FOLLOW-ON ACTIONS—ALTERNATIVES AND *DRAFT* IMPACT ANALYSIS

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Introduction and Overview

At its March 2018 meeting, the Council adopted or provided direction on ranges of alternatives for analysis on a variety of issues. For each issue this document provides purpose and need statements, background, alternatives and analysis to support a Council decision on preliminary preferred alternatives. Table 1 provides a summary of the issues and alternatives.

Table 1. Summary of issues and alternatives.

Issue	*Alternatives*
At-Sea Whiting Fishery Bycatch Needs	
a. Set-aside management—making it permanent for all species.	**Alt 1:** No Action. **Alt 2:** Remove POP and darkblotched set-aside distribution from the FMP. **Alt 3:** Expand set aside management to cover all four co-op managed species. **Alt 4:** Set-aside management for all four species and remove at-sea set-aside distributions from the FMP. NOTE: If Alternative 1, 2 or 3 are selected, in the future the Council may consider further action to modify within trawl allocations/distributions in the FMP. For Alternative 2, only the widow rockfish allocation would remain in the FMP.
Shorebased IFQ Accumulation Limits (Control and Vessel Limits)	
a. Blackgill annual vessel limits.	**Alternative 1 (No Action):** 9 percent vessel QP limit **Draft Alternative 2**: 12 percent vessel QP limit **Draft Alternative 3**: 20 percent vessel QP limit **Draft Alternative 4**: 30 percent vessel QP limit
Shorebased IFQ Sector Harvest Complex Needs	
a. Enhance fleet's ability to use quota within the trawl allocation	**Shorebased Needs Alternative 1:** No Action. **Shorebased Needs Alternative 2:** Allow Post-Season Trading for Accounts in Deficit (include an annual date for end of trading). **Suboption:** In covering their previous year deficits, vessels would not be limited by the annual vessel QP use limits for all species or certain non-target species ***(species covered to be determined)*** **Shorebased Needs Alt 3: Eliminate September 1st QP expiration for QP not transferred to vessel accounts.**
Catcher-Processor Sector Accumulation Limits	
a. Implementation Alternatives	**CP Implementation Alt 1:** No action. **CP Implementation Alt 2:** Vacate the June 13, 2017 control date (no new accumulation limits). **CP Implementation Alt 3:** Apply accumulation limits to the existing cooperative program. **CP Implementation Alt 4:** Apply accumulation limits only if the co-op dissolves and IFQ program is implemented for the CP Sector
b. CP Permit ownership Limit	**CP Permit Limit Alt 1:** No action – No control limit. **CP Permit Limit Alt 2:** Establish a five-permit limit. **CP Permit Limit Alt 3:** Establish a seven-permit limit. *(Control date for alternatives: 6/13/17)* **Rule for assessing the limit needed.**
c. Processing limit	**Processing Limit Alt 1:** No action – no processing cap **Processing Limit Alt 2:** 60% limit. **Processing Limit Alt 3:** 80% limit. *(Control date for all alternatives: 6/13/17)* **Rule for assessing the limit needed.**
New Data Collections	
a. Catcher-Processor Ownership Data	**Alt 1: No action.** Detailed ownership information not collected from catcher-processors. **Alt 2. Collect Detailed Catcher-Processor Ownership Data Annually.** Submission of ownership data would occur through the catcher-processor permit renewal process.
b. Quota Costs, Earnings & Share Owner Particip.	**Alt 1: No action.** Information from QS owners collected from QS owners and first receivers **Alt 2: Collect QS owner information through a new "QS Owner Survey."** **Alt 3: Collect QS owner information through a supplement the QS renewal form.**

At-Sea Whiting Fishery Bycatch Needs and Set-Aside Management

This section provides information to support consideration of a proposed action that would eliminate sector bycatch caps (widow rockfish and canary rockfish) for the mothership (MS) and catcher-processor (CP) at-sea co-op secotrs and remove from the FMP the allocations specified for species previously managed with sector bycatch caps (darkblotched rockfish, Pacific ocean perch [POP], and widow rockfish). Darkblotched rockfish and POP were previously managed as bycatch caps but were converted to set-aside management during the 2017-2018 biennium. Canary rockfish is managed as a bycatch cap but is allocated through the biennial specifications process rather than in the FMP. The sector bycatch caps are used to create co-op caps, however, because there is only one co-op in each sector the sector and co-op caps have been identical.

Proposed Purpose and Need

The following language was adopted by the Council at its September 2017 meeting.[1]

> Action is needed to allow the at-sea sector to more fully and efficiently harvest its allocation to the benefit of industry (harvesters and processors), communities, and consumers. The at-sea sectors' allocation of bycatch species occasionally prevent the fleets from taking their entire allocation, while simultaneously reducing their flexibility, increasing their costs, and hampering their ability to avoid protected or prohibited species, such as salmon. The purpose of this action would be to reduce the bycatch constraints.

Changing at-sea whiting fishery bycatch management from caps to set-asides might provide flexibility for the whiting fishery to continue fishing in years when its bycatch exceeds the amounts provided, so long as those excesses do not threaten important specification levels such as OFLs or ABCs. Removing formulas for the division of species among the trawl sector might provide the Council more flexibility during the biennial management cycle to address the needs of the at-sea fisheries within the context of the management conditions that are present in a particular management cycle.

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[1] For the purpose and need statements contained in the following, the "need" is identified as the condition which is requiring a response. The purpose then relates to the objective for the action which is intended to address the need.

The purpose and need statements are framed in the affirmative "action is needed," while the purpose leaves open the possibility that the action will not be taken ("the purpose of this action *would* be….").

The analysis will evaluate and verify the statement of need and impacts of the proposed action. Additionally, part of the assessment of impacts of a proposed action is an evaluation of whether or not the action is likely to achieve its purpose in a manner that addresses the identified need and results in an overall improvement in fishery management.

Background

Development of the Current Bycatch Management Measures and Allocations

When the Council designed the catch share program (Amendment 20), it recommended that co-op bycatch caps be established for four overfished species taken in the mothership (MS) and catcher-processor (CP) at-sea whiting sectors and that the co-ops for these sectors be held responsible for ensuring that their members did not exceed these caps. The amounts of fish available for these caps were specified in the FMP—for darkblotched, POP, and widow—or determined through the biennial specifications process—for canary (Amendment 21). The trawl sector as a whole is allocated over 90 percent of the formally allocated species (Table 2).

Table 2. Trawl/nontrawl allocations of at-sea bycatch species that were initially managed with bycatch caps under the trawl catch share program.

Stocks	Intersector Allocations	
	Trawl Sectors	Non-Trawl Sectors
Darkblotched	95.0%	5.0%
POP N. of 40°10'	95.0%	5.0%
Widow	91.0%	9.0%

During each biennial specifications cycle, after the trawl allocations are determined, amounts for the whiting fishery are set (shorebased, MS and CP sectors). The following are the FMP specifications of those amounts.

> *Darkblotched Rockfish*
>
> Allocate 9% or 25 mt, whichever is greater, of the total LE trawl allocation of darkblotched rockfish to the whiting fisheries (at-sea and shorebased combined). . . .
>
> *Pacific Ocean Perch*
>
> Allocate 17% or 30 mt, whichever is greater, of the total LE trawl allocation of Pacific ocean perch to the whiting fisheries (at-sea and shorebased combined).
>
> *Widow Rockfish*
>
> Initially allocate 52% of the total LE trawl allocation of widow rockfish to the whiting sectors if the stock is under rebuilding or 10% of the total LE trawl allocation or 500 mt of the trawl allocation to the whiting sectors, whichever is greater, if the stock is rebuilt. If the stock is overfished when the initial [quota share] allocation is implemented, the latter allocation scheme automatically kicks in when it is declared rebuilt.

The amounts available for the whiting fishery are divided among the shorebased, MS, and CP sectors in proportion to the whiting allocation to each sector (42 percent to the shorebased IFQ sector, 24 percent to the MS sector, and 34 percent to the CP sector).[2]

[2] The amounts for the shorebased whiting fishery are then combined with other amounts allocated to the nonwhiting shorebased fishery IFQ fishery and issued as QP for the shorebased fishery (available for whiting or nonwhiting trips).

Under the original catch share program, at-sea co-ops and sectors were required to stop fishing immediately if their allocation for any bycatch species was reached or exceeded. There was some flexibility for addressing overages in that NMFS could make an at-sea sector's remaining allocations available to another at-sea sector, if that sector had reached its whiting allocation or made clear that it did not intend to continue fishing. Additionally, the Council could take routine inseason actions to augment the at-sea sectors' allocations by transferring to them some of the "off-the-top deductions" that were determined to be in excess of the needs of the activities the deductions were intended to cover. (Before the ACL for a species is allocated, off-the-top deductions are made to cover research, exempted fishing permits, and the incidental open access fishery).

The bycatch cap allocations to the at-sea sector and management provisions proved to be constraining on the at-sea fishery. As stated in the purpose and need section for WDFW's 2016 analysis of a Council action to change the management of darkblotched and POP from bycatch caps to set-asides:

> In recent years, both sectors have approached or exceeded their initial allocation of darkblotched rockfish—the CP [and MS] sectors in 2011 and the MS sector in 2014 [Table 7], with the latter resulting in an emergency Council meeting in order to re-open the fishery. The risk of an inseason closure remains high. The MS sector again raised concern over darkblotched catches in 2015 and then for POP in 2016.[3] Other solutions to address this problem, such as allowing transfer of quota between sectors, have been discussed, but they have been deemed too complex to be analyzed and implemented in time for the 2017 fishing season. [4] During the upcoming five year review of the trawl rationalization program, it is the intention to review these allocations (among the other Individual Fishing Quota [IFQ] species) and determine what more appropriate (i.e., fair and equitable) allocations are for each of the sectors as well as consider other long-term solutions.

In September 2016, the Council took action to change management of the at-sea whiting sector allocations of darkblotched rockfish and POP from bycatch caps to set-asides, while maintaining the allocation formulas in the FMP for these two stocks to determine the set-aside amounts. Set asides are managed annually, which means they are generally not subject to inseason management adjustments to keep a sector within its set-aside. This generally provides a sector with more flexibility as long as it appears that all fisheries collectively will be below key harvest specifications such as OFLs and ABCs. An at-sea sector may be subject to inseason management or closure for a set-aside if "...there is a risk of a harvest specification being exceeded, unforeseen impact on another fishery, or conservation concerns..." [50 CFR 660.150(c) and 660.160(c), for the MS and CP sectors respectively]. While sector allocations can be augmented by inseason transfers of off-the-top deductions, there is not a routine process for augmenting set-asides. The flexibility provided by set-asides reduces the needs for such transfers. The final plan amendment language related to this management change was approved by the Council at its September 2017 meeting (Amendment 21-3), and final regulations were published January 8, 2018.

[3] In September 2016, POP that was not needed for the research deduction was transferred to the mothership sector to increase its bycatch cap.
[4] This issue has now been put on the omnibus list for prioritization at the September 2018 Council meeting.

The action on darkblotched rockfish and POP left widow and canary rockfish as the two nonwhiting species managed with bycatch caps in the at-sea sector and subject to the FMP formulas regarding amounts specified for set-asides as well as the widow rockfish allocation.

History of Current Deliberations

The Council began its five MSA required year review of the trawl catch share program in 2016. In conjunction with the review process, the Council tasked its Community Advisory Board (CAB) with the identification of "potential improvements" for the catch share program. The advisory board "identified priority follow-on actions for the review designed to yield the greatest improvements" (Agenda Item F.2.c, CAB Report, June 2017). "Meeting the at-sea whiting fishery bycatch needs" was the only high priority follow-on action item identified for the at-sea sectors; and a number of possible mechanisms for addressing that need were identified.

In September and November 2017, the Council considered the potential follow-on actions for the at-sea sector originally suggested by the CAB. The CAB's September 2017 report to the Council identified set-aside management for the at-sea whiting sectors as an action that would be "straight forward and provide relief in the short term" and the Council concurred (Agenda Item F.2.c, CAB Report, September 2017). With respect to other actions that might help meet at-sea bycatch needs, allowing between-sector quota trading, carry-over of at-sea set-asides and revision of trawl/nontrawl allocations were put on a list for consideration as part of the omnibus groundfish prioritization process. These possible policy changes would require a more extensive policy development and decision process. Possibilities for increasing the amounts of harvest available by adjusting the precaution levels in Council harvest policy were considered early on in the specifications process but not moved forward—for example the establishment of set-asides for research and incidental open access based on historical averages rather than historical maximums would have made more fish available for directed sectors. Finally, consideration of whether to change the FMP-specified within-trawl allocations of trawl dominant overfished species will not be appropriate until the Council decides whether or not to remove those allocation formulas from the FMP, an action which is among the alternatives included in this package.

Alternatives

The following action alternatives elaborate on the initial alternatives developed by the CAB and approved by the Council at the September 2017 Council meeting. Since that time, at-sea bycatch management issues have been moving forward in several different processes, including adoption of the Amendment 21-3 language related to removal of darkblotched and POP from the group of bycatch cap species (at the September 2017 Council meeting) and a Council recommendation to remove of automatic closure actions for at-sea set-asides (recommended during the biennial specifications process for 2019-2020). The following alternatives address two main questions: first, will the original at-sea bycatch cap species be managed as caps or set-asides (decision has already been made to manage darkblotched and POP as set-asides); and second, will the original allocation formulas for the bycatch species remain in the FMP. The alternatives are summarized in Table 3.

At-sea Set-Aside Alternative 1: No Action. Pacific ocean perch (POP) and darkblotched rockfish are managed as set-asides and the set-aside amounts are determined in the FMP. Widow rockfish and canary rockfish are managed as bycatch caps for which the at-sea co-ops are responsible. Widow rockfish cap allocations are determined in the FMP while the canary cap allocation is determined during each biennial specifications process.

At-sea Set-Aside Alternative 2: Remove POP and darkblotched set-aside distribution from the FMP. Remove from the FMP the formulas for determining at-sea amounts for POP and darkblotched rockfish, both of which are managed as set-asides (requires an FMP amendment). These amounts will be determined in the biennial specifications process.

At-sea Set-Aside Alternative 3: Expand set-aside management to cover all four co-op managed species. Add widow rockfish and canary rockfish to the other two species managed with set-asides (requires an FMP amendment).

At-sea Set-Aside Alternative 4: Set-aside management for all four species; remove at-sea set-aside distributions from the FMP. Add widow rockfish and canary rockfish to the other two species managed with set-asides (requires an FMP amendment). Remove from the FMP the formulas for determining at-sea set-aside amounts (requires an FMP amendment). These amounts will be determined in the biennial specifications process.

NOTE: If Alternative 1, 2 or 3 are selected, in the future the Council may consider further action to modify within trawl allocations/distributions in the FMP. For Alternative 2, only the widow rockfish allocation would remain in the FMP.

Table 3. Summary of at-sea bycatch species alternatives (grey cells are same as no action).

	Alternative 1 No Action		Alternative 2		Alternative 3		Alternative 4	
Bycatch Species	**Management Tool**	**Allocation/ Set Aside Amounts**	**Management Tool**	**Allocation/ Set Aside Amount**	**Management Tool**	**Allocation/ Distribution**	**Management Tool**	**Allocation/ Set Aside Amount**
Canary	Cap	Determined Biennially	Cap	Determined Biennially	Set-aside	Determined Biennially)	Set-aside	Determined Biennially
Darkblotched	Set-aside	FMP Formula	Set-aside	Determine Biennially (Remove FMP Formulas)	Set-aside	FMP Formula	Set-aside	Determine Biennially (Remove FMP Formulas)
POP	Set-aside	FMP Formula	Set-aside		Set-aside	FMP Formula	Set-aside	
Widow	Cap	FMP Formula	Cap	FMP Formula	Set-aside	FMP Formula	Set-aside	

Remaining Allocation Formulas for the Shorebased Fishery

If the elements of the formulas for determining the at-sea amounts are removed from the FMP then the entirety of the trawl allocation (minus the amounts designated for the at-sea sector) would go to the shorebased sector, as specified in Table 6-1 of the FMP: 95% of the darkblotched rockfish, 95% of the POP, and 91% of the widow rockfish. The FMP would be modified to reflect this.

Required FMP Amendment

Alternative 3 would not require an FMP amendment. For Alternative 4, the FMP would be amended by removing the entirety of the section entitled "Allocation of Select Groundfish Species." Prior to Amendment 21-3 the title was "Allocation of Trawl Dominant Overfished Species." For Alternative 2, the FMP would be amended by removing from that section the paragraphs on darkblotched and POP.

Analysis

Description of the Fishery – History of Bycatch Allocations and Attainment

Total set-aside amounts and allocations of the original four at-sea bycatch cap species increased dramatically in 2017 and 2018 (Table 4). At the same time, whiting allocations have increased in more recent years, with the 2017 allocation being 83 percent higher than in 2011 (Table 5). Overall, trawl sector catch for these four species has generally been less than 50 percent of the trawl allocation (with the exception of one tow that caused the canary rockfish allocation cap to be exceeded in 2015, Table 6). At the same time, there have been a few years in which the non-trawl sectors in aggregate have exceeded their allocations (Table 6). While the trawl sector as a whole has generally caught less than 50 percent of its allocations for these species, for individual trawl sectors the percent of allocation caught has been higher (Table 7), and, as discussed in the Background section, constraining for the at-sea sectors. The degree of constraint is not fully reflected in the percentage attainments provided here because allocations were increased inseason to provide an opportunity for a sector to continue (as reflected in the differences between the initial and final allocation amounts in Table 7). Finally, relevant to the prospects for bycatch constraints to limit whiting harvest are the changes in the at-sea bycatch allocations relative to the at-sea whiting allocations. While darkblotched and POP allocations have increased in proportion with whiting, the increases in canary and widow have been proportionally much larger than the increases for whiting (Figure 1). Whether the increases in allocations (related to increases in ACLs) reflect a lessening of the constraint depends on the degree to which the allocation changes are in sync with changing bycatch rates related to changing biomass levels and other factors.

Table 4. Initial set-asides and allocations for the original at-sea bycatch cap species (2011-2018).[a/]

	Set Asides						Trawl					
								At-Sea				
Species/Year	Tribal	Incidental Open Access	EFP	Research	Buffer	Total SetAside	Shorebasede	Mother-ship	Catcher-Processor	Total	Non-Trawl	Recreational (Part of Non-Trawl Allocation)
Canary												
2011	9.5	2.0	1.3	7.2		20.0	25.9	3.4	4.8	34.1	29.8	23.5
2012	9.5	2.0	1.3	7.2		20.0	26.2	3.6	5.0	34.8	29.8	23.5
2013	9.5	2.0	1.5	4.5		17.5	39.9	5.2	7.4	52.5	46.0	36.3
2014	9.5	2.0	1.5	4.5		17.5	41.1	5.4	7.6	54.1	47.4	37.3
2015	7.7	2.0	1.0	4.5		15.2	43.2	5.7	8.0	56.9	49.9	38.5
2016	7.7	2.0	1.0	4.5		15.2	44.5	5.8	8.2	58.5	51.3	38.5
2017	50.0	1.2	1.0	7.2	188.0	247.4	1,014.1	30.0	16.0	1,060.1	406.5	260.0
2018	50.0	1.2	1.0	7.2		59.4	1,014.1	30.0	16.0	1,060.1	406.5	260.0
Darkblotched												
2011	0.1	15.0	1.5	2.1		18.7	250.5	6.0	8.5	265.0	14.0	
2012	0.1	15.0	1.5	2.1		18.7	250.5	6.0	8.5	265.0	14.0	
2013	0.1	18.4	0.2	2.1		20.8	266.7	6.1	8.6	281.4	14.8	
2014	0.1	18.4	0.2	2.1		20.8	278.4	6.3	9.0	293.7	15.5	
2015	0.2	18.4	0.1	2.1		20.8	285.6	6.5	9.2	301.3	15.9	
2016	0.2	18.4	0.1	2.1		20.8	292.8	6.7	9.4	308.9	16.3	
2017	0.2	24.5	0.1	2.5	50.0	77.3	507.6	11.6	16.4	535.6	28.2	
2018	0.2	24.5	0.1	2.5	50.0	77.3	518.5	11.8	16.7	547.0	28.8	
POP												
2011	10.9		0.1	1.8		12.8	119.6	7.2	10.2	137.0	7.0	
2012	10.9	0.1	0.1	1.8		12.9	119.6	7.2	10.2	137.0	7.0	
2013	10.9	0.4		5.2		16.5	109.4	7.2	10.2	126.8	6.7	
2014	10.9	0.4		5.2		16.5	112.3	7.2	10.2	129.7	6.8	
2015	9.2	0.6		5.2		15.0	117.6	7.2	10.2	135.0	7.2	
2016	9.2	0.6		5.2		15.0	124.2	7.2	10.2	141.6	7.5	
2017	9.2	3.0		5.2	25.0	42.4	191.3	12.5	16.2	220.0	11.6	
2018	9.2	10.0		5.2	25.0	49.4		9.0	12.7	220.0	11.6	
Widow												
2011	45.0	3.3	11.0	1.6		60.9	343.1	61.2	86.7	491.0	49.0	
2012	45.0	3.3	11.0	1.6		60.9	343.1	61.2	86.7	491.0	49.0	
2013	60.0	3.3	18.0	7.9		89.2	994.0	120.0	170.0	1,284.0	127.0	
2014	60.0	3.3	18.0	7.9		89.2	994.0	120.0	170.0	1,284.0	127.0	
2015	100.0	3.3	9.0	7.9		120.2	1,421.0	120.0	170.0	1,711.0	169.0	
2016	100.0	3.3	9.0	7.9		120.2	1,421.0	120.0	170.0	1,711.0	169.0	
2017	200.0	0.5	9.0	8.2		217.7	11,392.7	290.3	411.2	12,094.2	1,196.1	
2018	200.0	0.5	9.0	8.2		217.7	10,661.5	271.6	384.8	11,317.9	1,119.4	

a/ From the following versions of the groundfish regulations (pink pages): September 2, 2011, November 1, 2012, July 25, 2014, May 15, 2015, May 16, 2017.

Table 5. Initial and final allocations of Pacific whiting (mt, 2011- 2017).

	Shorebased IFQ		Catcher-Processor		Mothership		Total Trawl		Final Total Trawl Allocation	
	Initial	Final	Initial	Final	Initial	Final	Initial	Final	Change Relative to Previous Year	Change Relative to 2011
2011	92,817.8	92,817.8	75,138.0	75,138.0	53,039.0	53,039.0	220,994.8	220,994.8	-	-
2012	56,902.0	68,661.9	46,046.0	55,584.0	32,515.0	39,235.0	135,463.0	163,480.9	-26%	-26%
2013	85,697.0	98,296.9	69,373.0	79,573.0	48,970.0	56,170.0	204,040.0	234,039.9	43%	6%
2014	108,935.0	127,835.0	88,186.0	103,486.0	62,249.0	73,049.0	259,370.0	304,370.0	30%	38%
2015	112,007.0	124,607.3	90,673.0	100,873.0	64,004.0	71,204.0	266,684.0	296,684.3	-3%	34%
2016	126,727.0	141,007.0	102,589.0	114,149.0	72,415.0	80,575.0	301,731.0	335,731.0	13%	52%
2017	152,327.0	169,547.0	123,312.0	137,252.0	87,044.0	96,884.0	362,683.0	403,683.0	20%	83%

Table 6. West coast groundfish sector allocations (trawl and nontrawl) and catches (in mt) for the original at-sea bycatch cap species (2011-2016) (highlighted cells indicate attainment rates ≥ 90%). Source: Amendment 21 Intersector Allocation Review Document, June 2017—updated with the addition of canary for all years and addition of 2016 based on regulations and WCGOP mortality report.

Stocks	Intersector Allocations															
				Trawl Sectors			Non-Trawl Sectors				Trawl Sectors			Non-Trawl Sectors		
	Trawl Sectors	Non-Trawl Sectors	Fishery HG	Alloc	Catch	% Attain	Alloc	Catch	% Attain	Fishery HG	Alloc	Catch	% Attain	Alloc	Catch	% Attain
			2011							2012						
Canary	Determined in Spex		63.9	34.1	4.3	12.6%	29.8	35.4	118.9%	64.6	34.8	7.7	22.1%	29.8	25.1	84.1%
Darkblotched	95.0%	5.0%	279	265	103	38.8%	14	16	113.3%	277	263	88	33.6%	14	9	65.9%
POP N. of 40°10'	95.0%	5.0%	144	137	54	39.3%	7	1	9.3%	144	137	53	38.8%	7	0	5.7%
Widow	91.0%	9.0%	539	491	174	35.6%	49	2	4.1%	539	491	232	47.3%	49	6	13.3%
			2013							2014						
Canary			98.5	52.5	10.9	20.8%	46.0	27.8	60.5%	101.5	54.1	11.2	20.7%	47.4	24.7	52.2%
Darkblotched			296	281	122	43.5%	15	4	27.0%	309	294	108	36.9%	15	5	32.9%
POP N. of 40°10'			134	127	55	43.7%	7	0	3.9%	137	130	45	34.6%	7	0	3.6%
Widow			1,411	1,284	443	34.5%	127	20	15.6%	1,411	1,284	710	55.3%	127	20	15.7%
			2015							2016						
Canary			106.8	56.9	45.0	79.1%	49.9	54.5	109.3%	109.8	58.5	20.2	34.5%	51.3	45.3	88.4%
Darkblotched			317	301.0	103.0	34.1%	16.0	4.0	23.2%	317	301.0	103.0	34.1%	16.0	4.0	23.2%
POP N. of 40°10'			143	136.0	40.0	29.4%	7.0	1.0	7.1%	143	136.0	40.0	29.4%	7.0	1.0	7.1%
Widow			1880	1,711.0	338.0	19.8%	169.0	7.0	4.2%	1,880	1,711.0	338.0	19.8%	169.0	7.0	4.2%
			2017													
Canary			1,467.6	1,061.1	248.4	23.4%	406.5	152.4	3.7%							
Darkblotched			563.8	535.6	223.3	41.7%	28.2	14.4	51.2%							
POP N. of 40°10'			231.6	220.0	120.6	54.8%	11.6	3.0	26.1%							
Widow			13,290.3	12,094.2	6,340.3	52.4%	1,196.1	25.9	2.2%							

a/ The Fishery HG for sablefish north of 36° N lat. is the commercial fishery HG (recreational impacts are managed as set-asides). Therefore, only commercial allocations and catches are depicted for non-trawl sectors. The allocation percentages are revised from those specified in the FMP to break down the formal allocations for trawl vs. commercial non-trawl sectors.

Table 7. West coast groundfish trawl sector allocations and impacts (in mt) for the original at-sea bycatch cap species (2011-2016) (highlighted cells indicate attainment rates ≥ 90%). Source: Amendment 21 Intersector Allocation Review Document, June 2017—updated with the addition of 2016 based on 2016 regulations and WCGOP mortality report.

Stocks	Shorebased IFQ				Catcher-Processors				Motherships			
	Initial Alloc.	Final Alloc.	Catch	% Attain.	Initial Alloc.	Final Alloc.	Catch	% Attain.	Initial Alloc.	Final Alloc.	Catch	% Attain.
					2011							
Pacific Whiting	92,817.8	92,817.8	91,185.8	98.2%	75,138.0	75,138.0	71,522.4	95.2%	53,039.0	53,039.0	50,049.8	94.4%
Canary Rockfish	25.9	25.9	3.7	14.3%	4.8	8.1	0.5	5.6%	3.4	0.1	0.1	78.6%
Darkblotched Rockfish	250.8	250.8	90.9	36.2%	8.5	12.8	10.3	80.4%	6.0	1.7	1.7	100.0%
POP	119.6	119.6	46.7	39.0%	10.2	16.7	6.5	39.0%	7.2	0.7	0.7	94.6%
Widow Rockfish	342.7	342.7	137.6	40.2%	86.7	135.0	24.1	17.8%	61.2	12.9	12.8	99.6%
					2012							
Pacific Whiting	56,902.0	68,661.9	65,661.5	95.6%	46,046.0	55,584.0	55,694.6	100.2%	32,515.0	39,235.0	38,215.5	97.4%
Canary Rockfish	25.9	25.9	7.2	27.6%	4.8	4.8	0.3	5.6%	3.4	3.4	0.2	4.4%
Darkblotched Rockfish	248.9	248.9	85.7	34.4%	8.5	8.5	1.4	16.9%	6.0	6.0	1.3	21.0%
POP	119.5	119.5	48.6	40.7%	10.2	10.2	3.2	31.0%	7.2	7.2	1.4	19.0%
Widow Rockfish	342.7	342.7	152.6	44.5%	86.7	86.7	42.0	48.4%	61.2	61.2	37.3	61.0%
					2013							
Pacific Whiting	85,697.0	98,296.9	97,621.3	99.3%	69,373.0	79,573.0	78,041.0	98.1%	48,970.0	56,170.0	52,522.3	93.5%
Canary Rockfish	39.9	39.9	10.2	25.6%	7.4	7.4	0.2	2.4%	5.2	5.2	0.5	9.2%
Darkblotched Rockfish	266.7	266.7	116.0	43.5%	8.6	8.6	2.1	24.2%	6.1	6.1	4.2	69.6%
POP	109.4	109.4	50.0	45.7%	10.2	10.2	4.3	41.9%	7.2	7.2	1.1	15.8%
Widow Rockfish	994.0	994.0	411.6	41.4%	170.0	170.0	15.7	9.3%	120.0	120.0	15.5	13.0%
					2014							
Pacific Whiting	108,935.0	127,835.0	98,714.0	77.2%	88,186.0	103,486.0	103,266.3	99.8%	62,249.0	73,049.0	62,038.3	84.9%
Canary Rockfish	41.1	41.1	10.5	25.5%	7.6	7.6	0.3	3.7%	5.4	5.4	0.4	6.5%
Darkblotched Rockfish [a/]	278.4	278.4	97.8	35.1%	9.0	6.0	3.4	56.8%	6.3	9.3	7.2	77.5%
POP	112.3	112.3	41.0	36.5%	10.2	10.2	0.3	3.1%	7.2	7.2	3.6	50.0%
Widow Rockfish	994.0	994.0	654.3	65.8%	170.0	170.0	16.6	9.7%	120.0	120.0	39.6	33.0%
					2015							
Pacific Whiting	112,007.0	124,607.3	58,383.7	46.9%	90,673.0	100,873.0	68,483.9	67.9%	64,004.0	71,204.0	27,660.4	38.8%
Canary Rockfish	43.2	43.2	44.8	103.7%	8.0	8.0	0.1	0.9%	5.7	5.7	0.1	2.5%
Darkblotched Rockfish	285.6	285.6	122.4	42.9%	9.2	9.2	5.6	60.4%	6.5	6.5	2.4	36.6%
POP	117.6	117.6	49.9	42.4%	10.2	10.2	7.0	68.2%	7.2	7.2	1.7	24.2%
Widow Rockfish	1,421.0	1,421.0	814.6	57.3%	170.0	170.0	17.4	10.3%	120.0	120.0	17.2	14.3%
					2016							
Pacific Whiting	126,727.0	141,007.0	85,756.6	60.8%	102,589.0	114,149.0	108,803.6	95.3%	72,415.0	80,575.0	65,017.9	80.7%
Canary Rockfish	45	45	13	30.1%	8	8	0	1.2%	6	6	0	7.2%
Darkblotched Rockfish	293	293	121	41.3%	9	9	4	37.4%	7	7	2	23.6%
POP	124	124	55	43.9%	10	10	3	30.3%	7	10	7	70.6%
Widow Rockfish	1,421	1,421	801	56.4%	170	170	112	66.0%	120	120	74	62.0%
					2017							
Pacific Whiting	152,327.0	169,547.0	145,915.5	86.1%	123,312.0	137,252.0	137,129.7	99.9%	87,044.0	96,884.0	66,257.0	68.4%
Canary Rockfish	1014	1014	242	23.9%	16	16	2	12.5%	30	30	5	16.7%
Darkblotched Rockfish	508	508	184	36.2%	16.4	16.4	32	195.1%	11.6	11.6	8	69.0%
POP	191	191	94	49.2%	16.2	16.2	20	123.5%	12.5	12.5	6	48.0%
Widow Rockfish	11,393	11,393	5864	51.5%	411.2	411.2	410	99.7%	290.3	290.3	66	22.7%

a/ The original allocation of darkblotched to the MS sector (6.3 mt) was increased to 9.3 mt with a transfer of yield from the CPs sector by automatic action on October 17, 2014.

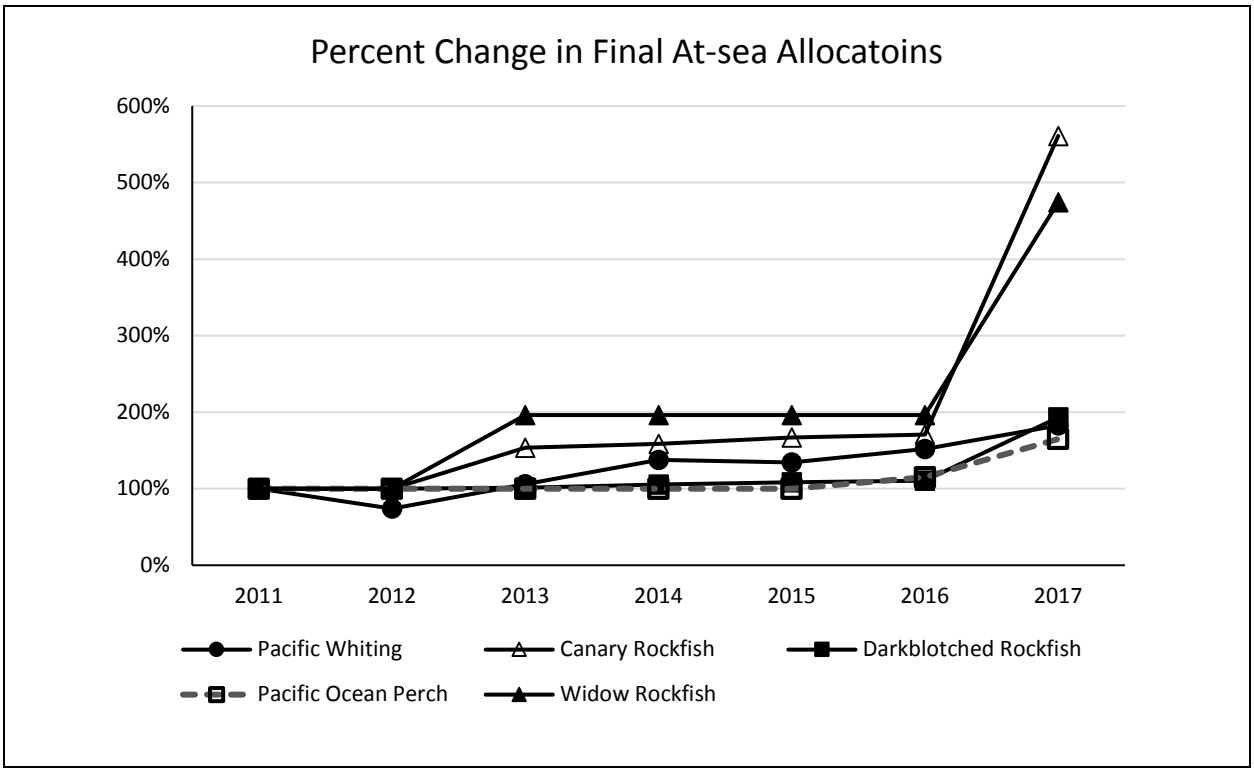


Figure 1. Percent changes in final at-sea allocations of whiting and Amendment 20 bycatch species (canary, darkblotched, Pacific ocean perch, and widow).

(Internal ref: XX_Att1_FollowOnActions_Sep2018BB_08-11-2018_Updated_Tables_ecw.xlsx: Table 7)

Impact Mechanisms

The action alternatives considered here would change bycatch management for canary and widow from caps to set-asides (Alternatives 3 and 4) and remove some or all within trawl allocation formulas from the FMP (Alternatives 2 and 4).

With respect to changing bycatch management, the primary mechanisms resulting in changes in impacts occur through

- changes in the fishermen's incentive structures for bycatch avoidance, and
- changes in the management systems ability to prevent fishing mortality in excess of total OFLs and ABCs.

Changes in the incentive structures and management control in turn impact biological, physical, and socio-economic environments to varying degrees. The socio-economic environment includes both the fisheries and dependent communities as well as governing activities and costs. The effects of changes in management control will be informed using a bootstrap model. A discussion of bycatch avoidance incentives along with the bootstrap model and its results will be presented in the section on the biological and physical environment and referenced in other sections.

With respect to removal of within trawl allocation formulas from within the FMP, the primary mechanism resulting in changes in impacts occurs through the resultant need to establish a division of fish among sectors each biennium (rather than having it preset in the FMP). Thus, the transition is from an allocation which is more fixed and certain (it takes more time and effort to change an FMP allocation than it does to set the sector divisions biennially) to one which is more variable and less certain (which requires time and effort each biennium but at lower levels than required for an FMP amendment).

Impacts to the Biological and Physical Environment

Impacts to the biological and physical environment will accrue to the degree that the action alternatives result in changes to the amount of effort and harvest. Biological impacts will occur primarily through changes in resource removals and physical impacts through changes in gear interactions. Under the no action alternatives, the levels and types of activity will be within those covered in the analyses produced each biennium in support of the development of two-year stock specifications and management measures. As will be described here, while the action alternatives may increase activity levels and change their distribution, they are not expected to result in activity levels that are greater or distributions that are different from the range of those anticipated under biennial specification and management measure analyses.

Fishing Activities—Impacts and Incentives to Avoid Widow, Canary and Salmon

Under management of canary and widow bycatch through caps (Alternatives 1 and 2), the co-ops to which those caps are allocated are required to hold their fleets to within the caps and once caps are reached the co-op/sector is closed. In order to meet their responsibility, the co-ops impose requirements and provide an incentive structure to the individual vessels under the terms of the co-op agreement. There is also a salmon take threshold that the collective whiting fisheries (tribal and nontribal) are held to (11,000 thousand chinook, plus some portion of a possible reserve up to a maximum of an additional 3,500 fish) and the fishery is closed when that cap is met. The incentive to avoid salmon may not be as strong as for other cap species, since the cap is not whiting sector or co-op specific; however, as with their groundfish cap species the MS co-op does provide move-on rules and penalty boxes for vessels encountering high rates of salmon bycatch and the CPs . Minimizing incidental catch of species of concern, including Chinook salmon, is also a stated priority for the CP sector cooperative (CP CoOp). The CP CoOp uses similar methods as the MS sector to prevent and respond to Chinook bycatch.

Under management by set-asides (Alternatives 3 and 4), the co-ops will no longer be held strictly to caps for widow and canary but the overall thresholds for Chinook will remain in place. Absent this constraint, the fleet is likely to be somewhat less bycatch avoidant in order to reduce time expense related to the search for lower bycatch areas. Industry members have testified that in addition to avoiding closure prior to catching all their whiting that these measures would be important to them for reducing costs. However, while there will not be a cap for groundfish bycatch species, as pointed out in the September 2016 WDFW analysis analysis, there will be an incentive for the fleet to continue to constrain their bycatch: "A failure to maintain bycatch of darkblotched or POP within reasonable levels would be likely to erode the Council's confidence in the approach" with the consequence of a return to bycatch caps or other restrictions (Agenda

Item F.7.a, WDFW Report, September 2017). The calls such a return to caps would be particularly strong if a set-aside overage resulted in closures of other sectors.

To the degree that the fleet exceeds its set-aside but is able to continue to harvest whiting, there will be more fishing effort, more targeted catch of whiting, and more bycatch, potentially including more salmon. At the same time, salmon bycatch rates may be reduced. Avoidance of salmon bycatch will continue to be incentivized through the hard caps required by the 2017 incidental take statement. By reducing the canary and widow constraints through their conversion from caps to set-asides, the fleet will have more flexibility to focus on avoiding salmon bycatch. Such flexibility may result in a lower salmon bycatch rate in all years. Assuming that vessels are able to use the greater flexibility provided by set-aside management to reduce their salmon bycatch rates, higher salmon bycatch would occur only in years when a set aside is exceeded in order to fully harvest the available whiting. Under cap management, the whiting fishery would have closed in those years, stopping the potential for additional salmon bycatch. As will be seen in the bootstrap analysis, the occurrences of such canary and widow set aside overages and accompanying higher whiting harvests is expected to be rare.

Management Control of Fishing Activities

To the degree that, under Alternatives 3 and 4, set-aside management reduces the incentive for co-op vessels to stay within their bycatch allowances for canary and widow, relative to the caps used under Alternatives 1 and 2, managers will need to take action to ensure that critical harvest specifications are not exceeded (OFLs, ABCs, and ACLs). When set-aside overages occur, the at-sea whiting fisheries may be subject to inseason action if "there is a risk of a harvest specification being exceeded, unforeseen impact on another fisheries, or conservation concerns" (50 CFR §§ 660.150(c) and 660.160(c)). In the closely monitored at-sea fishery, such provisions ensure that there is sufficient management control to prevent the fishery from going over management targets and that the fishery is managed fairly and equitably relative to other sectors.

The following bootstrap modelling shows that, assuming bycatch rates and patterns are similar to past fisheries, overages are likely to be rare. At the same time, with the move to at-sea set-asides some behavioral changes are expected such that bycatch rates may increase and the model will be somewhat under-predicting the frequency and size of overage. However, given the under-harvest of canary and widow rockfish in other fisheries (the nontrawl fishery in most years, Table 6; and the shorebased IFQ fishery, Table 7) it is unlikely that the fishery would need to be constrained for conservation reasons (including going over harvest specifications). Nevertheless, if such circumstances were to arise, managers have the authority to close the fishery so adverse conservation impacts to groundfish species would not be expected (660.150(a)(5) and 660.160(a)(5)). Additionally, as discussed in the previous section, salmon bycatch rates are likely to be reduced as a result of the increased flexibility to prioritize salmon avoidance over avoidance of set-aside species, and possible increases in total salmon catch are likely to be limited to years in which set-asides are exceeded.

Under Alternatives 2 and 4, formulas that managers use to allocate species among the trawl sectors would be removed. Alternative 2 would remove those formulas for darkblotched and POP, species already managed as set-asides. Alternative 4 would also remove the formula for

widow rockfish. These species would then be allocated during the biennial management process, at the same time that the amounts are determined for canary. Removal of the formulas from the FMP is not expected to have any impacts on the biological or physical environment. Any biological and physical impacts from allocation decisions would be evaluated when allocation decisions are made as part of each biennial management cycle.

Bootstrap Simulation Analysis

The bootstrap simulation has been used by the Groundfish Management Team (GMT) and the Washington Department of Fish and Wildlife (WDFW) in projecting the bycatch of selected species in the at-sea whiting sector. This methodology has been used in assessing the risks of managing darkblotched rockfish and Pacific Ocean Perch (POP) with set-asides (Agenda Item F.7.a., WDFW Report, September 2016) and within the 2019-20 biennium in analyzing the impacts of removing the automatic authority provision created through Amendment 21-3 (Agenda Item E.4., Supplemental REVISED Attachment 6, June 2018). More details can be found on the bootstrap method in Supplemental WDFW Report 2 from June 2016 and in a report presented to the SSC in November 2015.

For this analysis, the bootstrap uses observer estimates of catch on at-sea whiting hauls collected from 2000-2017. In this version, 18,000 "simulated seasons" were run (1,000 per year of haul data) for each alternative and sector. Each run begins with selecting a fishing season (e.g., 2010) and resampling the haul-level data with replacement. Simulated seasons are entirely composed of a single year of observer data to better reflect the interannual variability of bycatch seen in each sector. The simulation continues to draw hauls until a "closure" is triggered. Under Alternatives 1 and 2, a closure would be triggered if a sector reaches their whiting, canary rockfish, or widow rockfish allocation. Under Alternatives 3 and 4, only reaching the whiting allocation would result in a season closure.

For the simulations below, the 2018 allocations for Pacific whiting, canary rockfish, and widow rockfish were used (shown in Table 8). Using the 2018 allocation for whiting is one of the key underlying assumptions of this analysis because the number of hauls conducted in a season is the main factor in determining bycatch and is closely associated with the whiting allocation. Estimates of bycatch would scale to the level of the whiting harvest; however, the TACs in 2018 are the highest in recent history and likely represent the "upper end" of projected impacts.

Table 8. 2018 Allocations (mt) by Sector Used in Bootstrap Analysis

Species	C/P	MS
Pacific Whiting	123,312	87,044
Canary Rockfish	16	30
Widow Rockfish	384.8	271.6

Overview of How Bootstrap Results are Displayed

Similar to the results produced in Agenda Item F.7.a., WDFW Report, September 2016, this report looks at the risk of an individual sector exceeding an allocation or set aside value using quantiles (percentiles expressed as decimals) and how catches in both sectors would behave in the same

season. Quantiles represent the proportion of simulations that estimated amounts less than or equal to the reported value. For example, the 0.5 quantile is the median or 50th percentile. Half of the simulations produced estimates under this value, and half produced greater bycatch estimates. The median can be seen as the "risk neutral" estimate and what is generally used by the GMT in producing the inseason scorecard projection. When assessing the impact of changing from allocations to set-asides, it is the spread of the estimates around the median and the potential overages of the allocation or set aside amount that are important to consider.

Canary Rockfish – Bootstrap Modeling

Allocation and Harvest Levels

As described above anary rockfish allocations are established every two years through the biennial harvest specifications process. During the development of the trawl rationalization program and Amendment 21, the Council decided to not set a long term formal allocation for canary rockfish (along with other non-trawl dominant overfished species). It was thought that harvest opportunities would vary over time and area with the stocks rebuilding and setting a long term allocation may not provide equitable opportunities in the future.

Historically, the C/P sector has taken less than 3 mt and the MS sector less than 5 mt since 1991 (Table 9). Of the 25,683 hauls by the CP sector since 2000, only 4.51 percent were positive for canary rockfish compared to 9.26 percent of the MS sector's 18,960 hauls. Using the same haul size bins as described in Agenda Item F.7.a., WDFW Report, September 2016, Table 10 below shows the number of hauls, total catch of canary rockfish, the average catch per haul, and the proportion of positive hauls and catch for that size bin for the at-sea sector combined. Due to confidentiality, sector specific values could not be shown. With the vast majority of hauls being negative for canary rockfish, the remaining positive hauls are primarily made up of hauls of less than 0.005 mt (55.41 percent) and those between 0.005-0.03 mt (40.95 percent).

Table 9. Bycatch of Canary Rockfish (mt) By At-Sea Sector, 1991-2017

Year	C/P	MS
1991	2.57	0.85
1992	1.96	0.32
1993	0.87	0.14
1994	2.00	2.61
1995	0.13	0.26
1996	0.11	1.20
1997	1.08	0.69
1998	0.25	2.52
1999	1.03	0.18
2000	0.86	0.53
2001	0.65	0.87
2002	1.59	0.81
2003	0.17	0.08
2004	0.49	4.11
2005	0.34	0.70
2006	0.10	0.85
2007	0.35	1.62
2008	2.43	0.74
2009	0.29	0.60
2010	0.14	0.33
2011	0.46	0.08
2012	0.26	0.15
2013	0.18	0.45
2014	0.28	0.36
2015	0.07	0.14
2016	0.10	0.42
2017	2.06	4.50

Table 10. Summary Statistics of Positive Canary Rockfish Hauls in the At-Sea Sector by Size Bin

Bin	2	3	4	5	6
Size Bin (mt)	0-0.005	0.005-0.03	0.03-0.1	0.1-0.4	> 0.4
Hauls	1629	1204	86	17	4
Canary Catch (mt)	4.93	12.23	4.31	2.75	7.25
Average Catch per Haul	0	0.01	0.05	0.16	1.81
Proportion of Total Positive Hauls	55.41	40.95	2.93	0.58	0.14
Proportion of Catch	15.67	38.86	13.68	8.74	23.04

When canary rockfish was declared rebuilt in 2015, the sectors received a higher allocation in the 2017-18 biennium compared to the 2015-16 biennium based on the results of the bootstrap analysis.[5] The allocations were similarly adopted by the Council for the 2019-20 biennium in June 2018.

Simulation Results for Canary

As shown in Table 11, the model does not project that the CP sector will exceed its allocation/set-aside value of 16 mt under either cap management (Alternatives 1 and 2) or set aside management (Alternatives 3 and 4). Thus, a move to set-aside management would be expected to result in minimal risk. Additionally, the estimated impacts are relatively similar whether canary (and widow) rockfish are managed as set asides or allocations. However, the tail end distribution of the results for the MS sector show there is a small chance of exceeding the allocation or set aside value under any alternative.

Under all alternatives, the MS sector is projected to exceed the 30 mt allocation less than 1 percent of the time: about 0.19 percent under Alternatives 1 and 2 (35 simulated seasons) and 0.14 percent under Alternatives 3 and 4 (25 simulated seasons). However, the maximum projected amount under Alternatives 3 and 4 is greater than Alternatives 1 and 2. . This is a result of the closure mechanism in the model. In other words, under Alternatives 1 and 2, the season is "closed" once one of the three allocations is reached (whiting, canary or widow). The season with the maximum canary catch for the MS sector took 1,779 hauls and resulted in 32.2 mt of canary rockfish, 52.4 mt of widow rockfish, and 76,726 mt of Pacific whiting. Therefore, on haul 1,778, the MS sector was under all three allocations and then on haul 1,779 drew a haul record that had at least 2.2 mt of canary rockfish thereby closing the season. However, under Alternatives 3 and 4, the simulation was able to run until the full whiting allocation of 87,044 mt was attained, resulting in 40 mt of canary.

It is important to consider that the analysis assumes that in the 18 years of observer data, the maximum bycatch of canary rockfish in a single haul has been seen. Figure 2 shows the distribution of canary rockfish catches by haul from 2000-2017 for the MS sector. The simulated seasons in which the MS exceeded its allocation/set aside value were based on the simulation drawing over eight hauls with more than 0.4 mt of canary rockfish within the "season". As shown in Figure 2 though, only a very minor portion of total hauls have occurred beyond 0.4 mt (shown by the vertical line) in 18 years (only 4 hauls total in the at-sea sector). Therefore, the likelihood of multiple extreme catches occurring in one season leading to the MS sector exceeding its allocation or set aside amount is minimal.

[5] 2017-2018 Groundfish Harvest Specifications and Management Measures including Changes to Groundfish Stock Designations, September 2016

Table 11. Bootstrap simulation results for canary rockfish.

Sector	Allocation/ Set Aside (mt)	Alternative	Quantiles (canary rockfish catch)					
			0.01	0.25	0.5	0.75	0.95	0.9999
			Canary mt					
CP	16	Alt 1 & 2	0.1	0.3	0.6	1.2	4	8
		Alt 3 & 4	0.1	0.3	0.6	1.3	4.8	8.5
MS	30	Alt 1 & 2	0.1	0.5	1.1	2.3	8.5	32.2
		Alt 3 & 4	0.1	0.5	1.1	2.3	8.4	37

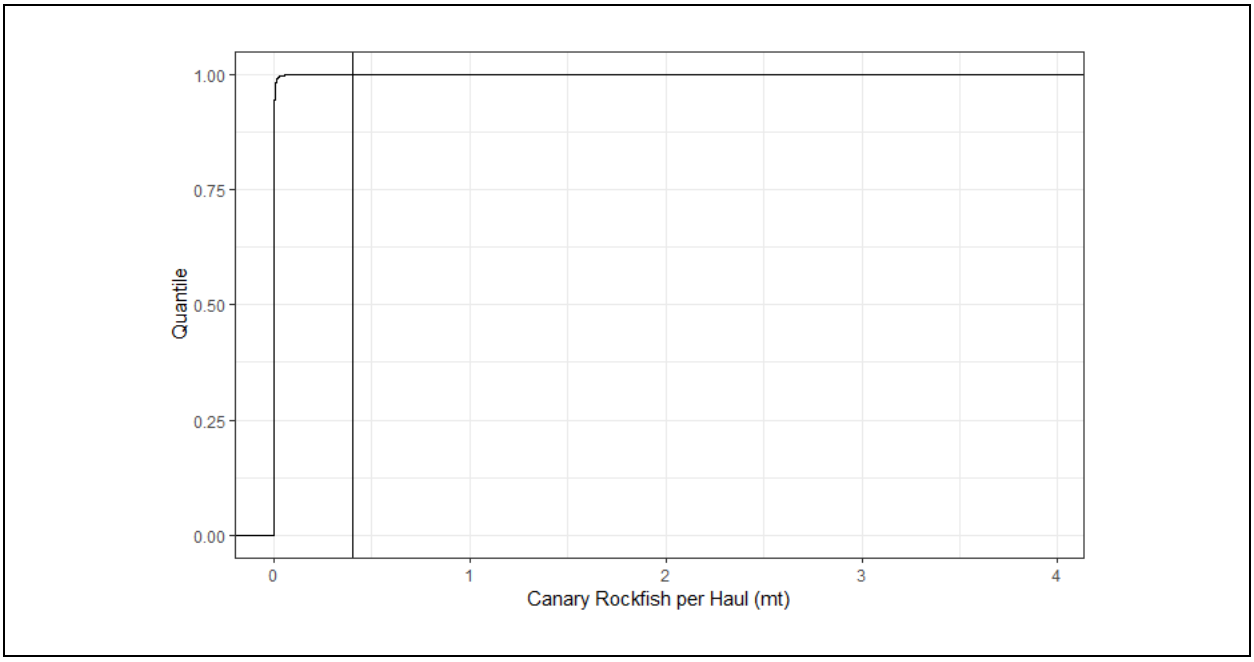


Figure 2. Cumulative distribution of canary rockfish catches (mt) on MS hauls, 2000-2017.

Looking at the sectors combined however, there was not a single simulated season under any of the alternatives in which the 46 mt combined set aside was exceeded. While there could be greater potential for higher bycatch in the future with changes in fishing behavior, move-along rules, and the rebuilding of the canary rockfish stock since the mid-2000s (2015 Canary Rockfish Assessment), it is unlikely that the sectors combined would exceed the set aside levels.

As discussed above, set asides are managed on an annual basis. However, if the at-sea sectors were to exceed a set aside level and there was a risk to a harvest specification, unforeseen impact on another fishery (e.g. shorebased IFQ), or a conservation concern, there are mitigation measures available through routine inseason action. Bycatch reduction areas (BRAs) can be implemented on vessels using midwater gear to close an area shoreward of a boundary line 75, 100, 150, or 200 fathoms.[6] Currently, BRAs can be implemented at 75, 100, and 150 fathoms through automatic

[6] The Council adopted the 200 fathom BRA line through the 2019-20 biennial process and will be available when the 2019-20 harvest specifications are implemented.

action only if NMFS projects a sector will exceed a groundfish allocation before reaching its whiting allocation. However, if canary (or widow) rockfish are managed as set asides, the automatic authority provision no longer applies. The Council could take action at a Council meeting to recommend that a BRA were implemented for the at-sea sectors to reduce bycatch of canary rockfish.

Even with an overage of the set-aside of canary rockfish, there may not be a need to restrict the at-sea sectors given the likely under-attainment of the shorebased IFQ sector and the overall ACL. The shorebased IFQ fishery is more of a multispecies target fishery in which the allocation for all species cannot be fully attained. Generally, the fishery comes close to fully attaining its allocations of northern sablefish, Petrale sole and whiting. Canary and widow are mostly underattained, as indicated in Table 6, though attainment of widow has increased in more recent years with the redevelopment of a midwater pelagic target strategy.

Widow Rockfish – Bootstrap Modelling

Allocation and Harvest Levels

Widow rockfish allocations for the at-sea sectors are determined based on the formula established under Amendment 21. Similar to darkblotched rockfish and POP, widow rockfish is a trawl dominant species that was overfished at the time of the implementation of the IFQ program and quota was needed in the non-whiting as well as whiting fisheries. For widow, the allocation formula established under Amendment 21 is to allocate 10 percent or 500 mt, whichever is greater, of the trawl allocation to whiting (shorebased and at-sea), and then apportion to each sector pro-rata to the whiting allocation.

While the at-sea sectors have seen minimal total landings of canary rockfish historically, widow rockfish bycatch has ranged from hundreds of metric tons to less than a metric ton for each sector since 1991 (Table 12). The rate of positive hauls is much higher with 35.8 percent of CP hauls having some widow rockfish bycatch and 56.7 percent in the MS sector since 2000. Yet, it is the composition of those positive hauls likely driving the wide variability of bycatch. As shown in Table 13, the majority of positive hauls fall into Bins 2 and 3 as was true for canary rockfish. However, the large amount of the total catch comes from tows that exceed 0.4 mt in size and account for 73 percent of the total widow catch in both sectors since 2000. Only 1.6 percent of all hauls (including hauls with no bycatch) historically have been greater than 0.4 mt, but the CP sector has seen single hauls almost up to 80 mt.

Table 12. Widow rockfish bycatch (mt) in the at-sea sectors, 1991-2017:

Year	CP	MS
1991	238.92	229.58
1992	333.40	92.67
1993	130.00	61.29
1994	198.76	187.43
1995	86.77	163.75
1996	115.89	144.17
1997	74.56	135.27
1998	120.91	177.21
1999	101.77	45.44
2000	70.32	150.39
2001	139.71	29.67
2002	115.20	20.51
2003	11.56	0.68
2004	8.21	11.42
2005	43.14	35.50
2006	66.88	71.88
2007	72.79	72.82
2008	52.34	60.58
2009	1.63	24.89
2010	5.15	34.02
2011	24.11	12.85
2012	42.36	37.17
2013	15.69	15.55
2014	16.55	39.69
2015	17.43	17.20
2016	112.26	74.40
2017	409.20	66.03

Table 13. Summary statistics of positive widow rockfish hauls in the at-sea sector by size bin.

Bin	2	3	4	5	6
Size Bin (mt)	0-0.005	0.005-0.03	0.03-0.1	0.1-0.4	> 0.4
Hauls	6877	8141	2947	1438	712
Widow Catch (mt)	18.71	106.87	158.36	273.48	1513.52
Average Catch per Haul	0	0.01	0.05	0.19	2.13
Proportion of Total Positive Hauls	34.19	40.47	14.65	7.15	3.54
Proportion of Catch	0.9	5.16	7.65	13.21	73.08

Simulation Results for Widow

Unlike canary rockfish, there is a risk of exceeding the allocation/set aside values for both sectors as shown in Table 14. Under Alternatives 1 and 2, the C/P sector exceeds the allocation of widow rockfish in 5.1 percent of simulations (or ~ 1:20 chance) compared to only 1.7 percent of simulations in the MS sector (~1:50 chance). As noted above, this simulation is based on the 2018 allocations. With the ACL for widow rockfish continuing to decline in 2019-20, the corresponding allocations decrease by 20-30 mt each year thereby increasing the likelihood that the fleet may exceed its set-aside, unless there is a corresponding decline in bycatch rates. The likelihood of exceeding the set aside value is approximately the same under Alternatives 3 and 4 (5.6 percent and 1.7 percent respectively), but the degree to which the sector could exceed the set aside value is much greater.

Figure 3 below depicts the ten simulated seasons that recorded the highest widow rockfish catch by sector and alternative with the proportion of hauls by haul size bin (including hauls with no widow rockfish bycatch). As shown, Alternatives 1 and 2 seasons vary in the number of total hauls and the composition of the hauls resulting in the exceedance of the widow rockfish allocation. The exceedance of an allocation is not only due to the accumulation of large tows, but can also be due to several smaller tows (bins 2 and 3, 0-0.005 mt and 0.005-0.03 mt, respectively).

Table 14. Bootstrap simulation results for widow rockfish.

Sector	Allocation/ Set Aside (mt)	Alternative	Quantiles (widow rockfish catch)					
			0.01	0.25	0.5	0.75	0.95	0.9999
			Widow Rockfish mt					
CP	384.8	Alt 1 & 2	4.8	21.7	61.9	128.7	384.8	462.6
		Alt 3 & 4	4.9	21.9	61.9	128.3	398.3	856.7
MS	271.6	Alt 1 & 2	2.2	48.6	72.9	95.7	221.2	281.3
		Alt 3 & 4	2.2	48.5	72.5	95.6	221.7	366.2

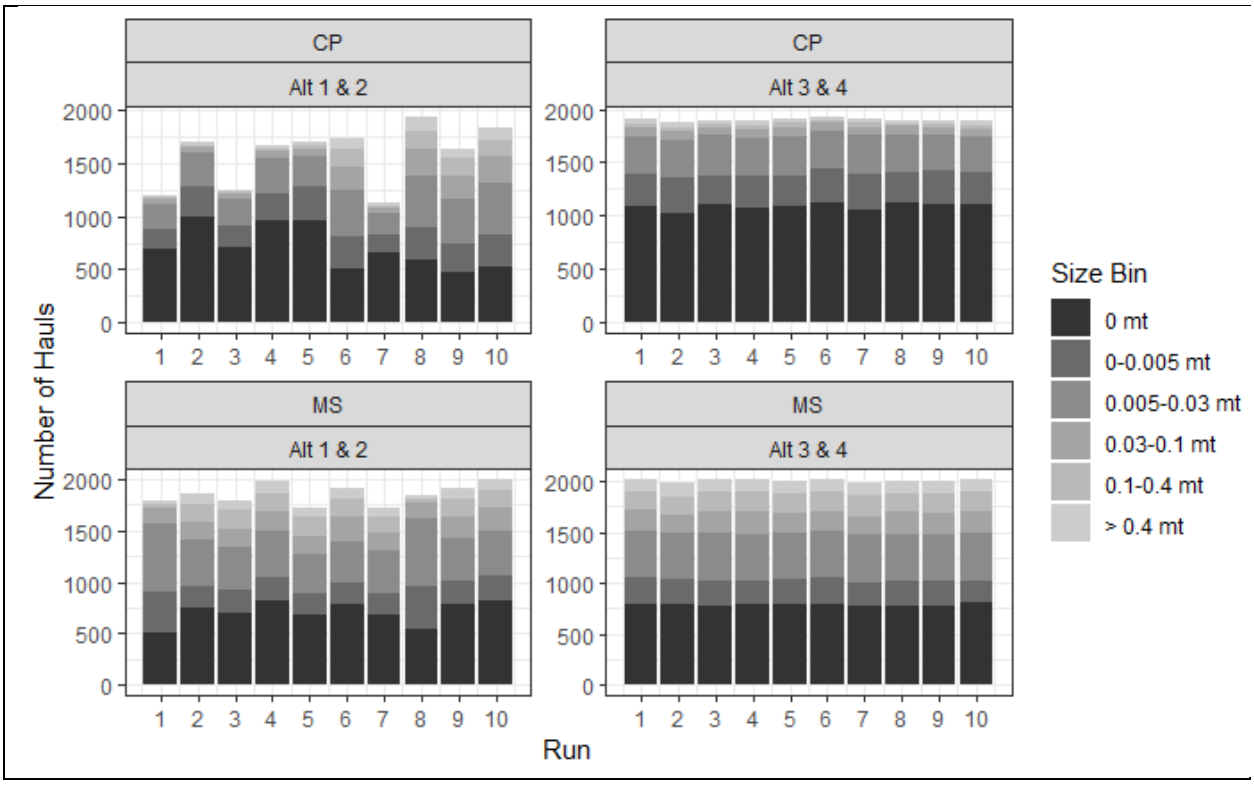


Figure 3. Top 10 Simulated Seasons of Widow Rockfish by Sector and Action Alternative

However, when looking at the sectors combined, there is no situation under Alternatives 1 and 2 (i.e. bycatch cap management) in which the sectors combined exceed the total value of the 2018 allocations (656.4 mt). Under Alternatives 3 and 4, however, there were 112 seasons out of 18,000 that exceeded the combined set aside value by anywhere from 0.46 mt to 503.3 mt (Figure 4). Overall though, these overage seasons equate to only 0.7 percent of the total simulated seasons. In other words, in these model runs, less than 1 out of 100 times did the at-sea sectors both catch enough widow rockfish to exceed the combined allocation or set aside. With the future ACLs in 2019-20 continuing to decline resulting in lower allocations, it does increase the likelihood that this situation could occur. However, based on recent low attainment of allocations by the shorebased IFQ fishery, there would still likely be no risk to the trawl allocation or the ACL (see percentage attainments in Table 6).

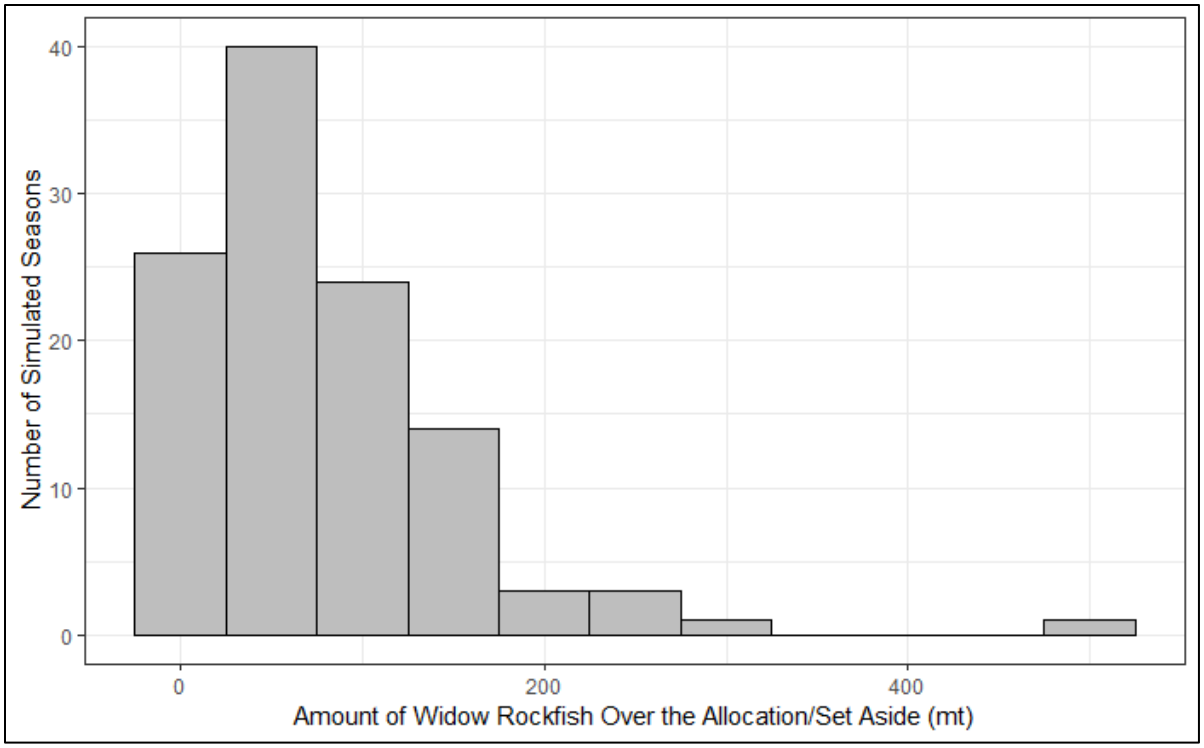


Figure 4. Projected overages of the combined widow rockfish allocation/set aside values for the at-sea sectors from the Alternative 2 bootstrap simulation.

Chinook – Bootstrap Modeling and Simulation Results

The relationship between whiting and Chinook salmon bycatch in the at-sea fleets has been examined at length through the development of the 2017 Biological Opinion. Ultimately, there is no apparent correlation between the catch of whiting and bycatch of Chinook salmon as described in Agenda Item F.7.a., WDFW Report, September 2016 and Agenda Item F.3.a, Supplemental GMT Report 1, April 2017. However, depth and distribution of whiting activity appears to drive the potential for bycatch. In the 2017 Biological Opinion, Tables 56a-56d and Figures 2-12 through Figure 2-15 show the projected distribution using a similar bootstrap methodology for both the CP and MS sectors under a TAC of 500,000 mt under a northern and southern distribution. An additional axis of uncertainty was the percent attainment of whiting (100 percent and the 2008-2016 average). As shown, fishing towards more southern latitudes resulted in a higher mean bycatch of Chinook salmon in both CP and MS sectors. Table 15 below shows the median predicted Chinook bycatch by sector under the various axes of uncertainty. As shown, the southern distribution results in approximately 5x the projected bycatch than the northern distribution. There is also a small difference in the projected bycatch between attainment scenarios, which is likely a result of the additional hauls (i.e., time on the water) needed to achieve the full whiting allocation under a 500,000 mt TAC.

Table 15. Median Chinook salmon bycatch projections from the 2017 BiOp (values in Tables 56a-56d)

Distribution	CP		MS	
	100 Percent Attainment	Average Attainment	100 Percent Attainment	Average Attainment
Northern	593	551	1,168	1,012
Southern	3,620	3,206	3,699	3,206

The bootstrap analysis used in this assessment does not look at northern or southern distributions, but does have 18 seasons of haul data to reflect a range of variable bycatch and fishing location patterns. Table 16 below shows the results of the expected Chinook bycatch under all alternatives. As shown, between Alternatives 1 and 2 as compared to Alternatives 3 and 4 there is a minimal increase in the expected number of Chinook caught in each at-sea sector in some quantiles. Since the Alternatives 3 and 4 simulations "closed" the fishery only on the attainment of the whiting allocation, it is likely on average that the additional hauls allowed for more Chinook salmon to be caught.

Table 16. Bootstrap simulation results for Chinook salmon.

Sector	Alternative	Quantiles (Chinook bycatch)					
		0.01	0.25	0.5	0.75	0.95	0.9999
		Chinook (number of fish)					
CP	Alt 1 & 2	68	714	2,402	3,191	4,734	6,348
	Alt 3 & 4	67	734	2,532	3,250	4,724	6,193
MS	Alt 1 & 2	306	1,025	1,852	3,990	7,993	11,761
	Alt 3 & 4	307	1,028	1,925	3,997	8,145	11,505.2

An additional way to consider potential impacts to Chinook salmon under set aside management is to look at the distribution of projections over varying number of hauls as was done in Agenda Item F.7.a., WDFW Report, September 2016. Instead of closing a season on the attainment of an allocation, this bootstrap simulation runs for a specific number of hauls. Comparing the panels below, the MS sector has much steeper slope than the CP sector in the upper quantiles, specifically the 0.9 and 0.9999 quantile (or the "worst case" scenario). Under the median estimate, it is likely that the CP sector would take more Chinook salmon that the MS sector over the same number of hauls. However, in 1:10 runs (i.e. 0.9 quantile), there are more Chinook caught in an MS haul compared to a CP haul. Under the worst case scenario (i.e., the 0.9999 quantile), the MS sector could take approximately 18,000 Chinook in 3,000 hauls. For perspective, Table 17 shows the number of hauls, post-reapportionment allocation, and whiting catch from 2011-2017 by sector. Given the historical performance, the likelihood of the MS or CP sectors taking 3,000 hauls is low.

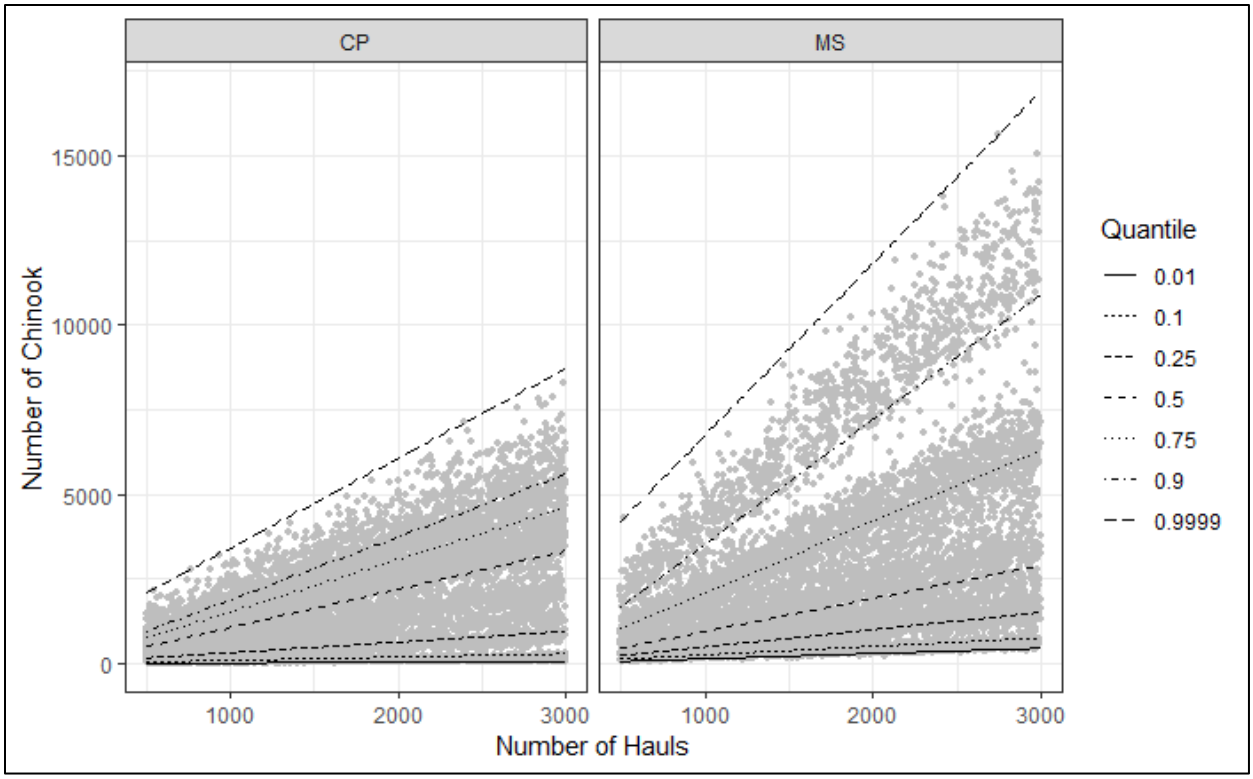


Figure 5: Bootstrap simulation results for Chinook salmon by variation of haul numbers

Table 17. Number of hauls, Pacific whiting catch (mt), and Pacific whiting allocation (mt; post-reapportionment) by sector, 2011-2017

Year	CP			MS		
	Hauls	Catch	Allocation	Hauls	Catch	Allocation
2011	1,534	71,679	75,138	1,248	50,051	53,039
2012	1,102	55,263	55,584	949	38,480	39,235
2013	1,443	77,950	79,574	1,256	52,450	56,170
2014	1,684	103,203	103,486	1,306	62,098	73,049
2015	1,507	68,484	100,873	631	27,660	71,204
2016	2,189	108,786	114,149	1,557	65,035	80,575
2017	2,145	136,961	137,252	1,302	66,430	96,884

Eulachon

The current Incidental Take Statement (ITS) bycatch limit for eulachon in 1,004 fish per year. They are expected to be caught in the at-sea whiting and bottom trawl fisheries. A new ITS is in the process of being prepared. The following is reported in the 2016 WDFW report on conversion of darkblotched and POP bycatch management from caps to set-asides. I

> In general, the bycatch patterns across all sectors indicate that there are either limited interactions with eulachon or that they are able to escape through the mesh. There may be more encounters with eulachon that are not captured by observer data as the only time

that they would be observed in the net would be if the net was clogged. Limited research is available on the actual mortality of these encountered, but not caught, fish (Gustafson, 2016). (Agenda Item F.7.a, WDFW Report, September 2016)

These measures would not be expected to significantly change the amount of eulachon bycatch. In the rare years when whiting harvest might be higher than it otherwise might be there could be a minor increase in bycatch volume. However, there is likely to be greater year-to-year change in volume total whiting allocated than there is in the minor fluctuations that might result from changing to bycatch management.

Summary

Under the no action alternative

- The fishery will continue to operate within the parameters taken into account in the current biennial specifications analyses.

Under the action alternatives that switch bycatch management of canary and widow from caps to set-asides (Alternatives 3 and 4) relative to Alternatives 1 and 2:

- Set-aside management will reduce but not eliminate the incentives to avoid bycatch species (in this case canary and widow).
- Managers will continue to have the ability to ensure that critical harvest specifications are not exceeded (OFSs and ABCs).
- Past harvest patterns indicate that managers will rarely need to exercise those abilities.
- There appears to be little risk to groundfish conservation objectives.
- On the one hand, potential total salmon catch could increase to the degree that total harvest of whiting may increase (which is likely to be an infrequent occurrence). On the other hand, fishermen will have incentive and more flexibility to avoid salmon throughout the year, potentially reducing salmon bycatch rates and total salmon bycatch when the fishery is operating within its set-aside.

Under the action alternatives that remove the within trawl allocations/divisions of harvest from the FMP (Alternatives 2 and 4) relative to Alternatives 1 and 3:

- No impacts to the biological and physical environment have been identified.

Impacts to the Fishery and Communities

Under Alternatives 1 and 2 management would continue under bycatch caps for canary and widow rockfish, the at-sea fleets would continue to expend effort avoiding these species and would occasionally have their season closed upon exceeding the caps. With the move from canary and widow caps to set-asides (Alternatives 3 and 4), reduction of the constraints imposed by bycatch allowances may benefit the at-sea sectors by increasing the certainty of the sector's access to its whiting allocation, decreasing the need for groundfish bycatch avoidance measures (and the attendant costs), and increasing opportunity to avoid salmon and the closures that would

occur if those caps are exceeded (as discussed under biological impacts). Set-aside management may also reduce disruption that occurs when the fishery has to slow or stop to wait for management entities to provide an inseason augmentation of bycatch allocations (when such augmentations are possible). These issues are addressed in the following sections.

Under Alternatives 1 and 3 the sector bycatch allowances, whether managed as caps or set-asides, would be determined by formulas specified in the FMP. Alternatives 2 and 4 would remove some or all bycatch allowance formulas from the FMP—for darkblotched and POP (under Alternative 2) or for darkblotched, POP, and widow rockfish (under Alternative 4)—and those allowances would be determined every two years as part of the biennial management process. This may lead to some uncertainty about future harvest levels and result in some additional conflict among opposing sides of allocation disagreements. Determination of bycatch allowances would be handled the way canary rockfish is under the current system.

Benefits from Whiting Harvest

For an indication of the likelihood of changes in whiting harvest levels this section will first use whiting harvest output results from the same bootstrap runs discussed in the previous section. It will then examine economic data indicating the economic importance of those changes.

Bootstrap results for management with caps indicate that the CP sector would not take its allocation less than 5.1 percent of the time, in other words, under cap management for canary and widow (Alternatives 1 and 2) there would be about a one in 20 chance that the sector would not be allowed to catch all of its whiting allocation. Results for the MS sector indicate that it would fall short of full whiting harvest only 1.9 percent of the time, in other words about a one in fifty chance the sector would not attain all its whiting allocation. These values assume that the bycatch caps are not augmented through inseason transfers, as occurred for darkblotched in 2014. However, such transfers have their own costs in terms of fleet stand down time and administrative costs. Nevertheless, the value provide an indication of the potential improvements that might occur if the at-sea sectors were instead managed with set asides—assuming that under set-asides the sectors would be able to continue to harvest and none of the other factors[7] are triggered that would cause inseason action in response to a set-aside overage.

Under cap management (Alternatives 1 and 2) the model projects that whiting will be forgone when the sector goes over its canary or widow cap. Thus the rare occurrence of an overage for one of these two species (documented in the biological impact section) implies a rare occurrence of foregone whiting harvest. For example, if 99 percent of the time the fleet is under its canary and whiting allocation then only 1 percent of the time would it be over and whiting harvest forgone. Table 18 and Table 19 show the degrees of harvest that might be forgone at different quantiles (percentiles expressed as decimals) for the MS and CP sectors based on fish availability and fishing patterns over the past 18 years. At the 0.0001 quantile (1 in 10,000 instances) the MS sector would be expected to forgo 27,849 mt or more of whiting harvest and at the 0.01 quantile (1 in 100 instances or less) the sector would be expected to forgo 5,089 mt or more. At the 0.0001 quantile (1 in 10,000 instances) the CP sector would be expected to forgo 89,387 mt

[7] Again, those factors are: risk of a harvest specification being exceeded, unforeseen impact on another fisheries, or conservation concerns

or more of harvest and at the 0.01 quantile (1 in 100 instances) the sector would be expected to forgo 42,793 mt or more.

Table 18. Total MS allocations and amounts of whiting caught and forgone for various quantiles of whiting allocation attainment (bootstrap model results for Alternative 1, no action).

Sector Allocation	Attainment	Quantiles (whiting allocation attainment)					
		0.0001	0.01	0.25	0.5	0.75	0.95
		Whiting mt					
123,312 mt	Caught	59,195	81,955	87,044	87,044	87,044	87,044
	Forgone	27,849	5,089	0	0	0	0

Table 19. Total CP allocations and amounts of whiting caught and forgone for various quantiles of whiting allocation attainment (bootstrap model results for Alternative 1, no action).

Sector Allocation	Attainment	Quantiles (whiting allocation attainment)					
		0.0001	0.01	0.25	0.5	0.75	0.95
		Whiting mt					
123,312 mt	Caught	33,925	80,519	123,312	123,312	123,312	123,312
	Forgone	89,387	42,793	0	0	0	0

Under Alternatives 3 and 4 the fishery would be managed with set asides and closures would not be expected (with the caveats previously discussed). Therefore, the differences in expected harvest between set-aside management (Alternatives 3 and 4) and cap management (Alternatives 1 and 2) are reflected in the foregone harvest amounts in Table 18 and Table 19. Assuming 2017 prices, these amounts forgone convert to exvessel values of between $800 thousand and $16.0 million.

Table 20. Exvessel value of whiting harvest potentially gained under Alternatives 3 and 4 relative to Alternatives 1 and 2, and probability levels for that gain. Data source: 2017 exvessel prices from NORPAC.

	Quantiles (whiting allocation attainment)		
	0.0001	0.01	0.25 and higher
	Whiting Exvessel Value or Equivalent ($ millions)		
MS Sector	4.8	0.9	0.0
CP Sector	16.0	7.7	0.0

Exvessel revenue converts to dollar flows that go to profits and expenditures on labor, supplies, hardware, etc. Profits are reflected in estimates of total cost net revenue and variable cost net revenue, presented in Table 21 on a per metric ton basis. These values indicate the loss per metric ton of harvest and foregone harvest indicated by the bootstrap model results in Table 19.

Table 21. Total cost net revenue per metric ton,=[a/] variable cost net revenue per metric ton [b/] (average of 2011-2017 annual median vessel values). Source: FISHEyE.

	Total Coast Net Revenue	Variable Cost Net Revenue
Mothership Catcher Vessels	37.23	84.51
Mothership Processors	-120.69	473.90
CPs	948.05	1,376.64

a/ Total cost net revenue (TCNR) is revenue minus fixed and total costs. Over many years, TCNR is a measure of long-term profitability. In any given year, a vessel may have a large fixed cost expense (such as a new engine) which may lead to a negative or unusually low TCNR.

b/ Variable cost net revenuae is revenue minus variable costs, a measure of the operating profit of the average vessel.

The Northwest Fisheries Science Centers Economic Data Collection reports show that the at-sea sectors earn some of largest commercial revenues among the groundfish sectors.[8] The benefits from additional harvest accrue not only to harvesters and at-sea processors but also to the communities from which these sectors draw support and supplies and in which individuals spend their earnings. In terms of their importance to fishing communities, the economic contributions of the at-sea sectors are taken into account each biennial cycle, and most recently as part of the 2017-2018 Groundfish Harvest Specifications and Management Measures Description and Analysis for Decision Making.[9] Regionally specific benefits from these expenditures are reflected in the income impact estimates provided in Table 24. These are the benefits that would be associated with the occasional higher levels of whiting harvest under Alternatives 3 and 4. Unmeasured benefits would also likely accrue every year from a reduction in costs. Cost reductions increase profits which in turn increase the amount of revenue that goes to personal income that can be respent in communities.

With respect to the specific fishing communities most directly affected by the activities of the at-sea sectors, the WDFW (2016) analysis of darkblotched and POP set-aside decision notes that all of the MS and CP vessels list Seattle and the Greater Puget Sound areas as their homeport, and deliver their products to Blaine, Bellingham, Tacoma, and Seattle. The sector employs people from those communities as well as from around the country and other nations. According to the EDC data, catcher vessels that participate in the MS fishery in 2014 listed their homeports as Puget Sound, Newport, and Brookings.[10] Therefore, any potential cost burdens or savings discussed below would filter down to communities in these areas.

[8] The EDC reports and FISHeyE data portal can be accessed here: https://www.nwfsc.noaa.gov/research/divisions/fram/economic/overview.cfm

[9] Final version is in progress. Current version at time of writing is available: http://www.pcouncil.org/wp-content/uploads/2016/06/G4_Att2_Analysis_Doc_JUN2016BB.pdf

[10] Prior to 2014, there were vessels also operated out of Alaska, Astoria, and San Francisco.

Table 22. Regional income impacts associated with the value of whiting harvest potentially gained under Alternatives 3 and 4 relative to Alternatives 1 and 2, and probability levels for that gain (based on 2017 exvessel prices from NORPAC).

	Quantiles (whiting allocation attainment)		
	0.0001	0.01	0.25 and higher
	Regional Income Impacts ($ millions)		
MS Sector	4.6	0.8	0.0
CP Sector	23.9	11.5	0.0

MSs and CPs are generally associated with Bellingham, Seattle, and Tacoma (EDC and USCG data). Catcher vessels participating in the MS fishery can be associated with ports through information on their shorebased deliveries. Table 23 indicates that Astoria and Newport are centers of activity for many of these vessels.

Table 23. Number of catcher vessels participating in the MS whiting fishery that also made shorebased landings in West Coast ports and the nominal ex-vessel revenue from those landings for two time periods. Source: West Coast Groundfish Trawl Catch Share Program Five-year Review, 2017.

	2006 to 2010		2011 to 2015	
Port	Number of Vessels	Inflation-adj. ex-vessel revenue ($mil. 2016)	Number of Vessels	Inflation-adj. ex-vessel revenue ($mil. 2016)
Washington	7	$9.8	7	$19.5
Astoria	11	$8.2	14	$25.3
Newport	12	$17.1	13	$28.7
Coos Bay	3	$0.8	1	***
Brookings	2	***	1	***
Crescent City	2	***		
Eureka	2	***		
San Francisco (incl. Bodega Bay)	1	***		
Morro Bay	1	***		
Coastwide	20	$38.3	16	$74.4

Note: *** signifies information is excluded due to confidential data restrictions (less than three vessels or first receivers).

Bycatch Avoidance and Fishing Activity Disruption

Bycatch avoidance measures (such as moving the fleet when high bycatch rates are encountered) reduce fleet efficiency by increasing operating costs. Members of both the MS and CP fleets have indicated that reduction of the constraints imposed by bycatch caps might allow them to reduce the stringency of their bycatch avoidance measures and thereby reduce fishing costs. As an example, the 2015 whiting MS co-op bycatch rules include closed areas and relocation requirements when high bycatch rates are encountered. Additionally, test tows are required each

time a new area is entered. While these costs affect the whole fleet, impacts may be greater on individual vessels. The MS sector fishery is conducted in a sequence of pools. Not all vessels participate in all pools. In 2011 no pools were closed based on bycatch, but in 2012 one pool was closed due to widow bycatch, in 2013 one pool was closed due to darkblotched bycatch, in 2014 two pools were closed due to darkblotched bycatch and in 2015 one pool was closed due to darkblotched bycatch. Thus, even though the MS sector substantially underutilized its bycatch allocations in all of these years of pool closures except 2014[11] (Table 7), there were periods during which fishing stopped due to bycatch limitations under the co-op rules. Further, if fishing in one pool is shut down due to bycatch problems, a vessel may be prevented from participating in a subsequent pool if its bycatch rates exceeded 125% of the base bycatch rates.[12]

In 2015, MS catcher vessels were required to move to a new fishing area if:

i. a Fleet's three (3) day rolling average bycatch rate of Overfished Species or Chinook salmon exceeds the Base Rate for any such species, and that Fleet's cumulative annual bycatch rate for such species exceeds fifty percent (50%) of the Base Rate for such species,
ii. a Fleet's three (3) day rolling average bycatch rate for any of such species exceeds one-hundred twenty-five percent (125%) of the Base Rate for such species, or
iii. a Fleet's bycatch rate during any single day exceeds two-hundred percent (200%) of the Base Rate for such species

(from page 2 of the "2015 WMC Bycatch Rules")

Data from 2011 through 2015 for rockfish are used to illustrate the frequency with which the MS fleet moves in response to these triggers (Table 24). The 200 percent trigger corresponds to movement criteria iii in the above list. Under certain circumstances a move is required when the base rate is reached on a three day rolling average basis (see paragraph i above). Additionally, it is reported that vessels will move on a pre-emptive basis prior to reaching the triggers—thus moves occur at a greater frequency than would be indicated by an analysis of the trigger points. To indicate the higher frequency at which the fleets might move, an analysis is provided using a trigger of one day fishing at 100 percent of the base rate. In some cases, more than one single species trigger is encountered on the same day. To develop an estimate of the total number of days on which a move was required, the values in Table 24 were summed across species. A downward adjustment was made based on an estimate of the number of days in which the trigger for more than one species was reached (developed using five year annual average base rates). These results are displayed in Table 25. From these data it can be seen that based on the 200 percent criteria, from 2011 through 2015 the lowest frequency of move triggers was 5 percent in 2011 and the highest was 28 percent in 2015. If the more sensitive trigger of 100 percent reflects the fleet's actual behavior, these data show that the lowest frequency of move triggers was 13 percent in 2011 and 39 percent in 2015.

[11] In 2014, the darkblotched allocations for both at-sea sectors were augmented late in the year, but not before substantial time for harvesting had been lost and related delay expenses incurred.
[12] If any vessel fails to operate in conformance with these rules, the vessel operator is subject to a $2,500 penalty and the vessel owner a $10,000 penalty for each occurrence.

Minimizing incidental catch of species of concern, including Chinook salmon, is also a stated priority for the CP sector cooperative (CP co-op). The CP co-op uses methods similar to the MS co-ops to prevent and respond to Chinook bycatch. Because of the relatively small number of participants (three companies and nine vessels), near real-time catch data, and communication among the fleet and fleet managers, the CP co-op is able to readily assess and respond to bycatch events as they arise, for example, by identifying and avoiding problematic areas.

Table 24. MS sector processor days in which the base bycatch rates are exceeded by the base rate (Days >100%) and twice the base rate (Days > 200%) Source: personal communication, Dave Fraser, 1/31/2016).

Year	Base Bycatch Rate (kg/mt)	Processor Days With >100% of Base Rate	Processor Days With >200% of Base Rate	Total Number of Processor Days by Year	Percent of Days Exceeding 100% of Base Rate	Percent of Days Exceeding 200% of Base Rate
	Canary Rockfish					
2011	0.06	1	0	239	0%	0%
2012	0.10	0	0	190	0%	0%
2013	0.11	8	3	224	4%	1%
2014	0.08	4	1	221	2%	0%
2015	0.09	2	2	114	2%	2%
	Darkblotched Rockfish					
2011	0.11	11	7	239	5%	3%
2012	0.18	10	4	190	5%	2%
2013	0.12	24	17	224	11%	8%
2014	0.10	22	14	221	10%	6%
2015	0.10	21	15	114	18%	13%
	POP					
2011	0.14	9	2	239	4%	1%
2012	0.22	5	2	190	3%	1%
2013	0.15	8	7	224	4%	3%
2014	0.12	10	8	221	5%	4%
2015	0.11	17	11	114	15%	10%
	Widow Rockfish					
2011	1.15	11	4	239	5%	2%
2012	1.88	15	8	190	8%	4%
2013	2.45	8	5	224	4%	2%
2014	1.93	20	13	221	9%	6%
2015	1.87	11	7	114	10%	6%

Table 25. Number and percent of days exceeding trigger (sum of individual species triggers adjusted based on an estimate of the occurrence of more than one species trigger on the same day)[a/] Source: personal communication, Dave Fraser, 1/31/2016.

Year	Processor Days With >100% of Base Rate	Processor With Days >200% of Base Rate	Total # of Processor Days by Year	Percent of Days Exceeding 100% of Base Rate	Percent of Days Exceeding 200% of Base Rate
2011	30.5	12.5	239	13%	5%
2012	29	14	190	15%	7%
2013	43.5	29.5	224	19%	13%
2014	49	34	221	22%	15%
2015	45	32	114	39%	28%

a/ The approach used to develop these estimates will slightly underestimate the frequency of moves for the higher values and slightly over estimate the frequency of moves for the lower values.

The distances that the fleet moves in response to these triggers varies, nevertheless movement requires time and expense. Table 26 provides per vessel total and variable costs net revenue (measures of vessel profitability) and the variable costs per vessel-day. These per day costs provide an indication of the degree to which profits might be indicated by each additional day spent at-sea due to effort spent avoiding bycatch cap species. To the degree that under set-asides vessels are able to lessen their bycatch avoidance efforts without generating other management concerns, profits may be increased. Unlike the benefits the Alternatives 3 and 4 might provide in terms of avoidance of whiting closures and foregone harvest, the benefits from reduction in bycatch avoidance would accrue in every season (relative to cap management under Alternatives 1 and 2).

Table 26. Total cost net revenue per vessel,[a/] variable cost net revenue per vessel, [b/] and variable cost per vessel day (average of 2011-2017 annual median vessel values). Source: FISHEyE.

	Total Cost Net Revenue Per Year [a/]	Variable Cost Net Revenue Per Year [b/]	Variable Cost Per Day
Mothership Catcher Vessels	88,062	227,226	7,810
Mothership Processors	-147,672	2,012,114	98,902
CPs	2,686,857	4,065,999	69,707

a/ Total cost net revenue (TCNR) is revenue minus fixed and total costs. Over many years, TCNR is a measure of long-term profitability. In any given year, a vessel may have a large fixed cost expense (such as a new engine) which may lead to a negative or unusually low TCNR.

b/ Variable cost net revenuae is revenue minus variable costs, a measure of the operating profit of the average vessel.

Summary

Under the no action alternative

- The fishery will continue to operate within the parameters and with the resulting economic impacts taken into account in the current biennial specifications analyses.

Under the action alternatives that switch bycatch management of canary and widow from caps to set-asides (Alternatives 3 and 4), relative to Alternatives 1 and 2:

- Vessels will likely experience a cost reduction as they will need to spend less time and effort avoiding set-aside species.
- The sector will be more likely able to harvest its full whiting allocation due to
    - A lower likelihood of being closed due to bycatch of canary and widow because a set-aside overage would not necessarily require a management response
    - A lower likelihood of being closed due to salmon bycatch because the reduction of the canary and widow constraints will increase the fleet's flexibility to focus on avoiding salmon.
- Communities will benefit from increased profits due to reduced costs and increased whiting harvest.

Under the action alternatives that remove the within trawl allocations/divisions of harvest from the FMP (Alternatives 2 and 4) relative to Alternatives 1 and 3:

- There may be some increase in uncertainty about future harvest levels (for darkblotched and POP under Alternative 2 and for darkblotched, POP and widow under alternative 4),
- There may be an increase in social conflict between members of different sectors if they vie each biennium to convince managers to provide their sector greater allocations.

Impacts to Administrative Costs

Under Alternatives 1 and 2, in years when the at-sea sector exceeds a canary or widow rockfish cap, the Council and NMFS are likely to take action to augment those caps, provided there are set-asides that appear to be going unused (as occurred for POP in 2016) or unused allocation available from another sector (as occurred for darkblotched in 2014). These actions entail some administrative costs. Under Alternatives 3 and 4, set asides can be exceeded as long as there is not risk of a harvest specification being exceeded, unforeseen impact on another fisheries, or conservation concerns. This then would reduce administrative costs. However, the bootstrap modelling indicates that for canary and widow overages of set-asides would likely be a rare occurrence. Though this may change if the at-sea fleets take advantage of the increased flexibility to reduce operational costs related to avoidance of these species and/or increase emphasis on avoiding salmon.

Currently darkblotched, POP, and widow rockfish bycatch allowances are determined every two years by applications of the within trawl allocation formulas contained in section xx of the FMP. This practice would continue under Alternatives 1 and 3. Other alternatives would remove the

formulas from the FMP, leaving the set-aside determinations to the biennial management process (Alternatives 2 would remove darkblotched and POP and Alternative 4 would remove those two species plus widow. This would add some to the workload associated with that process and may add to conflict to the degree that there is contention between the sectors about appropriate set-aside and allocation levels. Bycatch allowances for these species would be handled the way canary rockfish is under the current system.

Summary

Under the no action alternative

- The fishery will continue to operate within the parameters and with the resulting administrative costs taken into account in the current biennial specifications analyses.
- Inseason action may be occasionally taken to augment at-sea sector canary and widow caps, when there are shortages for one or both of the at-sea sectors and surpluses available from elsewhere.
- Bycatch allowances for darkblotched, POP and widow will continue to be determined by the FMP.

Under the action alternatives that switch bycatch management of canary and widow from caps to set-asides (Alternatives 3 and 4), relative to Alternatives 1 and 2:

- There will be a slight increase in the possibility that sector bycatch allowances will be exceeded and managers will need to evaluate whether a management response is required and, in some cases, take action.

Under the action alternatives that remove the within trawl allocations/divisions of harvest from the FMP (Alternatives 2 and 4) relative to Alternatives 1 and 3:

- There may be some increase in costs related to biennial determination of set-aside amounts (for darkblotched and POP under Alternative 2 and for darkblotched, POP and widow under alternative 4).

Blackgill Annual Vessel QP Limit

As part of its review of the catch share program, the Council considered whether or not to revise its accumulation limits, including the annual vessel QP limits. At its March 2018 meeting, based on preliminary analyses (Agenda Item H.6, Attachment 1), it decided that at this time it would not revise annual vessel QP limits for most species but did want to re-examine the blackgill vessel QP limit prior to implementation of the separation of blackgill rockfish from the southern Slope Rockfish complex (proposed Amendment 26 to the FMP).

In November 2015, the Council took final action to remove blackgill rockfish from the Slope Rockfish complex south of 40º 10’ N. lat and reallocate southern blackgill rockfish and the remaining species in the southern Slope Rockfish complex to trawl and non-trawl sectors as follows:

Blackgill: 41% to LE Trawl and
59% to Non-Trawl sectors;
Remaining Southern Slope Rockfish:
91% to LE Trawl and
9% to Non-Trawl sectors.

NMFS has not yet formally considered the Council's Amendment 26 recommendation due to workload limitations.

The Council recommended continuation of the same southern Slope Rockfish accumulation limits and application of those limits to the new blackgill QS and QP. Therefore, both blackgill and Slope Rockfish would carry QS control limits of 6% and annual vessel QP limits of 9%. However, if trawl vessels catch blackgill rockfish in amounts that are disproportionately large relative to the blackgill contribution to the slope complex ACLs, then even if vessels are within the 9 percent vessel QP limit for southern Slope Rockfish, they might be taking more than 9 percent of the blackgill rockfish contribution to the ACL. If this is the case and blackgill is broken out of the slope complex, then the 9 percent vessel limit could become constraining not only with respect to blackgill harvest but also that of co-occurring species.

Proposed Purpose and Need

The purpose and need statement the Council adopted in 2017 for general consideration of vessel QP limits for all species is probably not appropriate for the specific circumstances of the blackgill rockfish vessel QP limit. Working from the previous purpose and need statement, the following draft has been developed by staff for Council consideration.

> **DRAFT:** Action is needed to ensure that the IFQ program functions as intended and allows the shorebased sector to reduce costs and more fully harvest its allocation to benefit the industry (harvesters and processors), communities, and consumers. The MSA requires that participants in catch share programs not be allowed to acquire an excessive share. NMFS guidance on catch share programs (NMFS, 2007) points out that excessive share limits intended to address management objectives other than limiting market power (e.g. distributional objectives) may impose costs that reduce efficiency. Such limits might also prevent full harvest of the available quota, particularly in regions where the number of vessels participating is relatively low. Concern has been expressed that once the Council recommendation to split blackgill from the southern slope complex is implemented, the 9 percent vessel QP limit for southern Slope Rockfish may be overly constraining when applied to blackgill. This would result in lower than expected gains in net benefits and efficiency from the catch share program and an under-attainment of sector allocations. The purpose of this action would be to change the blackgill vessel QP limit originally recommended as part of the Council's Amendment 26 action.

Background

Accumulation Limit Policy

Accumulation limits are established primarily in relation to economic and social objectives. They can be set to prevent aggregations that would generate market inefficiency (to prevent excessive market power) and to achieve other management objectives (Holliday and Anderson, 2007). On the one hand, limits should be set low enough that they prevent the excessive market power that would adversely impact efficiency. On the other hand, as limits are reduced they begin to adversely impact the efficiency of individual operations. Accumulation limits set to address market power issues are generally much higher than the limits needed to address other concerns. IFQ program accumulation limits were generally set to ensure individual vessels are able to operate efficiently and to address management objectives related to distributional issues.

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.[13] At the same time, while high accumulation

[13] 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).

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).

Within the trawl IFQ program, there have been three types of accumulation limits. QS control limits, vessel QP limits and, for overfished species and Pacific halibut, daily vessel limits. Both individual species/species group and aggregate non-whiting control and vessel limits have been set. Through its biennial specifications process for 2019-2020, the Council has recommended permanent elimination of the daily vessel limits. The remaining limits are defined as follows.

> ***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.
>
> ***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 " (50 CFR §660.111(1)(ii)). The vessel QP limits apply to both used and unused pounds in a vessel account, effectively limiting the amount of fish an individual vessel can harvest (the amount of QP a vessel can use).

As stated in the Amendment 20 FEIS:

> The Council's accumulation limits are aimed at more than just preventing market power or other anti-competitive situations from developing in the fishery. The Council views accumulation limits as important tools to use in balancing its broad, and often competing, social, economic, and conservation objectives for the fishery. (Amendment 20 EIS, p. A-301)

As an example of an effort to balance vessel efficiency and distributional concerns, QS control limits were generally set to ensure distribution of the benefits from resource control among more individuals (and hopefully communities), while vessel QP limits were set higher. Vessel QP limits were set to allow vessels to potentially operate at greater levels of efficiency and provide opportunities for crew and others to use QP on vessels owned by individuals that had maxed out their QS control limit. Additionally, enforcement of QS control limit was expected to be inexact and vessel QP limits provide a backstop against some methods of working around QS control limits (e.g. long term contracts for the annual transfer of QP).

For context, the following table provides the existing annual vessel QP limits and QS control limits.

Table 27. Annual vessel QP limit and QS control limits.

Species Category	Annual Vessel QP Limit	QS Control Limit
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%
POP	6.00%	4.00%
Pacific whiting (shorebased)	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%

History of Development of the Current Southern Slope Rockfish Accumulation Limits

As indicated, the blackgill rockfish accumulation limits proposed as part of Amendment 26 would be the same as those for the southern Slope Rockfish complex. Following is a description of the Council's development of accumulation limits, with emphasis on southern Slope Rockfish.

The Council considered ranges of alternatives initially developed in the context of individual permit/vessel historic proportions of annual catches (not allocations) and projected initial QS allocations for each permit (Table 28). In 2007, the GAC reviewed options initially developed by the Trawl Individual Quota Committee (TIQC) and developed a comparable set based on past vessel/permit performance. GAC Option 1 would have set control limits at the maximum landings history share for non-buyback permits for each species, i.e., the 1994 to 2003 average of each nonbuyback permit's annual landings divided by the annual landings of all nonbuyback permits, with an upper limit of 5 percent for all nonwhiting species except for English sole and the Other Flatfish management unit. The Initial GAC Option 1 control limit was 5 percent for southern Slope Rockfish). The intent of Initial GAC Option 1 was to specify levels that were generally above the QS amounts that would be allocated to most permits based on their permit history. To explore the effects of higher limit levels, Initial GAC Option 2 would have set the control limits at 1.5 times the Initial GAC Option 1 (7.5 percent for southern Slope Rockfish). The vessel limits would have been set at double the control limit amount, except for whiting. In

setting options for the limits, the GAC also paid particular attention to the maximum fleet consolidation level (minimum fleet size) permitted by a particular accumulation limit. For example, for southern Slope Rockfish, the minimum fleet size required to harvest the allocation would be 10 vessels under the first option and 7 vessels under the second option.

In January 2009, to develop a broader range for the Council's consideration the GAC focused on the share of harvest by the 90th percentile permit. New GAC Option 1 would have set control limits for each species at the 90th percentile of 1994 to 2003 harvests (5.8 percent for southern Slope Rockfish) and New GAC Option 2 would have used 2004 to 2006 harvests but capped control limits at 10 percent (10 percent for southern Slope Rockfish). Both options continued to include vessel limits that were twice the control limits (but capped vessel limits at 20 percent).

Table 28. Slope rockfish accumulation limit options considered by the Council in the process of developing its final recommendations for southern Slope Rockfish.[a/]

Initial GAC Option 1 (2007)		Initial GAC Option 2 (2007)		New GAC Option 1 (2009)		New GAC Option 2 (2009)		GMT Control Limits	GAP Recommendations		Maximums Historic and Initial QS Allocatio			
Vess Lim	Cntrl Lim (Avg non-buyback permit share '94-'93)	Vess Lim	Cntrl Lim	Vess Lim (2x Control Limit)	Cntrl Lim (90th P'cntile permit history ' 94-'03)	Vess Lim (2x Control Limit)	Cntrl Lim (90th P'cntile permit history '04-'06, cap-ped at 10%)	Control Limits Identified in GMT Report	Vess Lim	Cntrl Lim	Single Permit Max Annual Share of Trawl Fleet Allo-cation ''04-'06	Max Initial Permit QS Allocations	Single Permit Max Annual Share of Trawl Fleet Landings	
													'94-'03	'94-'06
10.0	5.0	15.0	7.5	11.6	5.8	20.0	10.0	6-10	13.5	9.0	12.1	6.4	24.8	21.7

a/ The final recommendation for southern Slope Rockfish was 6 percent QS control limit and 9 percent vessel QP limit.

For the Council's March 2009 meeting, the GMT developed recommendations for aggregate non-whiting control limits that would allow vessels along each region of the coast to achieve optimal efficiency under a "one vessel-one QS owner" model in which limits were specified to allow a single vessel owner to own all the QS needed to achieve optimal vessel efficiency for at least one vessel. The GMT recommended using the aggregate nonwhiting limits to ensure a dispersion of benefits from QS ownership while recommending less constraining individual species QS limits to provide flexibility within the aggregate limit.

For its recommendations for individual non-overfished species QS control limits and vessel QP limits, the Council relied principally on the GAP recommendations. The GAP considered the GMT approach but recommended limits that would allow a vessel to achieve the identified target levels but not necessarily by using QP from its own QS. The GAP recommendations also considered that the control of one species could limit access to not only that species but the harvest of co-occurring target species.

In general, in developing its individual species control limit recommendations, the GAP used as a starting point the maximum initial QS share allocation to permits and checked that level to

ensure that in most cases the resulting control limit or vessel limit would accommodate the maximum share of landings taken by any single vessel during recent years (2004-2006). For many species, the GAP recommended allowing for some growth above the maximum initial allocations to facilitate the desired improvements in harvesting efficiency and in some cases to accommodate recent harvest levels. However, they also went lower than the general approach in situations where catch of a species was widely distributed along the coast and important to a number of different trawl strategies. Conversely, when a particular segment of the fishery was very limited geographically, they went somewhat higher than was indicated by the general approach. For southern Slope Rockfish, while the GAP control limit recommendation (9 percent) was within the range recommended by the GMT (6 percent to 10 percent), the Council was more comfortable going with the lower end of the GMT's range (6 percent). It then set the vessel limits at 1.5 times the control limit.

In adopting its preferred QS control and vessel QP limits for non-overfished species, the Council noted that there will never be perfect information but that this did not prevent development of a good rationale for setting the accumulation limits.

Alternatives

At its March 2018 meeting the Council requested analysis of vessel QP limits of up to 30 percent. The following alternatives were selected for analytical purposes to display an array of impacts.

Draft Alternative 1 (No Action):	9 percent vessel QP limit
Draft Alternative 2:	12 percent vessel QP limit
Draft Alternative 3:	20 percent vessel QP limit
Draft Alternative 4:	30 percent vessel QP limit

Analysis

Description of the Current Fishery

The draft environmental assessment for the Amendment 26 (Blackgill Rockfish) provides a general description of the fishery (Agenda Item I.6, Attachment 1, November 2015). Blackgill rockfish is the dominant species in the current Slope Rockfish complex south of 40°10' N lat. From 2003 to 2013, 59.9 percent of all identified species in the directed groundfish fisheries southern Slope Rockfish catch was blackgill.

Blackgill rockfish was the one Slope Rockfish species caught significantly by both limited entry trawl and non-trawl sectors south of 40°10' N lat. during the 2003 to 2013 period, and there is a significant allocation provided to both sectors (Table 29). Within the limited entry trawl sector, the at-sea whiting trawl sectors are not affected by the proposed action since those fisheries are prosecuted north of 40°10' N lat. and therefore outside the action area. Therefore the primary sector impacted by the trawl/nontrawl allocations is the shorebased IFQ sector. Combined, the non-trawl sectors include the LE longline and pot/trap sectors (often referred to as the limited entry fixed gear sector), the directed open access sector, and the recreational sector. However,

the recreational groundfish fishery rarely impacts Slope Rockfish species since that fishery is typically prosecuted inshore on the shelf and in nearshore waters where Slope Rockfish do not occur. For the incidental open access sector, Slope Rockfish and all other groundfish FMP species are managed as set-asides.

Table 29. Trawl/nontrawl allocation shares of southern blackgill and southern Slope Rockfish, pre-Amendment 26 and Amendment 26.

	Trawl	NonTrawl
Southern Slope Rockfish (includes blackgill) (pre Amendment 26)	0.63	0.37
Southern Blackgill (Amendment 26)	0.41	0.59
Southern Slope Rockfish (excludes blackgill) (Amendment 26)	0.91	0.09

The recent trawl/nontrawl allocations of southern Slope Rockfish are provided in Table 30. Those allocations (and the harvest guidelines driving them) have been on a slight upward trend since 2014, with the 2018 allocations 15 percent above the 2011 level. For the purpose of this analysis, blackgill harvest guidelines were inferred (see footnotes to Table 30), a southern slope complex without blackrockfish constructed, and the Amendment 26 allocations for blackgill and remaining southern Slope Rockfish were applied retrospectively. These values show that while the southern Slope Rockfish complex has increased, much of that increase has been in the non-blackgill species. Retrospectively, harvest guidelines for those remaining Slope Rockfish would have increased 42 percent from 2011 to 2018, while the blackgill harvest guideline decreased 39 percent over that same period (with a large decrease coming between 2012 and 2013 and a slight increase since then). Overall, under Amendment 26 the trawl allocation of the entire southern Slope Rockfish complex (including blackgill) would have been an average of 111 mt greater than what actually occurred.

Table 30. Southern blackgill rockfish and southern Slope Rockfish harvest guidelines and sector allocations for 2011 through 2018 applying pre-Amendment 26 and Amendment 26 allocation shares (metric tons).

	Harvest Guideline	Trawl Alloc	NonTrawl Alloc	Harvest Guideline	Trawl Alloc	NonTrawl Alloc	Harvest Guideline	Trawl Alloc	NonTrawl Alloc
	Blackgill (Amendment 26 Allocations)			Other Southern Slope Rockfish (Not Blackgill) (Amendment 26 Allocations)			All Southern Slope Rockfish (Including Blackgill) (Amendment 26 Allocations)		
2011 a/	199.7	81.9	117.8	399.3	363.4	35.9	599.0	445.2	153.8
2012 a/	197.7	81.1	116.7	401.3	365.2	36.1	599.0	446.2	152.8
2013 b/	106.0	43.5	62.5	491.0	446.8	44.2	597.0	490.3	106.7
2014 b/	110.0	45.1	64.9	491.0	446.8	44.2	601.0	491.9	109.1
2015 b/	114.0	46.7	67.3	559.0	508.7	50.3	673.0	555.4	117.6
2016 b/	117.0	48.0	69.0	558.0	507.8	50.2	675.0	555.8	119.3
2017 b/	120.2	49.3	70.9	566.6	515.6	51.0	686.8	564.9	121.9
2018 b/	122.4	50.2	72.2	566.6	515.6	51.0	689	565.8	123.2
				All Southern Slope Rockfish (Pre-Amendment 26 Allocations)			Difference Between Pre-Amendment 26 and Amendment 26		
2011				599.0	377.4	221.6	0.0	67.9	-67.9
2012				599.0	377.4	221.6	0.0	68.9	-68.9
2013				597.0	376.1	220.9	0.0	114.2	-114.2
2014				601.0	378.6	222.4	0.0	113.3	-113.3
2015				673.0	424.0	249.0	0.0	131.4	-131.4
2016				675.0	425.3	249.8	0.0	130.5	-130.5
2017				686.8	432.7	254.1	0	132.2	-132.2
2018				689.0	434.1	254.9	0	131.7	-131.7

a/ Harvest guidelines inferred from ratios of blackgill to southern Slope Rockfish ABCs applied to the actual southern Slope Rockfish harvest guideline.
b/ Harvest guidelines from regulations and annual specifications analyses (in some cases specified for nontrawl and, on that basis, inferred for trawl).
[Internal Ref: GDrive: Splitting Blackgill from S.Slope]

Blackgill caught south of 40º 10' N. lat. and remaining southern Slope Rockfish landings and exvessel revenue are provided in Table 31 and Table 32, respectively. On average from 2011 to 2017 blackgill contributed about 40 percent of both the weight and revenue that trawlers harvested from the southern Slope Rockfish complex. For the nontrawl sector, blackgill contributed about 90 percent of the weight and revenue. Like many groundfish species,[14] the shorebased trawl sector has been underattaining its allocation of southern Slope Rockfish (Table 33). That attainment rate for southern Slope Rockfish dropped substantially in 2015 when the trawl harvest guideline increased by 12 percent while trawl landings decreased by 32 percent.

[14] In general, the fleet reaches near full attainment of its allocations (greater than 80 percent) on sablefish, Petrale sole, and Pacific whiting, though in more recent years attainment of Pacific whiting has been variable (Table 33). 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).

While attainment of the southern Slope Rockfish allocation has been low, very few vessels have approached the southern slope limit. While an average of 17.9 vessels per year have landed some southern Slope Rockfish species, an average of just less than one (0.8) have caught more than 75 percent of their limit (Table 34).

Slope rockfish are generally discarded at a very low rate, though that rate increased for a while in more recent years (Table 35). From 2003 to 2013, the blackgill discard rate in the trawl fishery averaged 0.7 percent but increased to an average of 5.5 percent from 2014 to 2016 then declined back down to 0.8 percent in 2017.

Table 31. Metric tons of southern blackgill and other southern slope (excluding blackgill) landings by sector (trawl and nontrawl), 2011-2017 (metric tons).

	Blackgill		Other Southern Slope Rockfish		Combined Sectors		Combined Southern Slope (Including Blackgill)		Combined Southern Slope (Including Blackgill) All Sectors
	Trawl	NonTrawl	Trawl	NonTrawl	Blackgill	Other Southern Slope	Trawl	NonTrawl	
	Metric Tons								
2011	16.9	128.2	33.2	1.6	145.1	34.8	50.1	129.8	180.0
2012	79.2	103.6	38.1	9.4	182.8	47.5	117.3	113.0	230.4
2013	54.6	17.7	57.6	3.9	72.3	61.5	112.2	21.6	133.8
2014	37.3	23.2	60.0	3.6	60.4	63.6	97.3	26.7	124.0
2015	18.3	18.6	48.2	5.3	37.0	53.5	66.5	23.9	90.5
2016	10.8	22.7	37.5	3.4	33.5	40.9	48.3	26.1	74.5
2017	21.4	26.2	35.0	1.1	47.6	36.1	56.4	27.4	83.7
2018	6.7	8.5	6.7	0.8	15.2	7.5	13.3	9.3	22.6

[Internal Ref: Southern Slope RF landings 2011-2017_08-08-2018_hard-copied_links.xlsx: Totals_Tables]

Table 32. Exvessel value of southern blackgill and other southern Slope Rockfish (excluding blackgill) landings by sector (trawl and nontrawl), 2011-2017 (exvessel value, not adjusted for inflation).

	Blackgill		Other Southern Slope Rockfish		Combined Sectors		Combined Southern Slope (Including Blackgill)		Combined Southern Slope (Including Blackgill) All Sectors
	Trawl	NonTrawl	Trawl	NonTrawl	Blackgill	Other Southern Slope	Trawl	NonTrawl	
	Exvessel Revenue (not inflation adjusted)								
2011	29.8	361.3	47.1	4.8	391.1	51.8	76.9	366.1	443.0
2012	133.0	328.5	59.8	20.4	461.5	80.3	192.8	348.9	541.8
2013	88.8	56.3	104.8	8.7	145.1	113.5	193.6	65.0	258.6
2014	65.5	75.7	112.9	8.8	141.2	121.7	178.4	84.5	262.9
2015	30.9	64.5	84.7	16.0	95.3	100.7	115.6	80.5	196.1
2016	19.6	88.7	71.6	10.4	108.3	82.0	91.1	99.1	190.3
2017	29.2	106.2	52.9	5.8	135.4	58.8	82.1	112.0	194.2
2018	9.3	35.0	12.2	3.6	44.3	15.8	21.5	38.6	60.1

[Internal Ref: Southern Slope RF landings 2011-2017_08-08-2018_hard-copied_links.xlsx: Totals_Tables]

Table 33. Shorebased trawl sector attainment of the southern Slope Rockfish allocations. Data source: WCR IFQ database January 8, 2018

	2011	2012	2013	2014	2015	2016	2017
Slope Rockfish South of 40°10' N.	14%	33%	31%	26%	16%	12%	13%

[Internal ref: VA_Balances_2011-2017_2017_dec_07: All_IFQ_Lands_by_DS_&_Spp (2): Sector Attainment]

Tab le 34. Averaged annual (2011-2017) maximum, median, average vessel account attainment of accumulation limits and number of accounts at the indicated attainment levels. Data source: WCR IFQ database from January 8 2018.

	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%	
Minor Slope Rockfish South of 40°10' N.	76.9%	2.7%	12.9%	16.1	0.9	0.4	0.4	17.9

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

[Internal ref: VA_Balances_2011-2017_2017_dec_07: Summary of Species Results]

Table 35. Southern blackgill rockfish discard rates in the shorebased trawl fishery. Data source: WCGOP Mortality Reports in GEMM 2017.

Year	Discard Rate
2003	0.6%
2004	1.4%
2005	1.2%
2006	1.3%
2007	0.7%
2008	0.1%
2009	0.2%
2010	0.0%
2011	0.6%
2012	0.5%
2013	0.8%
2014	2.6%
2015	6.0%
2016	7.8%
2017	0.8%

[Internal ref: GFGEMM 11618 KLA Sectors.xlsx:BlackgillDiscMty]

On average, for all shorebased IFQ trips on which blackgill rockfish was taken south of 40º 10' N. lat., blackgill contributed an average of 2 percent to trawl trips and 5 percent to gear switched trips (Table 36). For those same trips, blackgill contributed 2 percent of the revenue on trawl trips (Table 37) and about 3 percent of the revenue on gear switched trips (Table 38). The percent contribution to gear switched trips was more variable than the percent contribution to trawl gear trips. As will be seen in the impact analysis, for particular trips blackgill contributes much greater portions of the weight and revenue. In the first two years of the trawl IFQ program there were about 10 trawl vessels and 10 gear switching vessels that caught blackgill. There were one or two vessels that both trawled and gear switched in one of the more recent years. The number of trawl vessels landing blackgill declined to 6 in 2016 and 8 in 2017, while the number of gear switching vessels declined to 4 in 2016 and 5 in 2017.

Table 36. Pounds landed on IFQ trips that include blackgill rockfish south of 40º 10’ N. lat (2011-2017).

Year	Blackgill Rockfish	Other Southern Slope Rockfish	Sablefish	Total
	Trawl IFQ Landings			
2011	31,354	63,598	390,250	3,181,353
2012	162,000	82,740	354,976	3,946,091
2013	87,469	122,631	373,195	3,677,356
2014	63,443	80,793	307,305	2,747,711
2015	37,926	62,188	308,909	2,375,926
2016	19,109	82,347	217,165	1,678,507
2017	53,547	45,662	203,983	1,470,331
	Gear Switched IFQ Landings			
2011	6,103	67	283,976	292,035
2012	12,938	388	192,113	207,998
2013	33,133	583	173,224	213,404
2014	18,878	166	269,253	308,611
2015	2,491	28	210,658	213,840
2016	4,721	42	131,792	142,122
2017	1,374	17	247,995	250,668
	Total			
2011	37,457	63,665	674,226	3,473,388
2012	174,937	83,128	547,089	4,154,088
2013	120,602	123,214	546,419	3,890,760
2014	82,321	80,959	576,558	3,056,322
2015	40,417	62,216	519,567	2,589,766
2016	23,830	82,389	348,957	1,820,629
2017	54,921	45,679	451,978	1,720,999

[Internal Ref: Blackgill_QPLim_Analysis_Aug_2018.xlsx: Trips Wt Blackgill 04 20 LBS]

Table 37. Number of vessels making **trawl** caught IFQ landing of southern blackgill rockfish (south of 40º 10' N. lat) including exvessel value for blackgill and all other species in the landing.

			Exvessel Value		Percent	Average Revenue Per Vessel	
Year	Vessels	Days	Blackgill	Total	Blackgill	Blackgill	Other Revenue
2011	11	113	22,600	2,812,053	0.8%	2,055	255,641
2012	10	146	123,163	2,745,647	4.5%	12,316	274,565
2013	11	147	66,599	2,802,995	2.4%	6,054	254,818
2014	12	123	51,337	2,399,547	2.1%	4,278	199,962
2015	9	87	29,082	2,283,992	1.3%	3,231	253,777
2016	6	55	14,277	1,409,210	1.0%	2,380	234,868
2017	8	39	34,068	992,088	3.4%	4,258	124,011

[Internal Ref: Blackgill_QPLim_Analysis_Aug_2018.xlsx: Trips - Rev - 04 – Blackgill]

Table 38. Number of vessels making **gear-switched** IFQ landing of southern blackgill rockfish (south of 40º 10' N. lat) including exvessel value for blackgill and all other species in the landing.

			Exvessel Value		Percent	Average Revenue Per Vessel	
Year	Vessels	Days	Blackgill	Total	Blackgill	Blackgill	Other Revenue
2011	10	79	10,393	735,807	1.4%	1,039	73,581
2012	9	73	20,375	422,471	4.8%	2,264	46,941
2013	5	31	27,908	351,947	7.9%	5,582	70,389
2014	6	26	17,106	572,152	3.0%	2,851	95,359
2015	5	18	2,767	364,620	0.8%	553	72,924
2016	4	13	5,631	296,770	1.9%	1,408	74,192
2017	5	15	673	300,189	0.2%	135	60,038

[Internal Ref: Blackgill_QPLim_Analysis_Aug_2018.xlsx: Trips - Rev - 20 – Blackgill]

Impacts to the Biological and Physical Environment

Impacts to the biological and physical environment of the no action alternative are accounted for through the biennial specifications process and the Amendment 26 draft environmental assessment on separation of blackgill rockfish from the southern slope complex and reallocation of these species. If a higher annual vessel QP limit results in a greater concentration of harvest among vessels, to the degree that different vessels exhibit different fishing patterns, impacts in some areas will likely increase, offset by a reduction in impacts in other areas. The distribution of these shifts is not possible to predict. Additionally, if the 9 percent limit would have been a constraint on fleet attainment of its allocations, raising the limit would increase probability of that attainment and consequently total biological removals and impacts on the physical environment. However, the levels of removals and impacts would still be within those analyzed through the biennial specifications process, which anticipates full attainment of allocations when estimating biological and physical impacts.

Impacts to Fisheries and Communities

Alternative 1 may adversely impact the shorebased trawl fleet if Amendment 26 is approved by NMFS and the 9 percent limit constrains harvest by some vessels. Depending on fluidity in the system, quota that vessels constrained by the limit are unable to access may be taken up by other vessels such that harvesters, processors, communities and consumers do not lose much benefit from the fishery. In such case, the main impacts may be a redistribution of income among different harvest operations and a possible loss of efficiency. Whether there is a loss of overall efficiency depends on the marginal efficiency of vessels that, absent the restriction, would take more than 9 percent of the blackgill rockfish allocation relative to the marginal efficiency of vessels taking under 9 percent that might have an opportunity to increase their catch.[15] Information is not available to predict this, however, to the degree that the fleet has rationalized under catch shares, evidence that the 9 percent limit constrains some operations might be an indicator of a possible efficiency loss.

For each alternative, there is an implied number of vessels required to harvest 100 percent of the available allocation, assuming that every vessel takes the full limit. For the blackgill rockfish vessel QP limit alternatives, those values are displayed in Table 39. Looking at just the trawl vessels taking blackgill south of 40º 10' N. lat., the numbers in recent years are below that required to take the full allocation. Based on the number of active trawl vessels and the number of active gear switching vessels in each year, Table 40 shows the percent vessel QP that would be required for one group or the other to take the entire allocation. For both groups combined, the current number of participants might be adequate for that task, depending on the degree to which all active vessels would be able to increase their catch of blackgill.

Table 39. Vessel QP Limits and minimum fleet size required to take the entire allocation.

	Vessel QP Limit	Implied Minimum Fleet Size
Alt 1	9%	12
Alt 2	12%	9
Alt 3	20%	5
Alt 4	30%	4

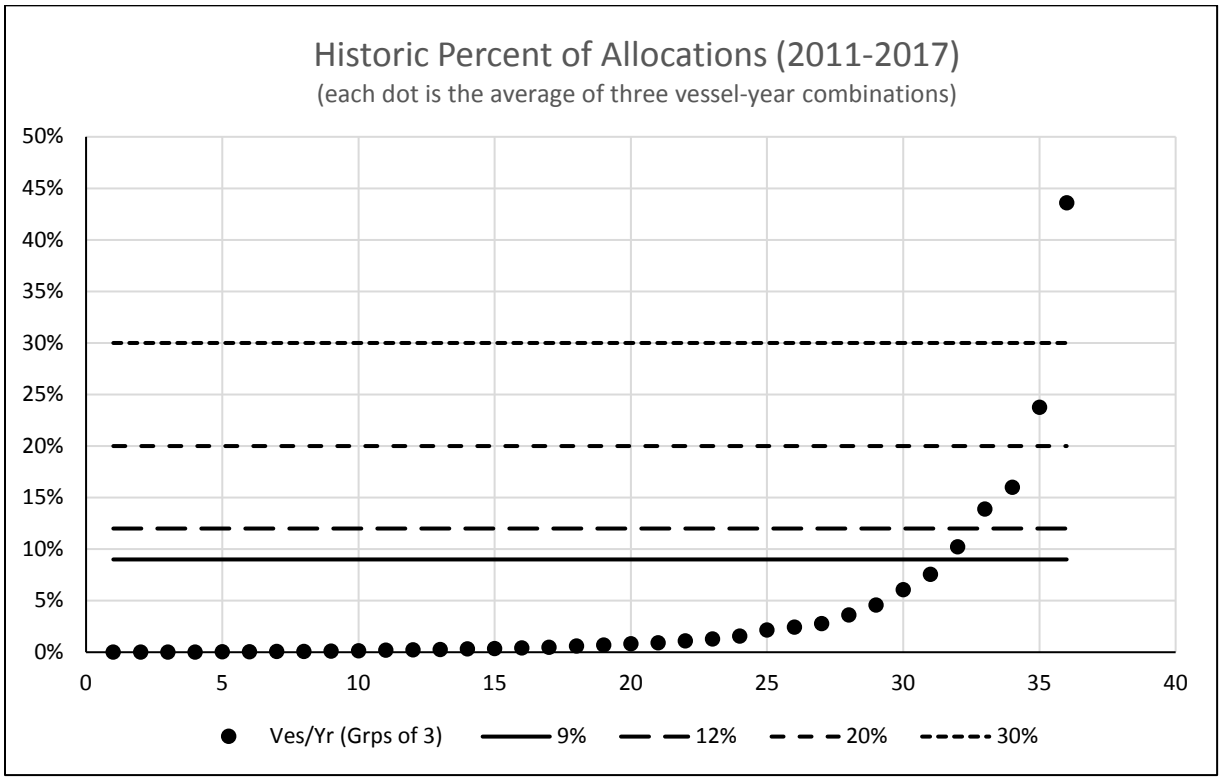
Table 40. Number of trawl and gear-switched vessels by year and the minimum vessel QP limit required for that number of vessels to take the entire allocation.

	Trawl	Min Vessel QP Limit	Gear Switched	Min Vessel QP Limit
2011	11	9.1%	10	10.0%
2012	10	10.0%	9	11.1%
2013	11	9.1%	5	20.0%
2014	12	8.3%	6	16.7%
2015	9	11.1%	5	20.0%
2016	6	16.7%	4	25.0%
2017	8	12.5%	5	20.0%

[15] In other words, whether is there a substantial difference in cost per pound of harvest for vessels taking more than 9 percent of the allocation relative to vessels taking less than 9 percent of the allocation.

Most of the following analysis is based on landings rather than catch. QP are used against catch, which includes discards. In general, discard levels have usually are usually below one percent, slightly higher for 2014-2016 (Table 35). To the degree that total catch is slightly higher than landings, these results on the effects of different vessel QP limits may slightly underestimate.

Since the start of the catch share program, within the southern Slope Rockfish complex some individual vessels have harvested well above the 9 percent limit. Figure 6 shows the percent of the blackgill harvest guidelines (specified and inferred) taken by trawl sector IFQ vessels from 2011 through 2017. Each vessel's share of the blackgill harvest guideline was determined for each year to generate vessel-year data points. These data points were then ordered from smallest to largest and put into groups of 3 to preserve confidentiality. The results show 5 points (15 vessel-year observations) above 9 percent with the highest point just under 45 percent.[16]



Note: The first group or two in each year may contain four vessels, since the number of observations did not divide evenly by three. [Internal Ref: Blackgill_QPLim_Analysis_Aug_2018.xlsx:BG_PlotAllYears]

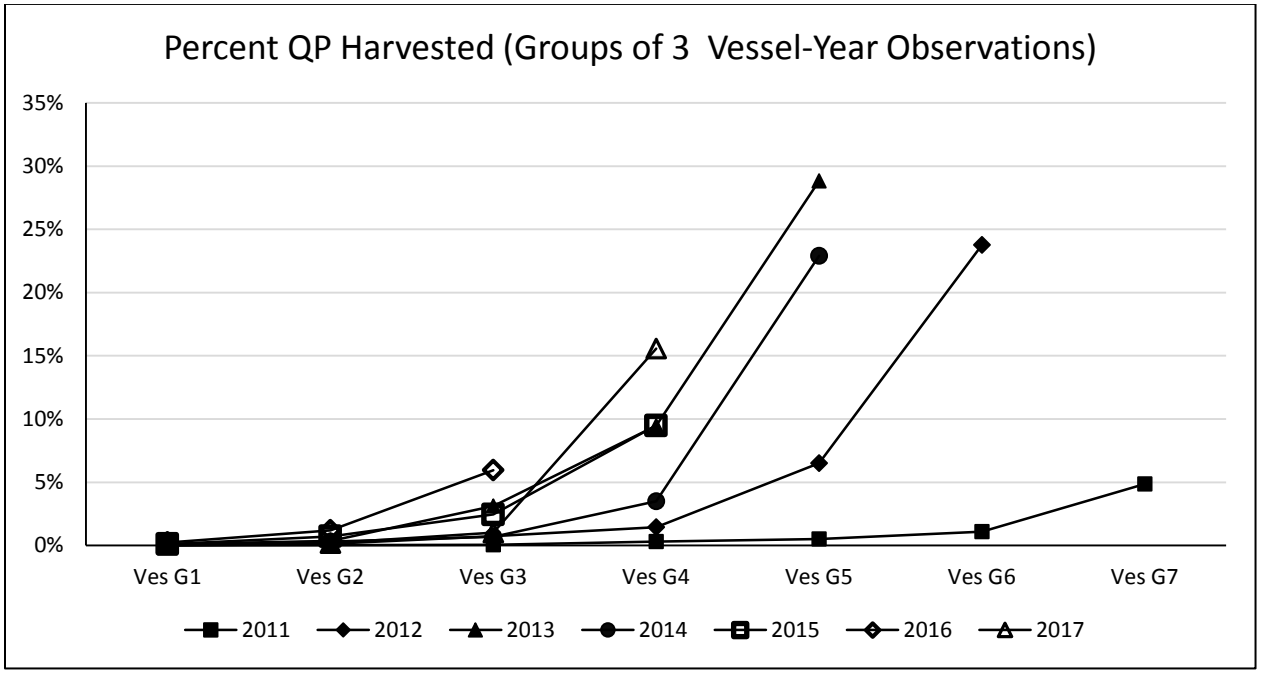
Figure 6. Percent of blackgill rockfish harvest for vessel-years grouped by threes, ordered for all years together from 2011 to 2017 (includes IFQ vessels using trawl and gear switched).

Looking at a similar graph based on individual years provides some additional information. Figure 7 is based on the same data as Figure 6 but the observations were first grouped by year then grouped by sets of three observations. Using this procedure the highest observations are averaged together with lower observations than is the case when all years were grouped together. Therefore the high points in Figure 7 are lower than those in Figure 6. In the earlier years of the

[16] The lowest of these five averages of three observations each, includes one vessel-year observations that is slightly below 9 percent.

program there were more vessels participating. The highest observations of vessel-year QP percentages were in 2012, 2013, and 2014. In general, with the exception of 2011, as the fleet size has diminished the maximums QP percentages have also declined. The maximums for the years 2015, 2016 and 2017 are all lower than in the years 2012, 2013 and 2014. These results can be used to infer the number of vessels that might benefit by alternatives providing higher vessel QP limits for blackgill rockfish.

Patterns in these percentages may be influenced by changes in the actual southern Slope Rockfish allocations under which the vessels were fishing (which influences the numerator for each percentage, i.e., each vessel's actual fishing activity) or the inferred blackgill allocations which were used to calculate the blackgill percentage (which affects the denominator). Trawl sector catches of southern Slope Rockfish complex were declining with the decline in size of the active fleet while at the same time the allocations were increasing (Figure 8, Table 37, and Table 38). The inferred blackgill allocations also declined substantially in 2013, which might have been expected to result in an increase in the percentage taken by larger producers—since the fleet was being managed under the southern slope complex allocation rather than a blackgill allocation, and the southern slope complex was increasing (Figure 8). However, despite these declines in inferred harvest guidelines, the maximum percentage of the trawl blackgill allocation harvested by single vessels also appears to have declined since 2014. At the same time, there was not an overall decline in revenue per vessel on blackgill trips until 2017 (Table 37, and Table 38). The decline in 2017 could be due to a reduction in vessel revenue or a decrease in frequency of blackgill bycatch, since the revenue totals in the tables only include trips on which blackgill was taken. And, while overall revenue on blackgill trips declined in 2017, average blackgill revenue per trip returned to its 2014 level.



Note: The first group or two in each year may contain four vessels, since the number of observations did not divide evenly by three. [Internal Ref: Blackgill_QPLim_Analysis_Aug_2018.xlsx:BG_PlotIndividualYears]

Figure 7. Percent of blackgill rockfish harvest for vessel-years grouped by threes, ordered within each year from 2011 to 2017 (includes both IFQ vessels using trawl and gear switched vessels).

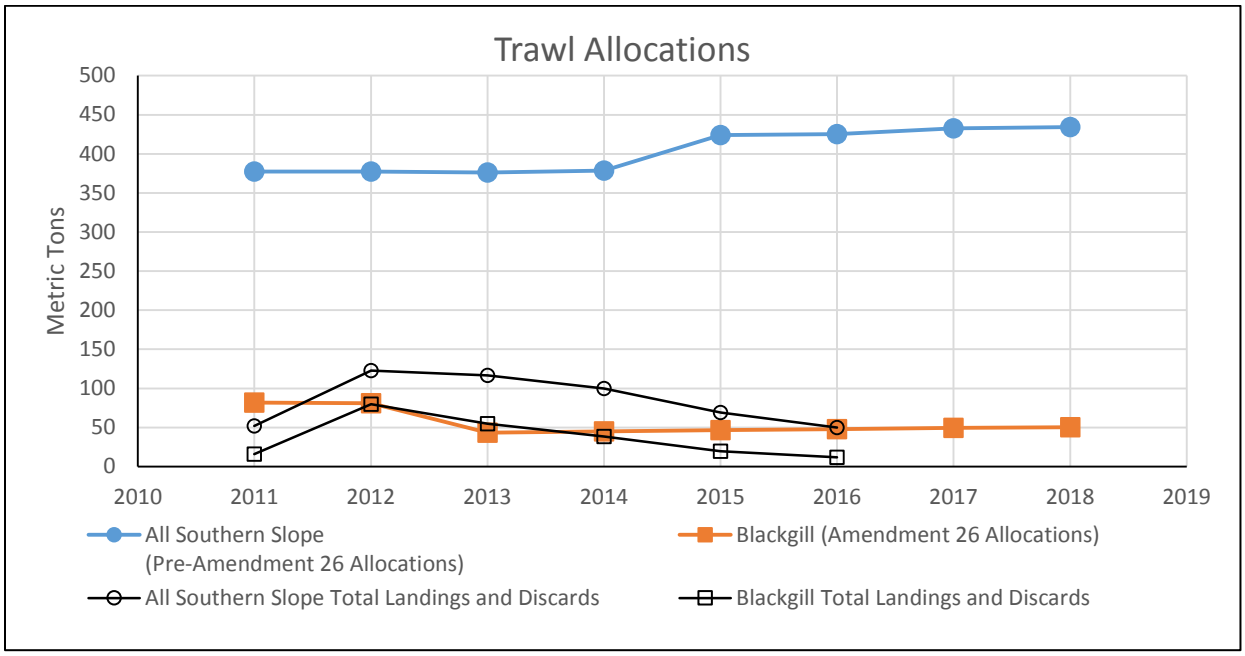


Figure 8. Trawl allocations of southern Slope Rockfish (based on existing allocations) and blackgill rockfish (Amendment 26 allocations applied to inferred harvest guidelines) and catch (landings and discards) Sources (CFR §660.65 – 2012, 2014, 2016, 2017; biennial specification analyses; and GEMM workbook).

When a vessel hits an annual vessel QP limit then it can no longer catch more of that species. Thus, the impacted revenues are not just for the limit species but also for any catch that may have co-occurred with that species. Table 41 explores the degree to which a 9 percent blackgill vessel QP limit and other percentage limits may have constrained revenue in the past. Data is displayed for the specific alternatives considered here, except for the 30% level, which was confidential because there would have been fewer than three vessels impacted. For 2011 to 2017, the first row Table 41 shows information on trips (landing days) that occurred after vessels caught at least 9 percent of what would have been the blackgill allocation (under Amendment 26) but including the trip on which the vessels hit the limit. The second and following rows exclude the landing days on which the vessel went over the limit. The table then shows number of vessels with landings over the prospective QP limit, and for trips after the limit was hit (or, with respect to the first row, as the limit was hit) the total revenue of all IFQ landings, revenue for those landings with blackgill, and the blackgill revenue. The revenue that might have been constrained by the 9 percent limit is likely between the total revenue for all IFQ landings and for those with blackgill. The degree to which the total of all IFQ landings might be reflective of foregone revenue depends on two factors: first, the degree to which it includes target strategies on which there would have been some risk of taking blackgill, even though none were encountered on that particular trip; and second, whether additional revenue could have been generated through substitute strategies.

Comparing the 9 percent row that includes the landing that went over the 9 percent limit to the 9 percent row that includes only landings made after the 9 percent limit was exceeded, for the seven year period from 2011 through 2017 just under $0.5 million of exvessel value was landed

on the trip that took the vessel over the 9 percent limit. Focusing on the implications of a 20 percent vessel QP limit, it appears that for the seven year period a total of $1.2 million of exvessel revenue was taken on trips with blackgill bycatch on trips that occurred after the vessel had landed more than 20 percent of the available QP. This averaged to $173 thousand per year or $201 thousand per vessel for the seven year period. Table 41 excludes a 30% limit due to confidentiality restrictions (i.e., fewer than 3 vessels).

Table 41. Exvessel revenue from landing days (trips) with landings that would have been in excess of the indicated blackgill vessel QP limit[a/] (includes gear switched vessel). Data source: PacFIN.

Alt Vessel QP Limit (Alt #)	Num of Vess	2011-2017 Total			Average Per Year			Average Per Vessel		
		All Revenue for Trawl IFQ Days	Revenue for Trawl IFQ Days With With Blackgill	Trawl IFQ Blackgill Revenue	All Trawl IFQ Days	Days With Trawl IFQ With Blackgill	Trawl IFQ Days with Blackgill	All Trawl IFQ Days	Days With Trawl IFQ With Blackgill	Trawl IFQ Days with Blackgill
		Including the Day that Went Over the Limit								
9% (Alt 1)	14	3,384,274	2,581,595	208,869	483,468	368,799	29,838	241,734	184,400	14,919
		Excluding the Day that Went Over the Limit								
9% (Alt 1)	14	2,925,890	2,123,211	116,687	417,984	303,316	16,670	208,992	151,658	8,335
12% (Alt 2)	12	1,987,756	1,723,199	96,961	283,965	246,171	13,852	165,646	143,600	8,080
20% (Alt 3)	6	1,423,622	1,207,752	53,739	203,375	172,536	7,677	237,270	201,292	8,956

a/ These limits would apply to catch (discards and landings) however, this analysis is based on landings and therefore may underestimate the amount of harvest occurring over the limit. However, as indicated in Table 35, discard rates are relatively low.

Internal C:\Users\Jim Seger.DISCO\Dropbox\Organization\!Work\A20\Follow-On\Accumulation Limits\Blackgill: Ref: 9%ers

Impacts to Government and Regulatory Burden

All of the action alternatives would entail one-time costs to modify regulations but would not be expected to result in increased ongoing costs for the government or regulatory burden for industry.

Shorebased IFQ Sector Harvest Complex Needs

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 landings limits for species and species group for all vessels operating in an area, and there was no way for vessels to adjust the limits in response to the actual mix of species caught. 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). This led to high bycatch discard rates. 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.

Proposed Purpose and Need

The following purpose and need was adopted by the Council at its September 2017 meeting.

> Action is needed to allow the shorebased sector to more fully and efficiently harvest its allocation to the benefit of industry (harvesters and processors), communities, and consumers. For some species, the amount of QP available is so limited that it inhibits the harvest of multispecies complexes, either because of actual catch rates for co-occurring species or because of excessive precaution on the part of vessels' trying to avoid species for which the amount of QP is limited. Sometimes individual vessels are limited by unexpected high catches of bycatch species, so large that they exceed annual vessel limits. These constraints on harvesting also adversely impact processors and markets. The purpose of this action would be to relieve the limiting species constraints including constraints for individual vessels encountering unexpectedly high bycatch in excess of annual vessel limits.

Background

A retrospective evaluation of allocation 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 shown in Table 42.

Table 42. Shorebased trawl sector attainment of its allocations (values 90% or above are shaded, values between 80% and 90% are in bold). Data source: WCR IFQ database January 8, 2018.

	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%
POP 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%

[Internal ref: VA_Balances_2011-2017_2017_dec_07: All_IFQ_Lands_by_DS_&_Spp (2): Sector Attainment]

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 relatively limited or for which a vessel might readily exceed the annual vessel QP limit on a single tow (susceptibility to "lightning strike" tows). 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 groundfish species. A number of possible sources of relief have been considered.

At its May and July 2017 meetings, the CAB began addressing options for meeting the shorebased IFQ sector's needs to more fully attain its harvest complex allocations. At the July

meeting, it developed the approaches included in the alternatives provided in the following section. It also considered but rejected elimination of surplus QP carryover. The surplus QP would instead have gone into a pool for NMFS to sell to vessels with deficits. However, the elimination of the surplus carryover would have reduced the flexibility that creates more opportunity for individual vessels to fully harvest their quota. Instead, the CAB's September 2017 report recommended considering an alternative that would increase QP carryover to 30 percent, based on the success of the BC program which uses such a value.

At its September and November 2017 meetings, the Council eliminated some alternatives from consideration and recommended that several of the alternatives be moved forward as part of a follow-on package. Additionally, it grouped alternatives addressing fleet attainment of the shorebased allocation with alternatives specifically targeted on the issue of vessels that encountered lightning strike tows. At its September 2017 meeting, the Council eliminated the following alternatives from consideration.

Increase Quota Issued: Raise the amount of QP issued to the point where the modelling would suggest that the trawl allocations would be taken.

Change Management Tools for Some Species

Convert yelloweye and cowcod from IFQ management to set-aside management. Take into account that existing closures are protecting the resource and its habitat, but also identify the specific areas that should remain closed to ensure the resource is protected.

Suboption: Create a new management line at 34^{o} 27' N. and make cowcod a monitored (set-aside) species between 34^{o} 27' N. and 40^{o} 10' N. (Management north and south of this area would not change).

Area Restriction Alternative. Vessels that are in deficit by amounts in excess of the annual vessel QP use limits may continue to fish in areas where that deficit species is not caught (species/area relationships to be defined).

The GMT recommended against the area restriction alternative due to the large analytical and implementation burdens that would be associated with it. NMFS also expressed concern about the costs of this alternative and the potential for a group of vessels encountering high bycatch to impact the rest of the fleet.

Also at the September meeting, in response to a NMFS report, the Council added the alternative to eliminate the requirement that all QP be transferred to vessel accounts by September 1st of each year. This September 1st provision was resulting in some QP expiring unused, reducing the total amount of QP available at the end of the year.

At its November 2017 meeting, the Council eliminated the following alternative because it was redundant with the follow-on action pertaining to the adjustment of accumulation limits.

Raise Annual Vessel QP Limits.

Raise the vessel cap for vessels that participate in risk pools (define qualifying risk pool). ***Other alternatives to be developed.***

Additionally, it grouped the following option on increasing carryover with a separate agenda item on flexibility in ACL management.

> **Increase Carry-Over.** Raise the carryover amount from 10 percent to as much as 100 percent (particularly for non-target species with low ACLs).

In its November 2017 report to the Council, NMFS recommended that the Council consider a suboption to allow all vessels (not just those with deficits) to acquire additional QP during the post-season trading period provided by Alternative 2. The GMT noted that this allowance would go beyond the intent of the action and the Council declined to take-up the suboption.

At its March 2018 meeting, the Council eliminated a sub-option that would have provided an auction for surplus QP that could not be carried over to the following year along with unused quota from other sectors (converted to QP). This auction of previous year QP would have allowed that QP to be used to cover previous year catch. The March 2018 CAB report to the Council recommended elimination of the auction option because information provided in the preliminary analysis indicated that it was unnecessary if a post-season trading alternative were implemented the unused QP available for transfer to accounts with deficits would generally be far greater than the deficits. Therefore, there would not be a need to have NMFS sell additional QP to cover deficits. Furthermore, there was concern that developing a new program component whereby NMFS would sell quota to the fleet would require significant staff analytical time, detracting from other needs, and add significant administrative burden.

Alternatives

> **Shorebased Needs Alternative 1: No action.**
> **Shorebased Needs Alternative 2: Allow Post-Season Trading for Accounts in Deficit** (include an annual date for end of trading). After the end of the year, all vessels with deficits in their account would be allowed to buy previous year QP to cover their deficit, up through a certain date.
>
> > **Suboption:** In covering their previous year deficits, vessels would not be limited by the annual vessel QP use limits for all species or certain non-target species ***(species covered to be determined)***
>
> **Shorebased Needs Alt 3: Eliminate September 1st QP expiration**. Eliminate the September 1st QP expiration for QP not transferred to vessel accounts.

[Action Alternatives are not mutually exclusive]

Analysis

> ***Impacts to the Biological and Physical Environment***

Impacts to the biological and physical environment will accrue to the degree that the action alternatives result in changes to the amount of effort and harvest. Under the no action alternative, the levels and types of activity will be within those covered in the analyses produced each biennium in support of the development of two-year stock specifications and management

measures. Under the action alternatives, biological impacts will occur primarily through changes in resource removals and physical impacts through changes in gear interactions. While the action alternatives are intended to increase attainment of the trawl allocations, none of them would allow average harvest greater than anticipated under the biennial specifications because the IFQ program requires all catch be covered with QP. While there may be some interannual variability in the distribution of catch and effort, with respect to the biological and physical environment this would not be expected to have any noticeable impacts.

Impacts to the Fishery and Communities

Impacts of Alternative 1 (No Action)

Management of the IFQ program would continue unchanged. At the end of every year there are vessel accounts with leftover unused QP and accounts with QP deficits (Table 43). 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. However, after the start of the year QP from the prior year 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. This reduces the QP available for catch in the following year and the associated economic and social benefits for fishermen and processors and the dependent communities and consumers.

Even if QP are available, vessel QP limits can prevent a vessel from covering a large deficit, resulting in what might be highly precautionary fishing and underharvest of allocations. Under the current program, a vessel must stop fishing until it covers any deficits in its account. If a vessel catches more than the annual vessel QP limit, then it must stop fishing until the next year when it can acquire additional QP under that year's annual limit. If the deficit is large enough, a vessel might have to remain out of the fishery for several years before it can cover its deficit. There have been 15 instances where vessels have had deficits in excess of the annual vessel QP limits (Table 44). In most instances, the amount over the annual limit has been 6% or less, providing ample opportunity for the vessels to cover the deficits at the start of the subsequent years with QP from that subsequent year. There have been three instances of vessels with overages of between 20 and 60 percent of the annual vessel QP limit (once for canary rockfish and twice for POP). There has only been one instance of a vessel landing more than twice the annual QP limit (canary rockfish). Under circumstances in which stocks are declining, deficits of a magnitude that requires multiple years to cover would be more likely. A deficit that is only a small portion of the annual vessel QP limit for a stock might exceed the limit several times over if in the subsequent year the trawl allocation is substantially reduced due to a stock decline or for other reasons.

Finally, on September 1st of each year, any QP that has not been transferred from the QS accounts for which it was originally issued to a vessel account expires (Table 45). Each year in advance of the September deadline, NMFS attempts to contact QS account owners who still have significant amounts of QPs in QS accounts. Despite NMFS efforts, some QS account owners still leave their QPs in the QS account, and subsequently lose those QPs. While it is the individual QS 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 and resulting in the loss of potential economic and social benefits.

Table 43. Total QP deficits carried over from previous year (pounds). Data Source: WCR IFQ database.

IFQ Species/Species Group Category	2012	2013	2014	2015	2016	2017	Total
Arrowtooth flounder	350	267	11,838	4,560	25,081	-	42,096
Bocaccio rockfish South of 40°10' N.	-	-	3	-	-	-	3
Canary rockfish	-	21	-	-	38,335	32,226	70,582
Chilipepper rockfish South of 40°10' N.	-	-	-	-	-	-	-
Cowcod South of 40°10' N.	-	-	-	-	-	-	-
Darkblotched rockfish	-	511	-	-	13	-	524
Dover sole	247	-	-	-	-	-	247
English sole	-	-	-	-	-	-	-
Lingcod	17						17
Lingcod North of 40°10' N.		-	-	-	-	-	-
Lingcod South of 40°10' N.		-	1	-	-	-	1
Longspine thornyheads North of 34°27' N.	3	6,706	-	-	-	-	6,709
Minor shelf rockfish North of 40°10' N.	255	4	-	-	-	-	259
Minor shelf rockfish South of 40°10' N.	-	-	18	-	-	-	18
Minor Slope Rockfish North of 40°10' N.	-	4,915	-	-	-	-	4,915
Minor Slope Rockfish South of 40°10' N.	-	-	237	-	-	-	237
Other flatfish	-	283	-	-	-	-	283
Pacific cod	-	1,169	-	-	-	-	1,169
Pacific halibut (IBQ) North of 40°10' N.	910	9,405	-	3	4	4	10,326
POP North of 40°10' N.	797	11,534	2,061	-	-	500	14,892
Pacific whiting	9,906	12,410	-	1	1,782	-	24,099
Petrale sole	7,205	32,076	23,846	15,920	10,868	1	89,916
Sablefish North of 36° N.	8,940	2,889	2,106	706	4,835	2,416	21,892
Sablefish South of 36° N.	13	-	-	-	-	-	13
Shortspine thornyheads North of 34°27' N.	254	228	-	-	49	-	531
Shortspine thornyheads South of 34°27' N.	-	-	-	-	17	-	17
Splitnose rockfish South of 40°10' N.	-	-	-	-	-	-	-
Starry flounder	-	-	-	-	-	-	-
Widow rockfish	-	3,001	-	6,753	-	6,393	16,147
Yelloweye rockfish	-	-	-	-	-	-	-
Yellowtail rockfish North of 40°10' N.	-	1	-	-	-	-	1

Table 44. Instances of deficits in excess of annual QP limits. Data Source: WCR IFQ database.

IFQ Species/Species Group Category	2011	2012	2013	2014	2015	2016	2017	Total
Canary rockfish					1	1		2
POP North of 40°10' N.	1	1				1	1	4
Petrale sole		3	1		2			6
Sablefish North of 36° N.			1					1
Widow rockfish				1		1		2
Total	1	4	2	1	3	3	1	15

Table 45. 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
POP 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

Impacts of Alternative 2 (Post-Season Trading)

The primary focus of Alternative 2 is to allow post-season trading so that a vessel can cover its previous season deficits with previous season QP, rather than drawing down QP from the subsequent year (see discussion of Alternative 1). This would be expected to make more QP available in the subsequent year. For most species and years, the deficits are less than a percent of the trawl allocation (Table 46). For a few species and years, the percentage carryover is more significant: Pacific whiting in 2012 and 2013, POP in 2013, and canary rockfish in 2016 (Table 47). When deficits are small, being able to use previous year quota to cover a previous year deficit would have little impact on the overall fishing industry, relative to no action (Alternative 1). However, it might be more important for individual vessels (Table 47 and Table 48). For example, even though the total Petrale sole deficit from 2012 was only 0.45% of the 2013 allocation, for one vessel there was more than a 13 thousand pound deficit (Table 47). The potential economic benefit for individual vessels would likely be amplified by the discounted price at which previous year QP is likely to be available relative to the price for the coming year. The aggregate amounts of surplus QP that have been available were far greater than the deficits carried over from one year to the next (Table 49). Therefore, supply would be much greater than demand. Additionally, the price is likely be further discounted because any QP that cannot be carried over (QP in excess of the 10 percent carryover provision) only has value to those individuals with a deficit. Vessels with deficits would benefit by the difference in value between what are likely to be cheap QP from the previous year and full value QP for the coming year (whether it is the opportunity cost for use of their own following year QP or QP they purchase).

While historically the trawl IFQ sector deficit carry-over has been small for most species, if vessels are allowed to cover deficits in excess of annual vessel QP limits through post-season trading, the amounts of the deficits may increase as vessel operators anticipate that possibility and the availability of cheap quota. Additionally, if the Suboption is also selected (post-season relief from vessel QP limits), there may be an increase in deficit carryover as vessels become less precautionary.

Overall, post-season trading is expected to increase the current year QP utilization and decrease the advance commitment of subsequent year QP. This would be expected to provide economic benefits to vessels, processors, and the communities and consumers that rely on them.

Table 46. Deficits carried over from previous year as a percent of trawl allocation. Data Source: WCR IFQ database.

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%
POP 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 rockfish 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 47. Maximum QP deficit for a single vessel carried into the indicated year (pounds). Data Source: WCR IFQ database.

IFQ Species/Species Group Category	2012	2013	2014	2015	2016	2017
Arrowtooth flounder	335	267	11,838	4,560	17,837	-
Bocaccio rockfish South of 40°10' N.	-	-	3	-	-	-
Canary rockfish	-	21	-	-	38,335	28,529
Chilipepper rockfish South of 40°10' N.	-	-	-	-	-	-
Cowcod South of 40°10' N.	-	-	-	-	-	-
Darkblotched rockfish	-	269	-	-	13	-
Dover sole	204	-	-	-	-	-
English sole	-	-	-	-	-	-
Lingcod	17					
Lingcod North of 40°10' N.		-	-	-	-	-
Lingcod South of 40°10' N.		-	1	-	-	-
Longspine thornyheads North of 34°27' N.	3	5,757	-	-	-	-
Minor shelf rockfish North of 40°10' N.	182	4	-	-	-	-
Minor shelf rockfish South of 40°10' N.	-	-	18	-	-	-
Minor Slope Rockfish North of 40°10' N.	-	4,865	-	-	-	-
Minor Slope Rockfish South of 40°10' N.	-	-	237	-	-	-
Other flatfish	-	283	-	-	-	-
Pacific cod	-	1,163	-	-	-	-
Pacific halibut (IBQ) North of 40°10' N.	555	8,632	-	3	4	4
POP North of 40°10' N.	783	11,308	1,963	-	-	500
Pacific whiting	4,277	4,030	-	1	1,746	-
Petrale sole	2,739	7,136	13,192	6,195	3,973	1
Sablefish North of 36° N.	3,727	2,309	1,096	333	4,632	2,416
Sablefish South of 36° N.	13	-	-	-	-	-
Shortspine thornyheads North of 34°27' N.	200	228	-	-	49	-
Shortspine thornyheads South of 34°27' N.	-	-	-	-	17	-
Splitnose rockfish South of 40°10' N.	-	-	-	-	-	-
Starry flounder	-	-	-	-	-	-
Widow rockfish	-	2,995	-	6,753	-	6,393
Yelloweye rockfish	-	-	-	-	-	-
Yellowtail rockfish North of 40°10' N.	-	1	-	-	-	-

Table 48. Number of vessels carrying QP deficits into the indicated year. Data Source: WCR IFQ database.

IFQ Species/Species Group Category	2012	2013	2014	2015	2016	2017
Arrowtooth flounder	3	1	1	1	2	-
Bocaccio rockfish South of 40°10' N.	-	-	1	-	-	-
Canary rockfish	-	1	-	-	1	2
Chilipepper rockfish South of 40°10' N.	-	-	-	-	-	-
Cowcod South of 40°10' N.	-	-	-	-	-	-
Darkblotched rockfish	-	3	-	-	1	-
Dover sole	2	-	-	-	-	-
English sole	-	-	-	-	-	-
Lingcod	1					
Lingcod North of 40°10' N.		-	-	-	-	-
Lingcod South of 40°10' N.		-	1	-	-	-
Longspine thornyheads North of 34°27' N.	1	3	-	-	-	-
Minor shelf rockfish North of 40°10' N.	2	1	-	-	-	-
Minor shelf rockfish South of 40°10' N.	-	-	1	-	-	-
Minor Slope Rockfish North of 40°10' N.	-	2	-	-	-	-
Minor Slope Rockfish South of 40°10' N.	-	-	1	-	-	-
Other flatfish	-	1	-	-	-	-
Pacific cod	-	2	-	-	-	-
Pacific halibut (IBQ) North of 40°10' N.	9	4	-	1	1	1
POP North of 40°10' N.	2	3	3	-	-	1
Pacific whiting	8	12	-	1	2	-
Petrale sole	10	16	13	6	8	1
Sablefish North of 36° N.	12	4	6	4	2	1
Sablefish South of 36° N.	1	-	-	-	-	-
Shortspine thornyheads North of 34°27' N.	4	1	-	-	1	-
Shortspine thornyheads South of 34°27' N.	-	-	-	-	1	-
Splitnose rockfish South of 40°10' N.	-	-	-	-	-	-
Starry flounder	-	-	-	-	-	-
Widow rockfish	-	3	-	1	-	1
Yelloweye rockfish	-	-	-	-	-	-
Yellowtail rockfish North of 40°10' N.	-	1	-	-	-	-
Total Instances (may include some double counting of vessels)	55	58	27	14	19	7

Table 49. Deficits as a percent of total QP available at the end of the year (after surplus carryover is determined). Data Source: WCR IFQ database.

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%
POP 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%				

[Internal ref: shorebased_ifq_sector_balances_2011-2017_2018_jan_18: Results]

Impacts of the Alternative 2 Suboption (Vessel QP Limit Relief)

This Suboption would allow vessels with catches greater than the annual vessel QP limits to cover those deficits after the end of the year (even though it would require acquisition of QP in excess of the annual limit). On the one hand, this might reduce the incentive to avoid fishing into deficit—particularly at the end of the year when the amount of time off the water might be just a few days or weeks until the start of the following year. A vessel that takes an increased risk on encountering a species such as yelloweye (more of possibility with the reopening of the trawl RCA) and encounters a large tow could have an impact on other sectors. Even if individuals are holding unused QP, exceeding an ACL can still lead to the closure of the fishery (CFR 660.140(a)(3)). On the other hand, the Suboptoin would still require vessels to cover their catch with QP, ensuring a degree of accountability and incentive for not taking excessive risks—particularly for a species for which QP availability is likely to be limited. In the event that a vessel did not clear its deficit within 30 days of issuance of following year QP, it would be subject to citation for a violation (though some forbearance on such citations have been exercised when vessels have been prevented from covering their deficit due to the vessel QP limit).

Interaction Between Alternative 2 and the Alternative 2 Suboption

In some circumstances, inability to trade QP post-season combined with application of the vessel QP limit for one year into the following year(s) may have a noticeable impact on quota available to the fleet in subsequent years (No Action). A single vessel "lightning strike" in 2015 led to the carryover of a substantial deficit into 2016 and provides perhaps the best example. The 2015 canary deficit that the vessel carried into 2016 would have been 39% of the 2016 trawl allocation except that the 10% annual vessel QP limit prevented the vessel from completely covering the deficit with 2016 QP (i.e., only 10 percent of the 2016 QP were used to cover the vessel's 2015 deficit). Because canary was rebuilt by 2017, the trawl allocation increased by more than 20-fold, allowing the remaining 2015 deficit to be completely covered in 2017 with a relatively small impact on the available quota. Without the 2017 increase, using 10 percent of each year's trawl allocation to cover the 2015 deficit would have taken several more years. Under Alterantive 2 and the Suboption, after the end of 2015 the vessel would have been able to use 2015 QP to cover the 2015 deficit up to amounts in excess of the vessel QP limit. In that case, the vast majority of the deficit might have been covered by 2015 QP with little impact on availability of QP in the subsequent year(s). The total 2015 deficit represented 40 percent of the 2015 allocation in a season when 37 percent of the 2015 QP went unused in other vessel QP accounts. If most of that 37 percent had been swept up by the vessel with the overage, it would have been able to acquire a small additional amount of QP at the start of 2016 and continue fishing with little reduction in overall availability of canary QP in 2016.

Impacts of Alternative 3 (Eliminate QP Mid-year Expiration)

Alternative 3 would eliminate the September 1st expiration of QP that have not been transferred from QS accounts to vessel QP accounts (see discussion of the impacts of No Action and Table 45). The original intent of the provision was to encourage movement of the QP onto vessels where it could be used. Because of under attainment for most species, the expiration of QP has likely had little impact on total harvest (and hence availability of fish to processors and to the benefit of communities and consumers). However, historic amounts of QP expiration may not reflect future amounts of QP expiration if attainment improves substantially. This can be seen in the relatively low levels of Pacific whiting QP expiring (Table 45) in years when shorebased Pacific whiting attainment was over 95% (2011 through 2013, Table 33), and the increasing amounts that expired as attainment declined. Similarly for high attainment species such as Petrale sole and sablefish, very few pounds have expired. At the same time, bocaccio is under attained and is not listed in Table 45 because bocaccio QP have never been left to expire in a QS account.

If the QS owners are allowing their QP to expire unused, elimination of the expiration provision might not increase the probability that they will enter into a transaction to sell later in the year or otherwise ensure an opportunity to use the QP. It eliminates the penalty for not transferring the QP and provides more opportunity to make the transfer but not more incentive. To the degree that it might result in an increase availability of QP, it may benefit fishermen, processors and dependent communities and consumers. It could also become more important in the context of Alternatives 2 and its Suboption, in which case there could be a vessel with an overage that

might benefit from the QP that, under No Action, would expire on September 1st. Otherwise, the main impact will likely be with respect to government and regulatory burden.

Impacts to Government and Regulatory Burden

Alternative 2 would create some additional administrative steps for determining surplus QP carry-overs for the following year. There would have to be a deadline for the completion of post-season trading before data could be summarized for the final surplus carryover determination. Also, in its November 2017 report to the Council, NMFS noted that implementation of a post-season trading options would mean that provisions to automatically cover previous years deficits with following year QP would have to be modified.

Given that post-season trading would be occurring, the Alternative 2 Suboption does not appear to present an additional administrative or regulatory burden.

Alternative 3's removal of the September 1 deadline would eliminate a NMFS administrative task as well as a regulatory burden for industry.

Catcher-Processor (CP) Sector Accumulation Limits

The Council is considering accumulation limits that pertain to CP permit ownership. There are three aspects of this action, each addressed with a separate set of alternatives:

a. Implementation Process
b. Permit Ownership Limit
c. Processing Limit

Proposed Purpose and Need

The following purpose and need statement was adopted by the Council at its September 2017 meeting.

> Action is needed to ensure that limited access privilege holders in the CP sector do not acquire an excessive share of the total limited access privileges in the program, as required by Section 303(c)A(5)(D) of the Magnuson-Stevens Act. Accumulation of excessive shares and the associated market power can inhibit efficient market function and impacts other management objectives including those related to the distribution of benefits from the program. Amendment 20 established accumulation limits for other trawl sectors, but not for the CP sector. The purpose of this action would be to address for the CP sector the MSA mandate to ensure that program participants do not acquire excessive shares.

Background

The trawl catch share program, implemented in 2011 under groundfish FMP Amendment 20, created an IFQ system for the shoresbased sector and separate co-op systems for the MS and CP

sectors. For the shorebased IFQ and at-sea MS sectors, aggregation limits were included as part of the program. The aggregation limits were in response to the MSA provision that requires that

> In developing a limited access privilege program to harvest fish a Council or the Secretary shall— . . . . D) ensure that limited access privilege holders do not acquire an excessive share of the total limited access privileges in the program by—(i) establishing a maximum share, expressed as a percentage of the total limited access privileges, that a limited access privilege holder is permitted to hold, acquire, or use; and (ii) establishing any other limitations or measures necessary to prevent an inequitable concentration of limited access privileges; . . . .

For CPs, the catch share program incorporated within it a voluntary co-op under which the CP sector had been operating since 1997. That self-organized co-op did not include an aggregation limit and none was added when the co-op was incorporated as part of Amendment 20.

NMFS and Council policy on accumulation limits are discussed in more detail at the start of the section on blackgill rockfish vessel QP limits (page 45). As discussed there, in addition to controlling the amount of market power, other management objectives are considered in establishing accumulation limits. Relevant management objectives for the trawl rationalization program include but are not limited to providing for a viable, profitable, and *efficient* groundfish fishery; and avoiding excessive quota concentration from either an efficiency or other management objective perspective. Limits on accumulation of shares can have an adverse impact on efficiency, but not having limits can lead to high quota concentrations that may adversely impact other management objectives. Table 50 provides a summary of excessive share provisions in other U.S. catch share programs.

Table 50. Accumulation limit/excessive share cap provisions for catch share programs in the U.S.

Program	Accumulation Limit/Excessive Share Cap
Atlantic Sea Scallops IFQ	Yes. 2.5% limit on the amount any one vessel can harvest (annual quota pounds[17]); 5% cap on any individual or corporation ownership interest (quota share[18])
Multispecies Sectors	Yes. No individual or entity can hold more than 5% of all limited access groundfish permits. Additionally, there is a limit on the aggregated average of all allocated groundfish stocks of 15.5 Potential Sector Contribution (PSC). (Each permit has a history that brings a percentage of quota to the sector the permit enrolls with.) An entity can hold PSC for a single stock in excess of 15.5%, so long as the total holdings do not exceed 232.5 PSC for all 15 species. In other words, because there are 15 groundfish stocks currently allocated to the fishery, the total PSC across all stocks used by a permit holder cannot exceed 232.5 PSC (an average PSC of 15.5% per stock multiplied by 15 groundfish stocks). These limits apply to individuals or entities, and not sectors. An individual or entity can only belong to one sector.

[17] Quota pounds is the annual amount of fish a participant is allowed to catch, usually defined in terms of total weight. It is often calculated as a percentage of the commercial quota based on a participant's quota shares. It varies according to changes in the commercial quota over time.

[18] Quota share is the percentage of the sector's catch limit to which the holder of quota shares has access to harvest. This percentage is used to calculate the annual allocation, and it is not affected by changes in the catch limit over time.

Bluefin Tuna IBQ	No. The IBQ program is designed to account for bycatch in directed pelagic longline fisheries. There are various measures in place to curtail the excessive accumulation of share or allocation, such as no permanent sales and all leases contained within the calendar year.
Surf Clam & Ocean Quahog	No. The Mid-Atlantic Council is currently reviewing the need for excessive share provisions.
Golden Tilefish	Yes, 49% of the tilefish IFQ total allowable landings.
Wreckfish	Yes, 49% of quota share.
Red Snapper	Yes, 6% of quota share.
Grouper & Tilefish	Yes, quota share caps are: deep water grouper 14.7%, gag 2.3%, other shallow water grouper 7.3%, red grouper 4.3%, and tilefish 12.2%.
Pacific Sablefish Permit Stacking	Yes, no individual can hold more than three permits unless meet requirements of grandfather clause.
Pacific Coast Groundfish Trawl Rationalization	Yes - For IFQ, quota share limits and quota pound vessel limits (annual and daily). Limits vary by species. The 30+ categories can be found here: http://www.westcoast.fisheries.noaa.gov/publications/fishery_management/trawl_program/accumulation-limits.pdf. - For the MS cooperative program, MS permit usage limit (no more than 45% of sector allocation). MS catcher vessel endorsed permit ownership limit (no more than 20% of the sector allocation). MS catcher vessel catch limit (no more than 30% of the sector allocation).
Halibut & Sablefish	Yes. No one can hold or control more than 0.5%-1.5% of the halibut or sablefish quota shares in various combinations of areas (Gulf of Alaska, Bering Sea, and Aleutians) unless grandfathered in based on original landings history. There are similar restrictions on the amounts of IFQ that can be used on any single vessel.
Western Alaska CDQ	No. The Bering Sea King and Tanner Crab and Halibut Sablefish IFQ have limits on CDQ holdings, but there are no specific excessive share limits in the CDQ Program itself because the allocations were specified by Congress. However, the percentage allocated is reviewed every 10 years.
Bering Sea AFA Pollock Coop	Yes. No entity can harvest more than 17.5% or process more than 30% of the pollock directed fishery allocation. These caps apply to the entity, and not only within each sector.
Groundfish (non-Pollock Coops)	Yes. No single person can hold or use more than 30% of the quota share, unless grandfathered; no single vessel may catch more than 20% of the initial TAC assigned to the non-AFA trawl catcher/processor sector in any given year. This program has only one sector.
Bering Sea King & Tanner Crab	Yes. No individual or entity may hold/use more than 1-20% of shares (varies by fishery) unless grandfathered. Processors may not possess or use more than 30% of the processor shares for each fishery unless grandfathered, with some limited exceptions for specific fisheries and entities. These caps apply to the entity, and not only within each sector.
Central Gulf of Alaska Rockfish	Yes. There are four types of use caps to limit the amount of rockfish quota share and cooperative fishing quota, unless grandfathered. The caps can be found in Table 1 here: https://alaskafisheries.noaa.gov/sites/default/files/rockfish-faq.pdf. The caps apply within the sector, but there is not overlap in ownership across sectors.

There are a few other regions in the country where a catch share program includes more than one sector. The AFA program, for example, has limits on the harvest and on the processing which both apply at the entity level, not within each sector of the AFA program (Table 50). The

Council's deliberations on Amendment 20 included an alternative that would have created an IFQ system for the CP sector, including the possibility of a whiting accumulation limit for all whiting sectors combined.

For the Amendment 20 IFQ option for the CP sector, CP annual vessel QP limit and processing limit options ran from 65 percent to 75 percent and CP whiting QS control limit options ran from 50 percent to 60 percent. In addition to limits for CPs, there was also consideration of a limit for all whiting sectors combined. While no CP accumulation limits were adopted under Amendment 20, the following are the Amendment 20 whiting limits for other West Coast groundfish limited entry trawl sectors.

Shorebased IFQ Accumulation Limits –	
Vessel QP Limit:	15% of the QP (used and unused)
QS Control Limit:	10% of the QS
MS Co-op Accumulation Limits –	
Catcher Vessel Usage Limit:	30% of the sector allocation
Catcher Vessel Permits Ownership:	20% of the catch history allocation
MS permit owner usage limit:	45% (a MS permit owner may not process more than this amount, even if on different vessels)

During the catch share program five-year review, the Council began discussing whether or not the CP co-op sector should be covered by provisions which limit aggregation and adopted a June 13, 2017 control date to support its consideration of such a policy. Initially a question was raised as to whether the establishment of such limits for the CP sector was within the purview of the Council (e.g. CAB report, September 2017), but NMFS advised the Council that such considerations were permissible (Agenda Item E.2, Supplemental NMFS Report 2, September 2017).

a. Implementation Alternatives

Alternatives

CP Implementation Alternative 1. No action.
CP Implementation Alternative 2. Vacate the June 13, 2017 control date (no new accumulation limits).
CP Implementation Alternative 3. Apply accumulation limits to the existing cooperative program.
CP Implementation Alternative 4. Apply accumulation limits only if the co-op dissolves and IFQ program is implemented for the CP sector.

Analysis

No mechanism has been identified by which any the alternatives would have impacts to the biological or physical environment.

If the Council chooses not to move ahead with a CP accumulation limit, the no action alternative may adversely impact future management options by leaving in place a control date that is not being used, reducing the veracity of future control dates and creating uncertainty for future industry investments. Leaving the control date in place might help substantiate the use of the date for a future policy, but if the Council is not actively working on a policy that relies on the control it may become more difficult to defend the use of the date if there were a court challenge. CP Implementation Alternative 2 would eliminate the availability of the date for future use but prevent adverse consequences anticipated under CP Implementation Alternative 1. CP Implementation Alternative 3 would immediately establish limits for the CP co-op program, which may or may not have an economic impact, depending on future consolidation trends. So far, since implementation of the program there have not been any major consolidations in the CP sector. CP Implementation Alternative 4 would establish the limit policy but delay implementation and raises some other questions that might need to be addressed: What happens if the co-op dissolves and at that time the concentration of permits or processing exceeds what is specified in the alternatives? Would those holding excess permits be provided a divestiture period? Would those processing more than that allowed under the processing limit be provided a grace period before processing had comply with the caps? Or, would those in excess of these limits have their activities grandfathered in indefinitely?

b. CP Permit Ownership Limit

Alternatives

CP Permit Limit Alternative 1: No action
CP Permit Limit Alternative 2: Establish a Five-Permit Limit. No individual or entity may own or control more than five CP permits
CP Permit Limit Alternative 3: Establish a Seven-Permit Limit. No individual or entity may own or control more than seven CP permits

The June 13, 2017 control date adopted by the Council may be used to establish a grandfather clause that would allow the continuation of any pre-existing concentrations of permits.

Rules for Counting Permit Ownerships (and Processing Limits)

Another factor to consider is how proportional ownership will count towards total ownership. The West Coast groundfish limited entry sablefish tier program counts any degree of ownership of a permit or having a permit registered to one's vessels as full control of the permit for purposes of assessing the three-permit limit (with an exception for individuals with ownership of vessels that also participate in Alaska, CFR 660.25(b)(3)(iv)(B) and (C)). This applies even for individuals that do not own their permits but lease or otherwise acquire permits for their vessels. The AFA program in the North Pacific has a statutory statement that any entity that owns 10% or more of any other entity is considered the same entity. Programs like the shorebased IFQ program address this issue by applying an individual's proportional ownership of an entity to the amount of the access rights owned by the entity to determine the proportion of the rights owned

by the individual (known as the "individual and collective rule"). For the IFQ program this rule is applied for determining QS ownership.

Interdependency with Other Follow-on Actions

If there are rules for determining ownership that require an evaluation of ownership percentage, then additional CP ownership information would likely be collected to help with enforcement. There is a follow-on action under New Data Collections for CPs and QS Owners" that addresses the need for that information. Alternatively, collection of the information could be considered a necessary implementation detail under one of these action alternatives.

Analysis

No mechanism has been identified by which any the alternatives would have impacts to the biological or physical environment.

The impacts of a permit ownership limit are expected to be primarily distributional but could limit net benefits if efficiency would be increased at higher levels of consolidation without adversely impacting efficiently functioning markets (i.e., without creating market power that interfered with competitive market functions). A permit ownership limit would not prevent consolidation of ownership of vessels or the ownership of product after processing is completed (e.g., a single company could still purchase all of the product processed by CPs). This is also true for QS control limits in the IFQ program.

Neither the original license limitation program (Amendment 6) nor the catch share program (Amendment 20) placed limits on the number of vessel permits a single entity can own. Available data on permit ownership (Table 51) indicates that since implementation of the catch share program in 2011 there has not been an increase in the concentration of permit ownership in the CP sector. (Note that there was a reorganization of the business structure of American Seafoods Group part way through 2015. While this has not resulted in a shift of permit ownership at the holding company level or in terms of participating vessels, the impact on entity control of the permits is unknown.)

There are 10 CP permits, currently owned by 3 companies with no single company owning more than 5 permits (Table 51). While CP Permit Limit Alternative 1 would potentially allow all these permits to be consolidated under a single ownership, CP Permit Limit Alternative 2 would limit consolidation to the current maximum 5 permits. This would allow all permits to be owned by as few as two companies. CP Permit Limit Alternative 3 would allow some additional consolidation by one company but still allow all permits to be owned by as few as two companies. If with each additional permit a company moves to a higher level of efficiency and the optimal consolidation level is 7 permits, then as one company approaches that level, the other company would necessarily move away from that optimum. However, if one company did consolidate 7 permits, it would be expected that the sector, as a whole, would be moving toward greater efficiency, unless the consolidation leads to excess market power.

Table 51. CP permit ownership, by company (2011-2017).

Permit	Year								Associated Vessel(s)
	2011	2012	2013	2014	2015	2016	2017		
	Glacier Fish Company LLC								
GF0030	x	x	x	x	x	x	X		Alaska Ocean, Northern Glacier
GF0101	x	x	x	x	x	x	X		Pacific Glacier
	Trident Seafoods Corp.								
GF0007	x	x	x	x	x	x	X	x	Island Enterprise
GF0062	x	x	x	x	x	x	X	x	Seattle Enterprise
GF0108	x	x	x	x	x	x	X	x	Kodiak Enterprise
	Northern Jaeger LLC				American Seafoods Group LLC				
GF0119	x	x	x	x	P	p	x	X	x	Northern Jaeger
	American Dynasty LLC								
GF0092	x	x	x	x	P	p	x	X	x	American Dynasty
	American Triumph LLC								
GF0048	x	x	x	x	P	p	x	X	x	American Triumph
	Northern Eagle LLC								
GF0142	x	x	x	x	P	p	x	X	x	Northern Eagle
	American Seafoods Company LLC								
GF0298	x	x	x	x	p	p	x	X	x	Katie Ann

Data: Permit owner company names, addresses, and vessel information are publicly available on the Pacific Coast Fisheries Permit System, and summarized here.

The Amendment 20 CP co-op system is structured in a fashion that might provide an entity with even just a single permit considerable power in the co-op. Specifically, if the co-op is unable to develop an agreement that includes all permit owners, then the entire system reverts from a co-op to an IFQ program in which each permit would be allocated 10% of the QS.[19,20]

c. Processing Limit

Alternatives

Processing Limit Alternative 1: No Action (Allow a single entity to process 100 percent of the CP sector allocation, subject to anti-trust limits)
Processing Limit Alternative 2: 60% limit. No individual or entity owning a CP permit(s) may process more than 60 percent of the total CP sector whiting allocation.
Processing Limit Alternative 3: 80% limit. No individual or entity owning a CP permit(s) may process more than 80 percent of the total CP sector whiting allocation.

[19] The Economic Data Collection Program has published an extensive report on the economic performance of the CP sector annually since 2014. The most recent report highlights data collected for participants for the 2015 fiscal year, in addition to summaries of all data collected for 2009-2015 and a description of the sector and history of the fishery and program (NMFSa, 2017). Economic Data Collection results for the CP sector are also readily accessible on the FISHEye data exploration tool.

[20] The Public Review draft of the Five-year Review contains additional information about the performance of the CP sector during the first five years of the catch share program, including net benefits, efficiency, distribution of harvest revenue, and quartile distributions of net revenue.

The June 13, 2017 control date adopted by the Council may be used to establish a grandfather clause that would allow the continuation of any pre-existing consolidation.

Rules for Assessing the Processing Limit

Under the permit ownership limit, a discussion is provided of methods for assessing permit ownership for the purpose of applying the limit. Here the question is not only does an entity own a permit but, if so, how will processing carried out by the vessel operating under that permit apply toward that entity's processing limit. One could apply a rule like the sablefish tier permit program such that if an entity had any degree of ownership in a permit (or some threshold amount) then all processing under the permit would count toward that entity's processing limit. Alternatively, an individual and collective rule could be applied. For example, if Company A has 5% ownership of a CP permit that processes 15% of the sector allocation, and 25% ownership of a different CP permit that processes 10% of the sector allocation, Company A would have a 3.25% share of the processing in the CP sector. If any ownership counts as complete ownership (as in the sablefish tier program) then in this example Company A would have 25% share of the processing in the CP sector. And, if the 10% ownership threshold were applied, as in the AFA fishery, Company A would have a 10% share of the processing in the CP sector. Most other catch share programs around the country use the proportional method ("individual and collective rule") for determining ownership for accumulation limits, as do the shorebased and MS sectors in the West Coast IFQ program.

Interdependency with Other Follow-on Actions

If there are rules for determining ownership that require an evaluation of percent ownership, then additional CP ownership information would likely need to be collected to help with enforcement. There is a follow-on action under "New Data Collections for CPs and QS Owners" that addresses the need for that information. Alternatively, collection of the information could be considered a necessary implementation detail under one of these action alternatives.

Analysis

No mechanism has been identified by which any the alternatives would have impacts to the biological or physical environment.

The impacts of a processing limit will likely be distributional and may also impact net benefits if efficiency could be increased through higher levels of processing consolidation without adversely impacting efficiently functioning product markets (i.e., without creating market power that interfered with competitive market functions). One reason for establishing accumulation limits is to control the amount of market power a limited access privilege holder can acquire. Given that a permit owner in the CP sector also competes with harvesters in the IFQ sector and processors in the MS sector, even a 100% accumulation limit in the CP sector might not give the permit holder unlimited control of the product market because of competition from entities in the shorebased and MS sectors, as well as other sources of whitefish that substitute for whiting in the

market. However, because ownership extends across sectors, the possibility for more extensive control exists which could be inhibited by processing or ownership accumulation limits.

The Council's deliberations on Amendment 20 included an alternative that would have created an IFQ system for the CP sector, including IFQ accumulation limits and vessel limits for amounts caught and processed (Table 52).

Table 52. CP accumulation limit options considered in the Amendment 20 IFQ alternative.

	Option 1	Option 2	Option 3
QS Control Limit	50%	55%	60%
Vessel Harvest and Processing Limit	65%	70%	75%

Analysis at the time showed that the most restrictive vessel processing limit options were at least 70 percent above the 90th percentiles vessel production levels for the 1994-2003 and 2004-2006 historic periods and 30 percent above the vessel maximums for the same periods. Accumulation limits were not included in the co-op alternative the Council adopted for CPs.

The current processing limit action alternatives (60 percent to 80 percent) bracket the range considered under Amendment 20. However, they are proposed not for the processing vessel but for the entity owning the vessel. Each year co-ops are required to submit annual reports that include information on annual allocations and harvest agreements. Those reports show that harvest allocation has not changed substantially between the participating companies during the course of the catch share program. For each company, harvest as a share of allocation is typically less than or equal to the company's share of actual harvest, because, on average, the sector has attained only 94% of its allocation from 2011-2016. These annual report data show that all entities would be well below the lowest of the action alternatives (Alternative 2, 60%; Table 53).

Table 53. Percent attainment of CP sector allocation and share of actual harvest by each CP company, by year.

	American		Glacier		Trident			Harvest
Year	Catch as a % of Sector Allocation	Catch as a % of Sector Catch	Catch as a % of Sector Allocation	Catch as a % of Sector Catch	Catch as a % of Sector Allocation	Catch as a % of Sector Catch	Sector % Attainment of Allocation	(1,000s mt)
2011	45	48	20	21	30	31	95	72
2012	49	50	21	21	29	29	99	55
2013	51	52	19	20	28	28	98	78
2014	51	51	20	20	29	29	100	103
2015	29	43	15	21	24	35	68	68
2016	51	54	18	19	26	27	95	109
2017	50	50	20	20	30	30	100	137
Avg	47	50	19	20	28	30	94	89

Data:
https://www.pcouncil.org/wp-content/uploads/2018/04/IR5_Supp_PWCC_Rpt_to_NMFS_on_2017_Fishery_FINAL_Apr2018BB.pdf
http://www.pcouncil.org/wp-content/uploads/2017/03/Sup_IR2_2017_PWCC_Rpt_re2016_Apr2017BB.pdf
http://www.pcouncil.org/wp-content/uploads/2016/06/IR2_CoopRep_CP_2015_PWCC_JUN2016BB.pdf
http://www.pcouncil.org/wp-content/uploads/2015/03/IR3_2014_Co-op_Annual_Rpt_CP_APR2015BB.pdf
http://www.pcouncil.org/wp-content/uploads/IR2_2013_Final_PWCC_Am20_AnnualRpt_JUNE2014BB.pdf
http://www.pcouncil.org/wp-content/uploads/INFO_SUP_RPT_2_Co_opAnnualRept_2013_preliminary_CP_NOV2013BB.pdf
http://www.pcouncil.org/wp-content/uploads/D2b_ATT2_CP_RPT_APR2013BB.pdf
http://www.pcouncil.org/wp-content/uploads/INFO_RPT3_PWCC_Am20_-NOV2012BB.pdf
2011 Catcher Processor Annual Report (not published on web)
[Interal Ref: CP_CoCatches.xlsx]

Based on the table, Alternative 2, a 60 percent limit, would allow the largest producer to expand its CP operations by 29 percent compared to its average and 18 percent compared to its maximum year. The smallest producer could expand its operations by 216 percent compared to its average and 186 percent compared to its maximum year. Alternative 3, an 80 percent limit, would allow the largest producer to expand its CP operations by 72 percent compared to its average and 57 percent compared to its maximum year. The smallest producer could expand its operations by 322 percent compared to its average and 281 percent compared to its maximum year.

In addition to issues of individual operational efficiency, members of industry have testified about the need for flexibility. For example, if one company's vessels are unable to make it to the fishing grounds, it is possible that a limit could impede or prevent another company's harvest of fish on behalf of the absent vessels. For example, Under Alternative 2, if Glacier vessels had been unable to fish in 2017, their allocation would have had to have been split between American and Trident (American could not have harvested all the fish for Glacier). If two companies are unable to fish in a particular year, any limit would make it impossible for a single company to take the entire sector allocation.

New Data Collections for CPs and QS Owners

CP Ownership Data

Purpose and Need

The following language was adopted by the Council at its March 2018 meeting.

> Attaining optimum yield from a fishery requires evaluating the performance of the fishery and managing it through adaptive adjustments based on successes and failures. The MSA requires that the Council and NMFS "ensure that limited access privilege holders do not acquire an excess share" of such privileges. Ownership information from CPs needs to be collected in order to evaluate program performance with respect to this mandate. The purpose of this action would be to create a mandatory requirement for the submission ownership information from those that own catcher- processors.

Background

The trawl catch share program was implemented in 2011 under Amendment 20 to the groundfish fishery management plan (FMP) which created an IFQ program for the shorebased sector, and separate co-op programs for the MS and CP sectors. For the shorebased IFQ and at-sea MS sectors, the program required that participants submit ownership information at the time of permit issuance and renewal. The related permit application and renewal forms require that all owners with 2 percent or greater ownership interest be declared. This requirement is to facilitate monitoring of accumulation limits that were included in the catch share program for these two sectors. Those accumulation limit rules are in response to the MSA provision that requires that

> In developing a limited access privilege program to harvest fish a Council or the Secretary shall— . . . . D) ensure that limited access privilege holders do not acquire an excessive share of

> the total limited access privileges in the program by—(i) establishing a maximum share, expressed as a percentage of the total limited access privileges, that a limited access privilege holder is permitted to hold, acquire, or use; and (ii) establishing any other limitations or measures necessary to prevent an inequitable concentration of limited access privileges; . . . .

The catch share program incorporated within it a voluntary co-op under which the CP sector had been operating since 1997 and did not include an accumulation limit and consequently there was not an ownership information collection requirement for that sector. This action, if recommended by the Council and implemented by NMFS, would establish such a data collection.

Alternatives

Alternative 1: No Action. Owners of catcher vessel, mothership processor, and shorebased first receiver permits are required to submit ownership information when they acquire or renew permits but catcher-processors are not.

Alternative 2: Collect Detailed Catcher-Processor Ownership Data Annually. Add a requirement that CPs submit ownership information when they acquire permits and to a similar level of detail as required for other permits.

Analysis

None of the alternatives would have direct or immediate indirect impacts to the biological or physical environment.

If CP ownership or accumulation limits are adopted as a follow-on action (see above), expansion of the collection of CP ownership information will likely be part of the implementation of that action. However, even if that action is not taken, the collection of such information would help monitor accumulation in the fishery in case conditions develop in the future which warrant such action.

Because of cross-participation between sectors, two out of the three businesses that currently own CP permits already provide ownership information because they also own QS and/or MS processor permits. There are 4 companies that own MS permits; one of the 4 companies owns both a MS permit and a CP permit. The action alternative would require the third CP participant (as well as any new entrants) to submit similar information.

On the Trawl Identification of Ownership Information form, the official PRA estimate listed on the form is 0.75 hours for new applicants, because the vast majority of the forms are very quick to fill out. However, the ownership structures of MS and CP companies are often much more complicated and can take much longer than that. There are a few companies that annually send representatives to hand-deliver fairly thick packages detailing the levels of the ownership structure, the relationships between them, and all the associated contact information. There is not an official estimate for these extensive ownership information forms (which represent about 1% of all the ownership information forms received), but the burden is probably much more extensive.

Quota Costs, Earnings and Share Owner Participation

The trawl catch share program was implemented in 2011 and required that participating vessel owners and first receivers (businesses buying catch share fish from vessels) submit the economic information needed to assess the performance of the program. During the recently completed catch share review, it has become apparent that the performance assessment desired by advisory bodies and the Council wanted information about how quota costs affect the financial performance of the fleet and where quota lease payments are accruing.

Purpose and Need

The following language was adopted by the Council at its March 2018 meeting.

> Attaining optimum yield from a fishery requires evaluating the performance of the fishery and managing it through adaptive adjustments based on successes and failures. For catch share fisheries in particular, important management objectives relate to socio-economic concerns, several of which relate to the economic health of individual fishing and processing businesses. Evaluation of the economic performance of these businesses requires complete information on costs and revenue, a portion of which are associated with the purchase and sale of quota shares and quota pounds. There has also been strong interest expressed about understanding how much of the value of quota is leaking out of the fishery and local communities. Currently, there is a mandatory data collection program that collects this information from vessel owners and first receivers but not from other types of quota owners. To accurately evaluate the program performance and make adaptive adjustments there is a need for information on quota purchases/sales from all QS owners, including those that do not own vessels or first receivers. The purpose of this action would be to create a mandatory survey for QS owners.

Background

Quota cost and earnings information is collected from vessel owners and first receivers through the Economic Data Collection (EDC) Program. This program indirectly collects data from quota share owners only when the quota share owning company is the same as the vessel owning company. Since the EDC form is designed to collect data from vessel owners, quota earnings data are not collected about the following types of operation:

- Quota share companies that do not own a vessel with a limited entry trawl permit
- Quota share companies that own multiple vessels
- Quota share companies whose owners have active vessels under other company names

Incomplete quota lease payment information results in the following:

- Financial performance of the active fleet can only be partially assessed with the current EDC data.
- An assessment of the amount and value of QS that is owned by entities that do not (or no longer) actively participate in the fishery cannot be provided.

- Community economic impact analysis that includes the economic impact of revenues from QS ownership cannot be provided without accurate QS owner-level earnings data
- An assessment of the effects of different levels of lease-dependence cannot be performed.

The structure of the catch share program and available data make it difficult to include quota costs and revenues in analysis of the financial performance of the fleet. Quota shares were allocated to permit owners (and, for Pacific whiting, processors) and not vessel owners, explicitly isolating quota leasing operations from vessel operations. Current estimates of net revenue are focused on fishing vessels as individual entities. However, fishing vessels often do not operate as stand-alone business entities. This becomes a critical issue when attempting to assess the financial performance of the fishing fleet in a catch share system. Additional information is needed about the relationships between quota share owners and vessel owners in order to include quota in the financial analysis of the fleet.

In addition to the limitations described above, the absence of a clear definition of "active participants" also restricts the ability to identify the benefactors of the catch share program. Potential definitions of active participants include:

1. Anyone that owns a share in an active vessels
2. Anyone with an active role in the fishery, could include Community Quota Funds, relatives of vessel owners, crew, service providers, quota share owners, etc.
3. Anyone that lives in the fishing community (definition of community needs to be specified)

To conduct the analyses described above, two primary pieces of data are necessary:

1. Revenue from quota share lease/quota pound sales from each quota share owner
2. Characterization of the quota share permit owner and relationship to active vessels in the fishery

The need for an augmentation of existing economic data collections was identified early in the catch share review process when the impact of partial availability of quota information on the review results became apparent. Initially the CAB supported this data collection and in June 2017 the Council included it on the list of follow-on action issues. But in its November 2017 report to the Council the CAB stated:

> . . . the CAB no longer has a consensus position in support of this survey. Some members of the CAB thought this was not a high enough priority to displace the pursuit of other follow-on actions and questioned the ultimate value of the information. Others thought the collection would be essential to tracking information that is important to understanding the performance of the program, in particular the ownership of QS and flow of benefits of the fishery to individuals who are not members of the fishing communities. It was also suggested that other methods for collecting some of this data be explored. For example, could vessel account owners be required to declare the QS accounts to which their ownership is linked including the percentage of the quota the

ownership of the account is linked to? (Agenda Item F.2.a, CAB Report, November 2017)

The Council adopted its final range of alternatives for analysis on this action at its March 2018 meeting.

Alternatives

Alternative 1: No Action. QS owners that are not also owners of vessels or first receivers do not provide information.
Alternative 2: Collect QS owner information through a new "QS Owner Survey." This survey would be sent to all QS owners and be part of the existing Economic Data Collection Programs mandatory response survey set. Questions in the current vessel and first receiver surveys that unnecessarily overlap with the new QS owner survey would be eliminated or modified in the current EDC vessel surveys.
Alternative 3: Collect QS owner information through a supplement to the QS renewal form.

As a fourth alternative, the Council might specify that NMFS should implement a system for collection of these data but leave it to NMFS to work out the most efficient and effective way to conduct the collections.

Preliminary Data Elements for the Survey

Alternative 1

The following are examples of the types of questions that might be included in a survey to collect the desired information. These questions would be refined with feedback from Council, industry, and SSC. Following that they would be tested and possibly refined further.

1.) What did this company do with the quota in 2018? Check all that apply.[21]

- ❑ Fished
- ❑ Leased to someone within community
- ❑ Leased it to someone outside of community
- ❑ Gifted to someone outside of your business
- ❑ Gifted to someone within your business
- ❑ Traded for quota
- ❑ Traded for non-quota

[21] We plan to revise these categories based on industry and Council feedback.

2.) What description best matches this Quota Share company? Individual can refer to a part or sole owner of the Quota Share company or trust.[1]

- ❏ Community Quota Fund/Other Non-profit Owners
- ❏ At least one individual owns a vessel that fishes in the IFQ program but a hired captain is used
- ❏ At least one individual fishes (but does not own a vessel) in the IFQ program
- ❏ At least one individual owns a processing facility that buys IFQ fish
- ❏ Company owns a vessel that fishes in the IFQ program
- ❏ Company buys IFQ fish
- ❏ At least one individual whose family member currently fishes in the IFQ program
- ❏ At least one individual whose family member owns a vessel that fishes in the IFQ program
- ❏ At least one individual who is not actively participating, lives within fishing community
- ❏ At least one individual who is not actively participating, lives outside fishing community

3.) How much did this company earn from leasing quota in 2018?

$_____

4.) The following vessels received quota from this quota share account in 2018, please fill in the following fields

Vessel Name	What is your relationship to this vessel? (circle one)[1]	How much did this vessel pay for quota from this account?
MISS SUSAN	owned, affiliated, part of risk pool, ...	$
JOLLY G		$
GOLDEN STAR		$

If this new QS owner data collection were implemented, the following information requests would be eliminated from current vessel owner and first receiver surveys.

- Earnings from lease or sale of quota pounds or quota shares

Alternative 2

The following are examples of the types of questions that might be added to the QS Permit/Account Application. These questions would be refined with feedback from Council, industry, and SSC. Following that they would be tested and possibly refined further.

1.) What description best matches this Quota Share company and fishing plans for 2019? Individual can refer to a part or sole owner of the Quota Share company. [1]

- ❏ Community Quota Fund
- ❏ At least one individual owns a vessel that fishes in the IFQ program but a hired captain is used
- ❏ At least one individual fishes in the IFQ program
- ❏ At least one individual owns a processing facility that buys IFQ fish
- ❏ Company that owns a vessel that fishes in the IFQ program
- ❏ Company that buys IFQ fish
- ❏ At least one individual whose family member currently fishes in the IFQ program
- ❏ At least one individual whose family member owns a vessel that fishes in the IFQ program
- ❏ No individual in this firm fishes or is related to someone that fishes in the IFQ program

After the end of the fishing year, the participant would be asked to certify the following statement:

5.) Based on the data recorded in the quota transactions database, please affirm that the data reported are correct, or provide revisions

Vessel Name	What is your relationship to this vessel? (circle one)	Reported quota revenue	Put check mark to confirm, or provide revision
MISS SUSAN	Owned, affiliate, part of risk pool, ...[1]	$1,423	
JOLLY G		$120,000	
GOLDEN STAR		$12	

Note: During QS renewal it is likely that data would be collected for the previous year. For example during the fall 2018 renewal for 2019 issuances, data would be collected/verified on total earnings from quota leased in 2017.

If this new QS owner data collection were implemented, the following information requests would be eliminated from current vessel owner and first receiver surveys.

- Earnings from lease or sale of quota pounds or quota shares

Analysis

None of the alternatives would have direct or indirect impacts to the biological or physical environment.

Collection of additional data would better inform the Council and public about the economic and social performance of the catch share program and allow the Council to better pursue MSA National Standards along with FMP and Amendment 20 goals and objectives related to efficiency, economic stability, fairness and equity, and communities. In general, there were two types of missing/incomplete information during the catch share review: information about the distribution of quota payments, in particular geographic distribution and status of payment recipients (whether they are active in the fishery); and a complete assessment of the profitability of fishing enterprises taking into full account both payments and revenue from quota sales and leases. The following two sections discuss: 1) the short-comings in the current data and 2) the types of analyses that might be produced with the expanded data collection. After that, a preliminary assessment of the paperwork burden is provided.

Quota Transaction Payments

There are two existing data collection programs, the Economic Data Collection (EDC) Program and the Quota Transactions Database (QTD), that provide some information about quota costs and earnings. To evaluate the need for a new data collection effort, it is important to understand the limitations of existing programs. The following is a summary of quota cost and earnings data collected by the EDC and the QTD. Differences and similarities in the type of data collected as well as discrepancies between the EDC and QTD are described.

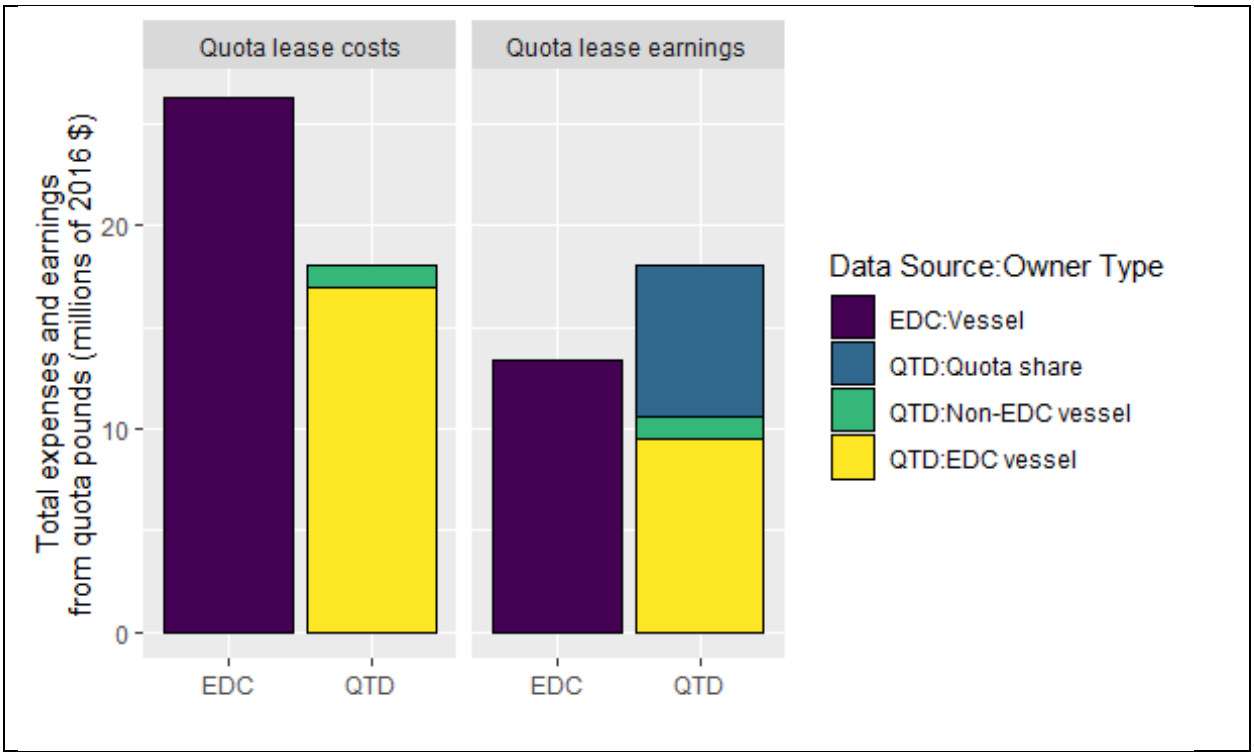


Figure 9. Comparison of quota lease costs and earnings reported on the Economic Data Collection (EDC) form and in the Quota Transactions Database (QTD).

In Figure 9 the EDC:vessel (purple bar) refers to quota cost/earnings data from the EDC survey while the other categories reference information collected through the QTD. The QTD:EDC vessel (yellow) refers to quota costs/earnings for vessel account owners that were required to complete an EDC survey; QTD:Non-EDC vessel (green) refers to quota costs/earnings for any vessel account owner that is not directly associated with an EDC vessel, and QTD:Quota share (blue) refers to earnings of quota share holders.

Every vessel with a limited entry trawl permit (and therefore all active catch share participants) is required to complete an EDC form (in Figure 9 these vessels are both the EDC vessels and the QTD:EDC vessels). Non-EDC vessel account owners (QTD:Non-EDC vessel) are not required to fill out an EDC form because the vessel associated with the account no longer has a limited entry trawl permit. Quota share account owners (QTD:Quota share) who do not own a vessel with a limited entry trawl permit or first receiver are never required to submit EDC forms. If data were recorded perfectly in both the EDC and QTD programs, in Figure 9 the lease cost and lease earnings for the EDC:Vessel category (purple bar) would match the QTD:EDC vessel totals (yellow bar) and with the augmentation of the survey to include QS ownes the bars on the left for lease costs the eight of the bars on the left would match the bars on the right for lease earnings.

Data recorded in the EDC form is annual data while data recorded in the QTD is for each transaction. Every time a transfer is made, either between a quota share account and a vessel account or between vessel accounts, participants have the opportunity to record the value in the QTD, but that information is voluntary. The left panel of Figure 9 shows that most lease costs

associated with quota pound transfers were incurred by EDC vessels. In contrast, only about half of the lease earnings from quota pounds were paid to EDC vessels, a small portion is paid to non-EDC vessels, and the rest was paid to quota share owners.

The QTD lease costs are lower than the EDC lease costs because a value is not reported for all cash transactions. The most likely reasons are that the price had not yet been determined at the time of the transfer, or the person registering the transfer did not know the price, did not have time to record the price, or did not want to record the price. Nevertheless, when provided, the per transaction values of the QTD are extremely useful in evaluating how well the quota market is working, an important determinant of how the program is functioning.

The QTD:EDC vessel lease earnings are lower than the EDC lease earnings for the same reasons listed above. And, importantly for considering whether to augment the data collection program, the total lease earnings recorded in the QTD are higher than the EDC lease earnings because not all quota owners are required to complete an EDC form or participants may choose to operate their quota leasing business as a separate company. As pointed out in the five-year review:

> Quota revenues [reported to the EDC] are likely underreported. Many QS owners consider themselves separate from the business operations of a vessel or processor. Thus, quota expenses would be reported in the EDC as a vessel business expense, but the revenue from quota leasing or sales would not. This underreporting increases the calculated difference between net revenue with and without quota. . . . As consolidation increases, the vessels that remain in the fishery are more likely to lease quota from quota shareholders who have exited or who fish less in the catch share program, and they spend a larger portion of their revenue on quota. The data suggest that this is occurring for both whiting and non-whiting vessels, but to a greater extent for nonwhiting vessels. (Public Review Draft, p. 3-87)

As QS owners sell their vessels but keep their QS, the amount of information missing on vessel lease payments for QP will likely increase.

Figure 10 shows that 40% of all quota pounds traded (2011-2018) were made to an account with the same owner and 60% were made to a different owner. Over the same time period 78% of all quota pounds traded were between quota share accounts and vessel accounts and 22% were traded between vessel accounts. Each time a trade is made, the participant classifies the transaction. Of all quota pounds traded, 57% were classified by participants as “Self-Trade” and 28% were classified as “Other”. The remaining categories: Barter QP, Cash Sale, Cash and Barter, and Barter are reported jointly as “All other”. Quota share trade transactions are not shown here because they are very infrequent.

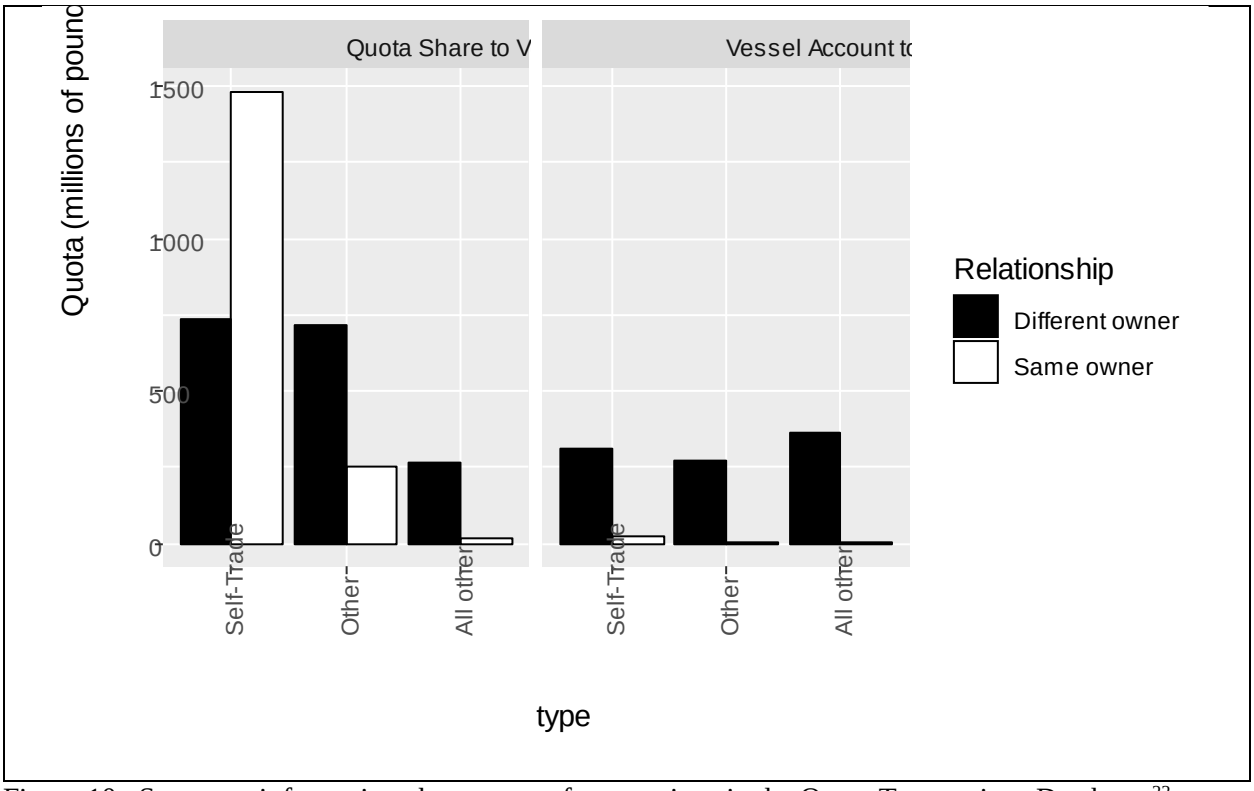


Figure 10. Summary information about types of transactions in the Quota Transactions Database.[22]

Information Improvement

The quota share owner survey would improve analysts ability to (1) identify which "types of participants" are receiving quota payments and answer a suite of questions about the distribution of quota payments, and (2) refine EDC Program estimates of financial performance by integrating quota revenue.

The quota share owner survey would help answer questions about the distribution of payments to sectors, geographic areas, targeting strategies, vessel size categories, or any other categorization the Council is interested in pursuing. It will be important to solicit feedback from Council and Council bodies to ensure that the survey is designed to collect the correct categories and granularity of data.

Information about the geographic distribution of quota-share holder transactions would facilitate estimates of where economic benefits are accruing. Questions of potential interest include: How has the distribution of quota share receipts changed over the course of the program? Which states and communities have been successful at retaining payments for quota? Have community quota funds affected the retention or "anchoring" of quota share receipts in communities? Using

[22] Self-trade between different owners: These designations are made by those who are involved in the transactions. For example if John Smith owned quota and his brother owned the boat, but they operate as one business, John might classify the transaction as a self-trade but according to ownership information in the database it would look like they were two different owners.

fictitious data, Figure 11 provides a mock-up of the types of results that might be produced with these data.

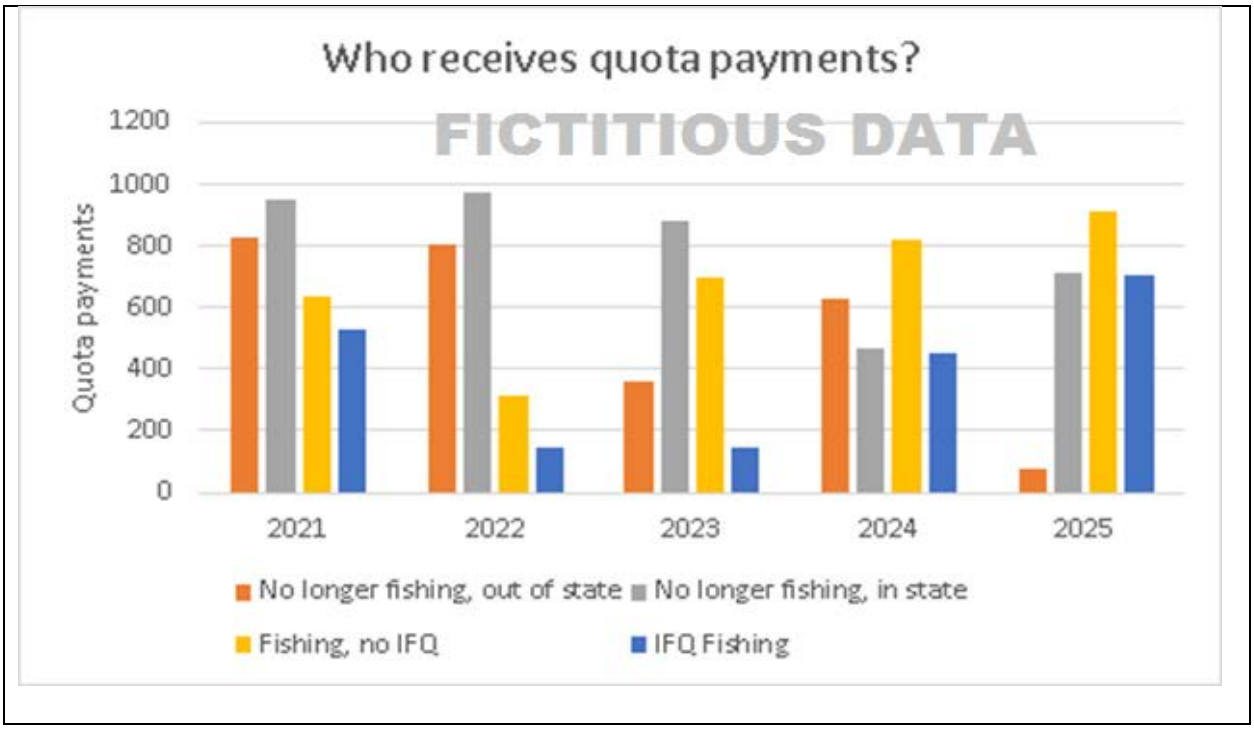


Figure 11. Mockup of results from proposed quota share owner survey.

More information about the geographic distribution of quota receipts is important for the estimation of income and employment impact estimates. A recent paper by Leonard and Steiner (2017) demonstrated that alternative assumptions regarding the distribution of quota payments can substantially change conclusions about the economic impacts of the program. Unless the quota share survey is implemented, these assumptions will be a major component of future estimates of economic impacts of management alternatives such as harvest specifications and changes in gear rules. Generally, there are three choices for assumptions: payments accrue to the port of landings in the form of proprietary income, payments do not accrue to any port area (i.e. treated as a leakage), or payments are distributed to the home-ports of vessels using the limited revenue information that is obtained from the EDC.

To illustrate how information about quota share payments can influence the outcome of net revenue analyses, in Figure 12 fictitious data are used to illustrate how the assessment of net revenue may vary with information about how quota payments are moving between sectors. In this illustration, the total payments made by participants remains the same for all scenarios. The sectors described here could refer to any division or sector of interest such as geographic areas, targeting strategies (trawl, gear switching, whiting vessels, nonwhiting vessels, etc.), or first receivers.

The assumptions of Figure 12 are as follows:

- *100% to Inactive sector:* All quota payments are made to inactive participants
- *20% to Sec. A:* Sector A receives 20% of all of the quota payments made in all three sectors with the remainder is going to inactive participants.
- *40% to Sec. A:* Sector A receives 40% of all of the quota payments made in all three sectors with the remainder is going to inactive participants.
- *80% to Sec. A:* Sector A receives 80% of all of the quota payments made in all three sectors with the remainder is going to inactive participants.
- *Remains within sector:* All quota payments are paid to vessels within the same sector

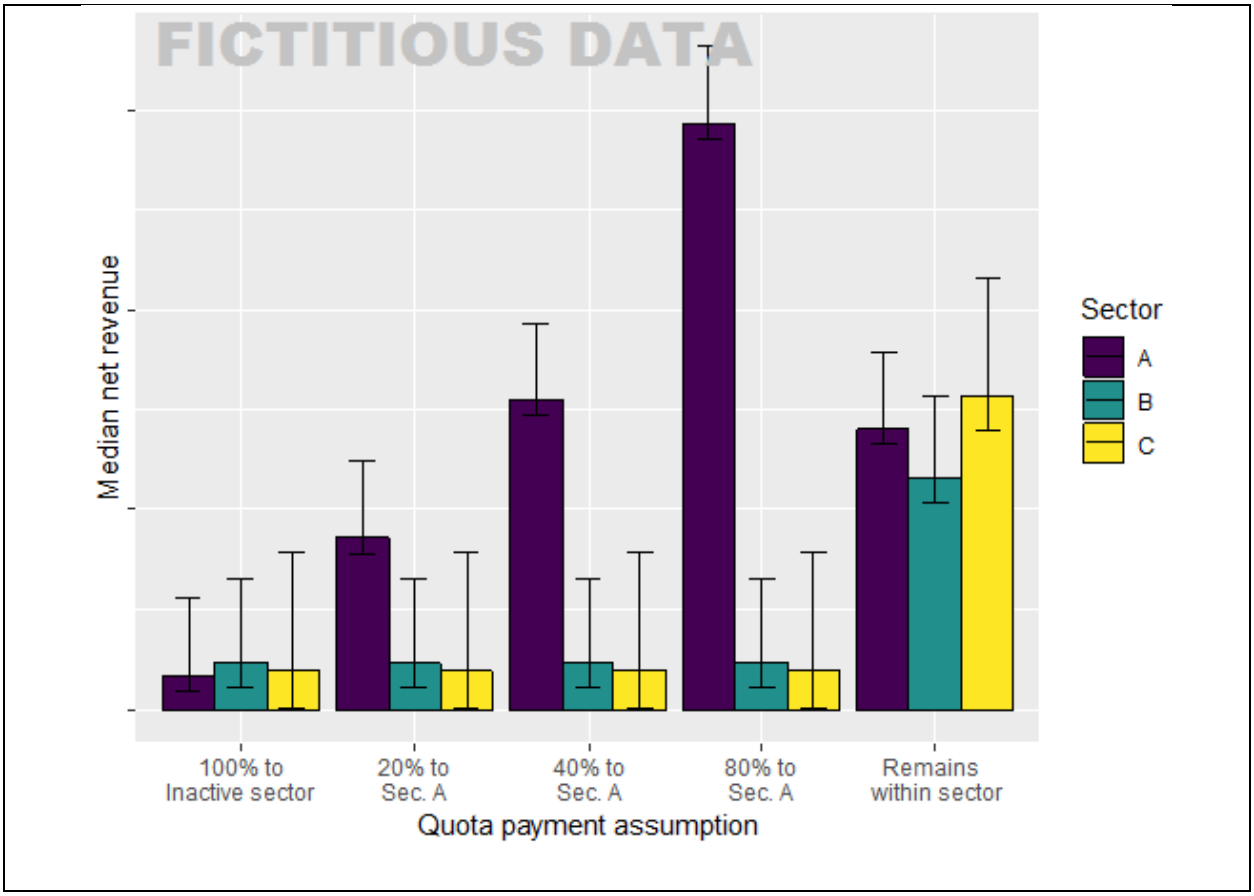


Figure 12. Median net revenue by sector under five different assumptions about quota payment receipts.

The quota share owner survey would improve estimates of financial performance of individual vessels/companies by collecting more complete cost and earnings information on quota transactions. Steiner et al. (2017) note

> The costs and earnings from quota are an important component of the economic health of the companies that fish in the catch share program. The value of quota is theoretically equal to the profitability of the asset. In theory, a quota owner will fish the quota if the profit they earn from fishing the quota is higher than the price they would receive if they sold the quota. Net revenue including earnings and costs from quota will be less than net

> revenue without considering quota transactions if quota is purchased from quota share owners not involved with an actively participating vessel. (p. 160)

Because of missing information, the assessment of net revenue with quota costs included must be considered a "lower bound" of net revenue. The quota share survey would provide more complete revenue information and potentially more informative cost information to allow for a more accurate representation of the financial performance of the fleet, such as the information shown in Figure 13. In Figure 13 the height of the bars is the same in each graph. The first graph shows all transactions as total revnue, the second as variable costs and net revenue, and the third as total costs and net revenue. See Figure ES-8 and Tables 3-45 and 3-46 in the "West Coast Groundfish Trawl Catch Share Program Five-year Review – Draft" as well as Section 13.3 of the Economic Data Collection Program Catcher Vessel Report (2009-2015) for further elaboration of how these data have been used.

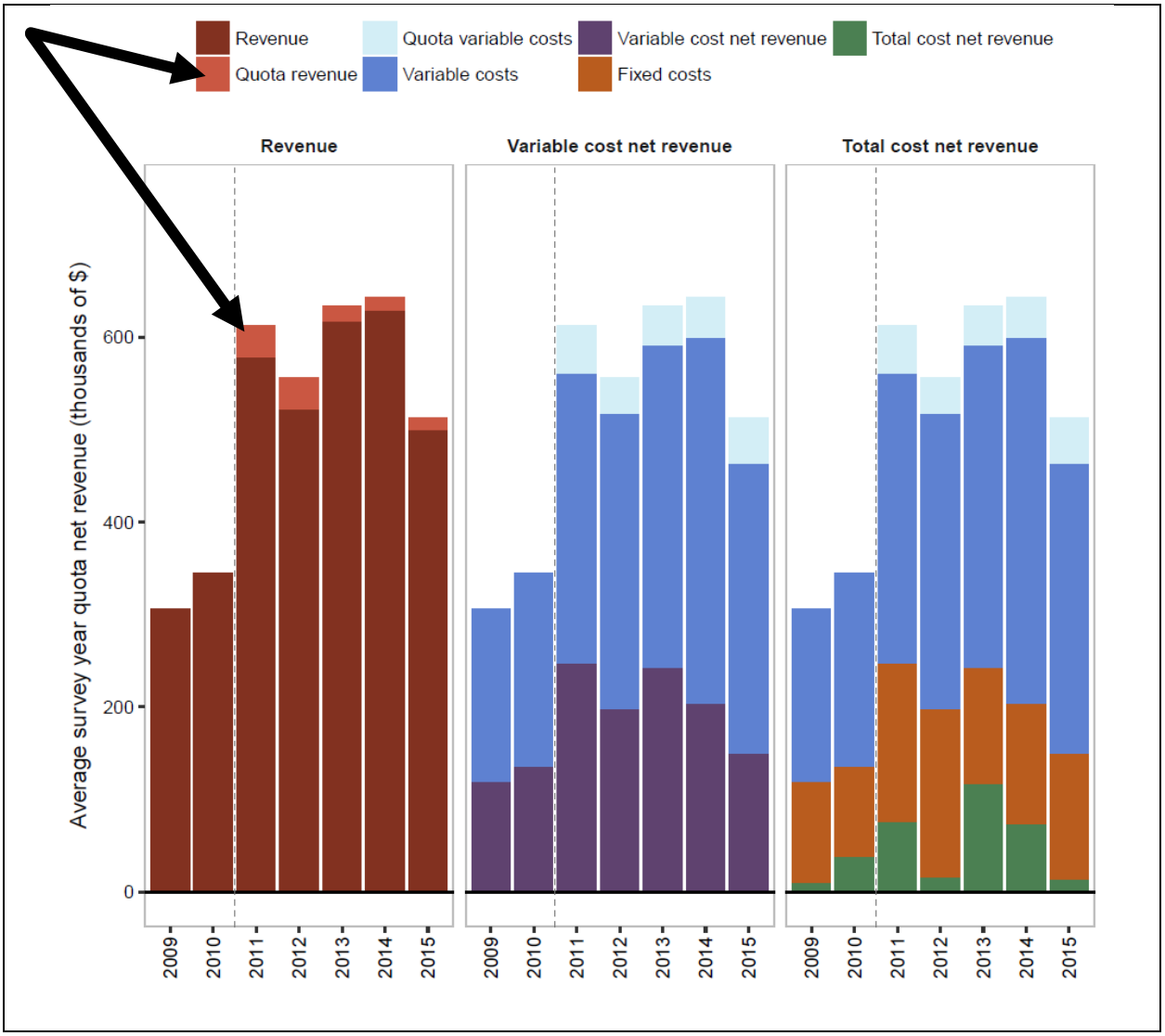


Figure 13. All catch share program participants (whiting and non-whiting groundfish) average net revenue with quota earnings and costs by survey year (average ex-vessel revenue, quota revenue, variable

costs, variable quota costs, variable cost net revenue, fixed costs, and total cost net revenue). Source: Economic Data Collection Program Catcher Vessel Report (2009-2015).

Paperwork Burden

The PRA public reporting burden estimate for the current QS permit/account application form is 0.5 hours. The current form is fairly simple including primarily: name, address, signature and date. The burden would increase proportional to the amount of additional information requested. Any time estimate will depend on the final set of questions that is developed but a preliminary estimate is that there would be an additional one to two hours of burden for the proposed expansion of data collection.