North Pacific Fishery Management Council

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Meeting of the Gulf of Alaska (GOA) Groundfish Plan Team
MINUTES

November 14-18, 2022
Hybrid Meeting: Seattle, Washington, AFSC

GOA Groundfish Plan Team Members:

Jim Ianelli	AFSC REFM (co-chair)	Nat Nichols	ADF&G
Chris Lunsford	AFSC ABL (co-chair)	Cecilia O'Leary	AFSC GAP
Sara Cleaver	NPFMC (coordinator)	Andrew Olson	ADF&G
Kristan Blackhart	NMFS OS&T	Jan Rumble	ADF&G
Obren Davis	NMFS AKRO	Paul Spencer	AFSC REFM
Craig Faunce	AFSC FMA	Marysia Szymkowiak	AFSC REFM
Lisa Hillier	WDFW	Ben Williams	AFSC ABL
Pete Hulson	AFSC ABL	Kresimir Williams	AFSC RACE
Sandra Lowe	AFSC REFM		

Administrative

The GOA Groundfish Plan Team ("Team") convened on Monday, November 14, 2022 1:00PM PST. Participation was in person and remote via Zoom. Roughly 45 people attended the meeting, but attendance varied throughout the meeting. All SAFE documents were posted to the AFSC draft assessments page and presentations given during the meeting were posted to the Teams' electronic agenda. All presentations are also linked in the header for each agenda item in this report. The Team has two new members, Ben Williams and Cecilia O'Leary. The Team also acknowledged that this was Kresimir Williams' last meeting as a member of the Team, and thanked him for his contributions.

GOA Ecosystem Status Report

Bridget Ferriss presented the GOA Ecosystem Status Report (ESR), which continues to be synthesized in terms of combining indicators from various ecosystem components. These indicators reflect the current status and trends of these components, which range from physical oceanography to biological observations and human dimensions. This year's report also includes additional information about long-term sea-surface temperature changes to inform the discussion of climate change.

The Team inquired about how the indicator relating to seabird reproductive success might vary by the size of the habitat being indexed. Bridget welcomed feedback from the Team for ESR content; specifically about what current content is useful, what missing content would be useful (e.g., ideal wish list even if the research/monitoring is not there), and how the content is analyzed and communicated (report and presentation). The Team noted that the presentation was effective and seems to be improving every year. However, the Team did not have any specific recommendations for changes or additions to the ESR.

2023 Partial Assessments

The partial GOA assessments for 2023 include Pacific ocean perch, blackspotted/rougheye, arrowtooth flounder, rex sole, shallow water flatfish including northern/southern rock sole, and deep water flatfish. GOA partial assessments were presented to the Team as a group using a template-based approach. The Team appreciates the consolidation of these assessments into one presentation but suggests some improvements to the template design to help review bodies interpret results.

The Team recommends consideration of the following changes to the presentation template design:

- Replace the catch/biomass figure with the executive summary table for the stock or complex.
- Include a bullet that provides the year(s) the last full assessment and survey were completed as well as stating the next planned survey and full assessment year(s)
- Include a bullet with next year's spawning stock biomass and trend for tier 1-3 stocks
- Delete the bullet that refers to projected catches
- Include a bullet if unusual trends are occurring in the fishery

The Team appreciated the efforts to streamline review of partial assessments. This allowed more time to focus on new data and model developments.

Regarding specific partial assessments, the Team noted that in the shallow water flatfish partial assessment, there are multiple executive summary tables because more than one tier level is represented in the overall complex. **The Team recommended that when separate summary tables are required (e.g., in the shallow water flatfish complex) that they be clearly labeled so readers can identify the overall stock complex table compared to the separate components (see GOA Rex sole "*Quantity*" labels for example).**

The Team supported the recommended 2023 and 2024 ABC and OFL for all GOA partial assessments.

Pollock Ecosystem and Socioeconomic Profile (ESP)

The GOA pollock ESP report card was presented by Kalei Shotwell. The Team noted the high inclusion probability of the sablefish biomass indicator and the proposed hypotheses in the ESP that there may be competition between pollock and sablefish at younger ages. The Team proposed that these inclusion probabilities could be further refined to test this hypothesis by comparing pollock and sablefish abundance at younger ages since these are readily available from the assessment models. The Team then discussed what resources are available to conduct such analyses since both the stock authors and ESP authors may have higher priorities. The Team requested clarification from the SSC as to what analyses would be required, how they should be completed, and the role of different review bodies for making these types of recommendations external to the stock assessment.

Pollock assessment

The GOA pollock assessment was presented by Cole Monnahan. The assessment included minor changes to the penalty on recruitment deviations and estimated selectivity for the summer acoustic survey. These changes in combination with the updated data from 2021 and 2022 increased the scale of the population biomass, particularly at the end of the time series. Cole also presented investigations into the residual pattern for the 2018 year-class, and hypothesized that the residual pattern is due to a CV that is too small,

which is assumed to be 45% for all years of the age-1 index. The Team agreed with the recommended ABC and OFL for GOA Pollock.

The Team recommends that the author work with the MACE program to develop uncertainty estimates for the age-1 index and supports investigation of alternative methods to implement uncertainty into this index.

The Team noted that the residual plot that Cole presented by year-class was extremely useful in the investigation of this pattern and encourages authors to also consider using this plot to present residual patterns in compositional data. **The Team also requested that Cole develop a presentation on one-step-ahead residuals for the September 2023 Plan Team meeting.**

Pacific cod Ecosystem and Socioeconomic Profile (ESP)

Kalei Shotwell presented the Pacific cod ESP report card template for 2022; a full ESP update is scheduled for 2025. Many indicators are "neutral" indicating average physical conditions.

The Team discussed the influence/importance of eddy kinetic energy, and indicated that it would be interesting to see how the importance of indicators might change over time. The Team noted that the "Steller sea lion survey" indicator was model output and not reflective of annual observations. The Team noted that reducing the descriptions of indicators might help with reducing some redundancy (e.g., just reference a full report card). Summarizing indicators that changed should be sufficient.

Pacific cod assessment

Pete Hulson presented the 2022 Pacific cod assessment. Pete noted that the current year's fishery length compositions are used in this assessment to track trends. In addition, some state catches previously reported in the assessment but mistakenly left out of the model were included in this year's model. There was some discussion on methods for teasing apart the state catch (pre-2003) since there is some potential that fish recorded as caught from state records may also have been recorded as part of the federal catch accounting. Pete considered that this potential is likely rare and on the order of tens-of-tons.

The Team discussed the mean fishery length by depths and region, noting that these inputs may be confounded by reductions in the population, the number of observed hauls, and sample sizes. Industry representatives corroborated that the fleet is catching large fish in the Central GOA trawl fishery, which aligns with observed samples. There is a voluntary catch share in the trawl fleet, and the CP fleet in the western GOA has been catching medium-sized fish. State fishery representatives also indicated that the fleet has been catching larger sized fish (there were large Pacific cod recorded in the 2022 pot fishery).

The Team recommended adding confidence intervals on the mean lengths by depth strata. Additionally, the Team recommended that the authors compare total fishing effort or catch (in addition to total sample size) to be sure that the observer coverage is capturing effort appropriately.

The Team noted that they received a detailed presentation on fish-condition from the bottom-trawl survey data, but that the assessment model uses a fixed relationship based on just over 7,000 observations that was completed in 2015. **The Team recommended that the data for length-weight relationships be re-evaluated and examined for sensitivity to the trends over time and areas.**

The Team noted that the predicted CAAL (conditional age-at-length) data appears to have varied over time relative to the predictions. The Team noted that using the CAAL approach is best to estimate mean growth but that a fixed pattern (along with a constant set of length-weight coefficients) may miss temporal and inter-annual changes.

The Team recommended the authors look at the model-predicted mean weight-at-age (by gear type), and compare to the observed weight-at-age data to see if there are discernible spatial or temporal patterns that the model is missing. It may be that using an empirical weight-at-age approach could simplify and improve the model behavior instead of assuming constant growth.

The fit of the age-length matrix (separated by gear and year) on pot data, as shown by the Pearson residuals, shows a distinct pattern through time. The Team discussed if this could be caused by changes in growth. Following from the above evaluation, **the Team recommended that an evaluation comparing how growth changes may affect the residuals be pursued. The Team also recommended the author investigate whether size-based selectivity affects the patterns observed.**

The Team inquired if the age-0 beach seine index was excluded as recommended by the Team and the SSC last year. Pete confirmed that it was. There was a question on how the beach seine age-0 data compared to the estimated recruitment without those data and the author responded that a direct comparison was not made. He noted that the beach seine survey began during a period of low recruitment.

Pete presented a slide (not in SAFE chapter) showing the impact of different future recruitment expectations. Namely, he showed that the near-term biomass trend was much less optimistic when mean recruitment is based on the 2014 and later year-classes. The Team acknowledged that this was useful for communicating potential near-term expectations (i.e., that the next few years of recruitment may fail to recover to the long-term post-1977 mean).

Pete mentioned that it is worth further exploring the IPHC survey to see if it can be incorporated into the assessment. The Team supported this idea.

The Team noted that the MCMC diagnostics were limited and it was unclear what parameters were correlated and how they might differ from the asymptotic approximations. A more detailed evaluation of the posterior might reveal issues with parameters that are confounded or poorly determined. **The Team recommended examining the updated MCMC tools (e.g., adnuts) and diagnostics.**

Relative to the time-varying longline survey catchability being linked to an environmental covariate, **the Team recommended that it be re-examined against a fixed value for comparison.**

Flathead sole

Maia Kapur presented the GOA flathead sole assessment. This assessment was scheduled to be a full assessment in 2021, but due to limited staff resources a partial assessment was done in 2021 and a full assessment was presented this year, with the next full assessment scheduled for 2025. There were no changes in the model structure, and the model was bridged to the most recent version of Stock Synthesis (SSv3.30.17). A new ageing error matrix was implemented using GOA flathead sole data rather than the previously used ageing error matrix based on BSAI flathead sole data.

The Team noted the two most recent survey biomass estimates show a decline but the model does not fit them well. Maia noted the data weights suggest that the model scale is sensitive to the treatment of the

conditional age and length data, but the input sample sizes are highly influential. She also noted that in the VAST application to flathead sole, the decline is less pronounced (she added a figure to the final draft of the chapter to illustrate this). In general, the new data had minimal influence on model results and the Team agreed with the author's recommendations. The 2023 ABC is 1% lower than the previous years. Catch continues to be low and is less than 10% of ABC.

Several analyses were conducted to explore scientific uncertainty, including likelihood profiles on several key parameters (i.e., natural mortality, survey catchability, and unfished recruitment), and evaluation of different data weighting procedures. The profiles for natural mortality and catchability revealed data conflicts with different data components. Research priorities Maia noted were to investigate the interaction between data weights and catchability, explore priors on catchability and natural mortality, and investigate selectivity. The Team supported these priorities.

The Team discussed the use of links in the assessment document that show additional analyses that were conducted. The Team appreciated the ability to easily review these analyses and had a short discussion on how future documents may be more accommodating for online viewing (i.e., as an html in addition to pdf documents).

Northern rockfish

This full assessment was presented by Ben Williams and new data included the AFSC 2021 GOA bottom trawl survey (and age compositions) and updated catch. Ben presented model changes (completed last year) which included moving the terminal length bin from 38 to 45 cm and removing the 1980s bottom trawl survey data. The shift in length bins reduced the sensitivity of this group and the removal of the 1980s survey data was recommended in the past. The Team accepted these changes.

A recent study of the potential for skipped spawning in older female fish was discussed, and it was shown that it can have a large impact on model outputs. However, the preliminary study was based on a limited amount of data. **The Team recommended that the author conduct a literature search to bring in more supporting information on skipped spawning from other studies on similar species in the interim until more information for northern rockfish becomes available.** A member of the public suggested that future data collections could potentially be arranged by partnering with industry.

The Team briefly discussed the incidental catch of prohibited species in the GOA rockfish fishery. The recent increase in salmon catch was mostly attributed to the POP fishery rather than directed fishing for northern rockfish.

Ben presented an alternative model with Francis data re-weighting but he noted further work was needed before this model could be suitable as the base model configuration. The Team supported this.

The Team highlighted the poor fits to the fishery length compositions in years prior to 2003, which also aligned with increased deviations in retrospective analyses. Team discussion centered on potential causes such as a change in growth or changes in fleet dynamics, since this corresponded to the same years when Pacific ocean perch were in a rebuilding plan. **The Team recommended that the author investigate these issues by evaluating separate fishery selectivity or growth patterns to better fit this older data.**

Dusky rockfish

Ben Williams presented the assessment for dusky rockfish. The 1980s survey data was removed, and a series of models were conducted to evaluate the effects of increasing the age and length plus group. Different VAST configurations were explored to estimate survey biomass with either gamma or lognormal distribution for the positive catch rates. The author's recommended model extends the plus group for age and length and applies a VAST model that uses lognormal error distribution for estimating survey biomass (the VAST default produced by AFSC is the gamma distribution). The effect of the lognormal error reduces the variability between the survey estimates of biomass, as well as the uncertainty of the individual survey biomass estimates. The retrospective pattern was improved, with the magnitude of Mohn's rho decreasing to -0.12 from 0.51 in the 2022 assessment. The Team supports the author recommended model, as it fits the data well and improves the retrospective pattern.

Ben noted elevated risk scores for both assessment and population dynamics considerations from level 1 to level 2. The assessment model is sensitive to the scale of the VAST estimates of survey biomass. Skip spawning has been observed for this stock, although the extent is unknown and is not accounted for in the assessment model. The recommended ABC for 2023 is a 47% increase from the 2022 ABC, although it should be noted this stock was placed on a stairstep transition to higher ABCs by the SSC because of the increases that occurred when the VAST survey biomass estimates were adopted in the 2020 assessment. The 2023 recommended ABC, however, is very similar to the projected 2023 ABC from the 2021 assessment.

The updated ABC apportionment results in a small ABC in the western GOA. The design-based estimates of survey biomass are used for apportionment whereas the VAST model-based estimates are used in the assessment. **The Team recommended evaluating the use of VAST estimates of survey biomass for apportionments.**

Ben identified several future research priorities, including identification of habitat requirements, ageing error and bias, skip spawning, data weighting, and additional observation error for the VAST estimates. The Team agrees with the author's plans for further research on these topics.

Several aspects of the input data were changed in this assessment (e.g., the age and length plus groups, VAST estimates of survey biomass, and removal of 1980s survey data), and the retrospective pattern changed substantially. **The Team recommended exploratory model runs to identify the extent to which each of these changes contributed to the change in the retrospective pattern.**

Demersal shelf rockfish

Phil Joy presented this year's assessment. The most recent survey was in the Central Southeast Outside Section in 2022. ROV surveys occur across the 4 different SEO management areas and each area is typically surveyed every 3 or 4 years. In past assessments, the yelloweye rockfish (the majority of the complex; >95%) biomass point estimate has been shown to be at low levels compared to historic biomass levels; however, the Team noted that the decline in biomass is less remarkable with transition from the historical status quo methodology to the new REMA model framework. In response to the perceived decline in biomass, previous assessments have taken a conservative approach and used the lower 90th confidence interval of biomass for setting the OFL and ABC for the harvest specifications. This method was not used for this year's assessment and OFL and ABC were set using the biomass point estimate. This change accounts for the increase in biomass estimates from 2022 (12,388 t) to 2023 (17,511 t). Three of the 4 risk level considerations scored at Level 2, while one scored at Level 1 (environmental/ecosystem considerations). The Team again discussed the lack of prescribed outcomes from the risk table scores

(i.e., what risk table score necessitates a reduction in ABC and what should the magnitude of the reduction be?).

The Team supports the author's recommended model (Model 22.2; two survey with an observation error term) and the recommended transition from Tier 4 to Tier 5 for the yelloweye rockfish component of the complex. The recommended random effects model smooths across years with missing data which is useful given the infrequent (3–4 year) survey schedule for this assessment.

The Team supported the author's recommended OFL (376 t) but not the author's recommended ABC (244 t) which proposed a 15% reduction from maxF_{ABC} through the risk table. The Team recommended an ABC of 283 t (maxF_{ABC}) noting that the lower F rate associated with the change from Tier 4 to Tier 5 was a sufficient conservation buffer to address the author's concerns. The author concurred with the Team's decision.

The Team commended the authors' work to update the assessment and looks forward to additional work on yield/per recruit, aggregation of data across the SEO sections, and further exploration of IPHC survey bycatch data.

Thornyhead rockfish

Katy Echave presented this assessment and noted that the R *rema* package was used and that the 1984 and 1987 bottom trawl survey biomass estimates were removed as requested. Two models were presented: the status quo with a correction to a coding error, and a second version that adds observation error for the bottom-trawl and longline surveys. Katy noted that the biomass index from the longline survey increased. Bycatch of thornyheads in longline fisheries has been decreasing likely due to changes in gear and increased use of collapsible, slinky pots in the sablefish fishery. Meanwhile, thornyhead catch has increased in the rockfish trawl fishery. The 2022 catch of thornyheads is well below the 2022 ABC.

The Team supported the correction to the base model and notes that the revised configuration of the model is a necessary improvement. The Team also concurred with the authors' recommendations to use Model 22. The Team discussed applying VAST or other methods to extrapolate information to the 700-1000m depth strata. A significant portion of thornyhead abundance is found within these deeper depths (e.g., ~25% of thornyhead biomass from the longline survey is caught between 600-800m) and removing these data entirely from the assessment would reduce ABC estimates. However, the trawl survey will no longer collect data from the 700-1000m depth strata, and longline survey data do not currently support depth stratification that is comparable to the trawl survey. The Team noted that it may be possible to use longline survey data to inform biomass trends at depth and to use existing trawl survey data points from this strata to determine scale. The author noted the REMA model already is doing this.

The Team recommended the use of a common process error across the GOA, and would like to see a comparison of that approach with the current approach that allows process error to vary by sub-region. If process errors are treated separately by sub-region, then justification for that decision should be provided.

Sharks

Cindy Tribuzio presented the assessment for the Gulf of Alaska shark complex. This year's full assessment for the shark complex included multiple changes, including shifting the SAFE report to a combined format for the BSAI and GOA to reduce redundancies and streamline review (analytic approach and results are largely segregated by FMP); reorganizing the SAFE document to provide information more efficiently and effectively (supplementary information has been moved to appendices); and investigation of alternative methods for both Pacific Sleeper Shark and Other/Unidentified Sharks within the complex (both Tier 6 species). The Team commends the authors on their efforts to investigate alternative approaches for Tier 6 species within the NPFMC management framework, respond to PT and SSC comments/recommendations, and utilize all available information for these species.

The assessment of Pacific Spiny Dogfish (Tier 5) was a straightforward update utilizing Model SD15.3A, which uses a random effects smoother of the time series of trawl survey biomass to calculate harvest recommendations. The assessment of Salmon Shark (Tier 6) is also an update with no changes to the previous methods (Model 11.0) based on mean catch from 1997-2007. The Team had no comments or recommendations on this work.

The authors investigated an alternative method for Other/Unidentified Sharks (Model OU22.0) that uses the 90th percentile of mean catch between 1997-2007 (this is the same time period of catch being used for the status quo approach). The authors recommended this approach over the status quo methods to reduce the impact of large/misreported hauls for these rare species and to keep consistent methods between GOA and BSAI (90th percentile is also recommended for BSAI Other/Unidentified Sharks). The Team had a robust discussion on this methodology, noting that "outlier" observations can still occur and also that Tier 6 methods are stop-gap measures until better monitoring and biological information becomes available.

The Team recommended the status quo methods (Model 11.0) for Other/Unidentified Sharks until additional exploration of the catch time series for this group can be conducted. The Team concurred that more information and rationale was needed to proceed with the author recommended method for this component (OU22.0). Catch time series investigations (for the next full assessment in 2024) should include reconsideration of the period used for calculating average catch.

The authors presented an alternative method for Pacific Sleeper Shark (Model PS22.0) that uses the Only Reliable Catch Stocks (ORCS) method. This was originally described in Berkson et al., 2011 and refined by Free et al., (2017) based on Restrepo et al., (1998). The authors described ORCS as the next step up from average catch for data-limited stocks since it includes life-history attributes. A variety of other data-limited methods were explored by the authors for use on PSS and found ORCS to be most suitable, despite being developed for use on data-limited exploited stocks. The Team noted that the terminology (i.e., under exploited/fully exploited/over-exploited) used in ORCS is problematic for application to Tier 6 stocks, as it implies unknowns about stock status (i.e., biomass or exploitation status). The authors noted that this approach was relatively insensitive to changes in multiple "attributes" used in ORCS.

There was discussion amongst the Team regarding the appropriateness of this approach for a Tier 6 stock, and whether this information should be brought forth via the risk table instead. The authors noted that the ORCS approach utilizes available information that, while not suitable for use in modeling, is not applied using the status quo catch method. The authors further noted that their entries to the risk table are based on their recommended approach; entries to the risk table would be substantially different based on the status quo approach. Additional concerns were raised about reproducibility of qualitative approaches in general; replicating methods that are largely based on expert opinion can be difficult or impossible. Further discussion focused on conservation concerns for PSS–sufficient information exists to warrant

precaution for this species given life history characteristics and general uncertainties. However, information to develop a stock-specific ABC and remove PSS from the shark complex is lacking at this time. The authors noted that there are multiple research projects currently in progress that may provide the missing information.

The Team recommended that a working group be formed to investigate alternative data-limited methods and harvest control rules for Tier 6 stocks. In particular, this WG should investigate how the ORCS approach might be applied to Tier 6 stocks with particular conservation concerns.

The Team recommended that the status quo for the PSS component be used for ABC/OFL recommendations this year. They noted that the innovative work is the first step to highlight whether PSS should be managed separately from the shark complex.

Forage fish

Cody Szuwalski presented the forage fish report and focused on replicating the forage fish reports from previous years. Survey data suggest that biomass and abundance of many forage species were near all time highs, and all species were above average. Cody noted however, that trends in fisheries catch in 2021 do not match survey trends, and he would like to explore this more. Additionally, data coming from the GOA ESR (specifically the rhinoceros auklet diet data showing capelin remaining near all time lows) were contrary to the findings in the forage report. Cody explained that this is one reason he would like to explore more spatio-temporal indices of forage fish and plans to work with the ESR Team. The Team noted that in the future it would be helpful to see more detail on areas between Kodiak and Yakutat (such as PWS). The Team appreciated Cody stepping up to take on this report.

Approve Harvest Specifications

The Team noted the compilation of the 2023 and 2024 harvest specifications and recommended their adoption by the SSC.

Adjourn

The meeting adjourned at approximately 12pm Pacific time.