SSC December 2020 minutes on BSAI BS/RE

Blackspotted and Rougheye Rockfish Complex

This was a full assessment of the BSAI blackspotted/rougheye (BS/RE) rockfish complex. This is a nontarget stock complex and the last full assessment was presented to the SSC in December 2018.

The SSC received public testimony from Todd Loomis (Ocean Peace, Inc.). Mr. Loomis noted that Ocean Peace Inc. has four Amendment 80 C/Ps, and one catcher vessel that participates in the Aleutian Islands fisheries. He stated that from the fishery's perspective there is a lot of BS/RE on the grounds and he indicated that while the fishery had not been successful at staying below the AI sub-area ABC and WAI MSSC in recent years it has not been for lack of trying. He summarized the A80 sector's BS/RE avoidance efforts including: 1) industry recommended 543 POP TACs below the ABC for multiple years in an effort to reduce BS/RE catch. He noted that this resulted in over 11,000 t of forgone POP harvest in 2019 and 2020, 2) shifting fleet effort to shallower fishing depths to avoid BS/RE. He reported that traditionally the 36 of 62 1/20/2020 fleet fished POP as deep as 180 fathoms (fm), but owing to fear of catching large BS/RE their average POP tow depths have been reduced by over 40 fm since 2010. He indicated that historically this would have avoided most of the BS/RE, but for several recent years the fleet has encountered small BS/RE in areas as shallow at 80 fm and that small BS/RE have been showing up in Atka mackerel targeted fishing as well. 3) Fishery support for cooperative research to improve understanding of BS/RE. This includes having NMFS scientists onboard industry vessels to collect samples from AI rockfish, work with the stock assessment author on proposals to get more observer-collected lengths and otoliths, support for post-doc and graduate student projects looking at surveying untrawlable habitats and ways to better incorporate fishery-dependent information in rockfish assessments. Mr. Loomis stated that he believed the industry's efforts to avoid BS/RE by fishing shallower are largely responsible for the change in fishery size composition, and that there is a large year class or classes just becoming available to the fishery. He noted that this is apparent in the recent fishery and survey age/size composition data but that the lack of an AI survey this year limits our ability to confirm this in the current assessment. He indicated that the industry thinks the large BS/RE are still present, but are not showing up in the fishery composition data due to lack of directed fishing effort in deeper waters. Finally, Mr. Loomis said that he believed the MSSC approach has had benefits in that it has identified area-specific targets for the fishery to try to stay below, but that the current challenges are likely because the AI spatial management boundaries do not correspond to anything biologically meaningful for BS/RE. He noted the large differences in BS/RE apportionment between areas 542 and 543. The SSC asked Mr. Loomis about potential additional industry efforts or ideas for addressing the disproportionate spatial harvesting of BS/RE in the AI. He indicated that distribution of targeted fishing was driven by the splits in POP and Atka mackerel quota among the AI sub-areas, that while excluders in use for Pacific cod might be effective for large BS/RE they were unlikely to reduce the catch of small fish, and that shifts back to deeper fishing might reduce catches of small BS/RE but would probably increase catches of larger, older fish.

The BS/RE rockfish complex is assessed with an age-structured model for the AI portion of the stock, managed in Tier 3, and a Tier 5 random effects model for the EBS portion of the stock. The 2020 assessment includes updated 2019 and projected 2020 catch data, replacement of the 2018 AI survey length composition with the 2018 survey age composition, and 2018 and 2019 AI fishery length compositions. The length-at-age, weights-at-age, and age-to-length conversion matrices were also updated with NMFS AI trawl survey data.

In Oct 2020, the SSC reviewed an investigation of recruitment for the AI portion of the stock that focused on the base model presented in the 2018 stock assessment employing McAllister-Ianelli weighting for compositional data, and a new model with Francis weighting as well as an update to the ageing error matrix, application of dome-shaped selectivity for the survey composition, and a new prior distribution for natural mortality. The SSC pointed out that while the new model with Francis weighting performed better by downweighing the composition relative to survey data, it did not resolve the conflict between these two datasets. The SSC requested the authors bring forward an AI model without the length data, updated maturity information, the updated aging error matrix, and an updated estimate of natural mortality. No changes were recommended for the Tier 5 EBS model. In response to SSC recommendations, the current assessment considers the accepted model from 2018 (18.1) and four alternative models.

In all the new models, the mean of the prior distribution for M was increased from 0.033 to 0.045, the average value from three maximum age natural mortality models developed by Then et al. (2015). The aging error matrix was updated using the Punt et al. (2008) procedure applied to 2,341 double readings of BS/RE rockfish from the BSAI sampled during 1986 – 2017 and resulted in higher CVs for ages than those that were estimated in the 2018 model. The proportion mature at age was estimated within the assessment model based on 237 aged blackspotted rockfish collected in the GOA from 2009-2012. Models 20 and 20b use Francis weighting, with 20b excluding the fishery length composition data. Models 20a and 20c use McAllister-Ianelli weighting, with model 20c excluding the fishery length composition data.

The authors noted that the primary challenge for this assessment is the conflict between the compositional data and the AI survey index. The authors recommended Model 20 based on improved fits to the AI survey biomass, decreased positive retrospective bias and recruitment variability, inter-assessment stability and their conclusion that the primary differences between the models resulted from different data weighting procedures with the exclusion of fishery length data having relatively little effect on model results. The EBS portion of the stock continues to be assessed using the random effects model. The resulting 2021 BSAI maximum ABC is a 32% decrease from the 2020 ABC primarily due to the change in the method for weighting the compositional data. **The SSC appreciates the authors' efforts to address October 2020 SSC recommendations and concurs with the author and BSAI GPT recommended model. This places BSAI BS/RE in Tier 3b. We also appreciate the examination of area-specific exploitation rates provided in Appendix 14A.**

This assessment includes the first risk table analysis for this complex. The authors ranked assessment related considerations for the recommended Model 20 as a level 3 concern (Major problems with the stock assessment) citing very poor fits to data, high level of uncertainty, inability of model to explain decline in abundance of older fish, highly constrained estimate of M, and strong retrospective bias. Population dynamics considerations were ranked as a level 2 concern (Substantially increased concern) based on abundance (particularly older fish) decreasing faster than usual, the unusual pattern of recent strong recruitments, and the inadequacy of the existing spatial management structure. Environmental/ecosystem considerations were ranked as a level 1 concern (no increased concerns) but the authors noted recent increased temperatures and acknowledged that the lack of ecological data relevant to the stocks (particularly blackspotted rockfish), as well as lack of 2020 survey data, limit the assessment of potential recent ecosystem impacts on this stock. Fishery Performance was ranked as a level 2 concern citing the perspective that for a bycatch stock, fishery performance is evaluated with respect to how well the target fishery can avoid bycatch. The fishery CPUE in the WAI is higher than would be expected based on the spatial distribution of survey biomass estimates with catches consistently exceeding the WAI

MSSC, and the increase in these overages over time. Further, the catches in the WAI/CAI subarea have also exceeded the subarea ABC in 2019 and 2020.

The BSAI GPT agreed with the authors' recommended risk table ranks and with their conclusion that, given the incidental nature of these species' removals, an ABC reduction would likely increase discards but not reduce catch. Additionally, while the recommended model lowers the 2021 and 2022 ABCs relative to the 2020 ABC, this outcome is strongly influenced by the selected component weighting approach and a reduction in the ABC would not address the apparent mismatch in spatial management and the spatial structure of the stock. Finally, the author and the plan team noted that since 2015 the BS/RE TACs have on average been 48% smaller than the maximum ABC and as such a reduced ABC would have little effect. For these reasons, neither the authors nor the BSAI GPT recommend a reduction from maximum ABC.

The SSC appreciates the authors' work to complete the risk tables and shares the authors' and BSAI GPT's concerns about the elevated risk scores. The author and BSAI GPT noted that in the case of target fisheries such scores would likely warrant a reduction from maxABC. **In this case, the SSC agrees with the author and BSAI GPT that due to the incidental nature of BS/RE catch and the ongoing fishing fleet avoidance efforts highlighted in public testimony a reduction in maxABC is unlikely to result in reduced catch. Further, the SSC notes that the new AI model does appear to be more appropriate in terms of tracking the substantial reduction in the scale of the stock shown in the survey data and improvements in fit and retrospective behavior. As such, the SSC supports the author and BSAI GPT recommended OFL and maximum ABC.**

A random effects model is used to smooth subarea survey biomass estimates to obtain the proportions of biomass across the spatial areas, which is used for sub-area ABC apportionment to the western and central AI, and the eastern AI and EBS. The subarea ABC for the western and central AI is further partitioned into MSSC levels for the WAI and EAI. 38 of 62 1/20/2020

The BSAI GPT minutes reflect a high-level of concern regarding the disproportionate spatial harvesting of this stock in the AI sub-areas and note that the MSSC-approach intended to help guide the fleet to voluntarily reduce catch in the WAI has been ineffective in recent years. However, they did not recommend removing the MSSCs because a better alternative has not yet been identified and there may be some positive influence of providing a target for the fleet. This is consistent with public testimony provided by Mr. Loomis. Finally, the BSAI GPT requested guidance from the SSC and Council on how to reduce incidental catch in areas with disproportionate spatial exploitation because the MSSC tool is not proving effective.

The SSC continues to be strongly concerned about the disproportionate spatial harvest including catch in excess of the WAI/CAI subarea ABC in 2019 and 2020, and notes that despite the limited information on stock structure this rockfish complex may be vulnerable to localized depletion. The SSC recommends that the MSSCs continue to be used as a means to monitor and give industry a target maximum catch and offers the following comments:

     ● The SSC supports the BSAI GPT recommendation that the authors explore the distribution of the survey samples to evaluate trends by depth, to help determine risk considerations and potentially help inform the industry on how to reduce incidental catch.

     ● Similarly, the SSC recommends an exploration of the spatial footprint of the AI survey and incidental catch fisheries with an eye towards potential mismatches due to untrawlable habitat that might provide context for interpreting conflicting survey abundance and fishery size/ age composition. We note

that a graduate research project investigating the survey – fishery alignment along with recent changes in Atka mackerel and POP fishing behavior is underway at Alaska Pacific University. In addition, the SSC pointed out that a NMFS – University – Industry cooperative effort entitled "The Science-Industry Rockfish Research Collaboration in Alaska" being led by Dr. Madison Hall is currently underway. While this effort is primarily focused on GOA rockfish, it may provide important analytical tools and insights for application to the BSAI BS/RE complex.

● The SSC supports the BSAI GPT suggestion to explore other survey data (e.g. NMFS and IPHC long-line or ADF&G survey data) to augment abundance and size/ age composition information. We note that a new graduate research project looking at combining data from different surveys and gears is underway at the College of Fisheries and Ocean Sciences at the University of Alaska Fairbanks. ● The SSC notes that the values of M used in the AI assessment are very high, especially for a longlived species, and requests that the authors fully explore the ranges and interactions of catchability and M in the AI assessment model.

● The SSC requests an update on work (e.g. genetics) to further refine BS/RE stock structure in the AI.

● Given the information regarding shifts in fishing effort to shallower areas provided in public testimony, the SSC requests that the authors investigate the effects of fleet behavior on apparent size/ age compositions, and to what extent this may be influencing fishery selectivity

● The JGPT proposed a Council workshop in 2021 to evaluate both the fishing mortality rates by gear associated with different apportionment schemes as well as the management and socioeconomic considerations of alternatives. The SSC concurs with the JGPT's note that the area apportionment approach currently used for the BSAI BS/RE complex should be included in the Spatial Management Workshop proposed for 2021.