

**Groundfish Stock Assessment Process Review
Pacific Fishery Management Council
Scientific and Statistical Committee's Groundfish Subcommittee
and Other 2021 Stock Assessment Review Process Participants
Online Webinar**

January 25, 2022

The SSC Groundfish Subcommittee met via webinar with representatives from the Groundfish Management Team (GMT), Groundfish Advisory Subpanel (GAP), Stock Assessment Team (STAT) representatives and other interested parties on January 25, 2021 to review the 2021 groundfish stock assessment and stock assessment review (STAR) Panel process. The focus was on recommending improvements for future groundfish stock assessments, STAR Panel meetings, including the Terms of Reference and the Accepted Practices document for groundfish stock assessments. Recommendations are listed at the end of the report. The webinar agenda is attached as Appendix A, a list of participants is attached as Appendix B and the input from the Science Centers is reflected in Appendix C.

Perspectives on the 2021 Stock Assessment Process

Center for Independent Experts (CIE)

Dr. Matt Cieri (Center for Independent Experts) offered the following comments with respect to his role as the external reviewer for all three STAR panels. With respect to technical aspects of the stock assessments, he noted the following:

- There is more prevalence of retrospective patterns across the stocks in this region compared to others. Consider how these patterns affect uncertainty and the category designation given to each assessment.
- The Sunset/Vermilion assessment showed considerable changes in spatial management over time. The consequences of these changes for uncertainty in the fishery-dependent indices warrants further consideration.
- Uncertainty in how state-collected recreational data were analyzed and how they could be used created confusion. This should be better documented and understood in future assessment cycles.
- Multiple assessments faced challenges because their spatial extent is not well-defined. This was particularly true for stocks crossing the U.S.-Canadian border, where a lack of shared data and collaboration with the Canadian Department of Fisheries and Oceans (DFO) was observed. Further collaboration with DFO on these issues is prudent.

Dr. Cieri also made the following suggestions with respect to the PFMC assessment process:

- In-person meetings are preferable to virtual meetings for STAR panels.

- When virtual meetings must be held, analyses need to be completed and documents prepared well in advance of the panel meeting. It would be preferable to have presentations available to reviewers in advance of the first day of the meeting.
- Mid-meeting presentations and responses to requests should include written conclusions on the slides for reference after the panel.
- Some models were dramatic improvements over previous assessments, but still could have benefited from further explorations. In the current process with one week STAR panels, the only options are to accept or reject. Consider implementing research track and management track assessments to allow for development of assessments over a less constrained period.
- The goals of the mop-up panel could have been more clear, in particular the role of the CIE reviewer in that meeting. Conducting this panel as a GFSC meeting meant that there were many reviewers and many stocks were discussed that were not from STAR panels
- There is more SSC involvement in all stages of the assessment process here than in other regions, including data acquisition, data preparation, on the assessment team, pre-review, review, and ABC/OY determination. Consider whether this level of involvement is intentional and benefiting the process. Given this, also consider what the role of independent review is in the process.

Groundfish Management Team (GMT)

Perspectives from the GMT were offered by Whitney Roberts, Mel Mandrup, and Katie Pierson. The GMT supports the recommendations listed as agenda sub-items. They also offered the following suggestions:

- A publicly accessible posted timeline of the whole stock assessment process would be helpful. In particular, clearer deadlines for requesting alternative catch streams and model runs and documentation of the process to submit requests to would improve the process.
- A larger and better defined role of the GMT and advisors in the data-moderate assessment review process is requested.
- Stock delineation decisions for assessments and management units should be made as early as possible in the assessment process.
- The goals and objectives of the mop-up panel were not very clear and the meeting was difficult to follow.
- In the future, pre-assessment workshops should not occur during Council meetings, where the GMT and advisors are focused on Council agenda items.

Groundfish Advisory SubPanel (GAP)

Gerry Richter offered the GAP perspective. He commented that the process went well overall, as did the individual STAR panels. Communication between STATs and reviewers was excellent and the GAP appreciated the considerable time and effort put into addressing the Council's requests. However, the GAP thought the review of the Data-Moderate assessments was

insufficient, and not enough time was devoted to the review process. In the future, reviewing these types of assessments during a STAR panel would be strongly preferred.

STAR Panel Chairs

The chair of each STAR Panel offered their perspectives on their respective panels. Dr. John Budrick (CDFW) chaired the Vermillion/Sunset panel. He thought the panel went well and appreciated the efforts by the STAT to provide complete documents, as well as their openness to requests by the panel. The outside reviewer (Dr. Alan Hicks) was excellent. Dr. Budrick offered the following suggestions:

- More time is needed between STAR panels, and between the last STAR panel and briefing book deadline for the September Council meeting to allow for report writing and document preparation.
- More clarity is needed in requirements for decision tables at STAR panels. Providing complete decision tables may not be feasible by the end of the panel, but having a clear outline of the catch streams is recommended.
- A process for determining stock structure should be discussed, perhaps occurring prior to the pre-assessment data workshop. This additional process step could be combined with the data and ageing coordination meeting in late summer of 2022.

Dr. John Field (SWFSC) offered his comments as chair of the lingcod STAR panel. Overall, the panel went well, but the models were challenging. Despite being data-rich, the data were not particularly informative. As a result, estimates of natural mortality and steepness were particularly sensitive to model structure and available data. However, all of the uncertainties and sensitivities present in this assessment were also present in the previous assessment and the new assessment was clearly an improvement. Dr. Field made the following recommendations:

- Update the accepted practices document to include recommendations on how to use more than one index for a given survey or fleet. This has been done previously using ghost fleets. However, there were misunderstandings among members of the STAT about how and when this would be appropriate, in this case for the CCFRP index in the south.
- Continued flexibility in the TOR for atypical decision tables is needed. The northern lingcod decision table used an unusual axis of uncertainty involving sex-based selectivity in the low state of nature and no fishery ages in the high state of nature, which this was appropriate given the unique situation.
- Recognize and accommodate extreme exhaustion with conducting virtual STAR panels. Despite best efforts, the review process does suffer some. Providing adequate time for turnaround of all documents and requests, and clear and transparent deadlines would help STATs plan their time and reduce stress.

Dr. Theresa Tsou (WDFW) chaired the dogfish and Dover sole STAR panel. She noted that the review of the Dover sole assessment went smoothly. The dogfish assessment was reviewed at the panel, and the STAT was reviewed at every subsequent GFSC and Council meeting, including the mop-up panel. She strongly recommended that avoiding this situation in the future would be

preferable, and that if problems were found at the first review, the assessment should be sent directly to the mop-up panel. Dr. Tsou also echoed the comments of the GMT that scheduling pre-assessment workshops during Council meetings should be avoided in the future.

Dr. Andre Punt (UW) and Dr. Kristin Marshall (NWFSC) co-chaired the GFSC review of the Data-Moderate assessments and Dr. Punt also chaired the mop-up panel and briefly commented on their experience. They appreciated the efforts of the STATs for these assessments given the multiple GFSC reviews and mop-up meeting. In retrospect, scheduling more time to review the Data-Moderate assessments would have been beneficial, especially given this was the first use of the newly approved length-based methodology applied to a PFMC stock. At the mop-up meeting, materials were submitted from different sources at different times and the many topics made the meeting difficult to chair. In particular, delineating stock boundaries for management was a challenge to address in an ad hoc manner, without adequate planning and preparation. Examining the North Pacific Fishery Management Councils framework for delineating stock boundaries may provide guidance on criteria and process considerations. The GFSC and STATs addressed the Council's requests to the best of their abilities, but more advanced consideration and planning should be done on this topic before the next cycle.

The STAT for each assessment was given an opportunity to share their perspectives. The NWFSC and SWFSC assessment staff led the preparation of a document ahead of the meeting summarizing the STATs' experiences and suggestions for the next cycle, which is captured in Appendix C of this report. One key consideration discussed is the high and increasing stress and workload associated with the assessment and review process. This cycle was characterized as the most challenging year experienced in the career of at least one seasoned assessment scientist. Moreover, high workload was noted throughout the assessment and review process, at NMFS, state agencies, and the Council. While incorporating the specific suggestions made in Appendix C will help reduce some of the stress and workload, the assessment prioritization process needs to better anticipate when multiple stock areas (and therefore multiple assessments) will be needed for a species as this is a substantial contributor to the amount of work.

Council Staff

Council staff, Mr. John Devore (PFMC) and Mr. Todd Phillips (PFMC), also shared their perspectives on this cycle. Their recommendations included:

- The Data-Moderate assessments should be reviewed by a STAR panel in the future. Attempting expeditious review of category 2 assessments may be desirable, but this has not worked well in the past.
- More attention to data deadlines is needed by all participants in the process (STAT, GMT, Council staff).
- Continue to look for opportunities to streamline the assessment reports, for instance, by moving non-technical material to SAFE documents (e.g., history of assessments for the species).
- Work to improve clarity in objectives and expectations at all stages of the assessment process.

- Identify any opportunities where Council staff can better facilitate STAR panels and the assessment process.

Recommendations for Improving the Stock Assessment Process

Attendees provided the following recommendations for future stock assessment cycles.

Improving timely data delivery to Stock Assessment Teams (STATs).

Deadlines for data delivery should be clear and should be met. The goal, of course, is to allow adequate time for the STAT to process and analyze the data, and then complete the modeling and written descriptions prior to review. There are other factors/improvements that could reduce the time spent on data sets by the STAT, the incidence of late arriving or late comprehension of the particularities of data sets, and improve the use of the data in stock assessment. These improvements include having all three states provide at least standardized data for all species and fisheries, and potentially working with assessors to provide processed data in a manner proper for each assessment.

In planning stock assessment responsibilities within the STAT, it would be a good idea to have a point person who is available to look at raw and/or processed data for each assessment early on in the assessment cycle, or as soon as it is available, so that questions, concerns and processing approaches can all be addressed.

The Council staff have proposed working on a regulatory history database, which should reduce the amount of time PFMC staff spend on researching the regulatory history.

Collaboration and planning between Science Centers and with others in the process.

Collaboration between the science centers has increased in the past few cycles. The same is true for collaborations with the states on assessments. While this is a positive development, it entails more meetings, and people focused on each assessment. Increasing federal-state collaborations are a positive development that result in higher quality assessments, although this collaboration requires more meetings, and people focused on each assessment.

Format, process and optimization of pre-assessment data workshops.

Pre-assessment workshops are important for setting up the assessment, including ensuring all relevant data are considered, and if used, are used in an appropriate manner, and in delineating assessment areas (note that the delineation of stocks will likely occur under a different process, prior to the pre-assessment workshops, in future cycles).

Require pre-assessment workshops in the TOR or specify the circumstances necessitating workshops when assessments are selected.

Pre-assessment workshops should be mandatory for full and data-moderate assessments, but not, in general, for updates or projections. Final scheduling of these workshops should occur at the June Council meeting in even years, if possible.

Since assessments may have different timeframes for data review based on the STAR panel schedule, and the importance of certain decisions, including assessment delineation may also

differ, pre-assessment workshops may be scheduled for different times during the stock assessment cycle. Therefore, it is unlikely there will be a single combined pre-assessment workshop for all species in a stock assessment cycle.

Document modeling frameworks agreed upon during pre-assessment workshop.

Assessment boundaries should be determined and agreed upon at pre-assessment workshops or before them in conjunction with the data and ageing coordination meeting. Clearly documented reasoning based on analysis of available data and previous studies should clearly articulate the justification behind boundaries. The approach to reconcile stock assessment regions with stock management regions (determined earlier) should also be documented. Affirmation of the anticipated assessment type (full, data-moderate) under action taken during prioritization or any changes, as well as the data to be used should be discussed at the pre-assessment workshop, with consideration of the type of review planned.

Increasing attendance of pre-assessment workshops.

Scheduling pre-assessment workshops during the June Council meeting prior to the start of the stock assessment cycle, and reiterating the importance of these workshops for assessment decision-making, should result in increased attendance. Scheduling should consider input on timing from interested parties and committees.

Pre-assessment workshop or another process for specifying stock structure.

Stock structure is a larger question, with procedural as well as scientific issues that should be scheduled for a future Council meeting. Genetic analysis and other cross-species and species-specific information should be brought to bear on the issue, as well as research and data collection planning to improve the data available to inform stock structure. Future prioritization efforts should focus not just on 2023 assessments, but on 2025 and beyond. An alternative to the pre-assessment workshop venue is the data and ageing coordination meeting to be held in mid-summer 2022.

Should decisions made at pre-assessment workshops be binding?

While decisions made at this stage should not be fully binding, decisions should be made and documented regarding the way they are intended to proceed. The decisions made at the pre-assessment workshops should be binding in so far as changes to those decisions, or requests for changes, will need explanations and review at the STAR panel prior to being accepted.

Advance agreement on deadlines by STAT and Council staff should be documented and made available on a public online assessment calendar with all important dates and deadlines.

Deadlines should be determined during the assessment prioritization and planning process, should be easily accessible in an online and well-advertised calendar with dates of meetings, product due dates and deadlines available for all steps in the process, including deadlines for documents following STAR or other review. Deadlines for post-STAR documents (for Council briefing books) should be a minimum of two weeks following the end of a STAR panel.

Circumstances under which status determination can be made from length-based data-moderate assessments.

At present, stock status can be determined on the basis of length-based data-moderate assessments

irrespective of any additional data available to inform a full assessment. Alternatively, a process could be established treating such assessments as research assessments to start with and then decide where to go once we see how well the assessment holds together, if there are concerns about the status or catch advice, and whether substantial additional information excluded due to the scope of the TOR is available to inform a full stock assessment. In 2013 the Council proposed a framework for such decisions that provides a starting place for further deliberation. General decisions would have to be made in terms of, for example, within what range of depletion, or under what circumstances, full assessments would be triggered, for consistency and to avoid bias in such decision making. Within stock prioritization, there should be a consideration of a range of information, including PSA values, what data is available, etc.

Overall, this topic requires a larger discussion at a future meeting, and there are likely MSA implications.

Groundfish sub-committee (GFSC) review of assessments should occur at least three weeks prior to the Council meeting where these assessments are reviewed.

Ideally the GFSC review of assessments (full and data moderate) should occur three weeks or more prior to a Council meeting to allow time for report writing. Though review of updates, catch-only projections, data-poor analyses do not require as much time between meetings, sufficient time should be allotted to allow for completion of the review in time for submission.

Review data-moderate assessments at a STAR panel meeting.

Most data-moderate assessments should be reviewed during a STAR panel, which allows the GAP and GMT more formal advisory roles. Many of these will include multiple areas, which will require more review time than was allocated during the 2021 cycle. There may be exceptions to be determined during the prioritization process.

Specify criteria for sufficient clarity of requests.

Ambiguity in requests made by STAR panelists can result in confusion and lost productivity given the limited time for review. Further clarification of the elements of a request that need to be included to provide guidance in adequately addressing the request should be developed.

Establish who should be included in communications when transmitting requests to the STATs.

It is not always clear who should send requests for further analyses to STATs, and which personnel should be included in requests for analysis by the STATs during STAR panels or other review meetings. Clarification of the parties to include in request for further analyses early in the assessment cycle would eliminate confusion. At a minimum this should include Council staff, the STAT lead and their supervisor, but could be expanded to include the other STAR panelists, GAP and GMT representatives.

Determine the basis for decision tables prior to the end of the STAR panel with subsequent finalization.

The category, states of nature and catch streams should be discussed and determined at the STAR panel, though the decision tables may be finalized afterward to provide adequate time to conduct runs required to propagate the decision table and ensure its accuracy.

Alternative to FTP site i.e., document list with links avoiding downloading large folders.

Council staff are exploring alternative means of disseminating assessment-related documents, including linked document lists allowing ready reference to pertinent documents without downloading from the FTP site.

Send presentations at least a day before for the initial presentations and when possible, for requests.

To provide as much time as possible for the STAR panelists to familiarize themselves with the material, presentations of pre-STAR assessment results should be provided ASAP at least a day before the initial presentations. Presentations of requests made during the STAR panel should be made available to STAR panelists ASAP prior to presentation of the results to facilitate access and reference to the materials provided, to maximize the capacity of the STAR panel to provide adequate review.

STATs should include written responses to requests highlighting key findings in presentation slides.

Written responses are needed to support report writing and interpretation for each analysis, even if this may lead to a delay in responses. . There is also a need for figures from responses so they can be added to the STAR panel report.

Provide a list of the state-specific points of contact for data sources for each stock assessment to the STAT to facilitate communication and data acquisition by the STAT.

Limiting substantial involvement of assessors in multiple assessments at the same time to reduce workload related stress, recognizing the tradeoff between number of spatial areas requiring individual models for a given species, the number of assessors needed for each assessment, and total number of assessments in a given cycle.

Provide a minimum of a two week (16 day) gap between STAR panels to allow the consistency CIE or repeat participants adequate time to finalize documentation for the previous review and prepare for the next one.

Recommendations for the Stock Assessment Terms of Reference

The following recommended changes to the TOR for the upcoming stock assessment cycle were discussed.

1. The need to establish *a priori* criteria and guidance on how to determine stock assessment and management units. This topic will be discussed at the March 2022 PFMC SSC meeting and a workshop to better define these criteria may be considered. The framework and criteria used in the North Pacific Fishery Management Council should be considered to provide guidance.
2. The requirement that the STAT provide catch histories to the states and that the states provide an approval of the catches to be used in assessments. This is particularly relevant for historical catches for new assessments. States would designate who approves catch histories. There is a request to provide catches at the state level, as well as aggregated for the stock assessment so that state representatives can better review changes and outliers.
3. The requirement to document modeling decisions agreed to at pre-assessment workshop, including the spatial strata for assessments, via the pre-assessment meeting workshop report.
4. The current TOR requirement that regulatory histories for stock assessments are provided by Council staff. The PFMC and Pacific States are working together to develop a regulatory history database that can be queried for management actions at the relevant spatial scale for each stock. Depending upon the stock being considered these spatial scales could be by state, sector, or management lines. States should be involved to ensure that all pertinent regulations are included and to emphasize those that are likely to affect availability and as a result, catchability or selectivity in meaningful ways that inform stanzas or time periods for time blocking etc..
5. A discussion of who is responsible for presenting stock assessment results to the GFSC concluded that the initial presentation will be by the STAR panel Chair, with any subsequent issues raised by the GFSC being addressed by the STAT, who will be present at the meeting. If there is a conflict between the STAR panelists and the STAT then both will present to the GFSC, and the conflict resolution mechanisms in the current TOR will be followed.
6. The catch-only projection documents are short but reconstructing the catches for fleets can be complicated, leading to errors that require additional review effort to identify. There are two options to address catch-only projection reviews, a longer timeline for review and additional reviewers. Both options could be added to the TOR.
7. Stock Synthesis is not currently built to separately weight discarded and retained catches, although there has been a long-standing desire to include this capability. Prior to including this requirement in the TOR someone needs to be identified to work with the SS team to adopt this new feature. If someone writes code for consideration, the SS team is more likely to adopt it. Interested parties can review the following Github issue on weighting retained and discards composition data separately, and comment on the discussion of how to implement this capability: <https://github.com/nmfs-stock-synthesis/stock-synthesis/issues/93>

Modify the TOR to require the identification of states of nature and removal assumptions for decision tables during the STAR panel, while allowing the decision table to be completed for the final document adoption at either the June or September PFMC meetings, or November for those assessments going to mop-up panel review. The reason for these changes is that decision tables often change based on additional requests, changes to removal assumptions, and the specification of assessment category by the GFSC. Also codify that last minute requests for revisions to future catches should be presented as revised 10-yr projection tables, not a full decision table, and a brief explanation should be added to the assessment document regarding the source of the difference between the decision table under the base model and the revised projection table.

Recommendations for the Accepted Practices Guidelines for Groundfish Stock Assessments

At its November 2021 meeting, the SSC identified three workshops to be scheduled in 2022. The outcome of these workshops would provide guidance and recommendations for related topics in the Accepted Practices Guidelines.

Application of ROV-based survey data in stock assessments.

A review of remotely operated vehicle (ROV) survey methods and associated data analyses developed by the California Department of Fish and Wildlife (CDFW) and the Oregon Department of Fish and Wildlife (ODFW) was conducted at the Southwest Fisheries Science Center in Santa Cruz, California, on February 4-6, 2020. This review had recommendations on survey designs and data analyses for their original survey objectives and for potential use to support groundfish stock assessments.

Key recommendations from this workshop include:

- Hold a workshop among the three state agencies (with invitations to Alaska and Canada) to promote further development and harmonization of field and analysis methods.
- Plan and complete model and inter-agency validations and calibrations.
- Define dedicated survey objectives.
- Identify and secure dedicated funding adequate to meet objectives.

The proposed 2022 workshop will include the ROV surveys and the ODFW acoustic/ROV combo survey for semi-pelagic species. Additional expertise, a CIE reviewer or academic expert, on acoustics abundance estimation may be needed. The topics for this workshop include but not limited to:

- Revisit 2020 review report to inform the TOR
- Identify methods for standardizing and incorporating length observations
- Identify methods for standardizing and normalizing fish count data for constructing Indices of abundance.

Accounting for closed areas in assessments.

Area closures, such as the marine protected areas and depth restrictions, constrain areas where fishery and survey can operate and should be accounted for in assessment. Information collected from fisheries and surveys may not reflect the true population dynamics. There were concerns raised regarding estimated selectivity and catchability in the assessments due to area closures/restrictions. The outcomes of this workshop will provide guidance on how to account for area closures in assessments.

At the same meeting, the SSCGS will also review the details of the sdmTMB framework to obtain a better understanding of its features, and the strengths, and any weaknesses of the method, with a view toward endorsing it for use in PFMC stock assessments. The sdmTMB framework is very similar to the vector autoregressive spatiotemporal (VAST) framework endorsed by the SSC.

Hook and line survey index development.

There are several hook-and-line (rod-and-reel) surveys conducted by the state agencies and the Science Centers, such as the WDFW nearshore survey, the California Collaborative Fisheries Research Program survey, the SWFSC Hook and Line Survey, and the fishery dependent surveys. This workshop will discuss how to use hook-and-line survey data for constructing indices of abundance. Potential topics for discussion include:

- Hook Saturation
- Normalization of Surveys
- Methods for dealing with zero values
- Methods to account for changes in sampling methods, *i.e.*, deeper depths, closed areas, and expansion of survey area.

In addition, the following points were identified as topics to be added to and addressed in the revisions to the accepted practices guidelines for the upcoming stock assessment cycle. Some of these topics will be discussed at the upcoming CAPAM diagnostics workshop or have been addressed at past CAPAM workshops and can be reviewed.

1. Guidance on when to turn on/off recruitment deviations or perform sensitivities.
2. Evaluate and consider adding SPAY plots to R4SS to compare the consistency of recruitment across data sources (proposed by Dr. Noel Cadigan and documented in his CIE report). The aim is to identify which data sources are driving recruitment patterns. See <https://flr-project.org/FLEDA/reference/bubbles-method.html> to understand the SPAY plot. Prior to considering inclusion of the SPAY plot it is necessary to determine if the plot can be automated in r4ss.
3. Guidance on sex-specific selectivity options with greater flexibility than an offset.
4. Guidance on application of the Lorenzen M to account for length/age specific M .
5. Guidance on time varying selectivity and time blocking.
6. Guidance on interpretation, causes and addressing uncertainty from retrospective patterns.
7. Recommendations on how to use more than one index for a given survey or fleet.

Other Business

The following additional items were discussed and next steps for further consideration provided.

A priori stock delineation. FMP amendment vs. a focal species process step.

This item was not discussed in detail at the workshop, in recognition that there is likely to be discussion of a potential FMP amendment to address this issue for all species at upcoming Council meetings.

Defining substantive change in stock assessments.

This was related to SSC discussions at the November Council meeting regarding inferred change to the probability of overfishing if only “pessimistic” assessments undergo additional scrutiny following STAR Panel review (see section *Defining Substantive Change in Stock Assessments in Agenda Item E.2.a, Supplemental SSC Report 1*). Essentially, this discussion was based on the recognition that even if individual assessments were improved by referral to “mop up” or other post-STAR panel review processes, there could be an FMP-wide risk of turning an unbiased process into a biased one if only “pessimistic” assessments were subject to this additional scrutiny. This risk could potentially be reduced through the development and application of objective, repeatable, policy-neutral criteria that were consistent with elements of the P* approach. The idea could be to have a “threshold” of the level of change in assessment result in which an assessment is either revised or referred to the mop up review panel. It was also noted that an analysis by Cope and Gertseva (2020) might provide elements of consideration for the larger question of “when to accept vs. reject” an assessment.

The workshop recognized this topic as appropriate for greater discussion and consideration prior to the next assessment cycle. The meeting recognized that this question begins to drift into the policy arena, and that some communication with respect to Council awareness and desire to consider a formal process for identifying change thresholds would be appropriate. The workshop recommended providing additional feedback to the Council in the near future, potentially in the next stock assessment prioritization statement (presumably March 2022).

Approach to Council request to revisit sigma framework for Category 2 and 3 assessments.

This topic related to the reconsideration of uncertainty (sigma) values for Category 2 and 3 assessments. Current values are based on doubling and quadrupling the values estimated for Category 1 assessments. The Council has expressed concern that the current approach is somewhat “ad hoc,” and could benefit from a more in depth analysis. The workshop discussed this issue, noting in particular that the approach used to develop the current sigma values will underestimate uncertainty in category 2 assessments due to simplified model structure, and is infeasible for category 3 assessments. Possibilities for addressing this challenge were discussed, such as developing category 3 assessments for stocks with category 1 assessments and basing the category 3 sigma on the variance between the category 1 depletion values and the default for category 3 assessments. It might be possible to develop something analogous to this for category 2 stocks as well. Alternatively, an intermediate value may be considered for category 2 in the absence of absolute estimates. The workshop recognized the need to continue discussions on alternative approaches for addressing this concern but did not develop clear recommendations for future progress.

Long-term requests for length-based data-moderate assessments from NWFSC.

The workshop recognized the value in revisiting additional concerns and diagnostics related to length-based assessments, both from previous methodology reviews and in response to issues that arose during the 2021 assessment cycle. The workshop recommended that the SSC review the remaining “to do” list for length-based assessments and prioritize additional work or analyses in the “Research and Data Needs” report. The November 2020 SSC report provides the current long-term requests anticipated to be reviewed at the post-mortem that will be a starting point for satisfying outstanding requests.

The workshop discussed coordination of stock assessment efforts with state agencies, particularly with respect to age determination efforts and comparisons among agencies. Some challenges were identified in efforts leading up to the spiny dogfish assessment, although an example of robust multi-agency cross-reads was included in the vermilion/sunset assessment.

Public Comments

A question was raised with respect to the length of the review process, noting that a several week-long process could provide a more efficient and less stressful opportunity to review assessments given the absence of time constraints from in person meetings and availability of tools for conducting online meetings.

A comment was made with respect to the “defining substantive change” discussion, that from the perspective of a manager and/or Council member, it is logical to expect that more attention will be given to more pessimistic assessments. This is consistent with the need to instill confidence for managers and stakeholders that the results are robust.

Recommendations

- Update the TOR to address the recommended changes proposed herein.
- Hold workshops and discussion of additional items identified to inform the accepted practices document.
- Revisit long-term requests for length-based data-moderate assessments at the March Council meeting under workload planning and coordinate with NWFSC to ensure the requested analyses are completed and reviewed at the June Council meeting.
- Discuss a process to establish criteria for defining substantive change in stock assessments at the March Council meeting under Workload and Future Meeting Planning.
- Develop approaches to the sigma framework for Category 2 and 3 assessments proposed.
- Schedule meetings needed to develop a framework and criteria for setting stock boundaries for assessment and management.

References

Cope, J. and Gertseva, V., 2020. A new way to visualize and report structural and data uncertainty in stock assessments. *Canadian Journal of Fisheries and Aquatic Sciences*, 77(8), pp.1275-1280.

Appendix A: Webinar Agenda

PROPOSED AGENDA

Groundfish Assessment Process Review Scientific and Statistical Committee's Groundfish Subcommittee and 2021 Stock Assessment Review Participants

Pacific Fishery Management Council

Via Webinar

January 25, 2022

Instructions for how to connect to the Scientific and Statistical Committee's (SSC) webinar will be posted on the Pacific Fishery Management Council's home page under [Upcoming Events](#) prior to the first day of the meeting.

SSC meetings are open to the public and a public comment period has been scheduled. Additional public comments may be taken at the discretion of the Chair. Times on this agenda are subject to change once the meeting begins.

Tuesday, January 25, 2022 – 12:30 PM

A. Call to Order

1. Call to Order and Introductions John Budrick
2. Webinar Instructions John DeVore
3. Overview of Webinar Objectives John Budrick and John DeVore
4. Assign Rapporteurs John Budrick
5. Approve Agenda

B. Perspectives on the 2021 Stock Assessment Process

1. Center of Independent Experts Matt Cieri
2. Groundfish Management Team Whitney Roberts, Lynn Mattes and Mel Mandrup
3. Groundfish Advisory Sub-Panel Gerry Richter
4. STAR Panel Chairs John Budrick, John Field, and Theresa Tsou
5. Stock Assessment Teams Jason Cope, Vlada Gertseva, Ian Taylor, Kelli Johnson, E.J. Dick, Melissa Monk, Brian Langseth and Chantel Wetzel
6. Council Staff John DeVore and Todd Phillips
(12:45 p.m.)

BREAK (2:00 – 2:15 p.m.)

C. Recommendations for Improving the Stock Assessment Process

1. Pre-Assessment Planning

- a. Improving timely data delivery to STATs.
- b. Discussion of format, process and optimization of pre-assessment data workshops.
- c. Discuss collaboration and planning between Science Centers.
- d. Require pre-assessment workshops in TOR or specify necessity when selected.
- e. Document modeling frameworks agreed upon during pre-assessment workshop.
- f. Increasing attendance of pre-assessment workshops.
- g. Pre-assessment workshop or another process for specifying stock structure.
- h. Advance agreement on deadlines by STAT and Council staff documented.
- i. Public assessment calendar communicating important dates online.
- j. List for each STAT the state-specific points of contact for data sources.
- k. Reduce workload related stress by limiting involvement in multiple assessments etc.
- l. Minimum of two weeks between STAR panels for consistency CIE/repeat participants.
- m. Minimize time zone differences in scheduling or CIE participant selection.

2. Stock Assessment Reviews

- a. Should decisions made at pre-assessment workshops be binding?
- b. Status determination from data-moderate stocks with additional data for full?
- c. Specify criteria for sufficient clarity of requests.
- d. Establish points of contact for requests i.e., Council staff, lead, supervisor.
- e. Determine category, states of nature and catch at STAR, decision tables after.
- f. More timely provision of input on data-moderates or STAR process.
- g. GFSC review no sooner than three weeks from Council meeting review.
- h. Inclusive roll for the GMT/GAP in data-moderate assessments like full assessments.
- i. Alternative to FTP site i.e., document list with links avoiding downloading large folders.
- j. Send presentations ASAP, at least night before when possible. Add language to TOR?
- K. Include complete written responses to requests with key findings in presentation slides.
(2:15 p.m.)

D. Recommendations for the Stock Assessment Terms of Reference

1. Establish criteria and guidance on how to determine stock assessment/management units.
 - a. Consider the approach to pooling in the North Pacific SSC.
 - b. Workshop to better define criteria?
2. Require a table listing catch streams approved by the state, date and approval?
3. Require documentation of modeling frameworks agreed on at pre-assessment workshop.
4. Require regulation histories from each state that affect the stock (currently Council staff).
5. Specify who presents model results to the GFSC- panel Chair vs. STAT.
6. More time dedicated to complete review of catch-only projections to catch errors.
7. Guidance on when to turn on/off recruitment deviations or perform sensitivities.
8. Consider adding SPAY plots to R4SS comparing consistency of recruitment across sources.
9. Add separate weighting of discarded and retained catches in SS and TOR guidance.
10. Guidance on sex specific selectivity options with greater flexibility than an offset.
11. Guidance on application of the Lorenzen M to account for length/age specific M.
12. Guidance on time varying selectivity and time blocking.
13. Guidance on interpretation, causes and addressing uncertainty from retrospective patterns.
11. Other Recommended Changes?
(3:15 p.m.)

BREAK (4:15 – 4:30 p.m.)

E. Recommendations for the Accepted Practices Guidelines for Groundfish Stock Assessments

1. Scheduled Workshops
 - a. Application of ROV-based survey data in stock assessments.
 - b. Accounting for closed areas in assessments.
 - c. Hook and line survey index development.
2. Unrelated Items
(4:30 p.m.)

F. Additional Items

1. A priori stock delineation. FMP amendment vs. a focal species process step.
2. Defining substantive change in stock assessments.
3. Approach to Council request to revisit sigma framework for Category 2 and 3 assessments.
4. Long-term requests for length-based data-moderate assessments from NWFSC.
 - a. Requested for post-mortem, need alternative timeline/process for review.
(5:00 p.m.)

PUBLIC COMMENT PERIOD
5:20 p.m. (or immediately following Agenda Item F)
Public comments, including comments on issues not on the agenda, are accepted at this time.

ADJOURN

PFMC
1/24/22

Appendix B: Attendees and Their Affiliations

John Budrick, California Department of Fish and Wildlife, SSC, Chair
Aaron Berger, National Marine Fisheries Service Northwest Fisheries Science Center
Mike Burner, Pacific Fishery Management Council
Fabio Caltabellotta, Oregon State University, SSC
Susan Chambers, West Coast Seafood Processors Association, GAP
Matt Cieri, Center of Independent Experts
Jason Cope, National Marine Fisheries Service Northwest Fisheries Science Center
John DeVore, Pacific Fishery Management Council
Edward Dick, National Marine Fisheries Service Southwest Fisheries Science Center
Jessi Doerpinghaus
Bob Dooley, PFMC
Jason Edwards, Pacific States Marine Fisheries Commission
John Field, National Marine Fisheries Service, Southwest Fisheries Science Center, SSC
Vlada Gertseva, National Marine Fisheries Service Northwest Fisheries Science Center
Owen Hamel, National Marine Fisheries Service Northwest Fisheries Science Center, SSC
Melissa Haltuch, National Marine Fisheries Service Northwest Fisheries Science Center, SSC
Gretchen Hanshaw, National Marine Fisheries Service West Coast Region
Jim Hastie, National Marine Fisheries Service Northwest Fisheries Science Center
Brian Hooper, National Marine Fisheries Service West Coast Region
Kelli Johnson, National Marine Fisheries Service Northwest Fisheries Science Center
Keeley Kent, National Marine Fisheries Service West Coast Region
Brian Langseth, National Marine Fisheries Service Northwest Fisheries Science Center
Melissa Mandrup, California Department of Fish and Wildlife, GMT
Heather Mann, Midwater Trawlers Cooperative
Kristin Marshall, National Marine Fisheries Service Northwest Fisheries Science Center, SSC
Lynn Massey, National Marine Fisheries Service West Coast Region
Lynn Mattes, Oregon Department of Fish and Wildlife, GMT
Melissa Monk, National Marine Fisheries Service Southwest Fisheries Science Center
Corey Niles, Washington Department of Fish and Wildlife, PFMC
James Phillips, California Department of Fish and Wildlife, GMT
Todd Phillips, Pacific Fishery Management Council
Katie Pierson, Oregon Department of Fish and Wildlife, GMT
André Punt, University of Washington, SSC
Kate Richerson, National Marine Fisheries Service Northwest Fisheries Science Center
Gerry Richter, B&G Seafoods, GAP
Whitney Roberts, Washington Department of Fish and Wildlife, GMT
Will Satterthwaite, National Marine Fisheries Service Southwest Fisheries Science Center, SSC
Jason Schaffler, Muckleshoot Indian Tribe, SSC
William Smith, U.S. Fish and Wildlife Service
Maggie Sommer, Oregon Department of Fish and Wildlife, PFMC
Andi Stephens, National Marine Fisheries Service Northwest Fisheries Science Center
Daniel Studt, National Marine Fisheries Service West Coast Region, GMT
Ian Taylor, National Marine Fisheries Service Northwest Fisheries Science Center
Tien-Shui Tsou, Washington Department of Fish and Wildlife, SSC

Dan Waldeck, Pacific Whiting Conservation Cooperative, GAP
John Wallace, National Marine Fisheries Service Northwest Fisheries Science Center
Chantel Wetzel, National Marine Fisheries Service Northwest Fisheries Science Center, GMT
Will White, Oregon State University, SSC
Ali Whitman, Oregon Department of Fish and Wildlife

Appendix C: Suggested topics for the post-mortem meeting on 2021 assessments from the Science Centers' stock assessment teams.

January 6, 2022

Data

1. Pre-assessment data workshops (2-fold)
2. Information on Fishery Regulations

Review

3. Better policy for data-moderate stock assessments
4. Data moderate review process
5. Requests for additional analyses
6. SSC Review
7. Decision Tables
8. More complete review of catch-only projections

Process

9. Deadlines
10. Assessment calendar
11. State representative participation
12. Lack of in-person discussion with partners
13. Stress and workload

Data

1. Pre-assessment data workshops (2-fold)

Issue: Pre-assessment data workshops are not required by the TOR. During this cycle the vermilion STATs met with the GAP and GMT (twice), which the STAT leads have done for several past cycles. However, there was a misconception that this was a pre-assessment workshop rather than discussions with management bodies.

Suggestion: A decision should be made as to whether a pre-assessment workshop is justified or not when the species are identified. An alternative is to require a pre-assessment workshop in the TOR.

Issue: Decisions made at pre-assessment workshops were later revisited without new information. There were requests during STAR panels, and during Council deliberations of SSC approved data moderate assessment models, to make modifications to model characteristics and/or data that were agreed upon at pre-assessment workshops (e.g., copper rockfish Point Conception assessment delineation; California quillback rockfish catch; quillback and copper rockfishes growth in California).

Suggestion: Pre-assessment data workshops should be revised in a manner where items are discussed in detail and such that decisions agreed upon during the pre-assessment

meetings have some binding authority, thereby limiting the ability to re-open or change positions on previously discussed decisions unless issues with modeling fits to the data or other data complexities arise that would warrant reconsideration. The assessment authors should come into these meetings prepared to discuss some of the finer decisions (e.g., fleet grouping, especially for low/small gear data sources, area definitions, combine growth or keep separate).

- There needs to be substantial attendance at the pre-assessment workshops by the interested parties, as topics such as stock delineation, fleet structure, and initial data and parameterizations are all discussed at them. However, attendance was low at each of these workshops this cycle.
- Institute, as part of the pre-assessment workshop meeting, an opportunity to not just establish the stock assessment units, but to discuss how the STAT, STAR Panel, and other advisors would recommend that those units be used in management. Stock structure may need to be defined prior to the pre-assessment workshops, and sub-stock management will remain an important issue.
- Establish a terms of reference for advising the Council on management units (stocks) in general, and how to determine stock assessment units given management units and other factors, and possibly hold a workshop to discuss the state of knowledge and provide guidance and recommendations for defining stock management units.
- Include a section in the TOR (possibly under data deadlines) requiring a table in the assessment that lists the catch streams, the date they were finalized/approved by the state (commercial and recreational) and by whom. This will ensure that STATs have documentation of the catch stream approvals by each state. This is similar to the suggestion to document aspects of the modelling frameworks agreed upon during the pre-assessment workshop (if there is one).

2. Information on Fishery Regulations

Issue: Regulations can be difficult to find, especially historical regulations that affect each species. Changes in the commercial hook-and-line fishery that did affect selectivity south of Point Conception were brought to light during the Vermilion/Sunset STAR panel. The changes may also affect the fishery north of Point Conception, but available length data were inadequate to make that determination. During the vermilion STAR panel, there were also a number of questions regarding regulations in Oregon and Washington and their effects on fleets.

Suggestion: Have the states provide the regulation history for each fishery (recreational and commercial) that affects a stock. The states could also provide years in which there were significant changes to the fishery that we may explore for time blocks.

Review

3. Better policy for data-moderate stock assessments

Issue: Data-moderate stock assessments can report stock status below the overfished

level. If this is done with data left on the table, this can create distrust in the assessment results, especially if they lead to an overfished determination.

Suggestion: More discussion is needed on the role of data-moderate assessments in cases when more potentially informative data sets are available and not used. Should it be the case that these data-moderate assessments not be used for stock status determination, and therefore should an estimate of overfished stock status (or otherwise adverse result) trigger a full assessment rather than lead to an overfished determination. Recall that there are two different data situations which exist for data-moderate assessments. First, those that consider all possible (informative) data, which, in these cases, happens to be very limited, and for which data moderates are the best available methods used to assess these stocks, including stocks that may be overfished. Second, data-moderates that leave (potentially informative) data on the table. A data-moderate may not be a good choice for a stock that shows possible indications of overfishing or being overfished. Those should ideally be assigned full assessments. However, one cannot always predict the outcome of a data-moderate (or full) assessment.

4. Data moderate review process

Issue: This cycle, data moderate assessments were in a continual state of review for months after the initial groundfish subcommittee review in June. Data requests and modeling choices were revisited after SSC approval (at the request of the Council), and new data were sought after review to reconsider decisions made at the pre-assessment workshops. The review process for the Data-moderate assessments did not have clear mechanisms for addressing these additional review requests, which complicated the process of finalizing the reports.

Suggestion: Revise the TOR to include clearer guidance for the review process and role of mop up for data moderate assessments. Alternatively, consider having a STAR panel for data moderate assessments with clear guidelines around what would be reviewed during the meeting (e.g., as a counter-point, the 2013 DM STAR panel spent the majority of the review time evaluating XDB-SRA and XSSS which had already been SSC reviewed and approved) and what can and cannot be considered (e.g., a process for exploring or including otherwise non-TOR approved data). Also, articulate in the TOR who the final approver is of the data moderate assessment documents (e.g., the STAR panel chair approves the final documents for full assessments).

5. Requests for additional analyses

Issue: Many requests for additional analysis were perceived as ambiguous by members of the STAT teams, and at times GFSC members as well.

Suggestion: Ensure requests are specific. Remind all participants that request and rationale language is to stand alone, and not be informed by additional information. If additional information informs the request, specifically add it to the request, or to the rationale.

Issue: Apart from STAR panel reviews, requests for additional analyses (model runs, extra analysis, projections) can come from many different individuals. Because of this, it

is unclear if “requests” from an individual are formal and have the full weight of the respective body on which the individual sits, particularly when that individual serves in multiple roles. Furthermore, requests do sometimes occur during meetings and show up in committee reports or decision statements rather than being sent directly to the STATs. In these cases, unless the STATs are alerted to the requests, it is therefore easy for requests not to reach the proper individuals and therefore be unaddressed.

Suggestion: All requests should be sent from a single individual to a single individual (with the entire STAT cc’d, perhaps) and be identified as a formal request, as is done in STAR panels. John DeVore, or more generally, the Council SSC staffer, would be the obvious individual for sending the notice with Jim, Owen, or John (e.g., the appropriate supervisor(s) of the STAT) receiving it, though it could be another individual (such as the lead of the STAT) instead. There should be confirmation of reception and understanding of the request as well.

6. SSC Review

Issue: In the June GFSC SSC meeting the STATs were expected to present the model results, while in the August meeting the STAR panel chair presented the model results and issues that arose during review. STATs were also asked to present stock delineation material to the November SSC meeting.

Suggestion: TORs could specify who is responsible for presenting model results to the GFSC.

7. Decision Tables

Issue: Decision tables take a lot of time to develop and are often conducted or revised at the end of the STAR panel (or end of the SSC/subcommittee meeting for data-moderate assessments reviewed in that manner), and often in a rush. Further review by the SSC or changes to anticipated catch during the current management cycle may require changes to the decision table, and during this cycle these things occurred very late in the calendar year. While exploration of alternative states of nature is appropriate, it seems premature to construct full decision tables before the SSC determines the stock category and alternative catch streams are more thought through. It can also be challenging to finish them at the end of a STAR panel.

Suggestion: Determine states of nature in the STAR panel, and provide projections from a single catch stream, but reserve the projections and completion of decision tables for another time to be determined. We would need to discuss when this would make most sense in terms of having complete information needed and the needs of the Council.

8. More complete review of catch-only projections

Issue: The SCC/GFSC spends very little time on these, and therefore errors which are not obvious might be missed.

Process

9. Deadlines

Report deadlines

Issue: The lingcod and vermilion/sunset STATs were not aware of the short turnaround

time (originally 6 business days for vermilion, resolved by including vermilion in the supplemental) for a request for a modified post-STAR assessment document.

Suggestion: At the beginning of the assessment cycle, the STATs and Council staff should agree upon all deadlines through final document preparation. SSC or Council officers should also be identified for the review process, to communicate changes and requests made during SSC/Council meetings and communicate new deadlines to the STATs (this could be done through a Google calendar with invites). When turnaround times are tight (less than two weeks), planning to have documents in the supplemental briefing book should be explicit. Preferably, no less than two weeks should occur between the end of a STAR panel or other review and the briefing book deadline. This could be explicitly taken into account in STAR panel planning.

Issue: Data-moderate reports were submitted three weeks before the June groundfish subcommittee meeting, and two weeks before the August groundfish subcommittee meeting. Comments on these were provided on the Thursday-Sunday before the meetings, with one exception. On more than one occasion SSC members made comments indicating there was not enough time to review the documents, nor enough time to have a reasonable back and forth on issues raised.

Suggestion: Remind people of the opportunity between time of report submission and time of review to ask questions, and that the data-moderate assessments are intended to have a different review process than full assessments. Alternatively, if the expectation is to have a STAR panel like level of review, consider having a STAR panel for data moderate assessments.

Data deadlines

Issue: The data moderate assessment reviews were bogged down by the presence of data not made available to the STAT until well after the data deadline, not clearly articulated to the STAT until during review, and not even generated until after review and after SSC acceptance.

Suggestion: Have PFMC staff enforce the data deadlines and reiterate to data providers their roles to make important data available to the STAT in a timely manner. Also see suggestion with respect to data workshops (item 1).

10. Assessment calendar

Issue: Need for increased communication regarding timelines.

Suggestion: This relates to #9. We can use the calendar put forward to the Council when exploring STAR panel weeks throughout the entire assessment process. An official and public assessment calendar will ensure better communication of deadlines and important dates across assessments. The calendar can be finalized and updated after the June Council meeting and circulated among the Council (GMT, GAP, SSC, etc.), reviewers, and all other parties providing data/input to STATs and could be posted on the Council's website. Adding the data deadlines and dates for data workshops to the calendar would be helpful. In addition, we can also take a look at available data for the preliminary list of species from the March Council meeting to allow for better planning by the assessors and the ageing labs.

11. *State representative participation*

Issue: There are usually a number of questions relative to state-provided data and it may not always be clear who to contact. State representatives should also ensure all data sources are available to STATs prior to the data delivery deadline, and MOUs (if necessary) are signed prior to the start of the assessment cycle (TBD).

Suggestion: State representatives provide an invaluable resource on details of the fishery and data that the STAT do not have. Have PFMC staff provide names of state representatives for each STAT to contact regarding data, questions, and guidance on state-specific issues at the same time assessed species are identified.

12. *Lack of in-person discussion with partners*

Issue: When Council meetings were in-person, we were able to have significant conversations outside of the meetings-- in hallways, at lunch-- that were often spontaneous and impactful. This assessment cycle we could have used those types of opportunities to better address the many issues that cropped up with some impromptu discussions to clarify misunderstandings and actually have conversations.

Suggestions: If we anticipate a similar situation next cycle, we will want to figure out how to encourage more such informal and impromptu interactions.

13. *Stress and workload*

Issue: We need to find a way to dial back the stress level that assessors have to cope with, whether in STAR Panels or when results suggest status issues. STAR Panels often require 12-15-hour work days for STATs. This leads to burn-out and increases opportunities for errors to be introduced by fatigued staff. The federal government created a process whereby an employee could take additional paid time off, if needed, for issues related to COVID-19. However, the Council process did not provide any such relief to the detriment of all involved.

Suggestions: Avoid having analysts lead multiple assessments or reports. Recognize that DM and update assessments typically require a substantial time investment, despite the intent for such products to be simple to produce and document. In these trying times, the Council should work harder at making a clean, streamlined process without unnecessary burdens that in other non-pandemic years could be taken up with less stress. Resolving other issues as raised in this document related to review, data, and deadlines, will help to mitigate stress levels as well.