

GROUND FISH MANAGEMENT TEAM REPORT ON BIENNIAL HARVEST SPECIFICATIONS FOR 2017-2018

The Groundfish Management Team (GMT) had lengthy discussions about the 2017-2018 biennial groundfish harvest specifications at our October work session and at the November Council meeting. The GMT also reviewed the briefing book documents and offers the following thoughts and considerations.

Annual Catch Limit Alternatives

The GMT notes that if the Council wishes to consider additional harvest level alternatives, this is the time for those to be put forward so that analyses can occur over winter. However, workload trade-offs must be considered when recommending annual catch limit (ACL) alternatives for analysis. The combination of ACL and allocation alternatives, combined exempted fishing permits, and the range of management measures multiplies the combinations that must be analyzed by the February 9, 2016 deadline (per the [schedule](#) adopted by the Council). **The GMT recommends that the Council adopt all ACL alternatives at this meeting, including selection of a preliminary preferred ACL to facilitate the analysis.** The Council may also need to consider prioritizing analysis of ACL and allocation alternatives above some of the new management measure alternatives that will be discussed under Agenda Item I.9 at this meeting.

Canary Rockfish

The GMT discussed the range of ACL alternatives forwarded by the Council in September, which are No Action (1,714 mt and 1,588 mt for 2017 and 2018, respectively) and Alternative 1 (857 mt and 763 mt for 2017 and 2018, respectively). The No Action alternative for canary rockfish, like all other species, is based on the default harvest control rule (HCR), and is not the 2016 value in regulation (125 mt) as in past biennial cycles. As such the GMT discussed with the National Oceanic Atmospheric Administration (NOAA) National Environmental Policy Act (NEPA) coordinator and General Counsel (GC) whether the range forwarded for analysis is sufficiently broad to meet legal mandates. **Based on preliminary discussions, the GMT understands that the range of alternatives for canary is considered adequate.**

Canary rockfish was declared rebuilt ahead of schedule (2015 vs. 2030) with a stock assessment that saw significant changes in the critical input parameters (e.g., natural mortality, M and steepness, h). While the 2015 canary rockfish assessment is the best available science for use in 2017-2018, it is also anticipated that our understanding of various stock assessment input parameters will continue to improve and change in future assessments. The science evolution is not unique to canary rockfish; however, it is unique that the updated parameters in this particular assessment resulted in rebuilding 15 years ahead of schedule. In this case, the change in assumed canary rockfish productivity was one of the primary factors leading to the stock reaching its rebuilding target 15 years ahead of schedule. The GMT has discussed the results and uncertainties extensively. While we recognize that the assessment is the best available science, the Council may be grappling with the results as well as the difference this cycle in not having a No Action alternative for comparison; therefore, they may want to consider an alternative for analysis that is more conservative. The GMT believes that it is important to have this

conversation now, as opposed to later, given the additional workload and possible two-year allocation decisions that may be made in Agenda Item I.9.

Evaluating these considerations is often referred to as “the cost of getting it wrong.” That is, the Council must determine whether the range of alternatives is within their risk tolerance. The GMT offers the following information for Council consideration:

1. Uncertainty and changes in stock productivity assessment parameters (e.g., natural mortality and steepness) have the greatest bearing on future stock status (depletion) and scale (estimated biomass).
2. Now that canary rockfish have been declared rebuilt, dropping below the target 40 percent depletion and into the precautionary zone would result in implementation of the 40:10 default harvest control rule.

Under No Action, there are two sets of decision tables characterizing the uncertainty around natural mortality and steepness. If the entire ACL were taken under the base case for No Action (where natural mortality (M) for males and young females is set at 0.0521), depletion would remain above 40 percent for the next 10 years. However, under the low state of nature (M=0.025), depletion would drop below 40 percent in 2019. While it is understood that the base case is twice as likely to occur as the low state of nature, the low state of nature offers insight to inform the Council’s risk call if the stock assessment assumptions mentioned above are incorrect.

In [Agenda Item I.4, Attachment 4](#), the decision table characterizing uncertainty around natural mortality for Alternative 1 is presented. Under the base case, the depletion remains above 40 percent in the 10 year forecast. However, under the low state of nature, depletion would drop below 40 percent in 2020. This result is projected under an assumption that the entire ACL is taken, which is largely dependent on the allocations and changes in targeting behavior in the coming years.

Therefore, the Council could consider the addition of a lower ACL alternative for analysis if they wanted to be more risk-averse. However, with the addition of an alternative (including potential allocation changes), this would result in more workload for the analytical team. Further, as noted above the existing range is understood to be sufficient.

Overfished Species

Bocaccio

There is no updated or new rebuilding analysis for bocaccio. If there is interest in departing from the Amendment 24 default HCR spawning potential ratio harvest rate of 77.7 percent, the bocaccio stock assessment could be used to make inferences about how different removals affect the stock status (Table 1, excerpted from [Agenda Item H.3, Attachment 1, September 2015](#)). The time to rebuild stays the same, at 2016.

Table 1. Biological implications (depletion) for possible bocaccio ACL alternatives (No Action is 0.777 SPR) under the Base assessment model and the Low State of Nature alternative model.

Base Model (h = 0.773, estimated 2013 recruitment)						
Year	Catch (mt)			Depletion (%)		
	No Action (SPR = 0.777)	Base Model ACL Catch	Average Catch (2010-2014)	No Action (SPR = 0.777)	Base Model ACL Catch	Average Catch (2010-2014)
2017	853	2,213	119	53.8%	53.8%	53.8%
2018	800	1,951	119	58.5%	55.7%	60.1%
2019	770	1,793	119	62.1%	56.5%	65.3%
2020	758	1,705	119	64.9%	56.7%	69.7%
2021	755	1,654	119	67.1%	56.4%	73.5%
2022	755	1,622	119	68.7%	55.9%	76.6%
2023	757	1,601	119	70.0%	55.2%	79.3%
2024	758	1,585	119	71.0%	54.5%	81.5%
Low State of Nature (h = 0.60, low 2013 recruitment)						
Year	Catch (mt)			Depletion (%)		
	No Action (SPR = 0.777)	Base Model ACL Catch	Average Catch (2010-2014)	No Action (SPR = 0.777)	Base Model ACL Catch	Average Catch (2010-2014)
2017	853	2,213	119	36.5%	36.5%	36.5%
2018	800	1,951	119	38.9%	36.2%	40.4%
2019	770	1,793	119	41.0%	35.6%	44.0%
2020	758	1,705	119	43.0%	35.0%	47.6%
2021	755	1,654	119	44.8%	34.3%	51.1%
2022	755	1,622	119	46.5%	33.6%	54.4%
2023	757	1,601	119	48.2%	32.9%	57.6%
2024	758	1,585	119	49.7%	32.3%	60.7%

The ACL is expected to increase substantially in 2017 (853 mt) and 2018 (800 mt) when compared to the 2016 ACL (362 mt), and in recent years mortality of bocaccio has been well below the level of the lower ACLs in 2015 and 2016. Given the large increase in the ACL for 2017 and 2018 and the relatively low utilization, additional mortality could be accommodated and more fishing opportunity potentially afforded under the current alternative without impacting the time to rebuild. **Therefore the GMT is not recommending additional ACL alternatives for bocaccio.**

Darkblotched rockfish

For darkblotched rockfish, there are relatively small biological changes between the ACL alternatives (Table 2): times to rebuild and future depletion rates are nearly identical for each alternative. Also, as can be seen in Table 2, assessment uncertainty has the greatest influence over future stock status, not catch (within proposed thresholds). For instance, depletion levels under the low state of nature (low natural mortality rates) are approximately 25 percent of the base model.

Given that biological implications are negligible across each of the ACL alternatives, the GMT recommends removing the intermediate ACL alternative (Alternative 2, P*=0.25).

While selection of a more liberal ACL alternative is expected to be beneficial to fisheries, the magnitude difference from the conservative to the liberal alternatives is not expected to alleviate darkblotched rockfish constraints in the at-sea Pacific whiting sectors. For example, selection of the most liberal ACL alternative would increase the at-sea darkblotched rockfish allocations by approximately 20 percent, resulting in a ~4.8 mt increase for mothership and a ~6.8 mt increase for catcher-processor. As noted in [I.4, Supplemental Attachment 9](#), bycatch of darkblotched rockfish from single tows among both motherships and catcher-processors have exceeded the potential allocation increases associated with a more liberal ACL alternative, thus it may not provide much relief to these fisheries.

Table 2. Biological implications (depletion) for each of the darkblotched rockfish ACL alternatives (no action is 64.9 SPR) under the based assessment model and the low state of nature alternative model.

Base model (M=0.054; higher natural mortality rate = more productive)						
Year	ACL			Depletion		
	No action	Alt 2 (P*0.25)	Alt 1 (P*0.45)	No action	Alt 2 (P*0.25)	Alt 1 (P*0.45)
2017	386	528	642	42%	43%	43%
2018	399	541	653	44%	44%	43%
2019	438	589	707	45%	45%	44%
2020	467	624	744	47%	47%	46%
2021	474	628	744	49%	48%	47%
2022	469	616	726	51%	50%	48%
2023	461	602	706	53%	51%	49%
2024	454	591	690	54%	52%	50%
2025	450	583	678	55%	52%	50%
2026	448	577	669	56%	53%	50%
Low state of nature (M=0.0412; low natural mortality rate = less productive)						
Year	ACL			Depletion		
	No action	Alt 2 (P*0.25)	Alt 1 (P*0.45)	No action	Alt 2 (P*0.25)	Alt 1 (P*0.45)
2017	0	0	0	9%	9%	9%
2018	0	0	0	10%	10%	10%
2019	8	11	14	11%	11%	11%
2020	22	29	36	12%	12%	12%
2021	37	49	60	13%	13%	13%
2022	52	68	82	14%	14%	14%
2023	64	84	101	17%	16%	16%
2024	76	99	118	18%	17%	17%
2025	86	112	134	19%	18%	18%
2026	97	125	148	20%	19%	19%

Yelloweye rockfish

In September, the Council requested that the yelloweye rockfish rebuilding plan be updated based on recent years catches since ACL attainment has been low. The rebuilding analysis, which

assumes that full ACL is harvested, has not been updated since the 2011 assessment. The GMT reviewed the materials in [Agenda Item I.4, Attachment 3](#), which indicates an update of the 2011 assessment was done, rather than an update of the rebuilding analysis, due to workload. Catch data from 2010 through 2014 were updated based on catch reported in the West Coast Groundfish Observer Program (WCGOP) Annual Mortality Reports and the GMT scorecard (with additional updates).

Two ACL scenarios were run for comparison. Both scenarios (Tables 4 and 5, in [Attachment 3](#)) assume that the full ACL was caught from 2015 on, with the ACLs and OFLs predicted under an SPR of 76 percent. Scenario 1 uses the actual mortality from the WCGOP Total Mortality reports for 2011-2013, and 2014 mortality is estimated using the GMT's 2014 scorecard with updated IFQ landings (see [Attachment 3](#), page 2 for more details). Note that at the time of the update, the 2014 WCGOP Mortality report was not available. The resulting OFLs are 56.9 mt and 57.5 mt for 2017-2018. Scenario 2 assumes the same as Scenario 1 for 2011-2013 but uses the minimum catch from that time period (8.8 mt in 2011) to estimate catch in 2014 as the 15.9 mt value from Scenario 1 was seen as highly conservative. The resulting OFLs under this scenario are 57.0 mt and 57.7 mt for 2017-2018. At the time of this statement, the GMT can report that the 2014 WCGOP Groundfish Mortality report shows a total mortality of 9 mt. The results of the 2011 yelloweye stock assessment, rebuilding analysis, and the updated assessment as reported in [Supplemental REVISED Attachment 2](#) and [Attachment 3](#) are summarized in Table 3 below.

Table 3. 2017-2018 yelloweye rockfish harvest specifications under alternative scenarios.

Scenario	OFL (mt)		ABC (mt)		ACL (mt)	
	2017	2018	2017	2018	2017	2018
2011 Update Assessment	51.1	51.0			18.8	19.1
2011 Rebuilding Analysis	51.6	51.6			19.0	19.3
Default HCR, based on Scenario 1 (Supplemental REVISED Attachment 2)	57	58	47	48	20	20
Updated Assessment - Scenario 1 (Highly Conservative Catch in 2014- Table 4, Attachment 3)	56.9	57.5	47.4	47.9	19.7	20.0
Updated Assessment - Scenario 2 (Less Conservative Catch in 2014- Table 5, Attachment 3)	57.0	57.7	47.5	48.1	19.7	20.0

At our meeting in October, the GMT discussed at length the workload relative to completing a full rebuilding analysis and the potential benefit from even slightly increased ACLs. Low yelloweye rockfish harvest allowances limit access to target species in all groundfish sectors. Management measures for recreational fisheries in Washington, Oregon, and northern California are driven by the need to avoid encounters with yelloweye rockfish. Access to healthy stocks like lingcod are

limited to keep yelloweye mortality under harvest guidelines and slight increases in the yelloweye rockfish ACL may allow less restrictive measures and reduce the burden on coastal fishing communities. Additionally, opportunities to minimize fishing restrictions on some species can offset new fishing restrictions needed for other stocks such as nearshore rockfish species. **Ultimately, given the high workload and likely minimal additional yelloweye rockfish (as shown in the table above) that would result, the GMT did not think a request to have the Northwest Fisheries Science Center do a full rebuilding analysis this management cycle would be worth jeopardizing the Council's goal of implementing regulations by January 1, 2017.**

Remaining Non-Overfished Species

California scorpionfish

The ACL for California scorpionfish increased substantially for 2017 (264 mt) when compared to 2016 (111 mt) as a result of updating the OFL-projections using the 2005 stock assessment model replacing removals assuming that the full OFL is taken with recent removals. As the stock is now considered Category 2, there is a greater buffer between the OFL and ABC. The GMT notes that since the scientific uncertainty buffer (σ) has increased, it may sufficiently address the degree of uncertainty in the updated ACL, given the dated nature of the assessment and the applicability of the assumptions made. However an ACT or HG set at a level commensurate with the amount of risk the Council is willing to accept, especially considering the magnitude of the ACL increase, could be considered under Agenda Item I.9.

China rockfish

During the September Council meeting, a motion was made to analyze two ACL alternatives for China rockfish using the default P^* of 0.45 as well as a more conservative P^* of 0.40. The rationale for the more conservative P^* was that China rockfish was deemed a category 2 stock for both these assessments primarily since recruitment deviations (pulses or lack thereof of juvenile cohorts entering the population) could not be reliably estimated.

The GMT discussed rationale for and against using a more conservative P^* for China rockfish as opposed to the other Category 2 stocks managed in stock complexes. The Council can use the P^* approach to account for scientific uncertainties. The σ value associated with the category of the stock is intended to address the uncertainty in estimating the OFL, while P^* values reflecting the probability of overfishing are intended to account for the risk perceived by the Council. The GMT notes that there are no formal guidelines regarding the choice of P^* . Factors considered previously include both the implications of overfishing a given stock for access to co-occurring species, value of the stock to coastal communities and the amount of time required to rebuild the stock were it to become overfished.

During the biennial cycle (2011-2012) during which the σ - P^* approach was first applied, the Council generally used a P^* of 0.40 to individually manage Category 2 stocks and generally used a P^* of 0.45 for individually managed Category 1 stocks and stocks managed in stock complexes. Since the 2011-2012 cycle the Council has used its discretion to set P^* values, not based on stock category alone. The GMT notes that many category 3 stocks are managed with a P^* of 0.45 such as in the Minor Nearshore Rockfish Complex, making selection of P^* values on

the basis of assessment category contrary to the direction the Council has taken in prior management cycles.

Some of the data inputs to the current China rockfish assessment are rather robust (e.g. fishery removals), while uncertainties remain (e.g. lack of fishery independent data, no recruitment deviations), landing it as a Category 2 assessment. In addition, since the southern stock is in the precautionary zone adjustments to the ACL will be made with the application of the 40:10 adjustment. The factors noted above, should be considered when setting P* values. **The GMT concluded that the P* decision is a policy risk call best addressed by the Council.**

Kelp Greenling

Washington

The GMT did not identify the need for additional ACL alternatives for kelp greenling in Washington because we think the alternatives outlined by the SSC are sufficient. However, the GMT does have comments regarding the four delta parameter value alternatives provided from the DB-SRA assessment that was completed, ([Agenda Item I.4, Attachment 4](#), Table 11). The GMT believes that Delta options 1 and 2 are not realistic given that both options result in a depletion of 40 percent, which is highly unlikely based on the management of kelp greenling in Washington. Washington has not had a nearshore commercial hook and line fishery since 1995 and catch in the recreational fishery averages less than 4.0 mt per year.

Currently, the basis for setting the OFL alternative presented in [Agenda Item I.4, Attachment 2](#), Table 1, is from Delta option 4, which is based on the GMT's Productivity and Susceptibility Analysis (PSA) score. The PSA score for kelp greenling was based on a coastwide assessment of factors, resulting in a depletion prior of 0.35 (or a depletion of 65 percent). However, with Washington's management history being quite different than Oregon and California, it suggests that a Washington specific kelp greenling PSA score may be more appropriate. Furthermore, based on the lack of targeted fishing of kelp greenling, it seems counterintuitive that the kelp greenling population off of Oregon would be at a lower depletion level (80 percent) than Washington. The use of the depletion prior from Oregon is shown in Delta option 3. While the GMT does believe that borrowing data across states should not occur, the comments presented above does provide rationale that the status of the Washington stock should be at least at a level comparable to Oregon. However, since there would be considerable workload to create a new PSA score and associated depletion prior and to avoid borrowing from another area, **the GMT supports Delta option 4, the SSC endorsed alternative.**

Oregon

The GMT does not see the need for additional alternatives for the kelp greenling in Oregon ACL. This stock is considered healthy, approximately 80 percent of unfished biomass, with the presumptive ACL being significantly higher than either recent catches or catches when landings were unrestricted in state regulations. Additionally, the state of Oregon has been managing both the commercial and recreational fisheries for this species via landings caps specified in state regulations, and is expected to continue to do so. Since there does not appear to be a conservation concern, **the GMT recommends not adding any additional alternatives for the kelp greenling (OR) ACL.**

Widow rockfish

The GMT recommends that Alternative 2 (11,078 mt and 10,589 for 2017 and 2018, respectively) should be removed for further consideration. The No Action Alternative (2,000 mt) and Alternative 1 (13,508 mt and 12,655 mt for 2017 and 2018, respectively) encompass a large range, including the ACL in Alternative 2. The previous assessment¹ of widow rockfish was rather uncertain, which factored in the Council choosing the current ACL of 2,000 mt, to be conservative. The current assessment² was completely redone, data and assumptions going into the model were changed, the stock is estimated to be healthy (75.1 percent of unfished biomass), and there is a very small likelihood that the stock was ever actually overfished. The current assessment is considered to be very well done, and while there is still some uncertainty, it has declined relative to the 2011 assessment. Table 4 (excerpted from Table H in the assessment) predicts that under the base case state of nature, with the ACL based on a $P^* = 0.45$ and $\sigma = 0.36$, the stock will remain well above the management target (low point is 56 percent in 2026). Even under the low state of nature, catching the entire ACL based on the $P^* = 0.45$ and $\sigma = 0.36$ for the next ten years results in the depletion ending up at 39 percent, just inside the precautionary zone. Therefore, since Alternative 2 is well within the range of the No Action Alternative and Alternative 1, and the stock is healthy, the **GMT recommends removing Alternative 2 (the intermediate alternative) for the widow rockfish ACL alternatives.**

¹ http://www.pcouncil.org/wp-content/uploads/Widow_2011_Assessment.pdf

² http://www.pcouncil.org/wp-content/uploads/2015/08/H3_Att10_Widow_FULLAssmt_E-Only_SEPT2015BB.pdf

Table 4. Biological implications (depletion) for possible widow rockfish ACL alternatives (No Action is 88.7% SPR) under the Base assessment model and the Low State of Nature alternative model.

Base Model (MBASE = 0.0521)				
Year	Catch (mt)		Depletion (%)	
	ACL	SPR = 88.7%	ACL	SPR = 88.7%
2017	1699	220	57.2%	57.2%
2018	1525	219	55.7%	57.8%
2019	1420	221	54.2%	58.3%
2020	1354	226	52.5%	58.6%
2021	1308	232	50.7%	58.6%
2022	1272	239	49.0%	58.6%
2023	1245	245	47.6%	58.8%
2024	1224	250	46.4%	59.2%
2025	1208	256	45.7%	60.0%
2026	1194	261	45.2%	61.1%

Low State of Nature (MBASE = 0.02)				
Year	Catch (mt)		Depletion (%)	
	ACL	SPR = 88.7%	ACL	SPR = 88.7%
2017	1699	220	35.3%	35.3%
2018	1525	219	33.3%	35.6%
2019	1420	221	31.3%	35.8%
2020	1354	226	29.2%	35.8%
2021	1308	232	27.1%	35.8%
2022	1272	239	25.1%	35.7%
2023	1245	245	23.5%	35.8%
2024	1224	250	22.4%	36.1%
2025	1208	256	21.50%	36.6%
2026	1194	261	20.80%	37.4%

GMT Recommendations

The GMT recommends:

- 1. the Council adopt all ACL alternatives at this meeting, including selection of a preliminary preferred ACL alternatives to facilitate analysis**
- 2. the Council could consider the addition of a lower canary rockfish ACL alternative (i.e., closer to the ACL under the rebuilding plan) for analysis**
- 3. no additional alternative ACLs for bocaccio**
- 4. removing the intermediate ACL alternative (Alternative 2, P*=0.25) for darkblotched rockfish, given that biological implications are negligible across each of the ACL alternatives**
- 5. consider the updated yelloweye rockfish OFLs, per SSC recommendation**

- 6. the Council should consider the information presented above when considering a P* of 0.40 for China rockfish**
- 7. accepting the SSC endorsed ACL alternative for kelp greenling in Washington**
- 8. no additional ACL alternatives analyzed for kelp greenling in Oregon**
- 9. removing Alternative 2 (the intermediate alternative) for the widow rockfish ACL alternatives**

Reference

Thorson, J.T. and C. Wetzel. 2015. The status of canary rockfish (*Sebastes pinniger*) in the California Current in 2015. National Marine Fisheries Service Northwest Fisheries Science Center, Seattle, WA.

PFMC
11/16/15