DRAFT SUMMARY MINUTES

Scientific and Statistical Committee

Pacific Fishery Management Council
Hyatt Regency Orange County
Terrace D-F and Online
11999 Harbor Blvd
Garden Grove, CA 92840
714-750-1234

November 2-3, 2023

Members in Attendance

Dr. Cheryl Barnes, Oregon State University, Newport, OR
Dr. John Budrick, California Department of Fish and Wildlife, San Carlos, CA
Mr. Alan Byrne, Idaho Department of Fish and Game, Boise, ID
Dr. John Field, National Marine Fisheries Service Southwest Fisheries Science Center, Santa Cruz, CA
Dr. Chris Free, University of California Santa Barbara, Santa Barbara, CA
Dr. Owen Hamel, National Marine Fisheries Service Northwest Fisheries Science Center, Seattle, WA
Dr. Michael Hinton, San Diego, CA
Dr. Dan Holland (SSC Chair), National Marine Fisheries Service Northwest Fisheries Science Center, Seattle, WA
Dr. Galen Johnson, Northwest Indian Fisheries Commission, Olympia, WA
Dr. Kristin Marshall, National Marine Fisheries Service Northwest Fisheries Science Center, Seattle, WA
Dr. Tommy Moore, Northwest Indian Fisheries Commission, Olympia, WA
Dr. André Punt, University of Washington, Seattle, WA
Dr. Matthew Reimer, University of California Davis, Davis, CA
Dr. William Satterthwaite, National Marine Fisheries Service Southwest Fisheries Science Center, Santa Cruz, CA
Dr. Jason Schaffler (SSC Vice-Chair), Muckleshoot Indian Tribe, Auburn, WA
Dr. Ole Shelton, National Marine Fisheries Service Northwest Fisheries Science Center, Seattle, WA
Dr. Cameron Speir, National Marine Fisheries Service Southwest Fisheries Science Center, Santa Cruz, CA
Dr. Tien-Shui Tsou, Washington Department of Fish and Wildlife, Olympia, WA

Members Absent

None

SSC Recusals for the November 2023 Meeting		
SSC Member	**Issue**	**Reason**
Dr. Will Satterthwaite	D.3 Final Methodology Review	Dr. Satterthwaite is supervised by a co-author
Dr. John Field	D.3 Final Methodology Review	Dr. Field supervises a co-author
Dr. Owen Hamel	E.2 Adopt Rebuilding Analyses, Catch-Only Projections, and Revised Projections	Dr. Hamel supervises assessment and projections authors

SSC Administrative Matters

Dr. Dan Holland (SSC Chair) called the meeting to order at 0800. Mr. Merrick Burden briefed the Scientific and Statistical Committee (SSC) on their tasks at this meeting. The November 2023 SSC agenda was approved. Several suggested edits were made to the September 2023 SSC Minutes and adopted as final. Thus, the November 2023 briefing book version of the September 2023 SSC Minutes will be updated to reflect SSC approved changes and the final document will be posted to the SSC minutes archive website. Subcommittee assignments were confirmed with no modifications.

C. Administrative Matters

7. Membership Appointments and Council Operating Procedures (SSC Closed Session)

D. Salmon Management

3. Final Methodology Review

The Scientific and Statistical Committee (SSC) received a report summarizing reviews of salmon methodology topics conducted by the SSC's Salmon Subcommittee (SSCSS) via webinar October 11, 2023 and discussed supplemental materials received after the methodology review (Supplemental Attachments 2 and 3). Tanya Rogers (SWFSC) and Michael O'Farrell (SWFSC, STT) joined online to present material related to Supplemental Attachment 3. The SSC received summaries concerning three review topics and one informational update:

1. Review Topic: Review and consider improvements to methods used to model South of Falcon fisheries in Chinook Fishery Regulation Assessment Model (FRAM)
2. Review Topic: Consider technical modifications to the Sacramento River winter Chinook abundance forecast by examining whether an egg-to-fry covariate can improve forecast performance
3. Review Topic: Explore alternative forecast approaches for the Oregon Production Index Hatchery coho forecast
4. Informational Update: FRAM documentation progress

Methods used to model South of Falcon fisheries in Chinook FRAM

The SSCSS received a presentation from Jon Carey (NMFS WCRO, STT) on calculation of Chinook FRAM preseason fishery scalars for south of Cape Falcon fisheries, as described in pages 4-11 of Attachment 1. Fishery scalars are used to project catch for fisheries that are managed as seasons and have no external estimates of projected total catch, such as fisheries south of Cape Falcon (SOF). The new approach to deriving the scalar improves the agreement between projected catch and the observed historical catch in SOF Chinook fisheries.

The SSC endorses use of the new approach to calculate scalars for SOF fisheries in Chinook FRAM. The SSC further recommends that scalars used to project catch in other fisheries, including those in coho FRAM, be evaluated to see if they can be similarly improved.

Sacramento River winter Chinook forecast

The SSCSS received a presentation from Tanya Rogers (NMFS SWFSC) with support from Michael O'Farrell (SWFSC, STT) evaluating several preseason abundance forecast methods for Sacramento River winter Chinook (SRWC), including a model with an egg-to-fry (ETF) survival covariate, as described in pages 12-27 of Attachment 1, with additional analyses produced in response to SSCSS requests reported in Supplemental Attachment 3. The analysts used one-year-ahead cross validation to compare the performances of different models forecasting SRWC abundance (SRWC age-3 escapement absent fishing), including the currently-used Base model and an extension of the Base model that included the egg-to-fry covariate (empirically measured egg-to-fry survival rate; ETF model), as well as an array of Gaussian Process (GP) models using various predictor variables. The analysts highlighted two GP models based on their performance in predicting abundance, GP-1 and GP-2. GP-1 used parent spawners and river temperature as predictors, while GP-2 used these two predictors along with hatchery releases.

The SSC recommends using GP-1 in harvest management starting in 2024. Overall, the highlighted GP models predicted abundance better than the Base or ETF models and were similar in their performance. In general, GP-2 did best at predicting abundance in terms of the raw number of fish, while GP-1 generally did best according to metrics of percent or proportional error. There are statistical reasons to expect proportional errors in both forecasts and postseason abundance estimates.

There is no consequence of forecast errors in determining allowable impact rates when both the forecasted abundance and post-season estimate are above 3,000, even if these errors are very large when measured in numbers of fish. This is due to the form of the control rule for allowable SRWC impact rates, which is flat for abundances above 3,000 and very steep for abundances below 500. However, at low abundance, forecast errors that are small in numbers of fish can be very consequential in terms of mis-specifying allowable impact rates. GP-1 outperformed GP-2 in control rule outputs by all metrics examined.
Although it had lower performance in forecasting abundance than the GP models, the ETF model was the only model considered that captured all three years in the evaluated 2012-2022 period

when the postseason abundance estimate was below 3,000, and application of the control rule to the postseason abundance estimate would have lowered the allowable impact rate. Therefore, continued consideration of the ETF, or other supplemental information on environmental conditions affecting SRWC, could be warranted.

The return year 2024 forecasts (Table 2 of Attachment 1) will be updated when 2023 data are available.

The SSC recommends that the forecast methods for SRWC be revisited periodically (3-5 years) to re-assess their performance and evaluate additional covariates (e.g. the Juvenile Production Index) as warranted. Although there was limited contrast among the GP model forecasts in recent years, the four forecasts methods differed in the abundance forecasted for 2023. A 2023 postseason estimate was not included in the analysis, but including 2023 for the performance evaluation would be informative. The SSC identified several additional factors that may warrant inclusion in future forecast models and communicated them to the analysts.

Oregon Production Index Hatchery coho forecast

The SSCSS received a presentation from Cassie Leeman (ODFW, STT) and Thomas Buehrens (WDFW) with support from Shannon Conley and Mark Sorel (both WDFW) on a new approach for forecasting Oregon Production Index-Hatchery (OPI-H) Coho abundance, as described in pages 28-51 of Attachment 1. Some typographical errors were noted as described in Supplemental Attachment 2, but these were errors in reporting only and did not affect the analyses or conclusions.

The Oregon Production Index Technical Team (OPITT) annually produces a forecast of natural-origin Coho salmon from the Columbia River Basin and hatchery Coho salmon production from Leadbetter Point, WA, to the California/Mexico border, and this aggregate is referred to as the OPI-H. There are inconsistencies between this report, Preseason Report 1, and previous documentation of the OPI-H forecast in identifying the stocks that are included in the OPI-H. The SSC recommends making all documents consistent and correct.

Leeman and co-authors explored alternate forecast models and recommended a new approach, a MAPE (mean absolute percent error)-weighted ARIMA-based (autoregressive integrated moving average) ensemble forecast. Jack returns, delayed smolt releases, and nine environmental covariates were considered for use in a multi-model approach to forecasting.

The SSC finds that the MAPE-weighted ensemble forecast model is an improvement over the current methodology and supports its use for 2024. The SSC recommends that the model structure and covariates of the top 10 models, and their assigned weights, be reported annually.

The SSC reviewed the performance of the forecast for the OPI-H, but this aggregate is divided into stocks for use in Coho FRAM and Preseason Report 1. Performance of the stock-specific abundance forecasts (or the stock-specific "forecasts" implied by disaggregating the OPI-H based on fixed proportions) is likely to be worse than performance for the aggregate. The SSC

recommends exploring forecasts of the individual hatchery and natural origin Coho stocks used for management.

FRAM documentation progress

The SSCSS received a presentation from Derek Dapp (WDFW) on updates and additions to the FRAM documentation that have occurred since the 2022 Salmon Methodology review, as described in pages 1-3 of Attachment 1. The current FRAM online material documents parts of FRAM (with the eventual goal of complete documentation), including structural and design changes since 2007, and provides a more detailed description of its procedures and algorithms than previous iterations of the FRAM documentation. Updates and improvements to the documentation for this year focused on calibration methods: the process used to develop the Chinook FRAM base period.

The SSC appreciates the work done by the analysts to update and expand the online FRAM documentation and recommends that documentation of existing methodologies be completed as soon as possible.

Recommendation for future methodology review topic

Forecast evaluations have used a wide variety of performance metrics (e.g., metrics based on raw error, percent error, or proportional error; and whether the direction of errors are accounted for). The SSC recommends work on reducing redundant metrics and identifying which metrics should be emphasized for particular forecasts based on management goals and the broader context for that stock.

SSC Notes

SOF Chinook FRAM Scalars

Previously, fishery scalars were produced by dividing projected effort by base period effort, implicitly assuming average scalars of 1.0 during the base period. The updated method changes the calculation of the scalar by multiplying the ratio between projected and reference period effort by the average of the fishery scalars during the reference period. The reference period may be the base period, but can be a different set of years.

SRWC forecast

The Base and ETF models were considered by O'Farrell et al. (2016) and were reviewed by the SSC in November 2016. At that time, it was recommended that the Base model be used to forecast SRWC, while evaluating whether there was more support for the ETF model or using other environmental covariates as more data accumulated over a wider range of environmental conditions.

The analysts used updated datasets to compare the forecast performance of models including the Base (median and mode), ETF (median and mode) and GP formulations considering all possible combinations of four covariates (included with appropriate time-lags and transformations): the empirical egg-to-fry survival rate, total number of female spawners, number of hatchery pre-smolts released, and an index of river temperature (degree days above 12°C between May 15 and October 31 at Clear Creek Gage). The initial analysis quantified abundance forecasting errors in terms of numbers of fish, proportional metrics, and percentage metrics. The SSCSS requested additional analyses of error in the impact rate specified when the control rule was applied to the forecasts, and also that the analysts identify their preferred performance metrics. These requests were addressed in Supplemental Attachment 3, which added evaluation of control rule output error and also added a new metric of abundance forecasting performance, meanLAR, which is a measure of proportional bias.

For all models, performance was measured using one-year-ahead cross validation. In general, the GP models predicted abundance better than the Base or ETF models. GP-1 (which included parent spawners and river temperature as predictive covariates) usually had the best predictive performance in measures of proportional or percent error (with the exception of mean LAR), while GP-2 (which included parent spawners, river temperature, and hatchery releases) had the best predictive performance in raw error (numbers of fish) and one proportional measure (meanLAR, added in Supplemental Attachment 3). GP-1 outperformed GP-2 in control rule outputs by all metrics examined, and was the best model for specifying impact rates by five out of six metrics reported (the correlation coefficient [r] favored the ETF model). However, neither GP model captured all of the return years when the postseason abundance estimate was below 3,000, the forecasted abundance below which the control rule for SRWC imposes additional constraints on allowable impact rates.

The SRWC forecast is used directly in harvest management to regulate allowable impact rates, via a control rule that rapidly ramps down allowable impact rates at the lowest forecasted abundances. As a result, different types of forecast error can have distinct downstream consequences. For example, a high forecast when true abundance is low, could allow for higher than intended impact rates for an endangered population. Conversely, a low forecast when actual abundance is high could restrict harvest and forego catch of more abundant stocks when correct application of the control rule would not have required this. When both the forecasted and true abundance are high, errors can have no effect on the allowable impact rate. Therefore, the SSCSS requested an analysis documenting how forecasts from the Base, ETF, GP-1, and GP-2 models would have interacted with the SRWC harvest control rule to affect error in the specified allowable impact rates, and this analysis was provided as Supplemental Attachment 3. GP-2 was the runner-up by most metrics, but ETF outperformed GP-2 in Mean Absolute Percent Error in the impact rate specified.

The ETF model identified lower impact rates than the control rule would have required in two out of those three years. Both the ETF and GP models would have substantially restricted impact rates in a single year when a correct forecast would not have required this (return year 2019 for ETF, 2012 for GP-1 and GP-2; GP-1 and GP-2 would have also slightly restricted fisheries in 2020).

On measures of forecast performance: There was support for log-scale RMSE as a measure of proportional accuracy, though the SSCSS favored looking at metrics of management error as opposed to solely focusing on error in the abundance forecast regardless of the consequences of those errors. However at least one measure of bias should be included in case there are policy considerations around the direction of error that should be accounted for. There were not many metrics of bias presented, though MPE has limitations with respect to directional sensitivity while MedianLAR doesn't work well with small sample sizes and just picking the midpoint ignores the magnitude of most of the errors. There was support for MeanLAR but it doesn't seem to be widely used. All members of the SSCSS emphasized the value of evaluating forecast accuracy with respect to the SRWC control rules instead of based solely on abundance.

In terms of abundance forecasting, for the return year 2012-2022 period, using average age structure, GP-1 was favored over GP-2 on the basis of MPE (percent bias), MAPE (percent accuracy), logR^2/logRMSE (redundant metrics of proportional accuracy), and arguably by MeanALAR (proportional accuracy, values of 0.66 versus 0.67). GP-2 was favored over GP-1 on the basis of ME (raw bias), MAE (raw accuracy), MedianLAR (proportional bias), and MeanLAR (proportional bias). The MeanLAR and MedianLAR metrics are somewhat redundant. and the analysts suggested placing more emphasis on the Mean. At the level of precision reported, GP-1 and GP-2 were tied in r (raw correlation) and R^2 (raw accuracy). R^2 is largely redundant with (should have the same ranking as) RMSE, but because RMSE was reported to 4+ significant figures, a small but likely statistically meaningless advantage for GP-2 was apparent. In terms of control rule output, GP-1 outperformed GP-2 by all metrics presented (ME, MAE, MeanLAR, MeanALAR, R^2, and r).

GP-2 would be preferred if it is considered more important to minimize raw error (number of fish) than proportional or percent error. GP-2 might also be preferred due to an expectation that hatchery releases will vary in the future, and that this variation should be accounted for based on first principles.

Note that impact rate performance is not driven solely by performance during low-abundance years, since false alarms when "true" abundance ≥3,000 would also lead to incorrect specification of impact rates.

The main set of analyses was based on an approach to estimating postseason abundance based on an average age structure across all years, rather than year-specific age structure estimates. Year-specific age structure estimates are imprecise due to limited sample size, and depend on hatchery surrogates to estimate age structure for the natural population, but there are plausible mechanistic explanations for much of the variation observed. Using year-specific age structure estimates decreased the performance of all models, but rankings remained broadly similar, with some metrics of abundance forecasting performance flipping to support GP-1 more than GP-2 but no abundance performance metrics flipping in the reverse direction. However, when evaluating error in allowable impact rate, the only changes in ranking favored GP-2 over GP-1, although no model using year-specific age structure had $R^2>0$ in specifying allowable impact rates. The SSC recommends further work on hierarchical approaches to balance noise and bias associated with

year-specific versus long-term average age structure, and inclusion of information on natural-origin age structure, but for now bases its recommendations on the average age structure approach taken in Attachment 1 and most of Supplemental Attachment 3.

Potential improvements to the SRWC forecast include basing initial model selection on performance in specifying impact rates, separating the contribution of hatchery- and natural-origin spawners, statistically rigorous treatment of annual variation in the age-structure of spawners, and considering other environmental covariates.

Statistical reasons to expect proportional errors: For the forecasts, multiplicative processes are at work (e.g. number of spawners times fecundity times survival to emerge times downstream migration survival etc.) which should lead to a lognormal error structure, consistent with the model being fit on the logarithmic scale. Errors in the postseason abundance estimate are likely to be proportional, due to typical error structure of escapement estimates, and the consequences of multiplying together uncertain escapement, age structure, and impact rate estimates. This will result in larger errors (in numbers of fish) when total escapement is higher.

OPI-H forecast

The post-season abundance for OPI-H is ocean abundance (after natural mortality) from Backward Coho FRAM, which is quite a different approach than used in many of the other forecasts we have reviewed.

Some of the decisions were rather arbitrary— e.g., choosing the top 10 models, or setting a maximum of six covariates. Consequences of those choices are not really clear. Analysts had much more of a data science approach to modeling and assumptions, depending on performance measures to sort out concerns about overfitting, correlation between covariates (only very highly correlated covariates were removed), etc.

For transparency, having a name that reflects what the forecast actually is (Natural and Hatchery, and not just Oregon) might be helpful.

The OPI-H has wild and hatchery components, from both the Coast and from the Columbia River. The covariates affecting abundance likely vary between the components, so it is unclear why the forecast is such a big aggregation of stocks. When the STT and other modelers use the forecast, it is divided up into a number of different model stocks based on assumptions such as average proportion over recent years. The analysts chose to just focus on the aggregate forecast because of Council direction and time constraints.

The OPI-H forecast includes Lower Columbia Natural (LCN), but there is also a separate forecast for LCN that is used by the Council according to pre-I. The definition of the OPI-H in Pre-I (section 3.1) does not mention that OPI-H includes some naturals, although the footnote in Table III-1 does. The OPI-H should be consistently defined to avoid confusion about what stocks are included.

The candidates for inclusion in the OPI-H ensemble had a minimum of zero and a maximum of six covariates used per model. Forecast performance of each model for the most recent 15 years was assessed, and various methods for producing weighted averages of the ten best-performing models were explored and compared to the current OPI-H forecast method and to the single best individual covariate combination as measured by MAPE. The current OPI-H model was the worst performing model. The MAPE-weighted ensemble performed the best, though there was little difference among the ensemble models.

Although the MAPE-weighted ensemble is an improvement from the current model, it still over-predicts abundance in nine of the past 15 years. While it is difficult to conclusively identify the presence of bias with small sample sizes, future consideration should be given to performance metrics that directly consider the magnitude and direction of bias, and it may be important to consider raw error (number of fish) given that OPI-H forecasts are used to set quotas in numbers of fish.

The SSC did not review methods for disaggregating abundance to the component stocks reported in the Preseason-I report or used in Coho FRAM, and did not discuss how the model performed for each of the component stocks.

The SSC recommends forecasting the natural and hatchery component of the OPI-H separately and exploring the possibility of forecasting the various components of the OPI-H separately and aggregating these forecasts as needed for Council use. Including natural-origin abundance indices and new environmental covariates, including freshwater indices, in the model selection process could also be explored.

FRAM documentation progress

The SSC finds the online FRAM user's manual and overview of the documentation to be well organized and user friendly and do not require further review. However, future review of changes to FRAM algorithms or portions of FRAM that have not been previously reviewed (e.g., Backward FRAM) will require completed documentation of all the underlying concepts and algorithms.

E. Groundfish Management

4. Sablefish Gear Switching – Preliminary Preferred Alternative

The Scientific and Statistical Committee (SSC) discussed the "Analysis to Inform Selection of an Initial Preliminary Preferred Alternative for Sablefish Gear Switching" (Agenda Item E.4 Revised Attachment 3). The SSC received a summary of the SSC Economics Subcommittee's (ESC) review of the analysis. The SSC also received an update from Jim Seger (PFMC) regarding a new document summarizing the analysis (Agenda Item E.4 Supplemental Attachment 4). The SSC appreciates the considerable amount of information in the analysis and the efforts of the analysts to complete the report.

The analysis provides estimates of the potential impacts of limiting the use of non-trawl gear to target sablefish (i.e., gear switching) by groundfish individual fishing quota (IFQ) participants. The estimated impacts depend on whether gear switching constrains the attainment of trawl allocations for non-sablefish species. This question was the primary focus of discussions by the ESC and the review by the full SSC. The analysis is inconclusive regarding whether gear switching has or will limit the attainment of non-sablefish species by the trawl fishery.

The SSC agrees with the recommendations of the ESC and has the following additional comments:

- Sablefish catch limits will likely increase substantially in the near future. This provides an opportunity to observe whether there are improvements in the attainment of trawl allocations when sablefish pounds are not constraining.
- The analysis indicates that trawlers earn higher net revenues per pound of sablefish (on average) than gear switchers, suggesting that they could outbid gear switchers for sablefish quota pounds. However, since they do not outbid gear switchers, it implies that net revenues generated with additional quota pounds may be lower for trawlers than gear switchers. There is some evidence that a limited market for fresh Dover sole may explain this, as fish destined for the frozen market generally receive lower prices. Future analysis could examine this possibility by analyzing the potential price of additional Dover sole landings, determining the break-even price at which trawlers would no longer have higher net revenues (per pound of sablefish) than gear switchers, and comparing these prices to those received in the past by Dover sole going to frozen markets.

SSC Notes

The inability to draw a definitive conclusion is due to the nature of the available information, which precludes the application of tests, and not the lack of a comprehensive analysis of the information.

E. Groundfish Management

2. Adopt Rebuilding Analysis, Catch-Only Projections, and Revised Projections

The Scientific and Statistical Committee (SSC) reviewed the rebuilding analyses for quillback rockfish off California, catch-only projections for chilipepper rockfish and yellowtail rockfish North of 40° 10' N. lat., revised forecasts for vermilion rockfish South of 42° N. lat., and revised projections for black rockfish off Oregon, Dover sole, and rex sole (Agenda Item E.2 Attachments 1, 2, 3, 5 and 4, respectively). The SSC also reviewed relevant SSC Groundfish Subcommittee (GFSC) reports from September 26, 2023 and November 1, 2023.

Quillback rockfish rebuilding analyses

The SSC endorses the quillback rockfish rebuilding analysis as best scientific information available (BSIA), and concurs with the GFSC that the analysis was conducted in accordance with the Terms of Reference (TOR) for Groundfish Rebuilding Analysis. The analysis used the Groundfish Management Team (GMT) estimated/projected annual removals for 2021-2024 of 15.8, 18.11, 11.12, and 10.62 mt. During its September 2023 meeting, the Council requested an

alternative analysis with a 2024 removal of 6.32 mt to account for harvest restrictions already put into place (Agenda Item E.2 Attachment 1, Appendix B). All model runs assumed full attainment of ACLs for 2025 and beyond and included uncertainty and starting values based on high and low states of nature that were specified as alternative natural mortality values in the 2021 stock assessment. The model included uncertainty in recruitment deviations with a sigmaR of 0.6. The rebuilding plan was set to start in 2025, with an estimated minimum time for rebuilding of 20 years (T_{MIN}=2045) and a mean generation time of 26 years, which resulted in a maximum time to rebuild of 46 years (T_{MAX}=2071). The analysis explored an appropriate range of alternative rebuilding strategies as specified in the TOR.

The SSC discussed some aspects of the 2021 stock assessment for quillback rockfish off California that were relevant to the 2023 rebuilding analyses. In 2021, the SSC reviewed the 2021 assessment and endorsed it as BSIA for use in management and the Council adopted the assessment after considering several discussions presented in SSC statements and GFSC reports that are reflected in the record for Council meetings in June 2021 (Agenda Item G.5.a Supplemental SSC Report 1), September 2021 (Agenda Item C.6.a Supplemental SSC Report 1) and November 2021 (Agenda Item E.2.a Supplemental SSC Report 1). Those reports characterize the SSC's conclusions about the assumptions, strengths, and limitations of the 2021 assessment.

The SSC received public comment at this meeting relevant to the assessment and rebuilding analysis and determined that many of the scientific aspects of the public comments had been previously considered in the construction and review of the 2021 assessment. Other comments suggested issues and approaches that will be considered as research and data needs to be addressed before the next quillback rockfish assessment.

Catch-only projections and revised projections

The SSC reviewed the following catch-only projections and revised projections and found them to be technically sound:

- Catch-only projection for chilipepper rockfish, which corrects an earlier error that had resulted from using the 2015 assessment update rather than the 2017 catch-only projection as the basis for the new projection (Attachment 2).
- Catch-only projection for yellowtail rockfish north of 40°10' N. lat., which corrects previous errors and uses the 2017 benchmark assessment (Attachment 3).
- Revised projections for Black rockfish off Oregon, Dover sole, and rex sole, which were requested by Council in September 2023 (Attachment 4).

The SSC reviewed the revised catch-only projections for vermilion rockfish south of 42° N. lat. (Supplemental Revised Attachment 5) and found them to be technically sound. The most recent stock assessments for vermilion rockfish south of 42° N. lat. modeled the population dynamics separately for areas north and south of Point Conception, approximately 34° 27′ N. lat. Buffers between the OFL and the ABC were calculated using a P* of 0.45. Since the assessments for the northern and southern areas were assigned categories of 1 and 2, respectively, a weighted σ for the statewide stock was used to calculate the buffers based on the OFL for each stock (Agenda Item H.3.a, NWFSC Report 1, June 2023).

Scientific and Statistical Committee's Groundfish Subcommittee Report on 2025-2026 Harvest Specifications

Pacific Fishery Management Council
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November 1, 2023

The Scientific and Statistical Committee's (SSC)'s Groundfish Subcommittee (GFSC) met November 1, 2023 to review the catch-only projections for chilipepper rockfish and yellowtail rockfish north of 40° 10' N. lat. as well as the harvest specification for vermilion rockfish in California combining assessment areas. Recommendations are provided to inform SSC discussions regarding endorsement of harvest specifications for 2025 and beyond.

Catch-Only Projection for Chilipepper Rockfish

During the September 2023 meeting, the GFSC noted that the 2019 catch-only projections for chilipepper rockfish incorrectly used the 2015 model, which included an incorrect catch history, rather than the 2017 model, which corrected errors in the catch history. As a result, the GFSC requested that catch-only projections be updated to use the revised model and catch history. The GFSC reviewed Attachment 2, which documents this revised analysis, and received a presentation from Chantel Wetzel (NMFS NWFSC). The revised analysis uses the 2017 model for the basis of a catch-only projection with time-varying buffers starting in 2015. Catches between 2017-2022 from the Groundfish Expanded Mortality Multiyear (GEMM) report split by fleet are fixed as the known catches. The removals for 2023 and 2024 were set equal to mortality projections provided by the Groundfish Management Team (GMT). For the years 2025 beyond, catches were set equal to the projected Acceptable Biological Catch (ABC) based on a category 1 time-varying sigma (σ) and a P* value of 0.45. Chilipepper rockfish are managed north and south of 40°10′ N. lat. with the estimated Overfishing Limits (OFLs) and ABCs split by area based on the historical landings of 93 percent and 7 percent of catch occurring south and north of 40°10′ N. lat., respectively. The GFSC discussed and endorsed the revised harvest specifications.

Catch-Only Projection for Yellowtail Rockfish North of 40°10' N. lat.

During the September 2023 meeting, the GFSC noted that catch projections for yellowtail rockfish north of 40°10'N were done incorrectly in the past and requested an update to fix these errors. The GFSC reviewed Attachment 3, which documents the revised analysis, and received a presentation from Chantel Wetzel (NMFS NWFSC). The revised analysis uses the 2017 benchmark assessment and updates catches between 2017-2022 to the removals by year from the GEMM. The removals for 2023 and 2024 were set equal to mortality projections provided by the GMT. For years 2025 beyond, removals were set equal to the projected ABC) based on a category 1 time-varying σ and

a P* value of 0.45. The catches starting in 2025 were set equal to the average catches by fleet between 2017-2024. The GFSC discussed and endorsed the revised harvest specifications.

Revised Harvest Specifications for Vermilion Rockfish in California

The GFSC received a report from E.J. Dick (NMFS SWFSC) on the revised harvest specifications for vermilion rockfish and sunset rockfish in California. The most recent stock assessments modeled the population dynamics separately for areas north and south of Point Conception, roughly 34° 27' North latitude. Buffers between the OFL and the ABC were calculated using a P* value of 0.45. Since the assessments for the northern and southern areas were assigned categories of 1 and 2, respectively, a weighted σ for the statewide stock was used to calculate the buffers based on the OFL for each stock. The GFSC endorsed this process and the revised harvest specifications.

Harvest Specifications for Remaining Species

The GFSC reviewed the harvest projections Dover sole, Oregon black rockfish, and rex sole that were requested by Council in September 2023 (Agenda Item E.2, Attachment 4, November 2023). The Dover sole harvest projections were based on the 2021 assessment using the sigmas for 2020 and beyond, a P* value of 0.45 with assumed removals equal to the adopted ACL in 2023-24. The Oregon black rockfish projections were based on the 2023 assessment using the sigmas for 2020 and beyond, and assumes a P* value of 0.45, sigma value of 0.5, and removals of 466 mt in years 2023 and 2024. The rex sole projections were based on the 2023 assessment using sigmas for 2020 and beyond and assumes a P* value of 0.40. The GFSC endorsed these harvest projections.

Appendix 1

Subcommittee Members in Attendance

Dr. Cheryl Barnes, Oregon State University/ODFW, Newport, OR
Dr. John Budrick (SSC GFSC Chair), California Department of Fish and Wildlife, San Carlos, CA
Dr. John Field, National Marine Fisheries Service Southwest Fisheries Science Center, Santa Cruz, CA
Dr. Chris Free, University of California at Santa Barbara, Santa Barbara, CA
Dr. Owen Hamel, National Marine Fisheries Service Northwest Fisheries Science Center, Seattle, WA
Dr. Kristin Marshall, National Marine Fisheries Service Northwest Fisheries Science Center, Seattle, WA
Dr. Tommy Moore, Northwest Indian Fisheries Commission, Forks, WA
Dr. André Punt, University of Washington, Seattle, WA
Dr. Jason Schaffler, Muckleshoot Indian Tribe, Auburn, WA
Dr. Tien-Shui Tsou, Washington Department of Fish and Wildlife, Olympia, WA

SSC Notes

Quillback rebuilding analysis

- *Only constant F strategies have been investigated in the rebuilding analysis thus far, not phase-ins or ramps. Selection of rebuilding options is the GMT's purview, but the SSC noted that the yelloweye rockfish rebuilding analysis had employed those approaches and they would be allowable as long as the ABC doesn't exceed the OFL in any future projected year.*
- *The documentation of the most recent version of the rebuilder should be posted on the Council's website.*

Issues raised discussed relevant to the 2021 quillback assessment for future research and incorporation in the next assessment

- *Uncertainty in growth rates off California could be reduced by data with sufficient samples collected across the range of sizes observed for quillback rockfish. The most appropriate way to estimate growth will depend on how the data are collected (e.g., random, stratified) and how many data are available to include in the model.*
- *Uncertainty in the estimate of natural mortality could be reduced by data with sufficient samples collected across a range of ages observed for quillback rockfish. However, given the low overall number of samples (about 100), lack of individuals over age 50, and several samples from the 30-40 yr age range suggests that quillback rockfish is a long-lived species with low natural mortality rates. The lack of older individuals may reflect the high fishing mortality rates over a long period.*
- *It is uncertain what the effect of marine protected area (MPA) closures off California is for quillback rockfish, in particular whether including MPAs in the assessment will lead to a substantial change in the estimates of biomass and stock depletion. Although they occur nearshore, available data (e.g., from the California Collaborative Fisheries Research Program CCFRP) suggest low densities of quillback rockfish in nearshore MPAs. Given the longevity of quillback rockfish, MPAs may not have been in place long enough to observe an effect on the population. For copper rockfish, where data do suggest an increase in abundance within MPAs, the results of both southern and northern CA 2023 benchmark assessments were very comparable to the results of the 2021 length-based models that did not explicitly account for or include inside/outside MPA data.*
- *An index of abundance would likely reduce uncertainty in the stock assessment. This is not available from CCFRP because sampling takes place in relatively shallow waters (less than 120 ft) that are not representative habitat for quillback rockfish.*
- *An absolute estimate of abundance based on the CDFW Remotely Operated Vehicle (ROV) surveys may be a useful addition to the next assessment, but would need to be reviewed before being incorporated into a new assessment.*
- *Uncertainty in the 2022 removal estimate, and its implications, were discussed. Opening of previously closed rockfish conservation areas may have increased access to depths occupied by quillback rockfish. Exploitation rate estimates of this magnitude are high, but not implausible or unprecedented for historical West Coast rockfish stock assessments.*

- *In addition, the scale of the stock assessment may not reflect historically discarded fish prior to the live fish fishery due to low conversion rates from the round to filets, though no WCGOP data is available to account for discards. The ROV survey can provide estimates of absolute abundance that may resolve scale issues due to unaccounted for historical discarding, natural mortality, and other factors.*

Vermilion rockfish off California

- *The method used to combine the sigma values across two assessment areas was applied as recommended by the SSC in June 2023. Alternative ways to combine variances were discussed and further guidance should be provided by the SSC in the next revision of the Terms of Reference for Groundfish Stock Assessments.*

E. Groundfish Management

5. Harvest Specifications and Management Measures for2025-2026 – Part 1

The Scientific and Statistical Committee (SSC) reviewed the draft 2025 and 2026 overfishing limits (OFLs) and acceptable biological catches (ABCs) for US West Coast groundfish stocks and stock complexes (Attachment 1). This included provisional harvest specifications under default harvest control rules (HCRs), the range of alternatives that were adopted in September 2023, and revisions made by the Council.

The SSC endorses the OFLs and ABCs listed in Attachment 1, with the following revisions (now referred to as Agenda Item E.5 Supplemental REVISED Attachment 1):

Table 1-1: 2025 harvest specifications under default HCRs

- Black rockfish off Oregon – Based on the GMT recommendation regarding recent (2023-2024) catch projections, these values need to revert to those provided in the most recent stock assessment (Table vii; Agenda Item G.2 Supplemental REVISED Attachment 7, September 2023; OFL 367.50 mt, ABC 343.62 mt).
- Quillback rockfish S of 42° N. lat. – The SSC revised these values based on the SSC-endorsed rebuilding analysis (Agenda Item E.2 Attachment 1) and total estimate of fishing mortality provided by the Groundfish Management Team (GMT; Agenda Item E.2.a Supplemental GMT Report 1), which pertains to all sectors in 2024 and amounts to 10.62 mt. Based on Table 4 of Agenda Item E.2 Attachment 1, the OFL value should be 1.51 mt for 2025. The ABC will depend upon the adoption of a rebuilding plan.
- Vermilion rockfish S of 42° N. lat. – The SSC revised these values using those provided by Agenda Item E.2 Supplemental REVISED Attachment 5 (OFL 315.2 mt, ABC 280.5 mt).

Table 1-2: 2026 harvest specifications under default HCRs

- Black rockfish off Oregon – Based on the GMT recommendation regarding recent (2023-2024) catch projections, these values need to revert to those provided in the most recent stock assessment (Table vii; Agenda Item G.2 Supplemental REVISED Attachment 7, September 2023; OFL 377.12 mt, ABC 350.50 mt).

- Quillback rockfish S of 42° N. lat. – The SSC will revisit these values following final Council decisions on the rebuilding analysis.
- Vermilion rockfish S of 42° N. lat. – The SSC revised these values using those from Agenda Item E.2 Supplemental REVISED Attachment 5 (OFL 314.1 mt, ABC 277.6 mt).

The SSC reviewed proposed changes to the annual catch limit (ACL) apportionment method for shortspine thornyhead (Agenda Item E.5.a Supplemental GMT Report 1). Although the 2023 stock assessment was coastwide, shortspine thornyhead is managed as two units with separate ACLs north and south of Point Conception. The GMT report presented two options for shortspine thornyhead apportionment. The status quo method relies on long-term (2003 to 2022) mean biomass estimated from the Northwest Fisheries Science Center's West Coast bottom trawl (NWFSC WCBT) survey whereas Option 1 involves a rolling 5-yr mean estimate of biomass from the NWFSC WCBT survey. The SSC supports the GMT's recommendation of using Option 1, which would be more responsive to changes in survey distribution and aligns with the apportionment method currently used for sablefish.

The last items reviewed under Agenda Item E.5 were two SSC subcommittee reports. The first was a joint Economics and Groundfish Subcommittee report, which included a review of the most recent sablefish trip limit model for the fixed gear fishery. The SSC concurs with the subcommittees' conclusion that the revised model is appropriate for use in harvest specifications and in-season management. The SSC also concurs with subcommittee recommendations for future work, which would involve jointly modeling catch-per-vessel and participation, jointly estimating the probability of fishing and expected revenue for individual vessels, and incorporating forecasted covariates to improve predictions of sablefish catch into the future.

The second subcommittee report was compiled by the SSC's Ecosystem-based Management and Groundfish Subcommittees (EBM-GFSC). This report included a review of the risk table approach (Fishery Ecosystem Plan's Ecosystem and Climate Information Initiative) developed by the ecosystem work group (EWG) and two pilot risk tables. The risk table approach involves synthesizing environmental or ecosystem, assessment-related, and population dynamics considerations for decision-making processes. Risk categories range from 1 (conditions above or better than normal) to 4 (conditions of major concern). Pilot risk tables presented for petrale sole and sablefish related ecosystem considerations to recruitment. The subcommittees were interested in also understanding how risk tables would perform when they address other components relevant to stock assessment. Potential implementation pathways that were outlined in the EBM-GFSC report involved using risk categories to prioritize stock assessments, adjust the extent of scientific uncertainty (σ) or management risk tolerance (P*), modify time penalties that account for the age of an assessment, and make in-season adjustments. The SSC subcommittees identified a need to tailor risk tables for their intended use and develop a process that prevents multiple concurrent uses (i.e., "double-counting" uncertainty). For the 2025-2026 harvest specifications cycle, the information in the risk table for sablefish could be used by the GMT or Council to inform their decision on P* alternatives. The SSC endorses the EBM-GFSC report and EWG's preliminary work on a risk table approach and recommends operational testing to explore the various

implementation pathways presented. The SSC also recommends development of additional risk tables to examine their potential utility for data-poor stocks.

SSC Notes

The risk table approach was modified from that developed for the North Pacific Fishery Management Council (NPFMC). In relation to buffers between the OFL and ABC, the NPFMC is more "heuristic" whereas the PFMC has been more formulaic (e.g., calculating the OFL-ABC buffer using σ and P). How do these regional differences affect the development and application of risk tables?*

P modifications would require a lot of consideration to avoid internally inconsistent rankings of risks among stocks or assessments varying in available data.*

The EWG noted the potential value of having a consistent reviewer to evaluate risk table applications across stocks.

The SSC recommends that the Council task the EWG to develop risk tables for stocks with varying degrees of information (e.g., to test their utility for data poor stocks).

Existing OFL-ABC buffers used by the PFMC are relatively small, thus there is not a lot of "wiggle room" for reducing them based on favorable conditions. The central subpopulation of northern anchovy (ABC 75% lower than OFL) is one exception to this general pattern for PFMC buffers.

To increase transparency, the SSC recommends explicitly including buffers as a column for Tables 1-4 through 1-7 of Attachment 1.

E. Groundfish Management

8. Phase 2 Stock Definitions – Planning

The Council completed Phase 1 of the stock definitions process with the adoption of Amendment 31 to the Pacific Coast Groundfish Fishery Management Plan (FMP) in June 2023. Phase 2 of the process will involve several steps: (a) defining stocks for at least 75 species, (b) selection of whether any of the stocks currently in the FMP should be redesignated as Ecosystem Component (EC) species, (c) identifying whether management of any stocks should be removed from the FMP or delegated to the states, and (d) revising groundfish stock complexes.

The proposed schedule for developing the Phase 2 stock definitions (Agenda Item E.8 Attachment 2) is focused on stock definition and the catch proportion analysis. It should be extended to include science-related activities expected to be associated with specification of groundfish stock complexes, identification of EC species, and consideration of either removal from the FMP or delegation of management authority to the states, noting that these activities have substantial scientific and policy components.

The SSC recommends reviewing the following methodologies before they are applied (see also Agenda Item C.8.a Supplemental SSC Report 1), specifically:

- the methodology to be used for the state/federal catch proportion analysis for recreational fisheries; and
- how the approach proposed to be used for catch proportion analysis for commercial fisheries developed by Sean Matson (June 2023 Briefing Book, SSC Materials), was revised based on the review by the SSC in June 2023.

Additional review of methods may be needed if information other than catch proportions (e.g., sea floor mapping in Oregon and California) are to be used as part of the basis for deciding whether stocks are to be delegated to the states.

The SSC recommends that the conceptual approach for the stock definition step include the aspects considered during Phase 1 within an interdisciplinary framework, as previously recommended by the SSC (see Agenda Item F.4.a Supplemental SSC Report 1, June 2022 and Agenda Item F.7.a Supplemental SSC Report 1, March 2023). In addition, the literature review should consider variation in life history characteristics (e.g., growth, maturity) when identifying stocks for species. There is also a need to develop a way to identify stocks for data-poor species - for example based on information for similar species. The productivity and susceptibility analysis should take into account climate change risks and make use of ecosystem information.

The SSC anticipates that its review of the literature survey for undefined groundfish stocks and the productivity and susceptibility analysis will focus on the interpretation of the information in relation to stock definition rather than on basic material.

A workshop related to accounting for closed areas in assessment and management would be valuable, as this may help to inform the delegation of stocks to states. In addition, there would be value in the SSC reviewing any methods that are planned for developing stock complexes.

SSC Notes

- *The state/federal catch proportion analysis should make use of data regarding the location of commercial and recreational catches, survey data, and habitat information.*
- *The process of the identification of stocks should be coordinated with planning for the 2025-2026 assessment cycle.*
- *Which fisheries a stock is taken in (i.e., state- versus federally-managed) should ideally be accounted for when deciding whether or not to delegate management of a species to the states.*
- *The following links provide information related to designing and testing spatial stock assessments: https://aaronmberger-nwfsc.github.io/Spatial-Assessment-Modeling-Workshop/ and https://www.capamresearch.org/Spatial-Stock-Assessment-Models-Workshop.*
- *Cadrin et al. (2003): https://doi.org/10.1016/j.fishres.2023.106650 provides information about best practices related to stock identification.*

Requests made of Sean Matson in June 2023 in response to his presentation on "Preliminary estimation of proportional groundfish catch distribution between federal vs state waters."

The Pacific Fishery Management Council's (PFMC) Scientific and Statistical Committee (SSC) received a presentation from Dr. Sean Matson (NOAA, West Coast Region) and reviewed a draft report entitled "Preliminary estimation of nearshore groundfish catch distribution shoreward and seaward of 3 nm to inform future fishery management planning." The report and presentation described a procedure for estimating the proportion of nearshore groundfish catch from inshore state waters and offshore federal waters and applied this procedure to China, copper, and quillback rockfishes.

The SSC recommends that the analysts carefully consider the objective of the analysis and then design the methods as appropriate. The SSC anticipates that this will help to avoid unnecessary work and will reveal the level of precision required for the analysis.

Key questions to consider in defining the objective of the analysis are:

1. *Is the goal to describe the distribution of the catch or the distribution of the population?*
2. *Is the goal to describe the unfished, current, or future distribution of the catch or population?*
3. *What are the key sources of variability relevant to the goals of the analysis and how should they be propagated?*

The distribution of catch is not necessarily the same as the distribution of the population. Catch distribution also depends on management measures (e.g. depth and spatial restrictions) as well as social and economic factors.

The SSC recommends that, depending on the analysis objectives, the analysts consider using more than five years of data. The Groundfish Expanded Multiyear Mortality (GEMM) dataset extends back to 2002, which makes 14 more years of data available for consideration (i.e., the current analysis considers 2016-2020). Representing year-specific catch distributions (as tables or figures) in conjunction with relevant fisheries regulations would facilitate the identification of their potential impacts on catch distribution.

The SSC recommends that the unit of observation and associated measurement of variability be either the proportion of the catch or population inside state waters, given that this is likely the value that will be used to differentiate state and federal stocks. Currently, the analysis reports the variability (coefficient of variation) of the annual catches inside state waters. The analysts could consider weighting annual proportions by the amount of annual catch when quantifying uncertainty. In addition, it would be useful to have a visual representation of proportions through time to understand variability.

The SSC recommends that the analysts consider the use of species distribution models (SDMs) to estimate population or catch distributions if estimating the proportion of the population occurring inside state waters remains an objective of the analysis. The SDMs could be developed using either fisheries-independent surveys or fisheries-dependent data sources. The SSC highlighted the potential for remotely operated vehicle (ROV) surveys and other nearshore fishery-independent

surveys to inform the mapping of population distributions, though limited by a lack of sampling in Federal waters limiting application of species distribution modeling.

The SSC highlights that the distribution and intensity of historical fishing effort may have impacted the distribution of the population and that additional analyses on this interaction may be warranted.

SSC Notes re: Matson presentation in June 2023.

The procedure operates in four steps. First, Pacific Fisheries Information Network (PacFIN) landings data are used to disaggregate GEMM total catch estimates into state, sector, species, and year groups. Second, West Coast Groundfish Observer Program (WCGOP) data are used to further divide the disaggregated GEMM total catch estimates into state and federal waters. Third, annual total catch by state, species, waters (state or federal), and year is computed (i.e., summed across sectors) and averaged across years. Fourth, the average proportion of a species in state waters by state is calculated.

SSC Administrative Matters
8. SSC Committee Operational Guidelines/Practices
9. SSC Coastal Pelagic Species (CPS) Subcommittee report: Accepted Practices (mtg 9/22)

The SSC reviewed a draft of SSC operational guidelines and practices. Feedback was provided as guidance for Council staff to prepare a version for final Committee review via email, prior to submission to PFMC.

The SSC was briefed by the CPS Subcommittee Chair regarding their report from the September 22, 2023 meeting on Accepted Practices Guidelines for Coastal Pelagic Species Stock Assessments in 2024 for CPS stock assessment scientists. The full SSC approved the document for use and requested it be posted to the Council's website.

C. Administrative Matters
8. Future Council Meeting Agenda and Workload Planning

The Scientific and Statistical Committee (SSC) discussed workload planning and has the following updates to its September 2023 statement under this agenda item.

The SSC anticipates conducting its March 2024 meeting in person and the April 2024 meeting remotely. If the April 2024 SSC meeting is remote, as currently suggested by the Council, the SSC suggests meeting Wednesday and Thursday April 3 and 4 (or April 4 if it is a one-day meeting) to accommodate those members who also participate in the Salmon North of Falcon process, as well as those members who have limited access to workspace on the weekends or family care obligations.

The SSC Groundfish Subcommittee proposes holding a stock assessment process review meeting in mid-January 2024, as a one-day webinar with participation from the Groundfish Management Team (GMT), and the Groundfish Advisory Subpanel (GAP). An exact date is yet to be determined.

The SSC Groundfish Subcommittee proposes holding a two-day meeting to review revisions to the Terms of Reference for Groundfish Stock Assessment Review Process and Accepted Practices Guidelines Documents for the next stock assessment cycle (2025-2026) as a webinar to be held January 17-18, 2024 with participation from the GMT and the GAP.

Members of the SSC will conduct a stock assessment review (STAR) panel for the Pacific sardine stock assessment from February 21-23, 2024 to be held in La Jolla, California and chaired by Dr. Andre Punt with participation from SSC members Dr. Tien-Shui Tsou and Dr. John Budrick, and Coastal Pelagic Species Management Team (CPSMT) and Coastal Pelagic Species Advisory Subpanel (CPSAS) representatives.

The SSC proposes the SSC Groundfish Subcommittee hold a meeting to discuss methods for the state/federal catch proportion analysis (recreational and commercial) in spring of 2024 prior to application of these methods in the Phase 2 groundfish stock definition analyses with participation from the GMT and the GAP.

The SSC proposes holding a Groundfish Methodology Review to consider the use of Fourier Transformed Near-Infrared Spectrophotometry (FT-NIRS) method for estimating groundfish ages to be utilized in future stock assessments in June 2024 at a time and place to be determined with participation from the GMT.

The Council Coordination Committee's (CCC) Scientific Coordination Subcommittee meeting (SCS8) will be hosted by the New England Fishery Management Council and will be held during the week of August 26, 2024 in Boston, MA. At least two members of the PFMC SSC are expected to attend.

The SSC Ecosystem-Based Management Subcommittee proposes a one-day meeting in August or September 2024 to review topics associated with the California Current Integrated Ecosystem Assessment Team's Ecosystem Status Report with participation from the Ecosystem Workgroup (EWG) and the Ecosystem Advisory Subpanel (EAS).

The SSC proposes the SSC Groundfish Subcommittee hold a meeting to discuss Phase 2 Stock Definition analyses prior to the September Council meeting at a time and place to be determined with participation from the GMT and the GAP, and possibly the SSC Economics Subcommittee.

The SSC proposes the SSC Salmon Subcommittee hold a Salmon Methodology Review with participation from the Salmon Technical Team (STT), and the Model Evaluation Workgroup (MEW) in October 2024 at a time and place to be determined.

The SSC proposes the SSC Groundfish Subcommittee hold a meeting to discuss "Approaches to Deal with Large Closed Areas and Other Spatial Issues in Stock Assessments" by November 2024 at a time and place to be determined, with participation from the GMT and the GAP.

The SSC proposes holding a workshop on use of remotely operated vehicle (ROV) data in stock assessments to facilitate inclusion in future groundfish assessments by November 2024. This

includes review of abundance estimates for quillback rockfish and consideration of methods for integration of results in future stock assessments.

The SSC recommends participation in the next Sablefish Management Strategy Evaluation (MSE) Workshop in 2024 at a time and place to be determined with participation from the SSC Groundfish Subcommittee, the GMT, and the GAP and possibly the SSC Economics Subcommittee.

The SSC proposes holding a Workshop to Develop Alternative Harvest Control Rules for Pacific Spiny Dogfish in 2024 at a time and place to be determined.

Proposed Workshops and SSC Subcommittee Meetings for 2024 and Beyond							
Workshop/Meeting		**Potential Dates**	**Sponsor/ Tentative Location**	**SSC Reps.**	**Additional Reviewers**	**AB Reps.**	**Council Staff**
1	Groundfish Stock Assessment Process Review	January 2024 TBD	Council/Webinar	Groundfish Subcommittee Members/STAT	CIE Continuity	GMT GAP Advisors	Bellman
2	Groundfish Review of Revisions to the Terms of Reference and Accepted Practices Documents (2025-2026)	January 17-18, 2024	Council/Webinar	Groundfish Subcommittee Members	Science Center Staff	GMT GAP Advisors	Bellman
3	CPS STAR Panel for Pacific Sardine	February 21-23, 2024	Council/La Jolla, CA	Punt - chair Tsou, Budrick	CIE TBD	CPSMT CPSAS	Doerpinghaus Bellman
4	Meeting to Discuss Methods for the State/Federal Catch Proportion Analysis (Recreational and Commercial)	Spring 2024	Council/TBD	Groundfish/ Economics Subcommittee Members	NA	GMT GAP Advisors	Bellman
5	Groundfish Methodology Review of FT-NIRS Method for Estimating fish Ages Utilized in Stock Assessments	June 2024 TBD	NWFSC	Groundfish Subcommittee Members	CARE	GMT	Bellman
6	CCC Scientific Coordination Subcommittee Meeting (SCS8)	August 26-29, 2024	NEFMC/ Boston, MA	SSC members TBD	NA	NA	Bellman
7	Ecosystem-Based Management (EBM) Committee Review of CCIEA topics	Aug/Sep 2024	Council/TBD	EBM Subcommittee	NA	EWG EAS	Bellman

Proposed Workshops and SSC Subcommittee Meetings for 2024 and Beyond							
Workshop/Meeting		**Potential Dates**	**Sponsor/ Tentative Location**	**SSC Reps.**	**Additional Reviewers**	**AB Reps.**	**Council Staff**
8	Review Phase 2 Stock Definition Analysis	Before September 2024 Council Mtg	Council/TBD	Groundfish/ Economics Subcommittees	NA	GMT GAP Advisors	Bellman
9	Salmon Methodology Review	October 2024 TBD	Council/TBD	Salmon Subcommittee	NA	STT MEW	Bellman/Ehlke
10	Approaches to Deal with Large Closed Areas and Other Spatial Issues in Stock Assessments	By November 2024 TBD	Council/TBD	Groundfish Subcommittee Members	NA	GMT GAP Advisors	Bellman
11	Use of ROV Data in Stock Assessments Workshop	By November 2024 TBD	TBD	Groundfish Subcommittee Members	TBD	NA	Bellman
12	Sablefish MSE Workshop	2024 TBD	TBD	Groundfish/ Economics Subcommittee Members	TBD	GMT GAP Advisors	Bellman
13	Proposed Workshop to Develop Alternative Harvest Control Rules for Spiny Dogfish	TBD	TBD	Groundfish Subcommittee Members	TBD	GMT GAP Advisors	Bellman

SSC Subcommittee Assignments

Salmon	Groundfish	Coastal Pelagic Species	Highly Migratory Species	Economics	Ecosystem-Based Management
Alan Byrne	**John Budrick**	**André Punt**	**John Field**	**Cameron Speir**	**Kristin Marshall**
John Budrick	Cheryl Barnes	John Budrick	Cheryl Barnes	Chris Free	Cheryl Barnes
Owen Hamel	John Field	Alan Byrne	Michael Hinton	Michael Hinton	John Field
Galen Johnson	Chris Free	John Field	Dan Holland	Dan Holland	Chris Free
Tommy Moore	Owen Hamel	Owen Hamel	Kristin Marshall	André Punt	Dan Holland
Will Satterthwaite	Kristin Marshall	Michael Hinton	André Punt	Matthew Reimer	Galen Johnson
Jason Schaffler	Tommy Moore	Will Satterthwaite	Matthew Reimer		Tommy Moore
Ole Shelton	André Punt	Tien-Shui Tsou			André Punt
Cameron Speir	Jason Schaffler				Matthew Reimer
Tien-Shui Tsou	Tien-Shui Tsou				Will Satterthwaite
					Ole Shelton
					Cameron Speir

Bold denotes Subcommittee Chairperson

ADJOURN

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