GROUNDFISH MANAGEMENT TEAM REPORT ON
FINAL ACTION INSEASON ADJUSTMENTS

The Groundfish Management Team (GMT) reviewed the progress of the groundfish fisheries to date and offers the following updates and recommendations.

Action Items

Incidental Pacific Halibut Retention in the Primary Sablefish Fishery North of Pt. Chehalis

As of June 22, 2019, the primary sablefish fishery north of Pt. Chehalis has taken 5,881 lbs net weight (nt. wt.) of the 70,000 lbs nt. wt. allocation for Pacific halibut. Currently, the incidental limit is 200 lbs dressed weight halibut per 1,000 lbs dressed weight sablefish, plus 2 Pacific halibut. The current halibut to sablefish ratio was increased from 160 to 200 in September 2018. At the time, that was the highest landing ratio considered and was needed to provide economic benefits to the fleet by achieving the 2018 allocation of 50,000 lbs. nt. wt. The 2018 landing ratio was rolled over for the start of 2019, and given the higher allocation compared to 2018, the GMT recognized that it might be necessary to analyze an even higher landing ratio as the season progressed. Based on data through June 21, 2019, the projected landings for 2019 are 47,878 nt. wt. lbs or 68.4 percent attainment of the 70,000 lb allocation (**Table 1**). These projections suggest that more than 22,000 nt. wt. lbs. will be unutilized, so industry requested the GMT analyze potential trip limit increases.

Table 1 below shows trip limit alternatives and the projected landings based on 2018 and 2019 data through June 21, 2019. These projections are likely over-estimates, as they assume the trip limit will be effective July 1st, when they will likely not be available until late July or early August. Under Alternative 2, the incidental limit would increase from 200 lbs dressed weight to 250 lbs dressed weight resulting in a projected attainment of 54,214 lbs nt. wt. or 77.4 percent of the 70,000 lbs nt. wt. allocation. Alternative 2 would also provide an estimated $34,087 in ex-vessel revenue to these participants compared to status quo, based on the average price per nt. wt. lb seen to date in 2019. **Therefore, based on the above analysis, the GMT recommends the Council recommend that the National Marine Fisheries Service (NMFS) implement Alternative 2, 250 lbs dressed weight halibut per 1,000 lbs dressed weight sablefish, plus 2 Pacific halibut as soon as possible.**

Table 1: Trip limit alternatives, projected landings, and projected attainment for incidental Pacific halibut catch in the sablefish primary fishery north of Pt. Chehalis (SQ = status quo).

Alternative	Trip Limit (lbs dressed)	Projected Landings (lbs nt. wt.)	Projected Attainment (%)
SQ	200	47,878	68.4
1	220	50,694	72.4
2	250	54,214	77.4

Limited Entry Bocaccio Trip Limits between 40° 10′ N. lat. and 34° 27′ N. lat.

South of 40° 10' N. lat., bocaccio is managed with stock-specific harvest specifications. For 2019, the bocaccio annual catch limit (ACL) south of 40° 10' N. lat. is 2,097 mt with a fishery harvest guideline (HG) of 2,051 mt. The non-trawl allocation in 2019 is 1,250 mt. Analysis for the 2019-20 harvest specifications used landings data through 2017 to develop trip limits for bocaccio south of 40° 10' N. lat. Table 2 shows the total attainment by area and attainment by period for the limited entry (LE) fishery in the area and open access (OA) fisheries south of 40° 10' N. lat. for 2018. The current 2019 trip limits for bocaccio between 40° 10’ N. lat. and 34° 27’ N. lat. is 1,000 lbs per two months (Table 4). In the first three periods of 2019 (January through June), there has been an increase in effort in the LE fishery in the area between 40° 10' N. lat and 34° 27' N. lat. (Table 3) compared to what occurred in 2018 and 2017, prompting the need to update the trip limit model.

Table 2: 2018 landings (mt) for bocaccio south of 40° 10′ N. lat. by area and trip limit period.

Sector	Area	Jan-Feb	Mar-Apr	May-Jun	Jul-Aug	Sep-Oct	Nov-Dec	Total
LE	40°10' N. lat.- 34°27' N. lat.	0.0	0.1	0.0	0.5	0.5	0.5	2.5
LE	S 34°27' N. lat.	1.0	CLOSED	0.9	0.9	1.4	0.9	5.1
OA	S 40°10' N. lat.	1.5	CLOSED	0.3	1.0	1.1	1.3	5.2

Table 3: Landings (mt) of bocaccio south of 40° 10’ N. lat. though June 20, 2019 compared to projected landings under the SQ trip limits (mt).

Sector	Area	Jan-Feb	Mar-Apr	May-Jun	Total Landings	SQ Projection	% Projected Attainment
LE	40°10' N. lat. - 34°27' N. lat.	0.6	1.4	2.3	6.9	12.2	56.6%
LE	S 34°27' N. lat.	0.7	CLOSED	0.5			
OA	S 40°10' N. lat.	1.0	CLOSED	0.4			

The trip limit request to the GMT was to increase the LE trip limits for the area between 40° 10’ N. lat. and 34° 27' N. lat. from 1,000lbs/ 2-months to 1,500lbs/2-months (Alternative 1) for all remaining periods in 2019 (Table 4). With the significant increase of the non-trawl allocation from 442.3 mt in 2018 to 1250 mt in 2019, and low projected attainments of bocaccio in the non-trawl sector in 2019 (10.77 percent, Table 5), increasing trip limits will allow for greater attainment while posing little risk to the non-trawl allocation. The economic benefits of Alternative 1 ranges from $440-$11,041 depending on the price per pound, which ranges from $0.25 - $6.25 per pound.

Table 4: SQ and alternative trip limits for bocaccio south of 40° 10′ N. lat.

Alternative	Sector	Area	Jan-Feb	Mar-Apr	May-Jun	Jul-Aug	Sep-Oct	Nov-Dec
SQ	LE	40°10' N. lat. - 34°27' N. lat.	1,000 lbs / 2 months					
1	LE	40°10' N. lat. - 34°27' N. lat.	1,000 lbs / 2 months			1,500 lbs / 2 months		

Table 5: SQ and Alternative 1 projected attainments (mt) for bocaccio south of 40° 10′ N. lat. in the non-trawl sector.

Sector	SQ	Alternative 1
Limited Entry 40° 10' N. lat. - 34° 27' N. lat.	4.5	5.3
Limited Entry S of 34° 27' N. lat.	3.1	3.1
Open Access South of 40°10'	4.6	4.6
Recreational	122.4	122.4
Total non-trawl estimated impacts	134.6	135.4
2019 Non-Trawl Allocation	1,250.2	1,250.2
% of 2019 Non-Trawl Allocation	10.77%	10.83%

The assumptions in Table 5 under Alternative 1 include projections for July through December and therefore are likely over estimates. The increased trip limits will likely not be available until late July or early August. **The GMT recommends Alternative 1, increasing the LE bocaccio trip limit for the area between 40° 10′ N. lat. - 34° 27′ N. lat. to 1,500 lbs/2 months, be implemented as soon as the National Marine Fisheries Service (NMFS) is able.**

Limited Entry Canary Rockfish Trip Limits

A public request was received to increase the LE canary rockfish trip limits south of 40° 10′ N. lat. so that LE trip limits are higher than those in the OA sector. The current trip limits for both LE and OA for canary rockfish south of 40°10’ N. lat. are 300 lbs per two months for period 1 (January through February), closed in period 2 (March and April), and 300 lbs per two months for the remaining periods (June through December). When the OA trip limit increase was raised in November, this point was discussed by the GMT and Groundfish Advisory Subpanel (GAP), and no concerns were expressed at the time. Discussion between the GMT and NMFS West Coast Region staff determined that this request does not meet the requirements of the Administrative Procedures Act to waive notice and comment through inseason action, but could be evaluated as part of 2021-22 Harvest Specification and Management Measures.

Big Skate Trip Limits in IFQ Sector

Big skate catch in the individual fishing quota (IFQ) sector is managed with coastwide, bi-monthly trip limits (shown in Table 6) which models to an unofficial landings target of 388.5 mt. The

unofficial target is calculated by subtracting 41 mt to account for at-sea bycatch and shoreside individual fishing quota (IFQ) discard mortality from the 429.5 mt trawl allocation. The current 2019 trip limits are based on GMT analysis for the 2019-20 biennium harvest specifications process, which used relatively high 2016-2017 landings, to project that attainment would be 98 percent of the landings target.

Landings and total mortality of big skate decreased dramatically in 2018 and 2019 (e.g., ~ half of 2016-2017 levels). The GMT projects that only 44 percent of the ACL was taken in 2018 (218 mt of 494 mt), mainly due to a decrease in IFQ landings to 128 mt. Under SQ trip limits, landings are projected to be 160.4 mt of the 388.5 mt landings target, primarily due to continued low landings so far in 2019, with only 73.3 mt landed through June 22. The GAP attributed the decrease in landings from 2016 and 2017 to those in 2018 and 2019 primarily to the retirement of fishermen who specialized in targeting big skate; the majority of the fleet does not appear to target big skate, as their landings are well below the trip limits.

While the number of trawlers targeting big skate has decreased, the stock remains an important contributor to the portfolios of some harvesters, who requested higher trip limits as described in alternatives 1 and 2 (Table 6). Under Alternative 1, the bi-monthly trip limit would increase by a flat 10,000 lbs in each period over the SQ amount for the remainder of 2019; the projected attainment assuming July 1 implementation under these proposed trip limits would be 46.7 percent of the landings target of 388.5 mt. Under Alternative 2, the bi-monthly trip limit would double that of the SQ in periods 4-5 and quadruple the SQ limit in period 6, resulting in a projected total attainment under Alternative 2 of 55 percent or 215.1 mt of the 388.5 mt target. **The GMT recommends the Council recommend that NMFS implement Alternative 2 trip limits for big skate in the shorebased IFQ sector as soon as possible.** The expected economic benefits of Alternative 2 are $48,502 in revenue paid to fishermen and $116,455 in income when factoring in added benefits to processors and fishing support businesses.

Table 6: Trip limit alternatives, projected landings (lbs), and landings targets (mt) for big skate in the IFQ fishery.

Alternative	Jan-Feb	March-April	May-June	July-August	Sept-Oct	Nov-Dec	Projected 2019 landings	2019 Landing target	% Attainment
SQ	5,000	25,000	30,000	35,000	10,000	5,000	160.4	388.5	41.3%
1	5,000	25,000	30,000	45,000	20,000	15,000	181.7		46.8%
2	5,000	25,000	30,000	70,000	20,000	20,000	215.1		55.4%

Sablefish Daily Trip Limit (DTL)

Table 7 shows the projected DTL landings and percent attainment, which incorporates landings and associated price data, through June 18, 2019.

Table 7: Projected landings, landing target, and percent attainment by DTL sector. (LEN= Limited Entry Fixed Gear North of 36° N. lat., OAN= Open Access North of 36° N. lat., LES= Limited Entry Fixed Gear South of 36° N. lat., OAS= Open Access South of 36° N. lat.)

Sector	Projected Landings (rd. wt. mt)	Landing Target (mt)	Attainment (%)
LEN	229.7-249.1	273	84.1-91.2
OAN	303.9-418.4	449	67.7-93.1
LES	356.6-437	788	49-60
OAS	23.7	338	7.0

Based on these projected landings and conversations with the GAP, the GMT developed the trip limit alternatives (Table 8) for Council consideration for the OA fishery north (OAN) and south (OAS) of 36° N. lat.

Table 8: OAN and OAS Sablefish Trip Limit Alternatives

Sector	Alternative	Trip Limit
OAN	SQ	300 lb/day, or one landing per week up to 1,200 lb, not to exceed 2,400 lb/2 months
	1	300 lb/day, or one landing per week up to 1,300 lb, not to exceed 2,600 lb/2 months
	2	300 lb/day, or one landing per week up to 1,400 lb, not to exceed 2,800 lb/2 months
OAS	SQ	300 lb/day, or one landing per week up to 1,600 lb, not to exceed 3,200 lb/2 months
	1	300 lb/day, or one landing per week up to 1,600 lb, not to exceed 4,800 lb/2 months

Table 9 shows the projected landings and percent attainment for OAN, assuming August 1 implementation. While the higher end bounds for alternatives 1 and 2 exceed the landings target, that estimate is based on the model's original projection. To date in 2019, the model has overestimated landings by an average of 38 percent. Assuming this trend continues and actual landings remain well below the model estimates, the proposed trip limits would likely result in percentage attainments closer to the lower bounds in Table 9. Due to the lack of participation and variance in trip limits in the OAS fishery, the model was unable to detect any estimated change in attainment. An average of ten vessels actively participated in the OAS fishery during periods 4-6 from 2016 through 2018, and few vessels have approached the bi-monthly limit in recent years. Therefore, the GMT believes that, even with additional higher trip limits for the OAS fishery, substantial increases in attainment are unlikely due to low participation rates. However, this may provide additional opportunity and revenue to those individuals participating in the fishery.

Based on the estimates, the GMT recommends Alternative 2 for OAN (300 lb/day, or one landing per week up to 1,400 lb, not to exceed 2,800 lb/2 months) and Alternative 1 for OAS

(300 lb/day, or one landing per week up to 1,600 lb, not to exceed 4,800 lb/2 months). The projected economic benefits of Alternative 2 are $800,000 in revenue paid to fishermen and $1.6-million in income when factoring in additional benefits to processors and fishing support businesses.

Table 9: Projected landings and percent attainment for OAN trip limit alternatives assuming August 1 implementation.

Alternative	Projected Landings (rd. wt. mt)	Landing Target (mt)	Attainment (%)
SQ	303.9-418.4	449	67.7-93.1
1	327.7-456.7		73-101.7
2	352.8-497.3		78.6-110.7

Shortbelly Rockfish

As a reminder from our November statement (Agenda Item G.6.a, Supplemental REVISED GMT Report 1, November 2018), shortbelly rockfish is a small forage fish (13.7 inches max length) that is not targeted by industry. In 2013-14, the Council discussed categorizing it as an ecosystem component (EC) species, but chose instead to select a restrictive ACL of 50 mt for 2013-14. In the 2015-16 biennium, the ACL was increased to 500 mt to account for unexpected high bycatch events that might have prematurely closed the re-emerging midwater rockfish fishery.[1] This ACL was meant to accommodate incidental bycatch of shortbelly rockfish while allowing most of the harvestable surplus of the stock to be available as forage to the myriad of predators in the California Current Ecosystem (CCE) (further discussion can be found in Appendix A).

In November 2018, the GMT estimated that shortbelly rockfish mortality had reached approximately 92 percent of the ACL by that time in 2018. The West Coast Groundfish Observer Program (WCGOP) has since provided draft 2018 estimates through the end of the year (December 31) to the GMT showing that total shortbelly rockfish mortality in 2018 exceeded the 2018 ACL (Table 10).

[1] Regulations at § 660.140, 660.150, and 660.160 provide NMFS with discretionary authority to react to potential or actual ACL overages. The regulations state that a sector "...may be restricted or closed as a result of projected overages within the MS Coop Program, the C/P Coop Program, or the Shorebased IFQ Program. As determined necessary by the Regional Administrator, area restrictions, season closures, or other measures will be used to prevent the trawl sectors in aggregate or the individual trawl sector (Shorebased IFQ, MS Coop, or C/P Coop) from exceeding an ACL, ACT, or formal allocation specified in the PCGFMP or regulation at §660.55, subpart C, or §§660.140, 660.150, or 660.160, subpart D."

Table 10: Estimates of total mortality (mt) and constant annual harvest specifications (mt) of shortbelly rockfish

Sector	2017	2018	2019 b/	ACL	ABC	OFL
Catcher-processor whiting	140.8	85.9	30.2	500	5,789	6,950
Mothership whiting	27.7	142.2	338.2			
Shoreside whiting	125.3	243.7	11.9			
IFQ non-whiting trawl	4.2	32.5	29.6			
Pink shrimp	21.5	3.0	UNK c/			
Other a/	0.6	1.2	UNK c/			
Total	*320.1*	*508.5*	*409.9*			

a/ Tribal, recreational, research, LE and OA FG, and other incidental OA
b/ WCGOP discard data through June 10th, 2019; landings and at-sea discard data through June 18th, 2019
c/ Final estimates will not be available until fall 2020

As of June 23rd, 2019, the total combined estimated mortality of shortbelly rockfish in 2019 was 409.9 mt, which is very close to the 500 mt ACL of 500 mt (Table 10). In addition to these estimates, the GMT ran a bootstrap statistical analysis (described in Appendix A) which projected that if the whiting sectors took the entire Pacific whiting total allowable catch in 2019, they would likely take an additional 570 mt of shortbelly rockfish (Appendix A, Figure 3, scenario 1). Given the already high levels of shortbelly rockfish bycatch, the GMT projects that the total mortality of shortbelly rockfish from all sectors will likely exceed 1,000 mt in 2019.

The GMT went through the different points of concern in the Conservation Framework in the Pacific Coast Groundfish Fishery Management Plan and find that conservation concern for shortbelly rockfish is minimal due to the considerable buffer between the ACL and acceptable biological catch (ABC). Therefore, NMFS has conveyed to the GMT that even if the 2019 ACL is exceeded, the agency may not exercise its discretionary authority to close the whiting fishery. However, given the estimated ACL overage in 2018, and projected ACL overage in 2019, the Council needs to consider possible accountability measures to prevent overages in 2020 to comply with National Standard 1 guidelines. **Therefore, the GMT recommends the Council schedule an agenda item to consider a new ACL for shortbelly rockfish in 2020 at the September and November 2019 Council meetings.**

The GMT also wishes to point out the emergence of shortbelly rockfish well north of its historic distribution center, and the interaction of shortbelly rockfish with an existing fishery, is the exact type of scenario that has been discussed by the Ecosystem Working Group as they consider how to manage the CCE under climate change. A current challenge for the Council is to move beyond ecosystem reporting and into ecosystem management. Under ecosystem management, actions pertaining to the ecosystem would be considered by the Council and ultimately implemented through on-the-ground actions. The GMT believes that this shortbelly rockfish issue is something that could potentially be dealt with in an ecosystem management context in the future. As noted in our statement for Agenda Item I.6. (Agenda Item I.6.a, Supplemental GMT Report 1, June 2019)

at this meeting, the Council may also want to reconsider the ACL for shortbelly rockfish, or classify it as an EC species, in 2021-22 harvest specifications.

Informational Items

Groundfish Scorecard Available on PacFIN Website

Over the last few years, members of the GMT have been working with PacFIN staff to develop a comprehensive groundfish scorecard that would be available to the public. Estimated inseason total mortality by species and attainment of the ACLs are available to the public by going to the PacFIN APEX Reports page and selecting "GMT 007 Scorecard of Groundfish Stock Species and Complexes". These data should be interpreted carefully, as providing estimates in-season for all groundfish fisheries involves a number of assumptions, which are explained in the meta-data. The GMT thanks PacFIN staff for their efforts on this project.

At-Sea Bycatch

As of July 22, 2019, the at-sea sectors have taken a combined 311.16 mt of yellowtail rockfish north of 40° 10′ N. lat. compared to their 300 mt set aside. The GMT reviewed the landing numbers and GMT does not expect the trawl sector as a whole to exceed the trawl allocation of 4,605 mt even with this exceedance as ~1,000 mt remained unutilized in 2018 and landings trends in 2019 are similar to those we saw in 2018. Additionally, there is little risk to the ACL as ~2,500 mt were unutilized last year and the non-trawl sector has taken less than 15 percent of the 2019 non-trawl allocation historically. The GMT will provide a further update on catch of yellowtail rockfish, and any other species of concern, at the September Council meeting.

Rebuilding Species Scorecard

The GMT has no updates to the rebuilding species scorecard from our March report (Agenda Item G.5.a, Supplemental GMT Report 2, March 2019).

Chinook Salmon Scorecard

Table 11 shows inseason bycatch estimates, and thresholds from the 2017 Biological Opinion, for Chinook salmon through June 24, 2019. The GMT projects that the whiting and non-whiting thresholds are unlikely to be reached or exceeded this year, based on the relatively low bycatch rates and amounts to date.

Table 11: Inseason bycatch estimates by sector and threshold for Chinook salmon (number of fish) through June 22, 2019.

Sector	Sub-Sector	Catch To Date	Threshold	% of Threshold
Whiting	CP	343	11,000	5.5%
	MS	185		
	Shoreside	81		
	Tribal	1		
	Total	*610*		
Non-Whiting	Bottom Trawl	258	5,500	14.5%
	Midwater Trawl	44		
	Fixed Gear	500 a/		
	WA Rec			
	OR Rec + longleader			
	CA Rec			
	Total	802		
All groundfish fisheries		1,412	20,000	7.1%

a/ GMT proposed assumption of mortality, which assumed maximum historical mortality (154) plus a 250 fish buffer from the 2017 BiOp and an additional 96 fish to account for some uncertainty in recreational salmon seasons; recreational estimates only applies to groundfish fisheries occurring outside of salmon seasons.

Recommendations

The GMT recommends the Council:

1. **Recommend that NMFS implement Alternative 2, 250 lbs dressed weight halibut per 1,000 lbs dressed weight sablefish, plus 2 Pacific halibut as soon as possible.**
2. **Recommend Alternative 1, increasing the LE bocaccio trip limit for the area between 40° 10′ N. lat. - 34° 27′ N. lat. to 1,500 lbs/2 months, be implemented as soon as possible.**
3. **Recommend that NMFS implement Alternative 2 trip limits for big skate in the shorebased IFQ program as soon as possible.**
4. **Recommends Alternative 2 for OAN (300 lb/day, or one landing per week up to 1,400 lb, not to exceed 2,800 lb/2 months) and Alternative 1 for OAS (300 lb/day, or one landing per week up to 1,600 lb, not to exceed 4,800 lb/2 months).**
5. **Schedule an agenda item to consider a new ACL for shortbelly rockfish in 2020 at the September and November 2019 Council meetings.**

Appendix A. GROUNDFISH MANAGEMENT TEAM REPORT ON ISSUES PERTAINING TO THE SHORTBELLY ROCKFISH BYCATCH

Given the emergent importance of shortbelly rockfish bycatch to whiting and other fisheries, the Groundfish Management Team (GMT) prepared this appendix to summarize relevant aspects of shortbelly rockfish ecology and fisheries dynamics.

1. Background of shortbelly rockfish

A robust overview of shortbelly rockfish biology, importance as a forage fish, and historical fishery impacts before the 2000's are provided in the 2007 stock assessment that was written by Dr. John Field and co-authors. The summary below is based on the 2007 assessment, discussions with Dr. Field, and preliminary analyses of shortbelly rockfish larval and habitat suitability dynamics.

Shortbelly rockfish are one of the most prolific groundfish stocks in the California Current Ecosystem (CCE). Shortbelly rockfish are important prey to wide numbers of fish, seabirds, and marine mammals. For many breeding California seabirds, as much as 90 percent of their diet is comprised of pelagic stages of juvenile (age 0) rockfish during the late spring and early summer breeding seasons. Unlike most harvested rockfishes (e.g., bocaccio and cowcod), shortbelly rockfish are diminutive, relatively short-lived, semi-pelagic, and school as adults. Shortbelly rockfish recruitment is highly variable among years, causing populations to undergo large "booms and busts." Between 1998 and 2013, total larval abundance (larval abundances are used as indices for spawning stock biomass in bocaccio and cowcod stock assessments) of shortbelly rockfish was the second highest of the 39 rockfish species collected by California Cooperative Oceanic Fisheries Investigations (CalCOFI) plankton sampling off southern California. However, while shortbelly rockfish were by far the most abundant larval rockfish in some years, they were scarce or even totally absent in other years. (Figure A-1). Historically, shortbelly rockfish was most abundant off central California from Monterey Bay to Point Reyes, common in southern California, and only rarely encountered north of Cape Mendocino, California.

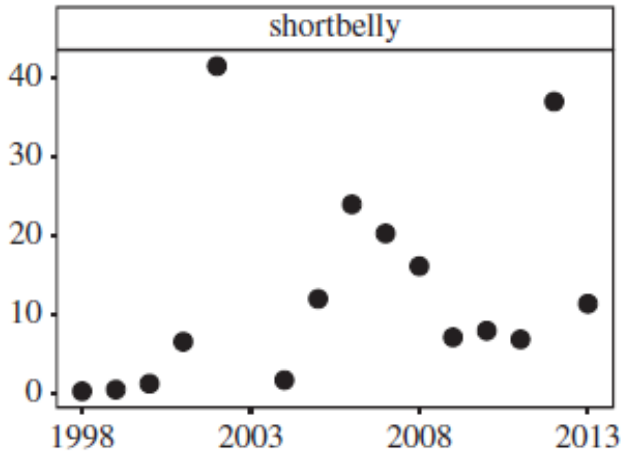

Figure A-1: Mean abundance of larval shortbelly rockfish (number per year) between 1998 and 2013 from CalCOFI stations in southern California (from Thompson et al. 2017 R. Soc Open Sci 4:170639).

Shortbelly rockfish are too small (max size 13 inches) to support a targeted fishery, and nearly all bycatch prior to 2017 came from mid-water trawl fisheries for rockfish. Historical bycatch, before the WCGOP began in 2002, is highly uncertain but was estimated to peak at 400-500 mt per year in the 1980's-1990's during the height of the mid-water rockfish fishery. Fishing-induced mortality from 2002-2016 was very low (less than 60 mt per year) as there was little mid-water rockfish or whiting fishing off central or southern California.

It is currently uncertain if the high shortbelly rockfish bycatch from 2017-2019 was due to a northern shift in distribution, high local recruitment, or some combination of both. The Rockfish Recruitment and Ecosystem Assessment Survey (RREAS) pre-recruitment midwater trawl survey throughout California recorded high catches of young of the year shortbelly rockfish in 2009-2010 and 2013-2017 in central California. Notably, the shortbelly rockfish that are being caught by the whiting fleet off Oregon and Washington are mostly 7-10 years old, and so were born in the same years of strong recruitment classes off California. It is thus possible that the large cohorts moved north from central California into northern California, Oregon, and even off Washington as they aged and have begun to interact with fisheries. Indeed, preliminary habitat suitability modeling analysis by the Southwest Fisheries Science Center suggests that there was more shortbelly rockfish-appropriate habitat in the northern part of the west coast of the United States in recent years than in past decades (Figure A-2). Given that shortbelly rockfish and whiting both forage largely on krill, associate with the shelf break, and are semipelagic, high bycatch is unsurprising if substantial numbers of shortbelly rockfish moved north in recent years. Shortbelly rockfish also were encountered in the mid-water rockfish trawl fishery (which fishes at shallower depths than the whiting fishery), but at relatively low amounts (~30 mt per year) in 2017 and 2018, although they have already taken an estimated 23.6 mt so far in 2019.

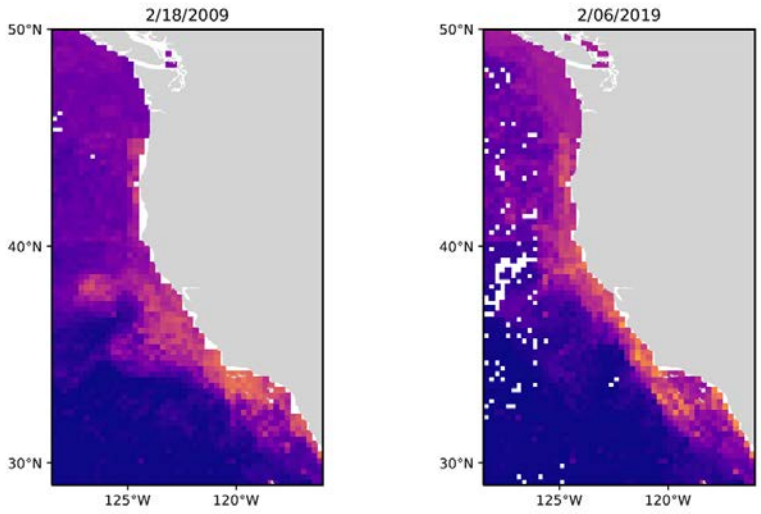

Figure A-2: Habitat suitability model results for shortbelly rockfish. Yellow indicates high and blue low probability of presence, respectively. Models are built by 1) correlating oceanographic variables against shortbelly rockfish larval abundances between 1951-2018 collected by the CalCOFI program and 2) evaluating where different quality habitats throughout the west coast of North America are found based on satellite readings.

2. Background on the shortbelly rockfish harvest specifications

Shortbelly rockfish have had a constant overfishing limit (OFL) of 6,950 mt since 2008 based on the maximum sustainable yield (MSY) estimate from the 2007 assessment. This MSY is considered to be conservative, as stocks such as shortbelly rockfish, which are above management "depletion" target, are typically "fished down" to MSY levels. Setting the OFL at the estimated MSY, but not fishing shortbelly rockfish down to MSY levels, is therefore precautionary. In addition, the Council also set a constant ABC of 5,789 mt based on a category II sigma and a precautionary P* of 0.40, which results in twice the OFL->ABC buffer as a P* of 0.45. Although shortbelly rockfish bycatch has been relatively high from 2017 to 2019, there is no conservation concern, as total mortality has been less than 10 percent of the ABC and OFL.

The primary issue with shortbelly rockfish is that bycatch was above the 500 mt ACL in 2018 and is again expected to exceed this value in 2019. This issue stems from the fact that the ACL is ~10 times lower than the ABC. Since shortbelly rockfish is a small forage fish that is not targeted by fishing, it was discussed as being classified as an ecosystem component (EC) species in 2013-14. However, instead of classifying it as an EC species during Amendment 23, the Council chose to put in a restrictive ACL in 2013-14 at 50 mt, which was less than one percent of the ABC and OFL. The 50 mt ACL was meant to discourage development of any targeted fishery, and accommodate incidental bycatch of shortbelly rockfish, while allowing most of the harvestable surplus of the stock to be available as forage fish in the CCE. The ACL was then increased from 50 to 500 mt starting in 2015 to prevent unavoidable bycatch from shutting down the re-emerging midwater rockfish fishery, as trawlers stated that it is difficult to differentiate shortbelly rockfish schools from target stocks (e.g., widow rockfish) using acoustic data.

In summary, the main objective of the low ACLs has been to provide forage protections by discouraging development of target fisheries while at the same time not constraining fisheries that incidentally catch the species.

3. Projections of potential shortbelly rockfish bycatch in 2019-20

The GMT projects that, as of June 12, 2019, only about 50-70 mt of the ACL was unutilized, after accounting for uncertainty in lagged pink shrimp and shoreside IFQ discard estimates (Table A-12). At present, the whiting fisheries have already caught 380.3 mt of shortbelly rockfish, while only obtaining 26 percent of their 2019 whiting allocations (Table A-12).

Table A-12: 2019 whiting catch (mt) as of June 12 2019 and allocations (mt).

	Whiting catch	**Whiting allocation w/o tribal reapportionment**	**Whiting allocation with possible tribal reapportionment**
MS	35,279	87,044	96,644
CP	52,674	123,312	136,912
IFQ	18,528	152,327	169,127
Total	*106,481*	*362,683*	*402,683*

To provide the Council with a sense of potential impacts and determine if there would be a conservation concern if no mitigation measures were implemented inseason for 2019, the GMT ran bootstrap simulations to project how much additional shortbelly rockfish the whiting fisheries may catch in 2019 in order to catch their remaining Pacific whiting allocation, adjusted for assumed tribal reapportionment (i.e., year-end 2018 allocations).

The GMT projects that whiting sectors would need an additional 250-570 mt of shortbelly rockfish to catch their remaining 2019 whiting allocations based on 100 bootstrap simulations[2] (Figure A-3, scenario 1). Therefore, the GMT projects that the total mortality of shortbelly rockfish from all sectors could be as high as 1,000 mt, or more, in 2019.

Shortbelly rockfish bycatch could be reduced if the whiting fishery avoids certain depths, including 100-200 fathoms, where bycatch rates have been high from 2017 to 2019 (Figure A-3, scenario 2; Figure A-4). However, GMT projections show that, even if the fishery avoids the 100-200 fathom zone, they would still exceed the 500 mt ACL (Figure A-3, scenario 2). In addition, this scenario would seriously compromise the ability of the fishery to efficiently catch whiting and may result in increased bycatch of other constraining species.

[2] Each bootstrap simulation randomly draws hauls from catcher processor, mothership, and shoreside EM sectors (WCGOP data was not included) during the highest bycatch years of 2017 to June 2019, until their whiting allocation is taken. The total shortbelly rockfish for those hauls is then summed to get the total bycatch from that sector. The annual expected total for all three whiting sectors is based on the sum of random sector-specific bootstraps (e.g., mothership only draws mothership tows and never shoreside or catcher-processor tows). Scenario 1 includes all tows and Scenario 2 only draws tows that occur outside of the high bycatch depths of 100-200 fm.

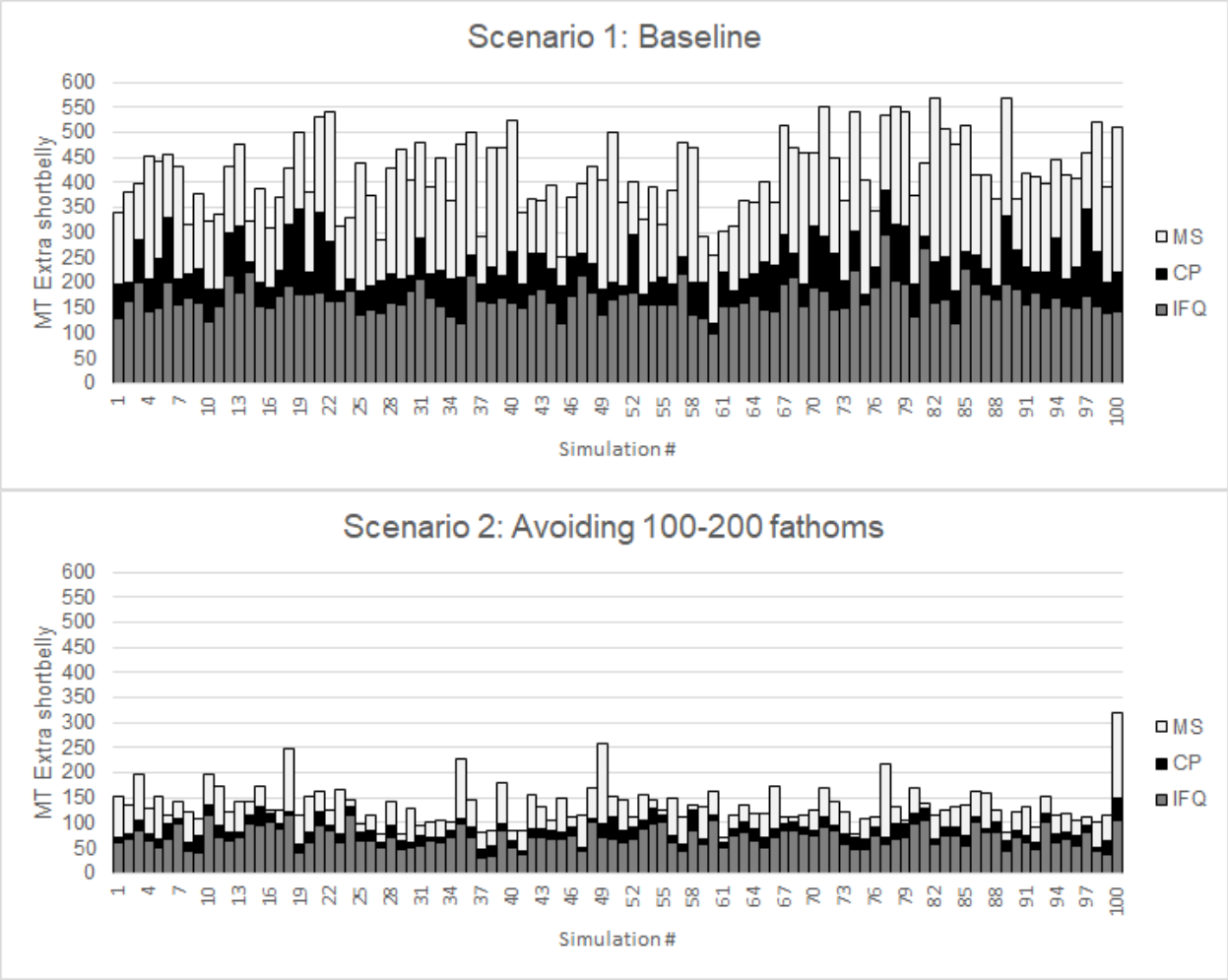

Figure A-3: Projected additional shortbelly rockfish bycatch (mt) by the catcher processor, mothership, and shoreside EM sectors (WCGOP data was not included) during the highest bycatch years of 2017 to June 2019 if they catch their remaining 2019 whiting allocations for 100 simulated seasons. Scenario 1: baseline assumes 2017-2019 fishing practices continue, and scenario 2 assumes harvesters avoid 100-200 fathoms, where bycatch rates have been high.

4. Impacts of Voluntary Hotspot Closures

Based on industry testimony, the whiting co-operatives have implemented voluntarily shortbelly rockfish hotspot avoidance practices. Both at-sea sectors (catcher-processor and mothership) as well as the co-op portion of the shoreside sector report that they have been on high alert to avoid shortbelly rockfish bycatch since the NMFS notification was released on June 7, 2019. The GMT supports voluntary avoidance, which could be somewhat effective given areas where of consistently high bycatch in recent years (Figure A-4). However, the GMT cautions that voluntary avoidance may have limited efficacy, since shortbelly rockfish have been abundant throughout the whiting fishing region from northern California to the Canadian border during the past three years. Further, since both shortbelly rockfish and whiting have the potential to move long distances, hotspots can be temporally transient and spatially unpredictable.

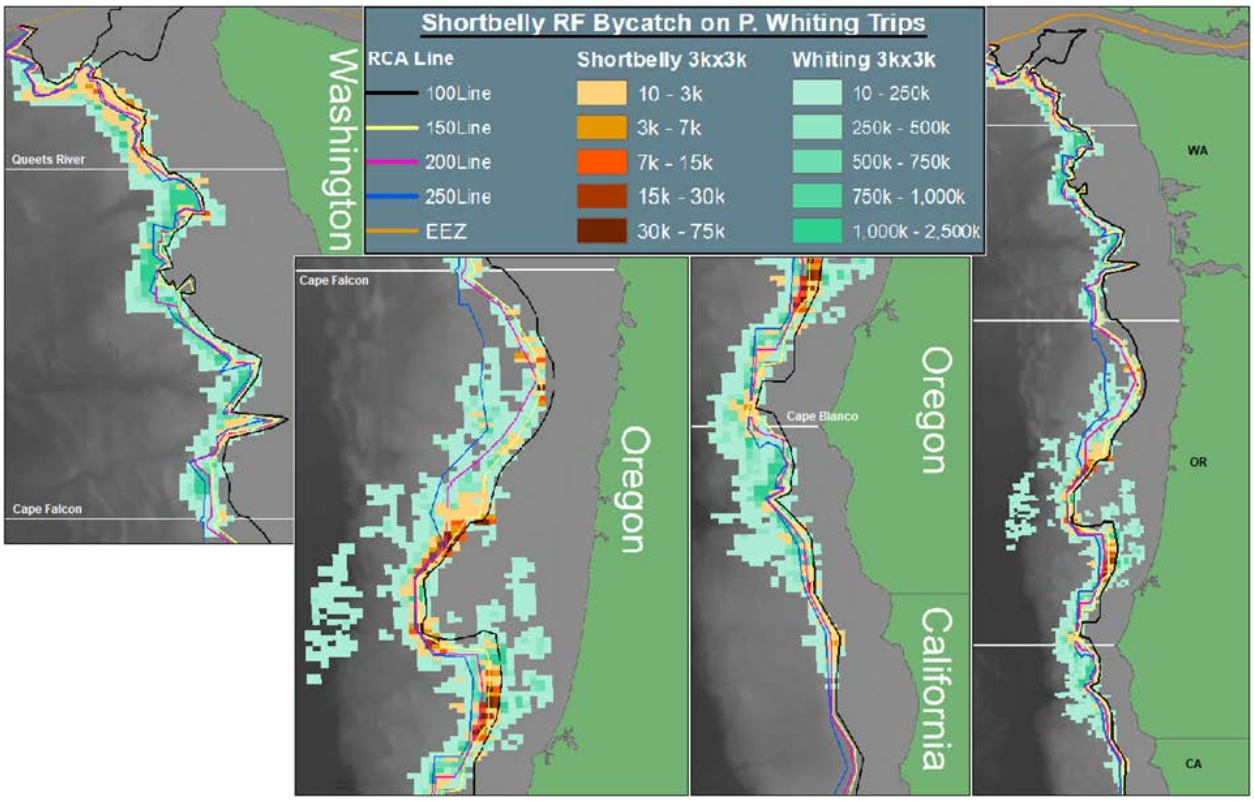

Figure A-4: Map of shortbelly and whiting catch (lbs) for catcher-processor, mothership, and shoreside EM sectors (WCGOP data was not included) during the highest bycatch years of 2017 to June 2019.

PFMC
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