

# Analysis of Sablefish Management and Trawl Allocation Attainment Issues

Produced for the January 2020 SaMTAAC Meeting

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# General Analysis of Gear Switching Issue

In October, the Sablefish Management and Trawl Allocation Attainment Committee (SaMTAAC/Committee) revised the range of alternatives (ROA). These revisions required additional analysis. The Committee also requested some specific analyses to assist in further development of the ROA at its January 2020 meeting. This document supplements the October analysis and has a similar outline structure to provide easy cross-referencing.

## Historical Information on Sablefish Allocation Attainment and Gear Switching (2011-Present)

### Fishery and Sablefish Market

#### *Trawl Allocations and Harvest*

*Summary: Previously provided data on the amount of quota harvested in the shorebased Individual Fishing Quota (IFQ) fishery, which is augmented with preliminary data for 2019.*

- *The amount of gear switching varied substantially in the first four years of the program but appears to have stabilized at just over 30 percent since 2015.*
- *There was an increase in the percent attainment in 2019 for both sablefish north and south compared to 2018.*
- *The available pounds of sablefish north and south in 2019 was the highest on record since the start of the IFQ program.*

Table 1 below shows the total available pounds (including surplus carryover) by area for 2011-2019, pounds caught by area and gear type for 2011-2018 and total mortality (with discard mortality rates applied) by area for 2019, percent caught by area and gear type for 2011-2018, and the total percent unharvested by area. Compared to 2018, the percent unharvested of sablefish north in 2019 decreased by over half even as the allocation increased by almost 300,000 lbs. The amount of sablefish south caught in 2019 was almost double that of 2018, although 2019 had the second lowest attainment percentage on record. Based on fish ticket data, fixed gear accounted for 36.2 percent of the total IFQ landings of sablefish north or 33.6 percent of the total available pounds. The percentage taken by fixed gear is the highest since the start of the program.

Table 1: Sablefish available quota (millions of lbs, including surplus carryover); total catch (millions of lbs) by area, catch (millions of lbs) and percent attainment by gear type and area, 2011-2018; and total mortality (millions of lbs) and percent attainment by area for 2019 (Source GEMM 2011-2018; IFQ database 2019 queried on January 3, 2020).

Area	Landing Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	
North	Available QPs	5.61	5.44	4.29	4.52	5.05	5.46	5.64	5.67	5.94	
	Total Catch	5.29	4.92	4.07	4.13	4.82	5.02	5.56	5.08	5.64	
	Trawl	Catch	3.75	3.26	3.09	2.86	3.24	3.22	3.69	3.27	
		% of Avail. QPs	66.8%	59.9%	72.1%	63.3%	64.2%	58.9%	65.4%	57.7%	
	Fixed Gear	Catch	1.54	1.66	0.98	1.27	1.58	1.80	1.87	1.81	
		% of Avail. QPs	27.4%	30.5%	22.9%	28.0%	31.3%	33.0%	33.2%	31.9%	
	Total Unharvested QP		5.8%	9.6%	5.0%	8.7%	4.5%	8.1%	1.4%	10.4%	
South	Available QPs	1.17	1.13	1.43	1.57	1.72	1.89	1.86	1.90	1.93	
	Total Catch (millions of lbs)	1.00	0.50	0.20	0.45	0.36	0.44	0.25	0.10	0.19	
	Trawl	Catch	0.04	0.05	0.01	0.02	0.01	0.01	0.00	0.00	
		% of Avail. QPs	3.2%	4.4%	1.0%	1.1%	0.9%	0.6%	0.1%	0.0%	
	Fixed Gear	Catch	0.96	0.45	0.18	0.43	0.35	0.43	0.25	0.10	
		% of Avail. QPs	82.3%	39.3%	12.8%	27.3%	20.2%	22.7%	13.5%	5.2%	
	Total Unharvested QP		14.5%	56.3%	86.3%	71.6%	79.0%	76.7%	86.3%	94.8%	

a/ Prior to 2019, survival credits were not given to IFQ vessel accounts. Values from 2011-2018 do not account for discard mortality, which is used in determining final year end estimates by WCGOP, and therefore should align with the vessel account database.

Internal Reference: [January Analysis- Catch vs. Allocation](#)

## Fleet and Buyers

*Section summary: This section supplements the fleet profile presented in October 2019: augmenting participation information with preliminary data for 2019, correcting some information on latent and inactive permits, and responding to information requests by the Committee. Specifically, with respect to the Committee requests, it focuses on the vessels and permits that have historically participated in gear switching of sablefish north but left the fishery, provides additional details on the number of latent permits that may be available for vessels interested in participating in the IFQ fishery, and provides a deeper look at the other fisheries that gear switching vessels are dependent on, with an emphasis on potential crossover from the Dungeness crab fishery. The following are a few of the highlights:*

- The number of vessels and permits gear switching declined substantially after the first two years of the program and was stable at 16 from 2016-2018. In 2019, there was one less vessel and permit in total that participated in gear switching.*
- Of all 39 vessels and 39 permits that have gear switched from the start of the program up to 2018, only 23 vessels and 25 permits were active in the fishery from 2016-2018.*
- As an indication of the permits potentially available for new entrants to the trawl fishery, there have been 52 trawl permits that have been latent for an entire year from 2011-2018 (i.e. not registered to a vessel), with five being latent the entire period.*
- Across the duration of the IFQ program, an increasing number of permits have become latent such that 33 of the 52 permits that were latent for the entire year were latent in 2018.*
- Another indicator of potentially available permits is the number permits registered to a vessel that were not used to fish in the IFQ fishery for an entire year. There have been 86 permits that have been inactive for an entire year from 2011-2018 (i.e. registered to a vessel but with no recorded IFQ landings), with eight being inactive the entire period.*
- A downturn in the Dungeness crab fishery might be more likely to lead to more gear switching entrants to the trawl fishery than trawl gear entrants; more than half of gear switching vessels and approximately a quarter of trawl vessels that have landed sablefish north also participate in the Dungeness crab fishery.*
- Out of the 39 gear switching vessels from 2011-2018, ten have had more than 50 percent of their yearly West Coast ex-vessel revenue sourced from gear switching in the year in which they gear switched.*
- Of the 42 first receivers who bought sablefish north from 2011-2019, 35 first receivers maintained their strategy compared to what they were doing previously while seven changed buying strategies. Seven of the 42 purchased from only fixed gear vessels.*

### *Vessel and Permit Activity*

Table 2 below shows the number of vessels and trawl permits that harvested sablefish north with fixed gear and the number of first receivers that purchased that fish from 2011-2019. Over the nine-year period, there were 41 vessels and 41 permits that were directly associated with gear switched landings of sablefish north. In 2019, there was one less vessel and permit in total that participated in gear switching of sablefish north, as compared to 2018. There were three vessels that had prior history of gear switching in 2018 but had none in 2019 and two vessels entered the gear switching fishery for the first time in 2019. Four permits that landed fixed gear sablefish north in 2018 had no record in 2019 and three permits were used to land sablefish north with fixed gear for the first time in 2019.

Table 2: Number of IFQ vessels and trawl-endorsed permits that harvested sablefish north with fixed gear and the number of first receivers that purchased that fish from 2011-2018.

Year	2011	2012	2013	2014	2015	2016	2017	2018	2019
Number of Vessels	17	20	11	15	14	16	16	16	15
Number of Permits	17	21	11	14	14	16	16	16	15
Number of First Receivers	14	15	11	13	14	13	15	12	9

Internal Reference: 4 Gear Switching Analysis

While in recent years (2016-2018), the number of vessels and permits that participate in gear switching has leveled out at 16 vessels and 16 permits, the first three years of the program saw participation levels range from 11 vessels and 11 permits in 2013 to 20 vessels and 21 permits in 2012. Given that there have only been 16 units (vessels or permits) participating in each year from 2016-2018, the SaMTAAC was interested in where the vessels and permits that started gear switching in the early years of the IFQ program went. First, in that regard, it should be noted that while there have been only 16 vessels and permits participating in any one year between 2016-2018, those 16 annual participants comprise a total of 23 distinct vessels and 25 distinct permits. This means that roughly 60 percent of the 39 distinct vessels and 39 distinct permits active from 2011-2018 participated in gear switching in the last three years. With respect to the remaining 40 percent, vessel and permit landing histories reveal there were 11 vessels and 11 permits (~28 percent of the 39 total vessels and permits) that participated in gear switching between 2011-2013 and had no additional history of gear switching after 2013. With respect to the vessels, three of the 11 vessels appear to have left West Coast fisheries entirely (i.e. no recorded landings in recent years) while the other eight appear to operate in other fisheries, including shorebased IFQ with trawl gear, limited entry fixed gear (LEFG) or open access (OA) sablefish, and other non-groundfish fisheries such as crab and shrimp. Specifically, four continue to participate as trawlers in the IFQ program through 2018. The number of participants in the other fisheries is not provided here due to potential confidentiality concerns. With respect to the permits, three of the 11 permits that were used for gear switching between 2011-2013 went latent (i.e., were not registered to a vessel from 2014-2018), while the majority of the remaining permits continued to participate as trawlers in the shorebased IFQ program. (Figure 1)

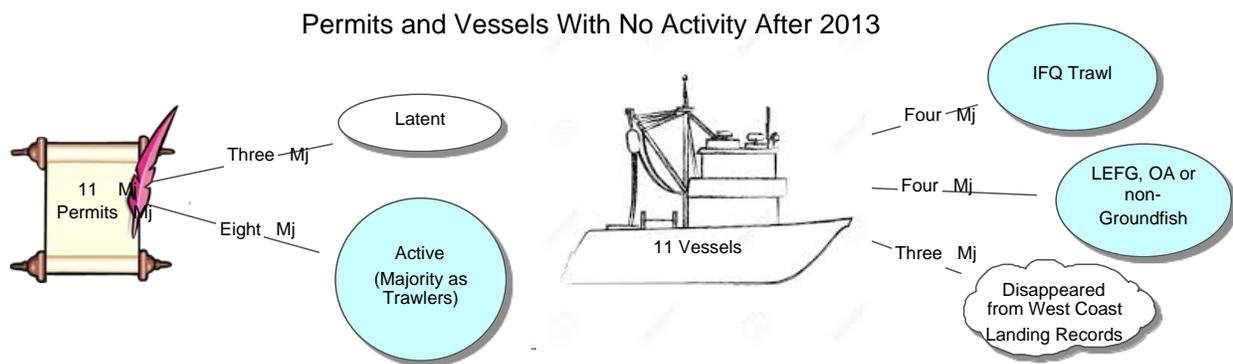


Figure 1. Recent activity of permits (left panel) and vessels (right panel) that participated in gear switching from 2011-2013 but not after.

### Permit Availability

During the course of the October meeting, it was discovered that Table 7 from the October analytical document mistakenly included catcher-processor permits in the count of total trawl endorsed permits that might be available to potential new entrants in the IFQ fishery, including gear switchers. Additionally, there were some other minor corrections to the number of latent permits and the number of inactive permits (i.e., permits with no IFQ landings). The information from Table 7 of the October analysis has been updated and corrected in Table 3 below. Table 3 provides the number of trawl permits used to harvest sablefish north, number of permits that used trawl gear to make IFQ landings, number of permits with trawl catch share landings (including those MS/CV endorsed permits that had no shoreside landings), number of latent permits (permits not registered to a vessel), number of permits that were inactive and the number of total trawl-endorsed permits available. Note that while the “inactive” permits were assigned to a vessel during the year, they could be seen as potentially available for gear switching or other entry to the trawl fishery, given that they were not used to participate in the IFQ fishery. Trawl vessels would not have lost opportunity if the inactive permit had been leased to another vessel.

Table 3: Number of trawl permits that landed sablefish north, number of permits with IFQ landings made with trawl gear, number of permits with trawl catch share landings, number of permits that were latent for entire year, number of permits with no IFQ landings, and total trawl endorsed permits available, 2011-2018.

Year	Number of Trawl Permits that Landed Sablefish N	Number of Permits with Trawl Gear IFQ Landings	Number of Permits with Trawl Catch Share Landings <sup>a/</sup>	Latent Permits (Permits Not Associated with Vessel for Entire Year <sup>b/</sup> )	Inactive Permits Registered to a Vessel but with No IFQ Landings	Total Trawl Endorsed Permits Available
2011	100	89	116	14	37	167
2012	100	84	110	22	33	165
2013	90	84	107	25	33	165
2014	92	82	106	26	33	165
2015	88	76	97	32	36	165
2016	86	76	98	33	34	165
2017	94	80	99	29	37	165
2018	93	81	100	33	32	165

a/ Includes permits that are MS/CV endorsed and the vessel participated in the MS fishery in that year

b/Vessel shows up as “unidentified” in the permit records.

Internal Reference: 7 Permits, 4 Gear Switching Analysis

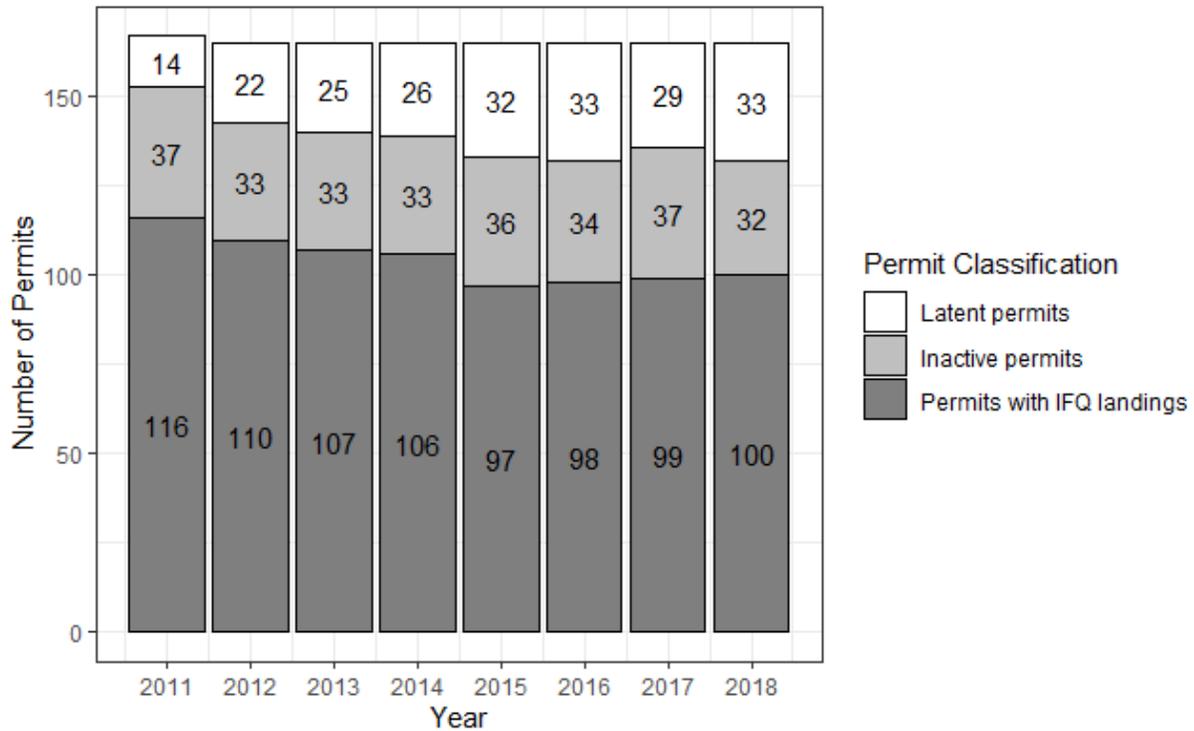


Figure 2. Number of trawl limited entry permits by classification (inactive for entire year, latent for entire year, or with IFQ landings), 2011-2018

Internal Reference: 7 Permits

Gear switching vessels tend to rely more heavily on leasing permits than vessels using trawl gear; however, while the number of potentially available trawl permits has been rising (Figure 2), the number of vessels gear switching has been stable or declining in the last four years (2016-2019). Over 2011-2018, roughly half of gear switching vessels leased their trawl permits (see Table 11 of October 2019 Analytical Document). Comparatively, trawl vessels that landed sablefish north (including those that both gear switched and trawled in the same year) had an average lease rate of 6.9 percent with 2016-2018 seeing the highest proportion of leased permits at an average of 11.3 percent, ranging from 9.9 percent in 2016 to 13.9 percent in 2017.

In examining the number of latent permits in Table 3 above, one question that arose from the SaMTAAC discussions was whether the latent permits tend to stay latent for multiple years at a time or vary year-to-year. Overall, there have been a total of 52 distinct trawl-endorsed permits that have been unassociated with a vessel for the whole year from 2011-2018 (i.e. latent). Table 4 shows number of permits by the number of years that permits were not assigned to a vessel for the entirety of a year. Of the latent permits, five have never been registered to a vessel during the IFQ era. Specifically, those five permits have not been registered to a vessel since 2003 (one permit), 2008 (one permit), and 2010 (three permits). Only one of these permits changed ownership over the latent period. In contrast to the five permits that were latent for the entire period, nine of the 52 permits were only latent for an entire year for a single year between 2011-2018, and six of those nine occurrences were in 2018. While these nine permits were only latent for an entire year for a single year within the analytical period (2011-2018), seven of these permits were not assigned to a vessel for portions of other years.

Table 4: Number of years that trawl-endorsed permits were unassociated latent permits for an entire year

Number of Years Latent (entire year)	1	2	3	4	5	6	7	8
Number of Permits	9	7	5	11	4	5	6	5

Internal Reference: 7 Permits

It seems likely that permits which are latent multiple years in a row would be more likely to available for leasing than permits that are latent for one year at a time. Figure 3 below shows the maximum number of consecutive years that a permit was latent. If a permit was not assigned to a vessel for seven total years, but it was in a four-year period (e.g. 2011-2014) and a three-year period (e.g. 2016-2018) with a year break in between (e.g. 2015), it would be counted under the “four-year” bin in Figure 3 below. Additionally, the bars are split (noted by color and labeled with number of permits) into counts of those permits that were latent in 2018 and those that were registered to a vessel in 2018.

While the vast majority of the permits that are latent for more than one year are latent for multiple years in a row, there were six permits that were latent for more than one year and the latent years were not consecutive. One example can be seen in the difference in the number of permits that were latent for a single year (nine in Table 4) compared to those permits where the maximum number of consecutive years was one (11 in Figure 3 below). The two additional permits in Figure 3 are the result of two permits that were latent for a total of two years, but the years were not consecutive. One of these permits saw a five-year gap in between latent years, while the other only had one year between. Another example can be seen where of the five permits that were latent for six years but there are only four that were consecutively latent for six years. One of the five permits saw a break in the latent period with four years of being un-assigned to a vessel, a single year of being assigned to a vessel, and then two more latent years (shown in the “four year” bin in Figure 3 below).

Of the 52 permits that have been latent (unassigned) for at least one entire year from 2011-2018, 33 were latent in 2018. Fifteen of those 33 permits have historically landed sablefish north between 2011-2017, with nine using fixed gear and six using only trawl gear. The remaining eighteen permits were composed of the five permits that were never assigned to a vessel, four permits that were historically assigned to a vessel but had no West Coast landings of any species associated with those vessels, three permits that were assigned but only had landings of non-groundfish (e.g. Dungeness crab) with the associated vessels, and six permits were assigned to vessels that participated in other groundfish fisheries, including fishing trawl IFQ sablefish south with fixed gear and LEFG or OA sablefish (Figure 4).

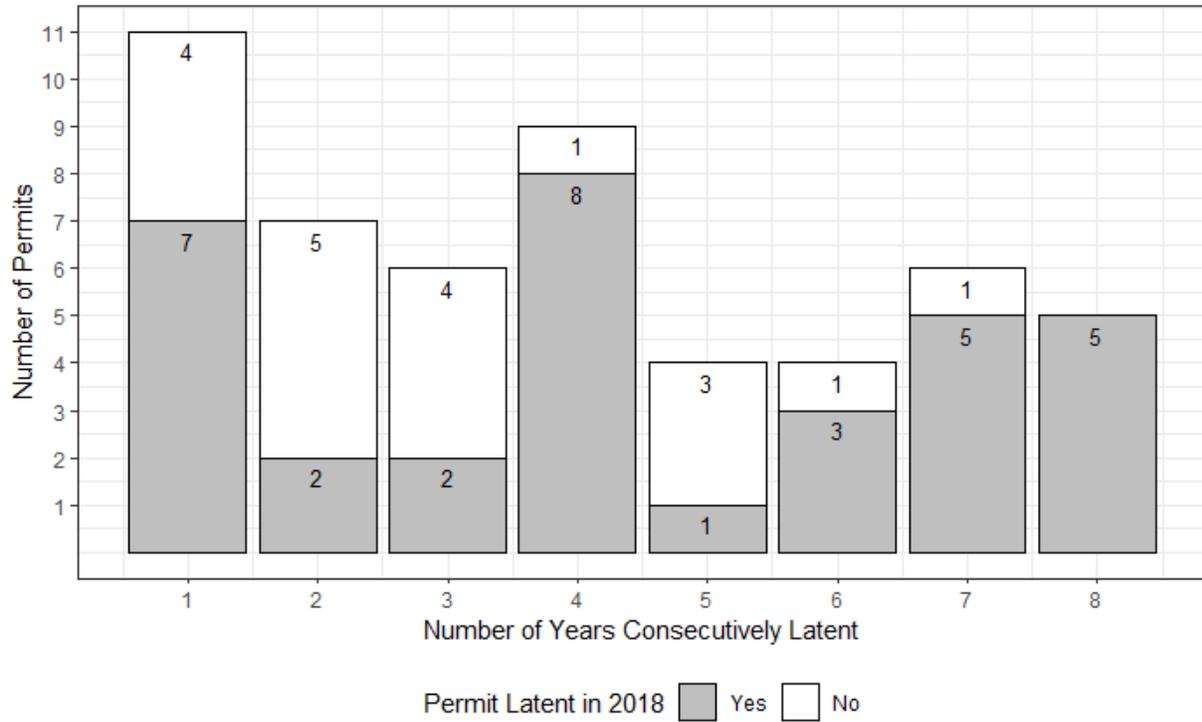


Figure 3. Maximum number of consecutive years that a permit was not assigned to a vessel. Bars are stacked to show those permits that were not assigned to a vessel in 2018 compared to those that were assigned to a vessel in 2018.

Internal Reference: 7 Permits

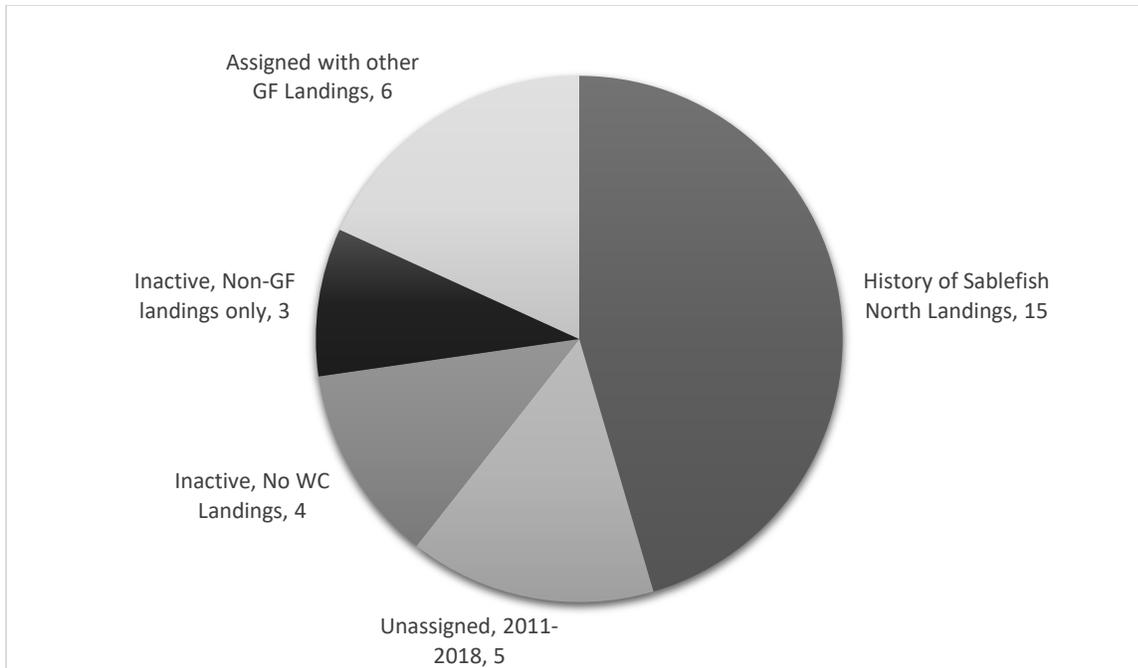


Figure 4. Breakdown of permit history for those trawl-enclosed permits that were latent in 2018.

In contrast to those that were latent (unassigned) for the entire year, there were 86 distinct permits that were inactive for at least one whole year (i.e. registered to a vessel for some or all of the year, but had no IFQ or MS landings). Table 5 shows number of permits by the number of years that a permit was inactive.

Table 5: Number of years that a trawl enclosed limited entry permit was inactive, 2011-2018

Number of Years Inactive (entire year)	1	2	3	4	5	6	7	8
Number of Permits	31	17	7	5	8	5	5	8

Internal Reference: 7 Permits

There have been eight permits that have been inactive for the entire analytical period (2011-2018). Five permits were assigned to a vessel for the entire eight-year period but had no IFQ landings. The other three permits were not registered to a vessel for portions of at least one year (ranging from less than 2 months to 10 months for one to two years per vessel). Inclusion in the latent permit analysis requires that a permit not be registered to a vessel for an entire year, therefore these permits are not included there.

In contrast to the recent year increase in number of latent permits, the number of inactive permits has remained relatively stable across the years (varying between 32 and 37, Table 3). Similar to the latent permits, there are some permits that were consecutive in the years of inactivity while for others, years of activity or latency intervened between their years of inactivity. Figure 5 below shows the same information as Figure 3 above, except that it depicts the trends of inactive permits instead of latent permits. Of the 86 permits that were inactive in the IFQ fishery for at least a year, 32 permits had no associated landings in 2018.

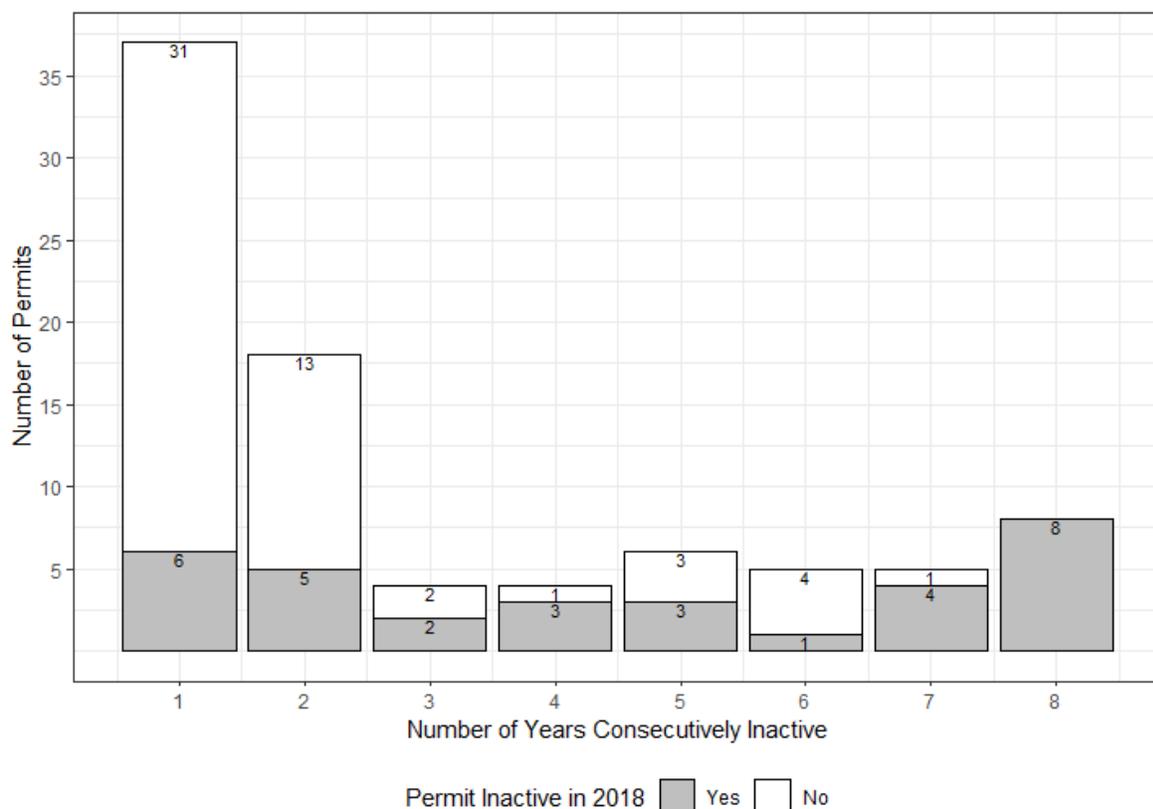


Figure 5. Maximum number of consecutive years that a permit was inactive. Bars are stacked to show those permits that were inactive in 2018 compared to those that were active in 2018.

Internal Reference: 7 Permits

A single permit could show up as latent in one year and inactive in another and therefore be represented in both categories discussed above, but it would not be present in both categories in the same year. There were 34 permits that were classified as latent and as inactive for at least one year between 2011-2018. Five permits were latent for the entire period and eight permits were inactive for the entire period. In addition, ten permits were either inactive or latent for every year of the entire eight-year period. Thus, there were a total of 23 trawl permits that were latent or inactive for the entire period.

### *Reliance on Gear Switching*

Gear switching vessels may participate in other fisheries, or even fish in Alaska. For all vessels that gear switched sometime between 2011 and 2018, of their total west coast shorebased ex-vessel revenue over that entire period, 23.0 percent came from gear switching of all species (Table 6).<sup>1</sup> On an annual basis (including only vessels that gear switched in the particular year), 41.5 percent of gear switching vessels' total west coast shorebased ex-vessel revenue came from gear switching.

<sup>1</sup> This includes gear switching targeting on northern sablefish, southern sablefish, and non-sablefish IFQ species.

Table 6. Gear switching vessel revenue dependence evaluated for all West Coast fishing by gear switching vessels over the entire period and only for fishing occurring in the years in which the gear switching occurred (2011-2018).

Vessel Average Revenue	Gear Switching	Trawl Gear (Whiting Portion)	LE FG	Dungeness Crab	Pink Shrimp
Over Entire Period (2011-2018)	23.0%	18.4% (7.6%)	14.2%	32.8%	8.7%
Just for Years of Gear Switching (2011-2018)	41.5%	3.7% (1.4%)	15.6%	27.8%	<1%

Out of the 39 gear switching vessels from 2011-2018, nineteen have had more than 50 percent of their yearly ex-vessel revenue sourced from gear switching of sablefish north, in any one year. Of those nineteen, ten vessels had more than 50 percent overall in all active gear switching years and three had more than 90 percent. Looking to a more recent period, five of the 23 vessels participating from 2016-2018 received an average of more than 50 percent of their revenue from fixed gear sablefish north in the years in which they participated. The other 18 vessels range from less than a percent to approximately 49 percent. Table 7 below shows the percentage of ex-vessel revenue made up by gear switched landings of sablefish north in years that vessels actively gear switched. While for some vessels, gear switching was only a minor part of their portfolio in those active years, ten vessels had over half of their ex-vessel revenue on average come from gear switched landings.

Table 7: Percentage of total ex-vessel revenue made up by gear switched sablefish north landings in years that vessels gear switched (2011-2018).

Percentage of Revenue from Gear Switched Sablefish North	0-5%	5-20%	20-50%	50-75%	75-100%
Number of Vessels	3	7	19	6	4

### *Potential Crossover from Other Fisheries*

In the October document, there was an analysis indicating the potential for new entrants to move from other fisheries into the IFQ fishery to harvest fixed gear sablefish north, with a focus on those that currently participate in the LEFG fishery. SaMTAAC members were interested in other fisheries from which active vessels might come to participate in gear switching. The existing crossover fisheries, discussed in the previous section, are considered the primary sources for potential additional crossover into the trawl fishery as gear switchers. Outside of the trawl and fixed gear sectors, the largest West Coast fishery from which vessels already crossover to the IFQ gear-switched sablefish fishery is the Dungeness crab fishery.

Between 560 and 657 vessels participated in the Dungeness crab fishery between the start of the 2010/2011 crab season and the end of the 2017/2018 season (Table 8). Table 8 shows the number of vessels that participated in Dungeness crab fishing by crab season as well as the number of vessels which participated in crab and any fixed gear sablefish fishery (IFQ, LEFG, OA), crab and IFQ fixed gear sablefish north (including those vessels that both trawled and gear switched for IFQ sablefish north in the same year), and crab and trawl sablefish north (excluding those that gear switched) in those same seasons. Note that the crab seasons were analyzed based on December 1 to November 30 fishing year, though in some years, openings have not occurred until a number of weeks after the normally scheduled December 1 opener. Also, delays in the crab season openings can vary by area. Between 82 and 134 of Dungeness crab vessels participate in fixed gear harvesting of sablefish north (IFQ or non-IFQ) for an annual average

of 17.4 percent of all crab vessels. However, only between seven and 12 vessels participate in Dungeness crab and cross over to use fixed gear in the IFQ fishery (an average of less than two percent of all crab vessels). At the same time, of those 39 vessels that use fixed gear to harvest sablefish north in the IFQ fishery (Table 2 above), 19 have also participate in the crab fishery (49 percent). In the three most recent crab seasons (2015/2016, 2016/2017, 2017/2018), 10 or 11 vessels have both crabbed and gear switched, accounting for approximately 61 percent of all gear switching vessels over that period.

Between 20 and 27 vessels participate in the crab fishery and use trawl gear in the IFQ fishery. The cross-over rate from the crab fishery to trawling in the IFQ fishery (an average of four percent) is between the cross-over rates to the fixed gear fisheries (18 percent) and that to gear switching in the IFQ fisheries (two percent). At the same time, approximately a quarter of trawl vessels that participate in the IFQ fishery also participate in the Dungeness crab fishery, a lesser amount of cross-over from trawl to Dungeness crab than from gear switching to Dungeness crab. The small proportion of crab vessels that gear switch (two percent) compared to the large number of gear-switching vessels that crab (~61 percent in recent years) might indicate that a decline in opportunities in the crab fishery could lead to more gear switching.

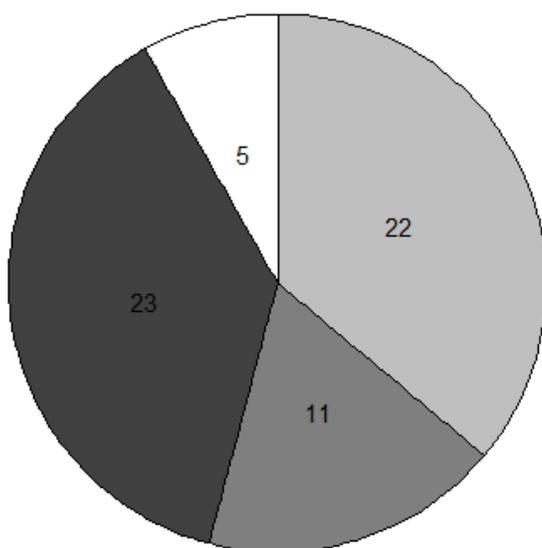
Table 8: Number of Vessels that participated in only Dungeness crab fishing, crab and fixed gear sablefish north, and crab and trawl sablefish north between 2010/2011-2017/2018 crab season.

Crab Season	Vessels that fished Dungeness crab	Vessels that fished Dungeness crab but not the trawl IFQ fishery.	Vessels that fished both Dungeness crab and landed sablefish north with fixed gear	Vessels that fished both Dungeness crab and landed sablefish north with fixed gear in the IFQ program	Vessels that fished both Dungeness crab and landed sablefish north with trawl gear
2010-2011	657	615	134	9	24
2011-2012	610	562	124	12	26
2012-2013	570	528	89	7	27
2013-2014	560	518	82	8	26
2014-2015	567	526	88	8	24
2015-2016	566	522	98	11	20
2016-2017	602	556	111	10	26
2017-2018	599	554	107	11	22

Internal Reference: 9 Post October Analysis

### *First Receivers*

Between 2011-2019, there were 61 first receivers that purchased IFQ sablefish north. Figure 6 below shows the number of first receivers by purchasing strategy. There were 23 first receivers who changed their purchasing strategy during this period. A first receiver was determined to have changed strategy if they went from purchasing from only trawl or only fixed gear or both fixed gear and trawl to a different classification (e.g. purchasing from both fixed gear and trawl in 2011-2014 and then only purchasing from trawl vessels in 2015 and beyond would be a “change”). Of the 11 first receivers who have purchased IFQ sablefish north in all eight years, six have changed strategy over time. All six dealers purchased trawl sablefish in every year.



Both Trawl and FG
  Changed Strategy
  FG only
  Trawl Only

Figure 6: Number of first receivers by sablefish north purchasing strategy, 2011-2019

Figure 7 provides a look at the changes in strategy over time in three eras (2011-2013, 2014-2016, and 2017-2019) for first receivers purchasing sablefish north. The most recent era had the greatest number of first receivers purchasing sablefish north (42), with the greatest number of trawl only buyers. The total number of first receivers purchasing from both trawl and fixed gear vessels or from fixed gear only vessels remained constant over time.

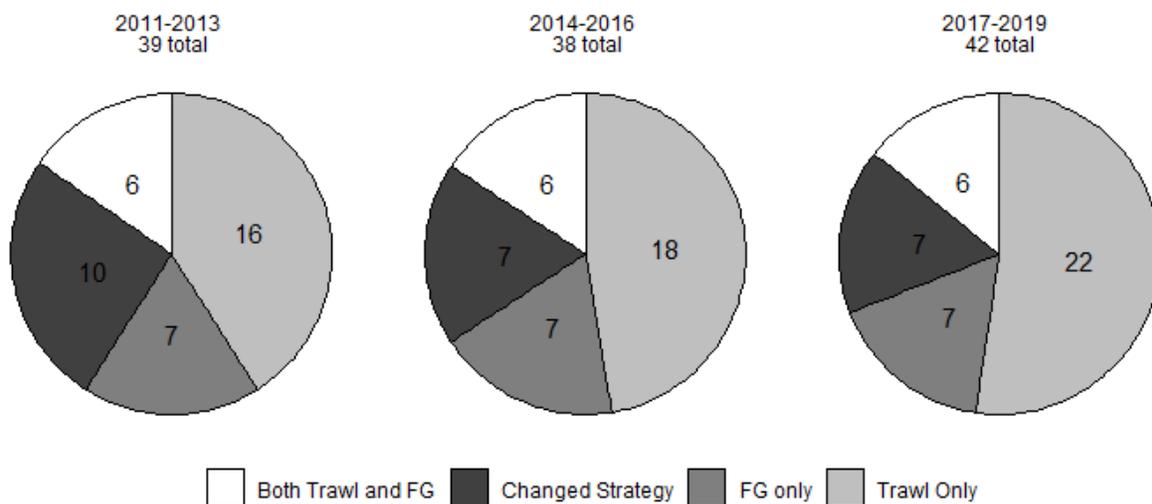


Figure 7: Number of first receivers by purchasing strategy and era--2011-2013, 2014-2016, 2017-2019

For those first receivers that maintained a sablefish north purchasing strategy, Table 9 shows the number of years that those buyers participated in the fishery. Due to the few numbers of first receivers purchasing trawl and fixed gear sablefish consistently, fixed gear only and “both” first receivers were combined. Some years were also combined to meet confidentiality.

Table 9: Number of Years that First Receivers who did not change strategy purchased from fixed gear only, trawl only, or both trawl and fixed gear vessels, 2011-2018

Years	1	2	3	4	5	6	7	8	9
FG/Both	8	5		0	0	0	3		
Trawl	7	4		3		4		4	

For those eleven first receivers who have only purchased IFQ fixed gear sablefish north, the alternatives that would restrict or eliminate gear switching may have significant impacts if they are unable to change to process trawl caught fish. These first receivers operated within the IOPAC port groupings of the Puget Sound, South and Central Washington Coast, Astoria, Newport, Monterey, and Morro Bay.

However, looking more recently at the 2017-2019 period may provide a better sense of the potential impacts. In this more recent period, there were only 42 first receivers as compared to the 62 that were active over the entire period. Of these 42, there were 35 first receivers who in 2017-2019 maintained their strategy compared to what they were doing previously while seven changed buying strategies. There

were 14 new first receiver licenses with sablefish north purchases in this period.<sup>2</sup> Of the 35 first receivers who maintained their buying strategy, six purchased from both trawl and fixed gear vessels, seven from fixed gear only vessels, and the remainder from trawl only vessels. Figure 8 below shows the number of first receivers who purchased sablefish north in 2019 by the purchasing strategy exhibited in the recent era (2017-2019). For the six buyers that purchased both fixed gear and trawl sablefish in 2017-2019, there were fewer than three that did not buy in 2019 and are combined in the graph below. Of the seven fixed gear only buyers, only four purchased IFQ sablefish in 2019.

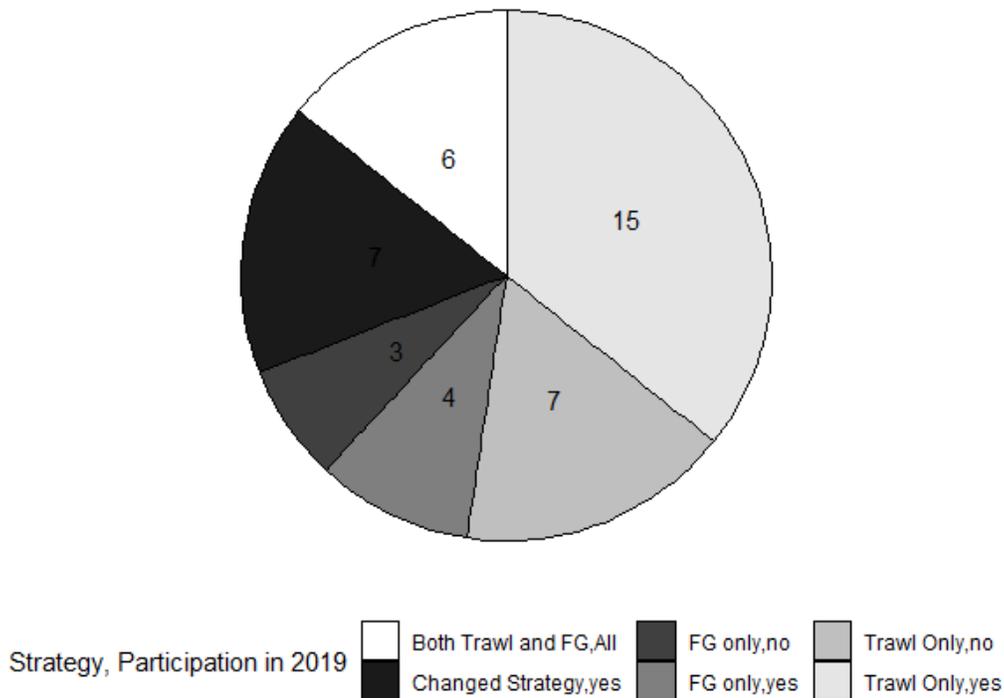


Figure 8: Number of first receivers that purchased sablefish north by strategy (2017-2019) separated into those who purchased sablefish north in 2019.

## Analysis Applying Across Several Alternatives

### Impact Information Related to Reducing Amounts of Gear Switching

#### Impact of Gear Switching on Attainment of Other Species

*Summary: One of the primary concerns associated with allowing gear switching of sablefish is that it limits the available sablefish for trawlers targeting other co-occurring species, especially those taken in the Dover sole, thornyhead, sablefish (DTS) complex. The October 2019 Analytical Document presented a preliminary analysis of the potential additional landings of Dover sole and the associated revenue that could be taken if all sablefish were taken with trawl gear as opposed to fixed gear under multiple haul ratios, assuming that limits on harvest are technical<sup>3</sup> rather than economic. Building off the work in that document, this section aims to present:*

<sup>2</sup> Some of the 14 first receiver licenses may be new licenses (either location or type) for current dealers and therefore may not represent new entrants.

<sup>3</sup> I.e., that the limitation on harvest is the ratio of species in the catch and not ex-vessel prices that do not provide trawlers with sufficient incentives or limits on the volume of fish the market is able to absorb.

- *additional details on the patterns of DTS hauls, and*
- *estimates of maximum potential revenue from DTS trips under different Dover sole to sablefish ratios and the absence of gear switching*

### *DTS Haul Characteristics*

In October, the SaMTAAC discussed the preliminary analysis on trends of those bottom trawl hauls that caught Dover sole and sablefish north. There was interest by committee members in looking closer at the differences in ratios of Dover sole to sablefish north taken by bottom trawl vessels by location, season, and by depth. Each of the figures below uses West Coast Groundfish Observer Program (WCGOP) haul level data for bottom trawl trips from 2006-2018 on which sablefish north was caught.

Figure 9 below shows a gradient map of the average ratio of Dover sole to sablefish north seen in each 0.5 x 0.5-degree grid cell. Cells without hauls from at least three vessels were removed for confidentiality. The left panel depicts a continuous gradient of the average ratio while the right panel has discrete categories of average ratios, making it easier to see differences for lower ratios. As shown, of those bottom trawl trips where sablefish north was caught, there is overall a higher ratio of Dover sole to sablefish north off the Washington/Oregon coasts as compared to California, with a significant peak in the ratio (shown by the brighter blue in the left panel) between approximately 46° N. lat. and 47° N. lat. The average ratio tends to decrease the further south the grid cell is located, so that catching the same amount of Dover sole requires more sablefish in the south. This is possibly correlated with a lower catch per unit effort (CPUE) for Dover sole in the south. In addition to a more visible distinction of differences between cells for which the Dover sole to sablefish north ratio is less than 20, the right panel provides context for the ranges previously discussed by the Committee. That is, what if vessels were able to increase from the recent average of approximately 4.65 pounds of Dover sole per pound of sablefish to over 10 pounds per pound of sablefish? Cells shown in the navy blue on the right panel represent those cells where the overall average is less than four pounds of Dover sole per pound of sablefish north. In general, these cells are farther south or deeper. Ratios higher than 20 are typically found north of the California border. These data indicate that a shortage of sablefish QP could push more of the trawling for Dover to the north (assuming that sablefish QP is a limiting factor).

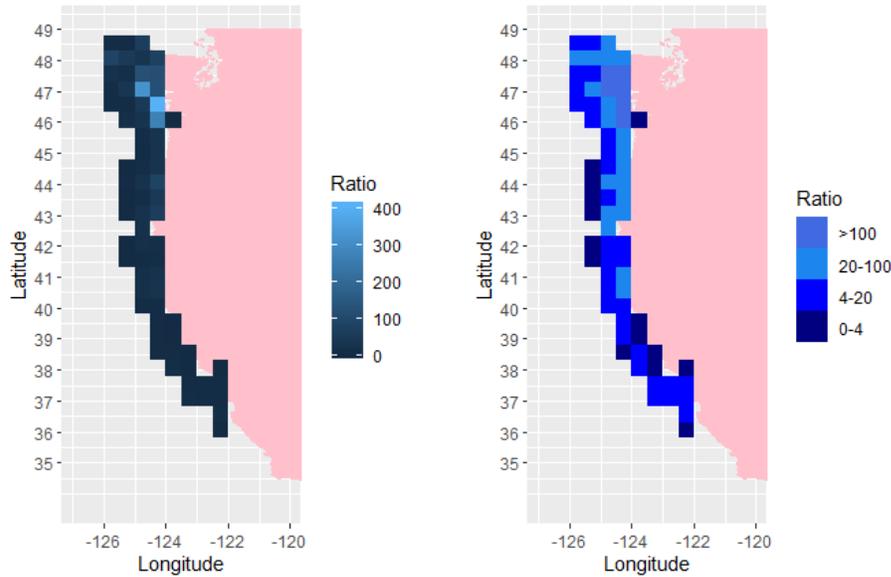


Figure 9. Left panel shows continuous gradient of the average ratio of Dover sole to sablefish north on positive bottom trawl hauls in 0.5x0.5-degree cells; right panel shows binned average ratio of Dover sole to sablefish north on positive bottom trawl hauls in 0.5x0.5-degree cells (Source: WCGOP; WGS84 Coordinate System)

With regards to seasonality, Figure 10 below shows the average ratio of Dover sole to sablefish north by month on those positive sablefish hauls. Not only does the range of average ratio vary by year, but the months at which the peaks occur vary. Looking at the IFQ era, five of the eight years experienced a bimodal pattern with peaks occurring typically between May and July and a later peak around October. Other years only exhibited a single peak occurring in one of those two seasons seen in bimodal years.

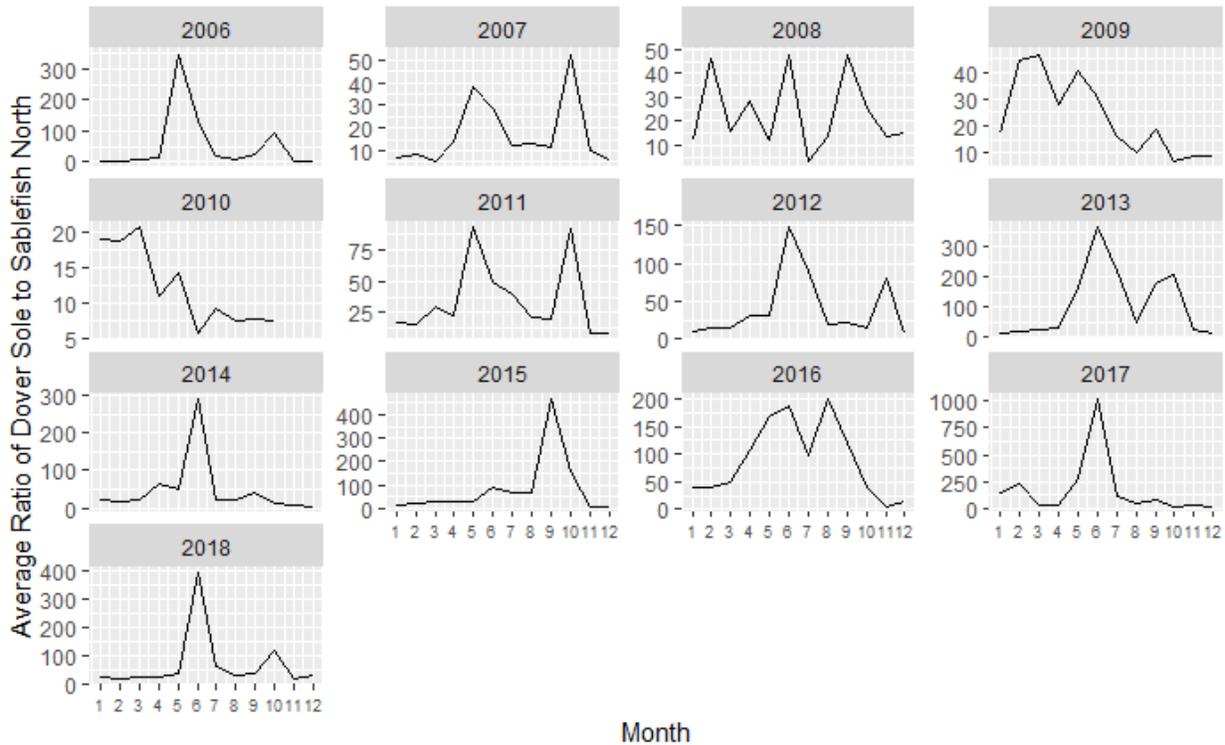


Figure 10: Average ratio of Dover sole to sablefish north on positive bottom trawl hauls, 2006-2018  
 Internal Reference: WCGOP Project/SaMTAAC

Looking closer at these ratios, for the bottom trawl sector, Figure 11 shows the same figures above for the ratio of Dover sole to sablefish north from 2011-2018 (top panel) compared to the amount of Dover sole landings (1,000s of lbs; middle panel) and sablefish north landings (1,000s of lbs; bottom panel). There appears to be a similar trend in the landings of Dover sole and sablefish north across all years in that the peaks of landings tend to co-occur. The majority of Dover sole landings tend to occur earlier in the year with other smaller secondary peaks occurring in the fall and winter months. Sablefish landings tend to show much more fluctuation across the years. In general, peak Dover/sablefish ratios occur when Dover sole landings are low but low Dover sole landings are not always related to a peak ratio. The high ratios might occur only when there are smaller production levels because only a few vessels are fishing and they are intentionally avoiding sablefish or simply because the number of trips is small and so there is more variability in the averages. The existence of high ratios only at low Dover sole landing levels likely indicates that there is little opportunity for consistently achieving them at production levels that would be significant enough to substantially expand attainment of the Dover allocations (and hence reduce the need for sablefish to cover bycatch). At the same time, other more moderate levels of Dover to sablefish ratios might be more achievable at higher production levels (above the average but lower than the peak levels). There are a few months when Dover sole production levels are relatively high and while the ratios are not at extremes (greater than 200:1), they still approach 100:1 (e.g. May of 2011; April, 2016; and February, 2017). Any assessment of the potential for expanding Dover attainment by increasing the ratio of Dover to sablefish will have to consider other potentially limiting factors such as possible negative implications for vessel net revenues and the question of whether the markets could absorb the additional Dover landings.

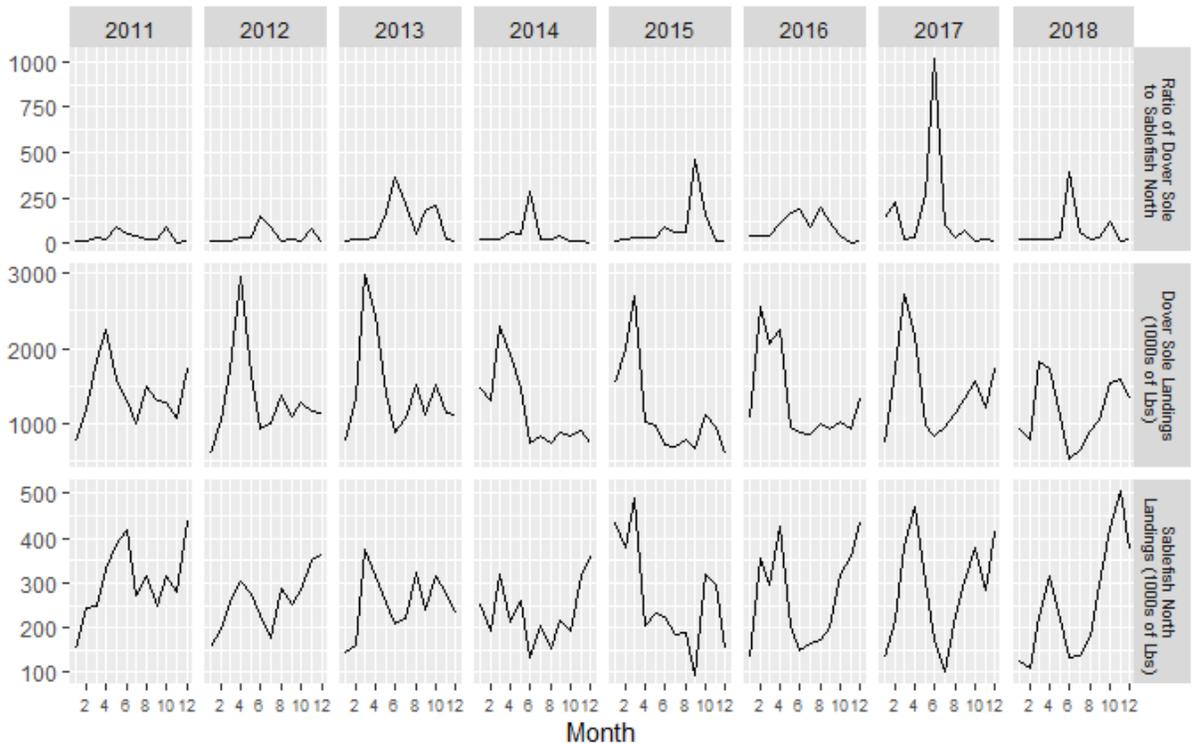


Figure 11: Ratio of Dover sole to sablefish north on bottom trawl hauls positive for sablefish north, Dover sole landings by bottom trawl vessels (1000s of lbs), sablefish north landings by bottom trawl vessels (1000s of lbs) by month, 2011-2018.

Internal Reference: WCGOP Project/SaMTAAC Analysis

Finally, there was an interest in what depths higher ratio hauls are occurring compared to hauls with a lower ratio of Dover sole to sablefish north. Of those bottom trawl hauls with at least some sablefish north, most have a Dover to sablefish ratio between 0 and 4.65 or greater than 10 (Table 10). Most of the volume of fish taken with sablefish are also in that same Dover to sablefish range. In general, as depth increases, the ratio of Dover to sablefish decreases (Table 11). For each of the four Dover to sablefish ratio categories provided in Table 10, Figure 12 shows the distribution of hauls by average depth of the tow (a different line for each ratio range). In general, sablefish tows with no Dover sole and tows with higher Dover to sablefish ratios tend to occur in shallower waters as compared to tows with mid-range ratios. The majority (~60 percent) of hauls without Dover sole (ratio of 0) occur shallower than 100 fathoms (fm). Within this same depth range, about 30 percent of all hauls exhibiting higher than a 10:1 ratio occur. Each ratio line shows the presence of the Rockfish Conservation Area (RCA) shown by the flattening of the curves from 100-150 fm. Outside of the RCA, it can be seen that tows tend to be more in the middle ratio groups (>0 up to ratios of 10 lbs of Dover sole to one pound of sablefish). At least half of the hauls exhibiting a ratio greater than 0 (i.e. some Dover caught) but less than 10:1 occur outside of 250 fm.

Table 10: Number of hauls, weight (mt), and proportion of total hauls and weight caught on bottom trawl hauls with northern sablefish present categorized by ratio of Dover in the haul. (2006-2018, Source: WCGOP)

	Ratio of Dover to Sablefish			
	No Dover	0-4.65	4.65-10	>10
Hauls	3,707	26,661	10,169	21,255
Percent of Total Hauls	6.0%	43.1%	16.5%	34.4%
Total Weight Caught (All Species)	6,431	62,068	27,904	60,006
Percent of Total Weight	4%	40%	18%	38%

Internal Reference: WCGOP Project/SaMTAAC

Table 11. Number of vessels, average Dover to sablefish ratio, hauls, weight (mt), and percentage of total hauls and weight for bottom trawl hauls with northern sablefish present, by depth range (2006-2018, Source: WCGOP).

Depth Bin	Vessels	Average Ratio (Across Tows)	Number of Hauls	Percent of Total Hauls	Weight Caught on Hauls (All species; mt)	Percent of Total Weight
0-100	84	207.8	15,383	24.9%	27,397.97	17.5%
150-200 <sup>4</sup>	106	21.5	5,254	8.5%	16,389.35	10.5%
200-250	108	24.0	12,429	20.1%	37,285.51	23.8%
250+	111	14.6	28,726	46.5%	75,335.48	48.2%

Internal Reference: WCGOP Project/SaMTAAC

<sup>4</sup> Less than 600 hauls were reported with an average depth between 100-150 fm, which are the approximate depth contours of the trawl RCA. Those hauls were incorporated into the 150-200 depth strata and likely occurred seaward of the trawl RCA boundary (150 fm).

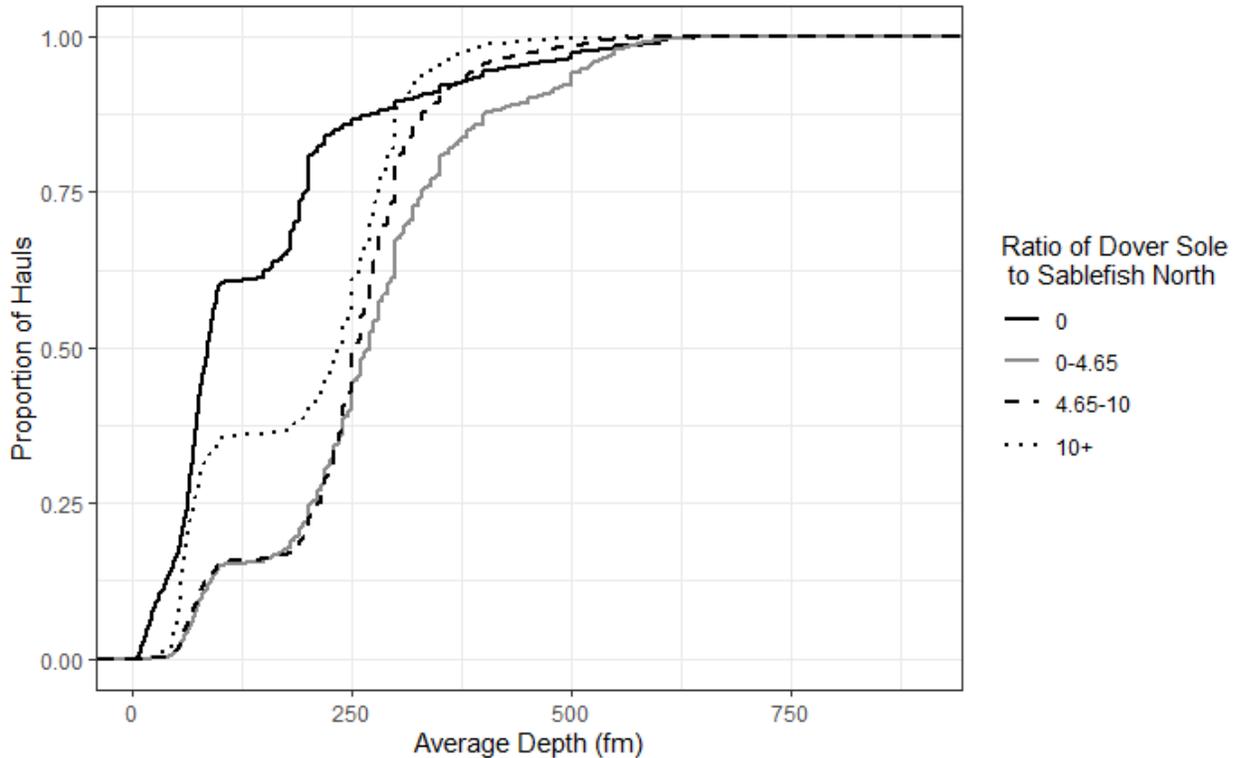


Figure 12: Distribution of bottom trawl hauls with sablefish north present by average depth and ratio of Dover sole to sablefish north, 2006-2018.

Internal Reference: WCGOP Project/SaMTAAC Analysis

### Economic Impacts

In recent years, gear switching vessels have been earning between 4.3 and 6.5 million dollars in ex-vessel revenue with 85 to 95 percent coming from northern IFQ sablefish landings (Table 12). Bottom trawl caught sablefish revenue is similar to that of the fixed gear fleet, ranging from 4-7 million in the last three years. While fixed gear operations can selectively harvest sablefish, trawl caught sablefish is needed to access the DTS complex, which has ranged between \$11.2 and \$17 million between 2016-2018, including the sablefish component. Looking at the overall revenue per metric ton that is accessed by these fleets, the DTS strategy can bring in approximately \$3,000 more in ex-vessel revenue per metric ton of sablefish compared to fixed gear vessels. However, this does not take into account relative costs for the two gear types.

Table 12: Total revenue (millions), sablefish landings (mt), and revenue per mt of fixed gear and DTS from 2016-2018

Year	Fixed Gear			Trawl Gear		
	Revenue (All Species)	Landings (Sablefish)	Revenue per Mt	Revenue (All Species in DTS)	Landings (Sablefish)	Revenue per MT
2016	6.45	810.9	7,952.46	15.33	1,453.0	10,553.53
2017	6.28	845.5	7,428.73	16.97	1,538.2	11,030.67
2018	4.26	805.7	5,286.12	11.25	1,379.7	8,151.23

Internal Reference: 6 Trawl Analysis

If the Council were to limit or eliminate gear switching of sablefish north in the IFQ sector, then there would be additional sablefish available to trawl vessels to harvest the DTS complex. Table 13 below shows the actual landings (millions of pounds) and revenue (millions of dollars) from DTS from 2016-2018 and the hypothetical landings and revenue if trawl vessels were to harvest all the sablefish previously harvest with fixed gear. The hypothetical landings of DTS was based on the ratio for each year of landings of Dover sole and thornyheads to landings of bottom trawl caught sablefish applied to the assumption that all sablefish caught in that year by gear switching vessels was instead caught by bottom trawl vessels. For example, if 10 pounds of bottom trawl caught sablefish resulted in 100 pounds of Dover sole and thornyheads (for a total of 110 pounds), and with no fixed gear allowed there were an additional 20 pounds of sablefish available, then the hypothetical result for DTS overall would be 330 pounds (30 pounds of sablefish plus 300 pounds of Dover sole and thornyheads). Note that this hypothetical result from an increase in sablefish available is likely an overestimate as it assumes all bottom trawl caught sablefish north was used in the prosecution of the DTS fishery. While DTS (with and without other flatfish) trips account for the overwhelming majority of sablefish caught in the bottom trawl fishery, as shown in the May SaMTAAC document, sablefish can be used in accessing other flatfish stocks or shelf rockfish and therefore it is likely that some sablefish would be used for other target strategies. In addition, this holds constant any bycatch of sablefish by midwater gear. If sablefish gear switching were prohibited, the additional 1.8 to 1.9 million pounds of sablefish north from fixed gear could result in over 67 million additional pounds of DTS complex compared to actual landings (Table 13). Applying an average revenue per metric ton, it would result in additional hypothetical revenue of over \$44.4 to \$49.4 million. This would far exceed the revenue brought in between 2016-2018 from fixed gear caught sablefish (Table 12). However, this is hypothetical and based on several assumptions. One of the primary constraints would be the ability for processors and markets to absorb the additional landings of DTS without impacting prices (with an influx of product, the price per pound could decrease.) Additionally, some ports that have historically focused on gear switching may not be able to handle the increase in trawl caught groundfish, which requires more processing capability, so there might be some geographic redistribution required in order to more fully harvest the DTS complex.

Table 13: Actual landings (millions of pounds) and revenue (millions of dollars) of DTS complex landed in 2016-2018 and the hypothetical landings and revenue assuming that all sablefish previously taken by gear switching were instead taken with trawl gear. Ratios of Dover sole and thornyheads and the revenue per mt of complex species landed were assumed to remain the actual values in that year.

Year	Dover sole and Thornyhead to Sablefish Landings Ratio	Revenue per metric ton	Actual		Hypothetical	
			Landings	Revenue	Landings	Revenue
2016	17.55	1,539	22.0	15.3	92.6	64.7
2017	16.57	1,503	24.8	17.0	92.4	63.0
2018	18.48	1,303	19.0	11.2	93.9	55.5

Internal Reference:6 Trawl Analysis

At the May and October Committee meetings, the analysis of the impacts on DTS landings potentially caused by the use sablefish QP for gear switching focused on the recent Dover sole to sablefish north average catch ratio of 4.65:1. In considering the degree to which this ratio might limit Dover landings, it is important to consider that the 4.65 ratio includes hauls in which Dover sole is present, but there is no sablefish north caught. From 2006-2018, the annual number of hauls with Dover but no sablefish ranged from 122 (on 51 trips; 2010) to 1,604 hauls (392 trips; 2013). In total, from 2006 to 2018 there were 11,591 hauls on 2,960 trips. Almost 17 percent of all bottom trawl hauls with Dover sole had zero sablefish present.

In response to committee member requests to further explore the impacts of the Dover to sablefish ratio, at the October meeting there was an analysis of what the impacts might be if the ratio could be increased to a 10:1 average. Here, the analysis of a 10:1 ratio is considered further, taking into account the impact of the ratio change on ex-vessel value received per metric ton of landings. If bottom trawling vessels were to increase their Dover sole to sablefish ratio to 10:1 compared to the recent 2015-2017 average of 4.65:1, then there would be a decrease in the DTS revenue per metric ton of sablefish. Table 15 below shows the Dover sole to sablefish ratio (landed), total revenue from DTS landings, total landings of DTS, and the revenue per metric ton of DTS landed in 2016-2018. The hypothetical landings column assumes the projected landings of Dover sole that would have occurred under 10:1 ratio using the actual trawl sablefish landings in that year. In other words, if there were 100 lbs of sablefish landed, the hypothetical Dover sole landings would be 1,000 lbs compared to an average of 465 lbs using the 4.65:1 ratio. Assuming the same price per pound for each species in the DTS (Table 14), the hypothetical landings and associated revenue per mt shows that the overall revenue per metric ton would decrease by between \$150-230 per mt. For this analysis, it is assumed that the thornyhead to sablefish ratio remains constant.

Table 14: Average price per pound of DTS complex species landed with bottom trawl gear, 2016-2018

Year	Sablefish	Dover sole	Longspine Thornyhead	Shortspine Thornyhead
2016	1.89	0.46	0.44	0.79
2017	1.91	0.43	0.49	0.70
2018	1.28	0.44	0.42	0.59

Internal Reference: 6 Trawl Analysis

Table 15: Dover sole to sablefish ratio (landed), total revenue (millions of dollars), total landings (millions of lbs) and revenue per metric ton of DTS complex landed from 2016-2018 and the hypothetical landings and revenue per metric ton under a 10:1 Dover sole to sablefish ratio.

Year	Actual Data				Under 10:1 hypothetical ratio		Difference (Actual-Hypothetical)
	Dover to sablefish ratio (landed)	Revenue (millions)	Landings (millions of lbs)	Revenue per Mt	Landings (millions of lbs)	Revenue per Mt	
2016	4.92	15.3	22.0	1539.42	38.2	1337.53	201.89
2017	5.02	17.0	24.8	1503.85	41.7	1277.60	226.25
2018	4.56	11.2	19.0	1303.25	35.6	1152.45	150.80

Internal Reference: 6 Trawl Analysis

The above table shows the projected revenue per metric ton under the higher Dover sole to sablefish ratio of 10:1 assuming that the price per pound by species stayed the same in that year. However, if vessels were to bring in a higher ratio of Dover sole to sablefish, in order to cover costs and make a reasonable profit, it might be necessary for revenue per metric ton to remain constant. Table 16 below shows the actual price per pound of Dover sole and thornyheads combined and the hypothetical price per pound and associated percent increase that would be needed to remain revenue neutral (i.e. for the revenue per metric ton to stay constant) assuming that the sablefish price per pound remained constant. As shown, prices would need to increase by 74-95 percent per pound in order for vessels to maintain the same overall revenue per metric ton in moving from an average Dover to sablefish ratio of 4.65 to 10.

Table 16: Actual price per pound of Dover sole and thornyheads and hypothetical price per pound and percent increase from actual price to maintain neutral revenue per mt under a 10:1 Dover sole to sablefish ratio

Year	Actual Price per Lb Dover and Thornyheads	Hypothetical Price per Lb Dover and Thornyheads	Percent Increase
2016	.47	.81	74%
2017	.47	.82	76%
2018	.45	.87	95%

Internal Reference: 6 Trawl Analysis

If bottom vessels were able to increase their ratio of Dover sole to sablefish north on trips, they could choose to make another trip (and thereby increase overall landings of Dover sole and potential overall revenue) or they could take the same amount of Dover as they currently do at the higher ratio (i.e. use less sablefish) and have the opportunity to sell sablefish QPs to fixed gear vessels. Table 17 below shows the average and most recent two years sale prices for sablefish north QPs from Jefferson State Trading. As shown, 2019 prices are down over 50 percent from 2018 selling prices.

Table 17: Average price per QP and number of sales of sablefish north QPs on Jefferson State Trading.

Year	2011-2019 <sup>a/</sup>	2018	2019a/
Average Price	\$1.103	\$1.324	\$0.680
Number of Sales	264	22	37

a/ Sales through December 20, 2019

To determine which strategy may be more advantageous to trawling vessels, Table 18 below shows the revenue from the DTS complex for a hypothetical vessel under three scenarios. The scenarios are:

Scenario 1: Status quo- maintains the ratio of Dover sole, shortspine thornyhead, and longspine thornyhead to sablefish north in each year

Scenario 2: Increases the ratio of Dover sole to sablefish north to 10:1 and continues fishing all 1,000 lbs of sablefish north at that ratio (thornyhead ratios remain constant)

Scenario 3: Increases ratio of Dover sole to sablefish north to 10:1 and lands same Dover amount as status quo; vessel sells remaining sablefish on market under the 2018 and 2019 average price.

In each scenario, the vessel has 1,000 pounds of sablefish north to either fish, sell, or some combination of the two. Additionally, each scenario assumes the vessel uses all 1,000 pounds. Price per pound of each species are also maintained across all three scenarios.

If trawl vessels were able to increase the ratio of Dover sole to sablefish to 10:1 and maintain the recent price per pound for all species (Table 14), it would be more profitable for them to continue to fish and land the entire complex of DTS species rather than selling the additional sablefish north QP at either price point. As mentioned above, this exercise does assume that prices for all species stays the same; however, prices are likely to vary depending on the influx of product. Further, Scenario 2 assumes that the markets can absorb any additional landings of Dover sole or under Scenario 3, that there are markets for sablefish QP at the time a vessel wants to sell. Additionally, Scenario 2, where the vessel takes additional trips to continue fishing their sablefish QPs, does not take into account the actual cost of going on a fishing trip.

Table 18: Hypothetical revenue under three scenarios: status quo, increasing dover sole to sablefish ratio to 10:1 and fishing all sablefish; and increasing ratio to 10:1 but maintaining status quo Dover landings and selling remainder of sablefish on market.

Year	Scenario 1 Status Quo	Scenario 2 Increase 10:1 and Continues Fishing	Scenario 3 Increase to 10:1 and sells surplus sablefish north QP	
			2018 Avg Price	2019 Avg Price
2016	\$4,739.22	\$7,075.94	\$4,451.70	\$4,124.56
2017	\$4,830.23	\$6,970.22	\$4,538.59	\$4,218.09
2018	\$3,653.01	\$6,048.01	\$3,676.96	\$3,326.42

### Impacts to Shoreside Whiting Fleet

*Summary: Sablefish north can be caught as bycatch by shoreside whiting vessels targeting Pacific whiting. This section aims to provide a summary of the potential needs of the whiting vessels to access sablefish north QPs inseason. Overall,*

- *bycatch of sablefish north in the shoreside whiting fleet varies by year, ranging from 0.3 mt in 2008 to an estimated 186 mt in 2019;*
- *the estimated bycatch in 2019 is approximately seven percent of the 2019 trawl allocation.*

While sablefish is needed to access co-occurring species in the bottom trawl fishery, there has also been a recent growing need for sablefish as a bycatch species in the shoreside whiting fishery. Table 19 below shows the amount of sablefish north total mortality in the shoreside whiting fishery from 2002-2019. As shown, the amount of sablefish that can be taken as bycatch is extremely variable as the high years likely represent the fishery interacting with large recruitment classes. In 2017-2018, the fishery saw the highest levels of bycatch since 2004, which had a total mortality of 129.4 mt. Preliminary 2019 data (queried on January 3, 2020) shows that the whiting fishery landed approximately 186 mt of sablefish north- over 50 mt more than was seen in 2002 (highest bycatch on record). This amount is approximately seven percent of the 2019 trawl allocation. If these trends continue, whiting participants could potentially need increased access to sablefish north quota inseason causing greater constraints among all trawl participants.

Table 19: Total bycatch mortality of sablefish north in the shoreside whiting sector (mt), sablefish north trawl allocation, percent of trawl allocation taken by shoreside whiting sector and bycatch rate (mt of sablefish north/mt of Pacific whiting), 2002-2019 (Source: GEMM 2002-2018; PacFIN 2019)

Year	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Bycatch (mt)	132.9	40.3	129.4	22.4	11.1	9	0.3	49.2	20.9	30.4	47.2	0.7	5.2	7	6	98.5	72.8	186
Trawl Allocation	2,052	3,031	3,514	3,505	3,427	2,651	2,651	3,335	3,400	2,597	2,517	1,878	2,038	2249	2461	2466	2572	2581.3
Percent Attainment of Sablefish North Trawl Allocation	6.48%	1.33%	3.68%	0.64%	0.32%	0.34%	0.01%	1.48%	0.61%	1.17%	1.88%	0.04%	0.26%	0.31%	0.24%	3.99%	2.83%	7.20%
Bycatch Rate (mt sablefish north/mt Pacific whiting)	0.0029	0.0008	0.0014	0.0002	0.0001	0.0001	0.0000	0.0012	0.0003	0.0003	0.0007	0.0000	0.0001	0.0001	0.0001	0.0007	0.0006	0.0013

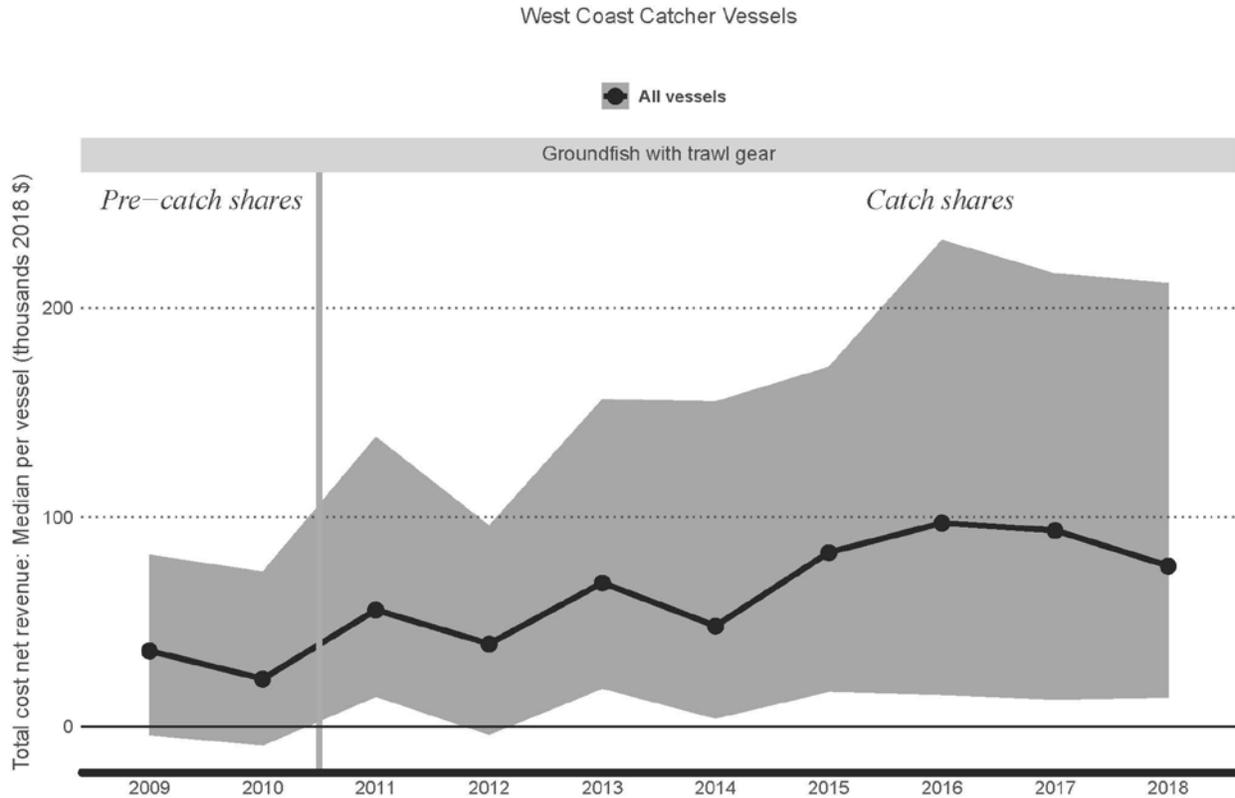
Internal Reference: [January Analysis-Whiting Bycatch](#)

## Impacts on Harvesting Firm Profits and Quota Prices—General Economic

*Summary: Applying the general economic theory on which catch shares are based, the catch share program is expected to result in normal levels of profits for harvesting operations (on average) and any increases in harvester profits to above normal levels are likely to be dissipated by increased quota costs. Increases (or decreases) in profit may result from changes in market conditions, regulations, or other factors. With respect to increases in profit levels, to the degree that a harvester owns quota share (QS), it will likely be able to sustain that increase. However, those who buy quota pounds (QP) each year or those that subsequently buy QS are likely to have to pay more for their quota, hence their profits will trend back toward normal levels. In some cases, the quota prices might adjust across a number of species. For example, if sablefish QP prices were to drop because of the reduction/exclusion of gear switching, QP prices for other co-occurring species, such as Dover sole or thornyheads, might increase. The outcomes expected based on this general theory may be modified by other conditions, such as the under-attainment of allocation. With a large surplus of Dover sole, reduced sablefish QP prices might have only a small impact on Dover QP prices.*

The need for the action considered here is rooted in the under-attainment of the trawl harvest allocations and the potential benefits that fuller attainment might bring to harvesters, processors, support industries, workers, communities, and consumers. This section provides an economic equilibrium analysis that focuses on the impacts policy changes may have on the profits of individual harvesting companies (entities controlling fishing assets including vessels, permits, or quota, in a variety of possible combinations). A distinction is made between impacts on the sector and impacts on individual companies. While a sector might be considered to benefit if a greater number of harvesters were able to maintain economically viable operations, the general profit levels for each individual company may remain relatively unchanged.

In general, while the catch share system may provide more stability than the cumulative trip limit and season management system that preceded it, under either system, harvester operation profitability is expected to trend toward normal levels, on average. Under normal profit conditions, operational revenue would cover all costs plus some returns on investment and profits to compensate entrepreneurial activity and risks. Above normal profits signal greater economic opportunity. When average profits are at normal levels, it is expected that some operations would be losing money, some making break even profits, and some making more than break even profits. These variable levels of profit are illustrated in Figure 13 which shows median net revenue for vessels using trawl gear to target non-whiting species, taking into account both variable and fixed costs. As shown, over the last three years (2016-2018) the median vessel has approached \$100 thousand in net revenues, while the 25<sup>th</sup> percentile vessel has been down around \$10 to \$15 thousand (not likely enough to cover normal profit returns) and the 75<sup>th</sup> percentile vessel has been over \$200 thousand in net revenues. Vessels much below the 25<sup>th</sup> percentile are likely not covering fixed costs in the particular year while those above the 75<sup>th</sup> percentile may be making substantially more than \$200 thousand.



Sourced from the FISHEyE application (<https://dataexplorer.northwestscience.fisheries.noaa.gov/fisheye/PerformanceMetrics/>) maintained by NOAA Fisheries NWFS on January 09 2020

Figure 13: Total cost net revenue for non-whiting trawl vessels, 2009 through 2018.

Prior to catch shares, any profits above normal levels would have been expected to attract more fishing activity (e.g., new vessels activating previously latent permits or increased intensity of participation by existing vessels). This new activity would then spread out revenue and profits until there was not enough left to stimulate further expansion (until average profits level declined to “normal” levels).<sup>5</sup>

Under catch shares, if something happens to make the fishery more profitable, whether it be an expansion of quota, increases in CPUE, increases in ex-vessel prices, a policy change that decreases operating costs, or something else, the end point with respect to profits is expected to be similar to what might have occurred before catch shares. While an increase in profits could lead to some initial expansion of activity (if there is unused quota and fish markets are able to accept the additional product), any above normal profits will likely be reflected in higher QS and QP prices.<sup>6</sup> To the degree that a harvester is a net buyer

<sup>5</sup> Often, because participants do not know how others are reacting to periods of high profits or heavy losses, there is an information lag in the system such that rather than reaching an economic equilibrium, conditions circle around it. A period of expansion is followed by a period of contraction as profits fall to below normal levels and effort leaves the fishery (or quota prices fall) and vice versa. Additionally, because there will always be some operations experiencing above normal profits and other below normal, seldom will the sector as a whole be at equilibrium. There will usually be some movement in and out with some operations making money while others are going broke.

<sup>6</sup> In the absence of the quota program, above normal profits may have led to an increase in the amount invested in equipment and fishing activity without necessarily increasing overall harvest, reducing net benefits to the national economy. Increased quota prices capture the money that would have otherwise been expended in on expanding capacity.

of QP (i.e. buying more QP than they sell), increases in profitability will likely be shorter term since QP prices would be likely to increase.<sup>7</sup> The QS owner that does not have to buy QP will be able to realize the higher profit levels available because of the change. Further, that owner's wealth will be increased because the value of its QS will be higher. This is similar to what happens in the stock market when a person buys a stock based on expected future earnings and then gains wealth (the stock gains value) if earnings are projected to be higher than originally expected, or loses wealth if earnings are lower. After a period of increased profits, when QS owners sell their quota, the subsequent owner would pay more and expect to experience normal profits unless conditions once again change in an unexpected way.<sup>8</sup>

Over the long term there may be little change for harvesters, however, improvements in efficiency benefit the national economy in that the same amount of fish is removed with lesser use of economic resources. In other words, in the absence of catch shares, higher profits would have attracted more expenditures on fishing without necessarily increasing the amount harvested. One of the primary benefits that catch share provide harvesters is a degree of stabilization and security. Harvesters that secure quota do not need to be as concerned about being displaced by those making new investments.

If the presence of gear-switching opportunities is increasing sablefish north QP prices, the reduction or elimination of gear switching could result in lower QP prices and higher profits for trawlers over the short-term. Analysis of QP prices provided in the October 2019 analytical document indicated that QP market prices do not vary largely between trawl purchasers and fixed gear purchasers. There are at least two possibilities that might explain that condition. One possibility is that the average value of QP to trawlers is comparable to the average value to fixed gear entities. In that case, eliminating or reducing the activity of gear switchers in the QP market might have little impact on QP prices, particularly if there is sufficient market capacity to absorb additional trawl production without diminishing ex-vessel prices. Another possibility is that price expectations are being set by gear switching vessels that are willing to pay more than most trawlers or that the presence of gear switching QP buyers on the market results in a greater volume of QP demanded at any particular price, putting upward pressure on QP prices. However, if elimination or restriction of gear switching results in lower QP prices and substantial increases in trawl vessel profitability, the degree of decline in sablefish QP prices would be muted and the prices of QP for other species caught with sablefish might increase. Over 93 percent of trawl caught Dover sole is harvested caught on trawl hauls with sablefish north. At the same time, any increase in prices for other QP species is likely to be limited by the current low attainment levels and associated large surpluses of unused QP. Recent increases in Dover allocations have led to surpluses of over 80 percent while for much of the duration of the program the surpluses of thornyhead QP have been more in the 40 to 50 percent range (see Table 1 [of the Amendment 21 intersector allocation review document](#)). Attainment for most species is less than 50 percent.

There appears to be at least a rough relationship between the degree of utilization and the ratio of QP price to ex-vessel prices. From 2011 through 2016, except for overfished or near full attainment species (Pacific whiting, Petrale sole, and sablefish north), QP tend to trade at well less than 20 percent of ex-vessel prices (Holland, personal communication, 2019). More fully utilized species such as Pacific whiting, and Petrale sole traded at an average of about 25 percent of ex-vessel prices while northern

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<sup>7</sup> If a policy change increases profits for some but not for others, those who lease QP and do not benefit from the policy change might experience some economic stress as a result of increased QP prices with no increase in their net revenue.

<sup>8</sup> Alternatively, if there has been a decline in profitability, QS owners will experience a decrease in wealth and if they sell their QS may receive less than they originally paid.

sablefish has traded at an average of just less than 50 percent of ex-vessel revenue, since 2012 (Holland, personal communication, 2019).<sup>9</sup> As a further sign of the possible connection between attainment and prices, when Pacific whiting attainment fell to 61 percent in 2016, its QP to ex-vessel price ratio declined to 14 percent (in all other years attainment was 77 percent or greater).<sup>10</sup>

In general, total cost net revenue on a per metric ton basis tends to be higher for fixed gear vessels than trawl vessels. However, trawlers deal in larger volumes and the sablefish landed by fixed gear vessels tends to be higher ex-vessel price than the average price for the species in a trawl delivery. The profit per metric ton for fixed gear vessels does not necessarily indicate a greater willingness to pay for quota. On a per vessel day and per vessel basis, total cost net revenue for trawlers tends to be higher than for fixed gear vessels (the exceptions were 2011 and 2016, the latter only on a per vessel day basis).

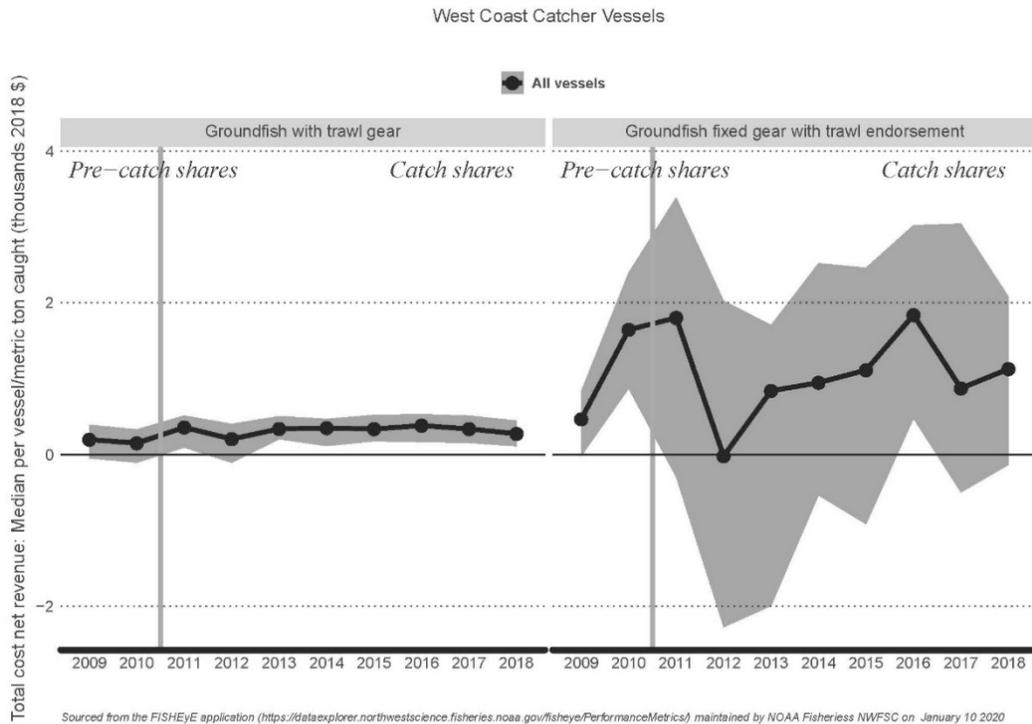


Figure 14. Trawl and gear switching (fixed gear) vessel net revenue per metric ton, after taking into account variable and fixed costs (2009-2018).

Note: The average per metric ton is much lower for groundfish trawl than fixed gear because for trawl catch a lower percentage is sablefish (a higher valued species relative to others in the trawl complexes). If it were possible to view the sablefish component in isolation, the differences might be substantially less than the comparison of all groundfish catch by these vessels.

<sup>9</sup> In contrast, QP for overfished species sometimes trade for more than the exvessel price per pound.

<sup>10</sup> For Pacific whiting, attainment was over 98 percent in 2011 but the ratio was lower than 20 percent in 2011 (18 percent in the first year of the program). Similarly, the 2011 attainment for northern sablefish was 94 percent but the ratio for was lower than for any other year (38 percent). These low values for highly attained species may have been a function of the newness of the program and uncertainty about appropriate pricing.

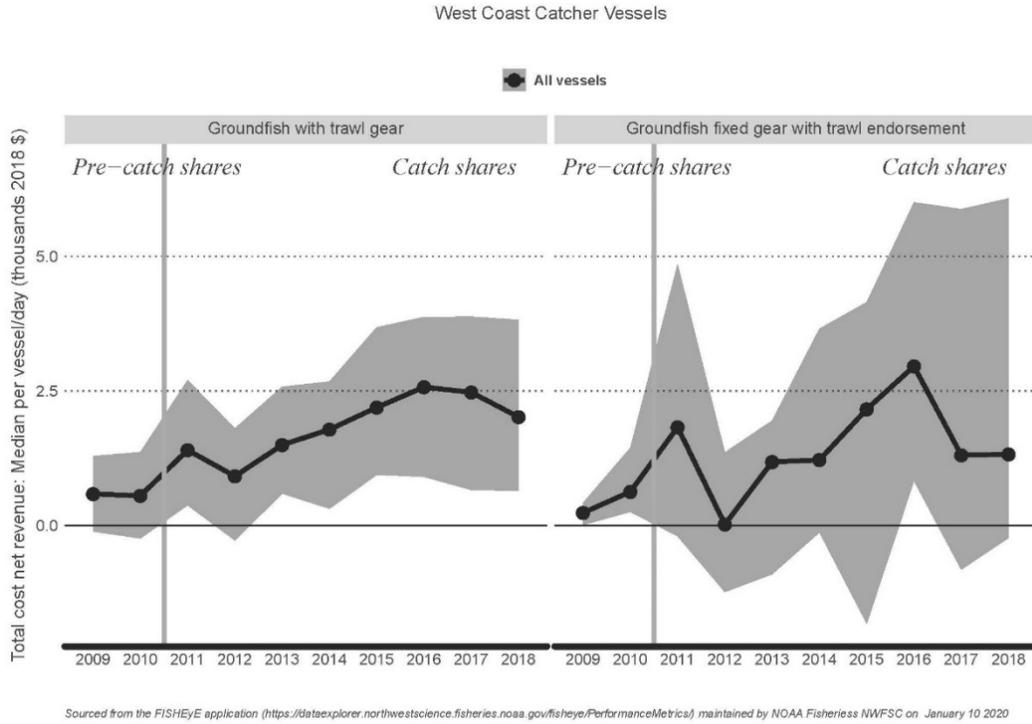


Figure 15. Trawl and gear switching (fixed gear) vessel net revenue per day, after taking into account variable and fixed costs (2009-2018).

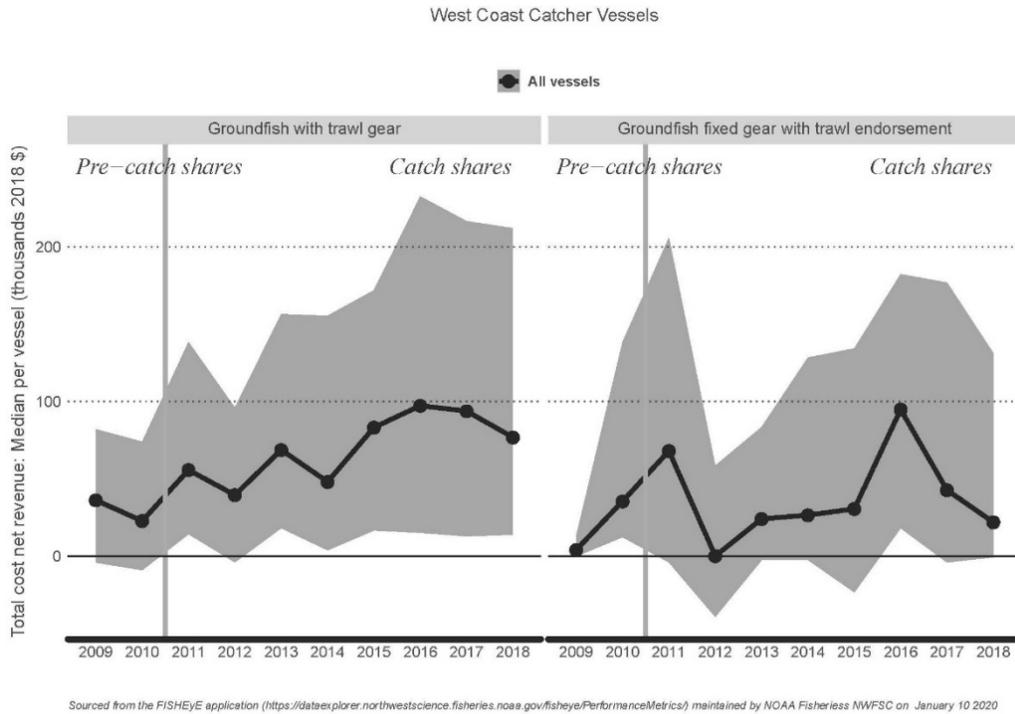


Figure 16. Trawl and gear switching (fixed gear) vessel net revenue per vessel, after taking into account variable and fixed costs (2009-2018).

While profits for a harvester are theoretically expected to trend toward normal levels, an entity that has a revenue stream reliant on the sale of northern sablefish QP generated by QS it already owns may be adversely impacted if the value of that QP goes down. If the northern sablefish QP seller also has other species to sell, this decline in revenue might be offset to some degree if the value of quota for other species were to increase because of increased utilization, however, most other species are underutilized by such a large margin there may be minimal impact on QP prices.

## Impacts on QP Marketing Channels

*Summary: Under the topic of “marketing channels”, this section addresses to areas of impact raised by the Committee: effect of a gear switching limitation on those who sell northern sablefish QP to gear switching vessels for cash, and the role in QP supply played by gear switching entities that supply non-sablefish QP to trawl gear vessels in barter transactions.*

- *Based on industry self-reporting on transactions,*
  - *Twenty percent of all northern sablefish transactions are cash only.*
  - *Seven percent of all northern sablefish transactions are cash only and involve the receipt of northern sablefish by a gear switching operation.*
  - *Nine percent of all northern sablefish transactions are at least partially based on barter.*
  - *Three percent of all northern sablefish transactions are at least partially based on barter and involve the receipt of northern sablefish by a gear switching operation.*
- *For northern sablefish QS owners that sell their QP to fixed gear operations, a limitation on gear-switching will alter their marketing channels (potential impacts on their revenue are discussed in the above section).*
- *For fixed gear operations that own non-sablefish QS, to the degree that a gear-switching limitation reduces or eliminates their need for northern sablefish, the primary outlet for their non-sablefish QP will become cash transactions (rather than barter). This might put them into more direct sales competition with other QP owners, possibly opening up some QP marketing opportunities for those other QP owners. Alternatively, fixed gear operations may decide to try to sell their QS.*

QP used for gear switching is either from QS already owned by gear switching entities or is traded to those entities.<sup>11</sup> During SaMTAAC discussions, it has been noted that reducing or eliminating gear switching will affect at least two marketing channels: one, the cash sale of northern sablefish QP to gear-switching entities by QS owners, and two, the barter exchange of non-sablefish QP for sablefish QP between gear-switching entities that own non-sablefish QP and other sablefish QP owners (often those that also own the sablefish QS).

Based on self-reporting, on average, just less than 30 percent of all northern sablefish QP transactions, including QP movement from QS accounts to vessel accounts (VAs), are cash and/or barter (Figure 17).<sup>12</sup> Twenty percent are cash only and nine percent are at least partial barter transactions. If self-trades are excluded from consideration, these percentages go up by just less than double (since self-trades average 48 percent of all trades). In recent years, roughly 20 percent of all gear-switched QP is acquired from QS owners that are not gear switchers (see the October 2019 analytical document).

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<sup>11</sup> Including some that might have been acquired as carryover in previous years.

<sup>12</sup> Barter is generally QP for QP trades.

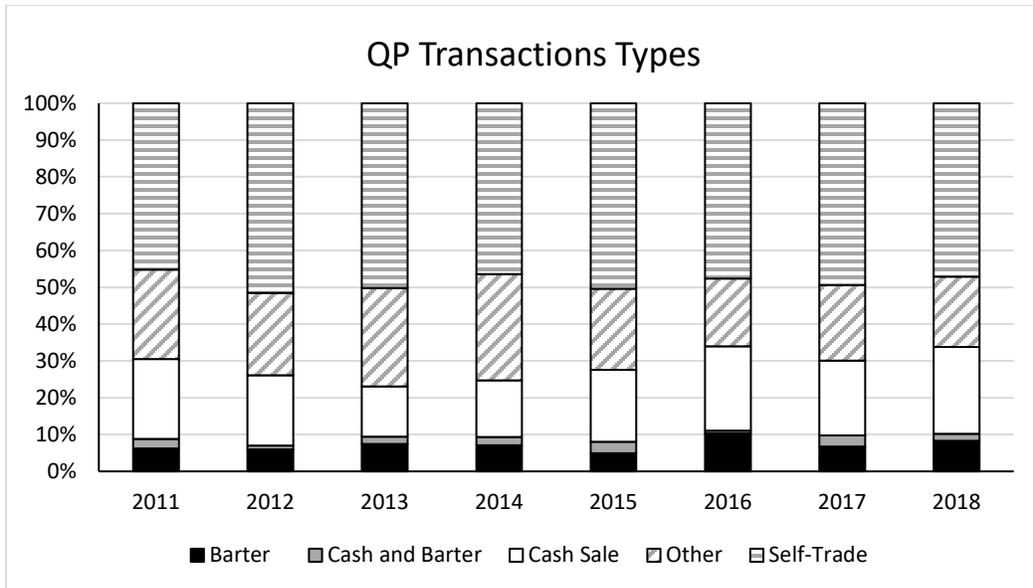


Figure 17. Percent of all northern sablefish QP trades (QP volume) by type of trade, 2011-2018 (starting in 2013, the barter category was specified as “Barter QP,” i.e. trading QP).

An average of three percent of all northern sablefish QP transfers to businesses with gear switching vessels are reported to involve barter or a combination of cash and barter, seven percent report as cash only, and eight percent as some “Other” consideration (Figure 18). Self-trading accounts for an average of seven percent of all northern sablefish QP transactions. If the typical ratios of QP price to ex-vessel prices (discussed in the previous section) influence the exchange rates for barter, those who give sablefish QP in barter would provide more ex-vessel revenue than they receive in return.<sup>13</sup> However, it has been reported anecdotally that barter exchange rates are often determined on a dollar-for-dollar value exchange based on ex-vessel prices.

<sup>13</sup> \$1.00 of sablefish QP would convert to around \$2.00 of sablefish exvessel value (a 50 percent QP to exvessel price ratio) while \$1.00 of QP for most other species would likely convert to well over \$5.00 of exvessel value (a less than 20 percent ratio for species other than overfished species, sablefish, Petrale, and whiting).

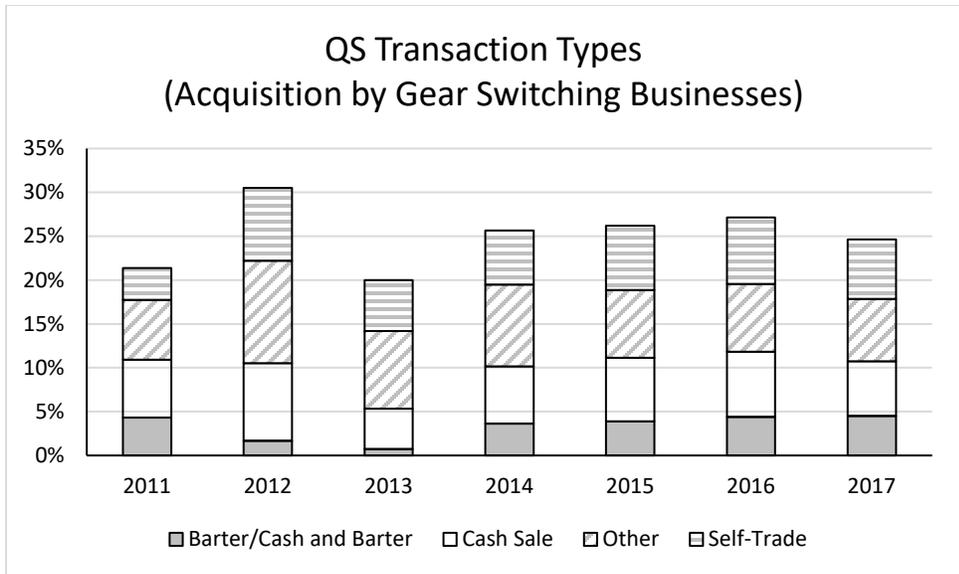


Figure 18. Percent of all northern sablefish QP trades (QP volume) by type of trade being transferred to a business with a vessel engaged in gear switching in the indicated year, 2011-2018 (starting in 2013 the barter category was specified as “Barter QP,” i.e. trading QP).

Note: Because the same QP may be transferred more than one time, the total amount QP represented by these transactions exceeds to the total QP issued and only approximately corresponds to the total amount of QP transferred to gear switching entities.

As implied in the previous section, for cash-based transactions whether, after a limitation on gear switching, new QP transfer channels can be established for the QP previously used in gear switching will depend on the overall amount of QP needed (i.e. whether or not trawl gear activity expands to utilize the northern sablefish QP made available by the limitation). For barter-based transactions involving gear switchers, there is a question of what will happen to the non-sablefish QS/QP held by gear switchers in the event of a limitation or prohibition. Such QP will have less direct use value to gear switchers unless they start using trawl gear. Whereas previously their interest in bartering may have made them a preferred market for individuals selling northern sablefish, a limitation on gear switching will put gear switchers more in the position of having to try to sell non-sablefish QP in a market for which, for most species, there is an excess of QP available. And conversely, trawlers that were able to barter sablefish before will now have to incur expenses and transaction costs for buying non-sablefish QP, perhaps then selling their surplus sablefish QP to fund those non-sablefish purchases. This may also generate some new openings for holders of surplus non-sablefish QP to sell their QP.

## Impacts on Biological Sampling

*Summary: During the October meeting, one question that arose was the potential impact to overall observer coverage and samples from fixed gear trips if there were an elimination or even a reduction to gear switching in the IFQ program. This section presents an overview of*

- *Current sampling rates of fixed gear fleets in the non-IFQ and IFQ sectors.*
- *Potential impacts to stock assessments if gear switching were to be reduced or eliminated.*

IFQ vessels are required to have 100 percent monitoring- whether through an onboard observer (where biological samples can be taken) or by electronic monitoring. In contrast, the non-IFQ sector (primary, LE DTL, OA) sees a much lower monitoring rate. Table 20 below shows the total groundfish landings by sector and the percentage of landings sampled in the last five years.

Table 20: Total groundfish landings (mt) by sector and gear and percentage of those landings observed by the WCGOP from 2014-2018. Source: [Sommers, et. al., 2019](#)

Year	IFQ								Non-IFQ							
	Pot		HKL		Pot-EM		Total		Primary		LE DTL		OA		Total	
	Landings	% obs.														
2014	681.1	100	88.5	90	n/a	n/a	769.6	98.73%	1193.4	29	464.4	5	373.2	6	2031	19.30%
2015	405.3	100	137.8	100	339.4	30	882.5	73.14%	1432.4	46	515.0	7	587.3	5	2534.7	28.77%
2016	387.1	100	192.7	100	445.5	34	1025.3	71.37%	1531.1	41	549.9	4	496.6	6	2577.6	26.65%
2017	366.0	100	115.9	99.6	493.7	37	975.6	68.22%	1594.3	36	547.9	3	561.2	7	2703.4	23.00%
2018	292.6	100	161.2	98.3	414.8	40	868.6	71.09%	1554.1	53	540.6	4	486.7	7	2581.4	33.83%

The main issue with a lower sampling rate if no gear switching was allowed or reduced would be the potential impacts to stock assessments from having fewer biological samples of fixed gear caught sablefish (or any bycatch species of concern caught on fixed gear trips, such as yelloweye). In the 2019 sablefish assessment<sup>14</sup>, the following excerpt describes the main use of WCGOP collected data:

The WCGOP provided information regarding length-compositions of discarded sablefish from 2002-2018. These samples were analyzed using a weighting method consistent with that applied to port samples described above. In aggregate, these samples reflect the sorting out of smaller fish from the retained catch, with all gears discarding sablefish at age-1 and several observations of age-0 fish as well (Figures 32-35). *Annual distributions from all fleets are highly variable due to limited sample sizes and probably only informative about the general size ranges that are discarded.* It is important to note that all fleets have at some time discarded some sablefish 50-60+ cm in length. These fish are large enough to be valuable (and at least as large as the average retained sablefish), implying that size-based sorting is not the only reason for discarding and that no size or age is likely to be completely retained under all conditions. With the implementation of the trawl catch share program, discarding is now directly accounted for and more than likely different than years prior to 2011.

State samples of fixed gear landed sablefish would continue to be able to be used to inform the fixed gear fleet parameters for landed fish. However, WCGOP observations on fixed gear vessels provided the vast majority of opportunity to collect biological data on species such as yelloweye rockfish, which are required to be discarded in all non-IFQ fisheries. Therefore, there may be some reduction in the number of samples that would be able to be collected to inform future assessments. While it is difficult to estimate the true impacts, there would likely be some loss of the information that was gained when gear switching was allowed in the trawl fishery starting in 2011. Depending on the importance of the information, if gear switching is discontinued, observation of some of the limited entry fixed gear trips might be increased to compensate for the reduction. From 2014 to 2018, 3,000 of 7,300 mt caught in the LEFG fishery (primary and LE DTL) were observed. Over the same period, 3,400 mt of fixed gear catch was observed in the IFQ fishery. Therefore, to maintain that observation rate, a total of 6,400 of 7,300 mt would have to have been observed in the LEFG fishery. To do this, the observer rate would have to been increased from about 40 percent to about 88 percent.

## Impacts to ESA Listed Salmon

*Summary: With the reduction or elimination of gear switching of sablefish north, there is the potential for greater trawl effort and therefore more salmonid take in the groundfish fishery. This section provides a preliminary overview of the salmonid bycatch by fixed gear and bottom trawl gear from 2011-2018.*

- *IFQ fixed gear has had zero bycatch of Chinook salmon and 15 Coho salmon since 2011.*
- *The non-whiting sector's total estimated bycatch has averaged less than 21 percent of the 2017 Biological Opinion's non-whiting sector guideline.*

In October, the SaMTAAC noted that there could be additional impacts to ESA listed salmonid stocks depending on the alternative selected. Trawl fisheries are responsible for the majority of the salmon bycatch on the West Coast. Table 21 below shows the number of Chinook and Coho salmon caught between 2011-2018 between the bottom trawl and fixed gear sectors. As shown, the IFQ fixed gear

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<sup>14</sup> Haltuch, M.A., Johnson, K.F., Tolimieri, N., Kapur, M.S., and Castillo-Jordán, C.A. 2019. Status of the sablefish stock in U.S. waters in 2019. Pacific Fisheries Management Council, 7700 Ambassador Place NE, Suite 200, Portland, OR. 398 p.

sector has taken no Chinook and 15 Coho salmon (in 2014) over the eight-year period. Depending on the alternative, if the amount of gear switching were reduced and the amount of bottom trawl effort were increased, there is a chance of increased total bycatch of salmon. However, overall, the non-whiting fishery (bottom trawl, non-whiting midwater trawl, commercial fixed gear, and select recreational fisheries) as a whole has historically caught, on average, less than 21 percent salmon of the current threshold of 9,000 Chinook salmon between 2011-2018.<sup>15</sup> Note that based on the Council’s action in November, the non-whiting trawl sector will now close at 8,500 Chinook salmon or all trawl fisheries (including the whiting sectors) will close at 19,500 Chinook salmon to preserve opportunity for the non-trawl sector (IFQ fixed gear, LEFG, OA, and select recreational fisheries) to operate in the case of unexpected high bycatch. Once the alternatives are finalized, staff will work to examine potential impacts to salmon as part of the consideration of whether consultation needs to be reinitiated as a result of this action.

Table 21: Salmon bycatch by IFQ sector and species, 2011-2018 (Source: WCGOP Salmon Report, PacFIN salmon scorecard)

Species	Sector	2011	2012	2013	2014	2015	2016	2017	2018
Chinook	Bottom Trawl	175	304	323	984	996	371	190	138
	Fixed Gear	0	0	0	0	0	0	0	0
Coho	Bottom Trawl	19	27	49	18	3	9	0	0
	Fixed Gear	0	0	0	15	0	0	0	0

## Alternative Specific Analysis

While the above analyses in combination with the information presented in October 2019 are intended to help the SaMTAAC select their final ROA, a few specific elements of each of the three alternatives are analyzed below.

### Alternative 1 (Gear Specific QP Alternative)

*Summary: Alternative 1 would create gear specific QP for sablefish north (trawl and unrestricted). In October, the Committee added an opt-out option for qualified permits and developed a specific range of options for the percentage of quota to be issue as trawl and unrestricted and the opt-out options.*

*Highlights from the analysis include:*

- *Of the 39 permits with gear switching history between 2011-2018, 24-33 would qualified under the sub-options under Opt-Out option a.*
- *The Opt-Out option b options show a wide range of QS that would be eligible for the opt-out with the range depending largely on the question of how many of years a QSA would need to meet the criteria. The choice to limit consideration of QP to three transfer degrees instead of taking all QP transfers into account affects a small number of QSAs and QS amounts for some combinations of scoring criteria and the number of years required to meet them.*

<sup>15</sup> Table 1 from [Agenda Item G.8.a, Supplemental GMT Report 1, November 2018](#)

## Allocation of Gear Specific QP

Under Alternative 1, QS accounts would receive a specified percentage of their northern sablefish QPs as trawl-only and the remainder as unrestricted. (Table 22)

Table 22: Alternative 1 Gear Specific QP Percentage Options, with and without the Opt-Out

Option	Opt-Out	Trawl Percentage	Any Gear
A	No	70	30
B	Yes	90	10

The potential impacts of the opt-out, in which a QS account could receive 100 percent of their QPs as unrestricted are discussed in the section below. However, if there is no opt-out, then a maximum of 30 percent of the allocated QPs (i.e. not including carryover) could be harvested with fixed gear. As shown in Table 1, recent percent attainment of the total available pounds has averaged 34 percent in recent years.

### Opt-Out Analysis

Under Alternative 1, there is an “opt-out” option that would allow those eligible to receive 100 percent of their QPs as unrestricted (i.e. status quo QPs). This would include QP issued for northern sablefish QS transferred into an opt-out QS account after initial implementation of the program. Opt-out Option a would provide owners of trawl permits with a qualifying history of using fixed gear to harvest sablefish N an opportunity to opt-out by designating a QS account that would receive all its sablefish QP as unrestricted. Opt-out Option b would provide owners of qualified QS accounts an opportunity to exercise an opt-out option for the qualified account.

#### *Opt-Out Option a: Permit Qualification*

##### **Number of Qualifiers**

With respect to Opt-out Option a, Table 23 below shows the two qualification periods being considered in combination with three different qualification criteria under consideration, for a total of six suboptions. The qualification criteria are applied to each permit’s IFQ landings of fixed gear sablefish north over the entirety of the applicable qualification period. In other words, Qualification Sub-Option 1.C would qualify a permit that participated in a single year and landed 30,000 lbs and a permit that landed 5,000 lbs each year for six years. Of the 39 permits with some gear switching history between January 1, 2011 and 2018, three have no qualifying history prior to the September 15, 2017 control date used for Suboptions 1.A through 1.C. Of the remaining 36, 31-33 would qualify under the sub-options. For the more recent qualification period covered by Suboptions 2.A through 2.C (which does not start until 2014 but includes years after the control date), of the 39 permits with some 2011-2018 history, 11 had no gear switched landings from 2014 to 2018 history. 24-26 of the remaining 28 permits would qualify under the sub-options. As shown, the more recent qualification period of 2014-2018 would have six to seven fewer permits qualify under each sub-option compared to longer and earlier qualification period of January 1, 2011 through the control date.

Table 23: Number of limited entry trawl permits that would qualify to opt-out under the qualification period sub-options and criteria sub-options.

Qualification Period Sub-Option	Qualification Suboption	Number of Qualifying Permits	Gear Switching Permits with No History <sup>a/</sup>
1: January 1, 2011-September 15, 2017	Sub-Opt 1.A: 10,000 lbs between 1/1/11-9/15/17	33	3
	Sub-Opt 1.B: 20,000 lbs between 1/1/11-9/15/17	31	
	Sub-Opt 1.C: 30,000 lbs between 1/1/11-9/15/17	31	
2: January 1, 2014-December 31, 2018	Sub-Opt 2.A: 10,000 lbs between 1/1/14-1/31/18	26	11
	Sub-Opt 2.B: 20,000 lbs between 1/1/14-1/31/18	25	
	Sub-Opt 2.C: 30,000 lbs between 1/1/14-1/31/18	24	

Internal Reference: 8 Alternative Analysis

a/ Of the 39 permits with some 2011-2018 history those that have none within the qualification period for the suboption.

Table 24 through Table 26 below compare the number of qualifying permits and the percentage of total gear switching permits for the two qualification periods, holding the qualification amount constant. For reference, there were 36 permits with history of gear switching between January 1, 2011 and the control date and 28 permits with gear switching history between 2014-2018.

Comparing qualification sub-options 1.A and 2.A (10,000 lb minimum landing criteria; Table 24), there is a difference of seven permits qualifying, however the total number of permits impacted would be more than seven. A total of 10 permits that would qualify under 1.A would not qualify under 2.A. Of those, five permits had no trawl or gear switching activity after 2014 and five permits that, while active in the IFQ fishery after 2014 and previously active as gear switchers, had no gear switched landings between 2014-2018 and therefore would not qualify under sub-option 2.A. At the same time, there are three permits that had no activity prior to 2014 and would only qualify under sub-option 2.A and not sub-option 1.A. These three permits would only qualify because of landings made after the control date.

Table 24: Number of qualifying permits and percentage of gear switching permits that would qualify during the two qualification periods with a minimum landing requirement of 10,000 lbs

Sub-Option	Qualification Period	Number of Permits Qualifying	Number Qualifying Under Both Sub-Options	Percentage of Permits with Gear Switching History <sup>a/</sup>
1.A	January 1, 2011-September 15, 2017	33	23	91.7
2.A	January 1, 2014-December 31, 2018	26		92.9

Internal Reference: 8 Alternative Analysis

a/ This is the percentage of permits with history in the period (36 under 1.A and 28 under 2.A) that qualify under the 10,000 pound criteria.

Between sub-options 1.B and 2.B, there is a total difference of six permits as shown in Table 25. There are ten permits that would qualify under 1.B that would not qualify under sub-option 2.B and four permits that would qualify under sub-option 2.B that would not qualify under sub-option 1.B. Two permits that qualified under sub-option 1.A would not qualify under sub-option 1.B. One of these two permits is also the one that qualified under sub-option 2.A. but not sub-option 2.B. That permit had less than 20,000 lbs of gear switched landings total for 2011-2018. The permit that did not qualify under sub-option 1.B, but did under sub-option 1.A, did not have enough landings prior to the control date. That permit however did qualify under all suboptions that have a qualification period of January 1, 2014-December 31, 2018 (i.e. had in excess of 30,000 pounds during the later period).

Table 25: Number of qualifying permits and percentage of gear switching permits that would qualify during the two qualification periods with a minimum landing requirement of 20,000 lbs.

Sub-Option	Qualification Period	Number of Permits Qualifying	Number Qualifying Under Both Sub-Options	Percentage of Permits with Gear Switching History <sup>a/</sup>
1.B	January 1, 2011-September 15, 2017	31	21	86.1
2.B	January 1, 2014-December 31, 2018	25		89.3

Internal Reference: Alternative Analysis

a/ This is the percentage of permits with history in the period (36 under 1.B and 28 under 2.B) that qualify under the 20,000 pound criteria

Table 26 below shows that between sub-options 1.C and 2.C there is a total difference of seven permits that would qualify when the landings requirement is 30,000 lbs. Ten permits would qualify under sub-option 1.C that would not qualify under 2.C and three permits would qualify under 2.C that would not qualify under 1.C. The number of permits that qualify does not change between 1.B and 1.C (same qualification period) while there is one permit that would not qualify under the higher landings threshold of 30,000 lbs under sub-option 2.C compared to 2.B (the more recent qualifying period).

Table 26: Number of qualifying permits and percentage of gear switching permits that would qualify during the two qualification periods with a minimum landing requirement of 30,000 lbs

Sub-Option	Qualification Period	Number of Permits Qualifying	Number Qualifying Under Both Sub-Options	Percentage of Permits with Gear Switching History <sup>a/</sup>
1.C	January 1, 2011-September 15, 2017	31	21	86.1
2.C	January 1, 2014-December 31, 2018	24		85.7

Internal Reference: 8 Alternative Analysis

a/ This is the percentage of permits with history in the period (36 under 1.C and 28 under 2.C) that qualify under the 20,000 pound criteria

### Projected Impacts

If Opt-Out Option a was selected, then each qualified permit could designate a QS account to opt-out and receive 100 percent of their QPs as any gear. While the opt-out would occur at the time of implementation, each QS account could acquire up to the control limit of 3 percent over time. Table 27 below shows the number of QS permits in 2019 grouped by the percentage of QS in their account.

Table 27: Number of QS permits that own a specified amount of sablefish north QS in 2019.

Percent	0	0.001-0.999	1-1.499	>1.5
Number of QS Permits	53	109	7	13

Table 28 below shows the number of permits that qualify to opt-out under each option, their maximum landings, average gear switched landings in active years, and average gear switched landings from 2011-2018 and the respective projected attainment of the 2020 trawl allocation under each statistic. While the permit may not be the same owner as the QS account holder, it is likely that the permit owner would select a QS account that they have a business relationship with that could provide the necessary QPs for fishing. Using the values in this table to make estimates of future landings is based on the assumption that each qualifying permit designates a QS account that would receive opt-out status and be sufficient to

supply the indicated amount of QP (with the possible addition of QP transferred from non-opt-out QS accounts that receive 10 percent of their QP as unrestricted). Additionally, Table 28 shows the percent of allocated QPs that could be designated as unrestricted from opt-out QS accounts if all of the QS account accumulated up to the 3 percent control limit. However, this is likely an overestimate because, of the 182 QS accounts in 2019 with sablefish north quota, only 13 QSA (~7 percent) had more than 1.5 percent QS with fewer than three accounts owning more than two percent. (Table 27)

Table 28: Number of permits that would qualify under each sub-option; total quota pounds that would be caught with fixed gear if each permit lands its historical maximum (2011-2018), average in active gear switching years between 2011-2018, and overall average (2011-2018, including zeros) and their projected usage of the 2020 trawl allocation; projected usage of the 2020 trawl allocation if each QS account designated by a permit acquired the sablefish north control limit (3 percent).

Sub-Option	Number of Permits	Projected landings assuming each permit takes...						Total % of 2020 Trawl Allocation If Every Eligible Permit Identifies an Opt Out QS Account Which Acquires a Full Limits of QS
		Max in Any Year		Average of Active Gear Switching Years		Average of 2011-2018		
		Landings (lbs)	% of 2020 Trawl All.	Landings (lbs)	% of 2020 Trawl All.	Landings (lbs)	% of 2020 Trawl All.	
1.A	33	4,504,503	77.49	3,317,248	57.06	1,524,212	26.22	99
1.B	31	4,282,288	73.67	3,158,654	54.34	1,487,028	25.58	93
1.C	31	4,282,288	73.67	3,158,654	54.34	1,487,028	25.58	93
2.A	26	3,560,476	61.25	2,448,096	42.11	1,372,903	23.62	78
2.B	25	3,540,764	60.91	2,428,383	41.77	1,370,439	23.57	75
2.C	24	3,516,018	60.48	2,403,637	41.35	1,367,345	23.52	72

### *Opt-Out Option b: Quota Share Qualification*

Opt-out Option b involves using the Washington Department of Fish and Wildlife (WDFW) proposed proportional weighting method for scoring QS accounts' (QSAs) connection to gear switching vessels. The method is described briefly below. As described in the Alternatives document, the SaMTAAC recommended at their October meeting to limit the scoring to three degrees of transfer relationships. The effects of this limit are also briefly discussed as well.

### **Brief Summary of the Scoring Method**

The WDFW scoring method tracks QP transfers between QSAs and Vessel Accounts (VAs) and among VAs to quantify the degree to which the sablefish north QP issued to a QSA is caught with trawl gear or fixed gear (gear switched). The scoring is proportionate to QP transfers and is calculated using a weighted average where the amount of QP transferred from the QSA to the VA serves as the weight between the two accounts. Put simply, if the owners of a QSA transferred 30 percent of their QP to a VA, 30 percent of their score comes from that VA.

The "score of a VA" can be thought of as a QP activity portfolio that summarizes the account's QP activity for the year. The portfolio consists of the following "end-state" categories:

- QP fished with trawl gear
- QP fished with non-trawl gear
- QP used to cover deficit catch from the previous year

- QP remaining in the account at the end of the year<sup>16</sup>

The proportion of QP in each category (i.e. percentage of the total expressed as a decimal) is calculated by dividing the category's QP by the total QP summed across all four categories. The “gear switching score” is the second listed category—the proportion of QP debited for catching sablefish north with a gear other than trawl.<sup>17</sup>

### **VA QP Activity Portfolios and VA to VA transfers**

The four portfolio categories can have “direct” and “indirect” contributions. The direct component is based on the activities of the VA itself. A VA that transfers QP will also have indirect contributions to its scores.

As with QSAs, a VA's indirect score is calculated as a weighted average of the QP activity portfolios of QP transfer partners. Extra calculation steps are needed compared to those required to score QSAs. In contrast to QSA transfers, which are one-way transfers (i.e. from QSA to a VA), VAs that transfer QP to other VAs may receive QP from their partners and partners of their partners. Where this occurs, there is a loop, or circular reference, in the weighted average equation. The iterative calculation features of spreadsheet programs like Microsoft's Excel, Google Sheets, and LibreOffice Calc or similar methods can work through the circular references and resolve all VAs so that the proportions across the four portfolio categories sum to one.

### **Limiting the Degree of Relationship - Transfers as a Network Graph**

The Committee's recommendation to limit the indirect contribution to VA QP activity portfolios can be understood by creating a network graph. The network can be graphed using VAs as “nodes” and QP transfers represented as “edges” (i.e. links, Figure 19). Although VAs can only be directly connected pairwise, they can be indirectly connected to others in long chains of association. A pair of VAs directly connected by an edge can be said to have a “first-degree” relationship. Two VAs that can be connected by crossing two edges (i.e. to a partner's partner) have a “second-degree” relationship. And so on. The degree of relationship between one VA and another is equal to the number of edges that need to be crossed to reach one another. The Committee's recommendation was interpreted to limit consideration of VAs to those reachable by three or fewer degrees of separation. Thus, a QSAs relationship to gear switching would be determined by the direct relationship between the QSA and VA and three levels of transfer between VAs.

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<sup>16</sup> NMFS uses two categories in the IFQ database to differentiate whether the QP is eligible to be carried over to the next year or not. For descriptive purposes here, the two categories are combined.

<sup>17</sup> There are possible variations that could be considered in the future. For example, QP left remaining for the purpose of carrying over the next year could be subtracted out of the denominator. Leaving it in the denominator has the effect of lowering the percentage/proportion of QP used with trawl or gear switching. If the SaMTAAC or Council were to use threshold criteria like in Opt-out Option b, the QP left for carryover could be the difference

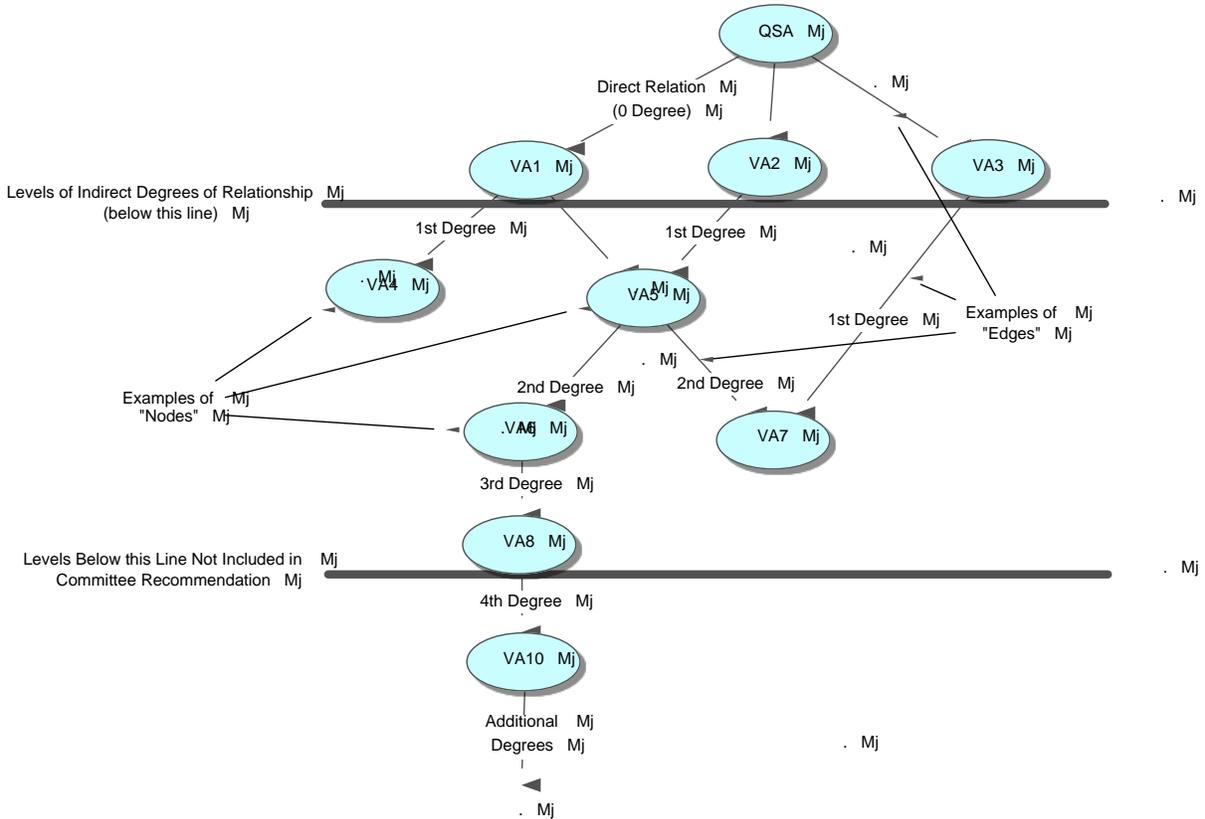


Figure 19. Relation of QSAs and VAs to concepts of degrees of relationship, nodes, and edges.

**The Effect of Limiting the Number of Transfer Degrees Considered**

Limiting the scoring to a certain number of transfer degrees requires a different means of calculation than the spreadsheet based iterative calculation. In brief, the direct VA activity portfolios must be visited degree by degree.<sup>18</sup>

As shown in the October analytical document, some VAs receive contributions to their activity portfolios from distantly related VAs.<sup>19</sup> At the same time, the contributions of these distantly related VAs is small.

<sup>18</sup> The two methods used to calculate the scores are similar but not identical. For one, the iterative calculation method will resolve all transfer relationships in one iteration for VAs without circular references in their networks. For networks with circular references, the iterative calculation will update the direct portfolio categories after each round of calculation. So each round brings some additional indirect contributions into the VA’s QP activity portfolios. This contrasts with the degree by degree weighted average, which only takes a weighted average of the direct QP activity portfolios of connected VAs.

<sup>19</sup> The last analysis presented to the SaMTAAC may not have made clear that loops in the network count some relationships more than once. For example, if a VA’s second degree partner transfers QP to that VA then the second degree partner will appear again at the fifth degree. For this reason, the scores the minimum . In the example, the VAs would have a second degree relationship. Graph theory differentiates the concepts of paths, trails, and walks to differentiate whether nodes and edges are visited multiple times. Which to use depends on the question of interest.

Again, thinking of the network graph, each edge in the network has a weight equal to the proportion of a VA's QPs being transferred to the receiving VA.<sup>20</sup> Crossing two edges involves multiplying their weights together. Therefore, the indirect contribution becomes multiplicatively smaller each time an edge is crossed.<sup>21</sup>

Figure 20 uses Opt-out Option b's Sub-options 2A, B, and C (suboptions with a 2014-2018 qualifying period) to highlight the effect of taking the indirect contribution of QP activity portfolios into account when scoring QSAs for their connection to gear switching. The clearest pattern seen is the major difference between the "direct only" scores and the two sets of scores that do factor in "indirect" contributions. This underscores the prevalence of QP trading among VAs. In contrast, the effect of the SaMTAAC's recommendation to limit the number of transfer degrees taken into account will be smaller. Comparing the "direct + indirect 4 deg." and "direct + all indirect" bars, the largest difference is seen in 2016 for Suboption 2.C. These minor differences do not argue one way or the other for taking all transfers into accounting or cutting them off. The figure is only meant to inform the Committee on the practical effects of either policy preference and that it would be expected to only affect a small number of QSAs holding a relatively small percentage of the Sablefish N. QS. The patterns for Opt-out Option a's Suboption 1 are not shown yet are very similar.

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<sup>20</sup> The weights are the same as those used in the weighted average equation. That is, a VA's weighted average equation is constructed by combining the edge weight times the VA portfolios of its first-degree partners.

<sup>21</sup> Unless the edge involves a VA transferring 100 percent of its QP to the receiving VA. This carries the previous weight to the next degree (i.e. the edge weight from the previous degree is multiplied by 1).

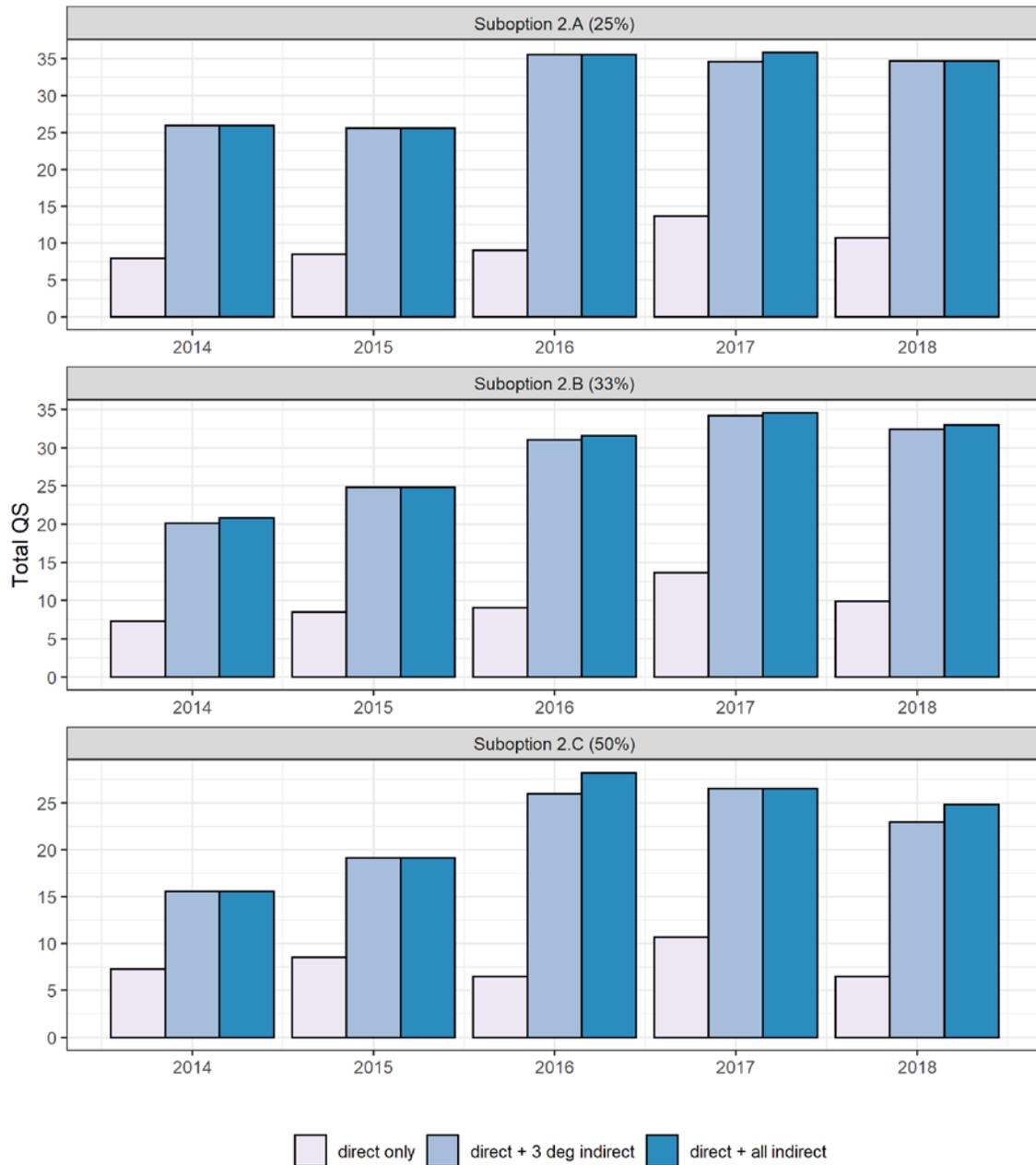


Figure 20: Total QS that would qualify under Opt-out option b suboption 2.A-2.C if: (1) no VA to VA QP transfers (“direct only”); (2) three degrees of transfer relationships (“direct + 3 deg indirect”); or (3) all transfers (“direct + all indirect”) are factored into the QP activity portfolio scoring.

### Result Tables

Table 29 and Table 30 report the results for Sub-options 1.A-1.C and 2.A-2.C, respectively. The SaMTAAC has not yet specified the number of years a QSA would need to meet the criteria within each respective window period (i.e., January 1, 2011-September 15, 2017 or January 1, 2014-December

31,2018). The two tables therefore report the results using the number of years QSAs would meet the criteria (e.g. the row marked as 4 means that QSAs would meet the criteria in four or more of the years). Other approaches, not reported here, could use average scores (weighted or simple) over the window period to evaluate the criteria. The number of years of activity as well as recency (e.g. QSA that appeared only in 2017) may be an issue for further consideration.

Of note, the results show in Table 29 only partially address Suboptions 1.A-1.C’s intention to limit consideration of gear switching to the control date. The QS reported there is limited to the amount each QSA owned on the control date. However, the scoring factored in QP transfers and landings for all of 2017. The task of excluding the activity between Sep. 15 and Dec. 31, 2017 was more difficult than anticipated and therefore could not be accomplished for this document. The difficulty relates to the NMFS QP Balance data that was at hand was being an end-of-year record of QP activity. It might be possible to roll back the data to September 15, 2017 for future analysis (this will be explored).

Table 29. Results for Opt-out Option b Suboptions 1.A-1.C displaying the number of QSAs that would qualify (QSAs), the QS held in those QSAs (as of Jan 12, 2020 but limited to what was owned on the control date), and the equivalent percentage of the total QS issued (i.e. QS divided by 90 because 10 percent was set aside for AMP). The rows in the “# of years” column refer to the number of years within 2011-2017 that the QSAs meet the scoring criteria (i.e. 3 means that the QSAs in that row had 3 or more years where they met the criteria). The top set of numbers was scored by limiting the contribution of QP transfers between VAs related by no more than four degrees of separation. The bottom set shows what the results would be if no limit were placed on the contribution of VA to VA QP transfers.

Limited to Three QP Transfer Degrees									
# of Years	1.A			1.B			1.C		
	QSAs	QS <sup>a/</sup>	% of QS <sup>a/</sup>	QSAs	QS <sup>a/</sup>	% of QS <sup>a/</sup>	QSAs	QS <sup>a/</sup>	% of QS <sup>a/</sup>
1	95	50.4	56.0%	91	47.6	52.9%	78	41.0	45.6%
2	70	36.2	40.3%	64	33.9	37.7%	51	26.7	29.7%
3	56	29.4	32.7%	49	25.9	28.8%	38	19.8	22.0%
4	39	20.1	22.3%	34	17.4	19.4%	25	13.2	14.6%
5	32	16.6	18.4%	28	13.5	15.0%	21	12.2	13.5%
6	23	12.5	13.9%	19	10.6	11.8%	15	9.8	10.9%
7	12	7.8	8.6%	10	7.3	8.1%	9	7.3	8.1%
Unlimited Transfer Degrees									
# of Years	1.A			1.B			1.C		
	QSAs	QS	% of QS	QSAs	QS	% of QS	QSAs	QS	% of QS
1	95	50.4	56.0%	92	48.2	53.6%	79	41.7	46.4%
2	70	36.2	40.3%	66	34.5	38.3%	53	27.4	30.5%
3	56	29.4	32.7%	49	25.9	28.8%	40	20.6	22.9%
4	41	20.8	23.1%	36	18.1	20.1%	25	13.2	14.6%
5	32	16.6	18.4%	28	13.5	15.0%	21	12.2	13.5%
6	24	13.0	14.5%	19	10.6	11.8%	15	9.8	10.9%
7	12	7.8	8.6%	10	7.3	8.1%	9	7.3	8.1%

<sup>a/</sup>While the amount of QS associated with potentially qualifying accounts is provided, once opted out QS accounts would be able to acquire additional QS the QP for which would be issued as unrestricted, up to the three percent QS control limit for northern sablefish.

Table 30: Results for Opt-out Option b Suboptions 2.A-2.C displaying the number of QSAs that would qualify (QSAs), the QS held in those QSAs (as of Jan 12, 2020), and the equivalent percentage of the total QS issued (i.e. QS divided by 90 because 10 percent was set aside for AMP). The rows in the “# of years” column refer to the number of years within 2013-2018 that the QSAs meet the scoring criteria (i.e. 3 means that the QSAs in that row had 3 or more years where they met the criteria). The top set of numbers was scored by limiting the contribution of QP transfers between VAs related by no more than four degrees of separation. The bottom set shows what the results would be if no limit were placed on the contribution of VA to VA QP transfers.

Limited to Three QP Transfer Degrees									
# of Years	2.A			2.B			2.C		
	QSAs	QS <sup>a/</sup>	% of QS <sup>a/</sup>	QSAs	QS <sup>a/</sup>	% of QS <sup>a/</sup>	QSAs	QS <sup>a/</sup>	% of QS <sup>a/</sup>
1	90	48.9	54.4%	86	46.2	51.3%	71	38.5	42.8%
2	70	38.7	43.0%	62	35.3	39.3%	49	27.0	30.0%
3	52	29.7	33.0%	46	27.3	30.3%	35	20.1	22.4%
4	41	24.8	27.6%	37	21.5	23.9%	26	16.0	17.8%
5	22	14.2	15.8%	19	12.3	13.7%	12	8.5	9.4%
Unlimited Transfer Degrees									
# of Years	2.A			2.B			2.C		
	QSAs	QS	% of QS	QSAs	QS	% of QS	QSAs	QS	% of QS
1	90	48.9	54.4%	88	47.3	52.6%	72	39.2	43.6%
2	70	38.7	43.0%	64	35.9	39.8%	51	28.4	31.6%
3	54	30.4	33.8%	47	27.6	30.7%	36	20.1	22.4%
4	41	24.8	27.6%	37	21.5	23.9%	29	17.4	19.4%
5	23	14.7	16.4%	19	12.3	13.7%	13	9.0	10.0%

a/While the amount of QS associated with potentially qualifying accounts is provided, once opted out QS accounts would be able to acquire additional QS the QP for which would be issued as unrestricted, up to the three percent QS control limit for northern sablefish.

## Alternative 2 (Gear Switching Endorsement)

*Summary: In October, the Committee advanced Alternative 2 and narrowed down the number of qualification levels to include a minimum of 5,000, 10,000, and 30,000 pounds for a minimum of 1,3,4, or 5 years. Additionally, it included a “recent participation” option to take into consideration the recent activity by permits and vessels. This analysis provides a summary of the:*

- *number of vessels and permits that would qualify under each criteria,*
- *projected landings and percent of the 2020 trawl allocation under each endorsement option, and*
- *impact analysis for those vessels that do not receive an endorsement under each criteria level.*

## Vessels

*Summary: Under one option for Alternative 2, the vessel would be the qualifying unit (with the designated permit at the time of implementation receiving the endorsement). If the qualifying unit for the gear switching endorsement were the vessel,*

- *The projected percent attainment of the 2020 trawl allocation assuming average landings is between approximately 17-26 percent would be less than the recent average of 34 percent under all qualification scenarios.*

- *Six vessels with gear switching history between 2011-2018 would not qualify for an endorsement at any level, with three having no gear switching landings prior to the control date.*
- *With the recent participation option, a maximum of 19 vessels would qualify under any qualification criteria level.*

### *Qualification*

Table 31 below shows the number of vessels that would qualify under the SaMTAAC's narrowed range of qualification amounts and minimum number of years. Additionally, each option (5,000 lbs for a number of years to be determined, 10,000 lbs for a number of years to be determined, and 30,000 lbs for at least three years) could be paired with a sub-option in which a vessel would have had to participate in at least one of the years between 2016-2018 (i.e. have one gear switched landing in this period). This table first provides results for the original option ("without" the sub-option) and then directly beneath it shows results for selection of the recent participation sub-option ("with" the sub-option). For example, if the criteria for qualifying for an endorsement was a minimum of 5,000 lbs of sablefish north landed with fixed gear between 2011 and the control date, 33 vessels would qualify. However, if the recent participation sub-option were included, the number of vessels that would qualify would drop to 19. For all qualification criteria except those with a one-year minimum participation level, there is only a one vessel difference between the option and the sub-option. This implies that all but one vessel with at least three years of activity also participated in the 2016-2018 period. Table 31 also provides an update of similar tables from the October analytical document. Prior versions of this table provided projections based on the qualification period (1/1/2011-9/15/2017). This table's projections are based on the 2011-2018 analytical period. In addition, two averages are presented for the SaMTAAC's consideration. The middle set of projections is based on qualified vessels average of gear switched yearly landings only in years that they gear switched. In other words, if a vessel only participated in a single year and landed 80,000 lbs of sablefish north with fixed gear, that entire amount would be contributing to the projection. The right set of projections based on averages include all years from 2011-2018. For the vessel in the previous example, that would result in 10,000 lbs (average of 80,000 lbs over eight years) being contributed to the projection. The two sets of averages are intended to provide a range of average estimated landings and percent attainment of the 2020 allocation. As previously discussed, several vessels (and permits) started gear switching at the start of the IFQ program, but left after only a year or two. This may represent future participants venturing into the fishery. Compared to the recent footprint of gear switching amounts of sablefish landed with fixed gear (~34 percent of the allocation in the last three years), all of the qualification options would tend to keep the projected 2020 percent attainment below 34 percent under both average scenarios. Even if vessels were to take their maximum landings in the same year, most qualification options would tend to keep the percent attainment below the 34 percent level.

Table 31: Number of vessels that would qualify for a gear switching endorsement based on minimum landings and participation criteria through the control date, with and without the option to have a recent participation criteria (2016-2018); total quota pounds that would be caught with fixed gear if each vessel lands its historical maximum (2011-2018), average in active gear switching years between 2011-2018, and overall average (2011-2018, including zeros) and their projected usage of the 2020 trawl allocation; qualified vessel projected usage of the 2020 trawl allocation if each took an annual vessel limit (4.5 percent).

With/ Without Recent Participation Option	Minimum Amount of Sablefish landed with fixed gear	Number of Years	Number of Vessels	Projected landings assuming each vessel takes...							
				Max in Any Year		Average of Active Gear Switching Years		Average of 2011- 2018		Annual Vessel Limit	
				Landings (lbs)	% of 2020 Trawl All.	Landings (lbs)	% of 2020 Trawl All.	Landings (lbs)	% of 2020 Trawl All.	% of 2020 Trawl All.	
Without	5,000 lbs	1	33	3,819,444	65.7	2,941,556	50.6	1,488,627	25.61	148.5	
With			19	2,777,302	47.78	1,984,522	34.14	1,299,512	22.35	85.5	
Without		3	15	2,123,847	36.54	1,445,382	24.86	1,211,503	20.84	67.5	
With			14	2,008,813	34.56	1,373,228	23.62	1,166,407	20.06	63	
Without		4	13	1,819,968	31.31	1,256,236	21.61	1,116,930	19.21	58.5	
With			12	1,704,934	29.33	1,184,082	20.37	1,071,834	18.44	54	
Without		5	10	1,721,993	29.62	1,187,406	20.43	1,079,044	18.56	45	
With			9	1,606,959	27.64	1,115,252	19.18	1,033,947	17.79	40.5	
Without		10,000 lbs	1	32	3,813,022	65.59	2,935,134	50.49	1,487,824	25.59	144
With				19	2,777,302	47.78	1,984,522	34.14	1,299,512	22.35	85.5
Without	3		15	2,123,847	36.54	1,445,382	24.86	1,211,503	20.84	67.5	
With			14	2,008,813	34.56	1,373,228	23.62	1,166,407	20.06	63	
Without	4		12	1,797,175	30.92	1,242,351	21.37	1,106,516	19.03	54	
With			11	1,682,141	28.94	1,170,196	20.13	1,061,420	18.26	49.5	
Without	5		10	1,721,993	29.62	1,187,406	20.43	1,079,044	18.56	45	
With			9	1,606,959	27.64	1,115,252	19.18	1,033,947	17.79	40.5	
Without	30,000 lbs		3	11	1,959,924	33.72	1,329,164	22.86	1,149,923	19.78	49.5
With				10	1,844,890	31.74	1,257,010	21.62	1,104,826	19.01	45

(Internal Reference: 8 Alternative Analysis, 4 Gear Switching Analysis )

### Endorsement Limit Options

For those vessels (or permits-discussed below) that qualify for an endorsement, there are three options for the limit of sablefish north that could be gear switched:

Endorsement Limit Option 1: the maximum percent of northern sablefish trawl allocation landed by the qualifying permit/vessel (TBD) with fixed gear in any year between 2011 and the control date (9/15/2017). Once that maximum is determined, it is assigned to the permit and stays with the permit when it is transferred.

Endorsement Limit Option 2: for each qualifying vessel/permit, the average percentage of the sablefish north trawl allocation landed with fixed gear for years fished between 2011 and the control date.

Endorsement Limit Option 3: the standard northern sablefish vessel QP limit (currently 4.5 percent).

Table 32 below provides the projected landings and percent attainment of the 2020 trawl allocation for each qualification level under each endorsement limit option. Option 2, which would grant each qualifying vessel the average percent of the sablefish north trawl allocation landed with fixed gear for years fished (i.e. does not include years with zero activity in gear switching), would result in the least number of pounds landed. While the one-year minimum requirement would result in a projected of ~35 percent (with recent participation option) to ~53 percent (without the option), the other qualification

levels range from approximately 21 to 27 percent projected percent attainment, assuming all vessels fish up to the maximum that would be allowed. Actual participation levels are likely to be lower. The projection under the annual vessel limit has the highest projected impacts, but given that only five vessels have landed over four percent of the limit between 2011 and the control date, projected impacts would likely be between endorsement options 1 and 2 even if option 3 were selected.

Table 32: Projected landings and percent attainment of 2020 trawl allocation for each endorsement limit option and qualification level.

With/ Without Recent Participation Option	Minimum Amount of Sablefish landed with fixed gear	Number of Years	Number of Vessels	Projected landings assuming each vessel takes...						
				Option 1 (Max. Percentage of Allocation Landed between 2011 & CD)		Option 2 (Avg. Percentage of Allocation Landed between 2011 & CD)		Option 3 (4.5% AVL)		
				Landings (lbs)	% of 2020 Trawl All.	Landings (lbs)	% of 2020 Trawl All.	Landings (lbs)	% of 2020 Trawl All.	
Without	5,000 lbs	1	33	3,987,691	68.6	3,096,198	53.3	8,632,526	148.5	
With			19	2,816,219	48.4	2,027,282	34.9	4,970,242	85.5	
Without		3	15	2,319,273	39.9	1,569,336	27	3,923,876	67.5	
With			14	2,181,360	37.5	1,482,485	25.5	3,662,284	63	
Without		4	13	2,053,655	35.3	1,390,337	23.9	3,400,692	58.5	
With			12	1,915,742	33	1,303,486	22.4	3,139,100	54	
Without		5	10	1,946,515	33.5	1,311,269	22.6	2,615,917	45	
With			9	1,808,602	31.1	1,224,418	21.1	2,354,325	40.5	
Without		10,000 lbs	1	32	3,981,041	68.5	3,089,548	53.1	8,370,935	144
With				19	2,816,219	48.4	2,027,282	34.9	4,970,242	85.5
Without			3	15	2,319,273	39.9	1,569,336	27	3,923,876	67.5
With				14	2,181,360	37.5	1,482,485	25.5	3,662,284	63
Without	4		12	2,028,730	34.9	1,374,902	23.7	3,139,100	54	
With			11	1,890,817	32.5	1,288,051	22.2	2,877,509	49.5	
Without	5		10	1,946,515	33.5	1,311,269	22.6	2,615,917	45	
With			9	1,808,602	31.1	1,224,418	21.1	2,354,325	40.5	
Without	30,000 lbs		3	11	2,141,645	36.8	1,440,413	24.8	2,877,509	49.5
With				10	2,003,732	34.5	1,353,563	23.3	2,615,917	45

Internal Reference: 8 Alternative Analysis

For those vessels that do not receive an endorsement under Alternative 2, there would be a 0.5 percent annual limit for gear switching of sablefish north.

Table 33 below shows the number of vessels with some gear switching history between 2011-2018 that would not qualify for an endorsement under the qualification criteria levels presented in Table 31 above. Additionally, a set of projected landings possibilities are provided using the assumptions that those vessels which do not qualify would have taken under their maximum, average gear switched landings in active years (i.e. years that they gear switched only), and average gear switched landings over 2011-2018 (including years with zero landings). The projections might be considered estimates of the gear switching that would be restricted by each qualification option. The far-right column describes the potential impacts compared to the 2020 allocation if these vessels took the 0.5 percent limit for non-endorsed vessels, which in 2020 would be 29,066 lbs. As shown, there are six vessels that would not meet the lowest criteria of 5,000 lbs of gear switched sablefish north for a minimum of one year from 2011 through the control date. Three of the six had no gear switched landings prior to the control date. Under all criteria levels (except for that with a single year landing requirement), the 0.5 percent limit would not be enough

to cover the average or minimum landings of those vessels with some gear switching history and therefore potentially impacted by the qualification level.

Table 33: Number of vessels with gear switching activity from 2011-2018 that would not qualify for a gear switching endorsement based on minimum landings and participation criteria through the control date, with and without the option to have a recent participation criteria (2016-2018); total quota pounds that would be caught with fixed gear if each vessel lands its historical maximum (2011-2018), average in active gear switching years (2011-2018), and overall average (2011-2018) and resulting projected attainment of the 2020 trawl allocation; total projected attainment of 2020 trawl allocation if qualified vessels each took a non-endorsement limit of 0.5 percent.

With/ Without Recent Participation Option	Minimum Amount of Sablefish landed with fixed gear	Number of Years	Number of Vessels	Projected landings assuming each vessel takes...							
				Max in Any Year		Average of Active Gear Switching Years		Average of 2011- 2018		Limit (0.5%)	
				Landings (lbs)	% of 2020 Trawl All.	Landings (lbs)	% of 2020 Trawl All.	Landings (lbs)	% of 2020 Trawl All.	% of 2020 Trawl All.	
Without	5,000 lbs	1	6	296,496	5.1	252,927	4.35	53,070	0.91	3.0	
With			20	1,338,638	23.03	1,209,961	20.81	242,185	4.17	10.0	
Without		3	21	1,743,974	30	283,171	4.87	283,171	4.87	10.5	
With			25	2,107,127	36.25	1,821,255	31.33	375,290	6.46	12.5	
Without		4	23	2,047,854	35.23	377,744	6.5	377,744	6.5	11.5	
With			27	2,411,006	41.48	2,010,402	34.58	469,863	8.08	13.5	
Without		5	26	2,145,829	36.91	415,630	7.15	415,630	7.15	13.0	
With			30	2,508,981	43.16	2,079,231	35.77	507,749	8.73	15.0	
Without		10,000 lbs	1	7	302,918	5.21	259,349	4.46	53,873	0.93	3.5
With				20	1,338,638	23.03	1,209,961	20.81	242,185	4.17	10.0
Without			3	21	1,743,974	30	283,171	4.87	283,171	4.87	10.5
With				25	2,107,127	36.25	1,821,255	31.33	375,290	6.46	12.5
Without			4	24	2,070,647	35.62	388,158	6.68	388,158	6.68	12.0
With				28	2,433,799	41.87	2,024,287	34.82	480,277	8.26	14.0
Without	5		26	2,145,829	36.91	415,630	7.15	415,630	7.15	13.0	
With			30	2,508,981	43.16	2,079,231	35.77	507,749	8.73	15.0	
Without	30,000 lbs		3	25	1,907,898	32.82	344,751	5.93	344,751	5.93	12.5
With				29	2,271,050	39.07	1,937,473	33.33	436,870	7.52	14.5

(Internal Reference: 8 Alternative Analysis, 4 Gear Switching Analysis )

## Permits

*Summary: If the permit were chosen as the qualifying unit,*

- *Six permits with gear switching history between 2011-2018 would not qualify for an endorsement at any level, with three having no gear switching landings prior to the control date.*
- *With the recent participation option, a maximum of 21 vessels would qualify under any qualification criteria level.*
- *More permits than vessels would qualify at some levels with the recent participation criteria.*
- *Except for the one-year requirement, the other qualification levels range from approximately 21 to 28 percent projected percent attainment, which is less than the recent percent attainment by fixed gear.*

### Qualification

Table 34 shows the same series of statistics as Table 31 above, except is based on the LE permits landing history instead of the vessel. In some qualification strata, there are more permits that would qualify compared to the number of vessels. This is likely due to permits moving amongst vessels and

accumulating enough catch amongst those vessels to reach a more stringent qualification level. For example, under the 5,000 lb minimum landing requirement for one year, the same number of permits as vessels would qualify (33); however, with the recent participation criteria, two additional permits would qualify compared to the number of vessels (21 vs. 19). This type of pattern might reflect a fishing operation that gear switches and either acquires a new vessel at the start of 2016 while keeping the same permit or decides not to gear switching beginning in 2016 and sells a permit to another operation that begins gear switching. In either case, neither the vessel the permit left behind nor the vessel the permit was transferred to would qualify. The pattern might also reflect the transfer of a leased permit between different vessels. The projected take of the 2020 allocation is higher for some levels of qualification for permits compared to vessels whether under average or maximum assumed landings.

Table 34: Number of limited entry trawl endorsed permits that would qualify for a gear switching endorsement based on minimum landings and participation criteria through the control date, with and without the option to have a recent participation criteria (2016-2018); total quota pounds that would be caught with fixed gear if each permit lands its historical maximum and average and resulting projected attainment of the 2020 trawl allocation; total projected attainment of 2020 trawl allocation if qualified permits each took an annual vessel limit (4.5 percent).

With/ Without Recent Participation Option	Minimum Amount of Sablefish landed with fixed gear	Number of Years	Number of Permits	Projected landings assuming each permit takes...						
				Max in Any Year		Average of Active Gear Switching Years		Average of 2011- 2018		Annual Vessel Limit
				Landings (lbs)	% of 2020 Trawl All.	Landings (lbs)	% of 2020 Trawl All.	Landings (lbs)	% of 2020 Trawl All.	% of 2020 Trawl All.
Without	5,000 lbs	1	33	4,504,503	77.49	3,317,248	57.06	1,524,212	26.22	148.5
With			21	3,294,994	56.68	2,225,494	38.28	1,309,000	22.52	94.5
Without		3	15	2,240,653	38.54	1,466,920	25.23	1,090,008	18.75	67.5
With			14	2,125,619	36.57	1,394,765	23.99	1,044,912	17.97	63.0
Without		4	13	1,819,968	31.31	1,217,544	20.94	978,773	16.84	58.5
With			12	1,704,934	29.33	1,145,390	19.7	933,676	16.06	54.0
Without		5	10	1,721,993	29.62	1,152,038	19.82	942,548	16.21	45.0
With			9	1,606,959	27.64	1,079,883	18.58	897,451	15.44	40.5
Without	10,000 lbs	1	33	4,504,503	77.49	3,317,248	57.06	1,524,212	26.22	148.5
With			21	3,294,994	56.68	2,225,494	38.28	1,309,000	22.52	94.5
Without		3	15	2,240,653	38.54	1,466,920	25.23	1,090,008	18.75	67.5
With			14	2,125,619	36.57	1,394,765	23.99	1,044,912	17.97	63.0
Without		4	11	1,756,036	30.21	1,178,226	20.27	955,642	16.44	49.5
With			10	1,641,002	28.23	1,106,072	19.03	910,546	15.66	45.0
Without		5	10	1,721,993	29.62	1,152,038	19.82	942,548	16.21	45.0
With			9	1,606,959	27.64	1,079,883	18.58	897,451	15.44	40.5
Without	30,000 lbs	3	11	1,959,924	33.72	1,293,795	22.26	1,013,427	17.43	49.5
With			10	1,844,890	31.74	1,221,641	21.02	968,330	16.66	45.0

(Internal Reference: 8 Alternative Analysis, 4 Gear Switching Analysis )

### Endorsement Limit Options

As described above for vessels, for permits that qualify for an endorsement, there are three options for the limit of sablefish north that could be gear switched. Table 35 below provides the projected landings and percent attainment of the 2020 trawl allocation for each qualification level under each endorsement limit option. Option 2, which would grant each qualifying permit the average percent of the sablefish north trawl allocation landed with fixed gear for years fished (i.e. does not include years with zero activity in gear switching), would result in the least number of pounds landed. While the one-year minimum participation requirement would result in a projected of ~38 percent (with recent participation option) to ~59 percent (without option), the other qualification levels range from approximately 21 to 28 percent projected percent attainment, assuming all vessels fish up to the maximum that would be allowed. Actual participation levels are likely to be lower.

Table 35: Projected landings and percent attainment for qualified permits under each endorsement limit option and qualification level.

With/ Without Recent Participation Option	Minimum Amount of Sablefish landed with fixed gear	Number of Years	Number of Permits	Projected landings assuming each permit takes...						
				Option 1 (Max. Percentage of Allocation Landed between 2011 & CD)		Option 2 (Avg. Percentage of Allocation Landed between 2011 & CD)		Option 3 (4.5% AVL)		
				Landings (lbs)	% of 2020 Trawl All.	Landings (lbs)	% of 2020 Trawl All.	Landings (lbs)	% of 2020 Trawl All.	
Without	5,000 lbs	1	33	4,579,468	78.8	3,422,016	58.9	8,632,526	148.5	
With			21	3,259,242	56.1	2,226,323	38.3	5,493,426	94.5	
Without		3	15	2,465,974	42.4	1,610,747	27.7	3,923,876	67.5	
With			14	2,328,061	40.0	1,523,896	26.2	3,662,284	63.0	
Without		4	13	2,051,742	35.3	1,354,146	23.3	3,400,692	58.5	
With			12	1,913,829	32.9	1,267,295	21.8	3,139,100	54.0	
Without		5	10	1,944,602	33.5	1,279,951	22.0	2,615,917	45.0	
With			9	1,806,689	31.1	1,193,100	20.5	2,354,325	40.5	
Without		10,000 lbs	1	33	4,579,468	78.8	3,422,016	58.9	8,632,526	148.5
With				21	3,259,242	56.1	2,226,323	38.3	5,493,426	94.5
Without			3	15	2,465,974	42.4	1,610,747	27.7	3,923,876	67.5
With				14	2,328,061	40.0	1,523,896	26.2	3,662,284	63.0
Without			4	11	1,981,829	34.1	1,310,070	22.5	2,877,509	49.5
With				10	1,843,916	31.7	1,223,219	21.0	2,615,917	45.0
Without			5	10	1,944,602	33.5	1,279,951	22.0	2,615,917	45.0
With				9	1,806,689	31.1	1,193,100	20.5	2,354,325	40.5
Without	30,000 lbs		3	11	2,139,732	36.8	1,409,096	24.2	2,877,509	49.5
With				10	2,001,819	34.4	1,322,245	22.7	2,615,917	45.0

Internal Reference: 8 Alternative Analysis

Table 36 shows the same data presented in

Table 33 above, except that it describes the impacts to permits that do not meet the qualification criteria levels instead of impacts to qualifying vessels. There would be six permits with some history of gear switching of sablefish north between 2011-2018 that would not qualify for an endorsement under the minimum criteria of 5,000 lbs or 10,000 lbs for minimum period of one year landed between 2011 and the control date. Similar to the vessel projections presented above, the 0.5 percent limit for gear switching on non-endorsed permits would not cover the maximum or average historic landings (in active gear switching years) associated with those permits, except for the one-year qualification limits. There are some levels of qualification criteria which would impact a greater number of vessels compared to number of permits (e.g. 5,000 lbs for a minimum of three years would qualify two fewer vessels compared to the number of permits). However, at the 10,000 lbs for four years level (with and without the recent participation requirement), one more vessel would qualify compared to the number of permits.

Table 36: Number of permits with gear switched landings between 2011-2018 that would not qualify for a gear switching endorsement based on minimum landings and participation criteria through the control date, with and without the option to have a recent participation criteria (2016-2018); total quota pounds that would be caught with fixed gear if each permit lands its historical maximum (2011-2018), average of active gear switching years (2011-2018), and overall average (2011-2018) and resulting projected attainment of the 2020 trawl allocation; total projected attainment of 2020 trawl allocation if qualified permits each took a non-endorsement limit of 0.5 percent

With/ Without Recent Participation Option	Minimum Amount of Sablefish landed with fixed gear	Number of Years	Number of Permits	Projected landings assuming each permit takes...							
				Max in Any Year		Average of Active Gear Switching Years		Average of 2011- 2018		Limit (0.5%)	
				Landings (lbs)	% of 2020 Trawl All.	Landings (lbs)	% of 2020 Trawl All.	Landings (lbs)	% of 2020 Trawl All.	% of 2020 Trawl All.	
Without	5,000 lbs	1	6	139,875	2.4	139,875	2.4	17,484	0.3	3.0	
With			18	1,349,383	23.2	1,231,629	21.2	232,696	4.0	9.0	
Without		3	21	2,312,228	39.8	1,898,706	32.7	440,252	7.6	10.5	
With			25	2,518,759	43.3	2,062,357	35.5	496,785	8.6	12.5	
Without		4	23	2,732,913	47.0	2,148,081	37.0	551,487	9.5	11.5	
With			27	2,939,444	50.6	2,311,733	39.8	608,021	10.5	13.5	
Without		5	26	2,830,888	48.7	2,213,588	38.1	587,712	10.1	13.0	
With			30	3,037,419	52.3	2,377,239	40.9	644,245	11.1	15.0	
Without		10,000 lbs	1	6	139,875	2.4	139,875	2.4	17,484	0.3	3.0
With				18	1,349,383	23.2	1,231,629	21.2	232,696	4.0	9.0
Without			3	21	2,312,228	39.8	1,898,706	32.7	440,252	7.6	10.5
With				25	2,518,759	43.3	2,062,357	35.5	496,785	8.6	12.5
Without			4	25	2,796,845	48.1	2,187,399	37.6	574,617	9.9	12.5
With				29	3,003,376	51.7	2,351,051	40.4	631,151	10.9	14.5
Without	5		26	2,830,888	48.7	2,213,588	38.1	587,712	10.1	13.0	
With			30	3,037,419	52.3	2,377,239	40.9	644,245	11.1	15.0	
Without	30,000 lbs		3	25	2,592,957	44.6	2,071,830	35.6	516,833	8.9	12.5
With				29	2,799,488	48.2	2,235,482	38.5	573,366	9.9	14.5

(Internal Reference: 8 Alternative Analysis, 4 Gear Switching Analysis )

### Alternative 3 (Active Trawler)

*Summary: Alternative 3 was added in October 2019 by the Committee and includes a provision for an active trawler designation and an exemption for fixed gear vessels that have a history of harvesting sablefish north with fixed gear. Based on the preliminary analysis:*

- *Between 57 and 71 vessels would have qualified as an active trawler in a given year between 2011-2018.*
- *Of the ten vessels that historically used fixed gear and trawl gear to harvest sablefish north in a single year, seven would have qualified as an active trawler; however, only four of the seven used fixed gear in the year following that in which they would have reached the qualifying requirement for being designated as an “active trawler” (vessels may also use fixed gear in the year in which they reach the active trawler qualifying requirement).*
- *Depending on the option, between 9-12 vessels would qualify for an exemption from the “active trawler” designation. Of those exempted vessels, only four appear to have 50 percent ownership in common with a QS account and would be able to gear switch the amount of northern sablefish QS owned as of and since the control date as opposed to the 0.6 percent maximum limit.*

### Active Trawler Qualification

Under Alternative 3, trawling vessels can receive an “active trawler” designation that would allow vessels to use fixed gear to harvest up to one percent of the northern sablefish allocation with fixed gear. Vessels

could receive the designation mid-year, as soon as they met the landings requirement, and the designation would last for the remainder of that year and the entirety of the following year. To qualify a vessel would have to use trawl gear to land at least six catch share landings that meet at least one of the two qualifying criteria:

- a. In the area north of 40° 10' N. lat., 18,000 lbs of any IFQ species
- b. In the area between 36° N. lat. and 40° 10' N. lat., 9,000 lbs of any IFQ species.

One question that arose during the October SaMTAAC meeting was whether to base the qualifying landings off the area of catch or port of landing. Trips were assigned based on a unique VESSEL\_NUM and landing date from fish tickets extracted from PacFIN's Comprehensive Fish Ticket table. The IFQ management area from the fish ticket was used to determine the area of catch and IOPAC port groups were used to determine area of landing.

The following tables (Table 37 and Table 38) show the number of vessels that would have met the qualifying requirements in each year with some combination of the trip criteria above via catch area or port of landing. As mentioned, the active trawl designation would apply for the remainder of the year (after they met the criteria) and the entirety of the following year. In addition, both tables show the number of vessels that had trips that met the poundage minimum (i.e. 18,000 lbs north of 40° 10' N. lat. or 9,000 lbs between 36° N. lat. and 40° 10' N. lat.) but did not meet the six trip minimum (3<sup>rd</sup> column). The far-right column shows the total number of trawl vessels with any IFQ landings north of 36° N. lat. As shown, the majority of trawling vessels that have caught or landed IFQ species north of 36° N. lat. would qualify for the active trawler designation. In recent years (2017-2018), 85 percent of trawl vessels north of 36° N. lat. would have qualified for an active trawler designation based on either area of catch or port.

From a management perspective, area of catch rather than port of landing is typically used to manage catch against harvest specifications and allocations for commercial landings. On each electronic fish ticket that is submitted, the IFQ catch area (N of 40° 10' N. lat., 36° N. lat. to 40° 10' N. lat., 34° 27' N. lat. to 36° N. lat., and S of 36° N. lat.) is recorded by the buyer. If multiple IFQ catch areas are fished, there is an option to portion out the amount of fish taken by IFQ management area.

Table 37: Number of vessels that would qualify for an active trawler exemption by meeting landing criteria for the indicated year **based on catch area**, the number of IFQ vessels that had trips with landings that meet the minimum poundage requirement (but not the requisite number of trips), and the number of trawl IFQ vessels with landings from north of 36° N. lat.

Year	Number of Qualifying Vessels	Number of Vessels with trawl IFQ landings N of 36° N. lat. with trips meeting poundage minimum (but not the number of trips)	Number of Vessels with trawl IFQ landings N of 36° N. lat. (no minimum landing or number of trips)
2011	70	79	86
2012	67	78	83
2013	69	78	84
2014	61	73	80
2015	57	69	75
2016	60	71	74
2017	68	77	80
2018	68	77	80

Internal Reference: 8 Alternative Analysis

Table 38: Number of vessels that would qualify for an active trawler exemption by meeting landing criteria for the indicated year **based on port of landing**, the number of IFQ vessels that had trips with landings that meet the minimum poundage requirement (but not the requisite number of trips), and the number of trawl IFQ vessels with landings from north of 36° N. lat.

Year	Number of Qualifying Vessels	Number of Vessels with trawl IFQ landings N of 36° N. lat. with trips meeting poundage minimum (but not the number of trips)	Number of Vessels with trawl IFQ landings N of 36 (no minimum landing or number of trips)
2011	71	79	86
2012	68	78	83
2013	70	78	84
2014	62	73	80
2015	58	69	75
2016	61	71	74
2017	68	77	80
2018	69	77	80

Internal Reference: 8 Alternative Analysis

As described above, if a vessel receives an active trawler designation, they would be allowed to harvest up to one percent of its northern sablefish QPs with fixed gear. As a reminder, only ten vessels between 2011-2018 have historically used fixed gear and trawl gear to harvest sablefish north in the same year with only two gear switching in multiple years. Seven of those ten vessels would have qualified as an active trawler (both under catch area and port of landing) in at least one year between 2011-2018, with three qualifying each year. However, only five have used fixed gear to catch sablefish in the year they would have qualified as an active trawler. Four of the five would have qualified in the previous year and thus have been eligible to gear switch in the entirety of the year in which they did gear switch. Of those five, if the one percent limit of the sablefish allocation were in place in the year that they fished both trawl

and fixed gear, then two vessels would have landed more than the one percent allowance for fixed gear. The two vessels that would have qualified as an active trawler in at least one year but not in the same year in which they gear switched would not have qualified in the previous year either. Both of these vessels gear switched early in the program and then trawled in multiple years later.

As discussed, under the active trawler designation, an active trawler could get the endorsement either from the previous year, or could get it inseason after making the six qualifying landings. The purpose of this provision is to allow vessels that might have been out of the fishery for a reason such as maintenance or some hardship to not have to also forgo an additional year of gear-switching activity. Figure 21 below shows by date the cumulative count of vessels that would have qualified for the active trawl designation each year from 2011-2018 (area assigned using fish ticket catch area). Since 2013, half of the vessels that would have received the active trawler designation in a year would have met the criteria before the end of May. However, there are some vessels that would have not qualified until the end of the year. If those vessels had not qualified as an active trawler in the previous year and desired to engage in gear switching in the current year, then they might have been able to rearrange their fishing to make their six landings earlier in the year.

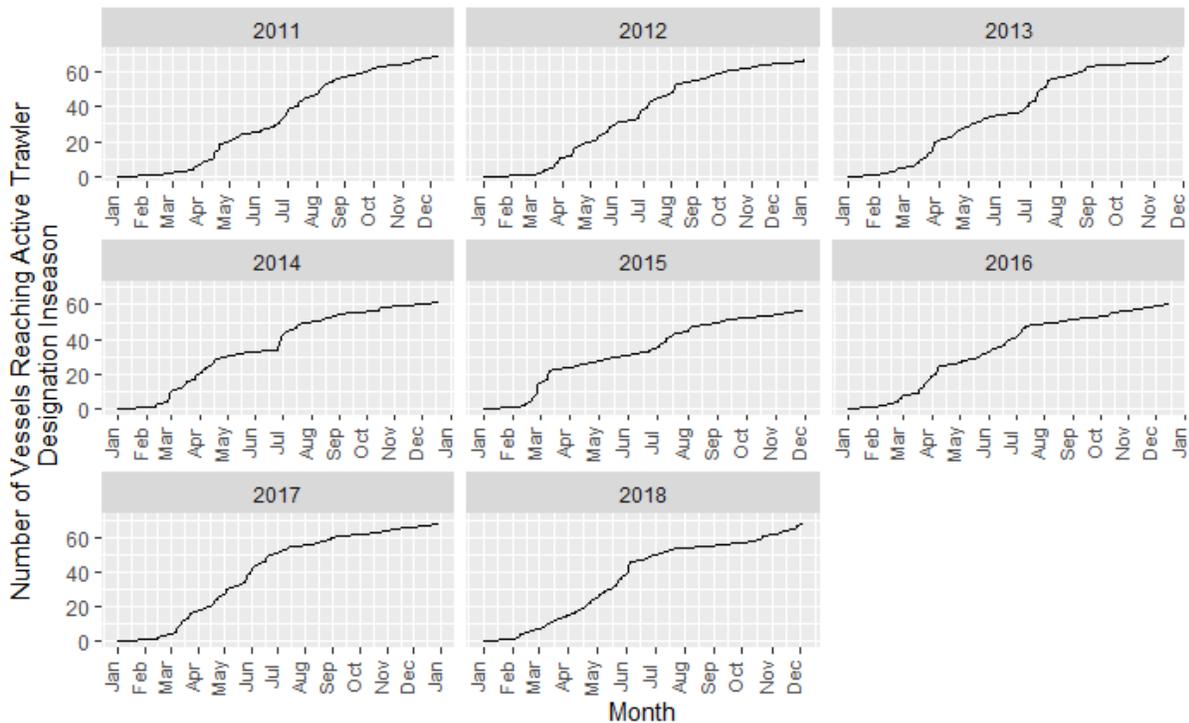


Figure 21. Cumulative count of the number of vessels that would qualify for the active trawler exemption inseason, 2011-2018

Internal Reference: 8 Alternative Analysis

A closer look at the requirements needed to meet the active trawler designation compared to the overall fleet characteristics shows that the majority of trips and trawl caught IFQ pounds are on qualifying trips (i.e. over 18,000 lbs caught north of 40° 10' N. lat. or over 9,000 lbs caught between 36° N. lat. - 40° 10' N. lat.). Figure 22 below shows the number of trawl trips coastwide that would meet either qualifier and the number of resulting pounds of IFQ species landed from those trips (area assigned using fish ticket catch area). In all years, pounds landed on qualifying trips accounted for over 98 percent of the total

trawl IFQ pounds landed. Qualifying trips accounted for 81.2-92.6 percent of all trawl trips in a given year. Note: while there does not appear to be a bar for non-qualifying trip pounds in 2015-2018, there are pounds landed, but the bar is simply too small to see on the scale.

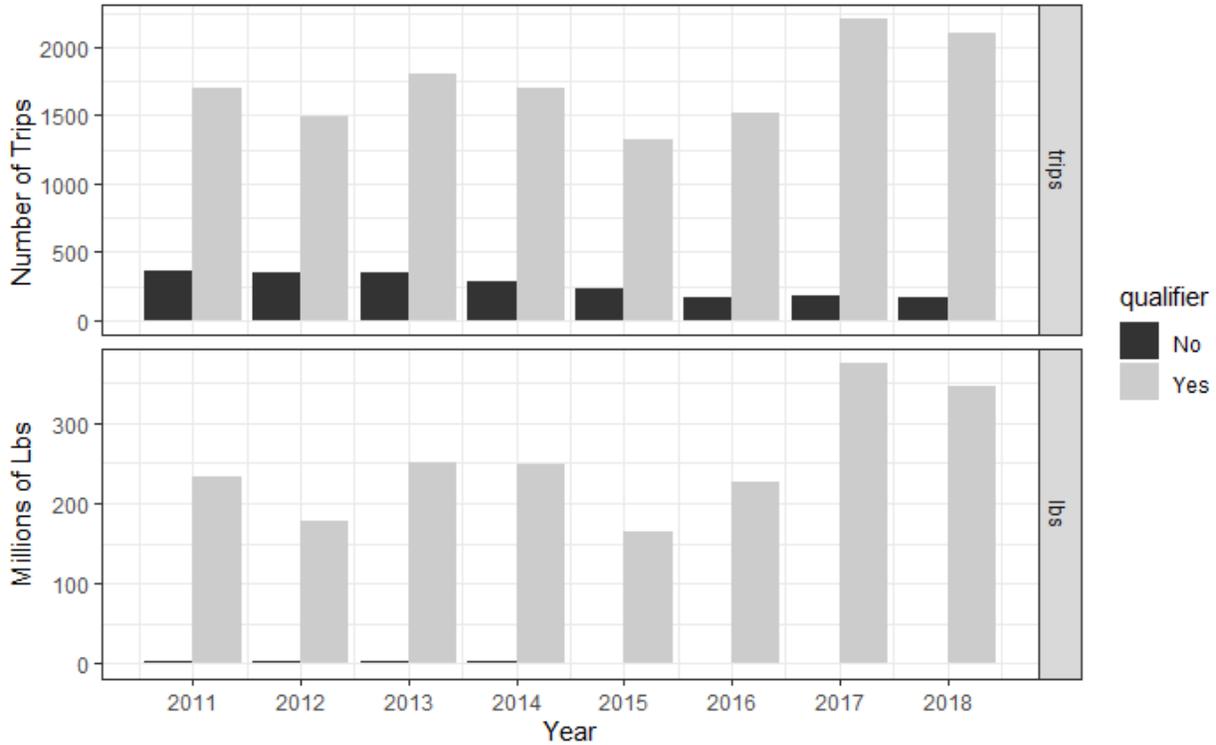


Figure 22. Number of trips (top panel) and pounds (bottom panel) that would qualify or not qualify a vessel for an active trawler requirement, 2011-2018.

Internal Reference: 8 Alternative Analysis

### Active Trawler Exemption

Under Alternative 3, fixed gear vessels could continue to fish fixed gear sablefish by qualifying for an exemption from the active trawler designation. Table 39 below shows the number of vessels that would qualify under each option. To qualify for the exemption, the vessel must have used fixed gear in the trawl catch share program to land a minimum of:

Exempted Vessel Option a: 30,000 lbs of northern sablefish trawl QPs per year in at least three years between January 1, 2011 and September 15, 2017.

Exempted Vessel Option b: 30,000 lbs of northern sablefish trawl QPs per year in at least three years between January 1, 2014 and December 31, 2018.

Exempted Vessel Option c: 30,000 lbs of northern sablefish trawl QPs per year in at least three years between January 1, 2011 and September 15, 2017 or 90,000 lbs cumulatively across three years from 2014 to 2018, with at least one gear-switched landing in each of the three years.

Option b, which would put the most emphasis on more recent years (including post-control date landings), would require a minimum landing of 30,000 lbs in at least three years across 2014-2018 and would qualify the least number of vessels. Nine vessels qualify under all three Options. Two vessels would qualify under both Option a and Option c, but not Option b. Under Option c, which includes Option a but would add an opportunity to qualify based on more recent cumulative catch, one additional vessel would qualify, as compared to Option a.

Under the exemption, fixed gear vessels could take the greater of 0.6 percent of the northern sablefish allocation or the percent of northern sablefish QS the vessel owner has owned as of and since the control date. The far-right hand column in Table 39 shows the resulting percentage that could hypothetically be taken assuming that 0.6 percent of the allocation was the greater amount for all qualifying vessels. Under Alternative 3, there is a “backstop percentage” of 10 percent, which is the greatest amount of the IFQ sablefish N allocation that could be taken with fixed gear. In this case, the 0.6 percent limit would keep the group of exempted vessels under the 10 percent cap. The 0.6 percent value may be adjusted downward if, prior to finalization of this alternative, it appears that landings with fixed gear will be greater than 10 percent. Gear switched landings greater than 10 percent may be possible depending on the amount of QS owned by owners of exempted vessels.

Table 39: Number of vessels that would qualify for an exemption from the active trawler requirement under Options A, B, and C; projected landings (lbs) and percent of 2020 trawl allocation if each vessel lands its historical maximum and average in the qualifying period; total projected attainment of 2020 trawl allocation if each qualifying vessel takes an annual vessel limit (4.5 percent) or maximum limit of 0.6 percent.

Option	Number of Vessels	Projected landings assuming each vessel takes...							
		Max in any year		Average in any active gear switching year		Average (2011-2018)		Annual Vessel Limit	Maximum limit of 0.6%
		Total QPs	Total % of 2020 Trawl Allocation	Total QPs	Total % of 2020 Trawl Allocation	Total QPs	Total % of 2020 Trawl Allocation	Total % of 2020 Trawl Allocation	Total % of 2020 Trawl Allocation
Option a	11	1,959,924	33.72	1,329,164	22.86	1,149,923	19.78	49.5	6.6
Option b	9	1,665,722	28.65	1,191,869	20.5	1,055,971	18.17	40.5	5.4
Option c	12	2,001,063	34.42	1,357,920	23.36	1,164,301	20.03	54.0	7.2

Internal Reference: 8 Alternative Analysis

After identifying the vessels that would qualify for an exemption from the active trawler designation, staff used QS and vessel account ownership data from NMFS West Coast Region to determine if some vessel owners would be able to fish the QS owned as of and since the control date. Based on initial guidance from the SaMTAAC, a 50 percent or greater ownership commonality between the vessel and QS, at any level of ownership aggregation, would allow the vessel to fish an amount of QP up to the percent of northern sablefish QS in the vessel owner's account. For example, consider the following ownership scenario. Corporation A owns 50 percent of a QS account and Individual Z (who does not own any of Corporation A) owns the other 50 percent (left side of Figure 23). If Corporation A owns 50 percent or more of a vessel (Vessel M) that qualifies for an exemption, then the vessel would be eligible to use the northern sablefish QS that has been in Corporation A's QS account continuously since the control date. If that amount is 1 percent, it would qualify to fish the one percent rather than be limited to the 0.6 percent currently proposed under this alternative. If Individual Z owns more than 50 percent or more of a different vessel (Vessel N), the question arises as to whether Vessel M owned by Corporation A and Vessel N owned by Individual Z would both be able to gear switch 1 percent of the northern sablefish QS or would their combined limited be 1 percent. Similarly, if two entities own a qualifying vessel and each also owns a separate QS account, would the northern sablefish in both QS accounts count toward determining the vessel's gear switching limit (right side of Figure 23)?

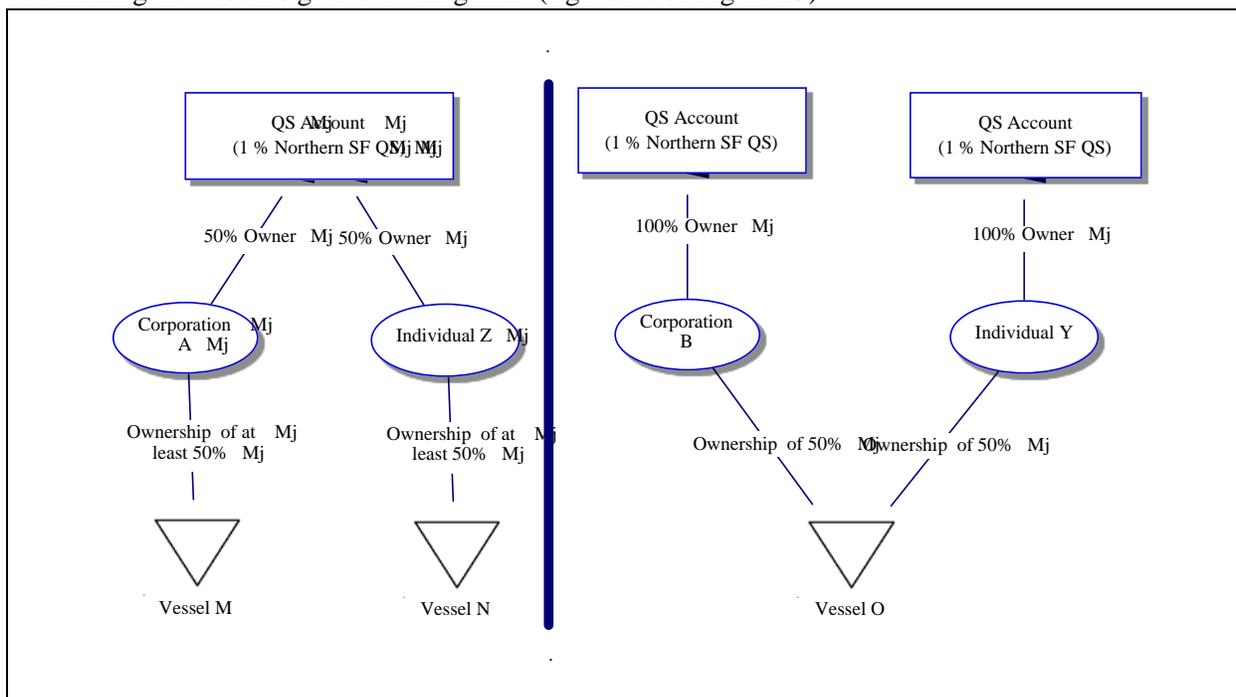


Figure 23. Examples of a single QS account with 50% common ownership with two vessels and one with a single vessel and two QS accounts.

Using 2019 vessel account information for each vessel, under all three options four vessels would qualify to fish the amount of QS owned by the vessel owner for a total of 4.65 percent (Table 40). For those four vessels, there are situation(s) in which vessel owner(s) have acquired more sablefish north QS since the control date and in which the amount of QS owned would not allow the vessel to fish more than the 0.6 percent allowed for all exempted vessels. In addition to these four vessel owners that also own QS, there are also fewer than three vessels that would qualify for the active vessel exemption but whose owners do not own sablefish north QS and therefore would be provided the 0.6 percent minimum gear switching limit for exempted vessels. While it would be possible for a vessel to be associated with more than one

QS account through ownership linkages (greater than 50 percent common ownership between the vessel and a QS account), this situation does not appear to have occurred among the potentially exempted vessels that have thus far been identified. However, the alternative currently does not have any restrictions on when a qualifying vessel is acquired by a QS account owner. Thus, while the northern sablefish QS must be owned continuously since the control date in order for it to be used to set the gear switching limit, the time at which a qualifying vessel is acquired is not currently restricted.

Note that under all options, the projected percent attainment of the 2020 allocation is less than 10 percent, the “backstop” percentage being considered under this alternative. Option c is projected to have the highest projected attainment as it has the greatest number of vessels qualifying and Option b is the lowest.

Table 40: Number of vessels that qualify under each exemption option, number of vessels that could fish own QS, and projected percent attainment of 2020 allocation assuming each vessel took historical maximum, average in active gear switching years, annual vessel limit (4.5%) and the maximum of either the 0.6% limit or the amount of QS owned as of and since the control date (if qualified)

Option	Number of Vessels that qualify under Option	Number of Vessels that would qualify to fish own QS	Projected percent attainment of 2020 allocation if each vessel lands...			
			Max in any year (2011-2018)	Average in any year (2011-2018)	Annual Vessel Limit	Maximum limit of 0.6% or the amount of QS owned
Option a	11	4	33.72	22.86	49.5	8.85
Option b	9	4	28.65	20.50	40.5	7.65
Option c	12	4	34.42	23.36	54.0	9.45

While there would be an impact to the exempted vessels overall with the proposed limit (far right column in Table 40) compared to what these vessels take on average, the impact to each individual vessel would vary. Of the 79 distinct combinations of landing year and exempt vessels fishing IFQ sablefish north (trawl, fixed gear, or both), there are only nine instances where the actual take of fixed gear sablefish was below the proposed limit for the exempted vessel (either 0.6 percent or the QS limit). Six of the 12 vessels who could receive an exemption under at least one of the options would have exceeded the proposed limit (the 0.6 percent limit or the QS based limit applying to the vessel) in each year that they participated in gear switching. Of the remaining six vessels, three had one year of participation where the total would have been covered by the proposed limit while the other three had two years, accounting for all nine instances of harvest below the proposed limit. Overall, there is only one qualifying vessel whose average gear switching activity in active gear switching years between 2011-2018 would be covered by the proposed limit (the 0.6 percent limit or the QS based limit applying to the vessel). All of the other vessels’ averages exceed the proposed limit by 0.32 to 3.4 percent. Based on the 2020 allocation, on a per vessel basis, the proposed limits would result in landings between 18,000 and almost 200,000 pounds lower than the vessel’s average gear switched landings and an associated ex-vessel revenue of between \$51,000 and over \$553,000 lower (using average fixed gear price for sablefish north from 2011-2018).