of sets had another set by the same vessel within 2 km compared to only 31% during the IFQ fishery.

A series of surveys was conducted in 1995 and 1996 of QS holders in the sablefish and halibut IFQ fisheries to gather information about the initial effects of IFQ management (Knapp, 1997). The author found that 38% of respondents cited "ability to choose when to fish" as a positive effect of the switch to IFQ management. Furthermore, 12% of respondents cited "uncrowded fishing grounds" and 5% cited "reduced gear loss". (Reductions in lost or abandoned gear have also been documented by the IPHC for halibut as an outcome of the transition to IFQ, see Section 2.9.) Wertheimer and Swanson (2000) also cite reductions in gear conflicts as a result of the longer season length under IFQ.

For the analysis in the Regulatory Impact Review for Amendment 101,[27] analysts provided information on where sablefish harvests occurred from 2009 through 2013 and how that compared to the location of commercial fishing activity in general. The analysts looked at sablefish harvest by any gear type, including directed or incidental, and identified 47 sablefish hotspot areas. They then looked at all other commercial fishing activity, including all groundfish, halibut, and crab fishing by all gear types (salmon was excluded), to see what proportion of all commercial fishing activity came from these sablefish hotspots. They found that generally the most productive sablefish areas coincide with the most productive Eastern GOA areas. For the Central and Western GOA there were relatively more options for productive fishing grounds and so fewer overlapping areas between sablefish hotspots and other commercial fishing grounds. The analysts highlighted several limitations to their analysis.[28]

The analysis on the interaction of fishing grounds for sablefish hotspot areas and other commercial fisheries points to fundamental gaps in spatial data for the IFQ fleet. Only vessels fishing for sablefish in the Aleutian Islands or Bering Sea are required to have vessel monitoring systems (VMS) on board. The basic function of a VMS is to determine a vessel's location at a given time and periodically transmit this information to an onshore monitoring system. Vessels fishing for sablefish IFQ in the Gulf of Alaska (or halibut IFQ in any area) do not fall under any type of VMS requirement unless they also participate in other fisheries wherein such a system is required (see 2.11.3 Monitoring and Enforcement for more details on which fisheries are subject to a VMS requirement). Fish ticket data includes a field for the ADF&G statistical area where the harvest occurred and a time variable for when the landing took place. However, the statistical areas are generally $50km^2$ in area, a resolution that would not be meaningful for assessing gear conflicts. Because of these data limitations, a similar spatial analysis of commercial fishing

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[26] The authors chose to compare sets by the same vessel for two reasons. "First, only part of the fleet is observed and there usually are unobserved vessels fishing nearby the observed vessels. However, the between-set distance for the same vessel measures the influence of these unobserved vessels and the crowding on the grounds. Second, vessels typically record their fishing locations, so they are unlikely to repeat fishing a location, whereas they inadvertently may fish a location previously fished by another vessel that has left the area. We examined fishing locations as far back as the previous 7 days. We chose 7 days as the cutoff because fishermen report that this is the length of time that they typically let the grounds "rest" before returning to an area."

[27] See: https://alaskafisheries.noaa.gov/sites/default/files/analyses/goa101earirirfa.pdf

[28] First, the number and expanse of statistical areas fished in a given GOA management area could have as much to do with the size, range, and operational characteristics of the local fleet as it does with the distribution of harvestable biomass. Sablefish areas could be more strongly correlated with total fishing in the Eastern GOA because sablefish make up a larger proportion of total catch in that region. Second, the minimum amount of "space" required for a pot and a HAL operation to share an area without gear conflict is undoubtedly smaller than an ADF&G statistical area. Third, this information is aggregated over five years, and does not pick up seasonal variation in fishing patterns or gear predominance.

patterns between the IFQ fleet and other fleets was not conducted for this review. Although such an overlay could provide information on whether sablefish and other commercial fishing areas were co-spatial and coincident, it would not provide information on whether there were actual gear conflicts between the fishermen.

One potential indicator of a lack of gear conflicts is that this issue has not been raised to the Council except by sablefish IFQ fishermen seeking to reduce the regulatory constraints on the use of longline pot gear. However, it should be noted that during the public testimony for Amendment 101, which authorized longline pot gear for sablefish IFQ fishermen in the GOA, there was public testimony from those who opposed the use of longline pot gear in the sablefish IFQ fishery. These fishermen testified that longline pot gear is typically left unattended on the fishing grounds for several days before the pots are retrieved, which could preempt the use of these fishing grounds by fishermen using hook-and-line gear as had occurred prior to implementation of the IFQ Program. The Council determined that the IFQ Program made it unlikely that hook-and-line and longline pot gear conflicts would occur or that fishing grounds would be preempted for extended periods.

Summary

Prior to the IFQ Program, there was historical conflict between longline pot gear and hook-and-line vessel operators. The competitive race for fish that existed at that time provided an incentive for participants to compete for space on the most productive fishing grounds sometimes laying gear on top of each other. For the sablefish fishery, longline pot gear could also be used to preempt fishing grounds because it is heavier than hook-and-line gear, soaks longer, and may be left on the grounds even when fishing is not occurring. The overall congestion on fishing grounds and the limited fishing seasons led to gear conflicts. Section 2.3.1 describes the history of gear conflicts and regulatory changes to allowable gear pre and post IFQ implementation, the context for gear conflicts between the trawl and IFQ sectors, and the information that could be used to understand the impacts of IFQ implementation on gear conflicts.

The implementation of the IFQ Program was anticipated to provide temporal and spatial flexibility to IFQ participants in how they harvest their IFQ. This flexibility, in combination with increased consolidation and coordination of shareholders onto fewer vessels, was anticipated to provide for reduced gear conflicts in the IFQ fisheries. In response to expectations about reductions in gear conflicts and increasing concerns over whale predation on sablefish on hook-and-line gear, the Council has iteratively lifted the restrictions on longline pot gear in the sablefish IFQ fishery, which were implemented prior to IFQ to minimize gear conflicts and grounds preemption. Longline pot gear was not and is not used in the directed commercial halibut fishery.

The prolongation of the fishing seasons for halibut and sablefish under the IFQ Program was also anticipated to potentially increase gear conflicts between IFQ fishermen and the groundfish trawl sector. It was expected that the trawl sector could not as easily avoid IFQ sector fishing gear under extended IFQ fishing seasons. However, the elimination of the derby-style fishery also decreased the amount of lost or abandoned gear from the IFQ sector (see Section 2.9) thus reducing the probability of trawlers accidentally snagging this gear. In effect, the two types of gear conflicts between the IFQ and trawl sectors would be differentially impacted by implementation of the IFQ Program.

Actually assessing the impacts of the IFQ Program on gear conflicts within the IFQ sector and between this sector and the trawl sector is restricted by a complete dearth of systemic data collection on this subject. Incidence of gear conflicts are not tracked in the IFQ fisheries and, if they were, would be largely based on self-reported data. Spatial information on where IFQ vessels fish is also limited to self-reported ADF&G statistical areas on fish tickets, which are on average about $50km^2$ in area. Vessel monitoring systems are largely not required for vessels participating in the IFQ fisheries, except for sablefish vessel in the Bering Sea and Aleutian Islands areas. Thus spatial data for the IFQ sector is constrained to a resolution that is not meaningful to examining gear conflicts. Perhaps the most meaningful evidence of reductions in gear conflicts following IFQ implementation is a survey that was conducted of QS holders after the first two years of IFQ wherein shareholders reported “uncrowded fishing grounds” as an outcome of IFQ (Knapp, 1997) and a study that indicated a reduction in congestion on sablefish fishing grounds following IFQ (Sigler and Lunsford, 2001). Furthermore, stakeholders have not raised gear conflicts as an issue to the Council except to argue that reductions in constraints on allowable gear in the sablefish IFQ fishery could lead to increased gear conflicts, primarily between the sablefish and halibut fisheries.

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Wertheimer, A. C., & Swanson, D. (2000). The Use of Individual Fishing Quotas in the United States' EEZ. *FAO Fisheries Technical Paper*, (2), 127-136.

2.3.2 Allocation conflicts

The Council recognized at the time of the implementation of the IFQ Program could engender conflict among various stakeholders over allocations. Specifically, analysts for the original EIS for the program highlighted that the initial allocations under the IFQ Program necessarily excluded certain user groups (e.g., crewmembers). Furthermore, it was expected that initial recipients would receive much of the benefits of the program at the cost of future participants who would have to pay for QS and that the public in general would have to pay for the management and enforcement costs of the program. Impacts of the IFQ Program on crewmembers are discussed in detail under Section 2.4.1 (“Crewmember Impacts”). Inter-generational distributions of the benefits of IFQ Program implementation will be discussed further in Section 2.6 (“Entry Opportunities”). With respect to the costs to the public, the IFQ Program has a system of recovering the incremental costs related to management, monitoring and enforcement from participants in the program, which is described under Section 2.11.3 (“Management Costs and Recovery”).

The Council also recognized during IFQ implementation that conflicts may arise between fishermen and CDQ fishery participants over allocations. The Council and NMFS sought to address these by allocating CDQ compensation QS for halibut and sablefish, described in more detail in Section 1.2 (“Description of Management”).

The Council anticipated allocation conflicts would arise among participants in different vessel classes as well. Such conflicts could arise if members of one vessel class perceived an inequity in maintaining QS allocations amongst vessel classes, especially if those allocations perpetuated production inefficiencies. However, the Council explicitly included maintaining fleet diversity amongst its objectives for the program. Quota share distributions and use restrictions among vessel classes are discussed in Section 2.3.6 (“Fleet Diversity”).

Given that the allocation issues identified in the original programmatic EIS are discussed elsewhere, this section provides a broader discussion of indicators of allocation conflicts since IFQ Program implementation. Allocation conflicts are not associated with an obvious metric and are inherently difficult to measure. This section utilizes initial allocation appeals and allocation litigations as indicators of allocation conflicts. The analysts expect that the inertia for appeals and litigation would dissipate over time as the IFQ Program cemented, although fewer appeals and litigation are not necessarily perceived to be an indicator of the absence of conflict altogether. (The history of the Native Village of Eyak’s pursuit of IFQ allocations is discussed in detail under Section 2.12.)

Data

The data presented in this section was previously provided in the annual NMFS Report to the Fleet (NMFS, 2012). The information on legal cases emerging from the IFQ Program was provided by NOAA General Counsel, Alaska Section.

2.3.2.1 Appeals and determinations

Perhaps one of the indicators of conflicts over IFQ allocations is the quantity of applications for and appeals during implementation and the first several years of the program. From 1994 to 1996, more than 6,000 persons applied for QS in the IFQ fisheries. These applications could (and often did) result in the issuance of more than one QS certificate, which were species, area, and vessel class specific. These requests were processed by the NMFS RAM Division. If an applicant failed to demonstrate their eligibility for QS, or some related claim (vessel category, qualifying pounds, etc.), they were issued an Initial Administrative Determination (IAD). An IAD represents a denial in whole or in part of an applicant’s claim for QS. Approximately 1,800 IADs were issued by RAM, compared to the nearly 10,000 QS certificates that were issued for the IFQ fisheries. Although the QS application process formally ended in July of 1994, a few applications still trickled in into the early 2000s.

Those applicants who received IADs could appeal to the Office of Administrative Appeals in the NMFS Alaska Regional Office. Fewer than 10.6% of the 1,800 IADs (or 191) were ever appealed. The three most common appeals claims were basic eligibility, vessel owner/lease conflicts, and untimely applications. In some cases, appellants challenged the adverse IAD on a medical or other circumstance that prevented them from fishing during the three-year eligibility period. These persons typically requested QS notwithstanding that they did not make any landings during the three-year eligibility period. Others challenged the landings requirement, stating that while they had no fish tickets to prove landings, they did in fact harvest halibut or sablefish. In other cases, persons challenged the IAD based on questions of vessel ownership interests.

The appeals process for QS under the IFQ Program was established in regulations. An administrative law judge considered the facts of each case individually and issued a decision after the appeals process was completed. A decision of the Office of Administrative Appeals became a Final Agency Action 30 days after it was published.

Appellants could further appeal Final Agency Actions to the federal courts, first to the U.S. District Court and then to a U.S. Circuit Court of Appeals. Only 11 of the Final Agency Actions for initial allocations of QS were appealed, and of these 8 were further appealed to the Ninth Circuit Court of Appeals.

Applications and appeals for QS decreased precipitously through the steps of the appeals process. Of the initial applications for QS, 15% were denied. Only 10% of the initial applicants who were denied appealed to the Office of Administrative Appeals and less than 1% of these appeals were taken through the federal court appeal process.

2.3.2.2 Alliance against IFQs vs. Brown

Immediately following the implementation of the IFQ Program, a group of individuals who were not assigned QS under the initial allocation filed suit against the Secretary of Commerce (See: http://caselaw.findlaw.com/us-9th-circuit/1265211.html). The group consisted of fishing vessel owners who did not fish during the three-year eligibility period, or who did fish but did not own or lease vessels. The group claimed that the adoption of the IFQ Program was arbitrary and capricious because the allocation of IFQs was limited to vessel owners and lease holders and because the 1990 cut-off for qualifying years meant that the allocations were not based on the most recent three-year period prior to implementation in 1995.

The district court granted the Secretary's motion for summary judgment and dismissed the case. The case was then taken to the court of appeals wherein the court again ruled in favor of the Secretary. The court ruled that the decision to limit the allocation of IFQs to vessel owners and lease holders was reasonable in order to address overcapacity in the fisheries and because of the practical difficulties in calculating individual crew member shares. The court asserted that the allocation to vessel owners and lease holders did not violate the statutory requirement for allocations to be fair and equitable. Furthermore, the court asserted that adverse impacts on some participants who were excluded from allocations (i.e. crewmembers) were inevitable. The court deemed the 1990 cut-off date reasonable in order to prevent excess capital investment in the fisheries in anticipation of IFQs.

Summary

Many of the conflicts over initial QS allocations that emerged from IFQ implementation are discussed under other sections of the IFQ Program Review. This section briefly discussed issues over initial allocations that emerged in the first several years following IFQ as a result of persons seeking QS allocations. Given the potential value of QS as a long-term asset, the percentage of applicants who were denied an allocation and then appealed is surprisingly small. Only 10.6% of the 1,800 applicants who were denied ever appealed and only 1% of these applicants continued their appeal through the Federal court process. Although the analysts do not suggest that there were no issues over allocations, the limited number of initial allocation appeals and the unsuccessful litigation on the initial QS allocation suggests that the impetus for such appeals diminished over time.

References

NMFS. 2012. Fishing Year 2012: Pacific Halibut-Sablefish IFQ Report. Available online: https://alaskafisheries.noaa.gov/sites/default/files/reports/rtf12.pdf . Accessed 05/16/2016.

2.3.3 Product wholesomeness

The IFQ Program was anticipated to lead to improvements in "product wholesomeness" (understood to mean overall quality). There are multiple mechanisms through which improvements in product quality could happen. With the IFQ Program the fisheries transitioned from a highly concentrated season to multiple months and currently extend from March to November. During the pre-IFQ baseline period (1992 through 1994), which is used for comparison throughout this section, some areas were open to sablefish fishing for 51 days and to halibut fishing for as little as four days. Prolonging the fishing season provided flexibility in when and how the participants fish, which enabled them to increase the quality of the ex-vessel product brought to the processor (in terms, for example, of flesh conditions). In turn, processors not only bring a higher quality product to market, but, no longer forced to freeze the bulk of their product during the compressed season, have the potential to develop expanded markets for fresh products and, more generally, innovate to respond to market incentives. This is also true for harvesters, who can market their fish directly to wholesalers, restaurants, or consumers. Product quality improvements and better targeting of markets gave rise to the potential for higher wholesale prices in both fisheries. The ability of processors to influence the rate and timing of landings was expected to decrease processing costs. The increased revenue and reduced costs to processors were expected to pass through to fishermen as higher ex-vessel prices, as processors compete for supply from catcher vessels.

This section examines changes in product form and ex-vessel and wholesale prices in both IFQ fisheries relative to the pre-IFQ baseline period, the average of the three years preceding the IFQ Program - 1992 through 1994.

Data

This section utilizes ex-vessel and wholesale price data from multiple sources. ADF&G Commercial Operator's Annual Reports (COAR) production data provided by AKFIN were used for wholesale processing information by product type and ex-vessel prices provided by AKFIN. The COAR production data includes both weight and price by product type. Ex-vessel prices are expressed per pound of headed and gutted product for halibut and per pound of round weight for sablefish. AKFIN utilizes CFEC gross earnings to estimate ex-vessel prices. CFEC collects summary data from permit-holder fish ticket landing records for the source of this data. These estimates reflect catcher vessel deliveries to shoreside processors for commercial catches (including only IFQ and CDQ allocations) and exclude harvests from discards, test fishing, confiscated catch, personal use, and other unsold harvests. As in all other section of this review, the baseline period refers to the average of three years prior to the implementation of the IFQ Program, 1992 through 1994.

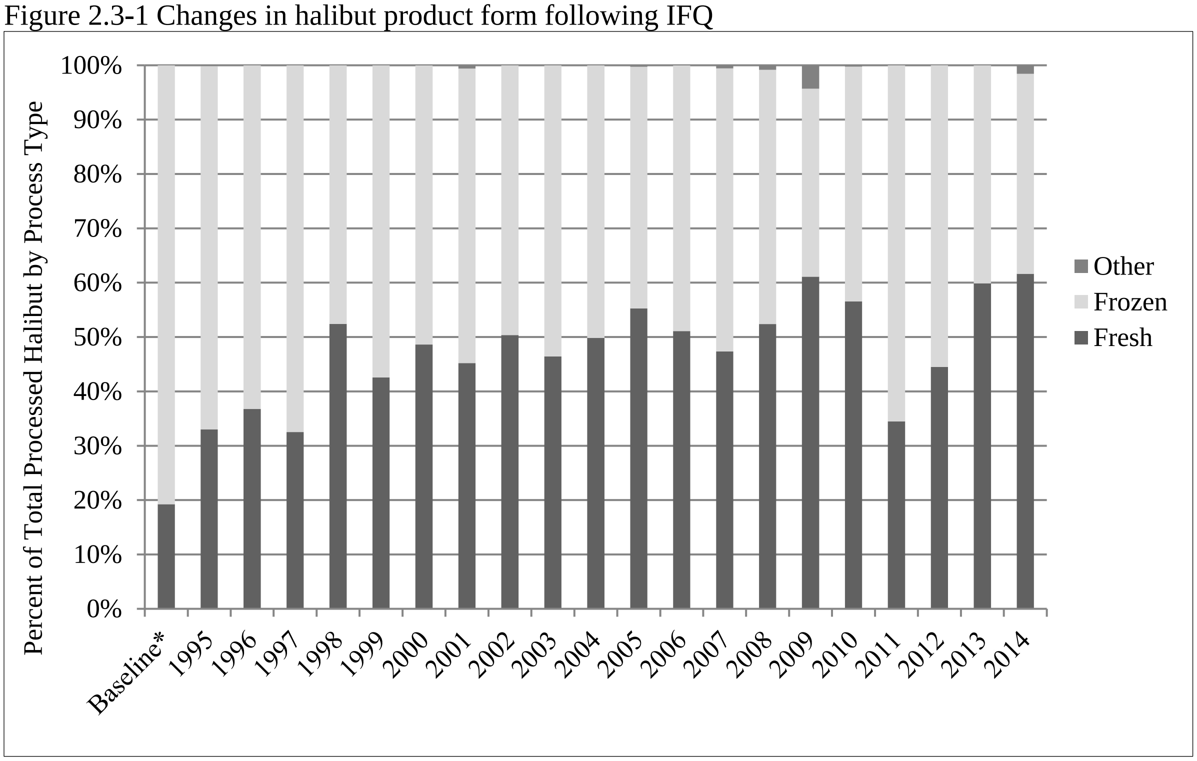
2.3.3.1 **Changes in product form**

Figure 2.3-1 and Figure 2.3-2 present changes in product form for halibut and sablefish, respectively, from the baseline period to 2014. The figures show the percent of total pounds of halibut and sablefish processed as fresh, frozen, and "other" product. The "other" category includes dried, smoked, cooked, and canned product. The production information is presented as a percentage of total processed pounds in these figures, as opposed to raw pounds, because the former more readily reveals changes in product form in light of the decreasing TACs in the fisheries over the time period. Given the declining trend in TACs and associated harvest amount, presenting product information with respect to total pounds would show decreasing production of both fresh and frozen fish.

The IFQ and CDQ halibut fisheries comprise the two directed halibut fisheries. Figure 2.3-1 includes CDQ halibut production data. However, this is not expected to significantly confound these trends, given that the CDQ fisheries comprise a small percentage of total halibut production. There are several directed fisheries for sablefish. However, the COAR production data is not generally disaggregated or flagged by gear type, so there is no way of differentiating product by fleet. The sablefish product information represents production from several different fleets, which means that changes in sablefish product form could be associated with these other fleets as well. Although the IFQ fleet makes up the majority of sablefish landings in Alaska waters, there are small sablefish landings from other fleets as well. The IFQ fleet receives 80% of the TAC in the Western and Central Gulf of Alaska sablefish IFQ areas, 95% of the TAC in the Eastern Gulf of Alaska, 50% of the TAC in the Bering Sea, and 75% of the TAC in the Aleutian Islands. From 2003 through 2015, the trawl fleet accounted for 7% to 11% of total sablefish landings in federal waters. Data prior to 2003 was not available due to a database change in 2003.

Figure 2.3-1 shows an increase in the percentage of wholesale halibut production of fresh product forms since IFQ implementation, i.e., relative to the baseline period. While there is some inter-annual variability in the post-IFQ production of fresh and frozen product, production of fresh halibut is higher in every year following IFQ Program implementation. The average percentage of Alaska halibut being processed for the fresh market was 48% between 1995 and 2014, compared to just less than 20% during the baseline period. (There was very little variation in the distribution of fresh and frozen product during the baseline period). The transition to a higher proportion of fresh product was gradual. Processing facilities were designed for frozen product during the derby-style fishery because of the highly concentrated time period in which the fishery took place.

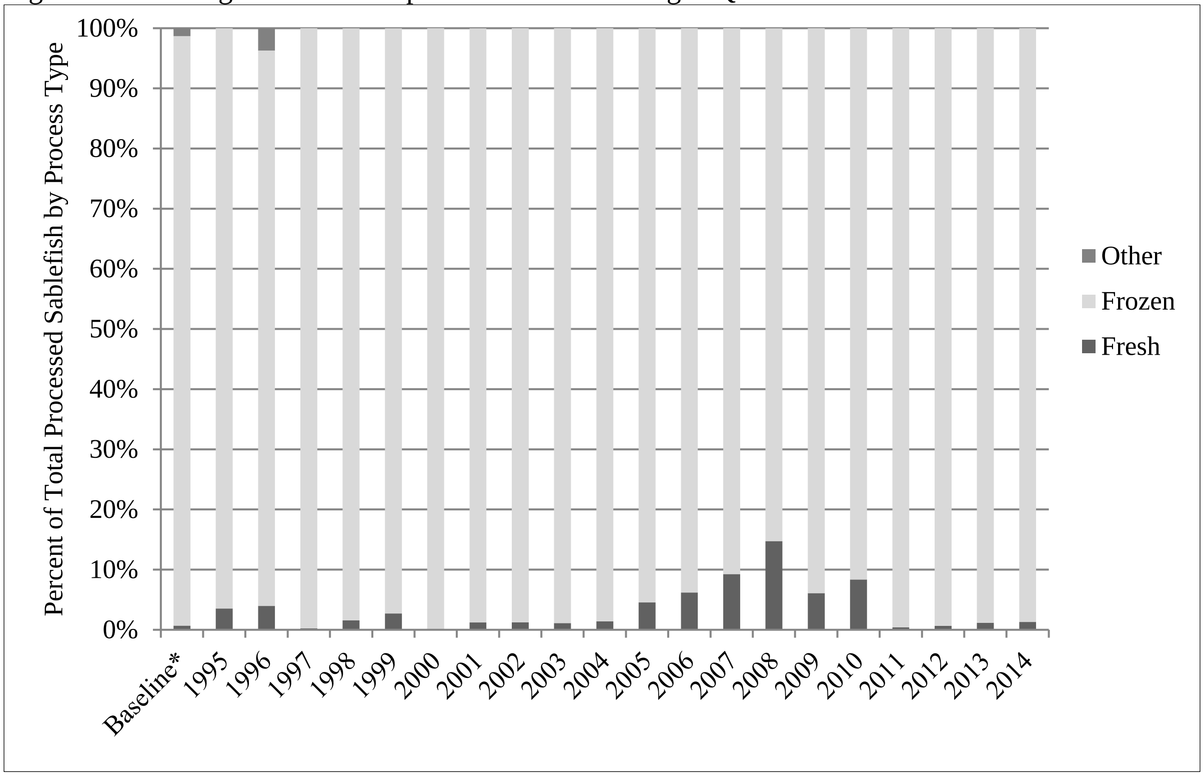
Figure 2.3-1 Changes in halibut product form following IFQ



Source: COAR production data sourced by AKFIN
Figure note: The calculation of fresh and frozen products includes all fresh and frozen product types, i.e., inclusive of vacuum-packed fresh and frozen products.

Unlike halibut, the product form of sablefish did not significantly change with the implementation of the IFQ Program. Sablefish continues to be a predominantly frozen product for the export market.

Figure 2.3-2 Changes in sablefish product form following IFQ



Source: COAR production data sourced by AKFIN
Figure note: The calculation of fresh and frozen products includes all fresh and frozen product types, i.e., inclusive of vacuum-packed fresh and frozen products.

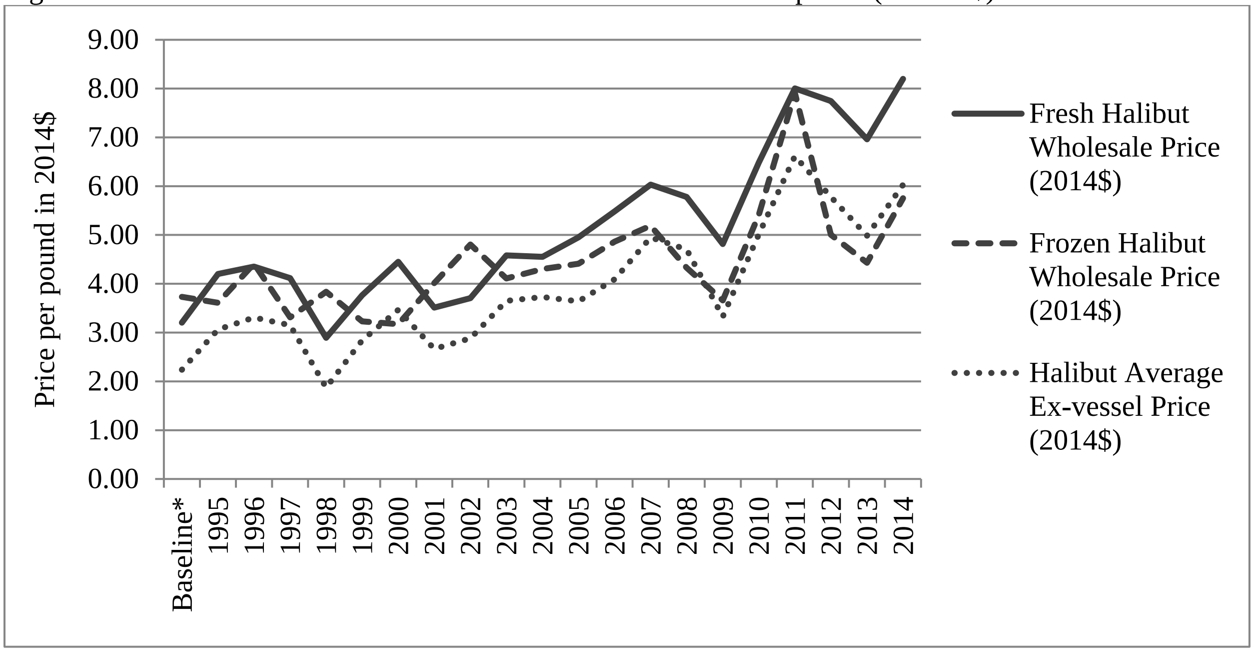
2.3.3.2 Changes in wholesale and ex-vessel prices

Changes in product form, product quality improvements, and better targeting of seasonal markets were anticipated to result in higher wholesale, and therefore ex-vessel, prices for both halibut and sablefish, given the assumption that the two prices follow each other. Ex-vessel prices could also increase in response to fishermen having a wider choice of processing options and bargaining strength in negotiating prices with processors, which is explored more in Section 2.4.2. The analysts also include ex-vessel prices in this section because these prices, unlike wholesale prices, are fishery specific. It is important to note that wholesale and ex-vessel prices also reflect changes in halibut and sablefish supply as a result of fluctuations in the TACs, and global supply and demand in these and substitute species, which are exogenous to the IFQ Program itself. Although for both halibut and sablefish, the Alaska fisheries represent the majority of global supply.

Figure 2.3-3 shows real halibut fresh and frozen wholesale and ex-vessel prices in 2014 dollars from the baseline period to 2014. These prices are presented as real prices in 2014 dollars, using the Bureau of Labor Statistics' Consumer Price Index to control for general price trends. This data excludes vacuum-packed fresh and frozen products, which are significant price outliers in the data.

Relative to the baseline period, real fresh and frozen wholesale and ex-vessel prices for halibut have risen substantially since the implementation of the IFQ Program. For most years of the dataset, fresh halibut wholesale prices are greater than wholesale prices for frozen halibut, although the difference between these two prices has increased substantially over the last four years (2011 – 2014). Increasing production of fresh halibut and increasing wholesale prices for fresh halibut may be helping to drive average ex-vessel prices, in addition to changes in fishing costs, processing costs, etc.

Figure 2.3-3 Real halibut fresh and frozen wholesale and ex-vessel prices (in 2014$)

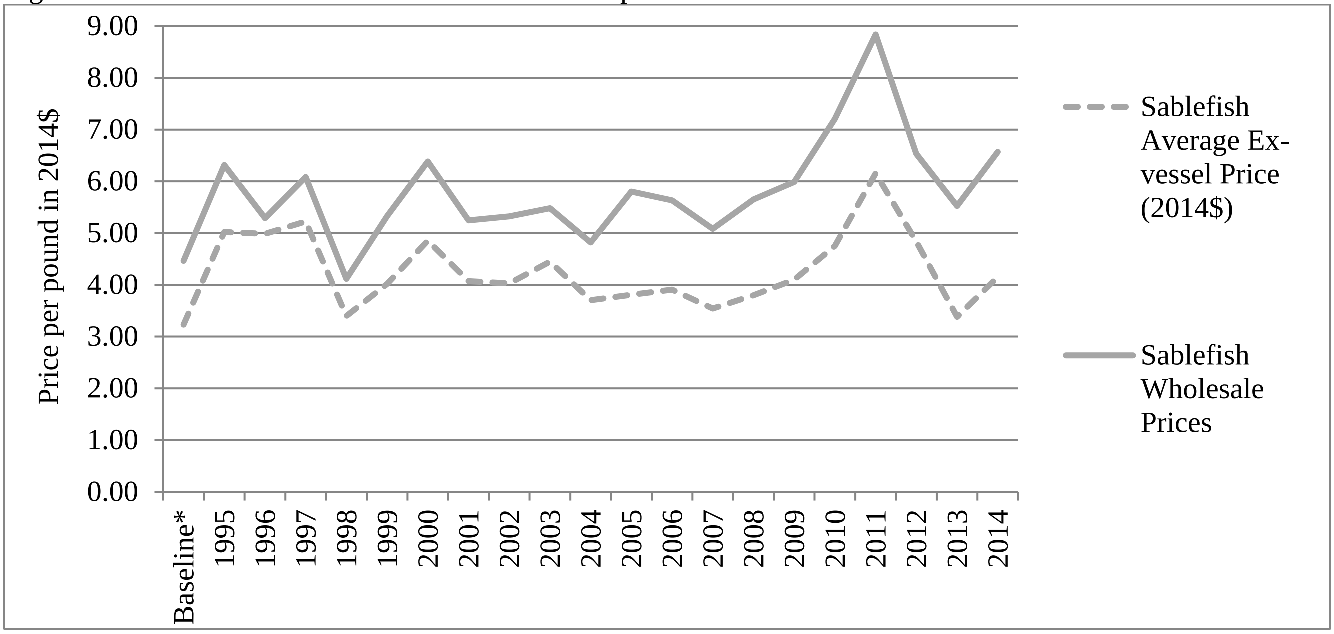


Source: COAR production data sourced by AKFIN and NMFS-RAM price data.

The wholesale and ex-vessel price increases for sablefish were expected to be less than for halibut following IFQ Program implementation because the potential benefits from the fresh fish market were anticipated to be lower. The primary sablefish market is an export market, which necessitates freezing. Also, the pre-IFQ sablefish fishery was not as intensive as the pre-IFQ halibut fishery, as the former had fewer total participants and longer fishing seasons.

Figure 2.3-4 shows real ex-vessel and wholesale prices for sablefish in 2014 dollars from the baseline period to 2014. Since the vast majority of sablefish is produced as frozen product, we did not differentiate between product type for the wholesale price data. Compared to halibut, the ex-vessel and wholesale price increases have been relatively smaller for sablefish.

Figure 2.3-4 Real sablefish wholesale and ex-vessel prices in 2014$



Source: COAR production data sourced by AKFIN and NMFS-RAM price data.

The increased flexibility, prolonged fishing season, harvest management and product improvements under the IFQ Program have also allowed IFQ fishermen and processors to realize some unique marketing benefits. For example, Sitka's Alaska Longline Fishermen's Association (ALFA) started a community-supported fishery called Alaskans Own in the late 1990s, which sells seasonal shares (ranging from 20 to 60 pounds) of a mix of fish including halibut and sablefish caught by Sitka fishermen directly to consumers. Alaskans Own now operates in Sitka, Juneau, Anchorage, Seattle, and Fairbanks. The IFQ fisheries are also certified for sustainability under the Alaska Seafood Marketing Institute's (ASMI) Responsible Fisheries Management Program, which utilizes an international standard for sustainable management and eco-labeling. Such a certification scheme may allow IFQ fishermen to tap into different markets and fetch higher prices.

In reviewing this data, it is important to consider that changes in wholesale and ex-vessel prices since IFQ implementation could be a result of multiple factors external to the program itself and that we do not know what these prices would have been over the last two decades without the IFQ management regime. In other words, the baseline period does not provide a sufficient counterfactual against which to evaluate the impacts of the IFQ Program on ex-vessel prices because one would need to know what halibut and sablefish ex-vessel prices would have been over the last 20 years in the absence of the IFQ Program. Researchers have, however, evaluated the impacts of the program with different analytical methods than those used here. For example, Hermann and Criddle (2006) developed a simultaneous equation model of the markets for Pacific halibut and showed that the IFQ Program resulted in an increase in average wholesale prices for halibut by $0.24 and average ex-vessel prices by $0.21 during the first seven years of the program. Warpinski, Hermann, Greenberg, and Criddle (2016) applied a similar model for sablefish, showing that for the modeling period (1988 to 2014) the IFQ management regime resulted in a 36.7% ex-vessel price increase for Alaska sablefish. Both of these modeling efforts point to increased prices for halibut and sablefish as a result of IFQ implementation.

Summary

The IFQ Program was anticipated to result in product quality improvements for IFQ fish due to prolonged fishing season, better handling of fish, decreased processing costs, and better targeting of markets. These benefits were expected to be especially significant for halibut, which is primarily consumed in North America and therefore could feasibly have substantial increases in production for the fresh market. Since IFQ implementation, Alaskan halibut has gradually increased in fresh production, averaging 48% fresh product from 1995 to 2014 compared to 20% during the 1992 to 1994 baseline period. Sablefish product form largely did not change following IFQ implementation, as sablefish continues to be primarily processed as frozen fish for the export market to Japan. Wholesale prices for both IFQ fish have increased since IFQ Program implementation as well, although slightly more so for halibut, and price increases have transferred to dockside price increases for fishermen. Assuming a direct relationship between wholesale and ex-vessel prices and product quality, the marked increases in these prices over the 20 years of the IFQ Program and the results of the simulation modeling exercises cited above provide an indication that there is a potential association between the IFQ management regime and improved product quality in the IFQ fisheries.

References

Herrmann, M., & Criddle, K. 2006. An econometric market model for the Pacific halibut fishery. *Marine Resource Economics*, 129-158.

Warpinski, S., Herrmann, M., Greenberg, J. A., & Criddle, K. R. (2016). Alaska's Sablefish Fishery after Individual Fishing Quota (IFQ) Program Implementation: an International Economic Market Model. *North American Journal of Fisheries Management*, *36*(4), 864-875.

2.3.4 Harvest flexibility

Many of the benefits that were anticipated to materialize from the implementation of the IFQ Program (e.g. longer fishing seasons, better product, less gear conflict) were associated with the flexibility that would be afforded by QS allocations. The majority of these effects are discussed under other sections of this review. This section focuses on the 10% adjustment policy (the underage and overage provision), which was intended to provide additional flexibility benefits to IFQ participants, and the inter-area harvest provision that was implemented in 2005 allowing harvest of halibut Area 4C IFQ (and CDQ) in Area 4D.

Data

The data utilized in this section was provided by the NMFS RAM Division and NOAA's Office of Law Enforcement Alaska Division (for the overage violation data). Previously, data similar to that presented in Table 2.3-1 and Table A.2.3.4.1 were presented in the NMFS's annual Reports to the Fleet (e.g., NMFS (2012)). Data on the usage of the underage and overage provisions prior to 1998 was not available. Data similar to that presented in Table 2.3-2 are available in NMFS's Halibut Transfer Report (see NMFS (2015)).

2.3.4.1 The 10% adjustment policy (underage and overage)

Under the 10% adjustment policy, which has been in place since the start of the IFQ Program, a QS holder's annual IFQ allocation may be adjusted by up to 10% to cover under or over harvest from the previous year. The adjustment is to the IFQ permit account, which is area-specific. For an underage adjustment, if IFQ pounds remain un-fished, up to 10% of a person's total IFQ account for the current fishing year may be carried over to the following year. If the person has fished some pounds on their IFQ permit, the underage adjustment is up to 10% of the unfished amount. For an overage, if a person exceeds an IFQ account by up to 10% of their remaining balance at the time of landing, the holder of the QS may see a deduction in their permit account in the following year by the amount of the overage. If the overage exceeds 10% of the remaining balance, this would require enforcement action without future administrative adjustment, which is described in more detail in the following section.

The 10% adjustment policy was intended to address the difficulty of harvesting one's exact annual IFQ allocation. At the time of IFQ Program implementation, there was concern that fishermen would resolve overages by high-grading and discarding some of their catch. Providing for a small amount of overage with a deduction from the following year's IFQ allocation would reduce these incentives. The underage provision was included to provide equitable treatment to QS holders, who did not harvest their full IFQ.

NMFS applies administrative adjustments at the beginning of each fishing year when annual IFQ accounts are created and IFQ pounds are allocated to QS holders on an IFQ permit. Administrative adjustments "follow the QS" so that the adjustment is computed for the IFQ permit of the person who, at the beginning of a year, holds the QS associated with the IFQ permit with an underage or overage the prior year. In other words, the underage or overage adjustments occur in the following year even if the IFQ permit is transferred.

The underage or overage is added after the TAC has been fully distributed to the QS pool and the annual IFQ pounds are calculated for each permit holder. The underage and overage adjustments are calculated somewhat differently. If a QS holder holds 10,000 QS units in Area 2C and the QS to IFQ ratio for 2016 in Area 2C is 15.15 pounds, then the QS holder is assigned 660 pounds (equivalent to 10,000/15.15) on an IFQ permit. If the shareholder had an overage of 60 pounds in Area 2C in 2015, their final allocation for 2016 in Area 2C would be 600 pounds. The shareholder may carry over up to 10% of their remaining IFQ permit balance to the following year. So, if the QS holder above did not harvest any of their IFQ in 2016, they would be able to carry over 10% of 600 pounds, or 60 pounds. If the shareholder harvested 400 pounds of their IFQ in 2016, they would be able to carry over 10% of their remaining balance of 200 pounds, or 20 pounds.

Table 2.3-1 shows the total underage and overage administrative adjustments in the IFQ fisheries since the implementation of the IFQ Program as total pounds and percentages of the TACs. This does not include any overages that may have been in excess of the 10% allowable adjustment, or overage violations, which are discussed in the following section. For both fisheries, the administrative underage adjustments have substantially exceeded the administrative overage adjustment in every year since the implementation of the IFQ Program. The total administrative adjustments for both underage and overage have amounted to less than 5% of the TAC in every year since IFQ implementation. The continued greater utilization of the underage provision relative to the overage provision may be indicative of a lack of information amongst IFQ participants about the overage provision or maybe even some potential anticipation of beneficial changes in halibut prices. In other words, an IFQ holder may want to retain some of their annual IFQ allocation for the following year if they anticipate some increase in revenue in excess of the opportunity costs of not harvesting that IFQ in the current year.

Although administrative underage and overage adjustments account for a relatively small percentage of the TAC, the percentages of all permit accounts for which there was an adjustment averaged between 79% and 80% for the halibut and sablefish IFQ fisheries, respectively, from 1998 to 2014. These numbers indicate that the 10% adjustment policy provides substantial utility to QS holders in the IFQ fisheries. These percentages have decreased from about 90% for both IFQ fisheries since 1998.

Table 2.3-1 Total underage and overage administrative adjustments

Year	Halibut				Sablefish			
	Total underage adjustments	Percent of TAC transferred as underage	Total overage adjustments	Percent of TAC transferred as overage	Total underage adjustments	Percent of TAC transferred as underage	Total overage adjustments	Percent of TAC transferred as overage
1995	1,300,000	3.47%	-373,500	1.00%	1,019,400	2.23%	-424,500	0.93%
1996	961,700	2.57%	-371,500	0.99%	591,200	1.67%	-380,800	1.08%
1997	1,193,400	2.33%	-535,700	1.05%	641,500	2.12%	-405,200	1.34%
1998	2,046,414	3.67%	-364,634	0.65%	846,645	2.84%	-202,548	0.68%
1999	1,607,674	2.75%	-387,294	0.66%	795,747	2.93%	-150,402	0.55%
2000	1,607,788	3.03%	-387,294	0.73%	795,932	2.66%	-150,402	0.50%
2001	1,230,708	2.10%	-386,357	0.66%	820,578	2.82%	-184,351	0.63%
2002	1,706,271	2.89%	-366,655	0.62%	956,758	3.26%	-139,941	0.48%
2003	1,123,179	1.90%	-449,263	0.76%	750,074	2.15%	-159,878	0.46%
2004	1,122,362	1.90%	-508,434	0.86%	1,078,265	2.84%	-216,954	0.57%
2005	1,260,247	2.21%	-440,176	0.77%	1,250,826	3.50%	-172,211	0.48%
2006	1,350,576	2.53%	-362,681	0.68%	981,202	2.84%	-191,568	0.55%
2007	1,137,305	2.40%	-346,747	0.73%	1,025,278	3.07%	-159,209	0.48%
2008	1,054,105	2.19%	-330,715	0.69%	930,997	3.11%	-192,580	0.64%
2009	1,054,229	2.42%	-280,539	0.64%	846,611	3.20%	-162,555	0.61%
2010	1,116,859	2.77%	-204,493	0.51%	682,457	2.74%	-149,374	0.60%
2011	792,254	2.61%	-279,482	0.92%	690,894	2.58%	-120,903	0.45%
2012	688,716	2.87%	-210,586	0.88%	748,301	2.55%	-124,306	0.42%
2013	626,285	2.87%	-169,346	0.78%	935,908	3.34%	-91,587	0.33%
2014	623,293	3.91%	-142,425	0.89%	913,273	3.86%	-87,871	0.37%

Source: NMFS RAM

Tables A2.3.4.1 and A2.3.4.2 at the end of this section show the breakdown of the annual administrative adjustments by IFQ regulatory area for the halibut and sablefish IFQ fisheries, respectively. The tables begin with data from 2000 – the first year that an area-specific breakdown was available. For both IFQ fisheries, on average, annual administrative adjustments have been the lowest in the Southeast and Gulf of Alaska regulatory areas (Areas 2C, Areas 3A, and 3B of the halibut fishery and the Southeast, Western Yakutat, and Central Gulf areas of the sablefish fishery). This may be related to the relative accessibility of fishing grounds and better marine weather conditions in the Southeast and Gulf compared to the Aleutian Islands and Bering Sea.

These administrative overage and underage adjustments require complicated programming by NMFS to calculate each shareholder's next year's annual IFQ allocations. As a result, there is a lag period at the end of the IFQ fishing season, during which QS holders cannot make transfers because their accounts are being adjusted. This can be problematic for QS holders who want to transfer their QS, because they want to be able to calculate a specific price for underage or overage pounds.

2.3.4.2 Overage violations

If a person exceeds their remaining IFQ account balance at the time of landing by over 10%, this becomes an overage violation and an enforcement action rather than an administrative adjustment to an IFQ account. An overage violation is detected at the time of landing if the IFQ landing is in excess of 10% of the remaining balance on the IFQ account at the time of landing. When a QS holder exceeds this balance by more than 10%, the entire overage is seized by the government. In other words, if a QS holder exceeds their balance by 11%, they have to forfeit that entire 11% overage (in terms of landed pounds) to the government. For any overages greater than 10% and up to 33%, the QS holder just has to forfeit their entire overage. For overages greater than 33% and up to 66% and exceeding 1000 pounds, the QS holder has to forfeit the overage and pay a fine of $1 per pound of the overage (assuming no prior violations). For overages greater than 66% and exceeding 1000 pounds, the QS holder has to forfeit the overage and pay a fine of $1.50 per pound of the overage (assuming no prior violations).[29]

NOAA's Office of Law Enforcement (OLE) administers all overage violations above the 10% allowable adjustment threshold. OLE does not differentiate in their database between overages within the various ranges of penalties, nor does it track the amount of IFQ pounds associated with the overages. All harvests are accounted for in NMFS's catch accounting system, however, and calculated as part of total harvests that are reported annually.

Figure 2.3-5 shows the total overage violations (overages above the 10% allowable threshold) for both the halibut and sablefish IFQ fleets from 2005 through 2015. This overage violations data is completely separate from the annual administrative adjustment data within the 10% threshold presented in Table 2.3-1. Data on overage violations prior to 2005 were not available due to significant database changes in 2005. Although there is no distinction in this data between violations in the various penalty ranges, anecdotally there have been very few cases since IFQ implementation of violations above the 33% threshold (personal communication, Special Agent Al Duncan (OLE), May 26, 2016). Overall, overage violations represent a very small percentage of total IFQ permits in both IFQ fleets. Over the decadal dataset, 0.7% to 1.2% of all IFQ permit accounts were associated with an overage violation. Given that the remaining balance on an IFQ permit may be a very small amount of pounds and that it is difficult for an IFQ permit holder to accurately predict catch per unit effort, it may not be that surprising that several dozen such violations occur annually. On the other hand, this may also be indicative of IFQ permit holders trying to harvest IFQ up to that 10% allowable overage threshold and exceeding that amount.

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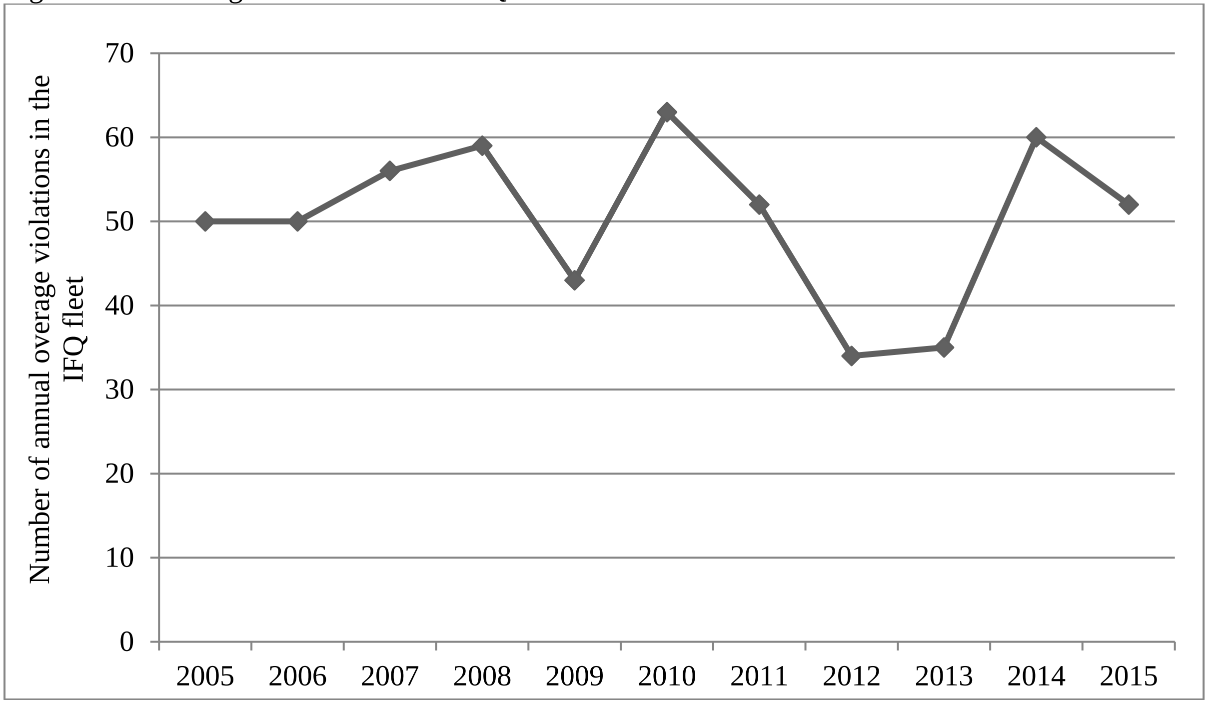
[29] A specific schedule of fees is available here: http://www.gc.noaa.gov/documents/gces/AK%20SS%20and%20Fix-it_FINAL.pdf

Figure 2.3-5 Overage violations in the IFQ fleet



Source: NOAA OLE

The data in Table 2.3-1 reveal substantial inter-annual variability in overage violations in the IFQ fisheries. The underlying reason for this variability is uncertain, but is likely to be a combination of fluctuations in monitoring/enforcement effort, IFQ fishermen's behavior, and changes in the regulatory environment and catch per unit effort. This inter-annual variability does not seem to be a factor of changes in the number of total IFQ permits, which have consistently decreased from 2005 to 2015. While this analysis identifies trends from the last ten years, analytical expansions could be used to more thoroughly examine these issues, outside of the scope of this document. For example, a count data regression model could be used to examine overage violations at the area level as a function of area-specific conditions (e.g., TAC and regulatory changes). Or, since overage violations are associated with specific IFQ permits, a permit-specific behavioral model could be developed to examine the choice to exceed an annual IFQ allocation as a function of individual and permit-specific and other characteristics. (Administrative overages could also be included in this model and/or differences in administrative overages and overage violations could be examined.)

2.3.4.3 **Biological management implications of the 10% adjustment policy**

To date, there have been no concerns about the biological implications of the 10% adjustment policy because the annual underage adjustments have always been substantially greater than the overage adjustments and the levels of both have been quite small relative to the TAC (personal communication, Ian Stewart (IPHC), March 30, 2016). Furthermore, all overages including overage violations are accounted for in calculations of total annual harvests, and the TACs have not been exceeded since IFQ implementation. There would, however, be a concern if there was a very large underage coupled with a decrease in the TAC in the following year. If the full underage were harvested in the following year, this could represent a large percentage of that year's TAC, although this would not technically be an over-harvest of the TAC because the underage amounts were authorized for harvest on IFQ permits.

The 10% adjustment policy likely provides significant benefits for the management of the halibut and sablefish IFQ fisheries. Without the flexibility afforded by the 10% adjustment policy, QS holders would likely have a greater incentive to try to harvest their full allocation annually, which, given the uncertainties of catch per unit effort, could also make them more likely to harvest in excess of their allocation. Given that QS holders would not be able to land fish in excess of their allocations and that there would be penalties for over-harvesting, the end result could be greater high-grading and discard rates, as discussed during the development of the IFQ Program and in Section 2.9.

2.3.4.4 **Inter-area harvest provision**

The IPHC considers the halibut in Areas 4C, 4D, and 4E to be a single stock unit for stock assessment and management purposes. Separation of these areas was a socio-economic decision established in the Council's Catch Sharing Plan for Area 4 (61 FR 11337). Therefore, there has been latitude for the Council to consider exemptions to harvesting halibut allocations across these management areas.

In 2003, NMFS amended the IFQ Program to allow CDQ Program participants to harvest allocations of Area 4D halibut CDQ in Area 4E. This action was intended to allow residents in CDQ communities along the Western Alaska coast to have more near-shore opportunities to harvest their group's CDQ halibut. This action is not discussed further in this section because it only affected CDQ halibut, which is not specifically included in the IFQ Program Review.

In 2005, in response to reports of localized depletion, decreasing catch per unit effort, and resultant limitations on the optimal utilization of Area 4C IFQ and CDQ, the Council passed an Omnibus (IV) amendment package providing for the harvest of Area 4C IFQ and CDQ in Area 4D. Area 4C surrounds the Pribilof Islands and communities of St. George and St. Paul.

Prior to the passage of this amendment, halibut fishermen in Area 4C were experiencing a steady drop in catch rates, amounting to a decline of 70% over the previous decade. During the 2003 fishing season, Area 4C fishermen landed just 42% of the total Area 4C IFQ halibut allocation compared to a statewide average of 97% for all areas. These declining catch rates and poor harvests had led to considerable concern amongst the community residents of St. Paul and St. George, for whom the halibut resource is the mainstay of household fisheries income.

Declining catch rates in Area 4C were assumed to be indicative of a decrease in halibut abundance over time in the area, which was associated with concentrated fishing effort in a relatively small fishing area and reduced recruitment and immigration into Area 4C. The available fishing grounds in Area 4C consist of only 561 square nautical miles out of a total of 11,076 square nautical miles comprising Area 4C. Incidental catch of halibut in other fisheries had also reduced recruitment and immigration.[30] Therefore, in addition to providing more expansive fishing opportunities for Pribilof Island community residents, the provision allowing Area 4C IFQ or CDQ holders to fish their IFQ or CDQ in Area 4D was also intended to reduce effort in Area 4C and to observe how the halibut biomass responded.

NMFS adjusts 4C IFQ permits by deducting any landings made in Area 4D that were in excess of Area 4D annual IFQ allocations from the 4C permits. Any amount of halibut IFQ catch in Area 4D that exceeds the 4D allocation and is subtracted from the Area 4C allocation will no longer be available for harvest in Area 4C. IFQ landed in Area 4C will also be deducted from the Area 4C IFQ allocation. In effect, there is no requirement for a formal transfer of Area 4C IFQ into Area 4D in order to be able to harvest Area 4C IFQ in Area 4D. Each IFQ holder has to monitor the harvest of Area 4C and 4D halibut

[30] The proposed rule for this amendment includes extensive discussion of these issues – 70 FR 23829, May 5 2005.

IFQ to ensure that: (1) their total catch in Area 4C does not exceed their Area 4C allocation, minus any portion of their Area 4C quota harvested in Area 4D, (2) their total catch in Area 4D does not exceed the sum of their Area 4C and Area 4D allocations, minus any portion of their Area 4C allocation harvested in Area 4C, and (3) their total catch in Areas 4C and 4D does not exceed the sum of their Area 4C and Area 4D allocations.

Table 2.3-2 shows the harvest of Area 4C and 4D TACs since IFQ implementation. After the implementation of the 2005 amendment, Area 4C and 4D TACs are combined, as are Area 4C and 4D harvests. The data reveal that harvest of Area 4C TACs plummeted in the three years prior to the 2005 amendment. Since 2008, over 90% of the combined TACs of Areas 4C and 4D have been harvested, except for 2013 when only 89% was harvested. The harvest of the combined TACs has remained high despite decreasing stock abundance in these areas as reflected in the decreasing TACs. During the first three years following the implementation of the amendment, 4C and 4D harvests were under 90% of the combined TACs, perhaps indicative of 4C IFQ holders adjusting to the new harvesting flexibility.

Combined with the underage data provided in Table A2.3.4.1, the data in Table 2.3-2 indicates that the utilization of Area 4C TACs increased after implementation of the inter-area harvest provision in the 2005 amendment. In Area 4C, the average percent of the TAC that was transferred as an underage to the following year decreased from 7.5% for 2000 through 2004 to 5.6% for 2005 through 2014. During the same time period for Area 4D, these percentages increased from 3.1% to 3.3%, so that the utilization of Area 4D TACs actually decreased slightly. This may be due to a number of factors including the increase in competition from Area 4C QS holders on fishing grounds in Area 4D, a decrease in the pressure on Area 4D QS holders, who are also 4C QS holders, to fully harvest their 4D IFQ if they are harvesting more of their 4C IFQ, marine weather conditions, resource accessibility, etc.

Table 2.3-2 Harvest of Area 4C and 4D TACs

Year	4C TAC	4C harvest	% 4C TAC harvested	4D TAC	4D harvest	% 4D TAC harvested
1995	385,000	301,221	78%	539,000	431,768	80%
1996	385,000	296,439	77%	539,000	487,140	90%
1997	580,000	504,926	87%	812,000	757,182	93%
1998	795,000	473,120	60%	1,113,000	842,812	76%
1999	1,015,000	767,567	76%	1,421,000	1,302,747	92%
2000	1,015,000	731,358	72%	1,421,000	1,378,038	97%
2001	1,015,000	724,815	71%	1,421,000	1,368,875	96%
2002	1,015,000	484,815	48%	1,421,000	1,360,253	96%
2003	1,015,000	424,935	42%	1,421,000	1,421,028	100%
2004	860,000	478,274	56%	1,204,000	1,202,152	99%
Year	4C/4D TAC	4C/4D harvest	% TAC harvested			
2005	2,178,000	1,756,825	81%			
2006	1,932,000	1,655,348	86%			
2007	2,239,800	1,986,725	89%			
2008	2,122,800	2,113,434	99%			
2009	1,882,800	1,737,668	92%			
2010	1,950,000	1,809,616	93%			
2011	2,028,000	1,847,773	91%			
2012	1,328,827	1,207,051	91%			
2013	1,030,800	917,155	89%			
2014	715,920	688,225	96%			
2015	715,920	690,581	96%			

Source: NMFS 2015a. Note: Area 4C and 4D TACs are combined following the 2005 amendment allowing 4C IFQ to be harvested in Area 4D.

Summary

Many of the benefits that were anticipated to materialize from the IFQ Program were associated with the flexibility that would be afforded by QS allocations. This section focused specifically on examining the utilization of the 10% administrative adjustment policy (the underage and overage provision, which allows annual adjustments of IFQ permits by up to 10% of the remaining balance), and the inter-area harvest provision that was implemented in 2005. Since IFQ implementation, administrative adjustments within the allowable 10% threshold have accounted for a very small percentage of the overall TACs for both IFQ fisheries (generally less than 1%).

However, on average 79% to 80% of all IFQ permit accounts in the halibut and sablefish fisheries, respectively, have been adjusted on an annual basis since 1998. In other words, administrative adjustments are highly utilized in the IFQ fisheries, although they don't amount to a substantial amount of IFQ. Overage violations are overages above the 10% allowable threshold for an IFQ permit. From 2005 to 2015, when these data were available, annual overage violations ranged from 34 to 63. Several dozen annual overage violations may be expected given the small IFQ amounts likely left over on IFQ permits at the end of the fishing season that permit holders are trying to harvest, but these violations may also be indicative of QS holders trying to maximize harvests to the allowable 10% overage. It should be noted that inclusive of both administrative overages and overage violations, the TACs in the IFQ fisheries have not been exceeded since IFQ implementation. That is at least in part because annual underage adjustments have greatly exceeded overage adjustments since IFQ.

In 2005, in response to declining catch rates and poor harvest in halibut Area 4C – the regulatory area surrounding the Pribilof Islands – an amendment was implemented into the IFQ Program allowing Area 4C IFQ harvest in Area 4D. There is indication that this amendment provided for the increased harvest of Area 4C IFQ, even in the face of declining halibut stock abundance in the Bering Sea as indicated by halibut TACs. Annual underage adjustments for Area 4C IFQ permits have decreased from 7.5% for 2000 through 2004 to 5.6% for 2005 through 2014, while increasing slightly for Area 4D IFQ permits. This may be indicative of increased competition on fishing grounds as well as decreasing resource abundance.

Appendix A2.3.4

Table A2.3.4.1 Total underage and overage adjustments in the halibut IFQ fishery in pounds and as a percent of the area TACs

Area		2000	2001	2002	2003	2004	2005	2006	2007
2C	Underage	404,575	263,953	334,996	170,266	202,675	304,895	370,623	334,172
	Overage	-34,050	-38,178	-29,168	-50,173	-43,257	-38,260	-36,261	-41,892
	% of area TAC as underage	4.82%	3.01%	3.94%	2.00%	1.93%	2.79%	3.49%	3.93%
	% of area TAC as overage	0.41%	0.43%	0.34%	0.59%	0.41%	0.35%	0.34%	0.49%
3A	Underage	564,715	376,023	549,188	323,124	339,290	426,169	455,136	365,051
	Overage	-156,438	-149,744	-129,493	-172,937	-202,875	-175,693	-158,400	-162,207
	% of area TAC as underage	3.08%	1.72%	2.43%	1.43%	1.35%	1.67%	1.81%	1.39%
	% of area TAC as overage	0.85%	0.68%	0.57%	0.76%	0.81%	0.69%	0.63%	0.62%
3B	Underage	286,792	237,823	405,844	307,214	217,941	304,546	259,616	206,217
	Overage	-90,373	-99,558	-96,472	-119,293	-134,100	-112,775	-87,874	-84,275
	% of area TAC as underage	1.91%	1.44%	2.37%	1.79%	1.40%	2.32%	2.39%	2.24%
	% of area TAC as overage	0.60%	0.60%	0.56%	0.70%	0.86%	0.86%	0.81%	0.91%
4A	Underage	96,971	106,159	139,962	102,924	121,552	94,610	101,498	86,300
	Overage	-58,468	-48,643	-57,460	-49,740	-58,924	-40,090	-38,399	-24,856
	% of area TAC as underage	1.95%	2.14%	2.82%	2.07%	3.50%	2.75%	3.03%	2.99%
	% of area TAC as overage	1.18%	0.98%	1.16%	1.00%	1.70%	1.17%	1.15%	0.86%
4B	Underage	149,087	128,269	164,752	96,569	121,187	59,153	79,163	60,244
	Overage	-22,349	-25,678	-27,088	-31,544	-30,675	-27,997	-15,177	-22,158
	% of area TAC as underage	3.80%	3.27%	4.93%	2.89%	5.31%	3.27%	5.93%	5.23%
	% of area TAC as overage	0.57%	0.65%	0.81%	0.94%	1.34%	1.55%	1.14%	1.92%

4C	Underage	56,788	66,408	60,891	85,572	92,630	55,918	46,254	44,739
	Overage	-11,138	-2,953	-4,074	-886	-1,136	-5,393	-13,552	-7,245
	% of area TAC as underage	5.59%	6.54%	6.00%	8.43%	10.77%	6.16%	5.75%	4.79%
	% of area TAC as overage	1.10%	0.29%	0.40%	0.09%	0.13%	0.59%	1.68%	0.78%
4D	Underage	48,860	52,073	50,638	37,510	27,087	14,956	38,286	40,582
	Overage	-14,478	-21,603	-22,900	-24,690	-37,467	-39,968	-13,018	-4,114
	% of area TAC as underage	3.44%	3.66%	3.56%	2.64%	2.25%	1.18%	3.40%	3.11%
	% of area TAC as overage	1.02%	1.52%	1.61%	1.74%	3.11%	3.15%	1.16%	0.31%

Source: NMFS RAM

Table A2.3.4.1 (cont.) Total underage and overage adjustments in the halibut IFQ fishery in pounds and as percentages of the area TACs

Area		2008	2009	2010	2011	2012	2013	2014
2C	Underage	261,045	190,794	163,280	109,893	56,352	61,563	72,914
	Overage	-27,980	-29,211	-21,700	-33,348	-24,305	-27,403	-24,211
	% of area TAC as underage	4.20%	3.80%	3.71%	4.72%	2.15%	2.07%	2.20%
	% of area TAC as overage	0.45%	0.58%	0.49%	1.43%	0.93%	0.92%	0.73%
3A	Underage	378,181	407,431	458,827	291,995	221,720	268,493	265,740
	Overage	-175,640	-137,666	-92,735	-147,496	-106,256	-77,258	-58,090
	% of area TAC as underage	1.56%	1.88%	2.30%	2.03%	1.86%	2.43%	3.63%
	% of area TAC as overage	0.73%	0.63%	0.46%	1.03%	0.89%	0.70%	0.79%
3B	Underage	176,899	223,684	271,429	162,763	196,208	135,286	131,023
	Overage	-81,946	-71,992	-55,448	-57,467	-40,948	-33,517	-33,935
	% of area TAC as underage	1.62%	2.05%	2.74%	2.17%	3.87%	3.15%	4.61%
	% of area TAC as overage	0.75%	0.66%	0.56%	0.77%	0.81%	0.78%	1.19%
4A	Underage	91,230	119,292	85,805	59,596	79,844	42,591	48,273
	Overage	-21,202	-16,044	-20,516	-19,585	-19,726	-19,152	-13,590
	% of area TAC as underage	2.94%	4.68%	3.68%	2.47%	5.10%	3.20%	5.68%
	% of area TAC as overage	0.68%	0.63%	0.88%	0.81%	1.26%	1.44%	1.60%
4B	Underage	41,793	66,249	66,731	100,794	63,336	63,226	61,681
	Overage	-15,829	-13,004	-8,785	-12,719	-10,123	-8,224	-6,430
	% of area TAC as underage	2.81%	4.43%	3.86%	5.78%	4.24%	5.45%	6.76%
	% of area TAC as overage	1.06%	0.87%	0.51%	0.73%	0.68%	0.71%	0.71%
4C	Underage	56,698	30,238	28,215	35,385	33,838	29,017	25,137

	Overage	-321	-7,984	-2,802	-2,484	-4,452	-1,699	-2,248
	% of area TAC as underage	6.41%	3.85%	3.47%	4.19%	6.11%	6.76%	8.43%
	% of area TAC as overage	0.04%	1.02%	0.34%	0.29%	0.80%	0.40%	0.75%
4D	Underage	48,259	16,541	42,572	31,828	37,418	26,109	18,525
	Overage	-7,797	-4,638	-2,507	-6,383	-4,776	-2,093	-3,921
	% of area TAC as underage	3.90%	1.51%	3.74%	2.69%	4.83%	4.34%	4.44%
	% of area TAC as overage	0.63%	0.42%	0.22%	0.54%	0.62%	0.35%	0.94%

Table A2.3.4.2 Total underage and overage adjustments in the sablefish IFQ fishery in pounds and as percentages of the area TACs

Area		2000	2001	2002	2003	2004	2005	2006	2007
AI	Underage	154,827	265,515	281,402	247,948	353,889	354,104	216,626	319,615
	Overage	-733	-2,644	-6,752	-6,175	-12,485	-597	-20,936	-12,696
	TAC	3,215,189	3,306,900	3,373,920	4,100,556	4,100,556	3,465,631	3,968,280	3,716,956
	% of area TAC as underage	4.82%	8.03%	8.34%	6.05%	8.63%	10.22%	5.46%	8.60%
	% of area TAC as overage	0.02%	0.08%	0.20%	0.15%	0.30%	0.02%	0.53%	0.34%
BS	Underage	95,499	101,040	106,404	110,215	219,343	230,278	157,904	181,790
	Overage	-2,701	-886	-2,718	-888	-2,434	-2,724	-7,008	-2,932
	TAC	1,296,305	1,375,670	1,701,951	2,557,336	2,557,336	2,151,690	2,486,789	2,627,883
	% of area TAC as underage	7.37%	7.34%	6.25%	4.31%	8.58%	10.70%	6.35%	6.92%
	% of area TAC as overage	0.21%	0.06%	0.16%	0.03%	0.10%	0.13%	0.28%	0.11%
CG	Underage	203,066	161,816	213,398	121,660	155,849	180,618	225,717	198,604
	Overage	-42,141	-62,989	-44,532	-44,397	-84,211	-72,879	-50,526	-43,931
	TAC	10,105,886	9,541,509	9,576,782	11,358,099	12,874,864	12,786,680	11,234,642	10,917,179
	% of area TAC as underage	2.01%	1.70%	2.23%	1.07%	1.21%	1.41%	2.01%	1.82%
	% of area TAC as overage	0.42%	0.66%	0.46%	0.39%	0.65%	0.57%	0.45%	0.40%
SE	Underage	185,901	154,034	177,171	138,989	133,729	184,491	174,889	144,854
	Overage	-37,926	-47,382	-35,127	-43,537	-42,360	-48,457	-44,043	-42,221
	TAC	7,832,944	7,407,456	7,076,766	7,848,376	8,311,342	7,870,422	7,760,192	7,429,502
	% of area TAC as underage	2.37%	2.08%	2.50%	1.77%	1.61%	2.34%	2.25%	1.95%
	% of area TAC as overage	0.48%	0.64%	0.50%	0.55%	0.51%	0.62%	0.57%	0.57%
WG	Underage	86,948	79,278	109,714	72,416	135,299	216,360	142,502	118,709
	Overage	-30,834	-17,918	-17,511	-35,294	-34,243	-9,874	-39,492	-25,946

	TAC	3,245,171	3,544,997	3,950,643	4,532,658	5,167,582	4,479,747	4,709,026	4,356,290
	% of area TAC as underage	2.68%	2.24%	2.78%	1.60%	2.62%	4.83%	3.03%	2.73%
	% of area TAC as overage	0.95%	0.51%	0.44%	0.78%	0.66%	0.22%	0.84%	0.60%
WY	Underage	69,691	58,895	68,669	58,846	80,156	84,975	63,564	61,706
	Overage	-36,067	-52,532	-33,301	-29,587	-41,221	-37,680	-29,563	-31,483
	TAC	4,230,627	3,944,029	3,708,137	4,466,520	4,925,076	5,011,056	4,387,154	4,402,586
	% of area TAC as underage	1.65%	1.49%	1.85%	1.32%	1.63%	1.70%	1.45%	1.40%
	% of area TAC as overage	0.85%	1.33%	0.90%	0.66%	0.84%	0.75%	0.67%	0.72%

Source: NMFS RAM

Table A2.3.4.2 (cont.) Total underage and overage adjustments in the sablefish IFQ fishery in pounds and as percentages of the area TACs

Area		2008	2009	2010	2011	2012	2013	2014
AI	Underage	276,969	262,865	219,698	182,767	224,265	194,307	215,881
	Overage	-10,996	-4,421	-1483	-2,041		-276	-742
	TAC	3,227,534	2,910,072	2,738,113	2,738,113	2,710,776	2,830,706	2,394,196
	% of area TAC as underage	8.58%	9.03%	8.02%	6.67%	8.27%	6.86%	9.02%
	% of area TAC as overage	0.34%	0.15%	0.05%	0.07%	0.00%	0.01%	0.03%
BS	Underage	164,267	186,337	160,188	213,265	223,597	128,139	86,716
	Overage	-9,634	-1,798	-2,542	-1,845		-3,586	-435
	TAC	2,522,062	2,398,605	2,460,334	2,513,244	1,966,503	1,393,307	1,181,666
	% of area TAC as underage	6.51%	7.77%	6.51%	8.49%	11.37%	9.20%	7.34%
	% of area TAC as overage	0.38%	0.07%	0.10%	0.07%	0.00%	0.26%	0.04%
CG	Underage	167,652	114,159	111,187	88,514	107,504	258,469	272,671
	Overage	-62,089	-50,913	-46,530	-39,115	-46,410	-23,759	-30,513
	TAC	9,700,240	8,800,763	7,954,197	8,359,843	10,158,797	9,770,787	8,256,227
	% of area TAC as underage	1.73%	1.30%	1.40%	1.06%	1.06%	2.65%	3.30%
	% of area TAC as overage	0.64%	0.58%	0.58%	0.47%	0.46%	0.24%	0.37%
SE	Underage	141,949	138,527	93,918	91,828	93,999	153,977	172,359
	Overage	-40,560	-48,749	-42,613	-34,718	-33,943	-33,069	-32,575
	TAC	7,098,812	6,053,832	5,687,868	6,481,524	6,995,196	7,032,674	5,941,397
	% of area TAC as underage	2.00%	2.29%	1.65%	1.42%	1.34%	2.19%	2.90%
	% of area TAC as overage	0.57%	0.81%	0.75%	0.54%	0.49%	0.47%	0.55%
WG	Underage	128,121	94,149	56,864	75,673	60,470	112,322	119,980

	Overage	-26,295	-21,292	-32,077	-14,359	-18,268	-9,303	-6,089
	TAC	3,333,355	2,892,435	2,927,709	2,857,162	3,139,350	3,086,440	2,610,246
	% of area TAC as underage	3.84%	3.26%	1.94%	2.65%	1.93%	3.64%	4.60%
	% of area TAC as overage	0.79%	0.74%	1.10%	0.50%	0.58%	0.30%	0.23%
WY	Underage	52,039	50,574	40,602	38,847	38,466	88,694	45,666
	Overage	-43,006	-35,382	-24,129	-28,825	-25,685	-21,594	-17,517
	TAC	4,085,124	3,432,562	3,108,486	3,844,822	4,356,290	3,899,937	3,295,877

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2.3.5 Fleet Diversity

This section will address Objective 4 of the original EIS for the IFQ Program.

- Objective 4: Maintain the diversity in the fleet with respect to vessel categories.

As explained in Section 1.4.4.1, QS are designated by vessel class, with a class of catcher-processor QS (Class A) and several classes of catcher vessel QS. The halibut IFQ fishery has three classes of catcher vessel QS (Class B for vessels greater than 60 feet LOA; Class C for vessels greater than 35 to 60 feet LOA; and Class D for vessels less or equal than 35 feet LOA). The sablefish IFQ fishery has two classes of catcher vessel QS (Class B for vessels greater than 60 feet LOA; Class C for vessels equal to or less than 60 feet LOA). There are no length restrictions associated with Class A QS in either IFQ fishery. Inter-class trading of QS is prohibited.

The Council's intention in designating the QS by class and in prohibiting trading between vessel classes was to prevent a redistribution of fishing privileges amongst vessel classes. At the time of IFQ implementation, the Council was concerned that if all of the QS in an area were available to all sizes of vessel, the owners of large vessels or freezer boats would acquire them. The Council viewed the displacement of small vessels as particularly problematic because of their tie to coastal communities and because they provide an opportunity for more people to participate in the fisheries. However, inter-class QS trading constraints limited the potential production efficiency gains that could have been achieved with an unrestricted market. The Council also recognized this tradeoff at the time of IFQ implementation.

Over the course of the IFQ Program, the Council has lifted some of the constraints on the size of the vessel upon which catcher vessel IFQ may be fished. The "fish down" amendment in 1996 allowed catcher vessel IFQ to be fished on vessels of a smaller size class. In 2007, the "fish down" provision was fully extended to halibut Area 2C and the Southeast Outside District of the sablefish fishery. The Council intended for the provision to provide flexibility for QS holders to acquire more catcher vessel QS of any size. The Council has also amended the IFQ Program to allow "fishing up" in halibut IFQ areas 3B, 4B, and 4C – the landing of IFQ derived from smaller class QS on larger class vessels. The intent of these "fish up" amendments was to alleviate safety concerns and issues with not being able to fully harvest QS allocated to small vessels in western Alaska waters.

This section examines QS distributions and IFQ harvests by vessel class, the evolution of participation in the IFQ fisheries with respect to multiple definitions of vessel diversification, and the production efficiency costs and qualitative benefits of maintaining fleet diversity in the IFQ fisheries. This section includes information on QS and fishery revenue distribution by vessel length, the utilization of the fish up and fish down provisions, vessel diversification into multiple IFQ areas and into both IFQ fisheries, and the tradeoffs between production efficiency and maintaining fleet diversity.

Data

This section utilizes QS transfer prices and QS distributions by vessel class, which have been previously provided in the NMFS Transfer Reports (NMFS 2015a; 2015b). The QS transfer prices by vessel class for the IFQ fisheries were provided by NMFS RAM IFQ shareholdings database. The data on fishery revenue distributions by vessel lengths, the distributions of catcher vessel IFQ landings by vessel size, and vessel diversification information (with respect to vessels landing across multiple areas and multiple IFQ fisheries) was all provided by AKFIN.

2.3.5.1 QS distribution by vessel length

Because QS trading between vessel classes is prohibited, QS distributions by vessel class for both IFQ fisheries were essentially fixed at the time of IFQ implementation. There have been minor changes over the course of the IFQ Program in the QS pool and distribution by vessel class across the IFQ regulatory areas, due to CDQ "swappable" QS and administrative revocations.

Setting aside TAC for the CDQ Program effectively reduced the harvest limits of individuals who were initially allocated QS in those areas. To compensate QS holders for this reduction, persons receiving QS in CDQ areas (halibut Areas 4B, 4C, 4D, and 4E; sablefish Bering Sea and Aleutian Islands areas), received additional QS in each of the management areas in which CDQs were not allocated. In many cases persons received CDQ compensation QS in areas in which they did not historically fish and therefore had not been issued regular QS. When this occurred, a person's catcher vessel CDQ compensation was unblocked and "swappable" to another catcher vessel category in the same area upon the first transfer. Because of such swaps, the total amount of QS may change in an area and vessel category after initial allocation.

Quota share distributions by vessel class can also change from initial issuance in an area due to appeal adjudications. In several cases QS was revoked to correct erroneous issuance (if still held by initial recipient) or for failure to pay fines resulting from violations. In 2012, in response to a recommendation from the Council, NMFS issued a final rule, sending notices to QS holders who had been inactive since

IFQ implementation that their QS would be revoked. The Council defined inactive as a QS holder who had not fished their IFQ or engaged in transfers. This action resulted in the revocation of about 2,000 pounds of IFQ, most of which was Class D halibut QS.

Table 2.3-3 shows the QS distribution by vessel class for the halibut and sablefish IFQ fisheries at initial allocation and in 2015. On this aggregate level, there have not been any changes in QS distributions by vessel class in either fishery. The majority of QS in the halibut IFQ fishery was allocated to Class C vessels, followed by allocations to Class B vessels, with Class A and D vessels together receiving only 11% of the total QS. Whereas in the sablefish IFQ fishery, the distribution of QS across the vessel classes is fairly more even.

Table 2.3-3 QS distribution by vessel class at initial allocation and in 2015

QS class	Halibut		Sablefish	
	Initial % of QS pool	2015 % of QS pool	Initial % of QS pool	2015 % of QS pool
Class A	3%	3%	21%	21%
Class B	37%	37%	42%	42%
Class C	52%	52%	37%	37%
Class D	8%	8%		

Source: NMFS, 2015a; 2015b

In the halibut fishery, there are 27 different area/vessel category combinations of QS (not including QS in Area 4E). Table 2.3-4 shows the QS distribution by vessel class by halibut IFQ area at initial allocation and in 2015. Throughout the halibut IFQ areas, QS distributions have remained largely the same since initial allocation, with changes not exceeding 1% for any vessel class-area combination.

As QS class designation was issued based on the characteristics of historical participation, this distribution highlights the differences in fleet characteristics by area. For example, in areas where nearshore fishing opportunities are available, the fisheries tended to comprise of smaller vessels, yielding history for D or C class QS. This is the case in areas such as Southeast Alaska (Area 2C), and for some communities in Gulf of Alaska (Areas 3A). Therefore, for example, in the 2C halibut fishery, C and D class QS make up almost 93% of the available QS, while B shares represent less than 5%. Area 4B and Area 4D fisheries have historically been prosecuted by larger vessels, generally more equipped to travel offshore for multiple days, and especially pre-IFQ Program, some of these vessels consisted of freezer long lining operations. Because of this, in Areas 4B more than 80% of the QS in these areas is made up of A and B class QS. In Area 4D, 91% of the QS is made up of A and B class shares, along with no vessels qualifying for halibut D class QS.

Table 2.3-4 Halibut QS distribution by vessel class and area at initial allocation and in 2015

Area	Vessel Class	Initial Percentage of Area QS	2015 Percentage of Area QS
2C	Class A	2%	2%
	Class B	5%	4%
	Class C	77%	78%
	Class D	16%	15%
3A	Class A	3%	3%
	Class B	37%	37%
	Class C	53%	53%
	Class D	7%	7%
3B	Class A	3%	3%
	Class B	55%	55%
	Class C	39%	39%
	Class D	4%	3%
4A	Class A	4%	4%
	Class B	58%	59%
	Class C	30%	30%
	Class D	8%	7%
4B	Class A	6%	6%
	Class B	77%	77%
	Class C	15%	15%
	Class D	3%	3%
4C	Class A	0%	0%
	Class B	44%	40%
	Class C	26%	22%

	Class D	29%	38%
4D	Class A	8%	8%
	Class B	82%	83%
	Class C	10%	9%

Source: NMFS 2015a

The sablefish IFQ fishery has tended to be prosecuted on larger vessels, compared to the halibut IFQ fishery; however, there are vessels that have been diversified in both species (discussed later in this section). In the sablefish fishery, C class shares were assigned to individuals operating the smallest vessels in this fishery. In the sablefish fishery, there are 18 different area/vessel category combinations of QS. As in the halibut IFQ fishery, QS distributions have remained largely the same since initial allocation, with changes not exceeding 1% for any vessel class-area combination.

There is substantial inter-area variability in QS distributions by vessel class for the sablefish IFQ fishery. The QS distribution in the Southeast Outside District of the sablefish fishery is dominated by the smaller vessel class, indicative of the greater participation of smaller vessels in this area relative to the other IFQ areas due to the easier accessibility to sablefish fishing grounds in Southeast Alaska compared to the other areas.

Table 2.3-5 Sablefish QS distribution by vessel class and area at initial allocation and in 2015

Area	Vessel Class	Initial Percentage of Area QS	2015 Percentage of Area QS
SE	Class A	10%	9%
	Class B	21%	20%
	Class C	70%	70%
WY	Class A	8%	8%
	Class B	61%	61%
	Class C	31%	31%
CG	Class A	15%	16%
	Class B	48%	48%
	Class C	37%	37%
WG	Class A	38%	38%
	Class B	43%	43%
	Class C	19%	19%
BS	Class A	39%	40%
	Class B	42%	41%
	Class C	19%	19%
AI	Class A	56%	56%
	Class B	36%	35%
	Class C	8%	8%

Source: NMFS 2015b

2.3.5.2 Utilization of the fish up and fish down provisions

In January 1996, the Council approved a “fish down” amendment that allows catcher vessel QS to be used on vessels of the same vessel size class or smaller. The Council intended for this provision to provide flexibility for QS holders to acquire more catcher vessel QS. The amendment allowed the use of larger vessel category QS on smaller vessels, except in Area 2C of the halibut IFQ fishery and the Southeast Outside District of the sablefish IFQ fishery, where “fish down” of Class B (greater than 60 feet LOA) QS is allowed only for blocks worth less than 5,000 pounds (based upon 1996 quotas). This amendment became effective August 16, 1996. A 2007 amendment removed the Area 2C and Southeast fish down restriction to provide greater operational flexibility and harvest efficiency. See Section 1.2 for a detailed description of the fish down provision.

The Council has also amended the IFQ Program to allow "fishing up" in some halibut IFQ areas – the landing of IFQ derived from smaller class QS on larger class vessels. In 2007, an amendment was implemented to the IFQ Program to allow halibut IFQ derived from Class D QS to be fished on vessels less than or equal to 60 feet in length in Areas 3B and 4C. In 2014, an amendment was implemented allowing halibut IFQ derived from Class D QS to be fished on vessels in the Class C category in Area 4B. The intent of these "fish up" amendments was to alleviate safety concerns and issues with not being able to fully harvest QS allocated to small vessels in western Alaska waters. See Section 1.2 for a detailed description of the fish up provision.

Table 2.3-6 and Table 2.3-7 show the distributions of halibut and sablefish catcher vessel IFQ harvest, respectively, by catcher vessel QS class and vessel size. The data on the length of vessel upon which the IFQ was harvested was taken from the IFQ landings database. For the landings database, this information is sourced from the NMFS Alaska Region database on vessel lengths, which is a combination of data that is self-reported by the vessel owner when they obtain a Federal Fisheries Permit and data from the State of Alaska CFEC database. The vessel length data is constantly updated and the length applied herein is the vessel length as of June 2016. Prior to 2012, there was no annual vessel file with vessel lengths, so the vessel length data prior to that year is the vessel length for 2012. As a result, there may be several issues with the vessel length information used for the following tables. Because some of the data is self-reported data, vessel owners may (and do) change their reported vessel lengths over time. Vessel owners may also reconstruct or modify their vessels and change the actual lengths of their vessels. This can lead to inconsistent distributions of catcher vessel IFQ landings by vessel size across time, as well as landings in some years on what appear to be vessels of a different size than is allowed by the regulations. However, for the most part, if vessel lengths change over the years it is only by a few feet.

Overall, the distributions of the halibut catcher vessel IFQ landings by vessel class align with expectations, in that the majority of IFQ from each vessel class is landed on the corresponding, appropriate sized length of vessel (e.g., Class B IFQ is mostly landed on greater than 60 foot LOA vessels). There is also indication of the utilization of the "fish up" and "fish down" provisions in the halibut IFQ fishery. An increasing portion of Class B IFQ is being landed by vessels greater than 35 to 60 feet LOA, and beginning in 2008 there was an increase in the harvest of Class D IFQ by vessels greater than 35 to 60 feet LOA as well. The trends in landings across the vessel classes are aligned with the fishery revenue distributions across the vessel classes as seen in Figure 2.3-6. That is, the greater than 35 to 60 foot LOA vessels are accounting for an increasing percentage of IFQ landings and revenues.

Table 2.3-6 Distributions of halibut catcher vessel IFQ harvest by QS class and vessel size

Year	Class B			Class C			Class D		
	≤ 35 FT	>35 to 60 FT	> 60 FT	≤ 35 FT	>35 to 60 FT	> 60 FT	≤ 35 FT	>35 to 60 FT	> 60 FT
1995	0%	25%	75%	7%	92%	0%	98%	2%	0%
1996	1%	28%	71%	8%	92%	0%	98%	2%	0%
1997	1%	31%	68%	9%	91%	0%	99%	1%	0%
1998	1%	34%	65%	8%	92%	0%	98%	2%	0%
1999	2%	35%	64%	8%	92%	0%	98%	2%	0%
2000	3%	21%	77%	6%	94%	0%	98%	2%	0%
2001	2%	24%	74%	6%	94%	0%	99%	1%	0%
2002	2%	27%	71%	5%	95%	0%	100%	0%	0%
2003	2%	27%	71%	6%	94%	0%	99%	1%	0%
2004	2%	29%	68%	7%	93%	0%	100%	0%	0%
2005	2%	32%	66%	7%	93%	0%	99%	1%	0%
2006	3%	33%	65%	7%	93%	0%	99%	1%	0%
2007	3%	34%	62%	7%	93%	0%	97%	3%	0%
2008	3%	37%	60%	7%	93%	0%	88%	12%	0%
2009	3%	37%	60%	7%	93%	0%	88%	12%	0%
2010	2%	39%	59%	7%	93%	0%	88%	12%	0%
2011	3%	38%	59%	8%	92%	0%	84%	16%	0%
2012	3%	41%	56%	8%	92%	0%	88%	12%	0%
2013	4%	40%	56%	9%	91%	0%	95%	5%	0%
2014	4%	42%	54%	9%	91%	0%	95%	5%	0%
2015	4%	45%	51%	9%	91%	0%	94%	6%	0%

Source: NMFS IFQ Landings Database sourced by AKFIN

Similarly to the halibut IFQ fishery, there is indication that the “fish down” provision is being utilized in the sablefish IFQ fishery. Over the course of the IFQ Program, 19% to 44% of Class B IFQ annually has been landed on vessels less than or equal to 60 feet LOA. There is no “fishing up” allowed in the sablefish IFQ fishery. Again, the trends in landings across the vessel classes are aligned with the fishery revenue distributions across the vessel classes as seen in Table 2.3-7. The less than or equal to 60-foot LOA vessels are accounting for an increasing percentage of IFQ landings and revenues.

Table 2.3-7 Distributions of sablefish catcher vessel IFQ harvest by QS class and vessel size

Year	Class B		Class C	
	≤ 60 FT	> 60 FT	≤ 60 FT	> 60 FT
1995	36%	64%	100%	0%
1996	37%	63%	100%	0%
1997	41%	59%	100%	0%
1998	44%	56%	100%	0%
1999	44%	56%	100%	0%
2000	19%	81%	100%	0%
2001	23%	77%	100%	0%
2002	30%	70%	100%	0%
2003	26%	74%	100%	0%
2004	27%	73%	100%	0%
2005	27%	73%	100%	0%
2006	28%	72%	100%	0%
2007	27%	73%	100%	0%
2008	29%	71%	100%	0%
2009	30%	70%	100%	0%
2010	32%	68%	100%	0%
2011	32%	68%	100%	0%
2012	36%	64%	100%	0%
2013	38%	62%	100%	0%
2014	37%	63%	100%	0%
2015	36%	64%	100%	0%

Source: NMFS IFQ Landings data sourced by AKFIN

Table A.2.3.5.1 in the Appendix shows the distributions of halibut IFQ harvest by catcher vessel QS and vessel size by IFQ regulatory area. Across the halibut IFQ areas, there is the most inter-annual variability in how Class B QS is fished. Beginning in 2000, the Class B IFQ landings were mostly on greater than 60-foot vessels. Differences between pre 2000 and 2000 to 2007 may be due to database changes in 1999, which make the pre-1999 data less reliable. With the implementation of the "fish down" provision in 2007 in Area 2C, there has been an increase in Class B halibut IFQ fishing on less than or equal to 35 foot LOA and greater than 35 to 60 foot LOA vessels. The impacts of the "fish up" provision are also evident in the table, with Area 3B and 4C Class D IFQ increasingly fished on greater than 35 to 60 foot LOA vessels beginning in 2008. A similar increase is evident for Class D IFQ in Area 4B in 2015.

From Table A.2.3.5.1 it seems that the "fish down" provision is highly utilized by the greater than 35 foot to 60 foot vessels, with on average over the last five years 50% of Class B IFQ being fished on these vessels across the halibut IFQ areas. There seems to be much less utilization by the smaller size vessels, which account for about 8% of Class C IFQ landings across the halibut areas over the same time frame.

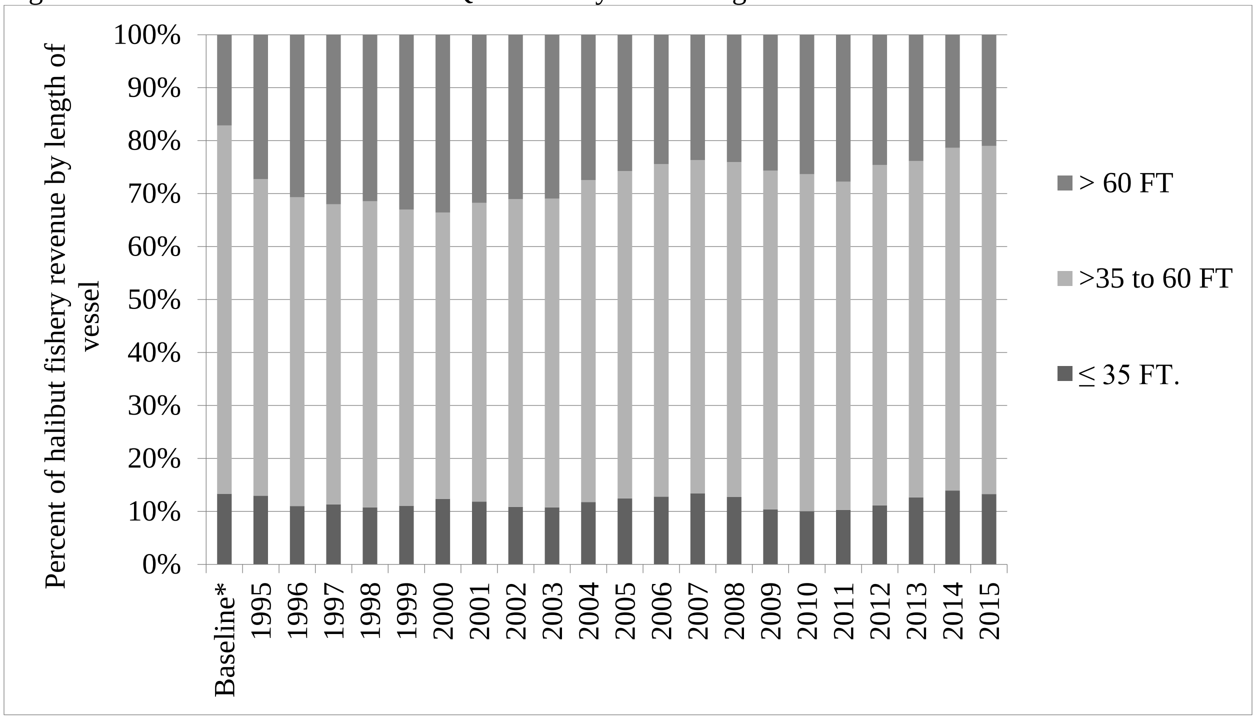
Table A.2.3.5.2 in the Appendix shows the distributions of sablefish IFQ harvest by catcher vessel QS and vessel size by IFQ regulatory area. There is considerable inter-annual variability in how Class B sablefish IFQ is landed between the less than and the greater than 60-foot LOA vessels, especially in the Aleutian Islands and Bering Sea regulatory areas. The greater than 60-foot LOA vessels dominated landings of Class B sablefish IFQ, except in the Western Gulf area wherein the less than or equal to 60-foot LOA vessels have accounted for the majority of Class B sablefish IFQ landed over the last several years. As in the halibut IFQ fishery, the implementation of the "fish down" provision in the Southeast regulatory area in the sablefish IFQ fishery in 2007 led to an increase in Class B sablefish IFQ landings on the less than or equal to 60 foot LOA vessels. Overall, there is an indication of increased utilization of the fish down provision over the 20 years of the IFQ Program, except in the Southeast and Western Gulf areas. Since there is no "fish up" provision for the sablefish IFQ fishery, the whole Class C QS is fished by the less than or equal to 60 foot LOA vessels.

2.3.5.3 Distribution of fishery revenue by vessel class

This section provides a discussion of IFQ fishery ex-vessel revenues by vessel length. Figure 2.3-6 shows the distribution of halibut IFQ fishery ex-vessel revenue by vessel length. The baseline is the average of the three years preceding IFQ implementation, 1992 through 1994. On average, since IFQ implementation the greater than 60-foot LOA fleet has accounted for 27% of the halibut IFQ fishery revenues, the greater than 35 to 60 foot LOA fleet has accounted for 61% and the less than or equal to 35-foot LOA fleet has accounted for 12%. There is also considerable inter-annual variability in halibut IFQ fishery revenue by vessel length.

Similar to vessel harvest by length overall, theoretically, the distributions of fishery revenues by vessel length should be largely aligned with QS distributions by vessel length. However, in Figure 2.3-6 this does not appear to be the case. There are likely several reasons for this. Since Class A IFQ is specific to a vessel length, and the harvest from Class A IFQ can be landed on any size vessel, this revenue could be distributed in any length category. This is particularly relevant for the sablefish IFQ fleet, which has a large amount of Class A QS. The fish up and fish down regulations that were explained in Section 2.3.5.2 allow for other opportunities for revenue to be distributed in a vessel length category that does not necessarily correspond with QS class type. Additionally, there could be ex vessel price differentiation by vessel length if a length category of vessels happened to land higher valued catch. Among other factors, this could be a matter of the distribution of QS class by area. If one area is receiving a higher ex vessel revenue in a year, and that area happens to have more small vessels, these revenues could be greater. Additionally, if more of one length category of vessels is relying on a processor that has identified a premium market for their product, this may change the distribution of ex vessel revenue by vessel length class. Finally, there may be a difference in distribution of ex vessel revenue by vessel length class if there are differences in the full utilization of IFQ.

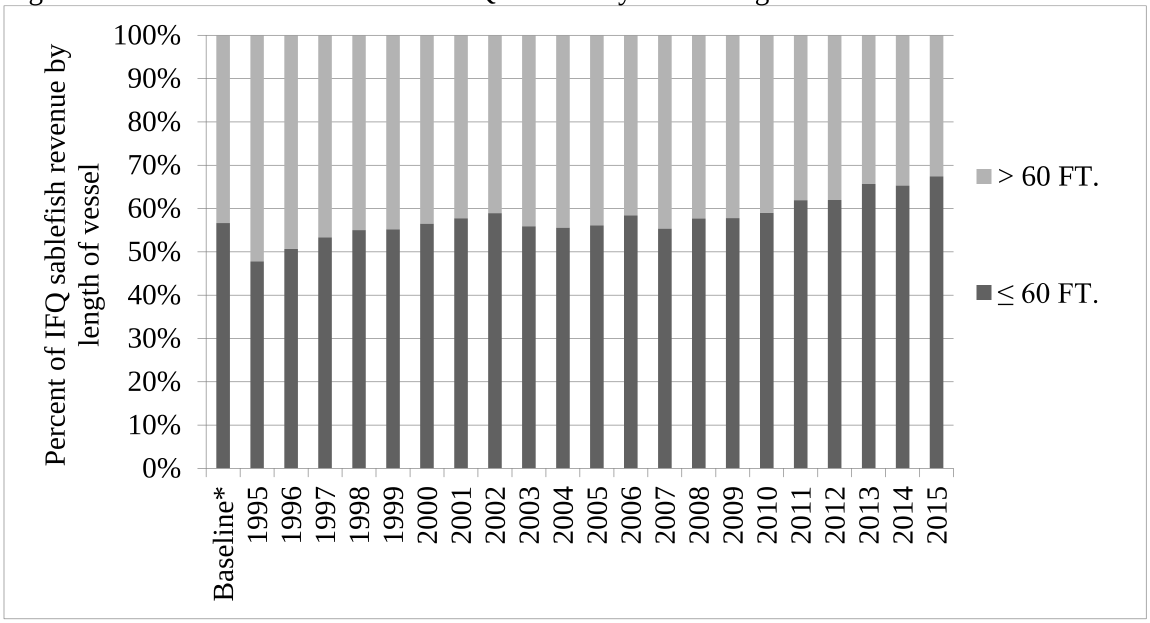
Figure 2.3-6 Distribution of halibut IFQ revenue by vessel length



Source: NMFS IFQ Landings data sourced by AKFIN

Figure 2.3-7 shows the distribution of sablefish IFQ fishery ex-vessel revenue by vessel length. Again, the baseline is the average of the three years preceding IFQ implementation, 1992 through 1994. On average since IFQ implementation the greater than 60-foot LOA fleet has accounted for 42% of the sablefish IFQ fishery revenues and the less than 60-foot LOA fleet has accounted for 58%. As in the halibut IFQ fishery, the distribution of fishery revenue by vessel length is not completely aligned with the distribution of QS by the relevant vessel class, and there is also considerable inter-annual variability in revenue by vessel length. As with the halibut IFQ fishery, these differences in QS and revenue distributions by vessel length likely reflect the size of the vessel upon which Class A IFQ is being landed, utilization of fish down and fish up provisions, any differences in the value of the landed catch, as well as the degree of utilization of the IFQ allocated to each class. For example, since IFQ implementation only 54% of the TAC in either the Aleutian Islands or the Bering Sea regulatory areas has been harvested and the majority of the TAC in those areas is allocated to the Class A and Class B vessels. This lack of utilization of the TAC in these areas can account for some of the difference in the amount of QS allocated by vessel class and the ex-vessel revenue by vessel length.

Figure 2.3-7 Distribution of sablefish IFQ revenue by vessel length



Source: NMFS IFQ Landings data sourced by AKFIN

2.3.5.4 Vessel diversification

Fishing is a highly financially risky business; subject to inter-annual variability in fish stocks, market prices, regulations, and weather conditions. A growing body of literature points to the potential application of risk portfolios, or diversification, as a means of managing this risk for fishermen and communities (Baldursson and Magnusson G 1997; Perruso et al., 2005; Sanchirico et al., 2007; Kasperski and Holland, 2013; Sethi et al., 2014). Fishermen can build portfolios that achieve diversity through participation in fisheries across regions and species. Income diversification in Alaska fisheries has been examined at the community level showing that communities with more diverse fishing portfolios experience lower fishing revenue vulnerability (Sethi et al. 2014) and at the vessel level showing that income variability is related to the degree of diversification (Kasperski and Holland, 2013).

Kasperski and Holland (2013) evaluated trends in diversification over time for vessels participating in fisheries off the West Coast and Alaska, including the halibut and sablefish IFQ fisheries, and analyzed the relationship between diversification and variation in revenues at the vessel level. The authors used the Herfindahl-Hirschman Index (HHI) to generate scores for individual vessels to indicate how diversified their fishing income was across all species groups on the West Coast and Alaska and regions each year. (The HHI is an index of concentration whereby higher numbers correspond to less diversification.) This study identified that for the vessels that had been involved in the halibut and sablefish IFQ fisheries, following the implementation of the IFQ Program there was a significant reduction in diversification (tested using one-way t tests of mean HHI scores before and after IFQ implementation). As the authors note, by the mid-1990s, entry into new fisheries was no longer possible for most vessels because nearly all fisheries had moratoriums on entry, and many were beginning to reduce fleets through attrition, vessel buybacks, or catch share programs that allowed for voluntary exit, cooperation, and consolidation.

Kasperski and Holland (2013) also looked at the relationship between the annual variation in fisheries income and diversification of fishing revenues in the IFQ fisheries, by calculating income variability for each vessel over the years[31] and comparing it to the HHI score for the vessel. Diversifying into multiple fisheries should reduce volatility of revenues and thus financial risk. The authors examined this relationship[32] and found that diversification can reduce annual income variation and the associated financial risk for fishermen.

Income diversification is also discussed as an important aspect of opportunities for new entrants into the IFQ fisheries (see Section 2.6). NMFS' Fisheries Finance Program is increasingly considering income diversification, whether from other fisheries or other non-fishing activities, as an important factor in loan approval decisions for QS purchases in the IFQ fisheries. Anecdotally, some IFQ participants have also noted that some shareholders acquire QS in the IFQ fisheries as a means of diversifying their fishing portfolios, which are dominated by State fisheries, or that they have to participate in the State fisheries in order to generate the capital necessary to buy into the IFQ fisheries.

This section examines changes in IFQ fleet diversity over time, where fleet diversity is measured with respect to diversifying into multiple IFQ areas and into the other IFQ fishery (halibut or sablefish). Changes in diversification in fisheries outside of the IFQ Program and even outside of Federal fisheries is outside of the scope of this review; however, it may be a useful analytical extension to understanding the full impacts of the IFQ Program on fishery portfolios.

Implementation of IFQ management as well as external factors to Alaska fisheries provided for a number of contrasting forces for fisheries diversification, likely influencing an individual's ability to diversify differently depending on their specific situation. For instance, particularly if an individual/entity had the ability to lease IFQ or use a hired master, they may have had more time to participate in other fisheries. The allocation of exclusive harvesting privileges provides one element of greater stability and certainty for the QS holder. This could allow for greater diversification as an individual has the ability to split up their season (between areas or IFQ species) with the certainty that the TAC will not be harvested before they have a chance to switch operations. The allocation of harvesting privileges also provides the holder with access to the equity value of that harvesting privilege. That value could be leveraged to make investments in other fisheries.

In contrast, an individual that is ineligible to lease IFQ or use a hired master would be required to be aboard the vessel while harvesting their IFQ. This individual may have less time available for diversifying into the other IFQ fishery or into other areas. Additionally as noted by Kasperski and Holland (2013), the allocation of QS created barriers to entry in the IFQ fishery. Although an individual's ability to diversify depends on a number of factors unique to their situation, the IFQ Program may have provided participants with the opportunity to diversify into multiple areas and multiple fisheries by providing for much longer fishing seasons and increased flexibility in how fishermen can participate in the IFQ fisheries,.

Figure 2.3-8 shows the percent of vessels participating in the halibut and sablefish IFQ fisheries that participated across multiple halibut and sablefish areas, respectively. The baseline is the average of the three years preceding IFQ implementation, 1992 through 1994. For both fisheries, there is a distinct spike in the percent of vessels participating across multiple IFQ areas, immediately following IFQ implementation. For the halibut IFQ fishery, the increase in the percent of vessels participating across multiple areas continued until the early 2000s when it stabilized, whereas in the sablefish IFQ fishery, there has been an increase in the percent of vessels participating across multiple areas in the last several

[31] The metric of income variability was the coefficient of variation (the ratio of the standard deviation to the mean) of fishing revenues for each vessel over the years.
[32] By estimating a quadratic regression of the coefficient of variation of gross fishery revenue as a function of HHI and HHI-squared.

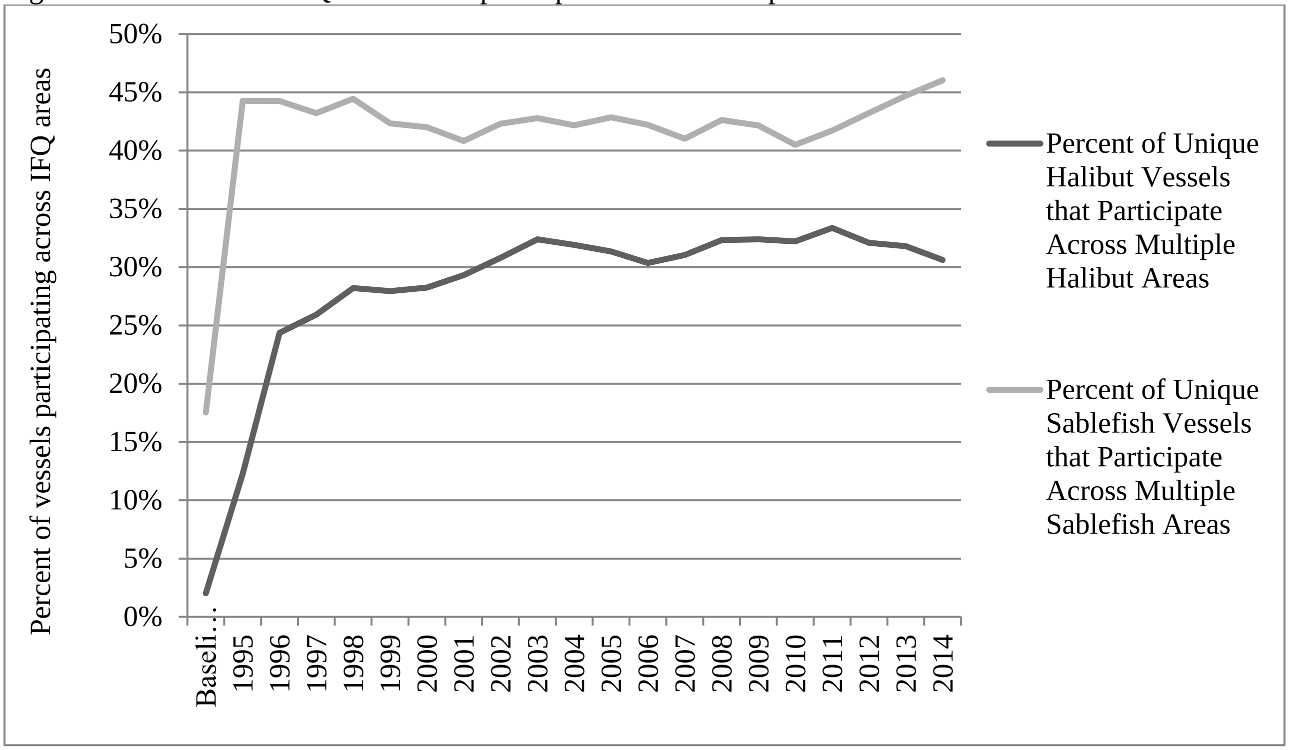
years as well. The increase in the percentage of vessels fishing across multiple areas is a factor of not only an increase in the number of multi-area vessels but also continued consolidation in the fishery, so that multi-area vessels comprise an increasing percentage of all vessels.

There are some differentiations in the participation of vessels across areas in the halibut and in the sablefish IFQ fisheries. The percent of unique halibut vessels participating across multiple sablefish areas may have been higher during the pre-IFQ baseline period because the sablefish seasons were less compressed than the halibut seasons, giving sablefish vessels the opportunity to participate in multiple areas. For the whole timeframe of the dataset, the majority of the vessels participating across multiple halibut IFQ areas are participating in two adjacent areas only, whereas for the sablefish IFQ fleet the majority of the multi-area vessels are participating in three adjacent areas, mostly Western Yakutat, Central Gulf, and Western Gulf. This may be expected given the smaller number of vessels in the sablefish fleet. Furthermore, given that the sablefish vessels are generally larger than the halibut vessels, they are able to travel further into more hazardous marine weather.

Figure 2.3-9 indicates a marked increase in the percent of all IFQ vessels fishing in both IFQ fisheries following IFQ implementation. This percentage has been relatively stable at just under 25% of all IFQ vessels over the last 6 years. As with diversification into multiple IFQ areas, the longer fishing seasons and greater flexibility afforded by the IFQ Program may have allowed participants to diversify into the other IFQ fishery, provided that they could purchase QS or otherwise obtain IFQ for use on the vessel (e.g., crew IFQ holdings or fishing as a hired master). Diversification across multiple IFQ areas and into the other IFQ fishery has likely become increasingly difficult over the course of the IFQ Program as QS prices continue to rise, although sablefish QS prices continue to be substantially lower than halibut QS prices (as will be further discussed in Section 2.3.5.5).

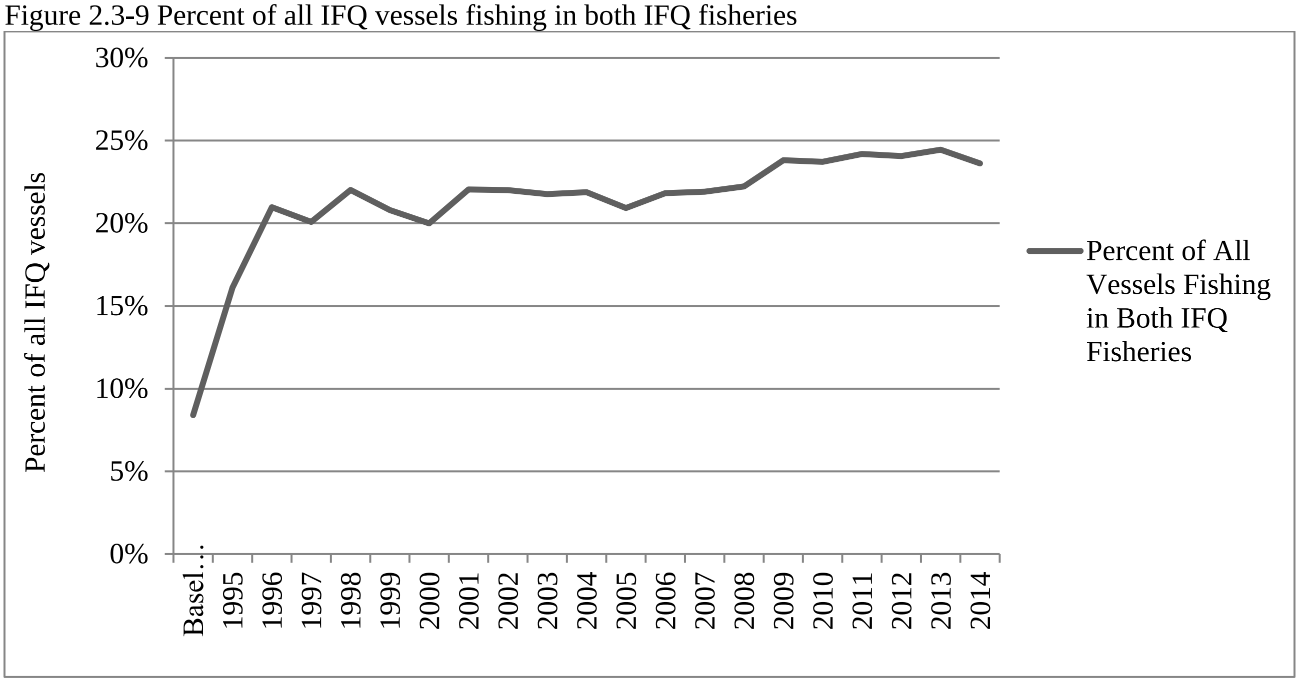
The increase in fishing across multiple areas and multiple IFQ fisheries post-IFQ indicates a different change in diversification than that found by Kasperski and Holland (2013) (who found that diversification for vessels that had been participating in the fisheries pre-IFQ decreased). The disparity in the findings of the IFQ review and Kasperksi and Holland's (2013) paper is likely due to differences in the vessels identified for the analyses and in the definition of diversification. Kasperski and Holland (2013) examined diversification with respect to the vessels that had been participating in the fixed-gear halibut and sablefish fisheries prior to IFQ implementation, whereas in the figures above the vessels include both those that had and had not been participating in the fixed-gear fisheries prior to IFQ. Kasperski and Holland (2013) also examined diversification with respect to different species groups outside of halibut and sablefish and different areas; the areas that they examined included the Bering Sea and Aleutian Islands, the Gulf of Alaska, the West Coast region, and Alaska in-State waters. Kasperski's and Holland's definition of diversification is much broader than the one utilized above to look at diversification into multiple IFQ areas and into just the other IFQ fisheries.

Figure 2.3-8 Percent of IFQ vessels that participated across multiple halibut and sablefish areas



Source: NMFS IFQ Landings data sourced by AKFIN

Figure 2.3-9 Percent of all IFQ vessels fishing in both IFQ fisheries



Source: NMFS IFQ Landings data sourced by AKFIN

2.3.5.5 Impacts of maintaining diversity on production efficiency

Maintaining fleet diversity in the IFQ fleet was anticipated to have economic efficiency costs with respect to limiting the production efficiency gains that could be had with an unrestricted market. This section provides a discussion of the efficiency and distributional tradeoffs of inter vessel class QS trading constraints, largely leaning on some recent literature that analyzed the production efficiency costs of these constraints and a broad discussion of the distributional tradeoffs, including maintaining employment and fishing opportunities.

Because the IFQ Program prohibits transfer of QS across vessel classes, the IFQ Program created discrete markets for each of the area-vessel class combinations. The basic concept of IFQ management is that holders of the production rights will have incentives to organize their production such that the value of their rights is maximized. As long as the rights are transferable, the rights holder has the choice to either harvest their IFQ or sell their QS. The basic rule is that the rights holder will harvest their own IFQ as long as they can earn more from doing so than from selling their QS on the market. Rights holders with lower marginal operating costs will have higher willingness to pay to purchase QS. Through this process, there will be a tendency for the production rights to end up with the most efficient operators and the value of production in the fishery will be maximized. Although this may not always be the case, these incentives are created by an IFQ management program.

The QS transfer price reflects the expected present value of an extra QS unit to future production, or the resource rent attributable to the scarcity value of the fish (Clark, 1980; 1985; 2005; Newell et al., 2007). In order to maximize rent in the fishery, the TAC should be allocated to those with the highest willingness to pay for the QS, or trades should be allowed such that these shareholders can purchase QS. With its numerous restrictions on QS transfers, the IFQ Program theoretically prevented the transfer of QS to the most efficient users and resulted in a lower rent than would have existed without these restrictions. The Council was aware that the QS trading restrictions would have potential costs. At the time of implementation of the IFQ Program, analysts for the final Environmental Impact Statement for the program estimated the costs of classifying QS by vessel class and prohibiting QS trading between vessel classes to be between $9.8 and $12.7 million in 1990 for the halibut fishery and about $1.2 million in 1989 for the sablefish fishery (NPFMC/NMFS, 1992).

Table 2.3-8 and Table 2.3-9 show halibut and sablefish QS prices, respectively, by vessel class averaged across all the respective IFQ areas in 2015 dollars. Due to confidentiality issues, QS prices can only be provided for years when there were at least three QS transactions for the vessel class. This results in numerous missing values for QS prices in the halibut IFQ fishery for Class A QS, since only about 3% of all QS in this fishery is Class A QS. Quota share prices are presented in 2015 dollars per pound of associated IFQ. QS prices are not available for 1999 because of database changes that year. For the sablefish IFQ fishery, there were no QS transfer prices available prior to 2000.

Theoretically, differences in QS prices between the vessel classes should reflect differences in earnings expectations, which would include expectations about ex-vessel prices and operating costs. One may expect that QS prices for Class A QS would be higher because this QS is associated with an additional processing right, as well as having no restrictions on leasing and the length of vessel upon which the resultant IFQ may be fished. Variation in QS prices across the catcher vessel classes is likely to reflect differences in operating costs as well some differentiation in the restrictiveness of the length of the vessel upon which the resultant IFQ may be fished (due to the fish up and fish down provisions).

Table 2.3-8 and Table 2.3-9 show that for most years QS prices are higher for Class A QS and for the larger vessel classes (Class B and C for the halibut fishery and Class B for the sablefish fishery). However, the differences in the QS prices are often small and in some years the smaller vessel classes have higher QS prices. The aggregation of regulatory area in Table 2.3-8 and Table 2.3-9, likely masks some of the QS class price differentiation. For instance, Transfer Reports (NMFS 2015a; NMFS, 2015b) suggest large variation in QS price by area. In 2014, in Area 2C, of the 45 self-reported transactions including prices, the mean price per pound for QS (all classes) was $44.29. This is compared to QS in Area 4A which resulted in a mean price per pound of $14.83 in 2014 (given 13 reported transfers). However due to the thin markets for some regulatory areas, price data disaggregated by area and QS class results a substantial amount of confidential information, thus was not included.[33]

Therefore, although the willingness to pay for QS is likely to vary across operators within each vessel class, the data in the tables below indicates that if the QS markets were opened to allow trading between vessel classes, some QS would likely flow from the smaller vessel classes to the larger classes, as was anticipated by the Council at the time of IFQ implementation. However, this movement of QS would be bounded by the individual and vessel use caps that exist to limit consolidation. Furthermore, the data also reveal that in many years Class D QS aggregated across all regulatory areas is not the lowest price QS in the halibut IFQ fishery. This could mean that Class D QS is not the QS that is most accessible to new entrants and small operators. This may be important for the Council to consider as it seeks to create or maintain entry opportunities for IFQ participants.

Table 2.3-8 Halibut QS prices by vessel class in 2015$, as the mean across all IFQ areas

Year	Class A	Class B	Class C	Class D
1995	**	$ 11.32	$ 10.39	$ 10.22
1996	$ 14.38	$ 12.27	$ 12.16	$ 10.91
1997	$ 18.04	$ 13.20	$ 13.21	$ 11.25
1998	**	$ 13.09	$ 11.79	$ 8.96
1999	**	$ -	$ -	**
2000	**	$ 9.96	$ 9.12	$ 7.16
2001	**	$ 10.39	$ 10.34	$ 7.67
2002	**	$ 9.86	$ 9.15	$ 7.55
2003	**	$ 10.71	$ 10.10	$ 8.28
2004	**	$ 14.46	$ 15.35	$ 11.80
2005	**	$ 15.93	$ 15.95	$ 15.16
2006	**	$ 18.36	$ 18.35	$ 14.25
2007	**	$ 16.18	$ 18.26	$ 14.92
2008	**	$ 20.80	$ 27.00	$ 17.79
2009	**	$ 19.99	$ 20.46	$ 19.38
2010	**	$ 17.50	$ 19.83	$ 22.12
2011	**	$ 23.12	$ 23.94	$ 24.53
2012	**	$ 35.65	$ 30.50	$ 32.16
2013	$ 35.65	$ 15.90	$ 31.89	$ 32.52
2014	**	$ 25.67	$ 33.54	$ 37.78

Source: NMFS, 2015a. ** indicates confidential data

[33] See NMFS (2015a; 2015b) for tables displaying non-confidential QS price information broken down by a number of different qualifications (i.e. area, QS class, price per QS unit, price per IFQ pound, etc.).

Table 2.3-9 Sablefish QS prices by vessel class in 2015$, as the mean across all IFQ areas

Year	Class A	Class B	Class C
2000	$ 16.67	$ 9.33	$ 9.33
2001	$ 15.21	$ 10.29	$ 8.90
2002	$ 11.59	$ 9.39	$ 7.89
2003	$ 12.44	$ 9.69	$ 8.85
2004	$ 14.51	$ 10.71	$ 10.03
2005	$ -	$ 10.48	$ 9.79
2006	$ 10.59	$ 9.25	$ 9.40
2007	$ 6.29	$ 10.60	$ 10.59
2008	$ 12.68	$ 10.90	$ 10.97
2009	$ 11.06	$ 12.57	$ 11.60
2010	$ 13.72	$ 14.75	$ 12.48
2011	$ 18.01	$ 16.20	$ 18.88
2012	$ 9.05	$ 14.96	$ 20.12
2013	$ 17.57	$ 16.53	$ 19.81
2014	$ -	$ -	$ 14.67
2015	$ -	$ 15.53	$ 13.64

Source: NMFS 2015b

Recently, researchers conducted an ex-post analysis of the costs of QS trading restrictions in the IFQ fisheries including those related to vessel class and QS blocks (Kroetz, Sanchirico, and Lew, 2015). They focused on examining whether or not restrictions in the QS market led to lower resource rents than would have existed in the hypothetical case where they did not exist. They hypothesized that a market with rules restricting production processes would likely to lead to the TAC being fished at higher costs and/or at lower per-unit revenue than when the trading market is unrestricted. To formally assess this, they estimated the price differentials between restricted and unrestricted QS using a model of QS prices that captured the impact of the restrictions. They estimated the differences in the total resource rent under the restricted and unrestricted scenarios and the differences in these rents were then the estimated costs of the QS trading restrictions. These estimates represent the long-run marginal value of moving one unit of quota from a restricted operation to an unrestricted one.

Overall, their results aligned with expectations in that more restricted QS sold for a lower price than restricted QS. They found that the restrictions in the IFQ fisheries had decreased the present value of resource rent (as measured by quota asset prices) over the lifetime of the program by approximately $117 million for halibut and $39 million for sablefish (in $2012). For 2011, this was estimated to be approximately 25% and 9% of the halibut and sablefish resource rents, respectively.

At the time of IFQ implementation, the Council recognized that implementing QS trading restrictions between vessel classes would mean that the QS in the IFQ fisheries would be harvested at a higher overall production cost than if these restrictions were not in place. But, the Council weighed these efficiency costs against the expected benefits associated from QS trading restrictions, such as providing more widespread fishing opportunities and employment in the IFQ fisheries. Furthermore, the Council considered the ties of the small vessel fleet to coastal communities and the potential multiplier effects on local economies of the revenue brought in by small vessel fishermen.

Without intensive modeling, it is inherently difficult to predict how QS would have moved between vessel classes had the QS transfer market not been restricted because mean QS prices by vessel class are often similar between the classes, use caps would have limited this QS movement, and participation in the IFQ fisheries would have been inherently different under an unrestricted market. Furthermore, as discussed more thoroughly in Section 2.4.1 and as analysts for the final EIS for the IFQ Program pointed out (NMFS/NPFMC, 1992) most vessels fished the halibut and sablefish fixed gear fisheries only part-time prior to IFQ implementation, so eliminating vessels from the IFQ fleet did not necessarily mean wholly eliminating fishing jobs. As Kasperski and Holland (2013) note, the vessels which had been participating in the fixed gear halibut and sablefish fisheries prior to IFQ have become more specialized in the IFQ fisheries exclusively since implementation, so that the revenue from the IFQ fisheries comprises a larger portion of their total fishing revenue. IFQ-related employment on these vessels is likely to have become more full-time. However, this research does not address diversification of vessels that did not receive initial allocations. This points to a critical gap in the understanding of the impacts of the QS trading restrictions in achieving their desired social objectives. In order to address this gap, researchers, including AFSC staff, are currently developing a structural dynamic model of the IFQ fisheries to predict how QS trading restrictions have affected entry and exit behavior, quantity fished, and profitability of IFQ fishery participants. This work builds on Kroetz (2014).

Summary

This section examines QS distributions and IFQ harvests by vessel class, the evolution of participation in the IFQ fisheries with respect to multiple definitions of vessel diversification, and the production efficiency costs and qualitative benefits of maintaining fleet diversity in the IFQ fisheries.

In the IFQ Program, QS are designated by vessel class with a class of catcher-processor QS (Class A) and several classes of catcher vessel QS designated by vessel length. There is no length restriction associated with the harvest of Class A IFQ in either IFQ fishery and inter-class trading of QS is prohibited. The Council’s intention in designating the QS by class and in prohibiting trading between vessel classes was to prevent a redistribution of fishing privileges amongst the vessel classes, largely from the smaller to the larger vessels. The Council viewed the removal of small vessels as particularly problematic because of their tie to coastal communities and because they provide an opportunity for more people to participate in the fisheries.

Because of the restriction on QS trading between vessel classes, QS distributions by vessel length were largely fixed at initial allocation. In the halibut IFQ fishery, 52% of QS was allocated to Class C, 37% to Class B, 8% to Class D, and 3% to Class A. In the sablefish IFQ fishery, the QS was more evenly distributed across the QS classes – 21% to Class A, 42% to Class B, and 37% to Class C. These distributions within the IFQ fisheries were very nearly the same at initial allocation and in 2015.

There is indication that the implementation of the “fish up” and “fish down” provisions provided desired flexibility in how catcher vessel IFQ may be landed in the IFQ fisheries. In both of the IFQ fisheries, an increasing portion of Class B IFQ is landed on smaller size vessels (greater than 35 to 60-foot LOA vessels in the halibut IFQ fishery and less than or equal to 60-foot LOA vessels in the sablefish IFQ fishery). In the halibut IFQ fishery, the implementation of the “fish up” amendment in 2007 was followed by an increasing portion of Class D IFQ being fished by the greater than 35 to 60-foot LOA vessels in Area 3B and 4C. A similar increase was seen in 2015 in Area 4B following the implementation of the “fish up” amendment for that area.

The fishery revenue distributions by vessel length are not completely aligned with QS distributions by vessel class. This is likely because of the utilization of the fish up and fish down provisions, because Class A IFQ can be landed on vessels of any length, and potentially because of ex vessel price differentials. The greater than 35 to 60-foot LOA vessel class accounts for the majority of halibut IFQ fishery revenue and has been increasing its portion of the total revenue over the course of the IFQ Program. The greater than 60-foot LOA vessel class accounts for less than the proportion of B class halibut QS and the less than or equal to 35-foot LOA vessel class accounts for more than their proportion of halibut QS, which largely reflects the utilization of the fish down provision. In the sablefish IFQ fishery, the less than or equal to 60-foot LOA vessel class accounts for an increasing proportion of total fishery revenue.

Income diversification, or the diversification of one's fishing portfolio, can be an important tool for managing financial risk for fishing businesses. Fishermen can diversify their fishing portfolios through participation across multiple regions and/or species. However, over time this kind of diversification has become more difficult to achieve because of the institution of various limited entry programs in fisheries. Kasperski and Holland (2013) examined diversification over time for vessels that had been participating in the fixed gear halibut and sablefish fisheries prior to IFQ implementation. They found that for these vessels there was a significant reduction in diversification following IFQ implementation. However, it could be expected that the implementation of an IFQ Program provided for increased diversification opportunities as participants were given more flexibility and the fishing seasons were prolonged. For the IFQ Program Review, a distinct increase was identified in the percent of unique vessels participating across multiple IFQ areas and in both IFQ fisheries following IFQ implementation. The disjunction in our findings and those of Kasperski and Holland (2013) may be attributed to the differences in the vessel identified for the analyses and the definition of diversification. Kasperski and Holland (2013) examined diversification with respect to different species groups and regions for vessels that had been participating in the fixed-gear fisheries prior to IFQ. The review examined diversification only as a factor of fishing in multiple IFQ areas and in both IFQ fisheries.

At the time of IFQ implementation, the Council recognized that maintaining fleet diversity by allocating QS by vessel class and prohibiting QS trading between vessel classes would have economic efficiency costs with respect to limiting the production efficiency gains that could be achieved with an unrestricted market. The prohibition on QS trading between the vessel classes prevented the redistribution of QS to those with the highest willingness to pay for the QS, which would reflect greater marginal earnings expectations. However, the Council weighed these efficiency costs against the QS trading restrictions that were intended to provide the benefits of more widespread fishing opportunities and employment in the IFQ fisheries as well as maintain the tie between the smaller vessel class and coastal communities.

Recently, researchers conducted an ex-post analysis of the costs of QS trading restrictions in the IFQ fisheries including those related to vessel class and QS blocks and found that these restrictions have decreased the present value of resource rent (as measured by QS prices) over the lifetime of the program by approximately \$117 million for halibut and \$39 million for sablefish (in \$2012), or 25% and 9% of the respective total resource rents (Kroetz, Sanchirico, and Lew, 2015). These researchers are currently developing a model to examine how these QS trading restrictions in turn affected entry and exit behavior, quantity fished, and profitability of IFQ fishery participants.

The differences in evidence of diversification following IFQ implementation from the Kasperski and Holland (2013) study and the brief examination in Figure 2.3-8 and Figure 2.3-9 above points to some interesting nuances that may be explored in future analytical extensions of diversification in the IFQ fisheries. Future research of diversification in the IFQ fleet could consider vessel diversification as a factor of vessel length, economic factors like earnings expectations based on operating costs, the TAC, ex-vessel prices of fish, and the generation of the participant (i.e., initial QS recipient or new entrant). The diversification strategy, or the necessity for diversification, may be fundamentally different based on the generation of the participant and may change over time as well. It may also be interesting to examine the choice of diversifying into multiple IFQ areas using an ordered logit or probit model. AFSC will be undertaking a study to examine many of these issues at the individual QS holder level for the IFQ fisheries.

Table A.2.3.5.1. Fishing Across Vessel Classes in the Halibut IFQ Fishery

Area 2C	Class B QS			Class C QS			Class D QS		
	LE 36 FT	36 to 60 FT	GT 60 FT	LE 36 FT	36 to 60 FT	GT 60 FT	LE 36 FT	36 to 60 FT	GT 60 FT
1995	0%	36%	64%	12%	88%	0%	99%	1%	0%
1996	0%	36%	64%	12%	88%	0%	99%	1%	0%
1997	2%	27%	71%	12%	88%	0%	100%	0%	0%
1998	1%	37%	62%	11%	89%	0%	100%	0%	0%
1999	2%	44%	54%	11%	89%	0%	100%	0%	0%
2000	0%	12%	88%	4%	96%	0%	98%	2%	0%
2001	1%	10%	88%	5%	95%	0%	100%	0%	0%
2002	2%	9%	89%	6%	94%	0%	100%	0%	0%
2003	2%	11%	87%	6%	94%	0%	100%	0%	0%
2004	3%	9%	88%	7%	93%	0%	100%	0%	0%
2005	3%	10%	88%	6%	94%	0%	100%	0%	0%
2006	2%	10%	88%	6%	94%	0%	99%	1%	0%
2007	1%	15%	84%	6%	94%	0%	100%	0%	0%
2008	2%	23%	75%	7%	93%	0%	100%	0%	0%
2009	2%	22%	76%	8%	92%	0%	100%	0%	0%
2010	5%	27%	68%	7%	93%	0%	100%	0%	0%
2011	6%	35%	59%	8%	92%	0%	100%	0%	0%
2012	5%	34%	62%	8%	92%	0%	100%	0%	0%
2013	5%	42%	54%	10%	90%	0%	100%	0%	0%
2014	6%	38%	56%	8%	92%	0%	100%	0%	0%
2015	6%	38%	55%	7%	93%	0%	100%	0%	0%

Area 3A	Class B QS			Class C QS			Class D QS		
	LE 36 FT	36 to 60 FT	GT 60 FT	LE 36 FT	36 to 60 FT	GT 60 FT	LE 36 FT	36 to 60 FT	GT 60 FT
1995	0%	24%	76%	6%	94%	0%	97%	3%	0%
1996	0%	30%	70%	5%	94%	0%	97%	3%	0%
1997	1%	34%	65%	7%	93%	0%	98%	2%	0%
1998	1%	37%	61%	6%	94%	0%	98%	2%	0%
1999	2%	38%	60%	7%	93%	0%	99%	1%	0%
2000	3%	22%	75%	5%	95%	0%	98%	2%	0%
2001	2%	23%	75%	5%	95%	0%	98%	2%	0%
2002	2%	25%	73%	5%	95%	0%	100%	0%	0%
2003	2%	25%	73%	6%	94%	0%	100%	0%	0%
2004	2%	27%	71%	6%	94%	0%	100%	0%	0%
2005	2%	28%	70%	7%	93%	0%	100%	0%	0%
2006	2%	30%	67%	8%	92%	0%	100%	0%	0%
2007	3%	31%	66%	7%	93%	0%	100%	0%	0%
2008	3%	33%	64%	7%	93%	0%	100%	0%	0%
2009	2%	34%	63%	6%	94%	0%	100%	0%	0%
2010	2%	34%	63%	7%	93%	0%	100%	0%	0%
2011	3%	35%	62%	8%	92%	0%	100%	0%	0%
2012	3%	36%	61%	8%	92%	0%	100%	0%	0%
2013	5%	36%	60%	9%	91%	0%	100%	0%	0%
2014	5%	38%	57%	10%	90%	0%	100%	0%	0%
2015	4%	42%	53%	10%	90%	0%	100%	0%	0%

Area 3B	Class B QS			Class C QS			Class D QS		
	LE 36 FT	36 to 60 FT	GT 60 FT	LE 36 FT	36 to 60 FT	GT 60 FT	LE 36 FT	36 to 60 FT	GT 60 FT
1995	0%	23%	77%	3%	97%	0%	97%	3%	0%
1996	1%	25%	74%	5%	95%	0%	95%	5%	0%
1997	1%	28%	70%	5%	95%	0%	99%	1%	0%
1998	1%	31%	68%	6%	94%	0%	98%	2%	0%
1999	1%	33%	66%	6%	94%	0%	94%	6%	0%
2000	2%	21%	77%	4%	96%	0%	99%	1%	0%
2001	2%	24%	74%	4%	96%	0%	100%	0%	0%
2002	1%	27%	72%	3%	97%	0%	100%	0%	0%
2003	2%	25%	73%	5%	95%	0%	100%	0%	0%
2004	2%	30%	68%	5%	95%	0%	100%	0%	0%
2005	2%	33%	65%	7%	93%	0%	100%	0%	0%
2006	2%	31%	66%	6%	94%	0%	100%	0%	0%
2007	4%	34%	63%	7%	93%	0%	100%	0%	0%
2008	4%	38%	59%	6%	94%	0%	76%	24%	0%
2009	3%	38%	59%	6%	94%	0%	62%	38%	0%
2010	2%	39%	59%	6%	94%	0%	67%	33%	0%
2011	4%	38%	58%	6%	94%	0%	75%	25%	0%
2012	4%	42%	55%	7%	93%	0%	69%	31%	0%
2013	4%	42%	54%	7%	93%	0%	70%	30%	0%
2014	5%	42%	52%	8%	92%	0%	75%	25%	0%
2015	4%	42%	54%	7%	93%	0%	64%	36%	0%

Area 4A	Class B QS			Class C QS			Class D QS		
	LE 36 FT	36 to 60 FT	GT 60 FT	LE 36 FT	36 to 60 FT	GT 60 FT	LE 36 FT	36 to 60 FT	GT 60 FT
1995	0%	31%	69%	1%	99%	0%	92%	8%	0%
1996	2%	31%	67%	10%	90%	0%	90%	10%	0%
1997	5%	28%	67%	26%	74%	0%	93%	7%	0%
1998	4%	33%	62%	21%	76%	3%	92%	8%	0%
1999	6%	32%	63%	26%	74%	0%	91%	9%	0%
2000	8%	20%	72%	29%	71%	0%	94%	6%	0%
2001	6%	21%	73%	26%	74%	0%	93%	7%	0%
2002	5%	28%	68%	17%	83%	0%	98%	2%	0%
2003	6%	31%	63%	16%	84%	0%	92%	8%	0%
2004	7%	33%	60%	24%	76%	0%	100%	0%	0%
2005	6%	38%	55%	21%	79%	0%	88%	12%	0%
2006	7%	45%	48%	15%	85%	0%	90%	10%	0%
2007	6%	46%	48%	17%	83%	0%	100%	0%	0%
2008	5%	45%	50%	17%	83%	0%	100%	0%	0%
2009	6%	47%	47%	13%	87%	0%	100%	0%	0%
2010	4%	51%	46%	11%	89%	0%	100%	0%	0%
2011	5%	55%	40%	14%	86%	0%	100%	0%	0%
2012	3%	60%	37%	11%	89%	0%	100%	0%	0%
2013	4%	57%	39%	14%	86%	0%	100%	0%	0%
2014	3%	61%	35%	14%	86%	0%	100%	0%	0%
2015	5%	57%	38%	15%	85%	0%	100%	0%	0%

Area 4B	Class B QS			Class C QS			Class D QS		
	LE 36 FT	36 to 60 FT	GT 60 FT	LE 36 FT	36 to 60 FT	GT 60 FT	LE 36 FT	36 to 60 FT	GT 60 FT
1995	0%	23%	77%	0%	100%	0%	100%	0%	0%
1996	0%	20%	80%	0%	100%	0%	0%	0%	0%
1997	0%	25%	75%	0%	100%	0%	100%	0%	0%
1998	0%	28%	72%	0%	100%	0%	100%	0%	0%
1999	0%	32%	68%	0%	100%	0%	0%	0%	0%
2000	0%	19%	81%	0%	100%	0%	100%	0%	0%
2001	0%	30%	70%	2%	98%	0%	100%	0%	0%
2002	0%	34%	66%	0%	100%	0%	100%	0%	0%
2003	0%	36%	64%	7%	93%	0%	100%	0%	0%
2004	0%	34%	66%	0%	100%	0%	100%	0%	0%
2005	0%	33%	67%	0%	100%	0%	100%	0%	0%
2006	0%	40%	60%	0%	100%	0%	100%	0%	0%
2007	0%	44%	56%	0%	100%	0%	100%	0%	0%
2008	0%	46%	54%	0%	100%	0%	100%	0%	0%
2009	0%	39%	61%	0%	100%	0%	0%	0%	0%
2010	0%	41%	59%	0%	100%	0%	100%	0%	0%
2011	0%	41%	59%	1%	99%	0%	100%	0%	0%
2012	0%	47%	53%	1%	99%	0%	100%	0%	0%
2013	0%	46%	54%	1%	99%	0%	100%	0%	0%
2014	0%	48%	52%	1%	99%	0%	100%	0%	0%
2015	1%	49%	51%	6%	94%	0%	87%	13%	0%

Area 4C	Class B QS			Class C QS			Class D QS		
	LE 36 FT	36 to 60 FT	GT 60 FT	LE 36 FT	36 to 60 FT	GT 60 FT	LE 36 FT	36 to 60 FT	GT 60 FT
1995	16%	25%	58%	0%	100%	0%	100%	0%	0%
1996	15%	27%	58%	0%	100%	0%	100%	0%	0%
1997	0%	42%	58%	0%	100%	0%	99%	1%	0%
1998	2%	35%	63%	3%	97%	0%	100%	0%	0%
1999	2%	40%	58%	0%	100%	0%	100%	0%	0%
2000	2%	24%	74%	4%	96%	0%	100%	0%	0%
2001	2%	41%	57%	1%	99%	0%	100%	0%	0%
2002	0%	46%	53%	0%	100%	0%	100%	0%	0%
2003	0%	54%	46%	0%	100%	0%	100%	0%	0%
2004	3%	61%	36%	0%	100%	0%	100%	0%	0%
2005	0%	59%	41%	0%	0%	0%	100%	0%	0%
2006	100%	0%	0%	68%	32%	0%	100%	0%	0%
2007	0%	100%	0%	100%	0%	0%	100%	0%	0%
2008	0%	77%	23%	0%	100%	0%	53%	47%	0%
2009	0%	100%	0%	0%	100%	0%	37%	63%	0%
2010	0%	13%	87%	0%	0%	0%	58%	42%	0%
2011	0%	91%	9%	0%	100%	0%	9%	91%	0%
2012	8%	81%	12%	25%	75%	0%	89%	11%	0%
2013	26%	61%	13%	0%	100%	0%	78%	22%	0%
2014	0%	100%	0%	35%	65%	0%	69%	31%	0%
2015	0%	5%	95%	27%	73%	0%	66%	34%	0%

Area 4D	Class B QS			Class C QS			Class D QS		
	LE 36 FT	36 to 60 FT	GT 60 FT	LE 36 FT	36 to 60 FT	GT 60 FT	LE 36 FT	36 to 60 FT	GT 60 FT
1995	0%	32%	68%	0%	100%	0%	0%	0%	0%
1996	0%	34%	66%	0%	100%	0%	0%	0%	0%
1997	0%	27%	73%	0%	100%	0%	0%	0%	0%
1998	0%	22%	78%	0%	100%	0%	0%	0%	0%
1999	0%	21%	79%	0%	100%	0%	0%	0%	0%
2000	0%	18%	82%	0%	100%	0%	0%	0%	0%
2001	0%	19%	81%	0%	100%	0%	0%	0%	0%
2002	0%	26%	74%	0%	100%	0%	0%	0%	0%
2003	0%	24%	76%	0%	100%	0%	0%	0%	0%
2004	0%	28%	72%	0%	100%	0%	0%	0%	0%
2005	0%	44%	56%	0%	100%	0%	0%	0%	0%
2006	0%	44%	56%	0%	100%	0%	100%	0%	0%
2007	0%	45%	55%	0%	100%	0%	0%	100%	0%
2008	0%	50%	50%	0%	100%	0%	0%	100%	0%
2009	0%	44%	56%	0%	100%	0%	0%	100%	0%
2010	0%	49%	51%	0%	100%	0%	0%	100%	0%
2011	0%	30%	70%	0%	100%	0%	0%	100%	0%
2012	0%	42%	58%	0%	100%	0%	0%	100%	0%
2013	0%	40%	60%	0%	100%	0%	0%	100%	0%
2014	0%	40%	60%	0%	100%	0%	0%	100%	0%
2015	0%	48%	52%	0%	100%	0%	0%	100%	0%

Appendix A.2.3.5

Table A.2.3.5.2. Fishing Across Vessel Classes in the Sablefish IFQ Fishery

	AI				BS			
	Class B		Class C		Class B		Class C	
	LE 60 FT	GT 60 FT	LE 60 FT	GT 60 FT	LE 60 FT	GT 60 FT	LE 60 FT	GT 60 FT
1995	32%	68%	100%	0%	36%	64%	100%	0%
1996	26%	74%	100%	0%	25%	75%	100%	0%
1997	42%	58%	100%	0%	46%	54%	100%	0%
1998	55%	45%	100%	0%	41%	59%	100%	0%
1999	56%	44%	100%	0%	28%	72%	100%	0%
2000	16%	84%	100%	0%	38%	62%	100%	0%
2001	35%	65%	100%	0%	30%	70%	100%	0%
2002	42%	58%	100%	0%	58%	42%	100%	0%
2003	30%	70%	100%	0%	17%	83%	100%	0%
2004	33%	67%	100%	0%	37%	63%	100%	0%
2005	21%	79%	100%	0%	20%	80%	100%	0%
2006	33%	67%	100%	0%	39%	61%	100%	0%
2007	12%	88%	100%	0%	12%	88%	100%	0%
2008	26%	74%	100%	0%	16%	84%	100%	0%
2009	30%	70%	100%	0%	16%	84%	100%	0%
2010	28%	72%	100%	0%	34%	66%	100%	0%
2011	15%	85%	100%	0%	33%	67%	100%	0%
2012	40%	60%	100%	0%	31%	69%	100%	0%
2013	17%	83%	100%	0%	35%	65%	100%	0%
2014	21%	79%	100%	0%	29%	71%	100%	0%
2015	35%	65%	100%	0%	39%	61%	100%	0%

	CG				SE			
	Class B		Class C		Class B		Class C	
	LE 60 FT	GT 60 FT	LE 60 FT	GT 60 FT	LE 60 FT	GT 60 FT	LE 60 FT	GT 60 FT
1995	41%	59%	100%	0%	39%	61%	100%	0%
1996	40%	60%	100%	0%	41%	59%	100%	0%
1997	44%	56%	100%	0%	40%	60%	100%	0%
1998	46%	54%	99%	1%	43%	57%	100%	0%
1999	46%	54%	100%	0%	42%	58%	100%	0%
2000	19%	81%	100%	0%	7%	93%	100%	0%
2001	23%	77%	100%	0%	10%	90%	100%	0%
2002	32%	68%	100%	0%	10%	90%	100%	0%
2003	29%	71%	100%	0%	9%	91%	100%	0%
2004	30%	70%	100%	0%	7%	93%	100%	0%
2005	29%	71%	100%	0%	8%	92%	100%	0%
2006	26%	74%	100%	0%	7%	93%	100%	0%
2007	26%	74%	100%	0%	11%	89%	100%	0%
2008	29%	71%	100%	0%	17%	83%	100%	0%
2009	30%	70%	100%	0%	18%	82%	100%	0%
2010	30%	70%	100%	0%	22%	78%	100%	0%
2011	31%	69%	100%	0%	31%	69%	100%	0%
2012	35%	65%	100%	0%	34%	66%	100%	0%
2013	36%	64%	100%	0%	39%	61%	100%	0%
2014	37%	63%	100%	0%	37%	63%	100%	0%
2015	35%	65%	100%	0%	40%	60%	100%	0%

	WY				WG			
	Class B		Class C		Class B		Class C	
	LE 60 FT	GT 60 FT	LE 60 FT	GT 60 FT	LE 60 FT	GT 60 FT	LE 60 FT	GT 60 FT
1995	31%	69%	100%	0%	28%	72%	100%	0%
1996	35%	65%	100%	0%	30%	70%	100%	0%
1997	38%	62%	100%	0%	38%	62%	100%	0%
1998	41%	59%	100%	0%	38%	62%	100%	0%
1999	43%	57%	100%	0%	40%	60%	100%	0%
2000	18%	82%	100%	0%	32%	68%	100%	0%
2001	18%	82%	100%	0%	34%	66%	100%	0%
2002	21%	79%	100%	0%	40%	60%	100%	0%
2003	19%	81%	100%	0%	39%	61%	100%	0%
2004	20%	80%	100%	0%	41%	59%	100%	0%
2005	23%	77%	100%	0%	47%	53%	100%	0%
2006	20%	80%	100%	0%	52%	48%	100%	0%
2007	25%	75%	100%	0%	55%	45%	100%	0%
2008	27%	73%	100%	0%	48%	52%	100%	0%
2009	28%	72%	100%	0%	53%	47%	100%	0%
2010	31%	69%	100%	0%	48%	52%	100%	0%
2011	31%	69%	100%	0%	48%	52%	100%	0%
2012	32%	68%	100%	0%	51%	49%	100%	0%
2013	36%	64%	100%	0%	57%	43%	100%	0%
2014	30%	70%	100%	0%	60%	40%	100%	0%
2015	28%	72%	100%	0%	55%	45%	100%	0%

Source: NMFS IFQ Landings data sourced by AKFIN

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2.3.6 Harvest Capacity

This section of the review addresses Objectives 1 and 7 of the original EIS of the IFQ Program.

- Objective 1: Address the problems that have occurred with the current management regime – excess harvesting capacity, allocation conflicts, gear conflicts, product wholesomeness
- Objective 7: Limit the concentration of quota share ownership and IFQ usage that will occur over time.

In developing the IFQ Program, the Council sought to address the problems with the race for fish, including excess harvesting capacity[34] and gear conflicts that had resulted from the previous management regime. At the same time, the Council also sought to limit excessive consolidation. In order to ensure that the benefits of implementing the IFQ Program were spread amongst a large number of participants the Council allocated QS to as many participants as possible, with many individuals that had marginal participation in the fisheries receiving small amounts of QS. In effect, the Council implemented countervailing provisions into the IFQ Program to try to balance these contrasting goals. The Council employed use caps to try to minimize consolidation in the IFQ fisheries; limiting the amount of QS that could be held by participants, QS use caps, and the amount of IFQ that could be landed on any one vessel, vessel IFQ caps.

This section analyzes harvest capacity and consolidation across the IFQ fisheries in a number of ways. The first category explored in this section includes information with respect to harvesting 'inputs', such as vessel and individual (QS holder) participation. As a basic indication of capacity and consolidation, this section begins with time-series data on vessel participation and the capacity (length overall) of these participating vessels. This section also examines the efficacy of the vessel IFQ caps with respect to achieving management goals for the IFQ Program. In addition, time-series data highlighting changes in QS holders and holdings are presented in this section, as well as the efficacy of the different individual QS use caps for halibut and sablefish IFQ.

Changes in capacity can also be understood by examining the output of IFQ harvesters. A fishery with a catch limit is clearly constrained in this regard. This section examines the utilization of the available TACs by the IFQ fleets and distribution of harvest across the active vessels.

In addition to this summary information, this section includes commonly used metrics of inequality (the Gini coefficient) and of market power (the Herfindahl-Hirschman Index (HHI)). Both of these metrics are used to assess IFQ ex-vessel revenue distribution and concentration. In addition to time-series data on QS holdings and consolidation, they can provide a tool for analyzing the IFQ Program with respect to the objectives of addressing excess harvesting capacity and limiting consolidation.

There is some overlap in information relevant to harvest capacity and other sections of the review. Specifically, changes in the number of QS holders per vessel are included in Section 2.4.1 on crew impacts. Consolidation indicators at the community level are presented under Section 2.7, the Community Impacts section.

[34] Harvesting capacity may be defined with respect to inputs (the characteristics of the vessels expressed as, for example vessel size, vessel gross tonnage, hold capacity, or power) or outputs (the maximum amount of fish that the fishing fleet can expect to catch). For the former see: (https://stats.oecd.org/glossary/detail.asp?ID=1202) and for the latter: (http://www.nmfs.noaa.gov/ocs/mafac/meetings/2008_11/docs/capacity_mafac110508.pdf). This section considers both.

Data

A variety of data sources are used in this section. Section 2.3.5.1, the Fleet Diversity section, primarily relies on NMFS Restricted Access Management (RAM) division IFQ landings database sourced through AKFIN. This dataset identifies individual landings by vessel, including qualifiers such as a vessel identifier, regulatory area, QS class, blocked/ unblocked status, the amount of IFQ sold and retained, and vessel length overall. Confidential information is included in this dataset and it is therefore not publicly available.

As with all other sections of the IFQ Program Review, the baseline period in this section is the average of the three years preceding the implementation of the IFQ Program (1992 through 1994). For active vessels and harvest information, baseline data is provided from ADF&G Fish Tickets.[35]

This section also relies heavily on the RAM QS holdings database sourced through AKFIN to provide time series information on QS holdings. This dataset includes a NMFS identification number to track each QS holder, along with a suite of variables qualifying the characteristics of the QS. This information is generally publicly accessible by year.[36] The QS holdings database is also a primary data source in the RAM Transfer Reports (NMFS, 2015a; NMFS, 2015b). The Transfer Reports are cited in this section and are an excellent reference for a much broader range of data on QS movement and consolidation.

To calculate the Gini and HHI indices, Commercial Fishing Entry Commission (CFEC) gross earnings from Fish Tickets were used to calculate weighted prices by IFQ area and AKRO's IFQ accounting data were used for total landed weight by vessel.

Finally, this section also incorporates other publicly accessible data such as vessel and QS use caps, and allocation and landings reports.[37]

2.3.6.1 Vessel capacity

2.3.6.1.1 The number of participating vessels

A simple way to understand capacity is to examine the trends in active vessels in the halibut and sablefish fisheries overtime. For both the halibut and sablefish fisheries the most drastic change in vessel numbers occurred during the first year of the program. Figure 2.3-10 and Figure 2.3-11 demonstrate that between the baseline years and 1995 the number of vessels dropped 63% and 56% in the halibut and sablefish fisheries, respectively. In both fisheries, the trend of consolidation has continued to occur each year, with only a few exceptions. The halibut fishery dropped from 2,060 active vessels in the first year of the program to 920 vessels in 2014. The sablefish fishery was more consolidated at the onset of the program,

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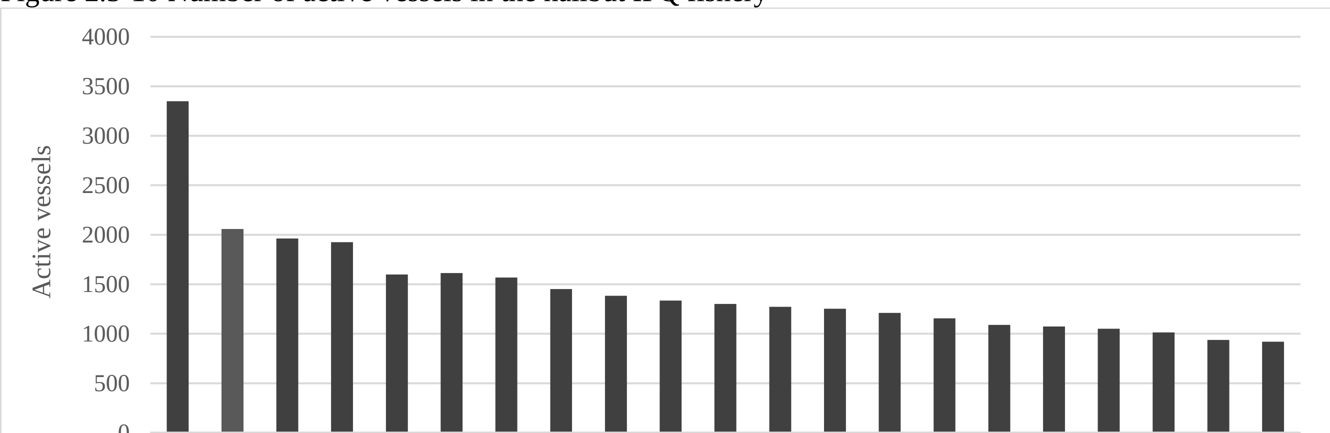
[35] For years prior to 2009, Fish Ticket data on active IFQ vessels and IFQ harvest tends to be greater than RAM IFQ landings data (vessel numbers generally inflated by 5 to 10%). In 2009, there was a transition from manually submitted Fish Tickets, to use of the electronic reporting system, *elandings*. Prior to this system, more errors were associated with the manually submitted Fish Tickets. For example, a misreported Fish Ticket could include an invalid ADF&G vessel number. These errors can sometimes be identified retroactively, but are often difficult to correct. However, Fish Tickets represent the best information available on participating vessels and harvest during the baseline years.

[36] Accessible at: https://alaskafisheries.noaa.gov/permits-licenses?field_fishery_pm_value=Individual+Fishing+Quota+%28IFQ%29+Halibut%2FSablefish+and+CDQ+Halibut+IFQ

[37] Accessible at: https://alaskafisheries.noaa.gov/fisheries-data-reports?tid=287

with 615 vessels with reported landings. In 2014, this number is almost half of what it was in 1995, at 315 active vessels. Reduction in the number of vessels relates to the decrease in the number of QS holders, and subsequent increase in holdings of the remaining holders, but also increased cooperation and coordination among remaining QS holders, allowing for the shared costs of operations. The steep decline in the number of participating vessels immediately following IFQ implementation is indicative of substantial consolidation likely associated with many participants receiving small amounts of QS, which in some cases, resulted in uneconomical amounts of IFQ. Any inter-annual variability in the rates of consolidation in either fishery like relates to a large suite of exogenous factors such as TAC, ocean and weather conditions, ex vessel price, and vessel IFQ caps.

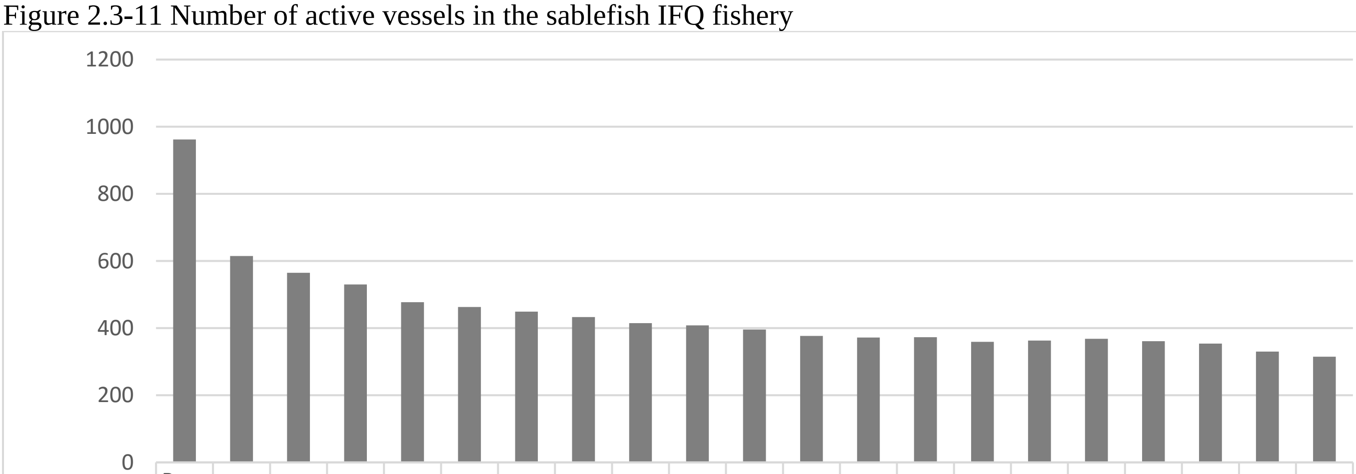
Figure 2.3-10 Number of active vessels in the halibut IFQ fishery



	Base line	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
# vessels	3350	2060	1962	1925	1599	1614	1568	1451	1384	1336	1301	1272	1253	1210	1156	1090	1074	1051	1013	937	920

Source: RAM IFQ landings database sourced through AKFIN. The baseline represents an average of the 1992 through 1994 values ADF&G Fish Tickets.

Figure 2.3-11 Number of active vessels in the sablefish IFQ fishery

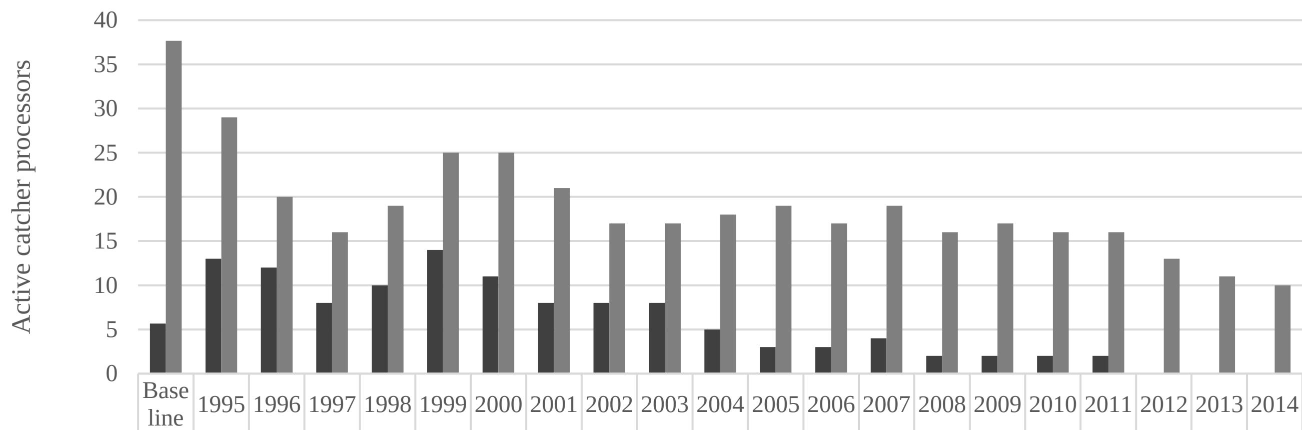


	Base line	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
# vessels	962	615	565	530	477	463	449	433	415	408	396	377	372	373	359	363	368	361	354	330	315

Source: RAM IFQ landings database sourced through AKFIN. The baseline represents an average of the 1992 through 1994 values from ADF&G Fish Tickets.

While Class A shares allow vessels to catch and process fish onboard, there have been very few catcher processors (i.e. freezer long liners) operating since the inception of the IFQ Program. This is particularly true for the halibut fishery (Figure 2.3-12). The decrease in freezer long liner activity is likely related to the shift towards an increasingly fresh market for halibut; more freezer long liners have been active in the sablefish fishery where frozen product is more common. However, the number of freezer long liners participating in the sablefish IFQ fishery has also been declining. The baseline years accounted for an average of 38 vessels in the sablefish fishery, compared to 10 active vessels in 2014.

Figure 2.3-12 Number of active catcher processor vessels in the halibut and sablefish IFQ fisheries



	Base line	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Halibut	6	13	12	8	10	14	11	8	8	8	5	3	3	4	2	2	2	2			
Sablefish	38	29	20	16	19	25	25	21	17	17	18	19	17	19	16	17	16	16	13	11	10

Source: RAM IFQ landings database sourced through AKFIN. Baseline represents an average of the 1992 through 1994 values from ADF&G Fish Tickets.

2.3.6.1.2 The size of participating vessels

With the understanding that significant consolidation has occurred in the halibut and sablefish fisheries, Table 2.3-10 and Table 2.3-11 provide a snapshot of this consolidation by vessel LOA, by comparing the first year of the program with the 2014 season for each IFQ species. These tables demonstrate that there have been substantial changes in active vessels for all class categories. In particular, there was a 62% decrease in the number of vessels greater than 60 feet LOA participating in the halibut IFQ fishery and a 57% decrease in the number of vessels greater than 60 feet LOA participating in the sablefish IFQ fishery since the first year of the program.

Table 2.3-10 Number of active halibut IFQ vessels by vessel length overall, 1995 and 2014

QS class category	1995		2014		Percent Change in number of vessels
	Number of vessels	% of vessels	Number of vessels	% of vessels	
≤ 35 FT	793	38%	318	35%	-60%
> 35 and ≤ 60 FT	1109	54%	542	59%	-51%
> 60 FT	158	8%	60	7%	-62%
TOTAL	2060	100%	920	100%	-55%

Source: RAM IFQ landings database sourced through AKFIN.

Table 2.3-11 Number of active sablefish IFQ vessels by vessel length overall, 1995 and 2014

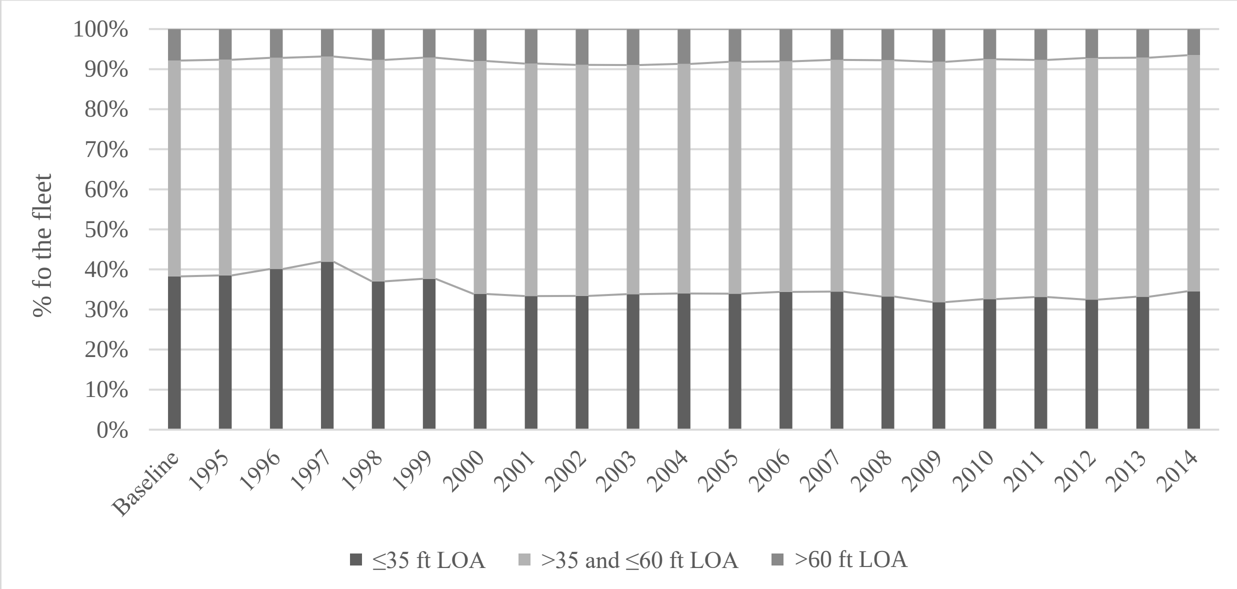
QS class category	1995		2014		Percent Change in number of vessels
	Number of vessels	% of vessels	Number of vessels	% of vessels	
≤ 60 FT	484	79%	259	82%	-46%
> 60 FT	131	21%	56	18%	-57%
TOTAL	615	100%	315	100%	-49%

Source: RAM IFQ landings database sourced through AKFIN.

Figure 2.3-13 and Figure 2.3-14 further highlight the consequences of the IFQ management shift on the characteristics of the fleet, by illustrating the composition of LOA for the vessels that continued to be active in the fisheries. These figures look at the proportion of active vessels before and throughout the program, qualified by the length categories established by the QS classes.

For the halibut fishery, the proportion of small vessels (less than or equal to 35 feet LOA) in the fishery has seen a slight decline over the course of the program, from a high of 42% of participating vessels in1997, down to 34% (in 2009, 2012). The proportion of large vessels (greater than 60 feet LOA) participating in the halibut IFQ fishery has remained fairly consistent throughout the course of the program, representing between 7-9% of the total vessels landing halibut IFQ. This has left the greater than 35 to 60-foot vessel category to grow slightly, relative to the other vessels fishing halibut IFQ.

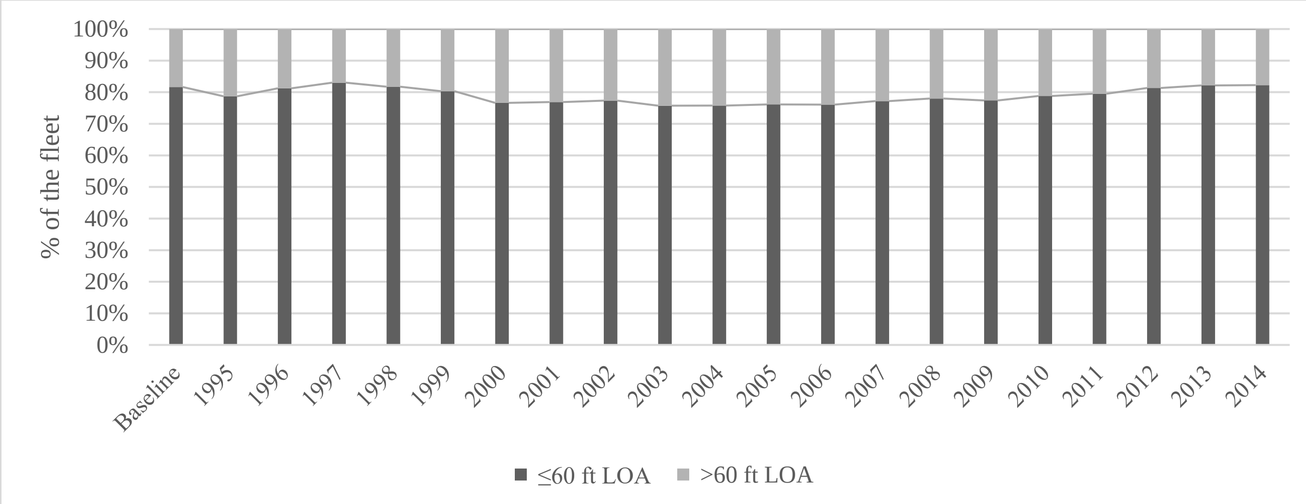
Figure 2.3-13. Composition of active halibut IFQ vessels by length overall



Source: RAM IFQ landings database sourced through AKFIN.

In the sablefish fishery, the two length categories established in the QS class designations have remained at relatively even proportions throughout the program. The proportion of sablefish vessels greater than 60 feet LOA increased slightly between 1997 and 2006; however, this percentage has come back down in recent years to match the composition of the fleet in baseline year. To provide more context outside of the QS class designation, there were only five vessels operating in the sablefish IFQ fishery under 30 feet LOA in 1995. This number has dropped to one or two vessels in recent years. Similarly, the proportion of sablefish vessels less than 40 feet LOA declined between the baseline years and 2000, but has remained around 6 to 10% of the composition of the fleet since 1999. The vast majority of the sablefish fleet consists of vessels between 40 and 60 feet LOA.

Figure 2.3-14 Composition of active sablefish IFQ vessels by length overall



Source: RAM IFQ landings database sourced through AKFIN.

2.3.6.1.3 Vessel IFQ caps

Before the IFQ Program began in 1995, it was not uncommon for more than one CFEC permit holder to make landings off one vessel in the halibut fishery. After the IFQ fisheries were implemented, two or more IFQ permit holders often also chose to join together to fish off one vessel. Cooperation and sharing operating costs can aid shareholders in increasing the value that they can generate from their holdings. Section 2.4.1 on crewmember impacts presents information on shareholders per vessel overtime. Figure 2.4-1 demonstrates that the ratio of the number of unique persons (including QS holders, lessees, and hired masters) with landings of halibut to unique vessels increased immediately following IFQ implementation and continued to rise over the following decade, with substantial inter-annual variability. Figure 2.4-2 demonstrates the trends in sablefish persons per vessel overtime, also demonstrating an immediate rise in shareholders per vessel compared to the baseline, and some variability in the years that followed.

In addition to being physically constrained on a vessel, in terms of how many shareholders can be onboard to fish their IFQ, there are also explicit constraints built into the program of how much consolidation of IFQ can occur on one vessel. The vessel IFQ cap (also referred to as “vessel cap” or “vessel use cap”) restricts the amount of IFQ of each IFQ species that can be consolidated and harvested on one vessel during a season. The vessel IFQ cap is specified as a percent of the annual TAC; therefore, the number of pounds capped changes annually. Table 2.3-12 shows the vessel IFQ caps for 2015. Regulations outline the specific vessel IFQ caps at §679.42 (h)(1) for halibut and §679.42 (h)(2) for sablefish.

Table 2.3-12 Vessel IFQ caps, 2015

Species	Applicable %	Annual IFQ TAC	Vessel IFQ Cap
Halibut	1% of 2C halibut IFQ TAC	3,679,000 net pounds	36,790 net pounds
	0.5% of all halibut IFQ TAC	17,136,920 net pounds	85,685 net pounds
Sablefish	1% of SE sablefish IFQ TAC	5,912,737 round pounds	59,127 round pounds
	1% of all sablefish IFQ TAC	23,569,378 round pounds	235,694 round pounds

Source: https://alaskafisheries.noaa.gov/sites/default/files/reports/15caps.pdf

As the TACs fall, the vessel IFQ cap falls proportionately with it (Table 2.3-13 and Table 2.3-14). In the high halibut abundance year of 2003, about 295,000 net pounds of halibut could be harvested on one vessel. With the low abundance levels of 2014 and 2015, one vessel was limited to harvesting a little more than one fourth of this amount (approximately 80,000 net pounds). Occasionally, the combined catch limit for all IPHC regulatory areas may move in one direction, but area-specific catch limits may follow a different trend. For example, each year between 2008 and 2011 the halibut catch limit increased in Area 4B; however the all-areas-combined catch limit decreased in each of those years. In this way the vessel cap may become more constraining even though an indiviudal's Area 4B IFQ may have increased.

Area 2C (Southeast), has its own, more stringent vessel IFQ cap level, set as 1% of the Area 2C halibut IFQ catch limit and 1% of the Southeast sablefish IFQ catch limit. The 'all area limits' are inclusive of the Southeast limits. In other words, if one vessel harvested 36,790 net pounds of halibut in Area 2C in 2015 (the Area 2C limit), that vessel may not harvest more than 42,982 net pounds of halibut in any other Alaskan waters (the remainder of the all areas limit). Table 2.3-13and Table 2.3-14 demonstrate the vessel IFQ caps for 2C/Southeast and all areas for halibut and sablefish, respectively.

Table 2.3-13 Halibut vessel IFQ caps for Area 2C and all areas, 1995 through 2015 (in net pounds)

Year	TAC for all areas	Vessel Cap for all areas	TAC for Area 2C	Vessel Cap for Area 2C
1995	37,422,000	187,110	9,000,000	90,000
1996	37,422,000	187,110	9,000,000	90,000
1997	51,116,000	255,580	10,000,000	100,000
1998	55,708,000	278,540	10,500,000	105,000
1999	58,390,000	291,950	10,490,000	104,900
2000	53,074,000	265,370	8,400,000	84,000
2001	58,534,000	292,670	8,780,000	87,800
2002	59,010,000	295,050	8,500,000	85,000
2003	59,010,000	295,050	8,500,000	85,000
2004	58,942,000	294,710	10,500,000	105,000
2005	56,976,000	284,880	10,930,000	109,300
2006	53,308,000	266,540	10,630,000	106,300
2007	50,211,800	251,059	8,510,000	85,100
2008	48,040,800	240,204	6,210,000	62,100
2009	43,548,800	217,744	5,020,000	50,200
2010	40,298,000	201,490	4,400,000	44,000
2011	30,382,000	151,910	2,330,000	23,300
2012	24,003,027	120,015	2,624,000	26,240
2013	21,810,800	109,054	2,970,000	29,700
2014	15,954,370	79,772	3,318,720	33,187
2015	15,954,370	79,772	3,679,000	36,790

Source: NOAA NMFS/RAM, Quota share caps & vessel IFQ caps 1995 through 2015:
https://alaskafisheries.noaa.gov/fisheries-data-reports?tid=287

Table 2.3-14 Sablefish vessel IFQ caps for Southeast and all areas, 1995 through 2015 (in round pounds)

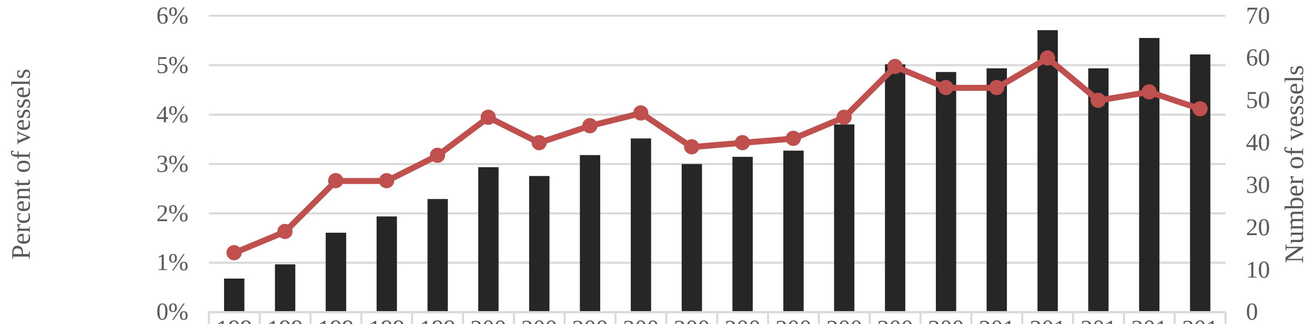
Year	TAC for all areas	Vessel Cap for all areas	TAC for Southeast	Vessel Cap for Southeast
1995	45,646,658	456,467	12,985,212	129,852
1996	35,480,619	354,806	10,436,188	104,362
1997	30,233,885	302,339	8,042,381	80,424
1998	29,845,875	298,459	7,687,440	76,874
1999	27,154,059	271,541	7,054,720	70,547
2000	29,926,122	299,261	7,832,944	78,329
2001	29,120,561	291,206	7,407,456	74,075
2002	29,388,199	293,882	7,076,766	70,768
2003	34,863,545	348,635	7,848,376	78,484
2004	37,936,756	379,368	8,311,342	83,113
2005	35,765,226	357,652	7,870,422	78,704
2006	34,546,083	345,461	7,760,192	77,602
2007	33,450,396	334,504	7,429,502	74,295
2008	29,967,127	299,671	7,098,812	70,988
2009	26,488,269	264,883	6,053,832	60,538
2010	24,876,707	248,767	5,687,868	56,879
2011	26,794,708	267,947	6,481,524	64,815
2012	29,326,912	293,269	6,995,196	69,952
2013	28,013,851	280,139	7,032,674	70,327
2014	23,679,609	236,796	5,941,397	59,414
2015	23,679,609	236,796	5,912,737	59,127

Source: NOAA NMFS/RAM, Quota share caps & vessel IFQ caps 1995 through 2015: https://alaskafisheries.noaa.gov/fisheries-data-reports?tid=287

The intention of vessel IFQ caps is to limit IFQ consolidation on vessels, which could reduce the number vessels needed to prosecute the fishery (or the number of trips taken in a season) and subsequently reduce the number (or duration) of available crew jobs as well as opportunities for new entrants. It is very difficult to say, particularly without further, more technical modelling, how the halibut and sablefish fisheries would have developed had there not been elements built into the program that limit both QS holdings and IFQ harvest on a vessel. Very likely, some additional consolidation would have occurred. Trying to understand what the economically optimal number of vessels would have been (in a counter-factual situation), had no provisions been put in place to prevent further consolidation, is out of the scope of this review. However, one way to get closer to understanding the effects of the vessel IFQ caps is to evaluate how many vessels are currently operating at or near the caps. Figure 2.3-15 and Figure 2.3-16 demonstrate the number of vessels that have harvested within 10% of the cap, over the years.

Figure 2.3-15 and Figure 2.3-16 show evidence of a greater percentage of active vessels nearing the “all areas” vessel IFQ caps for both the halibut and sablefish IFQ fisheries throughout the course of the program. Relatedly, the number of vessels nearing the caps in the halibut fishery has also risen during that time period, which is likely related to the decreasing TAC and corresponding decreasing vessel IFQ cap. Between 1995 and 2011, the number of halibut vessels nearing the vessel cap grew from 31 up to 60. In contrast, the minor increasing trend noted in the percent of vessels near the sablefish fishery vessel cap is likely primarily due to a decreasing number of vessels in the fishery overall, rather than an increasing number of vessels nearing the vessel cap. With the exception of the first two years, there is a relatively stable number of vessels that are within the 10% use cap for all areas.

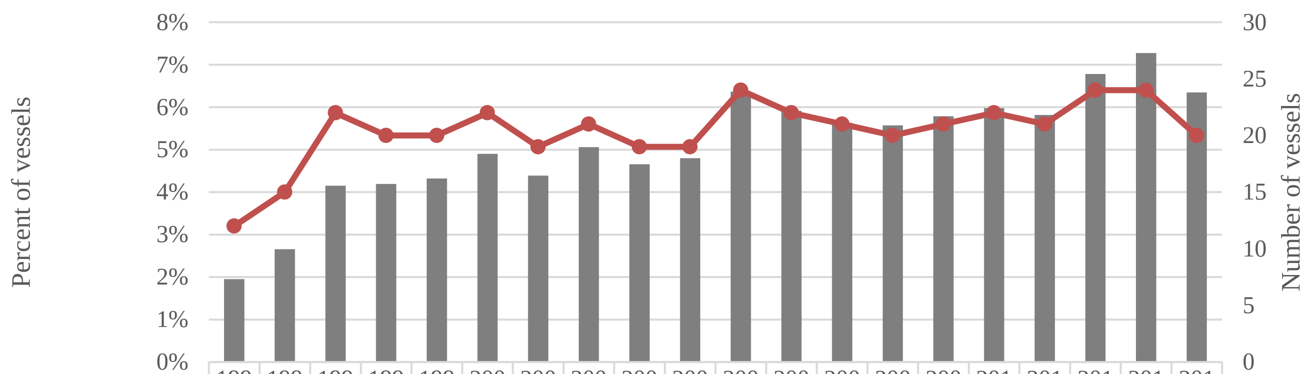
Figure 2.3-15 Count and percent of vessels participating in the IFQ halibut fishery within 10% of "all area" vessel IFQ caps



	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
% of vessels	1%	1%	2%	2%	2%	3%	3%	3%	4%	3%	3%	3%	4%	5%	5%	5%	6%	5%	6%	5%
# of vessels	14	19	31	31	37	46	40	44	47	39	40	41	46	58	53	53	60	50	52	48

Source: RAM IFQ landings database sourced through AKFIN

Figure 2.3-16 Count and percent of vessels participating in the IFQ sablefish fishery within 10% of the "all area" vessel IFQ caps, 1995 through 2014

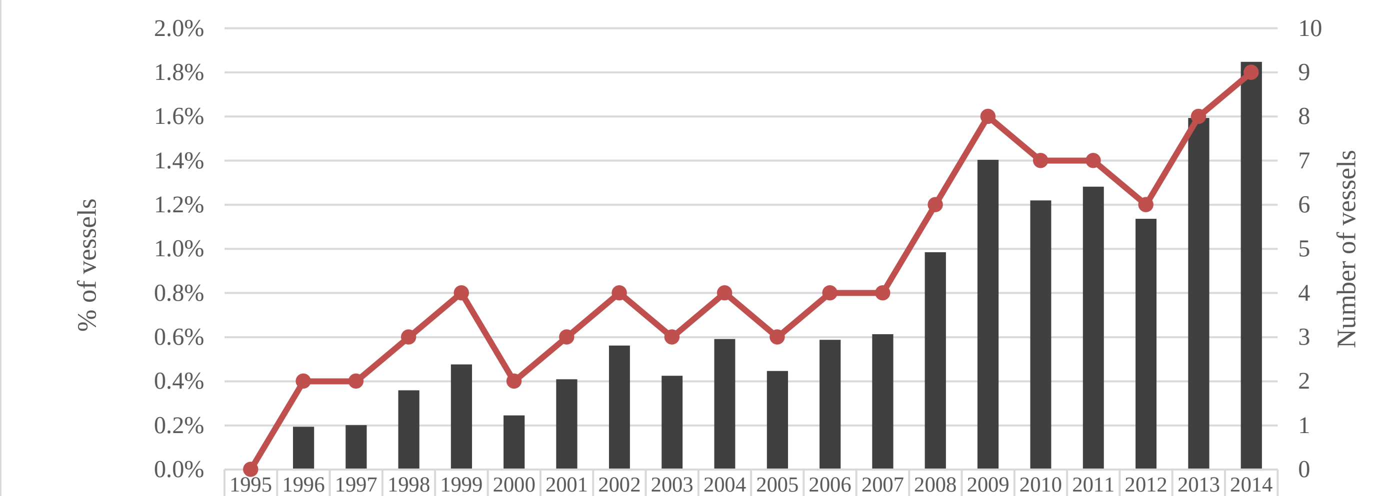


	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
% of vessels	2%	3%	4%	4%	4%	5%	4%	5%	5%	5%	6%	6%	6%	6%	6%	6%	6%	7%	7%	6%
# of vessels	12	15	22	20	20	22	19	21	19	19	24	22	21	20	21	22	21	24	24	20

Source: RAM IFQ landings database sourced through AKFIN

Different trends are noted for the Southeast Alaska-specific vessel IFQ caps (Figure 2.3-17 and Figure 2.3-18). As demonstrated in Figure 2.3-18, a very small number and proportion of the total number of vessels fishing halibut in Area 2C are constrained by these 2C-specific vessel caps. However, this proportion, and the corresponding number of vessels has risen over the time period presented (1995 through 2014).

Figure 2.3-17 Count and percent of vessels participating in the IFQ halibut fishery within 10% of Area 2C vessel IFQ caps, 1995 through 2014



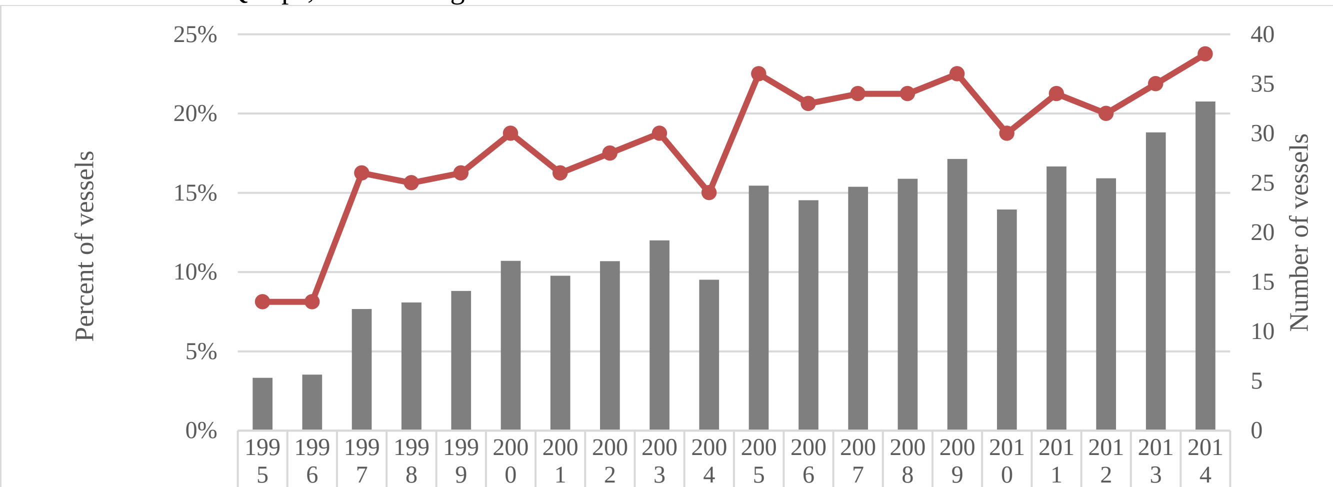
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
% of vessels	0.0%	0.2%	0.2%	0.4%	0.5%	0.2%	0.4%	0.6%	0.4%	0.6%	0.4%	0.6%	0.6%	1.0%	1.4%	1.2%	1.3%	1.1%	1.6%	1.8%
# of vessels	0	2	2	3	4	2	3	4	3	4	3	4	4	6	8	7	7	6	8	9

Source: RAM IFQ landings database sourced through AKFIN

A larger proportion of vessels active in the Southeast Alaska sablefish fishery have been, and are increasingly, nearing the Southeast-specific vessel IFQ caps (Figure 2.3-18). In 2014, more than 20% of the 183 active vessels had landed within 10% of the cap (59,414 round pounds).

As noted in public testimony and in a recent Council discussion paper, these constraints may be felt more acutely by sablefish IFQ participants in certain regulatory areas (NPFMC, 2013). In particular, the Bering Sea/ Aleutian Islands fisheries can be more expensive to prosecute (both in terms of variable costs as well as opportunity cost). In these areas QS holders may be more motivated to pool operating expenses by the consolidation of IFQ on a single vessel. This is further discussed in Section 2.3.6.3.1.

Figure 2.3-18 Count and percent of vessels participating in the IFQ sablefish fishery within 10% of the Southeast vessel IFQ caps, 1995 through 2014



	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
% of vessels	3%	4%	8%	8%	9%	11%	10%	11%	12%	10%	15%	15%	15%	16%	17%	14%	17%	16%	19%	21%
# of vessels	13	13	26	25	26	30	26	28	30	24	36	33	34	34	36	30	34	32	35	38

Source: RAM IFQ landings database sourced through AKFIN

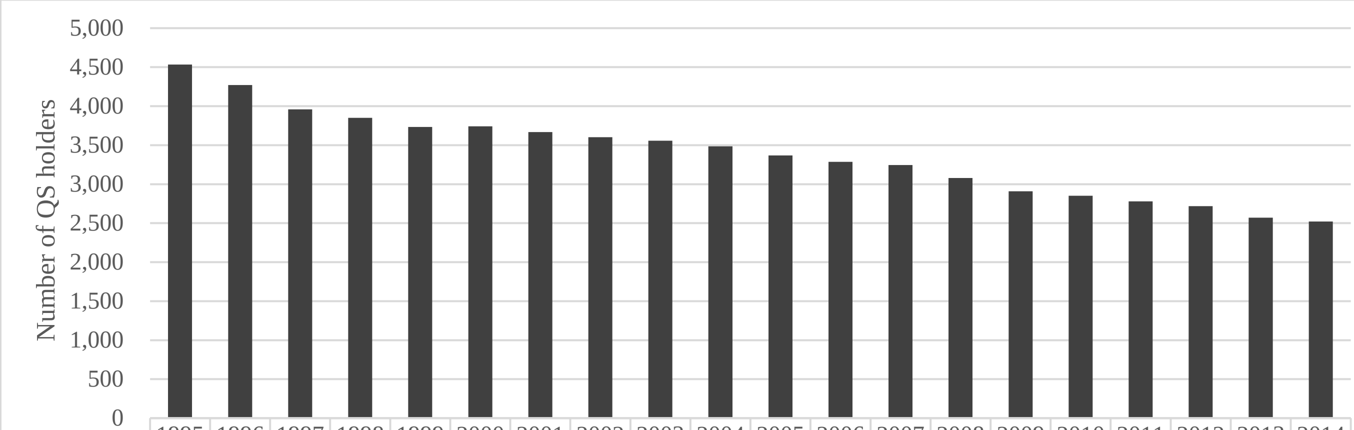
2.3.6.2 **QS consolidation**

2.3.6.2.1 Trends in QS holdings

As described in Section 2.2, through initial allocation, the Council wanted to link QS to recent dependence on the halibut and sablefish fixed gear fisheries (Objective 2) and to broadly distribute QS to prevent excessively large QS allocations to some persons (Objective 3). However, while initial QS allocations were broadly distributed to recent participants in the halibut and sablefish fixed-gear fisheries, many of these allocations resulted in small amounts of IFQ-equivalent pounds per QS unit. Some individuals considered their allocation too small to make economically worthwhile fishing trips. Thus, consolidation of QS occurred immediately following implementation of the IFQ Program.

As demonstrated in Figure 2.3-19 and Figure 2.3-20, the percent change in number of QS holding entities was highest for both fisheries in the first few years of the program. After the first few years, consolidation of QS to fewer QS holders has continued, with variable rates of decline in number of QS holders. Years in which more rapid consolidation occurred could be related to a number of outside stimulus including (but not limited to) factors such as changes in ex vessel price, changes in TAC and vessel IFQ caps, regulatory changes with stricter owner-on-board requirements, retirement of original issuees, etc.

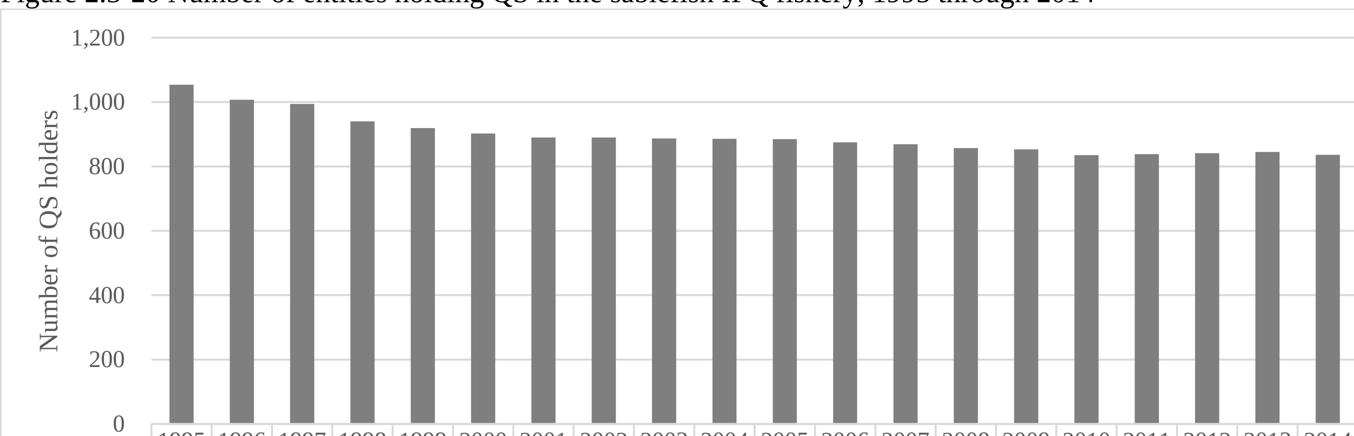
Figure 2.3-19 Number of entities holding QS in the halibut IFQ fishery, 1995 through 2014



1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
4,534	4,271	3,958	3,850	3,734	3,741	3,668	3,602	3,556	3,485	3,369	3,286	3,246	3,078	2,909	2,852	2,779	2,719	2,570	2,522

Source: RAM IFQ shareholdings database sourced through AKFIN

Figure 2.3-20 Number of entities holding QS in the sablefish IFQ fishery, 1995 through 2014



1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
1,054	1,007	994	940	919	902	890	890	887	886	885	875	869	857	853	835	838	841	845	836

Source: RAM IFQ shareholdings database sourced through AKFIN

Table 2.3-15 and Table 2.3-16 further disaggregate holdings by regulatory area in order to demonstrate consolidation of halibut and sablefish QS. These tables compare the initial QS allocation with holdings at the end of 2015. QS units are not comparable across areas; they represent different pounds of IFQ, dependent on that area's QS pool and the area-specific TAC. Therefore, these tables illustrate average and median holdings, each as a percentage of the area's QS pool.

Table 2.3-15 demonstrates a decrease in QS holders across all halibut areas, with Area 4A showing the largest percent change relative to the other areas (-63%). Both average and median holdings have increased across all areas, with the greatest increases shown in Area 3A (median holdings increasing 436%) and in 4A (median holdings increasing 552%).

Table 2.3-15 Changes in halibut QS holders and holdings by area, initial allocation and 2015-year end

Area	Initial Issuee			
	QS pool (QS units)	Count of QS holders	Average QS holdings (as a % of the pool)	Median QS holdings (as a % of the area pool)
2C	59,568,892	2,382	0.04%	0.02%
3A	185,492,433	3,067	0.03%	0.01%
3B	54,516,403	1,055	0.09%	0.03%
4A	14,634,439	532	0.19%	0.06%
4B	9,293,391	152	0.66%	0.34%
4C	4,016,352	81	1.23%	0.75%
4D	4,923,638	69	1.45%	0.93%
Area	2015- year end			
	QS pool (QS units)	Count of QS holders	Average QS holdings (as a % of the pool)	Median QS holdings (as a % of the area pool)
2C	59,477,396	993	0.10%	0.07%
3A	184,893,008	1,259	0.08%	0.04%
3B	54,201,315	461	0.22%	0.13%
4A	14,586,011	197	0.51%	0.38%
4B	9,284,774	85	1.18%	0.68%
4C	4,016,352	51	1.96%	1.22%
4D	4,958,250	44	2.27%	1.86%
Area	% change			
	in QS pool	in count of QS holders	in average QS holdings	in median QS holdings
2C	-0.2%	-58%	139.51%	309.16%
3A	-0.3%	-59%	142.82%	436.51%
3B	-0.6%	-56%	127.53%	384.18%

4A	-0.3%	-63%	169.16%	552.37%
4B	-0.1%	-44%	78.66%	103.09%
4C	0.0%	-37%	58.82%	61.84%
4D	0.7%	-36.2%	57.9%	102.0%

Source: RAM IFQ shareholdings database sourced through AKFIN

As previously noted, the sablefish fisheries were, prior to IFQ, generally more concentrated than the halibut fisheries, including fewer participants in total and fewer participants harvesting off of small vessels. In particular for Gulf of Alaska regulatory areas, this difference relative to the halibut fishery, is apparent in Table 2.3-16 with greater average and median QS holdings (as a percent of the QS pool) for the sablefish fishery, as well as a lower percent change in QS concentration. Similar to the halibut fishery, Bering Sea and Aleutian Islands QS was allocated in larger concentrations to the individuals/ entities with history in these areas, thus the QS market has not experienced as much overall consolidation.

Table 2.3-16 Changes in sablefish QS holders and holdings by area, initial allocation and 2015-year end

Area	Initial Issuee			
	QS pool (QS units)	Count of QS holders	Average QS holdings (as a % of the pool)	Median QS holdings (as a % of the pool)
SE	66,598,479	715	0.14%	0.05%
WY	53,470,436	457	0.22%	0.06%
CG	111,544,461	645	0.16%	0.03%
WG	36,086,355	234	0.43%	0.11%
BS	18,626,676	145	0.69%	0.25%
AI	31,518,176	135	0.74%	0.20%
Area	2015- year end			
	QS pool (QS units)	Count of QS holders	Average QS holdings (as a % of the pool)	Median QS holdings (as a % of the pool)
SE	66,120,619	385	0.26%	0.16%
WY	53,266,430	232	0.43%	0.17%
CG	111,686,622	367	0.27%	0.09%
WG	36,029,579	159	0.63%	0.27%
BS	18,765,280	101	0.99%	0.41%
AI	31,932,492	86	1.16%	0.31%
Area	% change			
	in QS pool	in count of QS holders	in average QS holdings	in median QS holdings
SE	-0.7%	-46%	84%	209%
WY	-0.4%	-49%	96%	200%
CG	0.1%	-43%	76%	199%
WG	-0.2%	-32%	47%	145%
BS	0.7%	-30%	45%	69%

AI	1.3%	-36%	59%	55%

Source: RAM IFQ shareholdings database sourced through AKFIN

QS movement is also broken out by area and vessel class in Tables A.2.3.6.1 (for halibut QS) and A.2.3.6.2 (for sablefish QS) in the Appendix to this section. Table A.2.3.6.1 demonstrates the most consolidation for Area 2C D class QS, both in terms of number of holders as well as average holdings over time. The average halibut D class QS holdings have increased 194% over time period shown (or almost 3 times what they were at initial allocation). The number of halibut D class QS holders has decreased 69% between initial allocation and 2015 (dropping more than 3 times what it was at initial allocation). This movement is not surprising, given the number of individuals receiving small amounts of Area 2C D class QS compared to other areas and QS classes. A similar pattern of D share consolidation exists in the other halibut regulatory areas, the one exception being Area 4C, which has only seen a decrease of 3% in the number of D class shareholders.

As shown in the appendix Table A.2.3.6.1, for the sablefish fishery, the C class QS pool has consolidated the most in terms of both the percent change in average holdings and the percent change in number of holders, in all areas but the Bering Sea. The Bering Sea area has seen fairly even consolidation between B and C class QS. For A class QS, the number of shareholders and the average QS holdings have remained relatively stable between initial allocation and 2015 in all areas, with some consolidation occurring in Southeast Alaska.

2.3.6.2.2 QS use caps

While it was anticipated that the IFQ Program would create a reduction in the number of participants, as QS consolidated on fewer vessels in the two overcapitalized fisheries, the Council was concerned about some individuals having the means to control a significant portion of the harvesting privileges. Therefore, limits on QS holdings were also established.

A QS use cap (also referred to as “ownership caps” in some programs) is applied to holders (individual or collective) of a long-term QS privilege. It limits the holder from exceeding a certain number of QS units. QS use caps in the IFQ fisheries have been constant, based on the 1996 QS pool. They are determined “individually and collectively;” that is, by QS held in an individual’s name, plus the part of QS held by any entity in which the individual is an owner (collectively). Regulations at §679.42 (e) explain what the QS use caps are for sablefish QS and §679.42 (f) explains what the QS use caps are for halibut QS. Table 2.3-17 shows the QS use caps for 2015; however, as they are based on the 1996 QS pool, these thresholds are the same year-to-year.

Table 2.3-17 QS use caps, 2015

Species	Applicable %	Size of Relevant QS pool	QS Use Cap
Halibut	1% of halibut 2C QS pool	59,979,977 QS Units	599,799 QS Units
	0.5% of halibut 2C, 3A, 3B QS pool	300,564,647 QS Units	1,502,823 QS Units
	1.5% of all halibut Area 4 QS pool	33,002,937 QS Units	495,044 QS Units
Sablefish	1% of sablefish SE QS pool	68,848,467 QS Units	688,485 QS Units
	1% of all sablefish QS pool	322,972,132 QS Units	3,229,721 QS Units

Source: https://alaskafisheries.noaa.gov/sites/default/files/reports/15caps.pdf

Table 2.3-18 and Table 2.3-19 demonstrate the number of individuals/ entities holding QS in each of the areas with applicable QS use caps, comparing holdings at initial allocation to holdings at year-end in 2015. These tables illustrate the number of individuals or entities that are over the QS cap (i.e. they were grandfathered into the program with holdings which exceeded the cap) and the number of individuals or entities that are within 10% of the caps. The number of QS holders within 10% of the QS use cap includes those who exceed the cap, those who are exactly at the cap, and those holders who are in a range 10% lower than the cap.

Table 2.3-18 and Table 2.3-19 demonstrate that in every area but the GOA halibut fishery (Areas 2C, 3A, and 3B), there were individuals or entities that were 'grandfathered' into the program with holdings greater than the QS use caps, based on their history in the fishery. These individuals/ entities are not permitted to acquire more QS in a category in which they exceed the cap, unless they first divest to a level below the cap. The number of QS holders exceeding the QS use cap has decreased from nine to six for halibut QS in Area 4, from seven to four for sablefish QS in Southeast, and from nine to two for sablefish QS in all areas.

Despite the consolidation trends revealed in Section 2.3.6.2.1, few entities are shown to be near the QS use caps. While the numbers of individuals/ entities nearing the cap has increased slightly for halibut QS in the GOA and BSAI, they have decreased slightly for sablefish QS holders.

It is important to note, however, that these tables include 1st-level QS holdings, evaluated by a unique identifier for each individual or entity. In other words, these tables do not include collective holdings due to subsidiaries, joint ventures, partnerships, or other similar business structures. Therefore, the number of entities near the caps presented in these tables may appear less than if collective holdings were calculated.

Table 2.3-18 Count of halibut QS holders above and within 10% of the QS use caps, 1995 and 2015

Applicable area	Stat	Initial Issuee	Year-end 2015
Area 2C	QS holders	2382	993
	Over the QS cap	0	0
	Within 10% of QS cap	0	0
Area 2C, 3A, 3B	QS holders	4783	2208
	Over the QS cap	0	0
	Within 10% of QS cap	0	9
Area 4	QS holders	533	359
	Over the QS cap	9	6
	Within 10% of QS cap	11	15

Source: RAM IFQ shareholdings database sourced through AKFIN

Table 2.3-19 Count of sablefish QS holders above and within 10% of the QS use caps, 1995 and 2015

Applicable area	Stat	Initial Issuee	Year-end 2015
Southeast	QS holders	715	385
	Over the QS cap	8	4
	Within 10% of QS cap	12	13
All areas	QS holders	1055	819
	Over the QS cap	10	2
	Within 10% of QS cap	15	13

Source: RAM IFQ shareholdings database sourced through AKFIN

2.3.6.3 **Volume of harvest**

2.3.6.3.1 Prosecution of the TAC

Harvest capacity in terms of output, i.e., the volume of total harvest, is clearly constrained in a fishery with a TAC. A chief goal of fisheries management, as described in the MSA, National Standard 1 is that, “Conservation and management measures shall prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery for the United States fishing industry."[38] Therefore, not only is it a goal for fisheries management to prevent overfishing and promote a sustainable healthy stock, this National Standard also points out the goal of allowing fisheries to develop and achieve the optimum yield. However, for a variety of reasons, during the course of the program in both halibut and sablefish fisheries, in some areas and some years, the TAC has not fully been harvested.

Participants of the halibut IFQ Program have had more consistent success in harvesting nearly all of the halibut TAC. In 2015, a total of 97% of the total allocated pounds of halibut IFQ were landed across areas (Table 2.3-20). Table 2.3-20 and Figure 2.3-21 illustrate that regulatory Area 4B, in the Aleutian Islands, and the combined Areas 4C and 4D, in the Bering Sea, have generally held the lowest harvest rates for halibut IFQ.

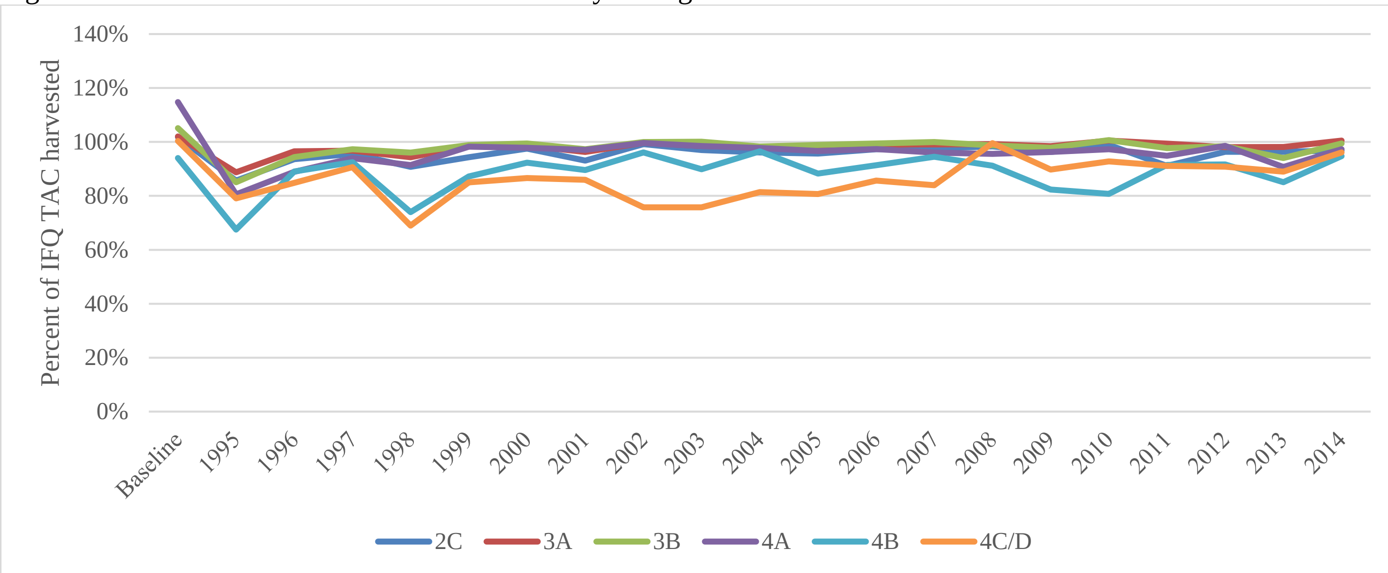
Table 2.3-20 Halibut landings in 2015 by management area

Area	Vessel Landings	Total Catch (pounds)	TAC		
			Allocation (pounds)	Remaining (pounds)	Percent Landed
2C	1,267	3,549,167	3,679,000	129,833	96
3A	1,546	7,685,254	7,790,000	104,746	99
3B	363	2,600,242	2,650,000	49,758	98
4A	171	1,319,795	1,390,000	70,205	95
4B	104	852,286	912,000	59,714	93
4C/4D	98	690,581	715,920	25,339	96
Total	3,549	16,697,325	17,136,920	439,595	97

Source: NOAA NMFS/RAM allocation and landing report, 2015

[38] Pacific halibut is managed through authority granted in the Northern Pacific Halibut Act of 1982. It is not a species directly managed through MSA and is therefore is not bound to the National Standards. However regulatory guidance is often still elicited from the MSA for the management of halibut.

Figure 2.3-21 Percent of the halibut TAC landed by management area



Source: NMFS RAM halibut transfer report (NMFS, 2015a; Table 13-1). Baseline is an average of the 1992 through 1994 values.

Table 2.3-21 and Figure 2.3-22 demonstrate a total harvest rate of sablefish IFQ at 86% of the available 2015 TAC. The harvest capacity of sablefish left unharvested, however, is very different across regulatory areas. Participants of the GOA sub-areas; the Central Gulf, Southeast, and Western Gulf typically prosecute 95 to 100% of the TAC. The sablefish fishing grounds in the Bering Sea and Aleutian Islands areas can be more difficult and cost prohibitive to reach; therefore, these areas have seen as much as 66% of the TAC left in the water (in 2015).[39] Figure 2.3-22 illustrates that there has been a gradual increase in the portion of the sablefish TAC left unharvested in the Aleutian Island and Bering Sea areas since the baseline years, with some inter-annual variability.

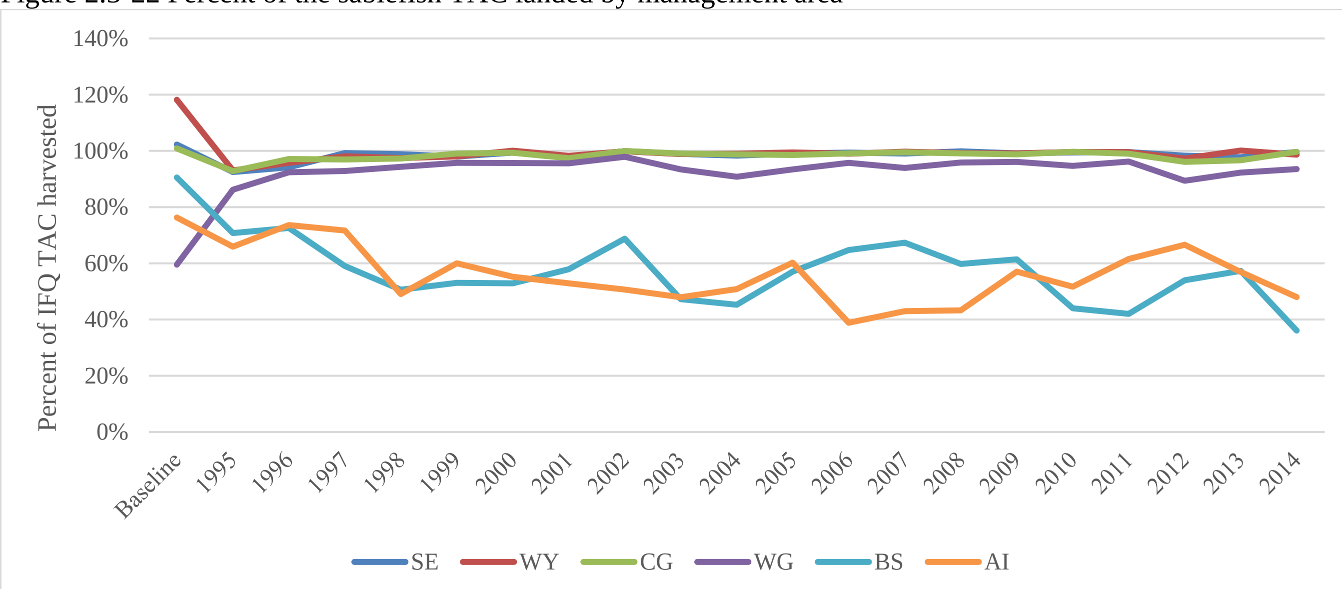
[39] In addition to this figure and table, a Council discussion paper from 2013 on QS use caps included tables of the percentage of sablefish IFQ harvested from 2004 to 2012 by area and QS category. One take-away point from these tables is that while A, B, and C shares are harvested in relatively consistent rates with each other in CG, WY, and SE, the other subareas have a trend of dissimilar harvest rates across the share category. In BS, AI, and WG, C share IFQ are more often left unharvested, followed by B shares, with A shares harvested to the relatively highest capacity (NPFMC, 2013).

Table 2.3-21 Sablefish IFQ landings in 2015 by management area

Area	Vessel Landings	Total Catch (pounds)	TAC		
			Allocation (pounds)	Remaining (pounds)	Percent Landed
AI	72	892,236	2,383,173	1,490,937	37
BS	81	316,503	1,177,256	860,753	27
CG	596	7,904,224	8,214,340	310,116	96
SE	567	5,842,559	5,912,737	70,178	99
WG	192	2,022,392	2,599,223	576,831	78
WY	229	3,269,939	3,282,649	12,710	100
Total	1,737	20,247,853	23,569,378	3,321,525	86

Source: NOAA NMFS/RAM allocation and landing report, 2015

Figure 2.3-22 Percent of the sablefish TAC landed by management area



Source: NMFS RAM Sablefish Transfer report (NMFS, 2015b; Table 13-1). Baseline is an average of the 1992 through 1994 values.

There are many reasons that a historical participant may not take advantage of a sablefish fishing opportunity to the full extent of their QS. The ability to fully harvest the TAC of sablefish IFQ in the Bering Sea and Aleutian Islands is greatly dependent on weather and ocean conditions during the season. Harvest may also be stymied by other practical considerations such as availability of processing capacity and infrastructure, and the physical ability of the IFQ holder, particularly if they are required to be onboard.

Additionally, a suite of interacting economic factors together play a large role in if and how a QS holder may harvest their sablefish IFQ. An individual's assessment of the value of prosecuting their IFQ would weigh the revenue from this potential harvest, taking into account the expected market price of sablefish, against the costs they are likely to incur. These are "economic costs", i.e., they include the market price of variable costs (e.g., fuel, vessel maintenance, labor, observer coverage) as well as the opportunity cost of their time in the prosecution of the fishery. In other words, QS holders will consider if there are other fisheries, including IFQ fisheries in other sub-areas that would be more worthwhile to participate in.

Additionally, participants have testified that vessel IFQ caps are restrictive in allowing for the economies of scale needed to balance the high cost of prosecuting in the Bering Sea/ Aleutian Islands. While this depends on the vessel IFQ cap for that year, it also depends more broadly on the TAC, the level of QS that an entity holds, and the class of QS holdings. Marginal amounts of remaining IFQ may not justify the costs it would require to harvest sablefish, particularly in these areas. In addition, Bering Sea/ Aleutian Islands and Western Gulf class A shares are much more likely to be harvested than Class B or C shares, indicating vessel capacity could be another factor inhibiting the necessary economies of scale to be reached (NPFMC, 2013).

2.3.6.3.2 Distribution of harvest

In order to understand the distribution of the harvest within the fleet over time, the analysts separated the IFQ fisheries into quartiles of vessels. Each of the quartiles includes an equal number of active vessels and represents 25% of the participating vessels for that year. The first quartiles in Table 2.3-22 and in Table 2.3-23 are comprised of those vessels that harvest the least weight of fish and the fourth quartile includes an equal number of vessels harvesting the largest weight of fish.

While the total pounds of halibut IFQ harvested has been extremely variable over the years, largely due to TAC changes, the distribution of halibut harvest among participants has been relatively stable. In the halibut fishery, the top 25% of the vessels are responsible for between 72 and 81% of the directed harvest of that species, while the bottom 25% of the vessels continue to make up about between 1-2% of the total harvest.

Appendix A.2.3.6.3 includes the total and average pounds of halibut IFQ associated with each quartile. The average pounds of halibut harvested by the first quartile group over the course of the program is around 1,000 pounds. The average pounds harvested for quartile 2 and 3 are approximately 7,000 pounds, and 20,000 pounds, respectively. Quartile 4, in particular, is the group most likely to be constrained by vessel IFQ caps; average pounds harvested by this group ranges from about 48,000 pounds (in 1995 and 2014) up to an average of 137,000 pounds (in 2003). As illustrated in Section 2.3.6.1.2, the vessel IFQ caps for all areas in 2014 and 2015 were equivalent to about 80,000 pounds.

The ability to harvest enough halibut to be included in the fourth quartile, is likely both a factor of the number of trips taken in a season as well as vessel size. The relatively unchanged proportions of halibut IFQ harvest among the four quartiles of vessels aligns with the modest changes to the proportion of vessels in each length category.

Table 2.3-22 Quartiles of vessels for halibut IFQ harvest

Year	Number of vessels per quartile	Total pounds	Quartile 1	Quartile 2	Quartile 3	Quartile 4
Baseline	837-838	43,535,338	2%	8%	17%	73%
1995	515	32,502,416	1%	6%	17%	76%
1996	490-491	35,567,687	1%	6%	17%	76%
1997	481-482	49,312,973	1%	5%	16%	78%
1998	399-400	51,405,493	1%	6%	16%	77%
1999	403-404	56,436,229	1%	5%	15%	79%
2000	392	51,796,152	1%	4%	14%	81%
2001	362-363	55,758,769	1%	5%	14%	80%
2002	346	58,122,339	1%	5%	15%	80%
2003	334	57,405,763	1%	5%	15%	80%
2004	325-326	57,245,331	1%	5%	16%	78%
2005	318	55,233,049	1%	5%	17%	77%
2006	313-314	52,187,115	1%	5%	17%	77%
2007	302-303	49,328,713	1%	5%	16%	78%
2008	289	47,321,739	1%	5%	15%	80%
2009	272-273	42,274,247	1%	4%	15%	79%
2010	268-269	39,878,733	1%	4%	15%	79%
2011	262-263	29,634,253	1%	4%	15%	81%
2012	253-254	23,327,682	1%	5%	16%	78%
2013	234-235	20,831,308	1%	6%	18%	75%
2014	230	15,772,510	1%	7%	20%	72%

Source: RAM IFQ landings database sourced through AKFIN. Baseline values represent an average of 1992 through 1994 values sourced from ADF&G Fish Tickets.

In the sablefish fishery, Table 2.3-23 demonstrates a long-term trend of harvest from vessels in the top 25%, spreading into the other three quartiles. This trend implies a more even distribution of the sablefish IFQ harvest relative to earlier years of the program. Given the decrease in number of small vessels that participate in the sablefish IFQ fishery (as discussed in Section 2.3.6.1.2), this trend may be associated with an increase of vessels of a more similar size and capacity. There may be economic reasons why a certain vessel type may increasingly dominate the prosecution of this fishery, slightly evening the distribution of harvest. For instance, this trend may be related to an increase in vessels that specialize in the sablefish or IFQ fisheries exclusively. (Diversification of IFQ vessels is further discussed in Section 2.3.5.)

However, there is still great variability in the harvest of sablefish IFQ among participating vessels. Appendix Table A.2.3.6.4 illustrates that the average pounds of sablefish harvested by the first quartile group over the course of the program is around 3,500 pounds. The average pounds harvested for quartile 2 and 3 are approximately 20,000 pounds, 60,000 pounds, respectively. Vessels in the fourth quartile are responsible for harvesting, on average, about 200,000 pounds.

Table 2.3-23 Quartiles of vessels for sablefish IFQ harvest

Year	Number of vessels per quartile	Total pounds	Quartile 1	Quartile 2	Quartile 3	Quartile 4
Baseline	234-235	43,437,232	3%	9%	20%	68%
1995	153-154	40,935,864	1%	5%	17%	77%
1996	141-142	33,196,479	1%	5%	18%	76%
1997	132-133	28,651,250	1%	5%	18%	77%
1998	119-120	27,636,101	1%	6%	19%	75%
1999	115-116	25,410,370	1%	6%	19%	74%
2000	112-113	27,624,507	1%	6%	20%	73%
2001	108-109	26,355,159	1%	6%	20%	73%
2002	103-104	27,091,941	1%	6%	21%	72%
2003	102	30,808,511	1%	6%	21%	72%
2004	99	33,695,316	1%	6%	20%	73%
2005	94-95	32,877,746	1%	7%	20%	72%
2006	93	30,842,178	1%	7%	21%	70%
2007	93-94	30,080,328	1%	7%	21%	71%
2008	89-90	26,872,648	1%	8%	23%	68%
2009	90-91	24,202,405	1%	8%	23%	67%
2010	92	21,952,388	1%	8%	22%	69%
2011	90-91	24,041,223	1%	8%	23%	69%
2012	88-89	26,551,349	1%	8%	22%	69%
2013	82-83	25,479,833	1%	9%	24%	65%
2014	78-79	21,414,917	2%	10%	25%	63%

Source: RAM IFQ landings database sourced through AKFIN. Baseline values represent an average of 1992 through 1994 values sourced from ADF&G Fish Tickets.

2.3.6.4 Gini and HHI Indices

The following section includes commonly used metrics of inequality (the Gini coefficient) and of market power (the Herfindahl-Hirschman Index (HHI)) to examine changes in the IFQ fisheries relative to the baseline period (an average of the years 1992 through 1994) and over 20 years since IFQ implementation.[40] Both of these metrics are applied to examine annual IFQ revenue distributions across all active vessels within both IFQ fisheries. While describing a similar phenomenon, these metrics are not comparable as they are each constructed around a slightly different intent.

The Gini coefficient is a measure of the evenness of the distribution of revenue among the active vessels, which increases as participants with low levels of revenue exit the fishery and revenues become more concentrated among fewer vessels. If one vessel were to exit, but all other vessels achieved their status quo revenue, the Gini coefficient would not change as the distribution of revenue would remain the same. The Gini coefficient varies between 0 and 1, where a value of 0 indicates that all vessels earn exactly the same revenue, while a value of 1 indicates that a single vessel had 100% of the revenues. The HHI is a measure of concentration; examining total revenues by the total number of vessels. In other words, the HHI is dependent on the total number of active vessels; if one vessel exits and all other vessels achieve their status quo revenue, the HHI would go up as each vessel now earns a larger share of the total.

The HHI is also dependent on the concentration of revenues, even when the number of vessels remains the same. For example, if a vessel operator typically prosecutes their Area 2C and 3A halibut IFQ on their own vessel, but in one year they chose to coordinate their 3A harvest with a different vessel operator that also typically prosecutes Area 3A, the number of active vessels would remain the same, but the concentration of revenues by vessel would be affected. HHI scores approach zero when a market is composed of a large number of firms (here, vessels) of similar size and reaches a maximum of 10,000 when a market is controlled by a single firm (i.e., vessel). Federal merger guidelines indicate that HHI scores of less than 1,500 indicate a lack of market concentration and an unlikely presence of adverse competitive effects while scores above 2,500 indicate highly concentrated markets (U.S. Department of Justice and Federal Trade Commission, 2010).[41]

Figure 2.3-23 shows the Gini coefficient for the evenness of the distribution of revenue among vessels participating in the halibut IFQ fishery in a given year. The Gini coefficient for the baseline period (Gini = 0.59) is lower than at any point since IFQ Program implementation, which implies a more even distribution of vessel revenues before program implementation. After the initial increase in the Gini coefficient from 0.59 during the baseline to 0.66 in 1995, the Gini coefficient remained relatively stable after program implementation through 2011. The three most recent years have experienced a decline in the Gini coefficient from 0.70 in 2011 to the lowest Gini coefficient since program implementation of 0.60 in 2014, which suggests a more even distribution of revenues across vessels similar to the baseline period.

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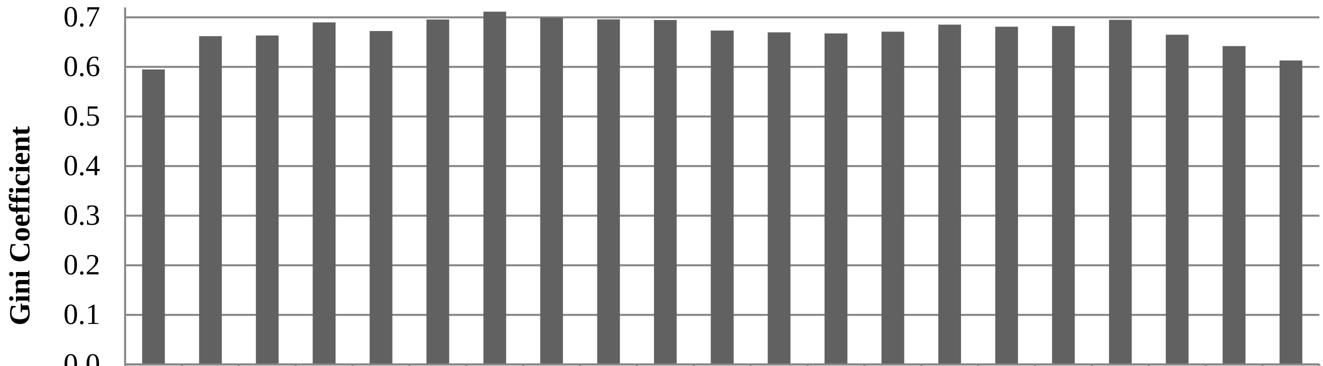
[40] The Gini coefficient is reported annually for all North Pacific catch share programs in the Groundfish and Crab Economic SAFE reports: http://www.afsc.noaa.gov/REFM/Docs/2015/economic.pdf, http://www.npfmc.org/wp-content/PDFdocuments/resources/SAFE/CrabSAFE/CrabEconSAFE2015.pdf

[41] U.S. Department of Justice and Federal Trade Commission, 2010. Guidelines for horizontal mergers. Available at http://ftc.gov/os/2010/08/100819hmg.pdf. Accessed on November 20, 2010.

Figure 2.3-23 Halibut IFQ fishery Gini coefficient for vessel revenue distributions

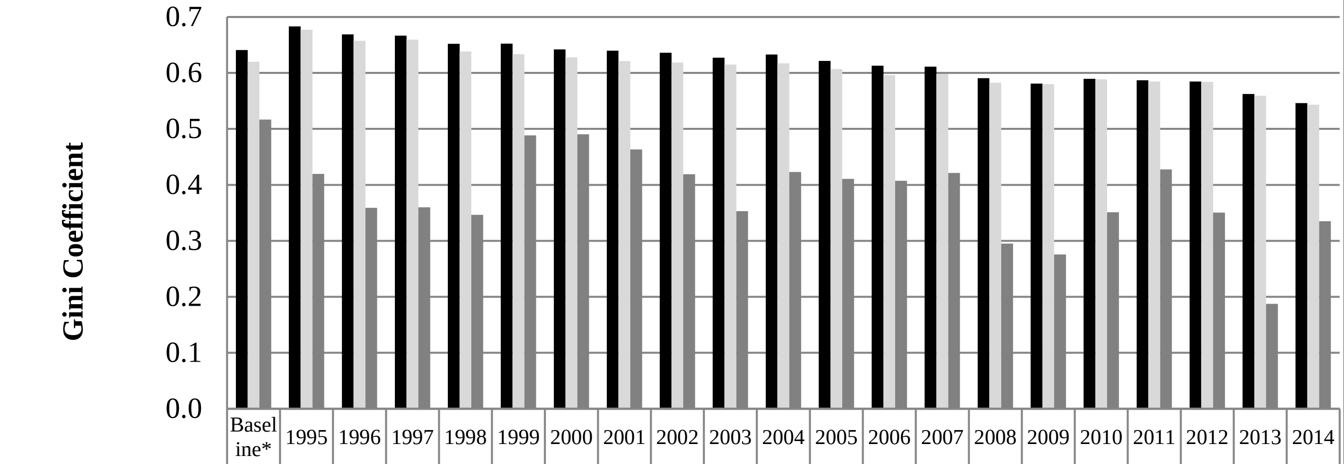


	Baseline*	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Halibut	0.59	0.66	0.66	0.69	0.67	0.70	0.71	0.70	0.70	0.69	0.67	0.67	0.67	0.67	0.69	0.68	0.68	0.70	0.66	0.64	0.61

Source: ADF&G Fish Tickets and AK Regional Office IFQ accounting data

Figure 2.3-24 shows the Gini coefficient for the evenness of the distribution of revenue among vessels participating in the sablefish IFQ fishery in a given year. The Gini coefficient demonstrates an increase in inequality among vessel revenues when catcher vessel operations are aggregated with catcher processor operations in a single year. This becomes apparent looking at the difference in Gini coefficient for the baseline period for all vessels (Gini = 0.64), which implies a higher level of inequality in vessel revenues compared with the Gini coefficient for either the catcher vessels only (Gini = 0.62) or for the catcher-processors only (Gini = 0.52). This is because the revenue per vessel among catcher vessels and the revenue per vessel among catcher-processors is very different. Thus, when the Gini coefficient is calculated across all vessels, it implies a higher level of revenue inequality than examining the within vessel-type revenue inequality alone. For all vessels in the sablefish IFQ fishery, and for catcher vessels exclusively, there has been a general decline in vessel revenue inequality since program implementation, falling from 0.64 and 0.62 to 0.55 and 0.54 in 2014, respectively. The catcher-processor revenue inequality has also declined since program implementation from 0.52 in the baseline to 0.34 in 2014.While the Gini coefficient for catch-processor vessels, exclusively, shows a lot more variation throughout the years, it has always been below 0.52 (the baseline value) throughout the course of the IFQ Program. This indicates that the revenue accruing to catcher-processor vessels has become more equal during the program compared with the baseline period before the program.

Figure 2.3-24 Sablefish IFQ fishery Gini coefficients for vessel revenue distributions by sector and for both sectors combined

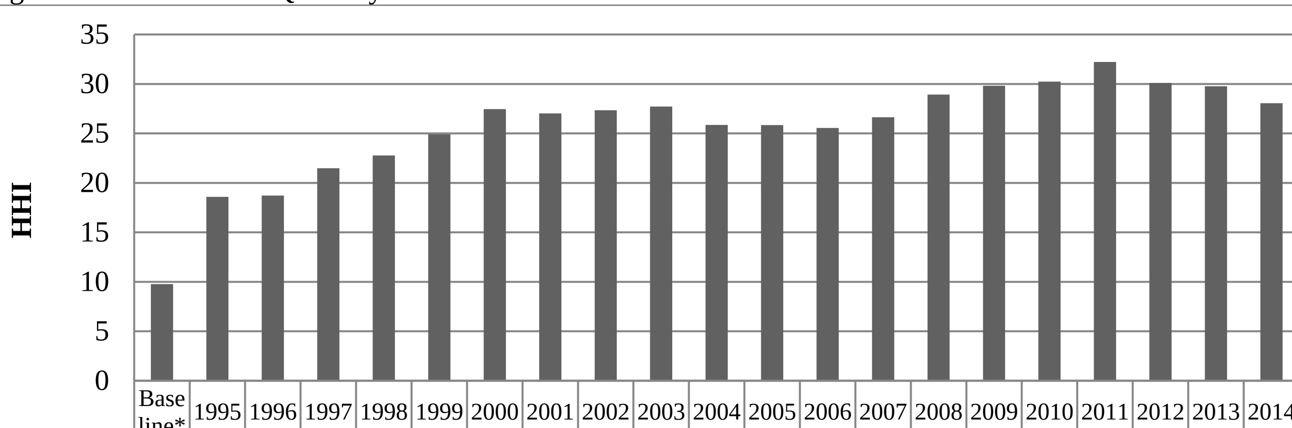


	Baseline*	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Sablefish Both Sectors	0.64	0.68	0.67	0.67	0.65	0.65	0.64	0.64	0.64	0.63	0.63	0.62	0.61	0.61	0.59	0.58	0.59	0.59	0.58	0.56	0.55
Sablefish CV	0.62	0.68	0.66	0.66	0.64	0.63	0.63	0.62	0.62	0.61	0.62	0.61	0.60	0.60	0.58	0.58	0.59	0.58	0.58	0.56	0.54
Sablefish CP	0.52	0.42	0.36	0.36	0.35	0.49	0.49	0.46	0.42	0.35	0.42	0.41	0.41	0.42	0.30	0.28	0.35	0.43	0.35	0.19	0.34

Source: ADF&G Fish Tickets and AK Regional Office IFQ accounting data

Figure 2.3-25 shows the HHI scores for vessel revenue concentrations for the halibut IFQ fishery. The HHI provides an indication of whether there is a change in the degree of concentration of revenues among vessels participating in the IFQ fisheries. The HHI scores have been substantially below 1,500, indicating a lack of market concentration and an unlikely presence of adverse competitive effects. The HHI scores for the halibut IFQ vessels show an increase in the concentration since the IFQ Program was implemented, from 9.77 during the baseline period to 28 in 2014. This in part reflects the decrease in the number of participating vessels in the halibut IFQ fishery following IFQ implementation and over the last 20 years of the IFQ Program. As the number of vessels participating in the fishery decreases, the percentage of the total halibut IFQ revenue is divided amongst fewer vessels; therefore, the revenue concentration and thereby the HHI scores will increase.

Figure 2.3-25 Halibut IFQ fishery HHI scores for vessel revenue distributions



	Baseline*	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Halibut	9.77	18.5	18.7	21.4	22.7	24.9	27.4	27.0	27.3	27.7	25.8	25.8	25.5	26.6	28.9	29.8	30.2	32.2	30.1	29.7	28.0

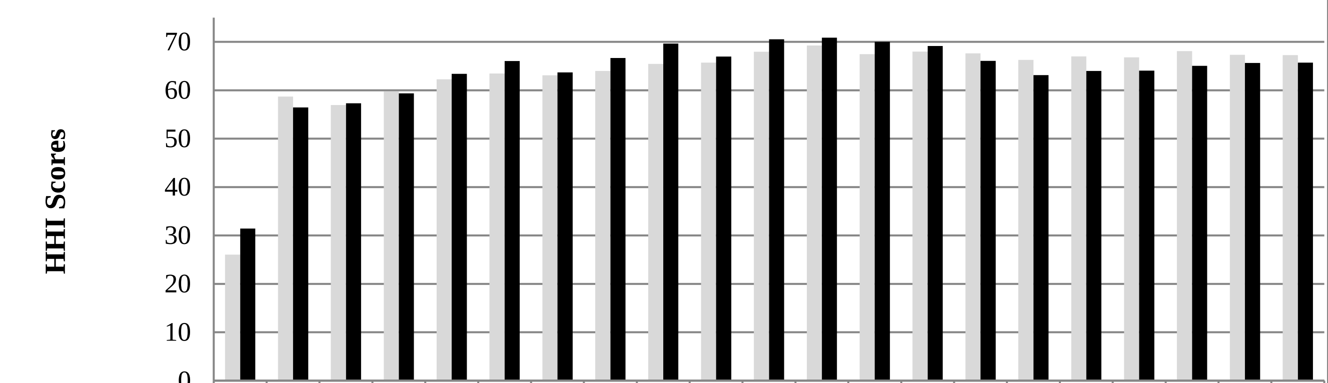
Source: ADF&G Fish Tickets and AK Regional Office IFQ accounting data

Figure 2.3-26 shows the HHI scores of vessel revenue concentrations for the sablefish IFQ fishery in the catcher vessel sector and both sectors combined while Figure 2.3-27 displays the HHI scores for the catcher processor sector. The HHI scores are split between two figures because the catcher-processor sector HHI scores necessitated a different scale. The HHI scores for both the catcher vessel and the catcher processor sectors have been below 1,500 indicating a lack of market concentration and an unlikely presence of adverse competitive effects.

For both the catcher vessel and catcher-processor sectors, the HHI scores show an increase in the concentration of sablefish IFQ revenues following IFQ implementation. As in the halibut IFQ fishery, this in part reflects the decrease in the number of participating vessels in the sablefish IFQ fishery following IFQ implementation and over the last 20 years of the IFQ Program. As the number of vessels participating in the fishery decreases, the percentage of the total sablefish IFQ revenue is divided amongst fewer vessels; therefore, the revenue concentration and thereby the HHI scores increase. The other factor in increasing HHI scores would be changes in the concentration of revenues across the same number of vessels. For the catcher vessel sector, the HHI scores increased from 26.02 during the baseline period to 67.24 in 2014, and the HHI scores have remained fairly stable for this sector since the mid-2000s. The HHI scores are much greater for the sablefish IFQ catcher-processor sector, which is comprised of fewer vessels.

For the catcher-processor sector, the HHI increased from 643 during the baseline period to 1,380 in 2014. With fewer vessels participating in this sector the change in HHI score is more dramatic when even one vessel exits the sector. The initial drop in the catcher-processor HHI may be associated with catcher-processors that only had a small share of their revenues from sablefish (but participated because it was short and profitable) exiting after the IFQ Program, because they could not fit the longer season into the rest of their vessel activities. This exit would have left the vessels more similar to one another in the fishery, which is consistent with what can be seen in the Gini for the catcher-processors as well. The HHI score that accounts for changes in revenue concentration across both sectors also shows a marked increase following IFQ implementation relative to the baseline period, but has remained fairly stable since the early 2000s.

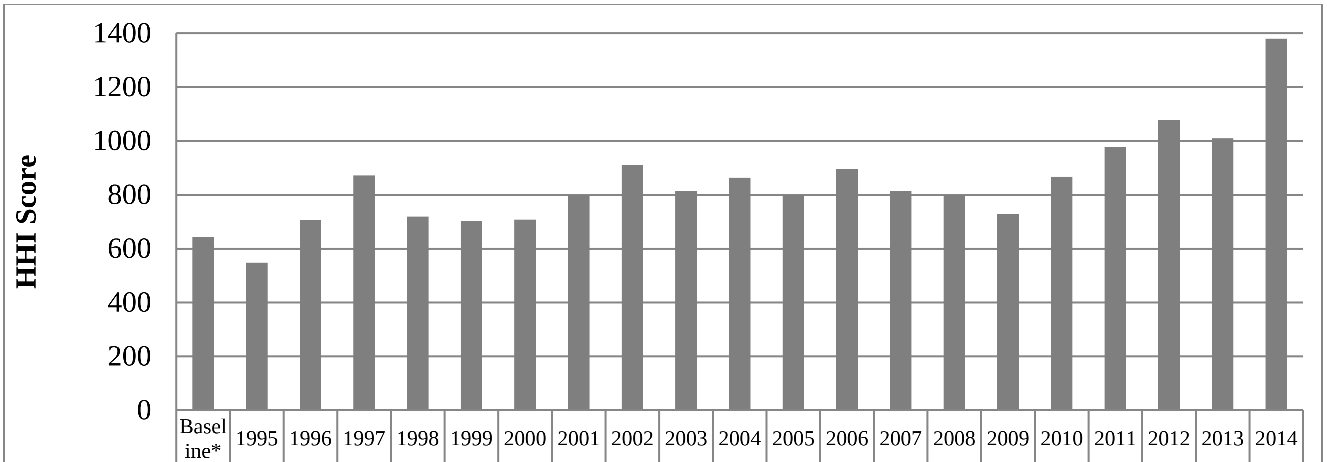
Figure 2.3-26 Sablefish IFQ fishery HHI scores for vessel revenue distributions for the catcher vessel sector and both sectors combined



	Baseline*	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Sablefish CV	26.02	58.69	56.95	59.76	62.28	63.45	63.08	63.99	65.44	65.70	67.95	69.25	67.45	67.98	67.61	66.25	66.99	66.79	68.09	67.31	67.24
Sablefish Both Sectors	31.44	56.45	57.30	59.36	63.37	66.03	63.67	66.66	69.62	66.95	70.53	70.86	69.99	69.14	66.08	63.14	63.99	64.06	65.05	65.63	65.71

Source: ADF&G Fish Tickets and AK Regional Office IFQ accounting data

Figure 2.3-27 Sablefish IFQ fishery HHI scores for vessel revenue distributions for the catcher-processor sector



	Baseline*	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Sablefish CP	643	548	706	872	719	703	708	798	910	814	863	800	895	814	798	728	867	977	1077	1010	1380

Source: ADF&G fish tickets and AK Regional Office IFQ accounting data

Summary

The capacity in the halibut and sablefish fisheries changed drastically in the first few years of the IFQ Program and has continued to change at an incremental rate over its lifetime.

Due in part to the exit of more individuals/ entities selling their QS than new entrants buying QS, as well as the increased coordination among existing QS holders, there has been drastic reduction in the number of vessels actively participating in both fisheries. The low number of participating freezer longliners has been further reduced, with no freezer longliners currently operating in the halibut IFQ fishery (2012 through 2014). Vessels prosecuting IFQ fisheries are increasingly nearing the vessel IFQ caps, particularly the halibut "all areas" cap, as the TAC has continued to drop and in the sablefish "Southeast-specific" cap, as the total number of vessels has also declined. Although the vessel IFQ caps have been constraining for some individual vessels and specific types of operations, the majority of the halibut and sablefish fleets are not near these caps, despite the consolidation that has occurred.

This section also illustrates the reduction in the number of QS holders. The percent change in QS holders was greatest for both the halibut and sablefish fisheries in the first year of the program. Average and median QS holdings have increased for all regulatory areas for both species. When broken out by regulatory area and QS class, the greatest level of consolidation (both in terms of the number of QS holders and average holdings) tends to be in the smallest class of QS (i.e., generally D class QS for halibut and C class for sablefish). Despite this consolidation, there is not a large population of individuals/ entities constrained by the QS use caps (at the 1st-level ownership structure). The number of individuals/ entities grandfathered in above the caps has gone down (i.e., some entities have divested some or all of their QS). Halibut Area 4 has the greatest number of individuals/ entities near, at, or over the QS use caps, increasing from 12 to 15 (in 1995 to 2015, respectively).

Harvest capacity is clearly constrained by the TAC set in a fishery; however, in both the halibut and sablefish fisheries, in some areas and in some years, the TAC has not been fully prosecuted. Participants of the halibut fishery have had more consistent success in harvesting nearly all of the TAC, while the Bering Sea and Aleutian Islands sablefish TACs have seen as much as 66% of the TAC left unharvested (2015, both areas combined). However, in the halibut fishery, when the total number of active vessel is divided into even quartiles, the relative distribution of harvest among four quartiles of vessels has shown to be relatively stable. In other words, the 25% of the vessels that harvest the greatest amount of halibut have continued to harvest approximately the same proportion of the total catch. In the sablefish fishery, there has been a slow, long-term trend of the top quartile of vessels harvesting a proportionately smaller amount of the total catch.

The Gini coefficient and the HHI are used in this section to examine annual IFQ revenue distributions across all active vessels within both IFQ fisheries in order to understand how the distribution of the value of the fisheries have changed over time. The Gini coefficient is a metric of inequality; measuring the evenness of distribution for revenue per vessel over time. The HHI is a metric of market power; evaluating concentration of revenues over the total number of vessels prior to, and throughout the program.

For both IFQ fisheries, the Gini coefficient increased after IFQ implementation (except for the sablefish catcher-processor sector), indicating a less even distribution of vessel revenues after program implementation. Comparing the Gini coefficient in the halibut fishery for the baseline period to the years under the IFQ management regime indicates that there was a more even distribution of halibut vessel revenues before program implementation. Since implementation, the Gini coefficient for halibut vessels has remained relatively stable through 2011, with more revenue equality in the last three years (2012 through 2014). In the sablefish fishery, the Gini coefficient demonstrates an increase in inequality among vessel revenues when catcher vessel operations are aggregated with catcher-processor operations in a single year or when the coefficient is calculated with exclusively catcher vessels. The Gini coefficient for sablefish catcher-processors reveals much more variation throughout the years. However, catcher-processor vessel revenues have become more equal during the program compared with the baseline period before the program.

For both IFQ fisheries, the HHI indicates increasing revenue concentration following IFQ implementation. The HHI for halibut IFQ vessels shows an increase in revenue concentration since implementation of the IFQ Program, likely in part due to the decrease in the number of participating vessels following IFQ implementation. For all vessels in the sablefish IFQ fishery and for the catcher vessels, exclusively, the HHI indicates an increase in revenue concentration the year following implementation of the program (likely, in part due to the drop in the total number of vessels), then a fairly stable HHI for this sector after the first three years of increased concentration. The HHI for sablefish catcher-processors operates on a vastly different scale than the HHI for catcher vessels due to its nature of having a higher concentration of revenues for a smaller number of vessels. However, this sector also experienced an increase in concentration of sablefish IFQ revenues throughout the course of the program. Given the limited vessels in this sector, this index is more sensitive to changes in the operations of an individual vessel.

Appendix A.2.3.6

A.2.3.6.1. Count of QS holders and average percent of holdings by area and vessel category, initial allocation versus year-end 2015.

Area	Vessel Category	Initial Allocation			Year-end 2015			Compared	
		Count of QS holders	% of area QS holders	Average QS holdings (QS units)	Count of QS holders	% of area QS holders	Average QS holdings (QS units)	% change in number of holders	% change in average holdings
2C	A share	31	1.5%	40,295	27	2.7%	46,264	-13%	15%
	B share	138	6.5%	21,257	66	6.6%	40,231	-52%	89%
	C share	1,146	53.9%	39,913	622	62.6%	75,044	-46%	88%
	D share	1,096	51.6%	8,829	345	34.7%	25,954	-69%	194%
3A	A share	36	1.2%	132,086	33	2.6%	144,664	-8%	10%
	B share	300	9.6%	226,839	273	21.7%	251,168	-9%	11%
	C share	1,496	47.9%	66,122	763	60.6%	129,589	-49%	96%
	D share	1,287	41.3%	10,615	363	28.8%	34,914	-72%	229%
3B	A share	19	1.8%	83,850	17	3.7%	93,715	-11%	12%
	B share	214	19.9%	139,548	179	38.8%	167,539	-16%	20%
	C share	560	52.0%	37,002	273	59.2%	76,799	-51%	108%
	D share	284	26.4%	7,153	61	13.2%	27,091	-79%	279%
4A	A share	15	2.8%	41,267	13	6.6%	47,616	-13%	15%
	B share	140	26.0%	60,776	100	50.8%	85,486	-29%	41%
	C share	146	27.1%	29,422	81	41.1%	53,958	-45%	83%
	D share	237	44.1%	4,760	51	25.9%	20,545	-78%	332%
4B	A share	8	5.2%	69,186	7	8.2%	79,070	-13%	14%
	B share	82	53.6%	86,836	56	65.9%	127,045	-32%	46%
	C share	36	23.5%	37,510	27	31.8%	49,917	-25%	33%
	D share	27	17.6%	9,963	11	12.9%	24,454	-59%	145%
4C	A share	1	1.2%	18,876	1	2.0%	18,876	0%	0%
	B share	29	35.8%	60,946	20	39.2%	81,045	-31%	33%
	C share	20	24.7%	50,354	12	23.5%	72,319	-40%	44%

	D share	31	38.3%	37,929	30	58.8%	50,291	-3%	33%
4D	A share	5	7.2%	82,787	4	9.1%	103,484	-20%	25%
	B share	50	72.5%	80,426	35	79.5%	117,146	-30%	46%
	C share	14	20.3%	25,375	10	22.7%	44,422	-29%	75%
4E	B share	2	1.9%	5,588	2	2.1%	5,588	0%	0%
	C share	7	6.7%	5,290	7	7.3%	5,290	0%	0%
	D share	95	91.3%	966	87	90.6%	1,050	-8%	9%

Source: NMFS RAM Transfer report (Table 2-2b) and RAM QS holdings database

A.2.3.6.2. Count of QS holders at initial allocation and year-end 2015 and average percent of holdings by area and vessel category.

Area	Vessel Class	Initial Allocation			Year-end 2015			Compared	
		Count of QS holders	Percent of area QS holders	Average QS holdings (units)	Count of QS holders	% of area QS holders	Average QS holdings (units)	% change in the number of QS holders	% change in average holdings
SE	A shares	45	6.3%	136,311	35	9.1%	175,257	-22%	29%
	B shares	119	16.7%	112,900	83	21.6%	161,868	-30%	43%
	C shares	552	77.3%	84,333	296	76.9%	157,269	-46%	86%
WY	A shares	33	7.2%	132,538	29	12.5%	150,819	-12%	14%
	B shares	134	29.4%	240,764	102	44.0%	316,298	-24%	31%
	C shares	290	63.6%	57,346	131	56.5%	126,949	-55%	121%
CG	A shares	41	6.4%	428,222	45	12.3%	390,158	10%	-9%
	B shares	193	30.0%	274,910	160	43.6%	331,610	-17%	21%
	C shares	414	64.4%	99,207	209	56.9%	196,516	-50%	98%
WG	A shares	32	13.8%	427,231	35	22.0%	390,611	9%	-9%
	B shares	103	44.4%	151,426	78	49.1%	199,961	-24%	32%
	C shares	99	42.7%	68,295	64	40.3%	105,645	-35%	55%
BS	A shares	26	17.9%	287,316	27	26.7%	276,675	4%	-4%
	B shares	64	44.1%	121,169	42	41.6%	184,638	-34%	52%
	C shares	56	38.6%	63,219	38	37.6%	93,165	-32%	47%
AI	A shares	27	20.0%	664,899	27	31.4%	664,899	0%	0%
	B shares	63	46.7%	179,677	43	50.0%	263,247	-32%	47%
	C shares	45	33.3%	59,124	28	32.6%	95,021	-38%	61%

Source: NMFS RAM Transfer report (Table 2-2b) and RAM QS holdings database

A.2.3.6.3. Total and average halibut IFQ harvest by quartiles of vessels

Year	Number of vessels per quartile	Quartile 1		Quartile 2		Quartile 3		Quartile 4	
		Total pounds	Average pounds	Total pounds	Average pounds	Total pounds	Average pounds	Total pounds	Average pounds
Baseline	837-838	691,603	834	3,636,137	3,927	7,529,317	10,453	31,678,282	37,210
1995	515	433,308	841	2,014,050	3,911	5,456,190	10,595	24,598,868	47,765
1996	490-491	406,627	830	2,139,817	4,358	6,149,327	12,550	26,871,916	54,729
1997	481-482	471,019	979	2,554,503	5,311	7,655,784	15,916	38,631,667	80,149
1998	399-400	526,808	1,317	2,888,996	7,222	8,170,091	20,425	39,819,598	99,798
1999	403-404	547,160	1,358	2,920,742	7,230	8,261,256	20,499	44,707,071	110,661
2000	392	439,256	1,121	2,282,336	5,822	7,207,230	18,386	41,867,330	106,804
2001	362-363	456,998	1,259	2,574,205	7,091	7,984,543	21,996	44,743,023	123,600
2002	346	504,794	1,459	2,725,698	7,878	8,630,468	24,944	46,261,379	133,703
2003	334	496,610	1,487	2,594,896	7,769	8,536,479	25,558	45,777,778	137,059
2004	325-326	516,172	1,588	3,072,133	9,453	9,278,747	28,550	44,378,279	136,130
2005	318	457,373	1,438	2,953,908	9,289	9,345,664	29,389	42,476,104	133,573
2006	313-314	452,622	1,446	2,787,676	8,906	8,896,660	28,424	40,050,157	127,548
2007	302-303	470,186	1,557	2,548,129	8,410	7,973,312	26,402	38,337,086	126,525
2008	289	398,429	1,379	2,139,547	7,403	7,160,116	24,775	37,623,647	130,186
2009	272-273	355,888	1,308	1,872,441	6,859	6,481,773	23,830	33,564,145	122,946

2010	268-269	317,391	1,184	1,771,475	6,585	6,116,970	22,825	31,672,897	117,743
2011	262-263	209,711	797	1,158,768	4,406	4,365,920	16,600	23,899,854	91,221
2012	253-254	210,308	831	1,120,577	4,429	3,795,230	15,001	18,201,567	71,660
2013	234-235	242,697	1,037	1,170,597	5,003	3,740,872	15,987	15,677,142	66,711
2014	230	224,722	977	1,066,950	4,639	3,167,185	13,770	11,313,653	49,190

Source: Source: RAM IFQ landings database sourced through AKFIN. Baseline values represent an average of 1992 through 1994 values sourced from ADF&G Fish Tickets.

A.2.3.6.4. Total and average sablefish IFQ harvest by quartiles of vessels

Year	Number of vessels per quartile	Quartile 1		Quartile 2		Quartile 3		Quartile 4	
		Total pounds	Average pounds	Total pounds	Average pounds	Total pounds	Average pounds	Total pounds	Average pounds
Baseline	234-235	1,245,393	5,284	4,020,094	16,921	8,700,713	36,441	29,471,031	122,881
1995	153-154	228,735	1,485	1,919,539	12,465	7,105,669	46,141	31,681,921	207,071
1996	141-142	249,854	1,772	1,727,702	12,253	5,927,810	42,041	25,291,113	178,106
1997	132-133	219,544	1,663	1,445,400	10,868	5,041,495	38,193	21,944,811	164,999
1998	119-120	280,873	2,360	1,548,859	13,016	5,166,832	43,419	20,639,537	171,996
1999	115-116	271,406	2,340	1,452,330	12,520	4,832,364	41,658	18,854,270	163,950
2000	112-113	236,566	2,112	1,597,096	14,260	5,567,904	49,713	20,222,941	178,964
2001	108-109	244,435	2,263	1,700,055	15,741	5,139,819	47,591	19,270,850	176,797
2002	103-104	299,186	2,877	1,658,008	15,942	5,649,656	54,324	19,485,091	189,176
2003	102	383,606	3,761	1,936,117	18,982	6,332,201	62,080	22,156,587	217,221
2004	99	392,356	3,963	2,029,136	20,496	6,737,572	68,056	24,536,252	247,841
2005	94-95	399,289	4,248	2,185,264	23,247	6,661,304	70,865	23,631,889	248,757
2006	93	341,697	3,674	2,190,643	23,555	6,628,100	71,270	21,681,738	233,137
2007	93-94	361,487	3,887	2,059,915	22,150	6,445,292	69,304	21,213,634	225,677
2008	89-90	375,157	10,930	2,133,741	42,658	6,047,506	112,355	18,316,244	354,505
2009	90-91	349,607	3,842	2,011,182	22,101	5,558,330	61,081	16,283,286	180,925

2010	92	314,480	3,418	1,678,390	18,243	4,904,497	53,310	15,055,021	163,642
2011	90-91	319,020	3,545	1,830,879	20,343	5,417,098	60,190	16,474,226	181,035
2012	88-89	348,836	3,964	2,056,683	23,109	5,854,685	66,531	18,291,145	205,518
2013	82-83	353,717	4,314	2,413,732	29,081	6,178,926	75,353	16,533,458	199,198
2014	78-79	354,657	4,489	2,110,897	26,720	5,394,710	68,287	13,554,653	173,778

Source: Source: RAM IFQ landings database sourced through AKFIN. Baseline values represent an average of 1992 through 1994 values sourced from ADF&G Fish Tickets

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2.4 CREWMEMBER AND PROCESSOR IMPACTS

This section will address Objective 5 of the original EIS for the IFQ Program.

- Objective 5: Maintain the existing business relationships among vessel owners, crews, and processors

At the time of implementation of the IFQ Program, the Council wanted to maintain the business relationships that had existed within the IFQ fleet prior to the implementation of the IFQ Program. Nevertheless, the Council understood that creating exclusive harvesting privileges for vessel owners could fundamentally shift the power structures in the fisheries. Sections 2.4.1 and 2.4.2 discuss how the implementation of the IFQ Program affected IFQ crewmembers and processors of halibut and sablefish and how these impacts may have changed over the 20 years of the IFQ Program.

2.4.1 Crewmember impacts

At the time of implementation of the IFQ Program, it was recognized that the program would likely increase the relative bargaining strength of whoever controlled the harvesting privileges. After some discussion of including crewmembers among the initial recipients, the Council elected to allocate QS only to persons who owned or leased a vessel with fixed gear sablefish or halibut landings off Alaska. This was intended to provide those who had borne the greatest financial risk in developing the harvesting sector with initial QS allocations and to ensure a smooth transition to IFQ management by maintaining existing (at the time of IFQ implementation) business relationships within the harvesting sector. In addition, there was no data from either the State of Alaska or NMFS at the time of the development of the IFQ Program on crew participation, so it would have been difficult to determine allocations to crewmembers (NMFS, 1992). The investment of crewmembers in the fisheries was recognized through the mandate that catcher vessel QS acquisition by transfer be limited to bona fide crewmembers (i.e., those with 150 days of commercial fish harvesting experience in a U.S. commercial fishery) and initial QS recipients.

The intent of this section is to discuss the impacts of the implementation of the IFQ Program on crewmembers in the IFQ fisheries. For simplicity, the discussion explicitly omits captains, whose earnings in the fisheries have always been different from that of crewmembers. Specifically, this section provides a discussion of how the IFQ Program affected the number of available crew jobs, crew earnings (as crew shares [percentage of vessel gross revenues paid to each crew member] and average earnings [dollar amount paid]), and conditions of crew employment. Crewmembers are also affected by entry opportunities into the IFQ fisheries, which are discussed under Section 2.6.

Historically there has been a fleet-wide contract – the "Set Line Agreement" between Seattle vessel owners in the Fishing Vessel Owner's Association – FVOA and largely Seattle-based crewmembers in the Deep Sea Fishermen's Union – DSFU. This agreement has existed for over 80 years and covers the revenue sharing basis and fishing conditions for DSFU crewmembers on FVOA vessels in the Seattle IFQ fishing fleet. Although the agreement does not guarantee crew shares, it does include the boat share that can be deducted from vessel revenues to compensate FVOA vessel owners and how crew shares are ultimately calculated. Furthermore, the agreement includes a provision that the revenue sharing calculation will not deduct payments to compensate QS holders for the harvest of initially allocated halibut and sablefish QS on the vessel. Because of the Set Line Agreement and the union membership of the DSFU, the Seattle fleet has some data on crewmember employment numbers and changes in boat shares. It should be noted that with 61 members (as of April 2016) the DSFU represents a very small contingent of the crewmembers in the total halibut and sablefish IFQ fleet.

There is extreme variability in fishing arrangements for members of regional fishing organizations throughout Alaska, e.g., the Alaska Longline Fishermen's Association (ALFA) in Sitka, the North Pacific Fisheries Association (NPFA) in Homer, the Petersburg Vessel Owner's Association (PVOA) in Petersburg, so that establishing set agreements for crewmembers is difficult. For example, some QS holders fish with family members or friends, some QS holders coordinate with each other and stack their shareholdings onto vessels, others may fish alone some days and take a crewmember other days, etc.

Data

There is very limited data available on crewmembers in the IFQ fisheries. Crewmembers participating in the IFQ fisheries have to buy a commercial crew license with the Alaska Department of Fish and Game (ADF&G). However, the ADF&G does not track in which fishery crew license holders participate. There have been inter-agency discussions in the past to try to develop systematic ways for gathering data on crewmembers, but to date these efforts have not been realized. However, beginning in 2006 a "crew size" field was added onto ADF&G fish tickets. This field is filled in by processors at the time of landing and is not audited or validated in any way.

Given these data limitations, analysts hosted a workshop with IFQ participants to gather information about the impacts of the implementation of the IFQ Program on crewmembers in the IFQ fisheries (hereinafter "crew workshop"). The crew workshop covered three major themes – crew earnings in the IFQ fisheries, other conditions of crew jobs, and entry opportunities. Past and present crewmembers, vessel owners, shareholders, and industry representatives from various geographic segments of the fleet attended the workshop. A list of crew workshop attendees and those who otherwise provided their feedback to the crew workshop topics is included in the Appendix to this section of the IFQ Program Review. Section 2.4.1 focuses on the discussion from this crew workshop along with results from a survey of halibut and sablefish QS holders that was conducted by NMFS in 2009 (Kotlarov, 2015).

The data included in this section of the IFQ Program Review on the number of active vessels in the IFQ fisheries was provided by AKFIN. Data on the number of persons per vessel post-IFQ and the TACs was provided by the NMFS RAM Division. Prior to the implementation of the IFQ Program, the number of persons per vessel was an estimate of the number of Commercial Fishery Entry Commission (CFEC) permit holders who recorded landings on the vessel, provided by the CFEC to NMFS RAM. As in all other sections of the IFQ Program Review, the baseline is the average of the values from 1992 through 1994.

2.4.1.1 **Crew employment conditions pre-IFQ**

In the years immediately prior to the implementation of the IFQ Program, the halibut and sablefish fisheries were derby-style fisheries: with fishing seasons down to day-long openers in some cases, taking place irrespective of weather conditions, and resulting in congestion, tangled fishing gear, and dangerous working conditions. Prior to the IFQ Program, most vessels participating in the halibut and sablefish fisheries were diversified into other fisheries, especially salmon and crab (Pautzke and Oliver, 1997; Kasperski and Holland, 2013). Therefore, for most crewmembers the halibut and sablefish fisheries served only as part-time employment, filling in gaps before or after other fisheries. According to workshop participants, at that time vessel owners were looking to crewmembers as “manpower” – working on little sleep, in stressful and dangerous conditions, doing hard physical labor.

The persistent need for manpower in the pre-IFQ halibut and sablefish fisheries likely allowed for crewmembers to retain some bargaining power, relative to vessel owners. During the pre-IFQ baseline period (an average of the values from 1992 through 1994), there were just over 4,300 vessels with landings in the halibut and sablefish fisheries combined (see Section 2.3.6). This meant thousands of jobs for crewmembers for very brief openers that occurred in the midst of other fishing seasons, which likely provided those crewmembers willing to participate in the halibut and sablefish openers with some leverage in negotiating their wages and conditions of employment.

Crewmembers in the halibut and sablefish fisheries have always operated under crew shares as a percentage of vessel revenues. The vagaries of weather and luck during the short fishing seasons in the pre-IFQ halibut and sablefish fisheries meant that crewmembers had no security in how much they made in these fisheries. Section 2.4.1.4.1 provides additional detail on the crew share system for the halibut and sablefish fisheries.

2.4.1.2 **Crew jobs – numbers of crew jobs**

There was substantial consolidation in the fisheries immediately following the implementation of the IFQ Program. Section 2.3.6 discussed the decrease in the number of unique active vessels in the halibut and sablefish fisheries following IFQ Program implementation. In the first year alone, there were 1,290 fewer vessels making landings in just the halibut fishery. The exodus of fishing vessels meant a substantial decrease in the number of available crew jobs and, according to crew workshop participants, in the bargaining power of crewmembers relative to vessel owners and QS holders. Over the 20 years of the IFQ Program, consolidation has continued in the IFQ fisheries.

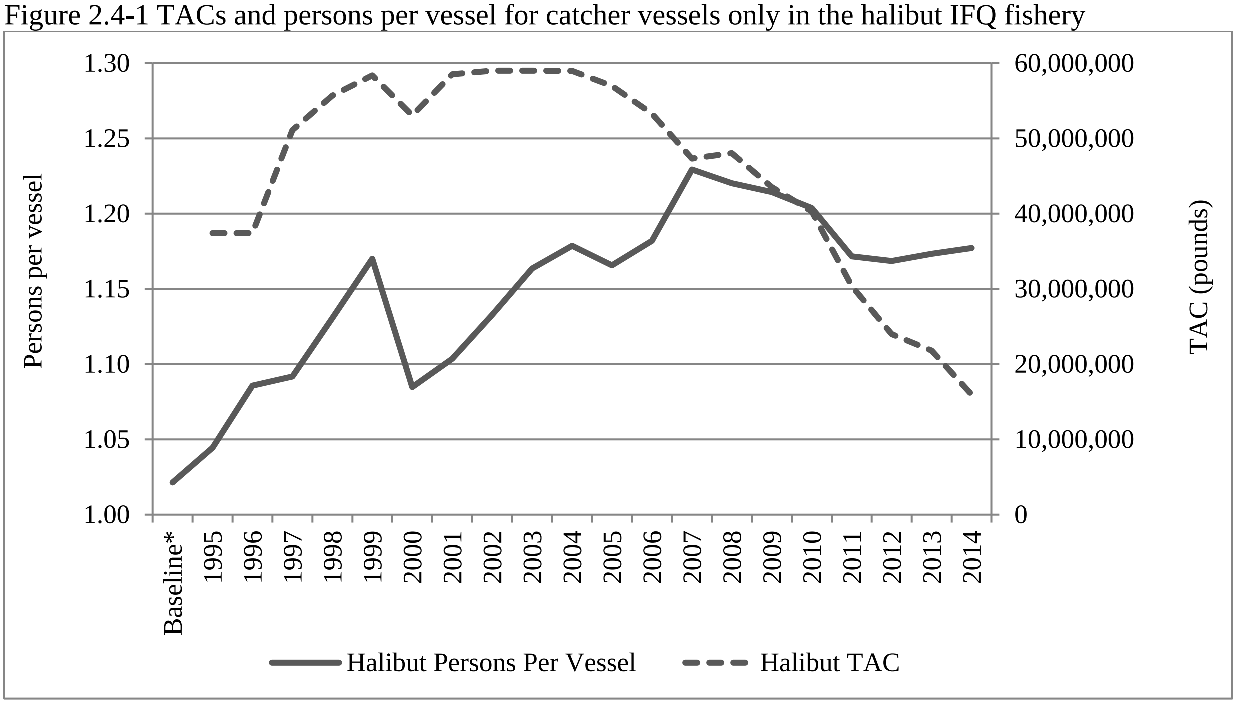
Other conditions in the fisheries have contributed to decreasing number of crew jobs. For instance, according to crew workshop participants, the number of crew jobs per vessel has also decreased since IFQ implementation. With the lengthening of the fishing season, vessel operators’ need for manpower in and of itself has decreased. Technological improvements, like the auto-baiter, have also contributed to the elimination of crew jobs on some IFQ vessels.

Shareholders have combined their IFQ holdings onto fewer vessels, reducing their operating costs and increasing the value that they can generate from their holdings, while eliminating crew member jobs (Hartley and Fina, 2001). Hartley and Fina (2001) estimated that the number of crew members on a typical fishing trip in the IFQ fisheries decreased from a range of 3 to 6 to a range of 2 to 4, including the captain.

Figure 2.4-1 and Figure 2.4-2 show the number of persons per vessel (post IFQ-program) or CFEC permit holder per vessel (pre-IFQ Program) in the halibut and sablefish IFQ fisheries for the catcher vessel fleet. In the post-IFQ fisheries, the term “persons per vessel” is inclusive of QS holders, hired masters, or persons leasing IFQ. In the pre-IFQ fisheries, the term "persons per vessel" refers to CFEC permit holders who recorded landings in the fisheries. The data is limited to catcher vessels because data on CFEC permit holders with landings over the 1992 to 1994 time period were only consistently available for catcher vessels. The baseline is an average of the three years preceding IFQ implementation, 1992 through 1994. The figures show that for both fisheries shareholders per vessel increased immediately following IFQ implementation and continued to rise over the following decade, with substantial inter-annual variability.

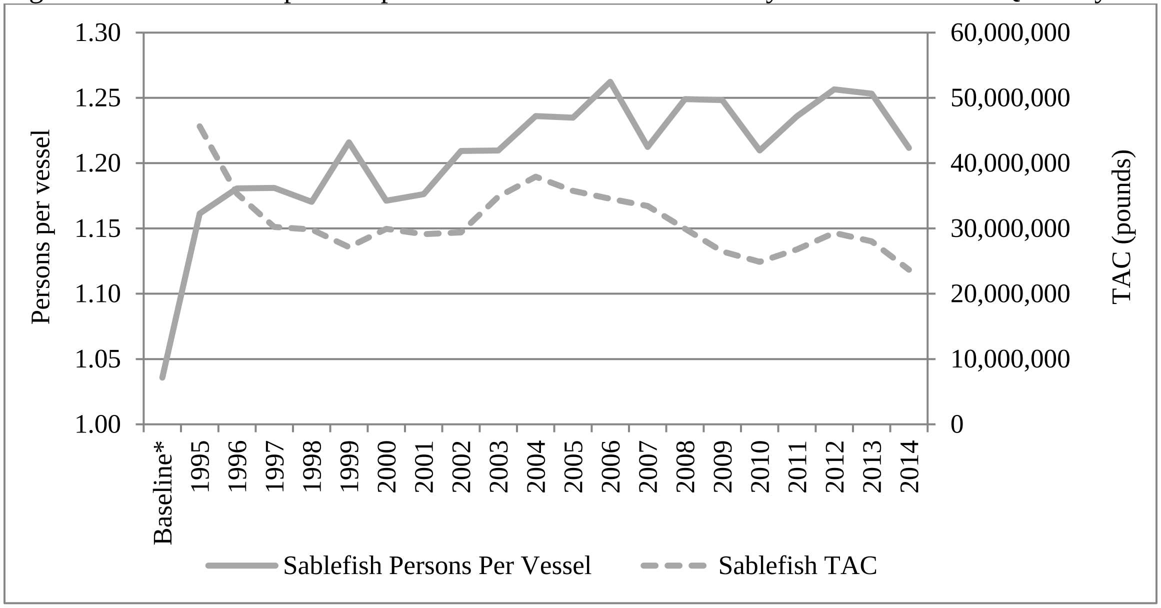
Figure 2.4-1 and Figure 2.4-2 show halibut and sablefish TACs since IFQ implementation plotted alongside the respective persons per vessel trend line to see if there is an inverse relationship between the two in the IFQ fisheries. The analysts prepared this plot in response to input from participants in the crew workshop, who noted that decreasing resource abundance and TACs in both IFQ fisheries have also likely contributed to QS holders consolidating onto fewer boats. The crew workshop participants suggested that as the IFQ pound value of QS decreases, some shareholders may pool their IFQ onto fewer boats as a way to minimize operating costs and to make economically worthwhile trips. According to some crew workshop participants, consolidating IFQ onto vessels is also a common practice for those vessel operators primarily functioning as a hired master or lessee for initial recipients of QS. That is, for those whose relationship with shareholders is functionally equivalent to that of a lessee, they will often harvest several shareholders' IFQ on a single vessel to maximize harvesting efficiency and revenues from their fishing trips. Visual inspection of the trend lines in Figure 2.4-1 and Figure 2.4-2 does not readily reveal any obvious relationship.

Figure 2.4-1 TACs and persons per vessel for catcher vessels only in the halibut IFQ fishery



Source: NMFS 2015a. Note: Persons per vessel includes CFEC permit holders (pre IFQ), and QS holders, hired masters, or lessees (post IFQ)

Figure 2.4-2 TACs and persons per vessel for catcher vessels only in the sablefish IFQ fishery



Source: NMFS, 2015b. Note: Persons per vessel includes CFEC permit holders (pre IFQ), and QS holders, hired masters, or lessees (post IFQ)

Scatterplots were also generated (not pictured), where the dependent variable is the persons per vessel and the independent variable is the respective TAC, and linear trend lines of best fit were drawn with associated R-squared values. The R-squared is the percentage of the variation in the dependent variable that is explained by the independent variable. For models with just one independent variable, the R-squared is also equivalent to the square of the correlation coefficient of the two variables. The halibut persons per vessel and respective TACs correlation coefficient (-0.1) and R-squared (0.01) do not provide an indication of a statistically significant relationship between these two variables. However, the respective correlation coefficient (-0.43) and R-squared (0.18) for the sablefish fishery reveal that there may be a negative relationship between these two variables in the sablefish fishery.

There may be several factors that explain why participants in the sablefish fishery may more readily respond to changes in TACs by consolidating onto fewer vessels. The sablefish IFQ fleet is less complex than the halibut IFQ fleet, with far fewer vessels and shareholders, and more consolidated holdings. This may mean that the sablefish fleet can more readily coordinate to consolidate IFQ onto fewer vessels during lean years. The incentives for doing so may be higher, because the sablefish QS holders may be less diversified in other fisheries than halibut QS holders. For the halibut IFQ fleet, particularly in times of low halibut abundance, some vessels have reached their vessel IFQ cap and do not have the capacity for additional consolidation. For the sablefish IFQ fleet, the harvest levels for the Bering Sea and Aleutian Islands are consistently substantially below the respective TACs due to the costs and risks of reaching these remote sablefish fishing grounds and prosecuting the fishery in these areas. This may further incentivize consolidation onto fewer vessels (NPFMC, 2014).

This brief examination is inherently limited but does point to some interesting potential future research. Understanding the factors underlying persons' decisions to consolidate IFQ permits onto single vessels would be better suited for a behavioral model at the individual level that includes a multitude of economic and individual factors. Researchers should consider a potential time lag in persons responding to TAC changes.

Table 2.4-1 shows the number of harvesting crewmembers on trips that targeted halibut and sablefish from the NMFS (2009) survey of IFQ shareholders (Kotlarov 2015). The table shows the distribution of responses to a question about the number of crewmembers onboard fishing vessels during the IFQ fishing season. This data is only a point estimate (one year) and was estimated 14 years into the IFQ Program. Nevertheless, the table provides some indication of how many crewmembers currently participate on IFQ fishing trips for each fishery. Since the number of crewmembers on board is a function of vessel size, the distribution of the number of crew on sablefish vessels is slightly more skewed to the right, because sablefish vessels are generally bigger. Assuming that the number of crewmembers per fishing vessel had stabilized by 2009, the vast majority of fishing vessels in both IFQ fisheries have four or fewer crewmembers.

Table 2.4-1 Number of harvesting crewmembers on trips that targeted halibut and/or sablefish (2009)

Crew members	Halibut	Sablefish
1	19.6%	13.6%
2	26.1%	20.9%
3	27.3%	27.2%
4	16%	24.6%
5	8.9%	10.5%
6	1.8%	2.1%
8	0%	0.5%
10	0.3%	0.5%
Total responses	337	191

Source: Kotlarov 2015

The distribution of number of crewmembers by fishing vessels from Table 2.4-1 cannot be applied to estimate pre-IFQ numbers of crewmembers in the halibut and sablefish fisheries due to possible changes in the number of crewmembers per vessel following IFQ implementation, as noted by crew workshop participants. Furthermore, given that NMFS and the ADF&G do not track crew participation in the IFQ fisheries, the analysts are limited to reporting anecdotal information on changes in total crewmember jobs following IFQ implementation. For the DSFU, for which these numbers are available, a member noted there were 175 crewmembers on 37 vessels in 1994 and in 2015 there were 61 crewmembers on 12 vessels. Participants during the crew workshop estimated that the overall number of crew jobs decreased by 50% to 70% since IFQ implementation. Hartley and Fina (2001) estimated that the number of active crew members in the halibut fishery fell from 10,500 in 1994 to 3,200, or 70% in 1999. These estimates were based on the number of total active halibut vessels between these two periods and on an assumed decrease of average crew size per vessel from 3 in 1994 to 2 in 1999, excluding captains.

Such a decrease in the number of available crew jobs likely had significant implications for remaining crewmembers with respect to their bargaining power relative to vessel owners. Especially during the first several years following IFQ implementation in the halibut fishery, wherein consolidation was substantial and rapid, there would have been numerous crewmembers looking for work. Over the last 20 years, many of these crewmembers have likely transitioned into other fisheries or other employment. Although consolidation has continued, conditions have likely stabilized for crewmembers relative to the first several years post-IFQ implementation.

Participants of the crew workshop noted that although the bargaining power of crewmembers has decreased since IFQ implementation, even in the face of fewer crew jobs, it is difficult for vessel owners to find good crew. Therefore, as with any job, crewmembers who are responsible, on time, and stable are likely to be in a better bargaining position. Highly skilled crewmembers have retained some bargaining power not only due to their contribution to maximizing the value of the vessel's quota but also because they are an inherently lower liability than less skilled crew. Injuries and lawsuits can increase a vessel owner's insurance costs over the long-term. Crewmembers who can bring quota on board their vessel are also in a more advantageous bargaining position.

2.4.1.3 **Crew earnings**

According to participants of the crew workshop, crew earnings in the halibut and sablefish fisheries have also changed since IFQ implementation. Crew earnings may be expressed as either crew shares (the percentage of ex-vessel revenue paid to each crewmember) or average crew earnings (the absolute earnings in the fishery in dollars).

2.4.1.3.1 Crew shares

Crew shares are expressed as a percentage of the total vessel gross revenues from an IFQ fishing trip. Herein all reported crew shares refer to the percentage of total vessel revenues that the individual receives from their work as a crewmember and does not include any earnings that the crewmember may receive as a shareholder, who brings quota onto the boat. Crew shares are not reported in the IFQ fisheries. All of the information presented below is based on anecdotal information from the crew workshop and the NMFS 2009 survey of shareholders (Kotlarov, 2015). Although the following may not be a comprehensive list of all cost and revenue allocation schemes in the fisheries, it should be broadly representative given that attendees of the workshop were from various geographic segments of the fleet, generations, and participant types.

Prior to the IFQ Program, for some operations revenue shares were calculated for the vessel (to compensate the vessel owner if different from the captain), captain, and crew. For some operations, operating costs were deducted from gross ex-vessel revenues (gross revenues) and the vessel, captain, and crew shares were allocated from these adjusted revenues. For other operations, the operating costs were included in the vessel share, so that the vessel share included some percentage of the revenue for the vessel owner plus a deduction for the operating costs. For others, only bait and fuel costs were deducted from gross revenues and the crew and captain would split the costs of food. Participants at the crew workshop estimated individual crew shares (i.e., the share accruing to each crewmember) prior to IFQ were between 9% and 15% of gross revenues for the halibut and sablefish fisheries.

The IFQ Program added another component to the revenue sharing calculation: a share of the revenues for the shareholder. Since IFQ implementation, a variety of revenue-sharing scenarios have emerged based largely on whether the vessel owner is an initial recipient of QS, has acquired additional QS, or largely operates as a hired master/lessee. These distinctions are important because share calculations are impacted if some of the vessel revenues for a trip are paid to shareholders for use of their IFQ. In the analysis for this section, deductions from gross revenues paid to compensate a shareholder, either through a hired master arrangement or a true IFQ lease arrangement, are referred to as a lease rate. There is some variation in the IFQ fisheries with respect to whether lease rates are deducted for initially allocated QS.

For operations that do not apply a lease rate for initially allocated QS, individual crew shares range from 8% to 20% of ex-vessel revenues just from the harvest of that initially allocated QS, according to crew workshop participants. For those operations that do apply a lease rate for initially allocated QS, these rates are generally about 15% to 30% of gross revenues. This lease rate percentage is deducted off the top from gross revenues, and then the vessel owner applies their usual cost deductions and revenue-sharing arrangements to the remaining 70% to 85%.

Lease rates and revenue sharing arrangements are applied differently for purchased QS and leased IFQ. Vessel owners who purchase additional QS deduct lease rates from gross revenues as compensation for the harvest of the resultant IFQ, and then the usual cost deductions and revenue-sharing arrangements are applied to calculate captain and crew shares. For vessel owners that operate strictly as hired masters or lessees, the QS holders receive a lease rate that is a percentage of the gross revenues and then the usual cost deductions and revenue-sharing arrangements are applied to calculate the vessel, captain and crew shares. According to crew workshop participants, lease rates have been growing over the 20 years of the IFQ Program and now range between 50% and 60%. That is, 50% to 60% of the gross revenue goes to the shareholder and the remaining 40% to 50% goes to the hired master/lessee to which cost deductions and revenue-sharing arrangements are applied. According to crew workshop participants, for those participants on vessels that harvest both initially allocated QS and purchased QS, each crewmember may be making 6% to 15% of gross revenues. For operations that are strictly hired master or lessees, the crew shares for each crewmember are about 3% to 8% of gross revenues. According to participants at the crew workshop, crew shares under all of these different cost deduction and revenue sharing arrangements have decreased since IFQ implementation, due increasing lease rates.

Table 2.4-2 shows the distribution of crew share, captain share, and vessel share as percentages of 2009 gross revenues from participation in the halibut and sablefish fisheries from the 2009 NMFS survey of QS holders (Kotlarov 2015). The survey asked: “roughly what percentage of your 2009 gross revenues from IFQ fisheries was spent on the following operational costs?” and provided respondents with a choice between ranges of revenues for expenditures on crew shares, captain share, and vessel share. Given this formulation for the question, the responses likely capture total shares for all crewmembers combined rather than shares paid to each crew member.

According to the results presented in Table 2.4-2, of the 375 QS holders who responded, in 2009 the majority paid their crew a total of 10% to 29% of gross revenues. Variation in crew share expenditures across IFQ fishery operations likely reflects not only differences in actual revenue sharing schemes but also the variation in the total number of crewmembers on the vessel, as demonstrated in Table 2.4-2. The aggregated results presented here for total crew shares from the survey responses cannot be compared to individual crew share estimates from the crew workshop.

The survey did not ask participants to provide information on lease fees or discuss how lease fees for purchased QS or leased IFQ were deducted from gross revenues. For both fisheries, survey respondents indicated that crew shares are greater in the more remote regulatory areas (regulatory Areas 3B and 4 for halibut, and the Aleutian Islands and Bering Sea for sablefish), likely due to the difficulty of getting and keeping crew in these sparsely populated regions, which are prone to severe marine weather.

Table 2.4-2 Crew, captain, and vessel shares as a percentage of 2009 gross revenues from participation in the halibut and sablefish fisheries

	Halibut			Sablefish		
	Crew share	Captain share	Vessel share	Crew share	Captain share	Vessel share
0-9%	11%	24%	10%	11%	22%	10%
10-19%	30%	29%	14%	30%	28%	14%
20-29%	30%	17%	21%	30%	9%	21%
30-39%	13%	14%	25%	13%	6%	25%
40-49%	10%	7%	19%	10%	5%	19%
50% +	6%	9%	12%	6%	5%	12%
Total response	375	278	290	375	218	290

Source: Kotlarov 2015. Note: Data is self-reported by survey participants.

2.4.1.3.2 Average crew earnings

Despite decreasing crew shares, many crewmembers' average earnings actually increased following IFQ implementation, according to crew workshop participants. This rise in crew earnings can be attributed to increased average revenues per vessel likely due to a combination of factors including increased TACs over the first decade of the program (in the halibut fishery only), consolidation of quota onto fewer boats, increased efficiency amongst remaining vessels, and higher ex-vessel prices for fish. For both fisheries, TACs began decreasing in the mid-2000s. Higher ex-vessel prices seem to have effectively counteracted these TACs declines for both fisheries for several years after the mid-2000s TAC declines, but revenues per active vessel have decreased in both fisheries over the last three years of available data (2012 through 2014). Nevertheless, for both fisheries, the revenues per vessel remain substantially higher than during the pre-IFQ baseline period (the average from 1992 through 1994). See Section 2.1 for average revenues per vessel.[42] Since crew earnings are based on a percentage of gross vessel revenue, these decreases in vessel revenues over the last several years have likely impacted crew earnings as well, although for many crew such earnings would remain comparatively higher than pre-IFQ earnings. These estimated revenues represent an average across the whole IFQ fleet, and may not be fully representative of conditions for some crewmembers, e.g., those who fish in certain areas where TACs have dropped more and those who crew on boats that are primarily a hired master/lessee operation.

Increases in crew earnings following IFQ implementation were substantial for some crewmembers. Hartley and Fina (2001) estimated that average crew annual earnings increased from $1,095 to $2,512 and

[42] For the halibut fishery, from 2012 through 2014 average revenues (all in 2010 dollars) per active vessel ranged from $100,000 to $120,000 compared to $25,000 during the baseline period. For the sablefish fishery, average revenues (all in 2010 dollars) for active catcher vessels and catcher processors during the baseline period were $70,000 and $401,000 respectively. This is compared to a range (again all in 2010 dollars) of $191,000 to $270,000 for catcher vessels and $560,000 to $694,000 for catcher processors over the period of 2012 through 2014.

from $3,615 to $8,342 per crewmember in the halibut and sablefish fisheries, respectively, in the first several years following IFQ implementation. For some of those at the IFQ crew workshop, crew earnings nearly quadrupled over one year, from 1994 to 1995. Despite the physical difficulty and danger of fishing, earnings for crewmembers in some sectors of the fleet remain high enough that the average age of crewmembers is quite high. For example, the average age of a crewmember in the DSFU is 55.

Crew workshop participants noted that crew earnings have also become more secure since IFQ implementation. Prior to the IFQ Program, the vagaries of weather and catch meant that vessel (and thereby crewmember) earnings were highly uncertain. Under the IFQ Program, each vessel owner knows how much they are going to fish, given their own allocation of QS holdings, the IFQ that they are fishing as hired masters/leasing, and any IFQ being brought on board by crewmembers. Crewmembers, therefore, have a greater degree of certainty about how much they will make in a given IFQ fishing season.

Most IFQ vessels are still diversified in other fisheries post-IFQ implementation (Hartley and Fina, 2001) although diversification has decreased over the last 20 years (Kasperski and Holland, 2013). Therefore, crewmembers likely continue to participate in multiple fisheries. However, increased average earnings and prolonged fishing seasons have likely increased the importance of the IFQ fisheries to the overall fishing portfolios of IFQ crewmembers.

2.4.1.4 Conditions of crew jobs

Besides earnings, others conditions of crew jobs changed following IFQ implementation, including the length of fishing seasons and overall safety of the fleet.

2.4.1.4.1 IFQ fishing seasons

The lengthening of the fishing seasons for halibut and sablefish since IFQ implementation has provided for some of the gross vessel revenue (and thereby crew earnings) increases. Relative to the pre-IFQ baseline period (1992 through 1994), fishing seasons for sablefish and halibut increased substantially following IFQ implementation. Although for those operations that followed halibut and sablefish openers along the Gulf Coast and into the Aleutians and Bering Sea during the pre-IFQ days, the total length of time at sea fishing halibut and sablefish is similar to that of the 1980s. Interestingly, a participant of the IFQ crew workshop also noted that his fishing season is often extended due to the vagaries of walk-ons – shareholders who bring their IFQ onto the boat to be harvested.

Longer fishing seasons have had implications for IFQ crewmembers. Longer fishing seasons coupled with increased average seasonal earnings may mean that for some crewmembers the transition to the IFQ Program resulted in them earning more of their fishing income from the halibut and sablefish fisheries than before. This could also mean that the opportunity costs for crewmembers to participate in non-IFQ (halibut and sablefish) fisheries would be different post-IFQ implementation and that they would thus participate less in these other fisheries. According to crew workshop participants, the prolonged fishing seasons also made participation in the IFQ fisheries prohibitive for some female fishermen, because of the extended time away from family.

2.4.1.4.2 Safety

The implementation of the IFQ Program led to some safety improvements in the halibut and sablefish fishing fleets, which are discussed in Section 2.8. This section provides a brief overview of the safety impacts highlighted by participants during the crew workshop.

The lengthening of the fishing seasons and the increased flexibility in harvest afforded by the IFQ Program has provided for some safety benefits in the fisheries. According to participants of the crew workshop, the IFQ Program has allowed fishermen to pick safer weather windows for going to sea, reduced congestion on fishing grounds and need to haul gear as quickly as possible, and enabled halibut and sablefish fishermen to develop a relatively consistent work schedule and to sleep more while at sea. However, participants also noted that not all of the safety improvements in the fleet can be attributed to the IFQ Program, since there have also been considerable efforts by the U.S. Coast Guard to improve safety in the IFQ fleet, and in commercial fishing fleets in general, over the last 20 years. Additionally, there is generally more awareness of and knowledge about safety amongst IFQ participants. Given that crewmembers are the most exposed participants on an IFQ boat, safety improvements in the IFQ fleet have made crew jobs considerably safer according to crew workshop participants.

Summary

Information on crew impacts is one of the biggest data gaps for the IFQ fisheries. Crewmembers have historically not been tracked in the IFQ fisheries. Therefore, there is no historical data on the number of crewmembers participating in the fixed-gear halibut and sablefish fisheries or on IFQ vessels. The State of Alaska, which issues crew licenses for participating in Alaska fisheries, does not track in which fishery the crewmember participated. The crew size field which was added onto fish tickets in 2006 will provide information on the number of crewmembers per IFQ vessel beginning that year; however, that information will have to be qualified because it is recorded by processors at the time of landing and is not audited in any way. There is also no data on crew shares (as a percentage of total ex-vessel revenues) or average crew earnings (as an absolute number) for IFQ crewmembers.

Because of the dearth of data and information on crewmembers in the IFQ fisheries, this examination of the impacts of the IFQ Program on crewmembers relies on previous research in this area and information gathered during a crew workshop held in April of 2016 with IFQ participants that was specifically intended to address these information gaps. Anecdotal information about impacts on crewmembers of the IFQ Program gathered during the crew workshop is only presented if there was an overall consensus at the crew workshop with that specific impact. To the extent possible, this anecdotal information is substantiated by previous research.

The implementation of the IFQ Program likely led to several major changes for crewmembers in the halibut and sablefish fisheries. The number of total crew jobs in the IFQ fisheries has decreased likely by several thousand due to consolidation and the exit of vessels from the fisheries (Hartley and Fina, 2001). With a decline in the number of available crew jobs and an overall shift away from vessel owners' need for manpower, the bargaining strength of crewmembers relative to vessel owners has likely decreased. In part as a result of these changes in bargaining strength as well as in how vessel owners now participate in the IFQ fisheries, crew shares as a percentage of vessel gross revenues have likely also declined since IFQ implementation. However, average seasonal crew earnings in the IFQ fisheries have likely increased and become more predictable following IFQ implementation. Furthermore, with some safety improvements in the fleet following IFQ implementation, crew jobs have likely become safer as well.

Appendix A2.4.1

Attendees of Workshop on Crewmember Impacts of the IFQ Program; April 7, 2016; Anchorage Hilton

IFQ Crew workshop attendees and those who otherwise provided input to the crew impacts section

Name	Relationship to the IFQ Fisheries (E.g., IFQ holder, crewmember, skipper, vessel owner, initial recipient, second-generation shareholder)	Residency (City and State only)
Rick Berns	IFQ holder	Old Harbor, AK
	President of Community Quota Entity in Old Harbor	
Linda Kozak	consultant	Kodiak, AK
Jeff Farvour	Crewmember	Sitka, AK
	2nd generation QS holder	
	Vessel owner	
Rob Wurm	Initial recipient and current QS holder	Lynden, WA
	Vessel owner	
Maggie Bauman	journalist	Knik, AZ
Mark Gleason	Crab Industry representative	Seattle, WA
Megan O'Neil	Petersburg Vessel Owner's Association representative	Petersburg, AK
Theresa Peterson	Crewmember prior to and a few years post IFQ	Kodiak, AK
	Vessel owner	
Jan Standaert	Crewmember prior to IFQ	Seattle, WA
	Skipper now	
	Second generation shareholder	
	Deep Sea Fishermen's Union representative	
Jeff Stephans	Kodiak Fisheries Advisory Committee	Kodiak, AK
Linda Behnken	Crewmember prior and post IFQ	Sitka, AK
	Initial recipient and current QS holder	
	Vessel owner	
Tom Gemmell	Halibut coalition	Juneau, AK

Alexus Kwachka	Crewmember prior and post IFQ	Kodiak, AK
	Vessel owner	
Rachel Donkersloot	Researcher	Palmer, AK
Brian Harber	Deep Sea Fishermen's Union representative	Seattle, WA
	Crewmember prior to IFQ and now	
	Second generation shareholder	
Erik Velsko	Crewmember	Homer, AK
	2nd generation QS holder	
	Vessel owner	
Jason Miller	Crewmember	Petersburg, AK
	2nd generation QS holder	
Buck Laukitis	Vessel owner,	Homer, AK
	2nd generation QS holder,	
	Crewmember at time of IFQ implementation	

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2.4.2 Processor impacts

This section will address Objective 5 of the original EIS for the IFQ Program.

- Objective 5: Maintain the existing business relationships among vessel owners, crews, and processors

One of the consequences of the derby-style halibut and sablefish fisheries was over-capitalization in the processing sector (Fell and Haynie, 2011). According to processor representatives who were interviewed or queried for this analysis, prior to IFQ management, the processing sector had significantly increased its freezing capacity for the halibut and sablefish fleets. The switch to IFQ management was expected to slow the pace of the fisheries and led to idle processing capital within the sector that had been processing halibut and sablefish prior to IFQ. Under an assumption of negligible changes in labor costs, there was an expectation that processors, especially those spatially concentrated, would bid up ex-vessel prices until less efficient processors were forced out of the market (Fell and Haynie, 2011; 2013). Thus, as in the harvesting sector the implementation of the IFQ Program was expected to result in a reduction of capacity in the processing sector.

It was also anticipated that processors could influence IFQ participants' decisions about when and how to fish by offering seasonal and quality-specific ex-vessel prices or other inducements. Therefore, it was expected that the harvesters' decisions on how to use their IFQs could be beneficial for both harvesters and processors. For example, it may have become mutually beneficial for a harvester and processor to agree on delivery schedules, quality control measures, and prices, which would potentially decrease uncertainty and costs and increase marketing opportunities. The IFQ Program was anticipated to decrease processing costs by providing processors with greater flexibility to select delivery schedules that reduce these costs and by reducing freezing and cold storage costs (NPFMC/NMFS, 1992).

At the time of IFQ implementation, it was also anticipated that the new management regime would shift some power from processors to harvesters. With the guaranteed allocation to harvest a percentage of the TAC, harvesters holders would gain the flexibility to decide when and where to land their fish (NPFMC/NMFS, 1992). Thus, they would have more latitude to bargain for higher ex-vessel prices with processors.

This section provides a discussion of the changes in processing capacity, processor/harvester bargaining strength, and economic rent[43] distribution between harvesters and processors that resulted from the IFQ

[43] Economic rent is any payment to a factor of production in excess of the cost needed to bring that factor into production. Economic rent arises from conditions of scarcity and is above normal profit.

Program. The impacts of the IFQ Program on processing with respect to product quality are explored in detail in Section 2.3.3 “Product Wholesomeness”. Regional and community shifts in processing are covered in the Section 2.7 “Community Impacts”.

Data

This section utilizes two Commercial Operators Annual Report (COAR) Production datasets provided by AKFIN. One dataset includes all processors that processed halibut or sablefish during any year from 1992 through 2015 and the amount and value of the halibut and sablefish that they processed. Each processor has an Intent to Operate (ITO) code that is specific to the company that owns the processor and its location, so that one processing company may own multiple processors in different cities. For the purposes of this analysis, a processor is designated by its ITO code. The other COAR dataset includes the average wholesale and ex-vessel prices for halibut and sablefish over time. As in all other sections of the IFQ Program Review, the baseline is the average of the three years preceding the implementation of the program (1992 through 1994).

In preparation for the development of this section, the analysts also spoke with several processors and processor representatives, representing both processors that had and had not been processing halibut and sablefish prior to IFQ implementation, and a tender representative that had been active in the halibut and sablefish fisheries prior to the IFQ Program. A major seafood industry associations also aided in collecting feedback on impacts of the IFQ Program on the processing sector from processing company representatives. This qualitative information is used to supplement the quantitative analysis below. Individuals that provided feedback are listed under persons consulted in the Appendix to this section.

2.4.2.1 **Halibut and sablefish processing by generation of processor**

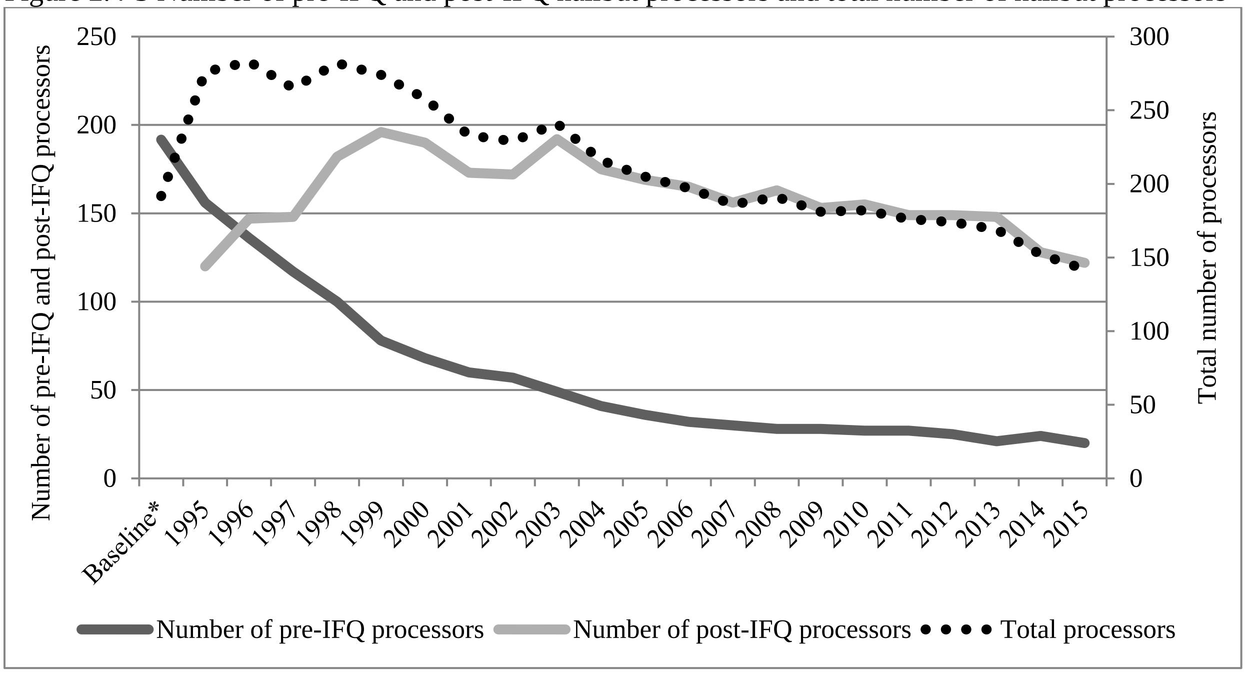
As discussed in Section 2.3.3 of this review, the implementation of the IFQ Program fundamentally changed processing needs in the IFQ fisheries. The prolonged fishing seasons and greater harvesting flexibility allowed fishermen to take better care of their fish and to harvest their IFQ when market conditions were optimal. Thus the pre-IFQ need to process frozen fish was gradually substituted, especially in the halibut fishery, with processing capacity for the fresh market. The IFQ Program thus released some of the previous constraints on processing in the IFQ fisheries and allowed new processors without the capital investment in frozen processing capacity to enter the market. According to processor representatives, this shift left those processors previously active in these fisheries with unneeded capacity to make ice and freeze fish and increased competition for landings of IFQ fish. Furthermore, processor representatives noted that in the new fresh halibut market, halibut buyers do not necessarily need any infrastructure in the communities in which they purchase halibut; they can simply load the fish into a truck to haul it to market or contract with another party to transport the fish.

The total number of processors processing halibut increased substantially following IFQ implementation. However, since 1997 the total number of processors has been lower than it was during the pre-IFQ fishery. Figure 2.4-3 shows the number of processors processing halibut that had (pre-IFQ processors) and that had not (post-IFQ processors) been processing halibut prior to the IFQ Program and the total number of processors from the baseline period through 2015. Some processor representatives noted that many pre-IFQ processors stopped processing halibut over time, as they found that they could not compete in a market that was increasingly becoming mostly fresh product. One processor noted that a small operation could operate in the pre-IFQ days when it only had to retain processing workers and cover overhead costs for a few short openers, but in the post-IFQ halibut fishery the prolongation of the fishing season resulted in the retention of workers and overhead costs for longer periods of time, which increased costs to the point that the operation could not be maintained.

The decrease in pre-IFQ processors has been exponential since IFQ implementation, decreasing by 90% by 2015 relative to the baseline. On the other hand, within the first year following IFQ implementation 120 new processors (post-IFQ processors) began to process halibut. The numbers of these new processors has gradually decreased since 2003, so that by 2015 the number was equivalent to that at the start of IFQ implementation.

Processor entry and exit should reflect expectations about earnings from the fishery, which would be a factor of harvest, wholesale prices, the margins between wholesale and ex-vessel prices, and operating costs. The trends in the numbers of new processors are generally aligned with halibut TACs, which rose for the first decade following IFQ and began to decrease in 2004. Although as Dawson (2006) points out, processor exit from the halibut IFQ fishery has also been impacted by trends in other fisheries in which each processor operates, poor business administration, and other personal circumstances.

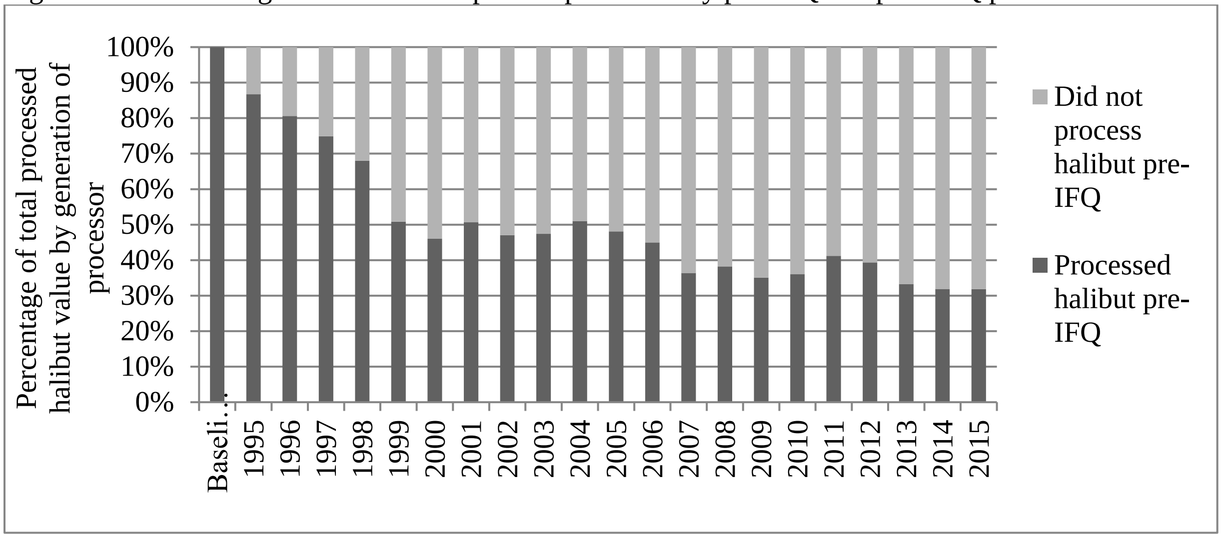
Figure 2.4-3 Number of pre-IFQ and post-IFQ halibut processors and total number of halibut processors



Source: COAR data sourced by AKFIN

Figure 2.4-4 shows the percentage of total halibut pounds processed by pre-IFQ and post-IFQ processors. As expected, the percentage of the total halibut pounds processed by the generation of pre-IFQ processors has decreased since IFQ implementation. However, the proportion of total processing activity by pre-IFQ processors exceeds their proportional composition of total halibut processors. For example, in 2015 pre-IFQ processors made up just 15% of all the processors processing halibut, but it accounted for 31% of the volume of processed halibut. This is likely due to this generation of processors having greater overall processing capacity, which was developed for rapid processing during the derby fishery. Indeed, processor representatives noted that many of the new processors that have entered the market since IFQ implementation have very limited processing capacity and some serve as buyers that ice the fish and quickly deliver it to market.

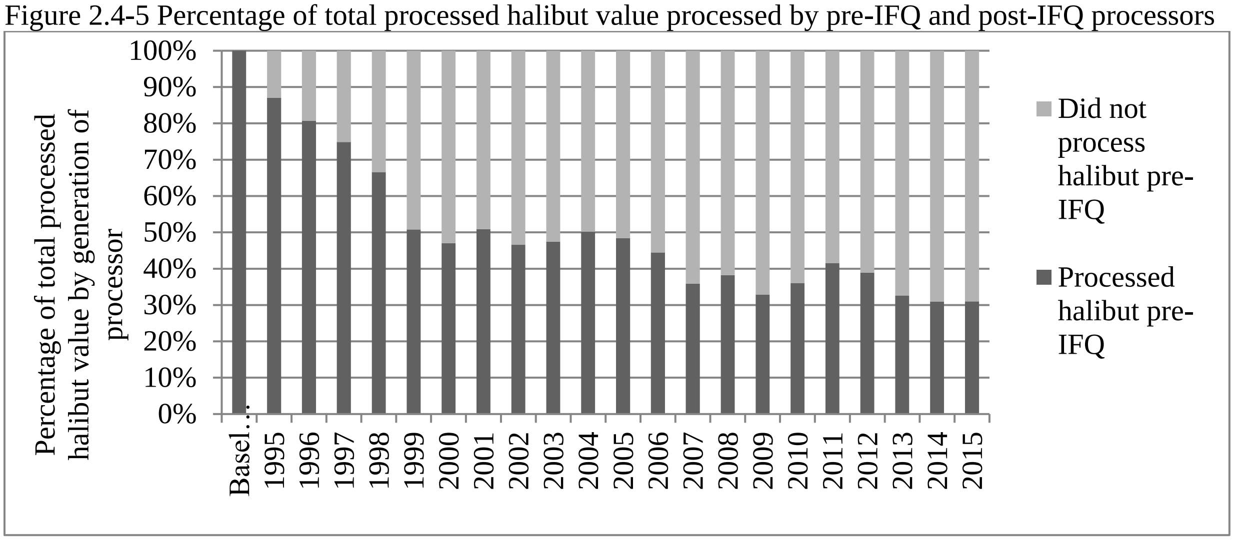
Figure 2.4-4 Percentage of total halibut pounds processed by pre-IFQ and post-IFQ processors



Source: COAR data sourced by AKFIN

The percentage of the total processed halibut value by the generation of processor (Figure 2.4-5) mirrors the percentage of the total processed halibut pounds by generation. This implies that between both generations of processors, there is no overall difference in product value, and likely the product type, that they are producing.

Figure 2.4-5 Percentage of total processed halibut value processed by pre-IFQ and post-IFQ processors



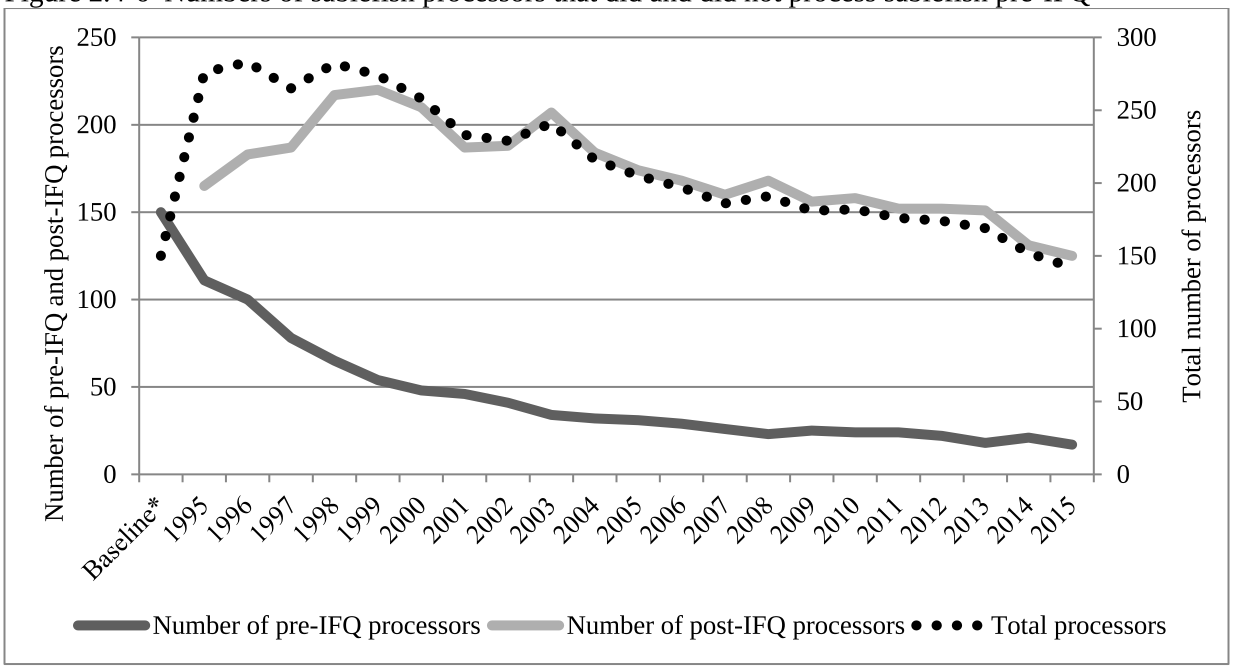
Source: COAR data sourced by AKFIN

Figure 2.4-6 shows the numbers of pre-IFQ and post-IFQ sablefish processors and the total number of processors from the baseline period through 2015. As noted in Section 2.4.2, sablefish processing data is not disaggregated by gear type. Although the IFQ fleet makes up the majority of sablefish landings in Alaska waters, there are small quantities of sablefish landings from other fleets as well. The IFQ fleet receives 80% of the TAC in the Western and Central Gulf of Alaska sablefish IFQ areas, 95% of the TAC in the Eastern Gulf of Alaska, 50% of the TAC in the Bering Sea, and 75% of the TAC in the Aleutian Islands. From 2003 through 2015, the trawl fleet accounted for 7% to 11% of total sablefish landings in federal waters. Data prior to 2003 was not available due to a database change in 2003. Processors interviewed and queried for the IFQ Program Review noted that although some processors process both

IFQ and trawl-caught sablefish, trawl caught fish do not typically drive processing trends or values for IFQ sablefish.

As in the halibut fishery, the total number of processors that process sablefish increased following IFQ implementation, peaking in 1996 and decreasing to below pre-IFQ levels in 2015. The trends in numbers of pre-IFQ and post-IFQ sablefish processors are very similar to those in the halibut fishery. The number of pre-IFQ processors has been exponentially declining since IFQ implementation, decreasing by 89% by 2015 from the baseline. Within the first year following IFQ implementation, 165 new processors began processing sablefish. The number of these new processors peaked in 1999 and has gradually decreased since then. Unlike in the halibut fishery, these trends in new processor numbers are not well aligned with overall trends in the sablefish TACs.

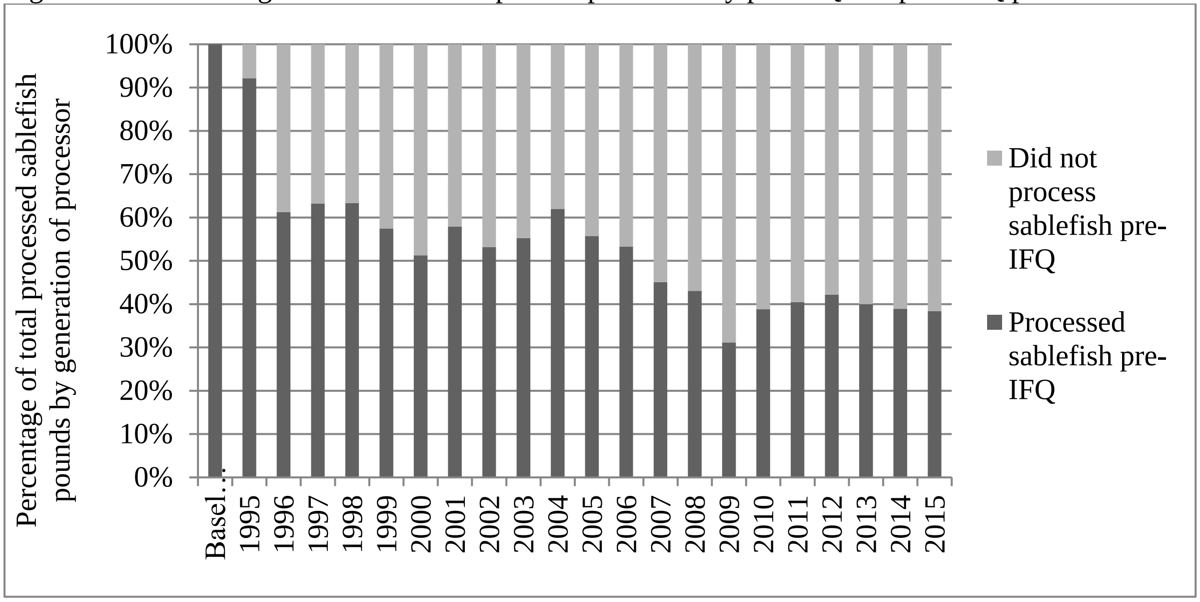
Figure 2.4-6 Numbers of sablefish processors that did and did not process sablefish pre-IFQ



Source: COAR data sourced by AKFIN

Figure 2.4-7 shows the percentage of total sablefish pounds processed by pre-IFQ and post-IFQ processors. The percentage of the total sablefish pounds processed by pre-IFQ processors has decreased since IFQ implementation. However, as in the halibut fishery, the proportion of the total amount of sablefish processed by these processors is larger than their proportion of the total number of processors. For example, in 2015 pre-IFQ processors made up just 12% of all the facilities processing sablefish, but it accounted for 38% of the volume of processed sablefish. Again, this is likely due to pre-IFQ processors having greater overall processing capacity, which was developed for rapid and high-volume processing during the derby fishery.

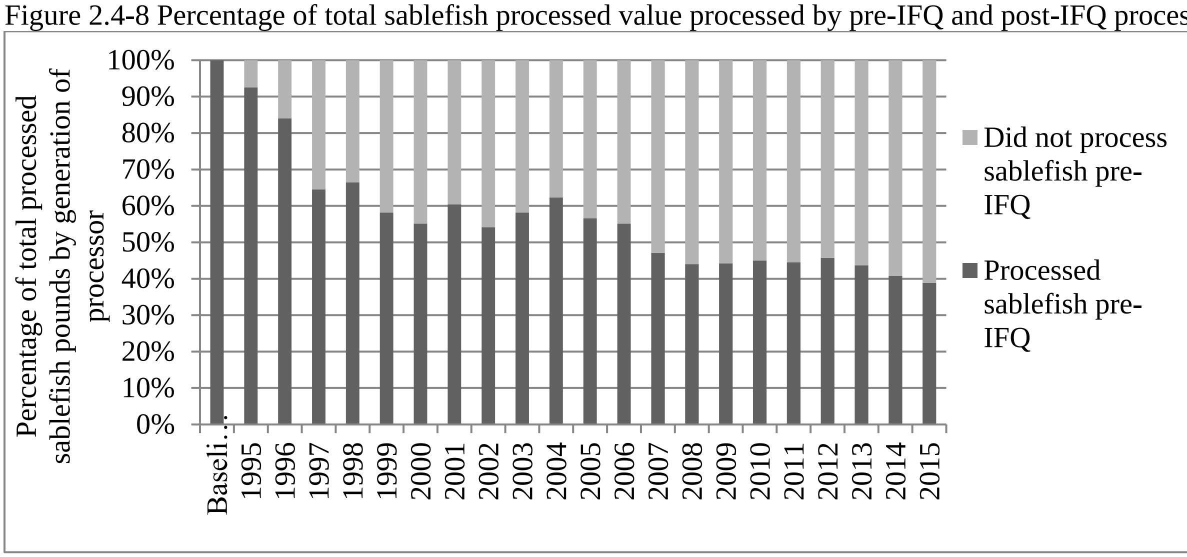
Figure 2.4-7 Percentage of total sablefish pounds processed by pre-IFQ and post-IFQ processors



Source: COAR data sourced by AKFIN

The percentage of the total processed sablefish value by the generation of processor (Figure 2.4-8) mirrors the percentage of the total processed sablefish pounds by generation. The only outlier to this trend is 1996, wherein pre-IFQ processors account for a substantially greater percentage of the value of landed sablefish than they do of the volume of the landed sablefish. Analysts have not identified a cause for this difference; this could be an inaccuracy in the underlying data. For the remainder of the years, the similarity between the volume and value of processed sablefish implies that across both generations of processors, there is no overall difference in the value of the product, and likely the product type, that they are producing.

Figure 2.4-8 Percentage of total sablefish processed value processed by pre-IFQ and post-IFQ processors



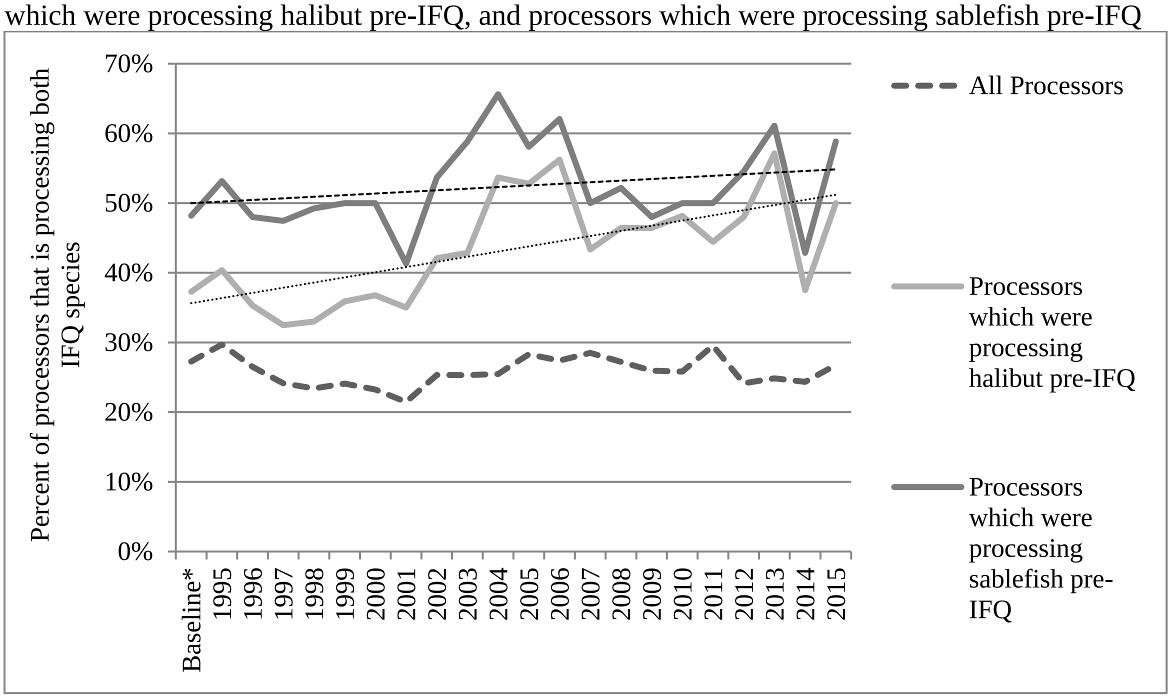
Source: COAR data sourced by AKFIN

2.4.2.2 **Processor Diversification**

The implementation of the IFQ Program substantially changed processing needs in the IFQ fisheries. As a result, processors which were processing halibut or sablefish pre-IFQ may have diversified into processing other species. This section specifically looks at whether pre-IFQ processors of halibut and/or sablefish started processing both halibut and sablefish post-IFQ implementation. The focus is on the processing sector that had been processing halibut and/or sablefish prior to IFQ because Objective 4 of the original EIS for the IFQ Program focused on maintaining pre-existing business relationship amongst vessel owners and processors in the IFQ fleet.

Figure 2.4-9 shows the percentage of processors processing both IFQ species as a percentage of all processors, as a percentage of processors which were processing halibut pre-IFQ, and as a percentage of processors which were processing sablefish pre-IFQ. The “all processors” data is inclusive of all pre-IFQ and post-IFQ halibut and sablefish processors. With respect to all processors, the percent of processors that process both halibut and sablefish has been relatively stable since prior to IFQ implementation. However, there is some indication that of the pre-IFQ processors that processed halibut or sablefish and continued to process halibut or sablefish post-IFQ, an increasing percentage has since diversified into processing both IFQ species.

Figure 2.4-9 Processor diversification across both IFQ fisheries
Percentage of processors which were processing both halibut and sablefish, by all processors, processors which were processing halibut pre-IFQ, and processors which were processing sablefish pre-IFQ



Source: COAR data sourced by AKFIN

According to some processor representatives, pre-IFQ processors that had been processing halibut and/or sablefish tried to find other uses for the processing capacity that was left idle after IFQ implementation. Some processor representatives noted that they were able to diversify into the other IFQ species (ones that they were not processing prior to IFQ) due to the longer fishing seasons and their ability to purchase the fish at times that fit them. Some processors diversified into or increased their processing of other species following IFQ and in the 20 years of the program (notably Pacific cod) although others noted that there was limited diversification possible. Alaska’s salmon fisheries require similar ice making and freezing capacity, but most processors were already processing halibut/sablefish and salmon prior to IFQ because the halibut/sablefish and salmon seasons typically did not overlap prior to IFQ. Processor representatives also noted that the slower fishing seasons have allowed some processors to do more value added products, enter into custom processing arrangements with other processors, and increase product quality overall, including some of the processors that were active in processing halibut and/or sablefish prior to IFQ. This in turn has provided for higher wholesale prices, although processor representatives noted that they believe much of the benefits of value added products were captured by new processors and harvesters. For those processors that exited the market for halibut or sablefish processing following IFQ, the program led to a decrease in diversification and left these processors more vulnerable to annual fluctuations in harvest of other species.

2.4.2.3 **Bargaining Power**

At the time of IFQ implementation, it was anticipated that bargaining power in the IFQ fisheries would shift towards harvesters due to their increased flexibility in where and when they can land their fish under IFQ management (NPFMC/NMFS, 1992). Furthermore, researchers have noted that harvester's time costs should decrease with IFQs because the time spent on non-fishing activities like searching for ports offering relatively high ex-vessel prices does not result in lost portions of the TAC as they would under open access (Fell and Haynie, 2013). Matulich et al. (1996) argued that harvesters would extract all of the rents created by the implementation of an IFQ Program. However, as pointed out by Fell and Haynie (2011) such concerns stem from a fundamental assumption that ex-vessel markets are perfectly competitive, which is an unreasonable assumption in the halibut and sablefish IFQ fisheries for several reasons. The remote locations of many of the IFQ fishing areas mean that fishermen are limited in the processors to whom they can deliver (ibid.). Furthermore, processing firm consolidation (as evidenced in Figure 2.4-3 and Figure 2.4-6), harvesters' bargaining associations, and harvester-processor vertical integration would also undermine perfect competition in the ex-vessel market (ibid.). Dawson (2006) notes that, prior to IFQ management there was some vertical integration in the halibut fishery as a result of capacity restrictions amongst the processors and fishermen having ties to processors through other fisheries, e.g., salmon. Some processor representatives also noted that prior to IFQ processors had agreements with fishermen about which vessels would deliver to them. These "gentleman's agreements," which provided processors with guaranteed landings in exchange for fishermen receiving bait, ice, and a timely offload, were extinguished with the implementation of the IFQ Program because harvesters had increased flexibility to plan their fishing trips and deliver to processors with the highest ex-vessel prices.

Researchers have looked at processor impacts and market share and rent distribution between harvesters and processors post-IFQ implementation in Alaska's halibut and sablefish fixed-gear fisheries. Knapp (1997) conducted a survey of IFQ fishermen immediately following IFQ implementation and found that one of the most frequent comments was that the program led to "better markets and prices." Matulich and Clark (2003) used comparisons of wholesale and ex-vessel prices and recovery rate estimates for halibut and sablefish processed in Alaska during a pre-IFQ (1989-2004) and a post-IFQ (1995-2001) period to show changes in quasi rent distribution following IFQ implementation. Matulich and Clark (2003) estimated that participating halibut and sablefish processors that processed in both pre and post IFQ time periods lost 56% and 76% of their quasi rents[44], respectively. Fell and Haynie (2011) developed an econometric model to examine bargaining strength and rent distribution changes following IFQ implementation. Using quarterly data from 1996 to 2005, they found that harvesters' market power did increase after IFQ implementation; however, they found that post-IFQ implementation harvesters and processors were in a near-symmetric bargaining position, with generated economic rents split

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[44] Quasi-rent differs from pure economic rent in that it is a temporary phenomenon that can arise from, for example, barriers to entry.

approximately evenly. In another study, Fell and Haynie (2013) examined the impacts of the IFQ Program on competition for sablefish landings amongst processors in the Gulf of Alaska. They found that processors within the Gulf of Alaska responded to higher ex-vessel prices offered by more distant processors post-IFQ[45] and that this increased spatial competition amongst processors post-IFQ led to an average post-IFQ price increase of approximately 16% to 23% (ibid.). Processor representatives interviewed and queried for the IFQ review also noted that competition for halibut fish landings increased following IFQ especially in the Gulf of Alaska, where new buyers could easily deliver to fresh markets using the road system.

The difference or “margin” between wholesale prices and ex-vessel prices depends upon the costs of processing and transporting fish, as well as the extent of competition for fish among the processors and more generally the relative market power of harvesters and processors. Measuring changes in market power between harvesters and processors is relatively easy, given data on wholesale and ex-vessel prices. However, measuring changes in rents requires detailed information on variable processing costs as well as processor gross revenues. Because these data are not available, this section focuses on measuring changes in market share between harvesters and processors since IFQ implementation.

The following figures (Figure 2.4-10 through Figure 2.4-13) apply average first wholesale price and round wholesale price data to estimate annual average wholesale prices in the IFQ fisheries, which are the best available price information for processed halibut and sablefish. The first wholesale price data does not account for product recovery rates - the ratio of produced weight to purchased round weight. Recovery rates vary by wholesale product type. For example, the recovery rate for whole fish is 1, meaning that 100% of the landed weight is recovered in the wholesale product. The first wholesale price estimate is the sum of the value for all products divided by the weight of all products as received on the production reports. The round wholesale price accounts for recovery rates but the round fish amounts for those recovery rates are estimated from products. Many of the recovery rates are not directly provided by the processor; therefore, recovery rates have been estimated for some product types by AKFIN and may not be the correct rates. These recovery rate estimates in addition to the aggregated level of this analysis somewhat limit the analysts’ ability to effectively compare round wholesale and ex-vessel prices. For example, for some years the round wholesale price is actually below the ex-vessel price.

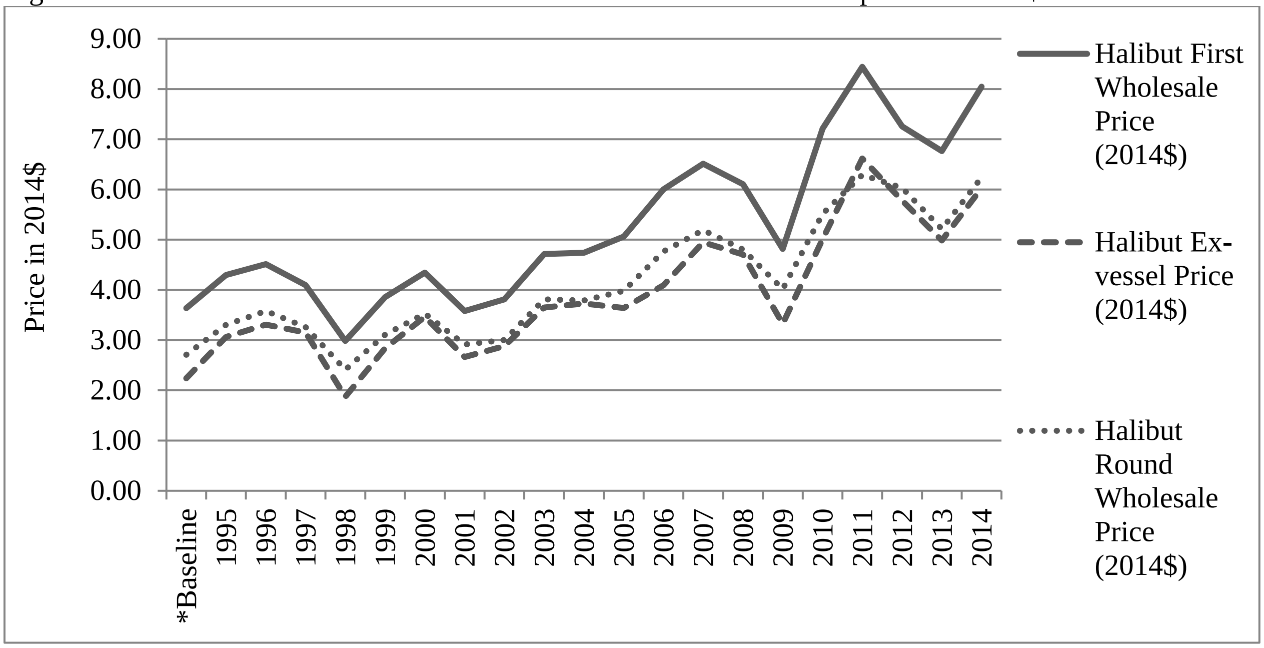
Figure 2.4-10 and Figure 2.4-11 show the first wholesale and round wholesale and ex-vessel prices for halibut and sablefish, respectively for the pre-IFQ baseline period and post-IFQ implementation through 2014. For halibut, the ex-vessel price reflects all IFQ and CDQ Program commercial delivery/condition types and all fixed-gear types from catcher vessel deliveries to shoreside processors. For sablefish, the ex-vessel price reflects all commercial delivery/condition types and all fixed-gear types from catcher vessel deliveries to shoreside processors.

In Figure 2.4-10 and Figure 2.4-11 below, the wholesale prices for halibut are more comparable to the respective ex-vessel prices than the wholesale prices for sablefish are to the respective ex-vessel prices. Because the IFQ and CDQ halibut fisheries comprise the two directed halibut fisheries, the wholesale halibut prices reflect only fish processed from these two fisheries. The data primarily reflect IFQ prices because the CDQ fisheries comprise a small percentage of total halibut production. Although the IFQ fleet represents the majority of sablefish production in Alaska, the sablefish product price information represents production from the trawl fleet as well. As previously mentioned, the COAR production data is not disaggregated or flagged by gear type, so there is no way of differentiating product by fleet. The ex-vessel prices for both fisheries are specific to their respective IFQ fleets.

[45] The authors used a range of “competitive regions”: 170 km as well as 250 to 450 km, in 100 km increments.

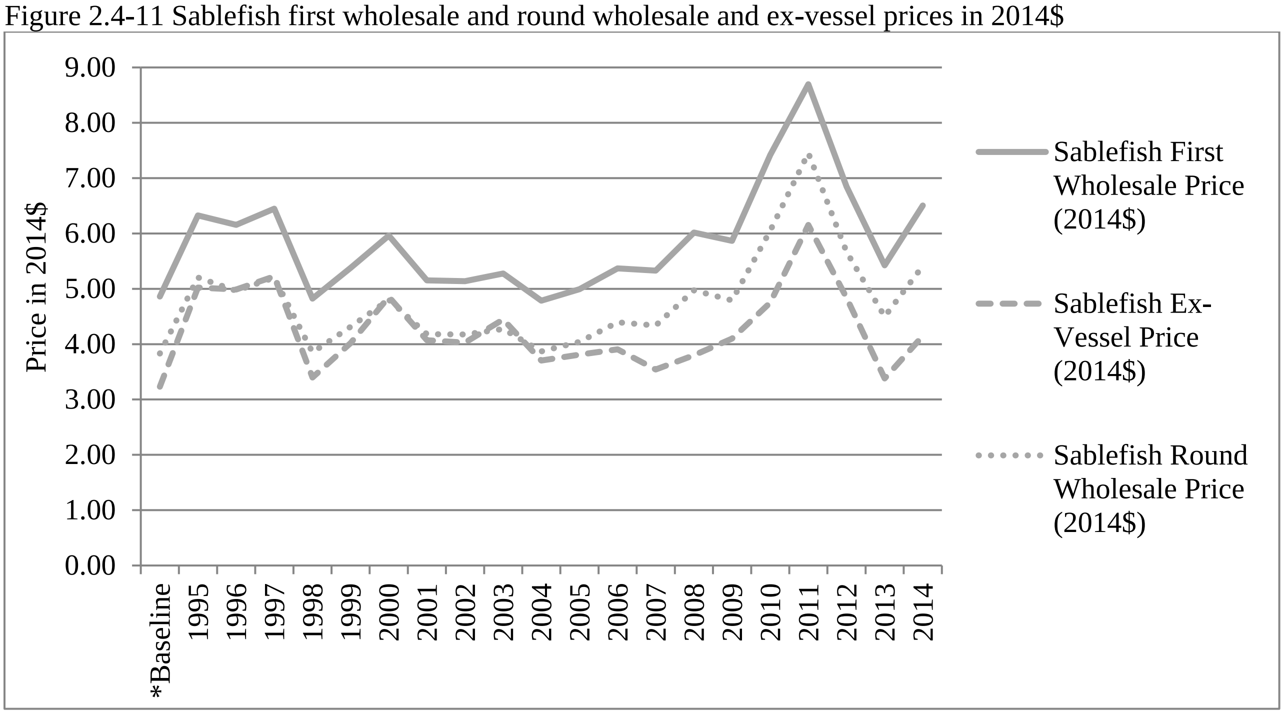
In terms of absolute dollars, the margin between first wholesale and ex-vessel prices for both IFQ fisheries has fluctuated over the dataset by $1 to $2.50, with those margins increasing over the last several years. Thin margins between the round wholesale and ex-vessel prices reflect the estimated recovery rates as well as the markets for IFQ species, especially halibut. For example, the vast majority of halibut is both landed and processed as head-and-gut product, so one may expect thin margins between the wholesale and ex-vessel prices due to the limited amount of processing required.

Figure 2.4-10 Halibut first wholesale and round wholesale and ex vessel prices in 2014$



Source: COAR data sourced by AKFIN

Figure 2.4-11 Sablefish first wholesale and round wholesale and ex-vessel prices in 2014$



Source: COAR data sourced by AKFIN

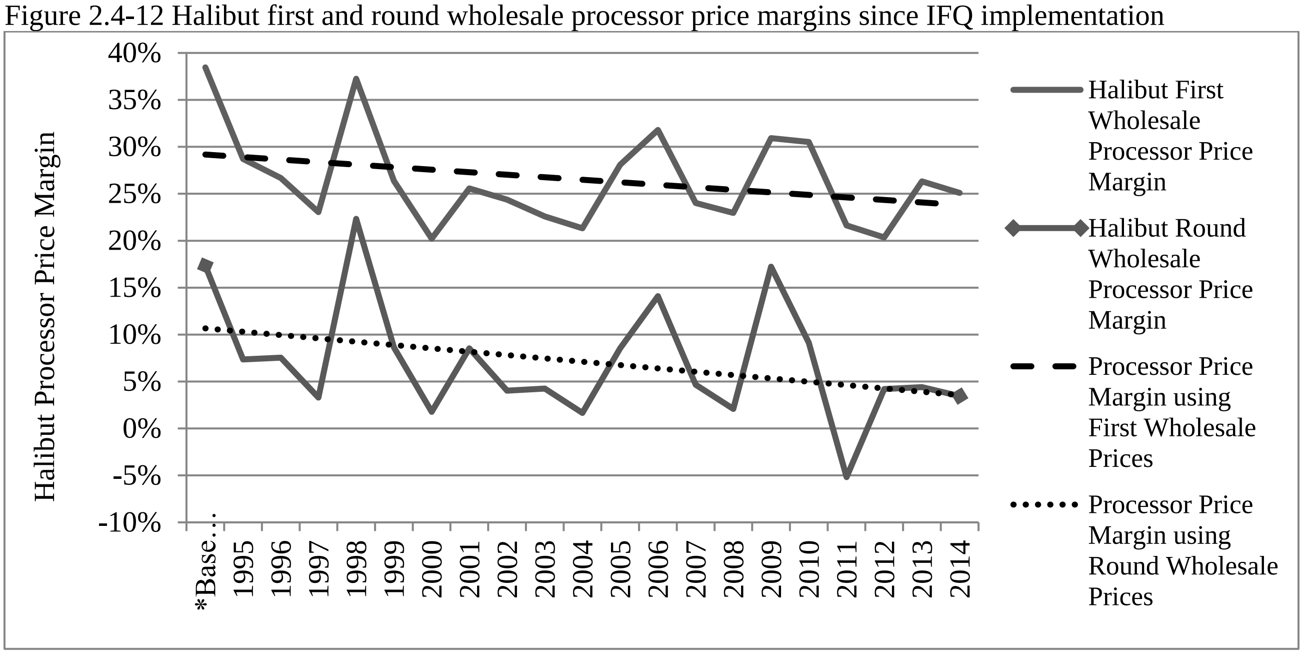
Figure 2.4-12 and Figure 2.4-13 show the processor price margins for halibut and sablefish processors during the pre-IFQ baseline period and since IFQ implementation through 2014. The processor price margin is defined as: [WP-XP]/WP, where WP is the wholesale price and XP is the ex-vessel price. At an individual level wholesale prices should always be marked up above ex-vessel prices to cover processor operating costs and any mark-up above this is the processor profit margin. Unfortunately, this analysis is limited to utilizing aggregated price data without processor cost estimates.

The processor price margins in Figure 2.4-12 and Figure 2.4-13 are estimates of the share of the wholesale prices retained by processors. Changes in processor price margins can include not only changes in market power between harvesters and processors, but changes in processing costs or product recovery rates, changing contracts, and a variety of other factors.

Figure 2.4-12 shows the halibut processor price margins estimated for first and round wholesale prices and the trend-line for both of those estimated margins. According to these estimates, there is considerable inter-annual variability in the halibut processor price margins, but these margins have generally been decreasing since IFQ implementation. This would indicate that, as expected at the time of IFQ implementation by Matulich and Clark (2003) and Fell and Haynie (2011; 2013), the IFQ Program resulted in a shift of market power toward harvesters. It should be noted that one cannot tell from this analysis what proportions of the actual rent in the fishery are being captured by harvesters and processors. We do not know how the costs of different processors are changing over this period.

According to processor representatives, prior to IFQ, processors bought hundreds of thousands of pounds of fish in a short time frame, processed it all over several days, and then offloaded it onto the market over months. This allowed processors to “play the market” a bit and time their sales to optimize market prices. The shift to the fresh market for halibut has eliminated the possibility of processors holding on to product and timing their sales in this way. Several processor representatives also noted that the margins essentially disappeared for processing halibut following IFQ implementation, and that some processors continue to process halibut to “keep the lights on”, covering operating costs, maintaining a market for the fish for vessels with which they have relationships in other fisheries, and providing a longer employment season for their processing workers.

Figure 2.4-12 Halibut first and round wholesale processor price margins since IFQ implementation

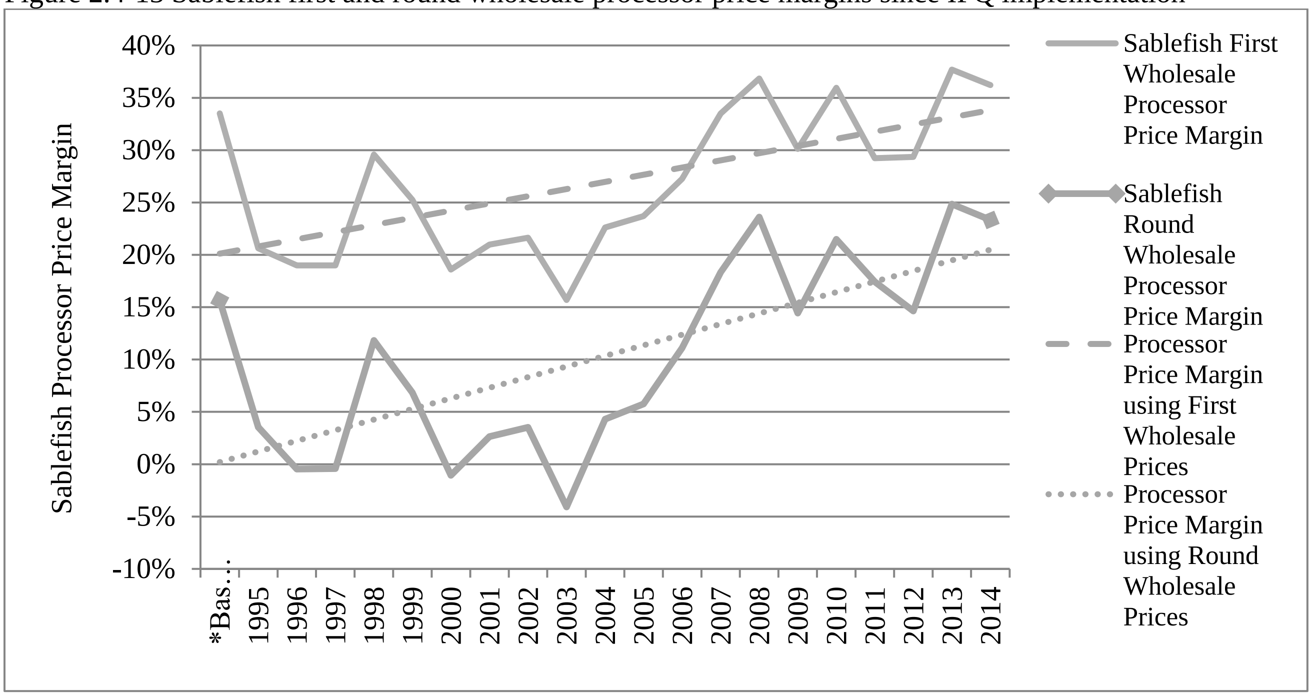


Source: COAR data sourced by AKFIN

The trend for the sablefish fishery is fundamentally different than for halibut (Figure 2.4-13). After a drop in price margins relative to the baseline period over the first decade of the IFQ Program, starting in 2007, the margin increased to levels higher than during the pre-IFQ baseline period. Since then, the average margin has been greater than the pre-IFQ baseline margin. As discussed in the Section 2.3.3, the product form for sablefish did not really change following IFQ implementation; sablefish remains a mostly frozen product for the export market.

According to processor representatives, the processing of sablefish did not change markedly as it did for halibut, because the product still necessitates freezing capacity although the prolongation of the fishing season has decreased the amount of that capacity that is needed at any given point. Despite inter-annual variability in margins, processors noted that they have still received a profitable margin for sablefish. Processor representatives also noted that the market for sablefish has been changing over the last decade, with an increase in domestic demand for sablefish which may be driving up wholesale prices. (This may in part account for increasing margins in the fishery.)

Figure 2.4-13 Sablefish first and round wholesale processor price margins since IFQ implementation



Source: COAR data sourced by AKFIN

2.4.2.4 **Other Impacts**

The following section describes other impacts of the IFQ Program noted by processors and a tender representative.

2.4.2.4.1 Processor Operating Costs

According to processor representatives, the IFQ Program led to changes in processing labor needs and the duration of processing employment. Prior to IFQ implementation, the derby-style openers for halibut and slightly less so for sablefish meant that processors had to employ processing workers for short amounts of time during periods when there were no other fisheries ongoing to keep the staff working. Under the longer post-IFQ processing season, processor can plan for workers around a steadier, longer season and the processing workforce is smaller and can be used for other fisheries. Some processors noted that this may have resulted in lower labor costs for them while other processors said that the labor costs remained the same pre and post IFQ because maintaining the smaller workforce over a longer period of time equated to the pre-IFQ costs of a larger workforce over a shorter time frame.

Processor representatives noted that other costs have increased for them as a result of the change to IFQ management and other factors over the course of the IFQ Program. For example, the paperwork requirements for processors have increased due to necessity under the IFQ Program to tie IFQ landings to IFQ permit accounts and over time due to the cost recovery submittal requirements. Other processor representatives noted increasing marketing and transaction costs over time especially for halibut as the shift to the fresh product has necessitated having numerous buyers.

2.4.2.4.2 Geographic Differentiation in Impacts on Processors

Processor representatives also noted a geographic disparity in the impacts of the IFQ Program on processors. For example, Bering Sea communities saw less of an impact from new competition for halibut landings than communities in Southeast Alaska or the Gulf of Alaska, because there are fewer Bering Sea communities with differentiated access to transportation (e.g., road access or airport) that could deliver to the fresh market than in Southeast or the Gulf. However, other processors in remoted regions noted that because their costs for delivering to the fresh market were higher they could not compete for landings for halibut post-IFQ even though the next processor was located hundreds of miles away. The geographic differentiations in impacts on processors were also a result of regional differences in focal species and the percentage of the processor’s total earnings that halibut and/or sablefish comprised. For example, whereas in the Gulf of Alaska, halibut and sablefish were a significant component of processors’ incomes pre and post IFQ, in the Bering Sea and Aleutian Islands, these species have always been processed mainly as a way of keeping the plants busy between crab, pollock, and Pacific cod. The geographic differences in impacts on processing at the community level are examined with respect to changes in IFQ landings as a factor of road or airport transportation access within Section 2.7.

Some processor representatives also noted that consolidation within the local IFQ fleet of some remote communities led to decreasing landings at processors in those communities. Small initial QS allocations were not sufficient to maintain economically viable fleets in these cases. Once the QS were sold out of the community, the incentive to deliver to the local processor diminished and landings decreased.

2.4.2.4.3 Impacts on Tenders

Processor and tender representatives also noted that the role of tenders in the halibut and sablefish fisheries was largely eliminated with the implementation of the IFQ Program. Prior to IFQ, processors either owned their own vessels that they deployed as tenders or the processors would contract with independently-owned vessels to act as tenders during the halibut and sablefish openers. The tenders operated on the fishing grounds as a representative of the processors, buying fish from fishermen for a pre-determined price set by the processor and delivering those fish to the processor. Independently-owned tenders were chartered for the halibut and sablefish openers in the spring and fall and were paid by the pound for deliveries to the processor. These tenders hired their own crews and paid all of their own operating costs.

The prolongation of the fishing seasons for both species eliminated the need for tenders following IFQ implementation. According to the tender representative, this eliminated an important source of revenue for many tenders, which could not be replaced with participation in other fisheries. There were no substitute fisheries that needed tenders during the same time period as the previous halibut and sablefish openers. Furthermore, these vessels could not readily switch into other fisheries, because of vessel length restrictions or gear requirements. The tender vessels represented by the representative interviewed for this review range in length from 52 to 120 feet, which is too large to participate in many of the Alaska's State regulated fisheries. The tender representative also noted that participation in other activities like freight transport necessitates meeting numerous other USCG regulations that are often too expensive for tenders.

Summary

The implementation of the IFQ Program fundamentally changed processing needs in the IFQ fisheries, especially in the halibut fishery, which has shifted from a primarily frozen to a majority fresh market. For processors previously active in the halibut fishery, this shift left them with excess capacity to make ice and freeze fish and increased competition for landings from new buyers, who did not need any infrastructure in the region. While 120 new processors entered the market within the first year of the IFQ Program, since IFQ implementation the number of processors that had been processing halibut prior to IFQ has decreased by 90%. Over time, the number of processors in both generations (those who harvested halibut or sablefish prior to IFQ, and those who did not) has decreased. The pre-IFQ processors continue to account for a greater proportion of total processing activity than their proportional composition of all halibut processors.

Within the sablefish fishery, the product form has not changed since IFQ, with most sablefish still processed frozen for the export market. However, similarly to the halibut fishery, there was an influx of 165 new processors within the first year of the program, although overtime there has been a substantial exodus of processors that were active in the sablefish fishery prior to IFQ (by 90% by 2015). The prolongation of the fishing season allowed for new buyers in this market as well although this fishery still requires freezing capacity. As in the halibut fishery, the pre-IFQ generation of processors continues to account for a greater proportion of total processing activity than their proportional composition of all sablefish processors.

There is some indication that of the generation of processors that were active in the IFQ fisheries pre-IFQ, an increasing percentage has since diversified into processing both IFQ species since IFQ implementation. Some processors note that they were able to diversify into the other IFQ species (one that they were not processing prior to IFQ) due to the longer fishing seasons and their ability to purchase the fish at times that fit their operating needs. Processor representatives also noted that diversification overall became a key survival strategy for them after the IFQ Program, including entering into other fisheries, increasing processing of species that they had previously been processing, adding value added products, and entering into custom processing arrangements.

It was also anticipated by analysts for the final EIS for the IFQ Program, that IFQ implementation would shift bargaining power in the fisheries towards fishermen. Researchers have shown that the IFQ Program resulted in increased spatial competition for IFQ landings, an increase in market power for harvesters, and near-symmetric bargaining positions and rent distribution between the harvesting and processing sectors (Matulich and Clark, 2003; Fell and Haynie, 2011; 2013). The analysis of margins between wholesale and ex-vessel prices indicates that halibut processor price margins have decreased over time, and processor representatives noted that these margins have essentially disappeared since IFQ implementation. The margins between wholesale and ex-vessel prices for sablefish, however, are fundamentally different. After a decade of decreasing margins, these margins began to increase again for the processing sector in the mid-2000s. Processor representatives noted that the market for sablefish has been changing over the last decade, with an increase in domestic demand for sablefish, which may be driving up wholesale prices.

Processors interviewed for this review highlighted the top impacts of the program on the processing sector as: lower volume of IFQ species landings at a time and over the season, the creation of surplus capacity (freezing capacity and ice-making capacity), devaluation of capital investments, shift in bargaining power towards harvesters, previously active processors going out of business (especially in rural communities without access to transportation), overall changes in landings patterns, changes in relationships between processors and fishermen, diversification into other fisheries and different product types, and steadier and longer employment for the processing workforce. Following IFQ, the labor needs for the halibut and sablefish seasons shifted to a small number of workers over a long period of time, which provides steadier employment for fewer people, and a labor force that can be readily used to process other species. Processor representatives also noted a geographic disparity in the impacts of the IFQ Program on processors. In general, processors in the Gulf of Alaska and Southeast more directly impacted by competition from other buyers than in the more remote regions, where there are no substantial differences with respect to access to transportation. Processor and tender representatives also noted that the necessity for tenders in the halibut and sablefish fisheries was largely eliminated with the implementation of the IFQ Program, and the tender representative said that substitute fisheries were not available to make up for the loss in revenue.

Future expansions of this analysis should compare wholesale and ex-vessel price data at the individual processor level, applying individual processor recovery rates and individual processor cost information. This could include an examination of differentiated impacts based on geographic attributes of the processor, as has been suggested to have been a critical factor in changes in processor margins following IFQ by processor representatives. This could also include examining differentiated impacts on margins between wholesale and ex-vessel prices by region (Southeast, Gulf of Alaska, Western Gulf, Bering Sea/Aleutian Island) and/or by community-level attributes (airport and road access). Given the change in the sablefish processor price margins in the data, it may also be interesting to update the Fell and Haynie (2011) paper using data only from 2005 and on to see if there is empirical evidence of a change in rent distribution over the last decade relative to the first decade of the IFQ Program. It could also be informative to utilize the Herfindahl-Hirschmann Index (applied in Section 2.3.6) to examine market concentration for the processing sector pre and post IFQ. This metric could be applied for the whole sector and specifically to examine differences in market concentration for the processors that were active pre-IFQ.

Appendix A2.4.2

Persons and associations consulted for this section

Pacific Seafood Processors Association member feedback

Nicole Kimball - Pacific Seafood Processors Association

Kris Norosz – Icicle Seafoods

John Woodruff – Icicle Seafoods

Stefanie Moreland – Trident Seafoods Corporation

Joe Plesha – Trident Seafoods Corporation

Lisa Terry – Alaska Independent Tendermans Association

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2.5 OWNER-OPERATED CHARACTERISTIC OF THE FLEET

One of the original objectives for the IFQ Program was to ensure that the sablefish and halibut fisheries were predominately owner-operator operations. Specifically, Objective 6 of the original EIS for the IFQ Program stated:

- Objective 6: Assure that those directly involved in the fishery benefit from the IFQ Program by assuring that these two fisheries are dominated by owner/operator operations

In developing the IFQ Program, and through subsequent program amendments, the Council has focused its efforts for an owner-operator fleet on the catcher vessel fleet. For instance, except for non-individual entities (businesses, partnerships, etc.) which were initial recipients of catcher vessel QS (and able to acquire catcher vessel QS up until December 1, 2014), acquisition of catcher vessel QS has been limited to “IFQ crewmembers” – individuals who were initially issued QS, and individual U.S. citizens who were not initially issued QS, but have demonstrated 150 days of experience working as a part of harvesting crew in any U.S. commercial fishery.

Additionally, leasing of IFQ derived from catcher vessel shares has generally been prohibited since 1998. Several provisions are included in the program that allowed for outright leasing under special conditions including leasing of IFQ derived from Class A (catcher processor) shares, or leasing of catcher vessel IFQ through 1) medical leases, 2) survivorship transfer privileges, 3) military leases, 4) leases through CQEs, and 5) IFQ to guided angler fish (GAF) transfers.

The opportunity for the use of a hired master is also available to a select group of QS holders in the program. Since the beginning of the program, individual initial recipients of catcher vessel shares have been allowed to use hired masters to land their IFQ, except in halibut Area 2C and the Southeast Outside District of the sablefish fishery. Non-individual initial recipients must use a hired master to harvest their IFQ. A 2014 amendment to the program prohibited initial QS recipients from using a hired master to harvest IFQ derived from catcher vessel QS received by transfer after February 12, 2010 in any regulatory area (79 FR 43679).

Both outright leasing and the use of a hired master can represent ways in which IFQ is harvested by an individual, who does not have direct equity in the underlying QS. The primary difference between the two practices is that leasing IFQ requires a formal leasing transfer application, and the IFQ permit is issued in the lessee’s name. In contrast, a hired master must obtain a hired master’s permit, but their harvest is debited from an IFQ permit authorized under the name of the QS holder. The QS holder remains liable for any fishing violations associated with that permit. Additionally, for the use of hired masters, regulations require the QS holder to have a 20% ownership interest in the vessel used to harvest the IFQ, demonstrated for at least a 12-month period. While not technically considered a lease based on federal regulations and requirements, the use of a hired master by a QS holder can act as a de facto lease depending on the arrangement with the individual or entity holding the QS.

This section first presents information on holdings of catcher vessel QS by non-individual entities. This is followed by a discussion of leasing in the fisheries, including use of the available exemptions for catcher processor and catcher vessel QS. In a similar fashion, the use of hired masters is explored for both catcher processor and catcher vessel QS. This section concludes with a summary on the owner-operator characteristic of the fisheries.

Data

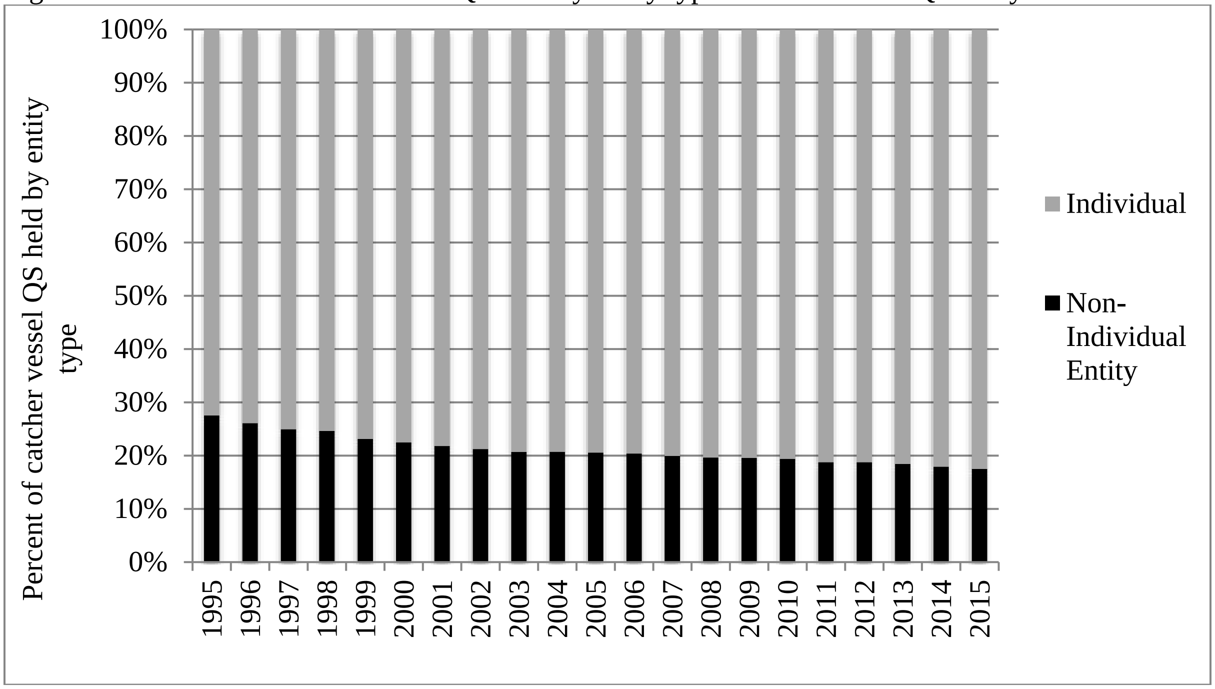
This section utilizes a variety of data sources, including data provided by AKFIN and the NMFS Alaska Region Office – through the Restricted Access Management and Sustainable Fisheries Divisions. We present different kinds of information for each of these sections below, based on what we thought the Council would find most useful in evaluating the utilization of each of these provisions. For example, the Council has historically had much different objectives with respect to active participation for Class A QS holders than for catcher vessel QS holders. Therefore, we present different data for evaluating the utilization of leasing provisions for Class A and catcher vessel QS.

2.5.1 Holdings of catcher vessel QS by non-individual entities

In halibut Area 2C and the Southeast Outside District of the sablefish fishery, catcher vessel QS acquisition by transfer has been restricted to IFQ crewmembers since IFQ implementation. In other words, non-individual entities even if they were initial QS recipients could not acquire catcher vessel QS by transfer in Area 2C and the Southeast Outside District. In all other areas, since IFQ implementation, non-individual entities have been prohibited from purchasing catcher vessel QS, unless these entities were initial recipients of catcher vessel QS. Starting on December 1, 2014, catcher vessel QS acquisition by transfer has been restricted to individual initial recipients of catcher vessel QS and IFQ crewmembers across all IFQ regulatory areas. In other words, starting on December 1, 2014, non-individual entities can no longer acquire additional catcher vessel QS in any IFQ area. The one exception to this is that individuals who were initially issued catcher vessel QS may transfer that QS to a corporation that is solely owned by the same individual.

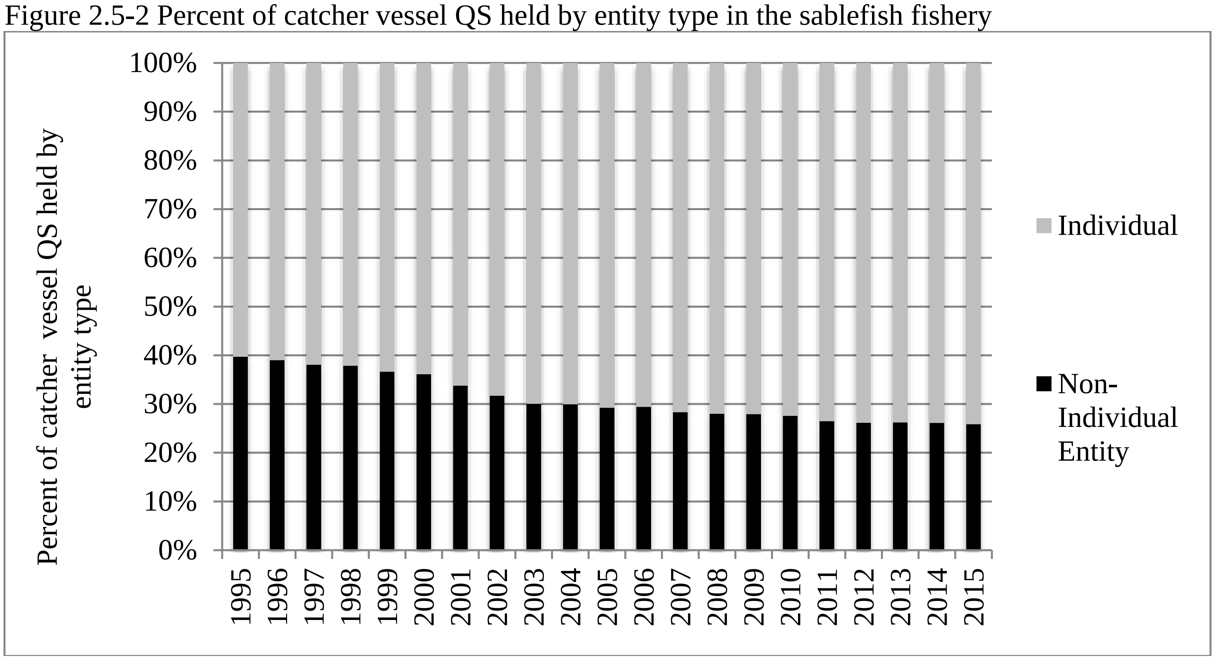
Figure 2.5-1 and Figure 2.5-2 show the percent of catcher vessel QS held by individual and non-individual entities in the halibut and sablefish IFQ fisheries, respectively, from IFQ implementation through 2015. For both fisheries, there has been a gradual shift of catcher vessel QS to individuals from non-individual entities. Non-individual holdings of catcher vessel QS continue to be greater for the sablefish than the halibut fishery, reflecting historically greater levels of participation by non-individual entities in the sablefish fleet. Given the recently (December 2014) implemented prohibition on the use of hired masters for QS transferred after February of 2010, and that initial recipients of QS can form solely-owned and operated corporations to hold their initially-issued QS, there is now a greater incentive for the formation of such new entities. Therefore, there could be some stagnation in the transfer of catcher vessel QS to individuals, but the impact is not likely to be substantial, given that these corporations may only hold initially-issued catcher vessel QS.

Figure 2.5-1 Percent of catcher vessel QS held by entity type in the halibut IFQ fishery



Source: NMFS IFQ landings data sourced by AKFIN

Figure 2.5-2 Percent of catcher vessel QS held by entity type in the sablefish fishery



Source: NMFS IFQ landings data sourced by AKFIN

Table 2.5-1 and Table 2.5-2 show the percent of catcher vessel QS held by individuals and non-individual entities by halibut and sablefish IFQ regulatory areas, respectively, from 1995 to 2015. As a group, individuals have increased their catcher vessel QS holdings across all of the IFQ areas. Halibut Area 2C and the Southeast Outside District of the sablefish fishery had the lowest catcher vessel QS holdings for non-individual entities at the start of the IFQ Program. Given the restriction on catcher vessel QS acquisition by any non-individual entities in these areas, it may be expected that non-individual entities would continue to hold the lowest percentages of catcher vessel QS in these areas. However, in the sablefish fishery, non-individual entities hold a lower percentage of total catcher vessel QS in the Bering Sea and Aleutian Islands areas than in the Southeast Outside District. There are numerous factors that could impact QS movement between individuals and non-individual entities, including differentiated earnings expectations (due to, for example, operating costs and business structures), opportunity costs due to opportunities in other fisheries, etc. The difficulty with harvesting the full TACs in the Bering Sea and Aleutian Islands areas may have also provided for the gradual transfer of QS from non-individual entities to individuals as the former found that they could not fully harvest their IFQ and sold their QS.

Table 2.5-1 Percent of halibut catcher vessel QS held by individuals and non-individual entities

Year	2C		3A		3B		4A		4B		4C		4D	
	Non-Individual Entity	Individual	Non-Individual Entity	Individual	Non-Individual Entity	Individual	Non-Individual Entity	Individual	Non-Individual Entity	Individual	Non-Individual Entity	Individual	Non-Individual Entity	Individual
1995	4.10%	95.90%	27.80%	72.20%	39.30%	60.70%	45.40%	54.60%	52.30%	47.70%	39.00%	61.00%	69.40%	30.60%
1996	3.60%	96.40%	26.30%	73.70%	38.60%	61.40%	42.80%	57.20%	50.70%	49.30%	28.10%	71.90%	62.90%	37.10%
1997	3.20%	96.80%	25.50%	74.50%	37.60%	62.40%	38.90%	61.10%	48.10%	51.90%	23.90%	76.10%	54.30%	45.70%
1998	2.70%	97.30%	25.30%	74.70%	37.50%	62.50%	39.00%	61.00%	45.40%	54.60%	22.60%	77.40%	52.10%	47.90%
1999	2.40%	97.60%	23.80%	76.20%	34.70%	65.30%	37.00%	63.00%	44.00%	56.00%	22.30%	77.70%	48.60%	51.40%
2000	2.30%	97.70%	23.40%	76.60%	33.80%	66.20%	32.80%	67.20%	42.60%	57.40%	22.40%	77.60%	46.00%	54.00%
2001	2.10%	97.90%	22.60%	77.40%	33.30%	66.70%	31.80%	68.20%	39.00%	61.00%	24.00%	76.00%	45.10%	54.90%
2002	2.00%	98.00%	21.90%	78.10%	32.50%	67.50%	31.80%	68.20%	38.70%	61.30%	22.20%	77.80%	44.00%	56.00%
2003	1.80%	98.20%	21.70%	78.30%	30.90%	69.10%	31.80%	68.20%	36.20%	63.80%	21.90%	78.10%	41.30%	58.70%
2004	1.60%	98.40%	21.90%	78.10%	31.20%	68.80%	28.90%	71.10%	36.10%	63.90%	21.90%	78.10%	41.30%	58.70%
2005	1.60%	98.40%	22.10%	77.90%	30.50%	69.50%	25.60%	74.40%	36.10%	63.90%	21.60%	78.40%	41.30%	58.70%
2006	1.60%	98.40%	21.90%	78.10%	30.50%	69.50%	24.40%	75.60%	36.10%	63.90%	21.60%	78.40%	41.30%	58.70%
2007	1.60%	98.40%	21.90%	78.10%	29.50%	70.50%	18.70%	81.30%	38.00%	62.00%	17.50%	82.50%	40.10%	59.90%
2008	1.40%	98.60%	21.50%	78.50%	29.00%	71.00%	21.50%	78.50%	33.50%	66.50%	17.50%	82.50%	40.10%	59.90%
2009	1.30%	98.70%	21.40%	78.60%	29.00%	71.00%	21.50%	78.50%	34.00%	66.00%	17.50%	82.50%	40.10%	59.90%

2010	1.30%	98.70%	21.10%	78.90%	29.10%	70.90%	21.50%	78.50%	34.10%	65.90%	17.50%	82.50%	39.80%	60.20%
2011	1.30%	98.70%	20.60%	79.40%	27.30%	72.70%	21.60%	78.40%	33.30%	66.70%	17.50%	82.50%	37.10%	62.90%
2012	1.30%	98.70%	20.60%	79.40%	27.30%	72.70%	20.50%	79.50%	33.30%	66.70%	17.50%	82.50%	37.10%	62.90%
2013	1.30%	98.70%	20.50%	79.50%	26.00%	74.00%	19.80%	80.20%	33.30%	66.70%	17.50%	82.50%	37.10%	62.90%
2014	1.30%	98.70%	19.60%	80.40%	25.30%	74.70%	19.40%	80.60%	37.70%	62.30%	17.50%	82.50%	37.10%	62.90%
2015	1.30%	98.70%	19.10%	80.90%	24.50%	75.50%	19.40%	80.60%	37.70%	62.30%	17.30%	82.70%	37.10%	62.90%

Source: NMFS IFQ QS holdings database sourced by AKFIN

Table 2.5-2 Percent of sablefish catcher vessel QS held by individuals and non-individual entities

Year	AI		BS		CG		SE		WG		WY	
	Non-Individual Entity	Individual	Non-Individual Entity	Individual	Non-Individual Entity	Individual	Non-Individual Entity	Individual	Non-Individual Entity	Individual	Non-Individual Entity	Individual
1995	50.80%	49.20%	64.40%	35.60%	46.90%	53.10%	15.40%	84.60%	47.20%	52.80%	43.70%	56.30%
1996	49.90%	50.10%	65.20%	34.80%	45.90%	54.10%	14.90%	85.10%	47.80%	52.20%	42.10%	57.90%
1997	44.90%	55.10%	64.40%	35.60%	44.90%	55.10%	14.30%	85.70%	44.80%	55.20%	42.70%	57.30%
1998	37.20%	62.80%	64.50%	35.50%	45.60%	54.40%	13.20%	86.80%	46.80%	53.20%	43.30%	56.70%
1999	37.40%	62.60%	58.40%	41.60%	44.50%	55.50%	12.40%	87.60%	43.10%	56.90%	43.00%	57.00%
2000	39.60%	60.40%	52.90%	47.10%	43.50%	56.50%	12.50%	87.50%	40.90%	59.10%	43.70%	56.30%
2001	32.00%	68.00%	50.30%	49.70%	40.70%	59.30%	12.40%	87.60%	38.20%	61.80%	41.50%	58.50%

2002	30.30%	69.70%	46.90%	53.10%	37.50%	62.50%	12.20%	87.80%	36.90%	63.10%	39.10%	60.90%
2003	22.30%	77.70%	31.20%	68.80%	37.30%	62.70%	12.10%	87.90%	33.20%	66.80%	38.60%	61.40%
2004	20.60%	79.40%	23.50%	76.50%	38.30%	61.70%	11.20%	88.80%	35.50%	64.50%	38.50%	61.50%
2005	19.10%	80.90%	20.20%	79.80%	38.30%	61.70%	9.70%	90.30%	33.30%	66.70%	39.00%	61.00%
2006	18.80%	81.20%	19.10%	80.90%	38.70%	61.30%	9.70%	90.30%	34.10%	65.90%	39.00%	61.00%
2007	14.30%	85.70%	16.10%	83.90%	37.70%	62.30%	9.50%	90.50%	27.00%	73.00%	40.80%	59.20%
2008	14.30%	85.70%	4.30%	95.70%	38.40%	61.60%	9.50%	90.50%	26.30%	73.70%	41.00%	59.00%
2009	12.90%	87.10%	4.20%	95.80%	38.30%	61.70%	9.50%	90.50%	26.80%	73.20%	40.90%	59.10%
2010	12.90%	87.10%	4.20%	95.80%	37.90%	62.10%	9.30%	90.70%	24.90%	75.10%	41.00%	59.00%
2011	5.70%	94.30%	3.80%	96.20%	37.20%	62.80%	9.30%	90.70%	24.90%	75.10%	38.90%	61.10%
2012	5.70%	94.30%	5.00%	95.00%	36.30%	63.70%	9.30%	90.70%	24.90%	75.10%	38.90%	61.10%
2013	6.40%	93.60%	5.70%	94.30%	36.50%	63.50%	9.30%	90.70%	24.00%	76.00%	38.90%	61.10%
2014	6.50%	93.50%	5.00%	95.00%	36.20%	63.80%	9.30%	90.70%	24.00%	76.00%	38.90%	61.10%
2015	6.30%	93.70%	3.60%	96.40%	35.70%	64.30%	9.20%	90.80%	24.00%	76.00%	38.80%	61.20%

Source: NMFS IFQ QS holdings database sourced by AKFIN

2.5.2 Leasing in Catch Share Fisheries

Transferability of fishing privileges is one of the key mechanisms through which production efficiency gains are expected to emerge from catch share programs, as privileges move from less to more efficient operators and capacity overall decreases. Temporary transferability or leasing of IFQ may provide additional benefits, beyond what can be expected with permanent transferability alone. Leasing of IFQ may allow fishermen to adjust to inter-annual TAC changes and personal circumstances without the commitment engendered in permanent transfers (Pallson and Helgason, 1996). Furthermore, leasing provides for a separation between the factors of ownership and production in the fishery and due to competition for quota, a class of highly efficient harvest service providers may emerge in the fishery (Le Gallic and Mongruel, 2006).

Despite these potential benefits to leasing, there are some potentially adverse impacts as well associated with what may be a fundamentally different incentive structure for shareholders and lessees operating in the fishery. Providing fishermen with an exclusive harvest privilege for a portion of the TAC through a catch share program is anticipated to foster a stewardship ethic amongst shareholders, because the value of the shareholders' asset is inherently tied to the health of the resource. Assuming that the stakeholder's investment in the fishery is a factor of the duration of their fishing privilege, when the fishery transitions to more lessees, these anticipated stewardship benefits may not materialize or may dissipate, as lessees may have a much shorter temporal horizon with respect to the fishery (Scott 1999; Bradshaw 2004; Gibbs 2009).

Researchers have shown that economic pressures (e.g., needing to pay for new gear, bills, and crew) and poor economic conditions caused, for example, by increasingly stringent management measures may incentivize vessel operators to participate in fishing opportunities that demonstrate significant risk (Kaplan and Kite-Powell, 2000; Lambert et al., 2015). Such economic conditions and pressures can be replicated in an IFQ fishery for lease-dependent fishermen, if rising lease fees cause a profit margin squeeze on the lessees. In other words, if an increasingly larger percentage of lessees' profits are shifted towards the shareholder, there may be profit margin compression for the lessee (van Putten and Gardner, 2010). For example, the institution of an IFQ Program in Tasmania's rock lobster fishery resulted in the emergence of a class of small lease dependent operators, who operate below normal economic profit (van Putten and Gardner, 2010). This kind of profit margin compression may fundamentally change the way lessees operate in the fishery, reducing their flexibility in when and how they operate, making them more vulnerable to numerous timing-related issues including inclement marine weather. Emery et al. (2014) showed that in the Tasmanian rock lobster fishery, lessees have significantly higher risk tolerance levels than quota owners, a pattern that was related to lease quota prices.

In effect, this means that some of the anticipated benefits of implementing a catch share fishery, with respect to a stewardship ethic and safety in the fishery, may not materialize or may dissipate under a catch share fishery with high rates of leasing.

2.5.2.1 Leasing of IFQ derived from Class A QS

Since the implementation of the IFQ Program, holders of Class A QS have been able to both lease their IFQ in both fisheries and across all IFQ regulatory areas, as well as use a hired master to harvest their IFQ. (The use of hired masters to harvest Class A QS is further explored in Section 2.5.5.) Any IFQ lease transactions are in effect for an IFQ year and expire on December 31st of the year of the lease. Class A QS makes up a small percentage of total QS in the halibut IFQ fishery, about 2% to 8% for any given area. In the sablefish fishery, Class A QS accounts for a larger percentage of total area QS, ranging from 8% in the Western Yakutat area to 56% in the Aleutian Islands area.

Table 2.5-3 shows the percentage of all Class A QS units that were leased as well as the percentage of Class A QS holders who leased their IFQ in the halibut and sablefish IFQ fisheries from 1995 to 2014. For both fisheries the percentage of Class A IFQ that was leased and the percentage of QS holders who leased their Class A IFQ have decreased since IFQ implementation. This trend is in contrast to catcher vessel IFQ lease trends presented in the following sections. One might anticipate a decreasing trend to reflect increasing Class A QS holdings by individuals, who may then harvest the resultant IFQ themselves. However, Class A QS has moved from individuals to non-individual entities since IFQ implementation, with the latter increasing their Class A QS holdings from 16% in 1995 to 51% in 2014. Decreasing percentages of Class A IFQ that was leased may, therefore, be associated with an increasing reliance on hired masters use by Class A QS holders. This is explored further in Section 2.5.5 below.

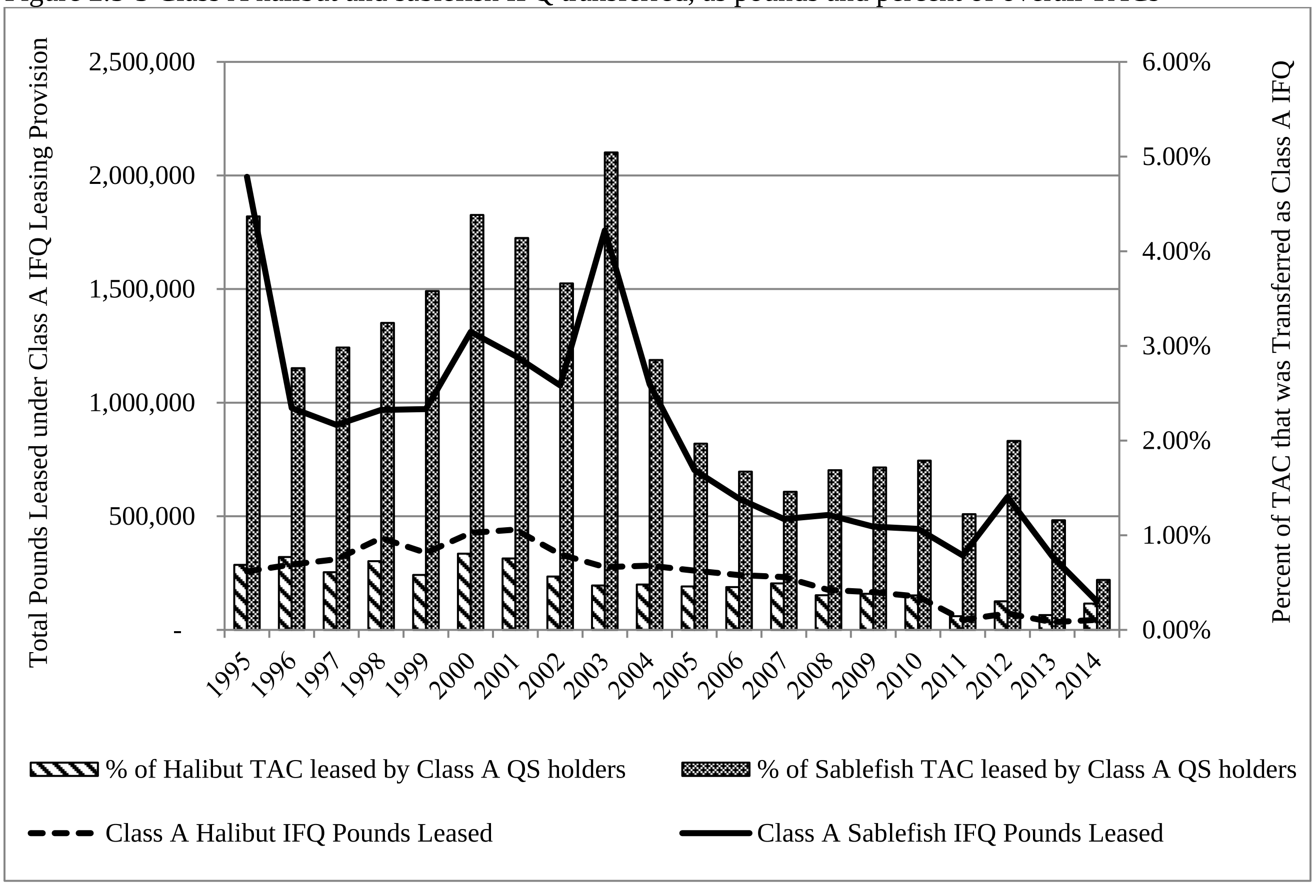
Table 2.5-3 Percentage of all Class A QS units that were leased and the percentage of Class A QS holders who leased their IFQ in the IFQ fisheries

Year	Percentage of Class A Halibut IFQ that was leased	Percentage of Class A Halibut QS Holders who leased their Class A IFQ	Percentage of Class A Sablefish IFQ that was leased	Percentage of Class A Sablefish QS Holders who leased their Class A IFQ
1995	28%	20%	28%	32%
1996	31%	19%	17%	19%
1997	21%	23%	19%	21%
1998	25%	26%	19%	26%
1999	21%	23%	20%	23%
2000	26%	25%	21%	30%
2001	25%	27%	19%	25%
2002	21%	26%	17%	27%
2003	18%	21%	21%	21%
2004	18%	18%	12%	17%
2005	17%	20%	9%	15%
2006	16%	17%	7%	16%
2007	17%	20%	6%	14%
2008	14%	16%	7%	13%
2009	15%	16%	7%	12%
2010	14%	18%	8%	13%
2011	7%	14%	6%	9%
2012	11%	20%	9%	10%
2013	7%	11%	5%	9%
2014	10%	14%	2%	8%

Source: NMFS IFQ transfer database sourced by AKFIN

Figure 2.5-3 shows the leasing of Class A IFQ in the halibut and sablefish fisheries since the implementation of the IFQ Program, as a percentage of the respective TACs and as IFQ pounds. The decreasing trends reflect the trends shown in Table 2.5-3. Class A IFQ leasing comprises a small percentage of overall TACs for both IFQ fisheries. Since IFQ implementation, Class A IFQ leasing has amounted to less than 1% of the halibut TAC in every year. For the sablefish fishery, Class A IFQ leasing peaked in 2003 at 5% and has continued to decrease since then, ranging between 2.9% in 2004 to 0.5% in 2014.

Figure 2.5-3 Class A halibut and sablefish IFQ transferred, as pounds and percent of overall TACs



Source: NMFS IFQ transfer database sourced by AKFIN

2.5.2.2 Leasing of IFQ derived from catcher vessel QS

Holders of catcher vessel QS could lease up to 10% of their IFQ in a given area for the first three years of the IFQ Program – 1995, 1996, and 1997. This temporary leasing provision for catcher vessel QS holders was intended to balance the Council's different objectives for catcher vessel shares. Opponents of leasing wanted to keep catcher vessel QS in the hands of active fishermen rather than absentee QS holders and to provide for access opportunities for new entrants. Proponents of catcher vessel IFQ leasing wanted to maintain operational flexibility for fishermen in the face of a changing regulatory environment in the IFQ fisheries.

Regulations providing for leasing of catcher vessel IFQ expired on January 2, 1998 and have not been renewed. Thus, since 1998, leasing of catcher vessel IFQ has generally been prohibited except under a few specific conditions. Leasing of catcher vessel IFQ is allowed under five special circumstances – 1) medical leases, 2) survivorship transfer privileges (beneficiary leases), 3) military leases, 4) leases through CQEs, and 5) IFQ to guided angler fish (GAF) transfers.

2.5.2.2.1 Medical leases

For those otherwise not eligible to use hired masters, leasing of catcher vessel QS is allowed in the event of a medical hardship. This includes individuals (including initial QS recipients) in halibut Area 2C and the sablefish Southeast Outside District, individual initial recipients of catcher vessel QS that do not meet the 20% vessel ownership requirement to hire a master, catcher vessel QS held by initial recipients but purchased after February 12th, 2010, and second-generation (i.e. non-initial recipient) shareholders in all areas. For those otherwise not eligible to use hired masters, the medical lease provision was intended to provide shareholders with a way to harvest their catcher vessel IFQ in times of hardship. Prior to this 2007 amendment, in years of hardship QS holders would have to divest themselves of their QS or sell their QS to friends or family with a tacit agreement that they would return the QS once the QS holder recovered.

Table 2.5-4 shows the utilization of the medical lease provision from 2007 through 2015.[46] The medical lease provision did not go into effect until September 10, 2007 (cite final rule). Therefore, 2008 represents the first year in which the medical lease provision was fully utilized. Unlike Class A QS, we do not present the IFQ and QS holder lease rates but rather the number of transfers and the number of transferors.

With some inter-annual variability, the number of transfers and the number of unique transferors has increased since the implementation of the medical lease provision. For the ratio of transfers to transferors, a 1 would indicate that each transferor accounts for one transfer. Since many QS holders hold QS across areas and vessel classes, a transferor can have multiple medical lease transfers. The farther the ratio is from 1, the greater is the number of transfers per transferor. Table 2.5-4 illustrates that the ratio has increased since 2008. This indicates that while the number of transferors has generally increased, so has the relative proportion of their transfers.

Table 2.5-4 reveals that initial recipients are utilizing the medical lease provision for leasing catcher vessel IFQ in areas in which they could potentially use hired masters (provided they could document a 12-month 20% vessel ownership interest and that the relevant QS was received by transfer prior to February 2010). This suggests that some QS holders may be using the medical lease provision as an alternative to using a hired master. This is demonstrated by the fact that the percent of medically leased IFQ that was leased by initial recipients in all regulatory areas is greater than the percent of medically leased IFQ that was leased by initial recipients leasing IFQ in halibut Area 2C and the sablefish Southeast Outside District (areas in which hired masters may not be used). Initial recipients may have an incentive to use a medical lease rather than a hired master because QS holders are not required to comply with the 12-month 20% vessel ownership requirement for catcher vessel IFQ leasing under the medical provision. There is significant inter-annual variability in the percent of medically leased IFQ that is being leased by initial recipients and second-generation shareholders. Nevertheless, for most years, second-generation shareholders account for the majority of medical leases, which is expected given that they do not have the opportunity to use a hired master.

[46] The 2015 data is through mid-November of 2015 when the data was compiled.

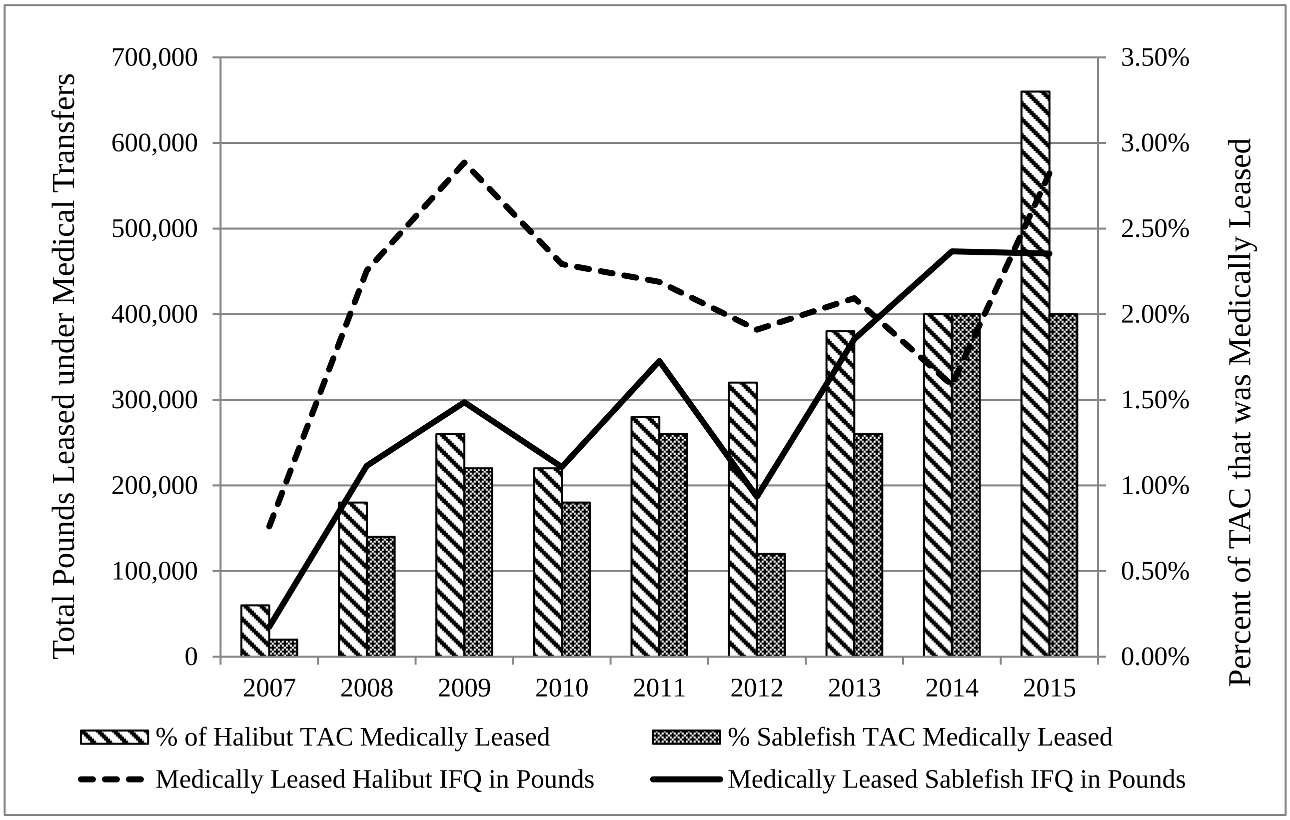
Table 2.5-4 Utilization of the medical lease provision from 2007 to 2015

Year	No. of Medical Lease Transfers (for both halibut and sablefish IFQ fisheries)	No. Unique Medical Lease Transferors (for both halibut and sablefish IFQ fisheries)	Ratio of Transfers to Transferors	% of medically leased IFQ that was leased by initial QS recipients leasing IFQ in Area 2C and/or Southeast Outside District	% of medically leased IFQ that was leased by initial QS recipients
2007	19	15	1.27	42%	45%
2008	72	54	1.33	24%	35%
2009	109	73	1.49	14%	27%
2010	99	66	1.50	32%	47%
2011	105	70	1.50	28%	51%
2012	93	63	1.48	15%	49%
2013	112	70	1.60	16%	27%
2014	131	86	1.52	32%	39%
2015	179	110	1.63	18%	42%

Source: NMFS IFQ transfer database sourced by AKFIN

Figure 2.5-4 shows the halibut and sablefish IFQ transferred under the medical lease provision in pounds of IFQ and as a percent of the overall TACs, from 2007 through 2015. The pounds leased as a percentage of the overall TACs may be a better indicator of the utilization of the medical lease provision given the variability in the TACs since 2007. Compared to 2008, the first full year of utilizing the medical lease provision, there has been an overall increase in the pounds of IFQ leased through the medical provision and the percentage of both the halibut and sablefish TACs that is leased through the medical provision. Although in both the halibut and sablefish fisheries medical leases have generally accounted for less than 2% of the overall TACs, in 2015 there was a spike in the percent of the overall halibut TAC that was leased through the medical provision to just less than 3.5%. The 2015 spike in the utilization of the medical lease provision may be associated with the implementation of the 2014 regulation constraining the utilization of hired masters. In other words, some QS holders may be replacing hired master use with medical leasing as the utilization of hired masters becomes constrained. This, along with the continued aging of QS holders, could mean that medical leasing may become more prevalent in the IFQ fisheries in the years to come.

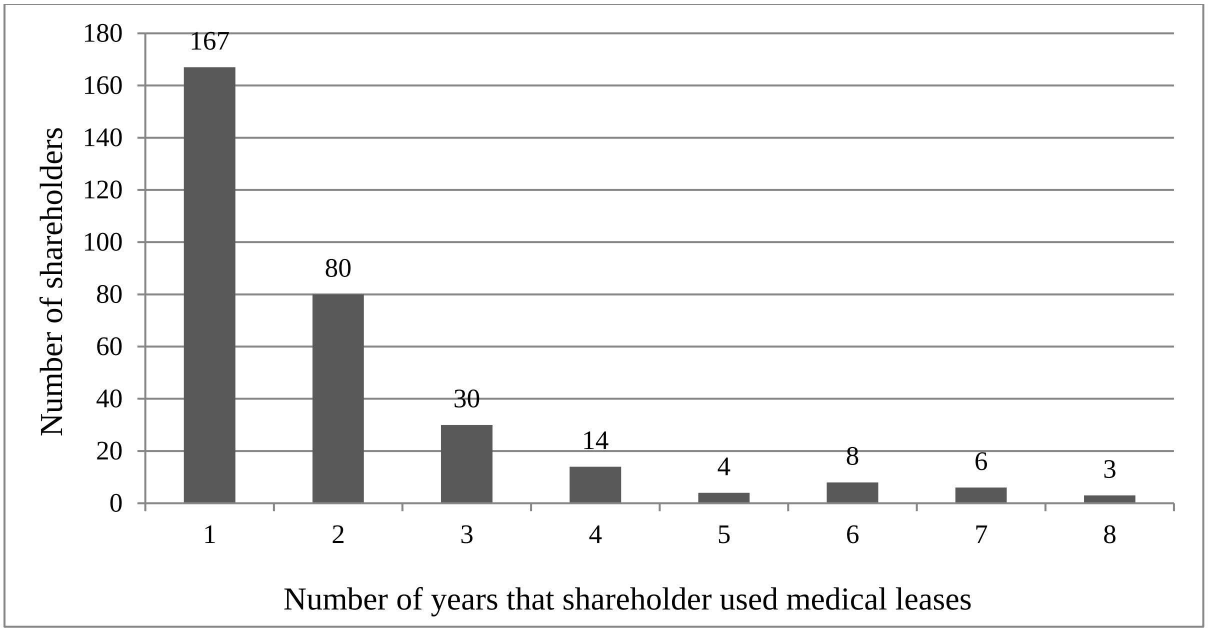
Figure 2.5-4 Halibut and sablefish IFQ transferred under medical lease provision, as pounds and percent of overall TACs



Source: NMFS IFQ transfer database sourced by AKFIN

A shareholder may not use the same medical condition to qualify for the medical lease transfer provision for more than two out of the previous five years. However, there is no overall cap for the total number of years that a shareholder may use the medical lease provision. Therefore, shareholders may use the provision to lease their catcher vessel IFQ as long as they can demonstrate a different qualifying medical condition. Figure 2.5-5 shows the distribution of medical leases by the total number of years that the shareholder used medical leases from 2007 through 2015. The vast majority of shareholders used the medical lease provision for one or two years. However, there were 65 unique shareholders, who used the medical lease provision for three or more years. Of those, 17 shareholders used the medical lease provision for 6 or more years and 3 used it for 8 years, nearly every single year since the provision was implemented.

Figure 2.5-5 Distribution of medical leases by the total number of years that the shareholder used medical leases



Source: NMFS IFQ transfer database sourced by AKFIN

The medical lease provision was intended to alleviate shareholders of the owner-on-board mandate in years of hardship. However, repetitive use of the provision may indicate that a select group of shareholders in the IFQ fisheries is utilizing the provision as a means of bypassing the owner-on-board provision altogether. Furthermore, some QS holders may be using the medical lease provision for chronic conditions, from which recovery is unlikely.

Given anecdotally reported lease rates in the IFQ fisheries (during the IFQ crew workshop described in Section 2.4.1), QS holders may have substantial financial incentives to lease their IFQ. The medical IFQ transfer form includes a section where the transferees (the person receiving the IFQ) indicate the primary source of financing for the transfer, in which they can add additional text to describe the financing. Many transferees indicate a percentage of the gross revenue as the primary source of financing. Given that this section is filled in by the transferee as an indication of how they are paying for the IFQ, we assume that the percentage of the gross revenues indicated herein is the percentage being paid by the transferee to the transferor. Since 2007 average lease rates reported for medical transfers in the fishery have been 51%, with a range of 12% to 75%. A simple scatterplot of lease rates over 2007 through 2015 indicates a slightly upward sloping trend line. This implies a positive relationship between lease rates and time, which concurs with anecdotally reported lease rate trends for the IFQ fisheries at the IFQ crew workshop (see Section 2.4.1 Crewmember Impacts).

The Council considered a medical lease transfer provision at the implementation of the IFQ Program. The Council did not adopt a medical lease transfer provision at that time due to concerns over the potential abuse of such a provision, the negative implications for the owner-on-board objective for the IFQ fisheries, and an onerous administrative burden for NMFS to use its discretionary authority to determine a demonstrable/actual medical hardship (NPFMC/NMFS, 2005). The Council had similar concerns when it was reconsidering the provision in 2005, but decided that the limit on the total number of years that the provision may be used would to some extent address this potential abuse (ibid.). The provision also provides clear authority for NMFS to only approve medical leases for the same condition for two out of five years, although as noted in Section 2.11.5 and Section 3, this has not eliminated the need for discretion by the agency in assessing the validity of a claimed hardship.

2.5.2.2.2 Beneficiary leases

The IFQ Program also allows beneficiaries to lease IFQ derived from catcher vessel QS that they received as a descendent of a QS holder. The original beneficiary lease provision went into effect on September 9, 1996, so 1997 represents that first year in which beneficiary leasing was fully available. Table 2.5-5 shows the utilization of the beneficiary lease provision from 1996 through 2015.[47] Since 1996, there has been substantial inter-annual variability in the number of beneficiary leases and in the number of beneficiaries utilizing this leasing provision. Table 2.5-5 also includes the ratio of transfers to transferors. As with the medical lease transfers the farther the ratio is from 1, the greater is the number of transfers per transferor. Table 2.5-5 shows that the ratio has increased since 1996, so that a smaller group of beneficiaries now accounts for a larger number of beneficiary lease transfers. In part, this may be a factor of consolidation. QS holders acquired different types of QS in the fisheries over time and this would result in beneficiaries having to make more unique transfers.

[47] The 2015 data is through mid-November of 2015 when the data was compiled.

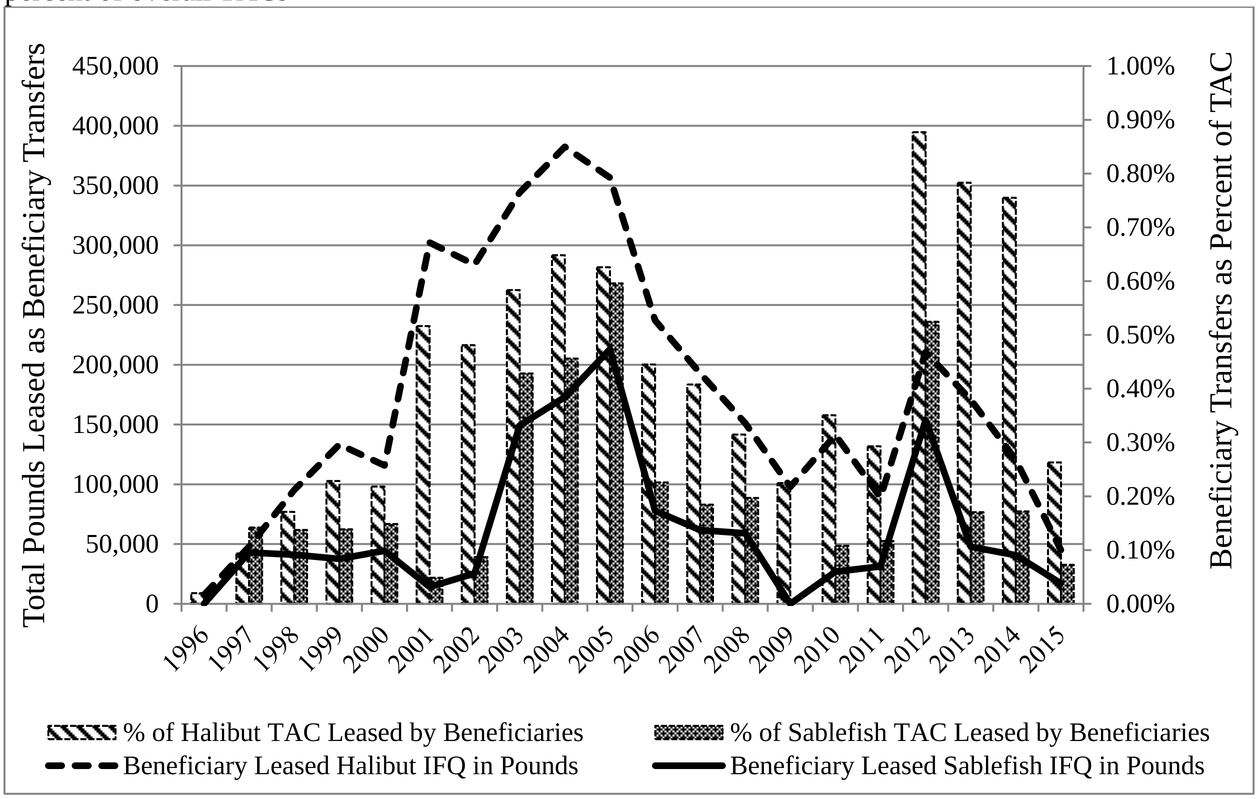
Table 2.5-5 Utilization of the beneficiary lease provision for halibut and sablefish catcher vessel IFQ

Year	Number of transfers	Number of transfers	Ratio of transfers to transferors
1996	3	3	1
1997	9	7	1.29
1998	13	11	1.18
1999	15	12	1.25
2000	19	12	1.58
2001	15	9	1.67
2002	19	11	1.73
2003	18	9	2
2004	19	13	1.46
2005	19	12	1.58
2006	15	9	1.67
2007	14	8	1.75
2008	14	7	2
2009	7	4	1.75
2010	14	7	2
2011	12	6	2
2012	21	5	4.2
2013	17	3	5.67
2014	17	3	5.67
2015	10	3	3.33

Source: NMFS IFQ transfer database sourced by AKFIN

Figure 2.5-6**Error! Not a valid bookmark self-reference.** shows the halibut and sablefish IFQ transferred under the beneficiary lease provision in pounds of IFQ and as a percent of the overall TACs, from 1996 through 2015. Again, the pounds leased as a percentage of the overall TACs may be a better indicator of the utilization of the beneficiary lease provision given the variability in the TACs since 1996. It may be expected that the percentages of the halibut and sablefish TACs that are leased by beneficiaries would increase over the 20 years of the dataset, as initial QS recipients age and pass away. However, the data reveals increasing percentages of the TACs leased by beneficiaries in the early 2000s and over the last several years. Importantly, for all the years of data the amount of IFQ leased by beneficiaries represents less than 1% of the halibut and of the sablefish TACs.

Figure 2.5-6 Halibut and sablefish IFQ transferred under beneficiary lease provision, as pounds and percent of overall TACs



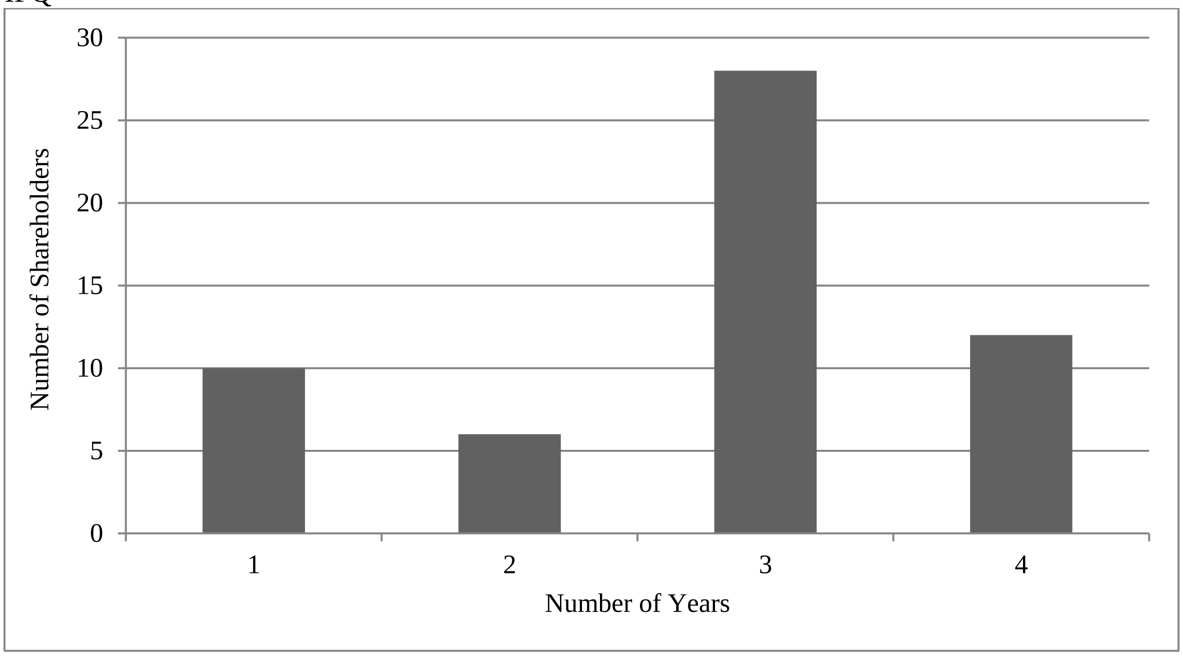
Source: NMFS IFQ transfer database sourced by AKFIN

Beneficiaries are allowed to lease IFQ that they received upon the death of a shareholder for up to three calendar years following the death of the shareholder. Figure 2.5-7 shows the distribution of beneficiary leases from 1996 to 2015 by the total number of years that the beneficiary leased their IFQ. The majority of beneficiaries leased their IFQ for three or four years. Although beneficiary leasing of IFQ is intended to be for three calendar years after the passing of the shareholder, there were 12 beneficiaries who leased their IFQ for four years. It was originally the policy of NMFS that if the shareholder died mid-season, the beneficiary was given the remainder of that season and three full years after to lease the IFQ. Currently, NMFS may allow beneficiaries to lease IFQ for four years if the shareholder did not have sufficient time to harvest their IFQ before they passed away.

As with the medical transfer forms, the beneficiary transfer form includes an area for the QS recipient to report financing for IFQ beneficiary leases. Many transferees indicate a percentage of the gross revenue as the primary source of financing. Given that this section is filled in by the transferee as an indication of how they are paying for the IFQ, we assume that the percentage of the gross revenues indicated herein is the percentage being paid by the transferee to the transferor.

NMFS has data on reported lease rates for beneficiaries from 2000 through 2015. (Data on financing of beneficiary leases was not available prior to 2000). Again, assuming the lessee is generally reporting the percentage of the ex-vessel revenue that goes to the QS holder, average beneficiary lease rates in the IFQ fisheries have been 56%, with a range of 25% to 100%. As with the medical lease transfers, a simple scatterplot of beneficiary lease rates over 2000 through 2015 indicates a slightly upward sloping trend line. This implies a positive relationship between lease rates and time, which concurs with anecdotally reported lease rate trends for the IFQ fisheries at the IFQ crew workshop (see Section 2.4.1 Crewmember Impacts).

Figure 2.5-7 Distribution of beneficiary leases by the total number of years that the beneficiary leased the IFQ



Source: NMFS IFQ transfer database sourced by AKFIN

2.5.2.2.3 Military leases

In the event of a military mobilization or order for a QS holder to report for military service that prevents them from being able to participate in the halibut or sablefish IFQ fisheries, the Regional Administrator may approve a temporary military lease for the IFQ derived from the QS held by a QS holder affected by the military mobilization. There have been no military leases in the IFQ Program since the implementation of the military lease provision in 2008 (73 FR 28733).

2.5.2.2.4 CQE leases

This section presents a discussion of leasing through CQE entities. CQEs may purchase catcher vessel QS. In order to harvest the IFQ derived from those shares, the CQEs must lease the IFQ to a resident of their community. Thus the leasing of catcher vessel shares by CQEs is another exception to the general prohibition on leasing of catcher vessel shares.

Table 2.5-6 presents the CQE holdings in the halibut and sablefish IFQ fisheries and as a percentage of the annual TAC in the fisheries, as well as the number of unique individuals that leased IFQ from all of the CQEs combined. Only three CQEs have purchased QS in the halibut and sablefish IFQ fisheries. The Old Harbor CQE, the Ouzinkie CQE, and the Adak CQE purchased QS in 2006, 2011, and 2014, respectively. The CQEs hold only catcher vessel QS in halibut Areas 3A, 3B, 4B, and the Aleutian Islands area of the sablefish fishery.

Because all of the CQEs have leased all of their IFQ holdings since the first CQE purchased QS in 2006, the CQE holdings are presented rather than actual leases. Furthermore, often the CQEs have to lease the same IFQ more than once because the initial lessor was not successful at harvesting the IFQ. Depending on how a lease is defined, utilizing data from the actual transfers of IFQ from a CQE may result in overestimating the percentage of the TAC that is leased.

The data in Table 2.5-6 show that CQE leases account for less than 1% of the annual TACs for both the halibut and sablefish IFQ fisheries. CQE IFQ holdings make up less than 1% of all area-specific TACs for all years with the exception of the Area 4B halibut TAC, where the Adak CQE held 6% of the total area halibut TAC in 2015. In other words, the 6% of the halibut TAC in Area 4B was leased through the Adak CQE in 2015.

Many of the same individuals lease halibut and sablefish IFQ from the CQEs on an annual basis. Since 2006, there have been a total of 36 unique individuals who have leased IFQ from the CQEs.

Table 2.5-6 Leasing of halibut and sablefish IFQ by CQEs

Year	Total halibut IFQ pounds held by CQEs	CQE holdings as a percentage of annual halibut TAC	Total sablefish IFQ pounds held by CQEs	CQE holdings as a percentage of annual sablefish TAC	Unique lessors for all CQEs
2006	30,917	0.06%			5
2007	25,725	0.05%			7
2008	30,413	0.06%			7
2009	30,413	0.07%			9
2010	27,622	0.07%			5
2011	29,224	0.10%			7
2012	21,009	0.09%			9
2013	27,405	0.13%			8
2014	55,277	0.35%	7,665	0.03%	10
2015	79,760	0.47%	7,630	0.03%	11

Source: NMFS database sourced by AKFIN

2.5.2.3 **Guided Angler fish (GAF) transfers**

In 2014, NMFS implemented a catch sharing plan (CSP) for the guided sport (charter) and commercial halibut fisheries in halibut Areas 2C and 3A. The CSP included the guided angler fish (GAF) program to authorize limited annual transfers (leases) of commercial halibut IFQ as GAF to qualified charter halibut permit holders for harvest by charter vessel anglers. Using GAF, qualified charter halibut permit holders may offer charter vessel anglers the opportunity to retain halibut up to the limit for unguided anglers when the charter management measure in place limits charter vessel anglers to a more restrictive harvest limit (78 FR 75843).

NMFS issues GAF in numbers of halibut based on a conversion factor from IFQ pounds. The conversion factor is area-specific and is expressed as pounds of IFQ per GAF, or the number of pounds a charter operator would need to purchase from an IFQ holder to be able to land a GAF. Table 2.5-7 shows the IFQ to GAF conversion factors for 2014 through 2016. In 2014, the first year of the GAF program, the conversion factors were based on the average weight of all charter halibut harvested by area in the most recent year without a size limit in effect. For 2015 and beyond, the conversion factors are based on the average net weight of GAF harvested by area. The first year's conversion factors were based on the average weight of all charter halibut harvested, but subsequent years' conversion factors were based on only the average size of GAF. Because the average weight of harvested GAF is larger than the average weight of all charter halibut harvested in an area, the GAF conversion factors, increased dramatically between the first and second years of the program. Relative to the changes from 2014 to 2015, the conversion factor is similar between 2015 and 2016.

Table 2.5-7 Guided Angler Fish (GAF) annual conversion factors as pounds of IFQ per GAF.

Area	2014	2015	2016
2C	26.4	67.3	65.1
3A	12.8	38.4	36.1

Source: GAF Program 2015 Annual Report (Scheurer, 2015)

Table 2.5-8 shows the summary of IFQ to GAF transfers in 2014 and 2015. In Area 2C in 2015, the number of transfers and pounds of IFQ transferred increased compared to 2014; however, because the IFQ to GAF conversion factor increased from 2014 to 2015, the number of fish that GAF permit holders received by transfer for harvest in the charter fishery actually decreased in 2015. In Area 3A, the number of transfers increased but the amount of IFQ pounds and the number of GAF fish decreased between 2014 and 2015. Participation in the GAF program has been limited. In 2014 and 2015, 43 out of 831 and 40 out of 824 charter halibut permit holders leased IFQ under the GAF program, respectively.

In a survey of charter halibut permit holders conducted by AFSC researchers, the majority of respondents cited the costs to lease GAF and general opposition to the GAF lease program as the primary reason for not participating in the program (Lew, Putman, and Larson, 2016). The survey data also suggested that there were differences in how respondents in Areas 2C and 3A viewed the CSP generally, as well as the GAF leasing program specifically. Respondents from Area 3A viewed the CSP and GAF leasing more negatively on average than those from Area 2C, citing the expense of leasing GAF, a lack of support for the GAF leasing program overall, and the difficulty of the leasing process.

It is important to note that because of the differences in annual management between Area 2C and 3A charter fisheries, GAF provides a different opportunity in each area. Under the CSP, Area 2C has had a daily bag limit of one halibut with a reverse slot limit on that fish in recent years. In other words, during the 2016 season charter vessel anglers could catch and retain one halibut per day, which had to be less than or equal to 43 inches or greater than or equal to 80 inches in total length. Thus, a GAF fish in Area 2C could have been used to catch one additional fish of any size. In Area 3A, for example in 2016, charter vessel anglers may catch and retain two halibut per day (up to a four halibut annual limit), with one of the fish not exceeding 28 inches in total length, and on Wednesdays during peak season, no charter anglers may catch and retain non-GAF halibut in 3A. Given the non-guided limit of two fish of any size, in Area 3A, an entire GAF could be used to increase the size of the charter angler's second fish, to catch a fish during the day of the week closure, or to increase an angler's annual limit. This illustrates the difference in opportunity afforded by the GAF leasing program between Areas 2C and 3A.

Furthermore, in Area 2C the more restrictive size and bag limits for halibut have been in place since 2007, while it is only in the last few years that size limits and additional restrictions have been imposed in 3A. Therefore, in addition to the product being different between what a GAF buys an angler in 3A versus 2C, there is also the possibility that more backlash has occurred against a perceived slew of "sudden" change in Area 3A management measures by CHP holders and anglers that are just starting to see changes occur in halibut management (CSP, tighter regulations, etc.).

Table 2.5-8 Summary of IFQ to GAF transfers and GAF usage in 2014 and 2015

Year	Area	No. of GAF transfer-red	No. of transfers (permits issued)	IFQ pounds transfer-red	Percent of area TAC leased as GAF	Percent of GAF harvested
2014	2C	1,117	92	29,498	0.89%	72%
	3A	910	19	11,654	0.16%	30%
2015	2C	548	119	36,934	1.00%	78%
	3A	269	25	10,337	0.13%	53%

Source: GAF Program 2015 Annual Report (Scheurer, 2015)

Halibut QS holders, who operate as charter halibut permit holders as well, can transfer QS to themselves as GAF. Such transfers account for a large percentage of the GAF transfers in Area 3A (40% in 2015) but a small percentage of the total GAF transfers in Area 2C (7% in 2015). The percentage of GAF transfers that were self-transfers decreased between 2014 and 2015 in both areas. GAF transfers account for a very small percentage of the area TACs in both Area 2C and 3A, although this percentage did increase in Area 2C from 2014 to 2015.

In both areas, participants are limited in how much of their IFQ holdings they may transfer as GAF. In Area 2C, participants may transfer up to 10% (or 1,500 pounds) of their IFQ, whichever is greater. In Area 3A, they may transfer up to 15% (or 1,500 pounds), whichever is greater. This has likely significantly restricted the incentive for participants to purchase halibut QS with the intention of self-transferring to GAF, unless they are also commercial IFQ fishermen, who could land the remaining IFQ in the commercial fishery.

Unused GAF are automatically converted back into IFQ 15 days prior to the end of the commercial IFQ fishing season. Depending upon the transfer arrangements between the GAF lessee and the IFQ holder, the lessee may or may not be reimbursed for the reconverted GAF. Table 2.5-8 shows the harvest rates for GAF in both areas. The harvest rate for Area 3A was lower than for Area 2C in both years, although it increased substantially in 2015. The higher percentage of self-transfers in Area 3A may partially explain why a lower proportion of GAF were harvested in Area 3A. The opportunity costs of not harvesting GAF are much lower if an individual can transfer the GAF back to themselves as IFQ and harvest it in the commercial fishery.

2.5.3 Hired master use

The previous sections discussed formal leasing arrangements in the IFQ fisheries. This section examines the use of hired masters by both Class A and catcher vessel QS holders.

2.5.3.1 Hired master use by Class A QS holders

Table 2.5-9 and Table 2.5-10 show hired master harvest of IFQ derived from Class A QS for both the sablefish and the halibut fisheries. Due to confidentiality issues, there are missing data in years and areas wherein there were three or fewer hired masters making landings.

The use of hired masters to harvest Class A QS has increased substantially across the IFQ regulatory areas in both fisheries. In particular, in the regulatory areas with the largest TACs (2C, 3A, and 3B of the halibut fishery and the WG and SE areas of the sablefish fishery) hired master use for Class A QS holders has increased substantially. As noted in Section 2.5.2.1, leasing of IFQ derived from Class A QS has decreased over the 20 years of the IFQ Program, despite a substantial transfer of Class A QS to non-individual entities. The increased use of hired masters and decrease in IFQ leasing indicates that Class A QS holders are transitioning from leasing their IFQ to using hired masters to land their IFQ. Operationally for Class A QS holders and the individual harvesting the IFQ, these may be equivalent relationships. However, the paperwork requirements are slightly smaller for a hired master permit than an IFQ lease, which may be contributing to this transition.

Table 2.5-9 Hired master harvest of IFQ derived from Class A QS by halibut regulatory area (Denoted as a percent of total Class A QS in the area)

Year	2C	3A	3B	4A	4B	4C	4D
1995	.	20.2%	.	.	.	.	.
1996	.	39.7%	34.0%	53.4%	100%	.	.
1997	.	64.1%	59.2%	55.9%	.	.	100%
1998	13.5%	57.1%	62.3%	.	.	.	.
1999	12.7%	56.2%	66.4%	58.6%	.	.	.
2000	8.4%	63.6%	59.6%	65.9%	91%	0.0%	100%
2001	17.3%	60.1%	58.7%	49.5%	91%	0.0%	100%
2002	25.0%	61.2%	74.0%	53.4%	92%	.	100%
2003	33.5%	63.5%	72.1%	69.2%	91%	0.0%	100%
2004	25.5%	61.9%	68.7%	77.9%	100%	0.0%	100%
2005	30.8%	73.9%	80.7%	69.6%	92%	.	100%
2006	31.3%	67.0%	75.1%	68.4%	100%	.	100%
2007	33.1%	76.1%	82.9%	72.5%	100%	.	100%
2008	44.7%	61.2%	89.4%	75.8%	100%	.	100%
2009	45.2%	72.4%	86.2%	84.3%	100%	0.0%	96%
2010	61.7%	83.8%	85.1%	68.8%	100%	.	100%
2011	63.8%	90.2%	87.5%	76.7%	100%	.	96%
2012	49.9%	87.7%	89.8%	76.6%	100%	.	100%
2013	72.3%	87.9%	95.6%	96.4%	100%	0.0%	100%
2014	62.0%	86.8%	82.9%	88.4%	100%	0.0%	100%

Source: NMFS IFQ landings database sourced by AKFIN

Table 2.5-10 Hired master harvest of IFQ derived from Class A QS by sablefish regulatory area (Denoted as a percent of total Class A QS in the area)

Year	SE	WY	CG	WG	BS	AI
1995	.	14.2%	24.6%	25.2%	35.3%	69.8%
1996	54.9%	63.0%	76.7%	72.6%	81.6%	86.1%
1997	49.1%	64.4%	82.0%	98.5%	.	.
1998	38.5%	51.0%	72.5%	93.0%	57.0%	67.2%
1999	.	.	.	.	.	.
2000	61.5%	67.5%	88.6%	95.6%	.	.
2001	62.7%	69.4%	92.0%	.	74.9%	.
2002	58.4%	68.8%	87.8%	90.9%	.	.
2003	59.1%	68.4%	91.8%	.	.	.
2004	56.6%	81.8%	95.8%	.	.	100%
2005	69.8%	78.3%	95.9%	.	.	100%
2006	74.9%	80.8%	95.2%	.	.	.
2007	78.6%	76.0%	94.5%	.	.	100%
2008	74.1%	78.6%	94.5%	.	.	100%
2009	70.6%	74.8%	93.3%	.	.	100%
2010	80.5%	75.5%	91.6%	.	.	100%
2011	81.0%	79.7%	95.0%	.	.	100%
2012	80.8%	.	95.4%	.	.	.
2013	81.9%	.	95.4%	.	.	100%
2014	80.9%	.	97.5%	.	.	.

Source: NMFS IFQ landings database sourced by AKFIN

2.5.3.2 Hired master use by catcher vessel QS holders

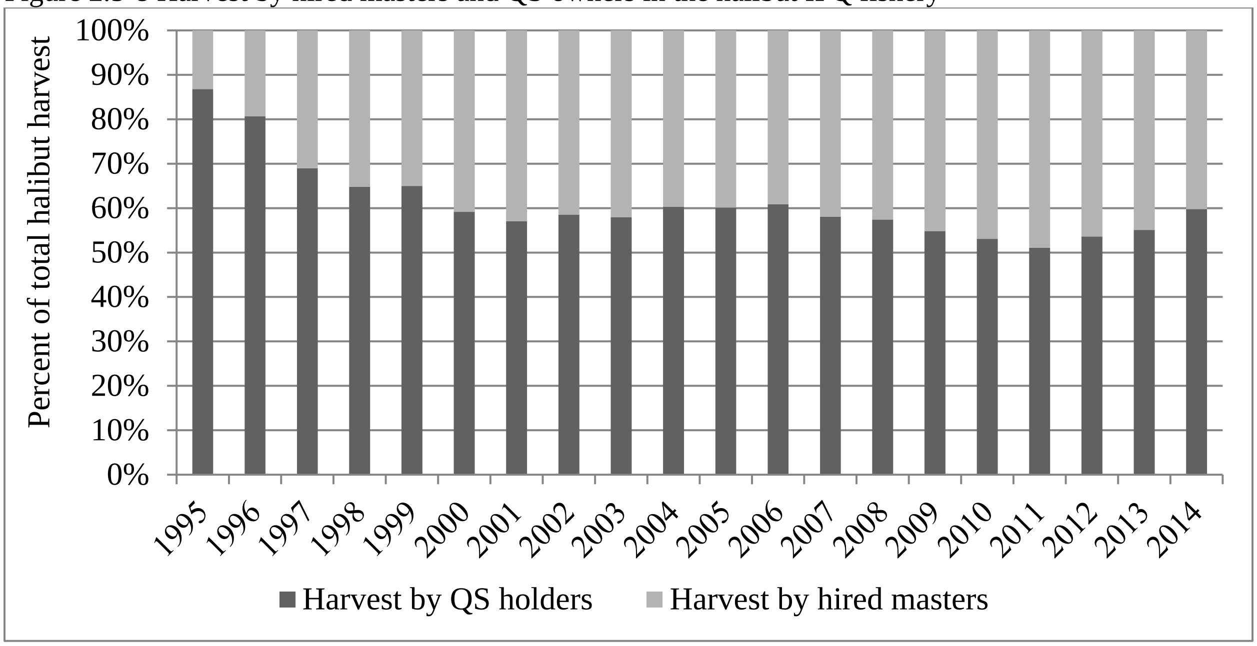
At the outset of the IFQ Program, the Council intended for catcher vessel QS to be held by owner-operators. However, the Council allowed initial QS recipients to use a hired master – a person designated by the shareholder to land that shareholder's IFQ – in order to provide these initial recipients with the flexibility to continue in the business practices that they had had prior to the implementation of the IFQ Program. Eligibility to use a hired master is tied to the shareholder and not the QS, so initial recipients could use a hired master on QS that they acquired over time. Non-individual entities have to use a hired master to land their IFQ, as is necessary for a non-individual entity to operate. In Southeast Alaska (halibut Area 2C and the Southeast Outside District of the sablefish fishery), the Council limited hired master use to non-individual entities that received an initial QS allocation in order to maintain what had historically been an owner-operated fleet in this area.

Over the 20 years of the IFQ Program, the hired master use provision has been amended several times to address regulatory loopholes. The Council's intent was that the shareholder using a hired master remains a vested participant in the IFQ fisheries, so the IFQ Program initially included a vessel ownership requirement for shareholders intending to use hired masters to land their IFQ. In 1999, the Council specified that shareholders must have at least a 20% ownership interest in the vessel upon which their IFQ is being fished. In 2002, an amendment to the program allowed shareholders to substitute indirect ownership of a vessel through corporate or other non-individual entity interest for all or part of direct vessel ownership by the shareholder for purposes of using a hired master to land that shareholder's IFQ. In 2007, an amendment to the program specified the formal, government-issued documents that shareholders must use to demonstrate the 20% vessel ownership interest requisite for using a hired master. In 2014, an amendment to the program added a 12-month requirement for the minimum 20% vessel ownership interest. Also in 2014, an amendment to the program was implemented prohibiting initial QS recipients from using a hired master to harvest IFQ derived from catcher vessel QS received by transfer after February 12, 2010. The 2014 amendments were in response to increasing evidence of overall reliance on hired masters by shareholders, many of whom had ownership interest in vessels only for the duration of the fishing trip during which their IFQ was being harvested.

As Szymkowiak and Felthoven (2016) note, the reliance on hired master use in the IFQ fisheries may indicate that shareholders expect to earn more from using hired masters now and potentially selling QS in the future than from selling the shares now and investing that money elsewhere. These decisions may also be driven by considerations such as capital gains taxes, insufficient knowledge of alternative investment opportunities, and personal circumstances (Szymkowiak and Felthoven, 2016). For hired masters, landing someone else's IFQ provides income, which can be used to subsidize fishing trips on which they are landing their own IFQ and to build up capital to buy their own shares. Average lease rates reported on the medical and beneficiary lease forms are 51% to 56% and self-reported hired master lease rates in the IFQ fisheries are 50% to 60% (see Section 2.4.1; Szymkowiak and Himes-Cornell, 2015). This means that hired masters earn 40% to 50% of the gross ex-vessel revenues, from which they have to deduct operating costs, crew shares, etc. Simple scatter plots of lease rates reported on beneficiary lease and medical lease forms over time indicate a positive relationship between lease rates and time, which is aligned with anecdotally reported trends in hired master lease rates at the IFQ crew workshop (Section 2.4.1). Although rising lease rates should reflect expectations about increasing marginal profitability, initial recipients may be able to subsidize lease costs with profits from freely-allocated QS and thus have a higher willingness to pay for leased IFQ. However, for hired masters who lease all or most of their IFQ such bidding up of IFQ may result in a profit squeeze as a percentage of their revenue is shifted to the shareholder (van Putten and Gardner, 2010).

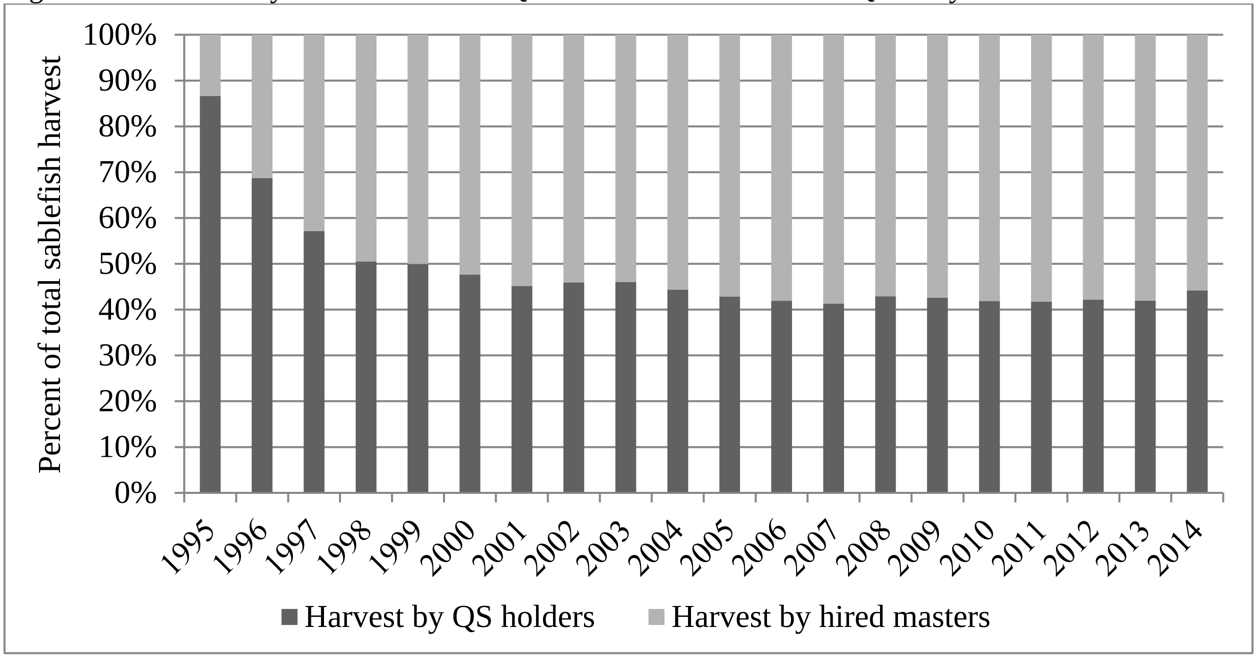
Figure 2.5-8 and Figure 2.5-9 show the percent of total catcher vessel harvest in the halibut and sablefish IFQ fisheries, respectively, by hired masters and QS owners. This includes catcher vessel QS holdings for both individuals and non-individual entities. Since the implementation of the IFQ Program, hired masters' harvests as a percentage of total harvest have increased substantially in both IFQ fisheries. Given the transfer of catcher vessel QS to individuals during this same time frame, the increasing use of hired masters can be attributed largely to individual initial recipients. Interestingly, in the halibut IFQ fishery hired master landings as a percent of total harvest has been decreasing over the last couple of years. Since the late 1990s, hired masters have accounted for the majority of landed IFQ for the catcher vessel fleet in the sablefish IFQ fishery. However, there was a slight uptick in harvest by QS owners in this fishery as well in 2014. The increasing harvest by QS owners in both fisheries in recent years may reflect the continuing transfer of catcher vessel QS to second-generation shareholders, who may not use hired masters, as well as anticipated implementation of the Sunset Provision.

Figure 2.5-8 Harvest by hired masters and QS owners in the halibut IFQ fishery



Source: NMFS IFQ landings database sourced by AKFIN

Figure 2.5-9 Harvest by hired masters and QS owners in the sablefish IFQ fishery



Source: NMFS IFQ landings database sourced by AKFIN

Table 2.5-11 and Table 2.5-12 show the breakdown of the percent of total catcher vessel harvest by hired masters by area for the halibut and sablefish IFQ fisheries, respectively. The use of hired masters for catcher vessel landings has increased across all of the IFQ regulatory areas in both fisheries. However, given the additional restriction on hired master use for catcher vessel IFQ landings in halibut Area 2C and the Southeast Outside District in the sablefish fishery, hired master landings as a percent of total catcher vessel landings in these areas have remained small relative to other regulatory areas.

Table 2.5-11 Percent of total area catcher vessel harvest by hired masters in the halibut IFQ fishery

Year	2C	3A	3B	4A	4B	4C	4D
1995	0.8%	14.3%	21.8%	35.4%	18.1%	29.1%	33.1%
1996	1.2%	19.9%	31.4%	40.3%	45.9%	29.7%	56.2%
1997	1.8%	31.1%	44.4%	50.6%	61.4%	29.4%	69.6%
1998	2.5%	35.0%	51.3%	52.6%	61.3%	57.9%	66.8%
1999	2.1%	33.3%	48.6%	51.4%	65.1%	38.7%	58.8%
2000	2.3%	35.7%	49.0%	51.2%	72.6%	76.1%	62.5%
2001	2.4%	37.0%	52.9%	58.0%	69.0%	82.1%	73.4%
2002	2.5%	34.9%	51.1%	54.2%	75.3%	84.9%	76.1%
2003	2.5%	35.4%	52.8%	57.3%	74.4%	81.0%	72.2%
2004	2.2%	37.1%	53.8%	57.1%	70.9%	78.6%	68.4%
2005	2.1%	39.2%	53.2%	52.6%	73.5%	95.7%	79.2%
2006	2.2%	39.7%	53.7%	52.7%	74.0%	75.4%	78.6%
2007	2.4%	42.4%	56.9%	48.2%	71.5%	84.7%	77.6%
2008	2.2%	39.6%	55.5%	52.0%	70.5%	96.0%	67.6%
2009	2.1%	42.9%	56.1%	50.1%	72.1%	95.1%	70.0%
2010	2.6%	43.9%	58.8%	52.1%	74.9%	89.3%	95.1%
2011	2.6%	43.1%	56.2%	51.6%	75.4%	96.3%	95.1%
2012	2.3%	43.7%	55.9%	49.1%	70.4%	90.2%	64.3%
2013	2.9%	45.2%	55.0%	50.8%	69.6%	81.7%	66.1%
2014	2.5%	42.7%	53.2%	48.5%	66.6%	74.5%	64.9%

Source: NMFS IFQ landings database sourced by AKFIN

Table 2.5-12 Percent of total area catcher vessel harvest by hired masters in the sablefish IFQ fishery

Year	AI	BS	CG	SE	WG	WY
1995	46.3%	27.9%	15.4%	5.9%	20.3%	7.6%
1996	60.8%	70.4%	41.6%	10.1%	46.3%	26.3%
1997	75.5%	72.3%	52.2%	12.4%	69.1%	44.2%
1998	67.4%	73.6%	62.3%	14.2%	74.3%	53.5%
1999	83.3%	81.4%	60.6%	16.0%	70.6%	53.2%
2000	80.8%	85.4%	64.6%	16.8%	71.2%	57.8%
2001	83.7%	70.7%	68.6%	17.2%	75.6%	57.7%
2002	80.9%	81.3%	65.6%	16.2%	73.9%	54.8%
2003	79.6%	60.7%	66.8%	15.6%	76.2%	53.9%
2004	76.0%	67.7%	67.6%	15.6%	80.8%	55.8%
2005	68.0%	60.9%	69.7%	15.6%	83.8%	62.5%
2006	74.5%	65.4%	71.7%	15.6%	84.0%	63.1%
2007	66.0%	69.0%	73.6%	16.1%	82.3%	64.2%
2008	74.7%	62.0%	73.9%	15.7%	78.6%	64.9%
2009	72.1%	65.9%	73.7%	15.1%	73.4%	66.6%
2010	79.3%	59.8%	74.3%	16.1%	75.4%	67.7%
2011	83.5%	65.7%	75.0%	15.9%	75.8%	67.6%
2012	69.2%	68.9%	74.6%	16.1%	74.6%	67.9%
2013	78.1%	59.8%	75.7%	16.4%	74.9%	67.6%
2014	66.7%	63.0%	72.8%	16.1%	71.8%	68.3%

Source: NMFS IFQ landings database sourced by AKFIN

Szymkowiak and Felthoven (2016) examined the shareholder characteristics that contribute to the decision to hire masters in the halibut IFQ fleet. The authors used a discrete choice model[48] to examine the probability of hired master use by individual initial recipients of catcher vessel QS in the halibut IFQ fishery from 2000 through 2013. They found that the probability of hired master use is a factor of the quantity and diversity of shareholdings and the residency of the shareholder. For example, according to their model when a shareholder's IFQ holdings increase by 25,000 pounds their odds of hired master use increases by 25.4%. According to their model, a shareholder, who has diversified their holdings portfolio into other vessel classes, increases their odds of hired master use by 1.8 times (or 80%). The switch to using a hired master associated with diversification into multiple vessel classes is likely associated with the regulatory restrictions on how different vessel class IFQ may be landed. If a shareholder owns QS in multiple vessel classes, they would likely be restricted in whether they can land their entire quota resulting from those shares on their own vessel (based on both length limitations associated with QS classes, as well as vessel IFQ caps). The odds of a shareholder using a hired master are 3.93 times (or 293%) greater when the shareholder moves out of Alaska, holding all the other variables constant.

Relevant literature indicates that one of the concerns about increased leasing in a catch share fishery is the different time horizon that lessees have than shareholders. Shareholders are expected to consider the long-term health of the fishery as the value of their QS is tied to that health. Lessees likely operate on a much shorter time horizon. Assuming that in many cases, acting as a hired master in the IFQ Program is functionally equivalent to leasing, concerns about the different time horizons may not be relevant in the IFQ fisheries, wherein the majority of hired masters are shareholders themselves. In 2012, of those hired masters hired to fish catcher vessel IFQ for non-individual entities, 52.1% and 58.3% in the halibut and sablefish fisheries, respectively, owned their own QS (NMFS, 2012). For the same year, of those hired masters hired to fish catcher vessel IFQ for individuals, 70% and 73% held their own QS in the halibut and sablefish fisheries, respectively (ibid.). The other considerations with respect to timing-related issues such as safety (see Section 2.5.2), however, may still be a greater concern with increasing hired master use. (Although Section 2.8 Fishing Vessel Safety does not specifically address this concern, examining differentiated safety choices between hired masters and shareholders may be an interesting analysis for further research.)

Summary

The original objective of the IFQ Program was to ensure that the IFQ fisheries were dominated by owner-operator operations. Although this objective was not specific to a certain vessel class, the Council has constrained its owner-operator requirements to the catcher vessel fleet. Therefore, this section largely focuses on leasing and hired master use in the catcher vessel fleet, although information on Class A IFQ leasing and hired master use was also presented.

Overall Class A IFQ leasing rates have decreased in the IFQ fisheries over the last 20 years, despite a transfer of Class A QS to non-individual entities during the same time period. At the same time, hired master use by Class A QS holders has increased. Class A QS holders may be choosing to engage in informal leasing arrangements with hired masters in order to avoid paperwork requirements for formal leasing arrangements with NMFS.

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[48] The authors applied a fixed effects logit model for panel data (also known as a conditional logistic regression for matched case-control groups). The model has an implicit assumption that the shareholder's decision to use a hired master or not for each unique vessel class and area combination of holdings is dependent upon their previous decision to use a hired master or not for that particular combination. However, the authors did not allow for cross-type fixed-effects in the model because the regulatory framework in the fishery, which restricts how QS may be landed, necessitates that for each area and vessel class combination of QS designations, the shareholder has to make an independent decision on how their IFQ should be harvested.

Despite a continued transfer of catcher vessel QS to individuals from non-individual entities, formal leasing of, and hired master use for, catcher vessel IFQ have increased over the course of the IFQ Program. Although total leasing of catcher vessel IFQ under the beneficiary, medical, CQE, and GAF transfer provisions comprises a small percentage of the TACs in both IFQ fisheries – about 4.3% and 2% in 2015 in the halibut and sablefish fisheries, respectively, these percentages have been increasing over the last 15 years. From 1995 to 2014, hired master use increased from 13% to 40% of the TACs in the halibut IFQ fishery and from 13% to 55% of the TACs in the sablefish IFQ fishery. Furthermore, there is some indication of increasing lease rates (or the percentage of the ex-vessel revenue that the QS holder receives) over time. Although lease rates should reflect earnings expectations in the IFQ fisheries, rising lease rates may also be a factor of initial recipients' higher willingness to pay for leasing IFQ because they are also fishing for IFQ derived from freely allocated initial QS. Thus, there may be a profit squeeze for those participating in the lease market strictly or mostly as lessees.

Relevant literature indicates that catch share and limited entry programs can create formidable incentives for privilege holders to lease their privileges, generating income in absentia and avoiding the overall risks of physically participating in the fisheries (Szymkowiak and Himes-Cornell, 2016). In the IFQ fisheries, even as QS is transferred to second-generation shareholders who are mandated to be on-board during the harvest of their IFQ, there is anecdotal information that some of these second-generation shareholders are coming on board as "walk-ons" or "ride-ons", who do not participate in the actual fishing activity (Van der Voo, 2013; Szymkowiak and Himes-Cornell, 2015). Because the IFQ Program tied the hired master use privilege to the initial catcher vessel QS holder and not the initially allocated catcher vessel QS, some initial recipients may have built business models on the basis of utilizing hired masters to land their IFQ. The hired master provision implemented in 2014 prevents such initial recipients from acquiring additional catcher vessel QS for the purpose of utilizing a hired master to land the resultant IFQ. Nevertheless, there will likely continue to be a lag in transfer of catcher vessel QS to second-generation, owner-on-board shareholders, because initial catcher vessel QS recipients can still use hired masters to land their IFQ from QS transferred prior to 2010.

It is in the purview of the Council to decide whether the IFQ Program is meeting its owner-operator objective. However, the Council's repeated amendments to the hired master privilege to address regulatory loopholes and most recently to prohibit the use of hired masters for QS transferred after February 2010 provide some indication that the Council has previously been concerned about the program's capacity to meet this objective. This review also points to repeated use of the medical lease provision for catcher vessel IFQ by a limited number of QS holders in the fisheries.

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2.6 ENTRY OPPORTUNITIES

This section examines entry opportunities into the IFQ fisheries, how these opportunities may have changed with the implementation of the IFQ Program and over the last 20 years of IFQ management. Providing entry opportunities for new participants is implicit to many of the objectives of the IFQ Program (e.g., owner-operator characteristic of the fleet, limiting consolidation, maintaining fleet diversity). In addition, analysts for the original EIS for the IFQ Program recognized that initial allocations could result in inter-generational equity issues as the benefits of program implementation, with respect to economic rent[49] accrual, flow largely to initial recipients.

This section focuses on entry into the halibut and sablefish fisheries before and after the IFQ Program was implemented. It explores the differentiated accessibility and acquisition of QS in the IFQ fisheries for initial recipients and second-generation shareholders (i.e., non-initial recipients) in the program. The IFQ Program includes many specific elements, such as the block program and limitations on IFQ use specifically intended to address active participation and allow for entry into the fisheries. This section examines the impacts of these provisions on entry to the degree that such links can be made.

This section includes information on QS ownership trends for initial recipients and second-generation shareholders (new entrants) throughout the course of the program, including QS holdings, rates of new entry, average QS holdings, and age distribution of QS holders. This section also includes information on the acquisition of halibut and sablefish QS and the loan programs available for financing fishing investments. Given the unique characteristics and regulations set up for the IFQ Program in Southeast Alaska, an additional section highlights access into this differentiated market. A final section summarizes the entry opportunity information presented. While this section of the document provides a large wealth of material on entry into the halibut and sablefish IFQ fisheries and changes in the program over time, the summary sub-section suggests future methods, outside of the scope of this review, that could be employed with available data to bring even more clarity to this topic.

Data

This section utilizes data provided by AKFIN on the count of new entrants, QS holdings data by initial recipients and second-generation QS holders, and blocked and sweepable QS. Data on the age distributions of initial recipients and new entrants as well as QS transfer data was provided by NMFS RAM Division. This section also provides a qualitative narrative of changes in entry opportunities based on anecdotal information collected during the IFQ crew workshop and in personal communications with IFQ participants (see Section 2.4.1).

2.6.1 Entry prior to the IFQ Program

Prior the implementation of the IFQ Program, entry into the halibut and sablefish fisheries was determined with respect to vessel and permit ownership. In other words, vessel and permit ownership were the factors that differentiated labor (crewmembers) and investors or business owners in the fisheries. A Federal Fisheries Permit from NMFS was (and is still) required for participation in the sablefish fishery and a commercial halibut vessel license from the IPHC was required for participation in the halibut fishery. Beginning in 1997 the IPHC stopped issuing commercial halibut vessel licenses (62 FR 12759). These pre-IFQ permits/licenses were not limited in any way, and were therefore readily accessible to

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[49] Economic rent is any payment to a factor of production in excess of the cost needed to bring that factor into production. Economic rent arises from conditions of scarcity and is above normal profit.

potential participants. During the pre-IFQ management regime, the big capital expenditure, and therefore the limiting factor to entry, was vessel ownership.

Crewmembers could become vessel owners in the pre-IFQ halibut and sablefish fisheries by acquiring sufficient capital from earnings in the fisheries (and elsewhere) to become a partner in or full owner of a vessel. Crew compensation in the halibut and sablefish fisheries has always been on a share basis, wherein expenses are deducted from gross earnings and the vessel owner, captain, and crew receive percentages of the remaining revenue. This is described in more detail under Section 2.4.1.

Unlike Alaska's other federally managed fisheries, entry into the pre-IFQ fisheries, especially halibut, was never highly capital-intensive. In many parts of Alaska, halibut can be accessed from near shore waters with relatively limited gear. During the pre-IFQ days, fishermen converted their boats for brief halibut and sablefish openers especially during poor crab and salmon fishing seasons (Pautzke and Oliver, 1997).

2.6.2 Entry in the post-IFQ fisheries

When implementing the IFQ Program, the Council wanted to provide for the dominance of owner/operator operations in the fisheries. Therefore, they restricted the acquisition of catcher vessel QS to initial catcher vessel QS recipients and individuals that could demonstrate 150 days of experience as part of a harvesting crew in any U.S. commercial fishery. In order to be eligible to receive catcher vessel QS by transfer in the IFQ fisheries, these new entrant individuals must possess a transfer eligibility certificate (TEC), which is issued by NMFS-RAM. Beginning on December 1, 2014, the acquisition of catcher vessel QS is limited to individuals only (79 FR 43679). The acquisition of catcher-processor (Class A) shares is not restricted by entity type, (i.e. individuals versus corporate entities), except that the entity must be able to demonstrate U.S. citizenship.

The Council included several provisions and amendments in the IFQ Program to facilitate entry.[50] Some elements of the program were more directly intended to allow for entry possibilities, while other elements indirectly facilitate entry by focusing on limiting consolidation, and encouraging an owner-on-board fishery that could allow for QS turn-over when participants were unable or not interested in continuing to fish. For instance:

- The block program was intended to constrain QS transferability and consolidation so as to preserve the availability of small amounts of QS in the fishery for part-time fishers and new entrants (Hartley and Fina, 2001). This element was intended to be directly focused on new entry opportunities and is discussed in more detail in sub-section 2.6.2.1 below.
- The "fish down" provision was intended to provide a larger pool of quota from which the smaller vessel owners could buy and use QS, which could facilitate entry if new entrants buy into the smaller vessel classes. (See Section 2.3.5).
- The Council also included individual QS holding and vessel use caps to limit consolidation, which could increase the availability of QS for new entrants. (See Section 2.3.6)
- Provisions in the IFQ Program that focus on creating an owner-operator catcher vessel fleet (i.e., prohibition on leasing, limited use of hired masters), may indirectly allow for entry opportunities by encouraging QS holders to sell the QS when they are no longer interested or

[50] These elements are all highlighted in greater detail in Section 1.2.

able to continue participating in the fishery. These elements, and other perspectives on the potential impacts, are discussed in greater detail in Section 2.5.

- Congress mandated that a portion of IFQ Program cost recovery fees support a loan program to address the needs of entry level and small boat fishermen (Pautzke and Oliver, 1997). Details and usage of the NMFS Fisheries Finance Program are described in Section 2.6.6.1 below.

In the post-IFQ halibut and sablefish fisheries, the chief limiting factor for entry has become QS acquisition. Herein, entry is understood to mean the acquisition of QS by non-initial recipients of QS. [51] Arguably to be an independent operator, a participant in the IFQ fisheries needs QS, a vessel, and a Federal Fisheries Permit. However, the direct investment to enter the IFQ fisheries is purchase of halibut and/or sablefish QS. QS holders can bring their IFQ onto other's vessels, and Section 2.4.1 explores the increasing utilization of these kinds of relationships in the IFQ fisheries.

There is some diversity in the ways an individual can move through the ranks to become invested in the IFQ fisheries. Sometimes, if an individual has access to start-up capital and at least 150 days of experience as crew in any U.S. fisheries, they may enter the fishery directly with an investment in halibut or sablefish QS. Particularly given owner-on-board requirements for non-initial QS holders, often an individual will have some level of halibut and/or sablefish fishing involvement prior to the purchase of QS. The individual may work their way as a crew member up to a skipper (master). They may or may not have equity in a vessel to add collateral to their purchase of QS. According to the participants of the crew workshop, initial recipients of QS and vessel owners would sometimes co-sign loans with crew or their children to help collateralize the QS purchase by new entrants.

Since the IFQ fisheries were overcapitalized at the time of IFQ implementation, entry into the halibut and sablefish fisheries post-IFQ was expected to be reduced relative to pre-IFQ management. Indeed, one of the objectives of the IFQ Program was to reduce overcapitalization in the halibut and sablefish fisheries (Section 2.3.6).

When QS is allocated at no cost on the basis of historical fishery participation, individual transferable quota programs lead to differentiated accessibility for initial recipients and new entrants. Economic theory suggests that any economic rent accrued in a fishery due to the implementation of a catch share program is capitalized in the sales price of the QS paid to the seller. This is the payment in excess of the normal profit which arises from the scarcity value of the resource. The individual buying the QS will thus only earn normal economic returns associated with a comparably risky investment (Szymkowiak and Felthoven, 2016). That is, many of the distributional consequences of an IFQ Program are decided at initial QS allocation and cannot easily be undone.

The economic incentives for buying QS are net of the opportunity costs of both the foregone income that the individual could have expected to earn from alternative work and the foregone returns they could have expected to earn from alternative investments. Because QS holders valuations of their QS change due to changes in earnings expectations and opportunity costs, transfers are likely to continue throughout the duration of an individual transferable quota managed fishery (Knapp, 2011). As shareholders age, their valuations may decline because they find fishing more difficult, while younger people's valuations may increase as they acquire crewing experience and financial capital (ibid.).

[51] Entry could also be defined as the acquisition of QS in a different IFQ regulatory area than that of initial allocation; however, for the purposes of this review, this kind of QS acquisition is characterized as a type of diversification and is assessed under Section 2.3.6.

Researchers have studied entry into the halibut and sablefish IFQ fisheries. Carothers, Lew, and Sepez (2010) used the first five years of QS transfer transactions in the halibut IFQ fishery to look at the probability of buying and selling QS as a factor of the individual's characteristics, including residency. They found that residents of small, remote fishing communities were more likely to sell than buy QS, as were residents of Alaska Native villages. Carothers (2013) conducted a survey of halibut QS holders showing that older individuals, individuals who make less money, and indigenous fishermen are more likely to sell QS and less likely to buy QS. On the other hand, women and those who are primarily employed in fishing are more likely to be buyers of QS rather than sellers (Carothers, 2013). As the author points out, the increased likelihood of women purchasing QS may be associated with family businesses seeking to consolidate more QS than can be held by the husband alone rather than an actual increase in female participants in the harvest of IFQ fisheries. In effect, the women may be proxy QS holders. The author does not differentiate whether the surveyed QS holders purchased catcher-processor or catcher-vessel QS. If the QS is catcher-vessel QS and the female QS holder was an initial recipient, her husband may land her IFQ as a hired master. If the QS is catcher vessel QS and the female is a new entrant, she must be on board during the harvest of her IFQ. If the QS is catcher-processor QS, there are no leasing restrictions.

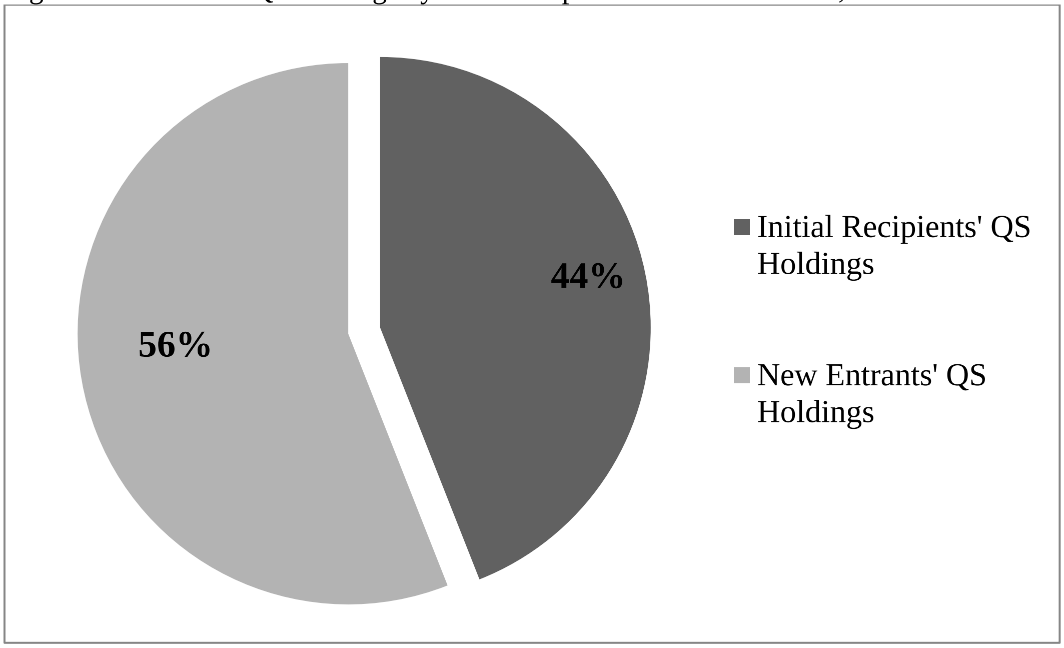
2.6.2.1 **Trends for initial QS recipients and new entrants**

2.6.2.1.1 QS holdings by new entrants and initial QS recipients

The acquisition of QS is fundamentally different for initial recipients and new entrant QS holders. Whereas initial recipients receive initially allocated QS gratis, new entrant shareholders have to purchase all of their QS. Initial recipients may utilize their initially allocated QS as collateral for loans, or subsidize the purchase of additional QS through revenues generated from harvest of IFQ derived from initially allocated QS. This can exacerbate inter-generational equity-in-access issues, given that new entrant shareholders compete for QS in a market with initial recipients.

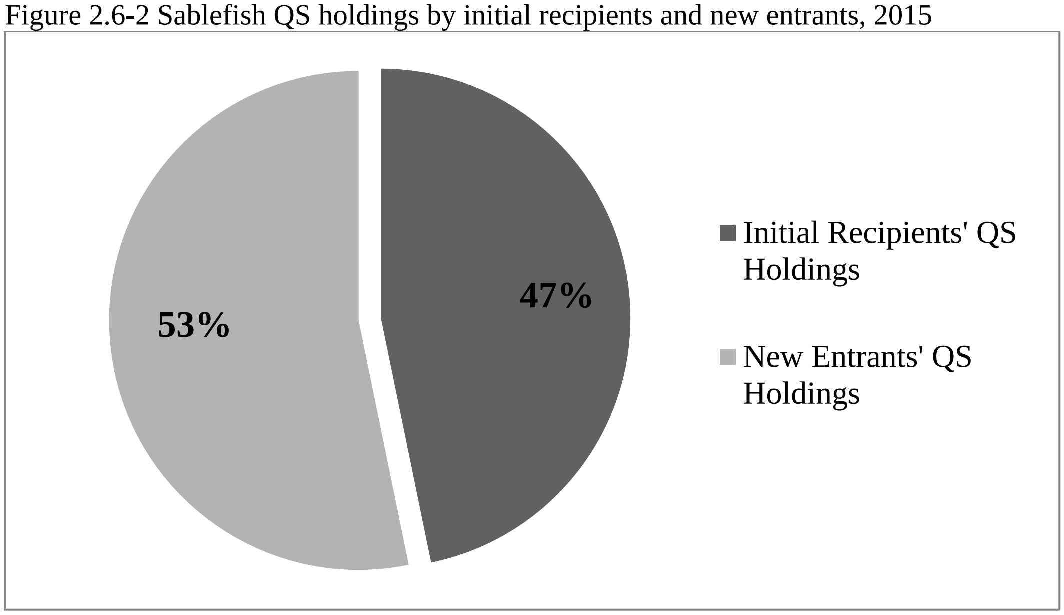
Figure 2.6-1 and Figure 2.6-2 show halibut and sablefish QS holdings, respectively, by initial recipients and new entrants in 2015. These holdings are aggregated across all IFQ regulatory areas for both fisheries. The portion of total QS holdings by generation for both fisheries from 1995 through 2015 is provided in Figures A.2.6.1.1 and A.2.6.1.2 in the Appendix to this section. The area-specific breakdown for QS holdings by generation from 1995 through 2015 is provided in Tables A.2.6.1.1 and A.2.6.1.2 in the Appendix. As one would expect, total QS units held by new entrants have been increasing annually in both fisheries since the inception of the IFQ Program. Within the first year of the program, 10% of the halibut QS and 5% of the sablefish QS had transferred to new entrants. Since 2009 and 2010 in the halibut and sablefish fisheries, respectively, new entrants have been the majority shareholders. New entrants hold slightly more QS in the halibut fishery than in the sablefish fishery, which is aligned with expectations given the greater capital needs of the latter.

Figure 2.6-1 Halibut QS holdings by initial recipients and new entrants, 2015



Source: NMFS IFQ QS holdings database sourced by AKFIN

Figure 2.6-2 Sablefish QS holdings by initial recipients and new entrants, 2015



Source: NMFS IFQ QS holdings database sourced by AKFIN

The analysts examined potential methods to determine the amount of QS that has been continually held by initial recipients and, therefore, not available for transfer to new entrants since implementation of the IFQ Program. The analysts determined that it is not possible to precisely track initially issued QS units since implementation of the IFQ Program to conclusively determine if the same units are still held by the initial recipient or have been transferred to another QS holder. While NMFS has tracked the holdings of each QS holder since implementation of the program by species, area, and vessel class, the unique identifier for initially issued QS units (serial numbers) cannot be tracked throughout the duration of the program. The serial numbers cannot be tracked because specific elements of the IFQ Program, such as the sweep up provision, and other NMFS' administrative and data programming needs sometimes required serial numbers be changed. Because QS serial numbers have changed since program implementation, it is not possible to track transfers of specific QS units to and from initial recipients. Therefore, if an initial recipient received QS by transfer that had an identical species, area, and vessel class designation to QS they received initially, it is not possible to determine which of the total QS holdings are the initially issued portion and what portion is the amount received by transfer without physically reviewing transfer documents. This is particularly true if the initial recipient transferred any of their QS holdings to another person or has done many transfers (in or out).

Given these data limitations, the analysts developed a methodology to estimate the amount of initially allocated QS held continually by initial recipients, who are still in the IFQ Program, with the available data. The analysts examined the QS transfer history of initial recipients to determine first, if any QS transfers had occurred (either received in or transferred out) by the initial recipient. Then the analysts looked for transfers by initial recipients of QS where the species, area, and vessel class combinations were the same as that initially allocated to the QS holder. We eliminated any QS holder who transferred any QS out of this same species, area, and vessel class combination. This provided a set of initial recipient QS holders, who have not undertaken any transfers out in the QS category for which they had received initial QS allocations. We then pulled the initially-allocated QS holdings for these particular QS holders. This provides an estimate of the total amount of QS continually held by initial recipients (who are still in the program as of the end of 2015) and not available for transfer to new entrants since implementation of the IFQ Program

Table 2.6-1 shows the estimated amount of initially allocated QS that was still held by the same initial recipients in 2015 using this methodology. The data in Table 2.6-1 show that initial recipients still hold 23% and 29% of their initially allocated QS in the halibut and sablefish IFQ fisheries, respectively. In other words, these are the estimated percentages of the total QS pools in each fishery that have not been transferred at all since IFQ Program implementation.

Table 2.6-1 Initially allocated QS held by initial recipients in 2015

	Initially Allocated QS Held by Initial Recipients	Total QS	Percent of Total QS that is Initially Allocated QS held by Initial Recipients
Halibut	77,629,446	331,417,106	23%
Sablefish	93,299,748	317,801,022	29%

Source: NMFS IFQ QS holdings database sourced by AKFIN

Table 2.6-2 shows the estimated initially allocated QS held by the same initial recipients in 2015 by halibut IFQ area. Initially allocated QS still held by the same initial recipients comprises the smallest percentage of total QS holdings in Area 2C and the largest percentages in Area 4B and 4D. The lower percentage in Area 2C may reflect regulatory constraints on IFQ participants in the area, including a prohibition on the use of hired masters by individuals and a prohibition on the acquisition of catcher vessel QS by non-individual entities. In addition, Area 2C is subject to more constraining individual and vessel use caps and the general prohibition of fishing down of QS except for small amounts of IFQ. Given that these additional restrictions would have constrained consolidation and the way in which QS holders could conduct their fishing business, there may have been a disincentive for initial QS holders to retain their QS in this area.

Table 2.6-2 Initially allocated QS held by initial recipients by halibut IFQ area in 2015

	2C	3A	3B	4A	4B	4C	4D
Initially Allocated QS Held by Initial Recipients	11,096,010	43,301,603	14,830,364	3,244,196	2,617,951	946,678	1,592,644
Total QS	59,477,396	184,893,008	54,201,315	14,586,011	9,284,774	4,016,352	4,958,250
Percent of Total QS that is Initially Allocated QS held by Initial Recipients	19%	23%	27%	22%	28%	24%	32%

Source: NMFS IFQ QS holdings database sourced by AKFIN

Table 2.6-3 shows the estimated initially allocated QS held by the same initial recipients in 2015 by sablefish IFQ area. The data reveal very different trends to the halibut IFQ fishery with respect to the percentage of area QS that was initially allocated QS held by the same initial recipients in 2015. Initial recipients' initially allocated QS comprised the smallest percentage of the total QS pool in the Aleutian Islands and Bering Sea areas, and the largest percentage in the Southeast and Western Yakutat areas. The additional regulatory constraints in the Southeast area are the same as those listed above for halibut Area 2C, so it is interesting to note that initial recipients in this area have retained more of their initially allocated sablefish QS relative to initial recipients of halibut QS. The transfer of initially allocated QS by QS recipients in the Aleutian Islands and Bering Sea areas may be associated with the difficulties of harvesting sablefish in those areas, subject to extreme marine weather on distant fishing grounds. These conditions may have provided initial recipients in these areas an incentive to sell their QS.

Table 2.6-3 Initially allocated QS held by initial recipients by sablefish IFQ area in 2015

	AI	BS	CG	SE	WG	WY
Initially Allocated QS Still Held by Initial Recipients	2,439,090	1,847,142	31,896,425	22,300,662	11,777,877	23,038,552
Total QS	31,932,492	18,765,280	111,686,622	66,120,619	36,029,579	53,266,430
Percent of Total QS that is Initially Allocated QS still held by Initial Recipients	8%	10%	29%	34%	33%	43%

Source: NMFS IFQ QS holdings database sourced by AKFIN

2.6.2.1.2 Rate of new entry

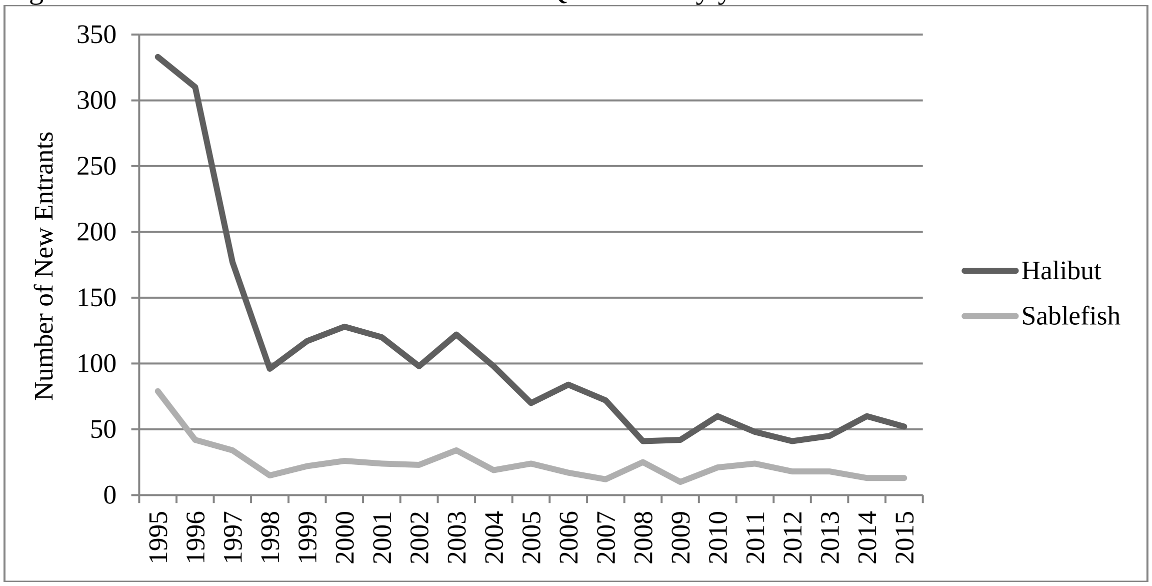
Barriers to entry into the IFQ fisheries have changed over the 20 years of the IFQ Program. According to participants of the IFQ crew workshop (see Section 2.4.1), at the start of the IFQ Program some vessel owners helped their crewmembers buy QS by co-signing for loans. The QS was relatively more affordable and the vessel owners had an incentive to have more IFQ on their boats. Many of the crewmembers that were helped in this way eventually purchased their own vessels and became fully independent owner-operators.

Over the last decade decreasing TACs, rising QS prices, and rising operating costs have likely made entry more difficult into the IFQ fisheries. A 2009 NMFS survey of current halibut QS holders indicated that the vast majority of existent QS holders were either unsure or did not have any intention of purchasing QS in the future, citing an inability to afford QS, concerns about TACs, and concerns about charter halibut catches (Kotlarov 2015). In the face of uncertainty about the health of the resource and rising QS prices, some lenders have increased the restrictiveness of loan conditions (Earl Bennett, personal communication, April 13, 2016). Whereas existent QS holders can use their current QS as collateral for loans, new entrants need to be able to provide other types of collateral, including vessels, permits in other fisheries, homes, etc. This is explored more in Section 2.6.3 below.

According to participants of the crew workshop, many new entrants interested in transitioning into the IFQ fisheries now have to start by participating in other fisheries (e.g., Alaska's State fisheries), building up the capital to buy halibut and/or sablefish QS through revenues generated in the State fisheries. Crew workshop participants also noted that increasingly regulations and external costs are mitigating entry, including observer fees or electronic monitoring costs, Coast Guard safety regulations and the equipment necessary to comply with those regulations, management cost recovery payments, and changing management regimes in other fisheries that would affect the IFQ fisheries (e.g., charter sector allocations, bycatch).

The trends in the count of new entrants over the last 20 years of the IFQ Program substantiates these anecdotal claims of decreasing entry in the halibut and sablefish IFQ fisheries (Figure 2.6-3). Rates of new entry have decreased since a peak in the first several years of the IFQ Program, with an average of 49 halibut new entrants and 17 sablefish new entrants from 2011 to 2015 compared to an average of 207 and 38 new entrants in these fisheries, respectively, in the first five years of the IFQ Program. Since program implementation, there have been about 2,214 new entrants into the halibut IFQ fishery and 513 new entrants into the sablefish IFQ fishery. The differentiated entry rates for these two fisheries are likely due to the substantially greater capital investment needs of the sablefish IFQ fishery.

Figure 2.6-3 Count of new entrants into the IFQ fisheries by year



Source: NMFS IFQ QS holdings database sourced by AKFIN

Table 2.6-4 and Table 2.6-5 show the count of new entrants in the halibut and sablefish IFQ fisheries by area from 1995 to 2015. Similarly to the aggregate count of new entrants by fishery (Figure 2.6-3), for most of the IFQ areas in both fisheries, the count of new entrants peaked in the first several years of the IFQ Program and has continued to decrease since then. As one might expect, the highest numbers of new entrants have been in the areas with the greatest accessibility to near-shore fishing grounds and the population centers of Alaska (Areas 2C, 3A and 3B for halibut and SE and CG for sablefish).

Table 2.6-4 Count of new entrants into the halibut IFQ fishery by area

Year	2C	3A	3B	4A	4B	4C	4D
1995	151	178	44	22	3	2	2
1996	112	161	49	33	4	4	3
1997	59	91	23	21	5	2	2
1998	45	43	15	6	2		2
1999	42	49	24	9	2	2	1
2000	57	50	11	10	12	4	2
2001	43	55	15	5	6		1
2002	42	42	13	5	5	1	1
2003	47	55	18	6	5	1	2
2004	34	51	8	7	6	1	1
2005	28	26	8	7	5	3	1
2006	29	39	12	6	2		
2007	25	28	13	8	3		2
2008	12	20	3	3	6	3	
2009	12	20	6	3	3	2	1
2010	22	30	6	5			
2011	10	27	7	5	4	3	2
2012	15	18	2	6	4	1	
2013	17	22	8	1	2	1	1
2014	21	30	9	4	2	1	1
2015	16	23	16	2	2	1	2

Source: NMFS IFQ QS holdings database sourced by AKFIN

Table 2.6-5 Count of new entrants into the sablefish IFQ fishery by area

Year	AI	BS	CG	SE	WG	WY
1995	6	4	25	55	7	25
1996	3	2	16	24	5	12
1997	3	2	15	13	4	7
1998	3	3	8	5	3	6
1999	1	2	6	15	3	7
2000	2	4	11	10	4	8
2001	1	3	12	4	5	8
2002	4	4	5	10	5	4
2003	2	11	7	14	4	4
2004	3	1	7	5	2	2
2005	3	5	5	11	3	5
2006	3	1	7	5	3	2
2007	1	1	7	6	1	3
2008	2	2	5	12	4	5
2009	2	1	3	4	1	2
2010		2	10	8	8	3
2011	3	5	5	7	4	6
2012	4	2	5	6	5	4
2013	3	2	7	3	5	1
2014	1	1	7	5	1	
2015	1		5	6	1	2

Source: NMFS IFQ QS holdings database sourced by AKFIN

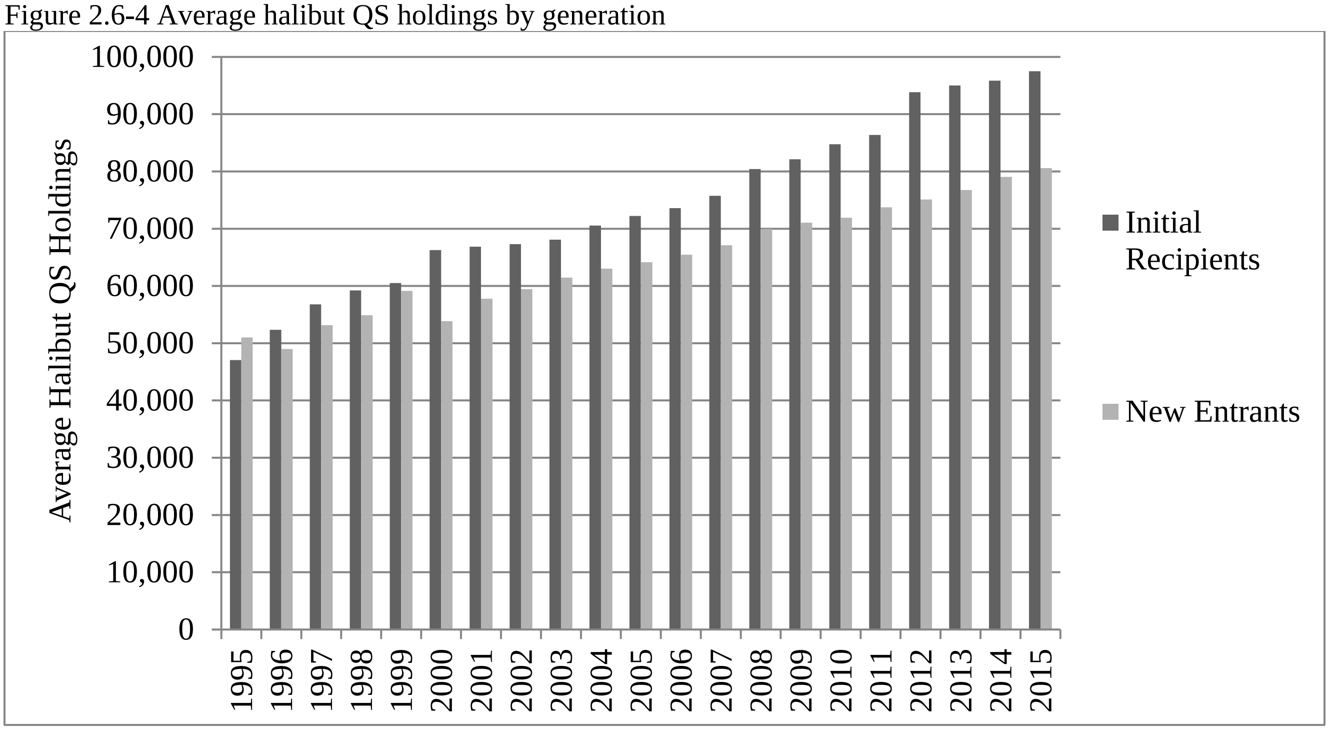
2.6.2.1.3 Average holdings of new entrants

The acquisition of halibut and/or sablefish QS is also a diversification strategy for new entrant shareholders in the IFQ fisheries. That is, some new entrants acquire halibut and/or sablefish QS as a means of diversifying their fishing portfolios, which are dominated by other species (e.g., salmon). For the most part, these new entrants cannot afford large amounts of QS, which over the 20 years of the IFQ Program have grown tremendously in value, but may accrue small chunks of QS over time. According to participants of the IFQ crew workshop, acquisition of QS is also an important bargaining tool for crewmembers, who can then contribute to the IFQ holdings on their vessels.

Figure 2.6-4 and Figure 2.6-5 show average halibut and sablefish QS holdings, respectively, by initial recipients and new entrants. These figures reveal continued consolidation of QS for both types of QS holders through increases in average QS holdings over time. However, new entrants continue to hold less QS on average than initial recipients. In the halibut fishery, the gap in average QS holdings between initial recipients and new entrants has increased over the 20 years of the IFQ Program. In the sablefish fishery, this gap has actually decreased. However, in the sablefish fishery, new entrants' average QS holdings continue to be a smaller percentage of initial recipients' average QS holdings (64% in 2015) than in the halibut fishery (83% in 2015), likely due to the greater capital investment needs of the sablefish IFQ fishery. Initial recipients would have greater success at consolidating QS than new entrants, as a result of the factors previously described with respect to utilizing initially allocated QS as collateral and to generate revenue to buy more QS, but also simply as a factor of time. Initial recipients have had more time to acquire additional QS in both fisheries.

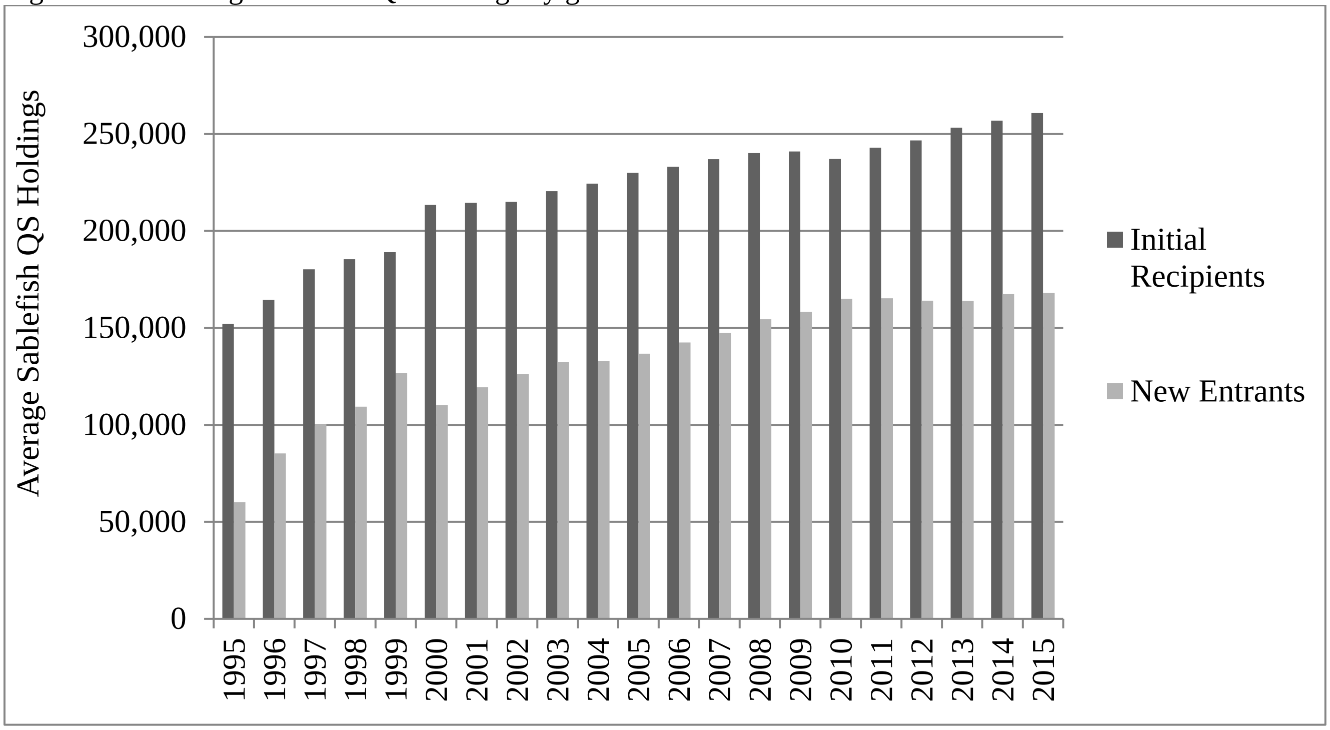
Figure 2.6-4 and Figure 2.6-5 demonstrate that *on average* initial recipients hold more QS for the halibut and sablefish fisheries than new entrants, in contrast to Figure 2.6-1 and Figure 2.6-2, which demonstrate that *overall* the majority of the QS units in both fisheries are held by new entrants. These figures combined illustrate that new entrants (compared to initial recipients) are each holding fewer QS units on average, but this amount totals more than the holdings of the initial recipients.

Figure 2.6-4 Average halibut QS holdings by generation



Source: NMFS IFQ QS holdings data sourced by AKFIN

Figure 2.6-5 Average sablefish QS holdings by generation



Source: NMFS IFQ QS holdings data sourced by AKFIN

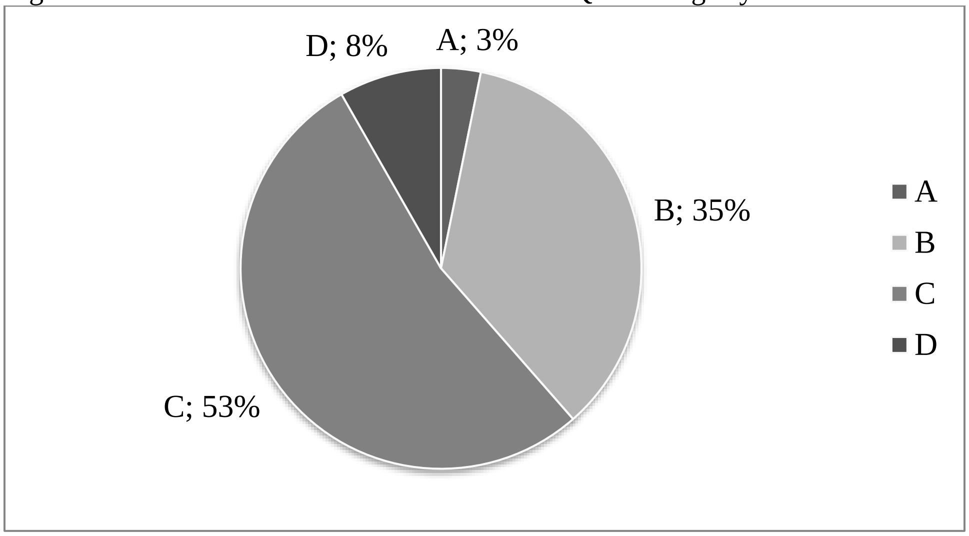
2.6.2.1.4 New entrant holdings by vessel class

Figure 2.6-6 shows the distributions of QS holdings by vessel class for new entrants in the halibut IFQ fishery across all IFQ regulatory areas in 2015. Class B and C QS make up the majority of new entrants' QS holdings in the halibut fishery. These trends are consistent across the 20 years of the IFQ Program. However, in Areas 3B, 4A, 4B, and 4D, new entrants' QS holdings are dominated by Class B QS. In Area 4C, the distribution of new entrants' QS is relatively more even across the three catcher vessel QS classes (B = 32%; C = 27%; and D = 40%).

These area-specific distributions of QS holdings by vessel class for new entrants align with QS distributions by vessel class for each area, likely reflecting the availability of QS on the market. In other words, in Areas 2C and 3A the majority of QS is designated as Class C, while in Area 3B, 4A, 4B, and 4D the majority of QS is designated as Class B. (See Section 2.3.6 for a breakdown of area QS by vessel class). In Area 4C the QS is more evenly distributed across the three catcher vessel QS classes. As noted in Section 2.5, Class A QS makes up a very small percentage of total QS units in the halibut fishery, about 2% to 8% for any given area. As with all other trends in the IFQ fisheries, Areas 2C, 3A, and 3B are the drivers of trends for the whole halibut IFQ fishery because they represent the vast majority of total QS holdings.

The distribution of QS holdings by vessel class for new entrants may also be due to the different harvesting use privileges associated with the various types of QS. In most of the IFQ regulatory areas, the larger vessel class QS actually has fewer restrictions on the vessel size that can be used to harvest the resultant IFQ due to the fish down provision (discussed in more detail in Section 2.3.6). This greater flexibility would provide meaningful incentives for new entrants to purchase larger vessel class QS.

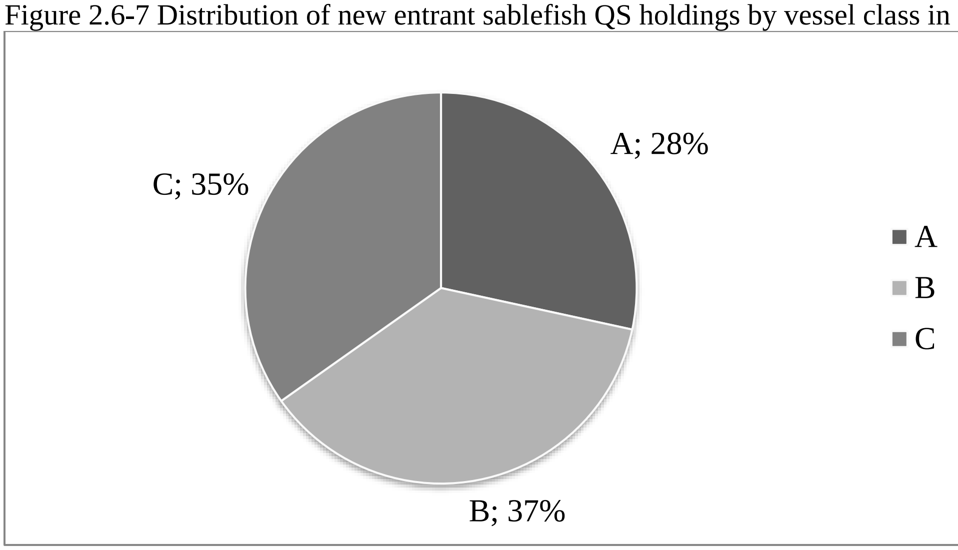
Figure 2.6-6 Distribution of new entrant halibut QS holdings by vessel class in 2015



Source: NMFS IFQ QS holdings data sourced by AKFIN

Figure 2.6-7 shows the distributions of QS holdings by vessel class for new entrants in the sablefish IFQ fishery across all IFQ regulatory areas in 2015. The distribution of new entrants' QS by vessel class is fairly more even across the three types of QS than in the halibut fishery. Again, this is aligned with overall QS distribution across the three vessel classes for the sablefish IFQ fishery. The sablefish IFQ fishery has historically included more large vessels with freezing capacity than the halibut IFQ fishery.

Figure 2.6-7 Distribution of new entrant sablefish QS holdings by vessel class in 2015



Source: NMFS IFQ QS holdings data sourced by AKFIN

2.6.2.1.5 Age distribution of QS holders

Information about an individual's age is considered personally identifiable information, which on its own or in combination with other information can be used to identify an individual. This information is considered highly sensitive and is thus presented below aggregated across all IFQ regulatory areas and

QS categories for both IFQ fisheries for individual QS holders in the fisheries (Tracy Buck – NMFS RAM, personal communication, May, 2016).

Table 2.6-6 shows the age distribution of individual initial recipient QS holders and new entrants in both of the IFQ fisheries in 2015. As one might expect, the data indicates that new entrant QS holders are significantly younger than initial recipient QS holders. The vast majority of initial recipient QS holders are between 50 and 79 years old, with 9.5% of initial recipients over the age of 80. The majority of new entrant QS holders are less than 59 years old, with just over 2% over the age of 80.

Although likely, whether the right-skewed age distribution of initial recipient QS holders is related to the hired master use privilege has not been determined. (Data on the ages of individual shareholders was not available for a model of the decision to use a hired master in the halibut IFQ fleet (Szymkowiak and Felthoven, 2016)). Nevertheless, as previously noted, the privilege to use hired masters to land catcher vessel IFQ does allow initial recipients to remain in the fishery even when they are no longer interested or able to harvest their own IFQ. It is interesting to also note that there are some new entrant QS holders in the over 80 category as well. In the future, an increasingly right-skewed distribution of new entrant QS holders could be associated with the increasing utilization of the medical lease provision, if older new entrant QS holders want to retain their QS when they are no longer able or willing to fish their IFQ. The utilization of the hired master and medical lease privileges is discussed in more detail in Section 2.5.

Table 2.6-6 Age distribution of initial recipients and new entrants in the halibut IFQ fisheries in 2015

Age	Initial Recipients	New Entrants
<20	0.00%	0.85%
20-29	0.00%	10.04%
30-39	0.05%	18.81%
40-49	3.83%	17.89%
50-59	23.97%	25.56%
60-69	40.47%	17.41%
70-79	22.17%	6.21%
80-89	7.33%	2.01%
90-109	2.17%	0.06%
Unknown	0.00%	1.16%

Source: NMFS IFQ QS holdings data sourced by AKFIN

2.6.2.2 QS block program

The Council included the QS block program to prevent excessive consolidation, to maintain the diversity of the IFQ fleet, and to facilitate entry into the IFQ fisheries. QS units that resulted in less than 20,000 pounds of initially issued IFQ are non-severable “blocks” for transfer purposes. At program implementation, shareholders could not hold more than two blocks of QS per area or one block and any unblocked shares in that area. Originally in the halibut fishery, individual blocks of less than 1,000 pounds could be "swept up" into a block of 1,000 pounds or less, and in the sablefish fishery, blocks of less than 3,000 pounds could be "swept up."

Early on in the program, it became apparent that the block program was too restrictive and that the amount of QS that were allowed to be swept up was too small to provide economically fishable amounts of IFQ. In 1996, the Council amended the provision to allow sweep ups of halibut QS up to 3,000 pounds and of sablefish QS up to 5,000 pounds. In 2007, the block program for halibut only was amended: 1) allowing a QS holder to hold 3 blocks rather than 2, 2) dividing blocks in Areas 3B and 4A that yield more than 20,000 pounds, based on the 2004 harvest figures, into a block of 20,000 pounds and the remainder unblocked, and 3) increasing the sweep-up level in Areas 2C and 3A to 5,000 pounds. Adjustments to the QS block designations in Areas 3B and 4A were in response to increasing TACs in these areas, which meant that utilizing the 1995 TAC levels resulted in some blocks in these western areas actually becoming large holdings over the years. For the sablefish IFQ fishery, the maximum number of blocks for an area remains two or one QS block and any unblocked QS, with total allowable sweep-ups up to 5,000 pounds.

Table 2.6-7 shows the amount of sweepable and blocked QS in the halibut IFQ fishery as well as the number of shareholders holdings such QS, at initial issuance and as of 2014. The amount of sweepable QS can change as a factor of QS holders actually sweeping up QS and as a factor of changes in regulations and the amount of QS that may be swept up. The regulatory changes (in 1996 for both fisheries and in 2007 for halibut Areas 2C and 3A only) which allowed an increase in the amount of QS that can be swept up likely contributed to the increase in the 2014 amount of sweepable QS for the halibut fishery in Areas 2C and 3A relative to initial allocations.

The number of sweepable blocks should decrease as they are combined, or swept-up, into a smaller number of larger blocks. The number of sweepable blocks could decrease even as the amount of sweepable QS increased because sweep-ups were executed but the swept-up block remained under the sweep-up limit. The data in Table 2.6-7 indicates that although the number of persons holding sweepable QS blocks and the number of sweepable blocks has decreased since initial issuance, there continue to be substantial numbers of persons holding sweepable QS blocks in 2014. Across the whole fishery, 59% of QS holders currently hold sweepable QS. For the purposes of harvest, the QS being part of a block or sweepable QS do not make a difference to the fisherman, as long as they have other QS in the area to harvest. However, small amounts of sweepable QS are likely difficult to transfer, because they are often quantities that are not economically worthwhile to harvest on their own and are therefore difficult to transfer and because aggregating blocks of sweepable QS from several QS holders would take substantial coordination. This likely contributes to continued substantial numbers of QS holders holding sweepable QS, even though as seen in Table 2.6-7 sweepable QS represents a small percentage of total QS by area in the halibut IFQ fishery.

The number of sweep-up transfers has decreased since the first four years of the IFQ Program across all halibut IFQ areas, from an average of 40 sweep up transfers between 1995 and 1998 to an average of 13 transfers between 2011 and 2014 (NMFS, 2015a). This trend is aligned with intuition in that the easiest opportunities for coordinating sweep-up transfers would have likely occurred in the first several years following the IFQ Program, as some initial QS recipients were exiting and others were consolidating QS.

However, this decrease in sweep up transfers may also be due to the manner in which the RAM database tracks sweep-up transfers by new entrants.[52]

Table 2.6-7 also shows the number of 2014 QS holders holding blocked QS and the amount of QS that was blocked in 2014 by halibut IFQ area. Recall that all sweepable QS is also blocked QS in both IFQ fisheries. Across the halibut IFQ areas, the vast majority of QS holders in 2014 held blocked QS. There is substantially more variation across the halibut IFQ areas with respect to the percent of 2014 QS that was blocked. This inter-area variation is a factor of the amount of initially allocated QS that was issued as blocked QS. Since Area 2C has historically been comprised of numerous small boat fishermen, this area had substantial numbers of QS holders who were allocated very small amounts of blocked QS at initial issuance.

[52] In the RAM database, a person must first hold QS before they can execute a sweep-up transaction. Therefore, if a person holds no QS but purchases and sweeps together one or more blocks in one transaction, the first transaction is recorded in the database as a “transfer” and not a “sweep-up.” Subsequent transactions associated with the entire sweep-up are entered individually as sweep-up transactions. Therefore for some persons, the data do not show the transfer of the first block in the sweep-up. If a person already held a block of sweepable QS, then the purchase of additional blocks to combine in the sweep-up would be recorded as sweep-up transactions.

Table 2.6-7 Sweepable and blocked QS holdings and holders in the halibut IFQ fishery in 2014

Area	Initial QS Holders Holding Sweepable QS	2014 QS Holders Holding Sweepable QS	% of 2014 QS Holders Holding Sweepable QS	Initial Number of Sweepable Blocks	2014 Number of Sweepable Blocks	Initial Amount of Sweepable QS	2014 Amount of Sweepable QS	% of 2014 Total QS that is Sweepable	2014 QS Holders Holding Blocked QS	% of 2014 QS holders holding blocked QS	2014 Total Blocked QS	% of 2014 Total QS that is Blocked
2C	1,269	669	67%	1,282	1,275	8,268,342	15,231,646	26%	908	91%	42,177,590	71%
3A	1,773	766	60%	1,798	1,669	13,921,758	23,853,204	13%	1,071	84%	65,341,809	35%
3B	608	253	55%	623	428	8,690,171	8,669,631	16%	405	87%	24,957,727	46%
4A	187	82	41%	193	139	1,768,990	1,790,213	12%	153	77%	9,502,377	65%
4B	48	27	31%	48	40	338,484	329,867	4%	69	79%	3,332,789	36%
4C	42	28	54%	42	41	556,328	556,328	14%	46	88%	2,095,233	52%
4D	25	16	36%	26	22	327,075	327,075	7%	36	80%	2,428,959	49%

Source: NMFS 2015a

Similarly to the halibut IFQ fishery, despite declines in the numbers of QS holders who hold sweepable QS since initial issuance, there continue to be substantial numbers of QS holders holding such QS in the sablefish IFQ fishery, amounting to 59% of all the QS holders in this fishery (Table 2.6-8). Unlike in the halibut fishery, there has been an overall decrease in the amount of sweepable QS since IFQ Program implementation in the sablefish IFQ fishery. This is likely in part because the sablefish IFQ fishery was not subject to the 2007 amendment, which increased the amount of sweepable QS in the halibut IFQ fishery, and QS holders undertook the readily available sweep-ups in the sablefish IFQ fishery, likely at the onset of the program. As in the halibut fishery, the number of sweep-up transfers has decreased since the first four years of the IFQ Program across all sablefish IFQ areas, from an average of 8 sweep up transfers between 1995 and 1998 to an average of 3 transfers between 2011 and 2014 (NMFS, 2015b).

As in the halibut IFQ fishery, the majority of 2014 QS holders in the sablefish IFQ fishery held blocked QS, even though across most areas (except the Bering Sea area) blocked QS actually comprises a small percentage of total QS. Given that the sablefish IFQ fishery has historically been more capital intensive than the halibut fishery and had greater average landings per vessel, less of the total QS were issued as blocked QS in the sablefish fishery than the halibut fishery.

Table 2.6-8 Sweepable and blocked QS holdings and holders in the sablefish IFQ fishery in 2014

Area	Initial QS Holders Holding Sweepable QS	2014 QS Holders Holding Sweepable QS	% of 2014 QS Holders Holding Sweepable QS	Initial Number of Sweepable Blocks	2014 Number of Sweepable Blocks	Initial Amount of Sweepable QS	2014 Amount of Sweepable QS	% of 2014 Total QS that is Sweepable	2014 QS Holders Holding Blocked QS	% of 2014 QS holders holding blocked QS	2014 Total Blocked QS	% of 2014 Total QS that is Blocked
SE	261	236	35%	265	207	2,702,656	2,701,767	4%	236	61%	9,724,565	15%
WY	210	145	42%	210	161	2,688,648	2,735,752	5%	145	62%	6,919,091	13%
CG	322	212	42%	325	266	3,116,978	3,064,147	3%	212	58%	8,393,054	8%
WG	76	96	33%	78	71	1,384,506	1,353,366	4%	96	60%	7,193,424	20%
BS	100	91	70%	100	92	2,898,464	2,850,870	15%	91	91%	11,258,520	60%
AI	82	59	63%	82	76	2,568,038	2,568,038	8%	59	68%	3,008,760	9%

Source: NMFS 2015b

The block program was in part included in the IFQ Program to facilitate entry for new participants into the IFQ fisheries by limiting consolidation and by ensuring that small amounts of QS would always be available on the market. Given the large percentage of total QS that is blocked in the halibut IFQ fishery, this program has likely significantly contributed to limiting consolidation in this fishery. In the sablefish fishery, the block program has likely been much less influential on limiting consolidation given the substantially smaller percentages of total QS in the fishery that is blocked. Although most sablefish QS holders hold blocked QS, the availability of large amounts of unblocked QS mean that they could consolidate their holdings by adding to their pool of unblocked QS. In the halibut fishery, there is much less unblocked QS available overall to be able to increase one's QS holdings in this way.

Sweep-up transfers in the IFQ fisheries may decrease in the years to come in response to the IFQ Program amendment implemented in December of 2014, which restricted hired master use to QS that was transferred prior to February 2010 (see Section 2.1). Recall that initial recipients are the only ones who have the option of using hired masters to land their IFQ, except in halibut Area 2C and the Southeast Outside District in the sablefish fishery wherein that option is not available to any individuals. Because sweep-ups are considered transfers, this rule to further restrict hired master use disincentivizes future sweep-ups by individual initial QS recipients in all regulatory areas except in halibut Area 2C and in the sablefish Southeast Outside District.

Although sweepable holdings represent a small percentage of the total QS pool in each area, a considerable number of persons hold sweepable QS and the number of sweep-up transfers has decreased substantially since IFQ implementation. This may indicate that the sweep-up provision is no longer working in facilitating sweep-ups into fishable amounts of IFQ, as coordinating with shareholders to execute a sweep-up transfer is likely difficult and associated with high transaction costs (the costs of participating in the market – e.g., searching for the good, acquiring information on pricing, bargaining, etc.). Furthermore, selling a very small amount of QS even if it is sweepable is likely to be quite difficult, because the resultant IFQ may not be economically worthwhile to harvest on its own and because the transaction costs for the QS buyer to purchase a small amount of QS are likely to be similar to those associated with a larger amount of QS. Such issues with the utility of the sweep-up provision may actually impede entry, if new entrants are likely to seek small amounts of sweepable QS for purchase and the supply is limited.

2.6.2.3 Leasing, hired master use, and entry

There is some debate in the fisheries literature about the potential impacts of leasing on the ease of entry or QS acquisition for new entrants. Some researchers argue that leasing can enable entry by providing fishermen with quota at a lower cost than would be possible in the permanent QS market, allowing entrants to build up experience and capital in the fishery in order to eventually buy QS (Wilen and Brown, 2000; GAO, 2004; Stewart and Callagher, 2011). Other researchers posit that leasing can provide a profitable alternative to selling QS, which can make QS more valuable and, thereby, more expensive for entrants to buy or lease (Pinkerton and Edwards, 2009; van Putten and Gardner, 2010). Stewart and Callagher (2011) showed that in New Zealand's Quota Management System, the impacts of leasing upon entry are a factor of the capital investment requirements of the fishery. For fisheries with limited capital expenditures on vessels and gear, the availability of leased quota can facilitate entry, while in fisheries with larger capital investment requirements, leasing may have no impact on entry rates (ibid.).

The utilization of hired masters and leasing provisions in the IFQ fisheries have allowed some QS holders to retain catcher vessel QS beyond the point at which they are able or willing to fish their IFQ themselves. Relative to an IFQ Program in which hired master use and/or leasing was not allowed, these privileges have likely constrained the amount of catcher vessel QS available on the market, potentially increased their value, and provided that there is a time lag in the transition of these QS to new entrants. According to economic theory, placing restrictions such as prohibitions on hired master use and leasing on an asset constrains the value of the asset. Thus, not including these restrictions provides that the value of the QS is greater. In the IFQ Program, initial QS recipients were permitted to retain a business structures that incorporated use of a hired master. Initial issuee QS holders may keep their QS until they pass away and then there is another three-year period during which their beneficiary may lease the IFQ. The recent restriction on the use of hired masters, which prohibits hired master use for IFQ resulting from catcher vessel QS transferred after February 2010 should constrain hired master use and the acquisition of QS by initial recipient QS holders, who have the intent of using hired masters to harvest their IFQ. However, the medical lease provision provides shareholders with another mechanism to continue these practices.[53]

2.6.2.4 **Acquisition of halibut and/or sablefish QS**

This section briefly reviews trends in the acquisition of halibut and/ or sablefish QS: the types of transfers that occur (e.g. whether purchased or gifted), the relation of the buyer and seller, as well as the financing mechanisms used for QS purchases in the halibut and sablefish IFQ fisheries. This section uses data collected through QS transfer applications approved by NMFS-RAM. Persons involved in the transfer or lease of QS are required to complete and submit a transfer application to be reviewed and approved by NMFS-RAM. Part of this application is required to be filled out by the transferor and the remaining part is to be filled out by the transfer recipient. The transfer application form requires applicants to respond to basic questions about the transfer to help NMFS monitor changes under the IFQ Program. The questions include self-reported price per pound and by QS units, reasons for transfer, financing mechanisms, etc. To gain more clarity on certain issues, the information collected on transfer applications changed over time. Because of these refinements, the data series are not highly comparable between 1995–96 and 1997 – 2014, except for the “priced sales” transactions. Data for 1999 is not available due to database changes. These data are not available disaggregated by initial recipients and second-generation shareholders, but rather present overall trends for all QS transfers in the IFQ fisheries since the implementation of the IFQ Program.

2.6.2.4.1 QS price

As catch share fisheries move towards reducing overcapitalization and increasing efficiency, the value of QS often increases making entry into the fishery more difficult. Indeed, the most frequently cited barriers to entry for second-generation shareholders are the costs of QS and the access to capital needed to buy them (Aslin, Connor, and Fisher, 2001; Cardwell and Gear, 2013; Carothers, 2008; Copes and Charles, 2004; Huppert, Ellis, and Noble, 1996; Pinkerton and Edwards, 2009).

Table 2.6-9 and Table 2.6-10 show the estimated weighted (by the amount transferred) mean annual QS prices per IFQ pound transferred by halibut and sablefish IFQ area, respectively, from 1995 to 2014. The prices shown in these tables are limited to QS transfer transactions in which the associated IFQ had largely not already been fished for that year. The tables are presented as QS prices in dollars per pound of associated IFQ, as this unit of measure is more comparable across areas and more relatable, and as QS is usually bought and sold in terms of price per IFQ pound. These prices are presented as real prices in 2014 dollars, using the Bureau of Labor Statistics’ Consumer Price Index to control for general price trends. The table has missing values in areas and years in which there were too few transactions to be able to report QS prices due to confidentiality restrictions.

QS prices should reflect expectations about future profitability in the fisheries. Yet, QS prices have continued to rise in most regulatory areas (except BS and AI areas in the sablefish fishery) in the face of

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[53] QS holders may only use the medical lease provision if they are not eligible to hire a master.

concerns about the health of both IFQ fishery resources, as reflected through decreasing TACs. Continued QS price increases may reflect positive expectations about the long-term recruitment into the fisheries, as well as the potential for new demand for QS due to development of the RQE program. The greatest QS prices are in the IFQ areas with the largest population centers from Southeast Alaska to the Central Gulf, reflecting in part higher demand and competition for QS (in addition to greater earnings expectations from higher ex-vessel prices and increasing TACs in these areas).

In June of 2016, asking prices on Dock Street Brokers (a halibut and sablefish QS brokerage firm) for halibut QS in Areas 2C and 3A were $49 to $66 per pound of associated IFQ across all IFQ regulatory areas and QS vessel categories. For new entrants, who unlike initial recipients do not have freely-allocated QS to use as collateral for loans or to generate revenue to subsidize the purchase of QS, these prices likely present significant hurdles to buying QS. Nevertheless, QS brokers report that the halibut QS market remains tight, with more interested buyers than sellers, and there were pending sales of $63 to $65 per pound in the spring of 2016 (Welch, March 16, 2016).

Unlike in any other IFQ regulatory area of either the halibut or sablefish IFQ fishery, over the last several years QS prices in the sablefish Aleutian Islands and Bering Sea regulatory areas have generally been below ex-vessel prices for those areas. The value of QS in the Aleutian Islands and Bering Sea regulatory areas remains low because of the difficulty and expense of harvesting sablefish in these remote fishing grounds. Since the implementation of the IFQ Program, on average only about 55% of the AI and BS sablefish TACs have been harvested.

Table 2.6-9 Halibut QS prices (mean price per pound of IFQ in 2014$) by regulatory area

Year	2C	3A	3B	4A	4B	4C	4D
1995	$ 11.77	$ 11.44	$ 10.14	$ 8.76	$ 9.53		
1996	$ 13.78	$ 12.68	$ 11.89	$ 10.08	$ 7.59		
1997	$ 16.77	$ 14.42	$ 12.65	$ 9.84	$ 7.60	$ 9.28	$ 8.63
1998	$ 14.73	$ 12.42	$ 11.51	$ 9.28	$ 10.52	$ 8.24	$ 8.82
1999							
2000	$ 11.27	$ 10.91	$ 10.78	$ 9.10	$ 6.60	$ 5.06	$ 5.92
2001	$ 12.32	$ 11.53	$ 11.68	$ 10.32	$ 7.64	$ 7.31	$ 8.61
2002	$ 11.80	$ 10.98	$ 9.33	$ 7.97	$ 6.10		$ 7.31
2003	$ 12.56	$ 12.62	$ 10.31	$ 7.64	$ 5.86		$ 8.83
2004	$ 17.17	$ 17.40	$ 13.99	$ 12.08	$ 10.15	$ 7.19	$ 12.55
2005	$ 21.89	$ 21.90	$ 16.40	$ 12.70	$ 9.08	$ 6.62	$ 11.02
2006	$ 21.64	$ 21.24	$ 17.41	$ 13.42			
2007	$ 22.40	$ 23.44	$ 19.29	$ 15.53	$ 9.65	$ 9.18	$ 10.01
2008	$ 28.48	$ 29.50	$ 28.41	$ 16.89	$ 10.99	$ 9.51	
2009	$ 22.22	$ 27.00	$ 19.87	$ 11.07	$ 11.46	$ 12.59	
2010	$ 24.66	$ 22.87	$ 20.23	$ 13.68	$ 9.70	$ 10.75	$ 10.32
2011	$ 34.12	$ 34.16	$ 26.06	$ 16.58	$ 11.62	$ 12.84	$ 14.29
2012	$ 37.35	$ 35.48	$ 28.32	$ 19.06	$ 20.21		
2013	$ 42.13	$ 31.49	$ 16.38	$ 16.60			
2014	$ 44.29	$ 37.58	$ 21.66	$ 14.83		$ 13.33	

Source: NMFS 2015a

Table 2.6-10 Sablefish QS prices (mean price per pound of IFQ in 2014$) by regulatory area

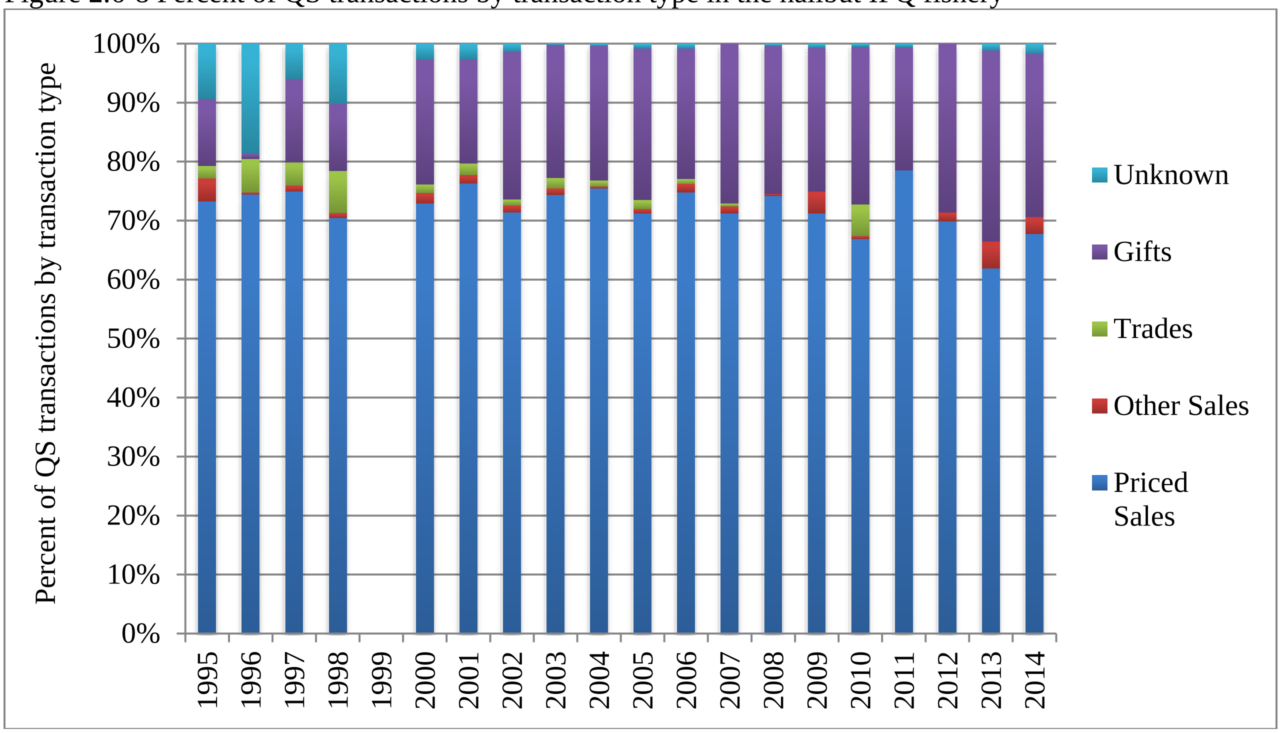
Year	AI	BS	CG	SE	WG	WY
1995	$ 7.10	$ 7.56	$ 9.35	$ 10.45	$ 9.57	$ 9.21
1996	$ 13.42	$ 10.01	$ 10.66	$ 12.15	$ 8.35	$ 11.50
1997	$ 6.11	$ 4.85	$ 13.81	$ 15.87	$ 10.41	$ 13.33
1998	$ 4.94		$ 15.51	$ 16.14	$ 11.62	$ 13.41
1999						
2000	$ 2.58	$ 4.34	$ 13.49	$ 15.02	$ 8.93	$ 14.84
2001	$ 2.58	$ 3.05	$ 12.91	$ 17.09	$ 10.10	$ 13.34
2002	$ 3.97	$ 3.92	$ 12.71	$ 13.56	$ 6.54	$ 13.12
2003	$ 4.94	$ 4.55	$ 13.59	$ 14.87	$ 8.57	$ 14.12
2004	$ 3.26	$ 5.35	$ 15.29	$ 15.17	$ 11.03	$ 16.57
2005	$ 4.58	$ 3.47	$ 12.97	$ 13.53	$ 11.57	$ 14.59
2006	$ 3.42	$ 4.07	$ 14.66	$ 14.03	$ 8.88	$ 13.36
2007	$ 3.05	$ 2.43	$ 15.65	$ 16.06	$ 9.28	$ 17.17
2008	$ 3.28	$ 2.87	$ 18.23	$ 17.54	$ 11.37	$ 15.19
2009	$ 3.47	$ 3.77	$ 18.01	$ 20.22	$ 11.57	$ 19.06
2010	$ 3.24	$ 4.46	$ 19.56	$ 22.78	$ 12.33	$ 22.48
2011	$ 2.97	$ 5.96	$ 23.83	$ 26.39	$ 14.59	$ 27.74
2012	$ 3.90	$ 4.07	$ 33.09	$ 15.07	$ 9.24	
2013			$ 19.92	$ 34.08	$ 14.35	
2014			$ 17.62	$ 25.79	$ 9.23	$ 25.00

Source: NMFS 20015b

2.6.2.4.2 Types of QS transfers

NMFS' QS transfer report (NMFS, 2015a) categorizes types of QS transfers as: priced sales, other sales, trades, gifts, or unknown based on information provided in the transfer applications.[54] For both the halibut and the sablefish fisheries, the percent of total QS transactions by transaction type is generally consistent across the IFQ areas and with the percent of total QS transferred by transaction type. In both IFQ fisheries, "priced sales" is the most frequent type of transaction for QS transfers (Figure 2.6-8 and Figure 2.6-9). However, the percentage of transfers as gifts has increased over the last several years in the fisheries. Gifted QS provides recipients of such transfers with market advantages similar to those of initial recipients; access to free QS which can be used to generate revenue or act as collateral for the purchase of additional QS. Furthermore, without the need to use some of the revenue generated from the harvest of the IFQ to make QS loan payments, recipients of gifted QS may have greater flexibility in how they fish their IFQ, whether they diversify into other fisheries, and whether they seek additional IFQ to harvest either through bringing more shareholders on their vessel, or looking for opportunities to lease IFQ or act as a hired master.

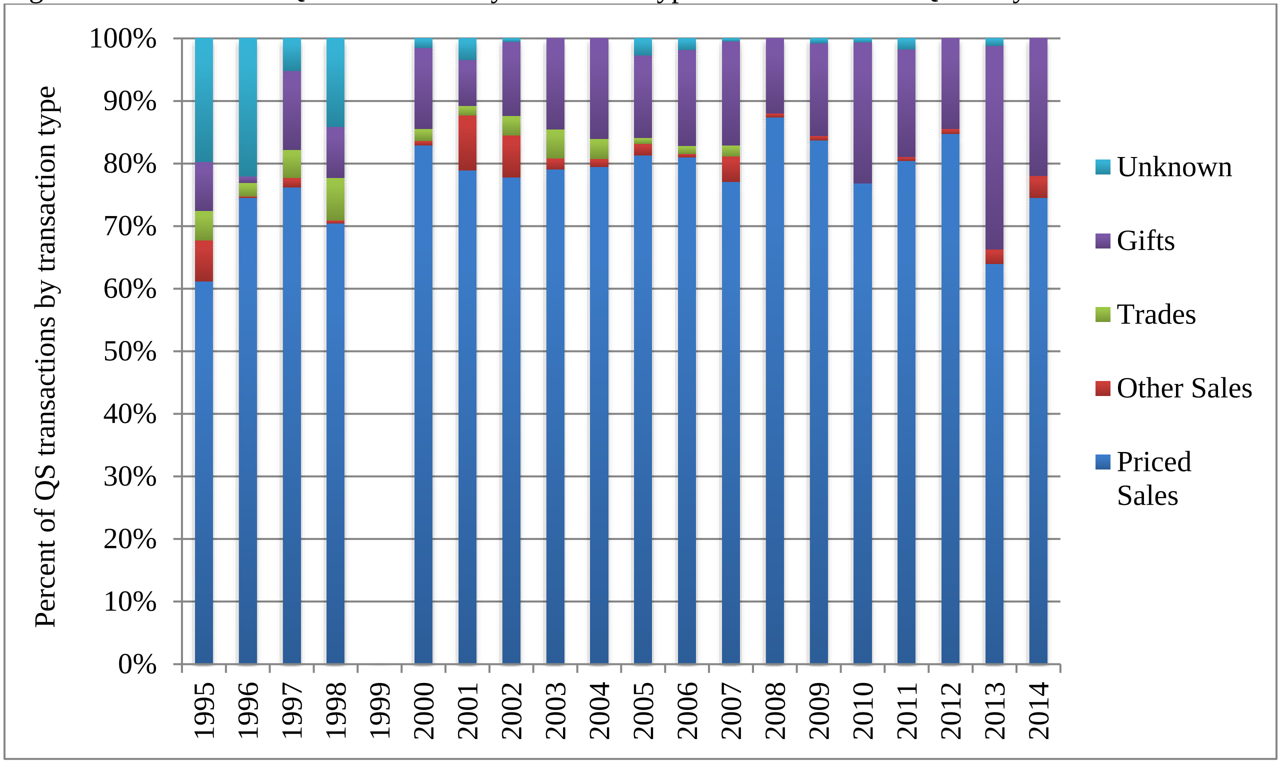
Figure 2.6-8 Percent of QS transactions by transaction type in the halibut IFQ fishery



Source: NMFS 2015a

[54] NMFS transfer report uses data from several questions on QS transfer applications to identify these categories. These categories are defined as:1) priced sales = a price for the QS transferred was listed on the transfer application form, 2) other sales = some monetary exchange occurred, but during the transfer NMFS-RAM could not calculate a price of the QS, based on application data, 3) trades = something was traded for the QS during a transfer, 4) gifts = a QS transfer noted as a gift with no evidence of a reciprocal exchange, and 5) unknown = insufficient or no information was provided or to classify a transaction (NMFS, 2015a, pp. 113).

Figure 2.6-9 Percent of QS transactions by transaction type in the sablefish IFQ fishery

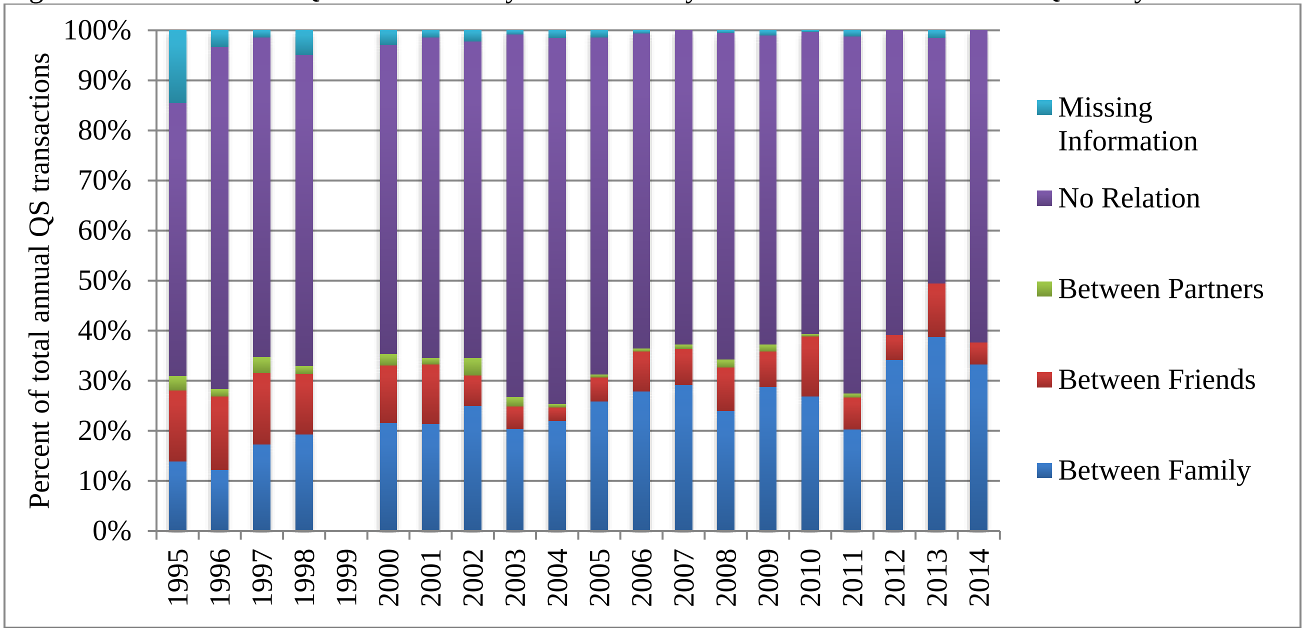


Source: NMFS 2015b

2.6.2.4.3. QS market networks

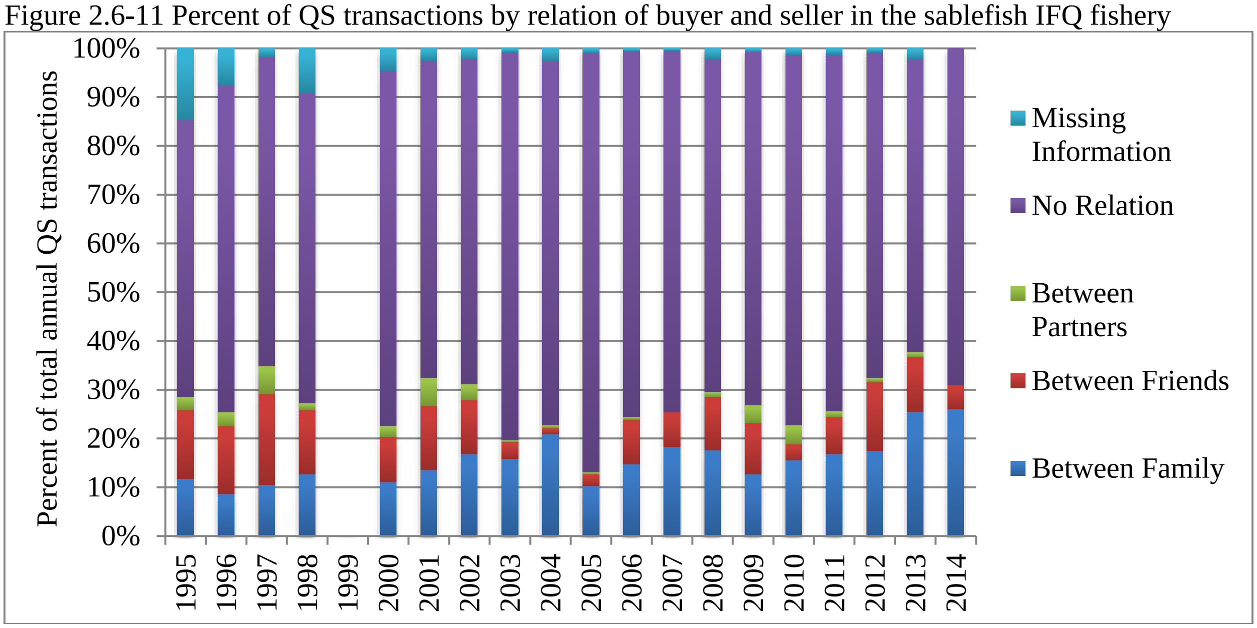
Having access to QS market opportunities can be an obstacle in itself in a fishery with a discrete amount of harvesting privileges. In such markets, family, friends, and business networks can benefit each other through market access. Figure 2.6-10 and Figure 2.6-11 show the percent of QS transactions by relation of buyer and seller in the halibut and sablefish IFQ fisheries, respectively. For both IFQ fisheries, the percent of total QS transactions by relation of buyer and seller is generally consistent across the halibut and sablefish IFQ regulatory areas and with the percent of total QS transferred by relation of buyer and seller. Transactions between buyers and sellers with no relation make up the majority of transactions in the IFQ fisheries. The percent of total QS transactions between family members has generally increased over the last three and two years for the halibut and sablefish fisheries, respectively, compared to levels in earlier years. These increases are aligned with the increases in the percent of QS transactions that were gifts in these two fisheries (see Figure 2.6-8 and Figure 2.6-9).

Figure 2.6-10 Percent of QS transactions by relation of buyer and seller in the halibut IFQ fishery



Source: NMFS 2015a

Figure 2.6-11 Percent of QS transactions by relation of buyer and seller in the sablefish IFQ fishery



Source: NMFS 2015b

2.6.2.4.3 Source of QS financing

NMFS' QS transfer application form asks for the "primary" source of financing for each transfer, and includes several options – personal resources (cash), received as a gift, private bank/credit union, Alaska Department of Commerce, Community, and Economic Development (DCCED), Commercial Fishing and Agriculture Bank (CFAB), NMFS' loan program (i.e., NMFS's Fisheries Finance Program), seller, processor, and "other". More than one financing mechanism can be reported per transfer and the proportion of financing derived from different sources is not requested on the transfer form. This means that the same QS transfer transaction can be recorded under more than one type of financing mechanism.

According to the QS transfer applications data, over the course of the IFQ Program, personal resources have been the most important source of financing for QS transfers, accounting for on average about 49% and 32% of the halibut and sablefish QS loan financing, respectively, across the IFQ regulatory areas (NMFS 2015a, 2015b). Banks have typically been the secondary most important source (accounting for on average about 31% and 29% of the halibut and sablefish QS loan financing, respectively, across the IFQ regulatory areas). As a group, NMFS's Fisheries Finance Program, Alaska's Commercial Fisheries and Agriculture Bank, and the State of Alaska's Department of Commerce and Economic Development in addition to the sellers themselves, have been the third most important sources of financing (accounting for on average about 5% and 6% of the halibut and sablefish QS loan financing, respectively, across the IFQ regulatory areas) (ibid).

2.6.3 Loan programs for halibut and sablefish fisheries

The following sections (2.6.3.1 through 2.6.3.3) focus on federal and State lenders and loan programs to provide some general information on lending conditions for potential QS buyers in the IFQ fisheries.

2.6.3.1 NMFS Fisheries Finance Program

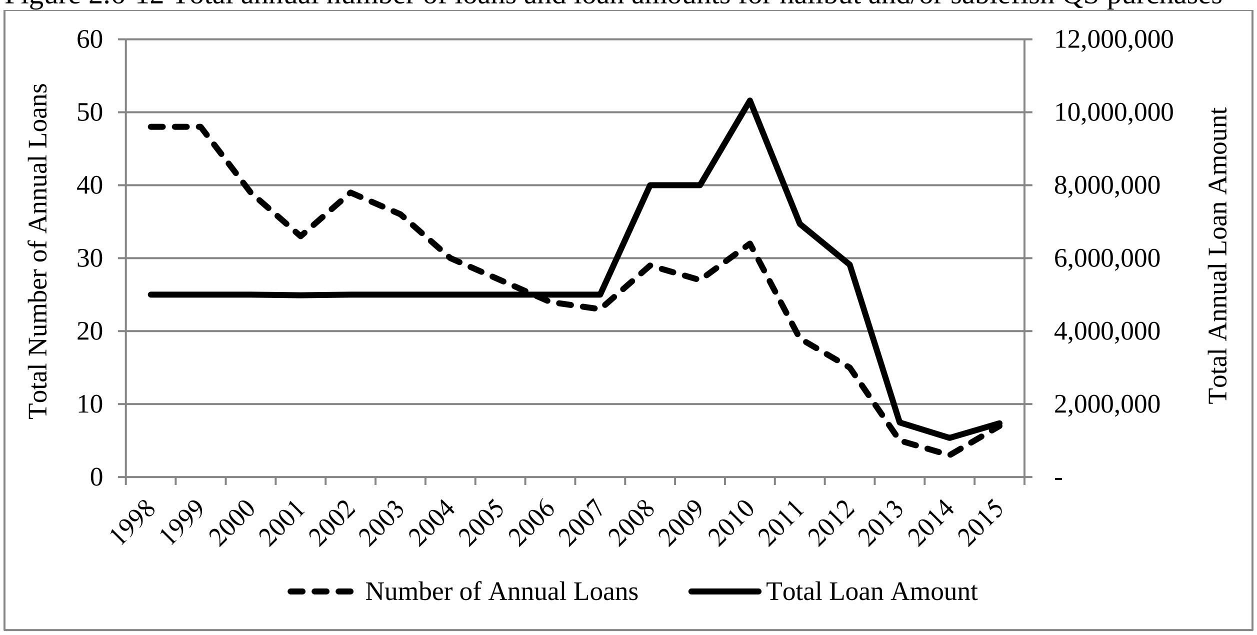
The Fisheries Finance Program (also referred to as "NMFS Loan Program") was established under the authority of the 1996 Sustainable Fisheries Act and is administered by the NMFS Financial Services Division. The Fisheries Finance Program provides long term financing for the cost of construction or reconstruction of fishing vessels, fisheries facilities, aquaculture facilities and individual fishing quota in the halibut and sablefish IFQ and BSAI crab fisheries. The Western Alaska Community Development Quota Share program was recently included in the program to provide economic development opportunities for Western Alaska Communities. For the halibut and sablefish IFQ fisheries, the Fisheries Finance Program provides entry level participants and participants fishing from small vessels (Class B, C, or D) the opportunity to receive a loan to purchase halibut or sablefish QS or to refinance existing QS debt within the halibut and sablefish fisheries. The program started in 1998 with a $5 million annual loan authority and has since increased to $24 million. This loan authority is the combined total available for halibut, sablefish and BSAI crab QS. The loan authority is annual; if a portion of the loan appropriation is not loaned for QS purchases, the remaining loan authority does not carry forward to the next year.

To be eligible for a Fisheries Finance Program loan as an active captain or crewmember who fishes from a small vessel, the applicant may not hold more than the equivalent of 50,000 pounds of halibut and sablefish IFQ during the loan origination year or, in whole or in part, a vessel corresponding to Class A or B length in the IFQ fisheries, and must possess a transfer eligibility certificate (TEC), which documents that the individual has no fewer than 150 days at sea as part of a harvesting crew in a U.S. commercial fishery. To be eligible for the loan as an entry level participant, the applicant may not hold any halibut or sablefish QS and may not apply for a loan greater than the equivalent of 8,000 pounds of IFQ during the loan origination year, and must possess a TEC. By statute, the Fisheries Finance Program may only finance up to 80% of the cost of purchasing halibut, sablefish and crab QS. This means that there is a minimum 20% down payment requirement for loans through the program. The loans have fixed interest rates with rates that are 2% over the U.S. Treasury's cost of funds. For example, if at the time of loan closing, the cost of borrowing from the Treasury has a 2.18% interest rate, the total interest rate for the borrower would be 4.18%. The loans are long-term with maturities not exceeding 25 years. There is also an application fee of 0.5% of the requested loan amount, which the applicant must pay at the time that they file their application for a loan.[55]

As with any lending institution, the Fisheries Finance Program evaluates the credit risk of the applicant when determining eligibility for a loan. The agency requires proof of income including tax returns, financial statements, and fishery catch records to establish that the applicant's income is sufficient to make loan payments. Aside from income, applicants may use secondary collateral (e.g., equity in a vessel, land, home, other fishing permits, or a co-signer) to meet the credit eligibility requirements for a loan.

Over the last several years, the total amounts of loans issued under the Fisheries Finance Program have decreased substantially. Figure 2.6-12 shows the total number of annual loans and loan amounts since the inception of the Fisheries Finance Program by federal fiscal year. Between 2013 and 2015, the average total annual loan amount issued under the IFQ loan program was $1.3 million, a 77% decrease from the average total annual loan amount issued between 1998 and 2012. During its first nine years, the Fisheries Finance Program capped out its $5 million loan authority annually. The loan authority increased to $12 million in 2008, and since then the program has not reached its cap. The total number of loans peaked at 48 in the early years of the Fisheries Finance Program and hit a low of three loans in 2014. The average loan amounts per borrower have increased over the years, reflecting rising QS prices in most IFQ fisheries. The average loan amount per borrower peaked in 2011 at $365,000, a 250% increase over initial average loan amounts of $104,000.

Figure 2.6-12 Total annual number of loans and loan amounts for halibut and/or sablefish QS purchases



Source: NMFS Fisheries Finance Program. Note: For each fiscal year of the Fisheries Finance Program

The expectation of an applicant's fishery landings is a driving component of the Fisheries Finance Program's assessment of potential income, and ultimately credit risk. Therefore, decreasing TACs in the IFQ fisheries over the last several years have led to the Fisheries Finance Program implementing stricter credit criteria for halibut and sablefish QS loan applicants (Earl Bennett, personal communication, April

[55]However, Fisheries Finance Program staff sometimes advise applicants of the likelihood of success prior to the application fee (Earl Bennett, personal communication, April 13,2016).

14, 2016). Although some of the decreases in the TACs have been offset by ex-vessel price increases, the value of the QS and the revenue it can produce may no longer meet the loan requirements. In essence, there is concern that borrowers may not be able to service their debt from the harvest of their IFQ alone. Secondary collateral may offset some credit risk. Diversification into other (non-IFQ) fisheries is becoming increasingly important. Those who can demonstrate income from a number of sources are not as dependent on the health of the halibut and sablefish resources and, therefore, represent a lower credit risk for the lender. Nevertheless, it should be noted that, as of this writing, there have not been any defaults in the Fisheries Finance Program (Earl Bennett, personal communication, April 13, 2016).

Table 2.6-11 shows the total number of loans, loan amounts, and the average loan amount by the borrower's state of residence. Since the inception of the Fisheries Finance Program, a vast majority of the IFQ loans have been issued to Alaska and Washington residents. Alaska and Washington residents have been issued loans for QS purchases or refinances every year, with the exception of 2014 when no Washington residents borrowed funds for QS purchases.

Table 2.6-11 Total number of loans, loan amounts, and average loan amounts for halibut and/or sablefish QS purchases by borrower's state of residence

Borrower's state of residence	Total Number of Loans	Total Loan Amount ($)	Average Loan Amount ($)
Alaska	280	48,229,392	172,248
Washington	132	30,354,482	229,958
Oregon	28	5,586,249	199,509
Arizona	4	985,187	246,297
California	8	1,767,950	220,994
Colorado	5	1,279,665	255,933
Totals	**484**	**93,103,565**	**187,352**

Source: NMFS Fisheries Finance Program. Note: Data for other states cannot be presented due to confidentiality issues.

Aside from residency, the Fisheries Finance Program does not track any information about the demographics of the applicants or borrowers. The program also does not track the types of QS that the borrowers purchased or refinanced, i.e., by area or vessel class. Anecdotally, the program has provided more loans for purchases of halibut QS than sablefish QS (Earl Bennett, personal communication, April 13, 2016).

2.6.3.2 Alaska Division of Economic Development – Department of Commerce, Community, and Economic Development Commercial Fishing Loan

The State of Alaska has a commercial fishing loan program that is managed by the Department of Commerce, Community, and Economic Development (DCCED). The goal of this program is to "provide long-term, low interest loans to promote the development of predominantly Alaska resident fisheries, and continued maintenance of commercial fishing vessels and gear for the purpose of improving the quality of Alaska seafood products." The program provides loans for a number of commercial fishing industry related purchases including vessels, limited license permits, QS, gear, engine fuel efficiency upgrades, etc. The loans are available for purchases and refinancing of loans.

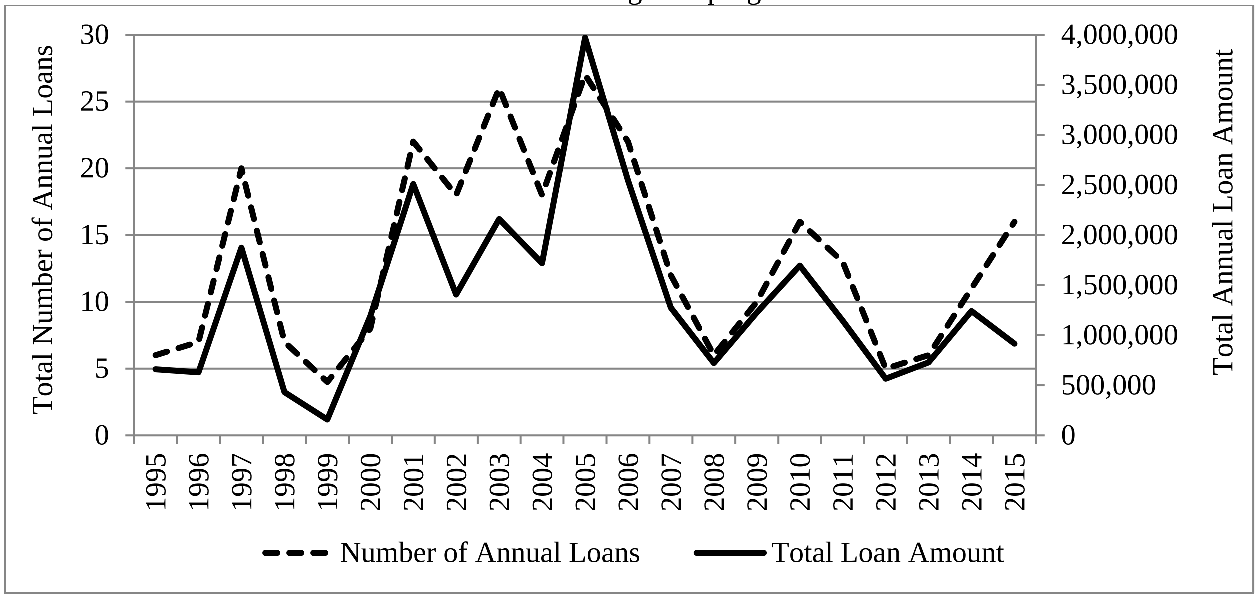
In order to qualify for the DCCED Commercial Fishing Loan for halibut and/or sablefish QS, the applicant must meet the following loan criteria:

- Alaskan residency for the past two years – defined as living Alaska with the intent to remain indefinitely, primary and permanent home in Alaska, and present in Alaska except for brief intervals (generally less than 90 days) except for military service, education or good cause;
- Held limited entry permit, commercial fishing, or crew license for 2 of the past 5 years;
- Fished in Alaskan waters during qualifying years;
- Qualify as a transferee for QS, and;
- Not eligible for financing of QS purchase from other recognized commercial lending institutions.

The total lending limit for the DCCED Commercial Fishing Loan Program is $400,000 per person. As with the NMFS Fisheries Finance Program, the DCCED's Commercial Fishing Loan Program may only finance up to 80% of the cost of purchasing QS, meaning that there is a minimum 20% down payment requirement for loans through the program. This maximum loan amount may be increased by offering additional collateral. The maximum loan term is 15 years and interest rates are fixed at the time of loan approval. There is a $100 application fee for each loan and a $200 pre-qualification fee for QS purchases. An origination fee of 1% of the loan amount is also deducted from the loan proceeds at closing. Amongst other requirements, the DCCED's Commercial Fishing Loan program requires applicants to submit federal tax returns, a letter of denial from a recognized QS lender, and a copy of the TEC with the loan application.

Figure 2.6-13 shows the total annual number of loans and loan amounts for halibut and/or sablefish QS purchases under the DCCED Commercial Fishing Loan Program. Loans for halibut QS purchases account for 70% of the total loan amount that have been issued under this program over the last 20 years. Interestingly, loans for QS purchases under this program did not peak until 2005. At the peak in 2005, the DCCED issued loans totaling $3.97 million compared to $10.32 million peak for NMFS loans in 2013. Rising loan numbers and amounts in the early to mid-2000s correspond to increasing TACs. These were also the years when NMFS's Fisheries Finance Program only had $5 million available in annual loans, which was maxed out every year. Over the years, the average loan amount through the DCCED's commercial fishing loan program has been just over $101,000, which is substantially less than NMFS's Fisheries Finance Program average loan amount of just under $225,000.

Figure 2.6-13 Total annual number of loans and loan amounts for halibut and/or sablefish QS purchases under the State of Alaska DCCED commercial fishing loan program



Source: Alaska DCCED

2.6.3.3 **Alaska Commercial Fishing and Agriculture Bank**

The Alaska Commercial Fishing and Agriculture Bank (CFAB) is a private member owned cooperative that was established through legislation by the State of Alaska in the late 1970s. CFAB provides loans for commercial fishermen, tourism businesses, resource-based industries as well as agriculture loans. CFAB provides loans for the purchase of halibut and/or sablefish QS, to refinance other loans incurred to purchase QS, and other business related loans for a commercial fishing operation using QS as collateral. CFAB makes direct loans to the borrower with a maximum term of 20 years. There are no limits on how much an individual may borrow from CFAB.

CFAB is limited to lending to Alaska residents – those with demonstrated residency in Alaska for at least the year prior to their application for the loan. For a commercial fishing loan, the borrower must have participated in fishing in any capacity at some time in their lives. For a QS loan, the borrower must meet NMFS's minimum qualifications for purchasing QS.

Because it is a cooperative, CFAB requires that each first-time borrower purchase one share of membership stock ($100), which provides voting and other ownership rights to the borrower. Each borrower/member is also required to make an investment in the cooperative when they borrow from CFAB. This is done by purchasing Class B Preferred Stock equal to 2% of the total loan amount or $2,500, whichever is less. The stock remains committed to CFAB until the loan is paid in full and then it becomes available to the borrower. Once it becomes available to the borrower, this stock can earn dividends, be used for new loans, or be retired and repaid to the member. Also due to CFAB's cooperative structure, borrower/members have the potential to earn patronage, which is effectively a rebate of the portion of interest a member pays on their loan. CFAB's Board makes an annual decision of distribution of profits after each fiscal year.

The amount CFAB lends to any borrower is based on a review of the individual borrower's financial strength, and the primary deciding factor is the borrower's ability to repay the loan based on their historical earnings or their "cash-flow". As a general rule, borrowers have to have collateral for 50% of the equity value of the QS. Other assets can also be used as collateral to offset the down payment if needed.

One unique type of loan that CFAB offers that other lenders might not is a “participation loan”, which provides the QS seller with the opportunity to participate in the loan to the buyer. Under this type of transaction, the seller is a co-lender with CFAB. They own a portion of the loan and can thereby set the terms of their portion of the loan. CFAB lending data was not available for this review.

2.6.4 Entry into the Southeast Alaska regulatory areas

The catcher vessel fleet in Southeast Alaska (halibut Area 2C and the Southeast Outside area in the sablefish fishery) has historically been primarily comprised of small boats (less than 60 feet in length), which were for the most part owned and operated by local Alaskan residents (NMFS, 1992). For most participants in this area, the halibut and fisheries have always been part-time fisheries, supplementing income from the salmon season (Pautzke and Oliver, 1997).

In developing the IFQ Program, the Council sought to protect the unique character of and to facilitate entry into these Southeast Alaska areas. Therefore, the Council included additional restrictions on QS acquisition and IFQ use for participants in these areas, specific to catcher vessel shares only. The two main provisions that impact entry into the IFQ catcher vessel fleets in these areas include a prohibition on QS acquisition by non-individual entities and a prohibition on hired master use by any individuals. By prohibiting the acquisition of catcher vessel QS by non-individual entities and by providing a disincentive for individual initial recipients to consolidate QS in this area relative to other areas, these restrictions may have led to more QS being available on the market for new entrants in the Southeast Alaska regulatory areas relative to other areas.

In 2015, new entrants held 60% of the catcher vessel QS in Area 2C compared to 55% across the other halibut IFQ regulatory areas (see Table A.2.6.1.3 in the Appendix to this section for an annual breakdown). In the sablefish fishery in 2015, new entrants held 50% of the Southeast Outside District’s catcher vessel QS, compared to 49% across the other regulatory areas (see Table 2.6.1.A.4 for an annual breakdown). Given that the appropriate counterfactual against which to evaluate the impacts of the Southeast-specific provisions intended to facilitate entry would be new entry in the Southeast areas without these provisions, these comparisons with the other regulatory areas cannot be used to make conclusive statements. In general, the acquisition of catcher vessel QS in the Southeast regulatory areas of both IFQ fisheries seems to be generally on par with other regulatory areas with respect to the percentage of QS held by initial recipients and new entrants. Aging initial recipients with QS in the Southeast regulatory areas might be more likely to hang onto these QS, because the fishing grounds are closer and less exposed than in some other regulatory areas, making continued fishing by aging fishermen relatively easier than in other areas. QS prices in these areas are also on average amongst the highest in the IFQ fisheries, which should reflect greater earnings expectations. High QS prices should provide an incentive for initial recipients to sell their QS; however, the continued increase in QS prices over the years may also incentivize QS holders to retain their QS in anticipation of their value continuing to increase.

Summary

Since IFQ implementation, 2,214 new entrants have purchased QS in the halibut IFQ fishery and 513 new entrants have purchased QS in the sablefish IFQ fishery. New entrants hold a majority of the QS in both IFQ fisheries and continue to consolidate QS on an annual basis. Although in both IFQ fisheries, new entrants’ average holdings are smaller than the average holdings of initial recipients. New entrants’ QS holdings distributions across the vessel classes are generally aligned with the total distribution of QS across the vessel classes. Additionally, the rate at which new individuals have become QS holders has generally fallen throughout the course of the program.

Given that initial recipients were allocated QS gratis and they could use the equity in their initially-issued QS as leverage to purchase additional QS, initial recipients likely have an advantage in the QS market. Prior to December 1, 2014, initial recipient catcher vessel QS holders could use hired masters to harvest their IFQ in most regulatory areas whereas all new entrant QS holders have always had to be on board during the harvest of their IFQ. This means that the privilege associated with QS was fundamentally different for initial recipients and new entrants for the first two decades of the IFQ Program, and that there was potentially a greater incentive for initial recipient QS holders to consolidate QS. The right-skewed age distribution of initial recipient QS holders and the increasing use of hired masters by individual initial recipients of catcher vessel QS (see Section 2.5) provides some evidence that some of these QS holders are retaining QS past the point at which they are willing or able to harvest their IFQ themselves. The retention and consolidation of QS by initial recipients, who rely on the use of hired masters to harvest their IFQ, has thus likely stymied entry into the IFQ fisheries.

Anecdotally, QS holders in the IFQ fisheries have also remarked that tax considerations are also a significant factor in whether and how they transfer their QS. Capital gains taxes, which are paid on the profit realized from a sale of an asset that was purchased at a cost amount that was lower than the amount realized at the sale, have been cited by QS holders as providing a significant incentive for them to refrain from selling their QS. Transferring QS as a gift or through an unpriced sale may limit the amount of such a tax that the transferor has to pay.

In the Southeast Alaska regulatory areas of the IFQ fisheries, Area 2C of the halibut fishery and the Southeast Outside District of the sablefish fishery, the Council included a prohibition on catcher vessel QS acquisition by non-individual entities and a prohibition on hired master use for the harvest of catcher vessel IFQ by any individuals. Although these restrictions may have theoretically led to more QS being available on the market for new entrants in the Southeast Alaska regulatory areas relative to other areas, new entry into these areas has generally been on par with the other IFQ regulatory areas. Isolating the impacts of these Southeast-specific provisions on new entry would be extremely challenging, as it would necessitate an appropriate counterfactual of the Southeast areas without these provisions.

Over the course of the IFQ Program, most QS transfer transactions have been priced QS sales between buyers and sellers with no relation, and personal resources have been the most important source of financing for QS. Although the QS transfer data is not disaggregated by generation of participant, it does provide a general idea of how QS is transferred in the IFQ fisheries. Over the last several years, the number of gift QS transfers and transfers between family members has increased in the IFQ fisheries. While this is beneficial for those who receive the gifted QS, such transactions may perpetuate inter-generational inequities in access to the fisheries by providing a select group of new entrants with a marked advantage in competing for more QS.

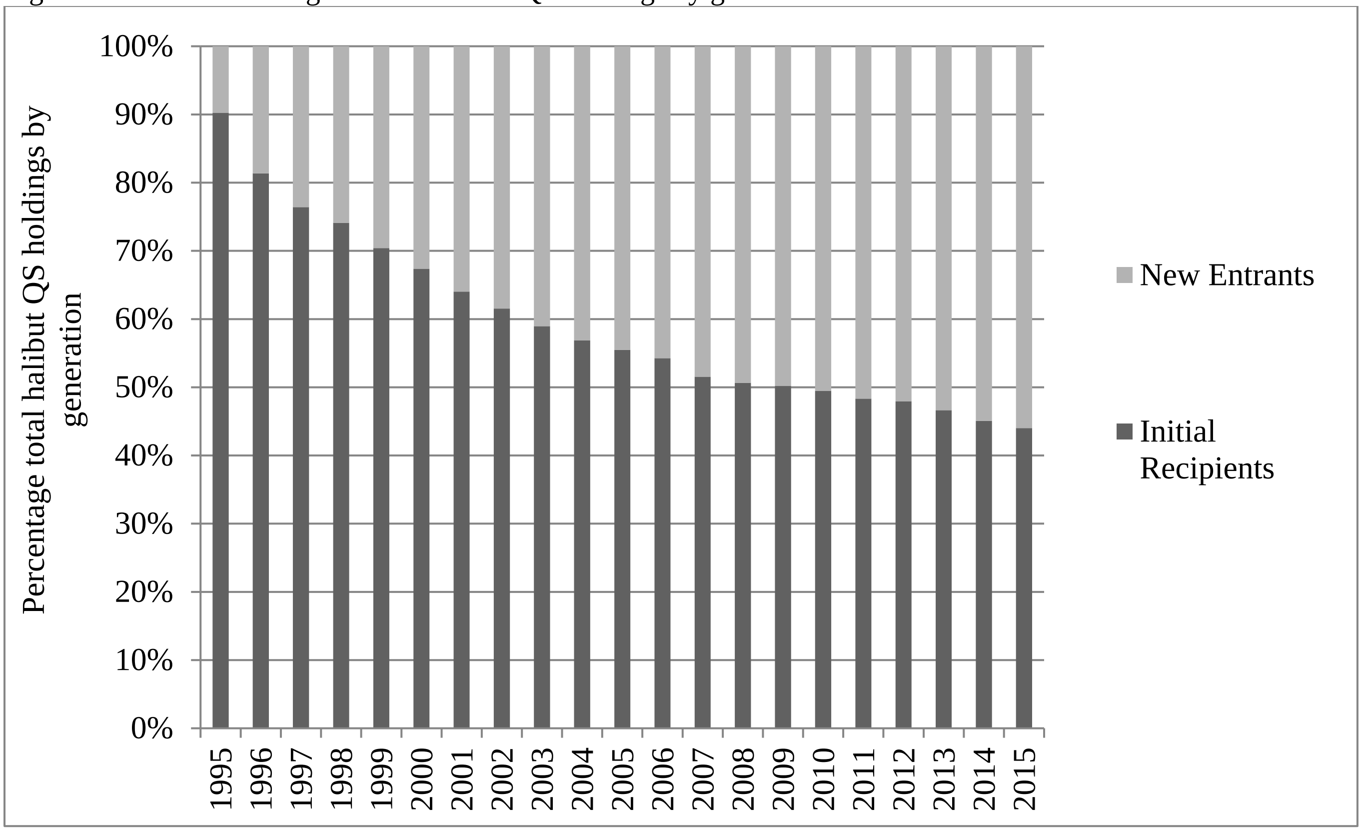
Entry into the IFQ fisheries may have become more difficult over the course of the IFQ Program due to decreasing TACs, continually rising QS prices, and some limitations on lending. Rates of new entry have decreased since a peak in the first several years of the IFQ Program, with an average of 49 halibut new entrants and 17 sablefish new entrants from 2011 to 2015 compared to an average of 207 and 38 new entrants in these fisheries, respectively, in the first five years of the IFQ Program. Due to decreasing TACs, the principal balances of QS loans in some IFQ regulatory areas are slightly greater than the estimated current market value of the underlying quota. In order to reduce the risk of defaults, the NMFS Financial Services Division, which administers the Fisheries Finance Program that provides loans for halibut and sablefish QS, now increasingly relies on secondary collateral, income diversification, and down payments to assess credit risk for loans for halibut and sablefish QS. The number of loans through the NMFS' Fisheries Finance Program has decreased substantially over the last several years, while the number of halibut and/or sablefish QS loans through Alaska's Department of Commerce, Community, and Economic Development Commercial Fishing Loan Program has increased over the same time frame.

The block program has created some entry opportunities by preventing the additional consolidation that would have happened if the block program had not existed and by providing for the availability of small amounts of QS on the market. However, the utility of the sweep up provision, which allows QS blocks of less than 5,000 pounds in the sablefish fishery and in halibut Areas 2C and 3A and of less than 3,000 pounds in all other halibut regulatory areas to be swept-up into larger blocks, has likely decreased over the course of the IFQ Program as evidenced by the decreasing number of sweep-up transfers as well as the high percentage of QS holders who hold sweepable QS. The easiest of such transfers likely occurred at the onset of the program. Coordinating the sweep-up of multiple QS blocks from different shareholders is likely difficult and associated with relatively high transaction costs. The purchase of individual small QS blocks or sweepable amounts of QS may not be economically worthwhile assuming the shareholder does not have additional QS in the area with which they can harvest the resultant IFQ. Thus the current function of the sweep-up provision may not be optimal for new entrants, who are likely seeking small amounts of QS and may not have other QS holdings in the area with which they can consolidate new QS purchases. Furthermore, as noted by Kroetz, Sanchirico, and Lew (2015) the blocking provisions in the IFQ Program have production efficiency costs, estimated to be $28.3 million and $8.2 million for the halibut and sablefish fisheries, respectively in 2011, or the equivalent of 13.8% and 6.4% of the gross ex-vessel revenues for the halibut and sablefish fisheries, respectively, for that same year.

There are numerous potential research extensions for examining entry into the IFQ fisheries. For instance, researchers could examine new entrants' responses to specific regulatory changes in the IFQ fisheries, like changes in the block program or sweep-up levels, to assess how participants may respond to other programmatic changes in the future. It would also be interesting to update the study conducted by Carothers, Lew, and Sepez (2010), which looked at the probability of buying and selling QS as a factor of specific individual characteristics and those of his/her community of residency for the first five years of the program, and to include other community attributes of interest (CDQ, airport, road access, etc.) to see whether the authors' findings still hold for the last 15 years of the IFQ Program. Such a study could also be used to corroborate Carothers' (2013) findings in a survey of QS holders provided the same individual attributes are available in the QS transfer data. A simple model of the count of new entrants as a factor of earnings expectations, QS prices, trends in other fisheries, etc., could also be useful in determining whether new entrants respond to changes in earning expectations and other factors in ways in that could be hypothesized. For example, there could be a year-long lag in new entrant increases into the halibut and sablefish QS fisheries, following a high earnings year in the salmon fisheries if increased earnings in the salmon fisheries provide fishermen with money to buy halibut and sablefish QS. It would also be interesting to further examine the impacts of hired master use and the differentiated hired master use restrictions in the Southeast regulatory areas on entry. A social network analysis could also be utilized to examine QS transfer networks. Differentiated QS acquisition over time by those new entrants who do and do not receive gifted QS could also be examined. This kind of research could be used to inform the Council on how regulatory frameworks in the fisheries affect entry and therefore potentially how regulations may be changed to facilitate entry in the future.

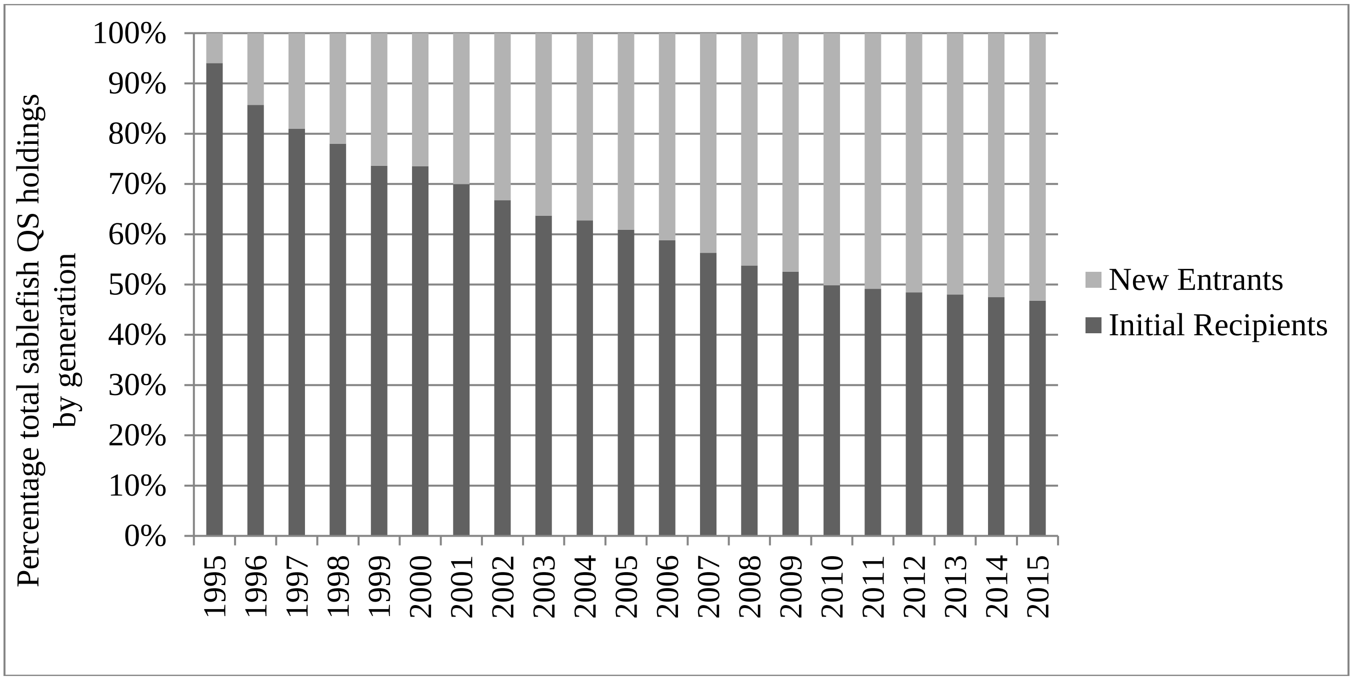
Appendix A2.6

Figure A.2.6.1.1 Percentage of total halibut QS holdings by generation from 1995 to 2015



Source: NMFS IFQ QS holdings database sourced by AKFIN

Figure A.2.6.1.2 Percentage of total sablefish QS holdings by generation from 1995 to 2015



Source: NMFS IFQ QS holdings database sourced by AKFIN

Table A.2.6.1.3 QS Holdings by halibut IFQ regulatory area and generation

	2C		3A		3B		4A		4B		4C		4D	
	Initial	New Entrant	Initial	New Entrant	Initial	New Entrant	Initial	New Entrant	Initial	New Entrant	Initial	New Entrant	Initial	New Entrant
1995	89%	11%	90%	10%	90%	10%	90%	10%	97%	3%	98%	2%	98%	2%
1996	79%	21%	82%	18%	81%	19%	78%	22%	93%	7%	83%	17%	89%	11%
1997	76%	24%	78%	22%	74%	26%	67%	33%	82%	18%	77%	23%	73%	27%
1998	73%	27%	76%	24%	72%	28%	67%	33%	78%	22%	77%	23%	69%	31%
1999	69%	31%	73%	27%	66%	34%	64%	36%	69%	31%	71%	29%	67%	33%
2000	66%	34%	70%	30%	64%	36%	58%	42%	58%	42%	67%	33%	63%	37%
2001	63%	37%	67%	33%	60%	40%	56%	44%	53%	47%	58%	42%	61%	39%
2002	61%	39%	64%	36%	58%	42%	52%	48%	52%	48%	56%	44%	54%	46%
2003	59%	41%	62%	38%	55%	45%	50%	50%	48%	52%	50%	50%	51%	49%
2004	56%	44%	60%	40%	53%	47%	47%	53%	45%	55%	48%	52%	50%	50%
2005	54%	46%	59%	41%	51%	49%	40%	60%	45%	55%	45%	55%	50%	50%
2006	53%	47%	58%	42%	51%	49%	39%	61%	45%	55%	45%	55%	50%	50%
2007	51%	49%	57%	43%	40%	60%	34%	66%	43%	57%	42%	58%	49%	51%
2008	50%	50%	56%	44%	40%	60%	34%	66%	42%	58%	38%	62%	49%	51%
2009	49%	51%	56%	44%	40%	60%	34%	66%	39%	61%	39%	61%	49%	51%
2010	47%	53%	55%	45%	39%	61%	33%	67%	40%	60%	39%	61%	49%	51%
2011	46%	54%	54%	46%	38%	62%	33%	67%	39%	61%	36%	64%	46%	54%
2012	45%	55%	54%	46%	37%	63%	32%	68%	39%	61%	36%	64%	46%	54%
2013	43%	57%	53%	47%	36%	64%	32%	68%	36%	64%	36%	64%	41%	59%
2014	41%	59%	51%	49%	34%	66%	32%	68%	36%	64%	36%	64%	41%	59%
2015	40%	60%	50%	50%	33%	67%	31%	69%	36%	64%	36%	64%	41%	59%

Source: NMFS IFQ QS holdings database sourced by AKFIN

Table A.2.6.1.2 QS Holdings by sablefish IFQ regulatory area and generation

	AI		BS		CG		SE		WG		WY	
	Initial	New Entrant	Initial	New Entrant	Initial	New Entrant	Initial	New Entrant	Initial	New Entrant	Initial	New Entrant
1995	96%	4%	96%	4%	96%	4%	90%	10%	95%	5%	94%	6%
1996	92%	8%	89%	11%	91%	9%	70%	30%	87%	13%	89%	11%
1997	86%	14%	84%	16%	85%	15%	67%	33%	82%	18%	87%	13%
1998	78%	22%	73%	27%	83%	17%	66%	34%	80%	20%	83%	17%
1999	65%	35%	69%	31%	80%	20%	61%	39%	77%	23%	81%	19%
2000	61%	39%	61%	39%	77%	23%	73%	27%	73%	27%	79%	21%
2001	55%	45%	57%	43%	73%	27%	71%	29%	69%	31%	77%	23%
2002	47%	53%	48%	52%	70%	30%	68%	32%	68%	32%	76%	24%
2003	45%	55%	35%	65%	67%	33%	66%	34%	64%	36%	75%	25%
2004	43%	57%	30%	70%	67%	33%	65%	35%	64%	36%	74%	26%
2005	43%	57%	27%	73%	66%	34%	61%	39%	58%	42%	74%	26%
2006	35%	65%	24%	76%	65%	35%	59%	41%	56%	44%	73%	27%
2007	34%	66%	22%	78%	62%	38%	57%	43%	54%	46%	69%	31%
2008	23%	77%	15%	85%	62%	38%	55%	45%	51%	49%	69%	31%
2009	13%	87%	14%	86%	62%	38%	55%	45%	51%	49%	69%	31%
2010	13%	87%	14%	86%	59%	41%	54%	46%	39%	61%	68%	32%
2011	12%	88%	13%	87%	58%	42%	54%	46%	39%	61%	67%	33%
2012	12%	88%	13%	87%	56%	44%	53%	47%	39%	61%	67%	33%
2013	12%	88%	13%	87%	56%	44%	52%	48%	38%	62%	67%	33%
2014	12%	88%	13%	87%	55%	45%	52%	48%	38%	62%	67%	33%
2015	12%	88%	13%	87%	54%	46%	51%	49%	38%	62%	66%	34%

Source: NMFS IFQ QS holdings database sourced by AKFIN

Table A.2.6.1. 3 Catcher vessel QS holdings by generation and area in the halibut IFQ fishery

	2C		3A		3B		4A		4B		4C		4D	
	Initial	New Entrant	Initial	New Entrant	Initial	New Entrant	Initial	New Entrant	Initial	New Entrant	Initial	New Entrant	Initial	New Entrant
1995	89%	11%	90%	10%	90%	10%	90%	10%	97%	3%	98%	2%	97%	3%
1996	79%	21%	81%	19%	81%	19%	79%	21%	93%	7%	84%	16%	92%	8%
1997	75%	25%	78%	22%	74%	26%	67%	33%	84%	16%	78%	22%	77%	23%
1998	72%	28%	76%	24%	71%	29%	67%	33%	82%	18%	77%	23%	74%	26%
1999	69%	31%	73%	27%	66%	34%	65%	35%	72%	28%	71%	29%	72%	28%
2000	66%	34%	70%	30%	64%	36%	59%	41%	61%	39%	67%	33%	67%	33%
2001	63%	37%	67%	33%	61%	39%	57%	43%	56%	44%	58%	42%	65%	35%
2002	61%	39%	64%	36%	59%	41%	53%	47%	54%	46%	56%	44%	58%	42%
2003	59%	41%	61%	39%	56%	44%	51%	49%	50%	50%	50%	50%	54%	46%
2004	56%	44%	60%	40%	54%	46%	48%	52%	47%	53%	48%	52%	54%	46%
2005	54%	46%	59%	41%	52%	48%	41%	59%	47%	53%	45%	55%	54%	46%
2006	53%	47%	58%	42%	51%	49%	40%	60%	47%	53%	45%	55%	54%	46%
2007	51%	49%	57%	43%	40%	60%	34%	66%	45%	55%	42%	58%	54%	46%
2008	51%	49%	56%	44%	40%	60%	34%	66%	44%	56%	38%	62%	54%	46%
2009	49%	51%	56%	44%	40%	60%	35%	65%	41%	59%	39%	61%	54%	46%
2010	48%	52%	55%	45%	40%	60%	34%	66%	42%	58%	39%	61%	53%	47%
2011	47%	53%	54%	46%	38%	62%	34%	66%	40%	60%	37%	63%	51%	49%
2012	45%	55%	54%	46%	38%	62%	33%	67%	41%	59%	37%	63%	51%	49%
2013	43%	57%	53%	47%	36%	64%	33%	67%	38%	62%	37%	63%	45%	55%
2014	41%	59%	51%	49%	34%	66%	32%	68%	37%	63%	37%	63%	45%	55%
2015	40%	60%	50%	50%	33%	67%	32%	68%	37%	63%	36%	64%	45%	55%

Source: NMFS IFQ QS holdings database sourced by AKFIN

Table A.2.6.1.4 Catcher vessel QS holdings by generation and area in the sablefish IFQ fishery

	AI		BS		CG		SE		WG		WY	
	Initial	New Entrant	Initial	New Entrant	Initial	New Entrant	Initial	New Entrant	Initial	New Entrant	Initial	New Entrant
1995	95%	5%	96%	4%	96%	4%	91%	9%	92%	8%	95%	5%
1996	96%	4%	96%	4%	92%	8%	69%	31%	87%	13%	90%	10%
1997	89%	11%	91%	9%	86%	14%	66%	34%	80%	20%	88%	12%
1998	77%	23%	91%	9%	84%	16%	65%	35%	77%	23%	84%	16%
1999	49%	51%	85%	15%	81%	19%	60%	40%	73%	27%	82%	18%
2000	45%	55%	73%	27%	78%	22%	73%	27%	67%	33%	80%	20%
2001	37%	63%	67%	33%	75%	25%	70%	30%	63%	37%	78%	22%
2002	33%	67%	60%	40%	72%	28%	68%	32%	61%	39%	77%	23%
2003	29%	71%	46%	54%	68%	32%	65%	35%	56%	44%	76%	24%
2004	27%	73%	39%	61%	69%	31%	64%	36%	54%	46%	75%	25%
2005	26%	74%	33%	67%	68%	32%	60%	40%	46%	54%	75%	25%
2006	17%	83%	30%	70%	68%	32%	58%	42%	44%	56%	75%	25%
2007	15%	85%	27%	73%	65%	35%	56%	44%	40%	60%	71%	29%
2008	15%	85%	14%	86%	65%	35%	54%	46%	40%	60%	70%	30%
2009	13%	87%	14%	86%	65%	35%	54%	46%	39%	61%	70%	30%
2010	13%	87%	14%	86%	64%	36%	53%	47%	39%	61%	69%	31%
2011	13%	87%	13%	87%	63%	37%	53%	47%	39%	61%	68%	32%
2012	13%	87%	14%	86%	62%	38%	52%	48%	39%	61%	68%	32%
2013	12%	88%	13%	87%	61%	39%	51%	49%	38%	62%	68%	32%
2014	12%	88%	13%	87%	60%	40%	51%	49%	38%	62%	68%	32%
2015	12%	88%	13%	87%	59%	41%	50%	50%	38%	62%	67%	33%

Source: NMFS IFQ QS holdings database sourced by AKFIN

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2.7 COMMUNITY IMPACTS

This section addresses Objectives 1, 8, and 9 of the final EIS for the IFQ Program.

- Objective 1: Address the problems that have occurred with the current management regime - economic stability in the fisheries and communities, and rural coastal community development of a small boat fleet.
- Objective 8: Limit the adjustment cost to current participants including Alaskan coastal communities.
- Objective 9: Increase the ability of rural coastal communities adjacent to the Bering Sea and Aleutian Island to share in the wealth generated by the IFQ Program.

In developing the halibut and sablefish IFQ Program, the Council was concerned with the potential impacts of the program on coastal communities. Communities have historically been principally involved in the fixed-gear halibut and sablefish fisheries as ports of landing, the location of processing plants, and the center of a multitude of secondary service providers for harvesters and processors. Additionally, communities are involved as the place of residence of those directly involved in the fisheries. At the time of IFQ implementation, the Council was particularly concerned about the impact of the IFQ Program on the halibut and sablefish landings at various coastal communities adjacent to the fishing grounds and on Alaska rural resident participation in the fisheries.

The Council included several provisions in the IFQ Program in order to address concerns about the potential redistribution of benefits from the fixed gear halibut and sablefish fisheries amongst communities (NMFS/NPFMC, 1992):

- The initial QS allocation criteria
- Restrictions on the amount of QS or IFQ a person can control or use
- Restrictions on who can acquire and use catcher vessel QS and IFQ
- Restrictions on leasing of catcher vessel IFQ
- Restrictions on the use of hired masters for the harvest of catcher vessel IFQ
- Vessel class use restrictions
- Restrictions on the amount of IFQ that can be used on each vessel
- No restrictions on where halibut and sablefish IFQ can be landed or requirements for delivery to specific processors
- No restrictions on where halibut and sablefish can be landed within Alaska

This section assesses the effects of the IFQ Program on communities, with respect to both QS holdings and IFQ landings. Changes in QS holdings and IFQ landings are first examined at the aggregated state level for Alaska, Washington, Oregon, and “Other States” (all other states combined). Given that the Council also made an explicit reference to rural communities in its objectives for the program, the effects of the IFQ Program with respect to QS holdings and landings on rural Alaska communities are also assessed, wherein rural is defined as a community with fewer than 2,500 people, based on the U.S. Census Bureau definition, although there are other potential ways of defining rural communities.[56] Information on QS holdings and IFQ landings for specific communities is provided in publicly available

[56] For example, eligibility to participate in the CQE Program is constrained to communities with a population of fewer than 1,500 people.

reports through NMFS.[57] It is not the intention of this review to reproduce these community-level reports, but rather to provide this information on the aggregated level that was identified in the Council's original objectives for the IFQ Program.

With respect to both QS holdings and IFQ landings, this section will present time-series data across the identified categories of communities. During the presentation of the outline of topics for the IFQ Program Review in December of 2015, the NPFMC recommended that the impacts on Alaska communities be examined specifically with respect to the communities' access to road and air transportation for this section of the review. Such a distinction is particularly applicable to examining impacts of the IFQ Program on communities with respect to processing, as the shift towards an increasingly fresh product especially in the halibut fishery increased the need for processors' access to transportation (see Section 2.4.2). This section, therefore, also includes an analysis of IFQ impacts on coastal communities with respect to transportation accessibility.

This section also provides a brief examination of changes in QS holdings specifically by residents of communities eligible to establish an entity to hold and lease halibut and/or sablefish QS under the Community Quota Entity (CQE) Program, implemented in 2004. The Council previously identified these rural Gulf of Alaska communities as being of particular concern with respect to QS holdings in the IFQ fisheries. The Council elected to provide these communities with authority to purchase and hold catcher vessel QS in order to help ensure access to and sustain participation in the commercial halibut and sablefish fisheries. Eligible communities can form non-profit corporations, CQEs, to purchase catcher vessel QS, and the annual IFQ resulting from the QS must be leased to community residents for harvest.

Researchers at the Alaska's Fisheries Science Center have developed community fisheries engagement and reliance indices, as well as resilience and vulnerability indices, which are also incorporated into this section of the IFQ Program Review (Section 2.7A).[58] The community fisheries engagement and reliance indices utilize information on commercial harvesting and processing and recreational fishing, while the resilience and vulnerability indices utilize a broader set of information including labor force participation, housing characteristics, poverty, population composition, personal disruption, housing disruption, subsistence fishing, and species-specific dependence.[59]

Objective 9 relates to the implementation of the CDQ Program. Since the CDQ Program is a separate management program, it will not be reviewed as part of the IFQ Program Review. However, with respect to the participation of rural coastal communities in the IFQ fisheries, a recent analysis by Council staff for the development of the Pacific Cod CDQ fishery[60] includes a description of CDQ resident participation in the CDQ halibut fishery.

Data

This section utilizes data on IFQ landings (pound and values) by port of landing provided by AKFIN (community profiling data). This section also utilizes data on QS holdings by community provided by

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[57] See Halibut Transfer Report: http://alaskafisheries.noaa.gov/ram/halibut-transferfrpt2015.pdf; Sablefish Transfer Report: http://alaskafisheries.noaa.gov/ram/sablefish-transferrpt2015.pdf; and Report on holdings of IFQ by residents of selected Gulf of Alaska fishing communities: http://alaskafisheries.noaa.gov/ram/reports/ifq_community_holdings_95-12.pdf
[58] Engagement represents the scale of the industry in the community while reliance represents the importance to the community of the industry in terms of numbers per resident. Broadly, vulnerability and resilience indices refer to a community's susceptibility and capacity to respond to change, respectively.

[59] The AFSC has also been working to present these vulnerability indices by catch share program and to test how community vulnerability has changed over time.
[60] See: C1 CDQ Pcod Public Review.pdf

AKFIN (community profiling data) and by the NMFS RAM Division. QS holdings at initial allocation and every year thereafter are available on NMFS' Alaska Region website.[61] Data on road access and air transportation for individual Alaskan communities was downloaded from the State of Alaska's Community Database Online.[62] As in other sections of this IFQ Program Review, the baseline period is the average of the three years preceding the implementation of the IFQ Program, 1992 through 1994.

In the following examination of QS holdings and IFQ landings by communities, Alaska communities are designated as either urban or rural. Population information was used to designate communities as urban or rural. Population data was pulled by AKFIN from the Alaska Department of Labor's annual population estimates. A community is designated as urban if it had a population of 2,500 people or more. Communities with populations under 2,500 were designated as urban if they are within urbanized areas. Urbanized areas are defined as communities and places connected by road to urban centers with populations of 6,000 or more and lying within a 20-mile radius of the urban center (for centers from 6,000 to 20,000 population) or a 40-mile radius (for centers of more than 20,000).[63] These urban and rural designations are aligned with previous NMFS reporting of rural and urban Alaska communities (NMFS, 2015a; 2015b). NMFS RAM Division provided a list of urban communities, inclusive of those within the defined urbanized areas. Other communities were added to the list of urban communities in years in which their population was over 2,500 people. Communities designated as rural are all those with fewer than 2,500 people that are not within the defined radii of urbanized areas. The community population data was then merged with the community QS holdings and IFQ landings data using a unique identifier for each community.

Alaska communities are also designated as having an airport or not (1 or 0) and as having road access or not (1 or 0). These were attributes that were of interest by Council during the workplan presentation for the IFQ review. The urban designation described above captures road access to large communities within the 20 and 40 mile radii boundaries, but does not include communities with road access beyond this area. In order to capture all communities on the road system in Alaska, the analysts utilized the road access designation provided by the State of Alaska for each community. Data on road access and airports was pulled from the Alaska Community Database Online available through the Department of Commerce, Community, and Economic Development (DCCED).[64] This data was then merged with community QS holdings, IFQ landings, and population data using a unique identifier for each community. DCCED defines road access as: "a community connected by part of a major road system, allowing surface transportation to other communities, the Canadian road system and the roads in the lower 48". DCCED provides information on airport type by community (airport, seaplane base, or helicopter base). For the purposes of this analysis, a community is designated as having an airport only if it has an "airport" under the airport type, so that communities with seaplane bases and helicopter bases but without airports were excluded. Note that the road access and airport transportation attributes are point estimates for one year, 2013 for road access and 2014 for airport transportation. These point estimates are applied to the rest of the years in the dataset for that community. Therefore, if an airport was built in a community only in 2000, that community would incorrectly be designated as having an airport in our dataset for all of the years of the dataset inclusive of pre-2000 years. The analysts were unable to find historical data on the

[61] See: https://alaskafisheries.noaa.gov/permits-licenses?field_fishery_pm_value=Individual+Fishing+Quota+%28IFQ%29+Halibut%2FSablefish+and+CDQ+Halibut+IFQ
[62] See: https://www.commerce.alaska.gov/dcra/DCRAExternal
[63] The radius is measured from the center of the city as denoted by the city location point on maps, rather than from the city limits. An exception to the radius rule is that the Anchorage "urbanized area" does not extend north of Knik Arm nor south of Turnagain Arm.
[64] See: https://www.commerce.alaska.gov/dcra/DCRAExternal

airport and road access attributes.[65] However, much of Alaska's road infrastructure was built in response to the needs of World War II and in the 1950s and airports in remote Alaska began to be built in the 1960s. Therefore, it is assumed that there were no significant changes in road and airport infrastructure following IFQ implementation and that applying DCCED's infrastructure data retroactively provides a reasonable level of accuracy for the purposes of this analysis.

2.7.1 Anticipated community impacts from changes in ports of landing following IFQ

A community can derive economic benefits from landings in its port as a result of several factors, including taxes on landed and processed fish, local employment at the processing plant, expenditures within the community by processing workers, the processor's expenditures on fuel, electricity, water, etc., and expenditures by marine support service businesses within the community resulting from vessels making landings in the community. Analysts for the final EIS for the IFQ Program described the anticipated effects of IFQ implementation on the redistribution of landings of halibut and sablefish (see Section 2.4.2 Processor Impacts and NPFMC/NMFS, 1992). The IFQ Program was anticipated to change processing needs especially in the halibut fishery as the market shifted from a frozen to a fresh product. It was also expected that some processing would shift from outside of Alaska into Alaska as the switch to a fresh market would mean that processors closer to the fishing grounds would potentially be able to offer higher ex-vessel prices. However, remote Alaska communities without access to road or air transportation to hubs, which could compete for landings in the pre-IFQ halibut and sablefish fixed-gear fisheries, would be at a comparative disadvantage under the IFQ Program wherein the capacity to deliver product to fresh markets would be increasingly important.

Prior to IFQ implementation, some fishermen made landings of Alaska-caught halibut in Oregon, Washington, and British Columbia. In these areas the ex-vessel price of fish was typically higher because the ports are closer to the final markets (NMFS/NPFMC, 1992). The incentives to land in ports outside of Alaska were greater for non-Alaska fishermen, who would ultimately be returning to their homeports. Prior to IFQ, the derby-style fishery often resulted in fishermen having to wait several days to deliver their catch to a processor. Since the non-Alaska fisherman may have to make the run from Alaska to their homeport anyway, if this fisherman decided to land their catch outside of Alaska prior to IFQ, they would save the costs of waiting in port for several days to unload their fish. Their fish would potentially be no less fresh than if they waited to deliver at a processor in Alaska, and they may be able to get a higher ex-vessel price (ibid.).

It was also anticipated that under IFQs, the number of fishing days per trip would increase as fishermen were no longer limited by the short openers, especially for halibut (NPFMC/NMFS, 1992). With these longer fishing trips, the additional days of running time required to land halibut in ports outside of Alaska would be even more costly in terms of decreased product quality. Therefore, even for non-Alaska fishermen who may have to eventually return their vessels to non-Alaska homeports, the incentives to land fish at non-Alaska processors were expected to change after IFQ implementation.

Coastal communities that had previously not been able to attract a processor with large freezing capacity could potentially be more competitive under an IFQ Program, especially with respect to processing halibut. With landings distributed more evenly throughout the year, much less freezing capacity is actually necessary and no freezing capacity is necessary if the fish is going to fresh markets. This change could allow small processors with limited or no freezing capacity to come into the halibut processing market. Furthermore, given the more dispersed distribution of landings under the IFQ Program, the

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[65] The analysts searched the online DCCED database and submitted an inquiry to the Alaska Region of the Federal Aviation Administration.

processors that had built processing capacity for the large volume of pre-IFQ landings in a short period of time would have to operate at less than peak capacity in the post-IFQ fisheries. If these processors were unable or unwilling to operate at less than peak capacity following IFQ implementation, this could open the way for small processors to become more viable in competing for IFQ landings.

Although some processing, especially of halibut, was expected to shift into Alaska as a result of IFQs, analysts for the final programmatic EIS anticipated that remote Alaska communities without access to air or road transportation to hubs would be at a competitive disadvantage in this new processing market (NPFMC/NMFS, 1992). These remote communities could compete in the pre-IFQ processing market of mostly frozen product because air or road transportation was not crucial and they could offer similar ex-vessel prices to those processors in larger ports. In the post-IFQ fisheries, the fresh halibut market is reliant on moving product quickly, and processors that do not have access to such transportation cannot process for the fresh market and offer ex-vessel prices similar to those that do. In effect it was anticipated that the IFQ Program would release some of the previous constraints on processing and lead to a mix of frozen and fresh product, but that this was likely to come at the cost of shifting processing out of some communities.

2.7.2 Anticipated community impacts from changes in QS holdings

Analysts for the final EIS for the IFQ Program described the anticipated effects of IFQ implementation on participation in the fixed-gear halibut and sablefish fisheries by residents of coastal communities. The analysts focused specifically on the creation of wealth through the IFQ Program, the capacity of communities themselves to assist fishermen in participating in the IFQ fisheries, and the potential movement of QS from rural coastal communities in Alaska. Although communities are likely to derive some benefits from landings made in their community, the distribution of income earned from the harvesting of IFQ among communities fish depends on where QS holders live (and others who earn income from the landing of IFQ fish, e.g., vessel owners, captains, crewmembers).

The IFQ Program was anticipated to increase the wealth derived by harvesters from the fixed-gear halibut and sablefish fisheries by providing for higher ex-vessel and wholesale prices and lower harvesting and processing costs. Much of these benefits would be captured by initial recipients of QS and some of the benefits would flow to those who acquired QS subsequent to initial allocations. The greater wealth was expected to benefit the communities in which the QS holders live.

The final EIS for the IFQ Program also examined the potential movement of QS away from rural Alaska communities. There was a concern that the implementation of the IFQ Program would lead to a redistribution of QS ownership within Alaska. Several factors could disproportionately affect the likelihood of a fisherman from a rural Alaska community in selling their QS, including potentially higher costs of access to markets for fishermen landing fish in remote communities; the likelihood that fishermen in remote communities use smaller, less efficient vessels to land fewer pounds of IFQ which result in lower profit margins than larger operations; less fishing infrastructure and fewer marine support services in remote communities; less access to capital to purchase economically viable amounts of QS; and more susceptibility to inter-annual variability in income which can provide an incentive for selling QS (McDowell Group, 2005; Carothers, Lew, and Sepez, 2010; Sethi, Dalton, and Hillborn, 2012; Sethi, Reimer, and Knapp, 2014; Sethi, Riggs, and Knapp, 2014).

Analysts for the final EIS compared transfers of limited entry permits in the Alaska's State limited entry fisheries out of Alaska and out of communities local to the fisheries to expected transfers of QS in the IFQ fisheries. They concluded that the net transfer from Alaska to non-Alaska residents and from local rural residents to other Alaska residents was expected to be substantially less than it had been for Alaska's limited entry permits, because of the experience in the State's programs and the critical differences between the limited entry and IFQ Programs. At the time, there had been a relatively small net transfer of limited entry permits from Alaska residents to non-Alaskans, but a substantially larger net transfer from rural local Alaska residents to other Alaska residents. Of particular importance was the distinction between the use rights afforded by a limited entry permit and by QS. Those with limited entry permits still have to compete with other fishermen for a limited allowable harvest and those who are more capable or willing to work their vessels harder and longer will be able to get more from owning their permit. The more "marginal" fisherman in terms of their harvesting level is at a disadvantage in a limited entry permit fishery. In an IFQ fishery, the same fisherman can use an amount of IFQ that actually reflects his earnings expectations at the margin. The EIS analysts also noted that unlike the State's limited entry programs, the IFQ Program was implemented in fisheries that had not been previously dominated by local rural residents.

2.7.3 Previous research on community impacts from IFQ implementation

This section briefly highlights previous research that has examined changes in participation in the halibut and sablefish fixed-gear fisheries following IFQ implementation. NMFS also has several data sources that provide information specifically on QS holdings in the IFQ fisheries by residents of Gulf of Alaska fishing communities,[66] by Census areas,[67] and by individual communities.[68]

Researchers have explored QS migration as a factor of community attributes. Early on in the IFQ Program, researchers showed the out-migration of halibut and sablefish QS from communities identified as the Alaska Peninsula subgroup[69] (CFEC, 1998). Carothers, Lew, and Sepez (2010) analyzed QS market participation from 1995 to 1999 in the halibut IFQ fishery by community of residence of the QS buyers and sellers. They found that residents of small rural fishing communities in Alaska, identified as those with fewer than 1500 residents within 10 miles of the coastline and having rural status according to the U.S. Federal Subsistence Board, were more likely to sell than to buy QS. They also found that residents of Alaska Native villages had an increased likelihood of selling QS. Carothers (2015) also conducted a survey of halibut IFQ holders and found that, as far as community characteristics, residents of small remote fishing communities in the Gulf of Alaska showed the least support for IFQ management whereas residents of CDQ communities expressed the most support for IFQs.

Researchers have also explored the impacts of the IFQ Program specifically on the community of Kodiak and the Alutiiq communities of the Kodiak archipelago. Carothers (2015) examined how fisheries privatization processes, including the IFQ Program, have negatively impacted core values, the empowerment of crewmembers relative to QS holders, the prospects for upward mobility in fisheries, and divisiveness among community members. Carothers (2010) utilized ethnographic research of the communities of Larsen Bay, Old Harbor, and Ouzinkie to describe how resource enclosure and privatization, such as the IFQ Program, may undermine the traditional fishing practices, culture, and economy in a community. Participants in her study indicated that lack of economic resources and limited access to information on fishery management processes created significant barriers to entry into the IFQ

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[66] "Report on Holdings of Individual Fishing Quota by residents of selected Gulf of Alaska fishing communities, 1995 to 2014", Available: https://alaskafisheries.noaa.gov/sites/default/files/reports/ifq_community_holdings_95-14.pdf
[67] Available in the halibut and sablefish transfer reports. See halibut: https://alaskafisheries.noaa.gov/sites/default/files/reports/halibut-transferfrpt2015.pdf See sablefish: https://alaskafisheries.noaa.gov/sites/default/files/reports/sablefish-transferrpt2015.pdf
[68] See Alaska Fisheries Science Center's community profiles: http://www.afsc.noaa.gov/REFM/Socioeconomics/Projects/CPU.php
[69] These communities included Akutan, Atka, Belkofski, Chignik, Chignik Bay, Chignik Lagoon, Chignik Lake, False Pass, King Cove, Perryville, Sand Point, and Ivanof Bay.

and limited access fisheries, and that the loss of fishing rights was the biggest threat to community sustainability.

Carothers (2011) explored the process of CQE formation, perceptions of the CQE Program, and participation possibilities and barriers on these same Kodiak archipelago communities. High QS prices and limited access to financing had impeded QS purchases by these CQE communities (ibid.). Other researchers have noted these factors as impediments to QS acquisition by CQE entities as well (Langdon, 2008; Himes-Cornell and Hoetling, 2015).

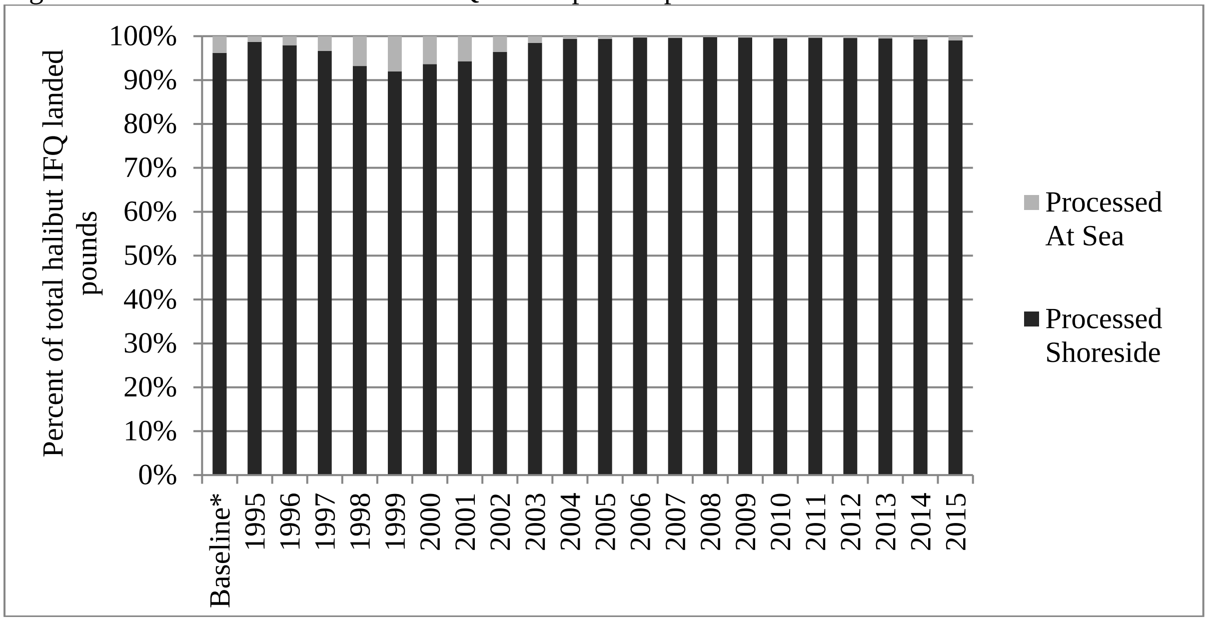
2.7.4 Geographic changes in halibut and sablefish landings

2.7.4.1 Changes in halibut and sablefish IFQ landings by state

At the time of IFQ implementation, it was anticipated that some processing, especially of halibut, would shift from outside of Alaska into Alaska as the market for halibut shifted to fresh product. The incentives to land in ports outside of Alaska were expected to decrease with the IFQ Program. The prolongation of fishing seasons was expected to eliminate the lines of fishermen waiting to deliver halibut to processors in Alaska. Furthermore, under IFQs Alaska processors with transportation access to the fresh market could presumably offer higher ex-vessel prices than processors elsewhere which would receive the fish several days later.

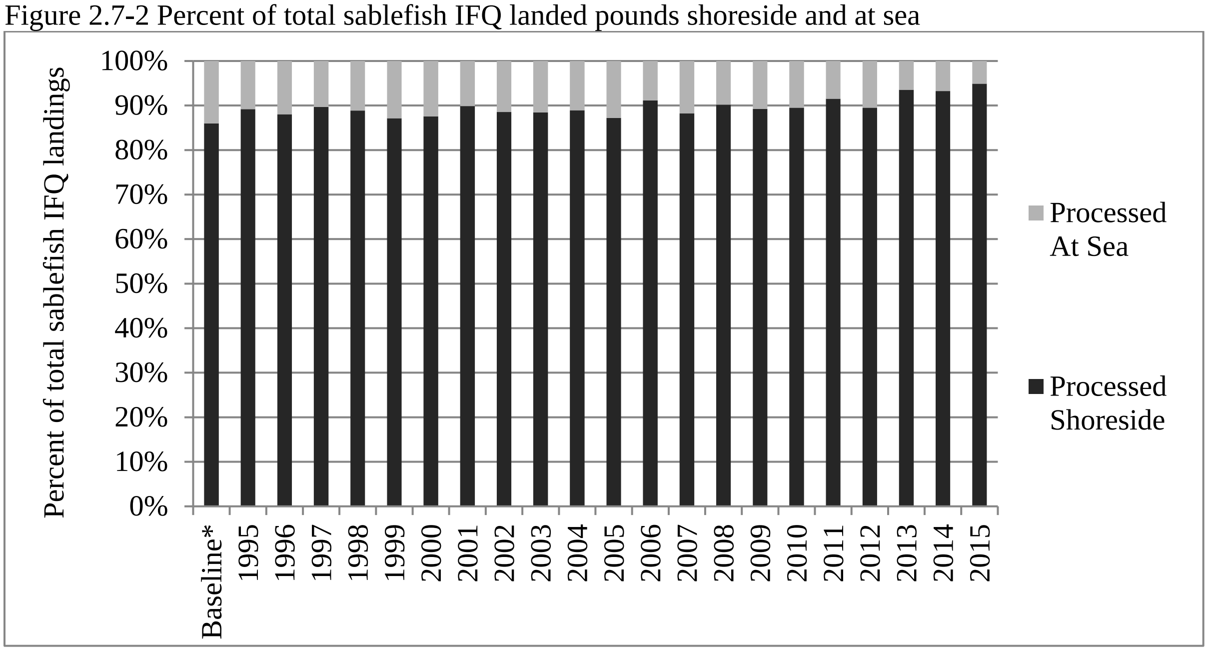
Figure 2.7-1 and Figure 2.7-2 show the percent of total halibut and sablefish IFQ landed pounds, respectively, processed shoreside and at sea for the baseline period and every year of the IFQ Program through 2015. For the purposes of this analysis, shoreside processing is strictly limited to those processors defined as “shore-based processors” in the ADF&G database of processor types. Therefore, at-sea processing includes all other processor types, such as catcher processors, floating processors, catcher-exporters (which catch and transport unpackaged, unprocessed fish out of state), and buyer-exporters (which buy unprocessed fish from fishermen for transport out of state). For both IFQ fisheries, at-sea processing has historically (during the baseline period) and since IFQ implementation comprised a small percentage of total processing. Relative to the baseline period, the percentage of all IFQ pounds processed at sea of both species has decreased over the course of the IFQ Program, after a slight increase in the late 1990s and early 2000s for halibut. There are numerous factors which could contribute to this decrease, including shoreside processors offering higher ex-vessel prices, the movement of QS from non-individual entities to individuals, the latter of which may be less likely to have a relationship with an at-sea processor, a decreasing market for frozen fish (the primary product of at-sea processing) especially for halibut, and decreasing TACs which could mean that at-sea processors are not receiving large enough landings to make at-sea processing economically viable.

Figure 2.7-1 Percent of total halibut IFQ landed pounds processed shoreside and at-sea



Source: COAR data sourced by AKFIN

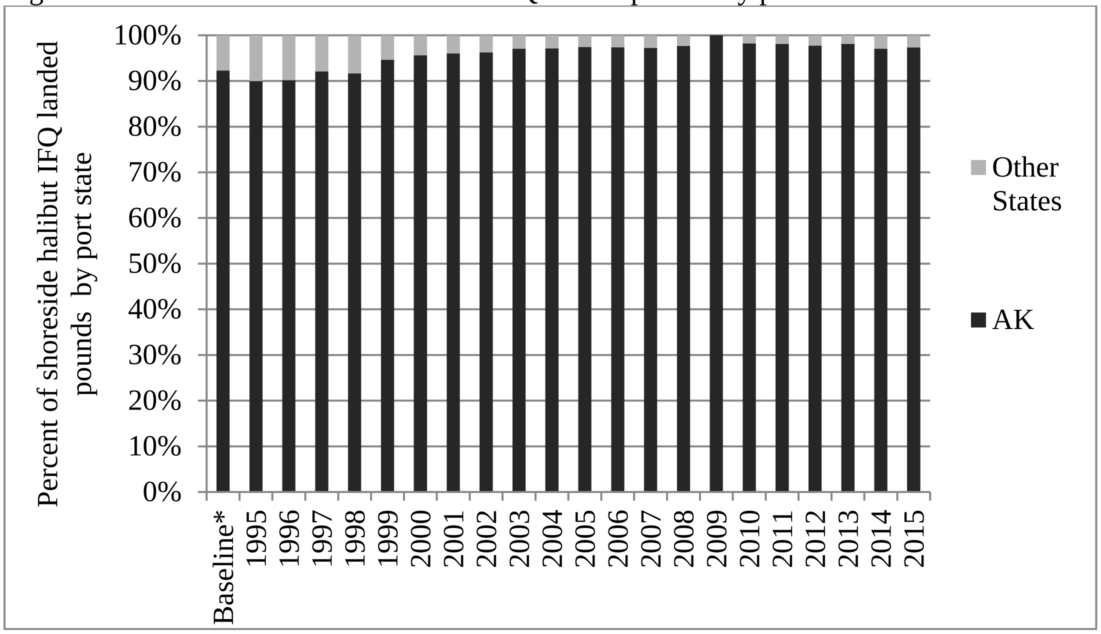
Figure 2.7-2 Percent of total sablefish IFQ landed pounds shoreside and at sea



Source: COAR data sourced by AKFIN

Figure 2.7-3 and Figure 2.7-4 show the percent of total shoreside halibut and sablefish IFQ landed pounds, respectively, by port state. Within the halibut fishery, after a slight increase in the years immediately following implementation of the IFQ Program, there was a decrease in the percentage of the total shoreside halibut IFQ landed outside of Alaska over the subsequent years relative to the baseline period. This change was anticipated at the time of IFQ implementation and is aligned with expectations about greater incentives to land halibut at shoreside processors in Alaska.

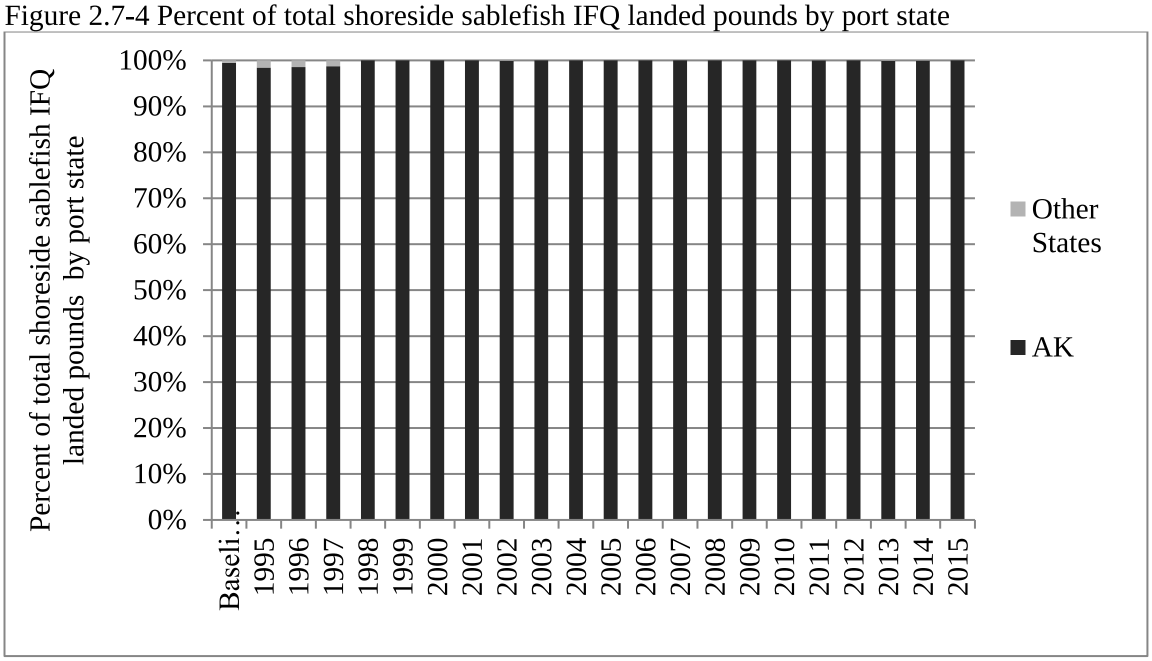
Figure 2.7-3 Percent of shoreside halibut IFQ landed pounds by port state



Source: COAR data sourced by AKFIN

Figure 2.7-4 shows that there was very little sablefish shoreside processing outside of Alaska prior to IFQ. Because the sablefish fishing seasons prior to IFQ were longer, sablefish fishermen did not have the same incentives to land their fish at processors outside of Alaska prior to IFQ as halibut fishermen (long lines outside of processors leading to deteriorating product and potentially lower ex-vessel prices in the derby halibut fishery). There was a slight increase in shoreside processing of sablefish outside of Alaska immediately following IFQ implementation, but sablefish landings at non-Alaska shoreside processors have been negligible since then.

Figure 2.7-4 Percent of total shoreside sablefish IFQ landed pounds by port state



Source: COAR data sourced by AKFIN

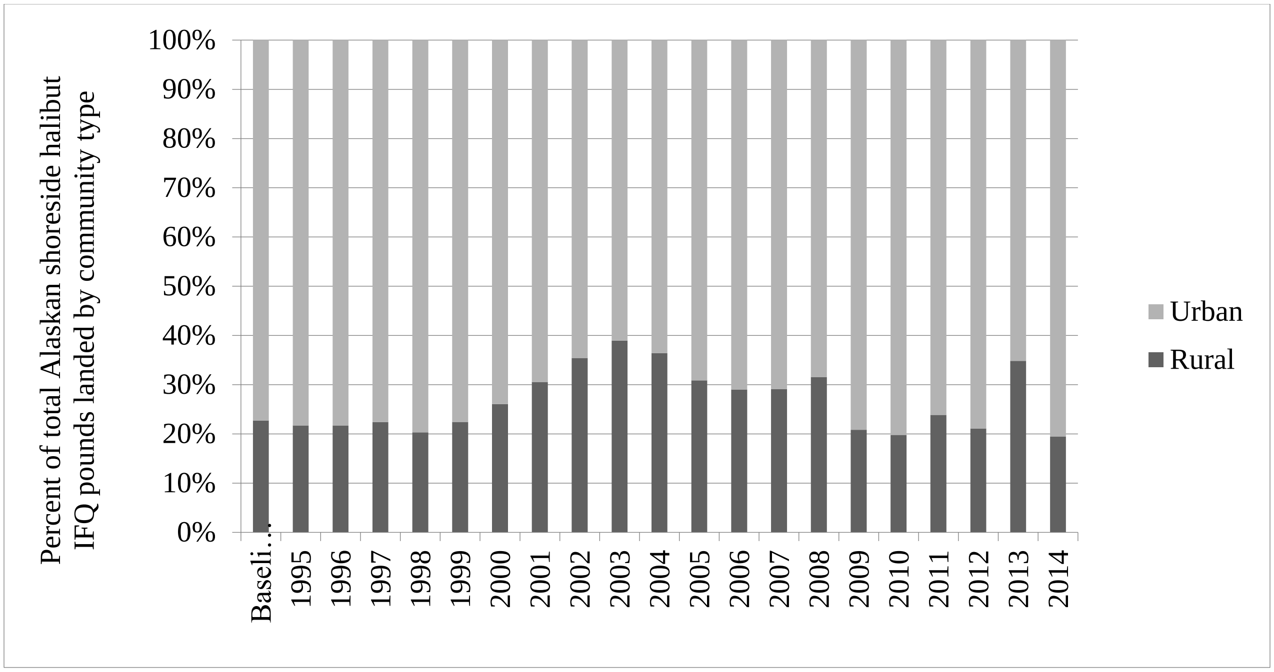
2.7.4.2 Changes in halibut and sablefish shoreside IFQ landings by urban and rural Alaska communities and by road and air transportation access

It was expected at the time of IFQ implementation that processing needs especially for halibut would change with the program. The shift towards a fresh product for halibut would provide opportunities for new processors to enter the halibut processing market and potentially allow new communities to benefit from these landings; however, this redistribution of landings would be at the cost of previous participants and communities that had benefited from the presence of a processor during the pre-IFQ fisheries. Analysts for the final programmatic EIS focused on the potential redistribution of landings from remote Alaska communities, without access to road or air transportation, which would not be able to compete in a market that shifted to fresh processing for halibut.

Figure 2.7-5 shows the percent of total halibut IFQ shoreside landed pounds in Alaska for urban and rural communities. Rural communities are defined as those with fewer than 2,500 people that are not within a pre-defined radius of an urbanized center (as described in the Data section above). Since IFQ implementation, the percent of the total halibut IFQ shoreside landed pounds in rural Alaska has been stable, with a slight increase relative to the baseline period, from 23% during the baseline to 26% for the period from 1995 to 2014. The increase in the average percent of Alaska shoreside halibut pounds landed in rural communities is due to increases in the years from 2000 through 2008 and in 2013.

It is important to note that inter-annual variation in the distribution of these landings is not just a factor of changes in processing across communities but also changes in the designation of communities as rural or urban. For example, the spike in landings in rural communities in 2013 is due to an increase in the number of rural communities due to a drop in the reported population of a community below the 2,500 population threshold for urban and the re-designation of that community as rural. In the following year (2014), the reported population for this community increased again to over 2,500 and the landings in that community were designated as urban. The landings in communities designated as rural in 2014 were similar to those in previous years. The increases in landed pounds in rural communities from 2000 through 2008 relative to the baseline period is associated with both a re-designation of one community from urban to rural (that remains rural throughout the remainder of the dataset) and with an actual shift in processing from urban to rural communities.

Figure 2.7-5 Percent of total halibut IFQ shoreside landed pounds in Alaska in urban and rural communities



Source: COAR data sourced by AKFIN & Alaska's Community Database Online

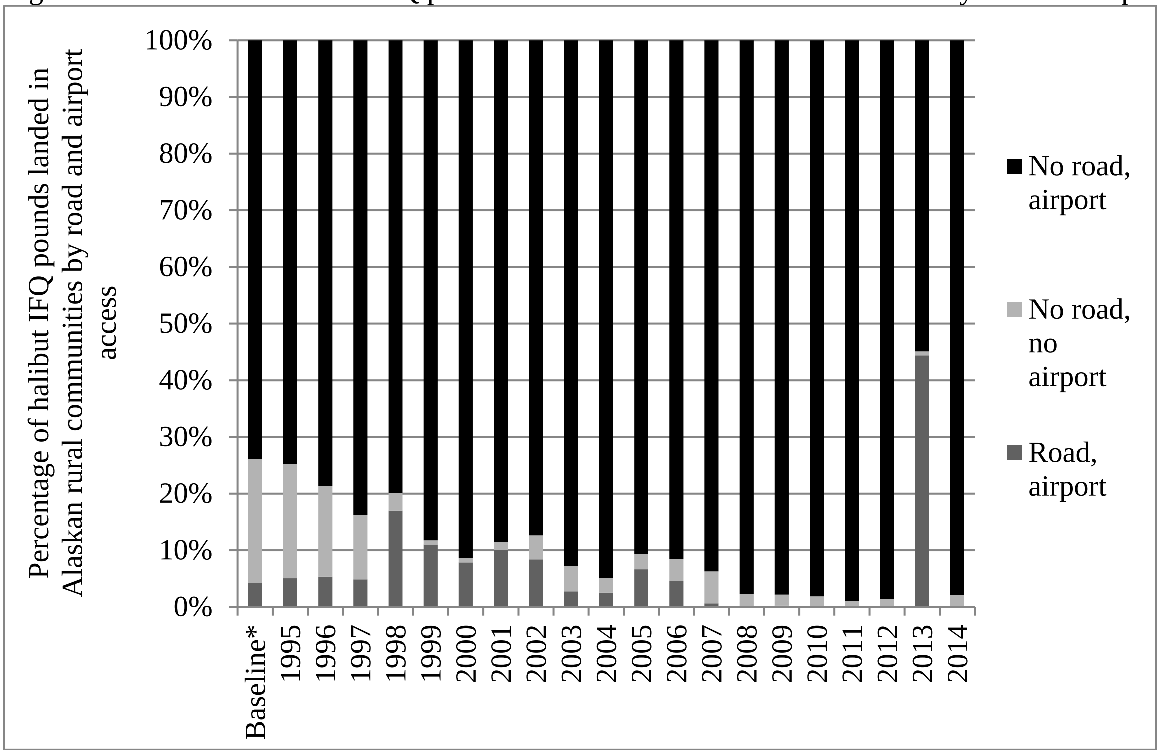
Figure 2.7-6 is used to examine whether the increase in the percentage of shoreside halibut IFQ pounds landed in Alaska in rural communities may be in line with expectations at the implementation of the IFQ Program that landings from remote Alaska communities would be redistributed to those communities with access to the road system and air transportation. The figure shows the percentage of halibut IFQ pounds landed in rural Alaska communities by whether the community has road access and/or airport transportation. Relative to the baseline period and over the course of the IFQ Program, there has been a decrease in the percentage of halibut IFQ pounds landed in rural Alaska communities in communities with no road or airport transportation. At the same time, there has been an increase in the percentage of halibut IFQ pounds landed in rural Alaska communities in communities with no road but an airport. For rural Alaska communities with road access and an airport, there was an increase in the late 1990s and early 2000s in the percentage of Alaska halibut IFQ shoreside landed pounds, but those landings essentially disappeared in the late 2000s. The increase in the percentage of rural Alaska halibut IFQ landed pounds in communities with a road and an airport in 2013 is due to the re-designation of the same community as noted for Figure 2.7-5 from urban to rural. There were nominal landings in rural communities with a road and no airport for three years of the dataset.

The trends in Figure 2.7-6 indicate that, as expected, there has been an overall shift of halibut IFQ landings out of rural Alaska communities without access to road or air transportation. Given that halibut IFQ landings in rural Alaska communities overall actually increased following IFQ implementation there has been an overall redistribution of halibut IFQ landings amongst rural Alaska communities towards those with road and airport access. The shift towards increasing fresh processing of halibut would necessitate access to quick transportation. Remote communities still processing for the frozen market would have a harder time competing for halibut IFQ landings with those processors offering ex-vessel prices aligned with fresh product. (This is described as well in Section 2.4.2 Processor Impacts).

The majority of communities with sablefish shoreside landings in rural Alaska communities are those communities without a road (37). Of those communities, 33 have an airport and 4 do not have an airport.

Only 11 Alaska rural communities with sablefish shoreside landings have road access, all of which have an airport. Nevertheless, the data does indicate an overall shift of sablefish IFQ landings away from the more remote rural Alaska communities without access to road or air transportation.

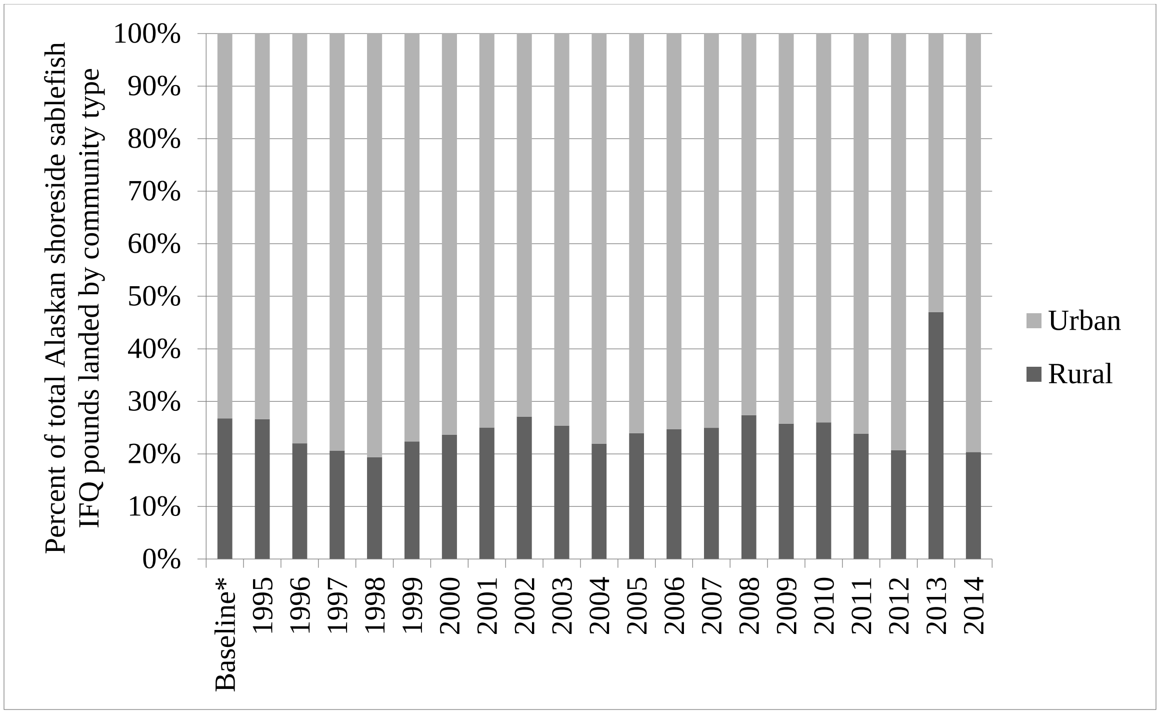
Figure 2.7-6 Percent of halibut IFQ pounds landed in Alaska rural communities by road and airport access



Source: COAR data sourced by AKFIN & Alaska's Community Database Online

Figure 2.7-7 shows the percent of total sablefish IFQ shoreside landed pounds in Alaska for urban and rural communities. Since IFQ implementation, the percent of the total sablefish IFQ shoreside landed pounds in Alaska has been stable, with a slight decrease (24% for the average of the years from 1995 to 2014, excluding 2013 for reasons described below) for rural communities compared to the baseline period of 27%. As with the halibut IFQ landings, the spike in landings in rural communities in 2013 is due to a drop in the reported population of a community below the 2,500 population threshold for urban and the re-designation of that community as rural. Unlike in the halibut IFQ fishery, the implementation of the IFQ Program was not expected to and did not change the product form for sablefish, which has remained a largely frozen product for the export market. Thus, processors that were established to process sablefish for the pre-IFQ market would be competitive in the post-IFQ market. The slight geographic redistribution of sablefish IFQ shoreside landed pounds from rural to urban Alaska communities may be tied to harvesters having more time and flexibility in where they can land their fish post-IFQ and therefore choosing urban ports which provide other advantages, including access to more marine support services, cheaper fuel and groceries, etc.

Figure 2.7-7 Percent of total sablefish IFQ shoreside landed pounds in Alaska in urban and rural communities



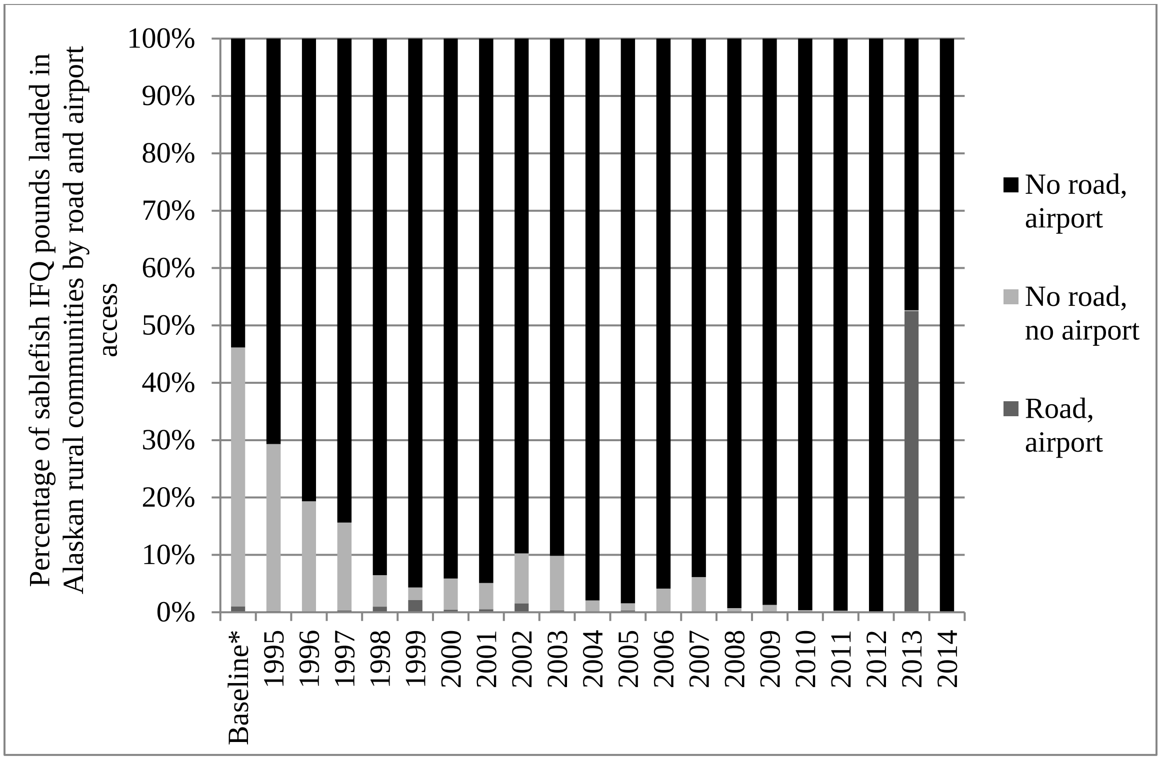
Source: COAR data sourced by AKFIN & Alaska's Community Database Online

Figure 2.7-8 shows the percentage of sablefish IFQ pounds landed in rural Alaska communities by road access and airport attributes of the communities. The trends in the redistribution of sablefish IFQ shoreside landings amongst rural communities with respect to road access and airports are similar to those for the halibut IFQ shoreside landings in rural Alaska communities. Relative to the baseline period and over the course of the IFQ Program, there has been a decrease in the percentage of sablefish IFQ pounds landed in rural Alaska communities with no road or airport transportation, with a concurrent increase in the percentage of sablefish IFQ pounds landed in rural Alaska communities with no road but an airport. Sablefish IFQ landings in rural Alaska communities with a road and an airport were eliminated in the mid-2000s. As in the halibut IFQ fishery, the increase in the percentage of rural Alaska sablefish IFQ landed pounds in communities with a road and an airport in 2013 is due to the re-designation of the same community as noted for Figure 2.7-5 from urban to rural. There were no sablefish IFQ landings in rural Alaska communities with a road and no airport in the dataset.

The trends in redistributions of sablefish landings in rural Alaska communities may be aligned with those in the halibut IFQ fishery because many halibut IFQ fishermen also own sablefish QS and may land their IFQ from both species with the same processor. Furthermore, if processing capacity moved between communities in response to changes in the halibut IFQ fisheries, this would shift sablefish processing to these other communities as well.

The majority of communities with sablefish shoreside landings in rural Alaska communities are those communities without a road (37). Of those communities, 33 have an airport and 4 do not have an airport. Only 11 Alaska rural communities with sablefish shoreside landings have road access, all of which have an airport. Therefore, sablefish IFQ landings as a factor of these transportation attributes of the communities are aligned with the distributions of these attributes across rural Alaska communities receiving sablefish landings. Nevertheless, the data does indicate an overall shift of sablefish IFQ landings away from the more remote rural Alaska communities.

Figure 2.7-8 Percentage of sablefish IFQ pounds landed in Alaska rural communities by road and airport access



Source: COAR data sourced by AKFIN & Alaska's Community Database Online

2.7.5 Geographic Changes in Halibut and Sablefish QS Holdings

The following sections discuss QS redistributions since IFQ implementation by the community of residence of the QS holder, at the aggregated state level and at the aggregated level of rural and urban Alaska communities.

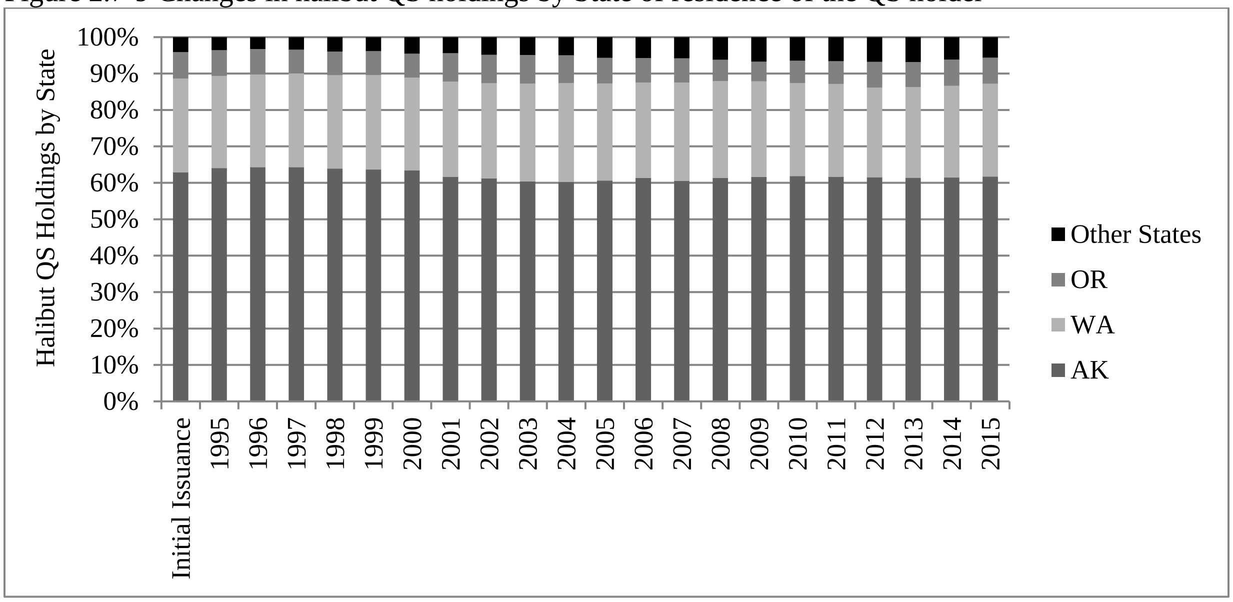
According to economic theory, QS movement from one operator to another should reflect expectations about marginal profitability, with QS ultimately moving from less to more efficient operators. As noted above in the discussions of anticipated community impacts from changes in QS holdings and the previous research on community impacts from IFQ implementation, differences in expectations about profitability at the community level may reflect differences in factors such as access to marine support services, operating in remote locations, differences in marine infrastructure, access to financing for QS loans, etc. These types of community-level economic factors may be important with respect to QS transfers between residents of rural and urban communities. However, they are unlikely to be of significance at the state level, wherein you may expect that these factors would be equalized. Differences in expectations about marginal profitability at the state level may reflect other factors, like the costs of participating in distant fisheries - the costs of transit to the fishing grounds (fuel, crew time expenses), the opportunity costs of that time, etc.

2.7.5.1 Changes in halibut and sablefish QS holdings by state of residency of the QS holder

The following section discusses QS holdings by the state of residence of the QS holder. The analysts for the final EIS for the IFQ Program did not indicate any expectations about QS redistribution at the state level.

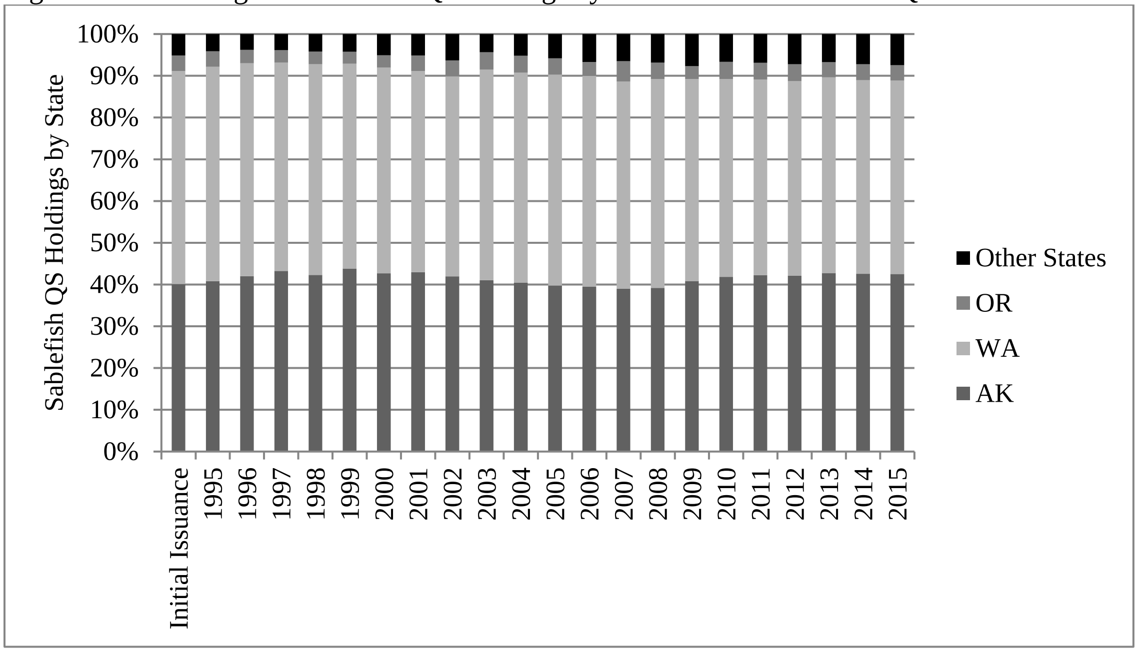
Figure 2.7-9 and Figure 2.7-10 show changes in halibut and sablefish QS, respectively, by the state of residency of the QS holder. Both figures indicate that there have been minor changes in QS holdings at the state level. For the halibut IFQ fishery, the majority of QS was issues to Alaska residents. QS holdings at initial issuance by the state of residency of the QS holder were 63% AK; 26% WA; 7% OR; and 4% other states have remained stable since initial issuance. 2015 QS holdings were 62% AK; 25% WA; 7% OR; and 6% other states. For the sablefish IFQ fishery, QS holdings have also been stable since initial issuance with a slight increase in holdings by Alaska residents. The QS holdings by state of residency at initial issuance were 40% AK; 51% WA; 4% OR; and 5% other states, compared to 2015 QS holdings – 43% AK; 46% WA; 4% OR; and 7% other states.

Figure 2.7-9 Changes in halibut QS holdings by State of residence of the QS holder



Source: NMFS RAM IFQ QS holdings database sourced by AKFIN

Figure 2.7-10 Changes in sablefish QS holdings by state of residence of the QS holder



Source: NMFS RAM IFQ QS holdings database sourced by AKFIN

Figure 2.7-11 and Figure 2.7-12 show halibut and sablefish QS holdings, respectively, by IFQ area and state of residence of the QS holder at initial allocation and in 2015. The figures indicate that there is substantial variation across the IFQ regulatory areas for both species with respect to the distribution of QS holdings by the state of residency of the QS holder and to changes in that distribution since initial allocation.

For halibut, Alaskans are the majority QS holders in Areas 2C, 3A, 3B, 4A, and 4C. In Areas 4B and 4D, residents of other states are the majority QS holders, with Washington residents being the predominant shareholders. The dominance of QS holders from other states in Areas 4B and 4D may be due to the difficulty of fishing in the Bering Sea, which likely necessitates bigger vessels to withstand the rugged conditions and therefore more capital. Area 4C is a small area surrounding the Pribilof Islands with waters that are more easily fished by the small vessel owners of those islands. From initial allocation to 2015, Alaskans have increased their halibut QS holdings in Areas 2C, 3B, 4A, 4B, and 4D, and their shareholdings have slightly decreased in Areas 3A and 4C.

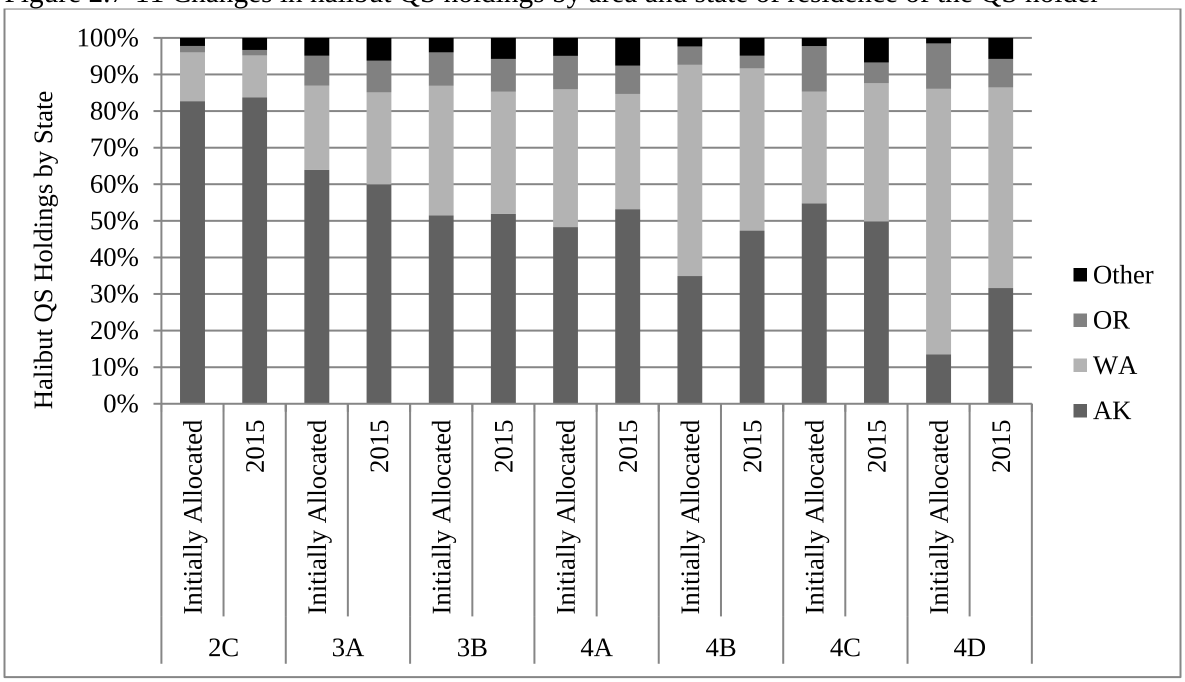
For sablefish, Alaskans are the majority QS holders only in the Southeast regulatory area, but Alaska residents have increased their QS holdings in the Aleutian Islands, Bering Sea, and Western Yakutat regulatory areas. Although they continue to be the majority QS holders in the Aleutian Islands and Western Yakutat areas, QS holders from Washington State have decreased their QS holdings in all of the sablefish IFQ regulatory areas from initial allocation to 2015. Residents from Oregon have increased their QS holdings substantially in the Bering Sea, and residents of other states have increased their QS holdings in the Aleutian Islands, Central Gulf, Southeast, Western Gulf, and Western Yakutat.

Regulatory differences in the Southeast Alaska regulatory areas (halibut Area 2C and the Southeast Outside District of the sablefish fishery) may have made participation for Alaskans more favorable than for non-Alaska residents. Most QS in these areas was allocated to the smaller vessel classes (Class D and C in the halibut and sablefish fisheries, respectively). Since fishing up, the harvest of smaller vessel class IFQ on larger vessels, is not allowed in these areas and QS trading between vessel classes is not allowed, the Council ensured the continued dominance of the small vessel fleet in Southeast Alaska. For non-

Alaska residents the use of small vessels would be difficult due to need to either run the vessel up to the fishing grounds for the season, which could be a long and dangerous voyage on a small vessel, or the costs and logistical difficulty of maintaining a vessel in a distant port.

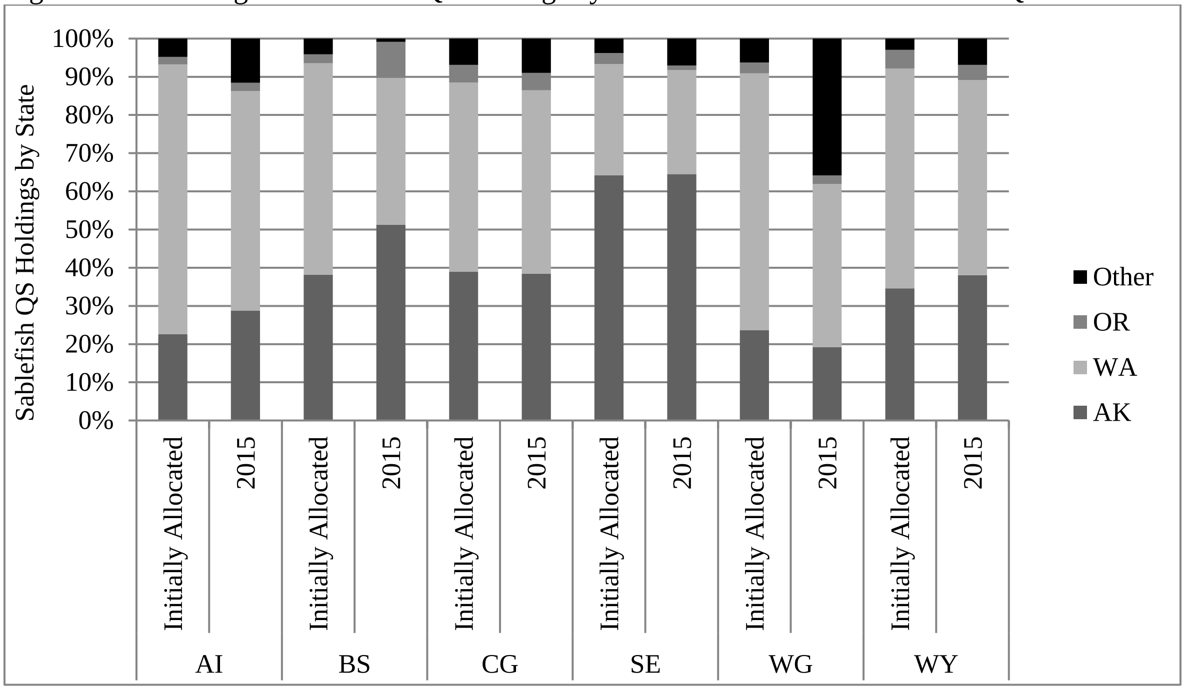
Furthermore, the prohibition on hired master use by all individuals in halibut Area 2C and the Southeast Outside District of the sablefish fishery may have provided a disincentive for non-Alaskans to acquire QS in these areas. Szymkowiak and Felthoven's (2016) model of hired master use in the halibut IFQ fishery shows that the odds of a shareholder using a hired master are 293% greater when the shareholder moves out of Alaska, holding all other variables constant.

Figure 2.7-11 Changes in halibut QS holdings by area and state of residence of the QS holder



Source: NMFS RAM IFQ QS holdings database sourced by AKFIN

Figure 2.7-12 Changes in sablefish QS holdings by area and state of residence of the QS holder



Source: NMFS RAM IFQ QS holdings database sourced by AKFIN

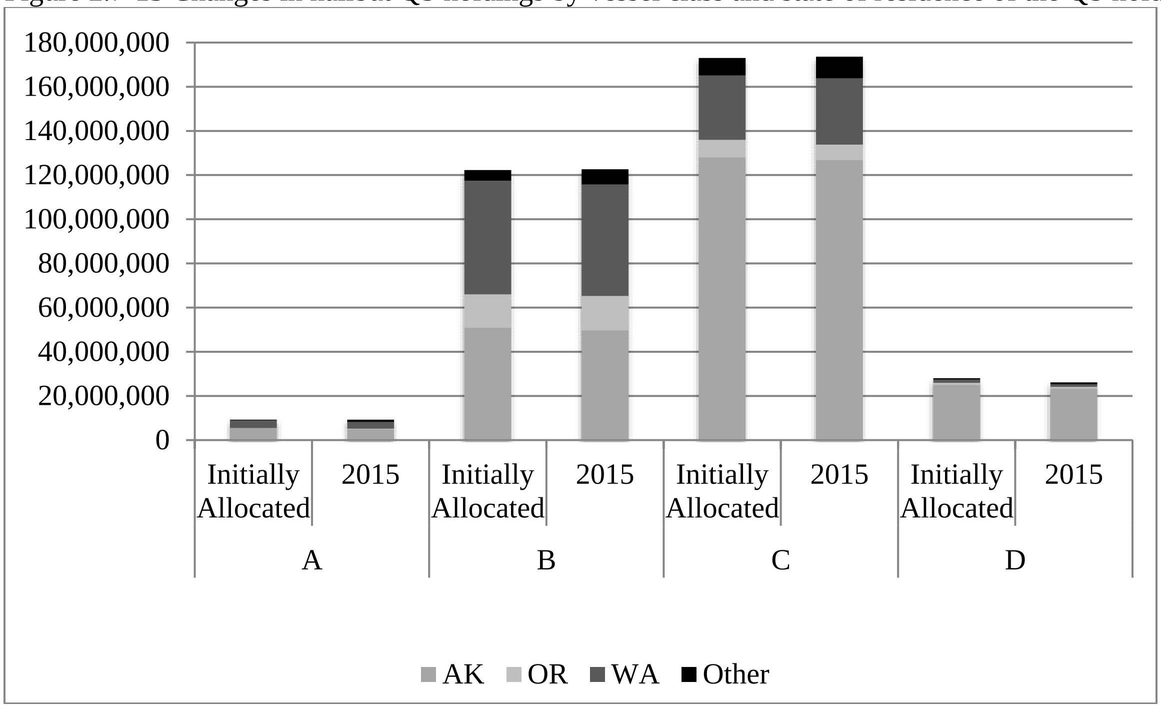
Table A.2.7.1 and Table A.2.7.2 in the Appendix to this section show the number of QS holders and average QS holdings by area and the state of residency of the QS holder at initial issuance and in 2014. The data in these tables has been previously presented in the NMFS Transfer Reports and is therefore not included in the text but in the Appendix for reference purposes. In general, as discussed in Section 2.3.6, there has been consolidation across all IFQ regulatory areas resulting in greater average QS holdings for participants across all states. Despite this overall trend, Alaska QS holders have smaller average QS holdings than non-Alaska residents across nearly all IFQ areas in both fisheries. However, Alaska QS holders were allocated smaller amount of QS on average at initial issuance than non-Alaska QS holders, and the percentage increase in average QS holdings for Alaska QS holders has been greater than for non-Alaska QS holders especially in the halibut fishery.

Figure 2.7-13 shows the changes in halibut QS holdings by vessel class and the state of residency of the QS holder. From initial allocation to 2015, there was little adjustment in the distributions of vessel class QS by the state of residency of the QS holder. (See Figures A.2.7.1 to A.2.7.7 for a breakdown of halibut QS holdings by area, state and vessel class at initial allocation and in 2015). Although not shown, these distributions are representative of annual QS holdings by vessel class and the state of residency of the QS holder throughout the time period.

These distributions provide an indication of how QS holders from different states may be differentially impacted by regulatory changes that affect a particular vessel class. Alaska residents continue to be the predominant owners of the smaller catcher vessel QS (Class C and D); therefore, any regulatory changes to how this vessel class QS may be transferred or utilized would predominantly affect Alaska IFQ participants. Washington and Alaska residents hold nearly equal percentages of the Class B QS (41% and 40%, respectively). As noted in the description of the distribution of QS holdings by area and the state of residency of the QS holder, it may be easier for Alaska IFQ fishermen to participate in the halibut IFQ fishery using small vessels because (assuming these fishermen are fishing in areas adjacent to their communities of residence) they do not have to travel as far to the IFQ fishing grounds as non-Alaska IFQ fishermen.

Another way to think about it is as a fraction of the total halibut QS holdings by residents of the state. In 2015, A shares comprised less than 7% of the total QS holdings of residents of any of the four state categories; D shares comprised 11% of the total QS holdings for Alaskans and less than 6% for each of the remaining state categories; C shares comprised the majority of QS holdings for Alaskans (62%) and residents of “other” states (52%); and B shares comprised the majority of Washington residents’ QS holdings (60%) and those of Oregon residents (66%) while only 24% of Alaska residents’ holdings and 37% of holdings of residents of “other” states. Thus, although changes to, for example, regulations affecting D shares would predominantly affect Alaskans that impact would be small relative to the total QS holdings for all QS holders. However, QS holdings by vessel class and State of residence of the QS holder vary by area. Therefore, the impacts of regulatory changes to a particular vessel class would have differential impacts across not just QS holders of different states, but within a group of QS holders from a particular state based on their area of QS holdings.

Figure 2.7-13 Changes in halibut QS holdings by vessel class and state of residence of the QS holder



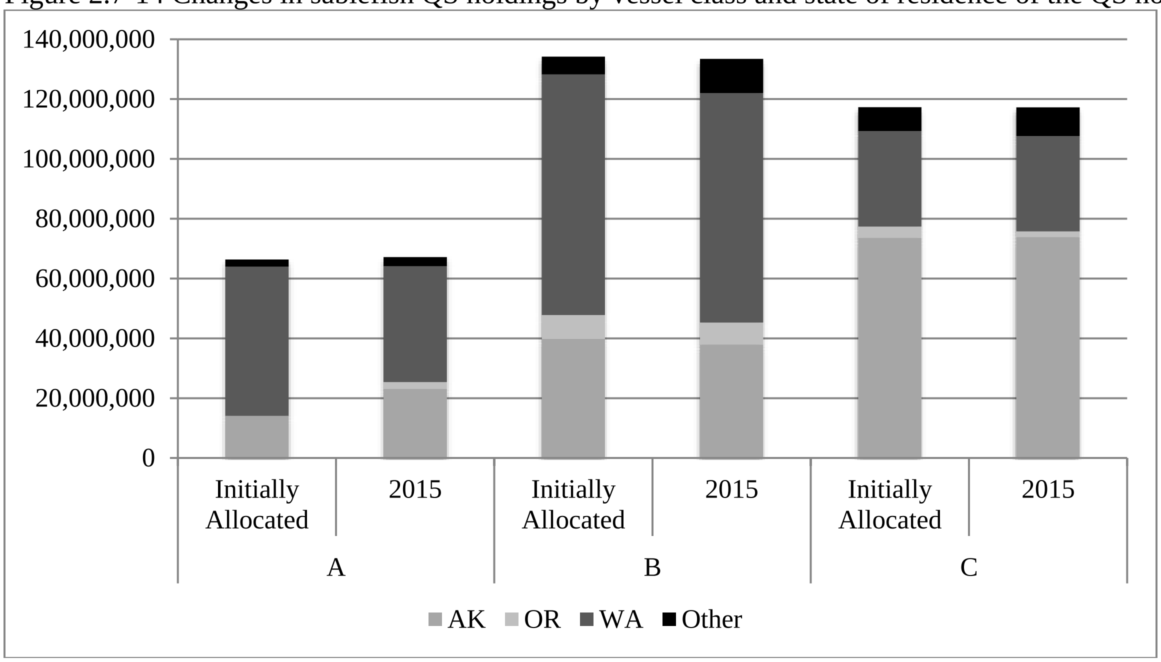
Source: NMFS RAM IFQ QS holdings database sourced by AKFIN

Figure 2.7-14 shows the changes in sablefish QS holdings by vessel class and the State of residence of the QS holder. From initial allocation to 2015, there was slightly more movement of sablefish QS (in terms of QS units) between residents of different states than in the halibut fishery. (See Figures A.2.7.8 to A.2.7.13 for a breakdown of sablefish QS holdings by area, state and vessel class at initial allocation and in 2015). There was an overall net transfer of Class A QS from residents of Washington to QS holders from Alaska. This is due to the net transfer of these QS in the AI and BS areas (see Figures A.2.7.8 and A.2.7.9), where as previously noted the sablefish harvest are impeded by the distance of fishing grounds and the severity of marine weather. Although not shown, these distributions are representative of annual QS holdings by vessel class by State throughout the time period. These distributions provide an indication of how QS holders from different states may be differentially impacted by regulatory changes that affect a particular vessel class. Washington residents continue to be the predominant owners of Class A and B shares, while Alaska residents hold the majority of Class C shares. The reason for the continued majority holdings of Class C QS by Alaska residents is likely similar to that noted for the halibut fishery.

As in the halibut fishery, another way to think about it is as a fraction of the total sablefish QS holdings by residents of the state. In 2015, A shares comprised 17% of the total QS holdings for Alaskans, 20% for residents of Oregon, 26% for residents of Washington, and 13% for residents of "other" states; B shares comprised 28% of the total QS holdings for Alaskans, the majority of QS holdings for residents of Oregon (64%) and Washington (52%), and 48% for residents of "other" states; C shares comprised the majority of QS holdings for Alaskans (55%) and 16% for residents of Oregon, 22% for residents of Washington, and 40% for residents of "other" states.

Unlike in the halibut fishery, in the sablefish fishery the distribution of vessel class QS by State is similar to the distribution by vessel class of total QS holdings by residents of a State. Therefore, changes to regulations affecting C shares would predominantly affect Alaskans and that impact would be substantial relative to their total QS holdings. However, as in the halibut fishery, QS holdings by vessel class and state of residence of the QS holder vary by area. Therefore, the impacts of regulatory changes to a particular vessel class would have differential impacts across not just QS holders of different states, but within a group of QS holders from a particular state.

Figure 2.7-14 Changes in sablefish QS holdings by vessel class and state of residence of the QS holder



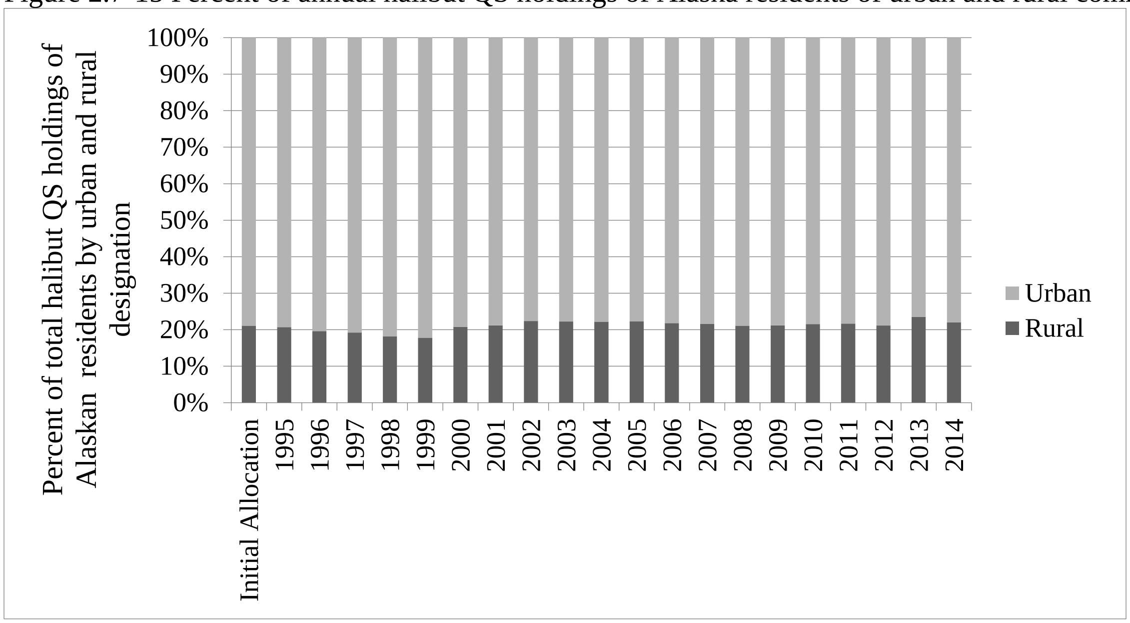
Source: NMFS RAM IFQ QS holdings database sourced by AKFIN

2.7.5.2 Changes in halibut and sablefish QS holdings by residents of rural and urban Alaska communities

At the time of implementation of the IFQ Program, there was concern over a potential redistribution of QS away from rural Alaska communities. Resultant consolidation and more efficient operators' higher willingness to pay for QS would likely result in residents from these communities having difficulty in competing for QS. Furthermore, rural residents generally received lower initial QS allocations because of their limited history of participating in the fixed-gear sablefish and halibut fisheries so that they had a higher likelihood of receiving annual IFQ allocations that were not economically worthwhile to fish (see Section 2.7.5.3 for more discussion on this subject). It is important to note that any net transfers of QS out of rural Alaska communities could be indicative not just of rural residents selling their QS but also of those QS holders moving. Although the effects on the rural community with respect to income from the harvest of the resultant IFQ remaining in the community would be the same.

Figure 2.7-15 shows the percent of total halibut QS holdings of Alaska residents of urban and rural communities. After a slight decrease in the percent of total halibut QS holdings of Alaska residents held by rural Alaskans in the first several years of the IFQ Program, the percentage held by these residents rose slightly again in 2000 and has remained at or above the baseline level since then. Recall from Figure 2.7-9 above that the percentage of all halibut QS that is held by Alaska residents has remained relatively stable from initial allocation to 2015, so that the percentage of all halibut QS held by rural Alaska residents has remained virtually unchanged.

Figure 2.7-15 Percent of annual halibut QS holdings of Alaska residents of urban and rural communities



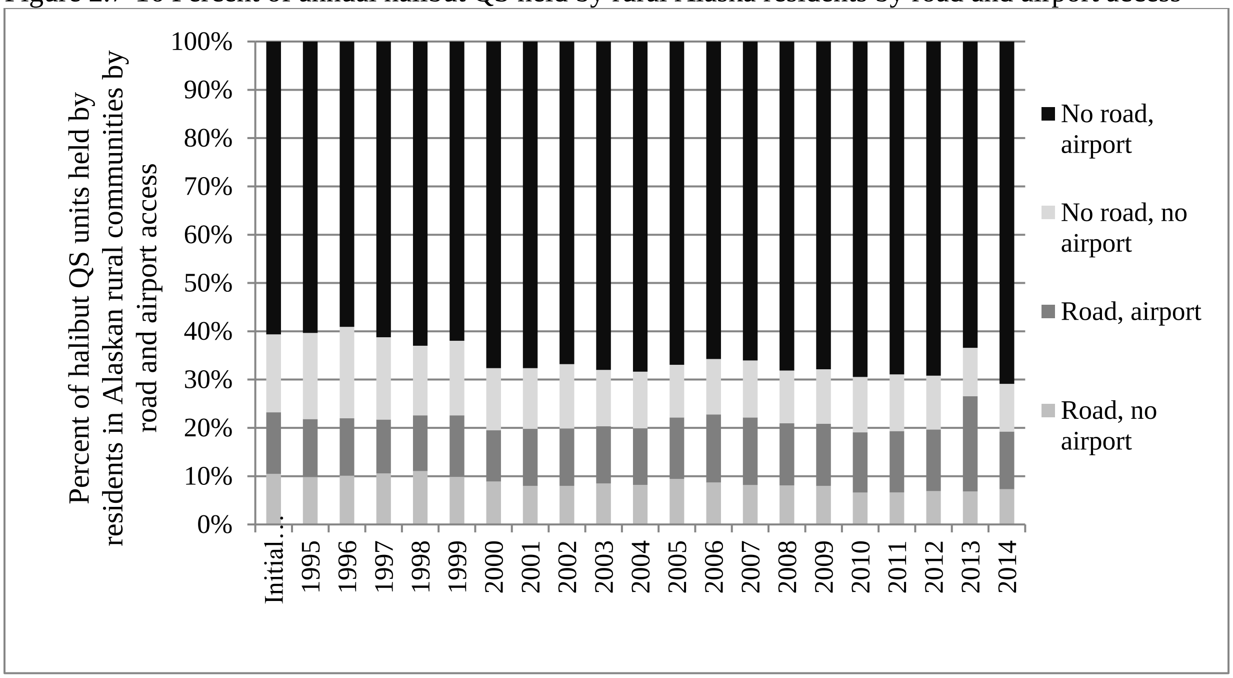
Source: NMFS RAM IFQ QS holdings database sourced by AKFIN & Alaska's Community Database Online

Figure 2.7-16 shows the percent of halibut QS units held by rural Alaska residents by road and airport access in the community in order to assess whether halibut QS redistributions amongst rural Alaska communities were similar to the redistributions of halibut IFQ landings amongst rural Alaska communities after the implementation of the IFQ Program. Similarly to the redistributions of halibut IFQ landings amongst rural Alaska communities, relative to the baseline period there has been an increase in the percentage of the halibut QS holdings of rural Alaska residents of communities without road access but with an airport and a decrease in the percentage of the QS holdings of residents of rural communities without road or airport access. Unlike the changes in the distributions of halibut IFQ landings, the percentage of the total QS holdings of rural Alaska residents of communities with road and airport access have remained stable over the course of the IFQ Program relative to the baseline period and the percentage held by rural Alaska residents of communities with a road but no airport have slightly decreased. The increase in the percentage of Alaska rural resident community halibut QS holdings by residents of communities with road and airport access is again due to the re-designation of the same community as noted for Figure 2.7-5 from urban to rural.

The halibut QS redistribution amongst rural Alaska community residents following IFQ implementation somewhat follows the redistribution of halibut IFQ landings – a decrease in QS holdings in the more remote communities without access to road or air transportation and an increase in QS holdings without a road but with an airport. That QS redistribution trends may somewhat follow IFQ landings redistributions may be expected given that the presence of a processor in a community would provide some benefits for QS holders who participate in the IFQ fishery, such as providing an incentive for support service businesses to exist in the community. However, different factors are at play for QS holders than processors; therefore, there continue to be QS holders in rural Alaska communities with road access and with and without airports.

The majority of rural Alaska communities in the dataset of halibut QS holdings are communities without a road (78). Of those communities, 14 do not have an airport and 64 do have an airport. There are 29 Alaska rural communities in this dataset with road access, 8 of which do not have an airport and 21 of which do have airport. As with halibut IFQ landings, the data indicate an overall shift of halibut QS ownership away from the more remote rural Alaska communities. The NMFS halibut transfer report (2015a) provides a breakdown of QS holdings by Census area and by local and non-local (to the fishing area) designations.

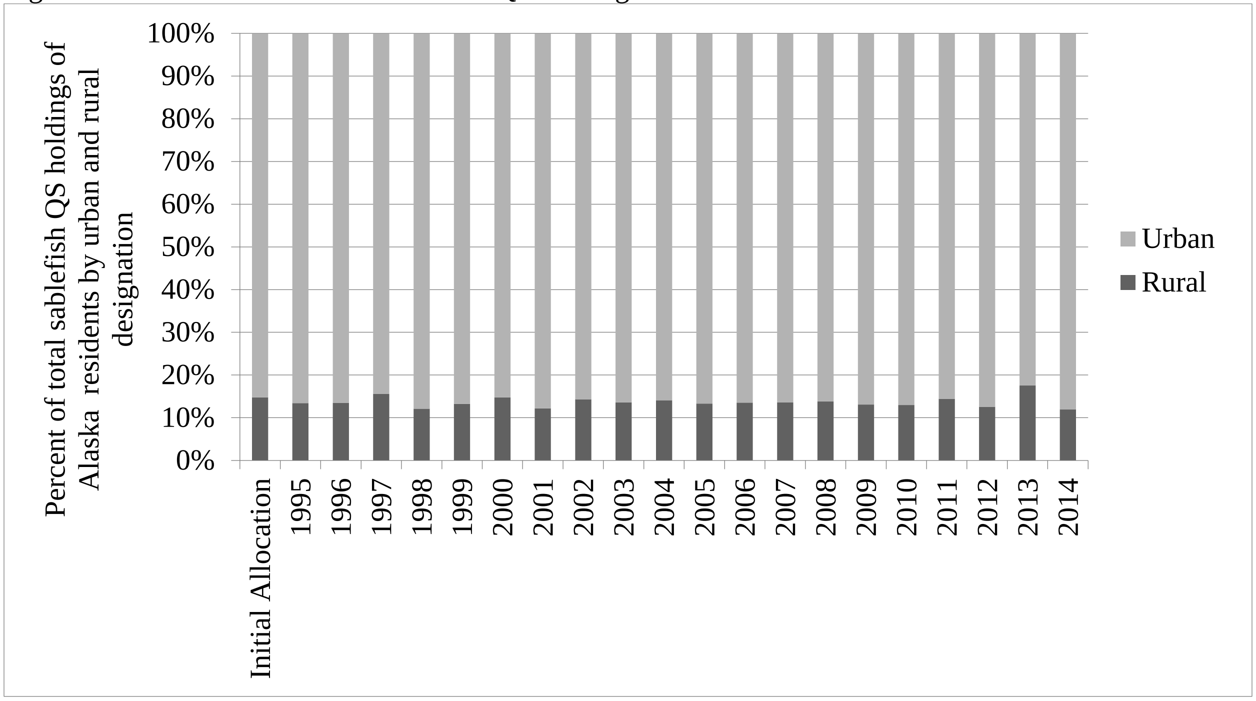
Figure 2.7-16 Percent of annual halibut QS held by rural Alaska residents by road and airport access



Source: NMFS RAM IFQ QS holdings database sourced by AKFIN & Alaska's Community Database Online

Figure 2.7-17 shows the percent of total sablefish QS holdings of Alaska residents of urban and rural communities. Relative to the initial allocation, the percentage of the total Alaska holdings of sablefish QS held by rural Alaska residents has decreased slightly over the course of the IFQ Program, from 15% at initial allocation to 13% averaged over the last 20 years. QS holdings in 2013 were not included in the calculation of the post-IFQ average again due to the increase in the rural holdings being a factor of the re-designation of a community from urban to rural. Recall from Figure 2.7-10 above that the percentage of all sablefish QS that is held by Alaska residents has remained relatively stable from initial allocation to 2015, so that the percentage of all sablefish QS held by rural Alaska residents has decreased slightly.

Figure 2.7-17 Percent of annual sablefish QS holdings of Alaska resident of urban and rural communities

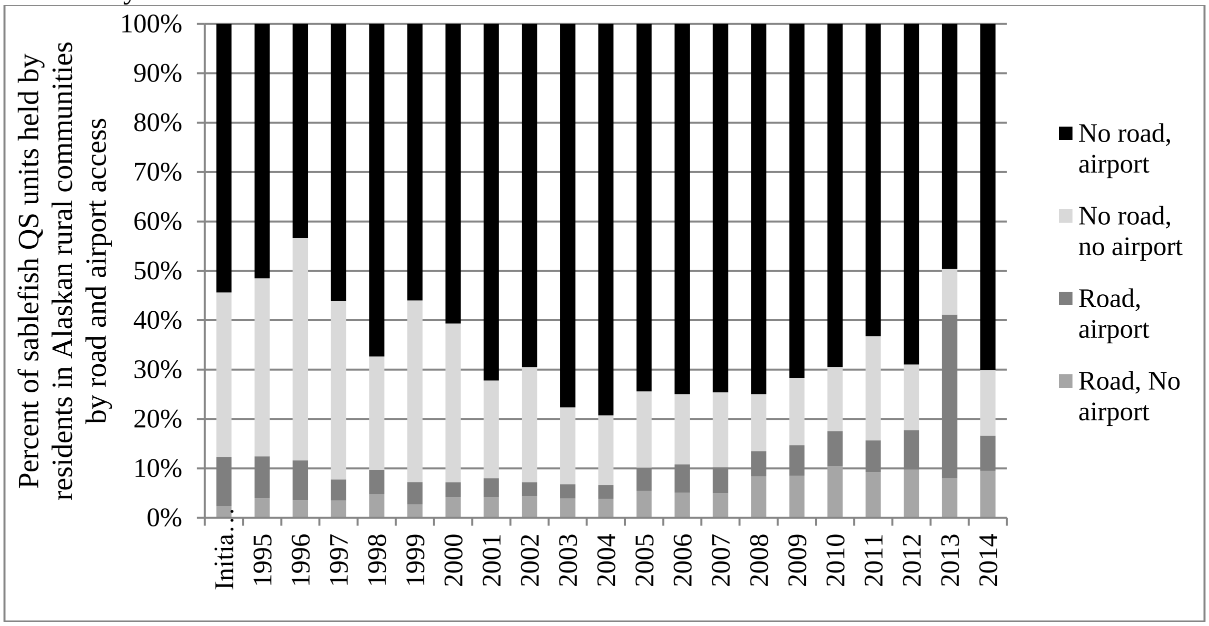


Source: NMFS RAM IFQ QS holdings database sourced by AKFIN & Alaska's Community Database Online

Figure 2.7-18 shows the percent of sablefish QS units held by rural Alaska residents by road and airport access in the community. The increase in sablefish QS holdings by residents of rural communities with no road but airport access and the decrease in QS holdings by residents of rural communities with no road and no airport are similar trends to those seen for the halibut IFQ fishery and to the geographic redistribution of sablefish IFQ landings amongst these two types of rural communities. Relative to initial allocations, there has been an increase in the percentage of sablefish QS units held by rural Alaska residents by those with road access but no airport and a decrease in the percentage held by those with road access and an airport. Rural communities with road access do not have landings in the sablefish IFQ fishery. The NMFS sablefish transfer report (2015b) provides a breakdown of QS holdings by Census area and by local and non-local (to the fishing area) designations.

It should be noted that the majority of rural Alaska communities in the dataset of sablefish QS holdings are communities without a road (42). Of those communities, 9 do not have an airport and 33 do have an airport. There are 19 Alaska rural communities in this dataset with road access, 5 of which do not have an airport and 14 of which do have airport. Therefore, as was true for the halibut QS holdings, it is intuitive that QS holders from communities with airports would account for the majority of sablefish QS holdings amongst rural Alaska residents. Nevertheless, as with sablefish IFQ landings, the data indicate an overall shift of sablefish QS ownership away from the more remote rural Alaska communities without road or airport access.

Figure 2.7-18 Percent of sablefish QS held by rural Alaska residents by road and airport access in the community



Source: NMFS RAM IFQ QS holdings database sourced by AKFIN & Alaska's Community Database Online

2.7.5.3 Changes in halibut and sablefish QS holdings by residents of CQE communities

After the first several years of the IFQ Program, there was concern about the decline in QS holdings by residents of small Gulf of Alaska coastal communities (NPFMC, 2004). This out-migration of QS was considered to be potentially damaging to these communities with respect to loss of income, income diversification opportunities, and employment. In response, the Council elected to revise the IFQ Program to allow specific communities to purchase sablefish and halibut QS through the Community Quota Entity (CQE) Program, which was implemented in 2004. The CQE Program was also intended as a way to promote QS ownership by individual residents, as individuals can lease annual IFQ from the CQE and gradually build up the capital and experience to purchase their own QS.

Under the CQE Program implemented in 2004, a distinct set of 42 coastal communities was allowed to purchase halibut catcher vessel QS in Areas 2C, 3A, and 3B and sablefish catcher vessel QS in the SE, WY, CG, and WG areas (69 FR 23681). Eligibility to participate in the program was limited to communities with fewer than 1,500 people, documented historical participation in the IFQ fisheries (at least one landing of halibut or sablefish), direct access to saltwater on the GOA coast, and no road access to a larger community. In order to acquire catcher vessel QS by transfer, eligible communities must form non-profit corporations called CQEs. In order to use their catcher vessel QS, the CQEs must annually lease the IFQ resulting from the shares to community residents. The communities of Cold Bay, Game Creek, and Naukati Bay were added in 2013 to the Gulf of Alaska CQE Program, and CQEs were allowed to purchase a limited amount of Class D QS in Area 3A. In 2014, a CQE Program was implemented for halibut IFQ regulatory Area 4B and the sablefish Aleutian Islands regulatory area, and the community of Adak formed a CQE (78 FR 68390). A more detailed description of the CQE Program is provided in Section 1.2.

Table 2.7-1 shows the halibut and sablefish QS holdings by residents of CQE communities (not CQE holdings) at initial issuance and in 2015. The highlighted communities are those in which there was an increase in community resident QS holdings between initial issuance and 2015, or the resident QS holdings were greater than zero and remained the same between initial issuance and 2015. Of the 46 CQE communities, only 10 have had stable or increased community resident QS holdings in the IFQ fisheries since initial issuance. Across all of the CQE communities, QS holdings of CQE community residents have decreased by 31% for halibut and 53% for sablefish from initial issuance to 2015. In 2015, QS holders residing in CQE communities held 5.85% of the total halibut QS and 2.15% of the total sablefish QS. In effect there has been a substantial decrease in QS holdings in both IFQ fisheries for CQE community residents since IFQ Program implementation and CQE community resident QS holdings account for a small percentage of the total QS pools in the fisheries. Although only two years of QS holdings are provided below, this is representative of the overall decrease in QS holdings by residents of CQE communities over time, which can be found in NPFMC (2010) or NMFS (2016).

Table 2.7-1 Halibut and sablefish QS holdings by CQE community of residence of QS holder at initial issuance and in 2015
(The highlighted communities are those in which there was an increase in QS holdings by community residents between initial issuance and 2015, or the QS holdings were greater than zero and remained the same between initial issuance and 2015.)

Community	Halibut			Sablefish		
	Initial Issuance	2015	Percent Change	Initial Issuance	2015	Percent Change
ADAK*	0	702,575	70257500%	0	102,230	10223000 %
AKHIOK	42,671	191,130	348%	0	0	0%
ANGOON	798,142	0	-100%	982,226	0	-100%
CHENEGA BAY	10,704	0	-100%	0	0	0%
CHIGNIK	621,738	128,220	-79%	0	0	0%
CHIGNIK LAGOON	407,246	387,417	-5%	998	0	-100%
CHIGNIK LAKE	1,866	1,866	0%	0	0	0%
COFFMAN COVE	20,721	61,094	195%	0	0	0%
COLD BAY	0	64,445	6444500%	0	0	0%
CRAIG	1,978,617	1,701,607	-14%	990,426	737,529	-26%
EDNA BAY	526,658	163,377	-69%	244,077		-100%
ELFIN COVE	407,021	1,108,421	172%	155,967	532,146	241%
GAME CREEK	0	0	0%	0	0	0%
GUSTAVUS	610,720	361,754	-41%	477,964	66,689	-86%
HALIBUT COVE	262,736	381,012	45%	16,836	707	-96%

HOLLIS	0	0	0%	0	0	0%
HOONAH	2,825,177	949,606	-66%	1,917,103	433,680	-77%
HYDABURG	405,285	34,913	-91%	223,941	9,011	-96%
IVANOF BAY	19,590	0	-100%	0	0	0%
KAKE	1,768,742	571,627	-68%	323,699	309,797	-4%
KARLUK	0	0	0%	0	0	0%
KASAAN	0	0	0%	0	0	0%
KING COVE	1,864,458	1,233,907	-34%	930,494	456	-100%
KLAWOCK	376,475	125,811	-67%	141,370	573,464	306%
LARSEN BAY	124,344	73,403	-41%	0	0	0%
METLAKATLA	761,059	345,474	-55%	118,259	26	-100%
MEYERS CHUCK	153,644	11,906	-92%	109,129	0	-100%
NANWALEK	0	0	0%	0	0	0%
NAUKATI BAY	17,506	0	-100%	0	0	0%
OLD HARBOR	758,425	357,174	-53%	36,822	0	-100%
OUZINKIE	813,542	249,865	-69%	91,457	0	-100%
PELICAN	2,475,167	1,465,513	-41%	3,150,327	2,829,384	-10%
PERRYVILLE	51,743	37,903	-27%	0	0	0%
POINT BAKER	545,188	138,669	-75%	364	364	0%
PORT ALEXANDER	828,942	85,703	-90%	734,129	0	-100%
PORT GRAHAM	176,480	65,599	-63%	380	0	-100%
PORT LIONS	425,710	130,716	-69%	1121	0	-100%
PORT PROTECTION	38,031	0	-100%	0	0	0%
SAND POINT	2,978,269	2,257,825	-24%	996,049	300	-100%
SELDOVIA	2,814,924	2,618,992	-7%	2,166,188	1,198,582	-45%
TATILEK	18,660	0	-100%	0	0	0%

TENAKEE SPRINGS	321,783	211,869	-34%	175,968	25,697	-85%
THORNE BAY	214,168	143,735	-33%	86,505	0	-100%
TYONEK	0	0	0%	0	0	0%
WHALE PASS	9,511	0	-100%	0	0	0%
YAKUTAT	1,509,041	3,095,335	105%	321,275	0	-100%
Total holdings of CQE residents	27,984,704	19,394,018	-31%	14,393,074	6,820,062	-53%
Total QS pool	333,000,811	331,556,698		319,439,842	317,801,022	
% of QS pool held by CQE residents	8.40%	5.85%		4.51%	2.15%	

Source: NMFS RAM IFQ QS holdings database sourced by AKFIN
* Adak is the only CQE community that is not in the Gulf of Alaska.

Table 2.7-2 shows the halibut and sablefish QS holdings of the CQEs themselves starting with the first year that any of the CQEs held QS. To date, only three CQEs have purchased QS in the IFQ fisheries – the Adak Community Development Corporation in Adak, Cape Barnabas Inc. in Old Harbor, and the Community Holding Corporation for Ouzinkie. The Adak CQE was established in 2014 following the implementation of the CQE Program in halibut Area 4B and the Aleutian Islands area for sablefish. The Adak CQE is the only CQE that has purchased sablefish QS.

Table 2.7-2 Halibut and sablefish QS holdings of CQEs

Year	**Halibut**				**Sablefish**
	Adak: Adak Community Development Corporation	Old Harbor: Cape Barnabas, Inc.	Ouzinkie: Community Holding Corp for Ouzinkie	Total	Adak: Adak Community Development Corporation
2006		151,234		151,234	
2007		151,234		151,234	
2008		151,234		151,234	
2009		151,234		151,234	
2010		151,234		151,234	
2011		151,234	106,488	257,722	

2012		151,234	106,488	257,722	
2013		151,234	258,724	409,958	
2014	615,956	151,234	258,724	1,025,914	102,230
2015	615,956	194,596	281,593	1,092,145	102,230

Source: NMFS RAM

The significant decline in QS holdings amongst CQE community residents following IFQ implementation may in part be attributed to the quantities of QS that they were issued at initial allocation. Residents of CQE communities received small amounts of QS relative to the number of initial issuees (NPFMC, 2010). CQE residents generally did not qualify for large QS allocations because prior to IFQ they fished multiple fisheries opportunistically (ibid.). Small QS allocations resulted in small amounts of IFQ pounds, which may not have been economically worthwhile to fish. Thus the QS holder would have had an incentive to sell their QS unless they could augment their QS or IFQ holdings by purchasing more QS or coordinating with fellow residents to harvest their IFQ together. In many instances, coordination amongst CQE community residents would have been precluded by these residents having QS in different areas and/or vessel classes.

The 2010 review of the CQE Program explored the factors underlying the limited acquisition of QS by CQEs (NPFMC, 2010). Many of the constraining factors were similar to those that limit QS acquisition by individuals, including the high price and lack of availability of the QS on the market, and the lack of access to capital and financing for QS purchases. Other factors were specific to the CQE Program, including the administrative cost necessary to both establish a nonprofit corporation and manage assets and program-related restrictions, such as the types of QS that CQEs may purchase[70], the residency requirement for leasing of CQE held IFQ, and vessel use caps.

Summary

The IFQ Program was intended to provide economic stability to coastal communities, to limit the adjustment costs to Alaska coastal communities, and to provide rural coastal communities in the Bering Sea with the opportunity to participate in the IFQ fisheries. The Council included several provisions to ensure the continued participation of Alaska coastal communities, including QS allocations by vessel class, limits on who can acquire and use QS, limits on leasing and hired master use, and QS acquisition and use caps. Economic stability from IFQ implementation was expected to flow out of the guaranteed harvesting privilege afforded by QS and potentially more stable and predictable landings.

Many of the anticipated changes to the processing sectors have been realized, especially for halibut, where product form changes were expected to result in geographic redistributions of halibut IFQ landings. With a change to more fresh production of halibut, halibut processing was expected to shift from outside of Alaska into Alaska and from remote Alaska coastal communities to those with access to road and air transportation, which would be critical in moving fresh product down to markets. For both IFQ fisheries, there has been an increase in shoreside processing (although at sea processing comprised a small percentage of total processing prior to IFQ as well) and an increase in the percentage of that shoreside

[70] To address the issues identified in the 5-year CQE Program review, the Council recommended and NMFS implemented Amendments 94 and 96 to the GOA FMP to revise the types of QS that CQEs may purchase and the use caps for vessels used by CQE community residents (78 FR 14490 and 79 FR 46237).

processing that takes place in Alaska, so that the percentage of total landed halibut and sablefish IFQ pounds at Alaska shoreside processors has increased since IFQ implementation. Since IFQ implementation, there has been a shift in processing for both IFQ fisheries from remote Alaska communities without road and airport transportation to those with access to air transportation. The shift in processing within the sablefish IFQ fishery was not in response to changes in product form for this species, but likely associated with the movement of processing capacity in response to changes in the halibut fishery as well as the incentives for IFQ fishermen who hold both types of QS to land both species with the same processor.

Overall, the percentages of the total QS held by Alaskans have remained relatively stable in both IFQ fisheries. The percentage of the total QS holdings in both fisheries have decreased for Washington resident fishermen, remained stable for Oregon resident fishermen, and increased for resident fishermen of other states. Compared to the movement of QS between residents of different states at the aggregated level for both IFQ fisheries, there has been more movement of QS between residents of different states within specific IFQ regulatory areas. Within the halibut fishery the greatest movements of QS relative to initial QS allocations have been in the Bering Sea areas (Area 4B, 4C, and 4D); where the percentage of the QS held has increased for Alaskans and decreased for residents of Washington. In the sablefish IFQ fisheries, the greatest movement of QS relative initial allocations has been in the Western Gulf, Bering Sea and Aleutian Island regulatory areas where the holdings of Washington residents have decreased and those of Alaska residents and residents of Oregon and other states have increased.

Analysts for the final IFQ Programmatic EIS focused on a potential redistribution of QS within Alaska, specifically away from rural to urban communities. There was a concern that the implementation of the IFQ Program could lead to QS migration away from rural Alaska communities, as had happened in Alaska's limited entry permit system although the impact in the IFQ fisheries was expected to be relatively smaller. Of the total QS held by Alaskans in the IFQ fisheries, the percentage held by rural Alaska communities has remained relatively stable since initial QS allocations, increasing by 3% for halibut QS and decreasing by 2% for sablefish QS. Amongst rural Alaska communities, there has been a general movement of QS for both IFQ fisheries away from the more remote communities (without airport and road access) to those with airport transportation. Some geographic redistribution of QS amongst rural Alaska communities was expected at the time of IFQ implementation, in response to consolidation and the greater willingness to pay for QS by more efficient operators. In addition, the movement of processing capacity out of some remote rural Alaska communities potentially affected other things like the provision of support services and fuel prices, which would have impacted operating costs for IFQ fishermen in these communities and how competitive they could be in the market for QS.

After the first several years of the IFQ Program, there was concern about the decline in QS holdings of residents of small Gulf of Alaska coastal communities (NPFMC, 2004). In response, the Council elected to revise the IFQ Program to allow specific communities to purchase sablefish and halibut QS through the CQE Program, which was implemented in 2004. There has been a substantial decline in QS holdings by residents in CQE communities since IFQ implementation and the CQE Program has not proven to be effective in terms of providing a feasible mechanism to allow residents further access to QS holdings. The decline in resident QS holdings in CQE communities may have at least in part been due to these residents of CQE communities receiving small quantities of QS at initial allocation, resulting in IFQ amounts that were not economically viable to fish. Augmenting QS holdings was likely prohibitively expensive and coordinating with fellow CQE residents was potentially not feasible due to differences in the area and vessel class designations of the allocated QS. QS acquisition by CQE entities is limited by the same factors that inhibit QS purchases by individuals, including high QS prices, a limited availability of QS on the market, and a lack of access to capital and financing. Implemented nearly 10 years after the IFQ Program itself, the CQE Program provided the opportunity for select communities to invest in QS but in a market that had already experienced rapid consolidation and QS transfers in its first several years.

The analysis of shoreside landings in this review is limited to landings at processors defined as "shorebased processors" in the ADF&G database of processor types (for both this section and Section 2.4.2). There are potentially other ways of defining the processor types that could be included in shoreside landings by thinking more broadly about how communities may benefit from the revenue generated by at-sea processing. The Appendix to this section includes a list of ADF&G processor types and their definitions (Table A.2.7.3).

If there are future iterations of this review, the Council may choose to define the rural and urban designation differently to meet its needs for assessing impacts on Alaska communities. For example, other authors have defined rural communities by several size categories (small, medium, large) based on population cutoffs of 1500, 2500, and 7500 (Carothers, Lew, Sepez, 2010). These authors found that QS loss was only evident in the smallest communities with populations under 1500 (ibid.).[71] Furthermore, the rural designation could be defined such that it is static for communities over time and is not a factor of changes in the community's population; however, it should be noted that only two communities change rural/urban designation throughout the dataset.

The Council could also choose to define road and airport access differently in any future iterations of this review. For example, anecdotally, processors have reported that the number of Alaska Airlines flights to a community is a limiting factor in how much halibut processed for the fresh market they can export from a community and therefore how much they can purchase from fishermen and how competitive their ex-vessel prices can be. The number of daily Alaska Airlines flights could potentially be included as a community variable to assess trends in IFQ landings, assuming such data could be provided by Alaska Airlines and could include historical data of flight schedules. There are also other proxies for airport/runway capacity that could be included in future iterations, including the number of runways and the conditions or size of the runways. Road access in this dataset includes communities connected by road to Fairbanks. The Council may choose to limit the analysis to coastal communities, but this would not be a comprehensive list of communities participating in the IFQ fisheries.

The Council may also choose to examine the impacts of the IFQ Program on Alaska communities by region. Anecdotally, processors that were processing halibut and sablefish prior to IFQ implementation have noted that the IFQ Program impacts on the redistribution of processing were fundamentally different by region. For example, Bering Sea communities saw less of an impact from new competition for halibut landings than communities in Southeast Alaska or the Gulf of Alaska. There are fewer Bering Sea communities with differentiated access to transportation that could deliver to the fresh market than in Southeast or the Gulf of Alaska and therefore limited incentives for new processors to enter these communities. The Council may also identify specific communities that are of interest with respect to the impacts of the IFQ Program using a specified criterion (like the proportion of total landings in the community that are from the IFQ fisheries), and these communities could be targeted for more in-depth analyses in the future.

Although this review stratifies IFQ landings and QS holdings by the rural/urban designation and road and airport transportation access, these community attributes would have to be formally tested in order to determine their statistical significance. This could be done by developing a model of QS transfers and including attributes of the community of residence of the buyer and seller (such as road access, airport transportation, rural/urban) as determinant variables in the model, essentially extending the analysis that

[71] The Council developed the CQE Program to address concerns about the loss of QS in these small communities. Only coastal communities with a population of 1500 or less in the 1990 U.S. Census and lacking road access (among other requirements) are eligible to participate in the CQE Program

was done by Carothers, Lew, an Sepez (2010), which looked at QS buying and selling decisions for the first several years of the IFQ Program, and adding new community attributes of interest.

Appendix A2.7

Table A.2.7.1. Halibut QS holders and average QS holdings by area and State at initial issuance and in 2014.

	STATE	INITIAL NUMBER OF QS HOLDERS	2014 NUMBER OF QS HOLDERS	INITIAL AVG QS HOLDINGS	2014 AVG QS HOLDINGS
2C	Alaska	1971	828	24,995	59,426
	Washington	322	129	24,674	53,846
	Oregon	45	15	23,191	72,784
	Other	51	42	25,781	53,175
3A	Alaska	2436	943	48,686	117,907
	Washington	391	192	109,103	240,211
	Oregon	121	66	125,887	242,593
	Other	124	82	72,597	141,164
3B	Alaska	780	310	35,913	90,250
	Washington	174	92	109,933	194,122
	Oregon	62	32	80,491	125,940
	Other	42	32	51,207	129,616
4A	Alaska	377	124	18,792	52,951
	Washington	109	52	50,241	91,138
	Oregon	31	11	43,310	122,492
	Other	16	14	44,796	86,082
4B	Alaska	80	46	40,534	86,850
	Washington	52	28	103,176	130,495
	Oregon	14	5	33,355	89,732

	Other	7	8	31,224	119,674
4C	Alaska	48	30	45,825	55,376
	Washington	24	15	49,201	108,861
	Oregon	5	3	99,680	86,355
	Other	3	5	30,120	81,787
4D	Alaska	22	15	28,258	105,098
	Washington	38	20	91,643	118,951
	Oregon	6	5	102,104	84,827
	Other	2	6	36,874	72,200

Source: NMFS, 2015a

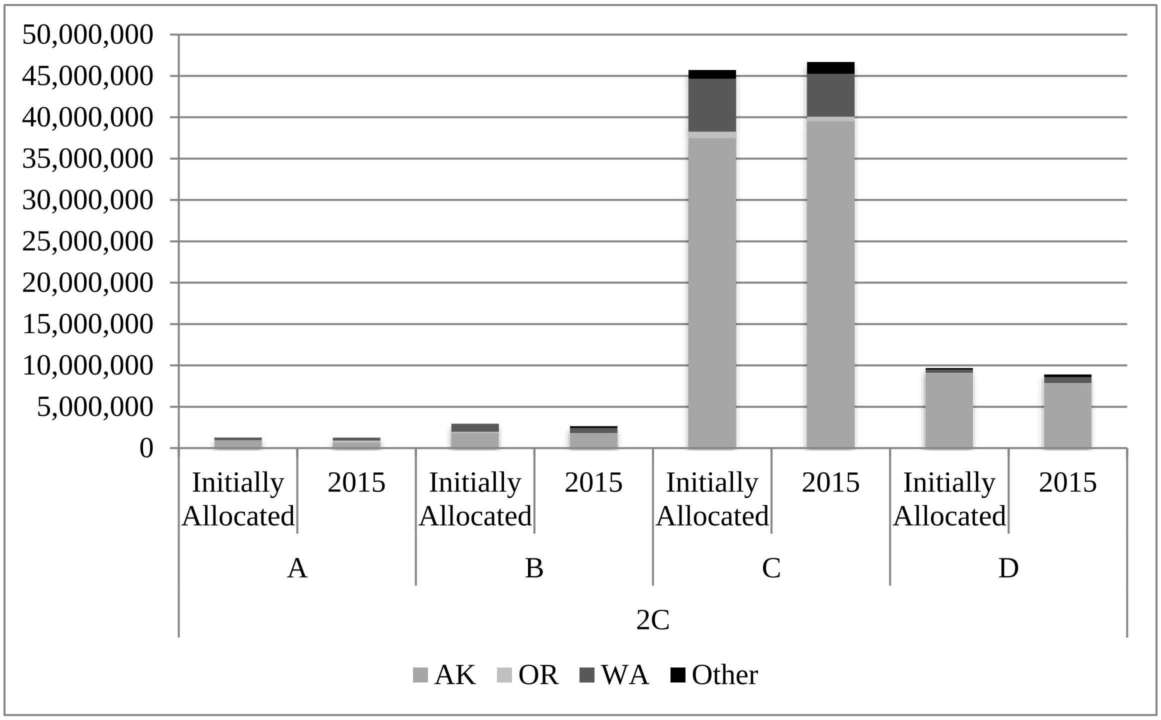
Table A.2.7.2. Sablefish QS holders and average QS holdings by area and State at initial issuance and in 2014.

	STATE	INITIAL NUMBER OF QS HOLDERS	2014 NUMBER OF QS HOLDERS	INITIAL AVG QS HOLDINGS	2014 AVG QS HOLDINGS
SOUTHEAST	ALASKA	465	255	91,915	86,502
	WASHINGTON	197	70	97,915	240,802
	OREGON	25	9	76,915	65,486
	OTHER	25	26	100,879	129,611
W. YAKUTAT	ALASKA	250	108	73,978	188,607
	WASHINGTON	160	87	192,088	303,897
	OREGON	24	13	109,134	175,725
	OTHER	21	24	75,475	173,893
C. GULF	ALASKA	395	205	109,930	213,775
	WASHINGTON	184	104	300,076	494,048
	OREGON	37	24	140,019	231,144
	OTHER	26	32	294,626	341,700
W. GULF	ALASKA	107	63	76,659	142,118
	WASHINGTON	100	70	242,835	280,188
	OREGON	12	9	85,239	130,529
	OTHER	13	26	173,546	38,214
BERING SEA	ALASKA	62	44	114,358	195,810
	WASHINGTON	65	43	158,671	174,559
	OREGON	8	6	54,109	284,072
	OTHER	9	7	85,382	42,777
ALEUTIANS	ALASKA	49	35	145,156	275,018
	WASHINGTON	73	45	305,077	480,756
	OREGON	5	2	125,630	336,422

	OTHER	9	5	167,416	46,266

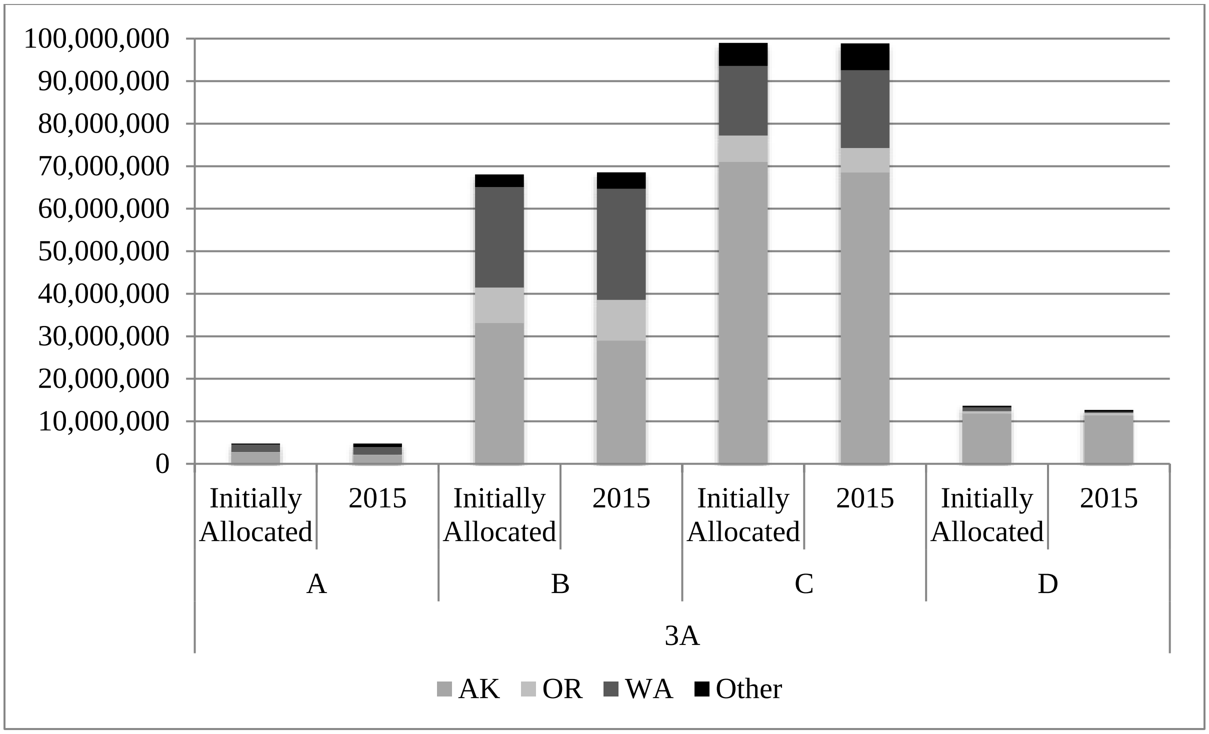
Source: NMFS, 2015b

Figure A.2.7.1. Halibut QS holdings by vessel class and State of residency of QS holder in Area 2C at initial allocation and in 2015



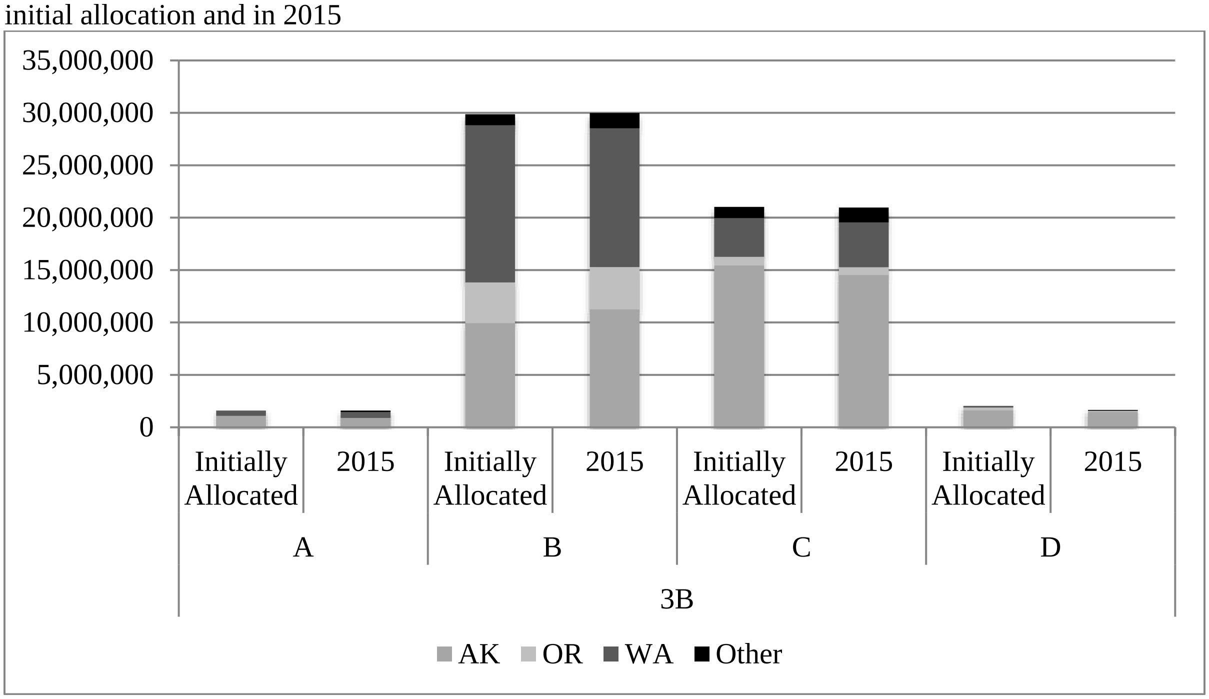
Source: NMFS RAM IFQ QS holdings database sourced by AKFIN

Figure A.2.7.2. Halibut QS holdings by vessel class and State of residency of QS holder in Area 3A at initial allocation and in 2015



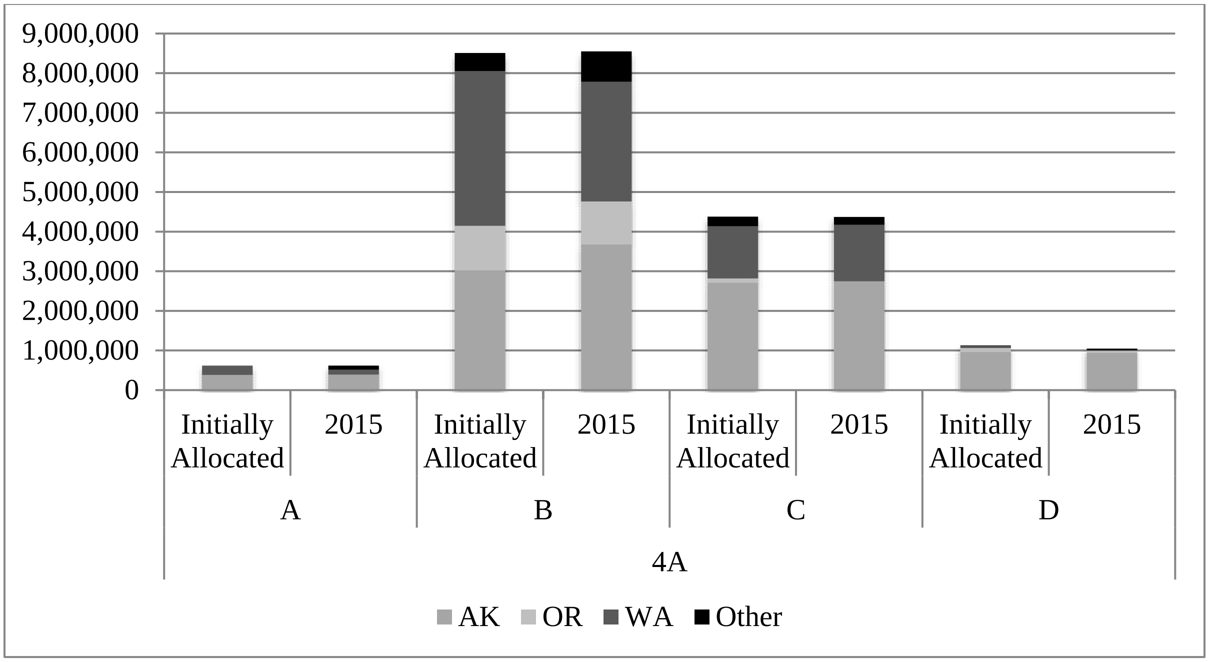
Source: NMFS RAM IFQ QS holdings database sourced by AKFIN

Figure A.2.7.3. Halibut QS holdings by vessel class and State of residency of QS holder in Area 3B at initial allocation and in 2015



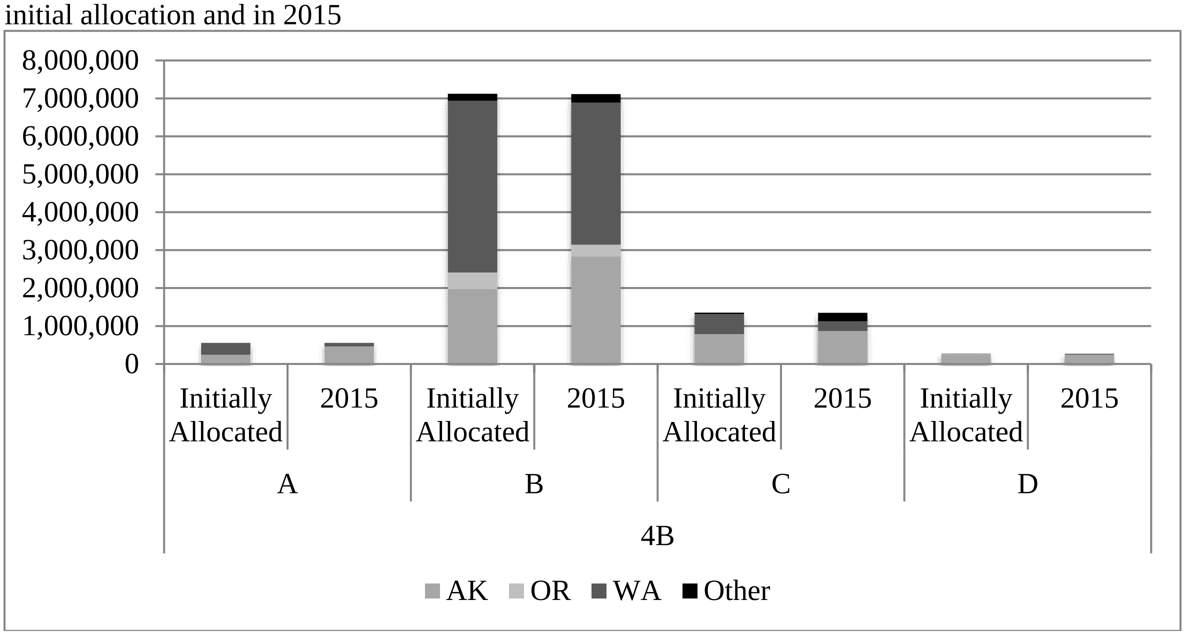
Source: NMFS RAM IFQ QS holdings database sourced by AKFIN

Figure A.2.7.4. Halibut QS holdings by vessel class and State of residency of QS holder in Area 4A at initial allocation and in 2015



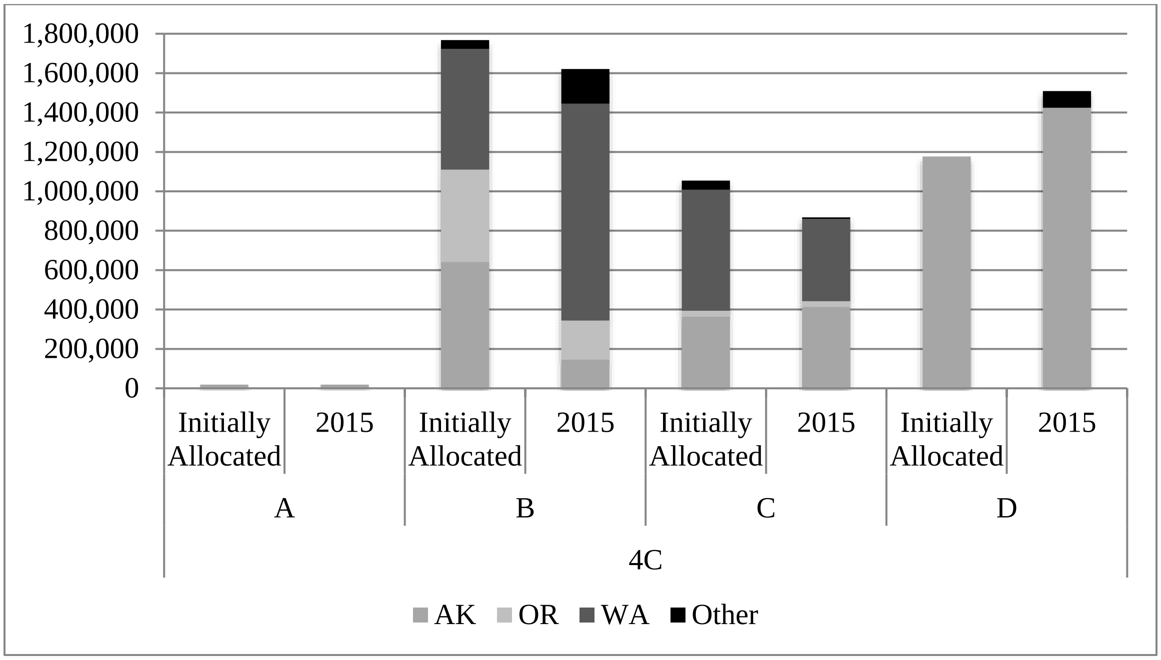
Source: NMFS RAM IFQ QS holdings database sourced by AKFIN

Figure A.2.7.5. Halibut QS holdings by vessel class and State of residency of QS holder in Area 4B at initial allocation and in 2015



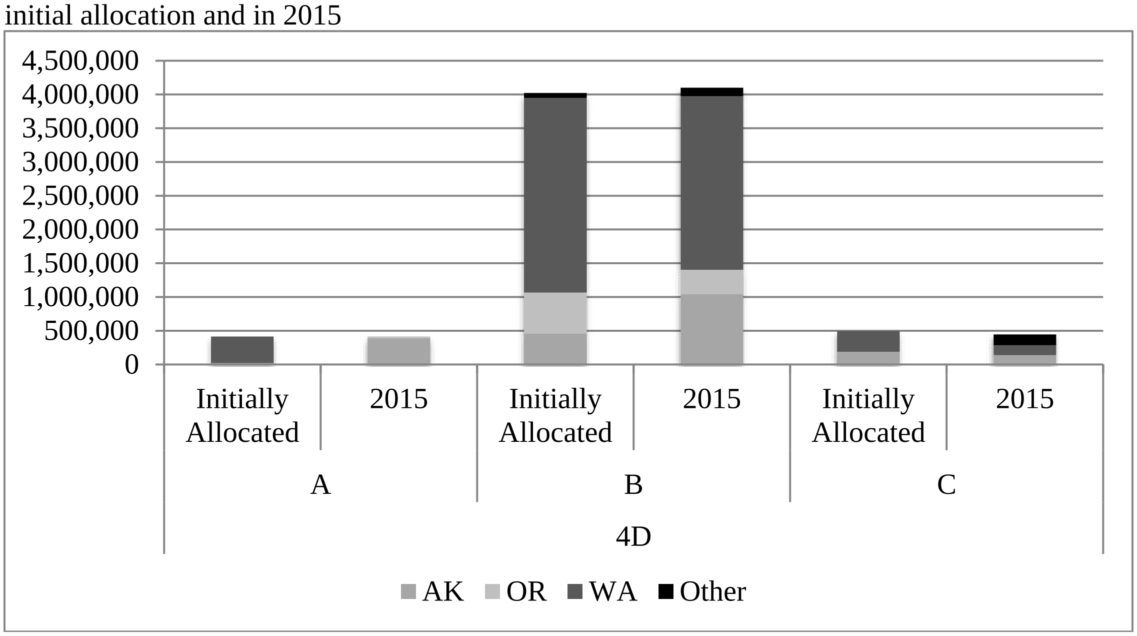
Source: NMFS RAM IFQ QS holdings database sourced by AKFIN

Figure A.2.7.6. Halibut QS holdings by vessel class and State of residency of QS holder in Area 4C at initial allocation and in 2015



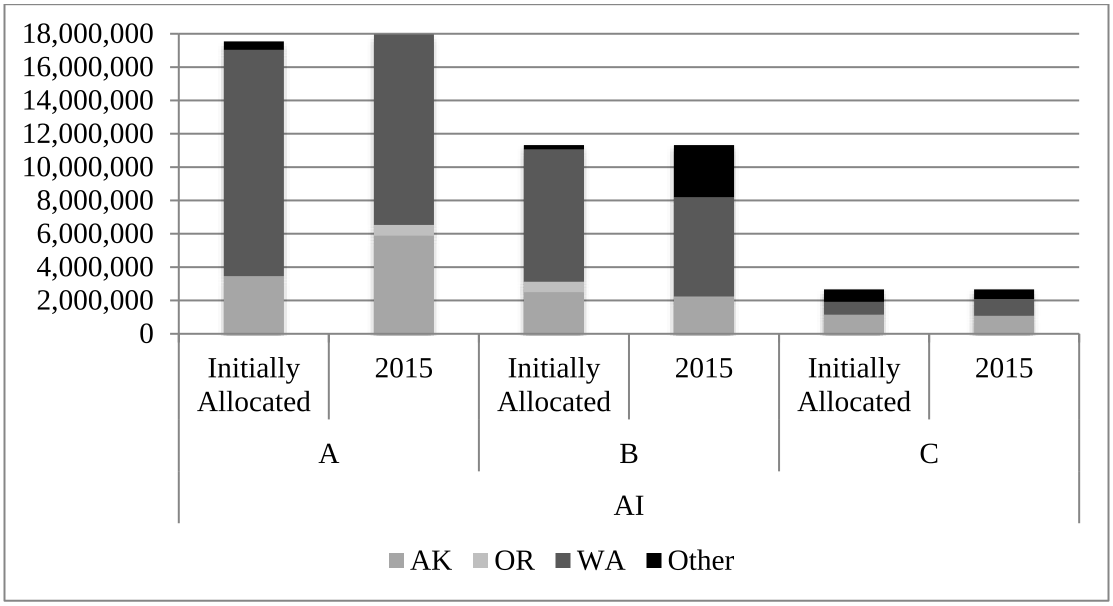
Source: NMFS RAM IFQ QS holdings database sourced by AKFIN

Figure A.2.7.7. Halibut QS holdings by vessel class and State of residency of QS holder in Area 4D at initial allocation and in 2015



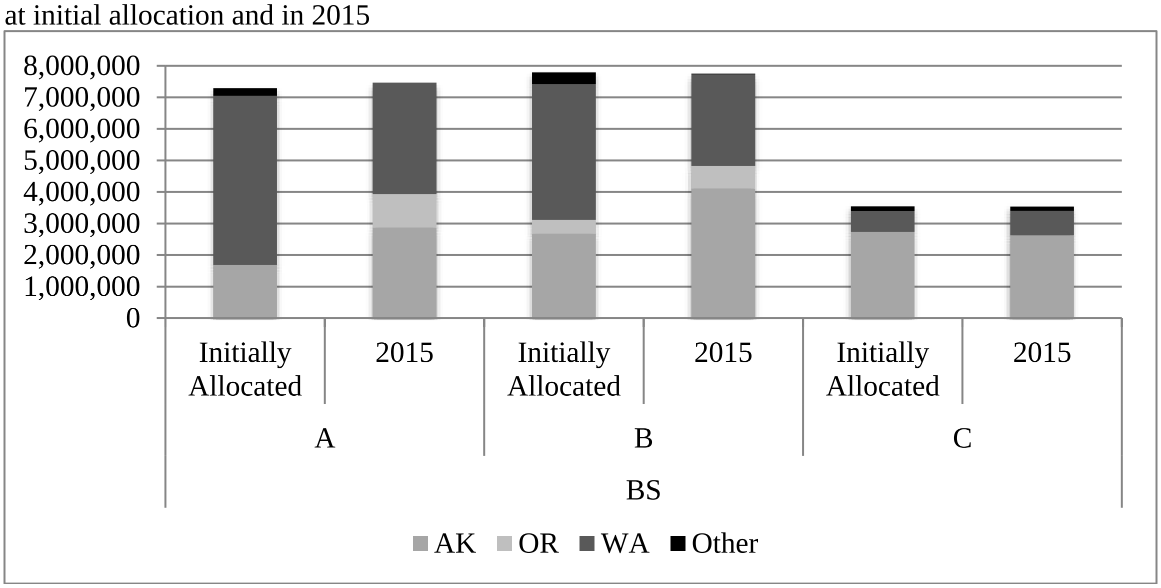
Source: NMFS RAM IFQ QS holdings database sourced by AKFIN

Figure A.2.7.8. Sablefish QS holdings by vessel class and State of residency of QS holder in the AI Area at initial allocation and in 2015



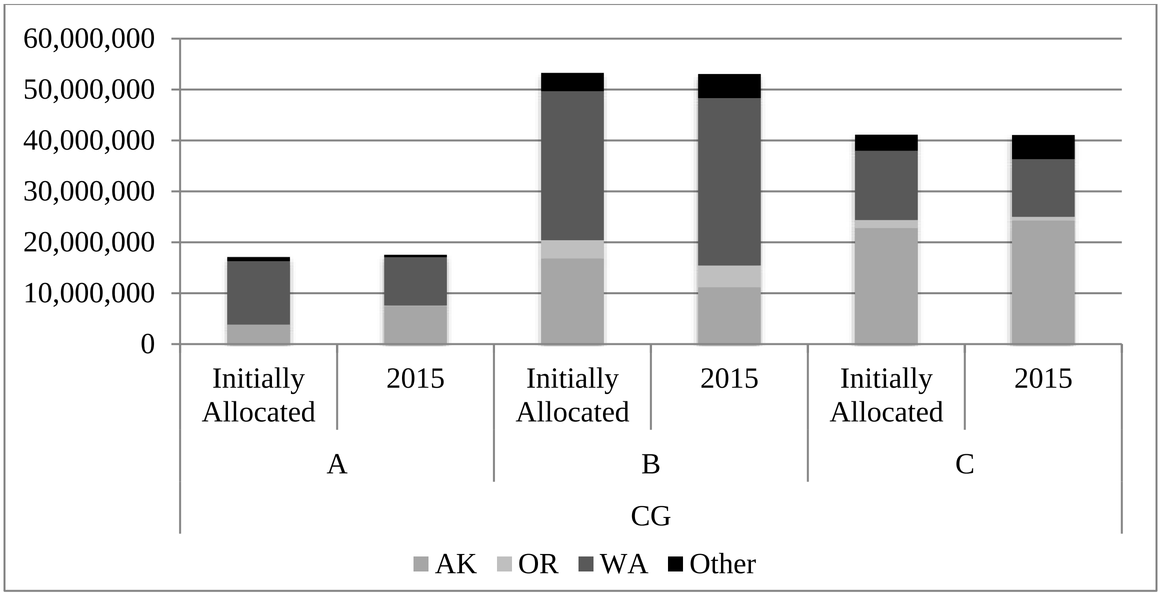
Source: NMFS RAM IFQ QS holdings database sourced by AKFIN

Figure A.2.7.9. Sablefish QS holdings by vessel class and State of residency of QS holder in the BS Area at initial allocation and in 2015



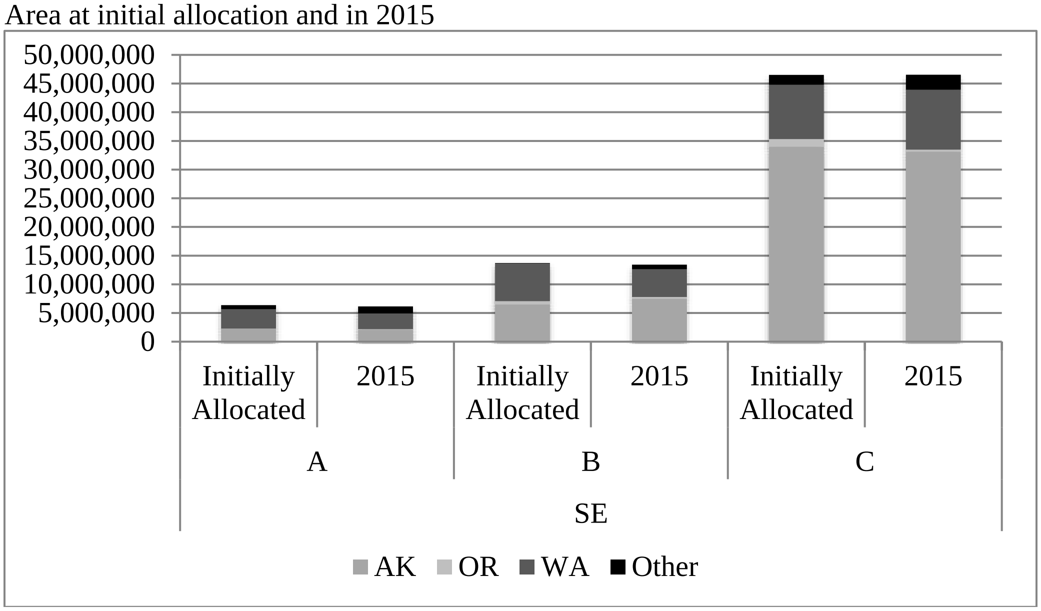
Source: NMFS RAM IFQ QS holdings database sourced by AKFIN

Figure A.2.7.10. Sablefish QS holdings by vessel class and State of residency of QS holder in the CG Area at initial allocation and in 2015



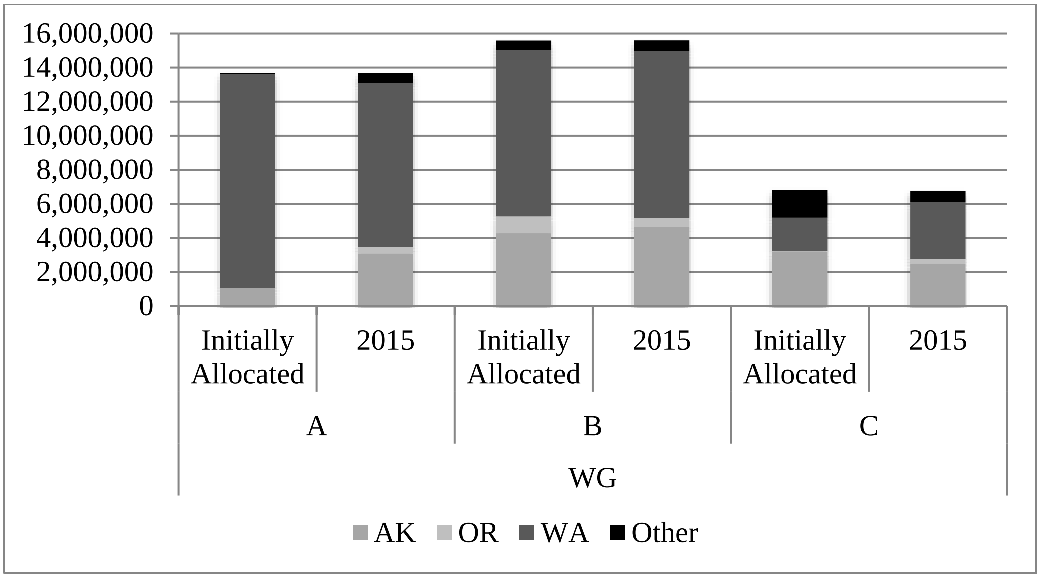
Source: NMFS RAM IFQ QS holdings database sourced by AKFIN

Figure A.2.7.11. Sablefish QS holdings by vessel class and State of residency of QS holder in the SE Area at initial allocation and in 2015



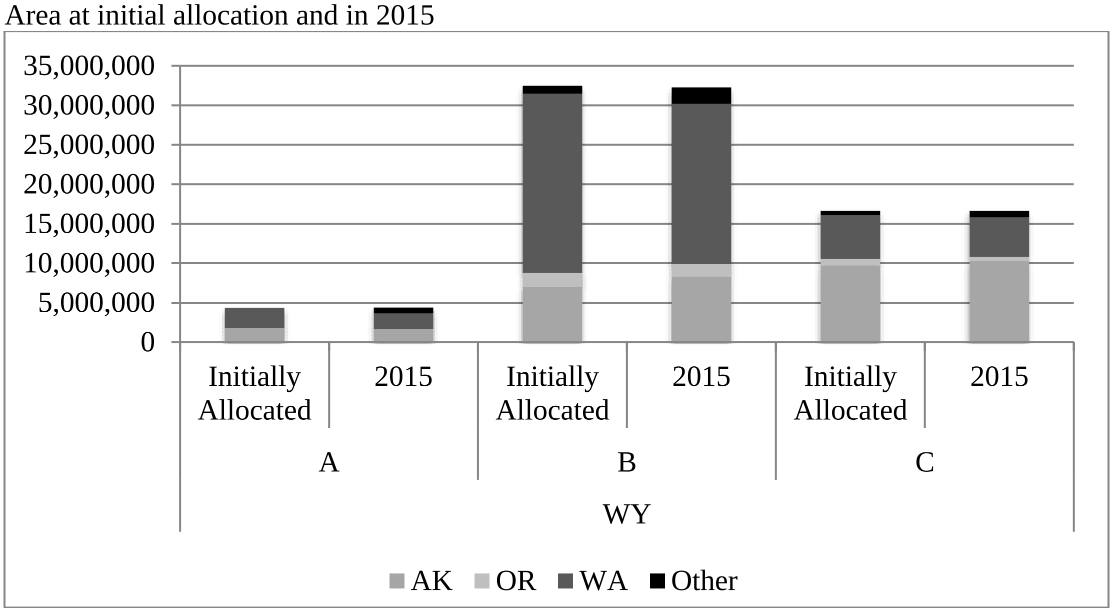
Source: NMFS RAM IFQ QS holdings database sourced by AKFIN

Figure A.2.7.12. Sablefish QS holdings by vessel class and State of residency of QS holder in the WG Area at initial allocation and in 2015



Source: NMFS RAM IFQ QS holdings database sourced by AKFIN

Figure A.2.7.13. Sablefish QS holdings by vessel class and State of residency of QS holder in the WY Area at initial allocation and in 2015



Source: NMFS RAM IFQ QS holdings database sourced by AKFIN

Table A.2.7.3. Processor types in the IFQ landings data

Processor Type Code	Processor Type Name	Definition
IBYO	Independent Buyer	An Independent Buyer is permitted to write fish tickets for unprocessed fishery resources they buy from fishermen. They can only sell the unprocessed resource in Alaska to licensed processors or exporters.
SBPR	Shorebased Processor	Processing facility on land, including canneries. They are authorized to buy and process fishery resources.
CASO	Catcher/Seller	A Catcher/Seller is a person who sells or attempts to sell unprocessed fish, that were legally taken by the Catcher/Seller: 1) to the general public for use for noncommercial purposes, 2) for use as bait for commercial or noncommercial purposes, or 3) to restaurants, grocery stores, and established fish markets (5 AAC 39.130(l)).
COBY	Company Buyer	A shorebased or floating buyer who works for a processing company, and is also known as a company buying station.
EXBY	Buyer/Exporter	Buys unprocessed fish from fishermen for transport out of state.
EXCA	Catcher/Exporter	Catches and transports unpackaged, unprocessed fish out of state.
FLPR	Floating Processor	A vessel that processes at sea. They are authorized to buy and process fishery resources.
CAPR	Catcher/Processor	Catches and sells processed fish or fish products off the boat. If they want to buy fish from others to process, they must obtain a license as a Floating Processor.
WBYO	Waivered Buyer	Waivered Buyers are permitted so that they can write fish tickets for unprocessed fishery resources they buy from fishermen. Examples of Waivered Buyers would be remote lodges that want to buy fish from passing fishermen to serve in their restaurant or fishing camps that want to buy fish to send home with their customers in the event the customer catches no fish.
DMCP	Direct Marketer Vessel	Fishermen with vessels 65' or less who process their catch on their vessel and/or at a shorebased facility they own. They can export their catch unprocessed or have it custom processed. They cannot purchase, process, export, or custom process another fisherman's catch.

Source: AKFIN

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2.8 FISHING VESSEL SAFETY

This section addresses Objective 1 of the final EIS of the IFQ Program:

- Objective 1: Address the problems that occurred with the open-access management regime: safety.

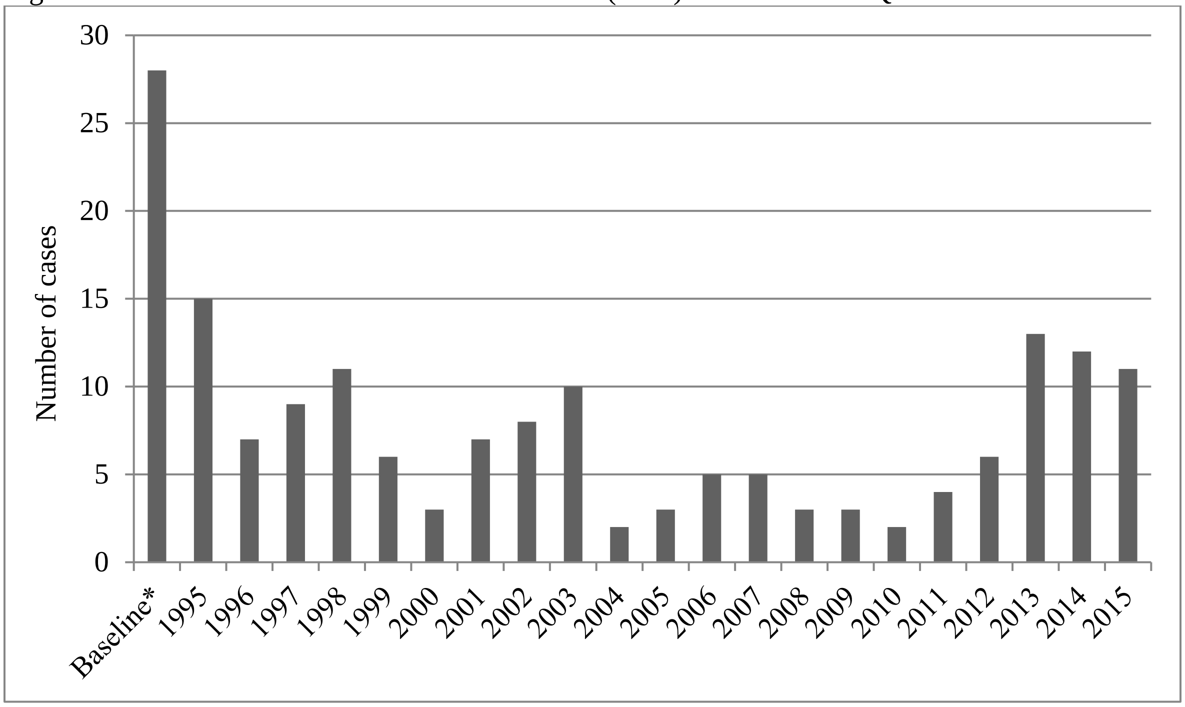
The original EIS for the IFQ Program identified safety as one of the primary problems with the open-access management regime in the fixed-gear halibut and sablefish fisheries. The IFQ Program was expected to provide safety improvements in the halibut and sablefish fisheries by providing IFQ participants with the privilege to harvest a guaranteed percentage of the TAC, which would eliminate the derby-style fishery and congestion on the fishing grounds and allow IFQ participants to decide when and where to fish.

Section 2.8A, produced by the National Institute for Occupational Health and Safety (NIOSH), examines changes in the safety conditions in the halibut and sablefish fixed-gear fleets following IFQ implementation. The NIOSH safety assessment concludes that there has likely been some decrease in hazards as a result of IFQs, although fatalities have continued in the fisheries. The NIOSH safety assessment of the IFQ fleet (Section 2.8A) is open for review and comment, and may be revised accordingly for the final IFQ Program Review. Potential revisions may include clarification of methods, further interpretation of results, and more discussion of potential limitations of the analysis.

In addition to the NIOSH safety assessment, another potential metric of safety in the IFQ fisheries is the number of USCG Search and Rescue (SAR) cases for the IFQ fleet. Figure 2.8-1 shows the number of SAR cases for the IFQ fleet during the baseline period (the average of the values from 1992 through 1994) and through 2015. Previously, information on SAR cases has been provided in the NMFS annual Report to the Fleet.[72] The USCG provided the number of SAR cases for 2013 through 2015 for the IFQ Program Review. The data in Figure 2.8-1 reveal a slightly decreasing trend for SAR cases for the fixed gear halibut and sablefish fleet following IFQ implementation, similar to the evidence of a minimal decrease in risk of fatality shown in Section 2.8A.

[72] Available at: https://alaskafisheries.noaa.gov/fisheries-data-reports?tid=287

Figure 2.8-1 Number of USCG Search and Rescue (SAR) cases for the IFQ fleet



Source: USCG Alaska District

It should be noted that the USCG SAR case data does have some limitations. The USCG does not identify the fishery that vessels are actually participating in during the time that the USCG logs SAR cases. The USCG matches the list of vessels involved in SAR cases to an annual list of vessels participating in the IFQ fisheries (provided by NMFS RAM) to identify IFQ vessels associated with a SAR case. Therefore, there is some uncertainty in linking the SAR cases to actual participation in the IFQ fisheries.

Safety impacts from IFQ implementation were also discussed during the April 2016 IFQ crew workshop (Section 2.4.1.5.2). At the workshop, IFQ participants noted that from their perspective there were safety improvements in the fixed gear halibut and sablefish fisheries following IFQ implementation. However, crew workshop participants also noted that the IFQ program was implemented during the same time frame as new USCG safety regulations, which also contributed to safety improvements.

2.9 BIOLOGICAL MANAGEMENT

This section addresses Objective 1 of the original EIS for the IFQ Program.

- Objective 1: Address the problems that have occurred with the current management regime – Deadloss from lost gear, bycatch loss, discard mortality

One of the chief reasons for the implementation of the IFQ Program was to address biological management issues for the halibut and sablefish fisheries that had existed under the previous race for fish management regime. Prior to IFQ implementation, shortening seasons and overcapacity in the fisheries had led to bycatch and discard issues as well as mortality of fish caught in lost gear (deadloss) from lost or abandoned gear. In addition, the season length restrictions were not always effective at maintaining harvests within the area-specific TACs.

This section investigates how the IFQ Program has affected the biological issues associated with the previous management regime for the halibut and sablefish fisheries. While it is difficult to attribute causality of a management program to the total health of the halibut and sablefish resource given the myriad of ecosystem factors at play, specific biological indicators were expected to be directly impacted by the shift in management regimes. Therefore, this section first provides a brief summary of the current IFQ species stock, then evaluates specific biological-related elements that may (or may not) track more directly with IFQ management.

Deadloss from lost or abandoned gear - The implementation of the IFQ Program was expected to decrease gear losses and abandoned gear in the IFQ fisheries by eliminating congestion on fishing grounds and allowing for prolonged fishing seasons. These changes affected the incentive structure for fishermen because the opportunity costs of time are fundamentally different under an IFQ Program than an open access regime. An IFQ Program allows fishermen to take more time to avoid tangling gear and to retrieve lost or tangled gear. The likelihood of entangling gear would also be reduced as longer fishing seasons and guaranteed quotas reduce congestion on fishing grounds and provide fishermen with the opportunity to be selective in when they choose to fish. Under the open access regime, fishermen also set more gear than they could retrieve before the end of the fishing season.

Bycatch loss - The IFQ Program was anticipated to increase the retention of other groundfish bycatch for the halibut and sablefish IFQ fleet. In the previous open access regime, there was a high opportunity cost for retaining other groundfish bycatch during the short halibut and sablefish fishing seasons; therefore there were high bycatch discard rates of groundfish bycatch. The premium on the rate of harvest, or the opportunity cost of time, was anticipated to decrease under the IFQ Program, with the guarantee of an IFQ allocation and the prolonged fishing season. As a result, the IFQ fleet was anticipated to retain more of its groundfish bycatch, resulting in less uncertainty about the total fishing mortality for the species taken as bycatch in the IFQ fisheries.

Discard mortality - At the time of implementation of the IFQ Program, there was also concern that halibut and sablefish discards, and therefore discard mortality, would increase under the new program because of the incentive to highgrade with IFQs. With IFQs the opportunity cost of time, in terms of foregone landings, is much lower than under open access. The potential for the fishery to be unexpectedly closed is eliminated, and the participant has a guaranteed but limited amount of IFQ pounds to harvest; therefore, the incentive to highgrade is much greater in comparison. The incentive to highgrade is determined by the price premium for larger fish and the cost per unit of landings. An increase in the price premium or a decrease in the cost per unit of landings would be associated with an increase in the incentive to highgrade. Halibut and sablefish pricing is often stratified by size of fish at a first wholesale and ex-vessel level because smaller fish yield less product and incur higher processing and handling costs (Fissel et al., 2015). Price differences at the dock between smaller and larger fish may provide significant incentives for highgrading under the IFQ Program.

2.9.1 Current halibut stock

The International Pacific Halibut Commission (IPHC) prepares an annual assessment of the coastwide Pacific halibut stock (from northern California to Alaska). The most recent 2015 IPHC stock assessment (Stewart et al., 2016) indicates that the Pacific halibut stock declined continuously from the late 1990’s to around 2010. That trend is estimated to have been a result of decreasing size-at-age, as well as recent recruitment strengths that are smaller than those observed during the 1980’s and 1990’s. Annual removals (from all sources) from the stock were above the long-term average from 1985 through 2010, decreasing from an annual peak in 2004 until 2014 in response to management measures (Stewart et al. 2016).

The largest sources of uncertainty in current understanding of the stock are 1) the sex ratio of the commercial catch, and 2) the treatment of spatial dynamic and movement rates among regulatory areas.

2.9.2 IFQ management impacts on halibut

2.9.2.1 Deadloss from lost or abandoned gear

Information on lost or abandoned gear is collected through the IPHC logbook program and summarized annually by the IPHC. Logbooks are required of any U.S. vessel fishing for halibut that has an overall length of 26 feet or more. Logbooks collected directly from fishery participants in the field by port samplers (and some are collected via mail) who interview the captains and clarify any blank fields or data questions. In some instances, very few to no lost skates are reported, which likely results in an underestimate of associated mortality. Catch rates on lost or abandoned gear are assumed to occur at the average rate observed in the regulatory area and year in which the gear was recovered. All fish estimated to have been captured by lost or abandoned gear are assumed to die. In other words, there is a 100% mortality rate applied to halibut estimated or reported from lost or abandoned gear.

Deadloss from lost or abandoned gear was first estimated by IPHC in 1985, and in 2013 estimates were updated to include the mortality of all sizes of halibut. The amount of mortality due to lost or abandoned gear varies by year but for the 10 years prior to the implementation of the IFQ Program, deadloss estimates ranged from 0.77 – 3.27 Mlbs (net weight), and since the implementation of the IFQ in 1995 the estimate has dropped to between 0.038- 0.28 Mlb pounds (net weight; Table 2.9-1). As expected, the conclusion of short intense derby style openings has allowed for more controlled setting and hauling of gear, and allowed IFQ fishery participants to spend more time recovering gear, and setting and hauling in more ideal weather conditions.

Table 2.9-1 Estimates of Pacific halibut killed by lost or abandoned longline gear in the halibut IFQ fishery (by IFQ area and in million net pounds)

	IPHC Regulatory Area								
Year	2C	3A	3B	4A	4B	4C	4D	4E	Total
1985	0.236	1.019	0.219	0.065	0.046	0.025	0.027	0.001	1.638
1986	0.472	2.036	0.439	0.195	0.014	0.041	0.074	0.002	3.273
1987	0.401	1.732	0.373	0.147	0.058	0.037	0.029	0.004	2.781
1988	0.225	1.651	0.134	0.030	0.024	0.011	0.008	0.000	2.083
1989	0.211	1.599	0.212	0.029	0.072	0.017	0.020	0.000	2.160
1990	0.357	1.217	0.237	0.117	0.060	0.026	0.049	0.003	2.066
1991	0.378	1.253	0.458	0.098	0.064	0.031	0.066	0.004	2.352
1992	0.267	0.705	0.198	0.054	0.046	0.017	0.016	0.001	1.304
1993	0.209	0.374	0.069	0.049	0.036	0.017	0.017	0.001	0.772
1994	0.249	0.918	0.043	0.038	0.041	0.016	0.016	0.002	1.323
1995	0.059	0.138	0.009	0.009	0.009	0.003	0.003	0.001	0.231
1996	0.048	0.196	0.024	0.026	0.030	0.011	0.011	0.002	0.348
1997	0.044	0.082	0.061	0.028	0.031	0.011	0.011	0.002	0.270
1998	0.046	0.173	0.063	0.022	0.018	0.008	0.009	0.001	0.340
1999	0.074	0.129	0.079	0.036	0.030	0.015	0.016	0.002	0.381
2000	0.042	0.067	0.065	0.028	0.024	0.009	0.010	0.002	0.247
2001	0.042	0.072	0.037	0.037	0.031	0.011	0.012	0.003	0.245
2002	0.029	0.157	0.040	0.022	0.016	0.005	0.007	0.002	0.278
2003	0.028	0.079	0.043	0.022	0.017	0.004	0.008	0.002	0.203
2004	0.037	0.089	0.019	0.017	0.013	0.004	0.007	0.001	0.187
2005	0.038	0.177	0.033	0.015	0.007	0.002	0.010	0.001	0.283
2006	0.026	0.059	0.014	0.008	0.004	0.001	0.005	0.001	0.118
2007	0.036	0.064	0.023	0.010	0.004	0.002	0.009	0.002	0.150

2008	0.015	0.075	0.006	0.014	0.007	0.003	0.011	0.002	0.133
2009	0.014	0.058	0.030	0.016	0.007	0.003	0.011	0.002	0.141
2010	0.012	0.030	0.031	0.011	0.008	0.003	0.009	0.001	0.105
2011	0.006	0.040	0.012	0.013	0.009	0.004	0.012	0.003	0.099
2012	0.013	0.016	0.016	0.007	0.003	0.001	0.001	0.001	0.058
2013	0.027	0.027	0.002	0.010	0.003	0.001	0.001	0.001	0.072
2014	0.007	0.016	0.003	0.005	0.011	0.000	0.002	0.000	0.044
2015	0.012	0.014	0.000	0.001	0.005	0.001	0.005	0.000	0.038

Source: IHPC. Note: Estimates for 2015 are preliminary

2.9.2.2 Bycatch Loss

Discards of other FMP groundfish species by the halibut IFQ fleet have historically not been estimated. The Groundfish Plan Team is currently discussing estimating other FMP groundfish, non-target species, and prohibited species catch discards for the halibut IFQ fleet using observer data from the restructured Observer Program that began in 2013.

2.9.2.3 Discard mortality

Incidental mortality of halibut in the commercial halibut fishery includes the mortality of all halibut that are discarded and do not become part of the landed catch. The International Pacific Halibut Commission (IPHC) annually estimates the amount of incidental mortality of halibut in the commercial halibut fishery, termed wastage, for use in the process to determine commercial halibut fishery catch limits (Gilroy and Stewart 2016). The main sources of wastage due to discards of halibut include: 1) fish that are captured and discarded because they are below the legal size limit of 32 inches (U32), and 2) fish that are discarded for regulatory reasons, termed regulatory discards (e.g., insufficient IFQ to cover the entire haul).

This section considers these types of wastage and how they have changed since IFQ implementation and throughout the program. The IPHC estimates that 16% of halibut caught and discarded in the commercial halibut fishery die after being discarded (i.e., 16% discard mortality rate or DMR).. The IPHC's harvest policy specifies that wastage mortality of halibut 26 inches and longer (O26), including O32 halibut (32 inches in length and longer) and halibut between 26 and 32 inches (U32/O26), is deducted from the total amount of allowable halibut harvest (total constant exploitation yield or TCEY) to determine the annual commercial halibut catch limits (fishery constant exploitation yield or FCEY) for each IPHC regulatory area. The wastage mortality of U26 halibut is accounted for in the stock assessment and in the exploitation rates specified for each IPHC regulatory area in the IPHC's harvest policy. The intent of the division of U26/O26 is to standardize the treatment of removals from all fisheries, given that sport and personal use fishery removals are directly deducted when setting catch limits.

As noted in the introductory text above, the IFQ Program was anticipated to potentially result in increased highgrading in the IFQ fisheries due to the changing incentives with allocations of QS and IFQ. The IFQ Program was therefore implemented with a prohibition on discarding halibut of legal size (32 inches or greater, O32) from any catcher vessel when any IFQ permit holder on board still holds unused halibut

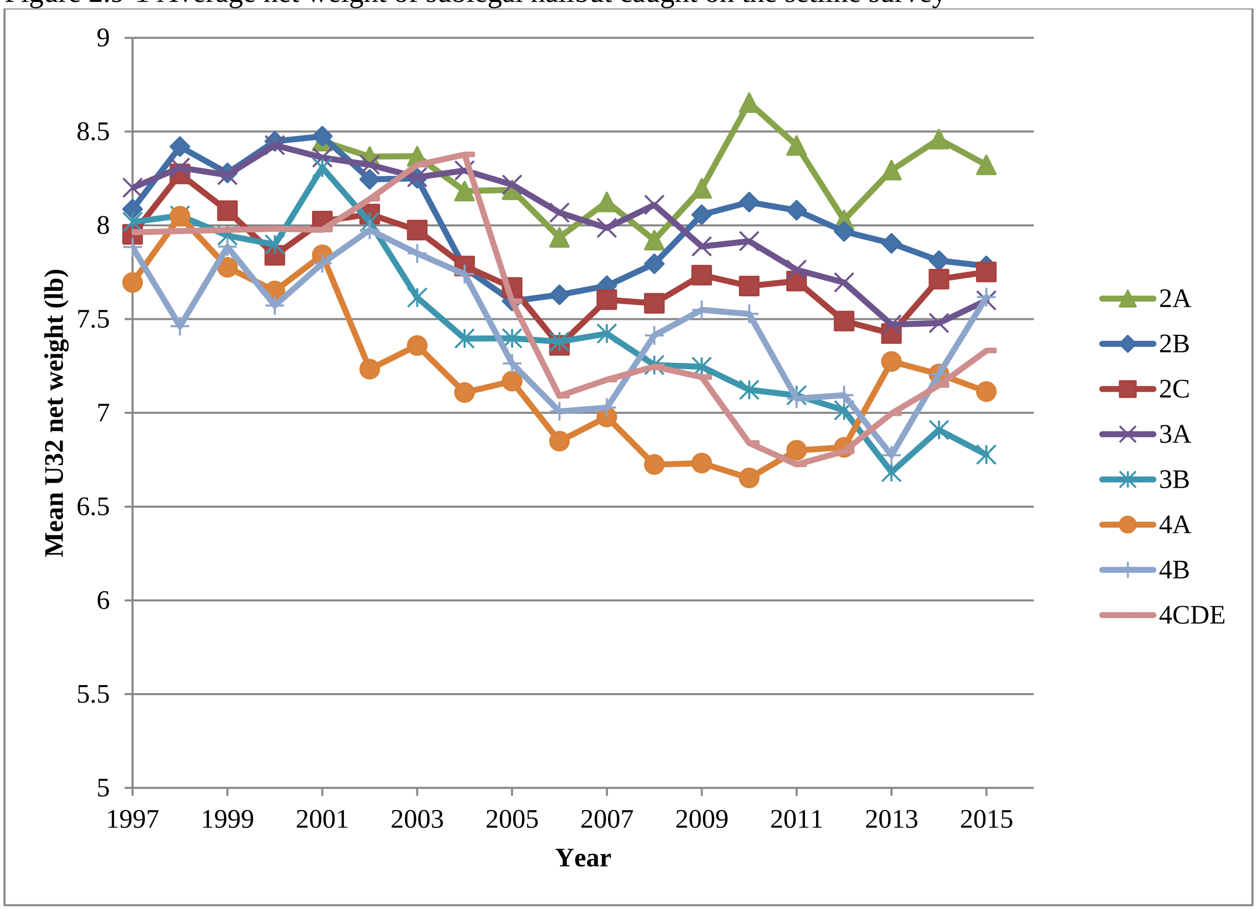
IFQ for that vessel category and the IFQ regulatory area in which the vessel is operating. Therefore highgrading of legal-sized halibut is assumed to not occur in the IPHC's estimation of removals.

According to IPHC regulations, no person is permitted to take or possess any halibut that is less than 32 inches (U32) in the directed IFQ halibut fishery. Therefore, U32 halibut are discarded and a certain percentage of them do not survive.

The IPHC estimates the weight of discarded U32 halibut in the commercial fishery by calculating the ratio of U32 to O32 halibut from the IPHC stock assessment survey in all Alaska regulatory areas and by direct fishery observation in British Columbia.

To determine U32 halibut mortality from discarded fish in the commercial fishery, the IPHC stock assessment survey is used to estimate the encounter rates by area and year, as similar gear is used. Figure 2.9-1 demonstrates the average net weight of U32 halibut caught on the setline survey by IPHC regulatory area over time.

Figure 2.9-1 Average net weight of sublegal halibut caught on the setline survey



Source: IPHC

It was recognized that some setline survey stations produce a much lower catch rate of legal-sized halibut than observed for the average commercial set (Gilroy and Clark 2008). Therefore, to make them more comparable, the setline survey stations are filtered to stations with a higher catch rate (by weight) of legal-sized halibut. Following the previous analyses in 2008, the top 33% was used for Areas 3A-4CDE, and individually estimated percentages for Areas 2A-2C. These percentages make the observed legal-sized halibut catch rates of filtered stations reasonably similar to those reported in commercial fishery logbooks. It is then inferred that the catch rate of U32 halibut (presumed to be discarded) would also be similar.

The IPHC has noted that direct observation of the fishery would be a considerably better approach for estimating the ratio of O32 to U32 halibut in due to differences in the spatial and temporal scope of the fishery relative to the survey, as well as differences in the gear used. The survey uses only fixed hook gear while the commercial fishery also uses snap and autoline gears. Although the commercial fishery uses multiple gear types, 50% of landings in Alaskan waters in 2013 came from fixed gear fishing a decrease from 76% in 1991. The impact of the changes in gear type in the commercial fishery on legal-sized halibut catch rates, and therefore, on discard mortality of U32 halibut, is uncertain.

A DMR of 16% has been applied to all directed commercial fishery halibut discards since the beginning of individual quota fisheries in 1995, and for the earlier years of derby fishing, a 25% rate was applied (Gilroy 2007). The16% DMR is uncertain and is the subject of ongoing research both at the IPHC and through the Council (see DMR working group paper from April 2016 NPFMC meeting: HAL 16-006 - C7 Halibut DMR Discussion Paper). To estimate the annual pounds of U32 halibut captured in the commercial halibut fishery, the area-specific sublegal:legal ratio is multiplied by the estimated commercial catch in each regulatory area for that year. The resulting poundage is then multiplied by the 16% DMR to obtain the estimated poundage of U32 halibut mortalities in the commercial fishery (Table 2.9-2).

Table 2.9-2 Estimates sublegal-sized (U32) halibut discard mortality (in thousands of net pounds) in the halibut IFQ fishery (by IFQ area an in thousands of net pounds)

Year	2C	3A	3B	4A	4B	4C	4D	4E	Total
1985	0.129	0.284	0.198	0.021	0.012	0.009	0.004	0	0.657
1986	0.173	0.517	0.190	0.048	0.002	0.011	0.011	0	0.952
1987	0.175	0.525	0.172	0.05	0.015	0.014	0.005	0.001	0.957
1988	0.179	0.652	0.145	0.024	0.016	0.009	0.002	0	1.027
1989	0.160	0.644	0.172	0.014	0.028	0.009	0.004	0	1.031
1990	0.182	0.583	0.198	0.038	0.015	0.01	0.008	0.001	1.035
1991	0.173	0.523	0.293	0.035	0.018	0.012	0.011	0.001	1.066
1992	0.191	0.587	0.207	0.039	0.028	0.013	0.004	0.001	1.070
1993	0.219	0.513	0.185	0.038	0.024	0.013	0.004	0.001	0.997
1994	0.215	0.632	0.095	0.028	0.025	0.012	0.004	0.002	1.013
1995	0.102	0.292	0.049	0.016	0.013	0.006	0.001	0.001	0.480
1996	0.133	0.358	0.061	0.019	0.013	0.014	0.015	0.003	0.616
1997	0.148	0.455	0.192	0.031	0.019	0.023	0.023	0.005	0.896
1998	0.189	0.522	0.233	0.048	0.035	0.018	0.018	0.003	1.066
1999	0.170	0.429	0.251	0.033	0.046	0.015	0.016	0.002	0.962
2000	0.160	0.416	0.326	0.066	0.036	0.004	0.004	0.001	1.013
2001	0.193	0.391	0.449	0.099	0.047	0.007	0.008	0.002	1.196
2002	0.146	0.507	0.481	0.083	0.020	0.003	0.004	0.001	1.245
2003	0.171	0.608	0.611	0.085	0.026	0.004	0.008	0.002	1.515
2004	0.331	0.682	0.701	0.063	0.022	0.005	0.009	0.002	1.815
2005	0.309	0.568	0.546	0.127	0.011	0.005	0.025	0.004	1.595
2006	0.404	0.69	0.465	0.095	0.009	0.006	0.031	0.005	1.705
2007	0.338	0.913	0.436	0.127	0.019	0.009	0.045	0.010	1.897
2008	0.288	0.943	0.672	0.138	0.018	0.018	0.063	0.015	2.155

2009	0.292	1.131	0.775	0.145	0.011	0.015	0.050	0.010	2.429
2010	0.246	1.429	0.883	0.130	0.030	0.02	0.053	0.010	2.801
2011	0.074	0.901	0.763	0.134	0.035	0.041	0.112	0.024	2.084
2012	0.082	0.581	0.516	0.090	0.035	0.017	0.044	0.011	1.376
2013	0.084	0.498	0.403	0.062	0.032	0.015	0.029	0.009	1.132
2014	0.110	0.431	0.324	0.034	0.047	0.016	0.028	0.006	0.996
2015	0.113	0.504	0.212	0.071	0.036	0.014	0.023	0.003	0.976

Source: IPHC. Note: Estimates for 2015 are preliminary.

NMFS is in the process of developing a methodology to estimate U32 halibut caught and discarded in the commercial halibut fisheries in Alaska from observer data. NMFS began collecting observer data in 2013 for the commercial halibut fisheries, including the amount of U32 halibut caught and discarded. Currently, vessels 40 feet and greater length overall in the Alaska halibut IFQ fisheries are subject to partial observer coverage under the restructured program. NMFS is developing a method to estimate the total amount of U32 halibut caught and discarded using available observer data and will provide these estimates to the Council and the IPHC when they are available.

Information on regulatory discards of O32 halibut is collected through the IPHC logbook program and summarized annually by the IPHC. Since the implementation of the IFQ Program, the only instance of regulatory discards would be if an IFQ holder fully harvests their IFQ during their last fishing trip of the year. Particularly given the 10% overage-underage provision very rarely exceed their quota limits requiring them to make regulatory discards. When overages do occur, they are generally not reported to be substantial (see Section 2.3.4 for a discussion of the overage-underage provision).

2.9.2.4 Size-at-age changes

Size-at-age for Pacific halibut have had wide fluctuations, from lows in the 1920's to a peak in the 1970's; returning to previous lows by the 1990's and early 2000's (Clark and Hare, 2002). The historical record suggests that size-at-age changes relatively slowly; therefore, although projection of future values is highly uncertain, near-term values are unlikely to be substantially different than those currently observed (Stewart and Monnahan, 2016). Data suggest that the decreasing trend in size-at-age has slowed and observations have been relatively stable over the last decade. No correlations in the changing size-at-age have been made to the implementation of the IFQ Program.

2.9.2.5 Recruitment and Pacific Decadal Oscillation

The link between halibut recruitment strengths and environmental conditions remains poorly understood although a significant correlation between them has been found (Clark et al., 1999), with positive regimes of the "Pacific Decadal Oscillation (PDO)" associated with enhanced recruitment of Pacific halibut. As there is no guarantee that observed correlations or decadal patterns will continue into the future, recruitment variability continues to be a significant source of uncertainty in current stock abundance, due to the long lag time between birth year and full entry into the fishery (roughly 7 to 11 years across both males and females). No correlations between recruitment strength and the implementation of the IFQ Program have been identified.

2.9.2.6 Spawning season

The advent of the IFQ Program prolonged the period of time that the fishery stays open, and there is some evidence that fish may be caught outside the regulatory area they are attributed to by the IPHC apportionment methods as they are transiting between their spawning grounds and feeding grounds at the tail ends of the season (Loher 2011). This could lead to annual differences between the target and actual harvest rates for individual regulatory areas (but not coast-wide).

2.9.2.7 Spatial patterns and localized depletion

There was an expansion of the spatial distribution of fishing effort in Alaska when IFQs took effect that added fishing pressure to areas of lower catch rates -mainly inshore and inside waters while reducing it in higher CPUE areas (unpublished spatial analysis further to Monnahan and Stewart (2015)). Implementation of a Pacific halibut quota program in Canada expanded the time available to go fishing, which in turn resulted in a spatial shift in effort to areas of higher halibut CPUE and to areas closer to home port in order to reduce operating costs (Sullivan and Rebert 1998). These changes have the potential to lead to increased interaction between IFQ and other fisheries targeting halibut primarily in inshore waters (e.g., sport and subsistence fisheries).

2.9.3 Current sablefish stock

According to the 2015 stock assessment (Hanselman et al. 2015), sablefish on the Pacific coast of North America are thought to form two populations with the northern population inhabiting Alaska and northern British Columbia waters and the southern population inhabiting southern British Columbia, Washington, Oregon, and California waters. In Alaska, sablefish are managed as a single unit stock in the BSAI-GOA and the scientific uncertainty associated with the stock assessment results in annual harvest specifications under Tier 3 of NPFMC harvest rules as described in the 2015 stock assessment. The updated female spawning biomass estimate (combined areas) for 2016 is 86,471 metric tons, which is 84% of the $B_{40\%}$ biological reference point, and therefore, fishing mortalities associated with ABC and OFL come from the Tier 3b control rule. Model projections from the 2015 stock assessment indicate that this stock is not subject to overfishing, not overfished, nor approaching an overfished condition.

2.9.4 IFQ management impacts on sablefish

2.9.4.1 Deadloss from lost gear

Prior to IFQ implementation, the sablefish fishery had historically had less intense fishing conditions than the halibut fishery. Therefore, the changes expected under the IFQ management regime with respect to decreased congestion on fishing grounds, prolonged seasons, and different incentives for fishermen were expected to have less pronounced impacts on the sablefish fishery. Estimates of deadloss from lost or abandoned gear in the sablefish fishery are not available.

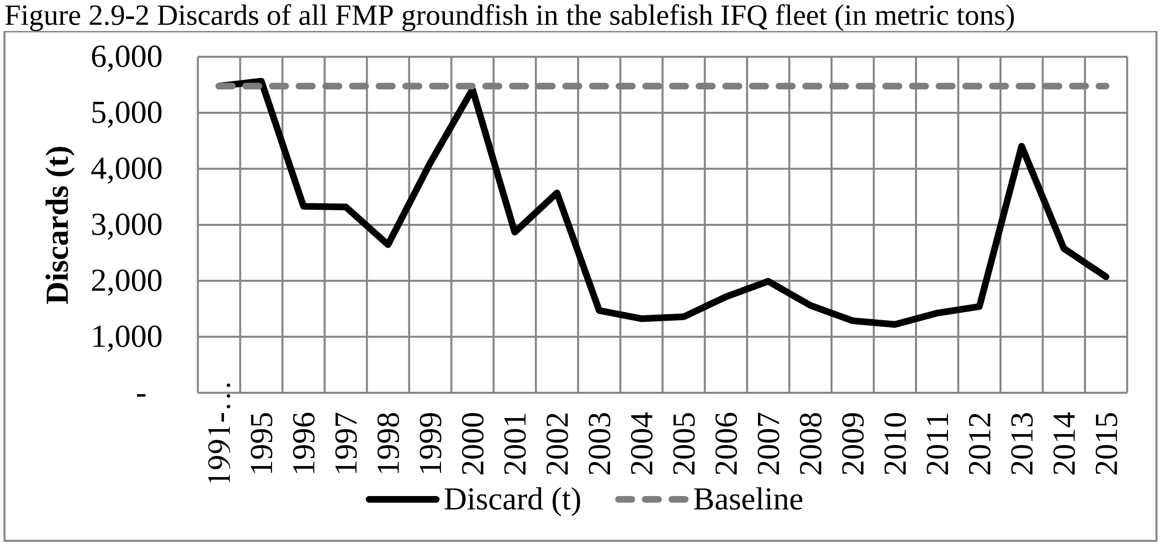
2.9.4.2 Bycatch loss of non-target species

The implementation of the IFQ Program was anticipated to increase the retention of other groundfish bycatch for the sablefish IFQ fleet by decreasing the premium on the rate of harvest or the opportunity cost of time. Furthermore, the mortality rate for discarded rockfish from this fleet was 100%, but much lower for other species. Under the IFQ regime, the sablefish fleet was anticipated to retain more of its bycatch, but the benefits of increased retention for the sablefish IFQ fleet were expected to be less than that in the halibut IFQ fleet, as the latter was more of an intensive fishery with shorter fishing seasons.

Discard rates are the ratio of estimated bycatch (non-target) of FMP groundfish species to the estimated total catch of sablefish and are estimated from at-sea observer data. From 1992 to 1994 (pre-IFQ baseline) non-sablefish discards averaged 5,477 metric tons for the GOA and BSAI combined (Hanselman et al. 2015). Since then, discards have been lower, averaging 2,608 metric tons between 1995 and 2015 (Figure 2.9-2; Figure 2.9-3). The highest discard amounts occur in hook-and-line fisheries in the GOA. For the sablefish IFQ fleet, a major bycatch species is halibut. In order for sablefish IFQ fishermen to be able to retain their halibut catch, they must have unused halibut IFQ specific to the area in and vessel class upon which they are making their landing. This information shows that non-sablefish discards, and therefore bycatch loss from non-target species, decreased following implementation of the IFQ Program as anticipated.

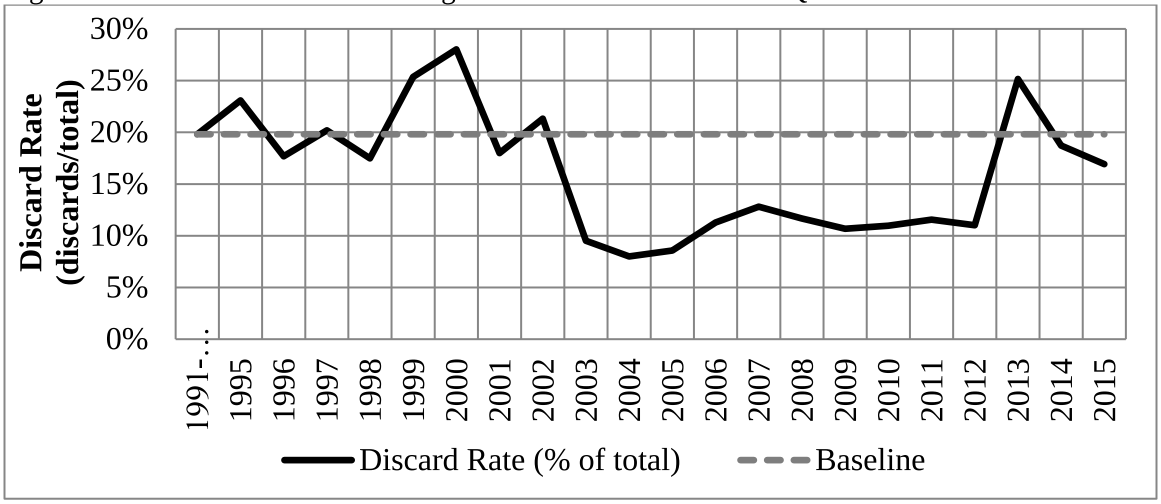
NMFS estimates non-sablefish discards in the sablefish IFQ fishery using observer data from vessels in the fishery. NMFS extrapolates non-sablefish discard data from observed vessels to the entire sablefish fleet to estimate the weight of the discards by species, including halibut. The resulting poundage is then multiplied by the DMR established for that species to obtain the estimated discard mortality of non-sablefish species in the commercial sablefish IFQ fishery. The DMRs established for halibut and groundfish are uncertain and are the subject of ongoing through the IPHC and the Council (see DMR working group paper from April 2016 NPFMC meeting: HAL 16-006 - C7 Halibut DMR Discussion Paper).

Figure 2.9-2 Discards of all FMP groundfish in the sablefish IFQ fleet (in metric tons)



Source: AFSC

Figure 2.9-3 Discard rate of all FMP groundfish in the sablefish IFQ fleet

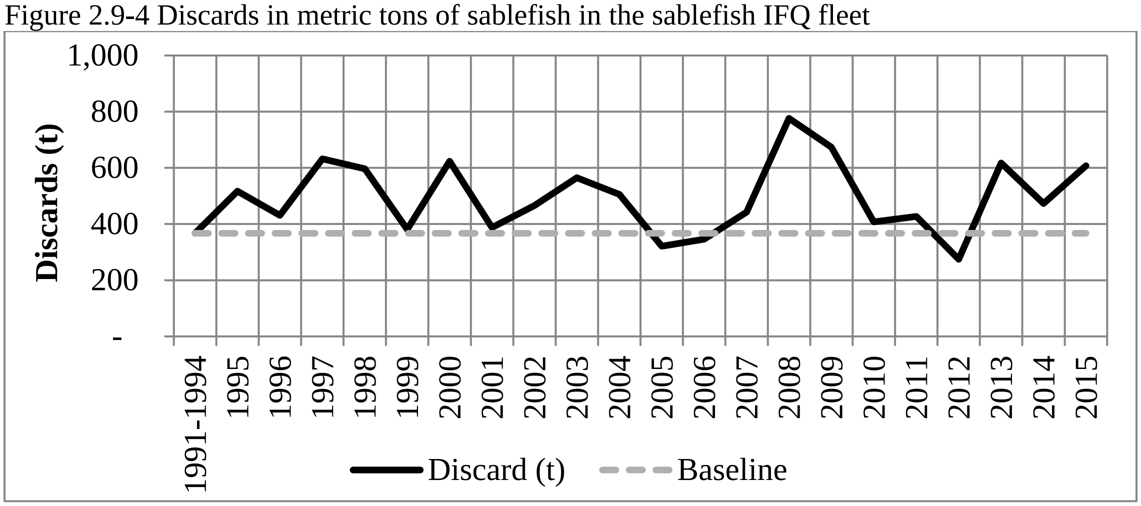


Source: AFSC

2.9.4.3 **Discards of sablefish in the sablefish IFQ fleet**

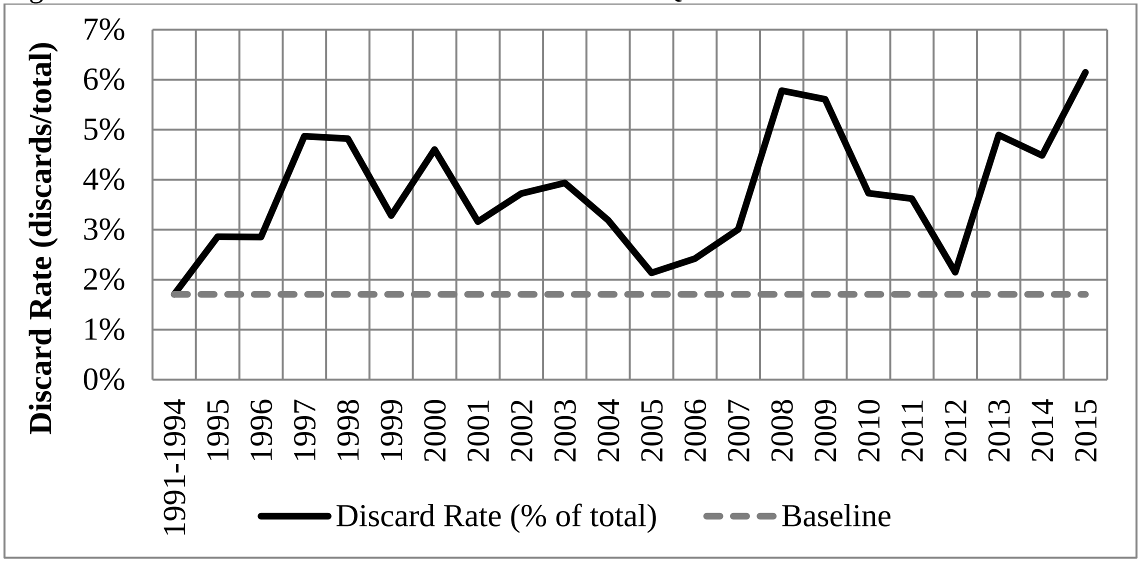
Discards of sablefish for the sablefish IFQ fleet in metric tons and as a discard rate are presented in Figure 2.9-4 and Figure 2.9-5. The discard rate is calculated as the sum of all discarded weight to the sum of all retained weight in the sablefish IFQ fleet. In the case of full coverage CPs, discarded sablefish is estimated solely from observer data, while discard for partial coverage CPs, prior to 2016, was based on industry-reported amounts of discard. Starting in 2016, discard on small CPs is estimated as the product of the species-specific discard rate, derived from observer data, and the round weight of groundfish calculated from NMFS production reports. Since the 2013 restructuring of the Observer Program, more IFQ vessels now fall under observer coverage, providing more observer data for generating these discard rate estimates. (See Section 2.11.2 for more information on the Observer Program and Cahalan et al. 2015 for details on catch estimation). All estimated at-sea discard of sablefish is assumed to have 100% mortality. Increasing observer coverage may account for some of the increase in the observed discard rates beginning in 2013.

Figure 2.9-4 Discards in metric tons of sablefish in the sablefish IFQ fleet



Source: AFSC

Figure 2.9-5 Discard rate of sablefish in the sablefish IFQ fleet

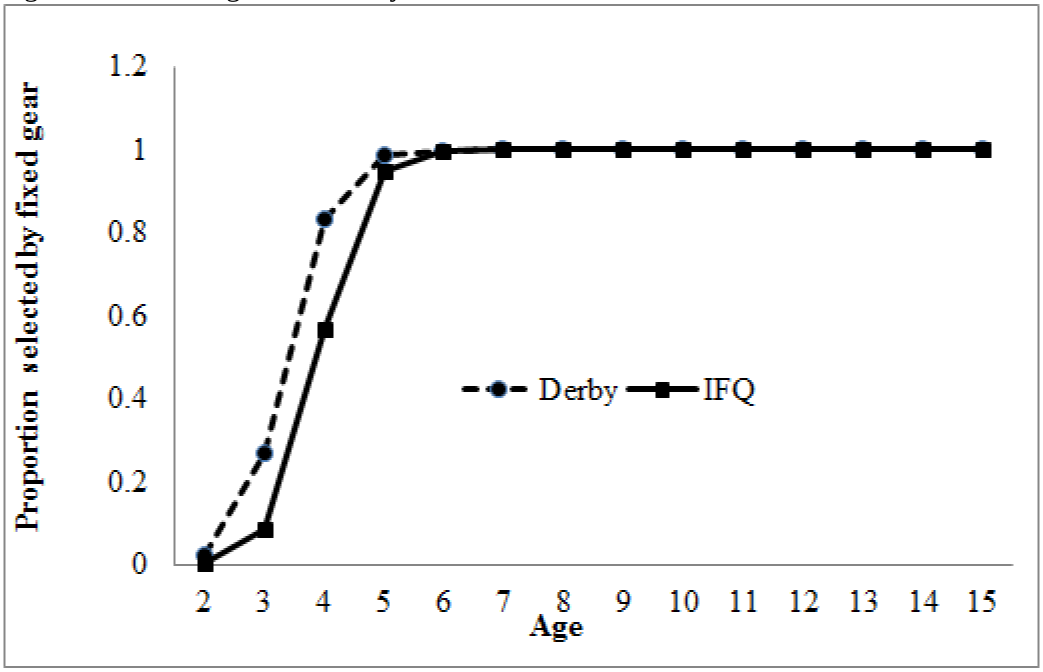


Source: AFSC

This information shows that sablefish discards exhibit inter-annual variability. In the years following IFQ Program implementation, the amount and rate of sablefish discards was higher than the baseline period prior to implementation. As described in the introductory section, sablefish IFQ fishery participants may be highgrading sablefish in response to changes in ex-vessel price and/or operating costs following implementation of the IFQ Program.

After the first several years of the IFQ Program, Sigler and Lunsford (2001) found that the switch to IFQ management increased the catching efficiency of the sablefish longline feet 1.8 times, reducing the variable costs of fishing from 8% to 5% of landed value. Such a reduction in the costs of fishing could be associated with greater incentives for discard rates. However, the authors also found that IFQ management decreased the harvest of immature fish for the sablefish longline fleet, with an implied increase in the spawning potential of sablefish, expressed as spawning biomass per recruit, at 9%. The 2015 sablefish assessment estimates that the IFQ fleet generally fishes on older females (see Figure 2.9-6) allowing more to become mature and spawn.

Figure 2.9-6 Fixed gear selectivity for female sablefish



Source: AFSC

2.9.4.4. Localized depletion and size-at-age

Detecting localized depletion in a well-mixed stock such as sablefish is unlikely (Hanselman et al., 2015). Size-at-age appears to have increased since the IFQ Program has been implemented (Echave et al., 2012).

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2.10 IN-SEASON MANGEMENT

Harvest specifications establish specific limits on the commercial harvest of groundfish used to manage the groundfish fisheries. Harvest specifications establish the overfishing level (OFL), acceptable biological catch (ABC), and total allowable catch (TAC) for each species or species group, including sablefish.

Sablefish are assessed annually as one population in Federal waters, but are managed by area. TACs are established for the Bering Sea (BS), Aleutian Islands (AI), and four Gulf of Alaska sub-areas: Western

(WGOA), Central (CGOA), West Yakutat (WY), and Southeast Outside (SE Outside). For sablefish, the area-wide TACs usually are set equal to the area-wide ABCs.

The sablefish BS, AI, and GOA TACs are then allocated by gear type – either trawl or fixed gear (hook-and-line). Table 10 of the BSAI Harvest Specifications shows the 2016 and 2017 allocations between gear types in the BS and AI subareas (https://alaskafisheries.noaa.gov/sites/default/files/16_17bsaitable10.pdf). Tables 7 and 8 of the GOA Harvest Specifications show the 2016 and 2017 allocations of sablefish among the GOA sub-areas (https://alaskafisheries.noaa.gov/harvest-specifications/field_harvest_spec_year/2016-2017-751). There is no trawl allocation in the GOA SE Outside District because there is no trawl fishery in that district. In the CGOA, sablefish caught on trawl gear is a secondary species for the Rockfish Program cooperatives. The allocations are in Table 28c to Part 679 – Allocation of Rockfish Secondary Species (https://alaskafisheries.noaa.gov/sites/default/files/tabl28c.pdf).

Incidental catch of sablefish refers to sablefish that are caught while targeting other species. In a Supplemental Environmental Impact Statement for the development of the IFQ Program (NPFMC, 1992), the Council acknowledged that if the total fixed gear allocation were allocated as IFQs, the incidental catch in other fisheries could result in annually exceeding the fixed-gear TAC. The Council acknowledged that the simplest solution would be to set aside a percentage of the TAC to support incidental catch of sablefish, and allocate the remainder as IFQ. However, at that time, an estimated bycatch mortality rate had not been established for sablefish as it had been for halibut. The Council acknowledged that to determine this rate would require continued monitoring of incidental catch through expanded observer coverage. Therefore, no set-aside was established for incidental catch of sablefish when the IFQ Program was implemented. At implementation of the IFQ Program, the Council believed that there would be enough unused sablefish TAC in the trawl fisheries to absorb incidental catches without exceeding the overall sablefish TAC.

Consequently, the fixed gear sablefish TACs are fully allocated to the IFQ Program, and none of the TAC is set aside for sablefish caught incidentally in other fixed gear fisheries (i.e., in the Pacific cod and halibut IFQ fisheries). Because there is no ICA for sablefish caught in the other fixed gear fisheries, any incidental catch of sablefish must be discarded and accrues toward the TAC. Sources of discards of sablefish in the fixed gear fisheries include sablefish caught in excess of a vessel's available sablefish IFQ, sablefish caught by vessels that do not have sablefish IFQ, and sablefish that are caught out of season (e.g., during the early season Pacific cod fishery).

Most trawl gear fisheries are closed for directed fishing for sablefish, and the entire trawl gear sablefish TAC is used for incidental catch of sablefish in trawl fisheries targeting other species. In the Central GOA Rockfish Program, the trawl cooperatives receive a sablefish allocation that is open for directed fishing. Also, for the BS and AI TACs, the Amendment 80 cooperatives are allowed to use their halibut PSC limit to support a sablefish directed fishery. However, since the Amendment 80 Program started in 2008, no directed fishery for sablefish has occurred among the Amendment 80 participants. Directed trawl fisheries for sablefish might be limited because of the difficulty of harvesting sufficient amounts of sablefish for trawl gear, and because of the potential for high rates of halibut prohibited species catch (PSC). For the BSAI trawl limited access sector, no halibut PSC limit is apportioned to support a sablefish directed fishery. For incidental catch of sablefish using trawl gear, retention is allowed up to the maximum retainable amount; however, retention is not required.

In the BS and AI areas, retained catches of sablefish in both the fixed gear and trawl sectors have been well below the TACs (Figure 2.10-1 and Figure 2.10-2). The IFQ fleet has not been able to fully harvest its TACs in these areas due to extreme marine weather conditions, distant fishing grounds, and the costs of participating in these areas. The trawl fleet only incidentally harvests sablefish in the BS and AI. The potential need for an ICA is currently limited to the GOA only.

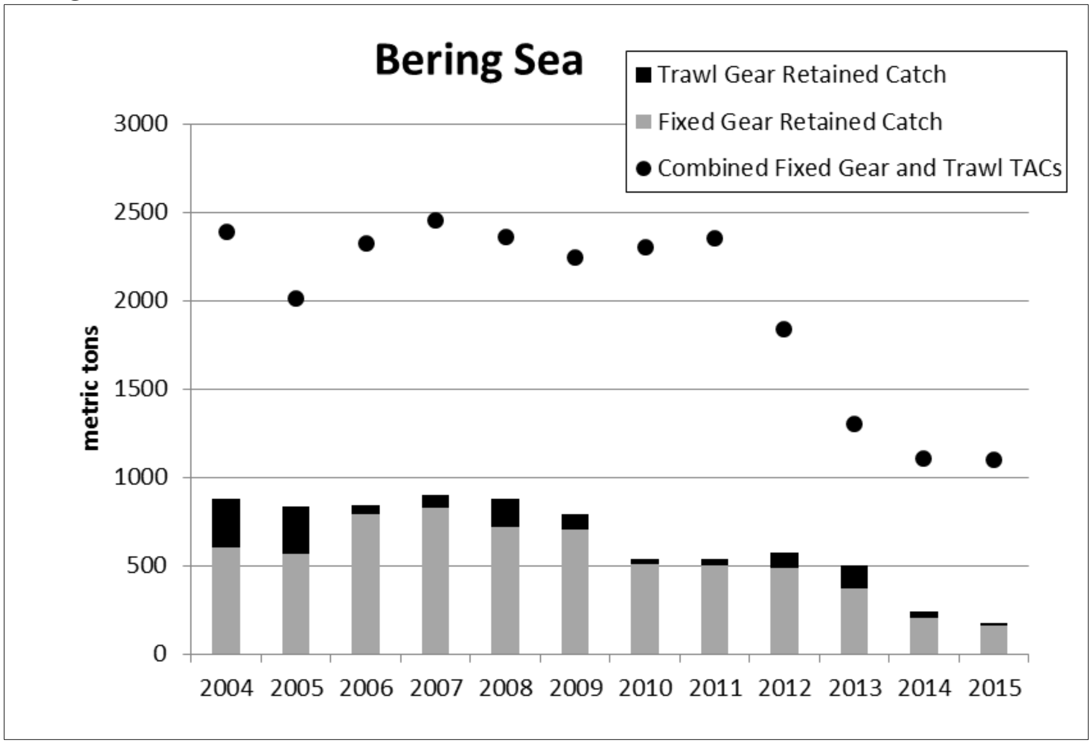
In the GOA, the allocations to the IFQ fleet have been fully harvested in most years since implementation of the IFQ Program. As a result, incidental catches of sablefish by other fixed gear vessels without sablefish IFQ have caused sablefish harvests by the fixed gear sector to exceed the fixed gear TACs in some areas of the GOA in some years. In the WGOA, the total fixed gear harvest and discards exceeded the fixed gear TAC in 2008, 2009, and 2011 (Figure 2.10-3). In the CGOA the total fixed gear harvest and discards exceeded the fixed gear TAC in 2004, 2007-2011, and 2013-2015 (Figure 2.10-4). In the WY District, the total fixed gear harvest and discards exceeded the fixed gear TAC in 2007-2011, and 2013-2015 (Figure 2.10-5). In the SE Outside District, the total fixed gear harvest and discards exceeded the TAC in all but one year (2006) since 2004 (
Figure 2.10-6).

The combined area TACs for fixed gear and trawl gear have generally not been exceeded since the implementation of the IFQ Program because the trawl allocation has not been fully harvested. However, in recent years trawl harvests plus discards of sablefish in the CGOA (Figure 2.10-4) and WY[73] districts have been approaching the TAC, leaving little TAC available to absorb overages from the fixed gear sector. As a result, the combined TAC has been exceeded in the CGOA (Figure 2.10-4) in 2004, 2011, and 2014, and in the West Yakutat District in 2010, 2013, and 2015[73]. While total catch (retained catch plus discards) has approached the combined GOA TACs in some years, the overall GOA TACs have not been exceeded (Figure 2.10-7).

Although retained plus incidental catches have exceeded the sub-area TACs in some years, NMFS does not consider this a current management issue, because total catch has remained below the area-wide TACs and area-wide ABCs (Figure 2.10-1; Figure 2.10-2; Figure 2.10-7). Total catch and discards for all of Alaska relative to the ABC and OFL are shown in
Figure 2.10-8.

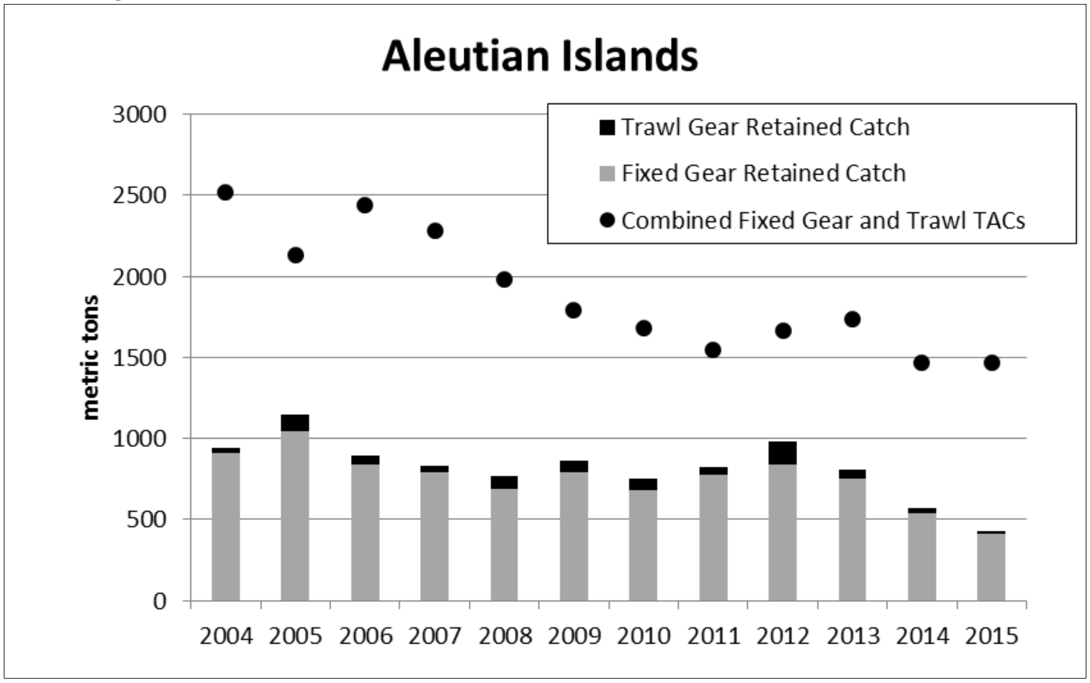
[73] Confidentiality rules prohibit NMFS from disclosing data for the trawl sector in the West Yakutat District because of the small number of participants.

Figure 2.10-1 Metric tons of sablefish retained relative to the combined TAC in the Bering Sea for the fixed gear and trawl fisheries



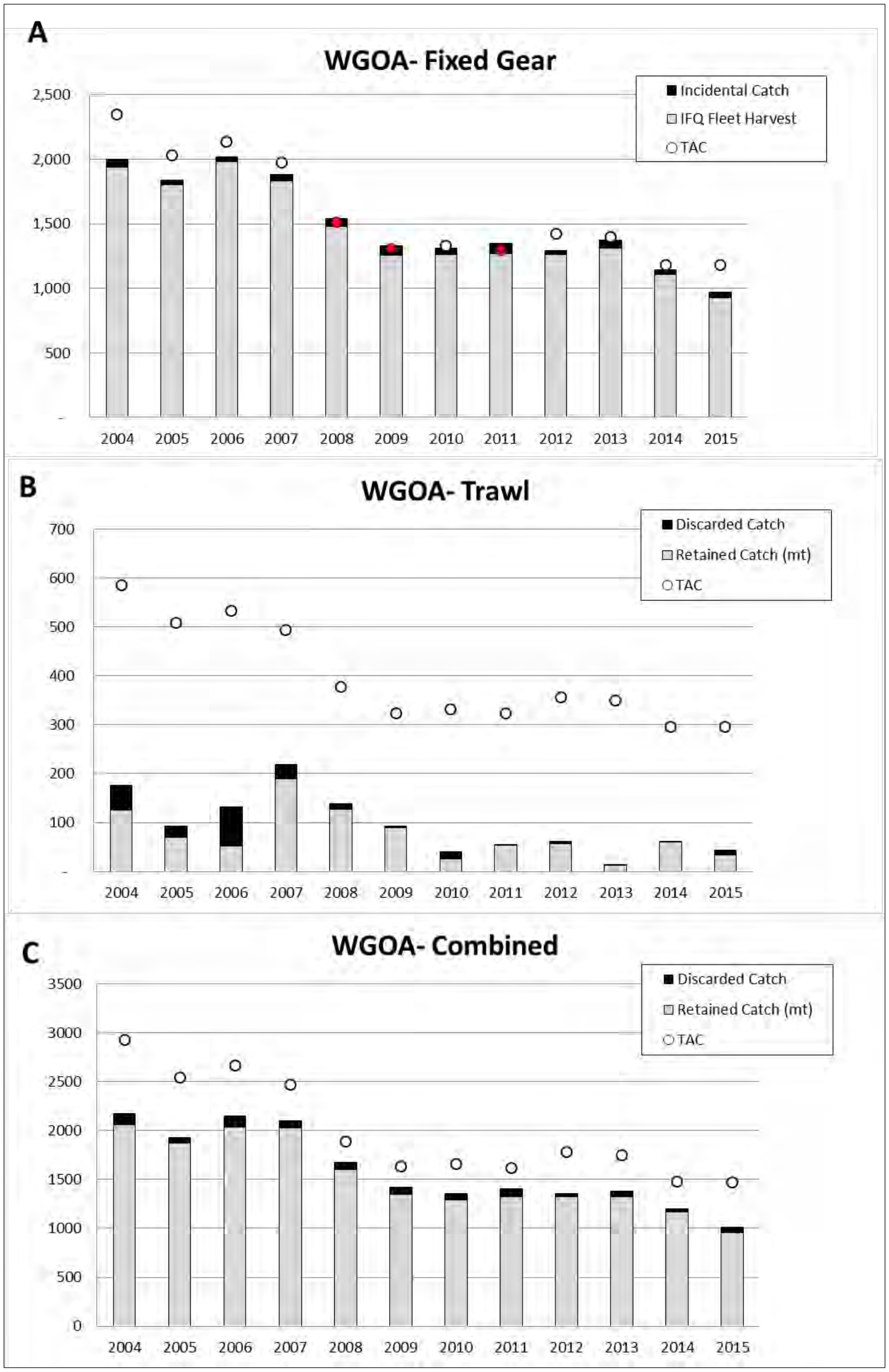
Source: NMFS SF

Figure 2.10-2 Metric tons of sablefish retained relative to the combined TAC in the Aleutian Island for the fixed gear and trawl fisheries



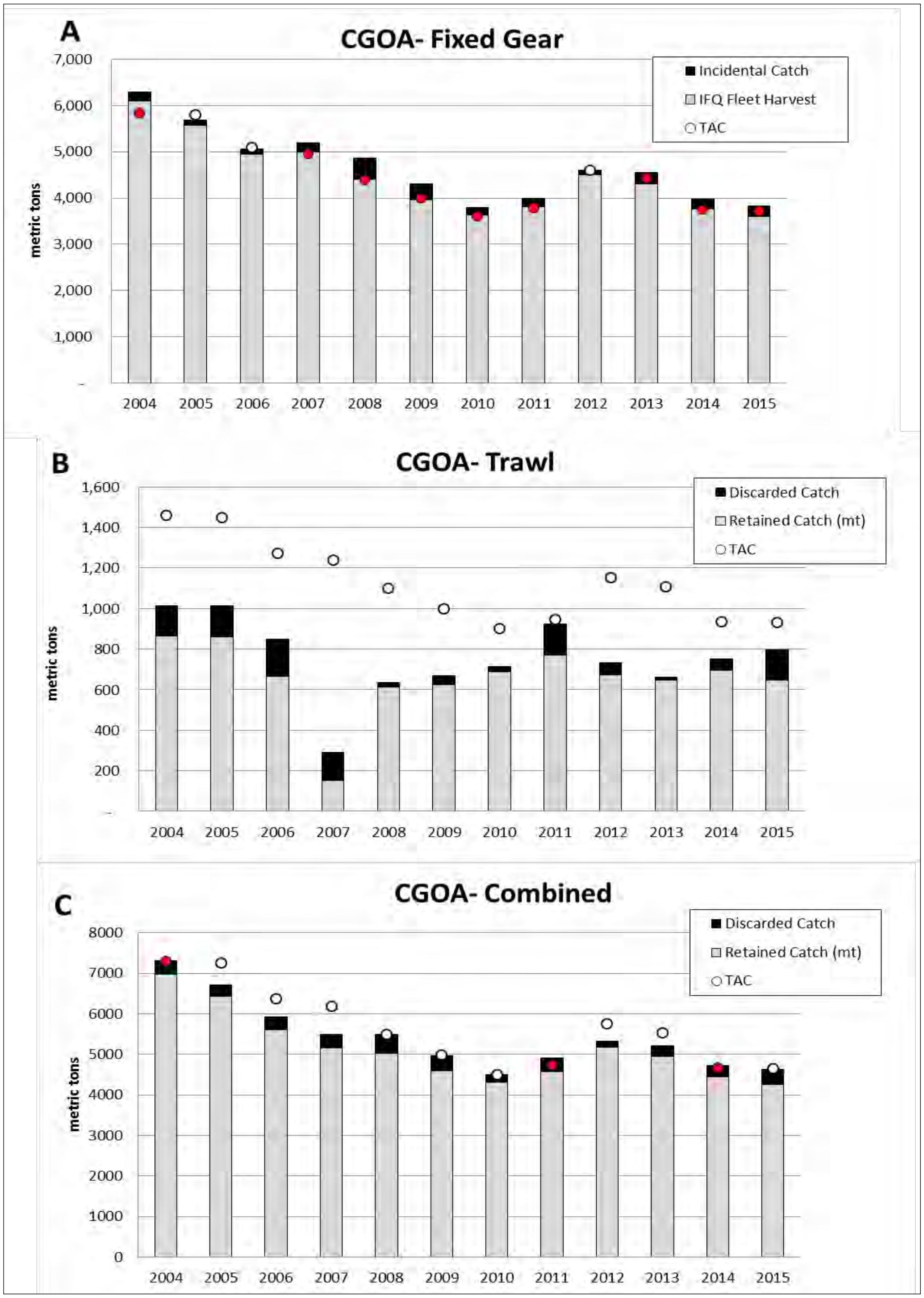
Source: NMFS SF

Figure 2.10-3 Metric tons of sablefish discarded and retained relative to the TAC in the Western Gulf of Alaska area
Metric tons of sablefish discarded (black bars); retained (gray bars); total allowable catch (dots) for the A) fixed gear fishery, B) trawl fishery, and C) fixed gear and trawl fisheries combined. Red dots indicate years when total catch exceeded the TAC.



Source: NMFS SF

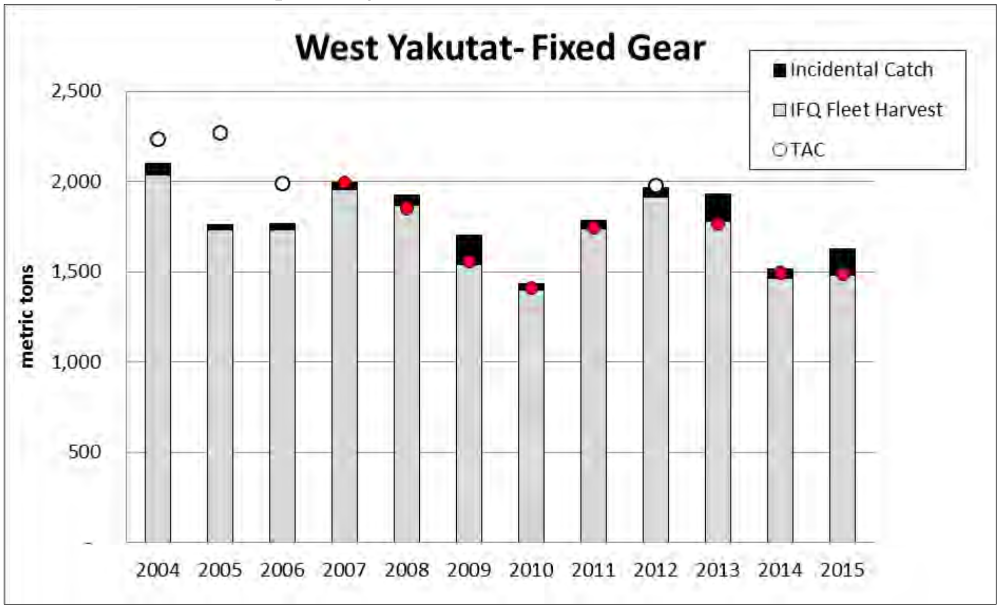
Figure 2.10-4 Metric tons of sablefish discarded and retained relative to the TAC in the Central Gulf of Alaska area
Metric tons of sablefish discarded (black bars); retained (gray bars); total allowable catch (dots) for the A) fixed gear fishery, B) trawl fishery, and C) fixed gear and trawl fisheries combined. Red dots indicate years when total catch exceeded the TAC.



Source: NMFS SF

Figure 2.10-5 Metric tons of sablefish discarded and retained relative to the TAC in the West Yakutat District for the fixed gear fishery

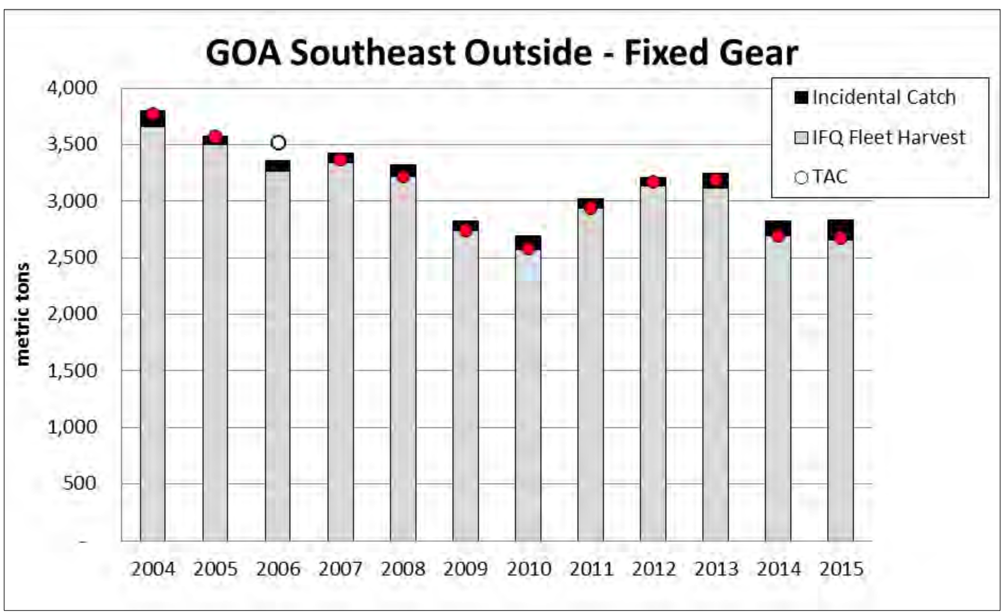
Metric tons of sablefish discarded (black bars); retained (gray bars); total allowable catch (dots). Data for the trawl fishery are confidential and cannot be shown because there were fewer than three participating vessels. The red dots represent years in which the total catch exceeded the TAC.



Source: NMFS SF

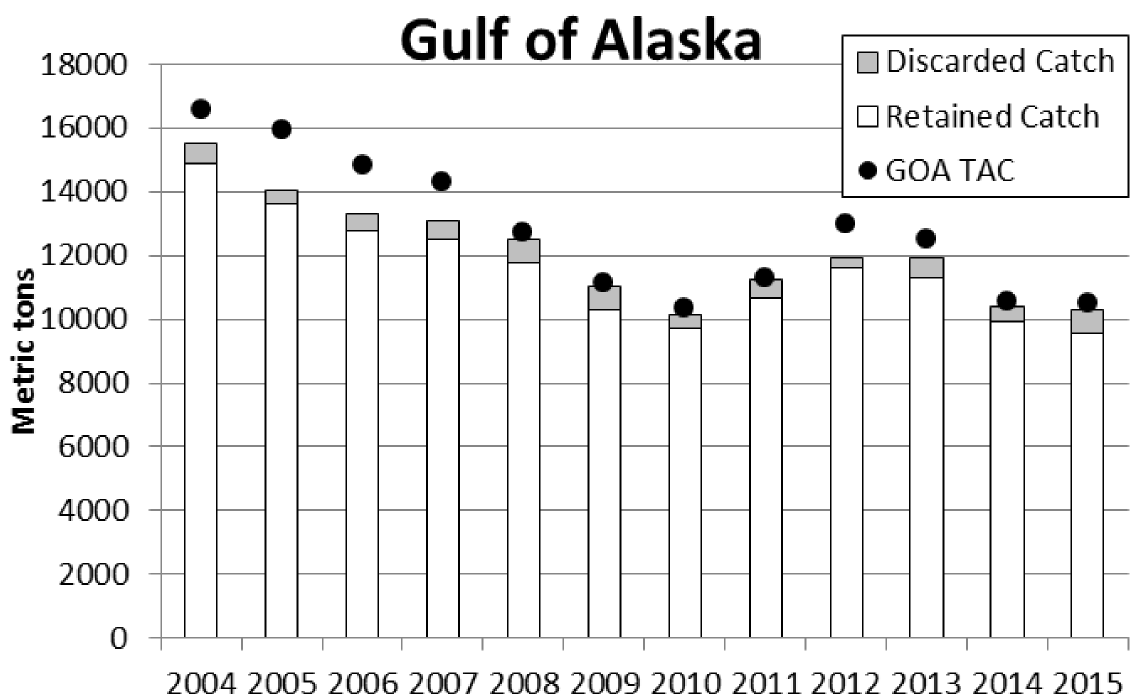
Figure 2.10-6 Metric tons of sablefish discarded and retained relative to the TAC in the Gulf of Alaska Southeast Outside District

Metric tons of sablefish discarded (black bars); retained (gray bars); total allowable catch (dots). There is no allocation to the trawl fishery in this district. Red dots indicate years when total catch exceeded the TAC.



Source: NMFS SF

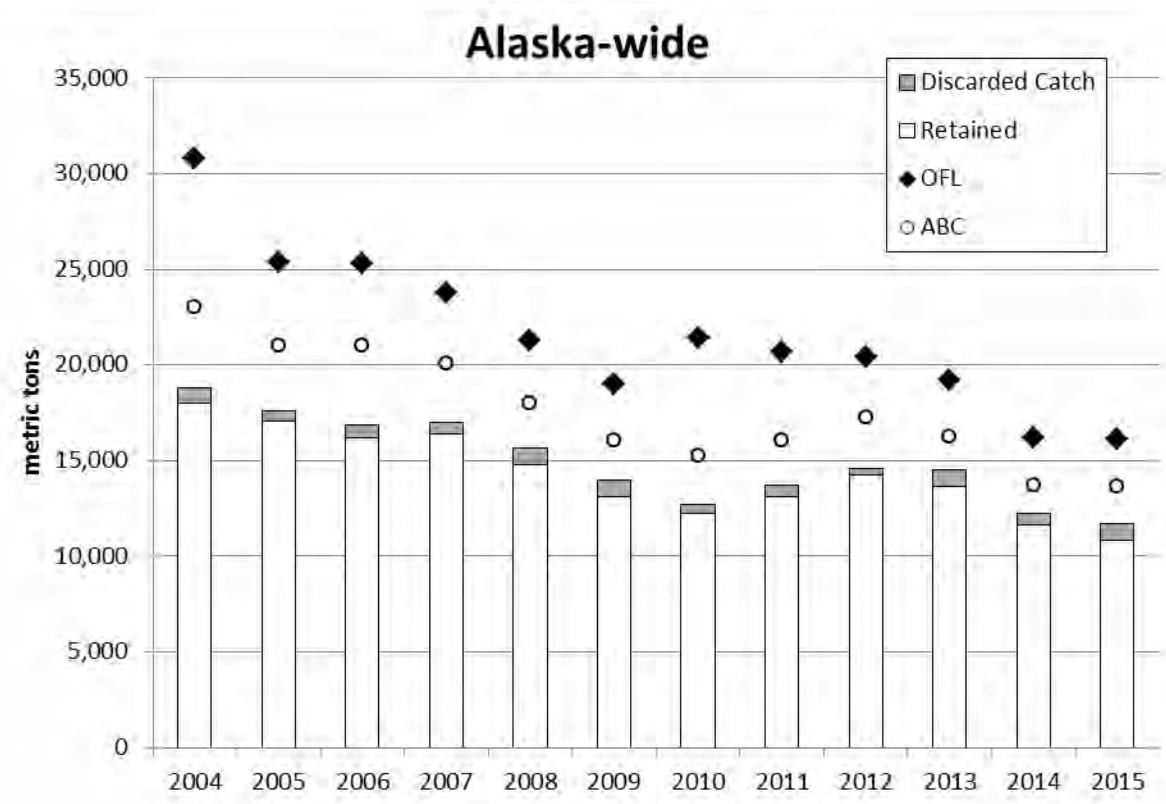
Figure 2.10-7 Metric tons of sablefish discarded and retained relative to the TAC in all sub-areas of the Gulf of Alaska combined for the fixed gear and trawl fisheries
Metric tons of sablefish discarded (gray bars); retained (white bars); total allowable catch (dots) In no year during this period did the sum of retained and discarded catch exceed the GOA TAC. In all panels, TAC is equal to ABC.



Source: NMFS SF

Figure 2.10-8 Alaska-wide metric tons of sablefish discarded and retained relative to the ABC and OFL for all Federal sablefish fisheries
Sablefish discarded (gray bars); retained (white bars); ABC (circles); OFL (diamonds). Includes all Federal sablefish fisheries, including CDQ. In no year during this period did the sum of retained and

discarded catch exceed the ABC.



Source: NMFS SF

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NOAA Fisheries Service. 2013. The Pacific Halibut and Sablefish IFQ Report for Fishing Year 2012. NOAA Fisheries Service, Alaska Region, Sustainable Fisheries Division, Juneau, AK. Available at https://alaskafisheries.noaa.gov/sites/default/files/reports/rtf12.pdf

(NPFMC 1992) SEIS for the IFQ Management Alternative for Fixed Gear Sablefish and Halibut Fisheries September 14, 1992 (Available at https://alaskafisheries.noaa.gov/sites/default/files/analyses/amd_15_20_seis_0992.pdf)

IFQ Program Proposed Rule, 57 FR 57132, December 3, 1992 (Available at https://alaskafisheries.noaa.gov/sites/default/files/57fr57130.pdf)

2.11 OTHER ISSUES

2.11.1 Recordkeeping and reporting

The IFQ Program includes requirements for QS holders to report specific information to NMFS and other management agencies for management, monitoring, and enforcement purposes. These recordkeeping and reporting requirements for the IFQ Program can be split into categories by subject, including those pertaining to: QS ownership; QS/IFQ transfer; fishing activity and landings; cost recovery; and CQEs.

Recordkeeping and reporting requirements for IFQ participants include a mix of electronic and paper submissions to NMFS. Since implementation of the IFQ Program, NMFS has transitioned a number of recordkeeping and reporting submissions from paper to electronic applications and forms in an effort to simplify recordkeeping and reporting, reduce costs and improve accuracy and timeliness of information for management agencies and fishery participants. In most instances, NMFS has maintained options for paper submissions when fishery participants are unable to report electronically.

Two electronic recordkeeping and reporting systems are currently used in the IFQ fisheries. The first is the electronic landings system (eLandings), which is an interagency program that was implemented in 2009 and is required to be used for all IFQ fishery landings, with limited exceptions.[74] The second system is the NMFS Alaska Region online Fisheries Information System (eFISH).[75] IFQ participants can use eFISH to comply with a number of recordkeeping and reporting requirements, including renewing annual permits, submitting ex-vessel volume and value reports; paying cost-recovery and observer program fees; reporting a Guided Angler Fish (GAF) landing; and reporting an IFQ landing (in cases where eLandings may not be used or the landing is outside of Alaska). IFQ participants may also use eFISH to receive information from NMFS relevant to their permits or QS/IFQ holdings, including checking QS, IFQ and vessel balances; printing a receipt for a previous landing; and viewing a registered buyer landing ledger report.

NMFS has maintained requirements for IFQ participants to submit paper applications and forms for a number of recordkeeping and reporting submissions. These submissions include initial permit issuance, transfers of QS/IFQ, and some logbook reporting requirements.[76] NMFS has maintained paper submission requirements for a number of reasons, including requirements for original signatures on applications and verification of the signatures by a notary public, requirements for participants to submit additional documentation to demonstrate to NMFS that they meet eligibility requirements required by the IFQ Program, and limited agency resources to establish electronic systems. NMFS regularly evaluates IFQ Program recordkeeping and reporting requirements to determine whether information submission processes can be transitioned from paper to electronic. NMFS considers management and administrative needs for the information, the impacts on fishery participants, and agency resource availability for developing an electronic system. NMFS anticipates it will continue to transition recordkeeping and reporting submissions to electronic in the future to the extent practicable.

The remainder of this section provides an overview of the current recordkeeping and reporting requirements for the IFQ fisheries and indicates whether the requirement mainly utilizes a paper or electronic form.

2.11.1.1 **QS Ownership**

- QS: Identification of Ownership Interest (paper)

The QS Holder Identification of Ownership Interest is a required submission from corporations, partnerships, associations, and other non-individual entities that hold QS under the IFQ Program. Such

[74] eLandings is the Interagency Electronic Reporting System for reporting commercial fishery landings in Alaska and is administered by the Alaska Department of Fish and Game, the International Pacific Halibut Commission, and NMFS (73 FR 76136, December 15, 2008). More information is available on the eLandings web site at https://elandings.alaska.gov/.

[75] The eFISH program provides fishery participants with online access to their NMFS accounts at https://alaskafisheries.noaa.gov/webapps/efish/login.

[76] The NMFS web site lists IFQ Program submissions that require a paper application or form at: https://alaskafisheries.noaa.gov/fisheries-applications?field_fisheries_program_value=IFQ+Halibut%2FSablefish+and+CDQ+Halibut+Program

entities must annually submit the individual owners and the percentage of interest each individual holds in the entity that holds QS. NMFS uses the information from this form to determine compliance with IFQ Program requirements including the limitations on use of QS and IFQ, hired master provisions, affirmation of an entity's continuing existence,[77] and identification of first-time applicants.

- QS/IFQ Beneficiary Designation Form (paper)

The QS/IFQ Beneficiary Designation Form allows an individual QS holder to provide NMFS with the name of a designated beneficiary who may receive survivorship transfer privileges in the event of the QS holder's death. NMFS only allows the transfer of IFQ resulting from the QS transferred to the beneficiary by right of survivorship, for a period of 3 years following the death of the original QS holder. After the three years, the beneficiary must transfer the QS to an individual that qualifies as an IFQ crewmember, unless the beneficiary meets the IFQ crewmember qualifications. An IFQ crewmember is any initial recipient of QS or any individual who has at least 150 days experience working as part of a harvesting crew in any U.S. commercial fishery.

2.11.1.2 QS/IFQ Transfer

- Eligibility to Receive QS/IFQ by Transfer (paper)

The application for eligibility to receive QS/IFQ is necessary for persons applying to receive QS or IFQ by transfer who must, through this application, apply to receive a transfer eligibility certification (TEC). To be eligible to receive a TEC, persons must have 150 or more days of experience working as part of a harvesting crew in any U.S. commercial fishery. For example, work on a fishing vessel only as an engineer or cook, or work preparing a vessel for a fishing trip would not be considered work of a harvesting crew. Applicants must provide a reference that is able to verify the harvesting crew experience claimed on the application. Individual and non-individual initial recipients of QS were automatically issued a TEC and are also therefore eligible to receive QS or IFQ by transfer.[78] TECs are also required for persons applying to receive QS or IFQ by transfer from a CQE entity, except for residents of Adak, Alaska. An eligible community resident of Adak receiving IFQ derived from QS held by an Aleutian Islands CQE is not required to meet the 150-day criteria for purposes of being issued a TEC to receive IFQ from an Aleutian Islands CQE.[79]

- Transfer of QS/IFQ (paper)

QS holders may submit a transfer of QS/IFQ form to transfer either their QS or IFQ to a TEC-holding entity. Applicants must provide the price per IFQ pound and the price per QS unit for the transfer as well as provide a reason for initiating the transfer. Additionally, applicants must indicate the relationship between the transferee and transferor and the primary source of financing for the transfer. Generally, IFQ resulting from category B, C, or D (catcher vessel) QS may not be transferred separately from its

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[77] 50 CFR 679.42(j) requires corporations, partnerships, or other non-individual entities to notify NMFS of a change in the entity within 15 days of the effective date of the change. A change means the addition of any new shareholder(s) or partner(s), except that a court appointed trustee to act on behalf of a shareholder or partner who becomes incapacitated is not a change in the corporation, partnership, association, or other non-individual entity; or for estates, the final or summary distribution of the estate. A qualifying change to a non-individual entity requires the entity to transfer any catcher vessel QS holdings to an individual (50 CFR 679.42(j)(6)).

[78] Beginning on December 1, 2014, non-individual initial recipients holding a TEC are only eligible to receive A share QS by transfer (79 FR 43679, July 27, 2014).

[79] The Council recommended removing the 150-day experience requirement for eligible community residents of Adak to accommodate younger residents of Adak who may seek employment, but lack the 150 days of experience as a crew member (79 FR 8870, February 14, 2014).

originating QS. NMFS has implemented recordkeeping and reporting requirements for the three exceptions to this provision (see Section 2.5 for a detailed discussion).

1) Emergency Medical IFQ Transfer (paper)

An approved application for emergency medical transfer waives the requirement for an IFQ permit holder to be aboard the vessel during fishing operations and sign the IFQ landing report. The medical transfer provision allows persons with a medical condition that precludes participation or a medical condition of an immediate family member that requires the QS holders' full time attendance to transfer their IFQ for the calendar year to a person that holds a TEC.

2) Temporary Military Transfer of IFQ (paper)

In the event of a military mobilization affecting a QS holder that prevents him or her from being able to participate in the halibut or sablefish IFQ fisheries, NMFS may approve a temporary military transfer for the IFQ derived from the QS held by a QS holder. A temporary military transfer will be approved if the QS holder demonstrates that he or she is unable to participate in the IFQ fishery for which he or she holds QS because of a military mobilization or activation to duty status. A QS holder who has received an approved temporary military transfer may transfer the IFQ derived from his or her own QS to an individual eligible to receive IFQ for the calendar year.

3) Transfer (Lease) Between IFQ and GAF (paper)

Under the Guided Angler Fish (GAF) program, QS holders can transfer halibut IFQ to persons holding charter halibut permits for the year. This allows the transfer of Areas 2C and 3A commercial halibut IFQ for use as GAF by persons holding charter halibut permits for Areas 2C or 3A. Recipients of GAF may also return unused GAF to the IFQ permit holder from which it was obtained between August 1 and August 31.

4) QS/IFQ Transfer by Self Sweep-up (paper)

The QS/IFQ Transfer by Sweep-up application allows persons to combine two blocks of QS/IFQ with the same vessel category that they currently hold, up to 3,000 pounds for halibut (except in Areas 2C and 3A wherein the allowable sweep-up level is 5,000 pounds) and up to 5,000 pounds for sablefish.

2.11.1.3 **Fishing Activity and Landings**

<u>Harvesters</u>

- IFQ permit (paper, for copies can do electronic)

On an annual basis, NMFS issues IFQ permits to all QS holders once the TACs and the season opening date has been set. The IFQ permit authorizes participation in the IFQ fisheries. The IFQ permit carries the permit holders permit ID, which is a unique identifier that is required on many of the recordkeeping and reporting forms for the IFQ Program. IFQ permits are mailed to permit holders, and permit holders can access their permit account balance through eFISH.

- IFQ Hired Master Permit (paper)

An IFQ hired master permit authorizes the individual identified on the IFQ hired master permit to land IFQ halibut or IFQ sablefish for debit against the specified IFQ permit. An IFQ permit holder who is not an individual (e.g., a corporation, partnership, association, or other non-individual entity) must designate a hired master to fish their IFQ or to obtain a permit to access their account and must own a minimum of 20% ownership interest in the vessel that the hired master will use to fish their IFQ. An IFQ permit holder who is an individual may designate a hired master to harvest catcher vessel QS that is fishable by a hired master if the IFQ permit holder was an initial recipient of QS and meets the vessel ownership requirements. However, a hired master may not be used by an individual IFQ permit holder to harvest halibut IFQ in Areas 2C or sablefish IFQ in the Southeast Outside District.

For the 12 months prior to filing an application for a hired master, the individual IFQ permit holder must either directly or indirectly own at least 20% of the vessel which the hired master will use to fish the IFQ belonging to the IFQ permit holder, or must meet the requirements for an exemption due to total vessel loss, irreparable vessel damage, or temporary vessel disablement. An IFQ permit holder owns a vessel directly by owning the vessel in the name of the IFQ permit holder. An IFQ permit holder owns a vessel indirectly by owning an interest in the corporation, partnership, association or other entity that owns the vessel. The IFQ permit holder annually must submit proof of ownership to NMFS for a vessel that the hired master will use to fish the IFQ. Proof of ownership may include a United States Coast Guard Abstract of Title for the vessel, ADF&G license or registration for the vessel, or other additional written documentation.

- Daily Fishing Logbook (paper or electronic)

The operator of a catcher vessel 60 feet or greater LOA, using fixed gear, setline, or pot gear to harvest IFQ sablefish or IFQ halibut must maintain a longline and pot gear Daily Fishing Logbook (DFL), which is a comparable requirement between NMFS and the IPHC. The DFL includes information on set number, time and date gear was set and hauled, beginning and end positions, permit numbers, and estimated total hail weight for each set. The DFL also requires the operator to record the discard and disposition information of the trip, including recording of discard quantities over the maximum retainable amount for Pacific cod or rockfish when closed to directed fishing. The operator may use an electronic reporting option, eLogbooks, if they choose, with some exceptions. Few, if any, IFQ catcher vessels utilize the eLogbook option, which was originally developed for trawl catcher processors. NMFS plans to better customize the eLogbook option for catcher vessels so it is a more viable option for participants.

Additionally, vessels less than 60 feet LOA and greater than 26 feet LOA are required by the IPHC to complete a logbook of their halibut fishing operations. The operator of a vessel fishing in Area 2A must use either the Washington Department of Fish and Wildlife (WDFW) Voluntary Sablefish Logbook, Oregon Department of Fish and Wildlife (ODFW) Fixed Gear Logbook, or the logbook provided by IPHC. These logbooks are submitted to the IPHC.

- IFQ Prior Notice of Landing

The operator of any vessel making an IFQ landing must notify OLE, Juneau, AK, no fewer than three hours before landing IFQ halibut or IFQ sablefish, unless permission to commence an IFQ landing within three hours of notification is granted by a clearing officer.

- IFQ Departure Report

A vessel operator who intends to make a landing of IFQ halibut or IFQ sablefish at any location other than an IFQ regulatory area for halibut and sablefish in the State of Alaska must submit an IFQ Departure Report, by telephone, to OLE, Juneau, AK, between the hours of 0600 hours, A.l.t., and 2400 hours, A.l.t. A vessel operator must submit an IFQ Departure Report after completion of all fishing and prior to departing the waters of the EEZ adjacent to the jurisdictional waters of the State of Alaska, the territorial sea of the State of Alaska, or the internal waters of the State of Alaska when IFQ halibut or IFQ sablefish are on board.

- IFQ Transshipment Authorization

No person may transship processed IFQ halibut or IFQ sablefish between vessels without authorization by a local clearing officer. The vessel operator must obtain authorization from a local clearing officer for each instance of transshipment at least 24 hours before the transshipment is intended to commence.

Processors

- IFQ Registered Buyer Permit (paper; for renewals can do electronic)

Applicants can apply to receive a Registered Buyer permit which authorizes a person to receive and make an IFQ landing by an IFQ permit holder or IFQ hired master permit holder. A Registered Buyer permit is also required of any person who harvests IFQ halibut or sablefish and transfers such fish in a dockside sale, outside of an IFQ regulatory area, or outside the State of Alaska. A vessel operator who submits an IFQ Departure Report to make a landing outside of an IFQ regulatory area in the State of Alaska is also required to have a Registered Buyer permit. This is applicable for vessels that make IFQ deliveries to the State of Washington. Registered Buyers must reapply for a permit every year, which can be done online through their eFISH account. Entities outside of the State of Alaska receiving IFQ halibut or sablefish are not required to have a Registered Buyer permit; in such cases the vessel operator must be a Registered Buyer.

- Registered Buyer Landing Report (electronic)

A person who is issued a Registered Buyer permit under and who receives IFQ halibut or IFQ sablefish from an IFQ permit holder at any time during the fishing year is required to use eLandings to submit landing reports. The Registered Buyer Landing report includes information on landing data and location, harvester information and weight.

2.11.1.4 **Cost Recovery**

- Cost recovery fee payment (paper or electronic)

NMFS recovers the incremental costs of managing and enforcing the IFQ Program annually through a fee paid by persons who hold a permit granting an exclusive access privilege to a portion of the total allowable catches in IFQ Program fisheries. After each IFQ fishing year, NMFS provides the IFQ permit holder an IFQ Landing Summary and Estimated Fee Liability page. The IFQ permit holder must either accept the accuracy of the NMFS estimated fee liability associated with his or her IFQ landings for each IFQ permit or calculate a revised IFQ fee liability for all or part of his or her IFQ landings using the Fee Submission Form. The IFQ permit holder is responsible for submitting their cost recovery payment to NMFS on or before the due date of January 31 following the year in which the IFQ halibut and sablefish landings were made. IFQ permit holders can pay the fee by check, money order, credit card, or electronic bank transfer.

NMFS implemented a rule on May 23, 2016 (81 FR 23646) that will require all cost recovery payments to be made electronically (credit card or electronic bank transfer) by 2020. Section 2.11.4 Management Costs and Recovery discusses the cost recovery program for the IFQ fisheries.

- IFQ Registered Buyer Ex-Vessel Volume and Value Report (paper or electronic)

The purpose of this form is to collect information from IFQ Registered Buyers that act as a shoreside processor so that NMFS can establish a “standard” ex-vessel price to determine the value of the fisheries for purposes of the IFQ cost recovery fee. An IFQ Registered Buyer that also operates as a shoreside processor and receives and purchases IFQ landings of sablefish or halibut must submit annually to NMFS a complete IFQ Value and Volume Report (Buyer Report) by October 15 of the year receiving IFQ fish. The Buyer Report may be completed online, through a person’s eFISH account.

2.11.1.5 **CQE**

- Community Quota Entity Program annual report:

A CQE must submit an annual report on the CQE's administrative activities, business operation, and community fishing activities for each calendar year if it holds any of the following: community charter halibut permits, halibut and sablefish QS, and community Pacific cod endorsed non-trawl groundfish license limitation program (LLP) licenses. The CQE may combine annual reports about its holdings of community charter halibut permits, QS, and LLP licenses in one report.

2.11.2 Observer Program

Observer coverage is not a requirement component under the IFQ Program. At the time the IFQ Program was implemented in 1995, the Observer Program was still relatively new and generally, observer coverage was only required for vessels participating in the groundfish fishery, and only on vessels above a minimum size (i.e., vessels over 60 feet in LOA). The IFQ Program was designed to be managed using landed catch information. Since then, fisheries management in the North Pacific has become more complex, incorporating management programs for a more diverse suite of fisheries, increasing the importance of understanding not only what is landed, but also what is discarded while at sea. Observer coverage of the IFQ fleet has since expanded from a monitoring requirement for observer coverage when a vessel wanted to fish in multiple areas and retain more catch than the total in any one area to a broadly inclusive observer coverage requirement for the purpose of collecting scientific data on catch and discards.

This section summarizes a framework of the Observer Program as it applies to IFQ participants. This section also includes a description of how changes to the Observer Program may have impacted IFQ participants, as well as identifying areas of current Observer Program development that are relevant to the IFQ Program. The intent of this section is not to analyze specific issues related to observer coverage in the IFQ fisheries, but to identify these issues and highlight which are being examined as part of other analytical processes. Current issues within the Observer Program are prioritized and analyzed through the Observer Advisory Committee (OAC), which presents to the Council each meeting during staff tasking.[80]

2.11.2.1 Description of the Observer Program

The Observer Program provides the regulatory framework for NMFS-certified observers (observers) to obtain information necessary to conserve and manage the Bering Sea, Aleutian Islands, and Gulf of Alaska groundfish fisheries, and the commercial halibut fishery. Observers are biologists trained by NMFS to collect a broad range of information needed by fisheries managers, stock assessment scientists, and policy makers. The information collected by observers provides the best available scientific information for managing these fisheries and developing measures to minimize bycatch. Observers collect a range of information including the following:

- Fishing effort information, such as the vessel's fishing locations and gear type;
- Catch composition, including the size, sex, length and weight of all organisms in samples;
- Biological samples such as scales, tissues, age structures (otoliths), and stomachs;
- Interactions with protected species such as marine mammals and seabirds.

These data are received by NMFS on a near real time basis and provide the foundation for in-season management and for tracking species-specific catch and bycatch amounts. Observer collected data are merged with other sources of information such as landings data on fish tickets, and are used to calculate total catch estimates and manage the groundfish fisheries.

In 2013, NMFS made significant changes to the North Pacific Groundfish and Halibut Observer Program, including how observers are deployed, how observer coverage is funded, and the vessels and processors that must have some or all of their operations observed. These changes increased the statistical reliability

[80] The most recent OAC report can be accessed here: http://npfmc.legistar.com/gateway.aspx?M=F&ID=2e271be2-8cd5-4aa5-a322-ed6f12c51506.pdf

of data collected by the program, addressed cost inequalities among fishery participants by charging a fee on landed catch, and expanded observer coverage to previously unobserved fisheries, and overall, generally improved data used for fisheries management. The 2013 restructuring of the Observer Program expanded the number of vessels included in the program, increasing the costs of participating in the fisheries for these vessels.

Prior to 2013, sablefish vessels less than 60 feet LOA and all commercial vessels targeting halibut were not included in the Observer Program. Generally, vessels greater than or equal to 60 feet but less than 125 feet LOA targeting sablefish were required to pay for and maintain observer coverage for 30% of their fishing days. Therefore, the only IFQ vessels subject to observer coverage requirements prior to 2013 were those vessels greater than or equal to 60 feet LOA targeting sablefish.

Now, all vessels and processors participating in the IFQ halibut and IFQ sablefish fisheries are placed into one of two observer coverage categories: (1) the full observer coverage category, where observers are on board for every fishing trip and the vessels and processors obtain observers by contracting directly with independent observer providers, and (2) the partial observer coverage category, where NMFS contracts with an observer provider and has the flexibility to deploy observers when and where they are needed as described in the annual deployment plan (ADP). Funds for deploying observers in the partial coverage category are provided through a system of fees (observer fee) assessed on the ex-vessel value of retained groundfish and halibut landings from vessels that are not in the full coverage category. These changes are actually specific to all vessels and processors participating in the commercial groundfish and halibut fisheries off Alaska, but for the purposes of the IFQ Program Review, we refer only to the halibut and sablefish IFQ fisheries.

Since 2013, the Observer Program regulations now apply to all vessels participating in the IFQ fisheries, but not every IFQ vessel is required to carry an observer. Generally, full observer coverage is required on large catcher/processors and when participating in a CDQ or other fishery with a transferrable PSC limit. Most IFQ vessels are now in the partial observer coverage category and are subject to the observer fee. Under the 2016 ADP, catcher vessels that participate in the halibut IFQ fishery fall into one of two strata in the partial coverage category. If the hook-and-line vessel is less than 40 feet LOA, they are in the “no selection pool” and will not carry an observer. If the hook-and-line vessel is greater than 40 feet LOA they fall into the “hook-and-line trip selection pool”, and they may be subject to observer coverage. The likelihood of this occurring is dependent on the available funds for the year and the deployment strategy outlined in the ADP.[81]

[81] Note that the sampling strata outlined in the ADP can change each year. In the 2014 ADP the partial coverage pools were: 1) no selection, 2) vessel selection, and 3) trip selection. Under the 2015 ADP the partial coverage pools were: 1) no selection, 2) small-vessel trip selection, and 3) large-vessel trip selection.

All vessels in the partial observer coverage category, including those in the “no selection pool,” pay the observer fee, thus sharing the cost burden of funding observer deployment under the partial observer coverage category. Table 2.11-1 summarizes the number of vessels subject to observer coverage and the observer coverage selection rates for vessels participating in the halibut and sablefish IFQ fisheries from 2013 through 2015. NMFS changed the methodology for deploying observers in 2016 to focus on strata based on gear (e.g., trawl, pot, and hook-and-line) and operational type (CV vs. CP). NMFS maintained a zero coverage selection rate for catcher vessels less than 40 feet LOA and jig gear. In 2016, NMFS targeted a selection rate of 15% for the hook-and-line CV stratum (a stratum that includes the vast majority of IFQ participants). Because fishing is still occurring in 2016, the actual rate of coverage in this stratum will not be known until December 2016. For purposes of this review, the analysts used complete data through 2015.

Table 2.11-1 Summary of the number of IFQ halibut and sablefish vessels and observer coverage selection rates, 2013 to 2015

Observer Category	Vessel Category	Average Annual Number of Vessels	Observer Selection Rate (Annual Ranges)
Partial Observer Coverage Category	Catcher vessels < 40’ LOA and jig	502	0%
	Catcher vessels 40’ to 57.5’ LOA	431	11% - 15%
	Catcher vessels > 57.5’ LOA (incl. a few CPs in partial coverage)	204	15% - 24%
Full Observer Coverage Category	Catcher/Processors	15	100%

Source: NMFS SF. Notes: Number of unique vessels is based off of 2013-2015 data. Observer selection rates vary in each year (see annual report). This table provides the range of selection rates from 2013-2015.

2.11.2.2 Benefits of the new Observer Program

The new Observer Program has resulted in improvements in the spatial and temporal representation of observer data across all fisheries in the partial observer coverage category (NMFS, 2015b). The current program structure reduces potential bias in fishery dependent data by using a scientific method (sampling plan) to deploy observers. Each year, the sampling plan is detailed in the ADP and the performance of the sampling plan is analyzed for potential bias in the Observer Program Annual Report. This iterative annual process allows flexibility to alter the sampling plan and respond quickly to changing fishery behavior and new information.

Improved data reliability was one of the primary drivers for restructuring the Observer Program. The restructuring of the Observer Program expands observer coverage to fill scientific data gaps, reduce bias in the data, and equitably distribute costs.

Within the IFQ halibut fishery, there was a large increase in observer coverage after restructuring. Prior to restructuring, observer information from the halibut longline fisheries was sporadic and an evaluation of this sector showed significant amounts of catch could originate from this sector, leading to a serious data gap. The new Observer Program improved the sampling frame so that the opportunity to sample vessels increased by 51-55%. The expanded sampling frame also resulted in better spatial distribution of sampling relative to the fishery footprint. Previous analysis suggested there was poor coverage in nearshore areas, particularly southeastern Alaska and other nearshore areas in the Central and Western Gulf of Alaska. The inclusion of small vessels and IFQ vessels under the restructured Observer Program improved the representativeness of data compared to the previous program and resulted in more nearshore data and better representation of the small vessels and halibut fisheries in 2013 and 2014 (NMFS, 2015). This improved data allowed estimation to occur when it previously had not and provided important new information to stock assessment authors and in-season managers on sensitive species such as skate, sharks, and rockfish. Taken together, the improvements in the underlying statistical reliability of the data under the restructured program have improved estimates of discards (NMFS, 2015).

Since 2013, observer data on halibut discards is available in the halibut IFQ fishery. NMFS reports estimated halibut discarded at sea in each Observer Program Annual Report.[82] As pointed out in the 2014 IPHC report, current observer coverage in the Alaska directed halibut IFQ fishery is low, and therefore estimates of wastage are of unknown accuracy; however, improved monitoring via increased observer coverage and/or electronic monitoring offer potential for improvement in these estimates (NMFS, 2015). This is important information for understanding the impacts of the IFQ fishery on the halibut resource and additional information about halibut discards is included in Section 2.9 of this program review.

The restructured Observer Program has addressed a critically important and long-standing information gap, the lack of seabird monitoring on halibut IFQ vessels. In deploying observers on board halibut vessels, NMFS can now monitor seabird interactions and calculate estimates of the seabird bycatch. NMFS is now able to include seabird bycatch estimates for the halibut fishery in its annual reports of total estimated seabird bycatch for Alaskan fisheries. This information is provided to a broad suite of interested parties globally, and is especially important for highly migratory species such as the black-footed albatross and for ESA-listed species such as the short-tailed albatross. Observer Program restructuring has been very successful in allowing NMFS to assess the effectiveness of seabird deterrent measures, monitor interactions and takes of seabird on halibut vessels, and begin to take actions to reduce seabird bycatch within this fleet (NMFS, 2015).

2.11.2.3 Impacts of the Observer Program on IFQ participants

2.11.2.3.1 Observer fees

Most IFQ participants are in the partial observer coverage category. Observer coverage in the partial coverage category is funded through the observer fee assessed on the ex-vessel value of groundfish and halibut. The objective of the observer fee assessment is to levy a fee on all landings accruing against a Federal total allowable catch (TAC) for groundfish or a commercial halibut quota made by vessels that are subject to Federal regulations and not included in the full coverage category. NMFS uses funds from the observer fee to purchase observer coverage days to be used by the NMFS contracted observer provider to deploy observers on selected trips made by vessels in the partial coverage category.

The observer fee is equal to 1.25% of the ex-vessel value and is assessed on the landings of groundfish and halibut subject to the fee. Ex-vessel value for halibut and sablefish IFQ and CDQ is based on standard ex-vessels prices reported in the IFQ Buyer Report for the previous year. The standard prices are calculated as a single annual average price, by port or port group and are published in the Federal Register. For example, volume and ex-vessel value data collected on the 2015 IFQ Buyer Report for

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[82] Observer Program Annual Reports are available online at: https://alaskafisheries.noaa.gov/fisheries/observer-program-reports

landings made from October 1, 2014, through September 30, 2015, were used to calculate the standard ex-vessel prices for 2016 (80 FR 77606).[83] The intent is for the fee liability to be split evenly between the vessel owner/operator and the processor or registered buyer. The owner of a shoreside processor and the registered buyer are responsible for collecting the fee, including the harvester's portion of the fee, and remitting the full fee liability to NMFS using the online eFISH system. Throughout the year, processors and Registered Buyers can access landing specific fee liability information through eLandings and print a copy of the observer fee liability report for the harvester. Total observer fee liability for landed halibut and sablefish in 2015 totaled almost $2.2M (NMFS, 2016). The total observer fee liability is reported by species, gear, and area in section 2 of each Observer Program annual report.[84]

2.11.2.3.2 Recordkeeping and reporting

Since 2013, the owners or operators of vessels in the trip selection pool of the partial observer coverage category are required to notify NMFS at least 72 hours prior to departure on a fishing trip. This was a new reporting requirement for vessels subject to partial observer coverage starting in 2013. The Observer Declare and Deploy System (ODDS) was developed to be used as a way to facilitate communication between vessel owners and operators, NMFS and the contracted Observer Provider. To log a trip, a vessel owner or operator can access ODDS online, or by calling the contracted observer provider. Once a trip is logged, the vessel owner or operator would be notified immediately if the trip is selected for observer coverage.

2.11.2.3.3 USCG safety decal

Any vessel selected for observer coverage must maintain a valid USCG Commercial Fishing Vessel Safety Examination within the last two years (50 CFR 600.746 and 679.50). Starting in 2013, NMFS deployed observers on vessels less than 60 feet LOA and vessels targeting halibut for the first time, thus, obtaining the necessary USCG safety decal was a new requirement for these sectors. Note that actual compliance with the safety requirements was not a new compliance requirement as all vessels are required to comply with USCG requirements regardless of whether they carry an observer. However, completing the USCG inspection process at least once every two years and documenting that compliance through the safety decal constitutes a new requirement as of implementation in 2013.

2.11.2.3.4 Observer coverage and the release policy

Impacts on IFQ participants were identified during the development of the new Observer Program and detailed in the EA/RIR/IRFA prepared for Amendments 86/76 to the FMPs (NPFMC, 2011). Crew could be variably impacted by observer coverage requirements, including the potential to displace an IFQ permit holder, a crew member, or a family member as well as potential impacts on crew safety of another person onboard the vessel. Space limitations were also identified, including bunk space, deck space for observer sampling and personal privacy concerns in the case of a female observer assigned to a vessel without a bathroom.

These issues were identified as potential impacts for some but not all vessels with new observer coverage requirements in 2013. Therefore, it was difficult to determine the extent of these impacts on the fleet. Observer Program staff conducted numerous community outreach meetings in an attempt to identify potential issues before they became a problem and work collaboratively to mitigate those issues as early

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[83] The Federal Register notices are available on the Alaska region's website: https://alaskafisheries.noaa.gov/
[84] Observer Program Annual Reports are available online at: https://alaskafisheries.noaa.gov/fisheries/observer-program-reports.

as possible. As a result of those meetings, a number of measures were taken to mitigate potential impacts, including additional observer training, a commitment to hiring and deploying experienced observers on vessels new to the program, and implementing a conditional release policy to minimize the displacement of crewmembers and halibut/ sablefish IFQ holders. In addition, vessels less than 40 feet LOA were excluded from selection for observer coverage upon implementation and this has remained true for each year since 2013.

The conditional release policy described in each annual deployment has changed each year since 2013 in response to recommendations from NMFS and the Council. These recommendations were intended to address potential sources of bias as well as continue to mitigate impacts of observer coverage on small vessels. The Council requested that IFQ holders and crewmembers not be displaced and that a vessel should not be forced to choose between exceeding the capacity of their life raft or purchasing a larger raft. To accommodate the Council's requests, in 2013 and 2014 the conditional release policy allowed a trip or vessel that met the criteria of maximum crew or IFQ permit holder on board to be temporarily released from observer coverage and in 2014, the Council supported NMFS's recommendation to restrict the policy to only apply to vessels in the vessel selection pool.

Data quality concerns were identified because of the conditional release policy implemented in 2013 and 2014 (NMFS, 2015). Beginning in 2015, vessels could participate in electronic monitoring (EM) cooperative research and be placed in the zero selection pool and this opportunity was expanded in 2016. EM research is further explained in section 2.11.2.4.1 below. As a result, NMFS recommended and the Council supported a more restrictive release policy for 2015 and 2016 that balanced the need to address data quality concerns and potential bias with the need to mitigate the impact of observer coverage on small vessels. Table 2.11-2 summarizes which vessels the conditional release policy could be applied to for each year since 2013.

Table 2.11-2 Summary of observer coverage conditional release regulations, 2013 to 2016

Year	Vessels eligible for release from observer coverage	Reasons for a release from observer coverage
2013	Hook-and-line (H&L) gear in the Partial Observer Coverage Category	Insufficient life raft capacity Displace an IFQ QS holder or crew member Insufficient bunk space
2014	40-57.4 feet LOA using H&L gear in the vessel selection pool	Insufficient life raft capacity Displace an IFQ QS holder or crew member Insufficient bunk space
2015	40-57.4 feet LOA using H&L gear in the small vessel trip selection stratum (t)	Insufficient life raft capacity 3rd selected trip in a row
2016	40-57.4 feet LOA using H&L gear	3rd selected trip in a row

Source: NMFS SF

2.11.2.4 **Ongoing Observer Program issues for the IFQ fleet**

2.11.2.4.1 Electronic monitoring

One primary area of interest related to the Observer Program for the IFQ fleet, is the progress of electronic monitoring (EM). Early in the development of the restructured Observer Program, NMFS and the Council established an intention to integrate EM tools into the Observer Program for the fixed gear groundfish and halibut fisheries. EM is a broad term for technologies – such as vessel monitoring systems or video cameras – that can be used to passively monitor fishing operations through video surveillance, tracking, and sensors. The Council has established a high priority goal to integrate EM into the Observer Program for the fixed gear small-boat groundfish and halibut fisheries. To meet this goal, the Council established a committee, the fixed gear EM workgroup, for industry, agency, and EM service providers to cooperatively and collaboratively design, test, and develop EM approaches that are consistent with Council goals and objectives to integrate EM into the Observer Program. At the October 2016 Council meeting, the Council will review an Initial Review draft of a regulatory amendment to include EM technologies Observer Program.

In the lead-up to regulatory implementation, the EM workgroup has collaboratively worked together to conduct research and plan to integrate EM as a monitoring tool for the collection of scientific data on the small vessel fleet. In 2015, 12 vessels participated in the EM cooperative research and those vessels were placed in the zero selection pool for observer coverage. In 2016, 58 fixed-gear vessels 40 to 57.5 feet LOA chose to participate in the EM selection pool and be placed in the zero selection pool for observer coverage.[85]

2.11.2.4.2 Other analytical projects

Three ongoing observer coverage issues specific to the IFQ fisheries were identified in a discussion paper presented to the Council at its Feb 2014 meeting (NMFS, 2014). The issues identified included: 1) monitoring options for vessels fishing IFQ in multiple regulatory areas; 2) exempt vessels with small amounts of IFQ from observer coverage; and 3) observer fee assessment method for IFQ fisheries. The Observer Advisory Committee tracks and recommends relative priority for observer related issues at various stages in the Council and NMFS developmental process.[86] These three issues have not been prioritized for further analysis since they were identified in 2014.

References

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[85] Information about the work being done by the EM workgroup can be found on the Council's website at: http://www.npfmc.org/observer-program/
[86] The priority of these and other projects are detailed in the Status of analytical priorities document available at: http://www.npfmc.org/observer-program/.

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2.11.3 Monitoring and enforcement

Under the MSA, Section 303A LAPPs are directed to include an effective system of monitoring and enforcement. The harvesting privileges created under the IFQ Program require specialized management, monitoring, and enforcement elements. Several aspects of participation in the program must be monitored to ensure compliance with the regulatory requirements. This section presents information on monitoring and enforcement in the halibut and sablefish IFQ fisheries, and the types and distribution of violations that occur in the fisheries.

Data

The data utilized in this section was provided by Alaska Enforcement Division of NOAA Fisheries Office of Law Enforcement (OLE) from the LEADS database. Previously, data on at-sea violations in the IFQ fleet reported by the USCG were provided in the NMFS annual Report to the Fleet (NMFS, 2012). The data presented in this section is comprised of both the US Coast Guard at-sea violations and shoreside violations reported by OLE. Due to database changes, data prior to 2005 were not available for this report.

2.11.3.1 Monitoring

The IFQ Program fisheries contain monitoring tools necessary for ensuring compliance with fisheries regulations and safety standards. Multiple agencies are involved with these monitoring tools in the IFQ Program fisheries. Monitoring tools include:

Dockside monitoring: NOAA OLE's Alaska Division provides critical dockside/shoreside monitoring of the IFQ fleet. NOAA OLE has a Cooperative Enforcement Agreement with the State of Alaska Department of Fish and Game, which authorizes state officers to enforce federal laws and regulations. OLE also has Joint Enforcement Agreements (JEA) with the State of Alaska Wildlife Troopers (Wildlife Troopers) and the USCG, which include a formal operations plan that transfers funds to the states and U.S. territorial law enforcement agencies to perform law enforcement services in support of federal regulations. The State of Alaska provides essential dockside boarding assistance in the major IFQ landing ports in Alaska through the utilization of JEA Public Service Technicians and provides statistical landing information in support of enforcing IFQ regulations.

Timely landings reports: All retained IFQ catch must be weighed, reported, and debited from the appropriate IFQ account. To ensure proper and timely catch reporting in the IFQ Program, an electronic reporting system is used. The Interagency Electronic Reporting System (IERS) and its reporting component, eLandings, is a joint system developed under the partnership of NOAA Fisheries Alaska Region, ADF&G, and the International Pacific Halibut Commission (IPHC). This system ensures that deductions are attributed to the appropriate accounts and catch is accounted. The eLandings system allows entry of IFQ landings and provides a printed fish ticket as a landing receipt, as well as receipts for IFQ account debits. Data are received into a central repository database and used to populate separate agency management and enforcement databases. There are also non-electronic mechanisms for reporting fish landings in a situation where the Internet may be unavailable.

Regulatory harvesting limits, leasing limits, and use caps: In the IFQ Program, limits are imposed on how QS may be harvested by area and vessel class, who may lease IFQ, who may use a hired master to land their IFQ, total QS holdings, and the amount of IFQ that may be harvested by a single vessel. These limits are monitored by RAM through applications for QS and IFQ transfers, as well as through monitoring of annual harvesting activity.

Vessel Monitoring System (VMS): VMS is a tool for monitoring and enforcement. It is a tamperproof system, set to report a vessel identification and location to OLE at fixed 30-minute intervals. VMS is required in some fisheries to ensure that vessels comply with area restrictions and to provide enforcement a tool to monitor compliance.

A vessel is required to use a VMS when:

- The vessel has a species and gear endorsement on its Federal Fisheries Permit for directed fishing for pollock, Pacific cod, or Atka mackerel and these fisheries are open, except if the vessel is using jig gear or dinglebar gear (50 CFR 679.7(a)(18)).
- The vessel is operating in the Aleutian Islands or in adjacent State of Alaska waters (50 CFR 679.28(f)(6)).
- The vessel has non-pelagic trawl or dredge gear onboard in the Gulf of Alaska or in adjacent State of Alaska waters (50 CFR 679.28(f)(6)).
- The vessel is in federal reporting areas 610, 620, or 630, and receives and processes groundfish from other vessels (50 CFR 679.28(f)(6)).
- The vessel is participating in the Rockfish Program (50 CFR 679.7(n)(3)).
- The vessel is fishing for sablefish in the Bering Sea or Aleutian Islands (50 CFR 679.42(k)(2)).
- The vessel is participating in the Crab Rationalization Program (50 CFR 680.23(d)).

Vessels fishing exclusively for IFQ halibut are not required to carry VMS, although there are some scenarios that would prompt a vessel operator to choose to do so. For example, vessels that carry VMS and/or have an observer present may possess halibut onboard from multiple regulatory areas of Area 4 at the same time (provided they meet other regulations). In addition, vessels with VMS are not required to have clearance before fishing or landing halibut in Area 4.

Because there is no universal requirement for fishing vessels targeting IFQ fish to be equipped with a VMS on board, there is no centralized means of assessing fishing activity in the IFQ regulatory areas. For the USCG, time intensive patrols by surface and aviation assets are the primary means to identify where vessels are fishing for halibut as well as the number of vessels at sea for a specific period of time. The need for patrols is emphasized from May through September when conditions are the most conducive to halibut fishing.

Logbooks: The operator of any U.S. vessel fishing for halibut that has an overall length of 26 feet (7.9 meters) or greater shall maintain an accurate log of halibut fishing operations. The operator of a vessel fishing in waters in and off Alaska must use one of the following logbooks: the Groundfish/ IFQ Longline and Pot Gear Daily Fishing Logbook, in electronic or paper form, provided by NMFS; the Alaska hook-and-line logbook provided by Petersburg Vessel Owners Association or Alaska Longline Fisherman's

Association; the Alaska Department of Fish and Game (ADF&G) longline-pot logbook; or the logbook provided by IPHC.

2.11.3.2 **Enforcement**

OLE and USCG are responsible for enforcement of regulations in the IFQ fisheries. OLE is responsible for shoreside enforcement and provides after hours surveillance while USCG engages in at-sea enforcement. The USCG documents at-sea violations and refers them to OLE for final action.

OLE employs a multifaceted strategy to maximize compliance in the IFQ fisheries. This strategy includes educational outreach, partnerships, patrols, inspections, and investigations. OLE spends thousands of hours annually providing marine resource users with compliance assistance, including staffing booths at organized events, daily contacts in communities, ports, harbors, and at-sea to ensure that the most current and accurate regulatory information is widely distributed and understood. OLE works closely with the Wildlife Troopers and the USCG to maximize compliance by sharing information, intelligence, knowledge, and resources. The formalized JEA with the Wildlife Troopers provide the state with federal funding for personnel, equipment, operations, and authorization for the Wildlife Troopers to enforce federal fishing regulations while engaged in their regular duties. OLE also spends thousands of hours annually conducting patrols to provide a visible deterrence to potential violators, to monitor fishing and other marine activities, to detect violations, to conduct compliance inspections, and to provide compliance assistance. OLE personnel investigate reports or complaints of IFQ violations as well as regularly analyze IFQ data that may lead to investigations of abnormal activity and missing or questionable information. OLE has identified two monitoring and enforcement concerns related to IFQ fishing requirements; these concerns are explained in more detail in Section 2.11.3.2.1 below.

The USCG's patrol and enforcement efforts for the IFQ fisheries consist of at-sea enforcement. This includes USCG major cutters, patrol boats, and aircraft patrol efforts to identify fleet activity and enable at-sea law enforcement boardings to verify compliance with federal fisheries regulations. USCG assets target at-sea boardings on the IFQ fishing grounds and on vessels returning to port to ensure compliance with IFQ, bycatch, seabird avoidance, and other fisheries regulations. USCG units routinely partner with OLE and the Wildlife Troopers to enhance enforcement presence and detection of violations during periods of high fisheries activity. The USCG eliminated its shoreside enforcement efforts in 2006 in response to OLE's increased capacity to monitor offloads and the enforcement agreements with the State of Alaska.

Table 2.11-3 shows shoreside and at-sea IFQ fisheries violations from 2005 through 2015. This includes violations detected both by OLE and the USCG. These selected violations are those that have persisted over time; other violations are not included because they are occasional or minor administrative discrepancies. Aside from overage violations, which are described in Section 2.3.4, the largest numbers of violations since 2005 have been for fishing for halibut without a permit and having an expired Federal Fisheries Permit (FFP). The total number of annual violations has decreased from an average of 103 from 2005 to 2010 to an average of 79 over the last five years. There continues to be considerable inter-annual variability in IFQ violations.

The data in Table 2.11-3 is not standardized in any way. Annual changes in violations may be a factor of regulatory changes (increases/decreases in the number of potential violations), OLE's staffing changes in various ports, or changes in USCG patrol and/or OLE's shoreside monitoring efforts. Since mid-2015, OLE has been increasing its hiring of enforcement officers (EO). As of May 2016, the first round of those EO hires was completing their field training requirements and was set to be integrated into OLE's field routines, investigations, and patrols shortly thereafter.

Table 2.11-3 Shoreside and at-sea IFQ fisheries violations, 2005 through 2015

Violation Type	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Not Maintaining continuous transit during a closed period	0	0	0	0	0	0	0	0	2	0	0
Failure to use Seabird Avoidance Gear	1	8	9	0	3	0	0	2	14	6	2
Fishing in Closed Area	2	2	4	1	2	1	4	8	4	1	0
FFP/IFQ Permit/Cardholder not onboard	8	5	0	1	9	4	3	6	13	3	6
Expired FFP	12	24	13	1	9	3	16	4	1	0	0
Missing Boarding Ladder	2	2	0	2	8	5	1	1	7	1	1
Insufficient Sea Bird Avoidance	13	7	2	3	2	5	4	2	0	0	0
Logbook Discrepancy	2	1	10	6	5	8	1	7	11	6	1
Fishing for halibut without a permit	8	7	8	7	13	10	6	5	7	1	1
Subsistence Fishing with too many hooks	4	0	1	20	1	10	2	1	1	0	0

Source: NOAA OLE LEADS database

For the IPHC's annual meeting, the USCG provides an annual fisheries violation rate for only the halibut IFQ fleet is expressed as a percentage of total at-sea boardings (total violations divided by total boardings). These violations are a subset of the violations presented in Table 2.11-3 and are specific to only the halibut IFQ fleet, but are described here because they are standardized by the total number of boardings. Such standardization allows for inter-annual comparisons in violation rates for the fleet because it controls for changes in monitoring/patrol efforts. From 2005 (the first year of available data) to 2014, the violation rate for the commercial IFQ fleet ranged from 4% to 10% (NMFS, 2012; IPHC, 2015). The rate increased substantially in 2015 to 17% (IPHC, 2015). This increase is due to both a decrease in the number of boardings and an increase in violations in 2015 relative to 2014. Due to some unexpected maintenance issues in 2015, there was a decrease in the availability of USCG patrolling resources.

2.11.3.2.1 NOAA OLE enforcement concerns

Quota share in the IFQ Program are allocated by specific regulatory area. False reporting of the area of harvest for IFQ is a concern for OLE. Such area fished violations have the potential to significantly impact the IFQ fisheries because the IPHC establishes catch limits by management area and NMFS tracks IFQ catch by area to ensure these catch limits are not exceeded. OLE has limited ability to track at sea-fishing activity and areas fished without the use of VMS. In cases where VMS data is available, it has been instrumental in prosecuting false reporting violations in the IFQ fisheries where a fisherman has caught fish in one area, and upon landing, reported it from a different area. Requiring the use of VMS in IFQ fisheries would substantially improve OLE's ability to prosecute false reporting violations. This intentional violation is hard to detect without VMS and has the potential to impact the fishery resource.

The second enforcement concern is a type of IFQ overage caused when a QS holder on board a vessel has IFQ in two areas, but the vessel does not have VMS or an observer onboard. In this situation the QS holder is not allowed to harvest more fish in any one area than the amount of IFQ he has available for that given area. Violation of this requirement is commonly referred to as a multiple area violation and is considered an IFQ overage even though the QS holder has IFQ in both areas. This type of violation can result in significant fines and forfeiture of the "overage". Requiring VMS in the IFQ fisheries could help fishery participants avoid unintentional multiple area overages.

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2.11.4 Management and cost recovery

Section 304(d)(2)(A) of the MSA, obligates NMFS to recover the actual costs of management, data collection, and enforcement (direct program cost) of the IFQ fisheries. NMFS implemented a cost recovery fee program for the IFQ fisheries in 2000 (65 FR 14919). IFQ fishermen pay an annual fee based on direct program cost and the ex-vessel value of fish landed under the IFQ Program. The MSA limits the fee to 3% of the annual ex-vessel value of the IFQ fisheries. NMFS assesses cost recovery fees only for fish that are landed and deducted from the total allowable catch in the IFQ fisheries. The regulations for the IFQ cost recovery fee program are in § 679.45.

Receipts from cost recovery are deposited into the Limited Access System Administrative Fund (LASAF). Funds in this account are available only to the Secretary of Commerce and must be spent on IFQ Program management, data collection, and enforcement. The following sections review the cost recovery requirements and responsibilities of fishery participants and NMFS, how the fee is determined, and what IFQ Program costs were paid for by the fee.

2.11.4.1 Requirements and Responsibilities

2.11.4.1.1 For IFQ Permit holders

IFQ permit holders are responsible for fees owed for all landings on their permit(s), regardless of whether their IFQ pounds were from their own QS or leased from another QS holder and regardless of whether a permit holder or a hired master made the landings. IFQ permit holders are also responsible for fees owed for all landings of their halibut IFQ leased as guided angler fish (GAF) to a person holding a Charter Halibut Permit issued by NMFS.

Permit holders must pay their fee liability no later than January 31 of the year after the calendar year of the landings. Permit holders may pay the amount calculated by NMFS that is based on standard ex-vessel prices and values, or permit holders may pay an amount based in whole or in part on actual ex-vessel value from the sale of their IFQ halibut or sablefish. Generally, permit holders submit actual ex-vessel value because they received a lower ex-vessel price than the standard price calculated by NMFS, resulting in a monetary savings to the permit holder from using the actual ex-vessel price for their cost recovery fee calculation. Permit holders using actual ex-vessel value must be prepared to demonstrate, with written documentation such as valid fish tickets, sales receipts, or check stubs that clearly identify the IFQ landing amount, species, date, time, and ex-vessel value or price, how much money or other value they received for those IFQ landings.

Since IFQ Program implementation, only a small portion of IFQ permit holders have chosen to pay their fees based on their individual actual ex-vessel value instead of standard prices. Each year the percentage of individuals using actual ex-vessel value has ranged from 2.5% to 10.6% of the IFQ holders. On average, 3% of permit holders pay an amount based on actual ex-vessel value from 2011 through 2015 (Table 2.11-4). Table 2.11-4 shows the number and percentage of total permit holders that successfully submitted actual ex-vessel value for the purposes of calculating their cost recovery fee from 2000 through 2015. Table 2.11-4 shows that the number of permit holders who paid a cost recovery fee has declined approximately 30% from 2000 to 2015. This decline reflects the overall reduction in the number of IFQ permit holders over the time period as discussed in Section 2.3.5.

In 2015, there were 88 permit holders who used actual ex-vessel value to determine their cost recovery fee rather than using the standard prices calculated by NMFS (Table 2.11-4). Of these 88: 12 had submitted actual ex-vessel value every year since 2012, 16 had submitted actual ex-vessel value for three of the four years since 2012, 25 had submitted actual ex-vessel value in at least one other year, and 34 submitted actual ex-vessel value only in 2015.

Generally, IFQ permit holders paid less in fees using actual prices compared to using standard prices. However, the overall savings in total amount and percentage of their total payment is small. In 2015, the average amount of money permit holders saved by using actual ex-vessel value rather than standard prices was $132.62. Of the 87 permit holders using actual ex-vessel value, 64 (74%) had a savings of less than $100 as a result of using actual ex-vessel value, and 41 permit holders (47%) had a savings less than $25. For 64% of permit holders using actual ex-vessel value, the savings on their fee was 5% less than the fee that they would have paid using standard prices. And for 79% of permit holders, the savings on their fee was less than 10%. In 2015, the largest savings on a fee as a result of using actual ex-vessel value was 13% less than the fee due if it was calculated using standard prices. For the 21% of permit holders who used actual ex-vessel value and whose difference in fee was greater than 10% compared to standard prices, the average savings was $561.

Table 2.11-4 Permit holders that paid cost recovery based on individually realized (actual) and ex-vessel value)

Year	Number of permit holders who paid a cost recovery fee using actual ex-vessel value	Percent of total	Total number of permit holders who paid a cost recovery fee
2000	436	10.6	4112
2001	231	5.7	4074
2002	161	4.1	3967
2003	135	3.4	3953
2004	99	2.6	3845
2005	319	8.6	3717
2006	90	2.5	3655
2007	114	3.2	3599
2008	104	3.1	3394
2009	101	3.1	3244
2010	131	4.1	3213
2011	95	3.0	3134
2012	115	3.8	3061
2013	73	2.5	2915
2014	65	2.3	2895
2015	88	3.1	2840

Source: NMFS Operations Management Division Cost Recovery Records

Failure to pay on time results in NMFS action against the permit holder's QS holdings and may result in additional monetary charges, fines, and/or permit sanctions. If a permit holder fails to pay by the January 31 due date, his/her QS/IFQ will become nontransferable and he or she may not receive QS or IFQ by transfer until the fee liability is satisfied. The NMFS, Alaska Region, Operations and Management Division (OMD) will issue an Initial Administrative Determination (IAD) to which the permit holder must respond within 30 days. If an account is unpaid for 30 days after the due date, administrative fees, interest, and penalties start to accrue.

If the account is not paid within the 30 days provided by the IAD, in addition to fees, interest, and penalties, the permit holder's IFQ permit account will be sanctioned and the permit holder will be unable to fish until the fee liability is satisfied. Additional fines may also apply.

2.11.4.1.2 For IFQ Registered Buyers

Registered buyers acting as shoreside processors must report the monetary value and amount of purchased pounds of IFQ halibut and sablefish by species, month, and port, on the IFQ Registered Buyer Ex-Vessel Value and Volume Report (IFQ Buyer Report). This report is essential information for calculating annual standard ex-vessel prices of IFQ fish. Reports are due to NMFS by October 15 each year.

2.11.4.2 Calculating the cost recovery fee

There are four main steps in the process of calculating individual IFQ permit holders' cost recovery fee, which are detailed below.

2.11.4.2.1 Calculating direct program cost for the IFQ fisheries

One component of determining the fee is calculating the direct program cost to manage the IFQ Program, collect data from the IFQ fisheries, and conduct enforcement. Note these costs are incremental: the costs would not have been incurred except for the IFQ Program. The fee offsets funds that would otherwise have been appropriated to NMFS, except the International Pacific Halibut Commission (IPHC) and Alaska Department of Fish and Game (ADF&G) expenditures, for which there is no direct appropriation. Collected fees are used to reimburse agencies and programs for the costs they incurred in the previous Federal fiscal year (October through September).

To arrive at these annual costs, in early October NMFS, IPHC, and ADF&G each calculate their own IFQ direct program costs. NMFS tracks costs by operating units including NMFS Restricted Access Management (RAM), NMFS Information Services Division (ISD), NMFS Office of Law Enforcement (OLE), NMFS Sustainable Fisheries (SF), NMFS Financial Service Division (FSD), NMFS Operations and Management Division (OMD), NMFS Regional Administrator Office and Administrative Appeals Office (RAO/AAO), and NOAA General Counsel (GC). IFQ Program costs are broken into six categories: labor (salaries and benefits), travel, training, purchases (services, equipment, supplies, software), transportation, rent/utilities, and printing. Table 2.11-5 shows the IFQ Program costs by agency and NMFS operating unit.[87] The IPHC and ADF&G and some NMFS operating units started submitting IFQ Program costs after cost recovery program implementation as they established procedures to track program costs. Table 2.11-5 shows that over time, IFQ Program costs have increased for some units and are higher now than they were in 2000, but for other units, IFQ Program costs have decreased. Generally, the most significant source of increased costs is due to personnel additions as well as increases in salaries due to performance and cost-of-living adjustments.

Some operating units had high initial costs at the beginning of the IFQ Program (such as the RAM division) due to management activities such as permit issuance that require significant time initially and then relatively fewer costs after program implementation. Other operating units have had an increase in IFQ Program costs. Costs for ISD have increased due to infrastructure needs such as software upgrades needed to maintain the catch accounting system necessary to track QS and IFQ allocation and use.

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[87] NMFS's Analytical Team also had $11,139 in incremental IFQ management costs in 2004. These costs are not shown here because of space limitations for the table.

Specifically for 2015, there was an increase in direct program cost. This was the result of the addition of staff in OLE, additional costs to maintain the interagency Internet-based landings system used for the IFQ Program, and increased costs for the IPHC port sampling program.

Table 2.11-5 Incremental IFQ management costs by agency and division (2015$)

Year	RAM	ISD	SF	FSD	OMD	RAO/OAA & GC & OLE	IPHC	ADF&G	TOTAL
2000	$1,556,827	$0	$84,239	$0	$0	$2,979,680	$161,038	$0	$4,781,784
2001	$1,944,008	$0	$107,110	$0	$0	$2,341,262	$198,546	$0	$4,590,926
2002	$1,900,779	$0	$85,626	$0	$0	$2,448,297	$194,740	$0	$4,629,442
2003	$1,684,986	$0	$91,504	$0	$0	$2,145,700	$466,640	$0	$4,388,830
2004	$1,417,909	$0	$106,385	$0	$0	$2,444,957	$190,740	$0	$4,159,991
2005	$983,631	$0	$93,519	$0	$104,857	$3,000,974	$360,306	$0	$4,543,287
2006	$506,001	$0	$64,715	$0	$79,604	$2,274,465	$354,240	$0	$3,279,025
2007	$492,438	$0	$54,651	$0	$138,959	$2,216,157	$229,490	$0	$3,131,695
2008	$438,878	$0	$133,336	$210,441	$59,519	$2,616,262	$359,972	$0	$3,818,408
2009	$377,423	$282,387	$190,757	$266,667	$54,454	$3,168,326	$412,792	$0	$4,752,806
2010	$374,239	$559,845	$260,217	$265,312	$106,116	$3,563,848	$441,155	$85,143	$5,655,875
2011	$408,247	$580,116	$360,673	$187,704	$96,329	$3,113,763	$432,871	$158,048	$5,337,751
2012	$504,762	$231,980	$627,113	$180,187	$113,123	$2,781,448	$404,697	$211,220	$5,054,530
2013	$592,136	$342,361	$464,008	$172,185	$101,764	$2,761,058	$461,521	$111,526	$5,006,559
2014	$353,659	$403,840	$404,219	$175,872	$79,668	$2,514,337	$532,727	$71,626	$4,535,948
2015	$342,523	$549,549	$445,830	$165,139	$65,270	$3,379,543	$539,832	$105,919	$5,593,605

Source: Halibut/Sablefish IFQ Cost Recovery Reports

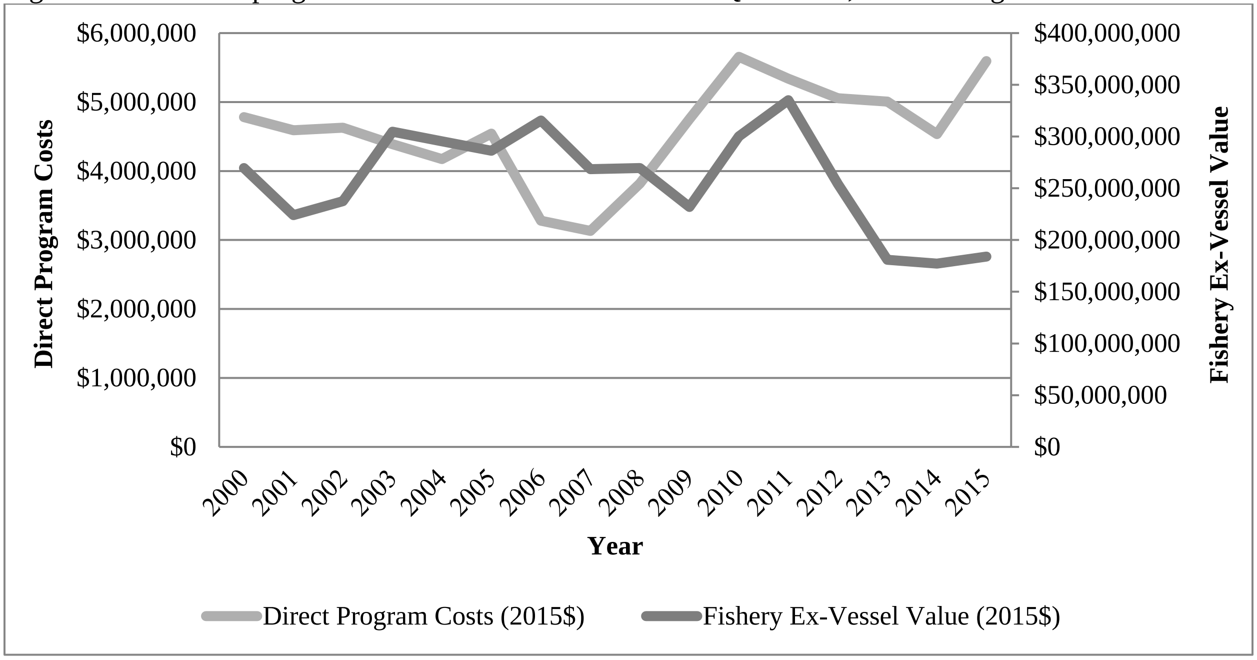
2.11.4.2.2 Calculating the ex-vessel value of the IFQ fisheries

Fishery ex-vessel value is determined from ex-vessel prices, which differ between IFQ species, from port to port, and with the time of year. NMFS utilizes the information submitted on the IFQ Buyer Report to calculate standard ex-vessel prices for the IFQ Program.[88] To account for price variability during the fishing year, NMFS calculates an average ex-vessel price for each species, port of landing, and month; these are the standard prices. NMFS combines ports with limited price data into port groups to comply with restrictions on reporting confidential fisheries data. The standard prices are applied to each IFQ Program landing to create a standard ex-vessel value for each landing. These values are summed to calculate the total ex-vessel value of the IFQ fisheries for that year.

Figure 2.11-1 shows the direct program cost and fishery ex-vessel value calculated for the purposes of cost recovery from the beginning of the cost recovery program in 2000 until 2015. These values were adjusted for inflation using the Bureau of Labor Statistics' Consumer Price Index. Figure 2.11-1 demonstrates that there was an increase in management costs for 2015. As described in the previous section, this increase was the result of the addition of staff in OLE, additional costs to maintain the interagency Internet-based landings system used for the IFQ Program, and increased costs for the IPHC port sampling program. Figure 2.11-1 also shows that the fishery ex-vessel value generally increased from 2000 to 2011, with some inter-annual variability. From 2011 to 2013, the ex-vessel value of the IFQ Program fisheries was in decline, but the value has since held steady, with a slight increase in 2015. This decline was due to reduction in TACs in both fisheries as discussed in Section 2.1 of this review.

[88] Note that the standard ex-vessel price used for cost recovery sometimes differs from that used to recover costs in the Observer Program. The Observer Program halibut and sablefish standard prices are a blend of data for the IFQ and CDQ fisheries, as described in regulation at § 679.55. The IFQ cost recovery standard prices utilize only IFQ ex-vessel prices.

Figure 2.11-1 Direct program costs and ex-vessel value of IFQ fisheries, 2000 through 2015

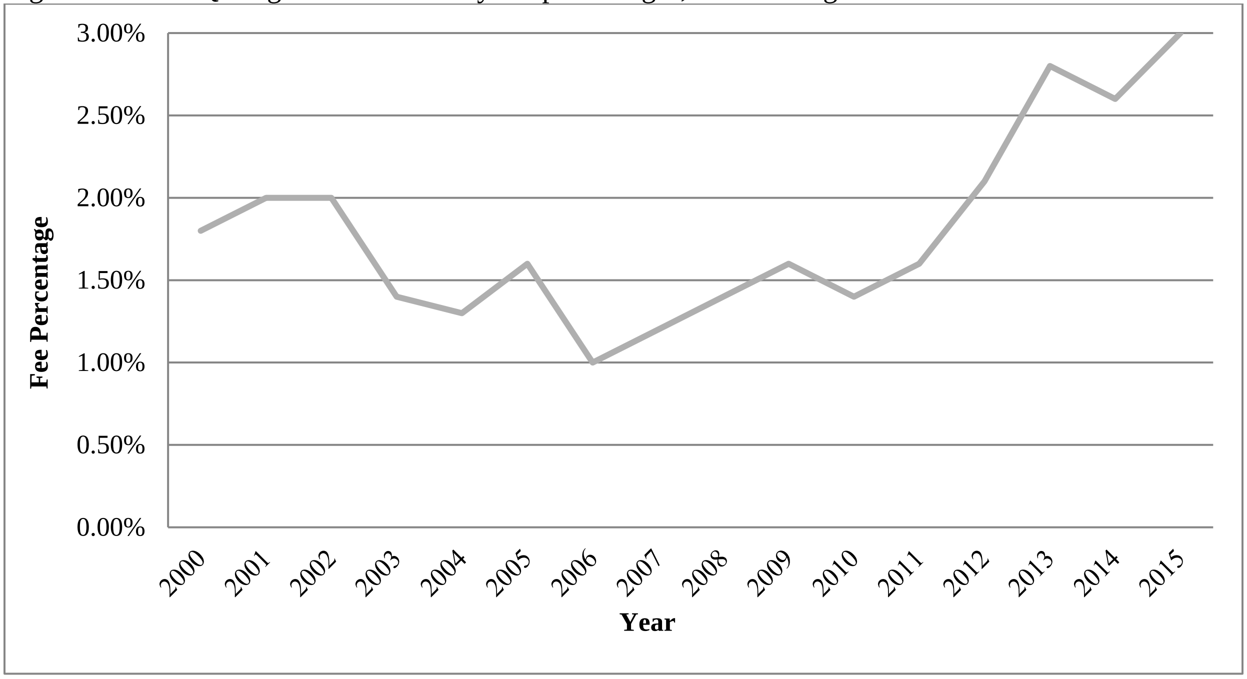


Source: Halibut/Sablefish IFQ Cost Recovery Reports

2.11.4.2.3 Calculating the fee percentage

NMFS calculates the annual fee percentage by dividing the direct program cost by the total ex-vessel value of the IFQ fisheries, and then multiplies by 100. The result, rounded to the nearest 0.1 percent, is the annual *fee percentage*. Figure 2.11-2 shows the annual fee percentage applied to IFQ permit holders based on standard ex-vessel prices and values. The changes in direct program costs and total ex-vessel values shown in Figure 2.11-1 subsequently affected the fee percentage as shown in Figure 2.11-2. From 2000 to 2015, the increase in direct program costs and decline in fishery ex-vessel value has resulted in increased fee percentages, which reached the maximum 3% in 2015.

Figure 2.11-2 IFQ Program cost recovery fee percentages, 2000 through 2015



Source: Halibut/Sablefish IFQ Cost Recovery Reports

2.11.4.2.4 Calculating each IFQ permit holder's fee

After calculating the fee percentage, NMFS applies the fee percentage to the standard ex-vessel value of each IFQ landing to determine the fee owed for the landing. NMFS then sums the fees owed for all landings on all IFQ permits held by each person, to calculate the annual fee liability each permit holder owes. Once the fee liability of each permit holder is calculated, NMFS mails each IFQ permit holder a summary that itemizes their landings and shows their calculated fee liability.

References

NMFS Halibut/Sablefish IFQ Cost Recovery Reports. Available online: https://alaskafisheries.noaa.gov/fisheries/cost-recovery-fee-programs

2.11.5 Housekeeping

The IFQ Program Review provides NMFS with the opportunity to review current IFQ Program regulations to evaluate whether they could be clarified and/or streamlined. In this section, NMFS identifies whether any such issues exist in the IFQ regulations and how such issues may be addressed.

2.11.5.1 QS surviving heir provisions

The IFQ Program regulations at 679.41(k) and 680.41(g) authorize the surviving spouse or designated beneficiary, who is an immediate family member, to lease IFQ for a three year period upon the death of the QS holder (see Section 2.5). However, there is no regulatory definition of "immediate family member" that NMFS can use to determine if a designated beneficiary is eligible to transfer QS and/or lease IFQ as a surviving heir in the absence of a surviving spouse. This creates an administrative challenge for NMFS as cultural understandings of family evolve. This has become an issue as QS holders age and undertake estate planning that increasingly includes beneficiaries that do not meet the traditional definition of immediate family.

To address this issue, NMFS recommends initiating a regulatory amendment to the surviving heir provisions to specify that a court appointed representative for the QS holder's estate would be authorized to transfer the QS and/or lease the resulting IFQ for a period of three years following the QS holder's death. NMFS would coordinate with the Council on development of the analysis for the proposed action.

2.11.5.1.1 Background on surviving heir provisions

The surviving heir provisions were initially implemented in 1996. The initial provisions allowed for a temporary transfer of QS to surviving spouses of deceased QS holders (61 FR 41523). The regulations specified that upon the death of an individual who holds QS or IFQ, a surviving spouse may request to receive for three years all QS and IFQ held by the decedent, unless a contrary intent was expressed in a will that is probated. This provision was consistent with the Council's intent for the IFQ Program, as evidenced by sections 14.4.7.1.4(5) and 4.4.1.1.4(5), respectively, of the Fishery Management Plan for the Groundfish Fishery of the Bering Sea and Aleutian Islands Area and the Fishery Management Plan for Groundfish of the Gulf of Alaska (FMPs), which state:

> The Secretary may, by regulation, designate exceptions to [the transfer provisions] to be employed in cases of personal injury or extreme personal emergency which allows the transfer of [IFQ resulting from QS assigned to vessel categories B, C, or D] for limited periods of time.

In June 1997, the Council recommended that the transfer privileges be extended to any heirs of the deceased, so that other members of a deceased QS holder's immediate family may benefit for a certain period of time from the deceased's commercial fishing interests with regard to the IFQ Program. NMFS subsequently published a proposed rule to implement the Council's recommendation on November 6, 1997 (62 FR 60060). Following the publication of this proposed rule and upon further analysis, NMFS recognized that the proposed action would not provide transfer privileges for an emergency situation and would require an FMP amendment not authorized by the Council. Therefore, NMFS withdrew the proposed rule by publishing a notice (63 FR 13161), which provides further explanation of the rationale for the withdrawal of the rule. Upon the withdrawal of the proposed rule, the Council requested that the analysis be amended with a new alternative that would affect the intent of the proposed action—to extend the benefit of the surviving spouse privilege to families of deceased QS holders who have no surviving spouse—in a manner consistent with the FMPs' emergency transfer provisions. In 2001, NMFS implemented a rule that expanded the existing survivorship transfer provisions to include an immediate family member designated as a beneficiary to whom the survivorship transfer privileges would extend in the absence of a surviving spouse. These are the regulations currently in effect.

The current regulations allow QS holders to provide NMFS with the name of an immediate family member to be the beneficiary of the survivorship transfer privileges in the absence of a surviving spouse. NMFS may approve an application to transfer QS to the surviving spouse or designated beneficiary, unless a contrary intent is expressed by the decedent in a will and provided that sufficient evidence has been provided to verify the death of the individual. NMFS will allow the transfer of IFQ only (lease) resulting from the QS transferred to the beneficiary by right of survivorship, for a period of 3 years following the death of the original QS holder, or until the QS is awarded to a legal heir, whichever comes first.

2.11.5.1.2 Challenge with the administration of the surviving heir provision

In recent years, NMFS has received transfer applications from heirs to a QS holder's estate who do not meet the traditional definition of immediate family member: a person's parents, spouses, siblings, and children. NMFS notes that since the current surviving heir regulations were implemented, the definition of immediate family has changed in many State and Federal jurisdictions, and now may include others connected by birth, adoption, marriage, civil partnership, or cohabitation, such as: grandparents, great-grandparents, grandchildren, great-grandchildren, aunts, uncles, siblings-in-law, half-siblings, cousin, adopted children and step-parents/step-children, and cohabiting partners. NMFS has received inquiries about the definition it is using of immediate family member and has received requests to use an expanded definition of immediate family member as described above in making determinations on accepting the person named on a QS/IFQ Beneficiary Designation form[89] or processing survivorship transfers. NMFS and IFQ Program participants would benefit from a clarification of the Council's intent for administration of this provision.

2.11.5.1.3 Recommendation

NMFS recommends a regulatory amendment to clarify that a court appointed representative for the QS holder's estate would be authorized to transfer the QS and/or lease IFQ for a period of three years following the QS holder's death. Under this option, NMFS would remove all references to surviving spouse or designated beneficiary in regulations and allow the court appointed estate representative to manage the use of the decedent's QS. NMFS recommends this approach because it would create a minimal burden for a person to demonstrate to NMFS that they are a court appointed representative to an estate. Such a representative could submit court-issued documents to demonstrate their eligibility. In addition, this approach would provide clear and consistent eligibility criteria for NMFS to determine if a person is eligible to transfer QS and/or lease IFQ previously held by a deceased QS holder.

2.11.5.2 **Medical transfers of IFQ**

The IFQ Program regulations at 679.42(d) authorize leases of catcher vessel IFQ to accommodate medical conditions of individual QS holders or their immediate family members that preclude the QS holder from participating in the IFQ fishery for which (s)he holds IFQ. The Council and NMFS developed the regulations to allow QS holders to benefit from the fishery through transfer of their IFQ under limited circumstances without substantially undermining the original owner onboard IFQ Program design. The regulations include a number of provisions that are intended to limit the use of medical transfers to legitimate medical conditions that make the QS holder temporarily unable to participate in the fisheries.

NMFS has identified two challenges with administering the medical transfer provisions: 1) the definition of "certified medical professional" under the medical lease provision may not include commonly used medical care providers such as chiropractors and providers outside of the United States, and 2) NMFS staff are increasingly required to make assessments as to whether an IFQ permit holder is applying for a medical transfer in any two of the previous five years for the same medical condition.

In addition, Section 2.5 notes that there are a few QS holders who have utilized the medical transfer provision for the majority or all of the years during which medical leasing has been allowed. The repetitive use of the provision may indicate that a select group of shareholders is utilizing it as a means of

[89] Regulations at 50 CFR 679.41(k) require that a QS holder provide the name of a designated beneficiary from the QS holder's immediate family.

bypassing the owner-on-board provision altogether. Furthermore, some QS holders may be using the medical lease provision for chronic conditions, from which recovery is unlikely. This is contrary to the intent of this provision, to provide relief from fishing for IFQ participants in emergency, and temporary, hardship situations.

The IFQ Program Review has identified a number of complex policy, implementation, and administrative issues related to the medical transfer provision. To address these issues, NMFS recommends development of a discussion paper to identify the implementation and administrative challenges related to the medical transfers of IFQ and to further examine the use of medical transfers in relation to the Council's intent. NMFS would coordinate with the Council to develop the discussion paper.

2.11.5.2.1 Background on medical transfers of IFQ

An emergency medical transfer provision was added to the IFQ Program 2007 (72 FR 44795). The emergency medical provision at 50 CFR § 679.42(d) authorizes leases of catcher vessel IFQ to accommodate medical conditions of individual QS holders or their immediate family members, which preclude the QS holder from participating in the IFQ fishery for which (s)he holds IFQ. To limit the use the provision for emergency conditions and encourage an owner-operator fishery, the Council recommended conservative measures that specify the provision: (a) is limited to individuals who are not eligible to use Hired Masters; (b) is limited to catcher vessel IFQ derived from QS held by the applicant; (c) includes a requirement for certification by specific types of medical professionals who must describe the condition (and care required if for a family member), and certify the inability of the QS holder to participate in IFQ fisheries; and (d) specifies that NMFS may not approve a medical transfer if the applicant has received a medical transfer in any two of the previous five years for the same medical condition. Note that the provision has been used by a small number of initial issuees who cannot use an IFQ Hired Master because they do not own a functional suitable vessel, or because they hold only QS for Area 2C (halibut) or SE (sablefish).

The Council began considering development of alternative medical provisions following implementation of the IFQ Program in 1995 because NMFS and the Council received several anecdotal accounts of injured or sick IFQ holders being transported on and off of fishing vessels to meet the owner-on-board requirements. However, the initially proposed medical provisions would have required NMFS to make an assessment of a medical condition to determine if an IFQ holder was eligible for a medical transfer and the agency does not possess the necessary expertise to make these assessments. NMFS determined that any medical transfer provision must remove the responsibility for making a medical assessment from NMFS, and that a temporary medical transfer must be based on a physician's recommendation. Based on this recommendation, the Council developed the current medical transfer provisions. In December 2004, the Council recommended the current provisions to allow medical transfers without jeopardizing its policy of maintaining an owner-operated fleet. The medical transfer provisions establish requirements for eligibility, application, transfer, restrictions, and appeals. Specifically, the provisions allow the temporary transfer of an annual IFQ permit or permits by an ill or injured QS holder to an eligible recipient (initial QS recipient or crew member). The Council and NMFS assumed that the eligible IFQ transferee would compensate the QS holder for the transfer of his IFQ, thereby allowing the injured QS holder to recoup a portion of his economic losses. Therefore, medical transfers were intended to allow QS holders to benefit from the fishery through transfer of their IFQ under limited circumstances without substantially undermining the original owner-onboard IFQ Program design.

The Council recommended several provisions to ensure that the medical transfer would be limited to legitimate medical conditions. First, the Council recommended that applicants must submit a declaration or affidavit signed by a "certified medical professional" as part of the NMFS transfer application form.

The signed declaration was intended to remove any discretionary responsibility from NMFS to determine whether an injury or illness is substantial enough to preclude fishing and would be presumed dispositive if signed by the submitting certified medical professional. Second, the Council recommended clearly defining which medical professionals would be allowed to sign the medical declaration. Thus, NMFS defined certified medical professionals as physicians that fall into three categories based on the Council's recommendation. NMFS proposed definitions for "licensed medical doctor," "advanced nurse practitioner," and "primary community health aide" based on definitions implemented by the State of Alaska. Certified medical professional definitions would include practitioners in states other than Alaska. NMFS proposed these definitions because they are well-established and longstanding definitions of the proposed terms within the State system and the medical profession. Finally, as part of the medical transfer application, the licensed medical doctor, advanced nurse practitioner, or primary community health aide is required to document the medical condition and certify that the condition would prevent the applicant from participating in the halibut or sablefish IFQ fisheries. If NMFS denies an application for a medical transfer, the applicant may appeal the denial according to existing appeal procedures found at § 679.43.

The Council also recommended several additional restrictions to the medical transfer provision to prevent potential abuse. Medical transfers are valid for only the calendar year in which the IFQ permit is issued. For instance, an individual who receives a medical transfer for a medical condition near the end of the season in November 2016 would have to apply for and receive a new medical transfer prior to the new IFQ season in 2017 if his or her medical condition persists. Additionally, NMFS denies subsequent applications for medical transfers based on the same medical condition unless a certified medical professional attests to a reasonable likelihood of recovery. Furthermore, NMFS does not approve a medical transfer if the applicant has received a medical transfer in any 2 of the previous 5 years for the same medical condition.

2.11.5.2.2 Challenges with the administration of the medical transfer provision

NMFS has identified two challenges with the administration of the medical transfer provision. First, applicants must provide documentation of their inability to participate in the IFQ fisheries by submitting a declaration or affidavit that is signed by a certified medical professional as defined in current regulations. NMFS has received medical transfer applications with a declaration or affidavit signed by a medical practitioner that does not meet the regulatory definition of certified medical professional (e.g., chiropractor or the medical professional is located outside of the United States). In these cases, the applicant was required to incur the additional cost of making an appointment with a certified medical professional in order to obtain the required documentation. The Council may wish to consider whether the regulatory requirement for an applicant to submit a declaration or affidavit from an authorized medical professional, as currently defined in regulations, meets its intent for the medical transfer provision.

Second, NMFS staff are increasingly required to make assessments as to whether an IFQ permit holder is applying for a medical transfer in any two of the previous five years for the **same** medical condition. In general, when an applicant reports multiple conditions in the same medical report, NMFS considers the next use of any of the reported conditions to be the second and final allowed use of all of the conditions for the five-year period. However, in some cases an applicant reports a medical condition that has multiple effects (such as diabetes or arthritis) yet reports one effect at a time in subsequent transfer applications. And, some conditions such as "age" unquestionably have medical implications, but may not meet Council intent for use of the catcher vessel lease prohibition exemption. However, NMFS must approve transfer requests that meet the current regulatory requirements. From the nature of many of the conditions reported as well as specific statements made to NMFS staff, it is clear that at least some applicants are using the provision to continue to hold QS and have no expectation, ability, and/or desire to actively participate in harvesting their IFQ. Thus, there are several ways in which applicants can repeatedly use medical transfers to support their holding QS without apparent prospects of or interest in resuming personal fishing activities. As initial recipients and other current QS holders age, use of medical transfers is likely to increase; especially as high lease rates provide incentive to continue to hold QS (see Section 2.5).

In contrast, NMFS has received a number of inquiries from initial recipients who have true medical issues that prevent their fishing but who do not qualify for medical transfers. Some cannot locate a willing hired master, others do not want to have a hired master use their vessel and consider the need to acquire an interest in another vessel an unfair requirement. As described in Section 2.5, the numbers of medical transfers and percentage of all transfer transactions requested are small and may remain so into the future if recently implemented restrictions on the use of hired masters do not result in a substantial increase in the number of initial recipients using the medical transfer provision. However, if the Council believes that inappropriate use of the provision contravenes its intention for an owner-operator fishery, or that the provision as structured imposes unreasonable impediments to QS holders with bone fide medical needs, and that effective remedial steps are possible, it might wish to consider future action. Such action might include imposing an absolute limit on the number of times an applicant may use the medical provision for any medical condition. For example, the BSAI Crab Rationalization Program initially included a medical transfer provision for holders of captain and crew shares (C share QS). This provision limited C share QS holders to using the medical transfer provision for two out of every ten years for any medical condition for which the applicant provided documentation from a licensed medical doctor who verified that the QS holder could not participate in the fishery because of the medical condition.[90]

Given the potential range of issues, NMFS believes that a discussion paper would be the most efficacious way to explore the complicated range of issues that affect the use and administration of medical transfers before deciding on potential regulatory changes.

2.11.5.3 Revising regulations for administrative appeals

NMFS recommends a regulatory amendment to revise the administrative appeals process regulations. NMFS could undertake the revisions as stand-alone action or in conjunction with another regulatory amendment to the IFQ Program.

NMFS has changed the administrative appeals process since the implementation of the IFQ Program. When the IFQ Program was implemented, any appeals to initial administrative determinations were adjudicated by the appeals office in the Alaska Regional office in Juneau. In the 2006 reauthorization of the MSA, section 303A, which specified requirements for LAPPs, also required NMFS to include an appeals process for administrative review of the Secretary's decisions. In response to this, NMFS developed regulations for administrative appeals that apply to all regional offices. In addition, NMFS created the National Appeals Office (NAO) at NMFS Headquarters in Silver Spring, Maryland, and permanently closed the Alaska Region appeals office. Therefore, all IFQ Program appeals to NMFS are administered by the NAO. The IFQ Program regulations have not been updated to reflect this change in the administrative appeals process. NMFS is recommending this straightforward housekeeping regulatory modification to bring the regulations into compliance with NMFS policy regarding administrative appeals.

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[90] Amendment 31 to the Fishery Management Plan for King and Tanner Crabs removed the medical transfer provision because the regulations implementing Amendment 31 authorized leasing of IFQ derived from C share QS. Amendment 31 also specified active participation requirements for C share QS holders to retain QS, so C share QS wishing to lease their IFQ are still be required to meet the participation requirements to retain C share QS.

2.11.5.4 Removing regulations on initial QS issuance

NMFS recommends a regulatory amendment to remove regulations on initial halibut and sablefish QS issuance. NMFS could undertake the revisions as stand-alone action or in conjunction with another regulatory amendment to the IFQ Program.

The regulations for initial issuance of QS for the IFQ Program at § 679.40(a) are no longer necessary. Removing these regulations would streamline the IFQ Program regulations as a whole. The revision would reduce the volume of Alaska Region regulations, which streamlines the regulations for the public and reduces the agency costs for publication in the Code of Federal Regulations.

2.12 NATIVE VILLAGE OF EYAK

In June 2014, prior to initiation of the IFQ Program Review, the Native Village of Eyak requested a tribal consultation with NMFS to discuss its request to be issued IFQ allocations. NMFS met with the Native Village of Eyak and subsequently recommended that it bring its request to the Council as part of the IFQ Program Review. The Native Village of Eyak submitted a public comment to the Council at the Council's February 2016 meeting requesting IFQ shares be allocated to the Native Village of Eyak (Tribe). In response, the Council passed a motion requesting analysts to address the issues raised by the Native Village of Eyak in the IFQ Program Review. Specifically, the analysts were asked to describe the Native Village of Eyak's proposal for an allocation of IFQ to the Tribe, its past litigation on the IFQ Program, and its requests for tribal consultation on IFQ allocations.

2.12.1 Description of the Native Village of Eyak's proposal for an allocation of IFQ to the Tribe

In its January 27, 2016, letter to the Council regarding the IFQ Program Review workplan for the February 2016 Council meeting,[91] the Native Village of Eyak requested that the Council "consult with the Native Village of Eyak to determine a means by which the Tribe can be allocated a reasonable number of IFQ shares so that its participation in this fishery can be restored, and that any necessary modification to the Halibut/Sablefish IFQ Program be made to accommodate the restoration of these rights."

On July 28, 2016, the Native Village of Eyak provided NMFS with a proposal for the distribution of IFQ shares to the Tribe. The proposal is described here and also attached as an appendix. The history of direct fisheries allocations to communities in Alaska's federally managed fisheries and the evolution of the Council's considerations regarding those allocations are described within Section 1.2 of this review.

The Native Village of Eyak has requested 1,502,823 QS units in any vessel class in Area 3A. This would indicate that the Tribe's request is limited to QS in the halibut IFQ fishery. The Native Village of Eyak's proposal indicates that in order to minimize the burden of an allocation of QS to the Tribe on other QS holders, the Tribe wishes to receive this QS allocation incrementally over the course of five years. The Tribe proposes to receive 50% of the 1,502,823 shares immediately (in the first year of the allocation process) and the remaining 50% over the course of the next four years, based on increases in the TAC. In years two through four, the Tribe would receive no more than 50% of a given year's TAC increase in the form of QS allocations. If the TAC does not increase sufficiently to provide the QS allocation over years two through four, the Tribe would receive the remaining 50% of the QS units in year five, regardless of changes in the TAC.

[91] See: https://npfmc.legistar.com/LegislationDetail.aspx?ID=2542959&GUID=14EC37E1-8EDC-4A7F-B40D-C791A9963A13

Allocating QS to the Tribe would expand the 3A QS pool and impact the holdings of other QS holders in 3A. The current 3A QS pool is 184,893,008 QS units. Despite the variability in the annual TAC and subsequent IFQ, an individual's units of QS will remain the same unless they chose to buy or sell more QS. Unless QS is added or revoked, an individual's proportion of the QS pool, and subsequently, an individual's proportion of the Area 3A TAC will also remain the same. With the addition of the proposed 1,502,823 units (granted over a five-year period), the QS pool would expand to 186,395,831; the Native Village of Eyak Tribe is requesting 0.81% of the 3A QS pool based on the 2016 QS pool. Adjusted for the change to the QS pool that their allocation would represent, the Tribe's proposal represents 59,147 pounds of Area 3A halibut IFQ using the 2016 halibut TAC for Area 3A.

An increase in the 3A QS pool would slightly decrease the percentage of the TAC that current 3A QS holders would receive. For example, if an individual holds 100,000 units of 3A QS, their holdings would represent 3,968 pounds of 3A halibut IFQ in 2016 (using the 2016 QS to IFQ ratio of 25.2). If the Native Village of Eyak Tribe received all 1,502,823 units in 2016, the QS to IFQ ratio would change to 25.4 (using the 2016 TAC), and the individual with 100,000 units of 3A QS would receive 3,956 pounds of halibut IFQ.

Although an increase in the QS pool would decrease the percentage of the TAC that each QS holder receives, an increase in the TAC of 59,147 pounds would absorb the increase in the QS pool relative to 2016 IFQ allocations to current 3A QS holders. In other words, it would take an increase of 59,147 pounds in the TAC over the course of 5 years for current Area 3A QS holders to receive the same IFQ allocations that they received in 2016 if the QS pool increased by 1,502,823 units. However, this also means that current Area 3A QS holders would not benefit from the TAC increase through greater IFQ allocations.

The Native Village of Eyak's proposal for QS allocations to the Tribe asserts that such an allocation would provide compensation for the Tribe "not having received a Government to Government consultation prior to the institution of the IFQ Program despite having requested such a consultation, and [having] a longer history of commercial use of halibut than any individual who received an allocation of the original IFQ shares." The history of NMFS' responsibilities for tribal consultations and of the Native Village of Eyak's past request for tribal consultations on IFQ allocations are described in Section 2.12.3 below. In its proposal for QS allocations, the Native Village of Eyak states that at the time [prior to the institution of the IFQ Program] it would have contested the method of distribution [of QS in the IFQ Program] and supported a means of distributing QS in the IFQ Program to "traditional users of the resource." Following the implementation of the IFQ Program, applicants for QS could (and many did) appeal initial allocation decisions and contested those decisions in the federal appeals courts (see Section 2.3.2). Whether the term "traditional users of the resource" herein refers only to the Native Village of Eyak, or is inclusive of other tribes (such as the four other Tribes that were part of their litigation on the IFQ Program in 1995), or other users, is unclear.

2.12.2 Description of the Native Village of Eyak's past litigation on the IFQ Program

On February 23, 1995, the Native Village of Eyak and four other Tribes including Tatitlek, Chenega, Nanwalek, and Port Graham (hereinafter plaintiffs) filed a lawsuit challenging the halibut and sablefish IFQ Programs on the ground that the plaintiffs held aboriginal title and therefore had exclusive hunting and fishing rights to the areas in the exclusive economic zone (EEZ) where those programs would be administered (broadly, large portions of the IFQ areas in the Gulf of Alaska). The U.S. District Court for Alaska ruled against the plaintiffs and held that such claims of exclusive title were precluded by the paramount interests of the United States in the area. The U.S. Court of Appeals for the Ninth Circuit affirmed. *Native Village of Eyak v. Trawler Diane Marie*, 154 F.3d 1090 (9th Cir. 1998), *cert. denied*, 527 U.S. 1003 (1999).

On November 2, 1998, the same plaintiffs filed a second lawsuit in the U.S. District Court for Alaska and challenged the same IFQ Programs on the ground that such programs improperly restrict the exercise of their non-exclusive aboriginal hunting and fishing rights in the EEZ. Again, the district court rejected those claims on the ground that the United States' had paramount interests in the areas. On July 12, 2004, an *en banc* panel of the Ninth Circuit reversed the district court's decision and remanded the case to the district court with instructions "that the district court decide what aboriginal rights to fish beyond the three-mile limit, if any, the plaintiffs have," and that "[f]or purposes of this limited remand, the district court should assume that the villages' aboriginal rights, if any, have not been abrogated by the federal paramountcy doctrine or other federal law." *Eyak Native Village v. Daley*, 375 F.3d 1218 (9th Cir. 2004).

In August 2008, the district court held a trial over seven days. The court heard testimony from 23 witnesses and accepted a great deal of documentary evidence. On August 7, 2009, the district court issued its decision and held that the plaintiffs failed to prove that they held aboriginal title to the contested areas (which requires proof that the plaintiffs used those areas exclusively, continuously, and over a long period of time). The court found that none of the plaintiffs was in a position to occupy or exercise exclusive control over any part of the contested EEZ areas on a sustained basis.

The plaintiffs appealed that decision to the Ninth Circuit and a divided *en banc* panel (6-5) upheld the district court's decision, finding that the plaintiffs failed to establish the prerequisites for such aboriginal rights. Specifically, the majority opinion found that while the plaintiffs' historic use of ocean areas was sufficient to show continuous use and occupancy sufficient for aboriginal title, they failed to show that such use was exclusive, as none of the plaintiffs was in a position to exclude outsiders from accessing these ocean areas. *Native Village of Eyak v. Blank*, 688 F.3d 619, 625-26 (9th Cir. 2012).

The plaintiffs sought review of that decision, but the Supreme Court denied that request. *Native Village of Eyak v. Blank*, 688 F.3d 619 (9th Cir. 2012), *cert. denied*, 134 S. Ct. 51 (2013).

2.12.3 Description of the Native Village of Eyak's past request for tribal consultations on IFQ allocations

NMFS is obligated to consult and coordinate with federally recognized tribal governments and Alaska Native Claims Settlement Act regional and village corporations on a government-to-government basis pursuant to Executive Order (E.O.) 13175 which establishes several requirements for NMFS, including 1) to provide regular and meaningful consultation and collaboration with Indian tribal governments and Alaska Native corporations in the development of Federal regulatory practices that significantly or uniquely affect their communities, 2) to reduce the imposition of unfunded mandates on Indian tribal governments, and 3) to streamline the applications process for and increase the availability of waivers to Indian tribal governments. E.O. 13175 requires Federal agencies to have an effective process to involve and consult with representatives of Indian tribal governments in developing regulatory policies and prohibits regulations that impose substantial, direct compliance costs on Indian tribal governments.

E.O. 13175 was issued by President William J. Clinton on November 6, 2000. It built upon a memorandum from President Clinton for the Heads of Executive Departments and Agencies that was issued on April 29, 1994 (59 FR 22951). This 1994 memorandum appears to be the first time that a President specifically required federal agencies to "consult…with tribal governments prior to taking actions that affect federally recognized tribal governments." The development of the IFQ Program generally occurred between the mid-1980s and the publication of the final rule was on November 9, 1993. Input or consultation requests to the Council or NMFS from Alaska Native tribes could have occurred at any time during this period. However, this input or requests may not have been formally characterized as a "tribal consultation request."

The guidance for federal agencies that was in effect during development and implementation (through the publication of the final rule) of the IFQ Program was contained in a "Statement by President Ronald W. Reagan on American Indian Policy" which was issued on January 24, 1983, and reaffirmed by President George H.W. Bush on June 14, 1991. These policy statements focused primarily on support for tribal self-governance, economic development initiatives, federal government funding for services provided by the tribes to their members, and responsibility for resources held in trust for the tribes. These policy statements did not include the specific requirements for consultation and communication with tribal governments that were implemented in 1994 and remain in effect today. Therefore, to the best of our ability to ascertain, there were no formal tribal consultation requirements in effect during the development of the IFQ Program. NMFS's records of communications and meetings identified as tribal consultation requests or meetings started to occur on a more formal basis in about 2000 with the Council's consideration of regulations governing the subsistence harvest of halibut and the development of the Alaska Native Subsistence Halibut Working Group.

NMFS has conducted a preliminary search through its records for communication from the Native Village of Eyak about tribal consultations and the IFQ allocations. The Native Village of Eyak wrote a letter to NMFS on December 12, 1994, asking "what is the Native Village of Eyak's Individual Fishing Quota of black cod and halibut in the Gulf of Alaska." NMFS responded that a) NMFS' records did not support a finding that the Native Village of Eyak owned one or more vessels that would have qualified it under the regulations to receive IFQ (i.e., a vessel with at least one fixed-gear landing of halibut or sablefish during the QS qualifying years—1988, 1989, or 1990); and b) the application period for QS expired on July 15, 1994, and it was too late to entertain a new application.

To date, NMFS has found no other written requests or documentation of communications between NMFS or the Council and the Native Village of Eyak requesting IFQ allocations or a government-to-government consultation prior to the implementation of the final rule for the IFQ Program. As part of the IFQ Program Review, NMFS requested such documentation from the Native Village of Eyak, but, as of the final revision of this document for posting on the NPFMC's website (September 13, 2016), has not received this documentation.

3. KEY FINDINGS AND CONCLUSION

This final section of the review summarizes the findings of the review with respect to how the IFQ program is meeting the 10 original objectives specified by the Council for the program and the objective of providing entry opportunities, which has been the focus of numerous regulatory amendments over the years. This summary cites sections of the review that provide more detailed information on these topics.

To help the Council and the public synthesize the information provided in the review, this section also highlights areas that appear to contain the largest challenges in reaching the 10 programmatic objectives. This section is not intended to be a comprehensive list of areas of interest for the program for either researchers or the Council moving forward, nor is it a list of recommended action areas. The Council may consider any issues it deems worthy of action through a separate analytical and regulatory amendment process.

Finally, this section identifies key data and information gaps in informing how the IFQ Program has performed with respect to its original policy objectives and potential research extensions for future IFQ programmatic reviews.

3.1 Key Findings

The Council's 10 original objectives for the IFQ Program and the objective of providing entry opportunities are broad and do not include specific, measurable targets. In addition, many of these objectives overlap while others are inherently conflicting. As a result, this review of the IFQ Program was limited to making general statements about how trends in the IFQ fisheries relate to the programmatic objectives. The following section summarizes these general trends for each of the objectives and identifies other potential areas of concern with respect to the IFQ Program. Evaluation of the IFQ Program could be improved with specific, measurable objectives.

As throughout the review, the baseline period referenced below is the average of the three years preceding the implementation of the IFQ Program (1992 through 1994). Baseline years could have been defined in many ways. No years would be completely representative of pre-IFQ program fisheries, as there are a multitude of exogenous factors that have influenced the operations of the fisheries overtime. However, since history was determined from activity between 1988 and 1990, it is likely there was less strategic fishing behavior in the baseline years chosen. Furthermore, there are concerns about the reliability of some sources of data further back in time.

3.1.1 Findings with respect to the programmatic objectives

- **Address the problems that occurred with the open-access management regime.** (The Council identified 10 specific problems which the IFQ management alternative was supposed to address):
  - **Allocation conflicts**
    - Many of the conflicts over initial QS allocations were settled during the first decade of the IFQ Program through the administrative appeals process and federal courts appeals process. The impetus for such appeals seems to have diminished over time, as there have been limited requests for re-allocations under the IFQ Program over the last 20 years. However, as part of the IFQ Program Review the Native Village of Eyak requested a direct allocation of halibut IFQ in Area 3A. Descriptions of the Tribe's proposal for an IFQ allocation, past litigation on the IFQ Program, and previous requests for tribal consultations on IFQ allocations are included in Section 2.12.
    - Other potential allocation conflicts identified during program development (crewmember impacts, inter-generational equity issues, and issues over QS allocations by vessel class) are discussed below.
    - There was concern during the development of the IFQ Program that the general public would have to pay the management and enforcement costs of a program, which allocates exclusive fishing access to a limited group of individuals and entities. NMFS implemented a cost recovery fee program for the IFQ fisheries in 2000 (65 FR 14919) to recover the direct costs of management, data collection, and enforcement for the IFQ Program fisheries from program participants. From 2000 to 2015, the increase in direct program costs and decline in fishery ex-vessel value has resulted in increased fee percentages for the cost recovery program, which reached the maximum 3% in 2015 (Section 2.11.4, Figure 2.11-2).
  - **Gear conflicts**
    - The IFQ Program likely led to a reduction in gear conflicts within the IFQ fisheries from eliminating congestion on fishing grounds and extending fishing seasons.
    - The analysts considered potential reductions in gear conflicts within the IFQ fisheries and between the IFQ and trawl sectors following implementation of the IFQ Program. However, no quantitative data are available on gear conflicts and the available spatial information on the IFQ fleet is of a resolution that is not meaningful

for examining gear conflicts. Therefore, the assessment of the impacts of the IFQ Program on gear conflicts relied on qualitative information and a discussion of the regulatory history of allowable gear in the IFQ fisheries (Section 2.3.1).

- The IFQ Program has provided temporal and spatial flexibility to IFQ participants in how they harvest their IFQ. This flexibility, in combination with increased consolidation and coordination of shareholders onto fewer vessels, has likely led to reduced gear conflicts within the IFQ fisheries. In response to expectations about reductions in gear conflicts and to increasing concerns about whale predation on hook-and-line gear in the sablefish fisheries, the Council has iteratively lifted the restrictions on longline pot gear in the sablefish IFQ fishery since implementation of the IFQ program (Section 2.3.1).
- The IFQ Program could have led to increased interactions between the IFQ and trawl sectors, because of the prolongation of the halibut and sablefish seasons under IFQ. However, the amount of lost or abandoned gear by the halibut and sablefish fleets has also decreased under the IFQ Program (Section 2.9), thus having a counteracting effect on potential gear conflicts between the IFQ and trawl sectors.

o **Deadloss from lost gear**
  - The IFQ Program decreased the amount of abandoned or lost gear on the fishing grounds and the resulting halibut mortality in the halibut IFQ fishery by changing the incentive structure for fishermen (the opportunity costs of time decreased), eliminating congestion on fishing grounds and allowing for prolonged fishing seasons. The amount of halibut mortality due to lost gear varies by year but for the 10 years prior to IFQ implementation ranged from 0.77 – 3.27 Mlbs (net weight); since IFQ implementation the mortality has dropped to between 0.038 – 0.28 Mlb pounds (net weight) (Section 2.9, Table 2.9-1).
  - Estimates of deadloss from lost gear in the sablefish fishery are not available.

o **Bycatch loss**
  - As expected, since IFQ implementation, discards of non-target groundfish species in the sablefish IFQ fishery have decreased relative to the pre-IFQ period. The IFQ program was expected to decrease the premium on the rate of harvest or the opportunity costs of time, providing IFQ participants with the incentive to retain other groundfish species.
  - In terms of total metric tons, discards of other groundfish by the sablefish IFQ fleet have decreased from an average of 5,477 tons for the GOA and BSAI combined during the 1992 through 1994 baseline period to an average of 2,608 tons between 1995 and 2015 (Section 2.9, Figure 2.9-2). Since IFQ implementation, there has been considerable inter-annual variability in the discard rate of other groundfish by the sablefish IFQ fleet, although in general the rate has been lower since IFQ (Section 2.9, Figure 2.9-3).
  - While the sablefish fleet was anticipated to retain more of its bycatch, the halibut fleet was expected to benefit more from reduced discards and increased retention of groundfish because it was a more intensive fishery with shorter fishing seasons. It is not possible to determine if retention of non-target groundfish species has increased in the IFQ halibut fishery since IFQ Program implementation. Historical estimates of groundfish discards are not available for the halibut IFQ fleet because these vessels were not subject to at-sea observer coverage prior to 2013. The Groundfish Plan Team is currently considering methodologies for estimating groundfish, non-target species, and prohibited species catch discards for the halibut IFQ fleet using available observer data.

o **Discard mortality**

- The IFQ Program could have provided participants with an incentive to highgrade their catch of IFQ species, because of the inherent limit on the quantity of fish that may be harvested given a certain QS allocation. The incentive to highgrade is determined by the price premium for larger fish (for which there is often a dockside premium in both IFQ fisheries) and the cost per unit of landing. The data reveal that, as expected, the IFQ Program has led to increased discarding of IFQ species in the IFQ fisheries.
- Since IFQ implementation, discards in metric tons of sablefish in the sablefish IFQ fleet have generally been above the pre-IFQ baseline level (average of 1991 through 1994) of just under 400 metric tons (Section 2.9, Figure 2.9-4). The discard rate of sablefish in the sablefish IFQ fleet (estimated as the sum of all discarded weight to the sum of all retained weight in the sablefish IFQ fleet) has also increased since IFQ implementation (Section 2.9, Figure 2.9-5).
- Highgrading of legal-sized halibut is assumed to not occur in current estimates of halibut removals because halibut IFQ fishery regulations prohibit discards of halibut that are 32 inches or greater (O32). However, as noted above, at-sea observation of halibut vessels was only recently implemented and historical estimates of discarded O32 halibut are not available. Therefore, fleet-wide data to characterize the extent to which highgrading is or is not occurring in the halibut IFQ fishery is not available.
- No person is permitted to take or possess any halibut that is less than 32 inches (U32) in the directed IFQ halibut fishery. Therefore, U32 halibut are discarded and a certain percentage of them do not survive. In the three years preceding the implementation of the IFQ Program the average sublegal-size halibut discard morality was 1.03 (in thousands of net pounds) and since IFQ implementation this mortality has increased to 1.43 (estimated from 1995 to 2015) (Section 2.9, Table 2.9-2).

- **Excess harvesting capacity**
    - The degree of excess capacity in the harvesting sector prior to IFQ implementation was not defined; therefore, the IFQ Program Review focused on how capacity has been reduced in the IFQ fisheries over the course of the IFQ Program and other issues potentially related to excess capacity.
    - The IFQ Program has effectively contained the capacity of the harvesting sector to maintain harvests within the TACs. Prior to IFQ implementation, halibut harvests exceeded TACs in some years (Section 2.1, Figure 2.1-3). Since IFQ Program implementation, harvests in both IFQ fisheries have not exceeded their respective TACs in any year (Section 2.1, Figure 2.1-3; Figure 2.1-4).
    - There was substantial QS transfer and consolidation of vessels and QS holding entities in the first several years following IFQ implementation as QS holders adjusted to the new management regime (Section 2.2, Table 2.2-1; Figure 2.2-1; Figure 2.2-2; Section 2.3.6, Figure 2.3-10; Figure 2.3-11; Figure 2.3-19; Figure 2.3-20).
    - Consolidation of the number of active vessels participating in the IFQ fisheries and the number of QS holders has continued over the last 20 years of the IFQ Program (Section 2.3.6, Figure 2.3-10; Figure 2.3-11; Figure 2.3-19; Figure 2.3-20).
    - Several provisions in the IFQ Program were intended to constrain consolidation in the halibut and sablefish fisheries following implementation. The vessel use IFQ and individual QS use caps could have limited consolidation. The vessel IFQ cap seems to be binding a greater number and percentage of operators than the individual QS use cap (Section 2.3.6, Figure 2.3-15; Figure 2.3-16; Table 2.3-18; Table 2.3-19). Consolidation in the IFQ fisheries has also likely been limited by the vessel class designations for QS, which constrained the amount of QS available for each vessel class. This provision was intended to maintain fleet diversity by preventing excessive

consolidation of harvests on larger vessels and ensuring that IFQ would be available for harvest on smaller vessels.

- **Product wholesomeness**
  - There is evidence that product wholesomeness (understood to mean overall quality) increased over the course of the IFQ program as reflected by higher wholesale and ex-vessel prices and other research (cited in Section 2.3.3). Wholesale and ex-vessel prices (adjusted for inflation) have increased for both halibut and sablefish since IFQ Program implementation (Section 2.3.3, Figure 2.3-3; Figure 2.3-4).
  - Product wholesomeness (understood to mean overall quality) was expected to improve under the IFQ Program due to the longer fishing seasons and guaranteed harvests for individual participants. The program was expected to provide for better handling of fish, eliminate waiting lines of vessels ready to offload outside of processors, eliminate the glut of frozen halibut on the market, and provide product innovation and new market opportunities.
  - In the halibut fishery, higher wholesale and ex-vessel prices likely can be attributed to an increase in production for the fresh market. Since IFQ implementation, Alaska halibut has gradually increased in fresh production, averaging 48% fresh product from 1995 to 2014 compared to 20% during the 1992 to 1994 baseline period (Section 2.3.3, Figure 2.3-1).
  - Compared to halibut, the wholesale and ex-vessel price increases have been relatively smaller for sablefish. Sablefish product form largely did not change following IFQ implementation, as sablefish continues to be primarily processed as frozen fish for the export market (Section 2.3.3, Figure 2.3-2).
- **Safety**
  - The IFQ Program was expected to result in safety improvements for the halibut and sablefish fixed-gear fleets from the elimination of competition between fishing vessels, the lengthening of fishing seasons and the elimination of congestion on fishing grounds. Furthermore, under IFQ management operators are empowered to determine when they fish based on weather, sea, and crew conditions.
  - USCG Search and Rescue (SAR) case data (Figure 2.8-1) and the NIOSH Safety Assessment (Section 2.8A) both indicate a slightly decreasing trend in hazards following IFQ implementation.
  - However, many fatalities have still occurred post-IFQ, indicating that serious hazards remain and must be mitigated. During 2001-2015, 15 commercial fishing fatalities were reported in the halibut and sablefish IFQ fleet. The continued incidence of fatalities and vessel disasters during the 2000s indicates that while fishery management policies may have influenced safety, other factors may be responsible for the persistent hazards observed in the fleet (Section 2.8A).
- **Economic stability in the fisheries and communities**
  - The IFQ Program was expected to provide economic stability from the guaranteed harvesting privilege afforded by QS, potentially resulting in more stable and predictable landings. Communities derive economic benefits from fisheries landings made in their community, through taxes on landings and economic activity around support services for processing and harvesting operations. In addition, income earned through harvesting halibut and sablefish IFQ benefits the communities where the QS holders and crewmembers live.
  - Since IFQ Program implementation, shoreside landings of both IFQ species at Alaska processors have increased slightly relative to landings in other states. This is further described under the "Limit the adjustment cost to current participants including Alaskan coastal communities" section below.

- Overall, the proportion of QS held by Alaska residents in the halibut and sablefish IFQ fisheries has been stable since implementation of the IFQ Program. This is described in more detail under the "Limit the adjustment cost to current participants including Alaskan coastal communities" section below. The proportion of QS held in the halibut and sablefish IFQ fisheries has decreased slightly for Washington residents, remained stable for Oregon residents, and increased slightly for residents of other states (Section 2.7, Figure 2.7-9; Figure 2.7-10).
- The impacts of the IFQ Program on a community's participation in the halibut IFQ fishery may be different with respect to commercial processing or harvesting engagement (Section 2.7A). Kodiak and Homer are the dominant communities with respect to halibut IFQ processed pounds and values (Section 2.7A, Figure 2.7A.6; Figure 2.7A.7). For communities with smaller proportions of halibut IFQ processed landings relative to total landings in the halibut IFQ fishery (such as Seward, Sitka, and Petersburg), halibut processing can nevertheless represent a significant portion of the value of total landings in a community and serve as a buffer during years of poor landings in other fisheries (Section 2.7A, Figure 2.7A.8; Figure 2.7A.9).
- Kodiak and the Seattle metropolitan area are the dominant communities with respect to halibut IFQ harvest pounds and values (Section 2.7A, Figure 2.7A.15; Figure 2.7A.16). For the harvesting sector, Kodiak and the Seattle metropolitan area account for approximately 30% of the regional pounds and values by resident vessel owners during the baseline and after IFQ implementation (Section 2.7A, Figure 2.7A.15; Figure 2.7A.16).
- As with the halibut IFQ fishery, communities' participation in the sablefish IFQ fishery varies by the harvesting and processing sectors. For example, some communities that were highly engaged in the commercial sablefish IFQ processing sector (at any point from the baseline period through 2014) were not highly engaged in any year of the dataset in the commercial sablefish IFQ harvesting sector. These communities include Cordova, Hoonah, Pelican, Sand Point, Seward, Unalaska, and Yakutat (Section 2.7A, Table 2.7A.7; Table 2.7A.9). Kodiak, Seward, and Sitka together make up the greatest percentage of total landed pounds and revenues for the commercial sablefish IFQ processing sector (Section 2.7A, Figure 2.7A.22; Figure 2.7A.23). The Seattle metropolitan area, Sitka, and Petersburg account for the largest percentages of the commercial sablefish IFQ harvesting pounds and revenues (Section 2.7A, Figure 2.7A.30; Figure 2.7A.31).
- For both IFQ fisheries, there have been substantial changes in processing and harvesting engagement at the community-level since IFQ Program implementation (Section 2.7A). Several communities, including Juneau, Homer, Sitka, and Wrangell, have seen an increase in both their halibut commercial processing and harvesting engagement from the baseline period to 2014, while others (Ketchikan, Kodiak, and Seattle) have had a decrease in both for the same time period (Section 2.7A, Table 2.7A.2; Table 2.7A.4). For the other communities that appear as highly engaged for both the processing and harvesting sectors in the halibut fishery, there have been mixed changes since IFQ implementation. For the sablefish fishery, only Sitka has had an increase in both its processing and harvesting engagement from the baseline period to 2014; for Homer, Kodiak, and Petersburg engagement has decreased for both sectors in the sablefish fishery (Section 2.7A, Table 2.7A.7; Table 2.7A.9).

- **Rural coastal community development of a small boat fleet**
  - This objective largely relates to the allocations of halibut and sablefish to the CDQ Program at the time of IFQ Program implementation. While related to the IFQ program, a more thorough assessment of the CDQ program in not included in this review. However, the IFQ Program Review did examine changes in IFQ landings and

QS holdings for rural Alaska communities (defined as those with populations of fewer than 2,500 people and not within a pre-defined radius of an urbanized area) since IFQ implementation (Section 2.7).

- There was some concern at IFQ Program implementation that the program would lead to a redistribution of QS ownership within Alaska away from rural Alaska communities. This was a concern because in general rural residents received relatively small initial QS allocations, had lower profit margins in the fisheries due to higher operating costs, were more susceptible to inter-annual variability in income due to limited employment opportunities, and had less access to capital to purchase additional QS.
- Since IFQ Program implementation, the percent of the total halibut IFQ shoreside landed pounds in Alaska has been relatively stable. The percent of landed IFQ increased slightly for rural Alaska communities from 23% during the baseline period to an average of 26% for the IFQ years, and has decreased slightly for the sablefish fishery from 27% to 24% for the same time period (Section 2.7, Figure 2.7-6; Figure 2.7-8).
- Of the total QS held by Alaskans in the IFQ fisheries, the percentage held by residents of rural Alaska communities has remained relatively stable since initial QS allocations, increasing by 3% for halibut QS and decreasing by 2% for sablefish QS (Section 2.7, Figure 2.7-15; Figure 2.7-17). Amongst rural Alaska communities, there has been a general movement of QS for both IFQ fisheries away from the more remote communities (without airport and road access) to those with airport transportation (Section 2.7, Figure 2.7-16; Figure 2.7-18).
- The IFQ Program was anticipated to result in a shift of halibut landings from remote communities to those with access to air and road transportation as the product changed to a largely fresh product. Since IFQ Program implementation, there has been a shift of halibut and sablefish IFQ landings from remote communities to those with airport access (Section 2.7, Figure 2.7-6; Figure 2.7-8). Although the primary sablefish product did not change with IFQ, the observed redistribution of sablefish landings may have resulted amongst other factors from processor movements in response to changes in halibut processing locations.

- **Link the initial quota share allocations to recent dependence on the halibut and sablefish fixed gear fisheries.**
  - In recommending the IFQ Program in 1992, the Council limited initial QS recipients to those who had owned or leased a vessel with legal fixed gear halibut or sablefish landings from 1988 to 1990. The 1990 cut-off also allowed the Council to distribute allocations to recent participants, while not exacerbating the race for fish during development of the program and implementation in 1995 (Sections 1.2 and 2.2).
- **Broadly distribute quota share to prevent excessively large quota share from being given to some persons.**
  - The Council sought to address excess harvesting capacity in the halibut and sablefish fixed gear fisheries while providing for broad participation in the IFQ fisheries through initial QS allocations. The Council determined that QS allocations would be based on the sum of the best five years of legal fixed gear landings of total landings between 1984 to 1990 for halibut and 1985 to 1990 for sablefish. The three-year eligibility period coupled with the five-year landing history meant that QS were allocated to a larger number of participants in any one fishing year. The broad distribution of QS among recent participants meant that many participants received QS allocations that resulted in IFQ amounts that were not economically worthwhile to fish. These small QS allocations, along with an overall adjustment by participants to management under the IFQ Program, resulted in substantial QS transfer and

consolidation in the first years following IFQ implementation (Section 2.2, Table 2.2-1; Figure 2.2-1; Figure 2.2-2).

- **Maintain the diversity in the fleet with respect to vessel categories.**
    - The Council designated QS in the IFQ fisheries by vessel class and prohibited QS trading between vessel classes in order to prevent a redistribution of fishing privileges amongst the vessel classes. Because of the restriction on QS trading between vessel classes, QS distributions by vessel class were largely fixed at initial allocation (Section 2.3.5, Table 2.3-3).
    - However, the fish up and fish down provisions have provided some flexibility in how IFQ is landed between the different vessel classes and has allowed for some movement of IFQ amongst the vessel classes in the IFQ fisheries. In both of the IFQ fisheries, an increasing portion of Class B IFQ is landed on smaller size vessels (greater than 35 to 60-foot vessels in the halibut IFQ fishery and less than 60-foot vessels in the sablefish IFQ fishery) (Section 2.3.5, Table 2.3-6; Table 2.3-7). In the halibut IFQ fishery, the implementation of the fish up amendment was followed by an increasing portion of Class D IFQ being fished by the greater than 35 to 60-foot vessels in Areas 3B, 4B, and 4C (Section 2.3.5, Table A.2.3.5.1).
    - The Council understood at the time of IFQ implementation that vessel class designation of QS and prohibitions on trading between vessel classes would have costs with respect to production efficiency. Recently, researchers conducted an analysis of the costs of QS trading restrictions in the IFQ fisheries including those related to vessel class and blocking and found that these restrictions have decreased the present value of resource rent (as measured by quota prices) over the lifetime of the program by approximately $117 million for halibut and $39 million for sablefish (in $2012), or 25% and 9% of the respective gross ex-vessel revenues in 2012 (Kroetz, Sanchirico, and Lew, 2015).
- **Maintain the existing business relationships among vessel owners, crews, and processors.**
    - With the IFQ Program the Council wanted to allow for the continuation of the business relationships that had existed within the halibut and sablefish fixed-gear fleets prior to IFQs. Nevertheless, the Council understood that creating exclusive harvesting privileges for vessel owners could fundamentally shift the power structures in the fisheries. This disparity in the focus of this objective and the evidence of the outcome of the IFQ Program is highlighted more under “Objectives that the analysis indicates the program may not have or may not be currently meeting”. The following two bullets discuss IFQ impacts on crew and processors.
    - **Crew Impacts**
        - Because of the dearth of data and information on crewmembers in the IFQ fisheries (described in more detail below under “Data Gaps”), the IFQ Program Review had to rely on previous research in this area and information gathered during a crew workshop held in April of 2016 with IFQ participants.
        - The implementation of the IFQ Program likely led to several major changes for crewmembers in the halibut and sablefish fisheries. The total number of crew jobs in the IFQ fisheries has likely decreased by several thousand due to QS consolidation, the exit of vessels from the fisheries, and QS holders consolidating IFQ permits onto fewer vessels (Section 2.4.1, Figure 2.4-1; Figure 2.4-2). With a decline in the number of available crew jobs and an overall shift away from vessel owners’ needs for manpower, the bargaining strength of crewmembers relative to vessel owners has likely decreased. In part as a result of these changes in bargaining strength as well as in how vessel owners now participate in the IFQ fisheries (leasing IFQ/acting as hired masters and paying off loans for QS purchases), crew shares as a percentage of vessel gross revenues have likely also declined since IFQ implementation. Average seasonal crew earnings in the IFQ fisheries have likely increased and become more predictable following IFQ implementation and crew jobs have likely become safer as well (Section 2.4.1).

    - In effect, the implementation of the IFQ Program does seem to have altered the relationships between vessel owners and crewmembers with respect to bargaining power and led to substantial job losses for previous crewmembers; however, those crewmembers remaining in the IFQ fisheries likely have higher paying, more stable, and safer jobs.
- **Processor Impacts**
    - The IFQ Program fundamentally changed processing needs in the IFQ fisheries, especially in the halibut fishery, which shifted from a primarily frozen to a majority fresh market. The number of processors that had been processing halibut prior to IFQ has decreased by 90% with an increase in the number of new processors (120 within the first year) (Section 2.4.2, Figure 2.4-3).
    - Similarly to the halibut fishery, there has been a substantial exodus of processors that had been active in the sablefish fishery pre-IFQ (by 90% by 2015) and an influx of new processors (165 within the first year). The prolongation of the fishing season allowed for new buyers in this market as well although this fishery still requires freezing capacity (Section 2.4.2, Figure 2.4-6).
    - Species diversification seems to have become more important to processors following IFQ implementation. Of the generation of processors that were active in the IFQ fisheries pre-IFQ, an increasing percentage has diversified into processing both IFQ species since IFQ implementation potentially due to the longer fishing seasons and the processor's ability to purchase the fish at times that fit them (Section 2.4.2, Figure 2.4-9). Processor representatives interviewed for the IFQ review noted that diversification including entering into other fisheries, increasing processing of species that they had previously been processing, adding value added products, and entering into custom processing arrangements became integral to their operations following IFQs.
    - There is also some indication that bargaining power between harvesters and processors shifted after IFQ implementation. Researchers have shown that the IFQ Program resulted in spatial competition for IFQ landings, an increase in market power for harvesters, and near-symmetric bargaining positions and rent distribution with the processing sector (Matulich and Clark, 2003; Fell and Haynie, 2011; 2013). The analysis of price margins between wholesale and ex-vessel prices indicates that halibut processor price margins have decreased over time, and processor representatives noted that, for their business, these margins have essentially disappeared since IFQ implementation (Section 2.4.2, Figure 2.4-12). For sablefish, after a decade of decreasing processor margins, these margins began to increase again in the mid-2000s (Section 2.4.2, Figure 2.4-13). Processor representatives noted that the market for sablefish has been changing over the last decade, with an increase in domestic demand for sablefish, which may be driving up wholesale prices.
    - Processor representatives highlighted the top impacts of the program from their perspectives on the processing sector as: lower volume of IFQ species landings, the creation of surplus capacity (freezing capacity and ice-making capacity displaced from the previous derby fishery), devaluation of capital investments, shift in bargaining power towards harvesters, previously active processors going out of business (especially in rural communities without access to transportation), overall changes in landings patterns, changes in relationships between processors and fishermen, diversification into other fisheries and different product types, and steadier and longer employment for the processing workforce.
    - In summary, the implementation of the IFQ Program does seem to have altered the relationships between vessel owners and processors with respect to bargaining power and led to the exodus of many previous processors from processing IFQ species.

However, the IFQ Program provided an opportunity for new processors to enter into the market, and at least in the sablefish fishery processor margins may be increasing again.

- **Assure that those directly involved in the fishery benefit from the IFQ Program by assuring that these two fisheries are dominated by owner/operator operations.**
    - Although this objective was not specific to a certain vessel class in the development of the IFQ Program, the Council has constrained its owner-operator requirements to the catcher vessel fleet.
    - Despite a continued transfer of catcher vessel QS from non-individual entities to individuals (Section 2.5, Figure 2.5-1; Figure 2.5-2), formal leasing of, and hired master use for, catcher vessel IFQ have increased over the course of the IFQ Program (Section 2.5, Table 2.5-4; Table 2.5-5; Table 2.5-6; Figure 2.5-8; Figure 2.5-9). Although total leasing of catcher vessel IFQ under the beneficiary, medical, CQE, and GAF transfer provisions comprises a small percentage of the TACs in both IFQ fisheries – about 4.25% and 2% in 2015 in the halibut and sablefish fisheries, respectively, these percentages have been increasing over the last 15 years.
    - From 1995 to 2014, hired master use increased from 13% to 40% of the catcher vessel TACs in the halibut IFQ fishery and from 13% to 55% of the catcher vessel TACs in the sablefish IFQ fishery; however, for both fisheries there has been a decrease in hired master use over the last several years (Section 2.5, Figure 2.5-8; Figure 2.5-9).
    - The hired master rule implemented in 2014 prevents initial recipients from acquiring additional catcher vessel QS for the purpose of utilizing a hired master to land the resultant IFQ. Nevertheless, there will likely continue to be a lag in the transfer of catcher vessel QS to second-generation, owner-on-board shareholders, because initial catcher vessel QS recipients can still use hired masters to land their IFQ from QS transferred prior to 2010.
    - There is evidence that some QS holders have used the medical lease provision for all or nearly all years that the provision has been in place, which may be indicative of QS holders using medical leasing to bypass the owner-on-board requirement or for chronic conditions. This is further discussed below under “IFQ Program provisions which may not be working optimally.”
- **Limit the concentration of quota share ownership and IFQ usage that will occur over time.**
    - The Council included vessel use IFQ and individual QS use caps in the IFQ fisheries to limit the concentration of IFQ usage and QS ownership (Section 1.2; 2.3.6). Although the percentage of vessels within 10% of the “all area” vessel IFQ caps has increased in both IFQ fisheries over the 20 years of the IFQ Program, these percentages were still only 5% and 6% in 2014 for the halibut and sablefish fisheries, respectively (Section 2.3.6, Figure 2.3-15; Figure 2.3-16). This was equivalent to 48 and 20 vessels in the halibut and sablefish fisheries, respectively.
    - In the halibut fishery, the number of QS holders within 10% of the QS use caps has increased since IFQ implementation, although these totals amount to less than 1% of the GOA QS holders and about 4% of the BS QS holders (Section 2.3.6, Table 2.3-18). In the sablefish fishery, the number of QS holders within 10% of the QS use caps for “all areas” has decreased since IFQ implementation with 1.6% of all QS holders within 10% of the cap (Section 2.3.6, Table 2.3-19).
    - For the Southeast-specific caps, the number and percentage of vessels within 10% of the Area 2C and Southeast caps has increased since IFQ implementation up to 2% in 2014 for Area 2C and up to 21% for the Southeast sablefish area (Section 2.3.6, Figure 2.3-17; Figure 2.3-18). For the Southeast-specific individual QS use caps, no QS holders have been within 10% of the cap for halibut Area 2C and the number of QS holders near the cap has decreased slightly for the Southeast sablefish area since program implementation (Section 2.3.6, Table 2.3-18; Table 2.3-19).

- The block program in the IFQ fisheries under which QS is designated as either blocked or unblocked and under which the amount of blocked and unblocked QS that a person may hold is limited has also constrained the concentration of QS ownership (Section 1.2). In both IFQ fisheries, the majority of QS holders hold blocked QS across all IFQ areas (Section 2.6, Table 2.6-7; Table 2.6-8). There is considerable variation in the percentage of QS holders that hold blocked QS across the IFQ areas, with the lowest percentage (58%) in the Central Gulf area of the sablefish fishery and the highest percentage (91%) in the Bering Sea sablefish area and Area 2C of the halibut fishery (ibid.). A substantially greater percentage of the halibut QS (range 35% to 71% across the halibut IFQ areas) than sablefish QS (range 8% to 60% across the sablefish IFQ areas) is blocked QS (ibid.).
- The vessel class designations for QS have also likely provided a constraint on QS consolidation and IFQ usage concentration. The QS distributions by vessel class were largely set at initial allocation so that consolidation within the vessel classes was limited (Section 2.3.5, Table 2.3-3; Table 2.3-4; Table 2.3-5). Although the fish up and fish down provisions have provided for some movement of IFQ between vessel classes, with an increasing portion of Class B IFQ landed on smaller class vessels in both fisheries (Section 2.3.5, Table 2.3-6; Table 2.3-7).
- There has been significant consolidation across all vessel classes in both IFQ fisheries. However, in the halibut fishery there has been less consolidation in the mid-size vessels (greater than 35 to 60 feet LOA) than the smallest and largest classes, and in the sablefish fishery there has been more consolidation in the largest vessel class (Section 2.3.6, Figure 2.3-13; Figure 2.3-14).

- **Limit the adjustment cost to current participants including Alaskan coastal communities.**
  - It was anticipated that, especially for halibut, the IFQ Program would contribute to geographic redistributions of halibut IFQ landings from outside Alaska into Alaska where processors could more easily compete for fish for the fresh market. Since IFQ implementation, the percentage of total IFQ landed pounds at Alaska shoreside processors has increased from 92% to 97% for halibut and from 99% to 100% for sablefish (Section 2.7, Figure 2.7-3; Figure 2.7-4).
  - Overall, the percentage of the total QS held by Alaskans has decreased slightly in the halibut IFQ fishery (from 62% for the baseline period to 61% in 2015) and increased slightly in the sablefish IFQ fishery (from 40% for the baseline period to 42% in 2015) (Section 2.7, Figure 2.7-9; Figure 2.7-10).
  - Changes in processing and harvesting engagement at the community level are discussed above under “Economic stability in the fisheries and communities.” In summary, there have been communities that have increased and those that have decreased their engagement in the processing and harvesting of IFQ fish since IFQ implementation. It could be argued that those communities that have decreased their processing or harvesting engagement since IFQ implementation relative to the baseline period are those communities for which the adjustment costs to IFQ implementation were not effectively curtailed. Of those communities that were highly engaged in the processing of halibut prior to IFQ, Kenai, Ketchikan, Seattle, and Other Washington were no longer highly engaged by 2014 (Section 2.7A, Table 2.7A.2). Of those communities that were highly engaged in the harvesting of halibut prior to IFQ, Anchorage, Ketchikan, and Oregon were no longer highly engaged by 2014 (Section 2.7A, Table 2.7A.4). Of those communities that were highly engaged in the processing of sablefish prior to IFQ, Pelican, and Unalaska were no longer highly engaged by 2014 (Section 2.7A, Table 2.7A.7). Of those communities that were highly engaged in the harvesting of sablefish prior to IFQ, Oregon was no longer highly engaged by 2014 (Section 2.7A, Table 2.7A.9).
  - The impacts of the IFQ Program with respect to rural Alaska communities are described above under “Rural coastal community development of a small boat fleet”.

- **Increase the ability of rural coastal communities adjacent to the Bering Sea and Aleutian Islands to share in the wealth generated by the IFQ Program.**
  - This objective relates to the CDQ Program and was not examined as part of the IFQ Program Review.
- **Achieve previously stated Council goals and objectives and meet Magnuson-Stevens Act requirements.**
  - Although not expressly addressed in the analysis and the key findings, this objective is woven in throughout this analysis.
- **Entry opportunities**
  - The Council included several provisions and amendments in the IFQ Program to facilitate entry, including the block program, the fish down provision, and the individual and vessel use caps. Other elements of the program indirectly facilitate entry by encouraging an owner-on-board fishery that could allow for QS turnover when participants were unable or not interested in continuing to fish.
  - By 2015, new entrants held a majority of the QS in both IFQ fisheries (56% in halibut and 53% in sablefish), although the rate at which new individuals are becoming QS holders has generally fallen throughout the course of the IFQ Program (Section 2.6, Figure 2.6-1; Figure 2.6-2; Figure 2.6-3). In both IFQ fisheries, new entrants' QS holdings distributions across the vessel classes are generally aligned with the total distribution across the vessel classes and their average holdings are smaller than the average holdings of initial recipients (Section 2.6, Figure 2.6-6; Figure 2.6-7; Figure 2.6-4; Figure 2.6-5).
  - The right-skewed age distribution of initial recipient QS holders (Section 2.6, Table 2.6-6) and the increasing use of hired masters by individual initial recipients of catcher vessel QS (Section 2.5) provides some evidence that some of these QS holders are likely retaining QS past the point at which they are willing or able to harvest their IFQ themselves. The retention and consolidation of QS by initial recipients, who rely on the use of hired masters to harvest their IFQ, has likely stymied entry into the IFQ fisheries.
  - Anecdotally, QS holders in the IFQ fisheries have also remarked that tax considerations (especially capital gains taxes) are a significant factor in whether and how they transfer their QS. Over the last several years, the number of gift QS transfers and transfers between family members has increased in the IFQ fisheries. While this is beneficial for those who receive the gifted QS, such transactions may perpetuate inequities in access to the fisheries by providing a select group of new entrants with a marked advantage in competing for more QS.
  - Entry into the IFQ fisheries may have become more difficult over the course of the IFQ Program due to decreasing TACs and continually rising QS prices. In turn, some lenders are responding to these factors by increasingly relying on secondary collateral, income diversification, and down payments to assess credit risk for QS loans.
  - The impacts of the block program, the fish down provision, and the individual and vessel use caps are discussed above under: "Limit the concentration of quota share ownership and IFQ usage that will occur over time."

3.1.2 Potential areas of concern

Because the original objectives for the IFQ Program did not include measurable targets, it is the prerogative of the Council to determine whether the programmatic objectives are being met. The following section highlights the objectives that the analysis indicates the program may not have met or may not be currently meeting, based on the analysts' understanding of past Council rationale and discussion of these objectives. This section also points to a few provisions or aspects of the IFQ Program that may not be working optimally with respect to fulfilling their objectives in addition to a few NMFS administrative issues.

Objectives that the analysis indicates the IFQ Program may not have or may not be currently meeting:

- Maintaining the existing business relationships among vessel owners, crews, and processors.
    - By providing exclusive harvesting privileges to vessel owners only, the IFQ Program prompted change in the business relationships that had existed prior to the program between vessel owners, crewmembers, and processors and shifted the balance of powers towards those vessel owners and QS holders. The IFQ Program likely resulted in the loss of crew jobs and the exodus of processors that had been processing halibut and sablefish pre-IFQ from this market. While this would have affected both crewmembers and processors who had been participating in these fisheries prior to IFQ, the implementation of the IFQ Program also opened the way for new processors to enter the market and has likely provided for more stable, safer, and higher paying jobs for current crewmembers and those who maintained their jobs post IFQ.
- Assure that those directly involved in the fishery benefit from the IFQ Program by assuring that these two fisheries are dominated by owner/operator operations.
    - The hired master use privilege for initial QS recipients has conflicted with the Council's objectives to provide for the dominance of owner-operators in the IFQ fisheries. In both IFQ fisheries, hired masters continue to account for a significant portion of the total catcher vessel IFQ landed. Leasing under hardship conditions (medical and beneficiary provisions) and other provisions accounts for a small but increasing portion of total catcher vessel IFQ leasing.
- Economic stability in the fisheries and communities; limit the adjustment cost to current participants including Alaskan coastal communities; and rural coastal community development of a small boat fleet.
    - After IFQ implementation, halibut and sablefish landings increased for Alaska communities overall and the landings distributions between rural and urban Alaska communities remained fairly stable relative to baseline conditions. Similarly, QS holdings of Alaska residents overall have remained fairly stable as has the distribution of QS between rural and urban Alaska residents. However, the IFQ Program did result in a redistribution of QS and IFQ landings away from remote Alaska communities without access to transportation. Furthermore, there have been IFQ landings and QS redistributions at the individual community level, with some communities that were highly engaged in the processing or harvesting sectors prior to IFQ losing substantial landings or QS holdings relative to other communities following IFQ.

IFQ Program provisions which may not be working optimally:

- Sweep-ups of small blocked QS units (Section 2.6)
    - There is some indication that the sweep-up provision is no longer working to facilitate sweep-ups of small QS blocks in the IFQ fisheries. Although sweepable holdings represent a small percentage of the total QS pool in each area, a considerable number of persons hold sweepable QS and the number of sweep-up transfers has decreased substantially since IFQ implementation. Selling a very small amount of QS even if it is sweepable is likely to be quite difficult, because the resultant IFQ may not be economically worthwhile to harvest on its own and because the transaction costs for the QS buyer to purchase a small amount of QS are likely to be similar to those associated with a larger amount of QS. Coordinating with shareholders to execute a sweep-up transfer is likely difficult and associated with high transaction costs (the costs of participating in the market – e.g., searching for the good, acquiring information on pricing, bargaining, etc.).

- Use of the medical lease provision (Sections 2.5 and 2.11.5)
    - The IFQ Program Review has identified a number of complex policy, implementation, and administrative issues related to the medical transfer provision. For example, Section 2.5 notes that there are a few QS holders who have utilized the medical transfer provision for the majority or all of the years during which medical leasing has been allowed. The repetitive use of the provision may indicate that a select group of shareholders is utilizing it as a means of bypassing the owner-on-board provision altogether. Furthermore, some QS holders may be using the medical lease provision for chronic conditions, from which recovery is unlikely, while the provision was intended to provide relief from fishing for IFQ participants in emergency hardship situations. Medical leasing may also increase in the IFQ fisheries in response to the new hired master rule implemented in 2014.
    - In addition, NMFS has identified two challenges with administering the medical transfer provisions: 1) the definition of "certified medical professional" under the medical lease provision may not include commonly used medical care providers such as chiropractors and providers outside the United States, and 2) NMFS staff are increasingly required to make assessments as to whether an IFQ permit holder is applying for a medical transfer in any two of the previous five years for the same medical condition.
    - Given the potential range of issues, NMFS believes that a discussion paper would be the most efficacious way to explore the complicated range of issues that affect the use and administration of medical transfers before deciding on potential regulatory changes.
- Definition of "immediate family member" under the beneficiary lease provision (Sections 2.5 and 2.11.5)
    - Under the beneficiary lease provision, surviving spouses or designated beneficiaries who are family members may lease IFQ for a three-year period upon the death of the QS holder. However, there is no regulatory definition of "immediate family member". This creates administrative issues for NMFS as cultural understandings of family are evolving and has increasingly become an issue for aging QS holders and estate planning.
    - To address this issue, NMFS recommends initiating a regulatory amendment to the surviving heir provisions to specify that a court appointed representative for the QS holder's estate would be authorized to transfer the QS and/or lease the resulting IFQ for a period of three years following the QS holder's death. NMFS would coordinate with the Council on development of the analysis for the proposed action.

NMFS administrative issues

- Administrative appeals regulations (Section 2.11.5)
    - NMFS recommends a regulatory amendment to revise the administrative appeals process regulations. NMFS could undertake the revisions as a stand-alone action or in conjunction with another regulatory amendment to the IFQ Program.
    - NMFS has changed the administrative appeals process since the implementation of the IFQ Program. When the IFQ Program was implemented, any appeals to initial administrative determinations were adjudicated by the appeals office in the Alaska Regional office in Juneau. In the 2006 reauthorization of the MSA, section 303A, which specified requirements for LAPPs, required NMFS to include an appeals process for administrative review of the Secretary's decisions. The IFQ Program regulations have not been updated to reflect this change in the administrative appeals process.
- Initial QS issuance regulations (Section 2.11.5)
    - NMFS recommends a regulatory amendment to remove regulations on initial halibut and sablefish QS issuance. NMFS could undertake the revisions as stand-alone action or in conjunction with another regulatory amendment to the IFQ Program.

- The regulations for initial issuance of QS for the IFQ Program at § 679.40(a) are no longer necessary. Removing these regulations would streamline the IFQ Program regulations as a whole. The revision would reduce the volume of Alaska Region regulations, which streamlines the regulations for the public and reduces the agency costs for publication in the Code of Federal Regulations.

3.2 Data/ Information Gaps and Potential Research Interests

The IFQ Program Review utilized relevant literature as well as quantitative and qualitative analyses to examine the effects of the program and any trends over the last 20 years. This examination was limited by data gaps and time and resource constraints. Conclusive statements about programmatic impacts were also constrained by the nature of the program goals established by the Council; allowing for the balance of sometimes conflicting policy interests, but not defining measurable objectives. Future reviews of the IFQ Program could benefit from more extensive explorative research and data collections that address the identified data gaps and information needs presented below. Furthermore, other data or information gaps may be identified through the process of presenting the IFQ Program Review to the Council, AP, and SSC. However, given that it is not practicable to expect that all of these research avenues can be explored in future programmatic reviews, it is the prerogative of the Council to identify which data and information gaps are most critical to its evaluation of the IFQ Program. The Council's SSC and other research experts (such as AFSC) can then determine the best methodologies for addressing those gaps. The following section presents the data and information gaps that were identified during the development of the IFQ Program Review. It is not intended to be a list of all potential areas of future research interest with respect to the IFQ fisheries.

Data/Information Gaps

- Crew Data
    - Because historically crewmembers have not been tracked in the IFQ fisheries, there is a dearth of information about IFQ crewmembers. There is no historical data on the number of crewmembers participating in the fixed-gear halibut and sablefish fisheries or on IFQ vessels. The State of Alaska, which issues crew licenses for participating in Alaska fisheries, does not ask the licensee to report the fishery in which they intend to participate or on which vessels the crewmember worked. In 2006, a crew size field was added onto fish tickets, which provides information on the number of crewmembers per IFQ vessel beginning that year; however, that information is recorded by processors at the time of landing and is not audited in any way. There is also no data on crew shares (as a percentage of total ex-vessel revenues) or average crew earnings (as an absolute number) for IFQ crewmembers.
- VMS data
    - NMFS Office of Law Enforcement (OLE) has identified the lack of comprehensive VMS coverage in the IFQ fleet as an impediment to effective monitoring and enforcement of the fleet. OLE identified two key areas of enforcement concern for the IFQ fleet – area fished violations (false reporting of the area of harvest for IFQ) and multiple area violations (fishing across multiple IFQ areas without observer or VMS coverage) (Section 2.11.3). VMS data could be used to detect both types of violations more effectively and to prevent IFQ participants from inadvertently committing a multiple area violation. VMS data could also provide spatial data for the IFQ fleet that could be used to examine any potential gear interactions on fishing grounds between IFQ participants and between IFQ participants and those in other fisheries.
- Gear conflicts

- Incidences of gear conflicts are not tracked in the IFQ fisheries and, if they were, would likely be largely based on self-reported data. The Council could seek more systematic information on gear conflicts in the IFQ fisheries through a survey mechanism or more anecdotal information through public comment. However, given that the majority of initial QS recipients have left the IFQ fisheries, it would be difficult to get a representative sample to make conclusive statements about the impacts of the IFQ Program on gear conflicts in the IFQ fisheries. Rather, this information would be pertinent to creating a baseline for understanding gear conflicts in these fisheries.

- Lease rates
    - Lease rates, the percentage of the ex-vessel revenue that the QS holder receives for the landing of their IFQ, are an important determinant in how QS holders and lessees operate in the IFQ fisheries and can provide the Council with information about the profitability and expectations of future profitability in the IFQ fisheries (Newell, Papps and Sanchirico 2007; Holland et al. 2014). These rates are not tracked in the IFQ fisheries except that lessors and lessees can voluntarily report these rates on the medical and beneficiary lease forms. The ex-vessel revenue splits between hired masters and QS holders, which are also an important component of hired master and QS holder decisions, are also not reported.
- Biological management issues
    - During the presentation of the outline and workplan for the IFQ Program Review, there was public comment asking for information on any links between IFQ Program management and specific biological issues of the IFQ species, including size-at-age, localized depletion, and overall stock health. Unfortunately, such information was not available for inclusion in this review.
    - There is lots of literature about catch shares creating incentives to highgrading, particularly in situations where at-sea discards are difficult to monitor. These conditions could exist in the IFQ fisheries given limited observations of at-sea discards, and price differentials for ex-vessel payments on larger fish. Currently, NMFS does not have the fleet-wide data to characterize the extent to which highgrading is or is not occurring. NMFS uses IPHC survey data to estimate at-sea discards of halibut. Although that may be a perfectly reasonable proxy, NMFS has not yet made comparisons between the survey estimates and the available at-sea discard data. Such a comparison would help provide information that could be useful to improve estimates of at-sea discards.

Potential Research Interests

- QS holders' operational decisions
    - Policy decisions can be informed with a more comprehensive and integrated understanding of what factors affect QS holders' decisions in the IFQ fisheries. Many of the choices that the Council may be interested in could potentially be modeled using behavioral choice models, including decisions about entry/exit, diversifying QS holdings, multiple shareholders consolidating IFQ permits onto vessels, etc. Such modeling should take into account a multitude of economic, regulatory, and individual factors that may affect the QS holder's decision as well as potential time lags in responses. Szymkowiak and Felthoven (2016) modeled the choice to use a hired master by individual initial QS recipients showing that the probability of hired master use is a factor of the quantity and diversity of shareholdings and the residency of the shareholder.
- Effects of area-specific regulations
    - The Council implemented several provisions in the IFQ Program to maintain the unique characteristics of the fleet in Southeast Alaska. In order to understand whether these special provisions met their intended objectives, more rigorous quantitative methods than

those utilized in this analysis would have to be applied. Such methods may include counterfactual analysis or difference-in-difference modeling, provided the special provision meets the underlying assumptions of the modeling approach (e.g., exogeneity).

- Vessel and individual diversification
  - Diversification into other areas or fisheries can provide IFQ participants with some buffer against TAC and regulatory changes in the IFQ fisheries. Therefore, the extent of diversification of the IFQ fleet can also be important for the Council to understand as they evaluate the potential impacts of changes in the IFQ fisheries on participants and potential spillover effects into other fisheries. Future research on diversification in the IFQ fleet should consider vessel diversification as a factor of vessel length, economic factors like earnings expectations based on operating costs, the TAC, ex-vessel prices of fish, and the generation of the participant (i.e. initial QS recipient or new entrant). AFSC will soon be undertaking a study to examine many of these issues at the individual QS holder level for the IFQ fisheries.
- Processor Impacts
  - Following IFQ implementation there was a substantial exodus of processors that had been processing halibut and sablefish prior to IFQ, but the pre-IFQ processors account for a greater proportion of the IFQ processed pounds and value than their proportional composition of the total IFQ-species processors. Researchers could examine how the IFQ Program affected market concentration in the processing sector using common metrics of market concentration like the HHI. This analysis could be done at the plant level, but a more useful measure of market concentration would be to summarize all plants owned by the same processing company. However, this would necessitate knowing the business structure of the processing plant, which is currently not documented, but seems feasible to ascertain. Researchers may also further examine the underlying reasons for processors closing post-IFQ, which could be a function of numerous factors exogenous to the IFQ Program itself, including changes in processing needs in other fisheries.
  - Understanding the diversification of processors beyond the IFQ species can also provide the Council with valuable information on the potential impacts of regulatory changes in the IFQ fisheries, as well as how processors adopted diversification as a resilience strategy following IFQs. Previous research on diversification at the vessel level and the discussion above on vessel and individual diversification provide some discussion points on how such research could be developed.
  - Future expansions of the analysis on shifts in bargaining strength between harvesters and processors should compare wholesale and ex-vessel price data at the individual processor level, applying individual processor recovery rates and individual processor cost information. Researchers could also extend the Fell and Haynie (2011; 2013) research to examine changes in actual rent distribution between harvesters and processors in the halibut fishery and in the sablefish fishery over the last decade.
- Entry Opportunities
  - There are numerous potential research extensions for examining entry into the IFQ fisheries in order to better understand the underlying factors affecting entry. For instance, researchers could examine new entrants' responses to specific regulatory changes in the IFQ fisheries, like changes in the block program or sweep up levels, to assess how participants may respond to other programmatic changes in the future. The Carothers, Lew, and Sepez (2010) study could also be updated and extended to look at the probability of buying and selling QS as a factor of the individual's characteristics and those of his/her community of residency, as well as to include other community attributes of interest (CDQ, airport, road access, etc.). This would provide the Council with more information on how the QS holder's residency affects these decisions. A simple model of the count of new entrants as a factor of earnings expectations (for which lease rates are a

sufficient statistic in well-functioning markets), trends in other fisheries, etc., could also be useful in determining whether new entrants respond to changes in earning expectations and other factors in ways that could be hypothesized. It may also be of interest to the Council to understand the impacts of hired master use and the differentiated hired master use restrictions in the Southeast regulatory areas on entry. A social network analysis could also be utilized to examine QS transfer networks in order to understand how individuals may enter the IFQ fisheries as has recently been completed for the Pacific trawl rationalization program (Holland and Norman, 2015). Finally, differentiated QS acquisition over time by those new entrants who do and do not receive gifted QS could also be examined to better understand whether there are any inequities in access that are promoted through gifting.

- Community Impacts
  - The Council may be interested in understanding the impacts of the IFQ Program on specific communities. More in-depth social science research methods or econometric modeling tools could be used to examine impacts on specific communities that are identified as being of interest. For example, ethnographic research tools could be used to examine more comprehensive impacts from QS or IFQ landings redistributions and impacts on support service businesses and other indirect fishery participants. Researchers from the AFSC and UC Davis are currently working on some research on potential community impacts from relaxing QS trading constraints in the IFQ fisheries.
- Variability in violations
  - There is considerable inter-annual variability in overage violations in the IFQ fisheries and some variability in other violations as well. The underlying reason for this variability is uncertain, but is likely to be a combination of fluctuations in monitoring/enforcement effort, IFQ fishermen's behavior, and changes in the regulatory environment, ex-vessel prices of fish, and catch per unit effort. Analytical expansions could be used to more thoroughly examine these issues. For example, a count data regression model could be used to examine violations at the area level as a function of area-specific conditions (e.g., TAC and regulatory changes). Or, since some violations are associated with specific IFQ permits (like overage violations), a permit-specific behavioral model could be developed to examine choices about violations as a function of individual, permit-specific, and other characteristics. This could potentially provide NOAA OLE with a better understanding of how to allocate enforcement efforts at different times and areas.
- Effectiveness of the CQE Program
  - Although the CQE Program was not evaluated as part of the IFQ Program Review, Section 2.6 does provide information on QS holdings of CQE entities and residents of CQE communities. Researchers could further examine the impacts of the CQE Program, including the community-level issues with acquiring QS and leasing it to community residents. Such research could help inform how the program may be improved and utilized more frequently.
- GAF usage
  - AFSC researchers have surveyed charter halibut permit holders regarding their opinions on and utilization of the GAF lease program (Lew, Putman, and Larson, 2016). AFSC researchers are also currently researching usage of the GAF program from the commercial sector perspective, examining the characteristics of the QS holders and the QS that are leased as GAF.

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APPENDIX 2.7A AFSC COMMUNITY INDICIES

Section 2.7A AFSC Indices of community involvement in the halibut and sablefish IFQ fisheries

2.7A.1 Introduction

NMFS has developed a national framework to understand community well-being and participation in marine fisheries (Jepson and Colburn, 2013). AFSC's Economic and Social Sciences Research Program (ESSRP) has adapted this framework to develop a set of performance metrics to track fisheries involvement over time using pre-existing data for a majority of Alaska communities. These performance metrics allow policymakers to examine the degree to which Alaska communities are involved in different aspects of commercial, recreational, and subsistence fisheries (Kasperski and Himes-Cornell, 2014; Himes-Cornell and Kasperski, 2016). The analysis presented here examines community involvement in the commercial sector of the Halibut and Sablefish IFQ Program (IFQ Program). As the halibut and sablefish fisheries are quite different, the analysis was conducted separately for each species. To conduct this analysis, ESSRP gathered information on communities throughout the United States that participate in the fishery either through processing halibut and/or sablefish locally or owning vessels that harvest halibut and/or sablefish. The purpose of this analysis is to explore the degree to which communities are involved in the IFQ Program fisheries and how their invovlement has changed over time.

Four performance metrics of community fisheries involvement were chosen to understand the different ways that communities are invovled in each of the IFQ Program fisheries: commercial processing engagement, commercial harvesting engagement, how important each community is in regards to the total IFQ Program fishery, and how important the IFQ Program fishery is to their overall portfolio of species harvested and processed within the community. These indicators provide a quantitative measure of community involvement in IFQ Program fisheries and how their participation has changed between a baseline period (the average of the three years prior to IFQ Program implementation, (1992 to 1994) to 2014.

2.7A.2. Methods

The ESSRP collected secondary data from state and federal sources for communities throughout the U.S. and Canada. These communities were aggregated into a smaller set of communities used in the analysis if they had any participation in the halibut and/or sablefish IFQ Program fisheries. All Alaska communities with some participation are included independently, but 5 regional groupings were created for communities outside Alaska including the Seattle Metropolitan Statistical Area (Seattle MSA), Other Washington, Oregon, All Other USA, and Canada.

2.7A.2.1 Commercial Fisheries Engagement Indices

Communities were included in the study population if any IFQ Program landings were made in the community or if the owner of a vessel that fished in the IFQ Program fisheries resided in the community for any year from 1992 through 2014.[92] The three years before the program were averaged to create a Baseline value for each community. The analysis uses values for all variables for each IFQ Program fishery for each community (or grouping) each year and separates variables into two categories of fisheries involvement: commercial processing and commercial harvesting. Processing engagement is

[92] The owner's community is determined from the CFEC vessel registration in a given year.

represented by the amount of IFQ Program landings and associated revenues from landings in the community, the number of vessels delivering IFQ Program fish in the community, and the number of processors in the community processing IFQ Program fish. Harvesting engagement is represented by the IFQ Program landings and revenues associated with vessels owned by community residents, the number of vessels with IFQ Program landings owned by residents in the community, and the number of distinct vessel owners with IFQ Program landings in the community. By separating commercial processing from commercial harvesting, the indices presented here highlight the importance of the IFQ fishery for communities that may not have a large amount of IFQ Program landings or processing in their community, but have a large number of fishermen and/or vessel owners that participate in the IFQ fishery that are based in the community.

To examine the relative harvesting and processing engagement of each community, a separate principal components factor analysis (PCFA) was conducted each year for each category to determine a community's relative engagement. Including the Baseline, there are 21 years in the study and two PCFAs to be conducted for each fishing season (processing engagement and harvesting engagement) and these are done separately for halibut and sablefish for a total of 84 different PCFAs.

PCFA is a variable reduction strategy that separates a large number of correlated variables into a set of fewer, linearly independent components. These components are used to create quantitative indices of engagement by using the regression method of summing the standardized coefficient scores multiplied by the included variables. In this case, we achieve a single factor solution for each PCFA and therefore, generate a unique processing index and harvesting index value for each community in each year. Each index is normalized to have a mean of zero and a standard deviation of one for each year. These indices are relative scores in that they represent each community's engagement in the IFQ Program fisheries within a single fishing season relative to all other communities in that fishing season. Indices are then combined across all fishing seasons to create a time series of relative engagement in the IFQ Program fisheries over time.

Communities that scored above one (above one standard deviation from the mean of zero) for any year are classified as highly engaged for that particular year. These communities are used in additional analyses to explore the changes in their participation from the Baseline through 2014. It is important to note that since these are relative indices, the large decrease in active IFQ Program vessels post-rationalization will only cause a change in the indices if one community loses a larger share of their vessels (or other IFQ Program activities) than another community. If the losses are proportional to the existing IFQ Program fisheries related activities pre-rationalization, there will not be a change in the indices post-rationalization.

2.7A2.2 Regional quotient

The regional quotient is a measure of the importance of the community relative to the total halibut or sablefish IFQ Program fishery in terms of pounds landed or revenue generated. It is calculated as the landings or revenue of halibut or sablefish attributable to a community divided by the total landings or revenue from the total halibut or sablefish IFQ Program fishery. The regional quotient is reported for both pounds and revenue from landings in a community (similar to processing engagement) as well as the pounds and revenue attributable to vessel owners in a community (similar to the harvesting engagement). The regional quotient is presented for all communities that were highly engaged for all years from the Baseline through 2014.

2.7A.2.3 Local quotient

The local quotient is a measure of the importance of the halibut or sablefish IFQ Program fishery to a community's overall portfolio of landings and revenue. It is calculated as the landings or revenue from halibut or sablefish landed in a community divided by the total landings or revenue from a community's total landings and revenue in each year (similar to processing engagement). The local quotient is only calculated based on the location of the landings because we do not have a full accounting of every fishery that community residents may participate in (those outside Alaska). The local quotient is presented for all communities that were highly engaged for all years from the Baseline through 2014.

As the local quotient is a measure of the share of IFQ Program landings and revenues to total revenues in a community, the local quotient can change over time even if IFQ Program landings and revenue are constant due to changes in the other fisheries in which the community is engaged. To better understand the trends in the local quotient as being attributable to changes in the program itself or changes in the program, when presenting the local quotient, the total pounds and revenues are also displayed to better gauge the degree to which changes in the local quotient are being driven by changes in the IFQ Program fisheries or changes in other fisheries.

2.7A.3. Results

2.7A.3.1 Halibut IFQ Program fishery

This section will report performance metrics of community involvement in the Halibut IFQ Program fishery from the Baseline period to 2014. Data were collected for 924 communities throughout the U.S., including 152 from Alaska, 237 from Washington, 107 from Oregon, 9 from Canada, and 419 other communities in the U.S. These communities were aggregated into a smaller set of 131 communities used in the analysis which include all 126 communities in Alaska with some participation in the halibut IFQ Program fishery and then 5 regional groupings including the Seattle Metropolitan Statistical Area (Seattle MSA), Other Washington, Oregon, All Other USA, and Canada. These aggregations were chosen to be the most relevant for the IFQ Program Review, but result in slightly different results than the forthcoming NMFS Technical Memorandum on community engagement in catch share fisheries (Colburn et al., *forthcoming*) which does not aggregate communities outside Alaska.

2.7A.3.2 Halibut commercial processing engagement

The results of the halibut commercial processing engagement PCFA analyses are shown in Table 2.7A.1, which presents the eigenvalues, factor loadings, total variance explained, and Armor's theta reliability coefficient (Armor, 1974) for all of the variables included in each PCFA. The results suggest very strong relationships among variables and that a single index best represents the trends in all four included variables as indicated by the large first eigenvalue and very small subsequent eigenvalues and the high percentage of variance explained (Kim and Mueller, 1978a and 1978b).

Table 2.7A.1 Halibut commercial processing engagement PCFA results.

Year	Eigenvalues				Factor Loadings				Percent variance explained	Armor's Theta
	1	2	3	4	Ex-vessel value	Pounds landed in community	Number of vessels delivering	Number of processors		
Baseline	3.46	0.42	0.12	0.00	0.9752	0.9654	0.9528	0.8204	86.60%	0.9484
1995	3.51	0.34	0.15	0.00	0.9701	0.9652	0.9441	0.8641	87.77%	0.9535

1996	3.46	0.42	0.12	0.00	0.9741	0.9701	0.9511	0.8144	86.45%	0.9477
1997	3.51	0.34	0.15	0.00	0.9712	0.9642	0.9417	0.8675	87.81%	0.9537
1998	3.56	0.30	0.14	0.01	0.9736	0.9667	0.9464	0.8819	88.90%	0.9584
1999	3.58	0.24	0.18	0.00	0.9708	0.9741	0.9291	0.9085	89.50%	0.9609
2000	3.52	0.31	0.17	0.00	0.9660	0.9634	0.9294	0.8892	87.89%	0.9541
2001	3.59	0.25	0.16	0.00	0.9736	0.9729	0.9390	0.9025	89.76%	0.9620
2002	3.52	0.31	0.17	0.00	0.9694	0.9696	0.9344	0.8787	88.12%	0.9551
2003	3.51	0.33	0.16	0.00	0.9686	0.9678	0.9372	0.8689	87.70%	0.9533
2004	3.60	0.26	0.14	0.00	0.9787	0.9784	0.9430	0.8921	90.00%	0.9630
2005	3.59	0.29	0.12	0.00	0.9754	0.9768	0.9527	0.8807	89.72%	0.9618
2006	3.60	0.27	0.13	0.00	0.9791	0.9797	0.9442	0.8889	90.00%	0.9630
2007	3.65	0.18	0.17	0.00	0.9781	0.9800	0.9314	0.9278	91.13%	0.9676
2008	3.58	0.25	0.18	0.00	0.9756	0.9777	0.9275	0.9001	89.46%	0.9607
2009	3.57	0.26	0.17	0.00	0.9683	0.9695	0.9276	0.9123	89.26%	0.9599
2010	3.60	0.24	0.16	0.00	0.9717	0.9704	0.9240	0.9257	89.91%	0.9626
2011	3.60	0.23	0.17	0.00	0.9723	0.9722	0.9276	0.9235	90.10%	0.9634
2012	3.60	0.23	0.16	0.00	0.9793	0.9766	0.9334	0.9054	90.10%	0.9634
2013	3.63	0.22	0.15	0.00	0.9761	0.9748	0.9419	0.9147	90.67%	0.9657
2014	3.64	0.24	0.12	0.00	0.9838	0.9826	0.9422	0.9026	90.90%	0.9666

In addition to the goodness of fit statistics of the analyses provided in Table 2.7A.1, each of the PCFA provides an index score for each of the 131 communities. These index scores are presented in Table 2.7A.2 for the 17 communities that were highly engaged (index score above one, which is one standard deviation above the mean of zero) for at least one year from the Baseline to 2014, and these cells are shaded in Table 2.7A.2. The index is an indicator of the importance of the Halibut IFQ Program in a community relative to its importance to other communities. It is a measure of the presence of commercial fishing through fishing activity including pounds landed, revenue, processors and the number of delivering vessels in the halibut fishery.

Of the 17 communities found in Table 2.7A.2, the 6 communities that were highly engaged in commercial halibut IFQ processing for all years from the Baseline through 2014 are shown in Figure 2.7A.1. Homer and Kodiak have the highest engagement scores, despite a decrease in Kodiak's engagement over time. Conversely, Homer showed a significant increase in engagement after the first few years of the program, experiencing a large increase in engagement in 1998 that was maintained through 2014. The engagement scores were fairly stable for the remaining four communities of Petersburg, Seward, Sitka, and Unalaska/Dutch Harbor. While not included in Figure 2.7A.1, with the exception of the Baseline year, Juneau was highly engaged for all years.

Table 2.7A.2 Communities highly engaged in Halibut IFQ Program commercial processing for one or more years from the Baseline (1992-1994) through 2014.

Community	Baseline	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Cordova, AK	0.75	0.93	0.98	1.24	1.15	0.86	1.11	1.07	1.22	1.26	1.32	1.38	1.24	1.26	1.32	1.47	1.12	1.41	0.99	1.23	1.22
Homer, AK	5.05	4.50	4.61	4.46	7.02	6.80	6.02	7.30	7.28	6.73	6.46	6.48	6.56	6.41	6.42	7.88	7.77	6.70	6.66	6.86	6.65
Hoonah, AK	0.42	1.23	1.75	1.71	1.35	1.07	0.93	1.15	0.77	0.91	1.42	0.89	0.87	0.71	0.66	0.49	0.51	0.71	1.06	0.72	1.03
Juneau, AK	0.69	1.62	1.86	1.69	2.06	2.34	2.40	1.67	1.89	2.03	2.01	2.41	2.34	1.91	1.72	2.18	2.15	1.89	1.92	2.30	2.07
Kenai, AK	1.36	0.51	0.18	0.23	0.24	0.17	0.28	0.24	0.23	0.17	0.21	0.13	0.09	0.18	0.23	0.34	0.14	0.18	0.22	0.28	0.26
Ketchikan, AK	1.25	0.76	0.70	0.81	0.40	0.44	0.49	0.61	0.50	0.64	0.64	0.71	0.60	0.60	0.74	0.56	0.48	0.65	0.68	0.62	0.62
Kodiak, AK	6.79	6.84	6.12	6.24	4.54	5.02	5.22	4.66	4.13	4.37	4.79	4.95	5.17	5.72	5.82	5.06	4.99	6.02	6.29	5.24	5.14
Other WA	2.37	1.85	2.59	2.12	2.09	1.60	1.53	1.43	1.17	0.85	1.02	0.83	1.19	1.05	1.09	-0.31	0.65	0.41	0.45	0.40	0.71
Petersburg, AK	2.86	2.70	2.81	2.24	2.24	1.94	1.60	1.95	2.00	2.01	2.23	2.51	2.34	1.95	1.93	1.79	1.79	1.69	1.99	2.25	2.81
Sand Point, AK	0.23	0.20	0.27	0.42	0.27	0.19	0.46	0.47	1.22	1.57	1.97	1.62	1.34	1.03	1.59	0.72	1.03	1.51	1.08	0.70	0.80
Seattle MSA	1.97	1.11	0.94	0.87	0.33	0.32	0.13	-0.26	-0.16	-0.16	-0.14	0.03	-0.10	-0.35	-0.22	-0.31	-0.32	-0.19	-0.18	-0.17	-0.34
Seward, AK	2.79	3.13	3.35	3.20	3.59	3.78	3.22	3.16	3.71	4.04	3.89	3.11	3.29	3.38	3.40	3.23	3.43	3.27	3.25	3.96	3.83
Sitka, AK	2.72	3.45	3.42	3.29	3.18	2.37	2.72	2.30	2.34	2.76	3.11	3.29	3.23	3.23	2.95	2.51	2.56	2.50	2.38	2.65	3.06
Unalaska/Dutch Harbor, AK	2.01	2.90	2.72	3.75	2.07	2.90	4.46	3.55	3.59	3.46	2.72	2.78	2.47	2.51	2.45	1.41	1.44	2.33	2.18	1.86	1.79
Whittier, AK	0.34	0.26	0.82	0.75	0.91	0.70	0.86	0.66	1.09	1.11	0.90	1.03	0.87	0.69	0.64	0.55	0.44	0.28	0.21	0.47	0.50
Wrangell, AK	0.50	0.54	0.79	0.70	0.54	0.82	0.80	0.58	0.79	0.67	0.78	0.71	0.87	0.83	0.53	0.57	0.56	0.43	0.74	0.91	1.28
Yakutat, AK	0.26	0.53	0.60	1.09	0.90	0.87	0.65	0.90	0.57	0.36	0.43	1.24	1.10	1.29	0.97	0.98	0.96	0.95	0.93	1.40	1.24

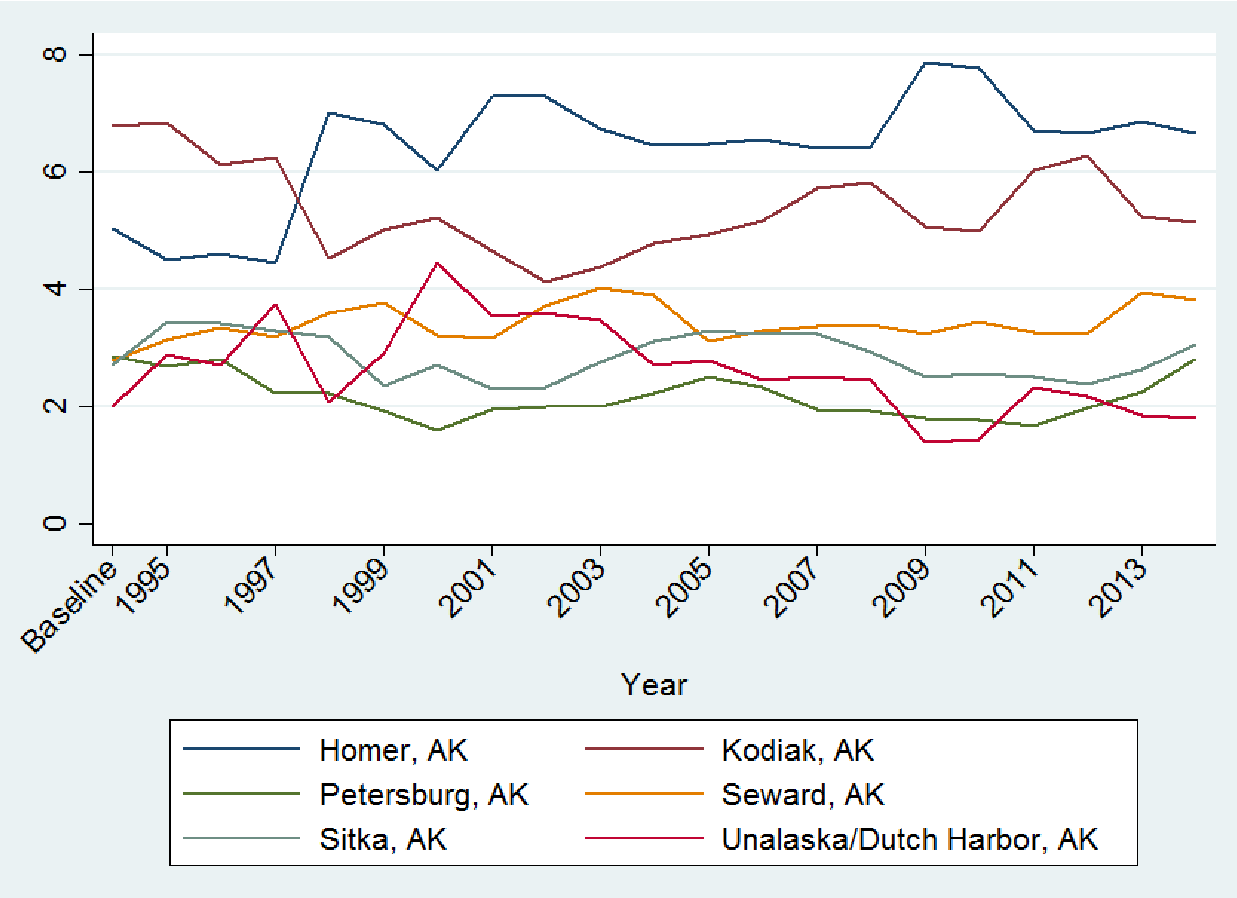

Figure 2.7A.1 Index scores of communities highly engaged in Halibut IFQ Program commercial processing for all years from the Baseline (1992-1994) through 2014.

Homer, Seward, and Sitka demonstrated an overall increase in the halibut commercial IFQ processing engagement score between the Baseline and 2014 (Figure 2.7A.2). However, while Homer showed a significant increase, the index scores for Seward and Sitka only increased slightly during this time period.

Figure 2.7A.2 Index scores of communities highly engaged in Halibut IFQ Program commercial processing for all years with increasing engagement between the Baseline (1992-1994) through 2014.

Of the communities that were highly engaged in commercial halibut IFQ processing during the baseline period, those that demonstrated a decreasing halibut commercial IFQ engagement index score from the Baseline through 2014 are depicted in Figure 2.7A.3. These scores highlight the declining involvement of Unalaska/Dutch Harbor in the halibut IFQ Program fishery, particularly after reaching a peak in 2000. Although Petersburg showed a decline in its index score, its engagement remained relatively stable over time. While there is an ultimate decline in Kodiak's engagement compared with the Baseline, Kodiak was the most highly engaged community from the Baseline through 1997 and remained the second most engaged community through 2014.

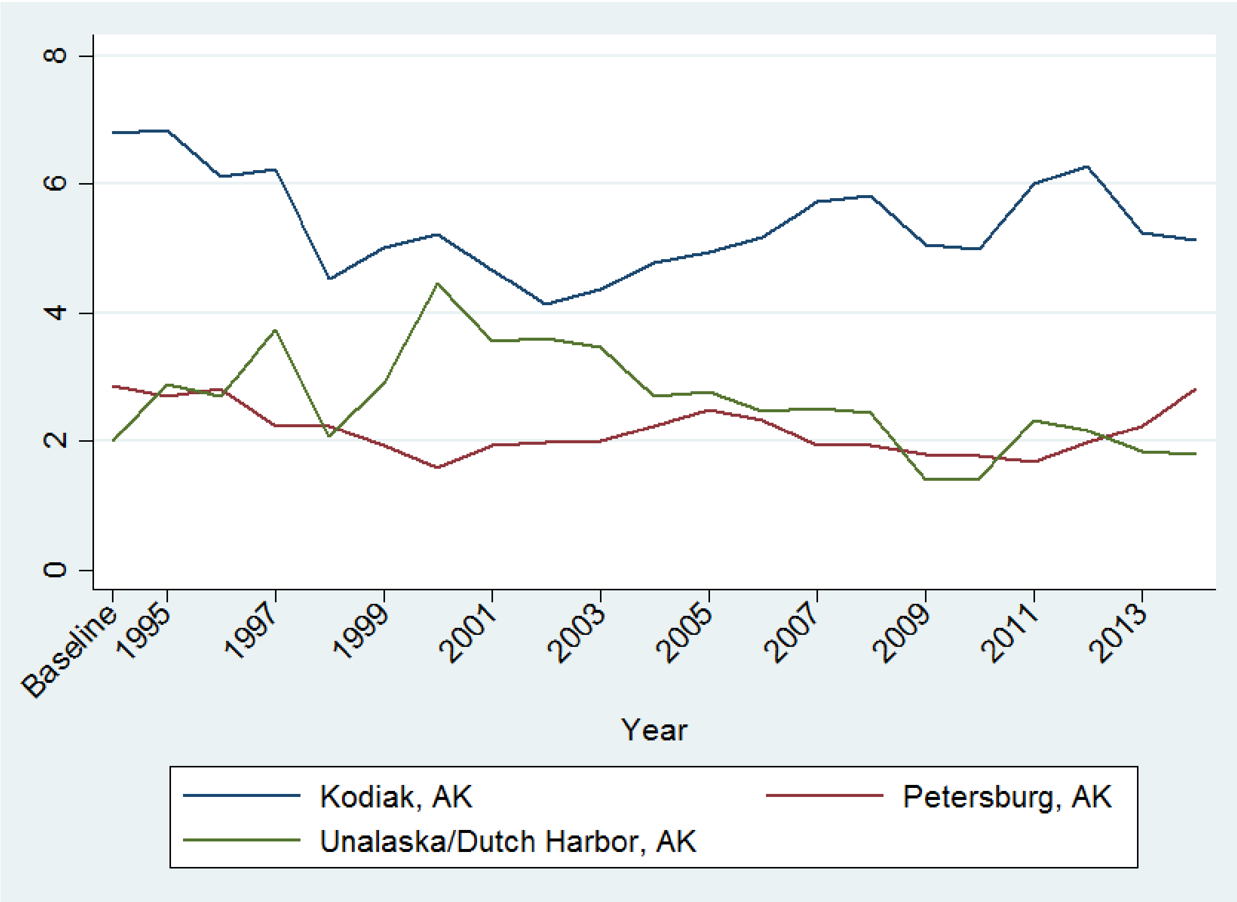

Figure 2.7A.3 Index scores of communities highly engaged in Halibut IFQ Program commercial processing for all years with decreasing engagement between the Baseline (1992-1994) through 2014.

Communities that were highly engaged in Halibut IFQ Program commercial processing for less than all years that experienced a 50% or greater increase in commercial processing engagement between the Baseline (1992-1994) and 2014 are depicted in Figure 2.7A.4 Sand Point and Yakutat each started at very low levels of engagement but ended up being highly engaged in commercial halibut processing for 10 and 6 years, respectively. Wrangell was only highly engaged in 2014 but has experienced a sharp increase in engagement since 2011. Hoonah was not highly engaged during the Baseline but was highly engaged in the first few years of the program but has declined from those high levels in the most recent years. Juneau was not highly engaged during the Baseline, but has been highly engaged in all years since program implementation. Cordova has generally increased is engagement over time, from not being highly engaged during the Baseline to being highly engaged in 16 of the 20 years post IFQ Program implementation.

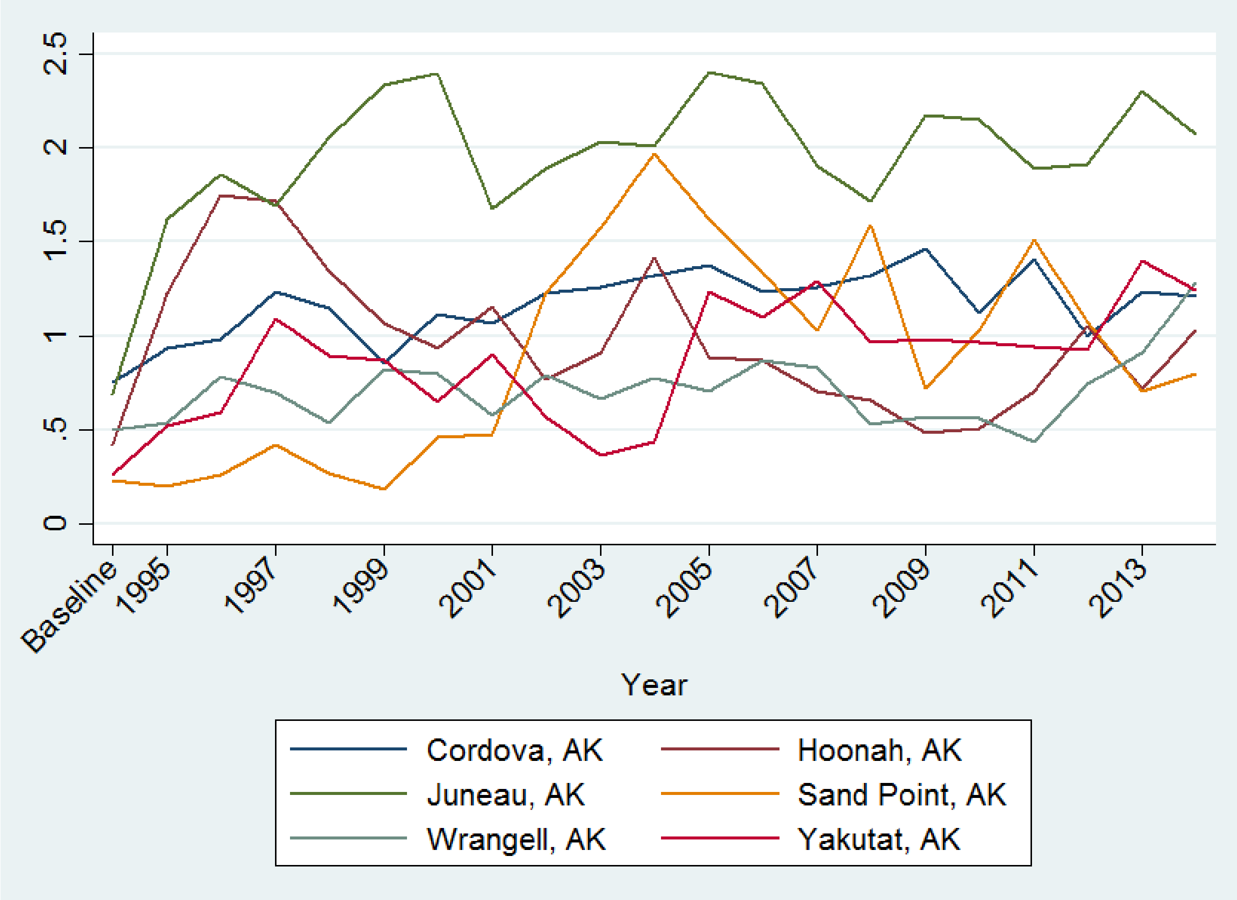

Figure 2.7A.4 Index scores of communities highly engaged in Halibut IFQ Program commercial processing for less than all years with a 50% or greater increase in engagement between the Baseline (1992-1994) and 2014.

Communities that were highly engaged in Halibut IFQ Program commercial processing for less than all years that experienced a 50% or greater decrease in commercial processing engagement between the Baseline (1992-1994) and 2014 are depicted in Figure 2.7A.5. Other Washington experiences a gradual decline in processing engagement over time while Seattle MSA and Kenai and Ketchikan both experienced more sudden declines in engagement after IFQ Program implementation.

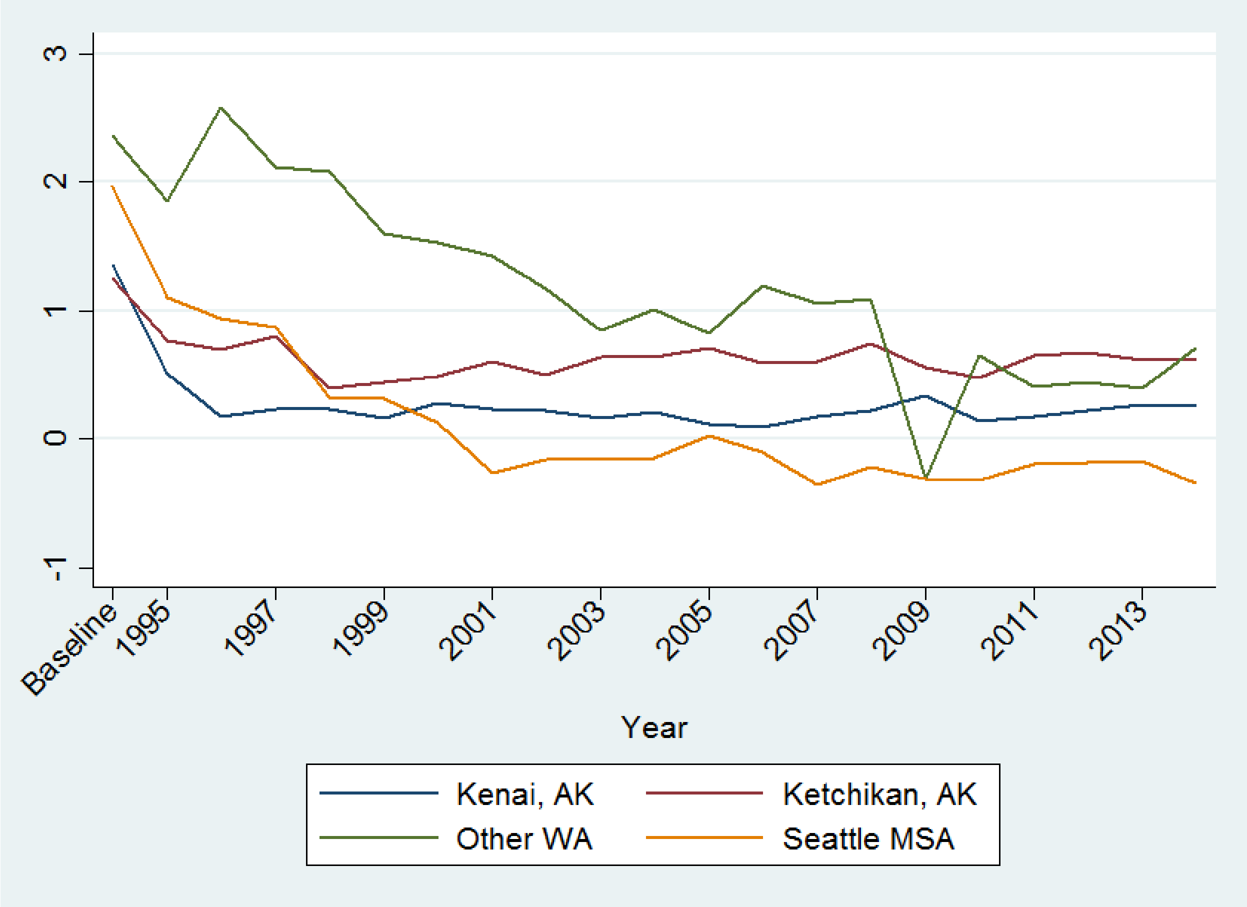

Figure 2.7A.5 Index scores of communities highly engaged in Halibut IFQ Program commercial processing for less than all years with a 50% or greater decrease in engagement between the Baseline (1992-1994) and 2014.

2.7A.3.3 Halibut processing regional quotient

Another measure of a community's involvement in the halibut IFQ Program fishery is its processing regional quotient, defined as share of IFQ Program halibut landed within a community out of the total halibut IFQ Program. It is an indicator of the percentage contribution in pounds or revenue landed in that community relative to the entire fishery. Figures 2.7A.6 and 2.7A.7 show the processing regional quotient both in pounds and revenue from the Baseline to 2014.

The most prominent communities in the halibut IFQ Program have been Kodiak and Homer accounting for approximately 34% of the regional pounds landed during the Baseline, but each has experienced diverging trends after program implementation (Figure 2.7A.6). Kodiak's processing regional quotient has decreased slightly, while Homer has landed a larger share of the pounds and revenues since the implementation of the IFQ Program. However, these two communities still only land 34% of the total IFQ Program halibut in 2014. The other highly engaged communities have increased their share of the pounds from 26% during the Baseline to 34% during 2014, which results in a declining share for all communities that were not highly engaged in all years (those included in the "Other Communities" grouping in Figures 2.7A.6 and 2.7A.7) from approximately 40% during the Baseline to 32% in 2014.

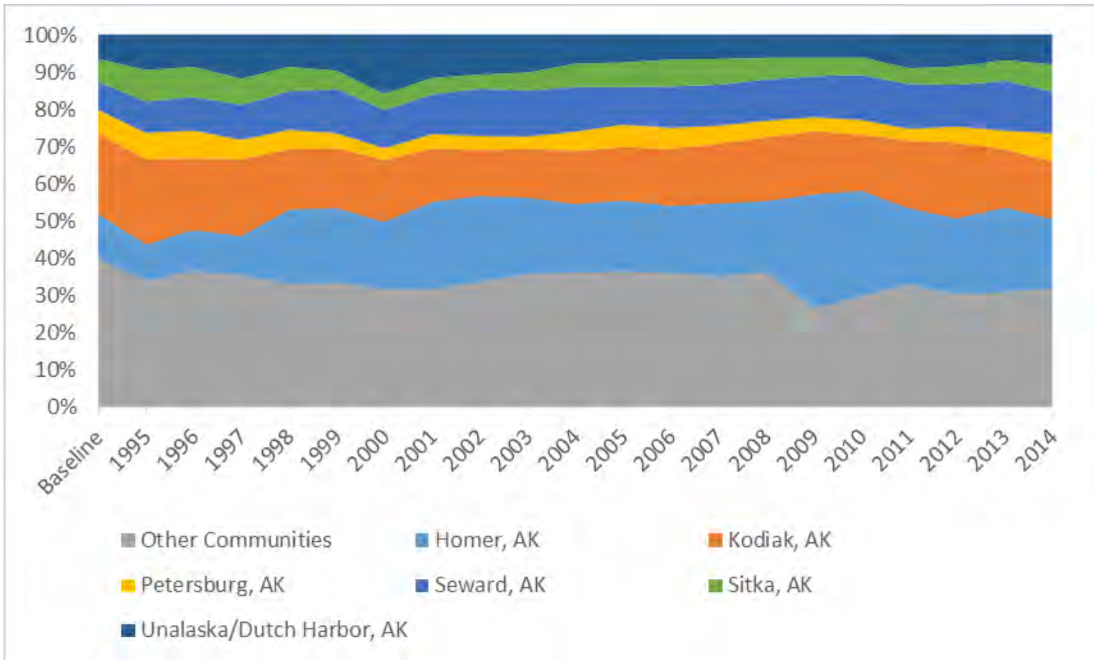

Figure 2.7A.6 Processing regional quotient of pounds for communities highly engaged in the Halibut IFQ Program for all years from the Baseline (1992-1994) through 2014.

Similar to the processing regional quotient of pounds, the two communities of Kodiak and Homer represented 32% of the regional revenue in the Baseline years and increased to approximately 34% of the regional value in 2014. The highly engaged communities for all years represented 58% of the regional value in the Baseline years and this value increased to 68% of the regional value in 2014. While the exception of Seward, which experienced a 50% increase in its processing regional quotient, Unalaska/Dutch Harbor, Sitka, and Petersburg all showed a small increase in the processing regional quotient between the Baseline and 2014.

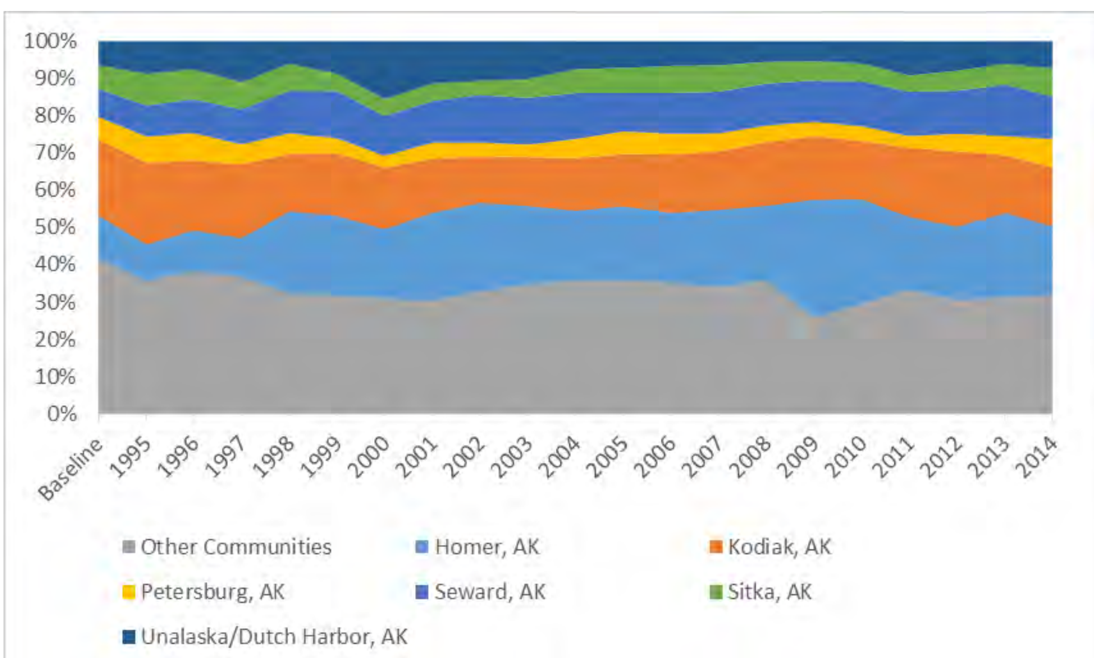

Figure 2.7A.7 Processing regional quotient of revenue for communities highly engaged in the Halibut IFQ Program for all years from the Baseline (1992-1994) through 2014.

2.7A.3.4 Halibut community processing local quotient

In contrast to the processing regional quotient, the processing local quotient represents the percentage of IFQ Program halibut landed within a community out of the total amount of all species landed within that community. It is an indicator of the contribution in value or pounds of a species to the overall landings in a community. In addition to the processing local quotient from the Baseline to 2014, Figures 2.7A.8 and 2.7A.9 show the total pounds and value for each community to show how the community totals vary with changes in the share of IFQ Program halibut pounds and revenues.

The processing local quotient of halibut pounds compared to other species increased dramatically for Homer after IFQ Program implementation, but has fallen to slightly above Baseline levels in the most recent three years. The processing local quotient has decreased for all other communities in Figure 2.7A.8 except Petersburg which remained at 3%. Sitka and Seward experienced the largest declines in the processing local quotient falling from 10% and 17% during the Baseline to 2% and 5%, respectively. One notable trend from the comparison of the processing local quotient and the total pounds landed appears that for Petersburg, Sitka, and Seward, the share of halibut increases in years with fairly large declines in total landings which suggests IFQ Program halibut are not drivers of changes in total pounds landed for these communities but could serve as an important standby in years with poor landings in other fisheries.

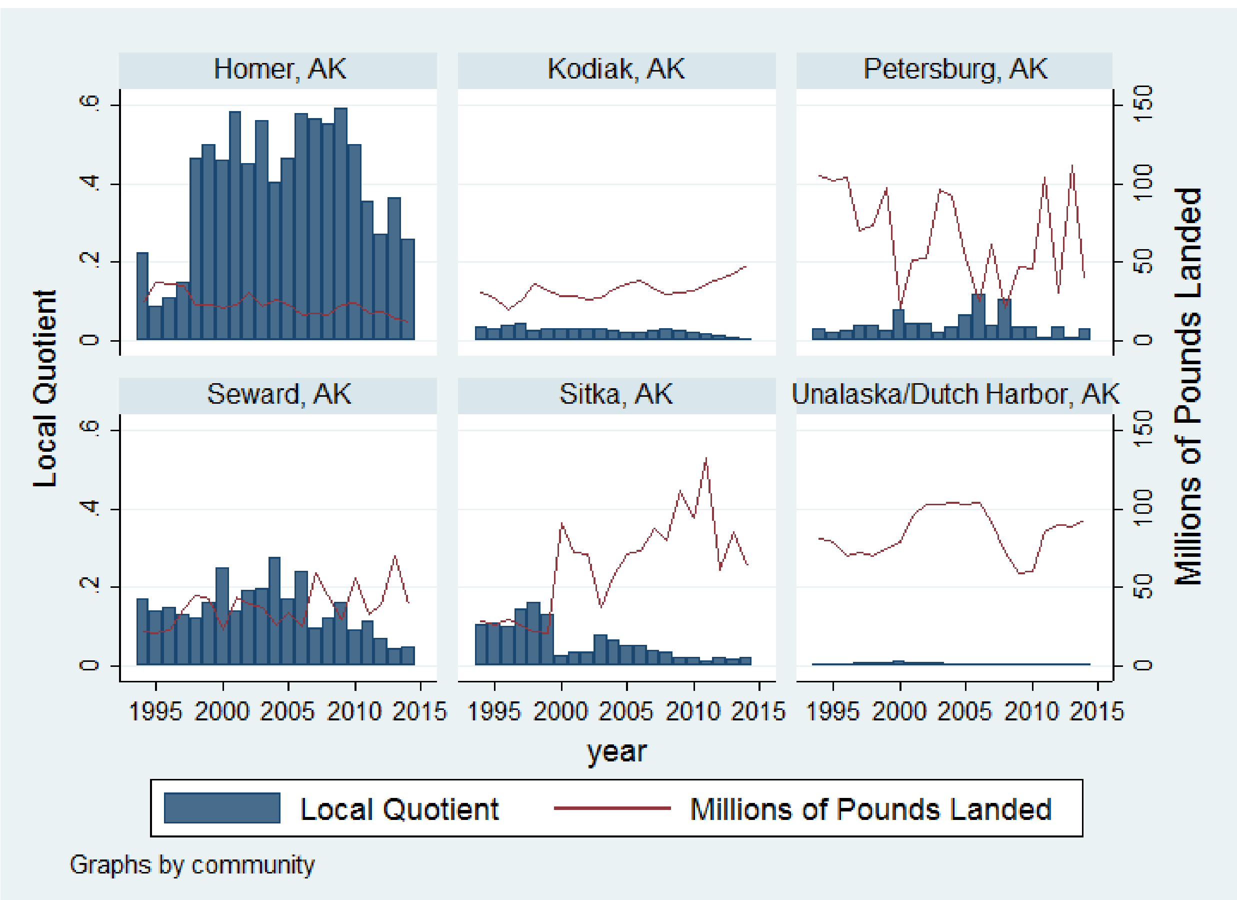

Figure 2.7A.8 Processing local quotient of pounds and total pounds landed for communities highly engaged in the Halibut IFQ Program for all years from the Baseline (1992-1994) through 2014. Note that for scaling reasons pounds are in tens of millions for Kodiak and Unalaska/Dutch Harbor.

Similarly, the percent of IFQ Program halibut revenue landed in Homer compared to other species landed in the community increased dramatically after the first few years of the program (Figure 2.7A.9). The differences between Figures 2.7A.8 and 2.7A.9 reflect differences in the relative price of halibut and other species landed in the community, and since halibut is a high value species, the value local quotient are generally higher than the pound local quotient. The percent of IFQ Program halibut processing local quotient of revenues increased in the first 10 years of the program for both Seward and Petersburg, but has decreased in recent years. The remaining communities in Figure 2.7A.9 showed a relatively smaller increase in the share of value of halibut landings over the first 10 years of the program followed by similar decline in relative share of revenue in more recent years.

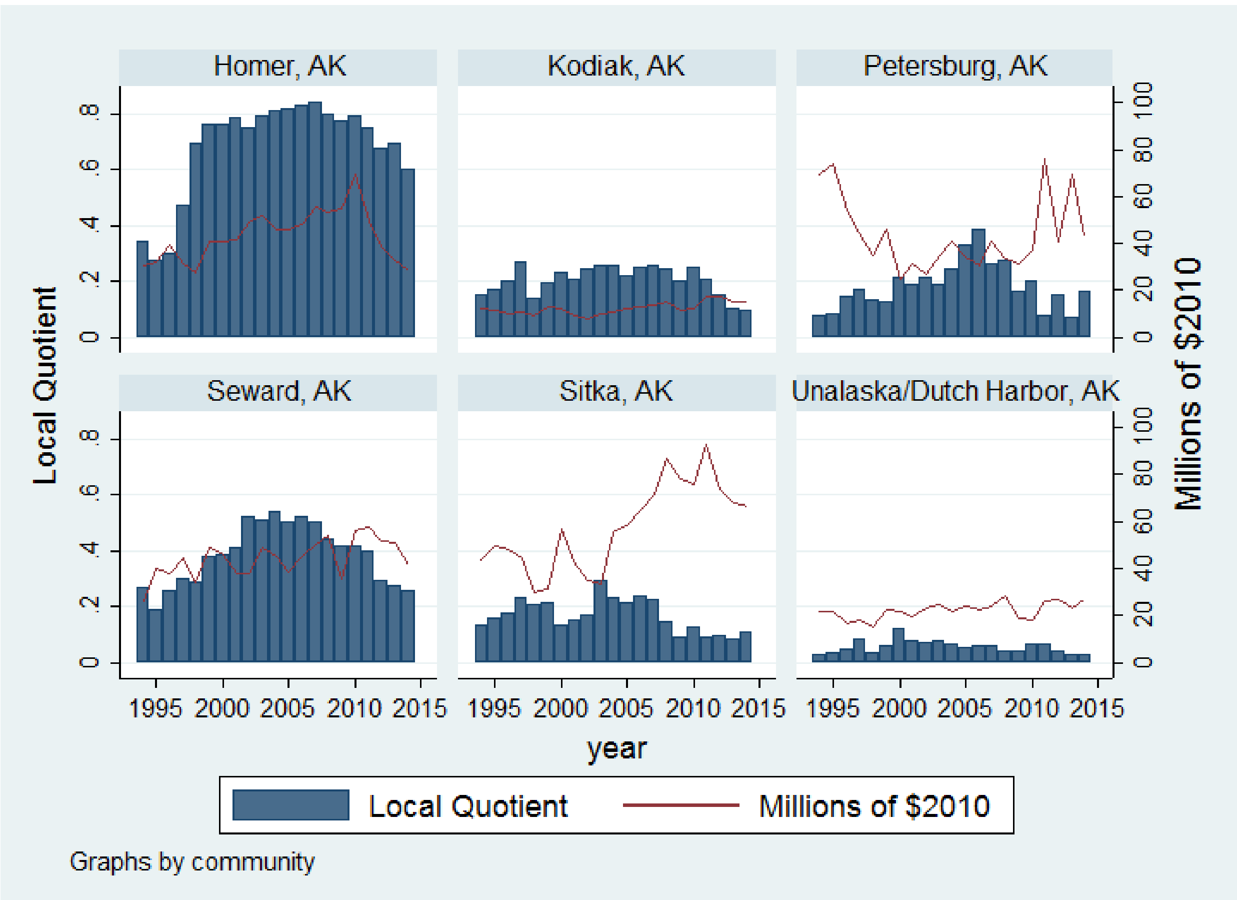

Figure 2.7A.9 Processing local quotient of revenue and total revenue for communities highly engaged in the Halibut IFQ Program for all years from the Baseline (1992-1994) through 2014. Note that for scaling reasons revenues are in tens of millions of $2010 for Kodiak and Unalaska/Dutch Harbor.

2.7A.3.5 Halibut commercial harvesting engagement

The results of the halibut commercial harvesting engagement PCFA analyses are shown in Table 2.7A.3 which presents the eigenvalues, factor loadings, total variance explained, and Armor's theta reliability coefficient (Armor, 1974) for all of the variables included in each PCFA. Similar to the processing engagement results, the results in Table 2.7A.3 suggest very strong relationships among variables and a single index best represents the trends in all four included variables. This is indicated by the large first eigenvalue and very small subsequent eigenvalues and the high percentage of variance explained from the single retained component (Kim and Mueller, 1978a and 1978b).

Table 2.7A.3 Halibut Commercial Harvesting Engagement PCFA Results.

Year	Eigenvalues				Factor Loadings				Percent variance explained	Armor's Theta
	1	2	3	4	Ex-vessel value from resident vessel owners	Pounds landed by resident vessel owners	Number of IFQ halibut vessel owners	Number of IFQ halibut vessels		
Baseline	3.78	0.22	0.00	0.00	0.9725	0.9724	0.9715	0.9735	94.57%	0.9809
1995	3.67	0.33	0.00	0.00	0.9562	0.9584	0.9571	0.9577	91.65%	0.9696
1996	3.71	0.29	0.00	0.00	0.9614	0.9636	0.9619	0.9632	92.65%	0.9735
1997	3.68	0.32	0.00	0.00	0.9601	0.9576	0.9583	0.9596	91.94%	0.9708
1998	3.70	0.30	0.00	0.00	0.9658	0.9584	0.9612	0.9634	92.58%	0.9733
1999	3.64	0.36	0.00	0.00	0.9530	0.9546	0.9522	0.9555	90.98%	0.9670
2000	3.63	0.37	0.00	0.00	0.9531	0.9520	0.9510	0.9541	90.73%	0.9660
2001	3.61	0.39	0.00	0.00	0.9510	0.9483	0.9481	0.9511	90.18%	0.9637
2002	3.60	0.40	0.00	0.00	0.9488	0.9490	0.9478	0.9499	90.03%	0.9631
2003	3.60	0.40	0.00	0.00	0.9480	0.9487	0.9479	0.9489	89.94%	0.9627
2004	3.67	0.33	0.00	0.00	0.9590	0.9572	0.9582	0.9579	91.79%	0.9702
2005	3.69	0.31	0.00	0.00	0.9611	0.9591	0.9603	0.9597	92.17%	0.9717
2006	3.70	0.30	0.00	0.00	0.9611	0.9614	0.9626	0.9599	92.40%	0.9726
2007	3.68	0.32	0.00	0.00	0.9601	0.9587	0.9604	0.9583	92.04%	0.9712
2008	3.63	0.37	0.00	0.00	0.9533	0.9531	0.9542	0.9522	90.85%	0.9664
2009	3.65	0.35	0.00	0.00	0.9565	0.9553	0.9568	0.9549	91.37%	0.9685
2010	3.63	0.37	0.00	0.00	0.9529	0.9526	0.9549	0.9502	90.75%	0.9660
2011	3.60	0.40	0.00	0.00	0.9492	0.9488	0.9503	0.9476	90.05%	0.9632
2012	3.62	0.38	0.00	0.00	0.9536	0.9491	0.9523	0.9503	90.50%	0.9650
2013	3.64	0.36	0.00	0.00	0.9561	0.9516	0.9551	0.9527	90.99%	0.9670
2014	3.70	0.30	0.00	0.00	0.9624	0.9613	0.9636	0.9600	92.52%	0.9730

Index scores derived from the PCFA results are presented in Table 2.7A.4 for the 12 communities that were highly engaged (index score above one, which is one standard deviation above the mean of zero) for at least one year from the Baseline to 2014, and these cells are shaded in Table 2.7A.4. The harvesting engagement index is an indicator of the importance of the Halibut IFQ Program based on the owners of vessels that reside in that community relative to other communities. It is less a measure of direct commercial fishing activity in the community, but rather where owners of vessels that participate in the fishery reside and to which some portion of the revenues from the fishery will flow. This index is created through a PCFA which includes IFQ Program halibut landings and revenues associated with vessels owned by community residents, the number of vessels with IFQ Program halibut landings owned by residents in the community, and the number of distinct vessel owners with IFQ Program landings in the community.

Table 2.7A.4 Communities highly engaged in Halibut IFQ Program commercial harvesting for one or more years from the Baseline (1992-1994) through 2014.

Community	Baseline	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
All Other USA	0.36	0.52	0.45	0.51	0.66	0.64	0.78	0.73	0.84	0.85	0.70	0.76	0.63	0.55	0.70	0.74	0.76	0.84	1.04	1.08	0.77
Anchorage, AK	1.54	0.99	0.96	0.78	0.60	0.71	0.67	0.78	0.95	0.67	0.46	0.57	0.50	0.37	0.47	0.51	0.50	0.78	0.71	0.71	0.77
Homer, AK	3.76	3.29	3.12	3.15	3.22	3.20	3.38	3.48	3.47	3.57	3.66	3.56	3.41	3.56	3.63	4.14	4.27	4.33	4.31	4.37	4.09
Juneau, AK	2.16	2.16	2.36	2.13	2.07	2.02	2.13	2.14	2.31	2.57	2.53	2.45	2.55	2.42	2.44	2.07	2.02	1.80	2.11	2.27	2.66
Ketchikan, AK	1.20	1.05	0.99	0.99	1.09	0.97	0.85	0.80	0.81	0.96	0.99	0.96	1.18	1.00	0.76	0.74	0.66	0.69	0.53	0.72	0.64
Kodiak, AK	6.09	6.05	6.00	6.30	5.99	6.31	6.24	5.79	5.77	5.70	5.62	5.47	5.68	6.05	5.91	5.89	5.80	6.00	5.78	5.42	4.99
Oregon	1.49	1.75	1.83	1.86	1.77	1.84	1.97	2.13	2.12	2.01	1.96	1.81	1.51	1.54	1.30	1.24	1.02	1.07	1.15	1.16	0.86
Other WA	2.89	2.62	2.65	2.93	2.94	3.24	2.99	3.36	3.16	3.29	3.05	3.16	2.88	2.98	2.83	2.81	2.69	2.55	2.33	2.15	2.32
Petersburg, AK	3.43	3.75	4.23	3.85	4.13	3.76	3.70	3.68	3.80	3.74	4.12	4.25	4.13	3.91	4.01	4.06	4.06	3.53	3.96	4.21	4.52
Seattle MSA	4.35	4.63	4.46	4.43	4.69	4.30	4.46	4.53	4.40	4.25	4.23	4.15	4.39	4.19	4.49	4.14	4.16	4.57	4.60	4.68	4.23
Sitka, AK	3.59	3.90	3.69	3.68	3.59	3.69	3.68	3.79	3.89	3.96	3.94	4.21	4.26	3.99	3.95	4.07	4.25	4.12	3.93	3.99	4.66
Wrangell, AK	0.95	1.13	1.06	1.06	1.08	1.21	1.06	0.96	0.97	0.93	0.89	0.84	0.87	1.00	0.74	0.84	0.84	0.76	0.88	0.90	1.12

Of the 12 communities found in Table 2.7A.4, the 7 communities that were highly engaged for all years from the Baseline through 2014 are shown in Figure 2.7A.10. In contrast to the commercial processing engagement index with two dominant communities, there are five communities with average index scores over three (those that average three standard deviations above the mean) including: Homer, Kodiak, Petersburg, the Seattle MSA, and Sitka. With the exception of the Seattle MSA, the other four communities were also highly engaged in the commercial processing engagement in all years. The two other highly engaged communities in commercial harvesting were Juneau and Other Washington, which were both highly engaged in all but one (20) and 13 years for the commercial processing engagement, respectively. Most communities in Figure 2.7A.10 have fairly stable commercial harvesting engagement over time, but Kodiak and Other Washington do have declining trends over time, and particularly in the most recent number of years.

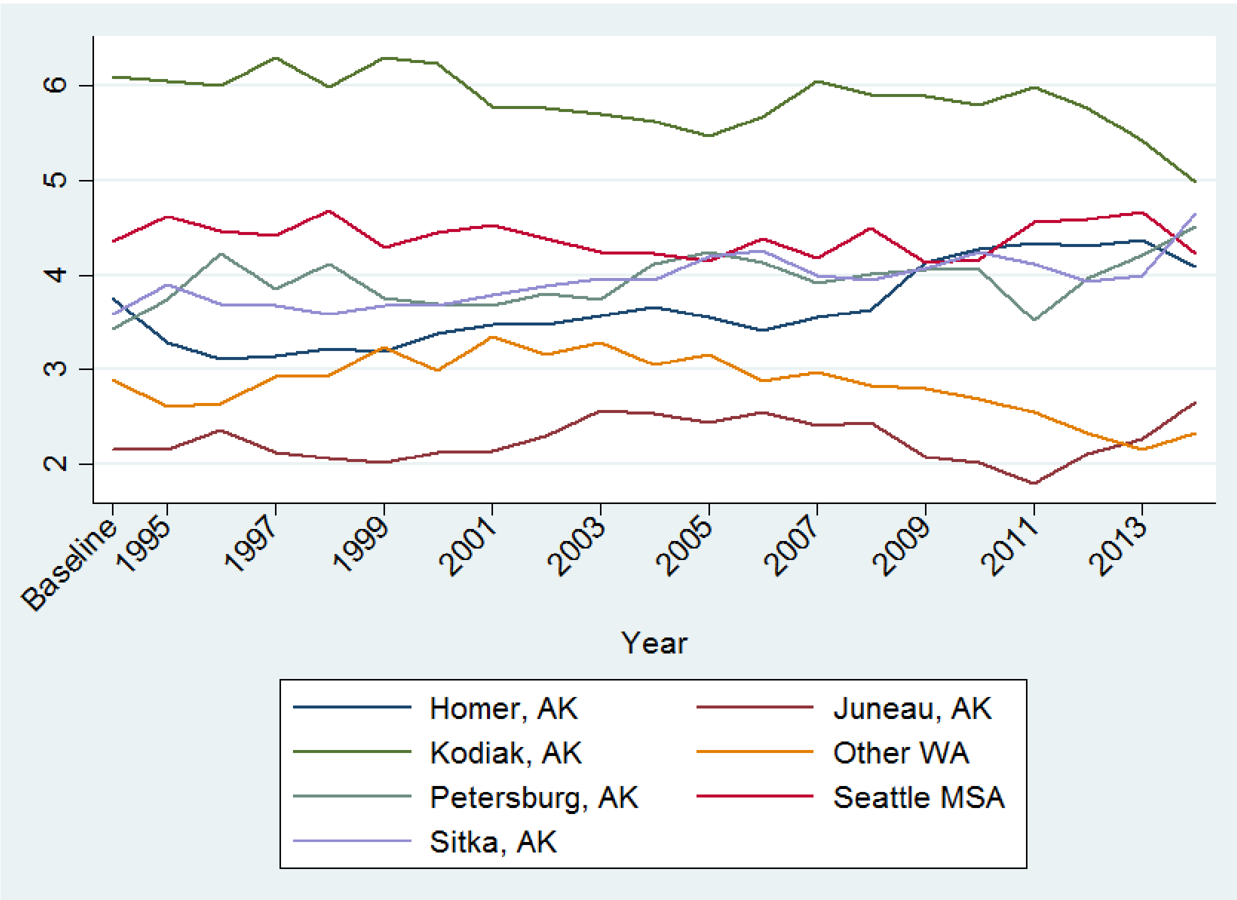

Figure 2.7A.10 Index scores of communities highly engaged in Halibut IFQ Program commercial harvesting for all years from the Baseline (1992-1994) through 2014.

Homer, Sitka, Juneau, and Petersburg demonstrated an overall increase in the halibut commercial harvesting engagement score between the Baseline and 2014 (Figure 2.7A.11). The harvesting engagement of Juneau and Petersburg has varied over time, but both have experienced a sharp increase in engagement in since 2011. Homer declined initially, but slowly began increasing the late 1990’s and then had a larger increase since 2008. Sitka has been on a generally upward trajectory over the course of the program and experienced a fairly large increase in harvesting engagement in 2014.

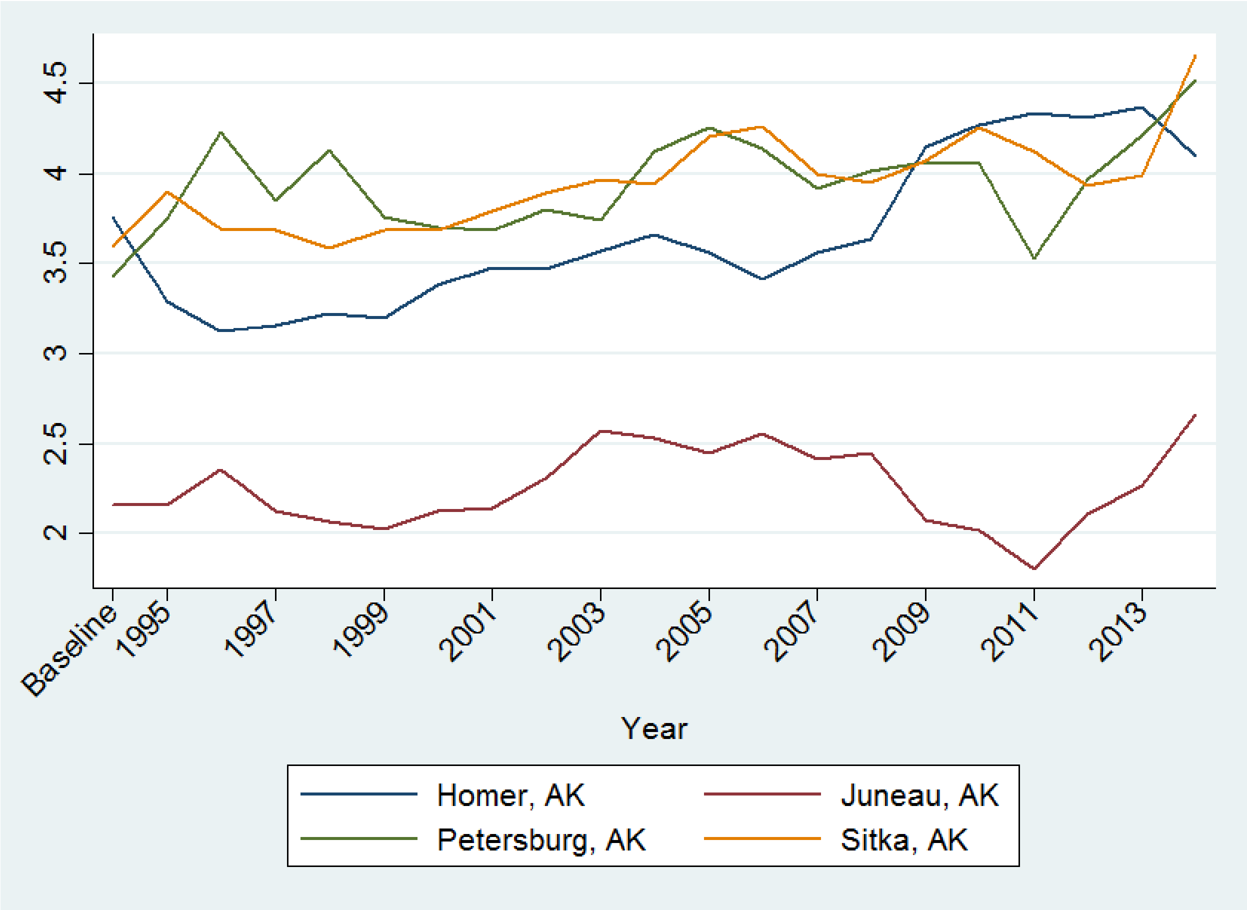

Figure 2.7A.11 Index scores of communities highly engaged in Halibut IFQ Program commercial harvesting for all years with increasing engagement between the Baseline (1992-1994) through 2014.

Highly engaged communities in commercial halibut IFQ harvesting for all years that demonstrated a decreasing commercial halibut engagement index score from the Baseline through 2014 are depicted in Figure 2.7A.12 and include Kodiak, the Seattle MSA, and Other Washington. The Seattle MSA showed a small decline in its commercial harvesting engagement index score between the Baseline and 2014. Kodiak experienced a more gradual decline in its harvesting engagement since program implementation and a more rapid decline since 2011. In contrast, Other Washington reached its highest level of engagement in 2001 and has experienced a decline in its harvesting engagement since then.

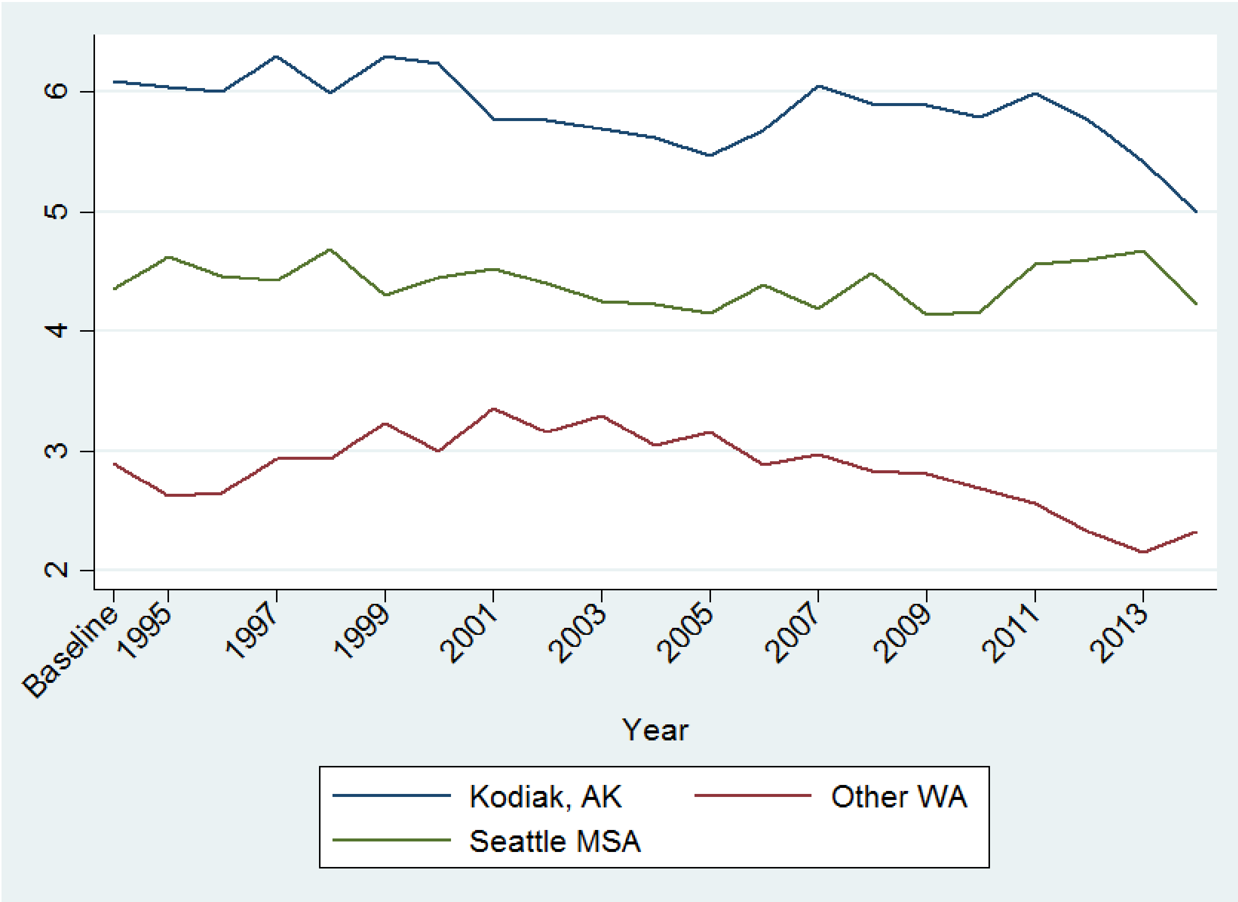

Figure 2.7A.12 Index scores of communities highly engaged in Halibut IFQ Program commercial harvesting for all years with decreasing engagement between the Baseline (1992-1994) through 2014.

Only the All Other US grouping was highly engaged in Halibut IFQ Program commercial harvesting for less than all years and experienced a 50% or greater increase in commercial harvesting engagement between the Baseline (1992-1994) and 2014 (Figure 2.7A.13). The All Other US grouping was only highly engaged for two years, but increased by 116% from the Baseline to 2014, even including the large decline in 2014.

Figure 2.7A.13 Index scores of communities highly engaged in Halibut IFQ Program commercial harvesting for less than all years with a 50% or greater increase in engagement between the Baseline (1992-1994) and 2014.

Only Anchorage was highly engaged in Halibut IFQ Program commercial harvesting for less than all years and experienced a 50% or greater decrease in commercial harvesting engagement between the Baseline (1992-1994) and 2014 (Figure 2.7A.14). Anchorage was only highly engaged during the Baseline and its engagement declined substantially in the years immediately after IFQ Program implementation. While not pictured in Figure 2.7A.14, Oregon (highly engaged in all years but 2014) and Ketchikan (highly engaged in 5 years, including the Baseline) experienced a 43% and 46% decline in their commercial halibut harvesting engagement index between the Baseline and 2014.

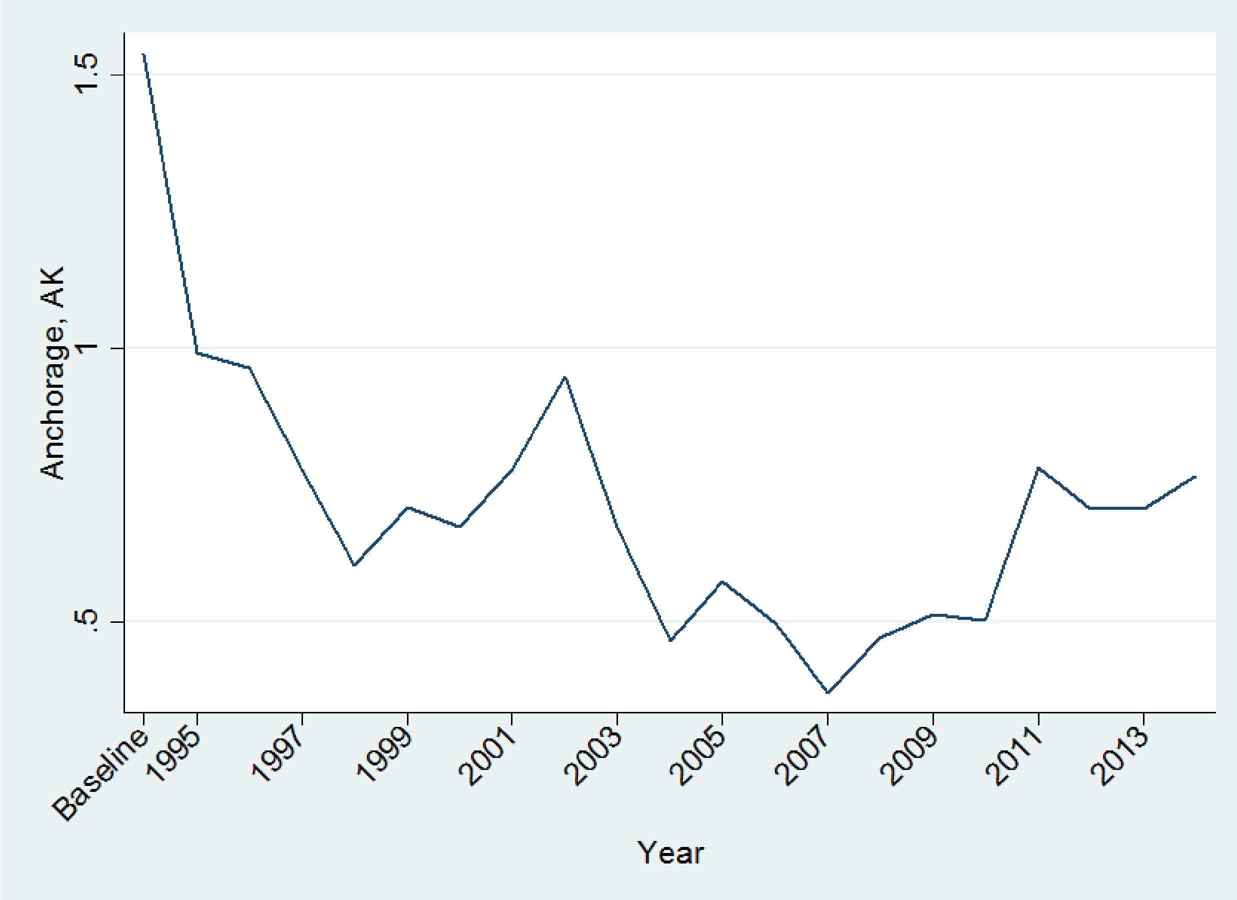

Figure 2.7A.14 Index scores of communities highly engaged in Halibut IFQ Program commercial harvesting for less than all years with a 50% or greater decrease in engagement between the Baseline (1992-1994) and 2014.

2.7A.3.6 Halibut harvesting regional quotient

Another measure of a community's involvement in the halibut IFQ Program fishery is its harvesting regional quotient, defined as share of IFQ Program halibut harvested by vessel owners residing within a community out of the total halibut IFQ Program. It is an indicator of the percentage contribution in pounds or revenue attributable to vessel owners in that community relative to the entire fishery. Figures 2.7A.15 and 2.7A.16 show the harvesting regional quotient both in pounds and revenue from the Baseline to 2014.

Kodiak and the Seattle MSA account for approximately 30% of the regional pounds by resident vessel owners during the Baseline. This has been fairly constant throughout the program as these two communities still account for 30% of the regional pounds by residents in 2014 (Figure 2.7A.15). The share of regional pounds by resident vessel owners among highly engaged communities in all years has increased slightly from 64% during the Baseline to 71% in 2014. Homer, Petersburg, Sitka, and Juneau experienced increases in their harvesting regional quotient of pounds from 9%, 3%, 6%, and 4% during the Baseline to 11%, 10%, 7%, and 6%, respectively. Other Washington experienced a slight decrease in its regional pounds by resident vessel owners from 8% during the Baseline to 7% in 2014.

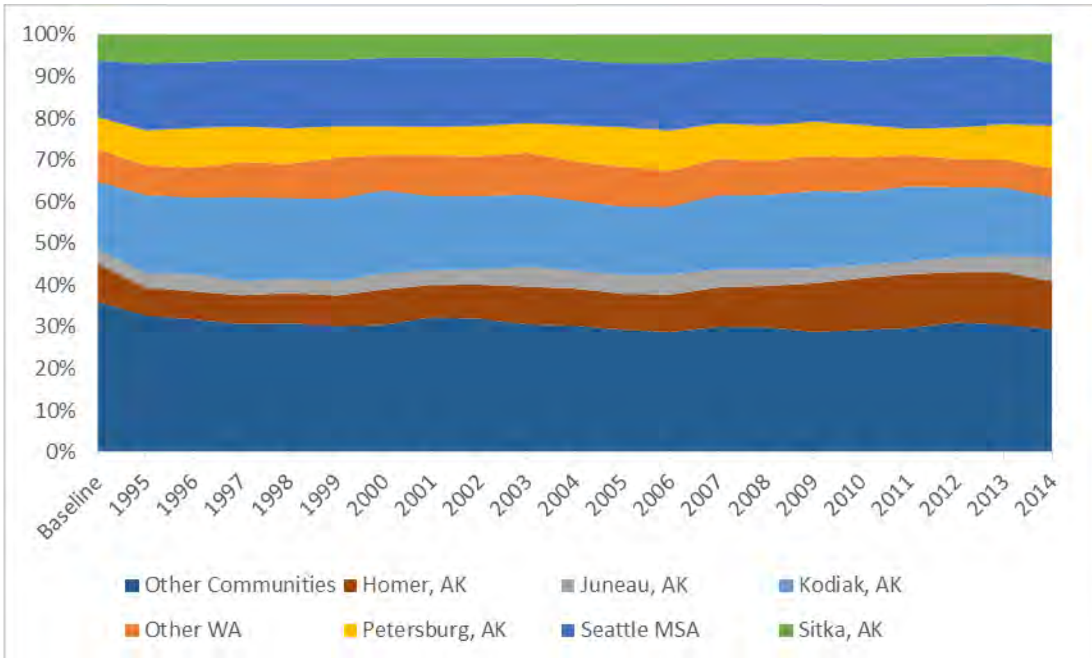

Figure 2.7A.15 Harvesting regional quotient of pounds for communities highly engaged in the Halibut IFQ Program for all years from the Baseline (1992-1994) through 2014.

Similar to the harvesting regional quotient of pounds, Kodiak and the Seattle MSA account for approximately 30% of the regional revenue by resident vessel owners during the Baseline and 2014. The Other Communities decreased from 36% of the regional revenue by vessel owner community in the Baseline years 29% in 2014. The other trends in the harvesting regional quotient of revenue were consistent with the harvesting regional quotient of pounds with increases for Homer, Juneau, Petersburg, and Sitka, and declines for Other Washington.

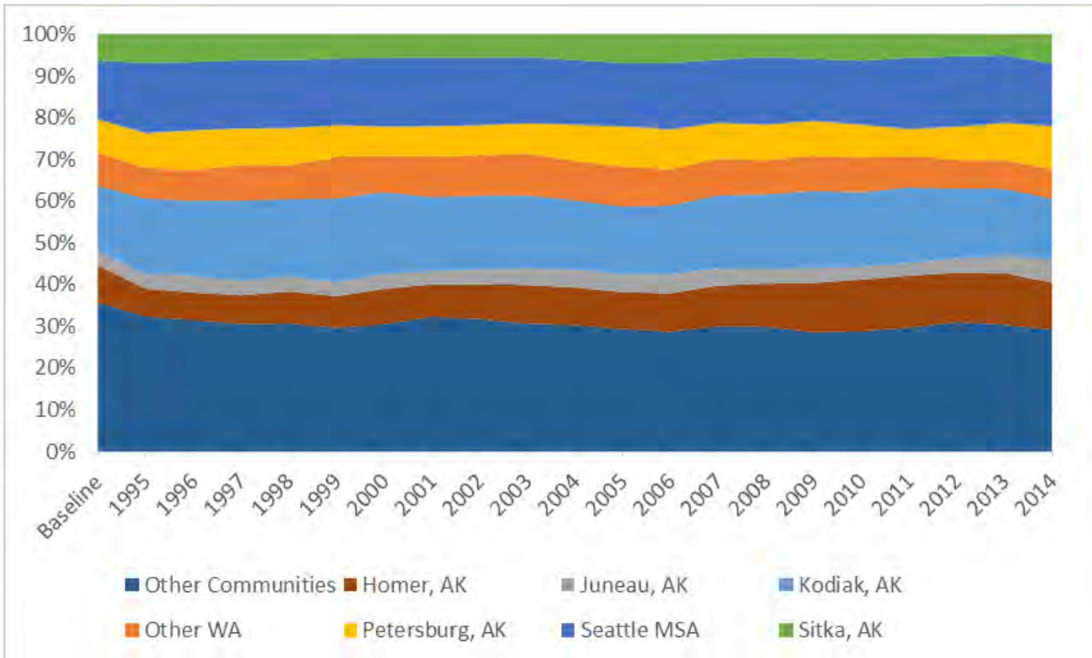

Figure 2.7A.16 Harvesting regional quotient of revenue for communities highly engaged in the Halibut IFQ Program for all years from the Baseline (1992-1994) through 2014.

2.7A.3.7 Halibut IFQ Program summary

Based on the community engagement index scores for both processing and harvesting engagement, communities were categorized into low (index scores below the mean of 0), medium (index scores between 0 and 1), and high engagement (index scores above 1) for each year. The number of years a community is in each category for the processing and harvesting engagement indices is presented in Table 2.7A.5. There are 46 communities in Table 2.7A.5 that had medium or high engagement in either harvesting or processing and 20 communities were highly engaged in one aspect of the halibut IFQ Program fishery in any year over the Baseline through 2014.

Table 2.7A.5 Number of years by processing and harvesting engagement level for the Halibut IFQ Program. Alaska communities not listed had low processing and harvesting engagement in all years.

	Processing Engagement			Harvesting Engagement		
Community	Low	Medium	High	Low	Medium	High
Adak, AK	8	13	0	21	0	0
Akhiok, AK	7	14	0	21	0	0
Akutan, AK	9	12	0	21	0	0
All Other US	21	0	0	0	19	2
Anchor Point, AK	21	0	0	5	16	0
Anchorage, AK	21	0	0	0	20	1
Angoon, AK	21	0	0	18	3	0
Atka, AK	20	1	0	21	0	0
Canada	16	5	0	21	0	0

Chignik, AK	18	3	0	21	0	0
Cordova, AK	0	5	16	0	21	0
Craig, AK	0	21	0	0	21	0
Excursion Inlet, AK	20	1	0	21	0	0
False Pass, AK	20	1	0	21	0	0
Haines, AK	1	20	0	0	21	0
Homer, AK	0	0	21	0	0	21
Hoonah, AK	0	12	9	4	17	0
Juneau, AK	0	1	20	0	0	21
Kake, AK	18	3	0	16	5	0
Kenai, AK	0	20	1	12	9	0
Ketchikan, AK	0	20	1	0	16	5
King Cove, AK	0	21	0	20	1	0
Kodiak, AK	0	0	21	0	0	21
Nikolaevsk, AK	21	0	0	20	1	0
Ninilchik, AK	20	1	0	21	0	0
Oregon	21	0	0	0	1	20
Other Alaska, AK	13	8	0	21	0	0
Other WA	1	7	13	0	0	21
Pelican, AK	10	11	0	15	6	0
Petersburg, AK	0	0	21	0	0	21
Port Alexander, AK	19	2	0	21	0	0
Saint Paul Island, AK	2	19	0	13	8	0
Sand Point, AK	0	11	10	0	21	0
Seattle MSA	13	6	2	0	0	21
Seldovia, AK	21	0	0	14	7	0
Seward, AK	0	0	21	0	21	0
Sitka, AK	0	0	21	0	0	21
Soldotna, AK	21	0	0	16	5	0
Sterling, AK	21	0	0	20	1	0
Unalaska/Dutch Harbor, AK	0	0	21	9	12	0
Valdez, AK	2	19	0	21	0	0
Wasilla, AK	21	0	0	15	6	0
Whale Pass, AK	17	4	0	21	0	0
Whittier, AK	0	18	3	21	0	0
Wrangell, AK	0	20	1	0	14	7
Yakutat, AK	0	15	6	5	16	0

2.7A.3.8 Sablefish IFQ Program fishery

This section will report performance metrics of community involvement in the Sablefish IFQ Program fishery from the Baseline period (average of 1992-1994) to 2014. Data were collected for 467 communities throughout the U.S., including 93 from Alaska, 162 from Washington, 62 from Oregon, 144 other communities in the U.S., and for 6 communities from Canada. These communities were aggregated into a smaller set of 86 communities used in the analysis which include all 80 communities in Alaska with some participation in the Sablefish IFQ Program fishery and then 6 regional groupings including the Seattle MSA, Other Washington, Oregon, All Other USA, Canada, and the At-Sea Sector. The At-Sea Sector comprises motherships and inshore floating processor vessels and is used in the processing engagement index because there is not a specific port of landing for these vessel revenues. Catcher/processor vessels revenues are attributed to their port of landing for the processing engagement index and vessel owner's address for the commercial harvesting engagement index. These aggregations were chosen to be the most relevant for the IFQ Program Review, but result in slightly different results than the forthcoming NMFS Technical Memorandum on community engagement in catch share fisheries (Colburn et al., *forthcoming*) which does not aggregate communities outside Alaska.

2.7A.3.9 Sablefish commercial processing engagement

The results of the sablefish commercial processing engagement PCFA analyses are shown in Table 2.7A.6 which presents the eigenvalues, factor loadings, total variance explained, and Armor's theta reliability coefficient (Armor, 1974) for all of the variables included in each PCFA. Similar to Tables 2.7A.1 and 2.7A.3, the results suggest very strong relationships among variables and that a single index best represents the trends in all four included variables as indicated by the large first eigenvalue and very small subsequent eigenvalues and the high percentage of variance explained (Kim and Mueller, 1978a and 1978b).

Table 2.7A.6 Sablefish commercial processing engagement PCFA results.

Year	Eigenvalues				Factor Loadings				Percent variance explained	Armor's Theta
	1	2	3	4	Ex-vessel value	Pounds landed in community	Number of vessels delivering	Number of processors		
Baseline	3.74	0.21	0.05	0.00	0.9838	0.9854	0.9790	0.9169	93.45%	0.9766
1995	3.49	0.46	0.05	0.00	0.9700	0.9725	0.9808	0.8011	87.26%	0.9513
1996	3.59	0.33	0.08	0.00	0.9739	0.9750	0.9706	0.8651	89.74%	0.9619
1997	3.63	0.28	0.09	0.00	0.9748	0.9749	0.9664	0.8919	90.75%	0.9660
1998	3.44	0.47	0.10	0.00	0.9498	0.9561	0.9587	0.8366	85.89%	0.9452
1999	3.49	0.38	0.13	0.00	0.9725	0.9690	0.9498	0.8401	87.32%	0.9516
2000	3.51	0.40	0.09	0.00	0.9657	0.9675	0.9650	0.8416	87.70%	0.9533
2001	3.67	0.26	0.07	0.00	0.9801	0.9800	0.9745	0.8951	91.80%	0.9702
2002	3.66	0.27	0.07	0.00	0.9814	0.9831	0.9700	0.8888	91.51%	0.9691
2003	3.67	0.25	0.08	0.00	0.9782	0.9813	0.9697	0.9022	91.85%	0.9704
2004	3.61	0.30	0.09	0.00	0.9813	0.9834	0.9579	0.8728	90.23%	0.9639
2005	3.69	0.26	0.05	0.00	0.9786	0.9776	0.9813	0.9016	92.23%	0.9719
2006	3.67	0.27	0.05	0.00	0.9788	0.9783	0.9805	0.8910	91.76%	0.9701
2007	3.69	0.25	0.05	0.01	0.9859	0.9746	0.9776	0.8988	92.13%	0.9715
2008	3.70	0.26	0.03	0.01	0.9824	0.9702	0.9881	0.9056	92.57%	0.9733
2009	3.78	0.16	0.04	0.01	0.9868	0.9788	0.9837	0.9406	94.60%	0.9810
2010	3.71	0.24	0.03	0.01	0.9800	0.9750	0.9876	0.9069	92.72%	0.9738
2011	3.63	0.32	0.04	0.01	0.9733	0.9645	0.9849	0.8818	90.63%	0.9655
2012	3.65	0.28	0.07	0.01	0.9776	0.9721	0.9759	0.8917	91.20%	0.9679
2013	3.67	0.27	0.05	0.01	0.9772	0.9681	0.9837	0.9021	91.84%	0.9704
2014	3.73	0.20	0.06	0.01	0.9839	0.9742	0.9780	0.9235	93.16%	0.9755

In addition to the goodness of fit statistics of the analyses provided in Table 2.7A.6, each of the PCFA provides an index score for each of the 86 communities. These index scores are presented in Table 2.7A.7 for the 13 communities that were highly engaged (index score above one, which is one standard deviation above the mean of zero) for at least one year from the Baseline to 2014, and these cells are shaded in Table 2.7A.7. The index is an indicator of the importance of the Sablefish IFQ Program in a community relative to its importance to other communities. It is a measure of the presence of commercial fishing through fishing activity including pounds landed, revenue, processors and the number of delivering vessels in the sablefish fishery.

Table 2.7A.7 Communities highly engaged in Sablefish IFQ Program commercial processing for one or more years from the Baseline (1992-1994) through 2014.

Community	Baseline	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
At Sea Sector	1.20	0.42	0.05	-0.01	-0.39	0.60	-0.37	-0.22	-0.39	-0.39	-0.36	-0.39	-0.37	-0.39	-0.39	-0.17	-0.40	-0.40	-0.38	-0.39	-0.36
Cordova, AK	0.85	1.08	0.91	0.90	0.80	0.78	0.84	1.25	1.17	1.22	1.09	1.89	1.08	1.08	0.96	1.17	1.11	1.05	0.81	0.97	0.68
Homer, AK	2.42	1.84	1.95	2.02	2.75	2.47	2.53	3.13	3.66	3.11	3.36	2.97	2.77	2.40	2.88	3.16	2.44	2.15	1.60	2.02	1.83
Hoonah, AK	0.29	0.74	1.11	1.53	1.80	0.96	1.06	1.12	0.78	0.57	0.90	0.58	0.26	0.36	0.54	0.49	0.33	0.46	0.52	0.20	0.15
Juneau, AK	0.33	0.25	0.56	0.78	1.43	1.38	1.66	1.83	1.61	1.26	1.36	1.69	1.16	1.02	1.46	1.53	1.58	1.46	1.32	1.49	1.15
Kodiak, AK	4.30	3.07	3.26	3.07	2.95	3.09	2.87	2.98	2.40	2.69	2.55	3.01	2.96	3.71	3.32	3.13	3.88	3.80	4.35	4.05	3.66
Pelican, AK	1.11	1.31	0.33	0.21	-0.39	-0.07	0.16	0.31	0.48	0.72	-0.36	-0.39	0.05	0.31	-0.21	-0.39	-0.40	-0.40	-0.38	-0.39	-0.36
Petersburg, AK	1.97	1.04	1.25	0.95	0.92	0.95	1.02	1.07	1.83	1.13	1.08	1.42	1.21	1.53	1.44	1.15	0.95	1.11	1.12	1.31	1.08
Sand Point, AK	-0.06	0.09	0.21	0.03	0.17	0.14	0.04	0.30	0.78	0.98	1.15	0.89	1.13	0.98	1.06	0.93	0.99	1.12	1.20	1.28	0.97
Seward, AK	5.51	6.25	5.98	6.02	5.53	5.93	5.73	5.25	5.15	5.26	5.65	4.53	4.98	4.70	4.26	4.46	4.25	4.50	4.93	5.03	5.63
Sitka, AK	2.90	3.63	4.02	3.74	3.93	3.97	4.17	3.78	3.58	4.22	4.00	4.69	4.82	4.58	4.94	4.94	4.90	4.75	4.24	4.18	4.30
Unalaska/Dutch Harbor, AK	1.17	1.90	1.78	2.33	1.83	1.55	1.85	2.01	2.56	2.56	2.12	1.84	2.06	2.01	1.43	1.35	1.16	1.24	1.40	1.12	0.82
Yakutat, AK	1.07	1.28	1.15	1.34	1.70	1.64	1.32	1.55	0.88	0.51	-0.01	1.38	1.36	1.61	1.91	1.53	1.83	2.08	2.05	2.03	2.06

Of the 13 communities found in Table 2.7A.7, the 4 communities that were highly engaged for all years from the Baseline through 2014 are shown in Figure 2.7A.17. Seward had the highest engagement scores for most years but was replaced by Sitka in some years in the late 2000's. Seward and Kodiak shared similar trends of declining engagement in the years after IFQ Program implementation followed by a more recent increase to near Baseline levels. In contrast, Homer and Sitka had the opposite trends of increasing in the years after IFQ Program Implementation but both have declined since the late 2000's. While not included in Figure 2.7A.17, Yakutat, Petersburg, and Juneau were highly engaged for all but 3, 4, and 4 years, respectively.

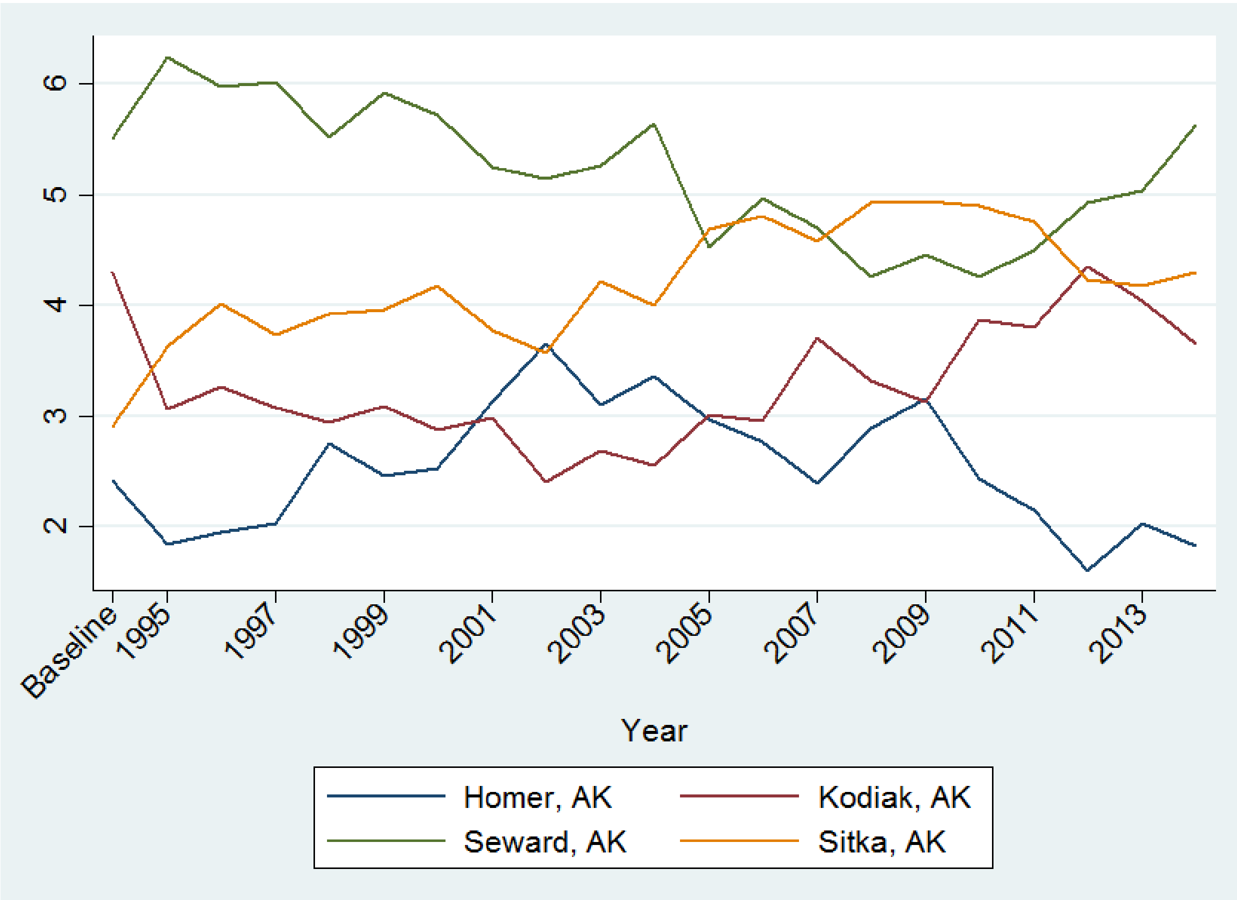

Figure 2.7A.17 Index scores of communities highly engaged in Sablefish IFQ Program commercial processing for all years from the Baseline (1992-1994) through 2014.

Seward, and Sitka demonstrated an overall increase in the sablefish commercial engagement score between the Baseline and 2014 (Figure 2.7A.18). Sitka showed a general increasing trend and its engagement increased by 48% between the Baseline and 2014. However, the index score for Seward generally declined from 1995 through 2010 but increased in recent years to be just 2% above its Baseline level.

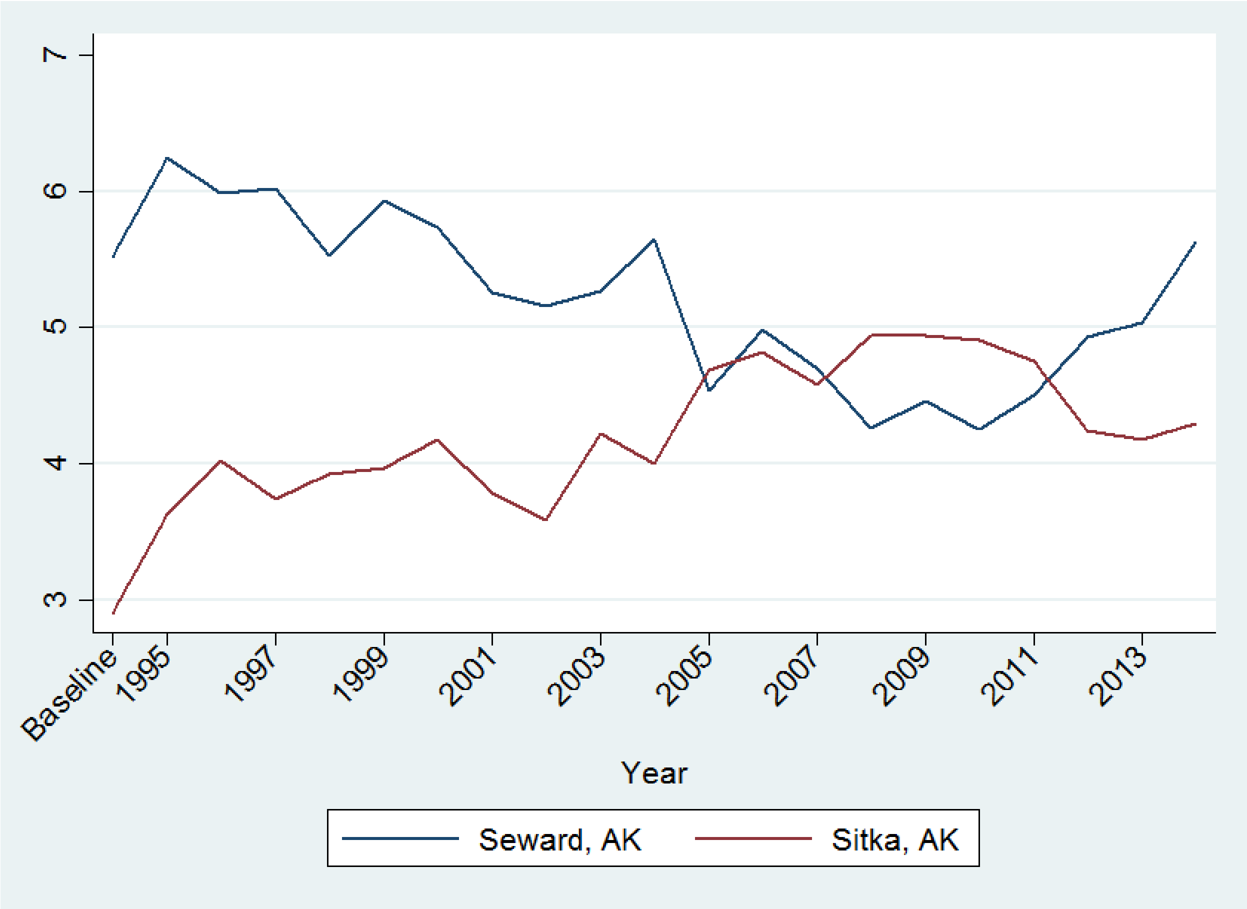

Figure 2.7A.18 Index scores of communities highly engaged in Sablefish IFQ Program commercial processing for all years with increasing engagement between the Baseline (1992-1994) through 2014.

Homer and Kodiak demonstrated a decreasing commercial sablefish engagement index score from the Baseline through 2014 (Figure 2.7A.19). Both communities experienced a decrease in engagement in the year following the implementation of the IFQ Program. Following the initial decline, Homer experienced several years of increasing engagement through 2002 at which point its engagement largely declined through 2014 to levels 24% below its Baseline level. While Kodiak had a declining trend overall, its engagement had been increasing since the early 2000’s through 2012 following a large decline in the years after IFQ Program implementation. Its engagement declined again in 2013 and 2014 to 15% below its Baseline engagement level.

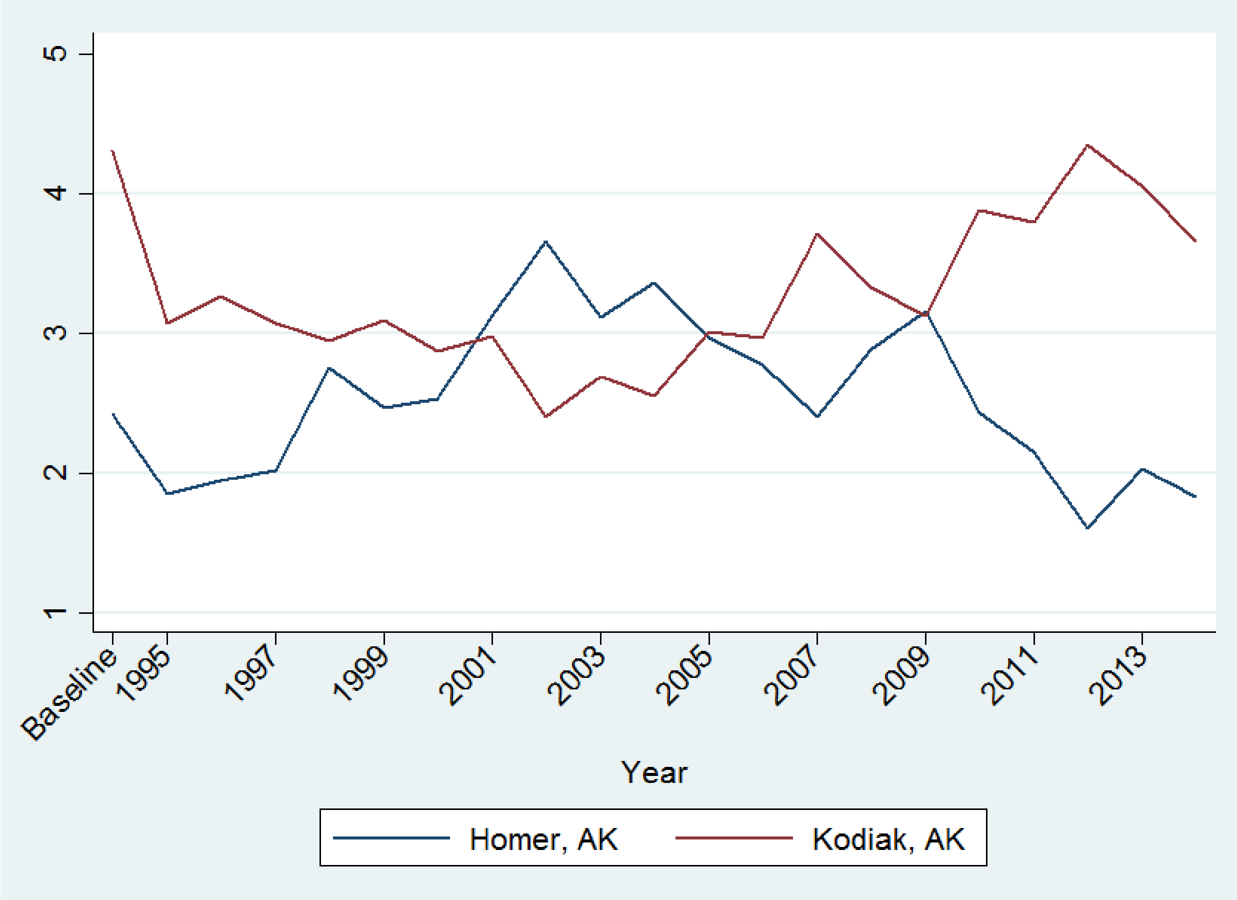

Figure 2.7A.19 Index scores of communities highly engaged in Sablefish IFQ Program commercial processing for all years with decreasing engagement between the Baseline (1992-1994) through 2014.

Three communities, Juneau, Sand Point, and Yakutat, that were highly engaged in Sablefish IFQ Program commercial processing for less than all years that experienced a 50% or greater increase in commercial processing engagement between the Baseline (1992-1994) and 2014 are depicted in Figure 2.7A.20. Sand Point and Juneau each started at very low levels of engagement but Juneau increased its engagement soon after IFQ Program implementation to become highly engaged in every year since 1998 while Sand Point did not start a meaningful increase until 2001 and has been highly engaged off and on for a total of 6 years. Yakutat experienced a generally increasing trend with the exception of a severe decline from 2002-2004, but has been highly engaged in all years outside that period.

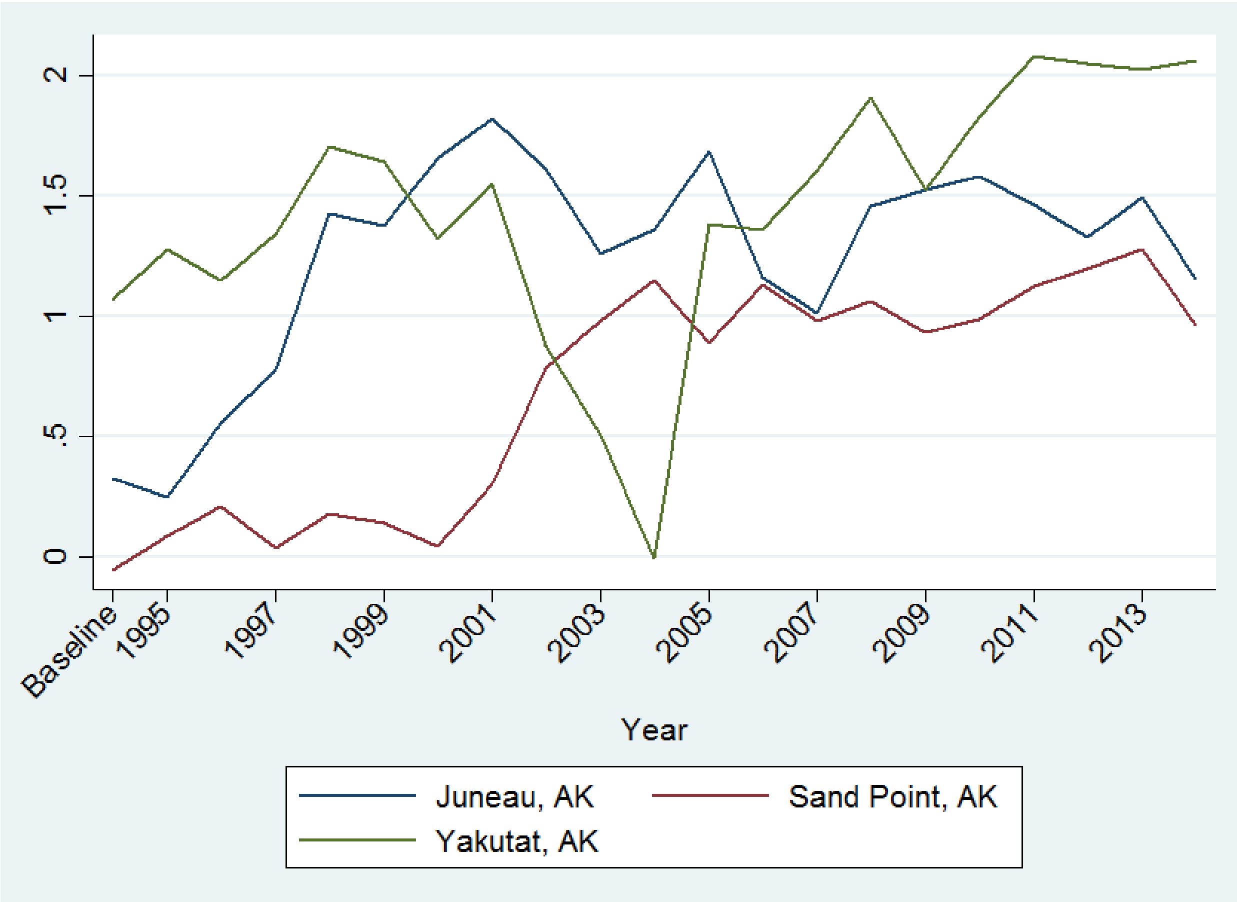

Figure 2.7A.20 Index scores of communities highly engaged in Sablefish IFQ Program commercial processing for less than all years with a 50% or greater increase in engagement between the Baseline (1992-1994) and 2014.

Only the At-Sea Sector and Pelican were highly engaged in Sablefish IFQ Program commercial processing for less than all years and experienced a 50% or greater decrease in commercial processing engagement between the Baseline (1992-1994) and 2014 (Figure 2.7A.21). The At-Sea Sector was only highly engaged during the Baseline and quickly declined following IFQ Program implementation. Pelican was highly engaged during the Baseline and in 1995 but saw a large decline in the following years to zero participation in 1998. It had pulses of activity in the late 1999-2003 as well as 2006-2008, but has had zero participation since 2009.

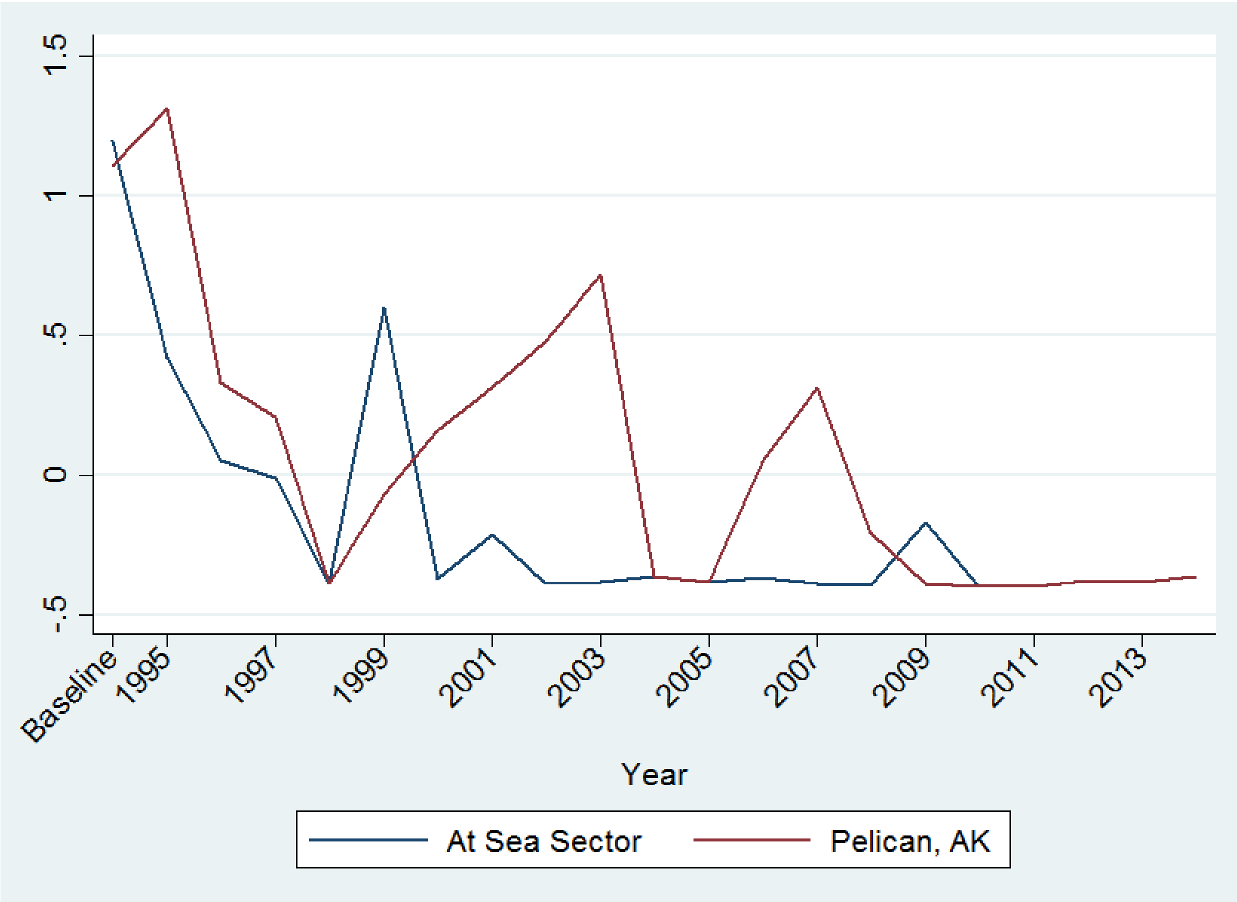

Figure 2.7A.21 Index scores of communities highly engaged in Sablefish IFQ Program commercial processing for less than all years with a 50% or greater decrease in engagement between the Baseline (1992-1994) and 2014.

2.7A.3.10 Sablefish processing regional quotient

The processing regional quotient is another measure of a community's involvement in the Sablefish IFQ Program and is defined as share of IFQ Program sablefish landed within a community out of the total sablefish IFQ Program landings. It is an indicator of the percentage contribution in pounds or revenue landed in that community relative to the entire fishery. Figures 2.7A.22 and 2.7A.23 show the processing regional quotient both in pounds and revenue from the Baseline to 2014.

Kodiak, Seward, and Sitka each had a 10% or greater share of the IFQ Program sablefish processing and accounted for 43% of the total regional pounds landed during the Baseline (Figure 2.7A.22). Kodiak's share declined slightly from 14% during the Baseline to 13% in 2014, while Seward and Sitka both experienced increases from 18% and 10% during the Baseline to 25% and 22% in 2014, respectively. Homer, the other highly engaged community, saw a decline in its processing regional quotient from 6% during the Baseline to 3% in 2014. Taken together, these communities accounted for 48% of the regional pounds landed during the Baseline but increased to 62% in 2014.

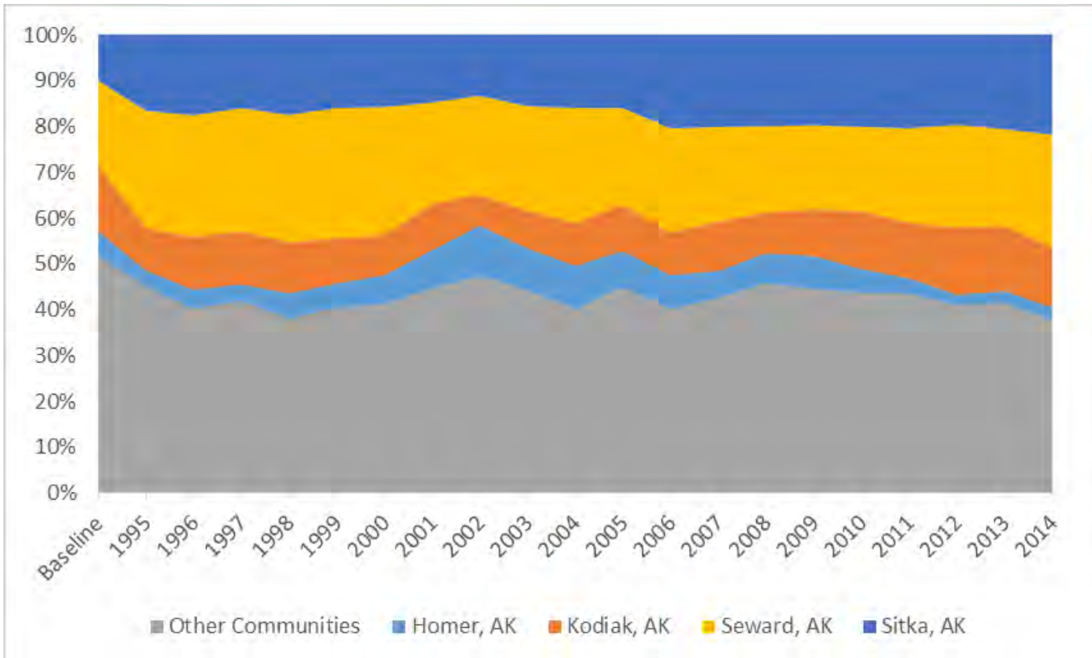

Figure 2.7A.22 Processing regional quotient of pounds for communities highly engaged in the Sablefish IFQ Program for all years from the Baseline (1992-1994) through 2014.

Similar to the processing regional quotient of pounds, Kodiak, Seward, and Sitka each represented greater than 10% of regional processing revenue for commercial sablefish IFQ and combined represented 42% of the regional processing revenue in the Baseline years. Each saw an increase in their processing regional quotient for revenue to a combined 57% share of the processing regional quotient in 2014. Homer's processing regional quotient declined from 5% during the Baseline to 3% in 2014. The Other Communities' share declined from 52% during the Baseline to 40% in 2014.

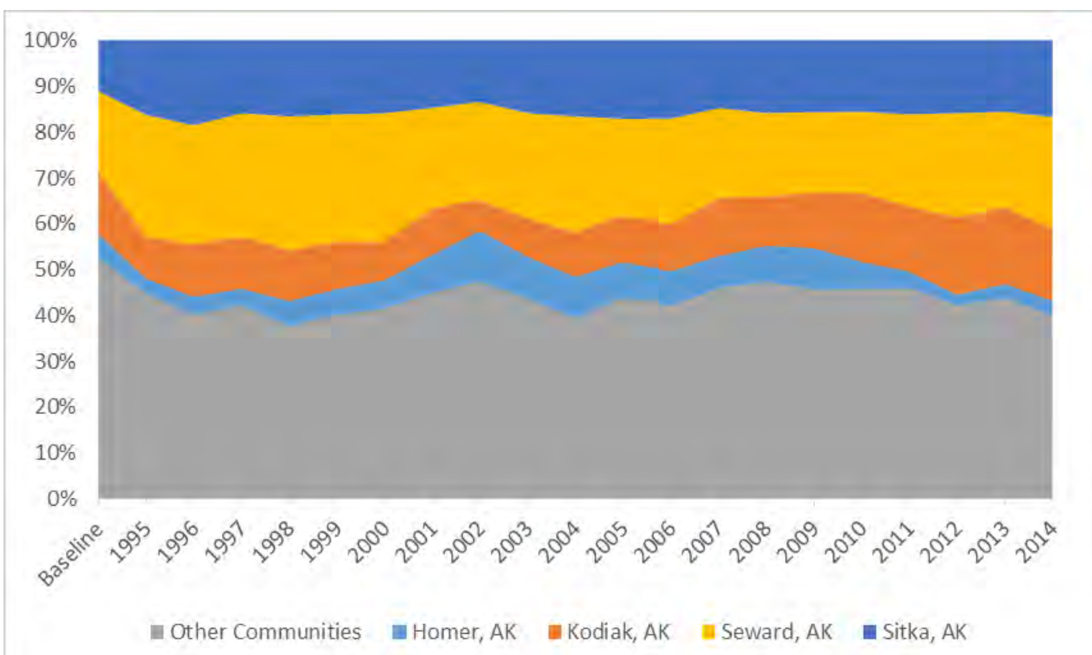

Figure 2.7A.23 Processing regional quotient of revenue for communities highly engaged in the Sablefish IFQ Program for all years from the Baseline (1992-1994) through 2014.

2.7A.3.11 Sablefish community processing local quotient

The processing local quotient represents the percentage of IFQ Program sablefish landed within a community out of the total amount of all species landed within that community. It is an indicator of the contribution in value or pounds of a species to the overall landings in a community. In addition to the processing local quotient from the Baseline to 2014, Figures 2.7A.24 and 2.7A.25 show the total pounds and value for each community to show how the community totals vary with changes in the share of IFQ Program sablefish pounds and revenues.

The processing local quotient of sablefish pounds is fairly low for even the highly engaged communities during the Baseline with only Seward having 10% or more of its landed pounds from IFQ Program sablefish. However, the share of pounds from sablefish in Seward declined quite a bit over time from 22%, 29%, and 22% during the Baseline, 1995, and 1996, to 10% in 2014. Sitka experienced a similar decline over time from 9% during the Baseline to 6% in 2014. The processing local quotient for Kodiak was 1.2% during the Baseline but has only been above 1% in 1996 and reached a low of 0.4% in 2014. Homer experienced a decline in the sablefish processing local quotient in the years following IFQ Program implementation even as total pounds increased and is now at a lower level than during the Baseline period. Similar to the halibut processing local quotient for Seward and Sitka, the share of sablefish increases in years with fairly large declines in total landings which suggests IFQ Program sablefish are not driving large changes in the total pounds landed in these communities but could serve as important fishery in years with poor landings in other fisheries.

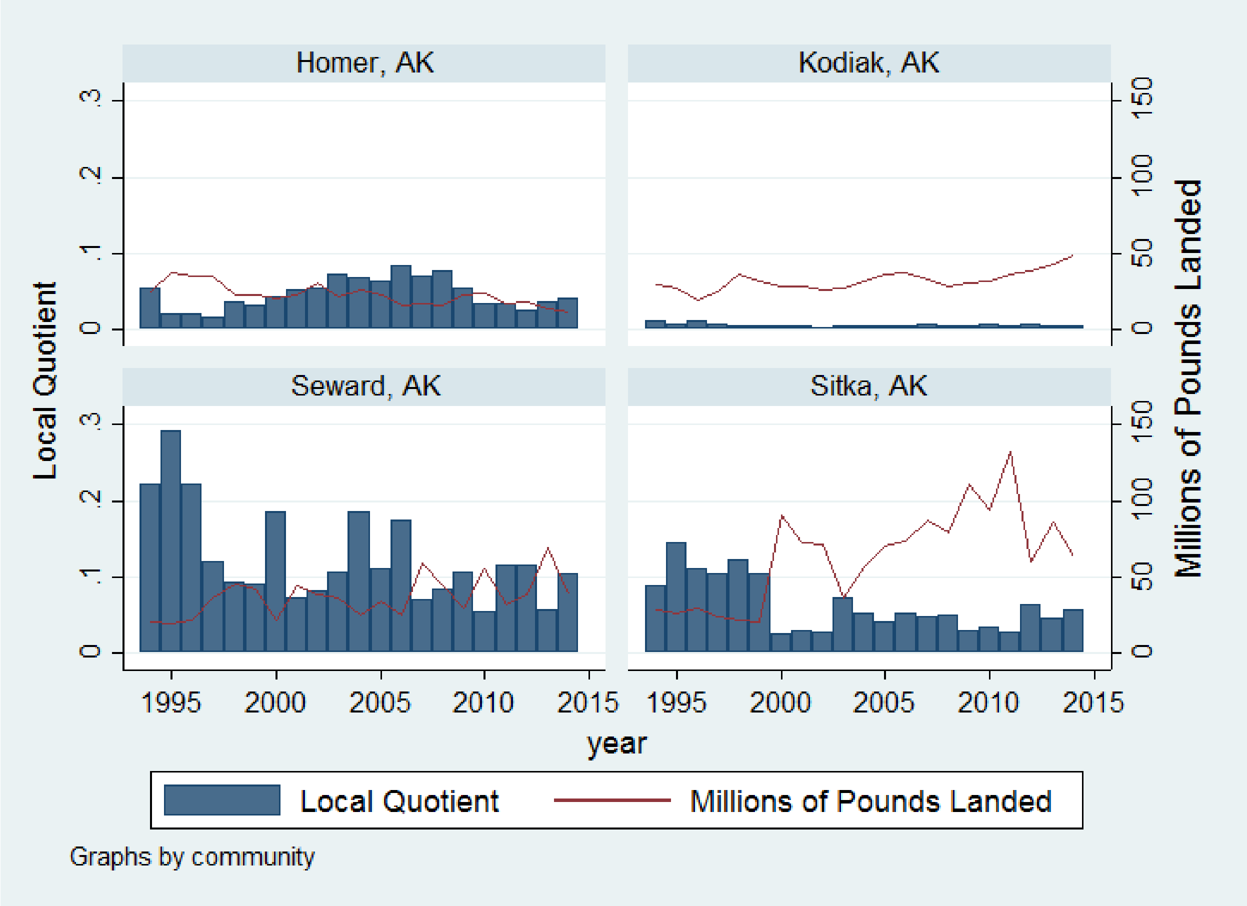

Figure 2.7A.24 Processing local quotient of pounds and total pounds landed for communities highly engaged in the Sablefish IFQ Program for all years from the Baseline (1992-1994) through 2014. Note that for scaling reasons pounds are in tens of millions for Kodiak.

As sablefish is a high value species, the processing local quotient is higher as a percentage of local revenues (Figure 2.7A.25) than local pounds landed (Figure 2.7A.24). Similar to the processing local quotient of pounds, the processing local quotient for revenue in both Seward and Sitka show declines over time from 48% and 18% during the Baseline to 38% and 16% in 2014, respectively. Homer and Kodiak also experienced declines over time from 12% and 8% during the Baseline to 8% and 7% in 2014, respectively.

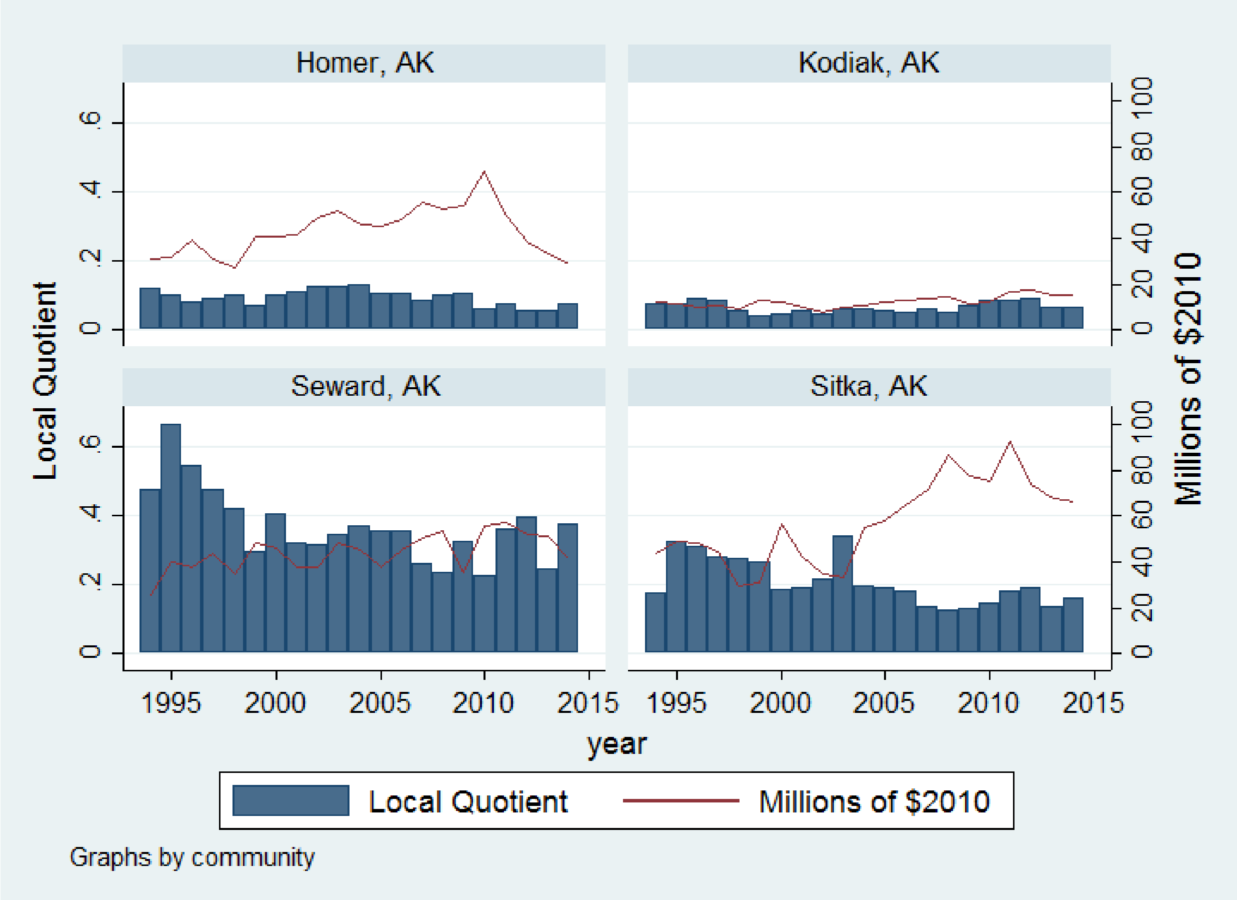

Figure 2.7A.25 Processing local quotient of revenue and total revenue for communities highly engaged in the Sablefish IFQ Program for all years from the Baseline (1992-1994) through 2014. Note that for scaling reasons revenues are in tens of millions of $2010 for Kodiak and Unalaska/Dutch Harbor.

2.7A.3.12 Sablefish commercial harvesting engagement

The results of the sablefish commercial harvesting engagement PCFA analyses are shown in Table 2.7A.8 which presents the eigenvalues, factor loadings, total variance explained, and Armor's theta reliability coefficient (Armor, 1974) for all of the variables included in each PCFA. The results in Table 2.7A.8 suggest very strong relationships among variables and a single index best represents the trends in all four included variables as indicated by the large first eigenvalue and very small subsequent eigenvalues and the high percentage of variance explained from the single retained component (Kim and Mueller, 1978a and 1978b).

Table 2.7A.8 Sablefish Commercial Harvesting Engagement PCFA Results.

	Eigenvalues				Factor Loadings					
Year	1	2	3	4	Ex-vessel value from resident vessel owners	Pounds landed by resident vessel owners	Number of IFQ sablefish vessel owners	Number of IFQ sablefish vessels	Percent variance explained	Armor's Theta
Baseline	3.76	0.24	0.00	0.00	0.9677	0.9706	0.9716	0.9664	93.91%	0.9784
1995	3.62	0.38	0.00	0.00	0.9506	0.9527	0.9528	0.9503	90.55%	0.9652
1996	3.73	0.27	0.00	0.00	0.9675	0.9646	0.9675	0.9642	93.31%	0.9761
1997	3.70	0.30	0.00	0.00	0.9618	0.9618	0.9627	0.9607	92.50%	0.9730
1998	3.75	0.24	0.00	0.00	0.9680	0.9699	0.9704	0.9669	93.85%	0.9782
1999	3.78	0.22	0.00	0.00	0.9732	0.9716	0.9738	0.9708	94.55%	0.9808
2000	3.77	0.23	0.00	0.00	0.9719	0.9707	0.9724	0.9698	94.32%	0.9799
2001	3.71	0.29	0.00	0.00	0.9643	0.9629	0.9648	0.9619	92.83%	0.9743
2002	3.71	0.29	0.00	0.00	0.9637	0.9635	0.9627	0.9645	92.85%	0.9743
2003	3.77	0.23	0.00	0.00	0.9703	0.9707	0.9721	0.9686	94.17%	0.9794
2004	3.73	0.27	0.00	0.00	0.9676	0.9641	0.9670	0.9647	93.29%	0.9760
2005	3.71	0.29	0.00	0.00	0.9660	0.9595	0.9641	0.9617	92.71%	0.9738
2006	3.70	0.30	0.00	0.00	0.9560	0.9659	0.9618	0.9609	92.38%	0.9725
2007	3.71	0.28	0.01	0.00	0.9509	0.9727	0.9648	0.9636	92.74%	0.9739
2008	3.75	0.24	0.01	0.00	0.9589	0.9757	0.9697	0.9691	93.78%	0.9779
2009	3.76	0.23	0.01	0.00	0.9602	0.9771	0.9714	0.9709	94.08%	0.9790
2010	3.77	0.22	0.01	0.00	0.9610	0.9785	0.9727	0.9725	94.32%	0.9799
2011	3.74	0.25	0.01	0.00	0.9568	0.9735	0.9685	0.9675	93.43%	0.9766
2012	3.72	0.27	0.01	0.00	0.9548	0.9725	0.9665	0.9658	93.10%	0.9753
2013	3.77	0.22	0.01	0.00	0.9592	0.9782	0.9729	0.9711	94.16%	0.9793
2014	3.78	0.21	0.01	0.00	0.9608	0.9799	0.9748	0.9722	94.47%	0.9805

Index scores derived from the PCFA results are presented in Table 2.7A.9 for the 8 communities that were highly engaged (index score above one, which is one standard deviation above the mean of zero) for at least one year from the Baseline to 2014, and these cells are shaded in Table 2.7A.9. The harvesting engagement index is an indicator of the importance of the Sablefish IFQ Program based on the owners of vessels that reside in that community relative to other communities. It is a measure where ownership of vessels that participate in the fishery reside and where some portion of the revenues from the fishery will flow. This index is created through a PCFA which includes IFQ Program sablefish landings and revenues associated with vessels owned by community residents, the number of vessels with IFQ Program sablefish landings owned by residents in the community, and the number of distinct vessel owners with IFQ Program landings in the community. With the exception of Oregon, which is only highly engaged for the Baseline, all other communities are highly engaged for all years.

Table 2.7A.9 Communities highly engaged in Sablefish IFQ Program commercial harvesting for one or more years from the Baseline (1992-1994) through 2014.

Community	Baseline	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Homer, AK	2.78	1.98	1.52	1.65	1.46	1.25	1.43	1.49	1.45	1.31	1.43	1.34	1.34	1.48	1.45	1.76	1.81	2.14	2.21	2.47	2.54
Juneau, AK	1.81	1.63	1.67	1.70	1.44	1.36	1.44	1.66	1.61	1.74	1.34	1.31	1.14	1.13	1.20	1.24	1.30	1.19	1.42	1.40	1.43
Kodiak, AK	2.87	2.16	2.60	2.66	2.64	2.36	1.89	1.78	1.73	1.64	1.54	1.79	1.96	2.28	1.95	2.11	2.31	2.37	2.19	1.97	1.89
Oregon	1.14	0.69	0.67	0.79	0.71	0.69	0.69	0.84	0.79	0.85	0.93	0.94	0.75	0.63	0.71	0.66	0.61	0.58	0.67	0.64	0.57
Other WA	2.50	2.47	2.76	2.86	2.80	3.32	3.21	3.01	2.69	2.86	2.73	3.05	2.85	2.78	2.68	2.71	2.56	2.60	2.45	2.20	2.28
Petersburg, AK	2.99	2.35	2.86	2.50	2.59	2.58	2.74	2.66	2.62	2.54	2.61	2.60	2.60	2.86	3.07	3.07	3.00	2.89	2.87	2.83	2.92
Seattle MSA	4.85	5.95	5.71	5.69	5.75	5.40	5.38	5.49	5.73	5.84	5.85	5.68	5.75	5.50	5.51	5.27	5.22	5.25	5.39	5.51	5.34
Sitka, AK	3.81	4.03	3.91	4.00	4.12	4.51	4.71	4.68	4.67	4.52	4.69	4.67	4.70	4.67	4.73	4.77	4.86	4.67	4.54	4.59	4.73

Of the 8 communities found in Table 2.7A.9, the 7 communities that were highly engaged for all years from the Baseline through 2014 are shown in Figure 2.7A.26 including Homer, Juneau, Kodiak, Petersburg, Other Washington, and the Seattle MSA. The two most prominent communities are the Seattle MSA and Sitka, which have quite a bit higher degrees of engagement than all other communities.

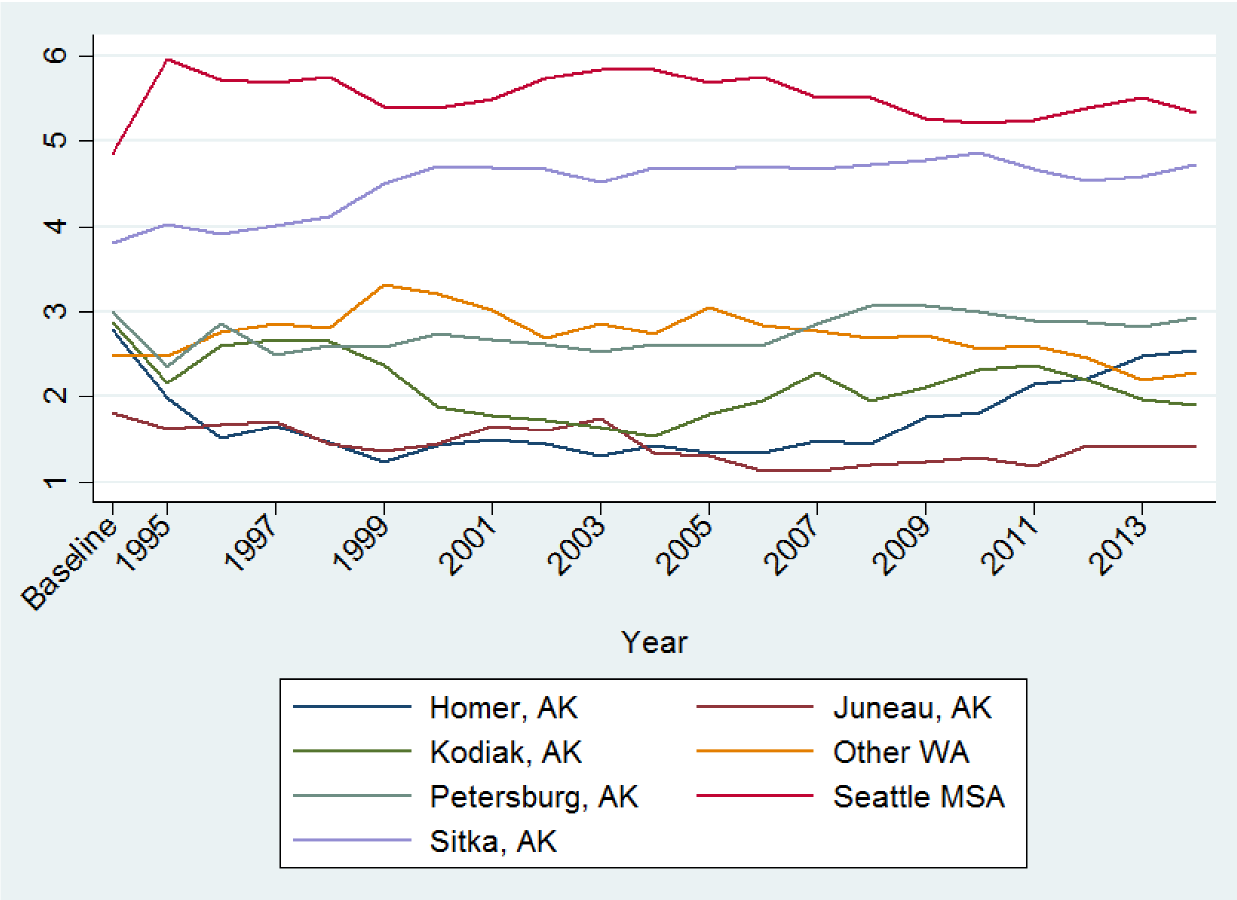

Figure 2.7A.26 Index scores of communities highly engaged in Sablefish IFQ Program commercial harvesting for all years from the Baseline (1992-1994) through 2014.

The Seattle MSA and Sitka were the only two highly engaged communities to increase in engagement from the Baseline to 2014, by 10% and 24%, respectively (Figure 2.7A.27). The Seattle MSA engagement increased substantially in the year after program implementation, but has experienced a gradual decline from a high level in 1995 to a level still above its Baseline in 2014. In contrast, Sitka experienced a smaller increase in 1995, but has been generally increasing over time.

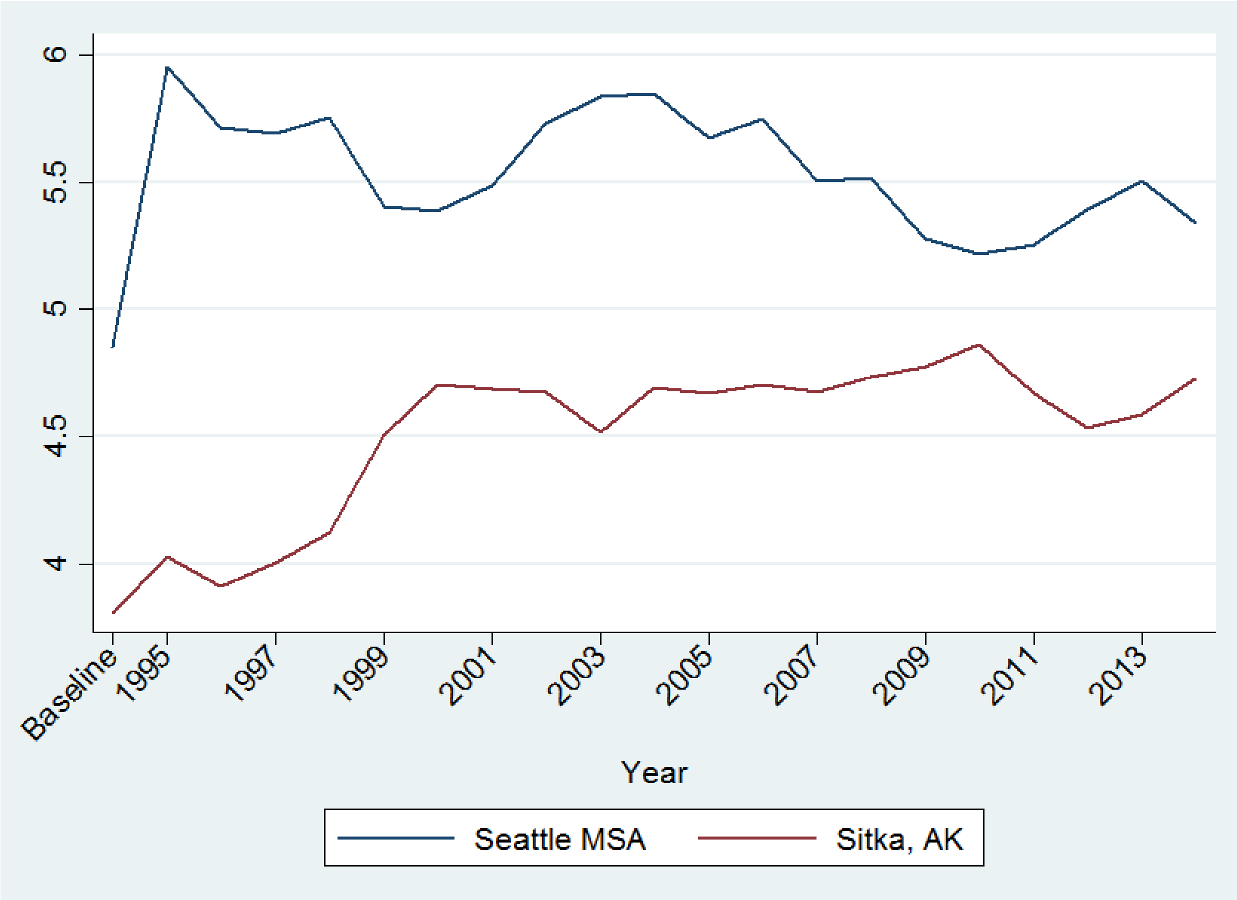

Figure 2.7A.27 Index scores of communities highly engaged in Sablefish IFQ Program commercial harvesting for all years with increasing engagement between the Baseline (1992-1994) through 2014.

Kodiak, Juneau, Homer, Petersburg, and Other Washington all experienced decreases from the Baseline to 2014 by varying degrees. Kodiak and Juneau experienced the largest decreases in engagement, by 34% and 21% from the Baseline and 2014, respectively. Homer and Other Washington both experienced declines of 9% while Petersburg only declined by 2% over the same period. Homer, Kodiak, and Petersburg all experienced declines in 1995 and while Kodiak and Petersburg had an initial bounce back in 1996, Homer had a lower level of engagement until after 2008 and has been increasing in engagement through 2014 but still remains below its Baseline level.

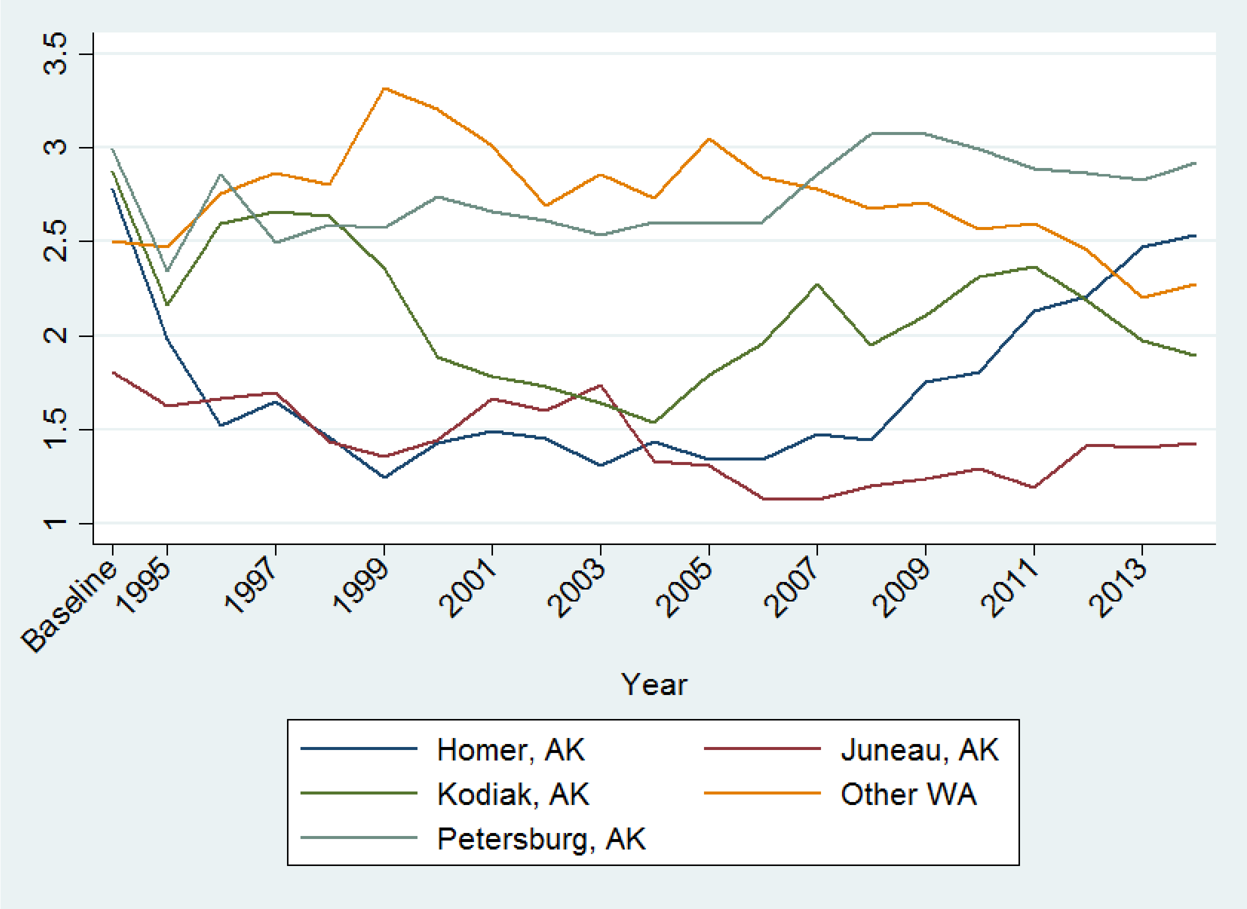

Figure 2.7A.28 Index scores of communities highly engaged in Sablefish IFQ Program commercial harvesting for all years with decreasing engagement between the Baseline (1992-1994) through 2014.

No communities that were highly engaged in Sablefish IFQ Program commercial harvesting for less than all years experienced a 50% or greater increase in commercial harvesting engagement between the Baseline (1992-1994) and 2014.

Only Oregon was highly engaged in Sablefish IFQ Program commercial harvesting for any years and experienced a 50% or greater decrease in commercial harvesting engagement between the Baseline (1992-1994) and 2014 (Figure 2.7A.29). Oregon was only highly engaged during the Baseline and its engagement declined substantially in the years immediately after IFQ Program implementation.

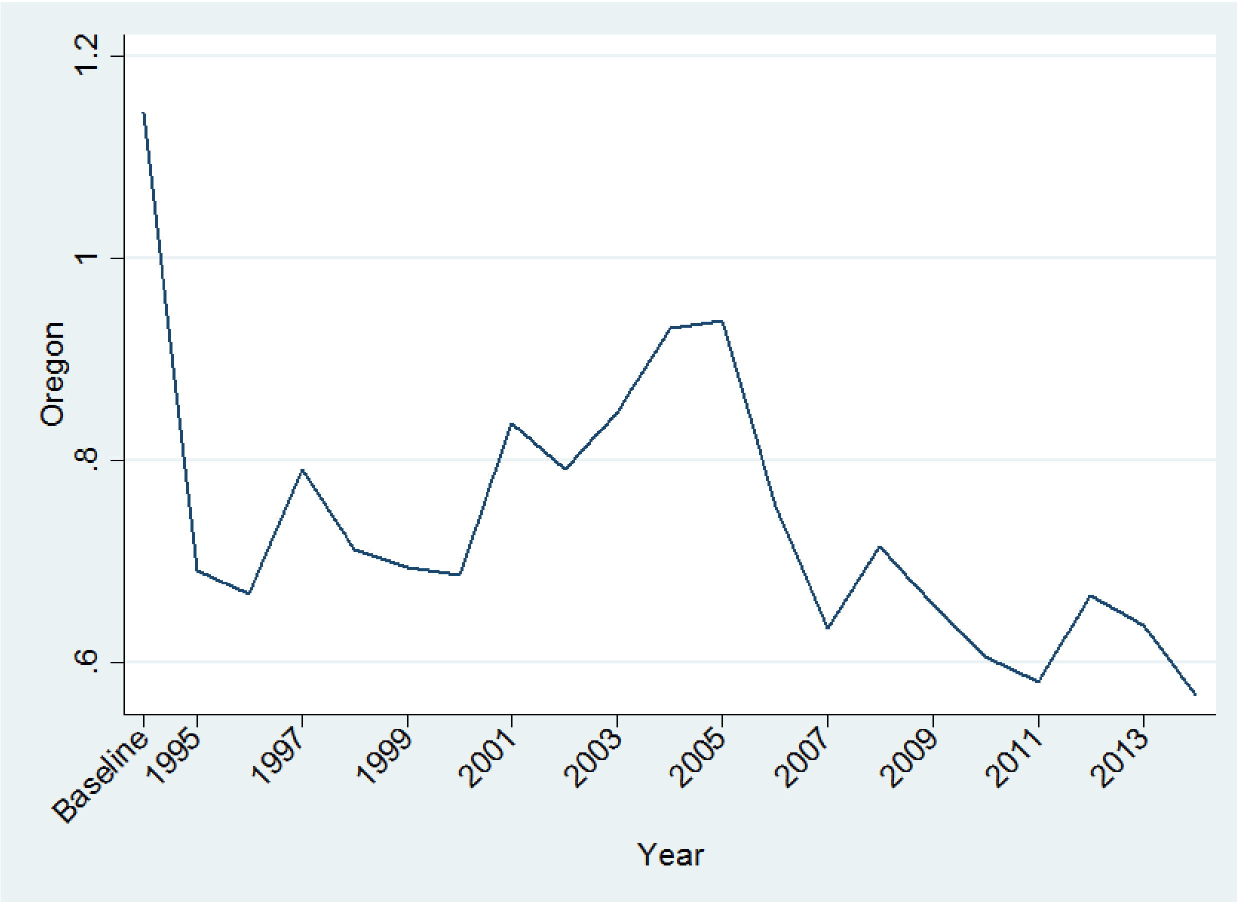

Figure 2.7A.29 Index scores of communities highly engaged in Sablefish IFQ Program commercial harvesting for less than all years with a 50% or greater decrease in engagement between the Baseline (1992-1994) and 2014.

2.7A.3.13 Sablefish harvesting regional quotient

The harvesting regional quotient is another measure of a community's involvement in the sablefish IFQ Program and is defined as the share of IFQ Program sablefish harvested by vessel owners residing within a community out of the total Sablefish IFQ Program. It is an indicator of the percentage contribution in pounds or revenue attributable to vessel owners in that community relative to the entire fishery. Figures 2.7A.30 and 2.7A.31 show the harvesting regional quotient both in pounds and revenue from the Baseline to 2014.

The three communities of the Seattle MSA, Sitka, and Petersburg accounted for 20%, 11%, and 13% of the commercial harvesting regional pounds during the Baseline and remained relatively constant through time at 24%, 16%, and 13% in 2014 (Figure 2.7A.30). The Other Communities share declined from 28% during the Baseline to 20% during 2014. Homer and Other Washington varied over time but remain fairly similar to their Baseline levels in 2014. Juneau and Kodiak both experienced declines over time from 6% and 9% during the Baseline to 4% and 7% in 2014, respectively.

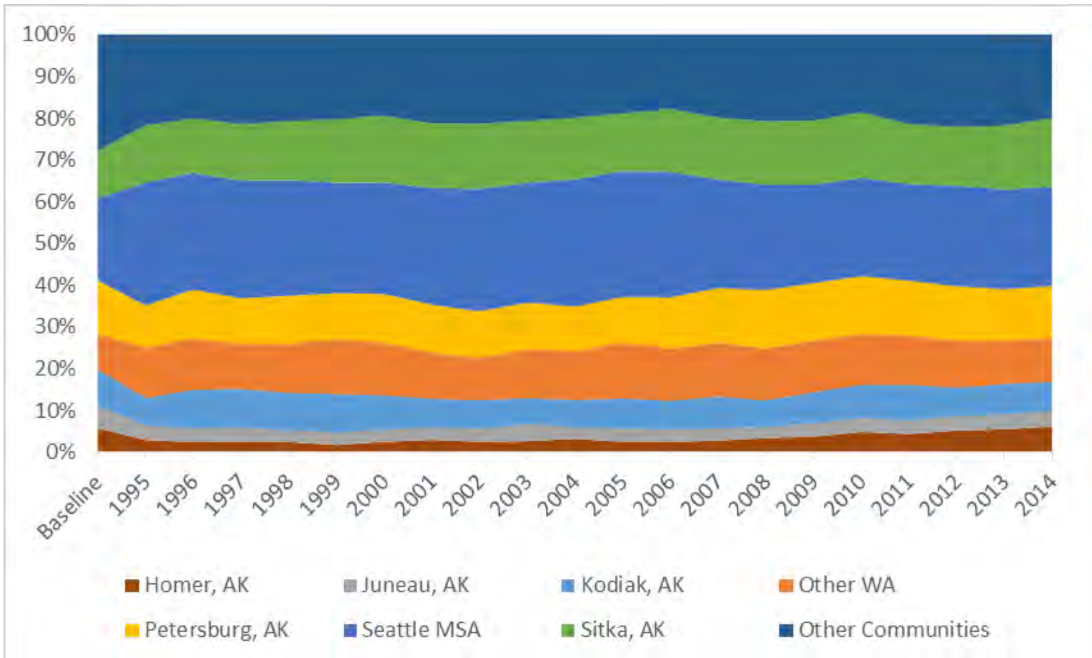

Figure 2.7A.30 Harvesting regional quotient of pounds for communities highly engaged in the Sablefish IFQ Program for all years from the Baseline (1992-1994) through 2014.

Similar to the harvesting regional quotient of pounds, Seattle MSA, Sitka, and Petersburg represented 45% of the regional revenue by vessel owner community in the Baseline years and increased to 52% in 2014. The Other Communities decreased from 27% of the regional revenue by vessel owner community in the Baseline years 19% in 2014. Homer, Kodiak, and Other Washington all increased their harvesting regional quotient for revenues by one percentage point between the Baseline and 2014 while Juneau decreased by 41% over the same time period.

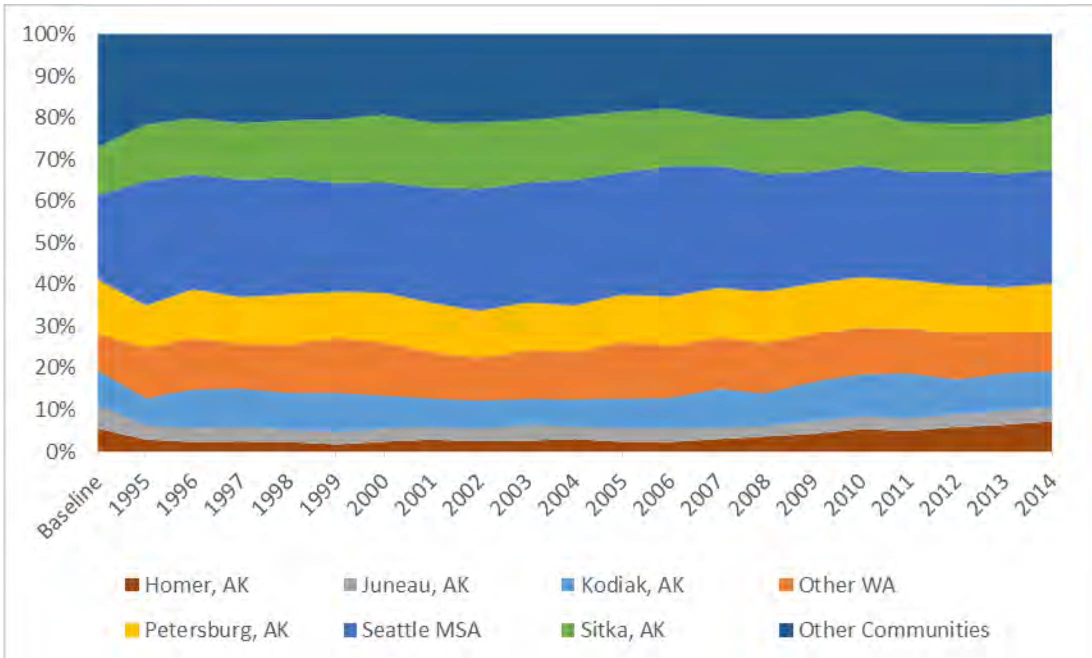

Figure 2.7A.31 Harvesting regional quotient of revenue for communities highly engaged in the Sablefish IFQ Program for all years from the Baseline (1992-1994) through 2014.

2.7A.3.14 Sablefish IFQ Program summary

Based on the Sablefish IFQ Program community engagement index scores for both processing and harvesting engagement, communities were categorized into low (index scores below the mean of 0), medium (index scores between 0 and 1), and high engagement (index scores above 1) for each year. The number of years a community is in each category for the processing and harvesting engagement indices is presented in Table 2.7A.10. There are 35 communities in Table 2.7A.10 that had medium or high engagement in either harvesting or processing and 16 communities were highly engaged in one aspect of the sablefish IFQ Program fishery in any year over the Baseline through 2014.

Table 2.7A.10. Number of years by processing and harvesting engagement level for the Sablefish IFQ Program. Alaska communities not listed had low processing and harvesting engagement in all years.

Community	Processing Engagement			Harvesting Engagement		
	Low	Medium	High	Low	Medium	High
Adak, AK	9	12	0	21	0	0
Akhiok, AK	13	8	0	21	0	0
Akutan, AK	10	11	0	21	0	0
All Other US	21	0	0	0	21	0
Anchor Point, AK	21	0	0	19	2	0
Anchorage, AK	21	0	0	6	15	0

At Sea Sector	17	3	1	21	0	0
Atka, AK	20	1	0	21	0	0
Canada	19	2	0	21	0	0
Cordova, AK	0	10	11	6	15	0
Craig, AK	11	10	0	13	8	0
Excursion Inlet, AK	17	4	0	21	0	0
Haines, AK	21	0	0	17	4	0
Homer, AK	0	0	21	0	0	21
Hoonah, AK	0	16	5	15	6	0
Juneau, AK	0	4	17	0	0	21
Kake, AK	20	1	0	21	0	0
Kenai, AK	20	1	0	21	0	0
Ketchikan, AK	1	20	0	6	15	0
King Cove, AK	1	20	0	21	0	0
Kodiak, AK	0	0	21	0	0	21
Oregon	21	0	0	0	20	1
Other WA	16	5	0	0	0	21
Pelican, AK	11	8	2	10	11	0
Petersburg, AK	0	4	17	0	0	21
Port Alexander, AK	21	0	0	20	1	0
Sand Point, AK	1	14	6	21	0	0
Seattle MSA	21	0	0	0	0	21
Seward, AK	0	0	21	0	21	0
Sitka, AK	0	0	21	0	0	21
Unalaska/Dutch Harbor, AK	0	1	20	19	2	0
Valdez, AK	11	10	0	21	0	0
Whittier, AK	19	2	0	21	0	0
Wrangell, AK	15	6	0	21	0	0
Yakutat, AK	1	2	18	21	0	0

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APPENDIX 2.8A NIOSH REPORT OF IFQ FLEET SAFETY

Assessment of Occupational Hazards in the Alaskan Halibut/Sablefish Fleet

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Assessment of Occupational Hazards in the Alaskan Halibut/Sablefish Fleet

Introduction

This report provides a current assessment of work-related fatalities and vessel disasters within the Alaskan halibut and sablefish fleet to identify trends, 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 halibut/sablefish fleet.

Management of the halibut and sablefish fishery was converted from an open access to a quota-based system in 1995. Prior to this change, operators engaged in a race for fish, resulting in shorter fishing seasons with the potential for working long days in inclement weather. Conversely, with the implementation of the Individual Fishing Quota (IFQ) program, catch limits were allocated to quota shareholders, eliminating competition between vessels, lengthening fishing seasons, and allowing operators to determine when to fish based on weather, sea, and crew conditions (Hughes & Woodley, 2007; Lincoln, Mode, & Woodley, 2007).

Previous research has evaluated the effect of quota share management systems on various safety measures in Alaskan fishing fleets. A decrease in the number of fatalities and vessel losses in the halibut/sablefish fleet was observed after the implementation of IFQs (Hughes & Woodley, 2007); however, this analysis did not account for the reduced size of the fleet. A subsequent analysis, allowing for such changes in the fleet, evaluated the effect of IFQs on safety in terms of fatalities and search and rescue missions during 1991-2000. Comparing pre- and post-IFQ implementation periods, researchers found that the rates of both fatalities and search and rescue missions decreased after the change in fishery management (Lincoln, Mode, & Woodley, 2007). Additionally, results of a survey conducted among halibut fishermen indicated that the IFQ program has led to perceptions of improved safety in the fleet (Knapp, 1999).

This report summarizes more recent data on fatalities and vessel disasters in the halibut/sablefish fleet. These findings can be used to evaluate the current hazards in the fleet and identify recommendations to reduce hazards.

Hazard Assessment Methods

Case Definition

Cases of fatal injuries and vessel disasters in the Alaskan halibut/sablefish fleet during 2001-2015 were identified from the Commercial Fishing Incident Database (CFID). This surveillance system, maintained by the National Institute for Occupational Safety and Health (NIOSH), is a nationwide database containing information on fatalities and vessel disasters in the U.S. commercial fishing industry. The National Marine Fisheries Service reviewed cases that were classified in CFID as operating in the Alaskan halibut/sablefish fleet to verify that the vessels were fishing for halibut or sablefish.

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

In CFID, a vessel disaster 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 catastrophic event. Results presented herein include vessel disasters that occurred during 2001-2014, as data on nonfatal vessel disasters are not yet available for 2015.

Numbers of fatalities that occurred during 1991-2000 were obtained from a previous study by Lincoln, Mode, and Woodley (2007).

Analysis

Causes and characteristics of fatalities and vessel disasters in the halibut/sablefish fleet were explored. In addition to fatality and vessel disaster counts, annual fatality rates were calculated to estimate risk within the fleet. These rates allow for comparison among fleets and over time because they account for changes in the number of vessels, workers, and days at sea. The rates adjust the number of fatalities in the fleet based on a common denominator of 100,000 full-time equivalent workers (FTEs). The method used for calculating the FTE denominator in this study was revised from earlier NIOSH publications to enhance the validity of the rates and standardize the calculation with the currently accepted method widely used in other agencies and academic institutions. As a result of these changes, the fishing fatality rates presented in this report are not comparable to rates published in NIOSH studies prior to 2014. Because denominator data were not available for 2013-2015, FTE calculations from 2012 were used as estimates for those years.

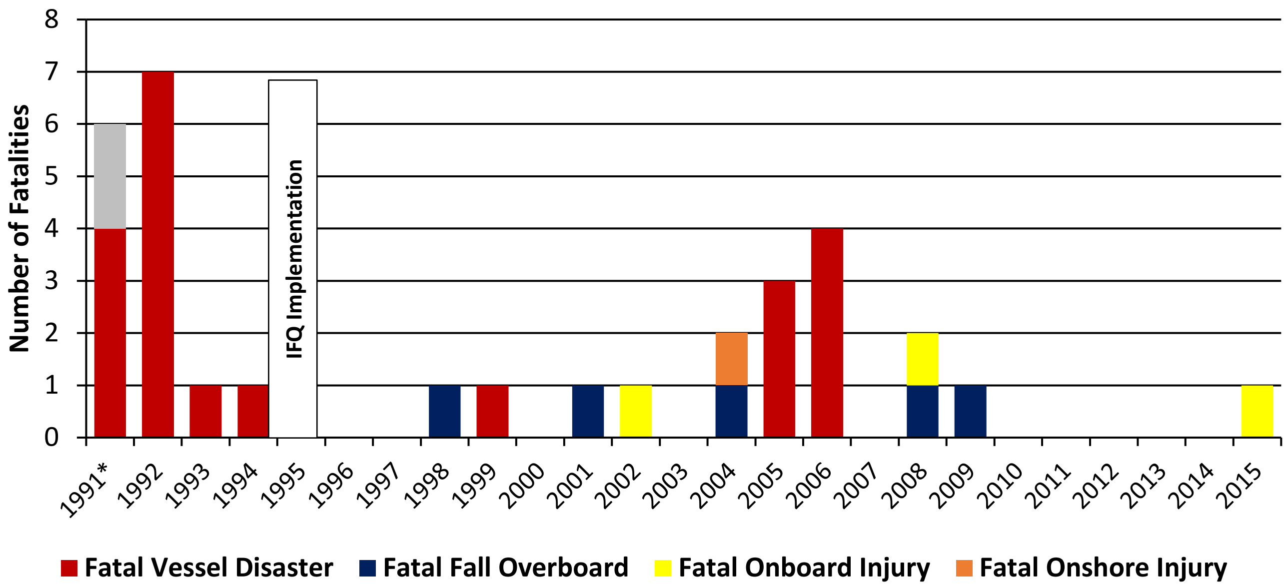
Several statistical modeling strategies were considered for estimating trends in fatality rates. A negative binomial regression model was chosen as the most appropriate model with the best fit for the count data. The model was used to estimate the trend in the rate of fatalities during 1991-2015.

Results of Hazard Assessment

Fatalities

During 1991-2015, 32 commercial fishing fatalities occurred in the halibut/sablefish fleet (Figure 1). In the most recent 15-year period (2001-2015), the frequency of fatalities ranged from a low of zero deaths during several years, to a high of four deaths in 2006. The apparent spike in fatalities in the mid-2000s was the result of four separate vessel disasters causing seven crewmember deaths in 2005 and 2006.

Figure 1 – Number and causes of fatalities in the Alaskan halibut/sablefish fleet, 1991-2015 (n=32)



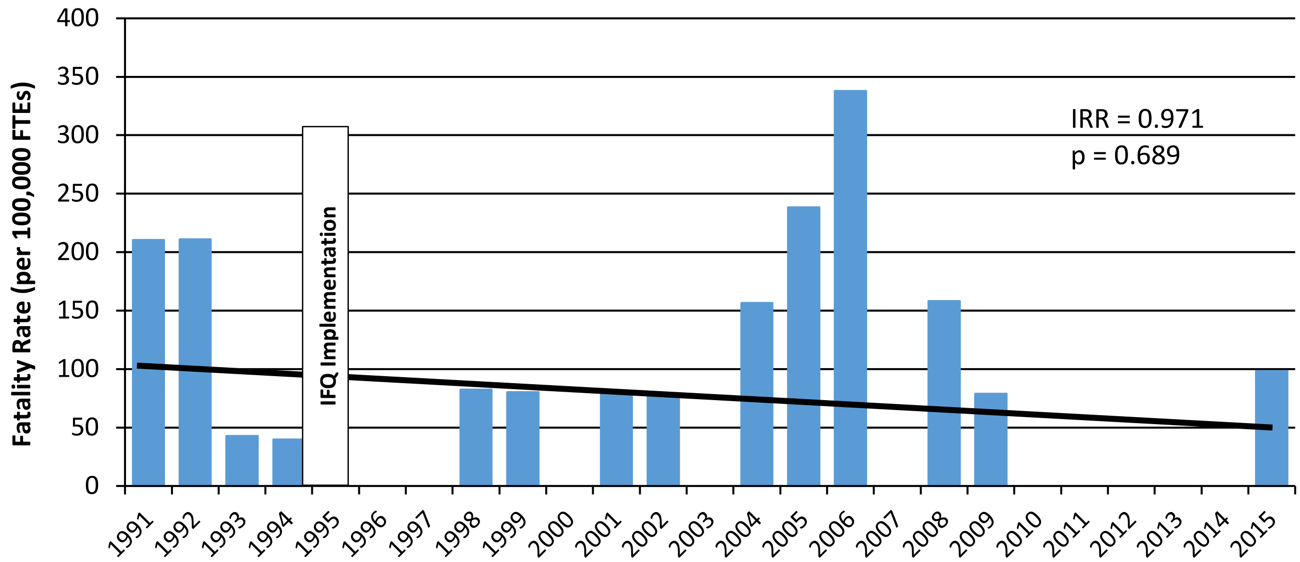
*Incident type is unknown for two fatalities in 1991

The raw number of fatalities each year is informative for describing the human cost of uncontrolled hazards, but it is not useful for measuring trends in risk over time. The fatality rates in Figure 2 are estimates of risk, expressed as the number of fatalities per 100,000 FTEs. Utilizing this common denominator enables the comparison of risk in the fleet from year to year and for conducting tests of trend.

The risk of fatalities in the halibut/sablefish fleet clearly decreased immediately following implementation of IFQs, with no fatalities for three straight years, as previously documented by Lincoln, Mode, and Woodley (2007). However, following that study period (1991-2000), the risk of fatalities spiked several times during 2001-2015, in some years even higher than the risk in pre-IFQ years. Because of the fluctuations in fatality rates, including some especially high spikes in certain years, there was no clear overall trend during 1991-2015 (IRR = 0.971; p=0.689).

Although the trend in fatalities over the course of 25 years was minimal and not statistically significant, and might call into question the extent of safety improvements promulgated by IFQs, there are limitations to this approach to measuring trend and assessing the effect of IFQs. For instance, the timeline is imbalanced, with only four years of pre-IFQ observations and 21 years of post-IFQ observations. If rates of fatalities were available for the 1980s and were high, then the trend might be stronger and lend more support to the safety benefits of IFQs.

Figure 2 – Fatality rates and trend in the Alaskan halibut/sablefish fleet, 1991-2015



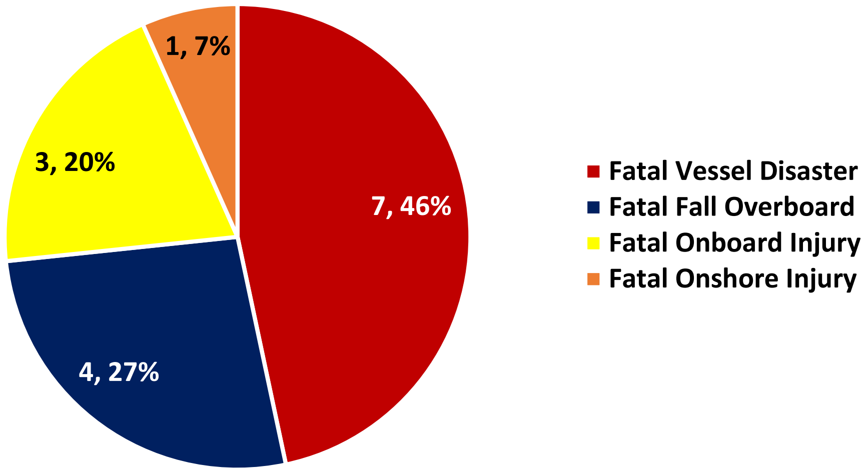
Taking into account the previous research discussed in the introduction, and the findings of this study, there has likely been some decrease in hazards as a result of IFQs. Nevertheless, many fatalities have occurred post-IFQs, indicating that serious hazards remain and must still be mitigated. During 2001-2015, 15 commercial fishing fatalities were reported in the halibut/sablefish fleet.

The leading cause of death was drowning following vessel disasters (7, 46%) (Figure 3). Severe weather contributed to all four of the fatal vessel disasters that resulted in drownings. Preventing vessel disasters involves applying good marine practices to keep vessels and systems well-maintained and watertight. Crewmembers should also be thoroughly prepared to respond to an emergency at sea. All crewmembers should participate in marine safety training. This practical knowledge should then be applied monthly through emergency drills.

Falling overboard contributed to four deaths (27%) during 2001-2015, and none of the fishermen were wearing a personal flotation device (PFD) when they drowned. To prevent deaths from falls overboard, crewmembers should wear a PFD any time while on deck, regardless of work task or weather conditions. In a previous NIOSH study of PFD use among commercial fishermen in Alaska, longline fishermen had the lowest use of PFDs and the most negative perceptions of PFDs (Lucas et al., 2013). However, during a subsequent study of PFD satisfaction that involved fishermen wearing and rating six styles of PFDs during their fishing seasons, longline fishermen successfully identified a PFD that was comfortable and worked well for their type of fishing (Lucas et al., 2012). There are many models and styles of PFDs available today that are designed for commercial fishing and overcome fishermen's complaints of discomfort. All vessel operators should have a PFD policy for their crew. Additionally, all crewmembers should participate in regular man overboard drills using effective recovery devices such as rescue slings or similar products.

The remaining fatalities during 2001-2015 included three that occurred onboard vessels, comprised of an asphyxiation in a confined space, a fatal head injury from a fall on deck, and an unintentional drug overdose. A single onshore fatality occurred when a crewmember drowned after falling from a dock.

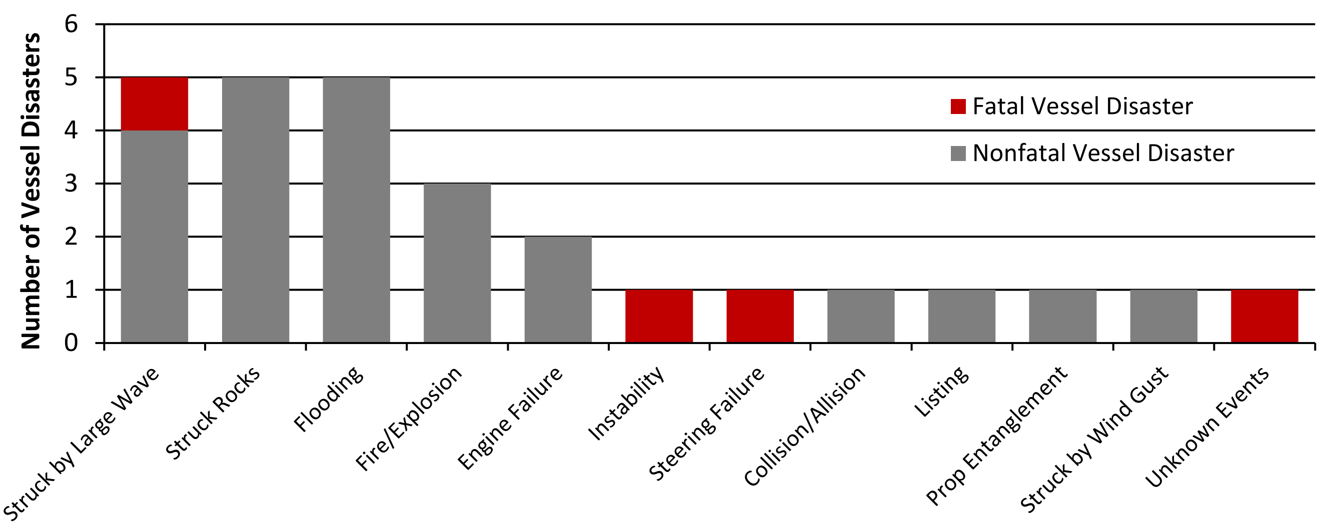
Figure 3 – Causes of fatalities in the Alaskan halibut/sablefish fleet, 2001-2015 (n=15)



Vessel Disasters

During 2001-2014, 27 vessel disasters occurred, of which 4 (15%) resulted in fatalities. Of 87 total crewmembers at risk during these events, 80 (92%) survived. Nonfatal vessel disasters were most frequently caused by striking rocks, flooding, or being struck by a large wave (Figure 4). Three fatal vessel disasters had unique causes, including being struck by a large wave, instability, and steering failure. The cause of the fourth fatal disaster remains unknown; however, severe weather contributed to all four fatal vessel disasters. Precautions aimed at preventing and surviving vessel disasters should be taken as described previously.

Figure 4 – Initiating causes of vessel disasters in the Alaskan halibut/sablefish fleet, 2001-2014 (n=27).



Conclusion

Although the initial evaluation of IFQs by Lincoln, Mode, and Woodley (2007) revealed a significant decrease in the rate of fatalities in the six years following IFQ implementation, fluctuations in the number and rate of fatalities during a longer time period (1991-2015) have resulted in a minimal decrease in risk. The continued incidence of fatalities and vessel disasters during the 2000s indicate that while fishery management policies may have influenced safety, other factors may be responsible for the persistent hazards observed in the fleet. Attention should be given to such hazards, particularly vessel disasters and falls overboard, to prevent further deaths among halibut and sablefish fishermen. Future research into nonfatal injuries and vessel safety issues (e.g., loss of propulsion, loss of power) could provide further insight on safety hazards in the halibut/sablefish fleet. These types of future research could attempt to collect and use data from fisheries observers, the United States Coast Guard, or insurance claims to identify additional hazards and provide a comprehensive assessment of hazards in the fleet.

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APPENDIX 2.12A Native Village of Eyak Proposal for distribution of IFQ Shares

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10,000 years in our Traditional Homeland, Prince William Sound, the Copper River Delta, and the Gulf of Alaska

Proposal for distribution of IFQ shares to the Native Village of Eyak

To: North Pacific Fisheries Management Council
Attn: IFQ Review Workplan Team
POC: Marysia Szymkowiak

From: Native Village of Eyak Traditional Tribal Council

The Native Village of Eyak seeks to receive IFQ shares in any class for area 3A equal to the Quota Share limit 1,502,823 shares to compensate for the Tribe not having received the Government to Government consultation prior to the institution of the IFQ program despite having requested such a consultation, and a longer history of commercial use of halibut than any individual who received an allocation of the original IFQ shares. At that time the Tribe would have contested the method of distribution and supported a means of distributing IFQ shares to traditional users of the resource. It is the Tribe's position that the current IFQ Program review provides an opportunity for this oversight to be remedied.

Because we wish to minimize the burden of the Tribe receiving IFQ shares on other IFQ shareholders (because this is a quota fishery, such an allocation could reduce the amount of fish other shareholders could take) we propose an incremental distribution such that all of the shares would be distributed within five years, with only a 50% portion guaranteed immediately.

The reminder would be distributed during any year in which the quota is increased, and no more than 50% of a given year's quota increase in quota would be given to the Tribe during that year, the other 50% would be distributed to the existing shareholders during that year.

We propose that if within five years, quota increases are not realized to sufficiently provide the Tribe with its due share by taking only 50% of an increase in quota during any one of those five years, that the total IFQ shares due be awarded at that time regardless of whether the overall quota is increasing or decreasing.

Signed: