

GROUND FISH MANAGEMENT TEAM REPORT ON INSEASON ADJUSTMENTS – INCIDENTAL LINGCOD IN THE SALMON TROLL FISHERY

Industry representatives from the salmon troll fishery have requested an adjustment to the incidental lingcod trip limit in the salmon troll fishery north of 40° 10' N. lat. The request is for one lingcod per two Chinook salmon, plus one lingcod, with an overall trip limit of ten lingcod. The current ratio is one lingcod per five Chinook salmon, with an overall trip limit of ten lingcod. The Groundfish Management Team (GMT) had lengthy and detailed discussions about this request and provides the following thoughts for consideration by the Pacific Fishery Management Council (Council). The GMT feels the decisions on whether to address this request under Inseason and whether to implement this request are policy calls for the Council, so do not provide recommendations.

Routine Considerations

In response to the request for a change in the lingcod retention ratio¹ in the salmon troll fishery, the GMT had a robust discussion on the degree to which this action is appropriate for a routine inseason action. The GMT did not come to a definitive conclusion, but provides the following arguments for and against to inform Council discussion.

Reasons to consider this request under routine inseason adjustments:

1. Conservation concerns
 - a. Impacts at most two groundfish species: lingcod north of 40° 10' N. lat. and yelloweye rockfish. Attainment of the lingcod north of 40° 10' N. lat. annual catch limit (ACL) has remained low. Yelloweye rockfish mortality is unlikely to change, assuming the majority of retained lingcod will be incidental, not targeted, catch.
2. Economic benefit
 - a. Immediate economic needs due to both the COVID-19 pandemic and depressed salmon quotas and seasons.
 - b. Rapid relief, via potential additional economic opportunity, could be provided by inseason action rather than waiting for the 2023-24 specification cycle.
3. “Tier off” previous analyses
 - a. Qualitative discussion of impacts of changes to the ratio made in the [2019-20 Environmental Assessment](#) are applicable to this request
 - b. Updating the 2019-20 quantitative analysis can determine if a ratio adjustment outside that analyzed in the Environmental Assessment (EA) results remain within scope of previous EA
 - c. Two new years’ (2018-2019) of proxy observer data can further inform analyses

¹ From one lingcod per five Chinook salmon (1:5) to one lingcod per two Chinook salmon (1:2), maintaining the “plus 1 lingcod” and a maximum trip limit of ten lingcod. The limit is within the open access trip limit of 2,000 lbs per month for north of 42° N. lat. and 1,000 lbs per month in the area between 42° and 40° 10' N. lat.

Reasons not to consider this request under Inseason, but by some other rulemaking:

1. Conservation concerns
 - a. Inability to assess impacts in-season or post-season. No at-sea observations and variation in completeness of state-level landings data result in little certainty in estimations. No projection models currently exist.
2. Economic benefit
 - a. Magnitude of potential economic benefits unclear. Difficult to quantify how many participants could and would take advantage of this potential opportunity.
3. Potentially outside previous analyses
 - a. The proposed ratio is outside the range considered in the 2019-20 biennial action.
 - b. Inseason actions ideally require minimal analysis to ensure that the GMT can efficiently assess and respond to requests that are added to the larger workload. If requests are beyond the scope of previous analyses, their inclusion into an inseason action may be difficult to assess given time constraints.
4. Equitability
 - a. Changing management measures that may increase the mortality estimates for fish taken off the top of the ACL may impact other sectors. The rapidity of inseason action limits input from those other sectors.
 - b. Benefits may not be realized evenly or equitably, even though the retention ratio is for salmon trollers north of 40°10' N. lat.² If another process were used, these actions could be further analyzed.

Summary of Methods and Conclusions

Using similar methodologies from the 2019-20 EA, updated with additional data on landings in the salmon troll fishery and observer data from other troll groundfish fisheries for recent years, the GMT concluded that:

1. There is considerable uncertainty in estimating how this action might change fishing behavior and to quantitatively estimate what the impacts might be.
2. Based on public comment from salmon trollers, additional targeting of lingcod is unlikely due to both concern over loss of gear when fishing over pinnacles or other rocky bottom habitat and the considerably lower price per pound of lingcod compared to Chinook salmon. The GMT also analyzed changes in lingcod retention after the previous ratio adjustment, and found no evidence that a further increase will result in targeting of lingcod by salmon trollers. However, potential future behavior changes in response to ratio adjustments remain uncertain.
3. Under a ratio of one lingcod per two Chinook salmon, total lingcod mortality (5.6-11.5 mt) by the incidental Open Access (IOA) fishery is anticipated to remain within the 11.68 mt IOA set-aside (Appendix 1; Table 1).
4. Under a ratio of one lingcod per two Chinook salmon, and assuming lingcod is targeted in the salmon troll fishery the expected additional yelloweye rockfish mortality is minimal (0.017 mt) and within the adopted 2021-22 yelloweye rockfish IOA set-aside of 0.69 mt (Appendix 1; Table 5).

² The California portion of the Klamath Management Zone is closed to the salmon fishery in 2021 and possibly in 2022, so there will be no salmon trolling in that area.

Appendix 1. Analysis Tiered from 2019-20 EA

Background and Lingcod Accounting

The ratio and trip limits for lingcod retention in the salmon troll fishery have been analyzed in recent years in an attempt to provide additional economic opportunity to salmon trollers while ensuring equity across fishery sectors and conserving yelloweye rockfish. As the GMT understands it, the salmon season is expected to provide lower opportunity in 2021 than previous years as a result of lower quotas and restricted access to the ports of Neah Bay and LaPush.

As described in [Appendix C to the 2019-20 Environmental Assessment](#), the Council has indicated that the ideal ratio would be set equal to the incidental rate of lingcod encounter in the salmon troll fishery and that setting the ratio too liberally might induce lingcod targeting while setting it too conservatively could lead to regulatory discard. However, a lack of data, natural variability, and decreases in salmon harvest opportunities have made this rate difficult to identify, consistent with the conclusion in the 2019-20 EA that impacts to fishing behavior could not be quantified. Instead, the Council must make a policy decision on how best to provide economic opportunity and utilize bycatch without incentivizing lingcod targeting in a non-groundfish fishery.

As part of the 2019-20 harvest specifications and management measures process, the Council chose to adjust the incidental lingcod ratio from one lingcod per 15 Chinook salmon to the current trip limit of one lingcod per five Chinook salmon to provide economic and social benefits consistent with policies for conservation and fair and equitable sharing ([Appendix C to the 2019-2020 EA](#)). The “plus one additional lingcod” and 10 lingcod trip limit remained unchanged³.

Lingcod caught by the salmon troll fishery is accounted for in the off-the-top IOA deduction from the ACL before setting the groundfish fishery harvest guideline. Lingcod catch by the IOA fisheries averaged 5.4 mt for 2012-2017, well below the 2019-20 IOA set aside and historical high of 9.8 mt. Lingcod mortality in the IOA sectors increased in 2018 and 2019. To account for this and because ACL attainment of lingcod north of 40° 10' N. lat. has been 35 percent or less since 2017, the 2021-22 set aside was raised to 11.68 mt. In 2018 and 2019, approximately 3 and 4.8 mt, respectively, of the “other incidental fisheries” mortality was from troll landings.

³ Excerpt from Table 3 (North), Subpart F: “...Salmon trollers may retain and land up to 1 lingcod per 5 Chinook salmon per trip, plus 1 lingcod per trip, up to a trip limit of 10 lingcod, on a trip where any fishing occurs within the rockfish conservation area (RCA)...The limit is within the per month limit for lingcod described in [Open Access Table 3 (North)], and not in addition to that limit....”

Table 1. Incidental open access lingcod north of 40° 10' N. lat. mortality and set-aside for 2012-2017 (mean), 2018, and 2019, with mortality estimates for 2021 and 2022.

IOA Sector	Mortality (landings + discard, with mortality rates applied; mt)			Estimated Mortality (mt) a/	Range of Potential Impacts (mt), if ratio changed
	2012-2017 (mean)	2018	2019	2021-2022	
Directed Pacific Halibut	1.8	3.0	6.8	2.8	2.8
Other Incidental Fisheries (including salmon troll) b/	3.5	8.2	5.0	4.8	2.6 - 8.5
Pink Shrimp	0.3	0.1	0.1	0.2	0.2
Total IOA	5.5	11.3	11.8	7.8	5.6 - 11.5
IOA Set-aside	16.0	16.0	9.8	11.68	11.68

a/ Mean of total mortality for 2014-2019

b/ “Other Incidental Fisheries” includes shoreside landings, with no estimate of discards, for all sectors unobserved by the West Coast Groundfish Observer Program (WCGOP) as well as landings and discards for all non-Catch Shares exempted fishing permits

The GMT provides a range of our best estimate at expected impacts to lingcod mortality if the incidental lingcod retention ratio is adjusted to one lingcod per two Chinook salmon. Considering that the increase in maximum lingcod allowed after the adjustment from 1:15 to 1:5 is relatively proportional to the increase in allowance that would result from an adjustment of 1:5 to 1:2 under this action, the GMT applied the percent increase in landings after the adjustment from 1:15 to 1:5 to the 2020 landings (low estimate) and the 2019 landings (high estimate; Table 2). That expected range (2.6-8.5 mt) is also shown in Table 1. Even using the high estimate, the total IOA lingcod mortality is expected to remain within the IOA set-aside of 11.68 mt.

Table 2. Increases in lingcod landings after the 2019 ratio adjustment and the respective percent increases applied to 2019 and 2020 lingcod landings.

Year	Lingcod Landings (mt)	Increase in Landings (mt) from 2018	Percent Increase in Landings	Lingcod to Chinook salmon ratio	Increase in max allowance
2018	2.4	-	-	1:15	-
2019	4.5	2.1	88%	1:5	67%
2020	2.5	0.1	4%	1:5	-
2021 a/	2.6 - 8.5	0.1 - 3.96	4% - 88%	1:2	60%

a/ “Percent Increases in Landings” after 2018 are applied to the 2020 and 2019 “Lingcod Landings” (range of low and high estimates)

Indicators of Lingcod Targeting

As the 2019-20 EA noted, if a favorable ratio induces a behavior change to target lingcod or increases any existing targeting practices, it may increase the risk of increasing the bycatch rates

and associated mortality of yelloweye rockfish. However, if a favorable ratio just allows retention of lingcod truly caught incidentally and reduces regulatory discards, then it is unlikely that it will increase yelloweye rockfish bycatch rates. In Appendix C, to provide the Council some means of qualitatively evaluating the potential for changed fishing behavior between a ratio of 1:5 and 1:15, the analysis provided a summary of troll lingcod activity and revenues over 2009–2017. The impacts of ratio changes on fishing behavior in the salmon troll fishery remain uncertain. Nonetheless, the GMT explored the potential for added targeting by analyzing landings changes after the 2019-20 ratio adjustment.

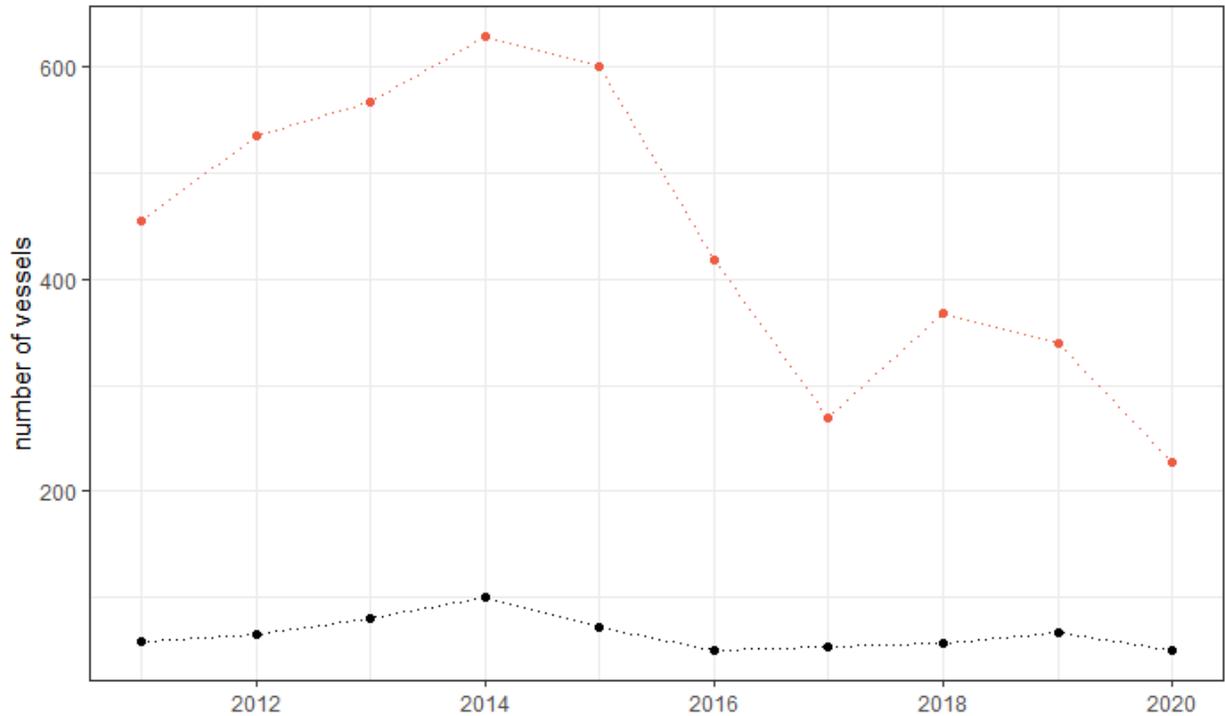


Figure 1. Number of vessels using troll gear north of 40° 10' N lat. that landed Chinook salmon (orange line) and, as a subset of that number, the number of vessels that landed Chinook salmon and lingcod (black line).

While the number of vessels landing both Chinook salmon and lingcod remained relatively steady across years (Figure 1), the total tonnage of lingcod landed varied annually, as shown in both Figure 2 and Table 2. However, the tonnage of lingcod landed per salmon troll trip increased from 2015 to a peak in 2019 before a slight dip in 2020 (Figure 2).

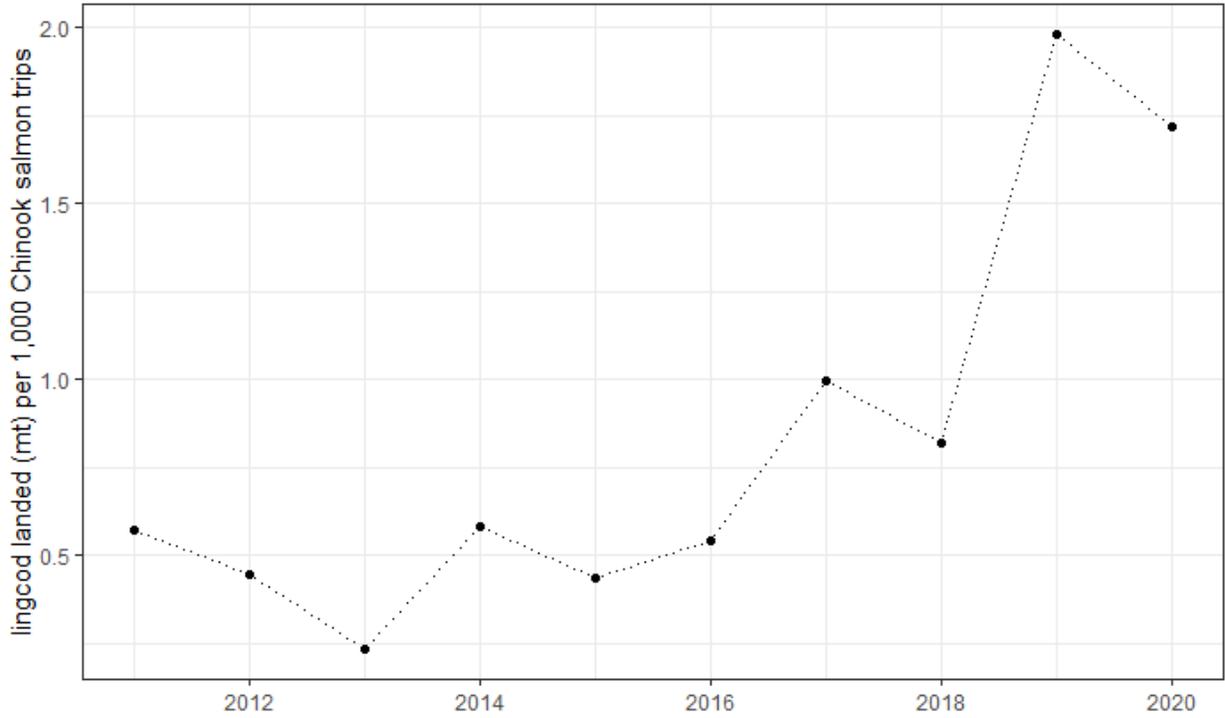


Figure 2. Lingcod landed (mt) per 1,000 salmon troll trips.

Table 3 below shows that lingcod revenues in the salmon troll fishery were at their second and third highest in 2019 and 2020, respectively. Additionally, the proportion of salmon trollers' revenue coming from lingcod increased from less than 0.2 percent from 2012 to 2018 to 0.40 and 0.44 percent in 2019 and 2020, respectively. This suggests that the ratio adjustment in 2019 provided a small amount of additional revenue to salmon trollers and may have met some of the objectives in the 2019-20 biennial harvest specifications and management measures rule to provide economic benefits to the salmon troll fishery. The GMT anticipates 2021 to be similar to 2019 and 2020 in terms of salmon opportunity.

Table 3. Landings (mt), numbers of salmon troll trips, and ex-vessel revenue for both Chinook salmon and lingcod, as well as the ratio of lingcod to Chinook salmon allowed per year.

Year	Chinook Salmon			Lingcod			Ratio Allowed (Lingcod: Chinook) ^{a/}	Percentage of Revenue from Lingcod
	Landings (mt)	Trips	Revenue (millions)	Landings (mt)	Trips	Revenue		
2011	428.0	3,522	\$5.2	2.0	148	\$9,382	1:15	0.18%
2012	668.7	4,933	\$8.0	2.2	186	\$10,836	1:15	0.14%
2013	1,052.6	6,928	\$13.2	1.6	193	\$6,172	1:15	0.05%
2014	1,664.4	7,041	\$19.5	4.1	299	\$14,724	1:15	0.08%
2015	982.3	5,950	\$12.0	2.6	206	\$9,988	1:15	0.08%
2016	379.8	2,987	\$6.3	1.6	133	\$6,204	1:15	0.10%
2017	313.7	2,009	\$5.2	2.0	152	\$8,018	1:15	0.15%
2018	327.5	2,871	\$5.6	2.4	160	\$10,764	1:15	0.19%
2019	349.5	2,264	\$4.3	4.5	204	\$17,090	1:5	0.40%
2020	181.0	1,453	\$2.7	2.5	165	\$11,901	1:5	0.44%

^{a/} plus 1 additional lingcod, maximum of 10 lingcod, for all years

As shown in Table 3, annual Chinook salmon landings have been less than 400 mt since 2016, which is lower than the lowest year during the period 2011-2015, while there is no indication of a clear trend in lingcod landings between 2011 and 2020. There are several possible explanations for this difference:

- **Hypothesis A:** Salmon trollers are encountering and catching lingcod at a higher rate in recent years as lingcod estimated stock abundance and spawning biomass increase ([Agenda Item H.5, Supplemental REVISED Attachment 22, September 2019](#)).
- **Hypothesis B:** In low salmon abundance years, Chinook salmon catch per unit effort is also low resulting in greater time spent on the water for a similar amount of Chinook salmon and a similar encounter rate, but a higher total amount of lingcod.
- **Hypothesis C:** When Chinook salmon seasons are restricted due to low abundance, salmon trollers have greater incentive to fill a lingcod bag limit. Nevertheless, the price per pound paid to vessels for Chinook salmon is 3-5 times greater than for lingcod. For example, in Oregon in 2020, the average price per pound paid to vessels for troll-caught Chinook salmon was \$8.14, which is much higher than for troll-caught lingcod, \$2.94/lb⁴.
- A combination of Hypotheses A, B, and C.

Hypotheses A and B are consistent with input the GMT has received from industry representatives, namely that vessels are experiencing a higher rate of lingcod encounters per trip.

To explore the potential for salmon troll trips to retain lingcod under different lingcod:salmon ratios, the GMT investigated data on the proportion of trips that were eligible for the maximum amount of lingcod hypothetically available for retention based on the number of Chinook salmon landed. The team analyzed Washington fish tickets only, which report both Chinook salmon and

⁴ Source Oregon Department of Fish and Wildlife fish ticket database

lingcod in numbers of fish, unlike the weights reported in Oregon and California. The ratio increase in 2019 resulted in a greater percentage of Washington trips eligible to retain the 10 lingcod per trip limit. From 2011 to 2018, less than 5 percent of trips were eligible; this increased by 26 percentage points in 2019 and 2020 to 35 and 28 percent of trips, respectively.

The increase in potential lingcod landings by the salmon troll fishery does not necessarily translate to greater actual lingcod landings. This suggests that the majority of trips do not include lingcod targeting. Specifically, if participants in the salmon troll fishery regularly target lingcod or are incentivized to do so by this ratio adjustment, we would expect a greater proportion of trips to retain the maximum allowed amount of lingcod. Instead, the percentage of trips retaining and landing the maximum potential amount of lingcod decreased from 69 percent in 2018 to 24 percent in 2019 and 12 percent in 2020. In order to maintain data confidentiality, the GMT can only qualitatively summarize that the proportion of trips reaching the ten lingcod limit has been virtually zero since 2012, other than a slight increase in 2019. For those participants with trips reaching the 10 lingcod trip limit, these lingcod targeting opportunities may be an essential part of their fishing portfolio.

Yelloweye Rockfish Considerations

Yelloweye rockfish and lingcod are co-occurring species, so the GMT projects yelloweye rockfish impacts when considering lingcod trip limit adjustments. Typically, additional targeting in the directed groundfish fishery can be evaluated using both discard estimates and landings data. However, the GMT notes that salmon troll industry members have indicated that additional lingcod retention would represent incidental, not targeted catch. Nonetheless, the GMT analyzed the full range of potential impacts of this action. Because the salmon troll fishery is unobserved, this required a number of additional assumptions that increased uncertainty. To estimate yelloweye rockfish impacts related to potential increases in lingcod targeting in the salmon troll fishery, the GMT used yelloweye rockfish bycatch data from WCGOP observed hauls in the OA fixed gear sectors, including state nearshore fisheries, that used troll gear to target lingcod. Although this may not be equivalent to the behaviors and bycatch patterns of salmon trollers targeting lingcod, these data provide the best available proxy for analyzing potential lingcod-targeting by the salmon troll fleet. The GMT used a proxy estimate of 0.23 mt in the 2019-20 management measures, based on WCGOP observations through 2017 ([Agenda Item E.4.a, Supplemental REVISED GMT Report 2, June 2018](#)). The GMT updated this estimate using an additional two years of WCGOP data (2018 and 2019). In 2018, the WCGOP refined the vessel selection process for the OA and nearshore fisheries, which resulted in additional coverage of lingcod-targeting trips. The GMT averaged these more representative years to estimate a bycatch rate of 0.0037 yelloweye rockfish to retained lingcod.

Table 4. WCGOP-observed hauls using troll to target lingcod in OA fixed gear sectors, including state nearshore fisheries.

Year	Observed Vessels	Observed Hauls	Lingcod Retained (mt)	Yelloweye Catch (mt)	Bycatch Ratio
2011	-	0	-	-	-
2012	-	0	-	-	-
2013	3	4	0.138	0.002	0.017
2014	-	0	-	-	-
2015	3	3	0.239	0.000	0.000
2016 a/	*	*	*	*	*
2017	5	6	0.285	0.002	0.008
2018	16	54	2.698	0.006	0.002
2019	14	42	2.121	0.011	0.005

a/ 2016 data are confidential and cannot be reported because fewer than 3 vessels were observed

The GMT applied the average bycatch ratio (0.0037) by OA fixed gear sectors targeting lingcod using troll gear to the average lingcod retention (3.45 mt) for 2018-2020 by salmon trollers to get an estimated impact of 0.017 mt and provides a range of expected yelloweye rockfish impacts from “other incidental fisheries”, which includes the salmon troll fishery, of 0.62 - 0.64 mt (Table 5).

For the 2021-2022 biennium, the Council adopted an incidental open access set aside of 0.69 mt for yelloweye rockfish. This set aside covers the impacts associated with several non-groundfish fisheries, both observed and unobserved: directed Pacific halibut, California halibut trawl, pink shrimp trawl, ridgeback prawn trawl, spot prawn trap, sea cucumber trawl, salmon troll, California sheephead, highly migratory species, coastal pelagic species (wetfish and squid), and California gillnet (e.g. white seabass). The set aside is typically based on the estimated total mortality historical high; however, the 2019 total mortality estimate of 7.43 mt (7.42 mt from the directed Pacific halibut fishery) was thought to be an outlier and therefore not adopted as the historic high for the set-aside for 2021-22 (Table 4). Information from the 2020 directed commercial Pacific halibut fishery will be available in September 2021 in the WCGOP Groundfish Mortality Report; a draft estimate may be available in June 2021.

Table 5. Incidental open access yelloweye rockfish mortality and set-aside for 2012-2017 (mean), 2018, and 2019, with mortality estimates for 2021-22.

IOA Sector	Mortality (landings + discard, with mortality rates applied; mt)			Estimated Mortality (mt) a/	Range of Potential Impacts (mt), if ratio changed
	2012-2017 (mean)	2018	2019	2021-2022	
Directed Pacific Halibut	0.10	0.01	7.42	7.42	7.42
Other Incidental Fisheries (including Salmon Troll) b/	0.01	0.10	0.01	0.62	0.62 - 0.64
Total IOA	0.18	0.03	7.43	8.04	8.04 - 8.06
IOA Set-aside	0.22	0.37	0.62	0.69	0.69

a/ Estimates from the 2021-22 biennial harvest specifications and management measures analysis.

b/ "Other Incidental Fisheries" includes shoreside landings, with no estimate of discards, for all sectors unobserved by the WCGOP as well as landings and discards for all non-Catch Shares exempted fishing permits.