NORTH PACIFIC FISHERY MANAGEMENT COUNCIL

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Meeting of the Gulf of Alaska Groundfish Plan Team

Plan Team Report

September 21, 2023

GOA Groundfish Plan Team Members:

Jim Ianelli	AFSC REFM (co-chair)	Sandra Lowe	AFSC REFM
Chris Lunsford	AFSC ABL (co-chair)	Nat Nichols	ADF&G
Sara Cleaver	NPFMC (coordinator)	Jan Rumble	ADF&G
Abby Jahn	NMFS AKRO	Paul Spencer	AFSC REFM
Craig Faunce	AFSC FMA	Kristan Blackhart	NMFS OS&T
Lisa Hillier	WDFW	Ben Williams	AFSC ABL
Pete Hulson	AFSC ABL	Cecilia O'Leary	AFSC RAC

Introduction

The GOA Groundfish Plan Team meeting was held on Thursday, September 11, 2023 at the AFSC. Participation was both in person and offered remotely via Zoom. Roughly 40 people attended the meeting in person, with more signed in remotely, but attendance varied throughout the meeting. All documents and presentations were posted to the Team's electronic agenda. All presentations are also linked in the header for each agenda item in this report.

GOA Shortraker survey weighting

Kevin Siwicke presented the GOA shortraker rockfish model update. The authors recommended that the REMA model be implemented using the rema R library which uses Template Model Builder (TMB). **The Team endorsed this recommendation.**

The authors recommended removing the 1984 and 1987 bottom trawl survey (BTS) estimates which are not comparable to the domestic surveys conducted from 1990 to the present. **The Team endorsed this recommendation consistent with GOA assessments.**

Discussion centered around the clarification of process error and observation error. The base model fixes the weight of the longline survey to 0.5. The authors recommend that process error be estimated within the *rema* model rather than down weighting the longline survey. Data shows that the longline survey samples the depths occupied by shortraker rockfish more appropriately than the BTS. **The Team endorsed the recommendation to weight the BTS and longline survey equally within the *rema* model.**

The authors presented alternative models using *rema* that estimated additional observation error for 1) only the bottom trawl survey, 2) only the longline survey, and 3) both surveys. Because the observation error of the bottom trawl survey is much larger than the longline survey, and the scale of additional observation error estimated in the model is quite large, the authors recommended a model that estimates additional observation error for the longline survey only. **The Team endorsed this recommendation.**

The discussion continued with apportionment and using the *rema* model. The standard apportionment was based only on predicted biomass by area. The new apportionment approach averages the predicted biomass apportionment from the BTS and the RPWs apportionment from the longline survey. The longline survey and bottom trawl survey data produce conflicting indices, and the proposed approach strikes a balance between these conflicting indices with respect to apportionment. **The Team endorsed this recommendation.**

Other rockfish

Kristen Omori presented GOA other rockfish stock complex updates. The Council is considering a motion to change the spatial management of demersal shelf rockfish (DSR). In the GOA, DSR are in the other rockfish complex, except for the Southeast Outside area where the State of Alaska manages DSR as a separate complex. The proposal is to move DSR species out of the other rockfish category to a Gulf-wide assessment. The Council asked for information on the impacts of this proposed change for the October Council meeting. The authors provided information on catch and harvest limits by area. **The authors and the Team recommended that this change to the DSR complex be made in the 2024 stock assessment for implementation for the 2025 fisheries.**

The authors updated the Random Effects model used in the 2021 assessment, with the REMA model and compared biomass estimates from the two models. Differences were negligible. **The authors and the Team recommended moving to the REMA model for the GOA other rockfish assessment.**

The authors expanded the catch time series for Tier 6 GOA other rockfish. Currently, the time series is 2013-2016. The range was expanded to 2013-2022, to represent a fuller time series (10 years) and capture increased catches since 2020. There were no single area changes and no major increases for most Tier 6 stocks. This resulted in a ~2% overall increase for the GOA other rockfish OFL. **The authors and the Team recommended using the years 2013-2022 for the Tier 6 catch time series.**

The authors evaluated whether the trawl survey adequately represents the Tier 4/5 GOA other rockfish biomass, and whether the survey biomass used in the REMA models provide “reliable biomass”. The authors used REMA as a model diagnostic tool, examining the proportion of hauls with positive catch and also looked at CVs. **The authors and the Team recommended:**

- **That the eleven Tier 5 species in the other rockfish complex be moved to Tier 6 management.**
- **Further investigation into redstripe and harlequin rockfish Tier 5 biomass estimates which have CVs >0.50.**
- **That tier specifications be re-evaluated if they have been in place for several years and/or there have been changes in stock dynamics and fishery**

The authors reevaluated the current method of weighted *M* biomass estimates to calculate OFL. Large changes in survey biomass have occurred leading to large changes in OFL values. To decrease the sensitivity to single survey variability for these poorly sampled rockfish, the authors propose an alternative weighted *M* biomass using the average of the 3 most recent surveys. **The authors and the Team recommend using the most recent 3-year average survey biomass for estimating *M*.**

GOA Rougheye/blackspotted rockfish

Jane Sullivan presented a suite of proposed data updates and resulting model sensitivities to the RE/BS model along with a new apportionment method. In response to previous Team and SSC recommendations,

the 1984 and 1987 bottom trawl surveys were removed from the survey index. This resulted in an overall slight drop of scale in abundance estimates because catchability is sensitive in this model.

The previous model used natural mortality estimates based on a 1994 study and it was noted this may be an underestimate of *M*. The author explored alternative methods and recommends using a "max age" based estimate (~135 yrs). The updated prior for this approach results in a large increase in the model estimated scale of the population and the Team raised concerns considering RE/BS are long-lived species. They acknowledged that there are also two species in this complex with maximum age differences of about 30 years. Alternative methods that relied on a more precise prior were discussed such as computing a distribution based on available ages and applying the ageing error matrix to set the prior. **The Team supported the author's investigation into *M* but recommended the author explore the application of the prior variance used for *M*.**

Previous assessments estimated maturity-at-age by converting maturity-at-length to maturity-at-age using the 2015 stock assessment's size-age transition matrix. The author proposed incorporating maturity data not previously used that comes from both rougheye and blackspotted rockfish determined through visual identification. Despite this new data not being verified using genetics, it is specific to the GOA, was analyzed using modern methods, and has age estimates for each specimen. Using combined RE/BS maturity estimates had minimal impact on model results. The Team discussed alternative methods to a generalized linear model (GLM) for estimating age-at-maturity that are capable of also incorporating skip spawning. **The Team recommended using the authors approach. Additionally, the Team recommended alternative methods be explored that take skip spawning into account.**

The author proposed incorporating new data for the ageing error matrix, the size-at-age matrix, and weight-at-age vector. The weight-at-age vector is assumed to be fixed and converts length-at-age to weight using the allometric function. Alternative methods were discussed but no changes were recommended. The Team supports the author's recommendation to update these data components with new data.

The author recommended new apportionment methods that incorporate REMA model estimates of area-specific catchability (q), has a single, shared process error, and starts in 1990. This method averages proportions of both the REMA predicted biomass from the bottom trawl survey and the REMA predicted relative population weights from the longline survey and helps balance the data conflict between the two surveys. This is the same approach proposed for shortraker rockfish. The Team supports the author recommended approach for apportionment.

The Team appreciates this stairstep approach of addressing biological concerns and updating the model with new data prior to addressing other assessment concerns along with evaluating the sensitivity of the model to these changes.

GOA pollock model considerations

Cole Monnahan and Grant Adams presented on the GOA pollock model. The model was converted from ADMB to TMB with plans to switch to the TMB version beginning this November. The two software programs produce virtually identical results. Consequently, the Team supports this change to TMB and the associated model number 23.0. **The Team recommended that when a new software framework such as TMB is used for the same base model from previous years that it should be considered a new model (with a new number).**

The authors explored some alternative flexible fisheries selectivity forms within the TMB model. Specifically, they wished to address issues with the lack of fit to fisheries age composition data. One issue related to a poor residual pattern that the previous parametric time-varying approach had difficulty

rectifying. The Team agreed that the non-parametric approach improved that problem. They also noted there continues to be a large drop in selectivity from age-9 to the age-10+ group and inquired about what biological underpinnings would cause that. The Team suggested considering lowering the "plus" group to age-8+ or age-9+ for comparison. Given the presentation of auto-correlated selectivities, the group discussed the best method(s) for projecting near-term trends. The Team agreed that additional examinations were warranted (not just for pollock) including testing approaches in a management strategy context.

With respect to modeling selectivity, **the Team recommended that the author consider exploring a 2d age-cohort effect to compare to the age-year effect as there appears to be a cohort influence within the age composition data.**

GOA Pacific cod model considerations

Pete Hulson presented modeling updates for the GOA Pacific cod model, including modifying the input sample sizes for the conditional age at length (CAAL) data, and exploring how temperature time series are related to the longline survey selectivity parameter and growth model parameters. The minimum sample size in the Stock Synthesis assessment model was inadvertently set too large, which resulted in 64% of the CAAL data being removed from the model. Lowering the minimum sample size such that these data were included in the model improved the fit to the age composition data, but had a relatively minor effect on the estimated spawning stock biomass and the fits to the survey indices.

Monthly temperature at depth is available from the Climate Forecast System Reanalysis (CFSR), and anomalies of temperatures at depths occupied by various size groups of Pacific cod from a mean baseline (years 1982 – 2012) were computed. The current model links longline survey catchability to the temperature index for depths occupied by 0 – 20 cm cod in June, and provides an improved fit relative to the model with no linkage between longline survey catchability and temperature. Alternative indices of temperature were considered as well as linkages between temperature and the parameters of the von Bertalanffy growth function. A post-doc (Krista Oke) will begin work investigating environmental links for the model over the next two years. The Plan Team discussion focused on model links to temperature. Members expressed that there were a large number of tests performed, some of which would be expected to improve the fit by random chance. Concern was expressed over a lack of biological mechanisms to explain improved fits and whether the improved fits were due to mechanisms that may be expected to persist into the future.

The Team recommended the input sample sizes be set so that all of the CAAL data are fit. This was included in the evaluations presented. However, a clear depiction of what aspects of the objective function changed before and after the sample sizes should be added since adding the missing data into the model resulted in a lower negative log-likelihood (contrary to expectation).

The Team recommended that existing environmental links for longline survey catchability be continued but that fits of the model with white noise random variability be explored to evaluate the strength of the identified CFSR temperature links.

The Team recommended the use of environmental links for growth parameters be deferred until Dr. Oke can examine this issue.

Finally, the Team noted that the Woods Hole Assessment Model (WHAM) be considered for modeling growth, as this model was originally developed for examining environmental linkages with growth parameters. Recently, a postdoc at the AFSC adapted the GOA Pacific cod data to WHAM and this could be explored as an option.

GOA Pacific ocean perch model considerations

Maia Kapur (AFSC) presented the 2023 Operational Update assessment for the Tier 3a Gulf of Alaska Pacific ocean Perch stock. The 2023 assessment updates the 2021 assessment using updated data only; no modeling framework changes are included. Ongoing work for the assessment is underway to address key comments from the SSC and CIE focused on exploring M and selectivity, as well as compositional data weights, design- vs. model-based survey indices, and weight-at-age inputs and is anticipated to contribute to the 2025 assessment. **The Team endorsed the continued explorations outlined by the assessment authors, including composition weighting, and the effect of selectivity on *M*.** The Team noted the potential transitioning of the POP assessment into the Stock Synthesis software platform.

Proposed Specifications (including halibut DMRs)

Abby Jahn presented the proposed harvest specifications. **The Team approved the proposed harvest specifications for 2023 and 2024 by recommending the 2024 GOA final harvest specifications for OFLs and ABCs as published in the Federal Register in March 2023.**

The Team approved the 2023 and 2024 halibut discard mortality rates as presented by the Halibut DMR WG in 2024-2025.