Review of Existing Analysis - Extracts

These are extracts from briefing book documents created specifically for what were the follow-on actions items. The five-year catch share review will be discussed separately.

FOLLOW-ON ACTIONS—ISSUES, ALTERNATIVES, AND ANALYSIS

This document provides a summary of ... analysis previously provided and some new preliminary data and analysis....

2. Trawl Sablefish Area Management and Gear Switching.....

2. Trawl Sablefish Area Management and Gear Switching

Data and Analysis (Provided at the September Council Meeting)

Sablefish Area Management

What is the nature of the gear conflict problem?

The draft catch share review document (Agenda Item F.2.a, Catch Share Analysts Report, June 2017) discusses the gear conflicts occurring in the south. Documentation of the performance of the gear switching provision starts on page 3-129 and discussion of the southern allocation and its utilization on page 3-130. Discussion of the conflicts south of 36º N. Lat. starts in the "Conflicts with Other Fisheries" section on page 3-178, and additional discussion of the interactions between fisheries can be found in the communities section starting on page 3-289 (esp., p. 3-291). In the section on environmental performance see starting on page 3-352.

How active have northern vessels been in the southern sablefish fishery?

Over the first six years of the catch share program, landings by a cumulative total of 11 vessels that also participated in the north accounted for between about 50 and 60 percent of the trawl southern sablefish landings (690 mt out of a total of 1,291 mt caught and 3,808 mt allocated in the south; landing data summarized from PacFIN fish tickets). In any one year, no more than four vessels with northern landings also landed trawl southern sablefish. A more careful consideration of the likelihood that sablefish currently caught and landed in the south will be caught and landed in the north would include identifying not only whether a vessel is active in the north but whether its main area of activity is in the north (in which case it may be less likely that it would travel south to harvest its quota, if the 36^{o} line is eliminated for the trawl fishery).

Where is southern sablefish landed?

While vessels from the north participate in the south, almost all the landings by these vessels are into the port of Morro Bay. On average, over 92 percent of the southern sablefish is landed in Morro Bay and none of the harvest from this area is landed further north than Monterey. Landings in ports other than Morro Bay are sporadic with no port showing landings in more than 3 of 6 years (from 2011 through 2016).

How much sablefish QP might become available in the north?

The sablefish QP that might become available for use in the north is a combination of the amount by which the southern sablefish is underharvested and the amount of southern sablefish harvested by vessels that would instead fish in the north (see discussion in previous pargraphs).

Over the last four years of the program (2013-2016), the southern sablefish trawl allocation has generally been underharvested by about three quarters (see following table). If that unharvested amount had been available in the north, it would have increased the northern allocation by about a quarter.

Table 2. Assessment of unused trawl sablefish allocation south of 36° N. Lat (mt).

	Northern Allocation	Southern Allocation	Southern Harvest	Unused Southern Allocation	Attainment of Southern Allocation	Unused Southern Allocation as a Percent of Northern Allocation
2011	2,546	531	446	85	84%	3%
2012	2,467	514	223	291	43%	12%
2013	1,828	602	86	516	14%	28%
2014	1,988	653	197	456	30%	23%
2015	2,199	720	145	574	20%	26%
2016	2,411	788	182	605	23%	25%

Possible Need to Adjust Sablefish Accumulation Limits

The regulations provide a process for the combination of quota share (QS) units from different areas and reallocation of the associated QS such that an individual receives the same amount of annual QP after the combination as they would if the combination did not take place (in this case the proposed action would combine southern and northern sablefish QS). However, there is no provision for an automatic adjustment to the QS control limits or vessel QP limits.

Using 2016 allocations, the following table displays the existing accumulation limits and metric ton equivalents and the coastwide limits that would be required to allow control or vessel harvest of the same maximum amount of coastwide metric tons.

Table 3. Existing accumulation limits, equivalent coastwide limits, and comparison to 2016 fleet.

	2016 Trawl Allocation (Mt)	Accumulation Limit	Mt equiv	Minimum Number of Entities to Fully Harvest Allocation
QS Control Limit				
Sablefish North	2,400	3.0%	72	34
Sablefish South	788	10.0%	79	
Total			151	
Coastwide Equivalent (neutral opportunity)	3,188	**4.7%**	151	22
Q: After combination of north and south quota, would the northern limit (3%) accommodate 2016 levels of QS control? A: Uncertain. Requires further analysis, and, ultimately, a definitive answer may not possible because only limited information on control is available in government data bases. A limit of 4.7 percent would accommodate anyone currently in compliance with the control limits.				
Vessel QP Limit				
Sablefish North	2,400	4.5%	108	23
Sablefish South	788	15.0%	118	
Total			226	
Coastwide Equivalent (neutral opportunity)	3,188	**7.1%**	226	15
Q: After combination of north and south quota, would the northern limit (4.5%) accommodate 2016 levels of vessel QP usage. A: Yes (for both trawl and gear switched vessels; additionally, the 2016 maximum for a trawl vessel is also less than the 3% control limit).				

Impacts

If the southern sablefish line is eliminated and vessels from the north choose to harvest in the north instead, gear conflicts are likely to be reduced but southern landings of trawl sector sablefish might also decline by between 50 and 60 percent—reducing revenue for first receivers/processors in the area and personal income generated in local communities.

Gear Switching

With the development of the trawl rationalization program, vessels with trawl permits were able to use fishpot and longline gear (fixed gear) to catch sablefish. In some cases, vessels which had been using trawl gear tried switching and catching some of their harvest with other gears ("switchers"), and in other cases vessels that traditionally participate in the fixed gear fishery acquired trawl permits and entered the trawl sector using fixed gear to take trawl allocations ("enterers"). Documentation of the performance of the gear switching provision starts on page 3-132 of the catch share review.

Analyses requested and assessment of its production.

- Amounts of capital investment by sector – results will be misleading because they cannot be disaggregated, and investments that occurred before a vessel entered the fishery may not be reflected.
- Assessment of the Steiner Holland Paper – this paper is still in the peer review process.
- Evaluation of the expansion of gear switching, impacts on lease prices and economic stability of harvesters and process – some of this can be done next winter.
- Evaluation of impacts on stock productivity – this analysis has been requested.

The Council also requested the assessment of an approach that would establish an amount of sablefish QS/QP that could only be used with trawl gear.

New Information (Since September Council Meeting) and Planned Analysis

In the first year of the trawl catch share program, there were about 27 trawl permits that gear-switched to target on sablefish ((north or south of 36º N. lat.). By partway through 2017, that number had grown to 52 with at least one year of gear switching (Figure 2). Most permits have participated in gear switching for only one year but a few of gear switched for as many as six or seven of the seven years over which the catch share program has been in place (Figure 3). Between 15 and 27 permits have participated in any one year (Figure 4), on average harvesting about 29 percent of the trawl allocation north of 36º N lat. and 21 percent to the south Table 3.

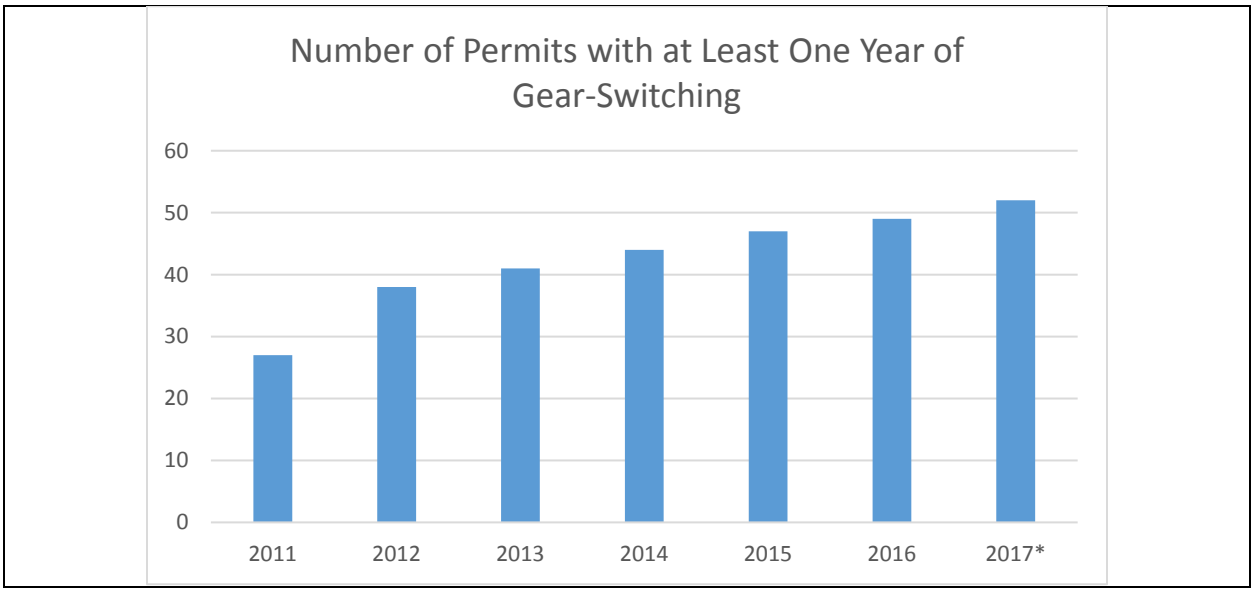

Figure 2. Number of permits with at least one year of gear switching (2011-2017). *Partial year of data. Data source: PacFIN. Intenal Source Reference: GS_Qualifying_Req_2017_Oct_18B_GMTSF_Analysis - FIXED.xlsx: Fixed Gear_N&S]

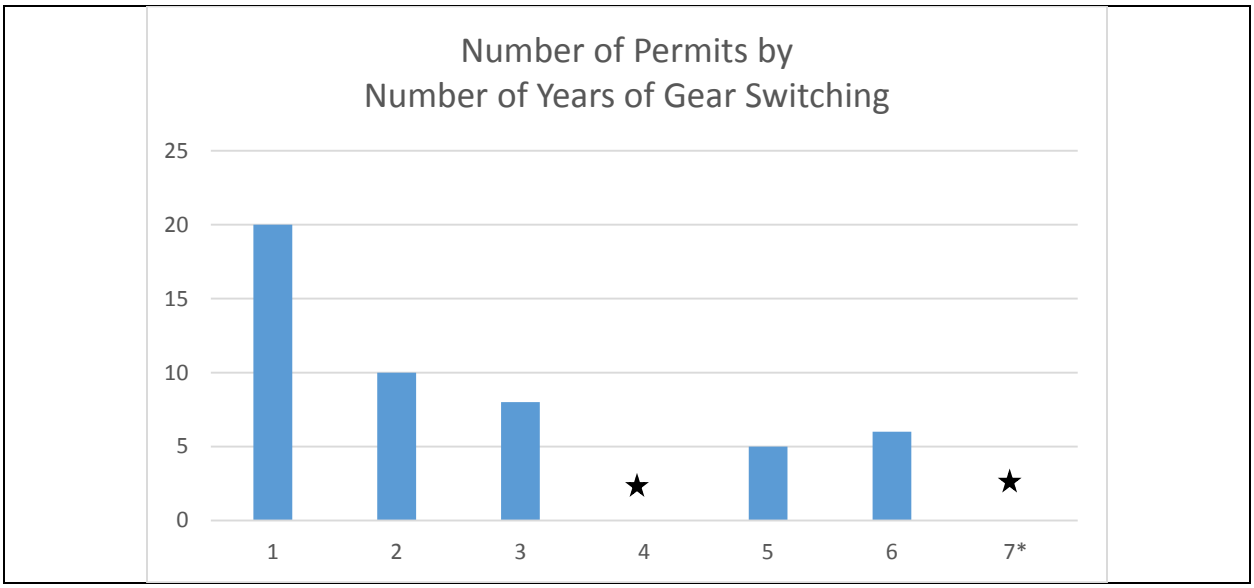

Figure 3. Number of permits by number of years of gear switching (2011-2017). *Partial year of data. ★Potentially confidential data. Data source: PacFIN. Intenal Source Reference: GS_Qualifying_Req_2017_Oct_18B_GMTSF_Analysis - FIXED.xlsx: Fixed Gear_N&S]

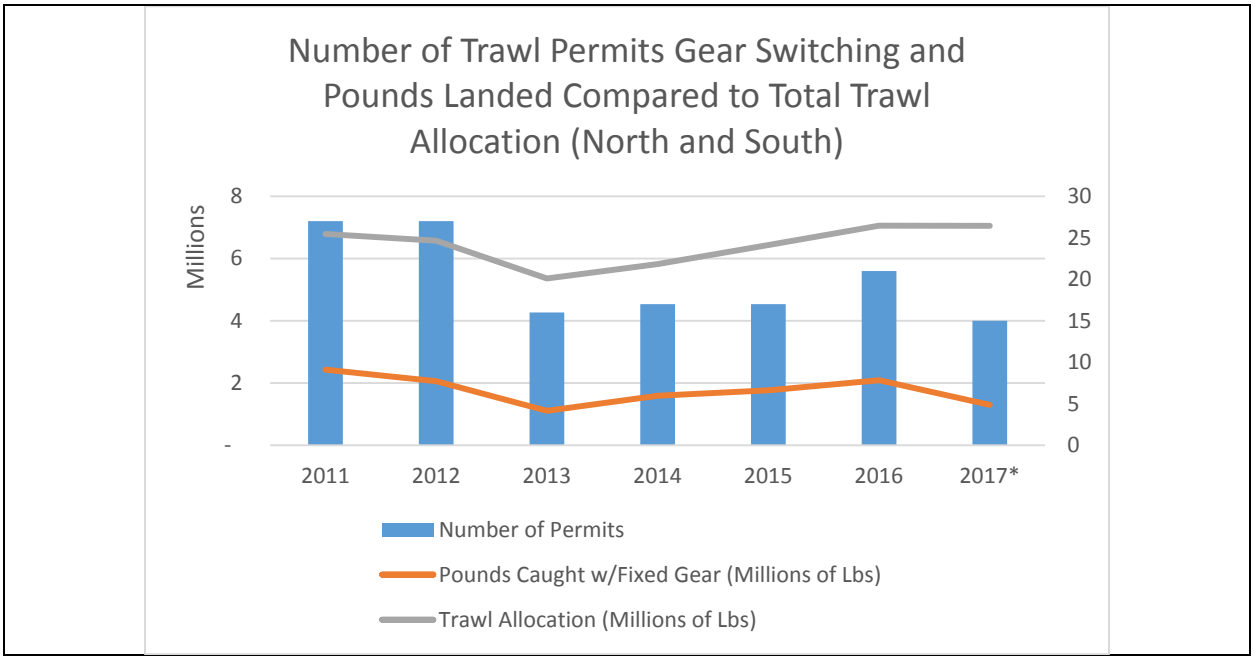

Figure 4. Number of trawl permits gear switching by year, pounds of sablefish caught with fixed gear and the trawl allocation (2011-2017).). *Partial year of data. Data source: PacFIN. Intenal Source Reference: GS_Qualifying_Req_2017_Oct_18B_GMTSF_Analysis - FIXED.xlsx: Fixed Gear_N&S]

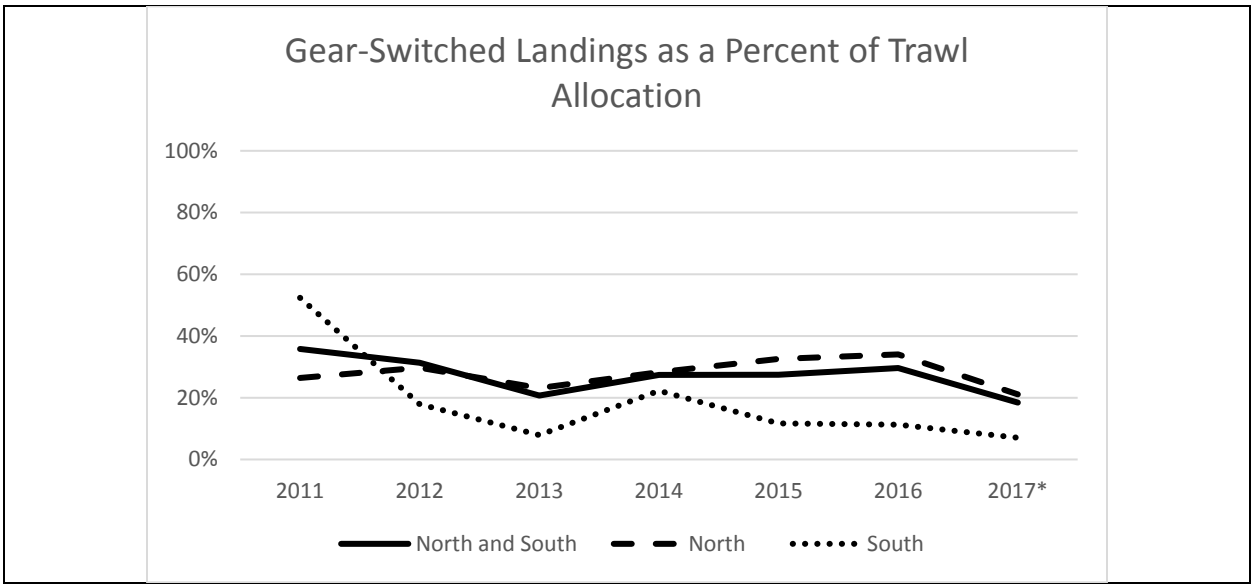

Figure 5. Percent of sablefish allocations harvested by vessels gear switching (2011-2017). *Partial year of data. Data source: PacFIN and groundfish regulations. Intenal Source Reference: GS_Qualifying_Req_2017_Oct_18B_GMTSF_Analysis - FIXED.xlsx: Fixed Gear_N&S]

Table 3. Percent of sablefish allocations harvested by vessels gear switching (2011-2017). .

	2011	2012	2013	2014	2015	2016	2017	2011-2016 (average)
North and South	36%	31%	21%	27%	27%	30%	18%	29%
North	26%	30%	23%	28%	33%	34%	21%	29%
South	52%	18%	8%	22%	12%	11%	7%	21%

Some alternatives discussed have included the concept of a gear-switching endorsement for vessels that have gear-switched prior to September 15, 2017. The following table provides an initial exploration of a range of possible qualifying requirements based on number of years of landing above some minimum level. The data is provided for permits rather than vessels because, in general, this Council has considered history to move with the permit rather than the vessel. This is intended as some initial data to help with preliminary discussion.

Table 4. Shorebased trawl sector sablefish allocations north and south of 36^{o} N. Lat (2011-2017).

MT (from regs)	2011	2012	2013	2014	2015	2016	2017
Trawl Allocation (N)	2,547	2,467	1,828	1,988	2,199	2,411	2,416
Trawl Allocation (S)	531	514	602	653	720	788	781

Table 5. Number of permits that had at least the indicated number of pounds of sablefish landings (north and south of 36° N. Lat.) for at least the indicated number of years.

	Number of Years (At Least)						
Pounds (At Least)	1	2	3	4	5	6	7
>0	53	32	22	14	11	7	<3
1,000	48	30	20	14	11	7	<3
5,000	46	30	19	13	10	7	<3
25,000	37	24	17	11	10	5	<3
50,000	32	21	11	8	6	3	<3
100,000	24	11	6	4	3	<3	<3

Source: PacFIN data. Intenal Source Reference: GS_Qualifying_Req_2017_Oct_18B_GMTSF_Analysis - FIXED.xlsx: Fixed Gear_N&S]

At least one alternative under discussion would require some minimum amount of use of trawl gear in order for a vessel to gear switch. 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 7 is a subset of Figure 6.

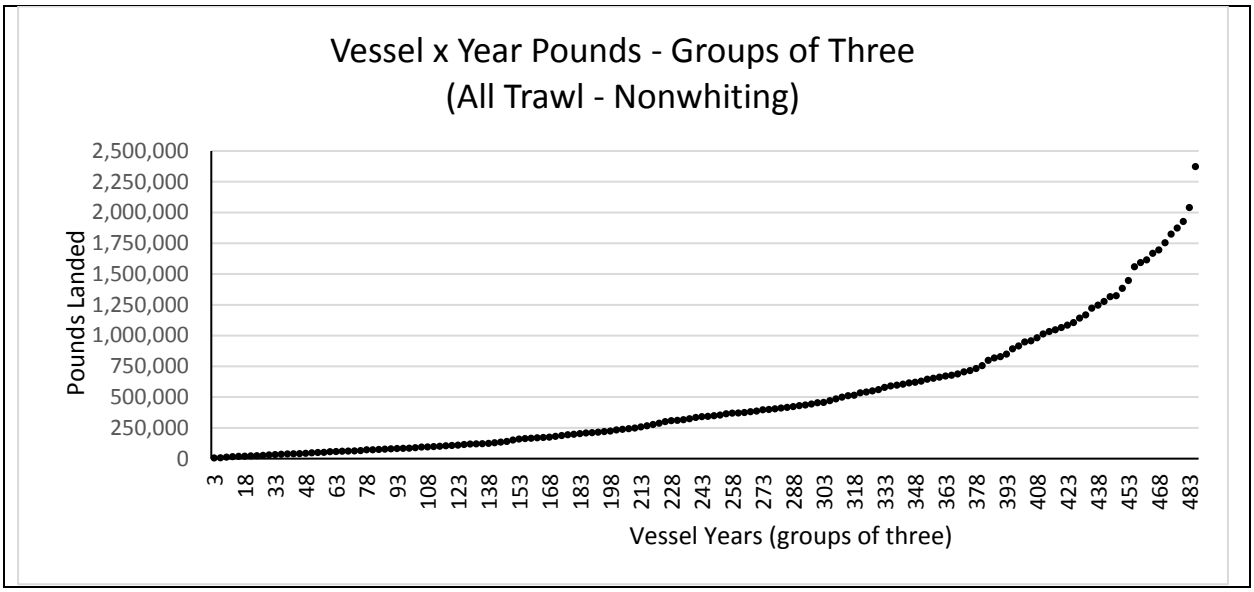

Figure 6. Annual nonwhiting trawl landings per vessel, ordered from least to most in groups of three (2011-2016). Data Source: PacFIN. [Intenal Source Reference: GS_Qualifying_Req_2017_Oct_18B_GMTSF_Analysis - FIXED.xlsx: Trawl Qualification Breakpoints]

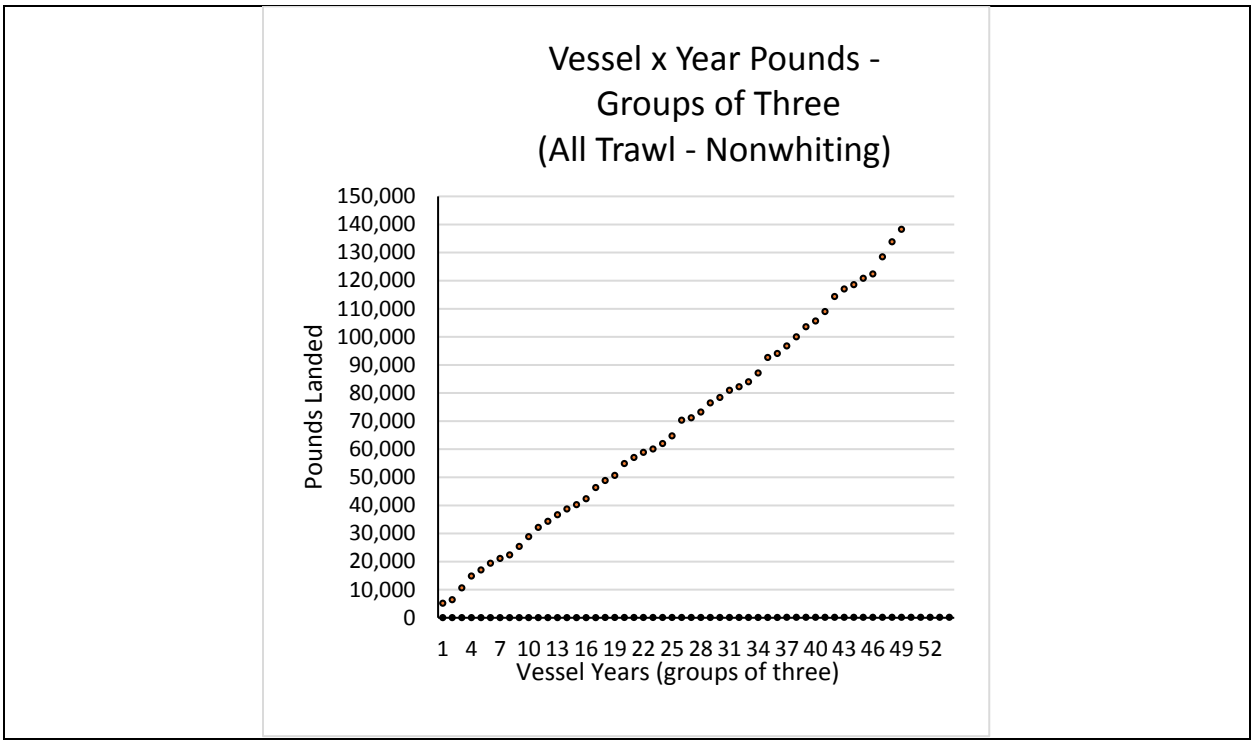

Figure 7. Annual nonwhiting trawl landings per vessel, ordered from least to most in groups of three (truncated at a maximum of 150,000 pounds) (2011-2016). Data Source: PacFIN. [Intenal Source Reference: GS_Qualifying_Req_2017_Oct_18B_GMTSF_Analysis - FIXED.xlsx: Trawl Qualification Breakpoints]

During discussions, one of the concerns with imposing a limit on gear switching that has been articulated is that some vessels that trawl also want to maintain the options to gear switch.

Table 6. Number of vessels in each year that participate with both trawl gear (nonwhiting) and gear-switch and total nonwhiting landings by those vessels (2011-2017).

	2011	2012	2013	2014	2015	2016	2017 (part.)	Total
Number of Vessels	4	4	3	4	<3	7	<3	19
Thousands of Pounds	414	660	1212	988	*	1745	*	26,568

Data source: PacFIN. [: CAB_Tasks_10-12-2017_ECW_Corrected.xlsx: All_IFQ_Lands_by_DS_&_Spp (2)]

While sablefish is the primary species taken by vessel that gear switch, there are small amounts of other species that are also harvested (Table 7)

3. Shorebased IFQ Accumulation Limits (Control and Vessel Limits)

a. Aggregate nonwhiting control limits

3. Shorebased IFQ Accumulation Limits (Control and Vessel Limits)...(continued)

a. Aggregate nonwhiting control limits

Data and Analysis (Provided at the September Council Meeting)

There are three types of accumulation limits:

> ***QS control limits*** limit the amount of QS an entity can control. Control limits impact the distribution of revenue from quota share ownership, but do not directly limit vessel harvest. There are control limits on individual species and an aggregate nonwhiting control limit. The aggregate nonwhiting QS control limits were set at levels that were expected to allow the generation of exvessel revenue equivalent to twice what was projected for efficient harvesters in a fleet rationalized under a trawl catch share program ($1.4 million compared to $700,000).
>
> ***Vessel QP limits*** limit the amount of fish an individual vessel can harvest (the amount of QP a vessel can use). Like QS control limits, vessel QP limits apply to individual species and nonwhiting species in aggregate (the nonwhiting aggregate vessel limit). Vessel QP limits are set higher than the QS control limits to accommodate crew or cooperation between QS owners.

Daily vessel limits limit the amount of unused QP that can be registered to a vessel at any particular time. Daily limits originally applied only to overfished species and Pacific halibut but some of those species have been rebuilt and, so far, the daily limit has been removed only for widow rockfish.

Table 4. Control and vessel limits.

Species Category	Vessel Limit (Applies to all QP in a Vessel Account, Used and Unused)	Vessel Unused QP Limit	QS Control Lim
Nonwhiting Groundfish Species	3.2%		2.7%
Lingcod – N. of 40°10 N. lat	5.3%		2.5%
Lingcod - S. of 40°10 N. lat	13.3%		2.5%
Pacific Cod	20.0%		12.0%
Pacific whiting (shoreside)	15.0%		10.0%
Sablefish			
N. of 36° (Monterey north)	4.5%		3.0%
S. of 36° (Conception area)	15.0%		10.0%
PACIFIC OCEAN PERCH	6.0%	4.0%	4.0%
Widow Rockfish *	8.5%		5.1%
Canary Rockfish	10.0%	4.4%	4.4%
Blackgill Rockfish N. of 40°10'N. Lat	9.0%		6.0%
Chilipepper Rockfish S. of 40°10 N. lat	15.0%		10.0%
BOCACCIO S. of 40°10 N. lat	15.4%	13.2%	13.2%
Splitnose Rockfish	15.0%		10.0%
Yellowtail Rockfish	7.5%		5.0%
Shortspine Thornyhead			
N. of 34°27'	9.0%		6.0%
S. of 34°27'	9.0%		6.0%
Longspine Thornyhead			
N. of 34°27'	9.0%		6.0%
COWCOD S. of 40°10 N. lat	17.7%	17.7%	17.7%
DARKBLOTCHED	6.8%	4.5%	4.5%
YELLOWEYE	11.4%	5.7%	5.7%
Minor Rockfish North			
Shelf Species	7.5%		5.0%
Slope Species	7.5%		5.0%
Minor Rockfish South			
Shelf Species	13.5%		9.0%
Slope Species*	9.0%		6.0%
Dover sole	3.9%		2.6%
English Sole	7.5%		5.0%
Petrale Sole	4.5%		3.0%
Arrowtooth Flounder	20.0%		10.0%
Starry Flounder	20.0%		10.0%
Other Flatfish	15.0%		10.0%
Pacific Halibut	14.4%	5.4%	5.4%

For analysis of the accumulation limits provided in the catch share review document (Agenda Item F.2.a, Catch Share Analysts Report, June 2017) see page 3-14 through 3-18, p. 3-152 through 3-163, p. 3-240 through 3-241. The following is some additional discussion and analysis of the current accumulation limits that will be further developed in the coming months.

Demonstrated Revenue Possibilities under Existing Nonwhiting Accumulation Limits

The original aggregate nonwhiting control limits were developed with the intent of allowing a single entity to acquire an amount of QS with a nonwhiting exvessel revenue equivalent of $1.4 million (twice the amount of revenue projected for the average vessel in an optimized fleet). Further, the vessel QP limit is 18 percent above the QS control limit, theoretically allowing another $400,000 of exvessel revenue. One question that can be examined here is whether

vessels are achieving the maximum levels of exvessel revenue anticipated when the program was designed.

The following table shows that when looking at the coastwide revenues for each fishing vessel, it is possible to achieve exvessel revenues at the anticipated $1.4 million level. It also shows that vessels fishing in the north and south are not achieving the $700,000 level projected for the average vessel in the optimized fleet, although this table does not assess whether some vessels fishing in these areas may be attaining a higher level when their coastwide landings are considered.

Table 5. Average nonwhiting exvessel revenue per vessel caught with trawl gear (millions of dollars) for the top three vessels fishing in a geographic area (only includes revenue from that geography area) and coastwide (includes vessels that also participate in the whiting fishery but only their nonwhiting revenue).

	2011	2012	2013	2014	2015	2016
Northern Washington	0.197	0.409	0.239	0.167	0.240	0.178
Westport WA to Newport OR	0.927	0.986	1.004	1.088	1.346	1.048
Coos Bay OR to Fort Bragg CA	0.836	0.604	0.872	0.982	1.073	1.086
San Francisco to Monterey	0.268	0.224	0.300	0.405	0.149	0.093
South of Monterey	0.281	0.397	0.583	0.509	0.515	0.539
Coastwide	1.011	1.032	1.024	1.181	1.388	1.196

While the above table establishes a lower bound for the maximums possible under existing vessel QP limits, many vessels are not achieving that level of evessel revenue, as indicated in the following graphic.

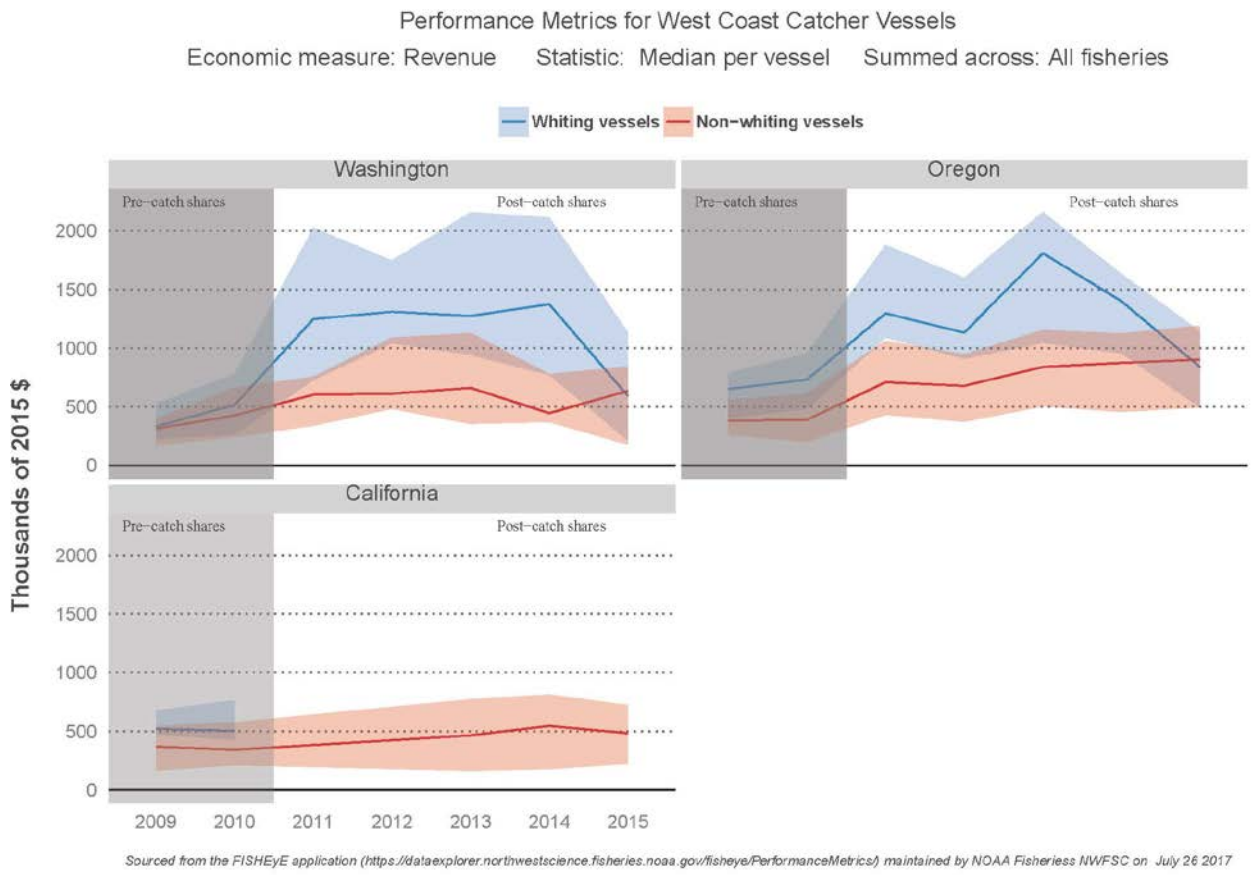

Figure 2. Per vessel average exvessel revenue for whiting and nonwhiting vessels by state.

The above graphic does indicate that many vessels are likely achieving the $700,000 revenue level inferred for the average vessel in the optimum fleet, particularly in Oregon. However, vessels are not necessarily achieving the levels of profit expected to be associated with the gross revenue amounts. The analysis on which the aggregate nonwhiting limits were based indicated that the average vessel in the optimized fleet would have around $500,000 of nonwhiting fishery profits. The following graphic indicates that level is not being achieved by most vessels but that it is possible that some vessels are achieving such profits. The upper bounds of these graphs show the 75th percentile values. Twenty-five percent of the vessels are receiving amounts in excess of those values.

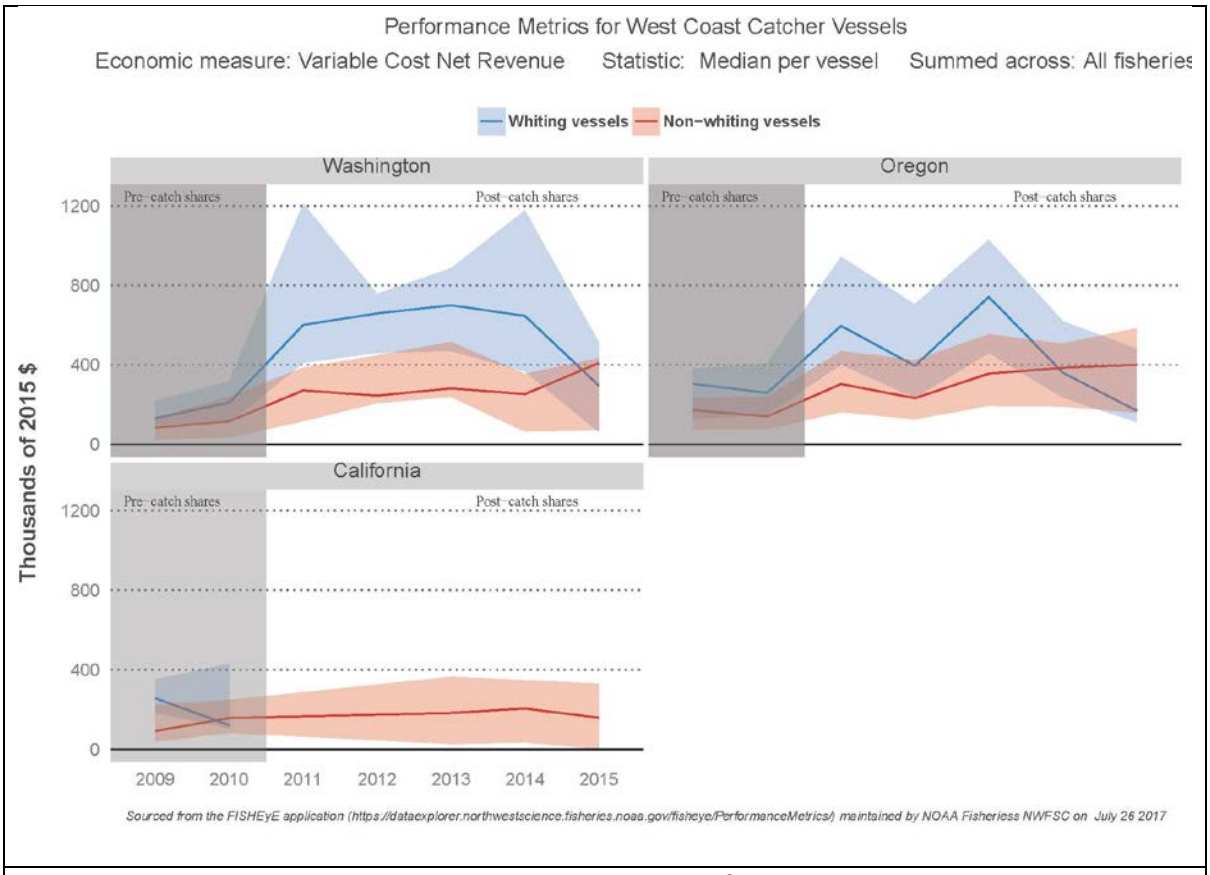

Figure 3. Per vessel average variable cost net revenue for whiting and nonwhiting vessels by state.

Additional analysis can be done to assess the theoretical limits achievable under current conditions in the fishery (reapplying the original GMT analysis from March 2009 to current fishery conditions) and evaluate whether the originally expected profit levels are achievable within the aggregate nonwhiting accumulation limits. Whether vessels are able to achieve the originally anticipated efficiencies is also a function of complete implementation of the program, including regulatory relief.

New Information (Since September Council Meeting) and Planned Analysis

Assuming the Council moves this issue ahead, over the winter analysts will take a close look at the original Lian, Singh, and Weninger (2015) paper on which the current aggregate nonwhiting accumulation limit was largely were based. The NWFSC has contracted for a reprise of that analysis based on data collected through the EDC. Additionally, discussion will be provided about the concept of a "reasonable level of profits." Amendment 20 discussed a level of about a half million dollars as a reasonable level of profit for a trawl vessel but there was not a careful discussion of the term and this did not mean that other levels of profit might also be "reasonable"

A discussion will also be provided regarding the criteria on which the aggregate limits nonwhiting are set and the types of analyses appropriate for the different criteria. These criteria generally fall into two categories "Market Power Excessive Share" and Management Objective

Excessive Share" (Holliday and Anderson, 2007). In the NMFS catch share program design guidance ("The Design and Use of Limited Access Privilege Programs") Holliday and Anderson identify that market power and management objective excessive shares "address completely different issues, and ***are, for the most part, independent of each other***" (emphasis added, p. 52).

Market Power Excessive Share (MP Limit): As quota accumulation levels increase, there is a possibility that inefficiencies will be introduced as participants use market power to influence prices. Indexes such as the Herfindahl Hirschman Index (HHI) are indicators of the likelihood of market power excessive shares. There are two markets of concern in considering these limits, the markets for quota and the markets for fish. Lower accumulation limits help reduce the risk of accumulation of excessive shares from the market power perspective.

Management Objective Excessive Share (MO Limit): Aside from concerns over market power, there are other management objectives which accumulation limits might usefully addressHolliday and Anderson identify that, "Councils are … given considerable latitude to determine the management objectives for any FMP and to choose the subsequent management measures to achieve those objectives" so long as national standards are addressed (p. 52). In relation to the concept of management objective excessive shares, they focus in particular on National Standard 8.

> (8) Conservation and management measures shall, consistent with the conservation requirements of this Act (including the prevention of overfishing and rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities by utilizing economic and social data that meet the requirements of paragraph (2), in order to (A) provide for the sustained participation of such communities, and (B) to the extent practicable, minimize adverse economic impacts on such communities.

Management objective excessive shares are generally less easy to measure market power excessive shares. "There is no body of theory, economic or otherwise, upon which to base the determination of the MO share limit." (Holliday and Anderson, 2007, p. 53). However, NMFS LAPP guidance advises that MO share limits should be less than the levels at which excessive market power would be accumulated. Holliday and Anderson point out that "if a relatively small operational MO share limit is chosen, it will likely preclude the necessity of rigorously determining s* [s* = maximum percentage of quota that can be controlled by a single entity without encountering market power issues]" (p. 53). While high accumulation limits might introduce inefficiency due to market power excessive share, limits which are too low may constrain efficiency, or, as has been of expressed concern in the catch share review, may possibly constrain the full harvest of the allocation. Thus, there is a potential cost to setting lower limits to address management objectives. Holliday and Anderson caution that MO Limits "should be used with care and only when the perceived benefits are greater than potential costs, and only then where there are no less costly or less intrusive ways to achieve the same objective" (p. 53). To help analysts determine how rigorous an analysis of the MP limit is required, at some point prior to the development of that analysis it would be useful to have an indication from the Council of the maximum accumulation limit they would be willing to consider based on other management objectives. In the extreme, Holliday and Anderson note: "If the Council has

management objectives that it deems can only be achieved by a quite low MO limit, it will not be necessary to perform all the analysis to define the MP limit. It is only necessary to show that the chosen MO limit will for all practical purposes prevent market power abuses as well" (p. 55).

b. Individual Species QP Limits

Data and Analysis (Provided at the September Council Meeting)

A question has been raised about whether attainment of some allocations is being limited because the number of vessels active in an area is very small, such that even if every vessel took its maximum amount, the allocation of a particular species could not be attained. The following tables indicate that this problem may exist for some species, primarily in the south (see values in bold).

Table 7. Vessel QP limits, number of vessels required to take the entire allocation, and number of vessels in the area catching each species (2011-2016.

			Nonwhiting Trawl Only		Nonwhiting Trawl and Fixed Gear	
	Vessel Limit	Min Number of vessels required to harvest the IFQ sector's allocation	Minimum Number Active in One Year	Maximum Number Active in One Year	Minimum Number Active in One Year	Maximum Number Active in One Year
Arrowtooth flounder	20.0%	5	55	65	63	69
Bocaccio rockfish South of 40°10' N.	**15.4%**	**7**	**8**	**13**	8	16
Canary rockfish	10.0%	10	29	36	32	39
Chilipepper rockfish South of 40°10' N.	**15.0%**	**7**	**8**	**13**	8	17
Cowcod South of 40°10' N.	17.7%	6	3	10	3	11
Darkblotched rockfish	6.8%	15	45	52	48	57
Dover sole	3.9%	26	38	44	38	47
English sole	7.5%	14	54	66	54	66
Lingcod North of 40°10' N.	5.3%	19	46	49	53	58
Lingcod South of 40°10' N.	**13.3%**	**8**	**8**	**13**	10	17
Longspine thornyheads North of 34°27' N.	9.0%	12	50	62	58	68
Minor shelf rockfish North of 40°10' N.	7.5%	14	45	53	50	60
Minor shelf rockfish South of 40°10' N.	**13.5%**	**8**	**8**	**12**	9	16
Minor slope rockfish North of 40°10' N.	7.5%	14	49	54	58	64
Minor slope rockfish South of 40°10' N.	**9.0%**	**12**	**8**	**13**	12	22
Other flatfish	15.0%	7	59	71	61	73
Pacific cod	20.0%	5	16	26	17	28
Pacific ocean perch North of 40°10' N.	6.0%	17	45	52	48	57
Petrale sole	4.5%	23	56	69	62	73
Sablefish North of 36° N.	4.5%	23	58	70	72	84
Sablefish South of 36° N.	**15.0%**	**7**	**1**	**2**	7	11
Shortspine thornyheads North of 34°27' N.	9.0%	12	56	65	71	82
Shortspine thornyheads South of 34°27' N.	**9.0%**	**12**	**0**	**0**	1	5
Splitnose rockfish South of 40°10' N.	**15.0%**	**7**	**6**	**13**	6	13
Starry flounder	20.0%	5	11	16	11	16
Widow rockfish	8.5%	12	38	44	38	47
Yelloweye rockfish	**11.4%**	**9**	**10**	**14**	11	18
Yellowtail rockfish North of 40°10' N.	7.5%	14	23	31	25	34

Data source: PacFIN. [: CAB_Tasks_10-12-2017_ECW_Corrected.xlsx: All_IFQ_Lands_by_DS_&_Spp (2)]

New Information (Since September Council Meeting) and Planned Analysis

The number of nonwhiting vessels active in an area helps provide an indication of the degree to which a local or coastwide fleet might be constrained from attaining the full trawl allocation because the individual vessel QP limits (Table 7). However, in some cases there may be an opportunity for the effort of gear switched vessels to also contribute to the attainment of the trawl allocation for species other than sablefish. In the last two columns of Table 7, counts of gear switched vessels harvesting more than 1,000 pounds have been added to the nonwhiting trawl vessel counts *[this sentence changed from original]*. Whiting-only vessels are not included in these tables because they target whiting and take non-whiting species only as unintended bycatch. Whiting vessels are included to the degree that they use other gears to harvest their trawl QP allocations.

GEAR SWITCHING AND TRAWL SABLEFISH AREA MANAGEMENT—PRELIMINARY DATA

This document provides some of the preliminary data developed on gear switching and trawl sablefish area management. Additional preliminary data and analysis can be found in Agenda Item F.2.a, Attachment 6 at the November 2017 Council meeting.

Sablefish Quota Utilization and Gear Switching

In general, the northern sablefish allocation has been fully attained and the southern sablefish allocation underattained, perhaps with the exception of the first year of the program (Table 1). Over the last four years of the program (2013-2017), the southern sablefish trawl allocation has generally been underharvested by an average of over 75 percent (under 25 percent attainment). The amount left unharvested is the equivalent of about 25 percent of the northern allocation and at an exvessel price of $2.00 per pound would yield about $2.4 million in exvessel value.

Table 1. Total sablefish allocations and quota pound (QP) used by management area (includes QP used for discards).

	2011	2012	2013	2014	2015	2016	2017
Allocation	Millions of Pounds						
Sablefish North of 36° N.	5.61	5.44	4.03	4.38	4.85	5.32	5.33
Sablefish South of 36° N.	1.17	1.13	1.33	1.44	1.59	1.74	1.72
Harvest	Millions of Pounds						
Sablefish North of 36° N.	5.29	4.93	4.08	4.15	4.86	5.07	5.58
Sablefish South of 36° N.	1.01	0.50	0.20	0.45	0.37	0.45	0.25
Attainment	Percent						
Sablefish North of 36° N.	94%	91%	101%	95%	100%	95%	105%
Sablefish South of 36° N.	86%	44%	15%	32%	24%	26%	14%
Unused/Deficit QP	Millions of Pounds						
Sablefish North of 36° N.	0.33	0.51	-0.05	0.23	-0.01	0.25	-0.25
Sablefish South of 36° N.	0.16	0.63	1.13	0.99	1.21	1.29	1.47
Unused/Deficit QP as Percent Coastwide	Percent						
Sablefish North of 36° N.	5%	8%	-1%	4%	0%	3%	-4%
Sablefish South of 36° N.	2%	10%	21%	17%	19%	18%	21%
Unused QP for Sablefish South of 36° N.	Percent						
As a Percent of Northern	3%	12%	28%	22%	25%	24%	28%
	Millions of Dollars						
Exvessel Value (@$2.00/lb)	$0.32	$1.26	$2.26	$1.97	$2.43	$2.58	$2.94

Data source: Vessel QP accounts. Internal Source Reference: VA_Balances_2011-2017_2017_dec_07.xlsx: Sablefish GS Issue

Amount of Gear Switching

Coastwide, on average from 2011 to 2017, 37 percent of sablefish landings and 30 percent of the trawl sector sablefish allocation were caught by gear-switched vessels. North of 36º N. lat. 32 percent of sablefish landings and 30 percent of the trawl sector sablefish allocation were caught by gear-switched vessels. On a coastwide basis, there is no clear trend in the proportion of the allocation taken by gear-switched vessels. However, in the area north of 36º N. lat., both the percent of landings and percent of allocation caught by gear-switched vessels appears to have been on an upward trend since 2013—although with respect to the percent of landings, the 36 percent taken in 2016 and 2017 was only slightly more than the 34 percent level taken in 2012.

Table 2. Sablefish landings by gear type as a percent of all landings and a percent of the allocations (discards not included[a/]).

	2011	2012	2013	2014	2015	2016	2017	Average
Sablefish North of 36° N.	Percent of Landings							
Trawl	71%	66%	76%	69%	67%	64%	64%	68%
Gear Switched	29%	34%	24%	31%	33%	36%	36%	32%
Sablefish South of 36° N.								
Trawl	4%	10%	7%	3%	4%	2%	1%	4%
Gear Switched	96%	90%	93%	97%	96%	98%	99%	96%
Coastwide								
Trawl	60%	61%	73%	63%	63%	59%	61%	63%
Gear Switched	40%	39%	27%	37%	37%	41%	39%	37%
Sablefish North of 36° N.	Percent of Allocations							
Trawl	65%	57%	76%	64%	66%	60%	63%	64%
Gear Switched	27%	30%	24%	29%	33%	34%	36%	30%
Sablefish South of 36° N.								
Trawl	3%	4%	1%	1%	1%	1%	0%	2%
Gear Switched	81%	39%	13%	29%	19%	22%	12%	31%
Coastwide								
Trawl	54%	48%	57%	48%	50%	45%	48%	50%
Gear Switched	36%	31%	21%	29%	29%	31%	30%	30%

a/ Since discards are not included, the percent of allocations attained in this table are slightly lower than the percent of allocations attained showing in Table 1.

Source: Landings data from PacFIN fish ticket data; allocation amounts based on amounts of QP issued. Internal Source Reference: Sablefish_04&20_N&S_Totals and Counts.xlsx: Pivot

Vessels from the North Fishing in the South and Landing of the Southern Quota

Over the first six years of the catch share program, landings by a cumulative total of 11 trawl sector vessels that also participated in the north accounted for between about 50 and 60 percent of the trawl southern sablefish landings (690 mt out of a total of 1,291 mt caught and 3,808 mt allocated in the south; based on landing data summarized from PacFIN fish tickets). In any one year, no more than four vessels with northern landings also landed southern sablefish QP. A more careful consideration of the likelihood that sablefish currently caught and landed in the

south will be caught and landed in the north would include identifying not only whether a vessel is active in the north but whether its main area of activity is in the north (in which case it may be less likely that it would travel south to harvest its quota, if the 36º line is eliminated for the trawl fishery).

While vessels from the north participate in the south, almost all the landings by these vessels are into the port of Morro Bay. On average, over 92 percent of the southern sablefish is landed in Morro Bay and none of the harvest from this area is landed further north than Monterey. Landings in ports other than Morro Bay are sporadic with no port showing landings in more than 3 of 6 years (from 2011 through 2016).

North-South Price Differentials

While exvessel prices between the north and south are comparable (north slightly higher) northern sablefish QP prices are substantially higher than in the south. There may be a number of reasons for this price differential, however, regardless of the reason it seems likely that if southern sablefish QP could be used in the north, a large portion of that quota would likely be acquired by individuals interested in harvesting north of 36º N. lat.

On average, from 2011 through 2017, the price of sablefish is only 4 to 13 percent higher in the north as compared to the south, depending on the gear type (Table 3). However, since 2014 the average price per pound of sablefish QP sales tends to be at least six times higher in the north, rising to over 17 times higher in 2017 (though there were only three trades of southern sablefish QP in 2017, Table 4). The annual average based on the NMFS vessel IFQ data system (2.81, Table 4) is comparable to that reported on the Jefferson State Trading Company site (3.30, Table 5). Data on QS sales is extremely limited, but the Jefferson State Trading Company site 2016 trades shows north to south price ratio (5.16, Table 5) similar to the QP ratio for that year (6.01, Table 4; 6.47, Table 5).

The demand for harvest opportunities north of 36º N. lat. would also be expected to increase the price of the quota that was previously restricted to southern areas. At the same time, there may be some diminishment in the northern prices given an increase in supply of QP from the south. Overall, the pool of QP potentially available in the north would expand by 32 percent (based on the 2017 north/south allocations). At the same time, some of the harvesting currently occurring in the south would likely shift northward. In 2017, the southern harvest was the equivalent of 4 percent of the northern harvest. Therefore, the proportion of additional quota available would be far greater than the proportion of additional harvest, even if all the southern harvest migrated northward.

Table 3. Weighted average 2011-2017 exvessel prices for IFQ sablefish caught with trawl gear and gear switched.

	North	South	Difference	North Relative to South
IFQ Trawl	$2.05	$1.81	$0.24	13%
IFQ - Gear Switched	$3.20	$3.08	$0.12	4%

Source: PacFIN fish ticket data. Internal Source Reference: Sablefish Prices - PacFIN - Dahl 03 04 20.xlsx: Counts and Prices

Table 4. Average annual QP prices for sablefish north and south.

	2011	2012	2013	2014	2015	2016	2017	Total
Sablefish North of 36° N.								
Price/Lb	1.07	1.04	0.88	1.00	1.11	1.10	1.21	1.06
Total Trades	54	47	66	62	57	83	86	455
Sablefish South of 36° N.								
Price/Lb	0.75	1.05	0.26	0.16	0.18	0.17	0.07	0.38
Total Trades	58	31	8	22	51	3	3	176
Ratio of North to South	1.43	0.99	3.38	6.25	6.17	6.47	17.29	2.81

Source: PacFIN fish ticket data. Internal Source Reference: QP_Prices_2011_2017_dec_07.xlsx: Pivot

Table 5. QP and QS price per pound from Jefferson Street Trading.

	2011-2017 (unweighted averge)		Recent Year	
	Price ($/lb)	**Number of sales**	**Price ($/lb)**	**Number of sales**
	QP Sales			
			2016	
Sablefish North	$1.193	205	1.225	43
Sablefish South	$0.361	62	.204	3
Ratio of north to south	3.30		6.01	
			2017	
Sablefish North			$1.321	33
Sablefish South			$0.044	1
Ratio of north to south			30.03	
	QS Sales			
			2016	
Sablefish North	Only two trades available.		$17.92	1
Sablefish South			$3.47	1
Ratio of north to south			5.16	

Source: https://jeffersonstatetradingco.com/priceperpound.php (December 7, 2017)
Internal Source Reference:Jeff_AuctionReults_Feb 13, 2018.xlsx: Simple Averages

Annual Vessel QP Limits

At the November 2017 Council meeting, Council members expressed interest in the possibility that a reduced northern sablefish annual vessel QP limit might be used to limit the amount of gear switching. The following information is provided to inform further discussion of this possibility. The current annual limit is 4.5 percent in the north and 15 percent in the south (Table 6). While there is a great divergence in these percentages, because the northern allocation is much greater than the southern allocation, the total QP harvestable under the northern and southern limits are somewhat comparable (240,000 QP in the north and 258,000 QP in the south, based on 2017 allocations). The annual vessel QP limits are set at 50 percent above the QS control limits.

Table 6. Annual vessel QP limit alternatives.

	Annual Vessel QP Limit		QS Control Limit	
Species Category	**Percent**	**QP Equivalent in 2017**	**Percent**	**QP Equivalent in 2017**
Sablefish N. of 36° (Monterey north)	4.50%	239,726	3.00%	159,818
Sablefish S. of 36° (Conception area)	15.00%	258,198	10.00%	172,132

Source: Regulations and 2017 QP allocations.

Most vessels harvest well below the vessel limits. Assessing vessels using vessel accounts as a proxy, for 2011 to 2017, the median vessel average annual attainment of the vessel QP limits was 15.9 percent for northern sablefish and 17.4 percent for southern sablefish (Table 7). Average per vessel attainment was somewhat greater (22.9 percent of the annual QP limit in the north and 23.6 percent in the south) because of the influence of highliner catches on the distribution statistic. Few vessels reached more than 90 percent of the limit and most of those were vessels with at least some gear switching during the year. In the north, an average of 2.7 vessels per year reached 90 percent of the 4.5 percent limit (i.e. caught more than 4.05 percent of the trawl allocation). Of these, an average of 2 of the vessels did some gear switching during the year and an average of 0.7 vessels fished only with trawl gear (i.e. from 2011 to 2017 there were five occurrences of a trawl-only vessel catching more than 90 percent of the annual vessel QP limit).

Table 7. Averaged annual (2011-2017) maximum, median, average vessel account attainment of annual QP control limits and number of accounts at the indicated attainment levels.

	Averages of Annual 2011-2017 (Percent of Annual QP Limit)			Average Number of Vessels Achieving Indicated Percent Attainment of QP Limit				Avg of Total Vessels Per Year
	Max	**Median**	**Average**	**Less than 50%**	**50% to 75%**	**75% to 90%**	**More than 90%**	
Sablefish North of 36° N.	98.3%	15.9%	22.9%	81.7	8.7	1.4	2.7	94.6
Vessels with Trawl Only	85.7%	12.7%	18.3%	69.0	5.0	0.6	0.7	75.3
Vessels with Some Gear Switching	95.2%	36.5%	41.4%	12.7	3.7	0.9	2.0	19.3
Sablefish South of 36° N.	66.4%	17.4%	23.6%	7.6	1.0	0.1	0.4	9.1
Vessels with Trawl Only	8.5%	8.3%	8.3%	1.1				1.1
Vessels with Some Gear Switching	66.4%	21.5%	26.3%	6.4	1.0	0.1	0.4	8.0

a/ The 90% level is approached only for lingcod north.
Data source: WCR IFQ database from January 8 2018. [Internal Source Reference: VA_Balances_2011-2017_2017_dec_07: Summary of Species Results]

A retrospective analysis applying hypothetical reductions to the annual QP limit can be used to indicate the degree of impact of such a reduction. Depending on the degree of change, reducing the sablefish annual vessel QP limit for the area north of 36º N. lat. might have only affected a relatively small portion of the total fleet, and the amount of landings that would have been over that limit is relatively small. Larger reductions result in greater impact. For example, a reduction of the limit to 3 percent would have impacted 9 vessels per year on average, at most 8 vessels in any one year, and a total of 24 vessels across all years, out of a total fleet represented by 157 vessels during the seven year period (Table 8). The total QP over the limit that would likely have been made available for other vessels was 5.1 percent on average and 6.1 percent in the year that would have been most impacted. Those percentages equate to 246,818 and 341,696 pounds, respectively. Of those amounts, most would have been caught by vessels with at least

some gear switching (180,229 and 296,838 pounds, respectively). And, 15 out of the 24 vessel affected would have been vessels with at least some gear switching during the year (i.e. 25 percent of the 59 vessels with some gear switching during the year).

Table 8. Impacts of hypothetical reductions in the sablefish annual vessel QP limit applied retrospectively on 2011-2017 trawl sector vessel accounts and catch (current limit is 4.5%).

Hypoth Annual Vessel QP Limit	Vessel Counts (based on Vessel Accounts)			Catch		Catch Over the Reduced Limit as a Percent of Total Catch for the Vessel Group	
	Average/ Year	Max/ Year	Total (All Years)[a/]	Average/ Year	Max/ Year	Average/ Year	Max/ Year
	Vessels Using Only Trawl Gear During the Year						
	75.3	80	120	3,078,400	3,580,930		
	Vessels Impacted			Catch Over the Reduced Limit			
4.0%	0.7	2	3	10,565	27,609	0.3%	0.8%
3.5%	1.0	3	5	30,272	88,975	1.0%	2.5%
3.0%	2.1	5	10	66,589	161,707	2.2%	4.5%
2.5%	4.9	9	20	152,229	295,621	4.9%	8.3%
2.0%	8.4	13	24	308,495	523,538	10.0%	14.6%
	Vessels With At Least Some Gear Switching During the Year[b/]						
	19.3	23	59	1,772,154	2,224,908		
	Vessels Impacted			Catch Over the Reduced Limit			
4.0%	2.0	3	6	39,166	69,300	2.2%	3.1%
3.5%	2.4	4	8	93,481	156,704	5.3%	7.0%
3.0%	4.7	6	15	180,229	296,838	10.2%	13.3%
2.5%	6.0	7	18	316,094	456,314	17.8%	20.5%
2.0%	7.9	12	24	483,533	657,882	27.3%	29.6%
	All Vessels[c/]						
	94.6	102	157	4,850,554	5,575,464		
	Vessels Affected			Catch Over the Reduced Limit			
4.0%	2.7	4	9	49,731	79,868	1.0%	1.4%
3.5%	3.4	6	13	123,754	167,523	2.6%	3.0%
3.0%	6.9	8	24	246,818	341,696	5.1%	6.1%
2.5%	10.9	15	37	468,323	616,464	9.7%	11.1%
2.0%	16.3	20	43	792,029	1,039,511	16.3%	18.6%

a/ Unique vessels participating from 2011 to 2017. Totals do not double count vessels participating in multiple years.
b/ Catch for this category of vessels includes both that caught with non-trawl and trawl gear by vessels using at least some nontrawl gear during the year.
c/ In some cases a vessel is in the "only trawl" category in one year and in the "some gear switching" category in another year. Totals for all vessels do not double count these vessels. Additionally, the maximum values for the two groups of vessels do not sum to the maximum for all vessels because the maximum for each group occurred in a different year.
Data source: WCR IFQ database from January 8 2018 for vessel account information and PacFIN fish ticket data for gear usage. [Internal Source Reference: VA_Balances_2011-2017_2017_dec_07.xlsx: Sablefish GS Issue

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FOLLOW-ON ACTIONS—ISSUES, ALTERNATIVES, AND ANALYSIS

This document provides a summary of the status of trawl catch share review follow-on actions, including: ... preliminary data and analysis. ....

2. Trawl Sablefish Area Management & Gear Switching (See Agenda Item H.2)

This issue is being addressed under Agenda Item H.2 at the March 2018 Council meeting.

3. Shorebased IFQ Accumulation Limits (Control and Vessel Limits)

Background

Accumulation limits restrict the aggregation of quota by persons and vessels. There are three types of accumulation limits

> ***QS control limits*** "Control limits means the maximum amount of QS or IBQ that a person may own or control" (50 CFR §660.111(1)(i)). Control limits impact the distribution of revenue from quota share ownership, but do not directly limit vessel harvest. There are control limits on individual species and an aggregate nonwhiting control limit. The aggregate nonwhiting QS control limits were set at levels that were expected to allow the generation of exvessel revenue equivalent to twice what was projected for efficient harvesters in a fleet rationalized under a trawl catch share program ($1.4 million compared to $700,000).
>
> ***Vessel QP limits*** "means the maximum amount of QP a vessel can hold, acquire, and/or use during a calendar year, and specify the maximum amount of QP that may be registered to a single vessel during the year . . . . Compliance with the QP vessel limit (annual limit) is calculated as all QPs transferred in minus all QPs transferred out of the vessel account." (50 CFR §660.111(1)(ii)). The vessel QP limits on both used and unused pounds in a vessel account effectively limit the amount of fish an individual vessel can harvest (the amount of QP a vessel can use). Like QS control limits, vessel QP limits apply to individual species as well as nonwhiting species in aggregate (the nonwhiting aggregate vessel limit). Vessel QP limits are set higher than the QS control limits to accommodate crew or cooperation between QS owners.

Daily vessel limits limit "the maximum amount of unused QP registered to a vessel account at any one time" (50 CFR §660.111(1)(ii)). Daily limits apply only to overfished species and Pacific halibut. As overfished species have been rebuilt, the daily limits have been removed.

The public has expressed concern that these limits may be hampering full attainment of the trawl allocations or otherwise generating inefficiencies in the trawl program.

National Guidance on Criteria for Limiting Excessive Shares

The criteria by which accumulation limits are set generally fall into two categories "Market Power Excessive Share" and "Management Objective Excessive Share" (Holliday and Anderson, 2007). In the NMFS catch share program design guidance ("The Design and Use of Limited Access Privilege Programs") Holliday and Anderson identify that market power and management objective excessive shares "address completely different issues, and ***are, for the most part, independent of each other***" (emphasis added, p. 52).

Market Power Excessive Share (MP Limit): As quota accumulation levels increase, there is a possibility that inefficiencies will be introduced as participants use market power to influence prices. Lower accumulation limits help reduce the risk of accumulation of excessive shares from the market power perspective.

Management Objective Excessive Share (MO Limit): Aside from concerns over market power, there are other management objectives which accumulation limits might usefully address. Holliday and Anderson identify that, "Councils are … given considerable latitude to determine the management objectives for any FMP and to choose the subsequent management measures to achieve those objectives" so long as national standards are addressed (p. 52). In relation to the concept of management objective excessive shares, they focus in particular on National Standard 8.

> (8) Conservation and management measures shall, consistent with the conservation requirements of this Act (including the prevention of overfishing and rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities by utilizing economic and social data that meet the requirements of paragraph (2), in order to (A) provide for the sustained participation of such communities, and (B) to the extent practicable, minimize adverse economic impacts on such communities.

Management objective excessive shares are generally less easy to measure than market power excessive shares. "There is no body of theory, economic or otherwise, upon which to base the determination of the MO share limit." (Holliday and Anderson, 2007, p. 53). However, NMFS LAPP guidance advises that if MO based share limits are established they should be less than the levels at which excessive market power would be accumulated.[5] At the same time, while high accumulation limits might introduce inefficiency due to market power excessive share, limits which are too low may constrain efficiency, or, as has been of expressed concern in the catch share review, may possibly constrain the full harvest of the allocation. Thus, there is a potential cost to setting lower limits to address management objectives. Holliday and Anderson caution that MO Limits "should be used with care and only when the perceived benefits are greater than potential costs, and only then where there are no less costly or less intrusive ways to achieve the same objective" (p. 53).

[5] Holliday and Anderson (2007) point out that "if a relatively small operational MO share limit is chosen, it will likely preclude the necessity of rigorously determining s* [s* = maximum percentage of quota that can be controlled by a single entity without encountering market power issues]" (p. 53).

Individual Species QP Limits

Table 9. Annual vessel QP limit alternatives.

	Annual Vessel QP Limit			
Species Category	**Alt 1 No Action**	**Alt 2 (TBD)**	**Alt 3 (TBD)**	**QS Control Lim**
Arrowtooth Flounder	20.00%			10.00%
Bocaccio S. of 40º10 N. lat	15.40%			13.20%
Canary Rockfish	10.00%			4.40%
Chilipepper Rockfish S. of 40º10 N. lat	15.00%			10.00%
COWCOD S. of 40º10 N. lat	17.70%			17.70%
Darkblotched	6.80%			4.50%
Dover sole	3.90%			2.60%
English Sole	7.50%			5.00%
Lingcod – N. of 40º10 N. lat	5.30%			2.50%
Lingcod - S. of 40º10 N. lat	13.30%			2.50%
Longspine Thornyhead N. of 34°27'	9.00%			6.00%
Minor Shelf Rockfish North	7.50%			5.00%
Minor Shelf Rockfish South	13.50%			9.00%
Minor Slope Rockfish North	7.50%			5.00%
Minor Slope Rockfish South	9.00%			6.00%
Other Flatfish	15.00%			10.00%
Pacific Cod	20.00%			12.00%
Pacific Halibut	14.40%			5.40%
Pacific Ocean Perch	6.00%			4.00%
Pacific whiting (shoreside)	15.00%			10.00%
Petrale Sole	4.50%			3.00%
Sablefish N. of 36° (Monterey north)	4.50%			3.00%
Sablefish S. of 36° (Conception area)	15.00%			10.00%
Shortspine Thornyhead N. of 34°27'	9.00%			6.00%
Shortspine Thornyhead S. of 34°27'	9.00%			6.00%
Splitnose Rockfish	15.00%			10.00%
Starry Flounder	20.00%			10.00%
Widow Rockfish *	8.50%			5.10%
YELLOWEYE	11.40%			5.70%
Yellowtail Rockfish	7.50%			5.00%
Nonwhiting Groundfish Species	3.20%			2.70%

The annual vessel QP limits are sometimes referred to as "annual vessel QP usage limits" however, *usage* is defined to include both the acquisition of QP and fishing against that QP. In other words, the annual limit is actually a limit on the amount of QP a vessel can have in its account, both used and unused, and so is independent of the amount of QP the vessel actually catches. At the same time, the vessel QP limit does restricts a vessel's annual catch.

Preliminary Data and Analysis

This preliminary analysis provides the following

1. Identification of those species for which the fleet under attains its allocation.
2. An assessment of the degree to which the fleet's catch appears to be constrained by existing QP limits.
    a. Based on individual vessel catches
    b. Based on number of vessels active in an area relative to the limits
3. An assessment of the degree to which an increase in existing QP limits might increase overall fleet attainment of the trawl allocation.
4. An assessment of the degree to which individual vessel revenue might be increased by an increase in vessel QP limits.

In general, the fleet reaches near full attainment (greater than 80 percent) on sablefish,[6] Petrale sole, and Pacific whiting, though in more recent years attainment of Pacific whiting has been variable (Table 10). Attainment levels for three other species were above 50% in 2017: yellowtail rockfish, Pacific halibut, and widow rockfish. The fleet attained 50 percent of its arrowtooth flounder allocation twice, once in 2013 and once in 2015, and reached 50% attainment in one year for the following five species: shortspine thornyheads south, bocaccio south, longspine thornyheads north, canary, and sablefish south. For no other species or species group has the fleet reached more than 50% attainment. Thus for most of the 29 categories of species and species groups, the industry and communities would benefit from higher levels of attainment (Pacific halibut is not included in this list since it cannot be retained by vessels fishing in the trawl sector).

Table 10. Shorebased trawl sector attainment of its allocations (values 90% or above are shaded values between 80% and 90% are in bold).

	2011	2012	2013	2014	2015	2016	2017
Arrowtooth flounder	20%	26%	63%	50%	52%	47%	12%
Bocaccio rockfish South of 40°10' N.	9%	15%	17%	11%	47%	51%	30%
Canary rockfish	14%	28%	26%	26%	104%	48%	25%
Chilipepper rockfish South of 40°10' N.	21%	22%	36%	29%	16%	6%	6%
Cowcod South of 40°10' N.	1%	5%	22%	20%	26%	21%	27%
Darkblotched rockfish	36%	36%	44%	35%	43%	42%	36%
Dover sole	35%	33%	36%	29%	14%	16%	16%
English sole	1%	2%	3%	5%	4%	6%	3%
Lingcod (coastwide)	16%	21%					
Lingcod North of 40°10' N.			28%	21%	16%	24%	46%
Lingcod South of 40°10' N.			3%	4%	7%	6%	4%
Longspine thornyheads North of 34°27' N.	49%	48%	59%	50%	26%	23%	30%
Minor shelf rockfish North of 40°10' N.	3%	8%	6%	7%	3%	3%	21%
Minor shelf rockfish South of 40°10' N.	3%	15%	25%	12%	5%	2%	1%
Minor slope rockfish North of 40°10' N.	17%	27%	25%	23%	19%	13%	13%
Minor slope rockfish South of 40°10' N.	14%	33%	31%	26%	16%	12%	13%
Other flatfish	17%	16%	19%	20%	11%	14%	10%
Pacific cod	22%	35%	14%	15%	37%	37%	4%
Pacific halibut (IBQ) North of 40°10' N.	28%	43%	31%	26%	43%	38%	55%
Pacific ocean perch North of 40°10' N.	39%	45%	45%	36%	42%	44%	47%
Pacific whiting	98%	96%	99%	**83%**	47%	61%	**87%**
Petrale sole	93%	100%	92%	97%	98%	95%	100%
Sablefish North of 36° N.	94%	91%	101%	95%	100%	95%	105%
Sablefish South of 36° N.	**86%**	44%	15%	32%	24%	26%	14%
Shortspine thornyheads North of 34°27' N.	50%	50%	60%	50%	45%	48%	48%
Shortspine thornyheads South of 34°27' N.	17%	1%	7%	5%	2%	4%	0%
Splitnose rockfish South of 40°10' N.	3%	4%	3%	4%	2%	1%	1%
Starry flounder	2%	1%	0%	2%	1%	2%	1%
Widow rockfish	40%	45%	41%	66%	57%	59%	52%
Yelloweye rockfish	10%	6%	6%	6%	4%	5%	15%
Yellowtail rockfish North of 40°10' N.	24%	32%	27%	40%	32%	26%	58%

Data source: WCR IFQ database January 8, 2018. [VA_Balances_2011-2017_2017_dec_07: All_IFQ_Lands_by_DS_&_Spp (2): Sector Attainment]

In some cases, interpretation of attainment levels is benefited by the context of changing levels of trawl allocation and harvest policy. For example, the widow 2017 attainment went down by a

[6] In 2017, the fleet reached 105% attainment of sablefish due to a combination of carryover of unused sablefish QP from 2016 to 2017 and carryover of sablefish QP deficits from 2017 to 2018.

small amount (from 59 percent to 52 percent), however, the 2017 trawl allocation of widow QP was substantially greater than in 2016 and 475 percent above the 2011-2017 average allocation (Figure 1). The 2017 gear trawl EFP may have helped keep attainment levels high and a similar but more expansive gear EFP in 2018 may continue to contribute to higher attainment. If the gear provisions included in this EFP are implemented as regulations, attainment may continue to be benefited. Similarly, if the Council reduces the extent of the trawl RCAs, attainment may also be positively effected, depending on the degree to which overfished or constraining shelf species are encountered in the newly reopened areas.

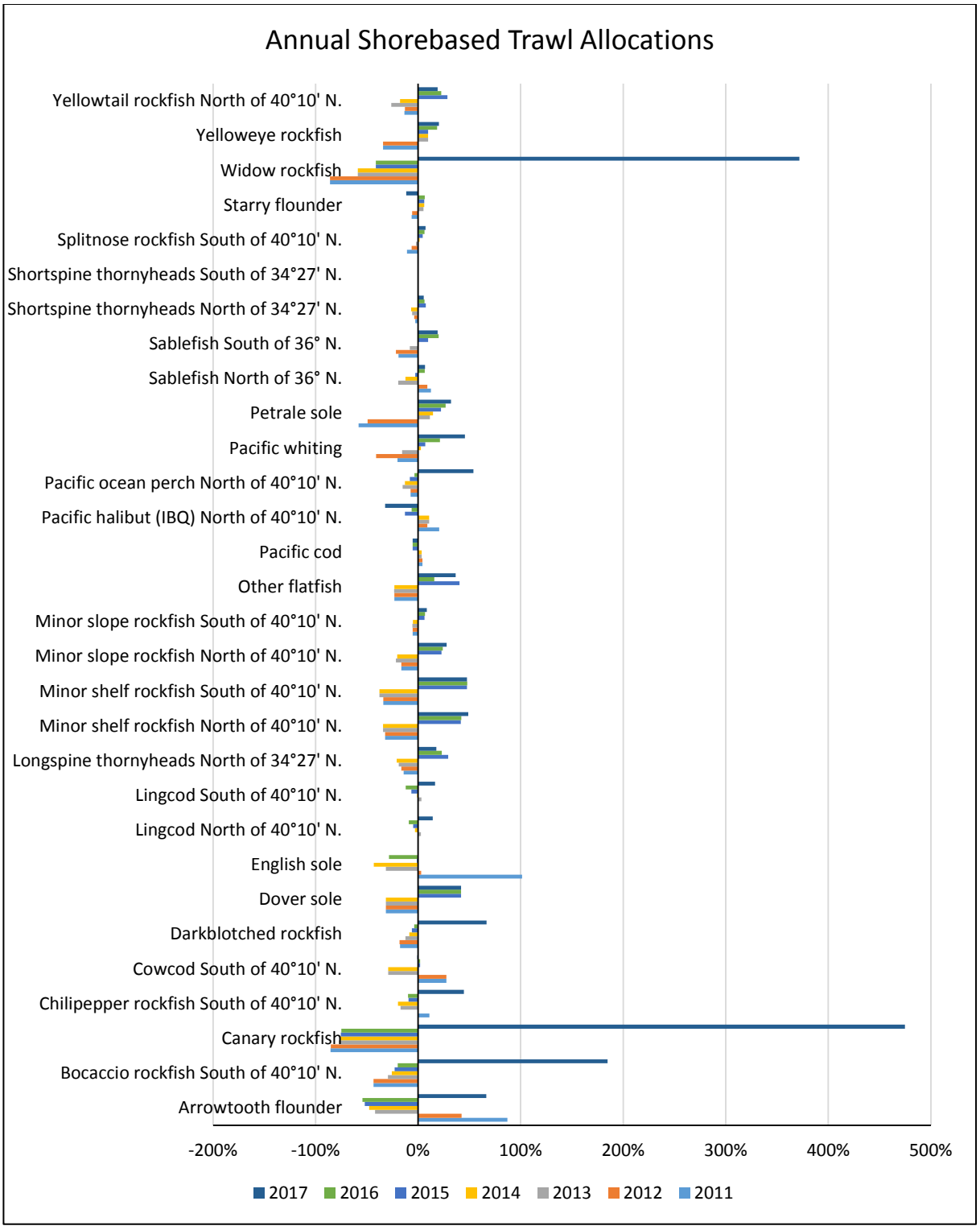

Figure 1. Shorebased trawl allocations of QP as the percent difference between individual year trawl allocations and 2011-2017 average. Data source: WCR IFQ Database.
[VA_Balances_2011-2017_2017_dec_07: All_IFQ_Lands_by_DS_&_Spp (2): Sector Attainment]

To evaluate the degree to which limits might be constraining of the current fleet, the occurrences of individual vessel catches within 10 percent of the current vessel limits is evaluated (i.e. occurrences of a vessel reaching 90 percent of the annual limit for a particular QP species). This approach may under estimate the degree to which the limits are constraining the current fishery, as indicated by the SSC at its June 2017 meeting[7]. The approach used here assesses one aspect of the degree of short-term constraint imposed by the limits, not taking into account possible effect the QP limits may have on dampening the purchase of larger vessels. QP limits may constrain efficiency of the fleet, but how fleet efficiency might impact total attainment is another question and depends on the causes of under attainment. For example, if attainment is limited because of limited markets or the limited amount of quota available for a constraining species in a mixed-stock fishery, then it is not clear that increasing the vessel limits would have a substantial impact on attainment.

The assessment of vessel catch in comparison to vessel QP limits is conducted based on vessel accounts, since it is the vessel account that is held to the limits.[8] Not more than a dozen vessels have come within 10% of a vessel limit for at least one species in any given year and in most cases, when they do so, they only come that close for one species (Table 12). A total of 32 vessels have come

Vessel Length

Data on the fishery indicates that thus far there has not been a move to larger vessels. In general, the average length of vessels in the non-whiting fleet increased by about 2 feet as the number vessels declined with implementation of the program but since program implementation, size has varied with no clear trend (Table 11). The change in average size with program implementation may be the result of smaller vessels dropping out. Whether the stability in vessel size over the course of the program is caused by annual QP limits is uncertain. For the whiting fleet there appears to be some indication of a possible trend toward larger vessels. The variability in participation in the fixed gear fleet makes a trend difficult to discern.

Table 11. Trend in number and length (feet) of vessels participating in the shorebased IFQ fishery with nonwhiting bottom trawl, whiting midwater trawl, and fixed gear.

	2009	2010	2011	2012	2013	2014	2015
Nonwhiting Groundfish Trawl							
Number	118	106	73	67	70	64	62
Average length	68.30	69.00	70.25	70.00	69.50	70.12	70.92
Whiting Groundfish Trawl							
Number	34	35	26	24	24	25	22
Average length	83.42	85.41	85.78	87.45	87.45	87.00	88.95
Fixed Gear							
Number	N/A	N/A	26	26	19	21	18
Average length	N/A	N/A	57.16	64.00	56.00	61.00	59.16

Source: Summarized from FishEyE, January 12, 2018.

[7] "While the fact that not many vessels have come close to aggregation limits is suggestive that the limits are not very constraining, it is not conclusive. We do not know, and there is nothing in the draft analysis to indicate, how many firms might have exceeded QP or QS aggregation limits, and by how much, if these constraints were not there. This is an important caveat that should be noted and may be an area where further research is needed." (SSC June 2017, draft minutes, page 8-10)

[8] When ownership of a vessel changes a new vessel account must be established. Compliance with annual QP limits is determined based on the vessel account. Thus, if ownership changes mid-year it would be possible for the vessel to exceed the limits over the course of the year, but not the individual accounts and their owners.

close to encountering a limit, and individually each of these 32 vessels have approached a limit an average of 2.3 times from 2011 to 2017. Thus, vessels with multiple close approaches to the limits tended to do so across years rather than with multiple species within a single year.

Table 12. Number of vessels (vessel accounts) coming within 10% of the vessel annual QP limit for at least one species in a year and the number of vessel/species combinations approaching the limit within each year.

	2011	2012	2013	2014	2015	2016	2017	Total	Avg
Total Vessels	6	8	8	9	11	11	12	32	9.3
Total Instances (vessel/species combinations approaching the limit)	6	13	9	9	12	12	13	74	10.6

Data source: WCR IFQ Database. [VA_Balances_2011-2017_2017_dec_07: All_IFQ_Lands_by_DS_&_Spp (2): VA Account Attainment of 90%]

Petrale sole and sablefish north are the species for which vessels most often attain more than 90 percent of the annual vessel limits (Table 13). These species are also the two for which the fleet regularly approaches full attainment of its allocation (Table 10). Petrale and sablefish are followed in order by yellowtail, POP and widow, all of which had an annual average of between 0.5 and 1.0 vessels per year coming to within 10 percent of the limit. Species and species groups with an average of less than 0.5 vessels coming within 10 percent of the limit were minor slope south, sablefish south, boccacio south, canary, darkblotched and Pacfic cod. No vessel came within 10 percent of the vessel QP limit for any of the other species.

Table 13. Averaged annual (2011-2017) maximum, median, average vessel account attainment of accumulation limits and number of accounts at the indicated attainment levels.

	Averages of Annual 2011-2017 (Percent of Annual QP Limit)			Average Number of Vessels Achieving Indicated Percent Attainment of QP Limit				Avg of Total Vessels Per Year
	Max	Median	Average	Less than 50%	50% to 75%	75% to 90%	More than 90%	
Arrowtooth flounder	19.0%	0.4%	2.1%	92.1				92.1
Bocaccio rockfish South of 40°10' N.	53.1%	11.0%	16.2%	11.4	0.6	0.1	0.3	12.4
Canary rockfish	116.7%	2.3%	7.0%	55.9	0.3	0.1	0.3	56.6
Chilipepper rockfish South of 40°10' N.	46.1%	4.5%	9.9%	11.6	0.6	0.1		12.3
Cowcod South of 40°10' N.	45.0%	7.2%	11.6%	7.3	0.6	0.1		8.0
Darkblotched rockfish	59.5%	2.1%	6.7%	83.7	1.0		0.1	84.9
Dover sole	40.2%	3.9%	7.1%	91.0	0.3			91.3
English sole	6.4%	0.1%	0.7%	66.0				66.0
Lingcod (Coastwide and Combined)[a/]	80.9%	0.1%	4.1%	84.4	1.0	0.9	0.6	86.9
Longspine thornyheads North of 34°27' N.	50.7%	1.9%	6.4%	68.9	0.9			69.7
Minor shelf rockfish North of 40°10' N.	26.2%	0.2%	1.4%	69.0	0.1			69.1
Minor shelf rockfish South of 40°10' N.	19.1%	2.2%	4.5%	12.9	0.1			13.0
Minor slope rockfish North of 40°10' N.	24.9%	1.3%	3.3%	78.1				78.1
Minor slope rockfish South of 40°10' N.	76.9%	2.7%	12.9%	16.1	0.9	0.4	0.4	17.9
Other flatfish	10.7%	0.4%	1.2%	82.3				82.3
Pacific cod	50.5%	0.1%	3.8%	31.9	0.3	0.1	0.1	32.4
Pacific halibut (IBQ) North of 40°10' N.	31.8%	1.2%	3.5%	73.4	0.1			73.6
Pacific ocean perch North of 40°10' N.	98.0%	2.8%	10.2%	66.4	2.3	0.1	0.7	69.6
Pacific whiting	46.1%	0.0%	6.2%	86.7	0.6			87.3
Petrale sole	100.4%	22.1%	29.3%	56.6	9.6	4.1	3.3	73.6
Sablefish North of 36° N.	98.3%	15.9%	22.9%	81.7	8.7	1.4	2.7	94.6
Sablefish South of 36° N.	66.4%	17.4%	23.6%	7.6	1.0	0.1	0.4	9.1
Shortspine thornyheads North of 34°27' N.	48.0%	2.8%	6.1%	91.4	0.4			91.9
Shortspine thornyheads South of 34°27' N.	38.6%	30.5%	31.3%	2.1	0.4	0.1		2.7
Splitnose rockfish South of 40°10' N.	6.8%	0.5%	1.4%	11.7				11.7
Starry flounder	3.2%	0.0%	0.5%	13.9				13.9
Widow rockfish	84.8%	1.0%	9.4%	61.4	1.6	1.3	0.7	65.0
Yelloweye rockfish	13.5%	2.6%	3.8%	16.1				16.1
Yellowtail rockfish North of 40°10' N.	87.8%	1.6%	9.1%	46.7	1.1	0.6	0.9	49.3

a/ The 90% level is approached only for lingcod north.

Data source: WCR IFQ database from January 8 2018. [VA_Balances_2011-2017_2017_dec_07: Summary of Species Results]

One reason to raise the vessel QP limits might be a demonstration that vessels are encountering the limits in such a manner that results in unanticipated consequences, such as underattainment of the trawl allocation. Another might be that there are not enough vessels operating in an area to fully harvest an allocation, even if most vessels were harvesting near the vessel QP limits. The number of nonwhiting vessels active in an area helps provide an indication of the degree to which a local or coastwide fleet might be constrained from attaining the full trawl allocation because the individual vessel QP limits (Table 14). While vessels are not restricted from moving into the area in which there is a demand for more landings, if the typical number of vessels operating in an area is not sufficient to harvest the trawl allocation then there might be reason to raise the QP limits. In some cases there may be an opportunity for the effort of gear switched

vessels to also contribute to the attainment of the trawl allocation for species other than sablefish. Therefore, numbers of active nonwhiting vessels (trawl and gear switched) are also included in Table 14. Vessels that only have shoreside whiting trips are not included because they target whiting and take non-whiting species only as unintended bycatch. Whiting vessels are included to the degree that they use make nonwhiting trips to harvest their trawl QP allocations. Table 14 indicates that unless there is a redistribution of vessels, if vessel harvests increase to approach the annual vessel QP limits a shortage of vessels operating in an area could be a problem for some species, primarily in the south (see species and values in bold).

Table 14. Vessel QP limits, number of vessels required to take the entire allocation, and number of vessels in the area catching each species (2011-2016.

			Nonwhiting Trawl Only		Nonwhiting Trawl and Fixed Gear	
	Vessel Limit	Min Number of vessels required to harvest the IFQ sector's allocation	Minimum Number Active in One Year	Maximum Number Active in One Year	Minimum Number Active in One Year	Maximum Number Active in One Year
Arrowtooth flounder	20.0%	5	55	65	63	69
Bocaccio rockfish South of 40°10' N.	**15.4%**	**7**	**8**	**13**	8	16
Canary rockfish	10.0%	10	29	36	32	39
Chilipepper rockfish South of 40°10' N.	**15.0%**	**7**	**8**	**13**	8	17
Cowcod South of 40°10' N.	17.7%	6	3	10	3	11
Darkblotched rockfish	6.8%	15	45	52	48	57
Dover sole	3.9%	26	38	44	38	47
English sole	7.5%	14	54	66	54	66
Lingcod North of 40°10' N.	5.3%	19	46	49	53	58
Lingcod South of 40°10' N.	**13.3%**	**8**	**8**	**13**	10	17
Longspine thornyheads North of 34°27' N.	9.0%	12	50	62	58	68
Minor shelf rockfish North of 40°10' N.	7.5%	14	45	53	50	60
Minor shelf rockfish South of 40°10' N.	**13.5%**	**8**	**8**	**12**	9	16
Minor slope rockfish North of 40°10' N.	7.5%	14	49	54	58	64
Minor slope rockfish South of 40°10' N.	**9.0%**	**12**	**8**	**13**	12	22
Other flatfish	15.0%	7	59	71	61	73
Pacific cod	20.0%	5	16	26	17	28
Pacific ocean perch North of 40°10' N.	6.0%	17	45	52	48	57
Petrale sole	4.5%	23	56	69	62	73
Sablefish North of 36° N.	4.5%	23	58	70	72	84
Sablefish South of 36° N.	**15.0%**	**7**	**1**	**2**	7	11
Shortspine thornyheads North of 34°27' N.	9.0%	12	56	65	71	82
Shortspine thornyheads South of 34°27' N.	**9.0%**	**12**	**0**	**0**	1	5
Splitnose rockfish South of 40°10' N.	**15.0%**	**7**	**6**	**13**	6	13
Starry flounder	20.0%	5	11	16	11	16
Widow rockfish	8.5%	12	38	44	38	47
Yelloweye rockfish	**11.4%**	**9**	**10**	**14**	11	18
Yellowtail rockfish North of 40°10' N.	7.5%	14	23	31	25	34

Data source: PacFIN. [CAB_Tasks_10-12-2017_ECW_Corrected.xlsx: All_IFQ_Lands_by_DS_&_Spp (2)]

As one indication of the potential for an increase in the vessel QP limit to increase sector attainment of its allocation, a 30 percent increase in limits was assumed and multiplied by the average number of vessels (vessel accounts) reaching within 90 percent of the limit for a particular species (rounded up to the next whole vessel). The result was then applied to the 2017 trawl allocations and actual catches for comparison. For example, if an average of 0.3 vessels per year reach near the QP limit, it was assumed that one vessel reaches near the limit and that if the QP limit were increased by 30 percent that vessel would take the full amount of the increase. The results of this exercise are provided in Table 15. Data are not provided for Petrale sole or

sablefish since these species are generally fully attained. For all other species, on average, fewer than one vessel account came to within 10% of the QP limit, therefore the estimates of the increase are all based on increased attainment by a single vessel. As measured against the trawl allocations, the degree of increased attainment is estimated at around 2 or 3 percent for most species (Table 15). When evaluated in terms of a percentage increase in sector catch, the increases are larger—particularly for Pacific cod, for which the allocation attainment level is very low (only 4%). Sableflish south, minor rockfish south, and bocaccio rockfish south are the three species with the next highest increases. The higher percent increases in catch for some species is due to a combination of relatively low attainment levels and current QP limits that are relatively high (such that a 30 percent increase results in a greater absolute increase in the limit).

Table 15. Estimate of potential increases in attainment and catch from a 30 percent increase in QP limits.

	2017 QP Allocation	2017 Catch	Percent of Alloc Caught	Numb of Ves Accts (rnded up)	QP Limit			Increase in Harvest (pounds)	Increase as a Percent of	
					Percent	2017 QP	Increased by 30%		Alloc-ation	Catch
Bocaccio rockfish South of 40°10' N.	666,673	202,154	30%	1	15.4%	102,668	20.0%	30,800	5%	15%
Canary rockfish	2,235,704	559,313	25%	1	10.0%	223,570	13.0%	67,071	3%	12%
Darkblotched rockfish	1,119,064	400,729	36%	1	6.8%	76,096	8.8%	22,829	2%	6%
Lingcod North of 40°10' N.	2,997,625	1,364,805	46%	1	5.3%	158,874	6.9%	47,662	2%	3%
Minor slope rockfish South of 40°10' N.	953,881	123,562	13%	1	9.0%	85,849	11.7%	25,755	3%	21%
Pacific cod	2,273,789	94,842	4%	1	20%	454,758	26.0%	136,427	6%	144%
Pacific ocean perch North of 40°10' N.	437,116	206,893	47%	1	6%	26,227	7.8%	7,868	2%	4%
Sablefish South of 36° N.	1,721,321	249,530	14%	1	15%	258,198	19.5%	77,459	5%	31%
Widow rockfish	25,116,596	13,050,983	52%	1	8.5%	2,134,911	11.1%	640,473	3%	5%
Yellowtail rockfish North of 40°10' N.	9,361,037	5,437,061	58%	1	7.5%	702,078	9.8%	210,623	2%	4%

Data source: WCR IFQ database. [VA_Balances_2011-2017_2017_dec_07: Summary of Species Results]

Among other factors, vessel limits are set to allow greater operational efficiency than would be the case if the control limits (which are lower than vessel limits) were applied to the vessel. At the same time, vessel QP limits are intended to encouraging broader distribution of benefits among vessel owners, and possibly among communities, than would occur if there were no such limits. For the species for which vessel accounts approached the QP limits (Table 13) and those for which there may not be enough vessels in an area to take the allocation even if limits were fully harvested (Table 14) Table 16 shows how a 30% increase in vessel limits would impact the minimum number of vessels required to harvest an allocation. The specific circumstances for each of these species should be considered in evaluating whether or not they are appropriate for an increase in the QP limits. For example, relatively few vessels have been landing yelloweye rockfish. However, because this is an overfished species and there is a very limited amount of QP available, vessels have been trying to avoid catching it.

Table 16. The minimum number of vessels that the fleet could shrink to while still taking the full allocation, for those species/species groups for which sector allocation attainment levels are low and either vessel limits were approached by at least one vessel or there may not be enough vessels harvesting the fish to fully attain the allocation (because vessel QP limits would not allow it).

Species	Vessel(s) Approach QP Limits (Table 13)	Not Enough Vessels in the Area (Table 14)	Minimum Number of Vessels to Take the Full Allocation	
			With Current QP Limits	With a 30% Increase in QP Limits
Bocaccio rockfish South of 40°10' N.	Y	Y	7	5
Canary rockfish	Y		10	8
Chilipepper rockfish South of 40°10' N.		Y	7	6
Darkblotched rockfish	Y		15	12
Lingcod North of 40°10' N.	Y		19	15
Lingcod South of 40°10' N.		Y	8	6
Minor shelf rockfish South of 40°10' N.		Y	8	6
Minor slope rockfish South of 40°10' N.	Y	Y	12	9
Pacific cod	Y		5	4
Pacific ocean perch North of 40°10' N.	Y		17	13
Sablefish South of 36° N.	Y	Y	7	6
Widow rockfish	Y		12	10
Yelloweye rockfish		Y	9	7
Yellowtail rockfish North of 40°10' N.	Y		14	11

Data source: Summaries of WCR IFQ database. [VA_Balances_2011-2017_2017_dec_07: Summary of Species Results]

The impacts of an increase in the vessel QP limit might be more important for individual vessels than it is for the fleet, processors, and communities which rely on those vessels. To provide a sense of the impact of a 30 percent increase in the vessel limit, the 2017 exvessel revenue for those vessels that approached the QP limits were examined. Of the 32 vessels that approached the limit in at least one year from 2011-2017, 27 were active in 2017 (summarized from WCR IFQ database). Those 27 vessels averaged $1.1 million in exvessel revenue (PacFIN data query, January 17, 2017).[9] Of the 27, only three had revenues of less than one half million. Those three vessels averaged 272 thousand dollars. These exvessel revenues per vessel can be contrasted with the amount of additional revenue that might be possible with a 30 percent increase in the annual vessel QP limits. For the 6 of the 14 species covered in Table 16, a 30 percent increase in the vessel QP limit for a species would mean an opportunity for a vessel to increase revenue from that species by less than 15 thousand dollars (Table 17). However, for three of the species the opportunity would be between 30 and 50 thousand dollars and for three others it would be between 75 and 100 thousand dollars. Finally, for two species, sablefish south and widow rockfish, a 30 percent increase could each provide an opportunity for a vessel to increase its revenue by over $150 thousand. In evaluating these results, it should be kept in mind first that these values do not include any co-occurring species that might be harvested due to the increase in the accumulation limit, and second that there is an average of about 10 to 11 close encounters with individual species limits each year, and finally that these encounters are spread across an average of about 9 to 10 vessels (Table 12). (This is a preliminary analysis using 2017 coastwide average prices for shorebased trawl caught groundfish in the nonwhiting fishery).

[9] Data summary location: VA_Balances_2011-2017_2017_dec_07: VA Attainment of 90%

Table 17. The exvessel value equivalent of a 30 percent increase in QP limits (using 2017 approximate prices for trawl caught fish), for those species/species groups for which sector allocation attainment levels are low and vessel limits were approached by at least one vessel or there may not be enough vessels harvesting the fish to fully attain the allocation (because vessel QP limits would not allow it).

Species	Vessel(s) Approach QP Limits (Table 13)	Not Enough Vessels in the Area (Table 14)	Exvessel Value ($)	
			Assumed Price Per Pound ($)	Equivalent to 30% Increase in Vessel QP Limits ($)
Bocaccio rockfish South of 40°10' N.	Y	Y	0.46	14,260
Canary rockfish	Y		0.48	32,393
Chilipepper rockfish South of 40°10' N.		Y	0.49	93,942
Darkblotched rockfish	Y		0.44	10,089
Lingcod North of 40°10' N.	Y		0.94	44,626
Lingcod South of 40°10' N.		Y	0.94	46,031
Minor shelf rockfish South of 40°10' N.		Y	0.44	7,548
Minor slope rockfish South of 40°10' N.	Y	Y	0.48	12,236
Pacific cod	Y		0.57	78,281
Pacific ocean perch North of 40°10' N.	Y		0.45	3,579
Sablefish South of 36° N.	Y	Y	2.09	162,044
Widow rockfish	Y		0.31	196,585
Yelloweye rockfish		Y	0.62	51
Yellowtail rockfish North of 40°10' N.	Y		0.41	86,326

Data source: Summaries of WCR IFQ database and PacFIN. [VA_Balances_2011-2017_2017_dec_07.xlsx: Summary of Species Results and IFQ_Prices_2017.xlsx:Sheet 2]

4. Shorebased IFQ Sector Harvest Complex Needs

Background

Prior to the trawl catch share program, many species were underharvested due to the rigidity of the trip limit system used for the shorebased fishery. This system provided a set of species and species group limits for all vessels operating in an area and there was no way for vessels to adjust the limits in response to the actual catch taken. At the same time, vessels were regulated on landings and so could continue to fish while discarding species for which they had reached their limits (so long as the fish that they were able to retain still provided for an economically viable trip). With implementation of the catch share program with its transferable individual quota that applied to catch rather than landings, it was hoped that the flexibility would both increase attainment of sector allocations and reduce bycatch.

While implementation of the catch share program appears to have substantially reduce bycatch, attainment of the trawl allocations has not improved. A retrospective evaluation of attainment for a number of significant groundfish species (arrowtooth flounder, canary rockfish, Dover sole, English sole, lingcod, petrale sole, sablefish north, and widow rockfish) showed that from 2011 though 2015 the attainment of related harvest allowances changed little relative to the years prior (Matson, 2016). For most species there was a slight but not statistically significant decline in attainment after the trawl catch share program went into place. Substantial increases in the Dover sole harvest allowances were accompanied by a more substantial decline in the percent of those allowances actually harvested. The shorebased sector's level of attainment of its allocations from 2011 through 2017 is provide in Table 10.

Further study is needed to determine whether attainment is being limited by factors such as markets or the limited availability of certain species that are taken as part of a stock complex (e.g. northern area sablefish). Another factor affecting attainment may be precautionary fishing by vessels concerned about encountering high levels of bycatch for species for which the QP available is limited or for which the catch level might readily exceed the annual vessel QP limit. In the case of exceeding an annual vessel QP limit, a vessel would no longer be able to

participate in the fishery until it has covered its deficit. In the event of a deficit several times the annual limit, a vessel might have to forgo fishing for several years.

An increase in the availability of quota for constraining co-occurring species or a decrease in the negative impacts from exceeding annual limits might help to increase the shorebased sector's ability to harvest complexes of groundfsih species. A number of possible sources of relief have been identified. First, at the end of every year there are vessels accounts with leftover unused QP and accounts with deficits. Some of these surpluses and deficits are not known until after the start of the following year because of a data lag between harvest and the time vessel accounts are debited (particularly for observer data on amounts discarded). However, after the start of the year QP cannot be traded between accounts. That means, if a vessel has a deficit it must cover it with QP issued for the subsequent year, even though unused QP for the previous year may be available in other vessel accounts. Second, on September 1st of each year, any QP that has not been transferred to a vessel account expires. While it is the individual quota share owner's responsibility to ensure that such QP are transferred in a timely fashion, other vessels, processors, communities, and fish consumers may all suffer by the expiration of unused QP. Finally, vessel QP limits can prevent a vessel from covering a large deficit, resulting in what might be highly precautionary fishing and underharvest of allocations. Some degree of post-season relief from these limits might reduce the degree of precaution, potentially encouraging higher attainment of the available QP. Each of these potential sources of relief may also have some adverse impacts that will be analyzed and considered during the course of deliberations on this issue.

Table 20. Deficits carried over from previous year as a percent of trawl allocation.

IFQ Species/Species Group Category	2012	2013	2014	2015	2016	2017
Arrowtooth flounder	0.00%	0.00%	0.15%	0.06%	0.38%	-
Bocaccio rockfish South of 40°10' N.	-	-	0.00%	-	-	-
Canary rockfish	-	0.02%	-	-	10.00%[a/]	1.44%
Chilipepper rockfish South of 40°10' N.	-	-	-	-	-	-
Cowcod South of 40°10' N.	-	-	-	-	-	-
Darkblotched rockfish	-	0.09%	-	-	0.00%	-
Dover sole	0.00%	-	-	-	-	-
English sole	-	-	-	-	-	-
Lingcod	0.00%	-	-	-	-	-
Lingcod North of 40°10' N.	-	-	-	-	-	-
Lingcod South of 40°10' N.	-	-	0.00%	-	-	-
Longspine thornyheads North of 34°27' N.	0.00%	0.16%	-	-	-	-
Minor shelf rockfish North of 40°10' N.	0.02%	0.00%	-	-	-	-
Minor shelf rockfish South of 40°10' N.	-	-	0.01%	-	-	-
Minor slope rockfish North of 40°10' N.	-	0.29%	-	-	-	-
Minor slope rockfish South of 40°10' N.	-	-	0.03%	-	-	-
Other flatfish	-	0.00%	-	-	-	-
Pacific cod	-	0.01%	-	-	-	-
Pacific halibut (IBQ) North of 40°10' N.	0.04%	0.38%	-	0.00%	0.00%	0.00%
Pacific ocean perch North of 40°10' N.	0.34%	4.87%	0.87%	-	-	0.35%
Pacific whiting	3.76%	5.14%	-	0.00%	0.65%	-
Petrale sole	0.31%	0.63%	0.45%	0.28%	0.19%	0.00%
Sablefish North of 36° N.	0.16%	0.07%	0.05%	0.01%	0.09%	0.05%
Sablefish South of 36° N.	0.00%	-	-	-	-	-
Shortspine thornyheads North of 34°27' N.	0.01%	0.01%	-	-	0.00%	-
Shortspine thornyheads South of 34°27' N.	-	-	-	-	0.02%	-
Splitnose rockfish South of 40°10' N.	-	-	-	-	-	-
Starry flounder	-	-	-	-	-	-
Widow rockfish	-	0.14%	-	0.22%	-	0.03%
Yelloweye rockfish	-	-	-	-	-	-
Yellowtail rockfish North of 40°10' N.	-	0.00%	-	-	-	-

a/ The 2015 canary deficit carried into 2016 would have been 39% of the 2016 trawl allocation except that the annual vessel QP limit prevented completely covering the deficit with 2016 QP.

Table 25. Deficits as a percent of total QP available at the end of the year (after surplus carryover is determined).

IFQ Species/Species Group Category	2012	2013	2014	2015	2016	2017
Arrowtooth flounder	0.00%	0.01%	0.31%	0.13%	0.71%	
Bocaccio rockfish South of 40°10' N.			0.00%			
Canary rockfish		0.03%			19.13%	2.00%
Chilipepper rockfish South of 40°10' N.						
Cowcod South of 40°10' N.						
Darkblotched rockfish		0.16%			0.00%	
Dover sole	0.00%					
English sole						
Lingcod	0.00%					
Lingcod North of 40°10' N.						
Lingcod South of 40°10' N.			0.00%			
Longspine thornyheads North of 34°27' N.	0.00%	0.40%				
Minor shelf rockfish North of 40°10' N.	0.02%	0.00%				
Minor shelf rockfish South of 40°10' N.			0.01%			
Minor slope rockfish North of 40°10' N.		0.38%				
Minor slope rockfish South of 40°10' N.			0.04%			
Other flatfish		0.00%				
Pacific cod		0.06%				
Pacific halibut (IBQ) North of 40°10' N.	0.62%	6.22%		0.00%	0.00%	0.17%
Pacific ocean perch North of 40°10' N.	0.50%	9.45%	1.34%			0.43%
Pacific whiting	0.15%	0.84%		0.00%	0.00%	
Petrale sole	9.02%	7.90%	17.77%	19.17%	3.83%	
Sablefish North of 36° N.	3.61%	4.52%	1.24%	1.37%	6.47%	
Sablefish South of 36° N.	0.00%					
Shortspine thornyheads North of 34°27' N.	0.02%	0.02%			0.00%	
Shortspine thornyheads South of 34°27' N.					0.02%	
Splitnose rockfish South of 40°10' N.						
Starry flounder						
Widow rockfish		0.26%		0.56%		0.06%
Yelloweye rockfish						
Yellowtail rockfish North of 40°10' N.		0.00%				

Data Source: WCR IFQ database. [shorebased_ifq_sector_balances_2011-2017_2018_jan_18: Results]

Table 26. Amounts of quota pounds expiring in September each year due to the QP not being transferred from the QS account to a vessel account prior to the deadline.

IFQ Species/Species Group Category	2011	2012	2013	2014	2015	2016	2017	Grand Total
Arrowtooth flounder		56,524	283	127,817	69,544		353,692	607,860
Canary rockfish			73	431	1,276			1,780
Chilipepper rockfish South of 40°10' N.			1	3,084	8,043	3,164	10,633	24,925
Cowcod South of 40°10' N.					1			1
Darkblotched rockfish			228	5,913	3,591		8,854	18,586
Dover sole		142,154	1,090	724,387	1,736,809	778,298	1,457,546	4,840,284
English sole		71,060	469	206,922	271,058	40,154	198,537	788,200
Lingcod		7,984						7,984
Lingcod North of 40°10' N.			211	59,629	28,624	9,341	8,421	106,226
Lingcod South of 40°10' N.			12,366	24,481	14,156	3,636	18,797	73,436
Longspine thornyheads North of 34°27' N.			91	34,787	65,048		44,318	144,244
Minor shelf rockfish North of 40°10' N.			113	37,356	19,461		28,051	84,981
Minor shelf rockfish South of 40°10' N.		293	498	771	1,626		1,830	5,018
Minor slope rockfish North of 40°10' N.			96	28,583	29,274		67,010	124,963
Minor slope rockfish South of 40°10' N.		1,673	1,990	3,440	3,892		3,965	14,960
Other flatfish			309	66,006	187,520	40,530	83,245	377,610
Pacific cod			56	105,488	34,548	8,059	8,059	156,210
Pacific halibut (IBQ) North of 40°10' N.			2,062	28,414	3,007	7,573	17,822	58,878
Pacific ocean perch North of 40°10' N.			40	4,843	2,058		8,173	15,114
Pacific whiting		425,103	354,715	759,472	5,854,489	13,003,986	4,323,962	24,721,727
Petrale sole			115	22,659	9,096			31,870
Sablefish North of 36° N.	6		135		7,660		6,338	14,139
Sablefish South of 36° N.			2,951	6,206	7,000	3,742	81,057	100,956
Shortspine thornyheads North of 34°27' N.			171	25,387	27,688		11,492	64,738
Shortspine thornyheads South of 34°27' N.			300	2,384	13,052	298	7,577	23,611
Splitnose rockfish South of 40°10' N.		4,810	5,392	10,649	13,286	5,371	11,235	50,743
Starry flounder	1	3,717	5,101	4,570	10,139	2,194	3,733	29,455
Widow rockfish			316	12,707	20,767		218,686	252,476
Yelloweye rockfish			1	134	33	20	7	195
Yellowtail rockfish North of 40°10' N.			777	137,761	135,512		110,772	384,822
Grand Total	7	713,318	389,950	2,444,281	8,578,258	13,906,366	7,093,812	33,125,992