North Pacific Fishery Management Council

Simon Kinneen, Chair | David Witherell, Executive Director
1007 W. 3rd Avenue, Suite 400, Anchorage, AK 99501
Phone 907-271-2809 | www.npfmc.org

Gulf of Alaska Groundfish Plan Team

MINUTES

September 21-22, 2022 – Alaska Fishery Science Center Seattle, WA

GOA Team Members			
Jim Ianelli	AFSC REFM (co-chair)	Pete Hulson	AFSC ABL
Chris Lunsford	AFSC ABL (co-chair)	Sandra Lowe	AFSC REFM
Sara Cleaver	NPFMC (coordinator)	Nat Nichols	ADF&G
Kristan Blackhart	NMFS OS&T	Andrew Olson	ADF&G
Obren Davis	AFSC FMA	Jan Rumble	ADF&G
Craig Faunce	NMFS AKRO	Paul Spencer	AFSC REFM
Lisa Hillier	WDFW	Marysia Szymkowiak	AFSC REFM

Administrative

The GOA Groundfish Plan Team ("Team") convened on Wednesday, September 21, 2021 at 10:45am PDT. Participation was in person and remote via Zoom. Roughly 60 people attended the meeting, attendance varied throughout the meeting. All documents provided prior to or during the meeting as well as presentations given during the meeting were posted to the Council's electronic agenda.

Shelikof Survey

Dave McGowan provided a summary of the 2022 winter acoustics survey. Transects were performed in 2021 in the southern end of the survey area that were not done in 2022. The public noted that there may have been juvenile pollock in those two transects, and that this could affect estimates. An industry representative noted that the fleet did not see the fish move north while it was harvesting its A-season pollock.

Pollock distribution was contracted this year and had moved to the southwest. Dave noted that the temperature was close to average, but there may have been some environmental driver affecting behavior.

The survey started one week later in 2022 but did find the pre-spawning fish and survey timing appeared appropriate. There were questions about how to decide when the survey should be conducted. Dave noted that part of the general timing is decided by weather, and weather drives the order of the survey (specific locations). There are many factors which go into survey timing. Spawning is driven by degree days, so it is hard to predict spawning timing and the ideal survey timing occurs just before spawning. Also, survey timing has changed in response to information on the spawn-timings collected over the years.

There were questions about factors affecting the change in the horizontal distribution of pollock, but there are no obvious explanations. Dave provided some information on forage fish. Capelin and eulachon are present in the survey area but hard to quantify. More herring were expected in this year's survey but estimates were low. There is interest by the survey team to investigate methods to estimate biomass for forage fish species, specifically for eulachon. A question was raised from the public about staffing for the surveys in the future. There are new employees who have been hired to support the survey and survey organizers are talking to leadership about getting additional support to maintain MACE survey operations.

There was discussion about survey vessel dependability, mechanical issues, and other problems related to the NOAA vessels. A member of the public noted that industry talked to the congressional delegation when they were in Kodiak about the utility of using NOAA vessels. Survey staff noted that once at sea, there were no problems and things aboard went smoothly. The issues occur at levels above the vessel crew and scientific staff, although there is a lack of deck hands, and maintenance issues also exist. NOAA leadership does need to hear from stakeholders about their priorities. Logistics may be difficult next year and may persist because of staffing issues and COVID. The Team noted this is a topic of conversation in many regions and there are no easy solutions. There were questions about the effect of the loss of survey information due to cancellation of surveys, but this is difficult to quantify.

GOA Pollock

Cole Monnahan presented an update on model results. The first analysis he showed was related to the ability to estimate "SigmaR" (the recruitment variability about a mean value). He was able to estimate this value using the new WHAM (Woods Hole Assessment Model) implementation. The new estimate is 1.3 compared to the previously assumed value of 1.0. It was noted that there is some difference between initial conditions (starting in 1970) specified in WHAM versus the base GOA pollock model.

The Team recommends using the new estimate of Sigma R (1.3) or the best estimate selected by the author.

Cole presented results from sensitivity model runs on bottom-trawl survey (BTS) catchability. The retrospective pattern was much poorer without the prior distribution on survey catchability. The Team discussed how the prior was developed. Martin Dorn said it was in discussions with BTS leads, it was originally set at 1.0, and about 10 years ago it was switched to 0.85, (CV 0.1). The Team agreed with past recommendations to look at the catchability/availability prior. While the Team agreed with the approach currently in use for the prior, especially because the retrospective pattern was better than when the prior was relaxed. More study and discussion would be worthwhile to elicit the prior that's in use including looking at the prior that was developed for Pacific cod.

The BTS catchability estimate varied substantially under the retrospective runs and seemed counterintuitive (it went up when the index was low). The Team suggested examining why this happens to help support assumptions about BTS catchability in the future.

Cole presented a one-step ahead residuals as a replacement for Pearson residuals used as a diagnostic. The Team endorsed this approach. He also showed one approach to help the poor residual patterns in the fits to the age composition (specifically age 4 over time). The Team responded that this was one approach but that it was ad-hoc. They encouraged examining other forms for time-vary selectivity specifications, for example, as done in the EBS pollock assessment.

The issue of inclusion of selectivity from the summer acoustic trawl data was discussed, and the Team left this up to the authors discretion, since new 2021 age composition will be available for the November assessment.

The Team discussed updating winter apportionments and Cole presented an AR(1) process (shared error) for the region-specific data (with an assumed constant CV). This approach is a useful way to identify areas where surveys have been missed. The trade-offs between using an AR(1) process vs a random-walk were discussed. The latter might be more reflective of a persistent species distribution shift. The Teams suggested doing a cross-validation (or leave one out) approach to help with selecting the model form. Specifically, whether AR(1) out performs a random walk approach.

Cole presented his work on adding covariate specifications applied to survey catchability for the acoustic trawl (AT) data within the assessment. Using TMB allowed for the estimation of error terms for the covariates, and he demonstrated that this can link up important aspects that can affect the assessment. The model with both covariates included a random-walk term, which greatly improved the model fit to the survey data and resolved some discrepancies. This model was the selected model based on AIC. The Team commended this work and agreed that this should be actively pursued so that environmental effects within assessments can be done using the best statistical assumptions possible. This represents work in progress and is not expected to be included in the 2022 assessment results. The Team suggested that a next step would be to scale the variance terms for the survey data fits according to the 1-D relative error estimates available from the AT data. It was also suggested that the AT relative error estimates could be rescaled to have a mean of 0.2 so that the scale of the index uncertainty would be comparable with the base model. The Team discussed whether there is net flux of pollock through the Shelikof strait and how this impacts the catchability estimates.

GOA Other Rockfish

Cindy Tribuzio presented methodology and updates to estimating natural mortality for GOA Other Rockfish.

In recent years, there have been advancements in updating natural mortality estimates (*M*) for 11 rockfish species across BSAI and GOA to be utilized in stock assessment. A recent tech memo was published that provides a suite of estimates of *M* that utilized multiple factors including life span, somatic growth, reproductive biology, and metabolism to estimate *M*. These results provide a suite of new *M* estimates for select other rockfish species, but authors still need to determine a single *M* value for each species for use in the stock assessment. Three options were evaluated for other rockfish for determining a single *M* including: 1) select a single estimate, 2) use the mean/median value, and 3) use a weighted mean value with uncertainty.

The author recommended using Option 3, developing a weighted mean value that estimates uncertainty. Team discussed the subjective nature of this method because it utilizes expert advice to determine data weighting of the *M* estimates, and that this is done at the discretion of the author. One concern the Team had with this approach is that it is qualitative and emphasized the need for a more expansive explanation of data weighting, methodology, approach, and how biases are minimized. It was noted that the more heavily weighted *M* estimates will have a large impact on final estimates.

Application of these methods to other rockfish species impacted sharpchin and yelloweye rockfish the most.

The Team endorsed the methodologies for estimating *M* and supports the author's recommendation of using the weighted mean with uncertainty method to estimate. **The Team recommended the methodology and approach for estimating values of *M* be brought forward in the next full assessment for documentation purposes and that decision points in determining species specific values and rationale be included.**

SEO Demersal Shelf Rockfish

Phil Joy (ADF&G) presented a new state-space surplus production model (SS-SPM), and an updated random effects model (REMA), for the demersal shelf rockfish (DSR) complex in the Southeast Outside (SEO) Subdistrict. A full assessment will be presented in November 2022. The Team commends the author on the thorough presentation of both the development process and the results of these new models.

The Team recommended that:

- **the REMA model be used for producing biomass estimates going forward.** The Team appreciated the work that went into developing the surplus production model but considers it a "research" model at this time.
- **the November 2022 assessment document includes the three versions of the results table for comparison purposes (current model [status quo], REMA model with IPHC survey data, and REMA model without IPHC survey data). The surplus production model results should be presented as an appendix.** The Team expressed concerns about using the IPHC survey data for a patchily distributed species such as yelloweye rockfish, and how appropriate the IPHC survey is for tracking yelloweye population trends.
- **the author use the biomass point estimate instead of the lower 90% CI that is being used in the current model. If the author recommends an ABC/OFL reduction, it should be justified in the risk table.**
- **the author determine the origins of the $F_{40\%}$ value (0.026) being used and noted that if a Tier 4 designation is determined to be inappropriate, that the author should consider dropping to Tier 5 to more appropriately reflect the data limitations of DSR.**
- **the author consult the catch accounting group at the Alaska Regional Office for the best way to estimate historical yelloweye rockfish discards in the halibut fishery and resulting catch estimates.**
- **the author, after consultation with the SSC, pursue a CIE-type review of this assessment in the next 2 years.**

Other Rockfish / DSR Spatial Management

Sara Cleaver presented an update on applying Step 2 of the Council's Spatial Management Policy to a proposal to separate GOA demersal shelf rockfish (DSR) species from the Other Rockfish Complex and establish a Gulf-wide DSR OFL and area-specific ABCs. The presentation, per the Council's October 2021 recommendation, included a discussion paper that addressed additional management considerations associated with recategorizing DSR. The DSR and Other Rockfish assessments would be revised to reflect the revised species groupings if the Council moves forward with this change.

Both the Team and the SSC have been proponents of this change to DSR and Other Rockfish species recategorization for a number of years. The DSR OFL would be set Gulf-wide. The DSR ABCs would be combined area-specific WGOA, CGOA, and West Yakutat ABCs, along with a separate East Yakutat/Southeast Outside ABC. This would allow the State of Alaska to continue to manage the DSR complex in the SEO District, particularly yelloweye rockfish, with the State's existing management tools. An aggregate ABC for the W/C GOA and West Yakutat could increase NMFS's DSR management flexibility and limit the potential for, and frequency of, placing the DSR complex on PSC status.

The Team noted that there already is a suite of management measures in place to curtail and control the catch of rockfish in general, including full retention requirements for fixed gear, with corresponding limits on the amount of rockfish that may enter commerce.

The Team recommended that the 2022 DSR assessment incorporate an example of how the DSR Gulf-wide OFL and the ABCs would be calculated under this revised categorization, including corresponding changes to the Other Rockfish OFLs and ABCs.

The Team suggested that Council begin the planning process for the rulemaking needed to revise regulations associated with the establishment of a Gulf-wide DSR category, per potential Council action on this item.

GOA CLIM

Martin Dorn, Alberto Rovellini, and Grant Adams gave a presentation on the evolution of GOA CLIM including the ATLANTIS and the CEATTLE models. Alberto Rovellini presented an update on the development and calibration of an Atlantis ecosystem model for the Gulf of Alaska. The intent of ATLANTIS is to hindcast heatwave impacts on GOA groundfish and provide projections of future impacts from climate change scenarios on the GOA. The ATLANTIS model includes 78 functional groups of groundfish, marine mammals, invertebrates, birds, bacteria, and detritus. Fishing is incorporated in the models through catch removals. Improvements to the model are needed to better reflect where harvests actually occur.

The Team asked where the species' thermal information in the model comes from because understanding how temperature will change and impact the system is particularly useful. Alberto noted that if we use these tools to understand the effects of warming, the right architecture must be built for understanding the impacts of temperature on each species, and we also must understand thermal niches and their intersection with spatial distributions of groundfish. Currently, the ATLANTIS model is using the broadest thermal envelope that a species can tolerate, and if the temperature rises above that, ATLANTIS essentially removes the species from that area.

The Team asked if mortality is tied to the bioenergetics responses in this model and if survival is linked to this. Alberto responded that ATLANTIS can be configured for that, but the GOA CLIM team is explicitly not imposing mortality that is not associated with harvests in ATLANTIS. Mortality is not explicitly tied to bioenergetics.

The Team noted that a recent GAO report noted that the timeframe of the science projections for models like ATLANTIS are misaligned with current management needs. The Earth System models that ATLANTIS projections are based on, project 50-100 years out. The ATLANTIS model is somewhat constrained with these timeframes for projections.

The Team noted that the method of applying Species Distribution Maps (SDMs) to survey data may be useful.

Grant Adams presented his work on MSEs using CEATTLE to determine whether ignoring predation mortality leads to an inability to achieve management goals in Alaska. Outputs from this model are used in developing the output for ESRs every year. The Team encouraged this approach as a strategic way of looking at patterns in how predation mortality may be changing over time, noting that this approach could be one way to synthesize diet data. This work demonstrates one way to test our current management strategy (single species versions) with a multi-species operating model. The Team supports this work and noted that this type of work should be considered in the Council's research priorities process.

As part of the GOA CLIM project, Martin Dorn presented a reevaluation of the OY range for groundfish in the GOA using single-species MSY estimates. This was the first effort reevaluating the upper end of the OY range in the Gulf of Alaska, with the methods originally used applied to updated stock assessment information. Martin provided relevant historical context and explained how the MSA requires Councils to review, "on a continuing basis….the assessments and specifications made…with respect to optimum yield". The Team noted that the previously estimated upper end of the OY range currently in use, is likely overestimated due to the early stock assessment methods and information. Of note was the lack of

documentation for the 8% reduction from the estimated aggregate MSY for the original upper end of the OY.

Based on this reevaluation of the upper end of the OY using the historical methods with updated MSY values, recent TACs and ABCs seem consistent with the new OY estimate of 444,600 t which may be more realistic than the upper end of the current OY range of 800,000 t. The Team noted the value of this work, and encouraged further efforts to re-evaluate the Gulf of Alaska OY.

Vulnerability Assessment

Ben Williams presented an overview of the GOA Fisheries Climate Vulnerability Assessment that is currently under development. This included a discussion of the project's objectives, methods, and process. Socioeconomic considerations are a key component of this assessment. Ben noted that the group associated with this project plans to poll Team members about their respective species' expertise following the September Plan Team meeting, with a subsequent survey/questionnaire to Team members after the November 2022 meeting.

The Team discussed how one of the drivers for this project is how to incorporate climate change vulnerability information into stock assessments' risk tables. Additionally, the Team discussed the importance of determining the nexus of potential vulnerability with the frequency of assessments, since some assessments are only done periodically.

The Team recommended that other subject matter experts beside Team members and assessment authors be considered as potential resources to assist with ranking and scoring the potential effects and extent of how species may be vulnerable to climate change. This is particularly important for the socioeconomic aspects of the vulnerability assessment.

Northern Rockfish

The Gulf of Alaska Northern Rockfish assessment was presented by Ben Williams. Three model modifications were explored: (1) increasing the length composition plus group, (2) using the Francis method to reweight the composition data, (3) changing the weight on the VAST index from 0.25 to 1, and (4) incorporating skip-spawning into the estimated maturity curve. Model estimates (i.e., biomass or biological reference points) were not sensitive to the plus length group, however, the fit of the length composition data was much improved with an extended plus group. Model estimates were sensitive to the Francis reweighting method and reweighting the VAST index, however, these improvements help the model to achieve a more objective relative weighting between the index and composition data, rather than using a subjective weight of 0.25 to balance the fit between the data sources. Spawning biomass was sensitive to the incorporation of skip-spawning information in the maturity curve, and decreased when skip-spawning was incorporated.

The Team recommended that the following model changes be brought forward in November:

1. **Remove the bottom trawl data from the 1980s**
2. **Extension of the length plus group**
3. **A model that uses the Francis method to reweight the composition data**
4. **A model that sets the VAST index weight at 1 rather than 0.25**

The Team encouraged future research efforts using skip-spawning in the Northern rockfish assessment, as well as investigating the VAST settings used, similar to the analyses in the Dusky rockfish assessment.

The Team recommended that the issue of skip-spawning be brought forward in the risk table for this year's assessment.

Dusky Rockfish

The Gulf of Alaska Dusky Rockfish assessment was presented by Ben Williams. The author explored two model alternatives including: (1) extension of the age and length composition plus group, and (2) alternative settings in the VAST index model. In general, extending the age and length composition plus groups resulted in better fits and have negligible effects on model estimates (i.e., biomass or biological reference points). Alternative settings in VAST were also explored, including the error distribution and number of knots. Model estimates of biomass are sensitive to the settings used in VAST because of the variability in the VAST index both across and within years. It was noted that using the lognormal distribution rather than the gamma distribution which is the current setting employed by GAP, reduced the influence of large biomass estimates (which are highly variable and driven by extreme catch events in the survey), on model results.

The Team recommended that the following model alternatives be brought forward in November:

1. **Remove the bottom trawl survey data from the 1980s**
2. **Extension of the age and length plus groups**
3. **A VAST index using the lognormal distribution and 750 knots**

The Team requested that VAST model diagnostics be placed in an appendix of the November SAFE document. The Team noted that future investigations should include using the Francis reweighting method similar to the Northern rockfish assessment.

Thornyhead Rockfish

Jane Sullivan presented model updates and proposed alternative models for the GOA thornyheads. This update demonstrated application of the *rema* R package to the two-survey model that is informed from the bottom trawl survey (BTS) and longline survey (LLS). This process allowed for bridging between ADMD and TMB, assessing the impact ADMB error had on new data for 2021, and development of new models with additional observation error estimated.

The BTS and LLS survey are stratified differently, where the BTS is stratified by management area and depth and the LLS survey is stratified by management area only. This model allows for parameters to be assigned to different strata and linked to appropriate management areas.

The model correction resulted in a 14.4% decrease in 2020 biomass and apportionment shifted to WGOA, whereas apportionment changed minimally for models with additional observation error.

The Team recommended excluding BTS data from 1984 and 1987 due to different survey methodology and to continue utilizing a two-survey model.

The Team recommended simplifying the model naming convention where Model 18 represents the status quo model, Model 18* is the corrected model in TMB with new data, and Model 22 is the model with additional observation error on BTS and LLS.

The Team recommended discontinuing the misspecified status quo model (Model 18) and bringing forward both the corrected model (Model 18*) and the model with observation error on both the BTS and LLS (Model 22) for the November assessment.

2023 and 2024 Harvest Specification Recommendations and Halibut Discard Mortality Rates

The Team approved the proposed harvest specifications for 2023 and 2024 by recommending the 2023 GOA final harvest specifications for OFLs and ABCs as published in the Federal Register in March 2022.

The Team approved the 2023 and 2024 halibut discard mortality rates with one change. The Team agreed with the Halibut DMR Working Group that the GOA non-pelagic trawl CP sector now has a sufficient sample size to calculate the GOA trawl CP DMR instead of using the BSAI proxy DMR. The revised recommendation using the two-year average is 83 percent.

Adjourn

The meeting adjourned at approximately 4:00pm Pacific time.