

BLACKGILL ROCKFISH ACCUMULATION LIMITS:
ALTERNATIVES AND *DRAFT* IMPACT ANALYSIS

In November 2015, the Council took final action to remove blackgill rockfish from the Slope Rockfish complex south of 40°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.

The Council's Amendment 26 recommendation included continuation of the same southern Slope Rockfish accumulation limits and application of those limits to the new blackgill quota shares (QS) and quota pounds (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 southern Slope complex annual catch limits (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.

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). NMFS has not yet formally considered the Council's Amendment 26 recommendation due to workload limitations. At its September 2018 meeting, the Council decided to reconsider the blackgill vessel QP limits when it reviews the updated analysis of Amendment 26, prior to initiation of NMFS' formal consideration of the amendment. This document contains the analysis that was presented to the Council at its September 2018 meeting.

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Contributors

This document was developed primarily by Council staff with the following individuals making important contributions to the indicated sections.

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Blackgill Annual Vessel QP Limit

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.¹ At the same time, while high accumulation limits might introduce inefficiency due to market power excessive share, limits which are too low may constrain efficiency, or, as has been of expressed concern in the catch share review, may possibly constrain the full harvest of the allocation. Thus, there is a potential cost to setting lower limits to address management objectives. Holliday and Anderson caution that MO Limits “should be used with care and only when the perceived benefits are greater than potential costs, and only then where there are no less costly or less intrusive ways to achieve the same objective” (p. 53).

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.

¹ 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).

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 1. 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 40°10 N. lat	15.40%	13.20%
Canary Rockfish	10.00%	4.40%
Chilipepper Rockfish S. of 40°10 N. lat	15.00%	10.00%
COWCOD S. of 40°10 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 40°10 N. lat	5.30%	2.50%
Lingcod - S. of 40°10 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%
Non-whiting 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 2). 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 non-buyback permit's annual landings divided by the annual landings of all non-buyback permits, with an upper limit of 5 percent for all non-whiting 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 2. 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 Allocation			
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, capped at 10%)	Control Limits Identified in GMT Report	Vess Lim	Cntrl Lim	Single Permit Max Annual Share of Trawl Fleet Allocation '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 non-whiting 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 3). 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/non-trawl 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 3. Trawl/non-trawl allocation shares of southern blackgill and southern Slope Rockfish, pre-Amendment 26 and Amendment 26.

	Trawl	Non-trawl
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/non-trawl allocations of southern Slope Rockfish are provided in Table 4. 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 4), a southern slope complex without black rockfish 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 4. 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	Non-trawl Alloc	Harvest Guideline	Trawl Alloc	Non-trawl Alloc	Harvest Guideline	Trawl Alloc	Non-trawl 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 non-trawl and, on that basis, inferred for trawl).

[Internal Ref: GDrive: Splitting Blackgill from S. Slope]

Blackgill caught south of 40° 10' N. lat. and remaining southern Slope Rockfish landings and exvessel revenue are provided in Table 5 and Table 6, 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 non-trawl sector, blackgill contributed about 90 percent of the weight and revenue. Like many groundfish species,² the shorebased trawl sector has been under-attaining its allocation of southern Slope Rockfish (Table 7). 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.

² 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 8).

Slope rockfish are generally discarded at a very low rate, though that rate increased for a while in more recent years (Table 9). 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 5. Metric tons of southern blackgill and other southern slope (excluding blackgill) landings by sector (trawl and non-trawl), 2011-2017 (metric tons).

	Blackgill		Other Southern Slope Rockfish		Combined Sectors		Combined Southern Slope (Including Blackgill)		Combined Southern Slope (Including Blackgill) All Sectors
	Trawl	Non-trawl	Trawl	Non-trawl	Blackgill	Other Southern Slope	Trawl	Non-trawl	
	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 6. Exvessel value of southern blackgill and other southern Slope Rockfish (excluding blackgill) landings by sector (trawl and non-trawl), 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	Non-trawl	Trawl	Non-trawl	Blackgill	Other Southern Slope	Trawl	Non-trawl	
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 7. 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]

Table 8. 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 9. 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 40° 10' N. lat., blackgill contributed an average of 2 percent to trawl trips and 5 percent to gear switched trips (Table 10). For those same trips, blackgill contributed 2 percent of the revenue on trawl trips (Table 11) and about 3 percent of the revenue on gear switched trips (Table 12). 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 10. Pounds landed on IFQ trips that include blackgill rockfish south of 40° 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 11. Number of vessels making **trawl** caught IFQ landing of southern blackgill rockfish (south of 40° 10' N. lat) including exvessel value for blackgill and all other species in the landing.

Year	Vessels	Days	Exvessel Value		Percent	Average Revenue Per Vessel	
			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 12. Number of vessels making **gear-switched** IFQ landing of southern blackgill rockfish (south of 40° 10' N. lat) including exvessel value for blackgill and all other species in the landing.

Year	Vessels	Days	Exvessel Value		Percent	Average Revenue Per Vessel	
			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.³ 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 13. Looking at just the trawl vessels taking blackgill south of 40° 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 14 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 13. 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

³ 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.

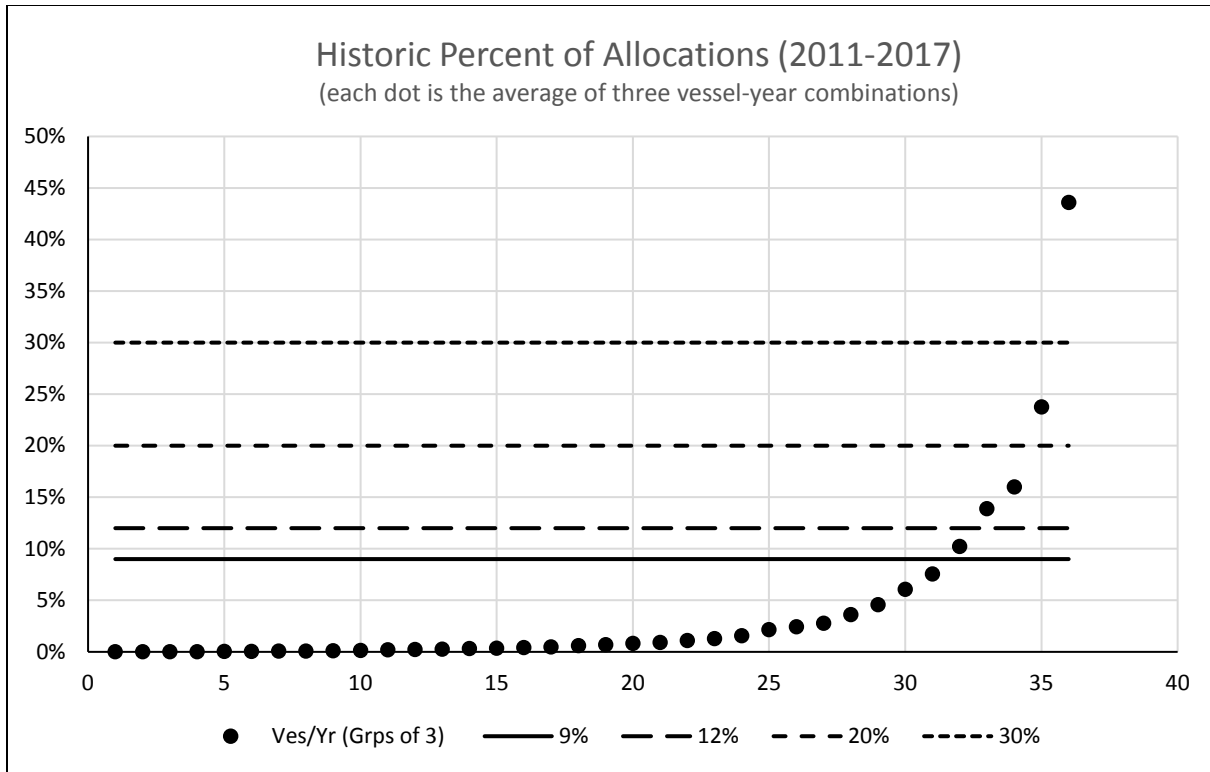
Table 14. Number of trawl and gear-switched vessels by year and the minimum vessel QP limit required for that number of vessels to take the entire allocation.

	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%

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 9). 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 1 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.⁴

⁴ The lowest of these five averages of three observations each, includes one vessel-year observations that is slightly below 9 percent.



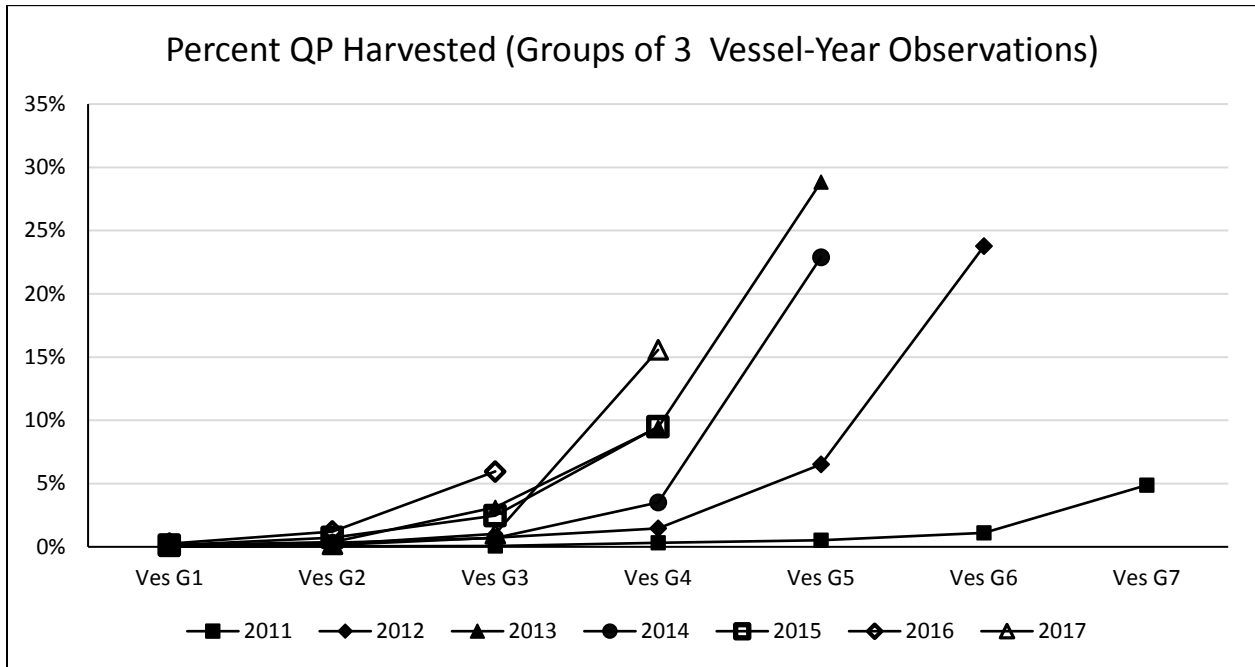
Note: The first group or two in each year may contain four vessels, since the number of observations did not divide evenly by three. [Internal Ref: Blackgill_QPLim_Analysis_Aug_2018.xlsx:BG_PlotAllYears]

Figure 1. 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 2 is based on the same data as Figure 1 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 2 are lower than those in Figure 1. In the earlier years of the 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 3, Table 11, and Table 12). 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 3). 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 11, and Table 12). 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 2. 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).

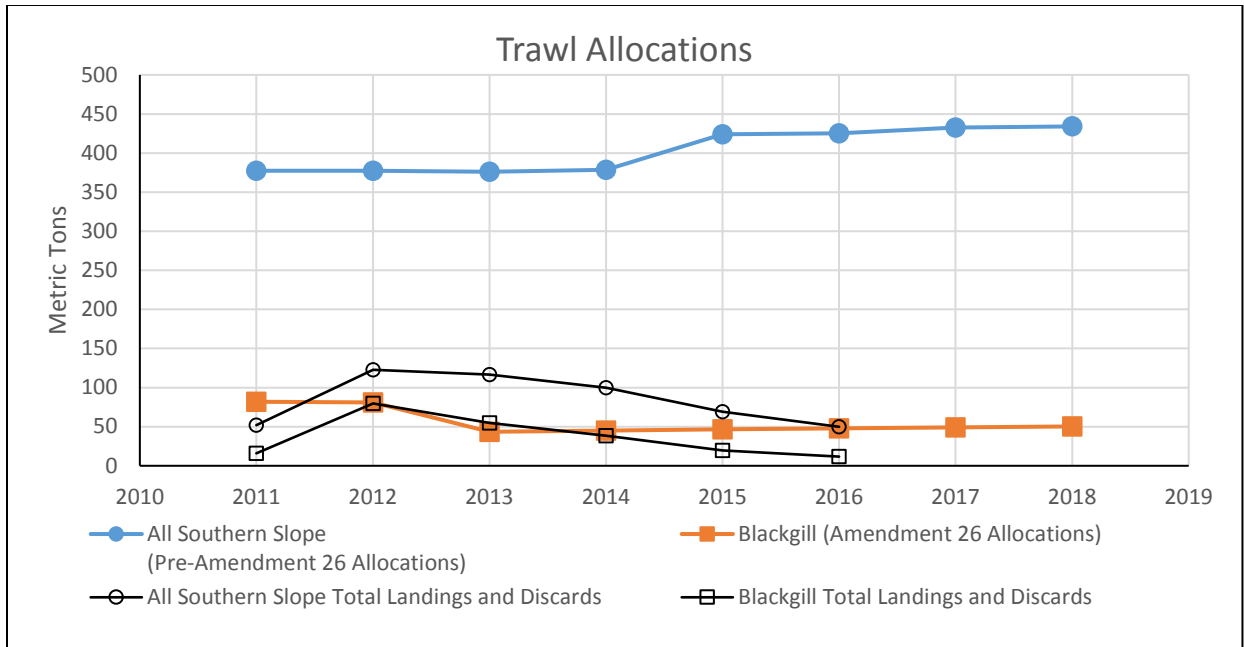


Figure 3. Trawl allocations of southern Slope Rockfish (based on existing allocations) and blackgill rockfish (Amendment 26 allocations applied to inferred harvest guidelines) and catch (landings and discards) Sources (CFR §660.65 – 2012, 2014, 2016, 2017; biennial specification analyses; and GEMM workbook).

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 15 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 15 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 15 excludes a 30% limit due to confidentiality restrictions (i.e., fewer than 3 vessels).

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.

Table 15. 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 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 9, discard rates are relatively low.

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