

LIMITED ENTRY FIXED GEAR PERMIT STACKING PROGRAM REVIEW—DRAFT
FOR COUNCIL REVIEW

The Magnuson Stevens Act (MSA) requires periodic reviews of catch share programs. In compliance with the MSA required timelines, the review of the Limited Entry Fixed Gear permit stacking program was started in the fall of 2020. An outline was reviewed at the June 2021 Council meeting and initial comments were provided on the content. This document incorporates responses to those comments and is believed to be ready for the Council to adopt for public review.

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1. INTRODUCTION

The limited entry fixed gear (LEFG) permit stacking program used to manage the primary sablefish fishery and is a type of catch share program also known as a limited access privilege program (LAPP). While called a permit stacking program, it was actually the extension of the season length from about nine days to several months in 2001 that changed the character of management of the primary fishery from a modified derby to a catch share program.¹ Prior to that action, the sablefish endorsement and equal landing limits for all vessels had been established (1997). Then, in 1998, sablefish endorsed permits were assigned to one of three tiers and different landing limits provided for each tier. The Pacific Fishery Management Council (Council, PFMC) discussed and authorized permit stacking to compensate for the reallocation that was caused by the system of tiered limits, independent of whether there would be a season extension. Then, in December of 2000, the LEFG sablefish fishery was given an exception to the Congressional moratorium on new catch share programs and that exception allowed the season extension, thereby converting the per-permit cumulative limits to quota and the fishery to a catch share system.

When the Magnuson Stevens Act (MSA) was reauthorized in 2007, Section 303A(c) included several requirements for LAPP programs. Because this program was implemented prior to the 2007 reauthorization, Section 303A(i)(1) specifies that the requirements of Section 303A do not apply to this program with the exception of Section 303A(c)(i)(G) which requires this review. Additionally, 303A(i)(1) specifies that Section 303(d) of the previous version of the MSA applies to programs implemented prior to 2007. Section 303(d) of the prior version of the MSA included the following relevant provisions: limiting the scope of the privileges created by a catch share program (but not limiting the duration); authorizing the charging of fees to finance individual fishing quota (IFQ) purchases; requiring that programs include provisions for review and revision of the program; requiring effective enforcement and management; requiring fees to recover actual costs directly related to enforcement and management (304(d)(2)²); and a number of initial allocation criteria.

The first LEFG permit stacking program review was initiated in 2013 and completed in June 2014. This second review of the program was initiated by the Council at its September 2020 meeting. As with the previous review, any potential actions identified as a result of the review would be the subject of a regulatory process to fully develop alternatives, analyze expected effects, and determine whether action should be recommended.

¹ In 2001 the season ran from August 15 through October 31 and since that time has run from April 1 through October 31.

² MSA, **Public Law 94-265, As amended through October 11, 1996**

304(d) ESTABLISHMENT OF FEES.--

(1) The Secretary shall by regulation establish the level of any fees which are authorized to be charged pursuant to section 303(b)(1). The Secretary may enter into a cooperative agreement with the States concerned under which the States administer the permit system and the agreement may provide that all or part of the fees collected under the system shall accrue to the States. The level of fees charged under this subsection shall not exceed the administrative costs incurred in issuing the permits.

(2)(A) Notwithstanding paragraph (1), the Secretary is authorized and shall collect a fee to recover the actual costs directly related to the management and enforcement of any--

(i) individual fishing quota program; and

(ii) community development quota program that allocates a percentage of the total allowable catch of a fishery to such program.

1.1. Description of the Current Permit Stacking Program

The sablefish fishery primary season occurs north of 36° N. latitude from April 1-October 31. Vessels in this fishery must be registered to at least one LEFG permit with a sablefish endorsement. Each of these permits has a gear endorsement for either longline or trap (pot), or in limited cases-both. Such vessels are eligible to fish in the daily trip limit (DTL) fishery before the primary season (i.e., January through March) and after the vessel has reached its aggregate tier limit, or the season has ended, whichever comes first.³

Under the permit stacking program, each sablefish endorsed LEFG permit is assigned to one of three tiers. The permit's tier level determines the poundage of sablefish which can be landed by that permit each season while participating in the primary sablefish fishery. For sablefish endorsed limited entry (LE) permits, tier limits are determined based on the allocation of sablefish north to the LEFG primary sablefish fishery (85 percent of the total sablefish allocated to the LEFG sector). The size of the cumulative landing limit for each of the three tiers associated with the sablefish endorsement is such that the ratio of limits between the tiers is approximately 1:1.75:3.85 for Tier 3, Tier 2, and Tier 1, respectively. Up to three permits can be stacked onto a single vessel, allowing that vessel to land up to the sum of the three tier limits in aggregate. Sablefish endorsements and their tiers may not be transferred separately from the LE permits.

1.2. Prior Program Review and Subsequent Management Actions

The first program review, finished in [2014](#), “support[ed] the conclusion that the LEFG sablefish permit stacking program, adopted under Groundfish FMP [Fishery Management Plan] Amendment 14 [A-14], has been mostly successful in achieving a significant majority of the goals and objectives intended by the Council.” Of the ten objectives of A-14, there were eight that were classified as “significantly achieved” while the remaining two objectives could not be adequately assessed due to lack of information. Based on the data available and anecdotal information available, the 2014 review suggests that Council actions related to these latter two objectives have been “neutral.” Table 1 is a reproduction of Table 5-1 from the 2014 review and is a summary of the conclusions on the ten objectives.

Table 1. Reproduction of Table 5-1 from the 2014 review detailing conclusions on the success of the Council's LEFG sablefish permit stacking program.

Objective	2014 Assessment Summary and Preliminary Conclusions
1. Rationalize Fleet and Promote Efficiency (Significantly Achieved)	Significantly lengthened seasons and ended derby fishery Reduced number of participating vessels while: <ul style="list-style-type: none">• Improving the ability of the fleet to achieve, without exceeding, the overall harvest allocation;• Allowing appropriate flexibility in how permits are stacked and fished; and• Allowing a similar concentration of landings as the original fishery.

³ While fishing in the DTL fishery, vessels can fish with their endorsed gear up to the LEFG trip limits, or up to the open access trip limits with non-trawl gears not covered by the gear endorsement on their permits.

2. Maintain or Direct Benefits toward Fishing Communities (Limited Assessment; Likely Neutral Effect)	Appears to be a possible decrease in involvement of Puget Sound in recent years and an increase in Brookings and Morro Bay. Landings data are extremely variable and program effects cannot be clearly separated from other sources of variation.
3. Prevent Excessive Concentration of Harvest Privileges (Significantly Achieved)	Comparison of annual Gini coefficients indicate little change in the concentration of permit and vessels ownership after implementation of the permit stacking program. Comparing the averages of the years prior to the program with the averages of the years post-program indicates increases of less than 5 percent and 10 percent in permit and vessel ownership concentrations, respectively.
4. Mitigate the Reallocational Effects of Policies in place just prior to this Program (Significantly Achieved)	Maintained a similar concentration of landings as the original fishery.
5. Promote Equity (Significantly Achieved)	Maintained a similar concentration of landings as the original fishery. Estimates of landings exceeding tier quota limits are very small and there does not appear to be a consistent pattern of offending permits over time.
6. Resolve or Prevent New Allocation Issues from Arising (Significantly Achieved)	Few calls for any changes to the allocations within the fixed gear sector. During formal consideration of groundfish allocations for Amendment 21, Council decided that there was not a sufficient need to examine reallocations of sablefish among sectors.
7. Promote Safety (Significantly Achieved)	Significantly lengthen season and eliminated the derby fishery. USCG incident data and estimates of trip starts under high wind conditions indicate generally safer vessel operations.
8. Improve Product Quality and Value (Limited Assessment)	Changes in ex-vessel prices do not indicate a significant change in product value and are driven by numerous variables outside the scope of this study. However, since the inception of the program there may have been stabilization in the relative price differential between fixed gear and trawl-caught sablefish.
9. Avoid Creating New Disruptive Effects (Significantly Achieved)	Allowed season of reasonable length without changing allocations, by creating flexibility with permit stacking.
10. Capability to Readily Transition to a Multi-Month Individual Quota (IQ) Program (Significantly Achieved)	Allocations are already established (a difficult first step in an IQ program) and could be transitioned to a more typical IQ program (with divisible quota freely transferable separate from the limited entry permits) if the need arises. Thus far the program is working well enough that there has been no call for such a transition.

In tandem with the development and approval of the review, the Council developed and took final action on a series of management measures in June 2014. These measures implemented electronic fish ticket (e-ticket) requirements and provided exemptions to permit ownership limits for permit owners with less than 20 percent interest in vessels participating in both Alaska and West Coast. These regulations were implemented on November 23, 2016 ([81 FR 84419](#)) as part

of a package that also included regulations allowing joint registration of a trawl endorsed and fixed gear endorsed LE permits on a single vessel at the same time (recommended as a trawl catch share trailing action) and other clarifying regulations⁴.

The June 2014 review document also included five recommendations to be considered in the groundfish workload prioritization process (formerly “omnibus”) at the September 2014 Council meeting. These recommendations are shown in Table 2 with a status description of the item in the right-hand column. Thus far, the Council has not prioritized any of these issues for action, with the exception of current deliberation on modification of the non-trawl Rockfish Conservation Area (RCA).

Table 2. Council recommendations from June 2014 program review and status of those management measures.

Recommendation	Status
Include tracking of permit price upon the transfer of permits in future data collection.	Currently on groundfish workload prioritization list ⁵ (see Section 3 for more details)
Require that all pot gear be returned to shore at the end of each fishing trip.	This item was brought forward in the June 2014 Council action for approval of the review and was focused on the shorebased individual fishing quota (IFQ) sector and potential conflicts. Ultimately, it was removed from consideration in June 2016 as it conflicted with the Council Vessel Movement Monitoring rulemaking (Agenda Item G.6, Attachment 2, June 2016).
Convert daily trip limits to a tier endorsement.	These two items were initially included as part of the “Phase 2” actions from the LEFG review along with the LEFG permit price reporting (first item in table). However, these items were removed from the groundfish workload list in November 2018 based on recommendations from the GAP and GMT (Agenda Item G.4.a, GMT Report 1, November 2018).
Combine longline and pot gear limited entry gear endorsements into a single fixed gear endorsement.	
Move the seaward line of the Rockfish Conservation Area (RCA) closer to shore for pot vessels.	This item was encompassed within the broader consideration of “Non-Trawl Sector Area Management Measures” which is currently proposed for selection of range of alternatives and/or a preliminary preferred alternative in April 2022.

Since implementation of the regulatory package following from the 2014 review (LEFG follow-on package, [81 FR 84419](#)), the only actions modifying the basic structure of the primary tier fishery were taken in both September 2020 and September 2021, when the Council recommended that National Marine Fisheries Service (NMFS) take emergency action to extend the sablefish primary season until December 31. These actions were based on an assessment that fishery conditions due to the COVID-19 pandemic resulted in vessels delaying their primary season harvest and would prevent them from fully attaining their tier limits by the October 31

⁴ Other actions included the prohibition of processing sablefish at-sea in the shorebased IFQ program for those LEFG vessels with exemptions that allow them to process at sea; clarification that sablefish catch in incidental open access counts against the open access allocation; requirements that any vessel with Vessel Monitoring System (VMS) registered with National Oceanic and Atmospheric Administration’s (NOAA) Office of Law Enforcement (OLE) submit a declaration report with OLE; updated and simplified equipment requirements for e-tickets; clarification of existing regulatory language prohibiting retention in the LEFG fishery beyond allowable quota.

⁵ Most recent groundfish workload prioritization list as of the drafting of this document is [Agenda Item G.2.a, GMT Report 1, March 2021](#).

season end date. NMFS implemented the 2020 emergency rule on October 27, 2020 ([85 FR 68001](#)) and the 2021 emergency rule on October 29, 2021 for longline gear ([86 FR 59873](#)) and December 10, 2021 for pot gear ([86 FR 70420](#)).

2. AMENDMENT 14 PROGRAM PERFORMANCE AND REVIEW

2.1. Evaluation of Goals and Objectives

The primary goal of a review is to assess progress in meeting goals and objectives of the program and MSA. The NMFS policy states that the goals and objectives to be covered in the review include those of the program (A-14), the groundfish FMP, the Catch Share Policy, and the MSA, but the primary focus should be on those identified in the implementing FMP amendment (A-14).

Many of the goals and objectives from these different sources are overlapping. The LEFG permit stacking program was expected to help the Council address objectives related to National Standards (NS) 4 (fair and equitable allocation), 5 (consider efficiency), 6 (take into account variations and contingencies), 8 (take communities into account), 9 (minimize bycatch and bycatch mortality), and 10 (promote safety). With respect to the FMP, it was expected to affect achievement of Groundfish FMP Goals 2 (maximize the value of the resource as a whole) and 3 (achieve maximum biological yield) through impacts related to Objectives 6 (achieve greatest net benefit), 9 (reduce wastage), 11 (minimize bycatch), 12 (equitable sharing of the conservation burden), 13 (minimize gear conflicts), and 14 (accomplish changes with minimum disruption). Key objectives of A-14, the permit stacking program, and their relation to the MSA and FMP goals and objectives were further defined as provided in the following table (reproduced from the previous A-14 review).

Table 3. Objectives from A-14 and their consistency with management objectives of the groundfish FMP and MSA.

Key Objective	Consistency with Management Objectives of the FMP and MSA
1. Rationalize the fleet and promote efficiency	Capacity reduction is one of the key elements of the Council's strategic plan. The strategic plan generally approaches capacity reduction by reducing the number of fishing vessels. This reduction does not of itself imply the rationalization of the fleet or increased efficiency. It is possible that the most efficient fixed gear sablefish harvest could involve a greater number of vessels taking sablefish as bycatch in other fisheries. However, given the high degree of overcapitalization in the fishery, it is believed that a reduction in capacity will generally move the fishery toward greater efficiency, addressing National Standard (NS) 5 and FMP Objective 6 on net national benefits.
2. Maintain or direct benefits toward fishing communities	This objective relates to NS 8 on fishing communities and FMP Objective 16 on fishing communities.
3. Prevent excessive concentration of harvest privileges	This objective relates to NS 4 on allocation, NS 8 on fishing communities, and FMP Objective 15 on avoiding adverse impacts to small entities.
4. Mitigate the reallocational effects of recent policies (3-tier system and equal limits)	This objective relates to NS 4 on allocation and FMP Objectives 12 on equitable allocation and 14 on minimizing disruption.
5. Promote equity	This objective relates to NS 4 on allocation and FMP Objective 12 on equitable sharing.
6. Resolve or prevent new allocation issues from arising	This objective relates to NS 4 on allocation and FMP Objectives 12 on equitable sharing and 14 on minimizing disruption.
7. Promote safety	This objective relates to NS 10 and FMP Objective 17 on safety.
8. Improve product quality and value	This objective relates to NS 5 on efficiency and FMP Objective 6 on net national benefits.
9. Take action without creating substantial new disruptive effects	This objective relates to FMP Objective 14 on minimizing disruption.
10. Create a program that will readily transition to a multi-month IQ program	This objective relates to capacity reduction recommendations in the strategic plan. Where individual quotas are transferable and divisible, they address NS 6 by providing the fleet with substantial flexibility to respond to changing conditions in the fishery and NS 5 by taking efficiency into account. FMP Objective 6 is also addressed.

2.1.1. Rationalize the fleet and promote efficiency

Rationalizing the fleet and promoting efficiency, primarily through reducing the number of participating vessels (capacity reduction) and lengthening the season, was a key objective of A-14. In considering how to reduce the fleet, the Council also had to balance that reduction with its other objective of preventing excessive concentration of harvest privileges (see Section 2.1.3). At the time A-14 was adopted, the Council had just completed the Groundfish Strategic Plan (PFMC, 2000) for which capacity reduction was one of the goals. A-14 was designed to allow the fleet to achieve some balance between too little and too much capacity reduction, without quantitative criteria for what constituted "too little" or "too much." Too little capacity reduction could mean that some commercial fishermen intending to make a career of fishing would have to rely on sablefish landings providing a smaller proportion of their incomes and require more reliance on other fisheries. Too much capacity reduction, while improving vessel efficiency and profits, could mean that the fleet would be reduced and concentrated to such a small number of vessels that harvest benefits from the fishery would be channeled to relatively few individuals, coastal communities, and processors. A-14 was explicitly not designed to reduce the fleet numbers to as few vessels as possible. The Council's judgment on whether the fleet's capacity has been reduced by too much or by too little, and whether excessive concentration of harvest

privileges has occurred, will be necessarily qualitative, since the Council did not set an explicit capacity reduction goal with A-14.

The 2014 review concluded that this objective was significantly achieved because it: ended the previous derby fishery by lengthening the season to seven months; reduced the number of vessels; improved the ability for the fleet to attain the allocation; provided more flexibility; and allowed for a distribution of landings across vessels similar to what existed prior to the imposition of equal limits in 1997 (discussed further below).

Season Extension

The season extension by itself (from about a week to seven months) would have allowed individual vessels to scale their capacity to the amount of sablefish available. Permit stacking provided flexibility in that scaling, allowing that capacity to be distributed among a variety of different possible fleet configurations determined by the number of permits, the limits associated with each tier, and the permit stacking limit. Since 2002, there have been no changes in the season dates, with the exception of the 2020 and 2021 emergency rule. For both years, the season was extended to allow the fleet to increase its overall attainment. In 2020, under the original season end date of October 31, the fleet was projected to harvest only 64 percent of its sablefish allocation ([SIR for Emergency Action to Temporarily Extend the Primary Sablefish Season](#)). This would have resulted in ~\$2 million in lost ex-vessel revenue to the fleet, relative to full attainment. However, with the extension, the fleet was able to harvest an estimated 79.7 percent (Table 4), taking 15.9 percent of the catch associated with ~\$660,000 in ex-vessel revenue in November-December. At the time of development of this document, 2021 information was not available.

Fleet Participation and Attainment

Since the 2014 review, the primary tier fishery has continued to attain its allocation at a high level. From 2015-2019, it averaged 94.4 percent attainment (Table 4). In 2020, attainment of the allocation appears to have been impacted by the pandemic. Thus, with the inclusion of 2020 data, average attainment since 2015 is approximately 91.9 percent.

With the implementation of the tier program, participation in the primary fishery declined from an annual average of 146 vessels from 1996-2000 to 87 vessels from 2002-2020, a 40 percent decline. Overall, participation since program implementation has ranged from a high of 100 vessels in 2002 to a low of 73 in 2020. Participation since the last review, with the exception of 2020, has stabilized at ~85 vessels (Figure 1).

Table 4. Annual total primary sablefish fishery mortality (mt), allocation (mt) and percent attainment, 2011-2020. Source: PacFIN and West Coast Groundfish Observer Program (WCGOP) GEMM

Year	Mortality	Allocation	Percent Attainment
2011	1,512	1,598	94.6
2012	1,423	1,549	91.9
2013	1,046	1,156	90.5
2014	1,100	1,254	87.8
2015	1,346	1,385	97.2
2016	1,446	1,515	95.4
2017	1,454	1,518	95.8
2018	1,480	1,583	93.5
2019	1,456	1,620	89.9
2020	1,318	1,654	79.7

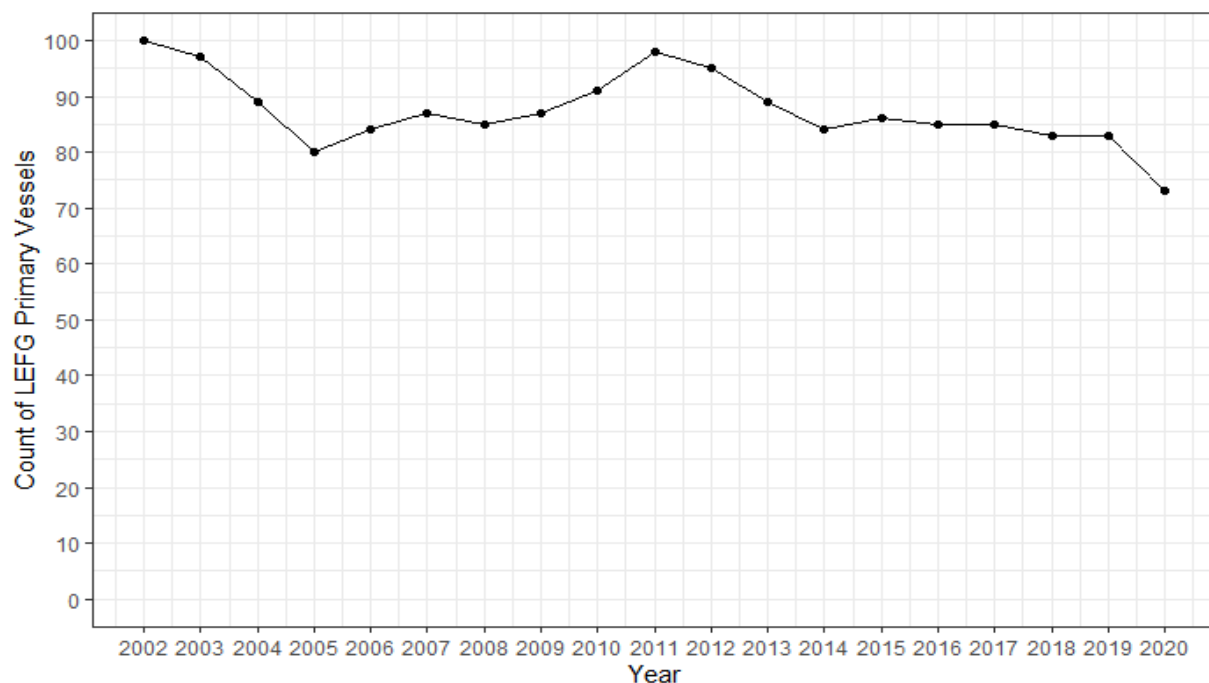


Figure 1. Count of participating LEFG primary vessels, 2002-2020.

In general, catch in the primary fishery occurs at a relatively steady pace over the season, with the most recent six years shown in Figure 2 below. However, in the last three years, the average percent of total harvest in the last months of the season has increased (by eight and nine percentage points in August and October, respectively, compared to the previous three years; Table 5). Differences for these months are approximately ten percentage points if 2020 is excluded. This could be a result of some vessels prioritizing other fisheries earlier in the year before transitioning to the primary tier fisheries and/or price differentials between the spring and fall might be driving effort later in the year (Section 2.1.8).

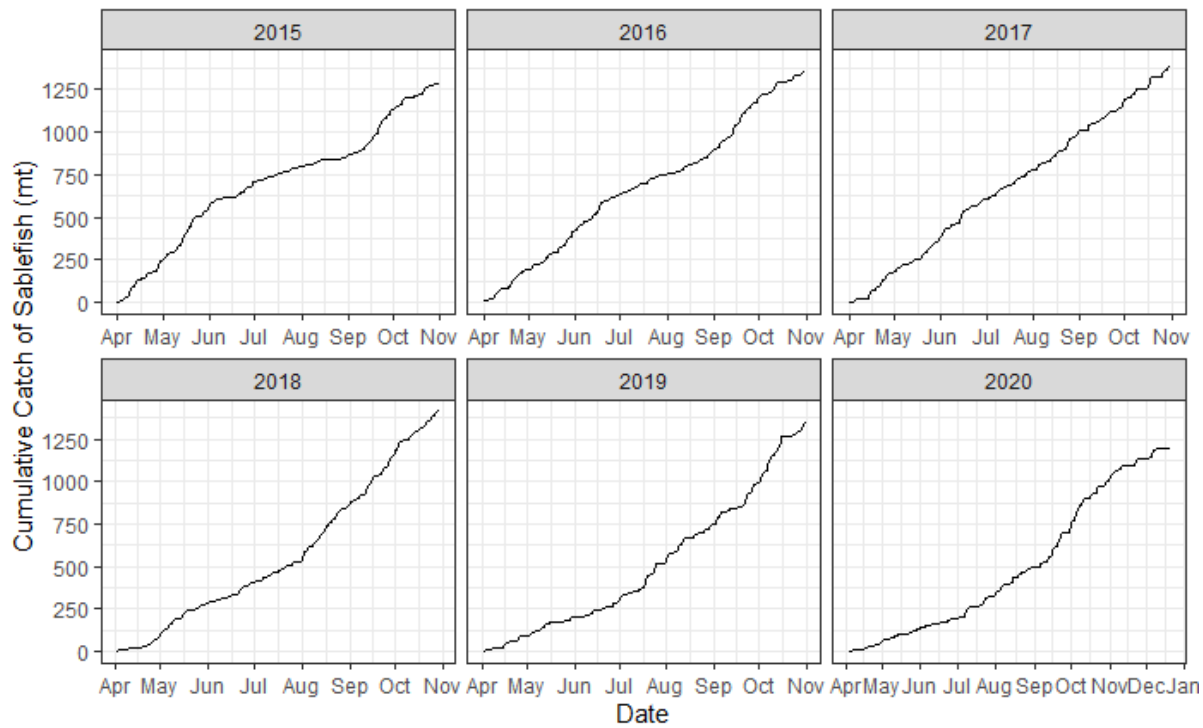


Figure 2. Cumulative catch of sablefish in the primary tier fishery, 2015-2020. Source: PacFIN

Table 5. Percentage of total catch by month for 2015-2020, average percent of total catch over 2015-2020, 2015-2017, and 2018-2020 by month. Source: PacFIN

Month	2015	2016	2017	2018	2019	2020	Average (2015-2020)	Average (2015-2017)	Average (2018-2020)
April	18.9%	14.1%	12.5%	6.5%	6.7%	4.5%	10.5%	15.2%	5.9%
May	23.4%	16.5%	13.9%	12.8%	8.1%	6.5%	13.5%	17.9%	9.1%
June	12.8%	16.3%	16.8%	9.1%	6.7%	5.6%	11.2%	15.3%	7.1%
July	7.2%	8.6%	12.5%	9.2%	16.9%	11.7%	11.0%	9.4%	12.6%
August	5.2%	10.0%	14.9%	23.6%	16.9%	13.0%	13.9%	10.0%	17.8%
September	20.8%	22.3%	14.5%	20.8%	18.3%	21.1%	19.6%	19.2%	20.1%
October	11.7%	12.1%	15.0%	17.9%	26.3%	21.8%	17.5%	13.0%	22.0%
November-December						15.9%			

Vessel-Level Attainment

Vessels participating in the primary tier fishery have cumulative landing limits that are determined based on the allocation to the primary fishery and the number and designated tier of the permits assigned to the vessel. There are 164 sablefish endorsed permits composed of 28 Tier 1, 42 Tier 2, and 94 Tier 3 permits. Table 6 below shows the number of vessels registered to the stacking combinations of permits by year from 2014-2020. Note that as vessels can register different permits throughout the year, this table only shows the largest cumulative limit combination that a vessel had during that year's season. For example, if a vessel were registered for one month to a Tier 1 and a Tier 2 permit, but for the remainder of the year only had the Tier 2 permit, it would show up in the 1 Tier 1, 1 Tier 2, and 0 Tier 3 strata for that year. Further, a

vessel could have been registered to a permit, but not used it to harvest fish against the tier allocation (e.g., the tier was utilized by a different vessel and then the vessel leased it to fish DTL prior to October 31 or the vessel with the permit chose to not fish).

Table 6. Number of vessels by permit stacking combinations for the primary sablefish tier fishery from 2014-2020. Vessels with multiple combinations within a year are classified by the combination with the largest cumulative limit. Source: NMFS Public Permit Database.

Number of...			Number of Vessels with Permit Stacking Combination							
Tier 1	Tier 2	Tier 3	2014	2015	2016	2017	2018	2019	2020	
3	0	0	2	2	2	2	2	2	2	
2	1	0	5	5	5	5	5	5	4	
	0	1	1	1	1	1	1	1	2	
		0	0	0	1	1	1	0	0	1
1	2	0	3	2	3	3	3	3	3	
	1	1	2	3	2	2	2	2	2	
		0	0	2	2	0	0	0	0	0
	0	1	1	0	2	2	2	2	2	1
		0	0	2	1	1	1	1	2	3
0	3	0	0	1	1	3	2	2	2	
	2	1	2	2	2	2	1	1	0	
		0	4	3	3	2	2	2	2	2
	1	2	6	6	6	5	6	6	6	
		1	3	3	4	5	4	4	4	4
		0	8	7	8	8	8	7	9	9
	0	3	4	4	5	7	5	5	4	4
		2	13	15	12	12	12	13	13	13
		1	42	38	36	37	36	33	34	34
Vessels Registered to 1 Permit			52	46	45	46	45	42	46	
Vessels Registered to 2 Permits			23	24	22	22	20	21	21	
Vessels Registered to 3 Permits			25	26	27	30	27	27	25	
Total Vessels Registered to Permits During the Primary Season			100	96	94	98	92	90	92	

Overall, with the exception of 2020, over 80 percent of the vessels that have fished in the primary tier fishery since 2015 have harvested the majority of their tiers as shown in Table 7. However, there are between nine and 13 vessels in 2015-2019 that have historically harvested no sablefish against their tier(s). Even with the season extension in 2020, 22 vessels that had registered tiers at some point during the season harvested no sablefish and the number of vessels with landings but less than 50 percent attainment increased by over five times the average of the previous four years (i.e., three vessels).

Table 7. Count of vessels by percent attainment of registered tiers, 2015-2020. Source: PacFIN.

Year	0	0-50%	51-75%	76-90%	91-99%	99%+
2015	10	3	2	9	23	49
2016	9	3	9	8	18	47
2017	13	3	2	3	12	65
2018	10	1	4	5	9	64
2019	10	5	6	8	9	54
2020	22	16	3	4	7	44

Internal Reference: LEFG Review/Code.rmd and ENF006 reports

Prior to 2017, a vessel could not fish against their tier limits and DTL fishery on the same trip and there was a 24-hour waiting period between landings in the two sectors. In other words, if a vessel had exceeded its cumulative tier limit on a trip, any fish in excess of the limit would need to be discarded. However, after implementation of the 2016 LEFG follow-on package, a vessel could harvest the remainder of its cumulative tier limit and a full LE DTL limit on the same trip. As shown in Table 6, starting in 2017, there was a shift in the proportion of vessels taking a higher percentage of their tier limits compared to 2015 and 2016, which may indicate that this flexibility made it easier for vessels to make a final trip and harvest the remainder of their tier limit without going over the regulatory limit (tier limit + one DTL) and having to discard additional sablefish.

Concentration of Harvest

Figure 3 displays how the participating vessels and concentration of landings in the LEFG primary sablefish fishery has changed since 2011. While there has been a reduction in participation since immediately prior to the last review, the concentration of landings among vessels was generally stable with the exception of 2020. This trend is more clearly captured in Figure 4 which normalizes the curves by comparing the share of harvest to the percent of the fleet rather than to the number of vessels (Figure 3). In Figure 4, an equal distribution line has been added which indicates the shape of the curve in the event that each vessel had landed exactly the same amount in a given year. Greater deviations from the equal distribution line indicate relatively greater concentration of landings among fewer vessels. The overlap of the 2011-2019 lines represent that there is a fairly consistent concentration in landings.

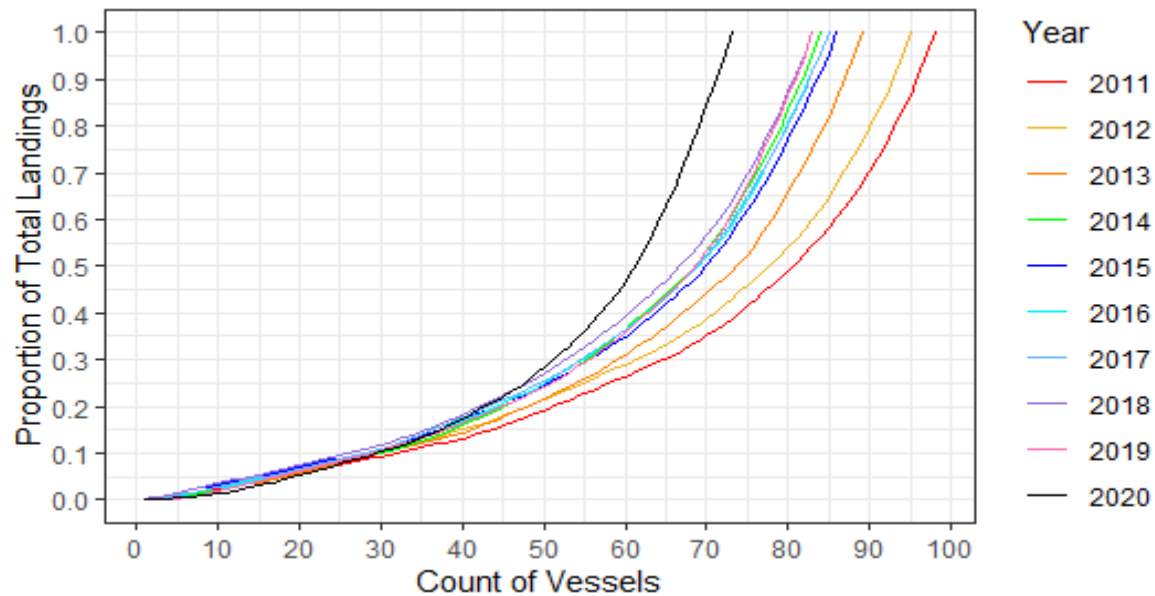


Figure 3. Cumulative distribution of landings by participating primary tier vessels, 2011-2020.
Source: PacFIN

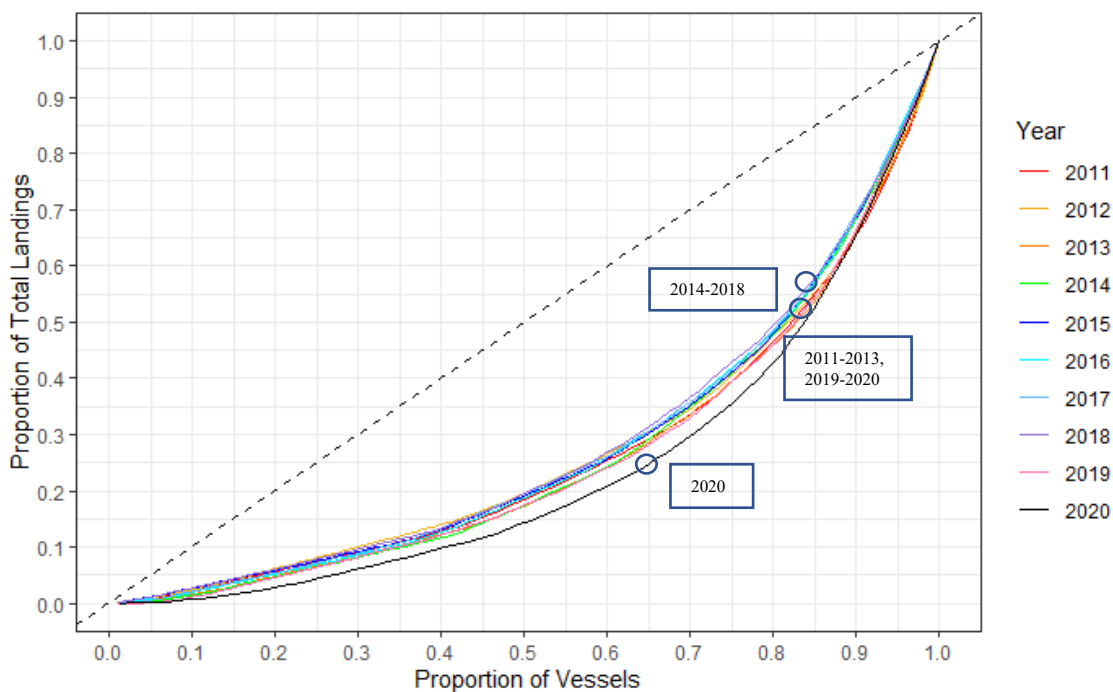


Figure 4. Concentration of landings by the cumulative share of vessels participating in the LEFG primary sablefish fishery from 2011-2020. Source: PacFIN

Changes in harvest distribution among vessels could indicate the possibility of shifts in equitable management outcomes. In terms of harvest distribution, there appears to have been no significant shift in the distribution of harvest since the last review or since just after the program

was implemented (see [Figure 3-6 of the 2014 review](#)). Using the Gini coefficient, which demonstrates the concentration of landings amongst vessels, Figure 5 shows the Gini coefficient from 2002-2020. A Gini coefficient of zero indicates an equal distribution of landings, while a value of 1 indicates that a single vessel made all the landings (i.e., the most concentrated distribution). As Gini coefficient values increase from zero to one indicates increasingly concentrated landings distributions. Starting in 2010, there has been little variation in the concentration of landings, with the exception of 2020. Prior to 2010, there was a greater dispersion of landings (shown by the lower Gini coefficient) from 2005-2008.

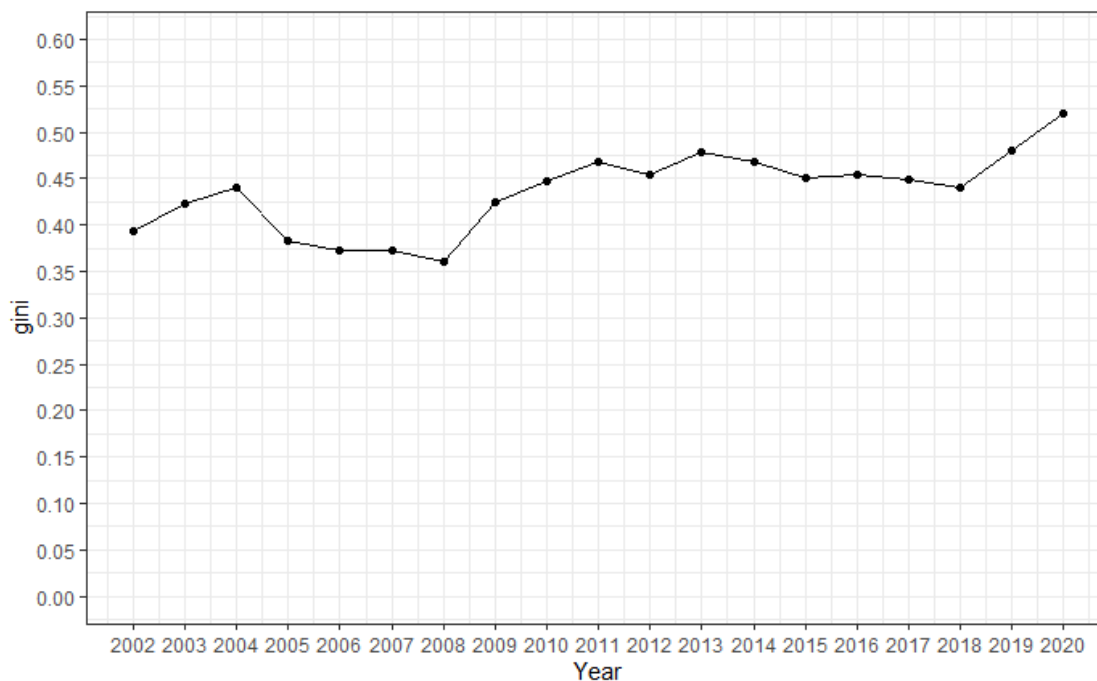


Figure 5. Gini coefficient of the distribution of landings by primary tier vessels, 2002-2020

Fleet Consolidation

One mechanism by which the fleet rationalizes is through the stacking of multiple permits onto single vessels and another is by the combination of permits to generate a single permit with a larger size endorsement.

The prior review noted that it was difficult to discern any consistent direction of change of consolidation of permits on a per-vessel basis. There have been some changes in consolidation since the last review, with more vessels stacking three permits and fewer vessels using only a single Tier 3 permit, but the more recent changes are still within the range of the values observed during the earlier times of the program (2002-2008). In 2008, there were 26 vessels with three stacked permits (Table 3-3 of the 2014 review) which then declined to 21 in 2012 (see [Table 3-2 in the 2014 review](#)). Since 2012 though, there has been an increase in the number of vessels with three stacked permits back to 2008 levels (21 in 2012 compared to 27 on average from 2014-2020) while the number of vessels registered to three Tier 1 permits has been stable at two. Given that the number of vessels with three stacked permits has been stable in the last five years,

it may suggest a consolidation of permits occurred between 2013 and 2015. Similar to the 2014 review, since 2014 the majority of vessels during the primary season are registered to a single permit. The greatest change during the period covered by this review (2014-2020) has been a general decline in the number of vessels that have only a single Tier 3 permit (from 42 in 2014 to 34 in 2020; second to last row of Table 6); however, these values are still greater than that in 2004 and 2008 (29 and 22, respectively, Table 3-2 of the 2014 review).

Permit consolidation may also happen through permit combination; though, in the case of permit combinations, the new larger permit theoretically allows the same physical capacity in the fishery as the two smaller permits. However, if two tier permits are combined, the resulting permit receives only the largest of the tier endorsement. The loss of a tier limit likely inhibits the combination of fixed gear permits with tiers in favor of the combination of tier permits (sablefish endorsed permits) with non-sablefish endorsed permits.

Table 8 shows the distribution of length endorsements for sablefish permits by tier and also by gear endorsement in 2020. From 2014-2020 there were no permit combinations and therefore no changes in the distribution amongst gear or tier groups. The table shows the average length endorsement for Tier 1 permits (66.6 feet) is longer than the average for both Tier 2 permits (52.6 feet) and Tier 3 permits (47 feet). The minimum length endorsements follow the same pattern, with the minimum Tier 1 permit length endorsement (40 feet) exceeding those for both Tier 2 (32 feet) and Tier 3 permits (18 feet). However, the same is not true for the maximum length endorsements. While the longest Tier 3 permit (97.3 feet) is shorter than the longest Tier 1 permit (138 feet), it is longer than the longest Tier 2 permit (73.3 feet). This is the same pattern as was shown in the previous review, with changes only appearing in the Tier 2 category for maximum and average lengths (decrease of 14.7 ft and 0.5 ft respectively). There are no changes in the endorsement length statistics by gear endorsement since the last review. From this table, it is difficult to discern any meaningful patterns of change regarding permit length and gear endorsements, as compared to the values observed in the previous review.

Table 8. Number of sablefish endorsed permits by tier and gear endorsement and the average, minimum, and maximum length of those permits as of end of 2020. Source: NMFS Public Permit Database

Permit Category		Count of Permits	Mean Length (ft)	Min Length (ft)	Max Length (ft)
Tier	Tier 1	28	66.6	40	138
	Tier 2	42	52.6	32	73.3
	Tier 3	94	47.0	18	97.3
Gear	Longline and Pot Endorsement	4	49.2	40	55.3
	Longline Endorsement	132	50.1	18	97.3
	Pot Endorsement	28	60.4	32	138

Larger vessels tend to stack more permits and smaller permits are more likely to remain unstacked than larger permits. Figure 6 shows the distribution of stacked and unstacked permits by vessel length in 2020. Vessels may stack permits of various length endorsements, however, at

least one of those permits must meet the vessel length requirement. Figure 7 shows as of September 1, 2020 how permits were registered across the same length bins shown in Figure 6. Additionally, the figure describes the permit stacking combinations and distinguishes between the stacked permits that meet the vessels length most closely (“Sufficient”) and other stacked and unstacked permits. For purposes of this analysis, a sufficient permit is either the permit within 5 ft of the vessel’s length or, if no permits are within the 5 ft requirement, the permit that is the closest (but greater) in vessel length. If multiple permits were within the 5 ft criteria, then the permit with the least difference from the vessel length was categorized as “sufficient”. NMFS designates the permit registered to the vessel for the longest period of time as the “base permit,” so long as its length endorsement is sufficient for the vessel and unless the vessel requests a different permit. Other “non-base” permits are not required to meet the vessel length requirements—i.e., may be used even if the vessel is more than five feet longer or shorter than the permit’s size endorsement. For stacked permit situations, this review focuses on the sufficient permits rather than the base permits because information on the base permits is incomplete. However, information on sufficient permits is more informative than that on base permits, because sufficiency relates to congruence with vessel size while base permit status is influenced by the order in which permit are acquired. The “other stacked permits” (which could include the base-permit) could be unregistered from the vessel and the vessel would still be able to participate in the primary fishery using the “sufficient” permit. Thus, the single permit plus the sufficient permits are those that allow the current fleet to operate while the “other stacked permits” are consolidations which allow participating vessels to expand their harvest.

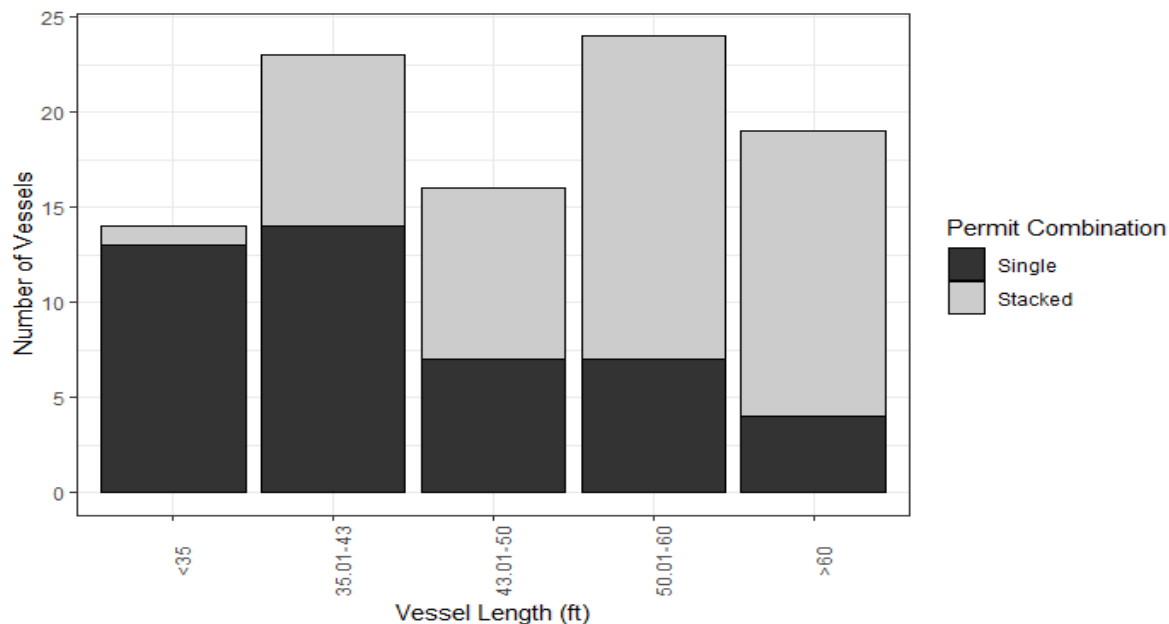


Figure 6. Number of vessels by permit combination (stacked or single permit) and vessel length, 2020. Only includes vessels with permit assigned during primary season. Source: NMFS Public Permit Database

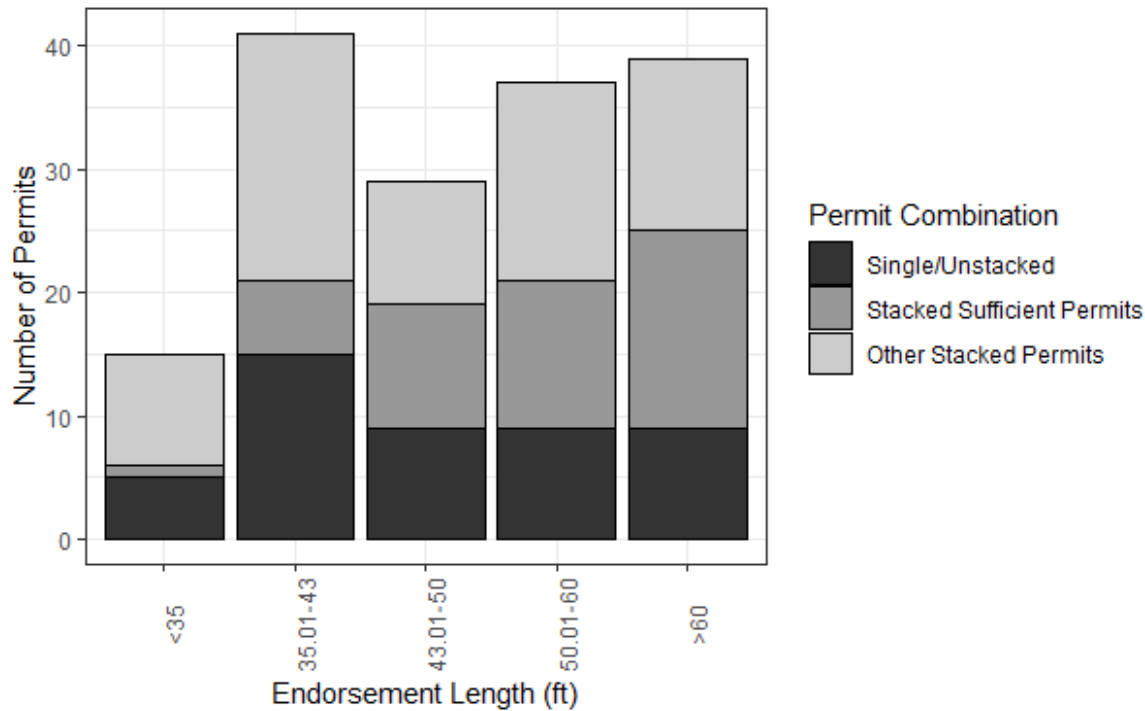


Figure 7. Number of permits by combination (single, sufficient length permit in a stack, other permits in a stack) as of September 1, 2020. Source: NMFS Public Permit Database

In general, larger vessels tend to stack permits more compared to smaller vessels (Figure 6). The permit size bin with the largest number of permits are the 35.01-43 ft bin and the >60 ft endorsement length bin (Figure 7). The largest number of single permits (15, unstacked permits) and largest number of other stacked permits (20, i.e., not the sufficient length) was in the 35.01-43 ft permit size bin. The largest number of sufficient permits and largest number of all stacked permits (sufficient and “other” combined) was in the >60 ft permit size bin.

The 2014 review noted that vessels appeared to be downsizing under the tier program, a possible source of increased efficiency based on comparing permit endorsements to actual vessel size. This is evidenced by the fact that permits are being used on vessels smaller than what is authorized by the length endorsements of the permits. Table 9 shows, by length category, the number of vessels and the number of permits used to authorize a vessel’s participation in the fishery (primary permits). The number of primary permits is the sum of unstacked permits (i.e., single permits used on vessels that do not stack additional permits) and stacked sufficient length permits (i.e., the main permit in a two or three permit stack) in Figure 7. The number of vessels is taken from the total vessel counts in Figure 6.

Based on 2020 data, the conclusion of the 2014 review with respect to vessels downsizing appears to remain true still. Looking at the >60 ft bin, there are 19 vessels of this size but there are 25 permits of >60 ft in endorsed length being used on vessels as the primary permit. This indicates that there were six vessels in 2020 using a permit endorsed for a greater length than is necessary for the vessel, which means that small vessels are using six permits that would

otherwise allow larger vessels into the fishery. The same pattern can be seen in the 34.01-50 ft bin.

Table 9. Number of vessels and primary permits (either single or sufficient length permit in a stack) by size category. Source: NMFS Public Permit Database

Size Category	Vessels	Primary Permits (sufficient)
<=35 ft	14	6
35.01-43 ft	23	21
43.01-50 ft	16	19
50.01-60 ft	24	21
>60 ft	19	25

One way to determine the degree to which there has been capacity reduction is by assessing the aggregate capacity of the LEFG sablefish endorsed permits compared to that of the vessels which participate in the fishery. Table 3 of Subpart C of 50 CFR 660 provides a table of capacity rankings by vessel length (LOA). Using those rankings, Table 10 below compares the overall capacity of all LEFG sablefish endorsed permits and those sablefish endorsed permits registered to a vessel as of September 1 of each year based on endorsement length compared to the vessels that participated in the fishery in each year.⁶ Prior to the catch shares program and under the equal tier allocations (1998-2001), the fleet's average capacity was 1,373. After the program was first implemented in 2002, it does appear that the total capacity of each years participating vessels is declining, with values averaging 1,055 between 2002 and 2011 and averaging 926 thereafter.

⁶ Vessel lengths were obtained from the NMFS permit database. For those vessels without length records, other sources of length data were acquired through the PacFIN system—including the USCG and state databases.

Table 10. Capacity comparison of all sablefish endorsed permits, permits registered to vessels as of September 1, and vessels that fished in each year from 1998-2020. Source: NMFS Public Permit Database and PacFIN

Year	All Sablefish Endorsed Permits	Permits Registered to Vessels as of 09/01	Vessels that fished in the tier fishery a/b/
1998	2113.38	2107.93	1366.85
1999	2113.95	2062.26	1459.12
2000	2107.56	1965.30	1450.28
2001	2107.56	2053.79	1214.47
2002	2107.56	2091.68	1123.68
2003	2107.56	2107.56	1139.67
2004	2108.80	2108.80	1079.92
2005	2108.80	2048.12	1003.72
2006	2108.80	2082.31	1020.39
2007	2108.48	1929.35	1073.62
2008	2108.48	2108.48	1048.61
2009	2108.48	2104.10	976.40
2010	2111.99	2072.53	1028.45
2011	2111.99	2012.33	980.02
2012	2111.99	2014.22	976.84
2013	2111.99	1963.90	900.53
2014	2111.99	1949.65	911.52
2015	2111.99	1866.76	913.03
2016	2111.99	1896.32	924.90
2017	2111.99	2111.99	919.35
2018	2111.99	2010.95	911.80
2019	2111.99	2005.87	932.62
2020	2111.99	2096.37	885.87

a/ Fifteen primary vessels that were registered to permits and made landings did not have a vessel length recorded (total of 29 occurrences) and were removed from the calculation of vessel capacity in the fourth column.

b/ Vessels that were modified inseason or had multiple listed vessel lengths were assumed to be at the larger of the two lengths.

Permit Prices

There are a number of different influences on permit prices, one of which is improvements in efficiency/profit opportunity. Expectations about efficiency/profit are influenced by assumptions about future sablefish prices and annual catch limits (ACL) and related factors—including whether vessels will be required to pay for cost recovery. The 2014 review stated that information on sablefish permit prices was too limited for use in determining any trends in the permit values over time. This remains true as of the drafting of this review—with the Council recommendation to collect LEFG permit prices yet to be prioritized (Table 2). A more in-depth study would be needed to assess impacts of factors on permit prices. However, some limited information is available via Dock Street Brokers. Figure 8 below compares the average price per pound of sablefish landed by tier vessels (top panel) to the implied price per pound of quota based on listed sale prices of permits (bottom panel) from 2002-2020. There appears to be a similar trend in the price per pound that vessels receive that is similar to the price paid for the permit per pound of quota— with an increase occurring from 2004 to 2011, followed by a recent decline in prices, particularly in the last three years.

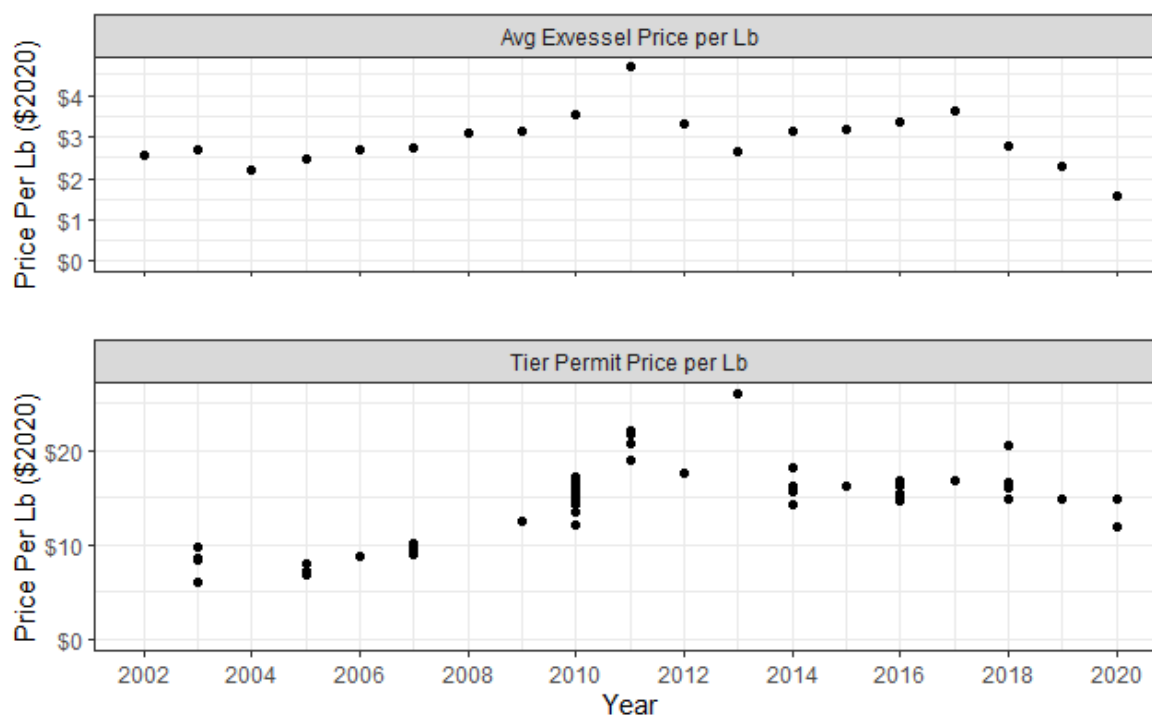


Figure 8. Average ex-vessel price per pound of landed primary sablefish (2020\$; top panel) compared to implied price per pound of quota (2020\$) for permits listed for sale by Dock Street Brokers (bottom panel), 2002-2020. Source: PacFIN, Dock Street Brokers

Net Revenue

In the 2014 review, research by Dr. Carl Lian of the Northwest Fisheries Science Center (NWFSC) was presented on the 2010 total cost net revenues earned by LEFG vessels (both LEFG primary and other LE groundfish fixed gear fisheries). Dr. Allen Chen of the NWFSC updated that analysis utilizing 2014-2017 voluntary survey data.

One of the expectations of catch share programs is that net revenue for vessels will increase with fleet consolidation and greater operational flexibility. An assessment of the effect of the program on net revenues requires cost and earnings data for both before and after the program went into place (2001). Unlike for the trawl catch share program, which required the submission of data for both the two years prior to and every year since implementation, there is not a mandatory data collection program for the LEFG permit stacking program. While pre-program cost data is not available, cost and earnings data were collected in 2010 through the NWFSC Economics and Social Science Research Program periodic voluntary economic data collection program. These data were used to provide 2010 net revenue estimates for the 2014 review. For this review, voluntary survey data collected between 2014 and 2017 were used to develop more recent estimates of net revenue. The 2010 and more recent estimates have been inflation adjusted to 2019 dollars to allow a comparison of the earlier to current results.

The estimates of net revenue provided are for total cost net revenue (TCNR; revenue generated after deducting both fixed and variable costs). See Appendix A for a more detailed description of the survey and methodology for estimating TCNR. Looking at groups of LEFG vessels where all groundfish revenue is included, most categories' revenue has gone down since 2010, but costs have declined by more such that TCNR per vessel has increased (Table 11). The exceptions are for vessels in the 35- 50-foot category, for which TCNR has declined by 29 percent and California vessels, for which TCNR has declined by 60 percent. Focusing only on the LEFG vessels that participate in the primary sablefish fishery, in the 2014-2017 period, there has been a decline in TCNR of 13 percent relative to 2010.

Table 11. Changes in vessel revenues and costs for 2014-2017 compared to 2010 (all values inflation adjusted to 2019 dollars). Source: NWFSC, Economics and Social Science Research Program (see Appendix A).

	Revenues Per Vessel	Costs Per Vessel	Total Costs Net Revenues Per Vessel	Revenues Per Vessel	Costs Per Vessel	Total Costs Net Revenues Per Vessel
All LEFG Vessels Groundfish	-\$17,742	-\$19,303	\$1,560	-14%	-17%	9%
< 35 feet	\$12,234	\$10,028	\$2,208	18%	16%	39%
35 to 50 feet	-\$33,013	-\$28,019	-\$4,994	-26%	-26%	-29%
> 50 feet	-\$3,363	-\$19,048	\$15,685	-2%	-13%	72%
CA	-\$5,289	\$1,236	-\$6,526	-5%	1%	-60%
OR	-\$15,900	-\$20,120	\$4,218	-11%	-17%	21%
WA	-\$5,055	-\$26,893	\$21,838	-4%	-24%	141%
All LEFG Primary Fishery Vessels ^{a/}	-\$33,595	-\$30,913	-\$2,682	-23%	-25%	-13%

a/ Note that for this study the sample did not include any LEFG sector vessels that were not also sablefish endorsed. Therefore, the data on this line is identical to the data for the top line of this table.

As in 2010, for 2014-2017, TCNR tend to be larger with larger vessel size. Table 12 reports revenues, costs, and total costs net revenues by various groupings for the 2014-2017 data

collections. Species-specific revenues and landings are obtained from fish tickets. While the average TCNR per vessel is \$18,546, vessels under 35 feet in length reported an average TCNR of \$7,832, while vessels over 50 feet in length reported an average TCNR of \$37,563. This is largely because while costs and revenues both increase with vessel size, revenues as reported by fish tickets increased at a faster rate as vessel length increased. While the averages for these size categories are different, the difference is statistically significant in comparison to the other groups only for vessels that are over 50 feet.⁷

When disaggregated by year, TCNR tended smaller in 2015. However, there is too much variability to say that 2015 is different from other years in a statistically significant way.⁸ Also, TCNR is lower for California vessels included in the sample, compared to other states (difference is statistically significant at the 10 percent level). One likely factor is that the average size of vessels in the sample were larger in Oregon and Washington, although this is unlikely to be the sole determinant.

Finally, vessels that participate in both the primary and DTL fisheries have slightly lower average revenue and TCNR per vessel than the averages for all LEFG primary vessels and the averages for just those that also participate as gear switchers in the trawl IFQ fishery, the latter of which are generally more profitable than the rest of the LEFG fleet (Table 12). Data on gear-switchers used for this analysis is not collected by the voluntary limited entry fixed gear survey, but rather by the Economic Data Collection Program at the NWFSC, which collect data for all participants in the trawl IFQ fishery. One factor likely influencing the higher TCNR for gear switchers is their vessels tend to be larger, fish greater quantities, and receive more revenue across all fisheries they participate in, compared to the LEFG fleet. However, even though they are larger, gear-switchers are still more profitable than even the LEFG fishery vessels over 50 feet. Also, not shown in the table is that gear-switchers were particularly profitable in 2016 and 2017, receiving higher-than-average prices per pound for sablefish. At large quantities, small increases in prices can translate to significant increases in profits if costs remain relatively constant, although additional research is required on this topic.

Looking at harvest levels and focusing just on variable costs, modeling exercises show that on average, the maximum variable cost net revenue (VCNR) estimate for a vessel would be around 25 mt of sablefish landings (the maximum difference between the revenue and variable cost lines in Figure 9). Figure 9 shows sablefish landings on the horizontal axis, and dollar values on the vertical axis. The revenue plot uses the price per metric ton received by those responding to the survey to assume linearly increasing revenue (dashed line). Variable costs per metric ton are assumed to be increasing with output (solid line). For the average amount of metric tons of sablefish landed (14.61 metric tons), VCNR is positive in the 2014-2107 survey sample, consistent with the estimates of TCNR. Uncertainty around variable cost is represented by the

⁷ Significance was determined using a two-sample t-test. Conversely, there does not appear to be a statistically significant difference between medium and small vessels (the null hypothesis that the difference between medium and small vessel TCNR is equal to zero cannot be rejected).

⁸ The two-sample t-tests fail to reject the null hypothesis that the difference between 2015 and other years is equal to zero, although 2015 is different from 2016 at a 10% significance level. No differences are statistically significant at a 5% significance level.

shaded area around the VCNR line.⁹ The 2014-2017 sample included only a few observations at the maximum observed landings, therefore, out-of-sample extrapolation is discouraged.

Table 12. Vessel revenues and costs by groups of LEFG vessels (2014-2017).^{a/} Source: NWFSC, Economics and Social Science Research Program (see Appendix A).

Grouping	Revenues Per Vessel	Costs Per Vessel	Total Costs Net Revenues Per Vessel	Metric Tons of Catch Per Vessel (All Species)	Total Costs Net Revenues Per Metric Ton of Catch Per Vessel
All vessels	\$110,619	\$92,072	\$18,546		
< 35 feet ^{b/}	\$80,286	\$72,455	\$7,832		
35 to 50 feet ^{b/}	\$92,806	\$80,404	\$12,402		
> 50 feet	\$165,245	\$127,682	\$37,563		
2014	\$91,953	\$72,419	\$19,534		
2015	\$100,223	\$93,044	\$7,179		
2016	\$118,855	\$93,041	\$25,814		
2017	\$127,162	\$105,291	\$21,871		
CA	\$91,884	\$87,537	\$4,346		
OR	\$125,785	\$101,186	\$24,598		
WA	\$120,228	\$82,926	\$37,302		
All LEFG Primary Fishery Vessels ^{c/}	\$110,619	\$92,072	\$18,546	17.10	\$331
Primary and DTL	\$106,755	\$89,661	\$17,093	17.20	\$538
Primary and Gear Switching	\$328,654	\$234,742	\$93,912	44.76	\$2,224

a/ Note that some groupings are not mutually exclusive. Some vessels may be in multiple groupings (e.g., registered in more than one state).

b/ Differences in values for vessels less than 35 feet and between 35 and 50 feet are not statistically significant at the 5% significance level.

c/ Note that the sample of LEFG groundfish vessels used for this study did not include any vessels that were not also sablefish endorsed.

Therefore, the data on this line is identical to the data for the top line of this table.

⁹ This area represents one standard error, calculated by the delta method.

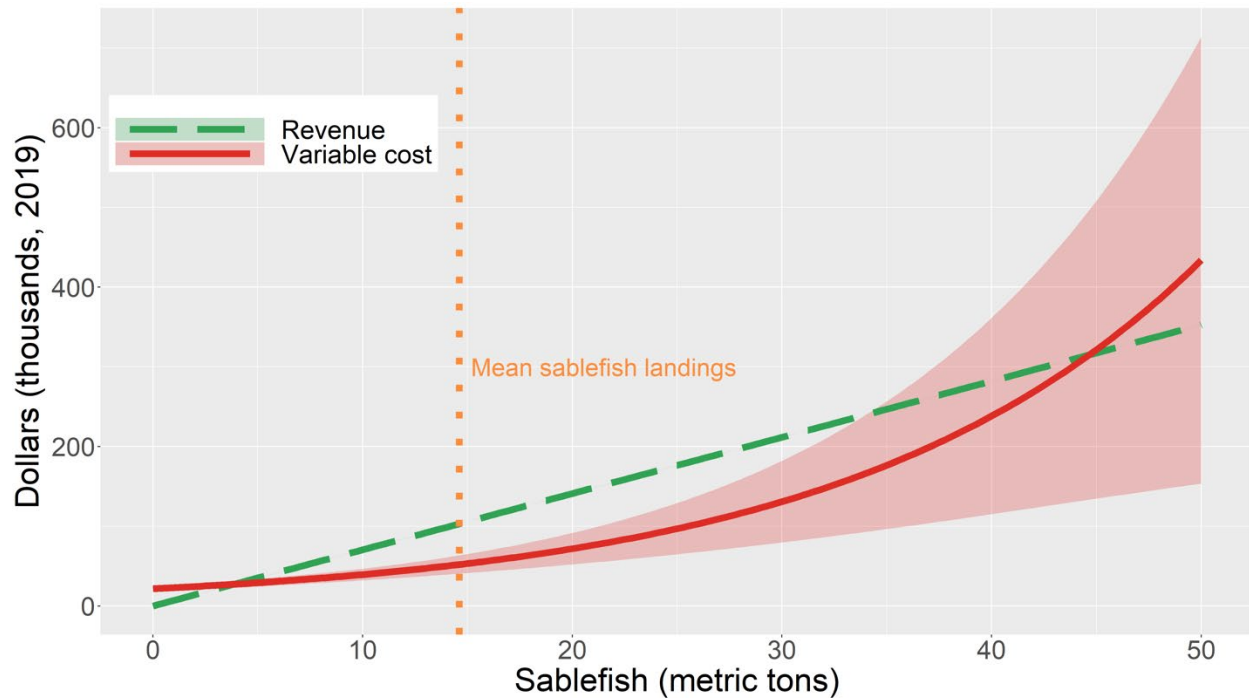


Figure 9. Variable costs and revenues fit to observed sablefish landings (LEFG sablefish vessels, 2014-2017). Source: NWFSC, Economics and Social Science Research Program (see Appendix A).

2.1.2. Maintain or direct benefits towards fishing communities

This objective relates most directly to NS-8 and FMP Objective 16 (take socio-economic needs of fishing communities into account). Did the program provide for the sustained participation of fishing communities and, to the extent practicable, minimize adverse economic impacts on such communities?

The last review noted that “for most ports, no consistent trend is obvious... and it is not possible to separate the effects of the program from the many other causes of variation in involvement by the port groups.”

To consider how well the sablefish program maintained or directed benefits toward fishing communities requires data on changes in the sablefish landings by West Coast port since the previous review. Additionally, an owner-on-board requirement—intended, in part, to direct benefits toward local fishing communities—can be assessed by evaluating changes in the number of entities subject to the provision. Similar to the 2014 review, the following information was considered or analyzed for this objective:

- identification of the primary ports where LEFG primary sablefish landings are occurring;
- calculation of port involvement and dependence ratios; and
- percent of shares registered to owner on board versus non-owner on board vessels.

Port Involvement

Port involvement is a measure of a port's contribution to the West Coast sablefish fishery landings (measured as the ex-vessel value from the fishery landed in the area as a share of the total ex-vessel value of the entire primary sablefish). Primary sablefish landings typically occur in every IOPAC (input/output model for the West Coast) port group north of 36° N. lat., with some landings occurring into Morro Bay (south of 36° N. lat.) prior to 2014. Due to confidentiality restrictions for several ports, annual involvement could not be shown on the individual port group level and therefore state level aggregations are also provided. For each state, Figure 10 displays involvement in the LEFG primary sablefish fishery for each year from 2002-2020. From 2008-2013, California received an increasing percentage of revenue coming from the LEFG primary fishery. Starting in 2013 however, as the California share began to decline, Washington began seeing an increase in the proportion of revenue landed into its ports until 2019. Oregon appears to have no clear trends in the year-to-year changes in the proportion of revenue landed.

While confidentiality concerns prevent showing the share of landings and revenue for many ports on a yearly basis, annual trends can be described qualitatively and port level information for multiyear periods can be displayed (Table 13). Qualitatively, on an annual basis, Puget Sound has been increasing its involvement in the fishery since 2011 by a factor of nearly three whereas the Washington Coast port group proportion of the revenue has declined by over half its 2011 value.

Relative to the 2011-2015 period, from 2016-2020 the proportion of average landings and revenue coming into Puget Sound ports has increased the most (9.3 and 10.1 percentage points, respectively), followed by minor increases into Astoria-Tillamook, Newport, and Crescent City-Eureka (Table 13). The largest decrease in terms of average proportion of landings and revenue for the two periods has been in the Washington Coast port group followed by Coos Bay-Brookings.

Coos Bay-Brookings have shown higher involvement in 2018-2019 compared to 2015-2017 and 2020, suggesting that the values in Table 13 are likely being down-weighted by those lower years. The opposite is true for Astoria, where the percent of the LEFG primary revenue has been steadily declining since 2016 with the exception of 2020 where it increased by a factor of three from 2019.

The peak for California from 2008-2013 was driven primarily by increases in both Fort Bragg and San Francisco. Morro Bay had received some primary sablefish landings prior to 2015, however, none were recorded in the recent era. These data show an opposite conclusion of the trends seen in the prior review, which saw declines in Puget Sound and increases in Brookings and Morro Bay.

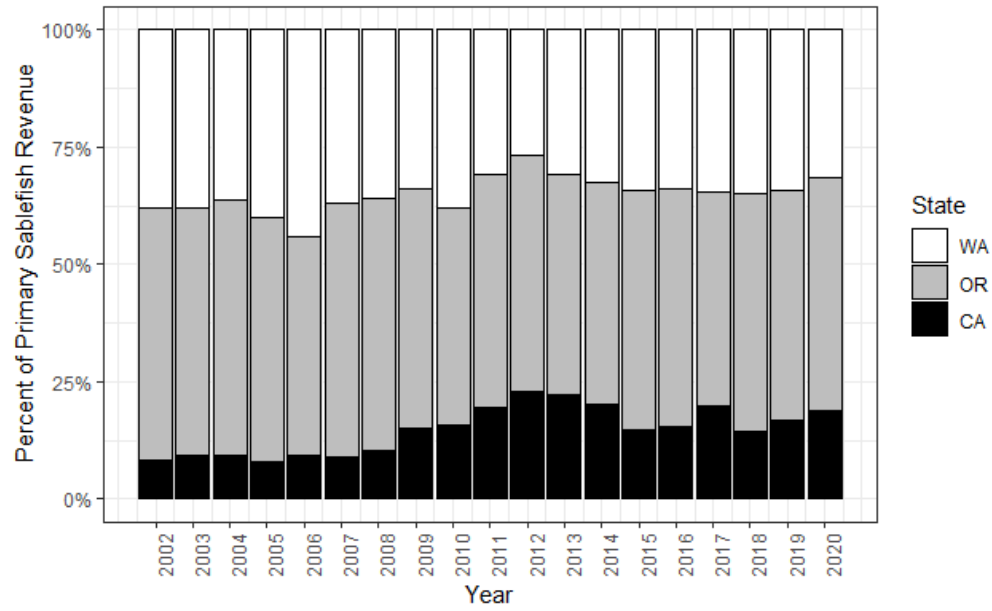


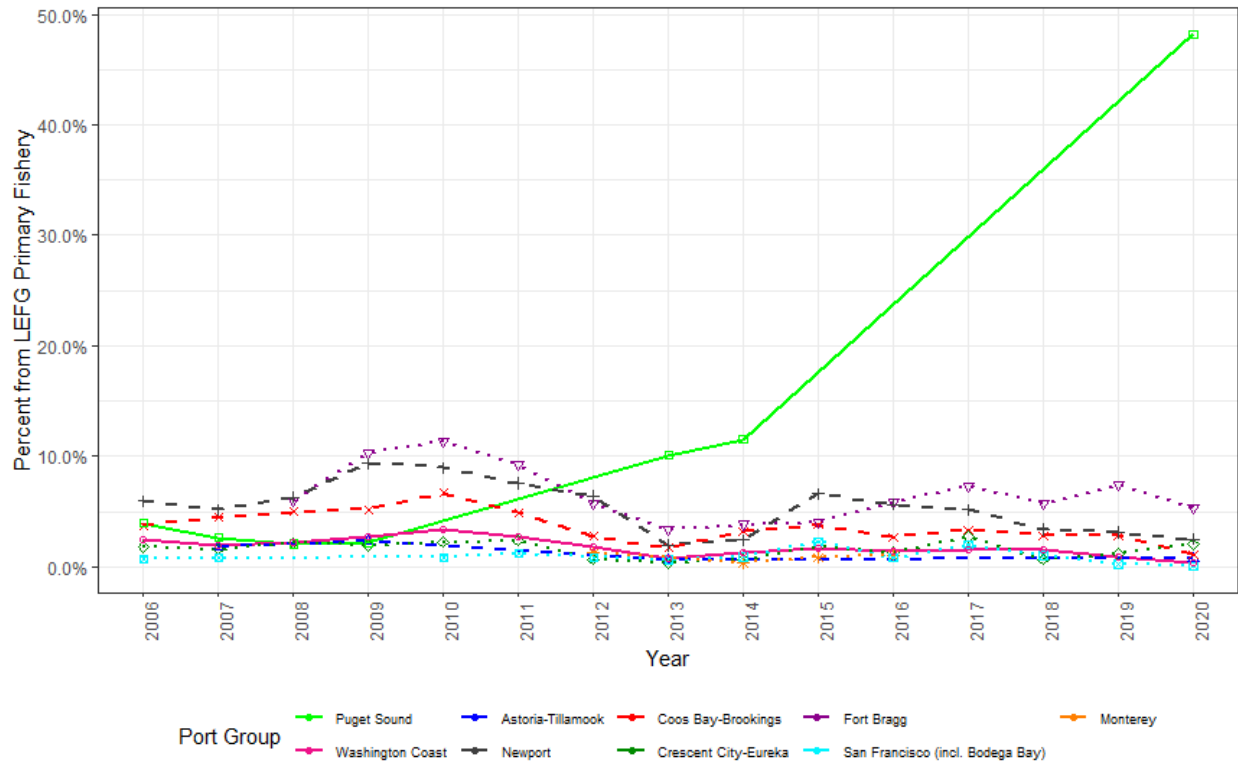
Figure 10. Percent of primary sablefish revenue by state and year, 2002-2020.
Source: PacFIN

Table 13. Primary sablefish average landings, percent of total coastwide landings and average revenue (1,000s of 2020 dollars, adjusted for inflation, AFI) and percent of total revenue by IOPAC port group, 2011-2015 and 2015-2020. Source: PacFIN

IOPAC Port Group	2011-2015						2016-2020					
	Avg. Land. (mt)	Avg. % of Coastwide Land.	Avg. Rev. (AFI 1000s)	Avg. % of Coastwide Rev.	# of Ves.	# of Dealers	Avg. Land. (mt)	Avg. % of Coastwide Land.	Avg. Rev. (AFI 1000s)	Avg. % of Coastwide Rev	# of Ves.	# of Dealers
Puget Sound	125.8	10.6%	\$1,017	11.7%	16	6	265.0	19.7%	\$1,721	21.8%	17	5
Washington Coast	228.1	18.5%	\$1,853	19.4%	40	18	154.2	11.2%	\$1,070	11.9%	26	27
Astoria-Tillamook	69.5	5.8%	\$515	5.7%	12	4	82.3	6.1%	\$533	6.4%	10	4
Newport	272.0	22.1%	\$2,290	23.9%	32	15	356.7	26.4%	\$2,249	28.0%	27	17
Coos Bay-Brookings	229.4	19.1%	\$1,791	19.5%	34	12	183.5	13.5%	\$1,238	14.8%	20	17
Crescent City-Eureka	49.1	4.0%	\$337	3.6%	10	8	83.4	6.2%	\$441	5.8%	12	19
Fort Bragg	135.6	11.2%	\$797	8.6%	13	14	153.5	11.3%	\$504	6.3%	14	19
San Francisco (incl. Bodega Bay)	64.5	5.4%	\$486	5.5%	16	27	43.4	3.1%	\$314	3.2%	11	32
Monterey	29.1	2.4%	\$128	1.4%	10	4	32.7	2.4%	\$138	1.9%	6	3
Morro Bay	20.2	1.5%	\$131	1.1%	6	7	-	-	-	-	-	-

Port Dependence

Port dependence is a measure of the West Coast sablefish fishery contribution to the landings in the port. Figure 11 displays the dependence of IOPAC port groups on revenue from the LEFG primary sablefish fishery measured as a percent of each port group's total landings revenue from all West Coast fisheries from 2006-2020. Port-year strata that do not meet confidentiality standards were removed from the figure and therefore lines connecting years through these points are not necessarily representative of the trends within that period. Puget Sound's increasing dependence on the LEFG primary fishery appears to have begun starting in 2011, which corresponds to the implementation of the trawl catch shares program, yelloweye rockfish rebuilding plan, and other factors that contributed to a significant loss of the groundfish deliveries to the area ([Appendix B to the 2019-20 Harvest Specifications, Yelloweye Rebuilding Plan Revisions, and Management Measures](#)). While certain years are not visible in the figure, this trend for Puget Sound appears to have continued in recent years, with the average percentage growing from 11.4 percent in 2011-2014 to 19.2 percent in 2015-2019. In 2020, the primary sablefish fishery was the source of almost half of the ex-vessel revenue for West Coast catch landed into Puget Sound ports. Port groups such as Newport, Fort Bragg, and Coos Bay-Brookings have seen a wide range of the percent of total revenue coming from the LEFG primary fishery over the time period. The remaining port groups appear more stable in their dependence on the fishery.



Note: Year-port combinations that do not meet confidentiality standards are excluded. Washington ports shown in solid lines, Oregon ports shown by dashed lines, and California ports shown in dotted lines.

Figure 11. Percent of total port revenue from the LEFG primary fishery by port group, 2006-2020. Source: PacFIN

Table 14 indicates the dependence of each port on the LEFG sablefish fishery in terms of local employment (number of jobs, both directly related to the fishing industry and those supporting the industry, e.g., grocery store workers) and local income (total wages and salaries) for 2014-2020 for those ports with primary fishery landings. For each port group, the table compares the average number of jobs and average income provided by the LEFG sablefish fishery compared to the average employment and income generated by all West Coast fisheries. The data displayed in Table 14 indicate the sablefish fishery provides a relatively small number of jobs in comparison to all fisheries. However, for Puget Sound, the primary sablefish fishery is a significant contributor for the groundfish sector, with an average of over 15 percent of all local fishery jobs related to West Coast catch and nearly 19 percent of resulting income impacts coming from the fishery.

Table 14. Average number of local jobs and income (millions of dollars AFI to 2020) resulting from the LEFG primary fishery compared to landings from all West Coast from 2014-2020 and the average percent of the total jobs and income from the LEFG primary fishery. Source: IO-PAC

IOPAC Port Group	Jobs			Income (millions of 2020\$)		
	Primary	All Fisheries	Percent	Primary	All Fisheries	Percent
Puget Sound	39	243	15.9%	3.35	17.72	18.9%
Washington Coast	35	2,919	1.2%	1.89	158.96	1.2%
Astoria-Tillamook	12	1,374	0.9%	0.99	95.11	1.0%
Newport	44	1,329	3.3%	3.00	80.83	3.7%
Coos Bay-Brookings	34	1,293	2.6%	1.99	71.32	2.8%
Crescent City-Eureka	10	574	1.7%	0.46	36.70	1.2%
Fort Bragg	25	330	7.5%	0.66	12.35	5.4%
San Francisco (incl. Bodega Bay)	12	1,246	1.0%	0.61	67.54	0.9%
Monterey	3	371	0.8%	0.18	23.67	0.8%

Estimates of local jobs and income impacts are based on port of landing, but residence of participants in the fishery also influence where income is spent and consequently the distribution of benefits. The NMFS participant survey (Appendix C) asked participants the zip code in which they lived at least half of the year. Of the LEFG primary fishery vessels that submitted a response, 23 listed California zip codes, 18 listed Oregon zip codes, and the remaining 20 listed Washington zip codes. The majority of responses were out of coastal ports for Oregon and California, with the majority of Washington responses from Puget Sound ports (Table 15).

Table 15. Number of LEFG primary participants (vessel owners) by whether they live in a zip code within a coastal county for more than half the year (from NWFSC voluntary survey).

State	Coastal County	Number of Responses
CA	No	5
	Yes	18
OR	No	2
	Yes	17
WA	No	3
	Yes	6
	Puget Sound	11

Vessel and Permit Ownership by State

Ownership of the tier permits (including those that were unregistered) and the associated vessels registered to those permits during the primary season from 2011-2020 has been fairly equally distributed across the three West Coast states, when examining the periods of 2011-2015 and 2016-2020. Between two to three percent of permits and vessels are owned by entities outside the West Coast in either period (Figure 12). Washington entities have tended to own a larger percentage of sablefish endorsed permits compared to percentage of participating vessels they own and vice versa for California. Oregon's ownership of vessels and permits are nearly identical percentages, although have declined from 2011-2015 to 2016-2020.

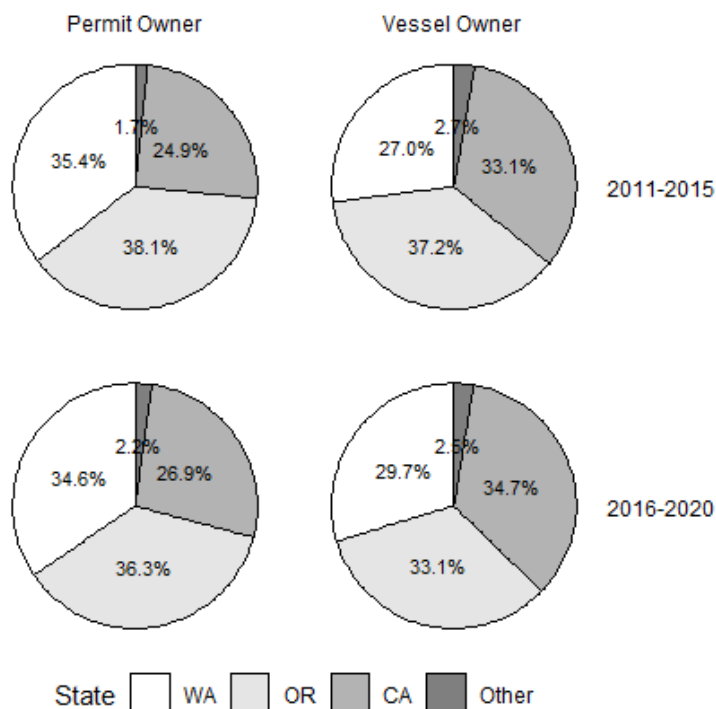


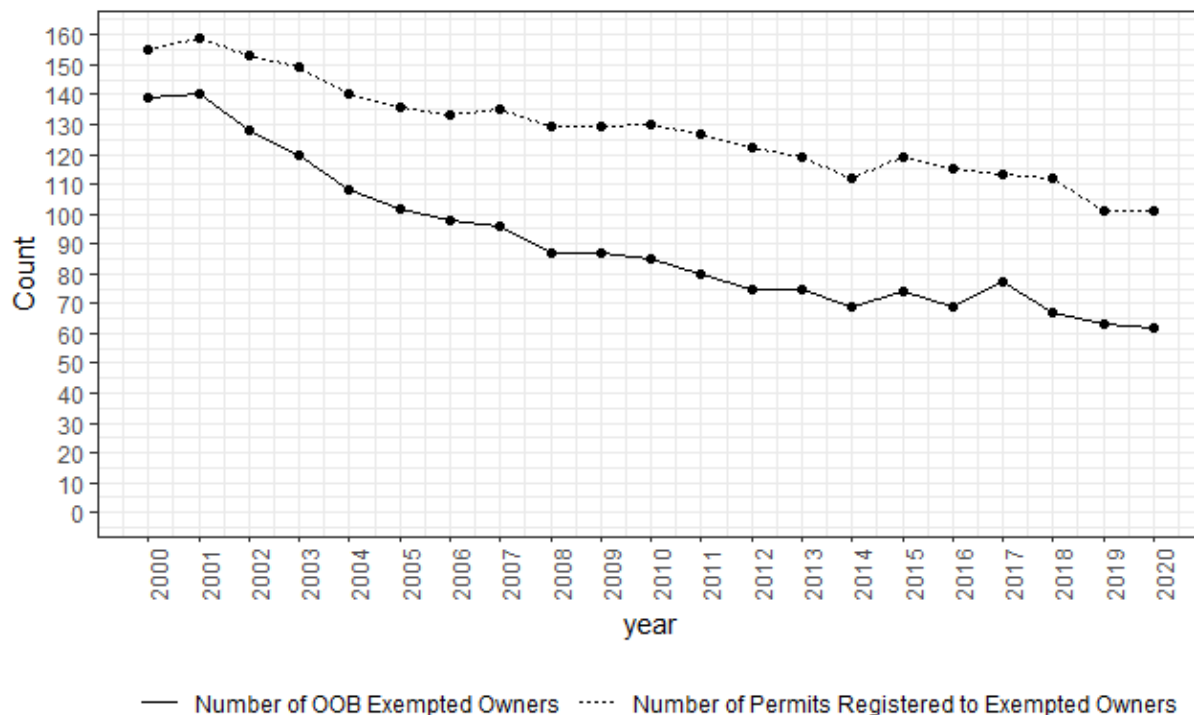
Figure 12. Percent of sablefish endorsed permits and registered vessels by owner state, 2011-2015 and 2016-2020. Source: NMFS Public Permit Database

Overall, the majority of landings of primary season sablefish occur in the state of the vessels' ownership. Due to confidentiality, values are unable to be presented. Washington sees the greatest amount of landings delivered to its ports by vessels owned by residents of the other West Coast states and non-West Coast states. Washington vessels also contribute the most outside of the state in terms of total revenue (nearly 10 percent to Oregon from 2011-2020). Each state though receives approximately 90 percent of the revenue of vessels owned by its own residents.

Landings and the Owner-On-Board Exemption

The owner-on-board provision of the LEFG program was intended to “preserve the social and historic characteristics and practices in the fishery or to encourage the flow of fishery benefits into fishing communities.” It also works together with the three-permit stacking limit to distribute fishery benefits among entities within and across communities (A-14). The owner-on-board requirement limits permit ownership to individuals and requires that any person who owns

or has interest in a sablefish endorsed permit be on board the vessel registered for use with that permit when it is harvesting sablefish against that permit's cumulative landing limit. However, the Council granted exemptions to the requirements in order to allow corporations, partnerships, and other entities that owned permits prior to November 1, 2000 to continue to own permits and not be present onboard the vessel when fishing the permit's tier.¹⁰ These exemptions are specific to the permit owner (not the permit they own); and the exemptions expire over time with changes in ownership of the corporation or partnership (i.e., addition of new owners but not subtraction of owners from partnerships, corporations, etc.) or the divestiture of tier permit(s) for a period of time. Figure 13 shows the number of owner-on-board exemptions and the number of permits registered to those exempted entities since 2000. The requirement was first implemented in 2001 but exemption determinations were based on activity as of 2000. Overall, the number of exempted owners has been steadily declining since 2000. Since implementation, there have been 78 owner exemptions that have expired, with an average of four exemptions per year expiring. The number of permits registered to exempted owners has not declined as rapidly as the number of exempted owners, implying that the average number of permits owned by entities with exemptions has increased.



Note: Permits for which the associated exemption status changed mid-year were categorized as being registered to an exempted owner within that year.

Figure 13. Number of owner-on-board exemptions and the associated number of permits registered to exempted owners, 2000-2020. Source: NMFS Public Permit Database

Occasionally, the number of owner-on-board exemptions appears to increase from one year to the next. However, these “new” owner-on-board exemptions are not the long-term legacy

¹⁰ Specific exemptions can be found at 50 CFR 660.231.

(grandfather) privileges but rather a short-term exemption granted for medical reasons. Medical exemptions can be granted to any sablefish endorsed permit owner for up to three years leading to an appearance that the owner-on-board exemption is increasing. Since 2007, there have been a total of 13 occurrences of temporary exemptions granted.

As the number of owner-on-board exemptions have been declining, so has the share of the allocation assigned to the permits owned by entities with exemptions. Table 16 below describes the number of permits registered to owner-on-board exempted permit owners as of September 1 of each year and the associated proportion of the total share that could be taken by those exempted permits. The decline in the share associated with permits registered to owner-on-board exempted owners is declining at a slightly lower rate (31 percent decrease) than the number of permits registered to exempted owners (34 percent decrease) from 2002-2020. This indicates that higher tier permits are tending to be retained by exempted owners more than lower tier permits. Note that this table provides a snapshot in a year and does not take into consideration exempted owners selling or buying new permits within a year (leading to an exemption status change for the registered permit) or if a medical exemption has been granted.

Table 16. Number of owner-on-board exempted permits (as of September 1) and the corresponding share of tier allocation associated with those permits. Source: NMFS Public Permit Database

Year	Number of Permits with Exemption (as of 9/1)	Share of Tier Allocation
2002	148	90.29%
2003	144	89.49%
2004	139	84.76%
2005	135	84.00%
2006	133	82.36%
2007	129	81.35%
2008	129	83.61%
2009	129	84.34%
2010	129	84.08%
2011	122	81.53%
2012	119	78.86%
2013	121	80.40%
2014	109	70.27%
2015	117	76.06%
2016	115	75.61%
2017	111	71.81%
2018	106	67.93%
2019	101	65.29%
2020	98	61.86%

While many individuals still have an owner-on-board exemption, that does not mean they necessarily use it. While around 40 percent of the permits require the owner to be present (permits not associated with an owner-on-board exemptions), just over 60 percent of the sablefish endorsed LEFG vessel responses to the NWFSC participant survey (Appendix C) indicate that they always captain their own vessels in 2020 (Table 30).

Table 17. NWFSC Survey Responses (2020) to “Do you captain your own vessel?”

Response	Respondents
Always	38
Mostly	10
Sometimes	8
Never	5

Processor Availability

One of the important factors in determining whether communities are able to benefit from the fishery is the availability of processors. While not a question in the 2017 NWFSC survey (Appendix C), the 2020 survey asked participants, “Do you have adequate access to processors or first receivers in order to sell your catch?”. Of the participating vessels from the LEFG primary fishery in the 2020 survey, 31 respondents said “yes,” 12 said “no,” and one did not provide an answer. The respondents replying “no” were equally divided between the states, with California responses tending to come from the northern part of the state (mainly Crescent City/Eureka areas), Oregon from the southern part of the state (mainly Florence and Port Orford), and Washington from inside Puget Sound (mainly from Gig Harbor and Port Angeles).

2.1.3. Prevent excessive concentration of harvest privileges

This objective relates to NS 4, on allocation, and both NS 8 and FMP Objective 16, on fishing communities. In the Council’s effort to reduce capacity in the fishery, did they provide an environment for excessive concentration of the remaining harvest privileges among a few individuals or entities? Such concentration could lead to significant changes in the distribution of fishery benefits among participating communities.

Concentration of harvest privileges are controlled with accumulation limits in this fishery: specifically, in the form of limits on permit ownership/use and the number of permits that can be registered to a single vessel (three permits).

No individual person, partnership, or corporation in combination may own or hold more than three sablefish-endorsed permits. Vessel owners that have permits that are registered to their vessels are considered to hold (control) the permit. However, an exception is provided. In particular, vessel owners may be granted an exemption for situations in which all of the following apply: they have no more than 20 percent ownership interest in a vessel registered to the sablefish endorsed permit, the vessel owner currently has ownership interest in Alaska sablefish individual fishing quota, and the vessel has fished in the past 12-month period in both the West Coast groundfish LEFG fishery and the Sablefish IFQ Program in Alaska. This exception was created to address a situation in which West Coast vessel owners that wanted to fish their Alaska IFQ on a different vessel had to take at least 20 percent ownership of the Alaska IFQ vessel. If that Alaska vessel also had a West Coast LEFG permit, then that permit would count against their three-permit total. There have been only two exemptions granted since 2017.

Concentration of Ownership of Permits and Vessels

One source of insight into whether the sablefish tier stacking program has prevented excessive concentration of harvest privileges is to examine if there is any apparent pattern to the changes in the ownership or control of permits and vessels in the fishery since the last review. The last review cited less than five percent and ten percent increases in permit and vessel ownership concentrations respectively, suggesting that there was little concentration of ownership after program implementation. Utilizing the same methodology of the Gini coefficient described in Section 2.1.1, Figure 14 shows the Gini coefficient from 2011-2020 for ownership of sablefish endorsed permits and all vessels with at least one primary tier landing in those years. Ownership determinations for this analysis were based on an examination of names, addresses, and a review of publicly available business records to identify businesses with common ownership interest (PFMC-Staff Ownership Study). Given that the prior review did not use the same ownership determination criteria, it is impossible to do a direct comparison of the actual values of the Gini coefficient. Yet, trends in consolidation of permits are similar—with a less than a five percent change in the coefficient from 2011-2020. For vessels though, there is a 61 percent difference between the maximum and minimum coefficients. Comparing 2011 to 2020, there has been a 33 percent increase in the coefficient, though the Gini coefficient for vessel ownership is much lower than for the permit-based quota. This suggests that there has been an increase in the concentration of ownership of those vessels participating in the LEFG primary fishery over the last ten years.

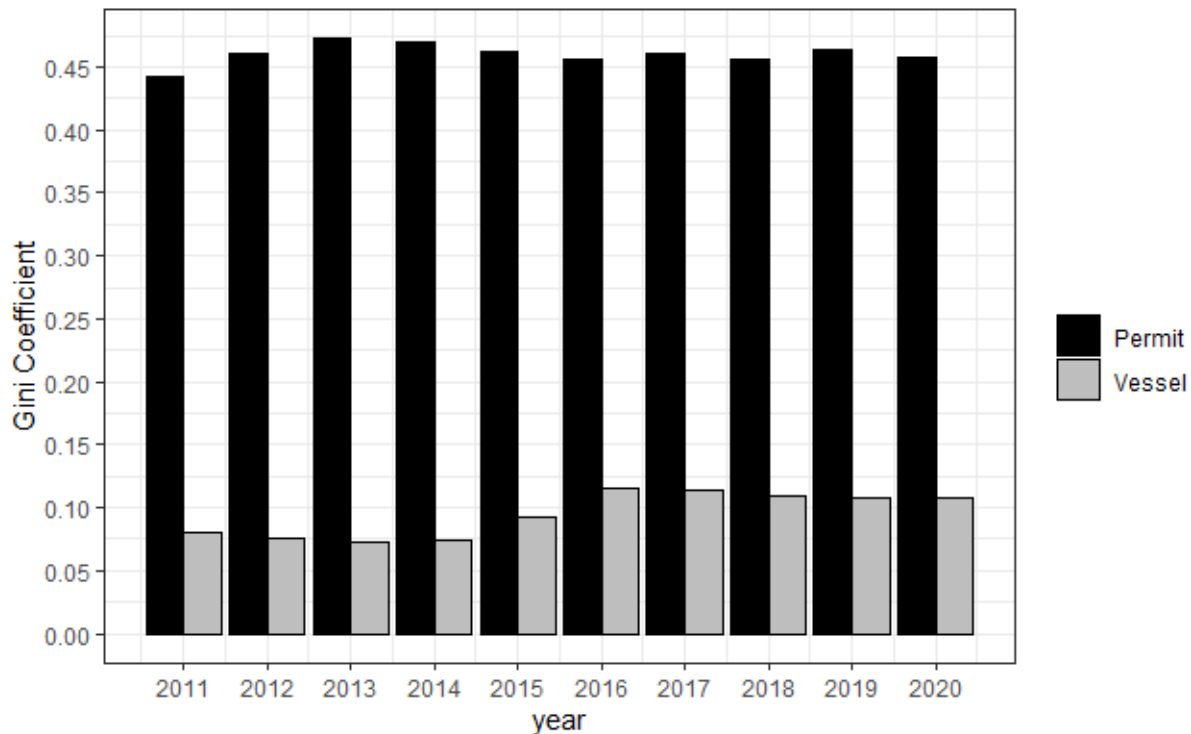


Figure 14. Gini coefficient of ownership for sablefish endorsed permits (based on the quota associated with each as represented by the related tier endorsements) and vessels that participate in the LEFG primary fishery (based on number of vessels owned), 2011-2020. Sources: NMFS Public Permit Database, PacFIN, PFMC Staff Ownership Study

As discussed in Section 2.1.1, the number of vessels with three primary tier permits stacked increased in recent years, but may not be a net change if considering the full program history. It has been hypothesized that one of the reasons that there has been crossover from the LEFG primary fishery to the shorebased IFQ program and “gear switching” might be due to the constraints imposed by the three-permit stacking limit, in addition to the seasonal constraints (April 1-October 31). Vessels with a trawl endorsed permit are able to “gear switch” (utilize legal non-trawl gear to harvest trawl quota in the shorebased IFQ program) and gear switching vessels have tended to primarily harvest sablefish ([Agenda Item F.4, Attachment 1, April 2021](#)). The gear switching limit for the IFQ program is 4.5 percent where the limit in the LEFG program depends on the permits that are stacked. Vessels that stack 3 tier-1 permits can harvest 4.1 percent of the total amount available to be landed, substantially more than the 1.82 percent (vessel with 3 tier-2 permits can harvest 1.8 percent and with 3 tier-1 permits 1.1 percent).

The lumped quota and limitation on the number of permits stacked provides an accumulation limit with a different balance between the limit and minimum fleet size than could be implemented with a divisible IFQ program, such as that used for trawl catch shares. With the 164 sablefish endorsed permits for the primary fishery, a three-permit stacking limit ensures there will be at least 55 vessels in the fleet (assuming all permits are used). If the primary fishery catch share program were instead implemented as a more typical IFQ with divisible quota and a vessel limit based on percentages of quota owned, that limit would have to be set at 1.82 percent to maintain a similar 55 vessel minimum fleet size. But, as described in the previous paragraph,

the LEFG program sets that minimum fleet size while at the same time allowing some vessels to catch as much as 4.1 percent of the LEFG primary fishery allocation. A general 4.1 percent limit would allow a reduction in the fleet to as few as 25 vessels.

LEFG primary fishery vessels that also cross-over into the trawl IFQ fishery tend to have stacked their maximum number of LEFG permits (three), but a larger number of LEFG primary fishery vessels have three stacked permits and do not cross over. From 2016 to 2019, all but one vessel that crossed over from the LEFG fishery (an average of six) to the IFQ fishery had stacked three permits at some point during the primary season. At the same time, there has been an average of 21 vessels with three stacked permits (at some point in the year) that did not crossover. Of those that crossed over from the LEFG sector, 56 percent of their total groundfish revenue and 41 percent of their total revenue on average comes from shorebased IFQ sablefish north compared to 76 percent and 38 percent respectively for those vessels that only gear switch in the IFQ program. The Council is currently undergoing considerations of limiting gear switching opportunity in the IFQ fishery, which may promote participation in the primary tier fishery by vessels that gear switch in the IFQ fishery but have not been participating in the LEFG fishery. Additionally, the overall profit for LEFG primary trips could provide more incentive to prioritize those trips compared to IFQ trips, given that the LEFG primary fishery does not have cost recovery or 100 percent monitoring requirements.

Leasing

One aspect not considered in the prior review was the leasing of tier permits used in the primary fishery. Since 2011, approximately a quarter of vessels lease the tier permits that were registered to their vessel during the primary season (Table 18), while approximately 60 percent of vessels were registered only to permits that they were thought to own, based on publicly available information. A subset of vessels though, between 10-15 a year (~12 percent), were registered to tier permits that they owned and also permits that were leased. Some of these instances were cases where a vessel purchased a permit midyear while others stacked a leased permit(s) with a permit that they owned in order to increase the vessel's available cumulative landing limit.

Table 18. Number of vessels registered to tier permits during the primary season from 2011-2020 based on if they leased a permit, owned the permit that they fished, or both leased a permit and owned a permit that they were registered to. Source: PFMC Staff Ownership Study

Year	Vessels that Leased Permits	Vessels that Were Registered Only to Permits that they Owned	Vessels that Leased Permits and were Registered to Permits they Owned
2011	37	64	11
2012	34	63	11
2013	27	58	14
2014	23	66	11
2015	23	58	15
2016	26	58	10
2017	28	59	11
2018	24	57	11
2019	25	53	12
2020	31	54	11

Of sablefish endorsed permits, just over one-third are leased for a portion of the year (31 percent are only leased, Table 19). In a given year from 2011-2020, an average of 51 permits are typically only leased while an average of 7 are both leased and used on a vessel also owned by the permit owner . An average of 105 permits (64 percent) are not leased during the year. Three or less permits have been latent (i.e., unregistered) for the entirety of the primary season in a single year from 2011-2020 (Table 19).

Table 19. Number of sablefish endorsed permits that were registered to vessels with the same owner, leased to a different owner, or were both leased and registered to the permit owner, and unregistered, 2011-2020. Source: PFMC Staff Ownership Study

Year	Permits Registered to Vessels Under Same Owners	Permits that were Leased	Permits Registered to Vessels Under Same Owner and Leased Out	Unregistered Permits
2011	91	55	18	0
2012	103	54	7	0
2013	104	52	6	2
2014	112	43	5	3
2015	105	50	8	1
2016	109	49	6	0
2017	106	49	9	0
2018	107	50	5	2
2019	104	54	4	2
2020	104	54	5	1

2.1.4. Mitigate the reallocational effects of recent policies

This objective can really be categorized as a subset of the broader objective of promoting overall equity which is covered in Section 2.1.5 below. Both objectives relate to NS 4 on allocation, FMP Objective 12 on equitable allocation, and FMP Objective 14 on minimizing disruption. As described in the introduction, the regulatory regime prior to A-14 had included a series of partial and short-term policies and actions that attempted to end the derby fishery during a time when new IFQ programs were prohibited by Congress. Of concern in development of this objective were the equal cumulative limits assigned to all fishery participants who qualified for endorsements in 1997 (regardless of permit catch history) and assignment of tiers starting in 1998. As compared to equal allocation, the assignment of tiered limits to permits better matched annual allocations to annual permit catch history of the derby fishery period but still provided limits that varied substantially from that catch history. The ability to stack permits started with implementation of permit stacking provisions in 2001, allowing vessels a way to better match their fishing opportunity to past levels of participation. This objective was considered as a part of the last review and there has been no reallocation within the program since the last review.

2.1.5. Promote equity

Promoting equity is an overarching objective that includes the objective of the previous section (2.1.4). Both objectives relate to NS 4 on allocation, FMP Objective 12 on equitable allocation, and FMP Objective 14 on minimizing disruption. The issue of compliance with the regulations also bears heavily on this objective. If some fishermen are not complying with the program, they are often viewed as gaining an unfair advantage over other fishermen. The 2014 review showed similar concentrations in landings as the pre-sablefish endorsement fishery (as the derby fishery occurring before 1997) and shows that when overages occurred, they were small without any consistent pattern among vessels.

As described in Section 2.1.1, there does not appear to be a substantial increase in concentrations in landings since the prior review.

One aspect of the program that might be considered inequitable or unfair was the difficulty it presented for fishermen trying to reach their cumulative limits without discarding (fishermen report that they do not like the wastage of discards and the MSA discourages discarding) or going slightly over. This situation was resolved by allowing vessels to take a DTL amount as part of their last tier limit trip. Since implementation of the ability to harvest in the DTL sector on the last tier-limit trip of the season (described in Section 2.1.1), there have been few/no instances of overages in the primary tier fishery.

2.1.6. Resolve or prevent new allocation issues from arising

This objective relates to NS 4 on allocation, FMP Objectives 12 on equitable sharing, and 14 on minimizing disruption.

Since implementation of the permit stacking program in 2001, there have been few calls for any changes to the allocations within the LEFG sector—that is, to alter the 85-15 percent split

between the primary and LE DTL fisheries. While there was some brief discussion of the intersector sablefish allocation during the Council’s formal consideration of its groundfish allocations for Amendment 21, it was decided that relative to other workload concerns at that time, there was not a sufficient need to reconsider the intersector allocations of sablefish. Based on recommendations from the Groundfish Advisory Panel (GAP) and Groundfish Management Team (GMT) at the June 2020 Council meeting, thus far the Council has chosen not to consider changes to the within LEFG sector allocations for primary and DTL fisheries during this review process.

2.1.7. Promote safety

The A-14 objective to improve safety also relates to NS 10 and FMP Objective 17 on safety. As discussed in the prior review, prior to A-14, the LEFG sablefish fishery was a classic derby fishery, lasting only five days in 1996. Such classic derby fisheries are well-known for creating safety hazards by providing incentive to fish in poor conditions to get an adequate share of catch, skipping maintenance, or overloading vessel capacity. Even with the sablefish endorsement and tiered limits, the fishery still only ran a maximum of 9 days¹¹ (this short duration was required for the fishery to avoid being classified as an IFQ program, which was prohibited at the time).

This objective was considered as a part of the last review and as there have been no substantive changes to the program management that are likely to affect safety—it is assumed that the program objective is continuing to be met.

2.1.8. Improve product quality and value

The A-14 objective to improve product quality and value also relates to NS 5 on efficiency and FMP Objective 6 on net national benefits. Achievement of this objective could be indicated by changes in the sales price or grades of fish landed after implementation of A-14 as compared to before. However, changes in ex-vessel price (the most readily available data) are strongly driven by the influence of broader market conditions which might overshadow any effects resulting from a change in product quality. The prior review examined the impact of the permit stacking program on ex-vessel prices by comparing the price differentials of trawl versus fixed gear prior to and after program implementation and saw no significant difference. The review noted a stabilization of prices in the LEFG sector after program implementation, which was likely due to the participant’s abilities to meet market demand over a longer set season rather than being restricted to whatever market conditions were present during the derby season. While the previous review was unable to provide much insight into the relationship of fish size and value, this section attempts to characterize how gear type and grades (weights) of sablefish affects price and the possibility that sablefish are high-graded to achieve higher revenue through retention of larger fish.

Average monthly price per pound in the early months of the year were lower in 2014-2019 as compared to the six-year period before the last review (2008-2013). Monthly prices in the later

¹¹ Regulations would have allowed the duration of the fishery to be as long as 10 days, but this would have allowed too many vessels to reach their tier limits (creating what would have been considered a quota system within that 10-day period).

months of the year are similar between the two periods (Figure 12). For both periods, prices for each month are higher compared to 2002-2007. While prices prior to 2014 appear to stay stable throughout the season, in the 2014-2019 period there appears to be an increase in sablefish prices in the fall relative to the spring. This seasonality appears to be driven more by trends in more recent years. For 2018-2020, the August-October prices are 17 percent above the April-July prices (comparing unweighted averages of monthly prices) while for 2014-2017 the difference is only eight percent. This recent strengthening of the seasonality of prices, may be contributing to the trend for a greater portion of landings to be taken later in the year, which started in 2018 (see Figure 2).

The inflation adjusted average annual price has declined by 36 percent in for recent years, with 2014-2017 averaging \$3.34 per pound compared to 2018-2020 averaging \$2.14 per pound. Comparing the monthly prices for the last three years (2018-2020) to the monthly prices for the prior three years (2015-2017), for each month, prices have been lower in the more recent years (Table 20).

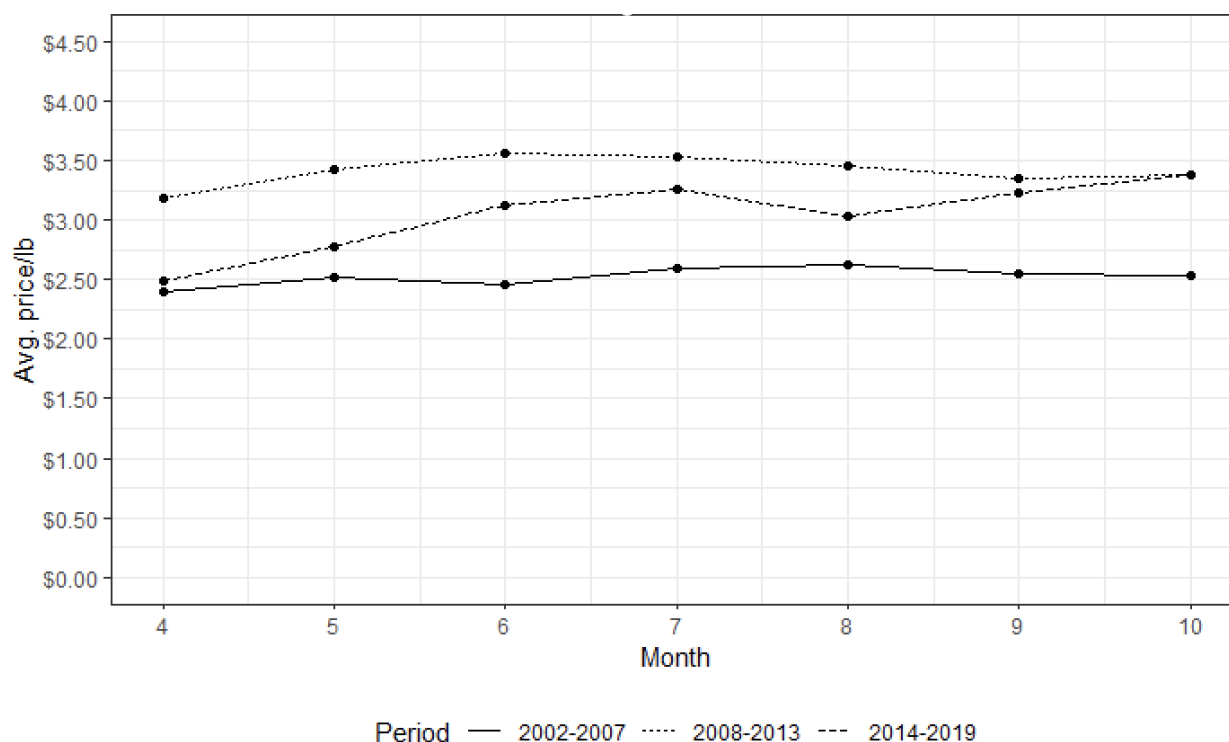


Figure 15. Average price per pound by month (2020\$) for periods of 2002-2007, 2008-2013, 2014-2019. Source: PacFIN

Table 20. Average price per pound by month (AFI, 2020\$), 2014-2020. Source: PacFIN

Year	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Avg.
2014	\$2.41	\$2.92	\$3.88	\$3.46	\$3.10	\$3.20	\$3.42			\$3.20
2015	\$2.47	\$3.21	\$3.16	\$2.91	\$2.58	\$3.39	\$4.20			\$3.13
2016	\$2.86	\$3.35	\$3.14	\$3.90	\$3.27	\$3.58	\$3.68			\$3.40
2017	\$3.36	\$3.04	\$3.52	\$4.01	\$3.90	\$3.83	\$3.74			\$3.63
2018	\$2.01	\$2.08	\$2.88	\$2.87	\$2.91	\$3.00	\$3.00			\$2.68
2019	\$1.81	\$2.02	\$2.18	\$2.42	\$2.41	\$2.40	\$2.23			\$2.21
2020	\$1.43	\$1.22	\$1.45	\$1.52	\$1.79	\$1.62	\$1.59	\$1.65	\$1.41	\$1.52
Average	\$2.34	\$2.55	\$2.89	\$3.01	\$2.85	\$3.00	\$3.12			

There are price differentials by gear type that may be affected by a number of factors, including size of fish (i.e., grade), fish quality, and ports to which deliveries are made. Overall, since 2012, longline caught sablefish have brought a higher price per pound on average compared to pot caught sablefish in the LEFG fishery (Table 21 and Figure 16 of this review; Figure 3-21 in the 2014 review).

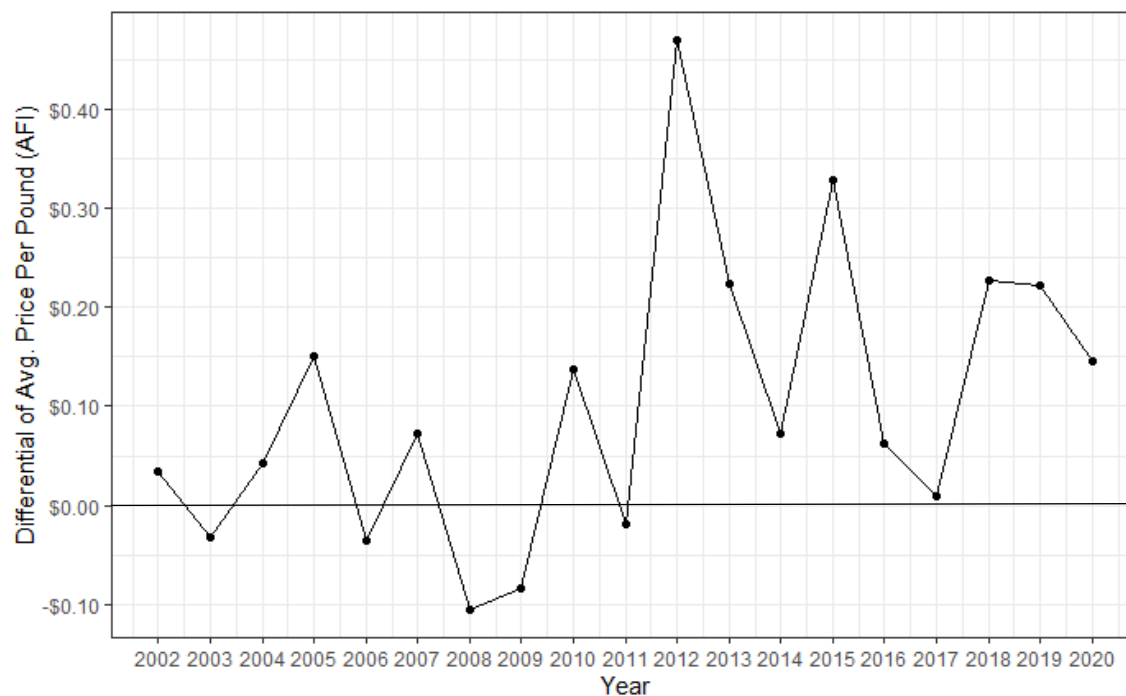


Figure 16. Differential between average price of longline caught sablefish compared to pot caught sablefish, 2002-2020 (positive values indicate higher longline prices). Source: PacFIN

Table 21. Avg. Price per pound (AFI, 2020\$) of LEFG sablefish by gear type, 2014-2020. Source: PacFIN

Gear Type	2014	2015	2016	2017	2018	2019	2020
HKL	\$2.93	\$3.03	\$3.20	\$3.49	\$2.79	\$2.34	\$1.63
Pot	\$2.87	\$2.72	\$3.14	\$3.48	\$2.56	\$2.12	\$1.48
Differential (HKL-Pot)	\$0.07	\$0.31	\$0.06	\$0.01	\$0.22	\$0.22	\$0.15
Percent Difference between Gear Types	2.33%	10.19%	1.82%	0.25%	8.06%	9.50%	8.97%

In general, larger sablefish receive a higher price per pound than smaller fish. Table 22 below shows the average price per pound based on the grade size recorded by the dealer on a fish ticket from 2014-2020 with the average by grade size shown for each row. Due to confidentiality, “X-Large” grade fish were combined with “Large” fish in the table. Note that grades are not required on fish tickets in some states or some sablefish are listed as “unspecified.” Grades also may not be consistent between dealers. From 2014-2020, 42 percent of the landings were categorized as unspecified.

Table 22. Average price per pound (nominal) by grade of sablefish in the LEFG primary fishery, 2014-2020. Source: PacFIN

Grade	2014	2015	2016	2017	2018	2019	2020	2014-2020 average
X-Small	\$4.87	\$2.38	\$4.73	\$2.37	\$1.37	\$0.69	\$0.55	\$2.42
Small	\$2.97	\$3.17	\$3.00	\$3.57	\$2.68	\$2.22	\$1.34	\$2.71
Medium	\$2.86	\$3.11	\$3.10	\$3.05	\$3.18	\$2.57	\$1.58	\$2.78
Large/X-Large	\$3.68	\$3.82	\$4.07	\$3.93	\$3.96	\$3.16	\$2.01	\$3.52
Unspecified	\$2.54	\$2.46	\$2.95	\$3.50	\$2.41	\$2.09	\$1.62	\$2.51

Because of the price difference between sizes and given that tier limits are used to cover landings but not catch, there is incentive and opportunity for vessels in the LEFG fishery to increase their revenue per pound by discarding smaller sablefish and retaining larger ones. This is unlike the shorebased IFQ fishery where discards count against the vessel’s quota. However, in the LEFG fishery, discard mortality is still accounted for through the level set for the tier landing limits. In the biennial harvest specifications, cumulative landing limits for the tiers are determined based on the share of the primary allocation expected to be landed. This “landed share” is the allocation to the primary tier fishery (85 percent of the limited entry fixed gear allocation) minus the expected discard mortality. Discard mortality parameters are recommended by the GMT and are based on the recent WCGOP historical discard mortality estimates.

The difference in size distribution between retained and discarded fish suggests that vessels are high-grading their catch. Figure 17 and Figure 18 provide the count and proportion of retained sablefish fork lengths (cm) sampled shoreside by catch monitors and state sampling programs compared to the fork lengths (cm) of discarded sablefish sampled by WCGOP onboard observers

in the LEFG primary fishery from 2011-2019. The average retained sablefish is approximately 63 cm in fork length compared to ~51 cm for discarded sablefish, which may suggest that vessels are prioritizing larger sablefish.

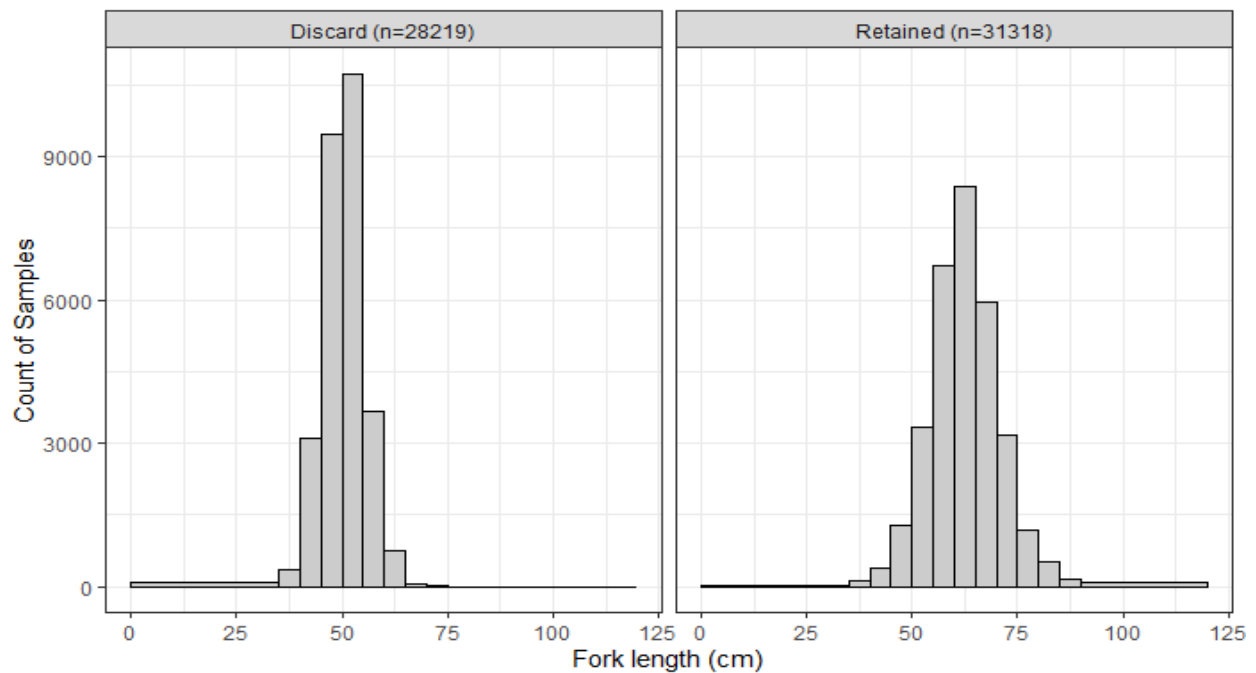


Figure 17. Count of sampled sablefish discarded (left panel) and retained (right panel) in the primary sablefish fishery by fork length size bin (cm), 2011-2019. Number of sampled sablefish shown for each group. Sources: PacFIN, WCGOP

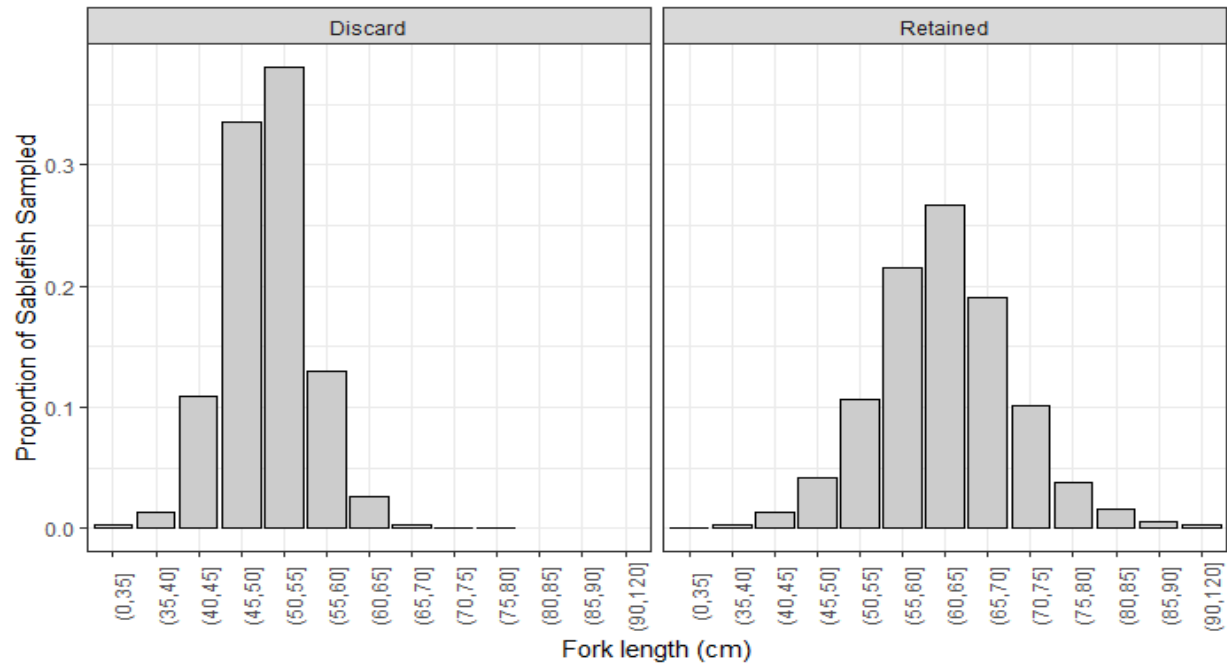
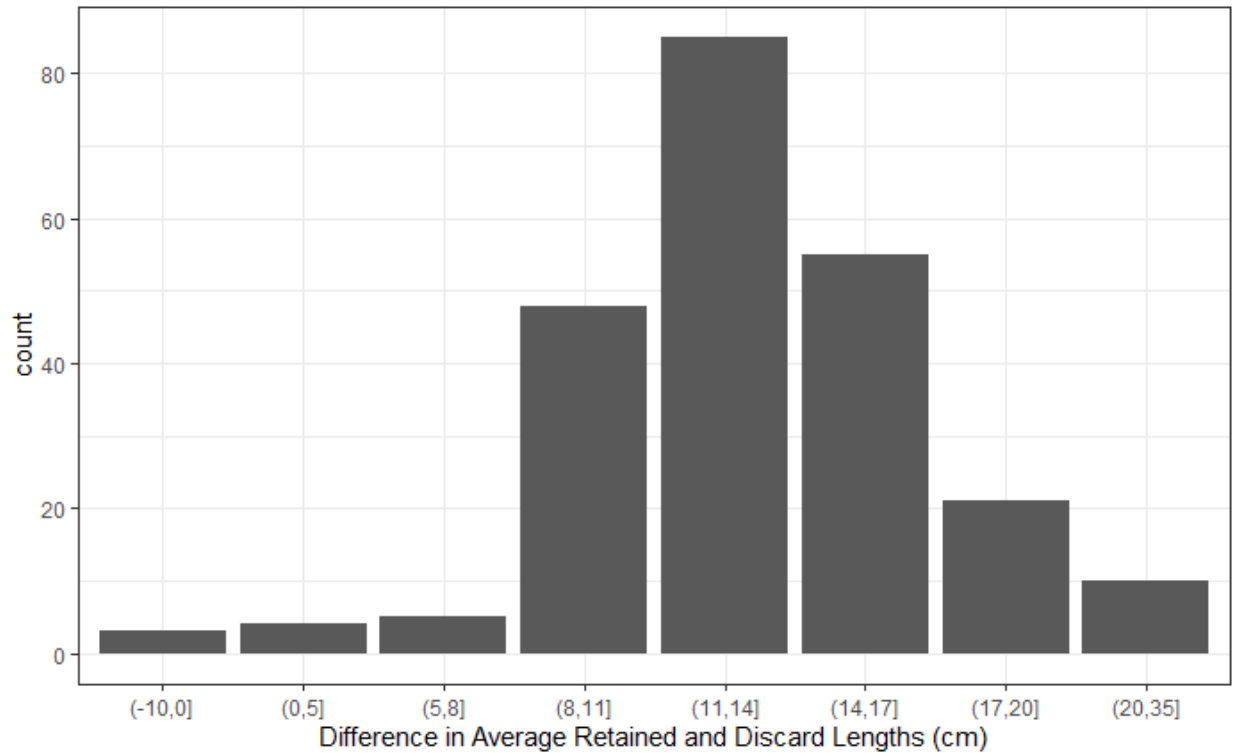


Figure 18. Proportion of sampled sablefish discarded (left panel) and retained (right panels) in the primary sablefish fishery by fork length size bin (cm), 2011-2019. Sources: PacFIN, WCGOP

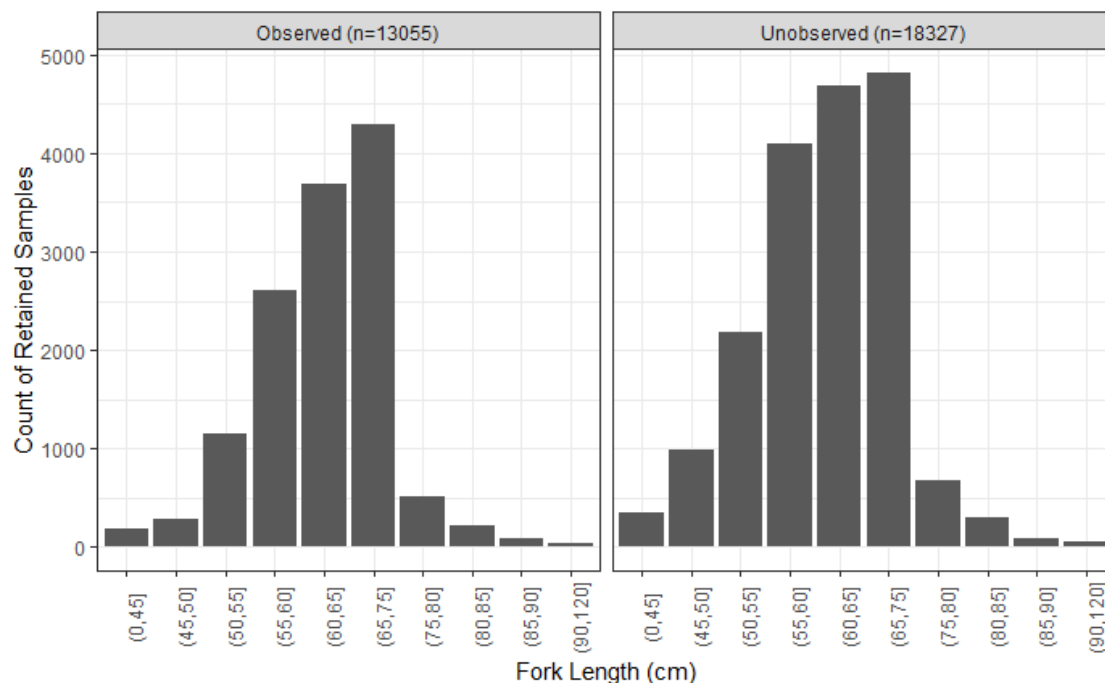
Looking closer at trips where sablefish were both retained and discarded, the average difference between the retained and discarded sablefish is over 13 cm. Trips were based on the “TRIP_ID” field in the WCGOP database and were linked to retained records through fish ticket number. Of the available samples, only three trips had an average discarded length greater than the average retained length (far left-hand bar of Figure 19.). This further supports the idea that vessels may be high-grading in the primary sablefish fishery.



Note: “(“ designates greater than the first value in the pair and “]” indicates less than or equal to for the second value in the pair.

Figure 19. Number of trips by the difference between the average retained and average discarded sablefish fork lengths (cm) on trips where sablefish were both retained and discarded, 2011-2019 (positive values indicate higher lengths for retained fish). Sources: PacFIN, WCGOP

In June 2021, the Council endorsed the Scientific and Statistical Committee (SSC) recommendation to look at the difference in retained sablefish lengths between observed and unobserved trips in order to assess if there is an “observer effect” in what vessels are discarding or retaining (i.e., whether fishing activities might be altered when observers are present). Unlike the IFQ sector, tier vessels are not individually debited for any discarded fish as the discard mortality is taken off the top of the primary sablefish fishery allocation; therefore, there is no direct benefit to observed vessels keeping smaller fish just due to an observer being on the vessel. This absence of such a benefit is supported by Figure 20 below which shows a similar distribution of retained fish lengths on observed trips versus unobserved trips. The average and median lengths for observed trips was approximately 64 cm compared to 62 cm on unobserved trips.



Note: “(“ designates greater than the first value in the pair and “]” indicates less than or equal to for the second value in the pair.

Figure 20. Count of retained primary sablefish by fork length bin (cm) on trips that were observed by WCGOP compared to unobserved trips, 2011-2019. Source: PacFIN, WCGOP

2.1.9. Take action without substantial new disruptive effects

This objective relates to FMP Objective 15 that directs the Council when considering alternative management measures to choose the measure that best accomplishes the change with the least disruption of current domestic fishing practices, marketing procedures, and environment.

As of the drafting of this document and since the last review, there have been no noted issues with the program’s structure, except for the need to extend the season in 2020 and 2021. The following changes have been made to the program since 2014:

- E-ticket requirement along with a subsequent update and simplification.
- Provide exemptions to permit ownership limits for permit owners with less than 20 percent interests in vessels participating in both Alaska and West Coast.
- Allow the joint registration of a trawl endorsed and fixed gear endorsed permit at the same time (recommended as part of the trawl follow-on action but implemented within a 2016 fixed gear regulatory amendment package).
- Prohibit processing sablefish at-sea in the shorebased IFQ program for those LEFG vessels with exemptions allowing them to process at-sea.
- Clarify existing regulatory language prohibiting retention in the LEFG fishery beyond allowable quota.

In general, these changes were intended to improve program performance and are not reported to have had any noticeable disruptive impacts to the LEFG fishery.

2.1.10. Create a program that will readily transition into a multi-month IQ program

By the time the Council was completing its deliberations on this program, Congress had provided this fishery with an exception to the moratorium on new IFQ programs. Therefore, upon implementation of the permit stacking program, the multi-month fishery was established. Without such an exception, there would have been a lag between implementation of the permit stacking program and its evolution to a multi-month IQ program. However, as noted in the prior review, the Council could consider the transitioning the program into a more “typical” IFQ program like the shorebased IFQ program in which individual pounds could be traded apart from the permit.

2.2. Allocations

NMFS [Fisheries Allocation Review \(01-119, 01-119-01\) policies](#) provide a mechanism for ensuring periodic allocation reviews and requires triggers for reviews of sector allocations. The triggers were implemented by this Council in [COP 27](#). A-14 is reliant on the trawl/fixed gear northern sablefish allocation originally established in the early 1990s. COP 27 specifies that the trigger for a review of that allocation is the review of the trawl catch share program, next scheduled for 2022. Therefore, a full analysis of that allocation is not a consideration for this review.

However, the NMFS catch share review guidance ([NMFSP 01-121-01, pp. 11-12](#)) also states that the allocations that should be reviewed are not just those between sectors but also between entities and subgroups within the program. The LEFG program includes allocations between individuals (assignment of tiers to permits) as well as the allocation to groups (amount allocated for Tier 1, Tier 2, and Tier 3 permits). The trawl catch share program would not be a very natural fit for a review of the LEFG within-program allocations. However, the Council’s GAP, which includes representation from all sectors, discussed the need for a review allocation and provided a consensus recommendation that no further analysis or changes to the current within sector allocations. The Council’s guidance incorporated this recommendation which covered allocation among individuals and groups within the program, and as mentioned in Section 2.1.6, the Council chose not to further consider changes to the division of the LEFG allocation between the LEFG sablefish DTL fishery (15 percent of the LEFG allocation) and primary fishery (85 percent).

The NMFS guidance also states that review of catch share allocations should explicitly consider the effect of existing accumulation limits. For the LEFG program, this would be the three-permit stacking limit which is discussed in Section 2.1.3.

Since the 2014 review (but excluding 2020, which was affected by COVID), the primary fishery has averaged 93.3 percent attainment with the DTL fishery averaging only 83.6 percent. In 2015, the LE DTL fishery was closed inseason for period 6 (November-December) due to expected overages in that sector ([80 CFR 61318](#)).

Table 23. LEFG primary tier and LE DTL allocations (mt), total mortality (mt), and percent attainment of allocations, 2014-2020. Source: PacFIN and WCGOP GEMM.

Year	Primary (85% of LEFG Allocation)			DTL (15% of LEFG Allocation)		
	Allocation	Mortality	Attainment	Allocation	Mortality	Attainment
2014	1,254	1,100	87.8%	221	148	67.0%
2015	1,385	1,346	97.2%	244	203.2	83.3%
2016	1,515	1,451	95.8%	268	241.9	90.3%
2017	1,518	1,454	95.8%	268	282.1	105.3%
2018	1,583	1,480	93.5%	279	245.7	88.1%
2019	1,620	1,439	88.8%	286	194.5	68.0%
2020	1,654	1,318	79.7%	292	161.2	55.2%
Avg. (2014-2019)			93.3%			83.6%

In order to understand the relationship between those that participate in the primary fishery compared to those that fish in the LE DTL fishery, Table 24 below looks at the number of vessels that crossover between the primary and LE DTL fishery from 2011-2020. From 2011-2019, of the 88 vessels on average that fished in the primary tier sablefish fishery, an average of 54 vessels (or 61 percent) had at least one LE DTL landing throughout the fishing year. However, in 2020, that number declined to 24, even with the extension of the primary season through December 31 (see “Season Extension” in Section 2.1.1 for more details). An average of 15 vessels fish only in the LE DTL fishery north of 36° N. lat. Prior to the first year impacted by the COVID pandemic (2020), 34 vessels with sablefish endorsed permits on average (2011-2019) have at least one DTL landing in period 6 (November-December; excluding 2015). This means that approximately 39 percent of all primary fishery vessels participate in the DTL fishery after the primary season has concluded. These vessels receive 16.5 percent of their ex-vessel revenue on average from the DTL sector compared to 36 percent from the primary fishery.

Table 24. Number of vessels that participated in the LEFG primary and/or DTL fisheries compared to total LEFG primary participation, 2011-2020. Source: PacFIN

Landing Year	Participated in both Primary and LE DTL	Participated in LE DTL only	Participated in Primary Only	Total Primary Participants
2011	75	23	23	98
2012	51	24	44	95
2013	49	10	40	89
2014	46	11	38	84
2015	52	13	34	86
2016	53	18	32	85
2017	57	14	28	85
2018	54	12	29	83
2019	47	10	36	83
2020	24	10	50	74

2.3. Eligibility

Reviews should evaluate who is allowed to hold quota and the effects of those eligibility criteria ([NMFS Procedural Guidance 01-121-01, p. 13](#)). If the needed resources and information is available, a more extensive review effort might also include effects on those who have left the fishery.

Anyone eligible to own a US documented fishing vessel is eligible to own an LEFG permit, except that only individuals are allowed to acquire sablefish endorsed LEFG permits (an exception was provided for non-individual entities that owned LEFG permits prior to implementation of the LEFG permit stacking program). As anticipated when the program was created, this means that while fishing enterprises may still organize themselves as corporations, partnerships, etc., the LEFG permits must be owned by a single member of such an entity. It also sets up a situation that contrasts with the trawl IFQ program in that while under the IFQ program a community can own quota, this is not possible under the LEFG program.

A preliminary look at the number of businesses that have left the LEFG primary fishery can be found in Section 2.10.2.

2.4. Transferability

The review should assess whether transferability limitations are conducive to achieving the program objectives. This program limits transferability in six ways, some of which hamper program objectives and others of which enhance achievement of those objectives.

First, the tier limits are of three size categories and may not be subdivided. This limits a vessel's ability to fine tune its allocation to its fishing needs.

Second, the three-permit stacking limit is essentially a transferability limit with respect to a vessel and further limits a vessel's ability to optimize the scale of its sablefish harvesting activities. The three-permit limit has been hypothesized as an incentive for participation in IFQ gear switching by LEFG permitted vessels (discussed more in Section 2.1.3).

Third, the tier endorsement is associated with a general LEFG permit and may not be separated from that permit. The permit includes the privilege of not only harvesting sablefish but all other groundfish species, subject to the gear specific bi-monthly limits and sector allocations. Therefore, the harvest privileges for all species must be transferred as a unit. One effect of this is that the consolidation of harvest privileges for the purpose of sablefish fishery (and consequently a reduction in the number of vessels active in the fishery) has effectively reduced the number of vessels eligible to target on other groundfish species within the LEFG fishery.

Fourth, associating the quota with a permit and restricting permit ownership to individuals facilitates the application of the owner-on-board provision and exceptions. The exceptions are expiring over time (as described in Section 2.1.2).

Fifth, limiting quota transferability by providing it in three sizes of blocks (represented by the three tiers) allows a different balance to be drawn between limits on the concentration of harvest privileges and the maximum level of harvest a single vessel can attain. The three tiers combined with a three-permit stacking limit provides higher a higher minimum fleet size (a greater dispersion of quota) for a given maximum harvest per vessel than could be achieved with divisible quota and percentage-based accumulation limits (as described in Section 2.1.3).

Finally, the LEFG permits may only be transferred from one vessel to another once in a calendar year, except in cases of death of a vessel owner or complete vessel loss (50 CFR 660.25). On average, over 90 percent of permits are utilized on only one vessel as shown in Table 25 below. The range of values shown in Table 25 are similar to the range observed since the start of the program. Given that the fishery allocation is highly attained, the transferability limitation appears to not be inhibiting fleet level attainment. However, on an individual level, this limitation could be restricting optimization of efficiency and vessel movement between different strategies.

Table 25. Number of sablefish endorsed permits by the number of vessels registered to them within a calendar year, 2014-2020. Source: NMFS Public Permit Database

Number of Registered Vessels	Number of Permits by Year						
	2014	2015	2016	2017	2018	2019	2020
1	139	147	153	146	151	157	147
2	21	16	11	18	11	5	16

2.5. Catch and Sustainability

The review should assess whether the program has kept harvest within applicable limits such as ACLs, evaluate achievement of full utilization, analyze impacts on the minimization of bycatch and bycatch mortality, and discuss changes in the status of the stocks covered by the program.

As described in depth above, the LEFG primary fishery has been managed within its allocation since at least 2001, with attainment averaging 93 percent from 2014-2019. The remainder of this section will focus on the other aspects of this element, including updates to stock status and impacts of bycatch within the fishery.

2.5.1. Stock Status

Since the last program review, there has been an update assessment in 2015 and a new full assessment in 2019. The 2019 assessment indicates the stock was at 39 percent unfished biomass as the start of 2019 compared to 34.5 percent in 2015. As noted in the 2020 [Stock Assessment and Fishery Evaluation](#) document, “Despite these [model] uncertainties, the NMFS trawl survey index and compositional data are informative with respect to both abundance trends and recruitment variability. Spawning output has been relatively stable over the past decade with depletion close to the management target level during that time. In 2019, the sablefish stock is estimated to be at 39 percent of unfished spawning output. However, abundance is projected to increase, and the spawning output is projected to be above the target level in 2021. This trend is driven in part by the estimated, but highly uncertain, size of the 2016 year class.” For the 2021 harvest specifications cycle, the Council chose to change the default harvest control rule to ABC=ACL and a P* of 0.45. Additionally, the Council changed the north-south apportionment of the stock from 73.6 percent north/26.5 percent south based on the long-term trawl survey biomass to 78.4 percent north/21.6 percent south based on a recent five-year average of the trawl survey biomass. This change effectively increased the proportion of the West Coast sablefish allocation that is within the scope of the LEFG primary fishery (which occurs only north of 36° N. lat.).

2.5.2. Co-occurring Groundfish Species and Pacific Halibut

While the primary sablefish fishery targets predominantly sablefish north of 36° N. lat., there is other catch and bycatch associated with the fishery. Vessels participating within the primary fishery may retain other groundfish species subject to the LEFG fishery landing limits for other species outlined in 50 CFR 660 Subpart E Table 2. Since the last program review, there have been several species rebuilt leading to less restrictive trip limits as well as modifications to the seaward boundary of the non-trawl RCA in 2017-2018 south of 40° 10' N. lat. (moved from 150 fm to 125 fm). From 2015-2019, excluding sablefish, the species with the highest average landings on deliveries that included primary fishery sablefish catch include slope rockfish north of 40° 10' N. lat., longnose skate, shortspine thornyhead north of 40° 10' N. lat., lingcod north of 40° 10' N. lat., and minor slope rockfish north of 40° 10' N. lat. (Table 26.). In terms of discard, the groundfish stocks (besides sablefish) with the highest average estimated discard in the primary tier fishery were spiny dogfish, arrowtooth flounder, longnose skate, minor slope rockfish north of 40° 10' N. lat. , and shortspine thornyhead north of 40° 10' N. lat. Spiny dogfish accounted for over a quarter of total discards on average.

Table 26. Average annual landings, discard, and percent of total landings and discard of the top five non-sablefish species delivered on trips that included LEFG primary fishery catch, 2015-2019. Source: WCGOP GEMM.

Landings			Discard		
Species	Avg. (mt)	Avg. Percentage of Total	Species	Avg. (mt)	Avg. Percentage of Total
Slope rockfish North of 40° 10' N. lat.	39.7	2.6%	Spiny dogfish	102.5	26.8%
Longnose Skate	28.4	1.8%	Arrowtooth flounder	27.8	7.5%
Shortspine thornyhead (North of 34°27' N. lat.)	21.8	1.4%	Longnose skate	25.5	7.3%
Lingcod (North of 40°10' N. lat.)	11.5	0.7%	Minor slope rockfish (North of 40°10' N. lat.)	24.3	6.6%
Minor slope rockfish (North of 40°10' N. lat.)	7.8	0.5%	Shortspine thornyhead (North of 34°27' N. lat.)	3.3	0.9%

Yelloweye rockfish remains under a rebuilding plan and is encountered in the LEFG primary fishery. The LEFG tier fishery is the primary source of mortality within the non-nearshore sector. Since 2015, the non-nearshore fishery has remained within its yelloweye HG with the exception of 2017.

In addition to groundfish, vessels fishing in the primary fishery can retain Pacific halibut in either the directed fishery south of Pt. Chehalis, WA or under per vessel incidental catch limits throughout the primary season north of Pt. Chehalis, WA. The directed halibut fishery has typically lasted for a few days but vessels with a primary tier permit may retain sablefish while fishing for halibut. The incidental halibut retention allowance north of Pt. Chehalis can last the entirety of the primary season assuming adequate quota is available. Recent incidental limit catch ratios, quotas, and harvest can be found in [Agenda Item F.2, Attachment 1, March 2021](#).

2.5.3. ESA bycatch

Impacts to Endangered Species Act (ESA) listed species vary by gear type. The majority of sablefish is caught by hook-and-line gear (mostly longline gear), as compared to pot gear. Table 27. below shows the relative amounts of sablefish landed by pot gear and longline gears in the primary sablefish fishery from 2011-2020. The percentage of sablefish landed by pot gear has increased slightly from an average of 25 percent in the three years prior to the last review to 28 percent in the years since that review (excluding 2020).

Table 27. Percentage of primary sablefish landings by gear type, 2011-2020. Source: PacFIN

Year	Longline	Pot
2011	75.3%	24.7%
2012	79.4%	20.6%
2013	71.8%	28.2%
2014	68.4%	31.6%
2015	72.7%	27.3%
2016	73.8%	26.2%
2017	73.4%	26.6%
2018	71.6%	28.4%
2019	69.6%	30.4%
2020	57.5%	42.5%

Whales

Incidental take of humpback whales occurs as a result of entanglement with fishing gear and is expected to occur in the sablefish pot/trap fishery. Since 2013, there have been two estimated takes of humpbacks in the groundfish fishery- one by pot gear in the LEFG sablefish fishery in 2014 and one in the open access fishery in 2016. NMFS released a new [BiOp](#) for humpback whales in October 2020, with a take limit of the following:

Mexico distinct population segment (DPS)

- Annual upper estimated amount = no more than 3
- 5-year running average limit = no more than 1.44

Central America DPS

- Annual upper estimated amount = no more than 2
- 5-year running average limit = no more than 0.90

Using the information available on entanglement, “if more than 5 humpback whales are observed or estimated to have been incidentally captured in the PCGF in any one year, or if the 5-year running average of humpback whale bycatch exceeds 2.34 per year, then we would conclude that the incidental take of ESA listed Mexico DPS and/or Central America DPS humpback whales would have been exceeded.”

The Council and its advisory bodies are currently engaging with NMFS on methods to satisfy the 2020 terms and conditions.

Seabirds

Short-tailed albatross take can occur off of the U.S. West Coast year-round and are subject to take by interactions with longline gear. On average from 2011-2020, approximately 71 percent of the tier fishery was harvested using longline gear (Table 27.). As of 2020 (see 84 FR 67674), all vessels larger than 26 ft LOA are required to use streamer lines or night set which is expected to minimize interactions.

There has only been one known case of short-tailed albatross take in the groundfish fishery, which occurred using line gear in the LEFG primary fishery off Oregon in 2011 ([NMFS Report](#)). The 2017 BiOp states that “Incidental take [for the entire groundfish fishery] should not exceed an estimated five albatross in a two-year period or 1 observed albatross in a two-year period.” Based on the most recent ESA Workgroup report ([Agenda Item G.4.a, GESW Report 1, June 2021](#)), the fishery remains in this threshold.

Salmon

The groundfish fishery operates under specific bycatch guidelines for salmon and the threshold for the non-whiting trawl sector¹² as a whole is 5,500 Chinook salmon and 560 coho salmon. Historically, the fixed gear fishery has had low Chinook salmon bycatch rates ([Agenda Item H.9, Attachment 1, November 2019](#)). There has been no observed bycatch of Chinook in the limited entry sablefish fleet since 2002 when WCGOP sampling began, with limited occurrences of coho salmon bycatch (Table 10 of Richerson, et. al., 2019).

2.6. Accumulation Limits/Caps

Accumulation limits for this fishery are in the form of limits on permit ownership/use and the number of permits that can be registered to a single vessel (three permits). Accumulation limits serve to disperse the concentration of ownership. An assessment of the degree of concentration of ownership in the fishery and change over time is discussed in 2.1.3. The NMFS catch share review guidance also states that “reviews should analyze and evaluate the equity/distributional impacts of existing caps and the impacts those caps have had on the creation of market power by affected entities . . . [and] analyze whether and to what extent QP caps or limits have generated technical inefficiency for firms operating in a CSP” ([NMFS Procedural Guidance 01-121-01, pp 14-15](#)). Capacity control might also be covered in this section and, if so, “should be conducted in a manner consistent with the terminology and methods outlined in NMFS’ National Plan of Action for the Management of Fishing Capacity.” ([NMFSPI 01-121-01](#), p. 15). Based on a preliminary assessment of the degree of concentration of ownership (Section 2.1.3), the Council has decided that a more in-depth review of the accumulation limits is not needed at this time.

Based on the NMFS guidance, a review of accumulation limits should also consider whether existing data collection and monitoring is adequate to determine ownership and evaluate compliance with the caps and whether the caps are being applied at levels that ensure they are serving their intended purpose. Discussion on data collection and reporting related to accumulation limits can be found in the “Ownership” section of Section 2.8.

2.7. Cost Recovery

The review should identify whether cost recovery is in place and if costs and fees are being appropriately assessed. It should also evaluate the economic effects of the fees on program participants along with any compliance or enforcement issues (enforcement is also a topic of Section 2.8). For programs without cost recovery, such as the LEFG permit stacking program,

¹² Bottom trawl, non-whiting midwater trawl, IFQ-fixed gear, LE and OA fixed gear fisheries, and select recreational fisheries outside of the primary seasons are included within this threshold.

the program review should explain the situation as well as “plans to develop such a program in the future, where applicable” ([NMFS Procedural Guidance 01-121-01, pp 15-16](#)).

If costs are to be recovered for the LEFG permit stacking program, the Council would be required to make a cost recovery recommendation. The Council recommendation for the trawl catch share cost recovery program was to recover incremental costs: “‘Incremental Costs’ means the net costs that would not have been incurred but for the implementation of the Individual Fishing Quota program” ([Council Final Cost Recovery Program Recommendations \(September 2011\)](#)). If that approach is taken, the history of program development seems to indicate that some aspects of the program would likely have been put into place regardless of whether it had been created as an IFQ program. Additionally, the Council recommendation that “net” costs be evaluated was meant to include cost savings that may have resulted from the program.

In 1997, sablefish endorsements for the LEFG permits were established and required for access to the primary sablefish fishery. At that time, the season lasted only about a week but could not be lengthened because a longer season, combined with cumulative limits that applied to each vessel, would have constituted an IFQ program; and a Congressional moratorium on new IFQ programs had gone into place in 1996. The 1997 management system allocated sablefish harvest opportunity (cumulative limits) equally among all permits, substantially redistributing harvest among vessels as compared to previous years and reflected in [Figure 3-7 of the previous review](#). In 1998, to partially compensate for the disruption caused by equal limits, those permits with sablefish endorsements were assigned to one of three cumulative limit tiers based on permit history. However, season duration continued to remain quite short and the program was not considered a catch share program.

Despite the system of tiered limits, there was still considerable redistribution of harvest among the fleet relative to the 1996 fishery; and permit stacking was seen as a way to further address the situation. Fixed gear permit stacking was discussed frequently at Council meetings beginning in 1998 and was a policy recommended as a high priority for consideration in the [Groundfish Strategic Plan](#) sent out for public review in June 2000 (pp 28-29). The strategic plan identified that once a permit stacking program was established, it might be easily transitioned to an IFQ program, if the Congressional moratorium on new programs were lifted. Also at its June 2000 meeting, consistent with but in advance of finalizing its strategic plan, the Council initiated formal development of the permit stacking program. At its September 2000 meeting, the Council both adopted its final groundfish strategic plan and approved the draft permit stacking alternatives and analysis for public review. At that time, it was recognized that even if the moratorium on IFQ programs were extended, the permit stacking program could be implemented without extending the season (e.g., the [September 2000 SSC statement](#)¹³). However, the [September 2000 GAP report](#) indicated that a majority of the GAP felt that stacking program

¹³ “The SSC concurs with the following conclusions from the analysis: unless the individual quota (IQ) moratorium is lifted, voluntary permit stacking per se is not likely to increase the duration of the fixed gear sablefish season, alleviate the safety concerns and complex management decisions associated with short seasons, or result in significant capacity reduction. In order to accomplish those things, voluntary stacking will need to be followed by a properly designed IQ system (an uncertain prospect at this time, given the moratorium) or some other stringent capacity reduction mechanism. The SSC is concerned about the limited benefits that would accrue from voluntary stacking if the IQ moratorium is not lifted. However, we also realize that it is up to the Council to decide whether that risk is acceptable.”

should not be implemented unless the season could be extended while a minority felt permit stacking should be implemented regardless¹⁴. The MSA moratorium on new IFQ programs expired October 1, 2000, however, there was an expectation that Congress might reinstate the moratorium. The Council took final action on the permit stacking program at its November 2000 meeting. At the time of that final action, NOAA General Counsel (GC) noted that “The proposal in this action would allow the season to be lengthened if there is a possibility (if this fishery is not under an individual fishing quota [IFQ] moratorium)” (as summarized in the November 2000 Council minutes, pp 30-31). Implicit in the GC statement is that if the moratorium continued to apply, the stacking program could have gone into place but without the extended season. On December 21, 2000, Public Law 106-553, an appropriations bill for the NOAA, contained a continuation of the IFQ moratorium through October 1, 2002 but provided an exception for the West Coast fixed gear sablefish fishery. This exception allowed the permit stacking program to be implemented with a longer season, effectively making it an IFQ program. As noted in the A-14 analytical package:

This proposed plan amendment and regulatory package would implement a permit stacking program, in which more than one permit could be registered for use with a single vessel and that vessel would have access to the cumulative limits associated with each of those permits. Most importantly, the exception to the IQ moratorium for the fixed gear sablefish fishery would allow a longer season (up to 12 months), so that each vessel can fish against its limits at its own speed” (p. 2).

The last review noted that:

Prior to the program review, incremental costs associated with this LAPP were likely minimal, although at this time no quantitative assessment of incremental costs has been done. However, certain actions being considered during this review process would implement an electronic fish ticket and modify the control rules. (p. 46)

Section 2.1.9 provides a list of actions related to the catch share program that have been taken since the last catch share review. Not all of these actions were necessarily because of the catch share program and further discussion is likely needed to explore which might be attributed to the catch share program.

If cost recovery is implemented and the Council recommends that net costs be considered, as was the case for the trawl catch share program, then annual management actions that were eliminated with implementation of the program might be considered as potential sources of cost savings. In the early 1990s, the Council took numerous actions on the opening dates for the LEFG derby fishery and rules for starting and ending the derby. In the latter part of the 1990s, once sablefish endorsements were issued and cumulative limits established, considerable Council and regulatory effort went into modelling fleet capacity each year in order to avoid classification as an IFQ program. This was done to determine cumulative landing limit levels and a season length that would ensure that on average, vessels would be expected to underharvest their limits by 25 percent. In other words, if all vessels fully harvested the available limit, the primary fishery allocation would be exceeded by 25 percent (an amount termed “overhead”). Under this system,

¹⁴ The groups represented by these majority and minority opinions was not recorded.

some vessels were constrained by the season duration and others by the individual cumulative limits. After the “regular” primary season was complete, a determination was needed of the amount of LEFG primary fishery allocation remaining unharvested and the levels for the one-month equal limits that would be in place for a mop-up fishery that occurred each fall. These were then announced to the public along with dates and rules for engagement in the mop-up fishery. Once the season was extended to create a LAPP program, these management activities were no longer necessary.

During the 2014 review, the question was raised as to whether it would cost more to recover the related costs than the costs themselves. Spending more to recover costs than the costs themselves might raise questions about consistency with national standards, for example, NS 5: “Conservation and management measures shall, where practicable, consider efficiency in the utilization of fishery resources....” NMFS guidelines on NS 5 indicate that administrative costs are part of a determination of efficiency and that minimization of these costs contributes to efficiency (e.g., 660.330(b)(2)(ii)).¹⁵ However, even though from an individual business perspective payment of cost recovery fees is a cost, from the national accounting perspective used to assess efficiency of the broader economy, cost recovery itself is a transfer from privately held assets to the government—as compensations for operational costs/expenditures already incurred by the government. Thus, the transfer itself (the amount recovered from industry) does not reflect an additional cost to the national economy. At the same time, from a national perspective, the costs of making the transfer and administering cost recovery would be new costs to the system, potentially reducing efficiency and net benefits to the nation. However, given that governmental activity is usually not cost-free, Congress likely understood that requiring cost recovery might reduce net program benefits. The basis for judging the efficiency of a system which has prescribed requirements is whether it is achieving the specified functions at least cost (cost minimization as required by NS 7). Cost recovery for catch share programs is a specified and mandated function and while there are conflicting objectives that must be balanced, the MSA does not carry an explicit exception to the mandate.

2.8. Data Collection/Reporting, Monitoring, and Enforcement

The NMFS catch shares review policy states that reviews “should contain a description and assessment of the existing data collection, monitoring, and enforcement programs (e.g., observers, logbooks, economic data reporting, etc.), including a discussion of any changes since the CSP’s implementation or the previous review” ([NMFSPi 01-121-01](#), p. 16). The assessment should indicate whether the information available is adequate to support the review, the reporting burden imposed by data collections, and opportunities for improvements along with related costs and opportunity for cost savings. The policy also states that “particular attention should be paid to assessing whether the current enforcement provisions and activities, including resources for conducting the latter, are sufficient to ensure a high rate of compliance with program requirements” ([NMFSPi 01-121-01](#), p. 17). Additionally, “...a description and overall assessment of the CSP’s administrative costs should be provided to determine whether total administrative costs are being minimized to the extent practicable, which is consistent with National Standard 7” ([NMFSPi 01-121-01](#), p. 17).

¹⁵ 660.330(b)(2) (ii) Management regimes that allow a fishery to operate at the lowest possible cost (e.g., fishing effort, administration, and enforcement) for a particular level of catch and initial stock size are considered efficient.

In contrast to the trawl IFQ program (for which the Economic Data Collection (EDC) Program was created), an expanded data collection for monitoring the program effects was not created when this program was implemented. As part of this review, the Council should consider whether key performance criteria are adequately measured and, if not, whether there are enhancements to the data collection system that should be implemented.

Catch Accounting/Monitoring and Enforcement

Catch data for the LEFG fishery comes through two pathways: fish tickets and observer records. Since the last program review, the Council recommended requiring e-tickets for all commercial sablefish landings on the West Coast beginning in 2017 ([81 FR 84419](#)). Prior to this action, sablefish landings were only recorded on paper tickets which could take weeks to months before being uploaded into the PacFIN database. Assessment of vessel compliance relied on review of landings information that often did not occur until after the season was over. With the 2017 rule, sablefish landings in the primary tier program (as well as the DTL fisheries) must be submitted within 24 hours of landing.¹⁶

Taking advantage of the electronic fish tickets, new in-season data reports have been developed that are aimed at helping both state and federal agencies track primary tier landings for the fleet as a whole and by vessel on more of an inseason basis. These new reports also provide enforcement officers the opportunity to assess vessel attainment and focus compliance monitoring efforts on vessels that are approaching their limit. A multiagency assessment of compliance with the LEFG catch share program is provided as Appendix B to this document.

One complexity left for enforcement with the LEFG sablefish fishery is the owner-on-board requirement. Currently there are exemptions to the owner-on-board requirement that make it difficult to enforce in the field. For example, it is not clear if an owner-on-board exemption that applies to one permit registered to a vessel also applies to leased non-exempted permits registered for use on the same vessel.

While fishery landings are the primary activity monitored, the fishery is also subject to WCGOP observer coverage. Observer coverage has increased from an average of 25 percent from 2002 to 2014 to 44 percent from 2015 to 2019 ([Agenda Item D.2.a, Supplemental REVISED GMT Report 4, September 2020](#)). As described in Section 2.1.8, these estimates are used to establish the amount of landed pounds available to be divided amongst the tiers (i.e., “landed share”).

Ownership Data

When A-14 was implemented, data collected via the permit system was enhanced to include more detailed ownership information, including that necessary to monitor expiration of exemptions to the owner-on-board requirement and compliance with the three-permit control limit.

¹⁶ This action was intended to address recommendations from the Department of Commerce, Office of the Inspector General report regarding tracking landings and potential overages of individual tier permits. (Final Report No. OIG-14-019-I, May 1, 2014).

The existing data collection and monitoring system is able to determine ownership and compliance with accumulation limits. Currently, sablefish endorsed LEFG permit owners must submit an ownership interest form to NMFS only if they are a partnership or a business entity. For LEFG permit owners who are individuals, NMFS does not need any additional information to determine if participants are complying with the ownership cap. Since the start of the program, permits can only be transferred to individuals, however, partnerships and other types of organizations that were already permit owners were allowed to continue in that capacity. In terms of the tier stacking limit, the NMFS public permit database tracks the registration of all federal groundfish permits and ensures that no more than three permits are registered to a vessel at the same time.

Other Data Collections

There are numerous other data collections that support management of the fishery but were not necessarily created for the catch share program including state fish ticket systems, the observer program, and others. Included among the other data collections is a voluntary West Coast Fisheries participation survey, which is used in this review and described in Appendix C.¹⁷ Currently, there is not a federal logbook requirement for the LEFG fishery.¹⁸ However, in December 2017, the NMFS issued a new [BiOp](#) and incidental take statement (ITS) for the groundfish fishery and its effects on seabirds. As a part of Term and Condition 2 for Reasonable and Prudent Measure 4 of the ITS, NMFS is in the process of developing a fixed gear logbook which is potentially scheduled for implementation in 2023.

2.9. Duration

The review should indicate the life span of the catch privileges (a maximum of ten years but with the possibility of automatic renewal if not revoked, limited, or modified) and discuss the pros and cons of the current specification of the catch privilege duration. The MSA provision limiting the duration of harvest privileges to a maximum of ten years does not apply to this program because it was implemented prior to the 2007 reauthorization which created extensive guidelines for catch share programs but exempted programs from a number of those guidelines. Nevertheless, the program allocates harvest privileges (not rights) which may be modified at any time or even eliminated without compensation to the holders of those privileges.

2.10. Entry and Exit, Including New Entrants

According to NMFS guidelines, the review should assess opportunities for new entrants including cost of entry and whether those costs have increased to the point where market power is being exercised, resulting in economic inefficiencies ([NMFS Procedural Guidance 01-121-01, pp 17-18](#)). Equity and distributional effects, including intergenerational effects, should also be considered.

Concentration of harvest among vessels and permit prices are considered in Section 2.1.1. This information (combined with the existence of the three-permit own-or-control limit) provides

¹⁷ 2015 and 2016 data was used for 2017 survey, 2019 was used for 2020 survey.

¹⁸ Oregon does have a state mandated logbook requirement for all fixed gear vessels landing into Oregon ports. Washington and California do not.

preliminary information indicating that it is unlikely that market power is being exerted to the point of creating economic inefficiencies. Additionally, at its June 2021 meeting, the GAP considered this issue and stated: “There does not appear to be any evidence a vessel owner with a maximum of three permits stacked has any ‘market power’ in the sablefish fishery, and as such, no further research [on this issue] is needed” ([Agenda Item G.2.a, Supplemental GAP Report 1](#)).

The NMFS catch shares review guidance associates consideration of equity and distributional effects with the question of new entry, and intergenerational effects in particular. Overall, those who are leaving the fishery will likely receive and those buying in will likely pay amounts for permits that are reflective of expected profit opportunity. Theoretically, permit values will reflect the amount of above normal profits that are expected to be generated by the fishery (leaving the new entrant with a normal profit level, after taking into account the price of the permit). After new entrants pay for permits, changing conditions may result in changes in expected profits (up or down) and increased valuation or devaluation of the asset value of the permit. Anything that improves profitability is likely to result in higher permit costs.

Flexibility in the entry and exit of vessels into the fishery is an important consideration with respect to changing demographics. As the participants in the fleet age, new entry will be important for maintaining the character of coastal communities and providing opportunities for those leaving to recoup their investments (Cramer et al., 2018). The NMFS participant survey (Appendix C) indicates that of the 62 vessels that participated in the survey in either survey year (2017 or 2000), the respondents appear to be skewed towards a higher age bracket, with the average age being 59 years as of 2021 (Figure 21).

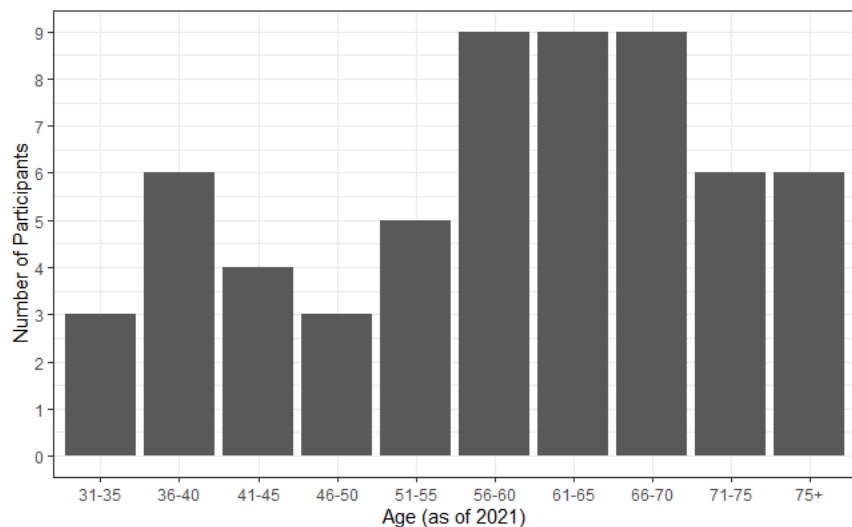


Figure 21. Age of survey respondents in 2021 to the 2017 and 2020 NWFSC surveys.

2.10.1. Entry

For the LEFG fishery, entry can be viewed in different ways: (1) a vessel enters the fishery that had not previously participated (the vessel might be newly acquired by an existing participant); (2) a vessel that previously participated returns to the fishery (new entry with respect to a

particular year); or (3) a vessel and or permit that has been participating is acquired by new owner (i.e., the new entrant is the owner, rather than the vessel).

In order to participate in the fishery, vessel owners must acquire a sablefish endorsed permit for their vessel, through lease or purchase. As of March 10th, 2021, Dock Street Brokers lists the price of Tier 3 permits for sale between \$150,000 and \$200,000, and Tier 2 between \$300,000 and \$375,000 (no Tier 1 permits are currently listed). (Further discussion on permit prices can be found in Section 2.1.1.)

This section evaluates entry opportunity as evidenced by changes over time in ownership of vessels and permits. These ownership changes also relate to exit opportunities. Using the same ownership database described in Section 2.1.3, Table 28 shows the number of sablefish endorsed permits and participating LEFG primary tier vessels by the number of owners from 2011-2020. From 2011-2020, there have been 138 entities that have owned at least one of the 164 sablefish endorsed permits and 141 entities that have owned at least one of the 158 vessels that participated in at least one year in the LEFG primary fishery. During this period, 65 permits and 18 vessels have had more than one owner. Three permits have had six or more owners but no participating vessels have had more than two owners.

Table 28. Number of sablefish endorsed permits and participating primary tier vessels by the number of different entities that have owned the permits/vessels from 2011-2020. Source: PFMC Staff Ownership Study

Number of Different Owners	Number of Permits/Vessels Owned by the Indicated Number of Different Owners	
	Permits	Vessels
1	99	140
2	37	18
3	17	0
4	5	0
5	3	0
6+	3	0
<i>Total Number of Individual Owners</i>	<i>138</i>	<i>141</i>

Changes in Permit Ownership

In 2011, there were 107 entities identified as owning at least one sablefish endorsed permit. Over the next nine years, there have been an average of almost four new permit owners entering into the fishery through purchase of a permit (Table 29); no new permit owners appear to have entered the fishery in 2020. The annual number of permit owners has declined by over 11 percent over the ten-year period, with most of that decline occurring in 2016.

Table 29. Number of new permit owners annually (compared to 2011 baseline) and cumulative number of permit owners from 2011-2020. Source: PFMC Staff Ownership Study

Year	Number of New Permit Owners (compared to previous year)	Total Annual Permit Owners	Cumulative Number of Permit Owners
2011	N/A	107	107
2012	3	105	110
2013	3	107	113
2014	6	109	119
2015	5	106	124
2016	2	100	126
2017	5	102	131
2018	4	102	135
2019	4	99	138
2020	0	95	138

An active permit market is an indicator of opportunity for new entry (as well as exit opportunities). While only a few entities have entered as new permit owners each year since 2011, the permit market is more active, as reflected by the annual number of permit transactions (an average of 12 for 2011-2020, Table 30) relative to the number of new owners each year.

Permit consolidation could inhibit entry opportunities for new fishermen (discussion on consolidation can be found in Section 2.1.3). While the number of entities owning two permits has been fairly stable, the number of entities owning three or more permits in a year increased for 2016-2020, compared to 2011-2015.¹⁹ Concurrently, over the 2011-2020 time period, there appears to be a downward trend in the number of entities that own a single permit (average of 66 for 2011-2015 compared to 57 for 2016-2020; Table 30).

¹⁹ While an entity could own more than three permits in a year, it would not be allowed to own more than three permits at a time except through the Alaska participant exemption.

Table 30. Number of entities by the number of permits owned annually, 2011-2020. Source: PFMC Staff Ownership Study

Number of Permits Owned by an Entity	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
1	67	64	66	69	64	58	57	57	57	54
2	20	21	23	18	17	18	22	21	19	19
3	16	17	15	17	21	20	19	17	19	19
4+^{a/}	4	3	3	5	4	4	4	7	4	3
Number of Permits with Ownership Changes Mid-Year	11	10	11	17	18	9	13	17	7	0
Number of Permits that Changes Ownership the Following Year^{b/}	0	1	2	0	0	0	0	3	0	n/a

a/ In general, an entity is not allowed to own or control more than three permits at a time, however, it could do so within a calendar year either through sequential transfer or the Alaska participant exemption.

b/ I.e., the first permit owner of a year is different than the last permit owner of the previous year.

Changes in Vessel Ownership

In 2011, 94 entities were identified as owning participating vessels. Over the next nine years, there have been an average of five new vessel owners entering into the fishery each year (Table 31). New vessel owners can enter either by acquiring an existing vessel or bringing a new vessel into the fishery. On average, fewer than two vessels have changed ownership within a year or between active fishing years (though potentially to an owner that is already in the fishery, i.e., while the vessel is new to an owner, the owner might not be a new entrant). New vessels tend to move into the fishery at the higher rate of five per year (and some of these new vessels may be being acquired by owners already participating in the fishery).

While new vessels and vessel owners have been entering the fishery, there have also been exiting. The annual total number of vessel owners has declined by over 20 percent from 2011 to 2019 yet annual vessel participation has been relatively stable over that same time period, with the exception of 2020 (Figure 1) which supports the idea of vessel ownership consolidation discussed in Section 2.1.1. From 2011-2020, there has been a decline in the number of entities owning a single vessel (Table 32). However, it appears as though a few entities have shifted from owning two vessels to three vessels in recent years, which aligns with the recent trends in annual owner and vessel participation.

Table 31. Number of new vessel owners, total annual vessel owners, and cumulative count of vessel owners from 2011-2020. Source: PFMC Staff Ownership Study

Year	Number of New Vessel Owners	Total Annual Vessel Owners	Cumulative Count of Vessel Owners
2011	N/A	94	94
2012	9	88	103
2013	7	82	110
2014	6	79	116
2015	5	80	121
2016	2	74	123
2017	7	76	130
2018	1	73	131
2019	5	75	136
2020	5	65	141

Table 32. Number of participating primary tier vessels owned by entity per year, 2011-2020. Source: PFMC Staff Ownership Study

Number of Vessels Owned by an Entity	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
1	86	80	75	72	72	65	67	65	67	57
2+	8	8	7	7	8	9	9	8	8	8
Number of Vessels with Ownership Changes Mid-Year or in Next Year of Fishing^{a/}	6	2	0	3	3	0	2	1	2	N/A

a/ While most participating vessels transfer mid-year or with the change in the calendar year, three vessels were inactive in the fishery for at least one year before moving to a new owner.

2.10.2. Those Exiting

As described in Section 2.3, reviews should evaluate impacts to those who have left the fishery. As a first step, this section identifies the number of those entities that have left the fishery in terms of ownership of a sablefish endorsed permit or participating primary fishery vessel. Table 33 below describes the number of business entities that have left the fishery by displaying the last year of permit or vessel ownership. Note that this table does not take into account any gaps in ownership. For example, if a company owned Vessel A, which participated in 2011 and 2013 only, it would be counted in the 2013 row as that was the last year of participation by that company. With respect to permit ownership, there are no entities with a gap in participation before the year they appear to exit the fishery. However, there are four vessel owners with a gap in participation prior to leaving the fishery. Overall, 43 companies ceased to own a sablefish endorsed permit since 2011 with an average of five per year and there are 60 entities that have left the fishery in terms of vessel ownership with an average of approximately eight per year. Note that the large increase in vessel owners leaving the fishery is likely due to the lower number of participating vessels in 2020 rather than actual owners selling their vessels for example.

Table 33. Number of entities that left the LEFG primary fishery from permit or vessel ownership, 2011-2019. Source: PFMC Staff Ownership Study

Year	Permit Owners	Vessel Owners
2011	4	13
2012	2	9
2013	2	11
2014	8	7
2015	7	6
2016	4	6
2017	5	4
2018	7	4
2019	4	18

2.11. Auctions and Royalties

For catch share programs implemented after January 12, 2007, the MSA requires consideration of auctions or royalties for the initial or any subsequent distribution of limited access privileges. This consideration does not apply to the LEFG catch share program.

3. RESEARCH AND DATA NEEDS

Based on the 2014 review, the SSC recommended in [April 2014](#) the following future research items to add further insight into the LEFG sablefish primary fishery.

1. Routine collection of permit sale prices to indicate the market value of the fishery.
2. Collect information about crew, captains, and owners of vessels. Information about the county of residence and participation in the fishery is necessary to understand the regional economic impacts of the fishery (for models such as IO-PAC), and to estimate the number of people who directly work in the fishery. This information will also assist in an evaluation of the community effect of the owner-on-board requirement.

With respect to permit prices, as described in Table 2, the collection of LEFG permit prices is currently listed as a potential new management measure to be considered on the groundfish workload prioritization list and could be picked up by the Council as a priority at any time ([Agenda Item G.2.a, GMT Report 1, March 2021](#)). Note that NMFS originally asked permit owners submitting a permit transfer form to voluntarily give the sale or lease price of the permit—however, due to lack of responses, it was dropped from the form in 2013.

With respect to the collection of information about crew, captains, and owners of vessels, some of that information was collected as part of a new voluntary NWFSC survey, described in Appendix C.

4. CONCLUSIONS

The LEFG program appears to be continuing to meet the goals and objectives of Amendment 14. Few changes have occurred since the previous review in 2014. Therefore, this review was kept narrowly focused on new information, taking into consideration the NMFS Catch Shares Review guidelines.

5. COUNCIL RECOMMENDATIONS

To be completed.

6. REFERENCES

[Cramer, L.A., Flathers, C., Caracciolo, D., Russell, S.M. and Conway, F., 2018. Graying of the fleet: perceived impacts on coastal resilience and local policy. Marine Policy, 96, pp.27-35.](#)

[Somers, K. A., J. E. Jannot, K. E. Richerson, V. J. Tuttle, and J. T. McVeigh. 2020. Fisheries Observation Science Program Coverage Rates, 2002–19. U.S. Department of Commerce, NOAA Data Report NMFS-NWFSC-DR-2020-03. <https://doi.org/10.25923/582b-ty89>](#)

[Richerson, K., K. A. Somers, J. E. Jannot, V. Tuttle, N. B. Riley, and J. McVeigh. 2019. Observed and Estimated Bycatch of Salmon in U.S. West Coast Fisheries, 2002-18. U.S. Department of Commerce, NOAA Data Report NMFS-NWFSC-DR-2019-02. <https://doi.org/10.25923/kq8v-hw57>](#)

Appendix A: Net Revenue Study

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This appendix provides background on methods used to generate the net revenue estimates provided in Section 2.1.1. We use cost-earnings data collected from surveys fielded by the Economics and Social Science Research program at the Northwest Fisheries Science Center to construct estimates of total costs net revenues. Using data between 2014 and 2017, the vessels that participated in these voluntary surveys comprised 64.7 percent of total landings in the Limited Entry Fixed Gear (LEFG) sector. All cost, revenue, and total cost net revenue figures reported in this document are reported in 2019 dollars. The number of vessel observations comprising the sample, by vessel length and year, are reported in Table 34.

Total costs net revenues (TCNR) are calculated as revenues less variable and fixed costs. The categories of costs used in estimation are listed in Table 35. Cost data collected in the surveys was total annual cost data across all the fishing activities for the vessel covered by the respondent. As many vessels participate in multiple fisheries, and costs are reported at the vessel level, cost data is allocated to individual fisheries based on the vessel's proportion of landings, days at sea, and revenues in that year. For example, repair and maintenance that prepares a vessel for use in all fisheries can be considered a joint cost associated with activities in all the fisheries in which a vessel operates. Costs may be allocated using different measures; for example, allocation of food costs to a particular fishing activity is based on days at sea in that activity, allocation of vessel on-board equipment purchases, repair, and maintenance is based on revenue, while fishing gear is based on landings.²⁰ It is also worth noting these cost estimates likely represent a lower bound, as vessels may incur costs not reported on the form (e.g. office space, storage of equipment, professional fees, etc.).

We also use an economic model linking historical landings and costs to understand and illustrate how vessel-level profitability changes with sablefish catch. In equation (1) landings L for species s , including their respective interactions, are associated with the natural log of variable costs VC for the i^{th} vessel in year t . The primary species landed by the fleet historically include sablefish and other groundfish (e.g., rockfish, lingcod, etc.). Variable costs categories are as listed in Table 35.

$$\ln(VC_{it}) = \sum_{s=1} L_{its} + \sum_{s=1} \sum_{r=1, r \neq s} L_{its} L_{itr} + \epsilon_{it} \quad (1)$$

While fixed costs are generally not malleable within a season, intuitively we might expect variable costs to increase when a vessel catches a greater quantity of fish (for example, expending more fuel). Interactions in the cost function allow for cost complementarities between species. This specific functional form also allows marginal costs to increase with landings, which might occur for example if there exists a stock effect, such that it becomes harder to find fish as catches increase.

²⁰ Here food is required regardless if fishing takes place, while fishing gear replacement likely depends on use.

At the level of average landings for the vessels responding to the 2014-2017 surveys (14.61 metric tons; Figure 1) variable costs net revenue (VCNR) are positive (revenues exceed variable costs), consistent with the estimates of TCNR. Uncertainty around variable represents one standard error is calculated by the delta method. This relationship is estimated from Equation (1), where other groundfish landings are included as a covariate in addition to sablefish.²¹ Therefore the plot illustrates variable cost as a function of sablefish landings, assuming a vessel caught an average quantity of the other species. We note there are only a few observations at the maximum observed landings in our sample, and out-of-sample extrapolation is discouraged.

Table 34: Number of vessel observations in survey results, by vessel length and year.

		Vessel length			
		< 35 feet	35 to 50 feet	> 50 feet	All vessels
Year	2014	5	21	10	36
	2015	9	26	10	45
	2016	10	20	14	44
	2017	9	24	14	47
	All years	33	91	48	172

Table 35 Cost categories reported by limited entry fixed gear catcher vessel survey.

Cost Categories
<i>Variable Cost Categories</i>
Bait
Captain wages
Communications
Crew wages
Fishing association dues
Food
Freight
Fuel and lubrication
Ice
Offloading
Supplies
Travel
Trucking
<i>Fixed Cost Categories</i>
Fishing gear
License fees
Insurance premium payments
Vessel and on-board equipment
Lease of vessel
Moorage

²¹ Vessel fixed effects are also included and evaluated at the mean to construct Figure 1.

Appendix B: Enforcement Compliance Report

2018-2020 Limited Entry Fixed Gear Enforcement Summary

NOAA Office of Law Enforcement - West Coast Division

January 2022

Enforcement of the West Coast Limited Entry Fixed Gear (LEFG) primary sablefish fishery is conducted cooperatively among federal and state partners that includes NOAA Fisheries' Office of Law Enforcement (OLE) West Coast Division (WCD), U.S. Coast Guard (USCG) Districts 11 and 13 (D11, D13), Washington Department of Fish and Wildlife Police (WDFW), Oregon State Patrol Fish and Wildlife Division (OSP), and California Department of Fish and Wildlife Enforcement Division (CDFW). As authorized under the Magnuson-Stevens Act (MSA), OLE's Cooperative Enforcement Program (CEP) uses Cooperative Enforcement Agreements (CEAs) to allow the deputation and annual funding of state marine conservation law enforcement officers to perform limited and specific law enforcement provisions of the MSA, which includes coverage of the LEFG primary sablefish fishery. CEP funding has also been provided to support the purchase, operation, and maintenance of state patrol aircraft, vessels, and vehicles. The CEAs are an important component of OLE's MSA enforcement strategy and are typically effective for a five-year period.

In support of the LEFG Program Review, OLE conducted a review of three years of law enforcement data, including data provided by USCG D11, D13, WDFW, OSP, and CDFW. The years selected for this review were calendar years 2018, 2019 and 2020. Compliance review of the LEFG primary sablefish fishery was initiated through queries of NOAA's West Coast Groundfish Limited Entry Permit database and OLE's case management system to identify commercial fishing vessels that were both registered with a sablefish endorsement and associated with any recorded enforcement-related incidents between 2018 and 2020. The combined results flagged an average of 72 vessels (53 longline; 19 trap/pot) per year that were assigned to at least one primary sablefish tiered permit; and a total of 219 enforcement incidents connected to the list of flagged vessels. Each of the 219 incidents were then reviewed to assess the disposition of enforcement actions taken.

Table 36 presents a consolidated summary of commercial groundfish enforcement statistics from 2018 to 2020 that are broadly applicable to the LEFG primary sablefish fishery. The *Effort* section includes data elements related to ongoing air, sea and shore-based patrol activities conducted collectively by OLE, USCG D11/D13, WDFW, OSP, and CDFW to enforce MSA regulations governing fisheries in Federal waters off the West Coast. Unlike the directed IPHC Regulatory 2A halibut fishery, patrol and other enforcement activity data specific to the LEFG primary sablefish fishery is difficult to differentiate because MSA-related missions often simultaneously include enforcement of other federal fisheries regulations, such as highly migratory, midwater, open access, and other groundfish fisheries. There were some enforcement operations focused on the LEFG fishery, such as USCG D13's *Operation Coleridge*, an ongoing annual surge operation that focuses on the use of Seabird Avoidance Gear by certain LEFG vessels as required by regulations implemented in 2020; and USCG D11's two surge operations, *Operation Mola Mola* and *Operation Western Dethrone*, conducted between 2018 and 2020 that focused on California commercial groundfish fleet activities. The MSA Enforcement Activities data is thus viewed as a broad measure of the enforcement capacity of federal and state agencies to cover







the LEFG primary sablefish fishery, along with other economically-important commercial West Coast fisheries.

The *Actions* section represents the primary enforcement measures taken after investigations of potential MSA violations have been identified, reported, or referred by another federal, state, or non-government entity. The top-five enforcement action categories over the 2018 - 2020 time period were: 1) *Compliance Assistance/Verbal Warnings*, 116; 2) *Complaints/Investigations*, 45; 3) *Referrals*, 33; 4) *Citations/Notice of Violations and Assessment (NOVA)*, 25; and *Written Warnings*, 20.

The *Results* section lists the 16 general categories of observed violations. The five categories with the highest frequency of occurrence were: 1) *License/Permit*, 33; 2) *Overage - Halibut/Other Species*, 29; 3) *Reporting/Recordkeeping*, 28; 4) *Gear*, 19; and 5) *Overage – Sablefish*, 17.

Overall analysis of incidents recorded in the OLE case management system between 2018 and 2020 that were directly associated with LEFG fishing vessels yielded an 83% compliance rate for the longline fleet; and an 80% compliance rate for the trap/pot fleet.

Table 36. 2018-2020 MSA/commercial groundfish enforcement statistics.

2018-2020 MSA/COMMERCIAL GROUND FISH ENFORCEMENT STATISTICS				
     				
	2018	2019	2020	2018-2020
EFFORT				
AIRCRAFT (Fixed-Wing and Helicopter)				
Aircraft Patrols	110	249	200	559
Aircraft Patrol Hours	832	1,576	1,694	4,102
AT-SEA CUTTERS				
Number of Cutter Patrols	408	514	403	1,325
Cutter Patrol Hours	8,970	13,398	13,189	35,557
Boardings / Contacts	42	36	48	126
AT-SEA VESSELS				
Number of Vessel Patrols	136	324	375	835
Vessel Patrol Hours	957	1,205	1,887	4,048
Boardings / Contacts	160	374	214	748
SHORE-BASED				
Shore-Based Patrol Hours	641	843	1,029	2,513
Shore-Based Personnel Hours	1,311	1,053	2,491	4,854
Boardings / Contacts / Inspections	258	217	137	612
ACTIONS				
Compliance Assistance / Verbal Warnings	52	23	41	116
Complaints / Investigations	9	7	29	45
Referrals	6	11	16	33
Citations / NOVAs	12	3	10	25
Written Warnings	12	6	2	20
Summary Settlements	3	4	7	14
Closed Investigations - Lack of Resources/Evidence	2	0	5	7
Settlements	0	0	1	1
RESULTS				
VIOLATIONS				
License/Permit	8	6	19	33
Overage - Halibut/Other Species	4	19	6	29
Reporting/Recordkeeping	13	3	12	28
Gear	1	17	1	19
Overage - Sablefish	3	3	11	17
VMS Issues	2	5	9	16
Prohibited/Undersized Species	3	5	2	10
Closed Season/Time	1	5	1	7
Closed Area	2	2	3	7
Observer-Related	2	0	4	6
Prohibited Sale	1	2	2	5
Permit Owner Not On Board	0	2	1	3
Seabird Avoidance	0	0	3	3
Undersized Halibut	0	1	1	2
Original Groundfish Permit Not On Board	0	2	0	2
Waste of Fish	1	0	1	2
Offload Monitoring	0	0	1	1
Vessel Marking	0	0	1	1

Appendix C: NWFSC West Coast Fisheries Participation Survey

This review includes information from a Northwest Fisheries Science Center (NWFSC) voluntary survey of West Coast fisheries participants. In 2017 and 2020 mail surveys were used to collect information about why West Coast fishermen choose to participate in commercial fishing, and the benefits they derive from fishing, including non-monetary benefits. The goal of the survey was to better understand how individuals and communities are affected when opportunities and profitability in particular fisheries change. The survey was sent to all vessel owners who had commercial fishery landings in Washington, Oregon or California in the years preceding the surveys. Over 1,450 responses to the survey were received in both 2017 and 2020, over a 50 percent response rate. The distribution of those responses is shown in Figure 22 below. Of the respondents to this survey, there were matches to 40 LEFG primary fishery vessels in the 2017 survey and 44 in the 2020 survey—which corresponds to approximately half of the participating vessels in those years (Table 4). There were 22 vessels in common across the surveys. More information on the survey, including results, can be found at <https://www.fisheries.noaa.gov/national/west-coast-fisheries-participation-survey-results>.

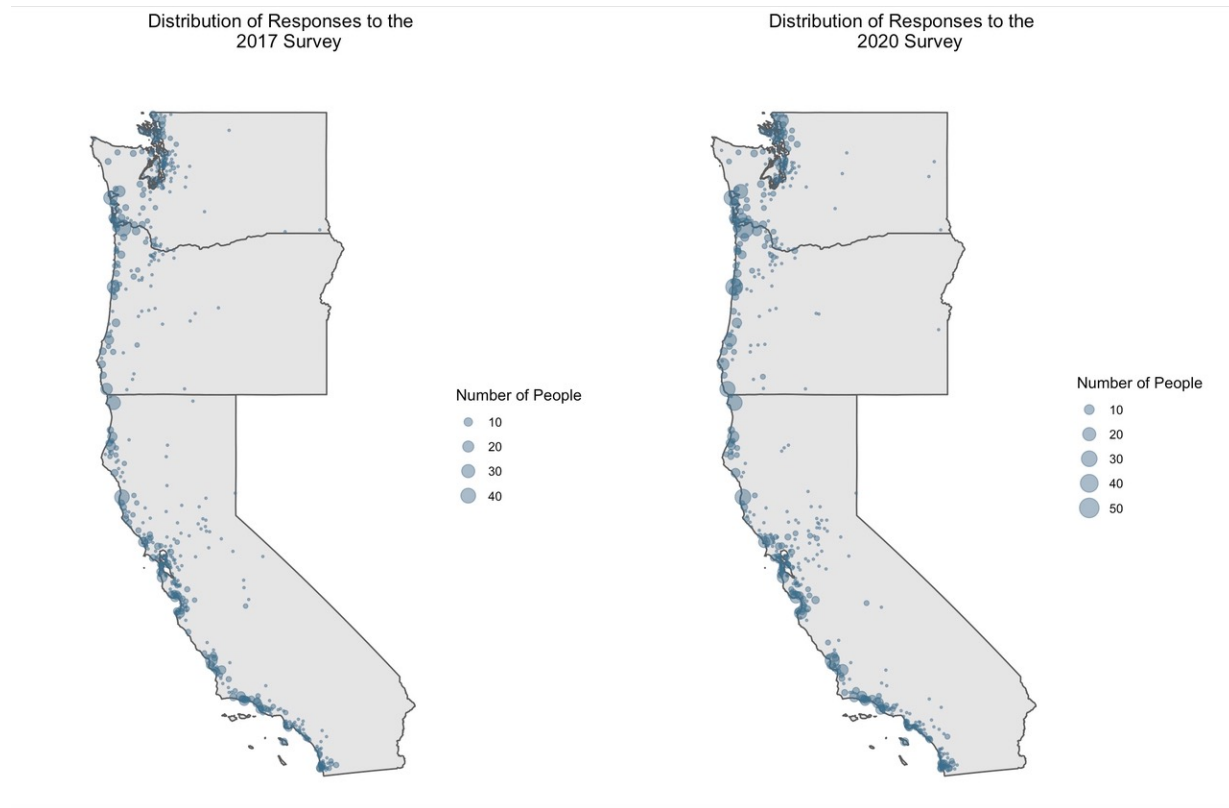


Figure 22. Distribution of NWFSC Survey Responses.