Analysis of Sablefish Management and Trawl Allocation Attainment Issues

Preliminary Draft
(Incorporates Corrections from May 20, 2019 Errata)

Produced for the May 21-22 2019 SaMTAAC Meeting

May 15, 2019

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1.0 INTRODUCTION AND ORGANIZATION OF THE DOCUMENT

After this introduction, the next section of this document is intended to provide the Sablefish Management and Trawl Allocation Attainment Committee (SaMTAAC) with an overview of the conditions in the fishery with respect to fixed gear utilization of northern sablefish quota and the underutilization of southern sablefish (Section 2.0).[1] The bulk of the analysis is provided in Sections 3.0 through 11.0. Section 12.0 provides some additional alternative-specific analysis. It also relates the alternatives back to information in the bulk of the analysis (which is not currently organized by alternative) directing the reader on where to find particular relevant information. Alternatives are described in a separate document provided to the SaMTAAC at an earlier date.

2.0 CURRENT CONDITIONS: GEAR SWITCHING AND SOUTHERN SABLEFISH QUOTA UTILIZATION

Utilization of the trawl allocation of sablefish coastwide continues to be an issue of concern. In particular, sablefish has been viewed as a harvest constraint for trawlers fishing north of 36° N. lat. while southern sablefish attainment continues to decline.

Table 1 below shows the shorebased Individual Fishing Quota (IFQ) allocations, quota pounds (QP) used and unused, and percent attainment of the allocations for sablefish north and south of 36° N. lat. from 2011-2018. QPs used were based on the National Marine Fisheries Service (NMFS) IFQ Vessel Account system and include carryover. As carryover pounds are not accounted for in the shorebased IFQ allocation, but rather just increase the total available pounds, some years exhibit an exceedance of the sablefish north allocation. The Council and NMFS consider the risk to the Acceptable Biological Catch (ABC) and Overfishing Limit (OFL) when considering issuing carryover each year.

Sablefish north QPs are highly utilized with each year seeing at least 90 percent utilization. While 2017 showed the highest attainment at 105 percent, 2018 saw the lowest since the start of the IFQ program at 91 percent (same as 2012). Sablefish south has seen a decline from 2011 from 86 percent down to a record low of 6 percent in 2018. The amount of unharvested sablefish south in 2018 represents about 30.5 percent of the 2018 northern allocation.

[1] A more complete version of this section will also include discussion and data on the under attainment of the trawl allocation of non-sablefish/non-whiting species. However, some information on under attainment is included in Section 6.0.

Table 1. Allocation, QP Utilization, Attainment and Unused QPs for Sablefish North and South of 36 N. lat. (Source: IFQ Vessel Account System)

Area		2011	2012	2013	2014	2015	2016	2017	2018
North	Allocation	5,613,719	5,438,797	4,030,050	4,382,790	4,848,781	5,315,874	5,327,250	5,559,838
	QP Used	5,287,802	4,928,150	4,080,318	4,154,279	4,857,784	5,070,079	5,574,933	5,085,672
	Attainment	94%	91%	101%	95%	100%	95%	105%	91%
	Unused	325,917	510,647	-50,268	228,511	-9,003	245,795	-247,683	474,166
South	Allocation	1,170,390	1,133,352	1,327,800	1,439,839	1,587,064	1,736,140	1,721,369	1,795,445
	QP Used	1,009,286	503,511	200,064	454,542	374,474	447,857	249,530	100,169
	Attainment	86%	44%	15%	32%	24%	26%	14%	6%
	Unused	161,104	629,841	1,127,736	985,297	1,212,590	1,288,283	1,471,839	1,695,276

Looking further into the landings by gear type, Table 2 shows the total mortality for 2011-2017 and landings for 2018 by gear for sablefish north and south and the percent of the allocation taken by that gear. 2011-2017 data is from the Groundfish Expanded Mortality Multi-Year (GEMM) product,[2] based on sector-gear definitions, and 2018 data is from PacFIN. Due to confidentiality, 2018 landings for sablefish south could not be shown by gear type. Fixed gear utilization of the northern allocation has averaged about 30 percent since the beginning of the IFQ program, with 2018 seeing a decline from 2017. Trawl utilization of northern sablefish also saw its lowest rate in the last eight years at 58 percent in 2018. Fixed gear utilization of the southern sablefish allocation continues to dominate total landings.

Overall, the average price per pound of sablefish north in 2018 was at its lowest since the program began with $2.28 for fixed gear caught sablefish and $1.30 for trawl sablefish (Table 3). While the highest prices for both gear types were seen in 2011, the average fixed gear price is $0.70 to $1.13 higher per pound than trawl caught sablefish. Southern sablefish prices were also at the lowest in 2018 at $1.74 a pound, which is almost fifty-cents lower than the IFQ program average for the south. Using the average price per pound for 2011-2018 for southern sablefish, the value of the unutilized southern sablefish in 2018 is approximately $3.9 million in ex-vessel revenue.

[2] https://www.nwfsc.noaa.gov/data/metadata/observer.gemm_fact

Table 2. Total mortality (2011-2017) and landings (2018) by gear and percent utilization for sablefish north and south of 36° N. lat. (Source: GEMM for 2011-2017, PacFIN 2018)

Stock			2011	2012	2013	2014	2015	2016	2017	2018
North	Allocation		5,613,719	5,438,797	4,030,050	4,382,790	4,848,781	5,315,874	5,327,250	5,559,838
	Fixed Gear	Lbs	1,514,167	1,627,973	964,653	1,250,622	1,546,759	1,779,475	1,874,346	1,790,854
		Percent	27%	30%	24%	29%	32%	33%	35%	32%
	Trawl	Lbs	3,737,402	3,245,920	3,084,224	2,843,147	3,228,224	3,180,730	3,610,369	3,212,075
		Percent	67%	60%	77%	65%	67%	60%	68%	58%
South	Allocation		1,170,390	1,133,352	1,327,800	1,439,839	1,587,064	1,736,140	1,721,369	1,795,445
	Fixed Gear	Lbs	951,890	442,276	178,107	422,921	343,090	418,216	243,317	97,009
		Percent	81%	39%	13%	29%	22%	24%	14%	
	Trawl	Lbs	37,535	49,990	13,550	14,844	13,015	10,907	2,212	5.4%
		Percent	3.2%	4.4%	1.0%	1.0%	0.8%	0.6%	0.1%	

Table 3. Average price per lb of sablefish by year.

Area	Gear	2011	2012	2013	2014	2015	2016	2017	2018
North	Fixed gear	3.53	2.49	2.31	2.68	2.74	3.07	3.06	2.28
	Trawl	2.51	1.78	1.59	1.98	2.02	2.05	1.93	1.30
South	All	2.26	2.07	1.96	2.48	2.87	2.21	2.34	1.74

3.0 POTENTIAL BIOLOGICAL IMPLICATIONS OF SHIFTING SOUTHERN ALLOCATION NORTH AND ECONOMIC CONSEQUENCES

Sablefish stock assessment authors have noted that

> Recent sablefish management has relied upon allocations north and south of an arbitrary line at 36°N. Although this does not likely correspond to any meaningful biological boundary, it has led to an increased interest in the fraction of the coast-wide stock that is present to the south of this line. Stewart et al., 2011, p. 61; Johnson et al, 2016, page 62

Concern has also been expressed about the distribution of harvest relative to biomass over a number of latitudinal areas off the West Coast. The alternatives considered here, Alternatives 1 and 2 in particular, have the potential to alter the proportionality between harvest and biomass in various geographic areas. This section first examines existing proportionality then the impact the alternatives might have on proportionality, and finally conservation and socio-economic implications of disproportionality between harvests and biomass.

Using data from 2003-2018, Figure 1 below shows the percentage of biomass estimated from the West Coast Groundfish Bottom Trawl survey ("trawl survey") and commercial landings distribution for all sectors by four biogeographic areas: north of 42° N. lat., 40° 10' N. lat. to 42° N. lat., 36° N. lat. to 40° 10' N. lat., and south of 36° N. lat. As shown, the percentage of total landings north of 42° N. lat. exceed the percentage of biomass surveyed in that area while the opposite is true south of 36° N. lat. Note that survey data only extends to 2017 due to 2018 data not being available at the time of this report. Minor recreational catches are not included in any figures or analyses below. Landings by biogeographic region from 2003-2018 are shown in metric tons in Figure 2. While the proportion of landings to estimated biomass might be higher in the north and lower in the south, landings north of 42° N. lat. only represent about 10.2 percent of the average biomass estimated in the survey while landings south of 36° N. lat. represents less than 2 percent of the average biomass from 2003-2017. However, that does not take into account for movement of the stock along the coast (discussed further below) or potential size differences in removals. There have been previous discussions of how northern sablefish tend to be larger than those landed in the south.

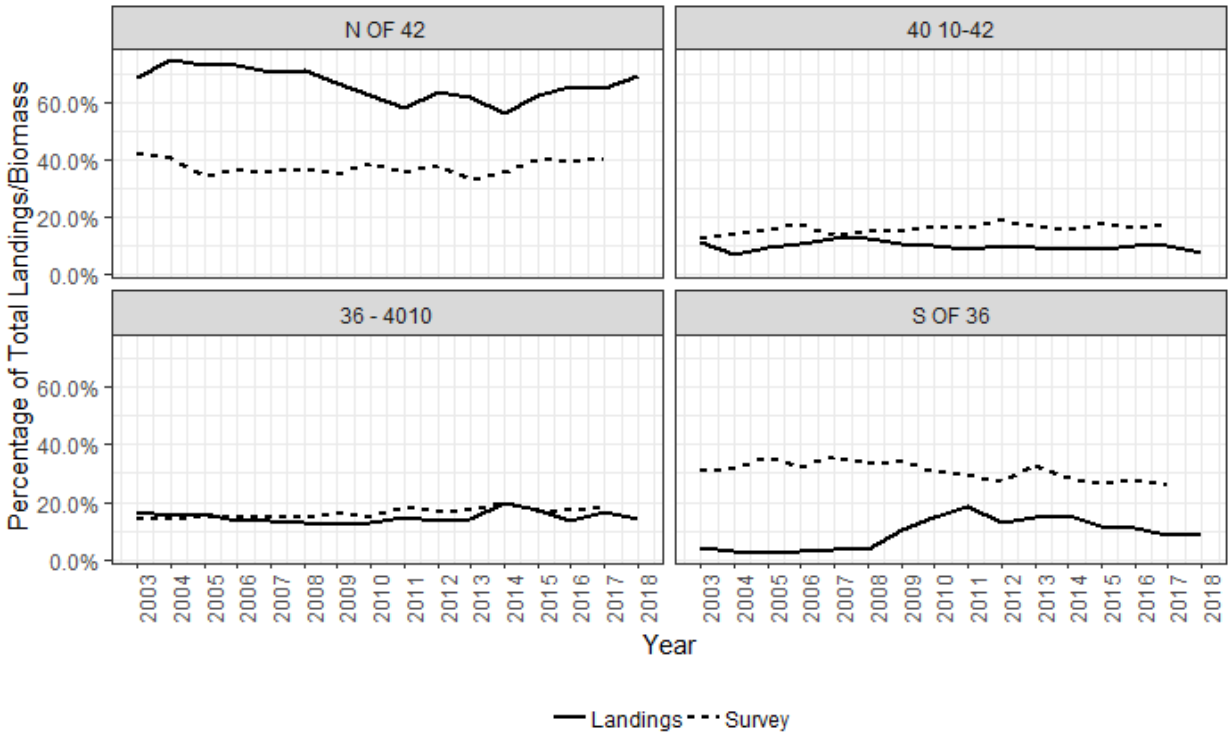


Figure 1. Percentage of total coastwide landings and trawl survey biomass estimates by area, 2003-2018. 46.9 mt of sablefish landings from 2003-2018 had no area identified and is not included. Shoreside landings queried from PacFIN 04/24/2019, At-Sea catch queried from NPAC 04/24/2019. Tribal and non-tribal data included. Minor recreational discards excluded.

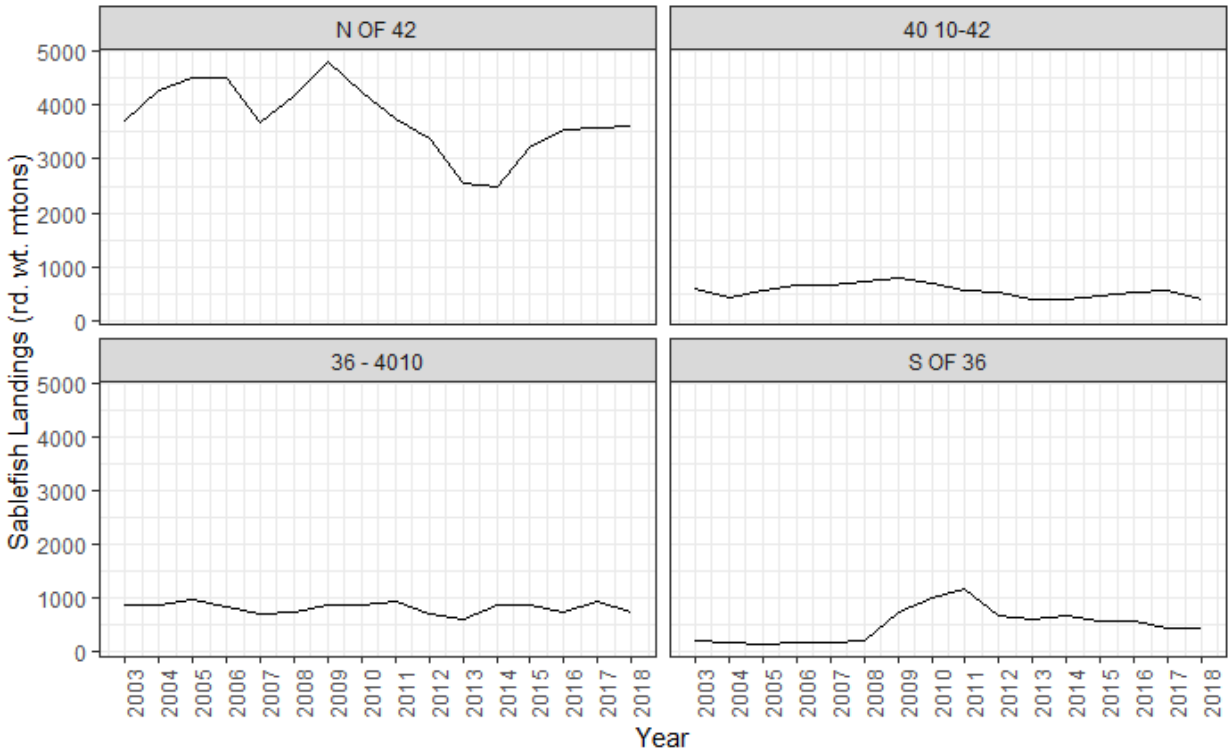


Figure 2. Landings (rd. wt. mt) by area. 46.9 mt of sablefish from 2011-2018 had no area identified and therefore is not included. Shoreside landings queried from PacFIN 4/24/19, At-Sea catch queried from NPAC 4/23/19. Tribal and non-tribal data included.

Landings in each region can further be looked at by sector and gear as shown in Figure 3 and Figure 4. Due to confidentiality, trawl versus fixed gear landings in the IFQ fishery could only be shown for north of 42 N. lat. For landings in the areas off Washington and Oregon, non-IFQ landings, including at-sea bycatch and tribal landings, have typically accounted for a little over 30 percent of the total coastwide landings (between 2,500 and 3,500 rd. wt. mt) and 50 percent of the total landings north of 42 N. lat. Northern California has historically seen more IFQ landings compared to non-IFQ landings, which is the opposite of the area from 36° to 40° 10' N. lat. South of 36° N. lat., non-IFQ landings are dominant, with 2018 seeing the lowest proportion of IFQ landings since the start of the program at 0.8% (or 9.5% of the total sablefish landings south of 36 N. lat.).

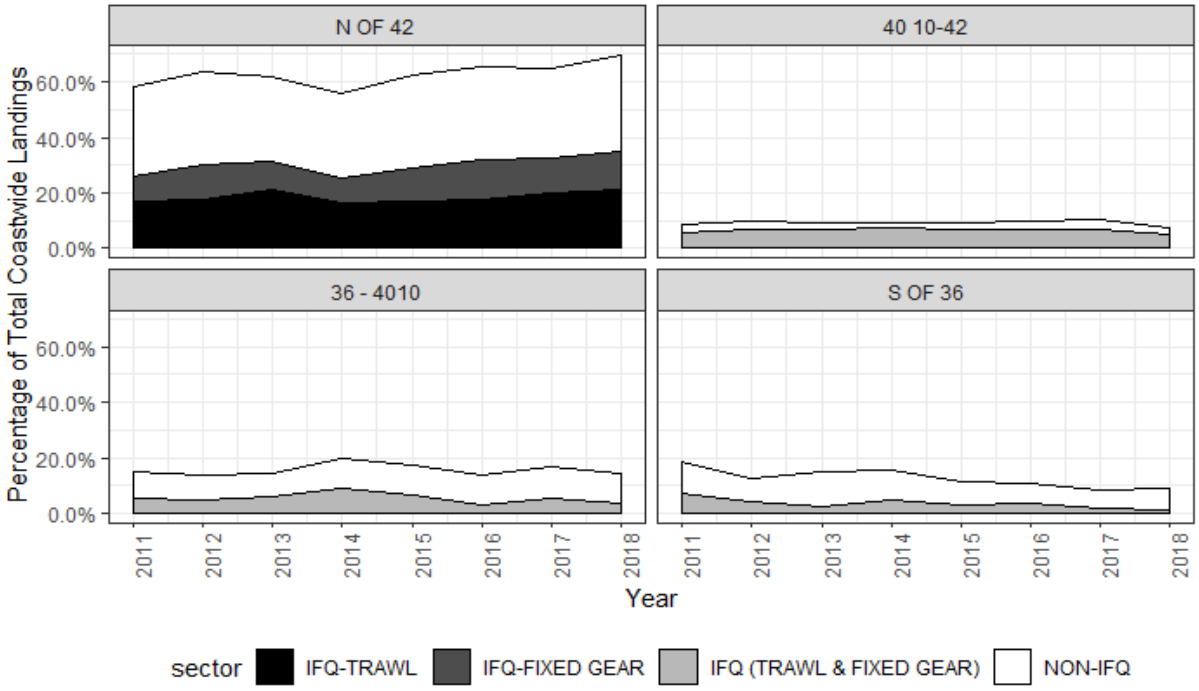


Figure 3. Percentage of coastwide landings by area and sector. 46.9 mt of sablefish from 2011-2018 had no area identified and therefore is not included. Shoreside landings queried from PacFIN 4/23/19, At-Sea catch queried from NPAC 4/24/19. Tribal and non-tribal data included. For all areas except N of 42, values could only be reported at the IFQ sector level, not at the IFQ and gear level due to confidentiality.

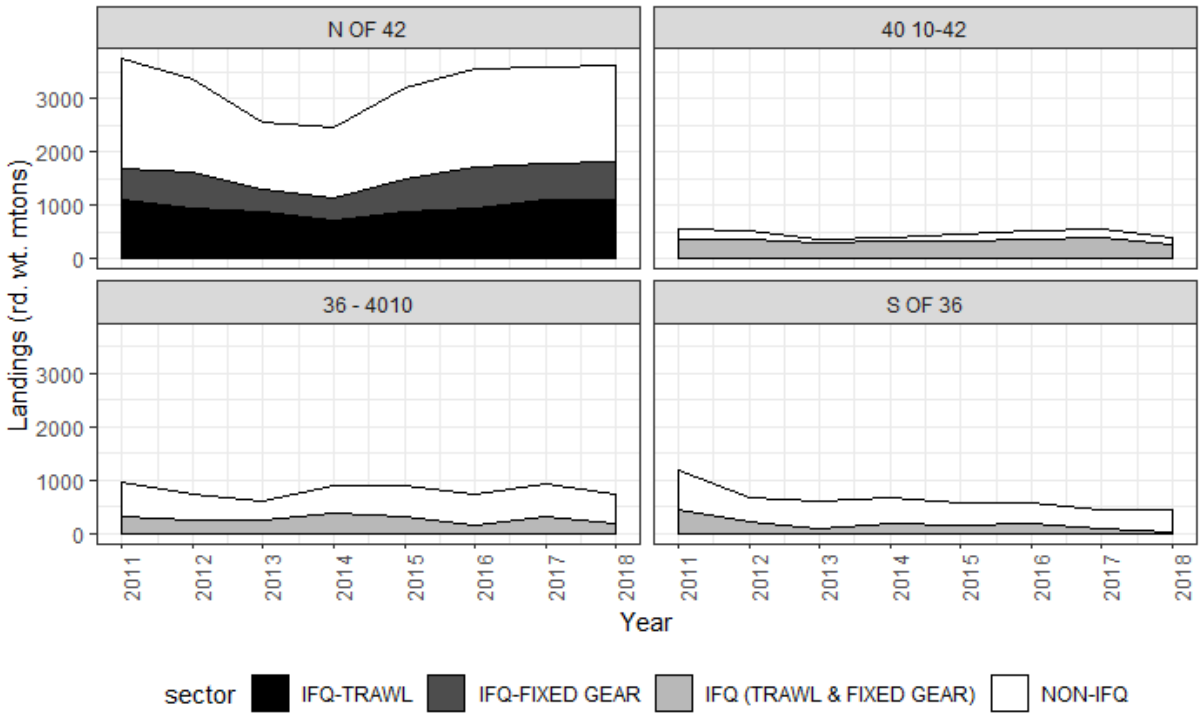


Figure 4. Landings (rd. wt. mt) by area and sector. 46.9 mt of sablefish from 2011-2018 had no area identified and therefore is not included. Shoreside landings queried from PacFIN 4/24/19, At-Sea catch queried from NPAC 4/23/19. Tribal and non-tribal data included. For all areas except N of 42, values could only be reported at the IFQ sector level, not at the IFQ and gear level due to confidentiality.

To provide additional details where confidentiality prevented showing further stratifications, Table 4 below shows the average landings by area and gear in the three areas south of 42° N. lat. for the shorebased IFQ program. Note that between 2011 and2018, only three vessels used fixed gear to catch sablefish between 40° 10' N. lat. and 42° N. lat. Only four vessels have fished trawl sablefish south of 36° N. lat. since the start of the shorebased IFQ program.

Table 4 Average Landings of Sablefish (rd. wt. mt) by area and gear in the Shorebased IFQ program, 2011-2018

Area	Gear	Average Rd. Wt. Mtons	Avg. Proportion of Landings(%)
40° 10' N. lat- 42° N. lat.	Trawl	334.6	14.2
	Fixed Gear	12.5	0.5
36° N. lat- 40° 10' N. lat.	Trawl	185.9	8.1
	Fixed Gear	86.8	3.7
S of 36° N. lat.	Trawl	7.9	0.3
	Fixed Gear	170.8	7.0

The SaMTAAC is considering alternatives would either shift southern quota to the north (Alternative 1) or allow southern quota to be fished up to the Oregon-California border (Alternative 2). Figure 5 and Figure 6 show the retrospective results of shifting 20, 50 or 90 percent of the southern allocation proportionally to the areas north of 36 N lat. from 2011-2018. These shifts were modeled in a manner that accommodated actual landings in each year by assuming an amount of quota would be left in the south equivalent to the actual harvest plus a 10 percent buffer. If the difference between southern sablefish allocation and the actual landings plus the buffer was less than the 20, 50, or 90 percent amount, then the difference between the allocation and the landings+buffer amount in that year was moved. If the difference amount was greater, then the percentage amount (20, 50, 90 percent of IFQ allocation) was moved. Figure 5 shows that regardless of the shift, there is no discernable differences in the overall proportion of landings coastwide. However, looking at a zoomed in version of the projected landings (Figure 6), the potential landings north of 42° N. lat. for the 90 percent shift scenario could have been almost 500 mt. Under Alternative 2, the maximum shift from the southern IFQ allocation is 50 percent and it could only be landed up to the Oregon-California border. Figure 7 and Figure 8 show the hypothetical proportion that would have been taken retrospectively if Alternative 2 was in place from 2011-2018. In 2018, under the 50 percent shift, it could have resulted in an additional ~500 mt of sablefish landed in California. Under Alternative 2, north of 42° N. landings remained status quo; however, there could be resulting movement of quota increasing potential harvest north of the California-Oregon border under this alternative.

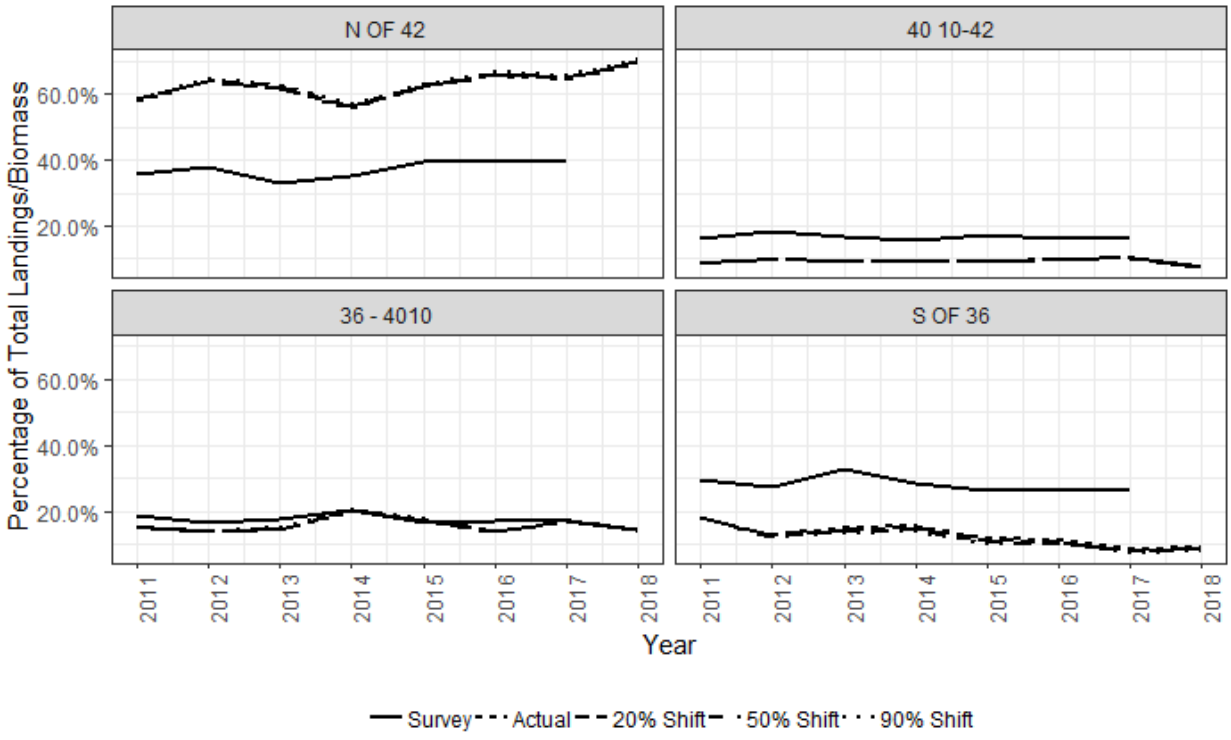


Figure 5. Reproduction of Figure 4 under Alternative 1 retrospective scenarios assuming 20, 50, and 90 percent shift in quota from south to north and proportional harvest by area.

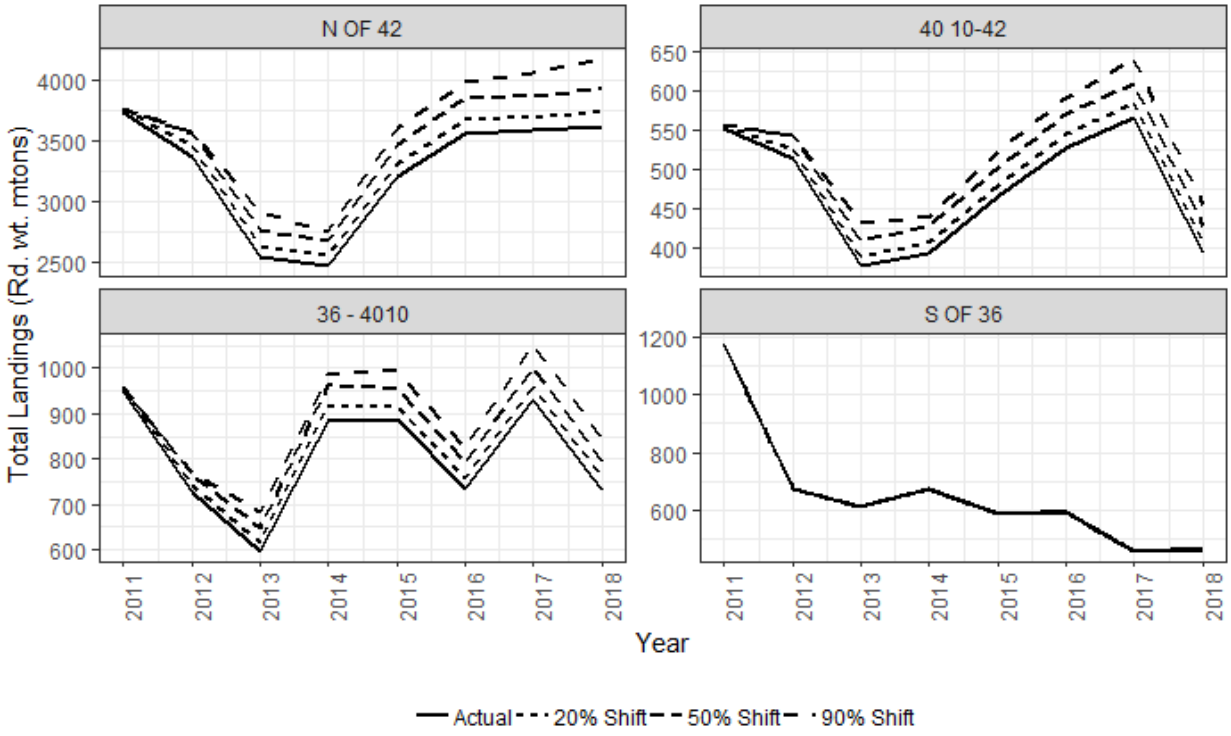


Figure 6. Alternative 1 retrospective harvest in rd. wt. mtons. assuming 20, 50, and 90 percent shifts in quota from the south to north and proportional harvest by area.

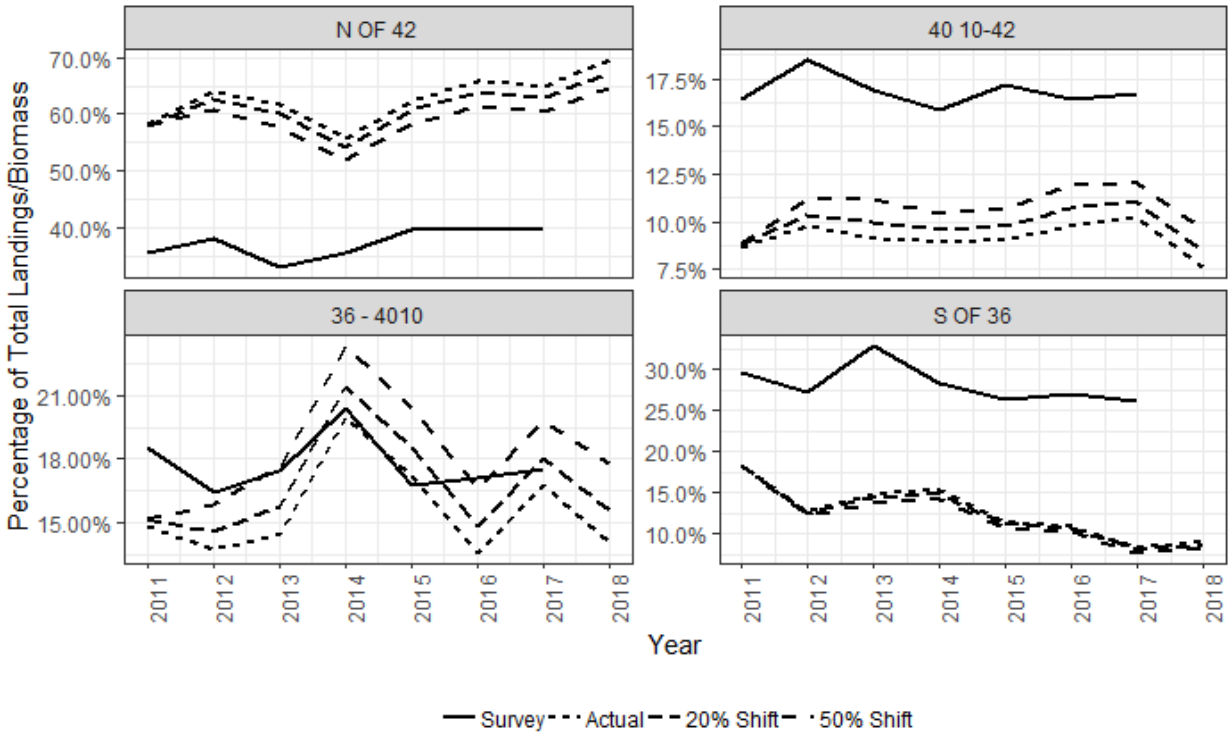


Figure 7. Reproduction of Figure 4 under Alternative 2 retrospective scenarios assuming 20 and 50 percent shift in quota from southern CA to northern CA and proportional harvest by area. No changes to north of 42° N. lat.

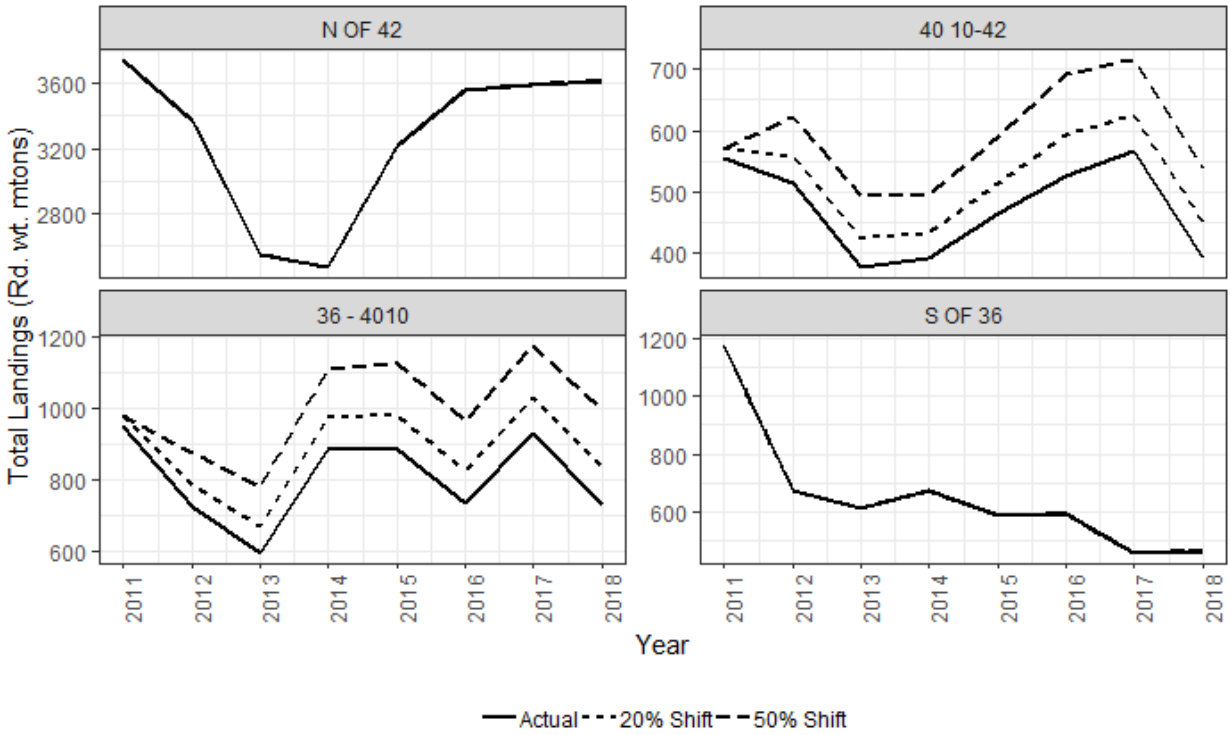


Figure 8. Alternative 2 retrospective harvest in rd. wt. mtons. assuming 20 and 50 percent shifts in quota from the southern CA to northern CA and proportional harvest by area. No changes to north of 42° N. lat.

The above discussion indicates the degree to which harvest in a particular area may become disproportionate to the biomass in an area. When such a disproportionality occurs, there are at least two impacts that may be of concern, the first relates to conservation and the second to socio-economic issues. For a species that does not move much, harvest that is disproportionate to biomass can result in areas of localized depletion that adversely impact stock productivity. Under such circumstances, it would be ideal for the proportion of catch in an area to be in approximately the same proportion as the proportion of biomass in the area (Haltuch, October 2018 report to the SaMTAAC).

There are at least three indications that sablefish may be mobile over their life span. First, tag recovers indicate that sablefish are capable of being highly mobile. However, there is not much data on sablefish movement within the California Current, such that present understanding of sablefish movement in the California Current area is limited. Second, genetic information indicates that there is a single stock of sablefish that runs from the Baja Peninsula to the Bering Sea. (Note: Requests have been made for summaries of available data on tag recoveries and information that indicates the probability that the stock is or is not a single unit. Some data on tag recovers for the West Coast will be available as part of the upcoming stock assessment and included here as it becomes available.) Finally, sablefish spawn in the deepwater of the continental slope where the larvae are dispersed by strong lateral currents that run parallel to the coast such that biomass in one area contributes to recruitment in another area (CITE). To the degree that adult sablefish are mobile, any misalignment between the spatial distribution of the stock and catch maybe of lesser concern as fish could move into areas that have been more heavily fished.

However, even if sablefish are mobile, there may still be localized socio-economic impacts of concern. With respect to the health of a stock, localized depletion events of concern are those that reduce stock productivity. On the other hand, after fishing has occurred in an area there may be a local reduction in CPUE that has economic effects but which stock assessment scientists would not consider localized depletion because there are no adverse stock level impacts. If adult members of a population are mobile but it takes several weeks or months for stock concentrations in a geographic area to recover after the area has been fished, then short-term depletions from fishing may still be of socio-economic concern. This possibility became evident during 2016 catch share program review hearings in which open access fishermen in the south expressed concern about reduced CPUE that lasted for many weeks after IFQ vessels had fished in an area. If the genetic homogeneity of the sablefish stock is due more to larval distribution (mobility in the larval phase) than movement of adults, it may be more likely that there will be socio-economic impacts from short-term depletions, as compared to a situation where movement of adults was responsible for maintaining the stock as a single genetic unit.

Given that there may be uncertainty regarding actual mobility of sablefish, it is worth considering what would happen if a policy were implemented that increased the proportion of removals in an area relative to the proportion of biomass in the area. The questions might be first, what would indicate that localized depletion is creating a conservation issue; second, what

are the policy response options; third, how long might it take to reverse any adverse impacts? A similar set of questions should be considered with respect to reductions of CPUE and socio-economic impacts. For example, a large number of factors might cause CPUE to fluctuate but what size and duration of fluctuation in the context of what ecosystem and oceanographic conditions might indicate that a new policy was having an adverse impact. To avoid wrongly attributing a diminished CPUE to a new policy it might be good to look at historic fluctuation of CPUE relative to indicators of stock biomass in an area.

4.0 POTENTIAL BIOLOGICAL IMPLICATIONS OF CHANGING GEARS USED TO CATCH SABLEFISH

An analysis of the impacts of gear switching was developed in 2011 which needs to be updated, reviewed, and finalized. The opportunity for this update will not occur until after work on the current sablefish stock assessment is completed. The 2011 analysis provided two projections to compare with status quo assumptions.

1) assigning all trawl allocation to the hook-and-line fleet beginning in 2013; and therefore reflecting that fleet's selectivity and retention curves.
2) assigning all trawl allocation to the pot fleet beginning in 2013; and therefore reflecting that fleet's selectivity and retention curves

The preliminary conclusion was that "Given base case ACLs and gear switching within those fixed catch levels, the projected stock trend shows similar levels of decline to the base case and slightly less rapid subsequent recovery."

5.0 TRAWL STRATEGIES IN WHICH SABLEFISH IS HARVESTED

In order to assess the degree to which northern sablefish might constrain trawl harvest of co-occurring species, information is needed on the strategies that might be constrained by a shortage of sablefish QP. The following sets of analyses look at the overall amount of sablefish north of 36 N. lat. taken by target strategy, the composition of sablefish to the rest of the species, and the ex-vessel revenue generated by each target trip type.

5.1 Sablefish Taken By Strategy

Two data sets were used to compare targeting in non-whiting trawl trips: PacFIN fish tickets from 2011-2018, with trips defined by unique vessel number and landing date in Dahl sector 04 (non-whiting trawl), and WCGOP observer data from 2011-2017.

5.1.1 PacFIN analysis

Targeted non-sablefish species were determined by proportion of the target species compared to the total non-sablefish landings in that trip. For example, if a trip had greater than 50 percent of the total non-sablefish landings as dover sole or thornyheads, it was labeled as a "DTS [dover sole, thornyhead, and sablefish] targeted trip". For some years and target groups, there were not enough vessels or dealers to meet the "rule of three" for confidentiality. Additionally, some

scoped target types like midwater trawl and slope rockfish, did not have enough sablefish to show up visibly on the graph. Therefore, all of these trips were grouped into "other".

Of the IFQ non-whiting trawl trips that landed sablefish from 2011-2018, the vast majority targeted the DTS complex with 49-67 percent of trips (average of 56.5 percent) in each year targeting the DTS complex. Figure 9 landings show the amount of sablefish landed on each type of trip type over 2011-2018. As shown, the DTS strategy represents the vast majority of the sablefish landings overall.

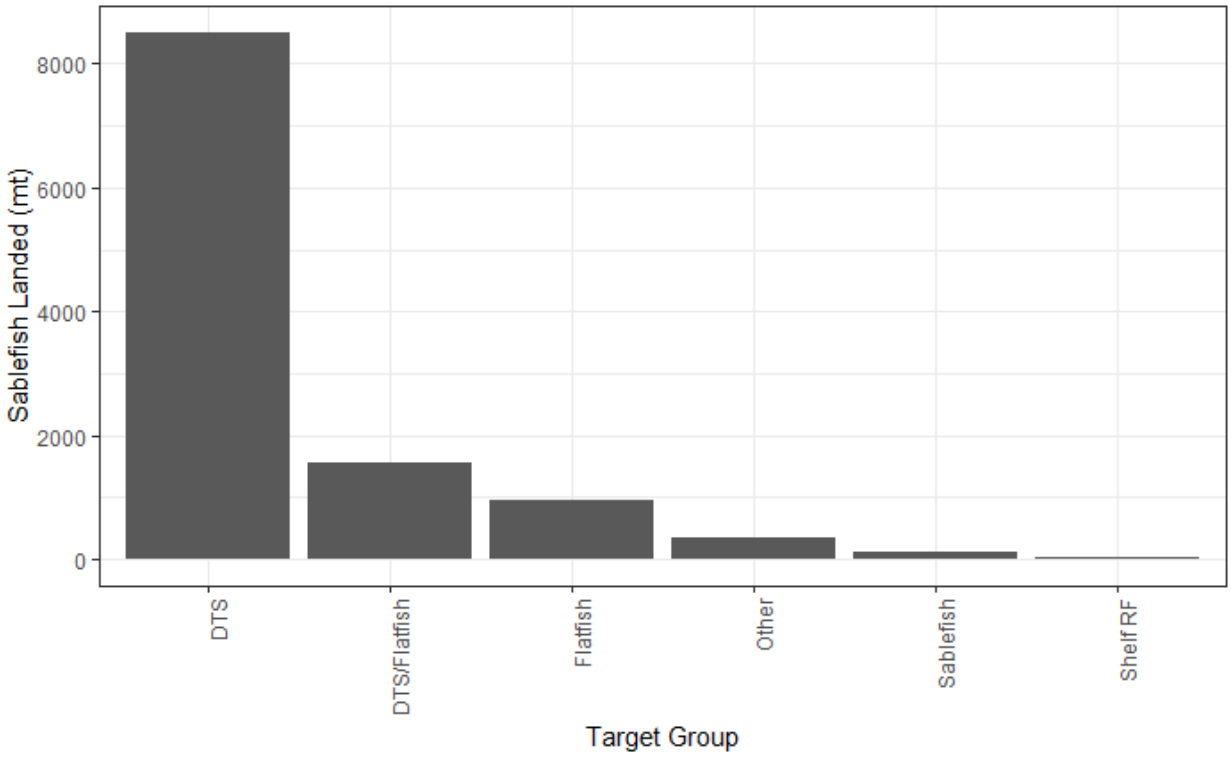


Figure 9. Total Sablefish Landings (rd. wt. mt) by target group determined by PacFIN analysis, 2011-2018

5.1.2 WCGOP Analysis

To provide a complementary analysis to the one above and to account for total mortality, WCGOP haul level data was examined to determine target strategy. Using the "TARGET" field in the WCGOP haul level data from hauls that contained sablefish (minimum of one pound from expanded weights) and an average latitude greater than 36° N. lat., from 2011-2017, the majority of trips again declared "DTS" as the target species. Figure 10 below shows the total sablefish (mt) taken (discarded and retained) by target from 2011-2017.

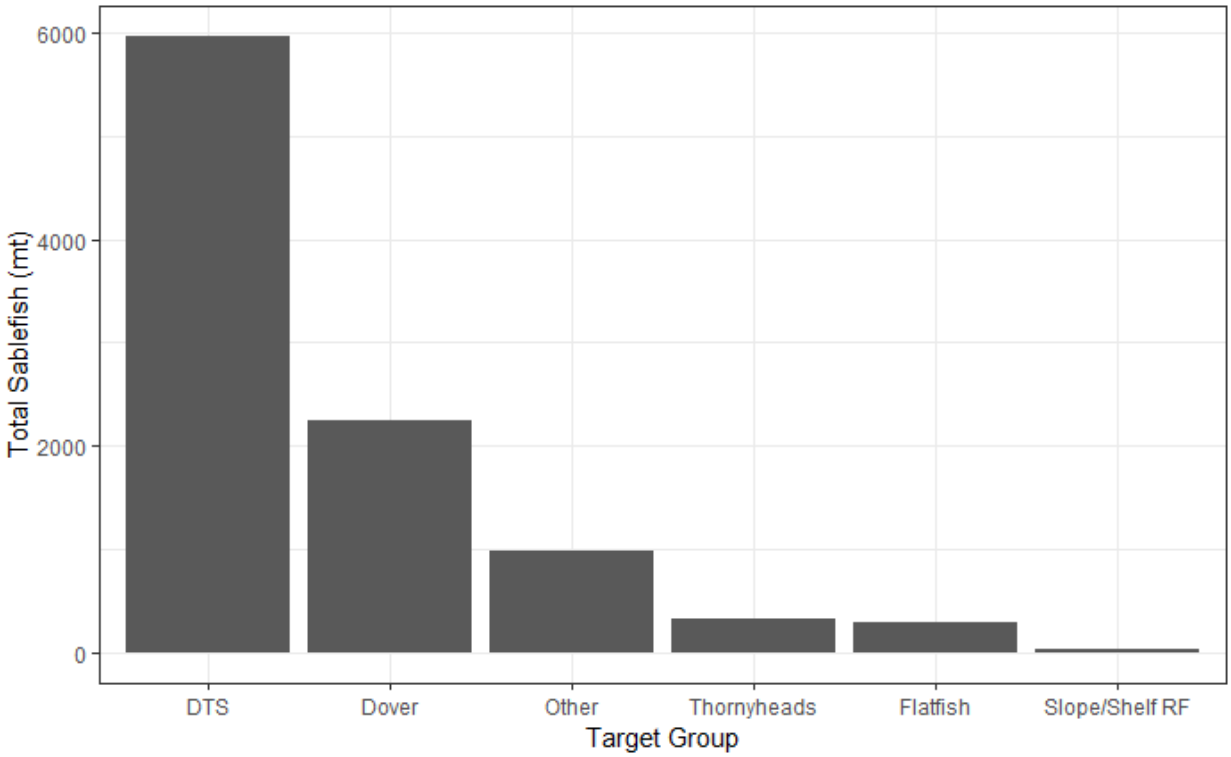


Figure 10. Total Sablefish Landings (rd. wt. mt) by target group determined by WCGOP haul level data, 2011-2017

Overall, both data sets show that the DTS strategy is the primary strategy in which sablefish is used. Looking further into the amount of sablefish used to prosecute these target strategies, Figure 11 shows the percentage of sablefish that makes up the total landings by target trip type. While the most amount of sablefish is taken on DTS trips in total, sablefish actually comprises only about 9-12 percent of the total landings within that target strategy.

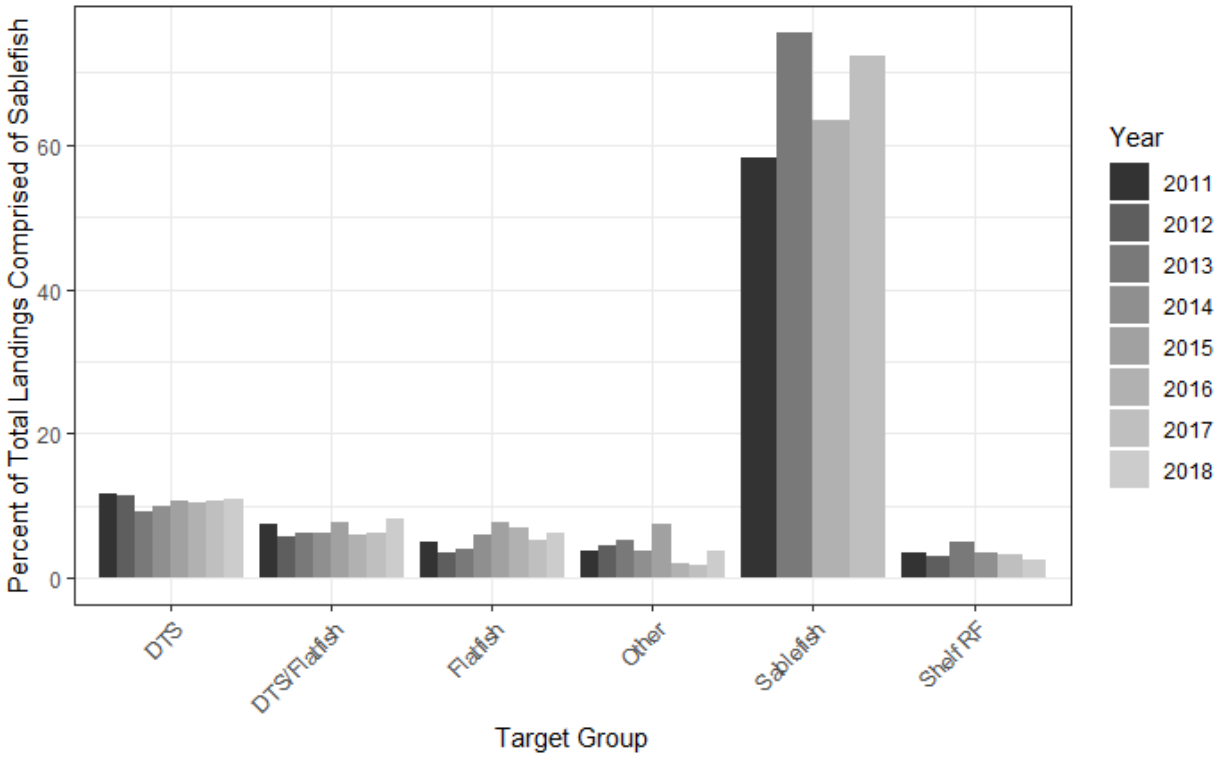


Figure 11. Proportion of Total Landings Comprised of Sablefish by Trip Type

The Five Year Review looked at the catch ratios of Dover sole and thornyheads to sablefish and used the ratios pre-catch shares and post-catch shares (2011-2014) to determine the hypothetical amount and utilization of the three species if all sablefish were to be taken with trawl gear (PFMC and NMFS. 2017) Lisa Pfeiffer with the Northwest Fisheries Science Center updated that analysis with 2016-2017 WCGOP observer program data. Figure 12 below shows the ratio of dover sole to sablefish catch from 2011-2017. Since 2015, when the Dover sole ACL increased to 50,000 mt, the catch ratio has averaged 4.65:1 compared to the 4.95:1 discussed in the five-year review document (average of 2011-2015). Assuming the more recent average catch ratio, it would take 21,799,308 lbs of sablefish (9,888 mt) to take the entirety of the shorebased IFQ allocation. That is almost 4x the amount of the shorebased IFQ allocation for sablefish north of 36° N. lat.

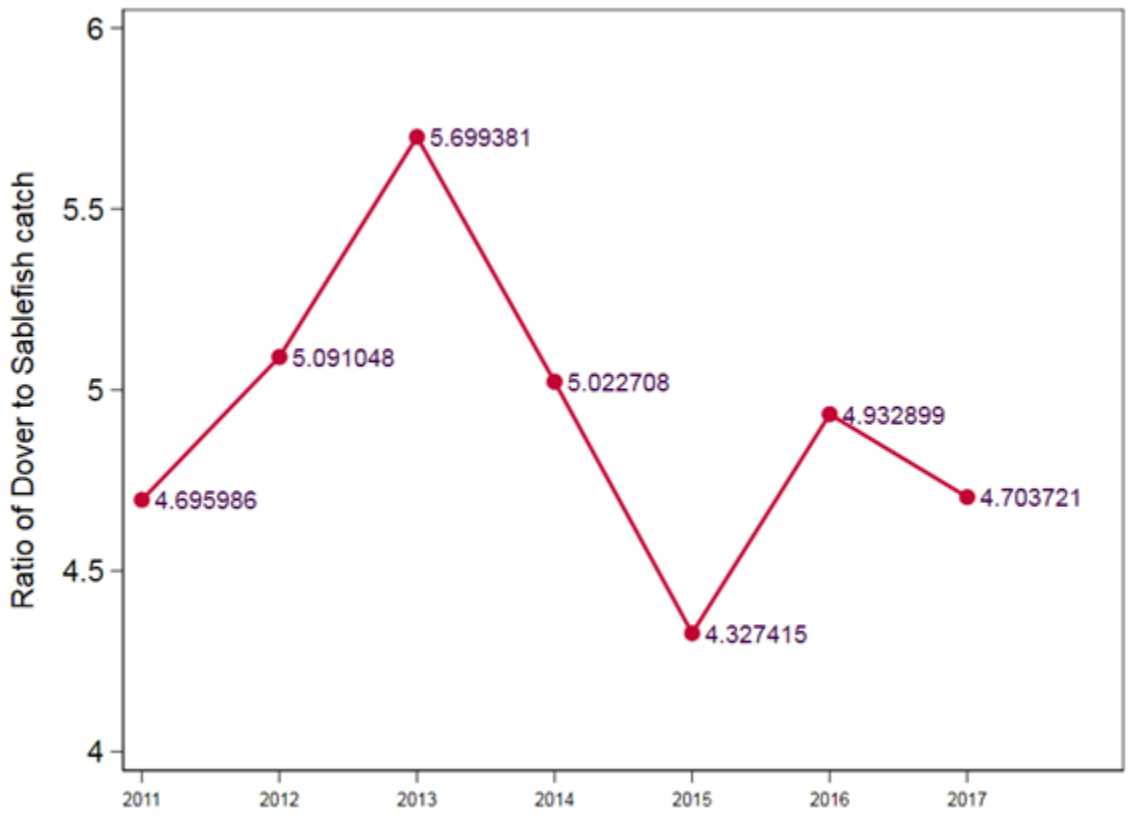


Figure 12. Ratio of Dover to sablefish north catch on WCGOP hauls, 2011-2017

Looking at the potential utilization of Dover sole, longspine thornyhead, and shortspine thornyhead if all sablefish were caught with trawl gear, Table 5 shows the comparison between the five year review document and the updated analysis. The actual utilization for all three species has increased from 2015 to 2017. Note that the "hypothetical" column is noted as the lower bound in the five year review document and applies the catch shares era catch rate to the 2015 or 2015-2017 shorebased IFQ allocations. The "upper bound" was not provided here as it used pre-catch shares catch rates which are not reflective of the current era and are unrealistic in terms of hypothetical utilization projections.

Table 5: Actual vs. Hypothetical (based on catch shares era data) Utilization of Dover sole and longspine and shortspine thornyheads north of 34° 27’ N. lat. for 2015 and 2015-2017

Species	Catch Shares Document (2015)		Updated Analysis (2015-2017)	
	Actual Utilization	Hypothetical	Actual Utilization	Hypothetical
Dover sole	13.1	16.2	15.0	17.9
Longspine Thornyhead	23	31.6	25.6	37.5
Shortspine Thornyhead	41.5	48.6	45.6	54.4

5.2 Revenue by Target Type

Using the PacFIN defined target trips from above, Figure 13 shows the ex-vessel revenue in $1000s by year and target type. Even though sablefish contributes only 9-12 percent of the total landings, the DTS strategy overwhelmingly provides the most ex-vessel revenue amongst these trip types. Ex-vessel revenue ranged from a low of approximately $12 million in 2018 to a high of $16.1 million in 2011 . DTS trips with flatfish and flatfish targeted trips together provide the second most amount of revenue ranging from approximately $5.2-9.3 million.

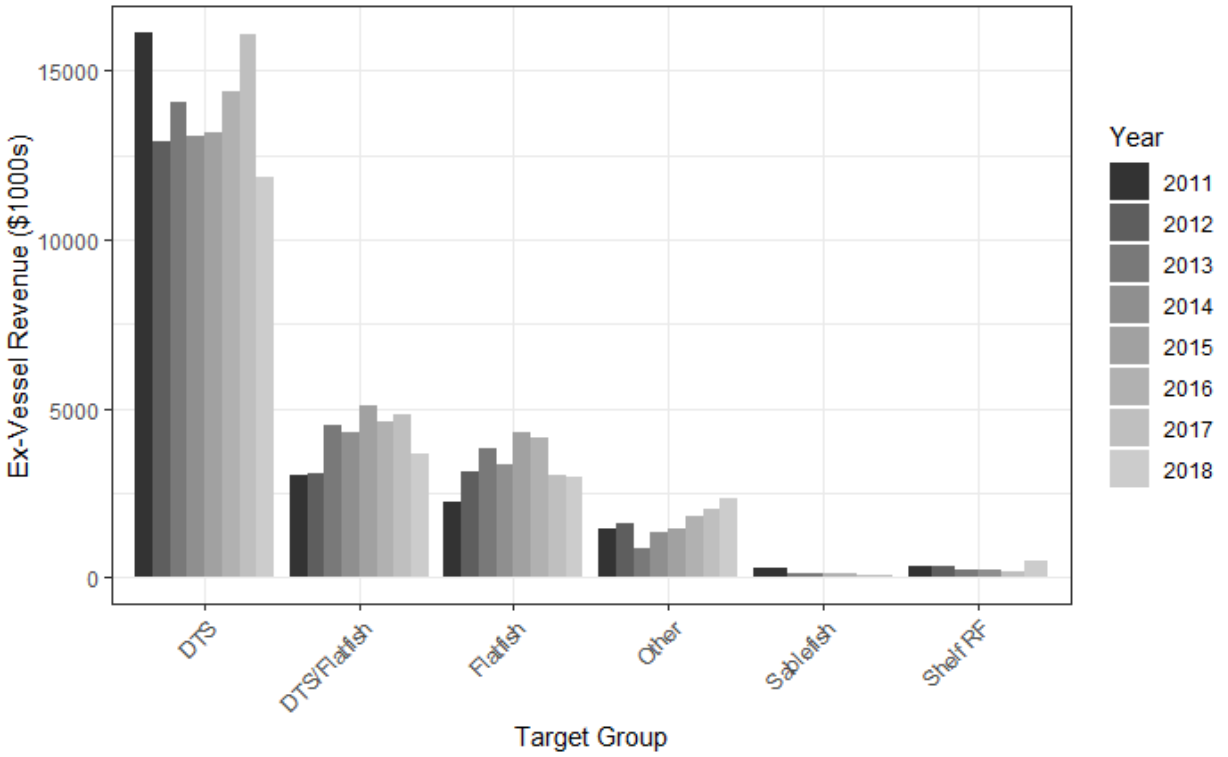


Figure 13. Total Ex-Vessel Revenue by Trip Target Type, 2011-2018

Within those trips, sablefish can account for a varying degree of the total revenue. For DTS trips, sablefish accounted for approximately 25-44 percent of the total ex-vessel revenue, with 2018 seeing 25.5 percent. Sablefish accounted for the lowest contribution to overall ex-vessel revenue for shelf rockfish and other target strategies.

6.0 SPECIES CAUGHT DURING GEAR SWITCHING

While sablefish has been the species of primary focus when considering gear switching limitations, there was interest in looking into other species that are commonly caught with fixed gear in the IFQ sector. That is, would gear switching limitations only apply to sablefish or all species? Additionally, should any qualification requirements in determining gear switching allowances include deliveries of all species or just sablefish? The following data show the degree to which non-sablefish are taken in gear-switching operations.

Of the IFQ fixed gear landings from 2011-2018 (defined by Dahl Groundfish Code==”20”), non-sablefish groundfish landings accounted for only a small proportion of the yearly gear switched landings of groundfish (Table 6). Across the seven years, it appears that only seven vessels had a strategy of targeting non-sablefish with fixed gear in the IFQ program. In other words, looking at yearly totals by vessels using IFQ fixed gear, only seven vessels had one or more years where the total of fixed gear caught non-sablefish groundfish was greater than their total sablefish landings with fixed gear.

Table 6. Non-sablefish landings by fixed gear in the shorebased IFQ fishery, 2011-2018

Year	Non-Sablefish Landings (rd. wt. mtons)	Non-Sablefish Landings (as percent of total gear switched landings)	Sablefish Landings (rd. wt. mtons)	Number of Gear Switching Vessels
2011	38.80	3.4%	1112.58	26
2012	47.09	4.8%	934.46	25
2013	34.52	6.3%	516.07	19
2014	25.18	3.2%	756.54	22
2015	29.50	3.3%	852.99	18
2016	36.87	3.6%	988.44	20
2017	26.98	2.8%	949.11	19
2018	46.26	5.1%	856.04	17

Looking further at the data, there were only 70 trips using fixed gear in the IFQ sector (defined by unique landing date and vessel number) taken by 18 vessels where landings consisted of less than 50 percent sablefish (Table 7).

Table 7. Trips and vessels targeting species other than sablefish by fixed gear, 2011-2018

Group	Trips	Vessels
No Sablefish	50	9
0-25% Sablefish	9	8
26-50% Sablefish	11	6

Shortspine thornyhead was the most targeted species, with 32 of the 70 trips landing 50 percent or more of the species. Other targeted species included blackgill, vermilion, and chilipepper rockfish.

Overall, the decision of whether to include other species in determining the level of gear switching participation for certain alternatives may be more important to a few select vessels rather than the fleet as a whole. For instance, if the number of years is used as a criteria, it could result in a vessel qualifying for an exemption or the addition of non-sablefish landings could put certain vessels into the qualifying pool in terms of total gear switched landings.

Additionally, fish tickets indicate there are some vessels with no gear switched sablefish landings but have fixed gear landings of other species. Table 8 shows that there were three vessels making only non-sablefish gear switching landings. The 2011-2018 total revenue by these vessels was $7,476 (not adjusted for inflation) and their average number of years of participation as a gear switcher was 1.67.

Table 8. Number of Gear Switching Vessels, Sablefish only versus all groundfish, 2011-2018

	Unique Vessel Counts (2011-2018)	
Type of Fishing	Sablefish N or S Only	All Groundfish
Fixed Gear IFQ	50	53

7.0 HISTORIC PATTERNS OF GEAR-SWITCHING

7.1 Northern Sablefish

Figure 14 below shows the cumulative catch of sablefish north in the shorebased IFQ fishery by gear type over the course of each year from 2011-2018. Typically, trawl catches of sablefish tend to increase gradually throughout the year while fixed gear landings may not start until late spring and then see a large increase in September and October. Members of the fixed gear fleet also participate in Alaska fisheries over the summer and some may have primary tier permits that they may fish prior to fishing IFQ. Figure 15 shows the inclusion of the primary sablefish landings. While the degree to which landings increase varies by year, there is an increase in IFQ-Fixed Gear landings towards the end of the primary season (September/October) where boats may have finished their tier or come back from Alaska and move onto fishing their IFQ.

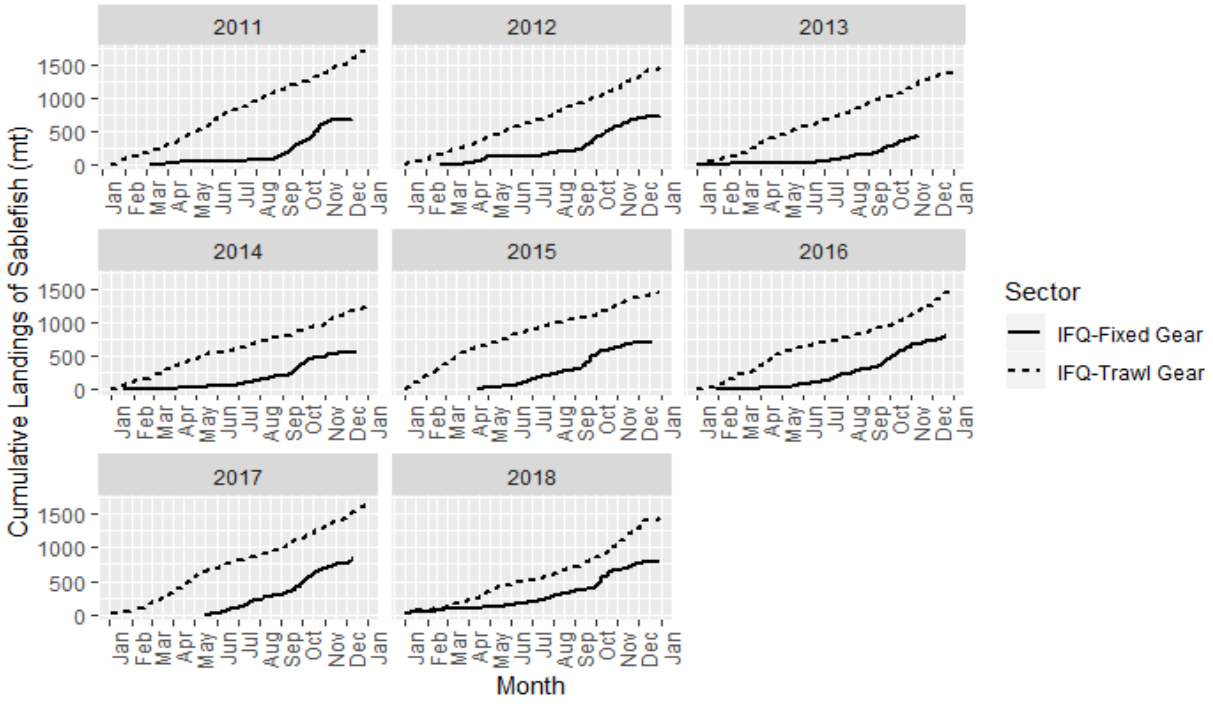


Figure 14. Cumulative catch of sablefish north of 36° N. lat in the IFQ fishery by gear type, 2011-2018

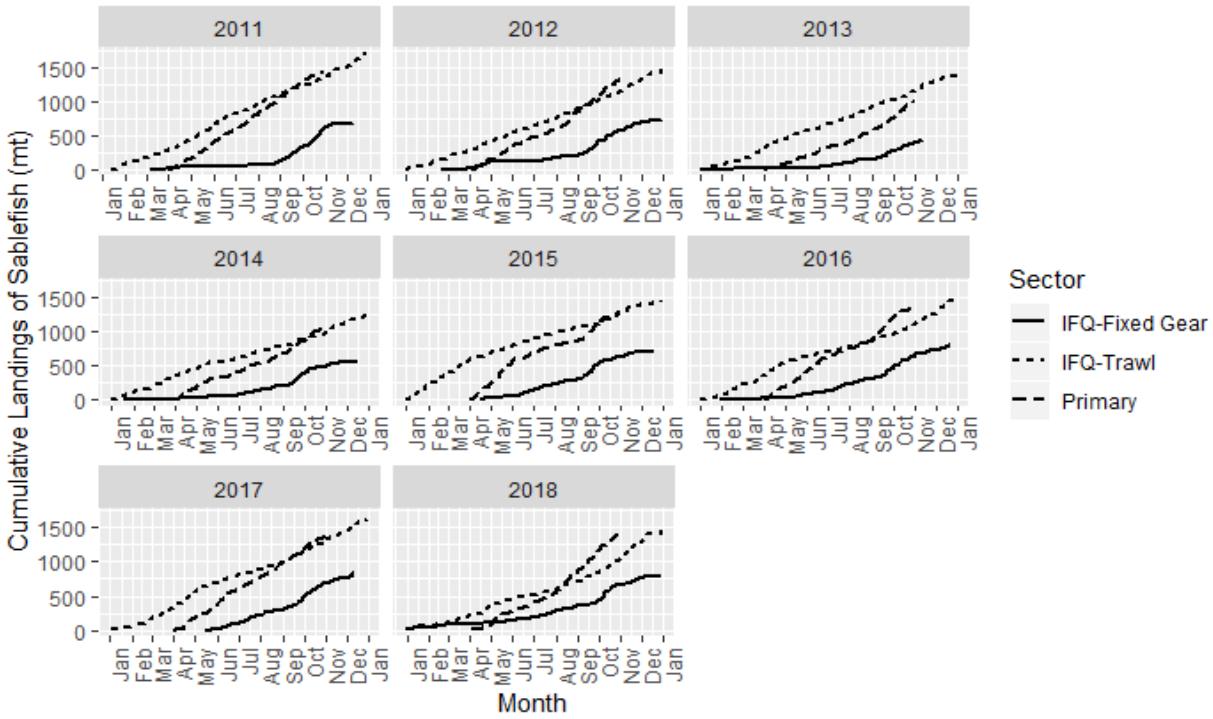


Figure 15. Cumulative catch of sablefish north of 36° N. lat. in the IFQ and primary fisheries, 2011-2018

Since the start of the IFQ program, only 10 vessels have used both trawl and fixed gear to catch sablefish north of 36° N. lat. Of these 10 vessels, some have participated in a single year and

others in multiple years. There have been 31 vessels that have used fixed gear exclusively and 105 that have used trawl gear only to land sablefish in the same time period.

Due to confidentiality, fixed gear landings could not be shown for vessels that also trawl (i.e., the "both" group below). Similarly, each year's quarterly and monthly data could not be shown for vessels that only use fixed gear. However, to provide a sense of when landings primarily occur in each of the groups, Table 9 shows a breakdown of the spread of fixed gear landings of sablefish north by individual vessels within each group and quarter across 2011-2018. Due to fewer than three vessels/dealers participating in the early months, quarter 1 could not be shown for the "both" group. Overall, the median vessel landings using fixed gear by quarter for fixed gear only vessels are higher than those than those that did both trawl and fixed gear. The average landings for fixed gear only vessels are also higher by ~25,000 lbs in quarters three and four, which is when the fixed gear vessels appear to start their primary IFQ fishing as discussed above. The increased average in period 2 for the "both" group compared to the FG only group is likely due to some higher landings over the 8 year time span (as shown in the 99th percentile column) which would raise the overall average up with a low amount of vessel effort.

Table 9. Statistics for fixed gear landings of northern sablefish by quarter by vessels that used both trawl and fixed gear and those that only use fixed gear.

Quarter	Group	25th Percentile	Median	Average	75th Percentile	99th Percentile
1	Both	Confidential				
	FG only	8,780	15,216	35,566	35,161	197,754
2	Both	14,423	19,312	45,911	50,800	138,772
	FG only	12,342	27,081	38,864	57,962	127,313
3	Both	14,029	17,694	42,111	48,407	135,262
	FG only	19,988	48,360	68,267	113,342	203,434
4	Both	14,336	24,551	35,309	49,924	87,511
	FG only	25,668	48,651	60,439	90,377	177,900

Trawl landings of northern sablefish by month from 2011-2018 are presented in Table 10 below with green representing those months with higher totals and red with lower totals. Typically, trawl landings of sablefish tend to occur in the fall and winter months, with low totals occurring early in the year and in the summer. However, these trends can be affected by fishing opportunities in other sectors, specifically in Dungeness crab. In 2015, there was an unusually high amount of landings during January and February, which was most likely due to low catch coastwide during the 2014-15 crab season[3]. In 2016, there was a significant delay in the Dungeness crab season opening, with Oregon and southern Washington opening January 4th and northern California not opening until May due to domoic acid. This may be one of the reasons for the spike in landings in February-April as the fishery didn't open as expected, fishing effort turned to sablefish, then slowed down when crab reopened.

[3] Dungeness crab season opened December 1, 2014 from Pt. Arena to Pt. Chehalis.

Table 10. Trawl Sablefish N. by Month, 2011-2018

Month	2011	2012	2013	2014	2015	2016	2017	2018
Jan	70.19	70.24	65.72	113.09	196.45	59.88	60.96	53.64
Feb	110.7	86.99	73.56	87.9	172.67	144.74	97.96	49.05
Mar	113.05	115.51	170.11	145.46	222.78	120.33	174.18	101.72
Apr	148.67	137.36	142.49	96.77	92.3	191.14	214.34	138.26
May	175.24	124.72	116.97	117.58	105.89	90.7	141.89	97.57
June	201.4	103.35	95.16	62.37	101.41	67.65	113.56	65.23
July	140.14	100.29	101.35	93.83	85.14	77.42	76.8	70.55
Aug	146.82	150.15	146.14	69.15	86.77	79	105.76	112.03
Sept	111.84	117.54	108.63	97.62	45.98	90.94	155.93	104.96
Oct	142.92	132.33	144.02	90.18	145.02	133.4	156.43	192.35
Nov	134.32	161.8	125.38	142.99	134.59	154.18	127.26	228.92
Dec	197.88	164.08	105.66	162.71	69.93	196.27	188.14	165.64
Grand Total	1693.17	1464.36	1395.19	1279.65	1458.93	1405.65	1613.21	1379.92

7.2 Southern Sablefish

Southern sablefish utilization has been a key concern for those fishing south of 36° N. lat. but also brings up discussions on whether or not some of this quota could be used north of 36° N. lat. without harming those with southern quota given that the stock is coastwide. Table 11 shows the allocations, landings, percent attainment, and unused quota pounds for sablefish south of 36° N. lat. in the shorebased IFQ sector from 2011-2018. Since 2011, the IFQ sector has seen a decline in overall attainment from 86 percent in 2011 to a low of six percent in 2018. Industry has stated that there has been a loss of market and infrastructure in southern California, making it not economically feasible to fish. This has been similarly seen in the non-IFQ sector in which attainment has gone from 104.3 percent in 2011 down to an estimated 37.9 percent in 2018.

Table 11. Allocation, Total Mortality, Attainment, Unused QPs from IFQ VA Website

Values	2011	2012	2013	2014	2015	2016	2017	2018
Pounds in Millions								
Allocation	1.170	1.133	1.328	1.440	1.587	1.736	1.721	1.795
Landings	1.009	0.504	0.200	0.455	0.374	0.448	0.250	0.100
Attainment	86%	44%	15%	32%	24%	26%	14%	6%
Pounds in Millions								
Unused	0.161	0.630	1.128	0.985	1.213	1.288	1.472	1.695

Historically, southern sablefish landings have peaked in the fall and winter months. Given that most of the southern sablefish is taken with fixed gear, this aligns with the general pattern seen with fixed gear landings in the IFQ sector north of 36 N. lat. (Figure 16).

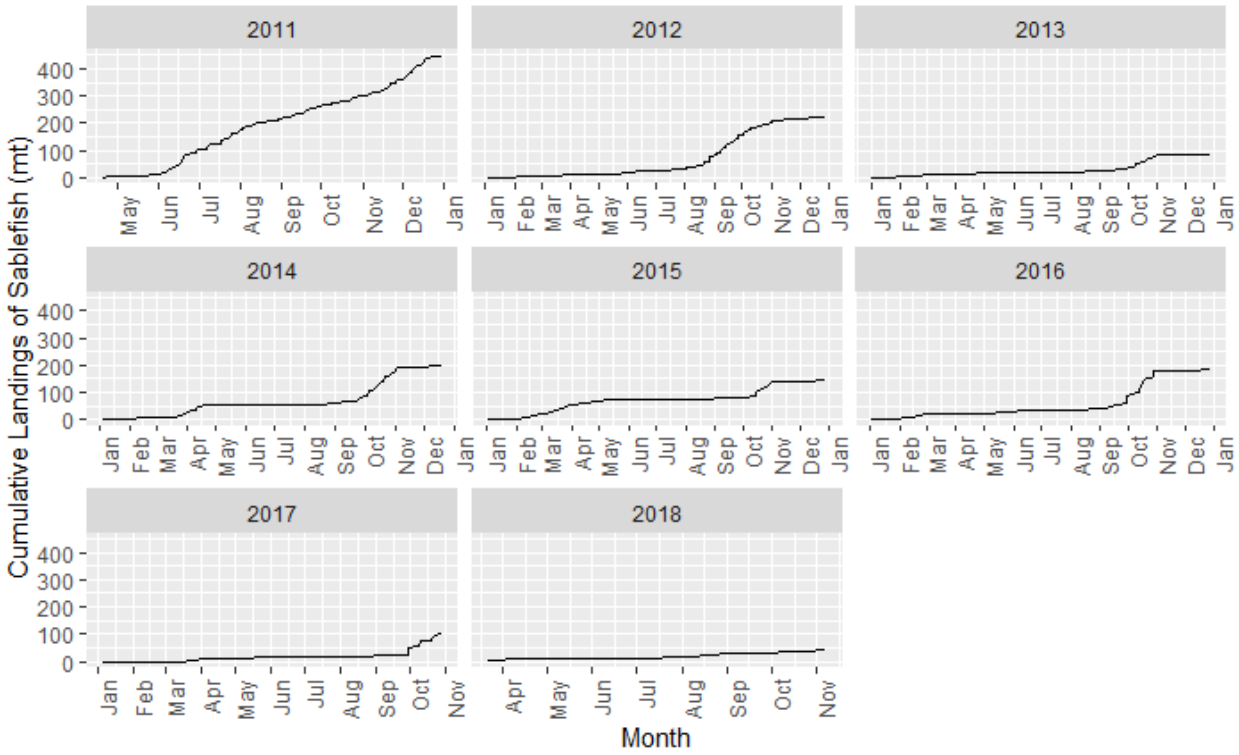


Figure 16: Cumulative catch of southern sablefish in the shorebased IFQ sector, 2011-2018

8.0 ENTITIES TO WHICH GEAR SWITCHING PRIVILEGES MIGHT BE ALLOCATED

Narrowing options for the type of entity that would be evaluated for allocating gear switching privileges with respect to northern sablefish (and possibly other species) would substantially reduce the scope and quantity of analysis. It would also allow for more focused identification of

issues that would need to be addressed for any of the options. The current suite of options include a number of variations on the entities to be evaluated: vessel, permit, or QS account. Many of the provisions involve evaluating the historic activity of these entities for determining future privileges. The approaches also include variations that would determine future gear switching limited based on a nexus between the owner of a vessel and the owner of the QS account: the limits would be determined by the amount of QS owned by the vessel owner.

8.1 MSA Allocation Guidance

There are a number of MSA requirements related to the allocation of fishing privileges including (but not limited to) National Standard 4, which requires

> (4) Conservation and management measures shall not discriminate between residents of different States. If it becomes necessary to allocate or assign fishing privileges among various United States fishermen, such allocation shall be (A) fair and equitable to all such fishermen; (B) reasonably calculated to promote conservation; and (C) carried out in such manner that no particular individual, corporation, or other entity acquires an excessive share of such privileges.

Determination of who is allowed to gear switch or not would likely be considered allocating an aspect of the catch share program (a Limited Access Privilege Program). When privileges related to a LAPP are allocated the MSA requires the Council to consider

> (i) current and historical harvests;
> (ii) employment in the harvesting and processing sectors;
> (iii) investments in, and dependence upon, the fishery; and
> (iv) the current and historical participation of fishing communities;
>
> MSA §303A,(c)(5)(A)

Other considerations include cultural and social framework (including small vessels, fishing communities, and excessive consolidation) and possible inclusion of measures to assist entry level and small vessel owner-operators, captains, crew and fishing communities. Finally, the program should

> (E) authorize limited access privileges to harvest fish to be held, acquired, used by, or issued under the system to persons who substantially participate in the fishery, including in a specific sector of such fishery, as specified by the Council.
>
> MSA §303A,(c)(5)

The initial allocations of the current program have been found to meet these requirements but as these fishing privileges are altered in a manner that affects different participants in different ways, this guidance continues to be relevant.

This section starts with a short review of groundfish limited access programs recommended by the Council, the entities the Council chose to evaluate for initial allocations, and some of the central rationale for those choices. It then provides information related to the consideration of allocation based on each type of entity.

8.2 History of Policy Choices

The Amendment 6 license limitation system was fully implemented in 1994. During development of the program, the Council considered whether to allocate based on this history of the fisherman or the vessel. Amendment 6 limited entry permits were allocated to the current owners of vessels with qualifying history. Using the vessel as the unit for which fishing history was allocated allowed fishermen to move in and out of the fishery during the period of program development with a lesser risk to their investments. Thus, even though there was a 1988 control date, when permits were issued in 1993, they went to the current owners. Fishermen were able to retire and new fishermen enter through the acquisition of a vessel that was likely to qualify. Additionally, once it became clear that vessels would likely be the basis of allocation, with increasing frequency fishermen wishing to acquire a new vessel without leaving the fishery would write sales contracts that reserved the rights to any future permit issued for the vessel based on activity during the time they owned it. Through this choice, the Council took into account recent and historic participation as well as investment in the fishery.

Another, advantage of allocating limited entry permits based on the vessel rather than that of the fisherman was that it reduced the need to consider the various intricacies of ownership history. These intricacies included how to treat catch history when partnerships formed and separated or individuals joined together and left other legal entities that might own a vessel accruing catch history.

For the sablefish fixed gear endorsement, sablefish tier, and IFQ program, rather than the vessel, the Council allocated based on the history of the Amendment 6 limited entry permits. Amendment 6 essentially associated the vessel history with the newly created permits and established in doing so established a precedent which the Council chose to follow in these new program. As with Amendment 6, associating the privilege with the asset allowed for entry and exit during the period of time the programs were under development, again taking into account recent participation (permit ownership), historic participation (history of the permit), and investment in the fishery (the amount paid for the permit). With respect to investment, it was noted that while a vessel that did not receive an initial allocation would still have some value, limited entry permits without the associated fixed sablefish harvest rights or trawl catch shares would be substantially diminished in value.

The trawl IFQ program is the first program subsequent to Amendment 6 that allowed the separation of harvest privileges from the permit subsequent to their initial allocation. Individuals holding trawl limited entry permits were issued QS accounts into which NMFS deposited the QS they were allocated.

8.3 Vessel History: Transfers

If allocation is based on vessel history, to what degree are those who caught the fish the owners of the vessel: How many vessels were transferred after some history was accumulated? While in the following section, leases of limited entry permits will be evaluated, the only information available for vessels is the owner of record.

There are 39 trawl permitted vessels that had gear switched through 2018 and 36 that had gear switching history up through the 2017 control date. Two sources of information are available on the ownership of those vessels. For vessels that stay within the limited entry permits system (are transferred with their LEP or to another LEP ownership information is available from the NMFS permit office. For those vessels that do not have an LEP, either before or after the transfer, if they have made a west coast landing, fish ticket information is available that is linked to vessel ownership information. If a vessel is transferred but not making west coast fishery landings, no information would be available as to whether it was involved in a transfer. Of the 36 vessels with pre-control date gear switching on northern sablefish, five transferred within the limited entry permit system. There were an additional 10 vessels that were not present in the LEP permit system in at least one of the 7 years from 2011-2017. Fish ticket data for these vessels was checked to determine if they continued to be active fishing vessels but under different ownership. Of those 10 vessels, 2 had other fishing activity as non-LEP vessels but under different ownership. Of all 36 vessels that participated in gear switching prior to the control date:

- 7 vessels were transferred and 29 remained under the same ownership for the entire period
- 5 vessels were transferred with the corresponding LEP
- Of those 5, less than three did not have gear switching history at the time of the transfer (gear switching activity occurred after the transfer, i.e. two or more had some gear switching history).
- For the 2 of 7 that transferred without a permit, no statements about gear switching prior to or after the transfer can be made due to confidentiality concerns.

In evaluating continuity of ownership for the purpose of making a policy decision, it should be kept in mind that additional transfers may have happened after the control date and may happen between now and when an allocation is implemented.

8.4 LEP History: Transfers and Leasing

If allocation is based on permit history, to what degree are those who caught the fish the owners of the permits: How many permits were transferred after some history was accumulated and how many permits were leased?

Since inception of the IFQ Program through the control date, there have been 171 permit transfers. There are a total of 36 permits with some sablefish north catch history prior to the control date. The following summarizes data on the transfer of those permits.

- 13 permits transfers
- 11 permits involved in the 13 transfers
- 8 transfers of permits after some sablefish history had been accumulated
- 5 of the 8 transfers were independent of the vessel (3 together with the vessel) (Internal Reference Internal Reference: Permits_Public_Jan 23 2019_R_Results_II.xlsx LEP Tfers SFN(CD)

As noted for vessels, in evaluating continuity of ownership for the purpose of making a policy decision, it should be kept in mind that additional transfers may have happened after the control date and may happen between now and when an allocation is implemented.

While most owners of gear switching operations for northern sablefish own their vessels and permits an average of 30 percent of those vessel lease their permits (Table 12). This also implies that a similar number of permits may be earning revenue for their owners through leases to gear switching vessels.

Table 12. For vessels that gear switched before the control date, numbers that leased permits and number that own both their vessel and permit.

	2011	2012	2013	2014	2015	2016	2017	Avg	Avg %
Leased In/Out	9	11	4	9	6	6	4	7.0	30%
Vessel and Permit	16	20	14	12	16	20	18	16.6	70%
Total Participants	25	31	18	21	22	26	22	23.6	

Internal Reference: Permits_Public_Jan 23 2019_R_Results_II.xlsx LEPs Leased

8.5 QS Account History: Ownership Change and Stability

QS Accounts are not transferable. Unlike a vessel or permit, which a fisherman must have access to in order to fish, a vessel is not required to have a QS account. Further, anyone can acquire a QS account for a nominal fee. The QS within the account is transferrable and such transfers convey long term harvest privileges between owners. Records of ownership for the QS account and the QS within allow the establishment of connection between QS ownership and the ownership of vessels and permits. Such linkages will be discussed in the next section.

While QS accounts are not transferable, as long as the entity named on the account does not change, then ownership can change without generating a new QS account. The names under which QS accounts are held has been relatively stable. Focusing only on QS held by entities that gear switch to catch northern sablefish before the control date, there have been a total of 29 entities that established ownership of QS accounts (most before and a limited number after the control date). At the time of initial issuance, 24 such entities held a total of 42 QS accounts (Table 13). It is public information that one of these entities, The Nature Conservancy, holds 10 QS accounts alone. A gear switching entity is defined as one that owns either a vessel or permit engaged in gear switching. As indicators of relative stability of this set of QS account owners, of the 29 gear switching entities that have held QS accounts, through 2019

- 23 have held those accounts continuously since initial issuance
- 5 have held accounts continuously since first acquired (sometime after initial issuance)
- 3 entities have reduced the number of, or eliminated, their QS accounts (not all of which have remained in the fishery as gear switchers)

Table 13. QS accounts held by businesses associated with permits or vessels involved in gear switching to catch sablefish north.

	2011	2012	2013	2014	2015	2016	2017	2018	2019
Number of Gear Switching Entities Holding QS Accounts	24	24	24	26	27	27	27	28	27
Number of QS Accounts Held by Gear Switching Entities	42	42	42	46	48	50	49	54	52

Internal Reference: Permits_Public_Jan 23 2019_R_Results_II.xlsx QS Account Changes

8.6 Permit-Vessel Interaction

When considering whether or not to issue qualifications based on permit or vessel history, there may be a need to look at how vessels use permits to participate in the fishery. Since 2011, there have been 57 distinct vessel-permit combinations that have landed fixed gear sablefish. A majority of fixed gear vessels have used only one permit at any time they have landed fixed gear sablefish north of 36° N. lat, while five have used three or more permits (Table 14). This does not take into account that some vessel owners may own multiple permits, that a permit owner may own multiple vessels, or that a vessel and/or permit changed ownership since 2011.

Table 14: Number of permits used by vessels to fish sablefish north of 36° N. lat. with fixed gear, 2011-2018

Permits	Vessels
1	28
2	6
3+	5

9.0 QS ACCOUNTS AND LINKAGES TO VESSELS AND LIMITED ENTRY PERMITS (LEPS)

The SaMTAAC is exploring the qualification of QS accounts for a privilege based on fishing activity (Alternative 3) and the determination of vessel accumulation limits based on vessel owner QS holdings (Alternative 4). These approaches require the establishment of a link between QS accounts and vessel activity. There are at least two ways to link QS accounts to vessels. One is through ownership and the other through QP transfers.

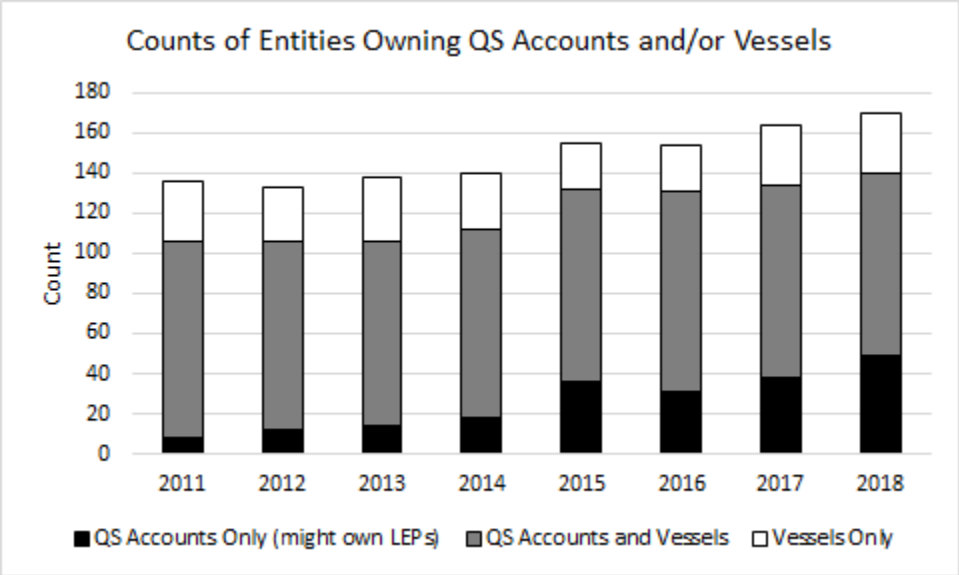
9.1 Ownership Linkages to QS Accounts

To evaluate QS account/vessel/permit ownership links, commonalities of owner's name and addresses in public records from the West Coast Region Permit Office were evaluated. In some cases, public internet records were also available to help further refine business linkages. The

Permit Office also has highly detailed and confidential ownership information that would allow a more accurate assessment of ownership linkages. However, that information is both complicated to analyze and summarized data would be subject to greater confidentiality restrictions. Such data were used in the widow QS reallocation analysis, which was more tenable because it covered QS ownership before QS trading began. Once the SaMTAAC alternatives are narrowed, with some programmer assistance, it might be possible to use those data to check and refine the results derived from the methods employed here.

9.2 QS Account/Vessel Linkages Through Ownership

Over time, the number of QS accounts not associated with vessels has increased while the number of vessels not associated with QS accounts has remained relatively stable (Figure 17). At the start of the program, 92 percent of the QS accounts could be linked to vessels through some degree of common ownership (Table 15). Since that time, QS account association with vessels has declined such that only 72 percent of QS accounts were associated with vessels in 2017 (the year of the control date) and 65 percent in the following year. Over that period, the number of owners with both vessels and QS accounts has not changed much but the number of QS accounts has been increasing. For a policy criteria that requires a link between a QS account and vessel, based on the ownership linkage methods applied here, it appears that about 25 to 35 percent of the QS accounts would not have such linkage..



Internal Ref: Permits_Public_Jan 25 2019_R_Results.xlsx, QSA--VesLink

Figure 17. Counts of entities owning QS accounts and/or trawl LEP vessels (2011-2018).

Table 15. Entities with QS accounts that also own vessels.

Evaluated on an Annual Basis	2011	2012	2013	2014	2015	2016	2017	2018
Entities with QS Accounts	106	106	106	112	132	131	134	140
Entities with QS Accounts and Trawl Permitted Vessels	98	94	92	94	96	100	96	91
Entities with QS Accounts but No Trawl Permitted Vessel	8	12	14	18	36	31	38	49
Percent of Entities with QS Accounts that Also Owned Trawl Permitted Vessels	92%	89%	87%	84%	73%	76%	72%	65%

Note: Midyear transfers of vessels will be double counted.
Internal Ref: Permits_Public_Jan 25 2019_R_Results.xlsx, QSA--VesLink

At the start of the program, 77 percent of the vessels could be linked to QS accounts through some degree of common ownership (Table 16). Since that time vessel association with QS accounts has fluctuated but remained relatively stable, averaging 77 percent, as has the number of owners with both vessels and QS accounts. For a policy criteria that requires a link between a vessel and QS account, based on the ownership linkage methods applied here, it appears that about 20 to 25 percent of the vessels would not have such linkage.

Table 16. Entities with vessels that also own QS accounts.

Evaluated on an Annual Basis	2011	2012	2013	2014	2015	2016	2017	2018
Entities with Trawl Permitted Vessels	128	121	124	122	119	123	126	121
Entities with Trawl Permitted Vessels and QS Accounts	98	94	92	94	96	100	96	91
Entities with Trawl Permitted Vessels but No QS Accounts	30	27	32	28	23	23	30	30
Percent of Entities with Trawl Permitted Vessels and QS Accounts	77%	78%	74%	77%	81%	81%	76%	75%

Note: Entities with QS Accounts" includes four processors. Processors received initial allocations of whiting based on processing history. Internal Ref: Permits_Public_Jan 25 2019_R_Results.xlsx, QSA--LEP Link.

When QS was issued at the start of the program, 98 percent of the northern sablefish QS and 99 percent of the southern sablefish QS allocated went to entities that also owned vessels (Table 17). Since that time, northern sablefish QS with ownership association to vessels has declined to 87 percent in 2017 (the year of the control date) and 84 percent in 2018. (These are percentages of the 90 percent of quota issued to limited entry permit holders. 10 percent of the QS was reserved for an adaptive management program which continues to be passed through). Similarly, southern sablefish QS with ownership association to vessels has declined to 81 percent in 2017 and 72 percent in 2018. Because QS did not start trading until 2014, at least some of these

declines were the result of QS owners selling vessels rather than transfers of QS from individuals that owned vessels.

Table 17. Sablefish QS held by entities that also own trawl permitted vessels

Evaluated on an Annual Basis (End-of-Year QS Holdings)	2011	2012	2013	2014	2015	2016	2017	2018
Entities with Sablefish QS Accounts and Trawl Permitted Vessels	98	94	92	94	96	100	96	91
Sablefish North QS Owned (Total QS = 90%)	88%	86%	85%	86%	82%	83%	79%	76%
Sablefish South QS Owned (Total QS = 90%)	89%	75%	74%	75%	73%	75%	73%	65%
Percent of Total Sablefish North Owned	98%	96%	94%	95%	91%	92%	87%	84%
Percent of Total Sablefish South Owned	99%	83%	83%	83%	81%	83%	81%	72%

Internal Ref: Permits_Public_Jan 25 2019_R_Results.xlsx, QSA--VesLink N-SF QS Owners

9.3 QS/Gear Switching Vessel Linkages Through Ownership

At its June 2017 meeting, the SaMTAAC requested information on the amount of QS owned by entities that gear switch. For entities that own vessels that gear switch in a particular year, the amount of northern sablefish QS they owned averaged 9.9 percent (Table 18). The amount fluctuated between 6 percent and 14 percent but primarily due to the number of entities gear switching in a particular year. At the same time, the overall amount of QS owned by entities that own vessels that gear switched at least one time from 2011 through 2018 has varied little and averaged 23.3 percent for the period. If the top four QS holders are removed, the time series has similar stability and the average declines to 12.4 percent.

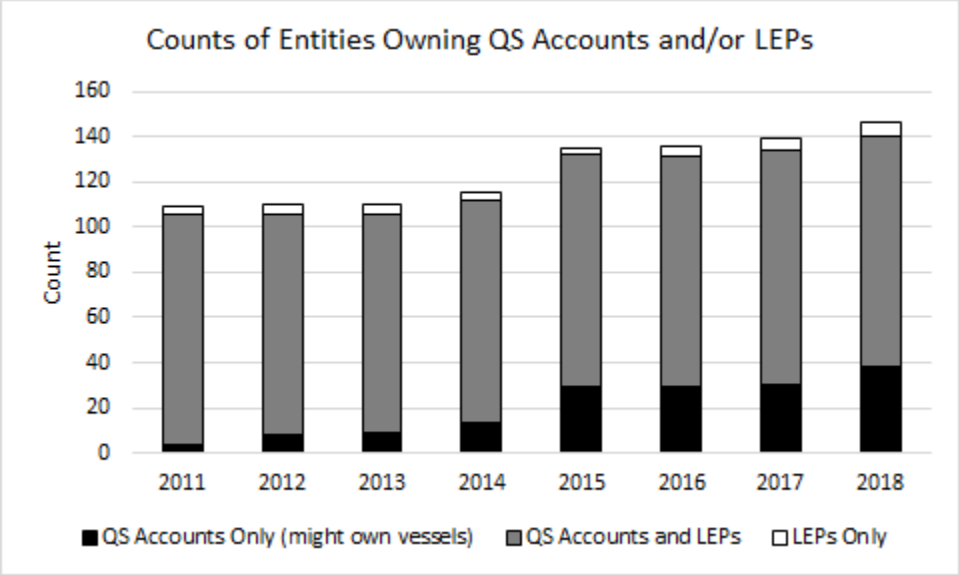
Table 18. Number of gear switching entities by year and amount of QS owned.

	Business Entities Owning a Vessel That Gear Switched During The Year		Business Entities Owning a Vessel That Gear Switched At Least One Time From 2011-2018 (Total of 52)
Year	Number	QS Owned	QS Owned
2011	9	6.0	23.9
2012	10	11.2	23.9
2013	5	6.9	23.9
2014	8	9.4	24.3
2015	9	10.1	22.0
2016	9	10.8	23.2
2017	10	14.1	22.8
2018	7	11.1	22.7
Average	8.4	9.9	23.3

Internal Ref: Permits_Public_Jan 25 2019_R_Results.xlsx, QS Owned by GS

9.4 QS Account/LEP Linkages Through Ownership

Over time, the number of QS accounts not associated with LEPs has increased (Figure 18) though not as much as the number of QS accounts not associated with vessels (Figure 17). At the same time, the number of LEPs not associated with QS accounts has remained relatively stable (Figure 18) and much smaller than the number of vessels not associated with QP accounts. At the start of the program, 96 percent of the QS accounts could be linked to LEPs some degree of common ownership (Table 19). Four permits were transferred after initial QS allocation. Since that time QS accounts association with vessels has not changed much in terms of total permits, but with the increasing number of QS accounts, the percentage of accounts associated with permits has declined to 72 percent of QS accounts. For a policy criteria that requires a link between a QS account and LEP, based on the ownership linkage methods applied here, it appears that around 25 percent of the QS accounts would not have such linkage.



Internal Ref: Permits_Public_Jan 25 2019_R_Results.xlsx, QSA--LEP Link

Figure 18. Counts of entities owning QS accounts and/or trawl LEPs (2011-2018).

Table 19. Entities with QS accounts that also own LEPs.

Evaluated on an Annual Basis	2011	2012	2013	2014	2015	2016	2017	2018
Entities with QS Accounts	106	106	106	112	132	131	134	140
Entities with QS Accounts and LEPs	102	98	97	99	103	102	104	102
Entities with QS Accounts but No LEP	4	8	9	13	29	29	30	38
Percent of Entities with QS Accounts and LEPs	96%	92%	92%	88%	78%	78%	78%	73%

Note: Entities with QS Accounts" includes four processors. Processors received initial allocations of whiting based on processing history. Internal Ref: Permits_Public_Jan 25 2019_R_Results.xlsx, QSA--LEP Link.

At the start of the program, 97 percent of the entities with trawl LEPs could be linked to QS accounts through some degree of common ownership (Table 20). Since that time the number of entities with LEPs and QS accounts has fluctuated but remained relatively stable, averaging 96 percent of all entities with LEPs. For a policy criteria that requires a link between an LEP and QS account, based on the ownership linkage methods applied here most LEPs would such a linkage.

Table 20. Entities with LEPs that also own QS accounts.

Evaluated on an Annual Basis	2011	2012	2013	2014	2015	2016	2017	2018
Entities with LEPs	105	102	101	102	106	107	109	108
Entities with LEPs and QS Accounts	102	98	97	99	103	102	104	102
Entities with LEPS but No QS Accounts	3	4	4	3	3	5	5	6
Percent of Entities with LEPs and QS Accounts	97%	96%	96%	97%	97%	95%	95%	94%

Note: Two entities acquired their permits midyear and so did receive a QS account as part of the initial allocation. A third never applied for QS .Internal Ref: Permits_Public_Jan 25 2019_R_Results.xlsx, QSA--LEP Link.

When QS was issued at the start of the program, 100 percent of the northern sablefish QS and southern sablefish QS allocated went to entities that also owned LEPs (Table 21). Since that time, northern sablefish QS with ownership association to LEPs has declined to 95 percent in 2017 (the year of the control date) and did not change substantially in 2018. (These are percentages of the 90 percent of quota issued to limited entry permit holders. 10 percent of the QS was reserved for an adaptive management program). Similarly, southern sablefish QS with ownership association to vessels has declined to 84 percent in 2017 and 2018. Because QS did not start trading until 2014, at least some of these declines were the result of QS owners selling LEPs rather than transfers of QS from individuals that owned LEPs.

Table 21 Sablefish QS held by entities that also own LEPs

Evaluated on an Annual Basis (End-of-Year QS Holdings)	2011	2012	2013	2014	2015	2016	2017	2018
Entities with Sablefish QS Accounts and LEPs	102	98	97	99	103	102	104	102
Sablefish North QS Owned (Total QS = 90%)	90%	88%	87%	88%	86%	86%	86%	85%
Sablefish South QS Owned (Total QS = 90%)	**90%**	76%	75%	76%	76%	76%	76%	76%
Percent of Total Sablefish North Owned	100%	98%	97%	98%	96%	96%	95%	95%
Percent of Total Sablefish South Owned	100%	84%	84%	84%	84%	84%	84%	84%

Internal Ref: Permits_Public_Jan 25 2019_R_Results.xlsx, QSA--LEPLink N-SF QS Owners

9.5 QS Account/LEP/Vessel Linkages Through Ownership

Over time, the number of QS accounts associated with both vessels and LEPs has decreased by about 12 percent (from 98 to 86, Table 22). At the same time, the number of QS accounts associated with neither vessels nor LEPs has increased from 4 to 33. In 2018, 24 percent of the QS accounts were not associated with vessels nor LEPs. Northern sablefish QS owned by these entities has declined from 98 percent of all QS initially issued to 84 percent of all QS issued; and southern sablefish QS owned by these entities has declined from 99 percent of all QS initially issued to 72 percent of all QS issued (a total of 90 percent of all sablefish QS was initially issued to LEP owners, Table 23).

Table 22. Number of QS accounts that are associated with neither vessels nor LEPs (2011-2018).

Evaluated on an Annual Basis	2011	2012	2013	2014	2015	2016	2017	2018
Entities with QS Accounts	106	106	106	112	132	131	134	140
Entities with QS Accounts, Vessels and LEPs	98	94	92	94	95	97	93	86
Entities with QS Accounts but No Vessel or LEP	4	8	9	13	28	26	27	33
Percent of Entities with QS Accounts but no Vessel or LEP	4%	8%	8%	12%	21%	20%	20%	24%

Note: Whiting QS was issued to some whiting processors that did not have vessel accounts or LEPs.

Table 23. Sablefish QS Owned by entities with QS accounts, vessels and LEPs.

Evaluated on an Annual Basis	2011	2012	2013	2014	2015	2016	2017	2018
Entities with QS Accounts	106	106	106	112	132	131	134	140
Entities with QS Accounts, Vessels and LEPs	98	94	92	94	95	97	93	86
Sablefish North QS Owned (Total QS = 90%)	88%	86%	85%	86%	82%	83%	79%	75%
Sablefish South QS Owned (Total QS = 90%)	89%	75%	74%	75%	73%	75%	73%	65%
Percent of Total Sablefish North Owned	98%	96%	94%	95%	91%	92%	87%	84%
Percent of Total Sablefish South Owned	99%	83%	83%	83%	81%	83%	81%	72%

9.6 QP Trading Linkages to QS Accounts

The Washington Department of Fish and Wildlife (WDFW) has proposed a method for linking QS ownership accounts to fishing history. The information it produces can serve two purposes. First, WDFW proposed it as providing a basis for use in an allocation scheme or for opt-out eligibility criteria for Alternative 3 or similar gear-based QS/QP management unit options. Specific allocation schemes and eligibility criteria would need to be looked at in detail, a number of variations are possible. However, the overall purpose would be to provide a means for considering how to separate those QS owners who have sufficient ties to fixed gear to keep all or some portion of their quota eligible for use by any legal groundfish gear versus those would have their quota converted to trawl-only use. The second purpose would be to analyze QS owner dependence on fixed gear operations as part of any analysis focused on the Magnuson-Stevens Act fair and equitable criteria for allocating fishing privileges.

The method uses sablefish QP transfer and landings data to calculate “QP use portfolios” for each vessel account. QS owners take on the characteristics of the QP use portfolios of the vessel accounts they transferred QP to, in proportion to the QP transferred. The same proportional QP weighting approach is also used to associate vessel accounts with the QP use portfolios of the vessel accounts they transfer QP with. The end results identify how networked each QS account has been to fixed gear and trawl sablefish by year. The key measures the method produces include the proportions of QP associated with fixed gear and trawl gear types. As a simple example, Figure 19 shows that QS account 1 (QS1) QPs would be based on the portfolios of Vessel Account 1 (VA 1) and VA2, which would be 50 percent trawl and 50 percent fixed gear.

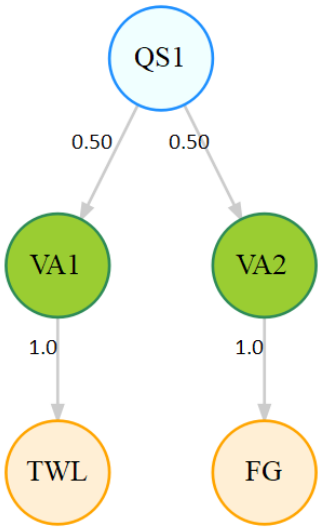


Figure 19 Simple scenario. The numbers represent the proportion of the transferring account's QP going to the receiving account.

The method will indicate interdependence of QS owners and fishing operations whether they share ownership or simply have a strong business relationships between independently owned entities. However, the method can also incorporate information on shared ownership from others sources, such as the "self-trade" designation in the NMFS quota transfer database and the research on business entities discussed in this document. Incorporating ownership information would result in two sets of statistics, such as the proportion of QP used by fixed gear operations with shared ownership and proportion of QP used by fixed gear operations, independently owned.

WDFW has applied the method in a proof of concept manner using the 2011-2018 NMFS quota transfer and PacFIN landings databases. More detail on the method and results will be provided in future reports. The proof of concept work has revealed a few patterns in the sablefish north QP transfer patterns, highlighted here. First, Figure 20 shows that the great bulk of QS accounts transfer their sablefish QP to a single vessel account in a year. On average, the one-to-one relationship has applied to more than 80 percent of QS accounts and around 75 percent of annual QP over 2011-2018. QS accounts will be taking on the QP usage portfolios from multiple vessel accounts in less than 20 percent of cases. Only 6.4 QS accounts, on average, and 13 at most have transferred QP to three or more vessel accounts in years.

Figure 21 focuses on vessel account to vessel account transfers of sablefish north QP. It shows that QP transfers between vessel accounts are an important factor in for understanding connection and dependence in the IFQ fishery. Vessel accounts receiving the most QP tend to transfer a smaller percentage of their QP, as seen by comparing the top and bottom rows of Figure 21, which represent the lower and upper 50 percent of vessels in terms of the amount of QP received. Nonetheless, a number of vessel accounts do transfer a substantial portion of their

sablefish north QP. For instance, the median percent of QP traded for vessels in the top 10 percent (i.e. the "(0.9, 1]" category), while showing a declining trend over 2011-2018, was still above 10 percent in the last three years. And, the 90th percentile value in that category, as well as many of other categories, stretch to the 100 percent QP traded mark. This indicates that 10 percent of the vessels accounts in these categories transfer all of their QP.

Figure 22 summarizes preliminary results on how vessel QP use portfolios change as QP transfers to other vessel accounts are taken into account. As seen, QP transfers make no difference for roughly 60 percent of the vessel account records. The cumulative distribution curve shows that the other 40 percent have a wide range of percent changes, from above zero up to 100 percent. If these data were displayed as histograms, they would show very large peaks at 0 percent with short bars of largely equivalent height running from zero to 100 percent. The pattern is very similar for both gear types, suggesting that transfers are similarly important for understanding connections to both sets of fishing operations. This pattern suggests that taking vessel account transfers would be needed to understand the gear dependencies for a sizeable portion of the vessel accounts, and in turn, the QS accounts they are connected with.

Lastly, Figure 23 summarizes preliminary results at the QS account level and shows how the breakdown between gear types compares when only direct QP use portfolios are taken into account versus when all vessel account to vessel account transfers are accounted for using the proportional weighting method. The percentages shown are percentages of fished QP over all QP issued to QS accounts. So they will differ from statistics that used only landings in the denominator, especially when only looking at the direct QP use level.

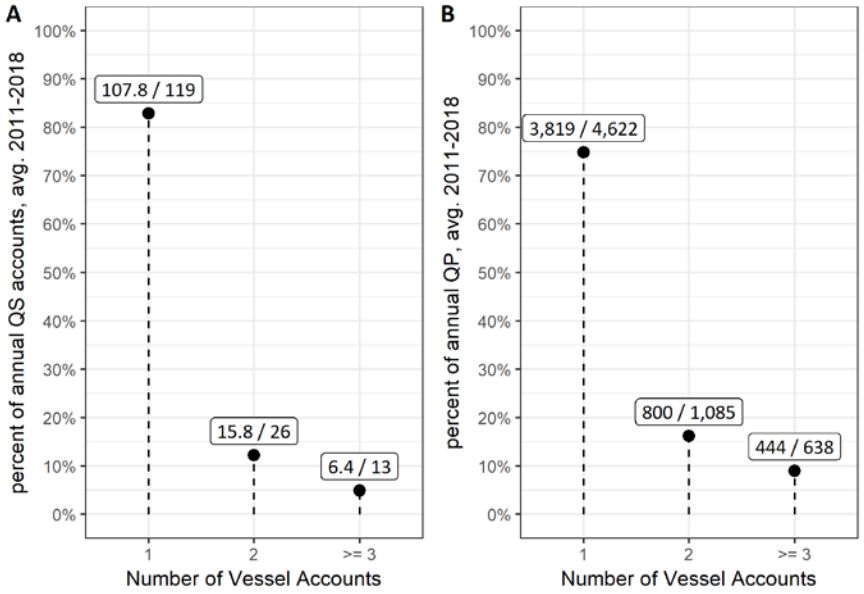


Figure 20. QS account and partner vessel account summaries. Panel A shows the proportion of QS accounts by number of vessel accounts to which sablefish north QP was transferred within a year on average, 2011-2018. The boxes at the top of each point identify the 2011-2018 average and maximum number of vessel accounts by category. Panel B shows the average proportion of total annual QP in each category with the boxes reporting the average and maximum in units of thousands of lbs.

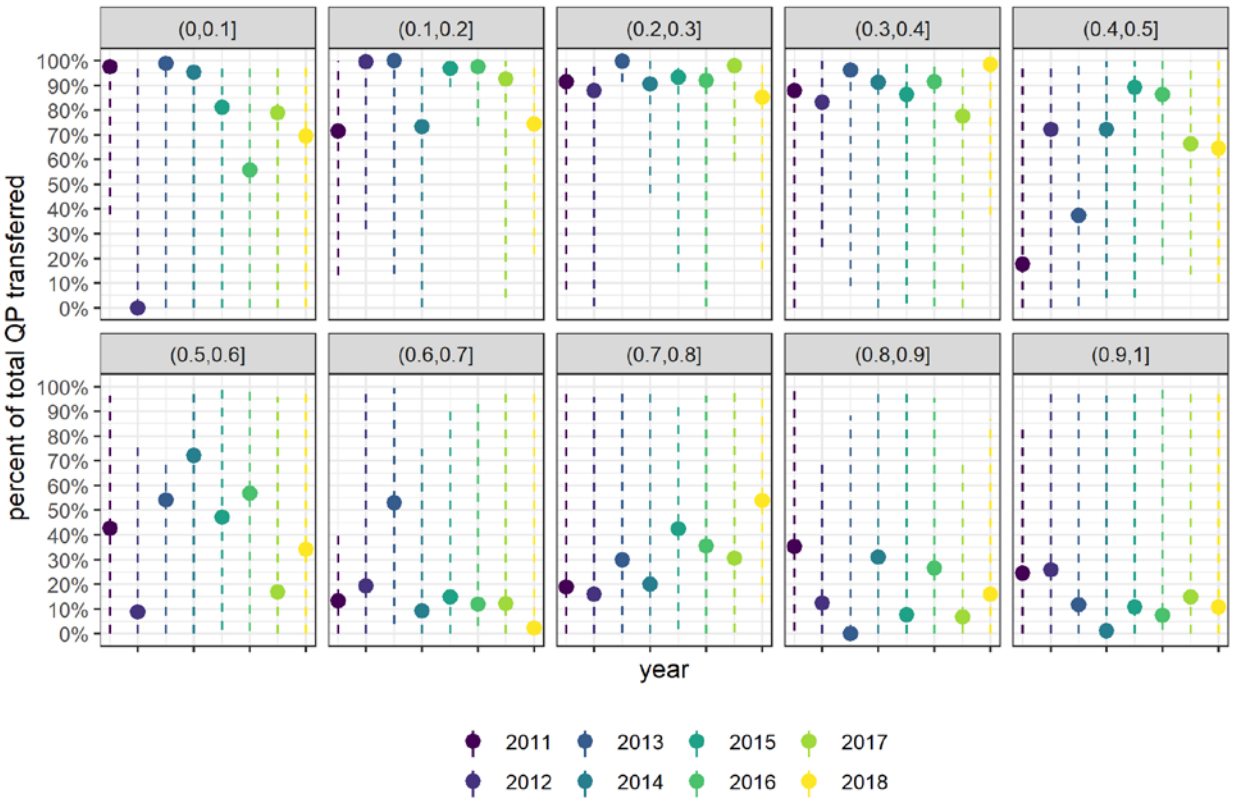


Figure 21. Sablefish north QP transferred out by vessel accounts as a percentage of the total QP they transferred in for the year. The points show the median percentages with the dashed lines extending from the 10th percentile to the 90th percentile transfer percentages. The panels divide vessel accounts into "deciles" defined by amount of QP. For example, (0,0.1] indicates vessel accounts in the bottom 10 percent and (.9, 1.0] vessel accounts in the top 10 percent of total QP received.

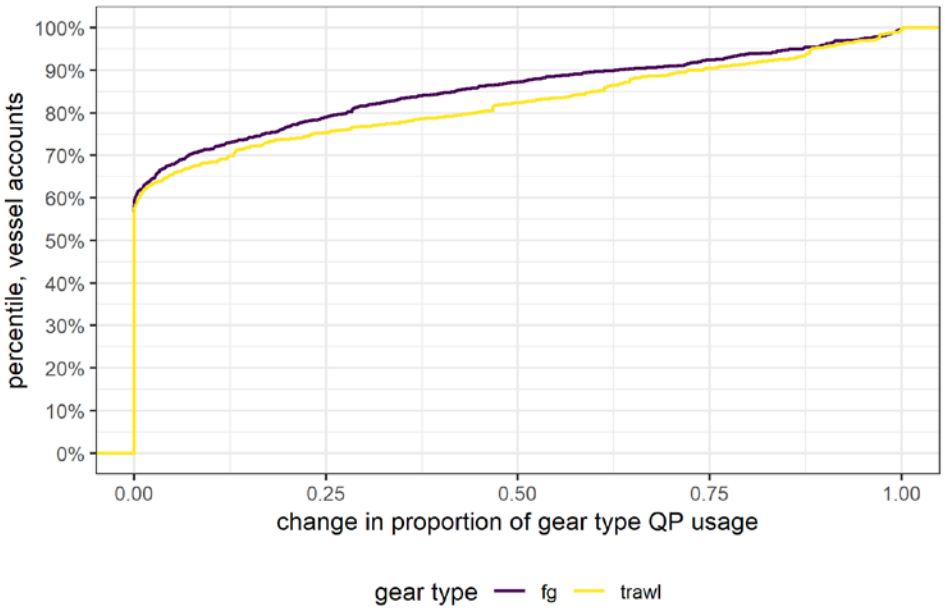


Figure 22. Change in vessel account QP fixed gear ("fg") and trawl gear type usage proportions after vessel account QP transfers are taken into account.

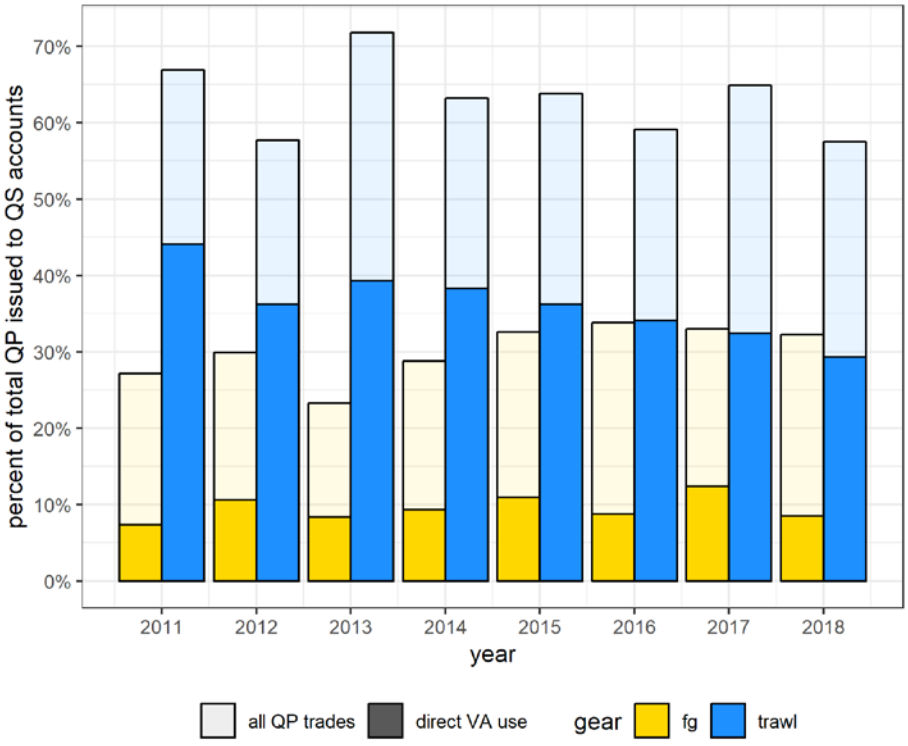


Figure 23. Preliminary results of the proportional QP usage portfolio method, show the percentage of total sablefish north QP issued to QS accounts associated with the two gear type categories by year with just direct vessel QP use considered (darker shades) and after all vessel account to vessel account QP transfers are factored in (lighter shades).

10.0 HISTORIC PARTICIPATION AND POTENTIAL QUALIFYING REQUIREMENTS

10.1 Annual and Total Participation—Gear Switching Vessels

From 2011-2018, there have been 39 vessels that have landed sablefish north with fixed gear. Table 24 shows the number of years that those vessels have gear switched northern sablefish. Four vessels have gear switched in every year of the program. Due to confidentiality, those vessels that have landed sablefish north in five or six years with fixed gears had to be combined. Table 25 shows the number of vessels within a given year than landed sablefish north with fixed gear. The last three years have seen 16 vessels land sablefish north with fixed gear. The greatest amount of gear switching participation was seen in 2012 and the least in 2013. As a reminder, 2013 was the lowest recorded amount of gear switching since the start of the program (Table 2).

Table 24. Number of years that vessels landed sablefish north of 36° N. lat. with fixed gear, 2011-2018

Number of Years	1	2	3	4	5	6	7	8
Number of Vessel	15	9	0	4	4		3	4

Table 25. Number of Vessels that landed sablefish north of 36° N. lat. with fixed gear by year, 2011-2018

Year	2011	2012	2013	2014	2015	2016	2017	2018
Number of Vessels	17	20	11	15	14	16	16	16

When considering the various alternatives, SaMTAAC members requested that certain levels of participation be evaluated. Table 26 below shows the number of individual vessels that landed a given level of sablefish north of 36° N. lat. with fixed gear within a year and how many years that they landed that amount through the control date of September 15, 2017. At that time, only 36 vessels had landed sablefish north with fixed gear (meaning three vessels landed fixed gear northern sablefish for the first time between the control date and the end of 2018). As shown, there are only three vessels that have landed over 100,000 lbs of sablefish north in five or more years since the shorebased IFQ program was established. Sixteen vessels overall have landed over 100,000 lbs of sablefish north with fixed gear in a given year since the control date, but over half only did that in fewer than three years.

Additionally, Table 26 looks at the scenario in which all vessel within that criteria take their maximum amount of sablefish north they have taken through the control date since the program started with fixed gear. If every vessel that has ever landed sablefish north with fixed gear caught their maximum amount of fixed gear sablefish in the same year, it would result in a projected attainment of 56.43 percent of the 2019 shorebased IFQ allocation. At the lowest analyzed qualification level of 30,000 lbs and three years, even if each vessel were to simultaneously land their maximum in a given year, the projected attainment of the 2019 trawl allocation of sablefish north would be less than 30 percent. As discussed in the opening section,

average fixed gear landings of sablefish north are about 30 percent. Given that the current 2019 vessel limit is 256,086 lbs, it is unlikely that a majority of these vessels would take the vessel limit in a given year. Therefore, the far right column is likely an unrealistic upper bound of possible attainment.

Table 26. Number of vessels that would qualify based on minimum landings and participation criteria through the control date; total quota pounds that would be caught with fixed gear if each vessel lands their historical maximum and resulting projected attainment of 2019 trawl allocation; total projected attainment of 2019 trawl allocation if qualified vessels each took an annual vessel limit (4.5 percent).

Minimum Amount of Sablefish landed with fixed gear	Number of Years	Number of Vessels	Total QPs that would be GS if each vessel lands max in any year	Total % of 2019 Trawl Allocation if vessels land max in any year	Total % of 2019 Trawl Allocation if each vessel lands a Vessel Limit
0	1	36	3,211,285	56.43	175.5
	3	11	1,631,616	28.67	49.5
	4	11	1,631,616	28.67	49.5
30,000	5	8	1,385,880	24.35	36
	3	9	1,442,661	25.35	40.5
	4	7	1,258,258	22.11	31.5
50,000	5	6	1,143,225	20.09	27
	3	7	1,246,829	21.91	31.5
	4	5	1,035,084	18.19	22.5
70,000	5	4	871,308	15.31	18
	3	5	1,035,084	18.19	22.5
	4	4	814,415	14.31	18
100,000	5	3	650,639	11.43	13.5

10.2 Annual and Total Participation—Gear Switching Permits

In addition to considering limits to gear switching to vessels, there was also interest in examining participation by LE permit. Between 2011-2018, there have been 13 LE permits that have landed sablefish north of 36 N. lat. with both trawl and fixed gear in at least one year. There have been 38 LE permits used to take sablefish with fixed gear only in a year and 111 that have been used to only catch sablefish with trawl gear in a given year. Note some permits have been used to gear switch in a single year but have also been used for fixed gear only. Table 27 below shows the number of LE permits that have landed fixed gear sablefish north of 36 N. lat. As shown, there have been zero permits that have been used every year to gear switch from 2011-2018. Due to confidentiality, permit participation in five and six years had to be combined. Table 28 shows the number of permits used to land sablefish north with fixed gear from 2011-2018. Similar to the trends seen in vessel activity in Table 25, the most number of permits that were used to land fixed gear caught sablefish north of 36° N. lat. was in 2012 with the fewest permits being used in 2013.

Table 27. Number of years that LE permits were used for landing sablefish north of 36° N. lat. with fixed gear, 2011-2018

Number of Years	1	2	3	4	5	6	7
Number of Permits	20	9	4	4	6		5

Table 28. Number of Permits that landed sablefish north with fixed gear by year

Year	2011	2012	2013	2014	2015	2016	2017	2018
Number of Permits	20	23	13	15	14	16	17	18

Similar to Table 26 above, the SaMTAAC was interested in qualifications based on limited entry trawl permit history of gear switching. Table 29 below presents the exact same information as Table 26, except it is based on the LE permit used to gear switch provided on the electronic fish ticket at the time of landing. Overall, there have been six more permits than vessels that have landed sablefish north with fixed year prior to the control date. For qualifications based on 30,000 lbs of fixed gear caught sablefish, the same number of vessels would qualify at the 3 year mark but for four and five years, more vessels would qualify than permits. At the 100,000 lbs level, the same number of permits and vessels would qualify. However, depending on the number of years, the vessels qualifying at 100,000 lbs for three years have a higher total maximum than the permits qualifying at three years (49,113 lb difference) but the opposite is true at the five year mark (permit maximum is 6,414 lbs higher than the vessel maximum).

Table 29 Number of permits that would qualify based on minimum landings and participation criteria through the control date; total quota pounds that would be caught with fixed gear if each permit lands their historical maximum and resulting projected attainment of 2019 trawl allocation; total projected attainment of 2019 trawl allocation if qualified permits each took an annual vessel limit (4.5 percent)

Minimum Amount of Sablefish landed with fixed gear	Number of Years	Number of Permits	Total QPs that would be GS if each permit lands max in any year	Total % of 2019 Trawl Allocation if permit land max in any year	Total % of Trawl Allocation if each permit lands a Vessel Limit
0	1	42	4,157,180	73.05	189
30,000	3	11	1,849,092	32.49	49.5
	4	9	1,606,591	28.23	40.5
	5	6	1,206,640	21.2	27
50,000	3	10	1,669,926	29.34	45
	4	6	1,206,640	21.20	27
	5	6	1,206,640	21.20	27
70,000	3	6	1,206,640	21.20	27
	4	6	1,206,640	21.20	27
	5	6	1,206,640	21.20	27
100,000	3	5	985,971	17.33	22.5
	4	4	820,828	14.42	18.0
	5	3	657,053	11.55	13.5

10.3 Qualifying as an Active Trawler

Alternative 4 may require some minimum amount of use of trawl gear in order for a vessel to gear switch, i.e. that a vessel be an active trawler. To inform further discussion of such an alternative, the following two figures provide the distribution of annual trawl landings ordered from least to most. In these figures, there is a data point for each year a vessel participated (thus there are multiple data points for each vessel). Figure 23 is a subset of Figure 24. Alternative 4 is to be further developed with an Active Participation option. Therefore, the SaMTAAC may want to identify other information that might be helpful in identifying an appropriate qualifying level.

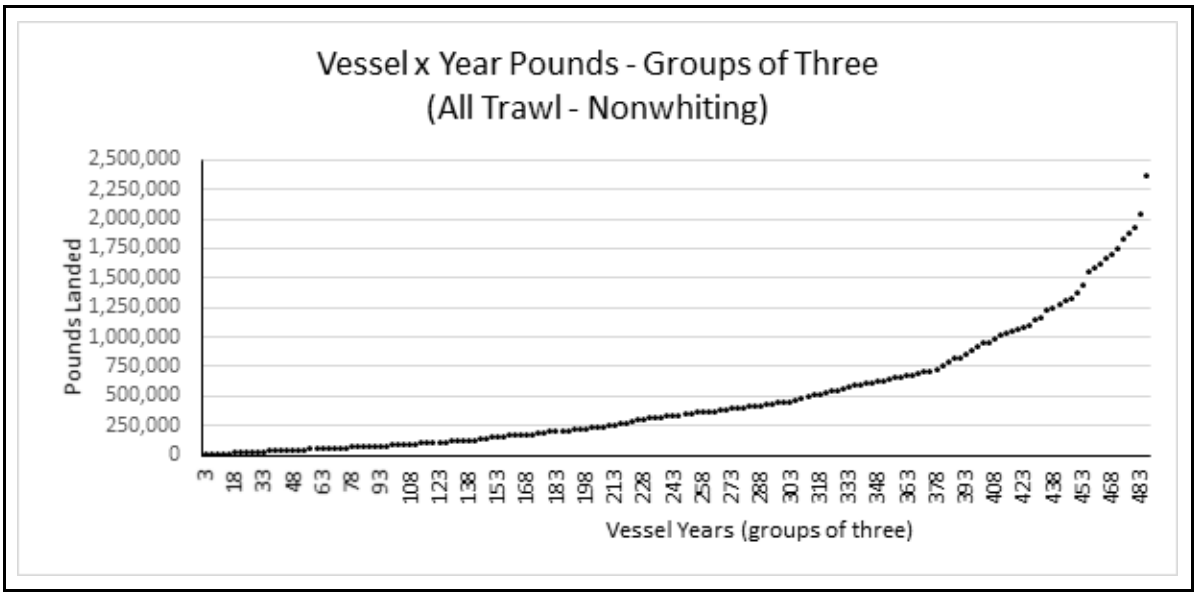


Figure 24. Annual nonwhiting trawl landings per vessel, ordered from least to most in groups of three (2011-2016). Data Source: PacFIN. [Intenal Source Reference: GS_Qualifying_Req_2017_Oct_18B_GMTSF_Analysis - FIXED.xlsx: Trawl Qualification Breakpoints]

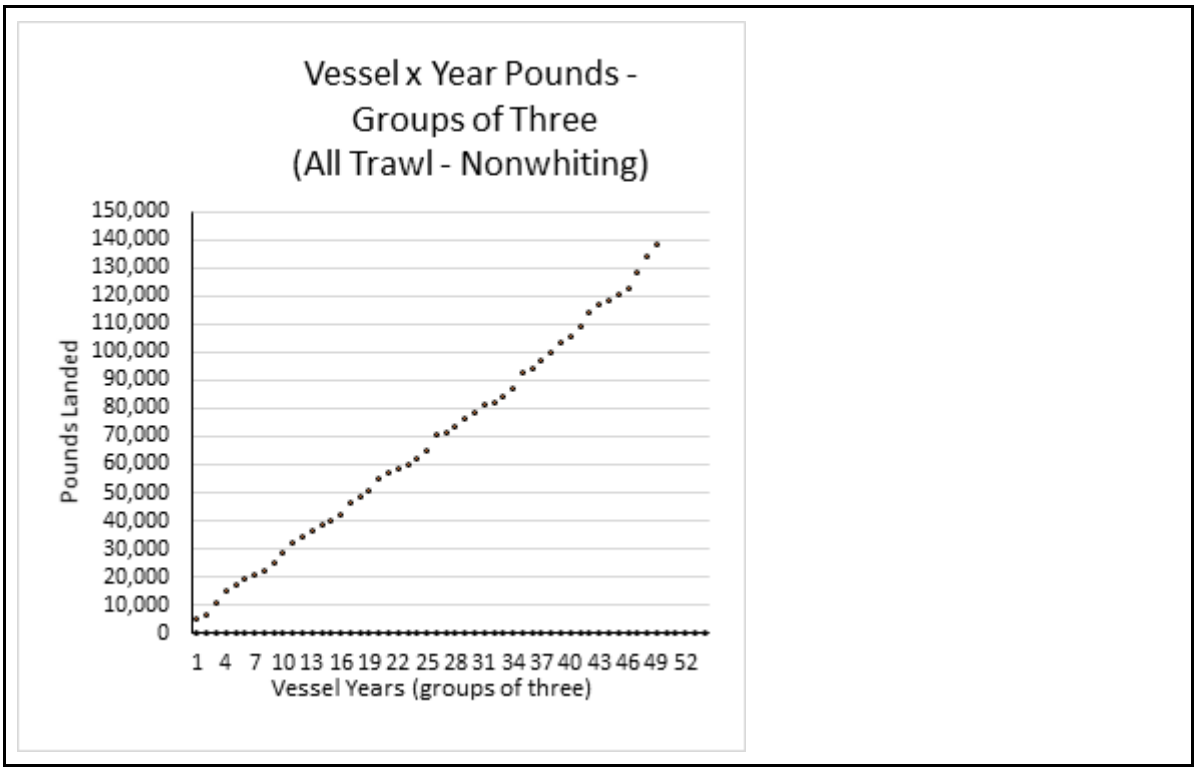


Figure 25. Annual nonwhiting trawl landings per vessel, ordered from least to most in groups of three (truncated at a maximum of 150,000 pounds) (2011-2016). Data Source: PacFIN. [Intenal Source Reference: GS_Qualifying_Req_2017_Oct_18B_GMTSF_Analysis - FIXED.xlsx: Trawl Qualification Breakpoints]

11.0 PROGRAM ADMINISTRATION

11.1 Management Process for Alternatives 1 and 2

These alternatives requires information on the utilization of southern sablefish QP in the previous year in order to determine the amount of quota to shift to the north in the current year. Some means will be needed to address the lags between when information is available on catch in the previous year, when a decision can be made, and when the decision can be implemented. Some possible approaches:

Biennial Projections: During the biennial process, the Groundfish Management Team (GMT) could make projections of the expected sablefish catches in the south and apply these for the coming biennium. Under this approach, utilization information from year one of the current biennium would be used to project attainment for both years of the coming biennium. Thus, the projection for year one of the coming biennium (e.g., 2021) would be based on data from two years before (e.g., 2019) and the projection for year two (e.g., 2022) would be based on data from three years before. This policy would shift geographic distributions but not overall quota, and so be within the coastwide ABC and OFL used to manage sablefish. Potential changes in bycatch of co-occurring species and other impacts that might result from shifts in geographic locations and the gears used would have to be taken into account in the analyses that are required when policy is developed (e.g. NEPA analyses).

End-of-Year Projection: At the November meeting of each year, the GMT will provide the Council with a projection of the expected harvest of southern sablefish QP based on data available from the current year and seasonal harvest patterns in previous years. The Council will adopt a projected harvest for the current year that will be used in applying the reapportionment for the coming year. To facilitate implementation, the NEPA and other management processes would be established similar to those used for routine inseason actions. Biennial specifications would have to analyze ranges of possible outcomes that would encompass potential reapportionment amounts.

Mid-year Reapportionment: Under Alternative 1, at the start of the year, a small amount of southern sablefish might be issued. Once the prior year catch information is complete, at the time of carry over issuance, the remainder would be issued as either southern or northern sablefish QP in accordance with the provisions of the alternative. The amount of southern sablefish issued at the start of the year would be equivalent to the previous year catch as known on December 1st of the previous year (but not more than the southern sablefish trawl allocation for the coming year). Biennial specifications would have to analyze ranges of possible outcomes that would encompass potential reapportionment amounts.

For Alternative 2, a mid-year approach might be used such that at the start of the year all quota would be issued as South-A (for use in the south only). Then after final data from the previous year is available some of the South-A might be re-designated as South-B (to allow it to be used as far north as 42° N. lat.).

11.2 New Data Elements to Track and the Main New Management Tasks (Preliminary)

This section focuses on impacts on the management system over the long-term and does not include data and tasks that might be related to initial implementation. It is preliminary and has not been fully reviewed by the NMFS personnel that will be responsible for the program.

Alternative 1: No new data elements to track. There would be some preseason data and modelling tasks to determine the amount of southern sablefish trawl quota that would be transferred to the north.

Alternative 2: There would be some preseason data and modelling tasks to determine the amount of South A and South B quota to issue.

For vessels that have South B quota and are fishing in the north,

- gear used would need to be included in the QP tracking system (to ensure that fixed gear was not being used against South B quota).

For vessels that have both northern sablefish and South B quota and are fishing in the north with trawl gear,

- there would need to be either an opportunity for the vessel to designate which quota should be debited for its catch or default rules governing which quota should be debited.

For vessels that have both sablefish South A and South B quota and are fishing in the south,

- there would need to be an opportunity for the vessel to designate which quota should be debited for its catch or default rules governing which quota should be debited.

Alternative 3: For all vessels

- gear used would need to be included in the QP usage tracking system (to ensure that vessels using fixed gear do not debit catch against trawl-only quota).

For trawl vessel with both trawl-only QP and any-gear QP:

- there would need to be an either opportunity for the vessel to designate which quota should be debited for its catch or default rules governing which quota should be debited, and
- during the period when all QP can be used to cover landings with any gear type, if the original gear type designations are maintained on the QP all vessels (including fixed gear vessels) may want the opportunity to designate which QP they are using since it may impact the type of QP they receive if they have a surplus QP carryover.

Alternative 4:

- The system would need to be augmented to track transfer of the active trawler designations to a new owner or vessel.

- For one exempted vessel option, the system would need to be augmented to track exempted vessel designation transfers to new owners or vessels.
- For two of the exempted vessel options, changes in ownership would need to be tracked to identify situations that trigger expiration of the exempted vessel designations.
- Depending on the option there might be two **gear switching limits to apply** (one for active trawlers and the other for exempted vessel) or one limit for all active trawlers and different limits for every exempted vessel. Under exempted vessel options where every qualified entity has a different gear limit, the system would need to track those limits along with transfers of the exempted vessel designation (if allowed).
- For the option that bases a vessel's gear switching limit on the owner's QS holdings, each year there might be a need to allow QS owners to **allocate the gear switching limit** among multiple vessels owned and possibly across partnerships and other business structures (this might be achieved through preseason designations by the individual QS owners).
- Limits would need for **monitoring compliance with the limits** and gear used would need to be included in the QP usage tracking system to identify illegal gear switching or, for vessels that are allowed to gear switch, whether they are over the gear switching limits.

Alternative 5:

- In order to monitor compliance with the endorsement requirement vessel status as an endorsed/permitted gear switching vessel would need to be included in the data system but not necessarily as part of the system that tracks QP usage. (Vessels with gear switching endorsements may land up to the standard annual vessel QP limit, so there would be no need for the QP tracking system to be able to evaluate gear switched sablefish catch independent of other trawl IFQ program sablefish catch. The fish ticket could be queried to determine whether any fixed gear landings were made by vessels without a gear switching endorsement.).

11.3 Administrative Interaction between Reapportionment Alternatives and Other Alternatives (Preliminary)

Alternatives 1 and 2 would probably not both be selected. Similarly, it is unlikely that Alternatives 3, 4, or 5 would be combined.

If Alternative 1 is combined with Alternative 3, it would simply result in the expansion of the amount of trawl-only and status quo QP (QP valued with any gear) issued in the north, in proportion to the amount by which the northern allocation is expanded by the movement of southern allocation to the north. Similarly there would probably not be any administrative interactions between Alternative 1 and Alternatives 4 or 5, which simply limit the population of vessels able to gear switch and possibly the amount of gear switching allowed.

If Alternative 2 is combined with Alternative 3, it may entail some tracking complexities that will need to be worked out for the portion of the northern area in which South B QP, any-gear QP, and trawl-only QP could all be used (from the Oregon/California border to 36º N. lat.). South B quota could only be used with trawl vessels in the north, i.e. would perform like trawl-

only quota of Alternative 3 but would not be treated as such for the purpose of the provisions of Alternative 3. A vessel using trawl gear with all three types of QP in its account would need to indicate which QP sablefish catch should go against, or there would need to be some business rules for handling such situations (e.g. exhaust the northern trawl-only quota first, then the South B quota, then any-gear quota).

Since Alternative 2 does not allow South B to be used for gear switching, initially it does not appear that there would be an administrative interaction between it and Alternatives 4 or 5, which limit the population of vessels able to gear switch and possibly the amount of gear switching they are able to do.

12.0 ALTERNATIVES AND ANALYSIS

12.1 Alternatives 1 and 2 (Shifting Southern Sablefish Allocation Northward)

Under Alternatives 1 and 2, amounts of the southern sablefish quota would be shifted to the north. Those amounts would vary by year depending on amounts being utilized in the south. Alternative 1 would do this by reapportioning the allocation to the north and issuing it to holders of northern sablefish quota share (QS) as northern sablefish QP. Alternative 2 would allow holders of southern sablefish QP to use that QP in the north. Both these approaches have similar implementation issues related to management processes and ensuring Annual Catch Limits (ACLs) are not exceeded.

12.1.1 Implementation Issues

In addition to what is covered in the following sections, carryover and other implementation issues are discussed in the document containing the SaMTAAC alternatives and in Section 11.0 of this document.

12.1.1(a) Specification Revisions to Prevent ACL Overages

Currently, while the ABC is coastwide, the ACLs for sablefish are set north and south of 36° N. lat.. Shifting southern sablefish trawl allocation to the north might result in harvest in excess of the northern ACL. As previously discussed, north and south ACLs do not appear needed to achieve conservation objectives as the stock is coastwide and the break at 36° N. lat. is based on the historical extent of the trawl survey. Therefore, it might be possible to avoid ACL overages by specifying the north/south sablefish allocations as Annual Catch Targets (ACTs).

The GMT has discussed the potential use of ACTs for sablefish over the last few years, especially with the instances of higher than normal bycatch in the whiting sectors contributing to the exceedance of the 2017 sablefish north ACL. Most recently, this potential new management measure was approved by the Council as an addition to the groundfish workload list (formerly known as "omnibus") and the GMT has recommended it be considered in the 2021-22 harvest specifications (Agenda Item G.4.a, Supplemental GMT Report 4, March 2019). As described in the GMT report, "Sablefish is assessed coastwide and has a coastwide overfished limit and allowable biological catch (ABC), which are used as a basis for conservation. However, annual catch limits (ACLs) are used to allocate sablefish for the management areas north and south of

36° N. lat based on the historical extent of the trawl survey. This action would change the north and south ACLs to soft-cap annual catch targets (ACTs), and change the ACL to coastwide, being the sum of the north and south ACTs."

While the GMT's proposal was intended to be looked at potentially outside of the SaMTAAC in the near term to provide benefit to all commercial fisheries without having to reallocate south of 36° N. lat. quota, the proposal may be needed to ensure that the sablefish north ACL is not exceeded if southern quota is moved to the north through any of the SaMTAAC alternatives. Regardless, each fishery would maintain their current allocation framework, but the resulting allocations, shares, etc. would be based off the ACT instead of ACL. The Council would still manage the fisheries to not exceed their allocations or set-asides while providing flexibility for unforeseen high catch events.

12.1.2 Analysis

12.1.2(a) Alternative 1/Alternative 2 Performance Comparison

A hindcast of Alternatives 1 and 2 was done using actual southern trawl allocations and southern trawl harvest and assuming that 90 percent of the QP made available in the north would be harvested. In general, Alternative 1 resulted in higher ex-vessel revenues than Alternative 2; however, some of this difference may be due to the specific parameters of the alternatives (e.g. Alternative 1 reapportions amounts of up to 90 percent of the south sablefish QP to the north while under Alternative 2 the most that could be made available to the north as South B QP would be 50 percent.

Table 30. Comparison between Alternatives 1 and 2 (actual southern harvests are assumed to not change and 90 percent of the QP made available to the north are assumed to be harvested).

Difference Between Status Quo and Alternatives--Metric Tons								
	2011	2012	2013	2014	2015	2016	2017	2012-2017 Avg
Alt 1 v. SQ	0	0	261	395	312	451	445	266
Alt 2 v. SQ	0	32	259	250	223	273	260	185
Difference Between Alternative 1 and 2--Metric Tons								
Alt 2 v. Alt 1	0	32	-2	-145	-89	-178	-185	-95
Difference Between Status Quo and Alternatives--Exvessel Revenue								
Alt 1 v. SQ	$0	$0	$914,235	$1,727,074	$1,393,939	$2,038,893	$2,010,549	$1,347,448
Alt 2 v. SQ	$0	$123,407	$907,914	$1,093,159	$995,768	$1,233,236	$1,175,017	$921,417
Difference Between Alternative 1 and 2--Exvessel Revenue								
Alt 2 v. Alt 1		$123,407	-$6,321	-$633,914	-$398,171	-$805,656	-$835,531	-$426,031

After the hindcasts, projections were done for the two alternatives to evaluate performance with dramatic changes in the trawl allocation of southern sablefish and amounts harvested. As for the

hindcast, it was assumed that 90 percent of any QP made available in the north was harvested. Results are displayed in Figure 26 and Figure 27. One of the interesting features of the way that Alternative 1 performs relates to the fact that between 50 percent and 75 percent utilization of the southern QP there would be no changes to the northward reapportionment. This means that if in the first year the southern fishery is in this range, whatever percentage it attains (e.g. 52 percent) will remain at that level until attainment either goes down or exceeds 75%. This can be seen in years 11 through 14 of Figure 26.

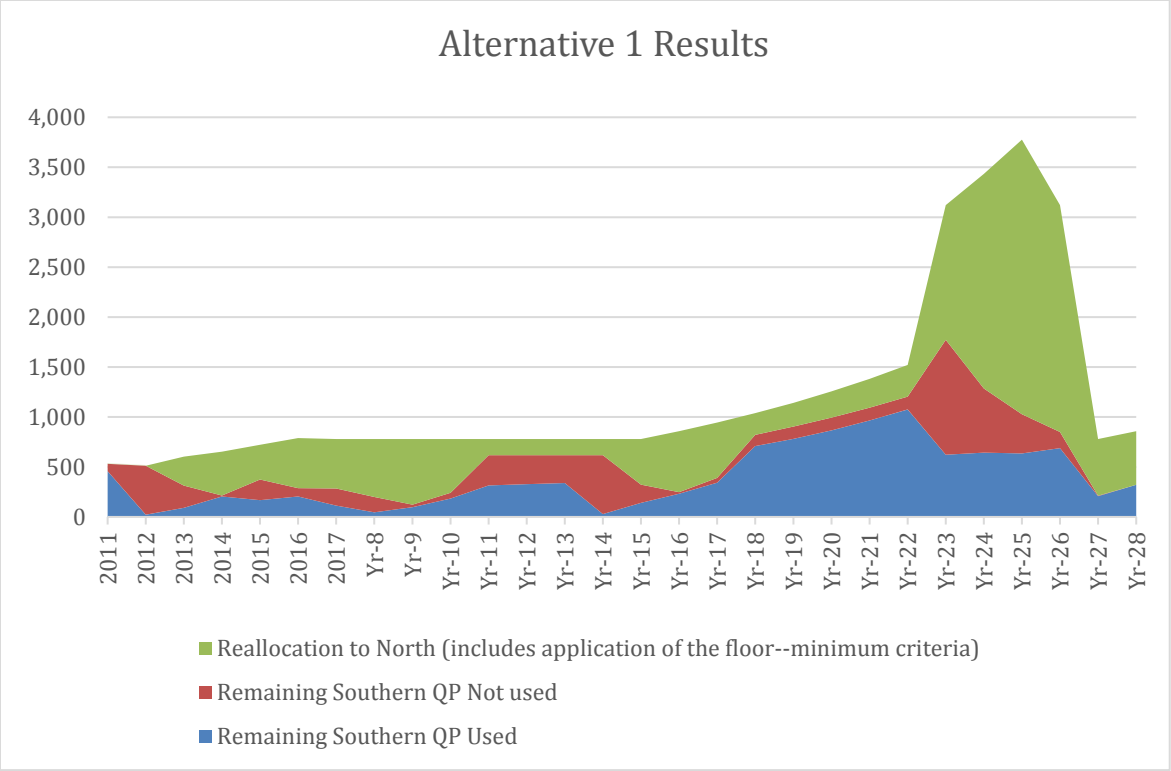


Figure 26. Hypothetical performance of Alternative 1 under a range of assumed trawl allocations and harvests.

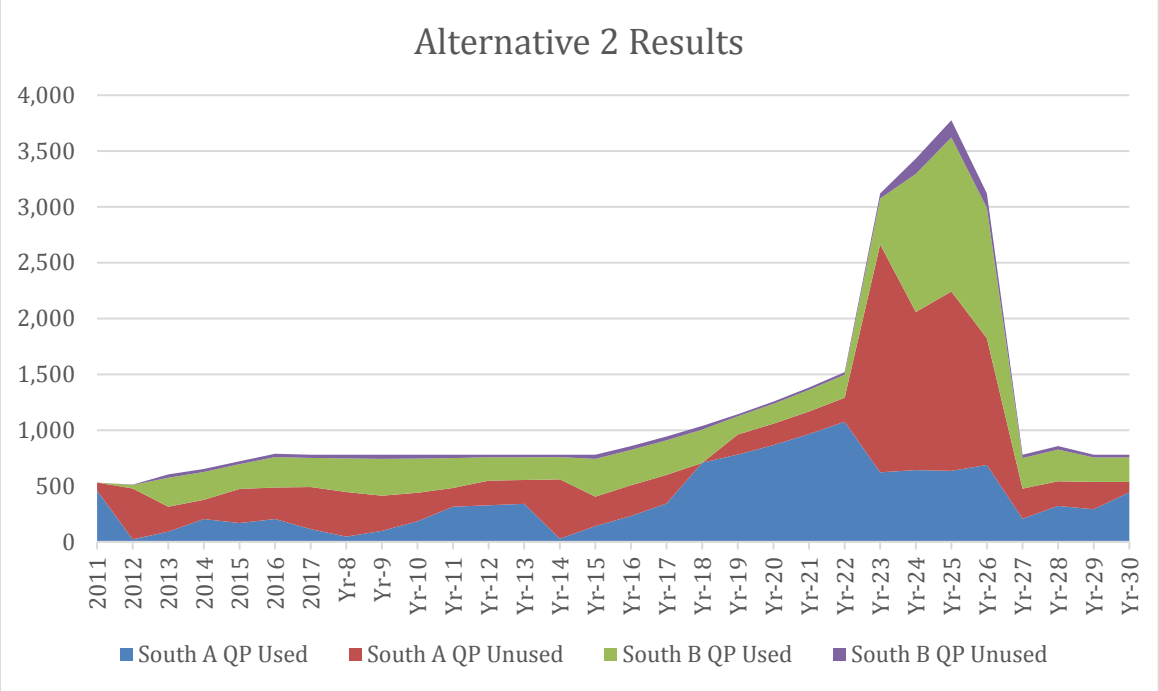


Figure 27. Hypothetical performance of Alternative 1 under a range of assumed trawl allocations and harvests.

12.1.2(b) Biological Impacts

One of the concerns with Alternatives 1 and 2 are potential biological impacts from the increased concentration of harvest in more northern areas. Section 3.0 discusses issues of localized depletion from both a biological and economic perspective. It includes a discussion of hypothetical distributions of effort relative to biomass with northward shifts of allocation and includes graphs showing the degree to which that proportionality might be impacted by different amounts of reapportionment to the north. Information provided there shows not only the amounts by which harvest in the north might be increased but also includes a discussion of how those amounts relate to the overall biomass in the area.

Another issue is the impact of changing the gear with which the trawl sablefish allocation is caught. Most of the southern allocation is caught with fixed gear. Alternative 1 would make that sablefish available in the north, where more trawl gear is used, is likely to shift that. Alternative 2 would require the use of trawl gear for southern allocation harvested to the north. Section 4.0 provides an initial discussion of potential biological impacts of changes in the proportion of the trawl allocation harvested by different gear types.

12.1.2(c) Alternative 2 Impacts on Fishing Operations in the South

12.1.2(c)(1) Number of Businesses Impacted and Annually Allocated QP

Alternative 1 would reduce the amount of southern sablefish QP received by holders of southern sablefish QS and increase the amount of QP received by holders of northern QS. With a reallocation to the north, an entity that held 1 percent of the southern QS and 1 percent of the northern QS would have exactly the same amount of sablefish QP after a south to north reapportionment. Alternative 2 would not change the amount of southern QP that any one southern sablefish QS holder receives. Table 30 shows the number of entities that have more southern sablefish than northern sablefish. These would be the entities that would experience a decrease in their total sablefish allocation with a shift of QP to the north under Alternative 1.

Table 31. Number of businesses with more southern sablefish QS than northern sablefish QS.

	2011	2012	2013	2014	2015	2016	2017	2018
Number of Businesses	6	6	6	7	13	13	12	14

While the number of businesses with more southern sablefish QS than northern sablefish QS is relatively small (compared to the 100 to 106 entities owning sablefish QS for one or both areas), the total southern QS held by these entities is around 50 percent (varying between 49 percent and 52 percent from 2011-2018).

The number of fishing businesses with vessels harvesting southern sablefish has declined over the years (Table 31). Of the 25 fishing businesses that harvested sablefish in the south, four also own QS. There were 12 fishing years of activity in the south for those four entities. Each entity had at least one year in which their own QS holdings generated enough southern sablefish QP to cover their harvest. The frequency of such occurrences increased as harvest declined. The average ratio of a business' harvest to its own QS/QP holdings was 9.8, indicating the importance of the availability of southern QP on the market for these entities.

Table 32. Number of businesses with vessels landing southern sablefish.

	2011	2012	2013	2014	2015	2016	2017	2018	Total Unique Businesses
Number of Businesses	11	7	7	7	6	6	7	3	25

12.1.2(c)(2) Southern Sablefish QS and QP Market Availability

If under Alternative 1 the amount of sablefish QP available in the south is reduced, questions have been asked about how vessels that fish in the south will be able to meet their QP needs? The answer will be influenced by two factors. First, for those vessels that prefer to cover their QP with QS they own, how readily will they be able to find southern sablefish QS from those who are not using it? Second, for those who rely on buying southern QP each year (or who cannot acquire additional QS), how might the decline in total amount of QP available impact the price of that QP?

With respect to QS availability, trades of QS have been relatively rare but there has been movement of southern sablefish QS over time, as shown in Figure 25. QS ownership has shifted from the Monterey/Mendocino area since 2011 with 2018 seeing increases to Washington and the Monterey South area. There is more information on QP trading and related markets, but it is still limited. Additional available information on QS and QP trading will be summarized in future analytical documents.

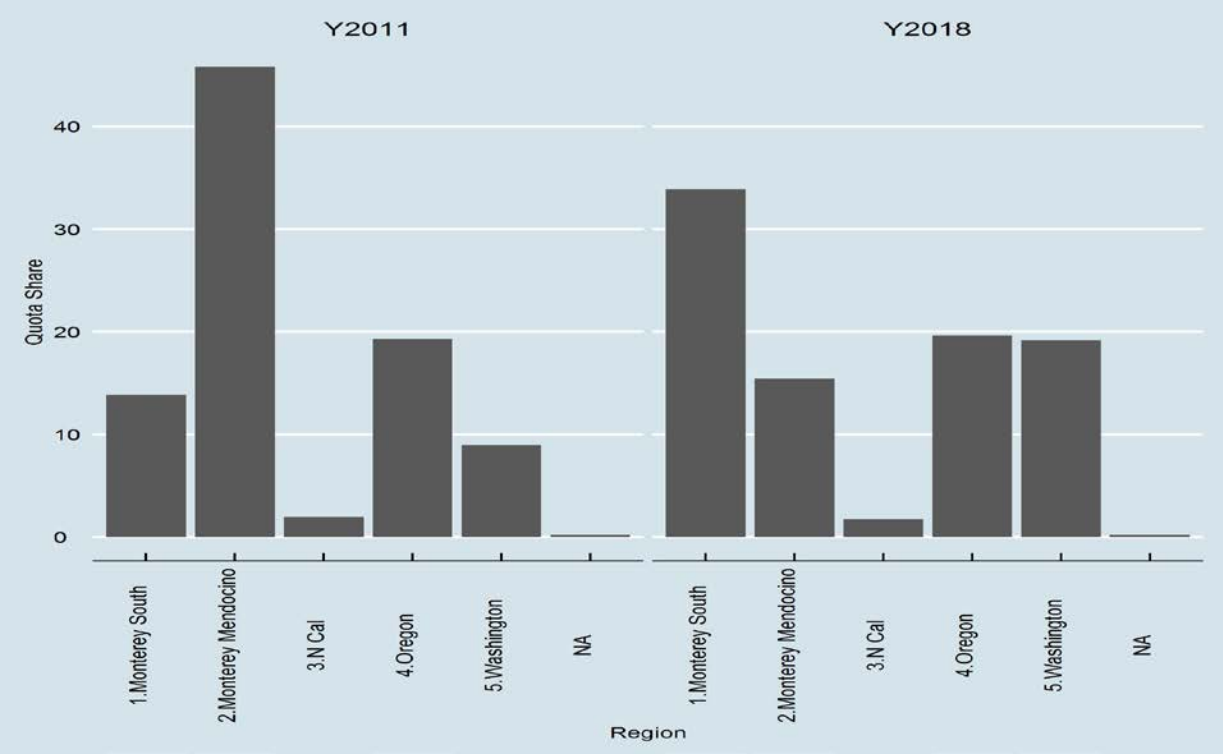


Figure 28. Changes to the geographic distribution of sablefish south QS (based on address of the QS owner, 2011 and 2018).

Here, the possible reapportionment of southern QP to the north is examined in terms of its impact on the amount of surplus QP available on the markets. Even if there is a reduction in available quota, if large amounts of surplus are available, the impact on QP price would be expected to be minimal. For this analysis, two approaches are provided. The first simply looks at a range of reapportionment percentages and the amount by which surpluses would have changed for 2011 through 2018. Under this approach, the actual quotas for each year are reduced by a reapportionment percentage, the actual harvest for the year subtracted, and the hypothetical surplus determined and compared to the actual surplus for the year to determine the percent change. Results show that a 10 percent reapportionment to the north would reduce available surplus by an average of 13 percent and a 50 percent shift would reduce surplus QP by an average of 67 percent (Table 32). Because there was near full attainment in 2011, results for that year are not included in the average. In terms of poundage, a 50 percent shift would still leave surpluses of several hundreds of thousands of pounds.

Table 33. Projected surplus QP assuming various levels of reapportionment to the north.

Amount Re-appor-tioned to North	2011	2012	2013	2014	2015	2016	2017	2018	2012-2018 Avg
Surplus QP Assuming Same Harvest Level But Reapportionment to the North (Millions of Pounds)									
0%	0.161	0.630	1.128	0.985	1.213	1.288	1.472	1.695	1.202
10%	0.044	0.517	0.995	0.841	1.054	1.115	1.300	1.516	1.048
20%	0	0.403	0.862	0.697	0.895	0.941	1.128	1.336	0.895
50%	0	0.063	0.464	0.265	0.419	0.420	0.611	0.798	0.434
75%	0	0	0.132	0.000	0.022	0.000	0.181	0.349	0.098
90%	0	0	0	0	0	0	0	0.079	0.011
Percent Change in Amount of Surplus QP									
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
10%	-73%	-18%	-12%	-15%	-13%	-13%	-12%	-11%	-13%
20%	-100%	-36%	-24%	-29%	-26%	-27%	-23%	-21%	-27%
50%	-100%	-90%	-59%	-73%	-65%	-67%	-58%	-53%	-67%
75%	-100%	-100%	-88%	-100%	-98%	-100%	-88%	-79%	-93%
90%	-100%	-100%	-100%	-100%	-100%	-100%	-100%	-95%	-99%

Internal Reference: Alt1_SurplusQP Impacts.xlsx.

The actual amounts reapportioned would be driven by the provisions of Alternative 1. Table 33 shows that on average, Alternative 1 applied to 2012 through 2018 would have reduced the southern sablefish QP allocation by 52 percent and the surplus QP by 63 percent. With the exception of 2014, there would generally be several hundred thousand pounds of surplus QP available.

Table 34. Hindcast of Alternative 1 and impact on available QP surpluses.

	2011	2012	2013	2014	2015	2016	2017	2018	2012-2018 Avg
	Pounds in Millions								
Actual Allocations	1.170	1.133	1.328	1.440	1.587	1.736	1.721	1.795	1.534
After Alt 1 Reappor-tionment	1.170	1.130	0.690	0.474	0.825	0.636	0.629	0.440	0.689
Reduction in Southern Allocation	0%	0%	-48%	-67%	-48%	-63%	-63%	-76%	-52%
	Pounds in Millions								
Actual Harvest	1.009	0.504	0.200	0.455	0.374	0.448	0.250	0.100	0.333
Projected Surplus	0.161	0.626	0.490	0.019	0.450	0.188	0.380	0.339	0.356
Reduction in Surplus Relative to Original	0%	-1%	-57%	-98%	-63%	-85%	-74%	-80%	-65%

12.2 Alternatives 3, 4 and 5, Limiting Gear Switching for Northern Sablefish

Carryover and other implementation issues are discussed in the document containing the alternatives and in Section 11.0 of this document.

12.2.1 Qualification Requirements

All of these alternatives potentially involve qualification requirements for one purpose or another. Qualification requirements are often tied to recent and historic participation and investment. Additionally, an Option of Alternative 4 would tie current QS ownership to the amount of gear switching an entity is allowed. One of the central questions that runs through all three alternatives is determination of the entities to which an allocation would be made. Section 8.1 reviews some of the MSA general guidance on allocation decisions. This is followed by Section 8.2 which discusses past Council choices on who should be given allocations. Past choices are important to consider and address to the degree that consistency is important in this situation and that fishermen may be making choices based on these past patterns. This does not necessarily mean that the past choices need to be repeated as circumstances change.

12.2.2 Changing Participation

One concern in allocation decisions is how to take into account investments that change over time. For example, when catch history is associated with a particular asset (like a vessel or

permit) but the ownership of the asset changes. Sections 8.3 through 8.6 summarize data on these dynamics for vessels, limited entry permits (LEPs), and QS accounts.

12.2.3 Linkage to QS Accounts

Both qualification requirements and some of the ongoing provisions under consideration would rely on linkages between QS accounts and vessels or LEPs. Ownership data was examined as one basis for those linkages. Sections 9.1 through 9.5 summarize ownership linkages, how they have changes over time, and amounts of northern sablefish held by entities for which such linkages were established. Also included here is a table which responds to a June 2017 SaMTAAC request for information about the amount of QS owned by entities that gear switch (Section 9.3).

An alternative means for establishing linkages is QP trading patterns between QS accounts and vessel accounts and amongst vessel accounts. This approach is discussed in 9.6.

12.2.4 Potential Landing History Requirements and Scope of Alternatives

Potential qualifying requirements for vessels and permits are explored in Section 10.0. This section also presents information pertinent to the active trawler designation that would be part of Alternative 4. Also, relevant to potential qualifying requirements is the scope of species for which a gear switching limit might be imposed and the question of whether those species should count toward qualifying requirement. This issue is discussed in the document that covers the alternatives. Section 6.0 provides information on non-sablefish species that are caught during gear switching.

13.0 CONTRIBUTORS

The primary authors of this document were

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Additionally,

- Lisa Pfeiffer, NMFS NWFSC, contributed an update of the catch share review analysis that looked at the relationship between utilization of non-sablefish species and sablefish (Section 5.1.2).
- Corey Niles, WDFW, contributed the QP transfer analysis provided in Section 9.6.

In preparation for this analysis considerable work was undertaken to resolve fish ticket data inconsistencies. Mel Mandrup of CDFW was instrumental in that effort, as well as the state and PacFIN staff.

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