MINUTES
Scientific and Statistical Committee

Pacific Fishery Management Council
The Riverside Hotel
Aspen Room
2900 Chinden Boulevard
Boise, Idaho 83714
Telephone: 208-343-1871

September 11-13, 2019

Members in Attendance

Dr. Aaron Berger, National Marine Fisheries Service Northwest Fisheries Science Center, Newport, OR
Dr. John Budrick, California Department of Fish and Wildlife, Belmont, CA
Mr. Alan Byrne, Idaho Department of Fish and Game, Boise, ID
Dr. John Field, SSC Chair, National Marine Fisheries Service Southwest Fisheries Science Center, Santa Cruz, CA
Dr. Marisol Garcia-Reyes, Farallon Institute, Petaluma, CA
Dr. Owen Hamel, National Marine Fisheries Service Northwest Fisheries Science Center, Seattle, WA
Dr. Michael Harte, Oregon State University, Corvallis, OR
Dr. Dan Holland, 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. André Punt, University of Washington, Seattle, WA
Dr. David Sampson, Oregon Department of Fish and Wildlife, Newport, OR
Dr. Jason Schaffler, Muckelshoot 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

Members Absent

Dr. William Satterthwaite, National Marine Fisheries Service Southwest Fisheries Science Center, Santa Cruz, CA
Dr. Rishi Sharma, National Marine Fisheries Service Northwest Fisheries Science Center, Seattle, WA
Dr. Tien-Shui Tsou, Washington Department of Fish and Wildlife, Olympia, WA

SSC Recusals for the September 2019 Meeting		
SSC Member	**Issue**	**Reason**
Dr. Aaron Berger	H.5 Adopt Final Stock Assessments	Aaron was the lead STAT for the Oregon cabezon assessment
Dr. John Field	H.5 Adopt Final Stock Assessments	John supervised the STATs for the cowcod and gopher/black-and-yellow rockfish assessments
Dr. Owen Hamel	H.5 Adopt Final Stock Assessments	Owen supervised the STATs for many assessments this year

California Current Integrated Ecosystem Assessment Products

1. Albacore Distribution and Availability Forecasts

Dr. Barbara Muhling (SWFSC) presented the progress made investigating drivers of albacore distribution and availability in the California Current. The goal is the development of indices for future inclusion in the CCIEA. The SSS-ES provided comments on the presentation and publication, and guidance for future analysis or development of indices to be included in the CCIEA.

The North Pacific albacore is considered a single stock distributed across the temperate North Pacific, and juveniles (age 2-5) migrate to the California Current (CC) during spring and back offshore in the fall. However, albacore distribution in the CC is strongly variable year to year; therefore, there is interest in the PFMC in the development of albacore indices focused in this area. The presentation was organized around two questions: how many fish migrate into the CC each year, and once there, what drives their distribution. This presentation included recent updates and therefore differed from what was stated in the initial abstract in 2018 (Agenda item F.1.a, NMFS Report 3, March 2018).

For the first question, temperature was investigated as driver of migration toward the CC, as albacore distribution seems to favor a range in temperature between 14 and 20°C due to metabolic needs. Along the central and northern CC, conditions are favorable only in spring and summer, while in southern CC favorable temperature conditions occur year-round. Favorable conditions in spring and summer also include primary productivity. The temperature limitation suggests a potential poleward shift of albacore distribution with increasing temperature trends; however, fishers' data show an inshore shift of the stock's center of gravity (COG) since the 2000s instead. There is also a northward shift; however, as the data is fishery-dependent, this shift might be due to the lack of an albacore fishery in southern CC in recent years. Correlations between the COG and sea surface temperature (SST) however, are weak, especially if only the US and Canada territorial waters data is considered.

To further investigate this question, an indicator called the Transition Zone Chlorophyll Front (TZCF) is been investigated. The TZCF follows the latitudinal position of a productivity hotspot across the Eastern Pacific and it is well approximated by the 28°C isotherm; because of that it is used by Turtle Watch to prevent bycatch along this isotherm, as there is a larger probability of tow interaction. Albacore appears to target the TZCF during their migration to the CC, and therefore it is being explored. Results show that there is significant correlation between the TZCF winter position and COG in May-July; both have been consistently high in later years. In addition, archival tag data shows that, in recent years, albacore is already in the CC by August and it does not redistribute, indicating that early season conditions and location are important. This work is still ongoing.

To answer the second question about the drivers of albacore distribution in the CC Dr. Muhling and team built species distribution models (SDMs) to estimate albacore and four prey species. They used boosted regression trees (BRT) to build these models, but they acknowledge that BRT has the problem of overfitting as that they will fit whatever predictor it is given. The models include environmental, biological (biomass) and fisheries (effort) data as predictors, which were selected by a combination of available data (i.e., only albacore catch data from boats available) and data used in similar modeling efforts (Brodie et al., 2018, Frontiers in Marine Science). Predictor selection was refined by previous research and preliminary results. Individual models were built for albacore (CPUE modeled), anchovy, sardine, hake and clubhook squid, which are important prey for albacore (for these species only presence/absence was modeled). Full details of the model presented are in Muhling et al. 2019 CalCOFI Report.

Model results indicated that for all species SST is an important indicator. The albacore model predicts that suitable habitat (and therefore presence) spans along the California Current (CC) and is fairly consistent among years. However, data shows only a fishery in the northern CC; although, some characteristics of the offshore extensions are captured by the model. In contrast, prey models show some offshore areas with high suitability, which is known to be incorrect, but the core of the habitat and presence is properly captured (coastal for all but squid which has a more homogeneous presence on the domain). More importantly, models show that there is little overlap in space and time between prey species (presence) with albacore (CPUE) at interannual and seasonal timescales.

Dr. Muhling concluded her presentation indicating future work that includes: role of marine heatwaves, dietary studies, climate change impacts and management strategy evaluations. She remarked that there is not a clear indicator to be included in the IEA yet.

The SSC-ES agreed that this project is progressing but there are still methodological and data challenges; therefore, it encourages future work, but does not consider the results to be ready for inclusion in the CCIEA. The SSC-ES recommends developing a more practical indicator of albacore that reflects density and extension, not only presence. A suggestion is CoG, and for this the TZCF shows potential as an index driving CoG variability and/or proportion of albacore per area and deserves further investigation. In terms of improving the model, and the investigation of drivers in general, the SSC-ES strongly recommends researching and including more absence/zero data (i.e. other fisheries in southern CC that did not observe tuna). It also recommends

investigating data that precedes albacore as recruitment was not conclusive. The SSC-ES consider it useful to have confidence plots of where the model is predicting vs. where there is albacore and where data exist, to better understand the strength and limitations of the model.

The SSC-ES raised other concerns about the models: not including temperature data at depth, lack of independent albacore data, lack of data from outside the CCS, prey species predictors being only presence/absence and not density, and the extent of extrapolation done as data is concentrated in fisheries location.

2. Salmon Stoplight Indicators and Forecasts

The SSC's Ecosystem Subcommittee received a presentation from Brian Burke (XXXX) on models used to relate ocean conditions to salmon return on the Columbia River. This work is useful in constructing and evaluating the salmon "Stoplight Indicators" in the CCIEA annual reports.

Dr. Burke presented two models that estimate different outcomes: 1) a dynamic linear model of fish counts at Bonneville Dam and 2) a structural autoregression (SAR) model using PIT tag data.

Model 1 relates adult fish counts at Bonneville Dam to jack returns the previous year and ocean conditions. Ocean conditions are represented by a summary metric constructed from principal component analysis of multiple ocean indicators. The dynamic linear model specification allows for the change in the sibling relationship over time (i.e., a different number of adult returners per jack), which appears to be occurring in some cases.

Model 2 uses PIT tag data and accounts for survival from outmigration to return to Bonneville Dam (need some clarification here). It is a model of individual fish and has a random effect for day and year.

Overall, the SSCES was supportive of these modeling approaches and encourages their continued development. The SSCES has the following comments.

Model 1 is evaluated in terms of model fit. However, the model should also be evaluated in terms of forecast performance. For example, by using methods that use a sub-sample of the data to generate the model and evaluate forecast performance against the rest of the observed data.

To date, the models do not include freshwater conditions. This may make up a large portion of the unexplained variance.

The analysis should note and explain that many of the ocean indicators are coastal and large scale, while salmon ocean survival may be related to "deep sea" and smaller-scale conditions. The analysis could explain how some of the indicators used related to salmon biology. The analysis should explain that most ocean indicators are correlated and, for now, large-scale indicators (e.g., ENSO, PDO) are what we have available.

Having two models is useful. However, it would be helpful to readers to carefully and explicitly explain the assumptions behind each model and explain why results may be different.

It is important to understand that these models, while offering specific, numerical forecasts, are

not used in in setting harvest rules and are not the same as forecasts used in the Council process.

- *These models only look at drivers for Columbia River Spring Chinook. Different stocks would require new models.*

- *This work models counts of adults at dams or PIT tag results. Therefore, they lack some spatial and stock-specific complexity.*

It would be useful to call these models something other than "forecasts" to differentiate them from the management model results. "Outlook", perhaps?

3. Spatial Indicators of Bottom Contact by Trawl Gear and Fixed Gear

Mr. Kelly Andrews briefed the SSCES on the development of indicators of bottom trawl contact with the seafloor for the California Current IEA Annual Report. Bottom trawl contact is currently the sole indicator of habitat modification in the Report. It currently relies on logbook records from the limited-entry and catch-share bottom trawl fisheries from 2002 to 2016. These data are processed to obtain total distance of bottom contact across the fishery. For each recorded tow, towline distance is calculated by connecting the coordinates of set and haul back points with a straight line. During data processing, a small percentage of towlines are dropped (5-9 percent) when errors in the data are presumed. These presumed errors occur when points intersect with land, fall outside the EEZ, are too deep, intersect EFH, or suggest tows are too fast (>5 knots). The remaining towlines are then summarized in two ways in the CCIEA Ecosystem Status Report: 1) time-series of summed towline distances at coarse spatial resolution, and 2) maps of finer spatial resolution summarized across years.

The time-series indicators shown in the report are summed towline distances coastwide, by three ecoregions (North, Central, South), by three bathymetric regions (shelf, upper slope, lower slope), and by two habitat types (hard, soft). Summarizing bottom contact in this way shows that bottom contact is higher in the North in soft bottom habitat than other ecoregions or habitats. Finer scale distribution of bottom contact is shown in the report on a 2 km grid in three maps representing the annual anomaly, the normalized mean, and the normalized 5 year trend in each grid cell. Due to confidentiality agreements, only grid cells with towlines for 3 or more vessels are currently shown.

Previously, the SSC had raised a potential concern that the removal of confidential data may be influential to the indicator reported. In response, Mr. Andrews presented an analysis calculating the proportion of confidential data across spatial resolutions, and while the proportion was higher with smaller grids, it never exceeded 11 percent. This amount of data loss was not of significant concern to the SSCES. However, the SSCES notes that clarification from the states on the confidentiality of vessel positions could potentially lead to inclusion of more of the logbook data for this analysis.

The SSCES discussion of the bottom contact indicator as it is currently presented included the following considerations for the CCIEA team:

- *In the written description of the indicator time-series, include description of management shifts that could be contributing to patterns in the bottom contact indicator, such as implementing a catch share program*

• *Include a fourth panel in the map figure that shows total fishing effort to give context to the anomaly, mean, and trend*
• *Positional accuracy is of more concern at finer spatial resolutions, consider other relevant work comparing VMS and logbook positional accuracy*
• *Investigate maps of standard errors at each scale (and potentially include in an appendix) because variance is likely higher at finer spatial scales*

Mr. Andrews also presented two potential new metrics for indicators of bottom contact to address concerns previously raised by the SSC. First, he compared the trawl distance metric, which is based on set and haul back locations, with a metric of trawl duration, which is based on set and haul back times. The analysis showed high correlation between the two metrics at the coastwide scale, with differences increasing at finer resolution (e.g. 2km). A second potential new metric calculates trawl distance using VMS vessel tracks instead of logbook data and straight line distance between the set and haul back locations of tows. Mr. Andrews presented an analysis using a subset of years (2008-2010), where 74 percent of tows from logbooks could be matched with VMS locations. The comparison between the two datasets suggests that VMS data provide more accurate magnitude and location of bottom contact. However, currently, logbook data provide more coverage across vessels and a longer time-series.

The SSCES discussed these tradeoffs and suggests the following:
• *Retain the current distance metric based on logbook data to preserve the length of the indicator time series.*
• *Consider adding a time-series representing the VMS data to the existing plot of bottom contact calculated from logbook data.*
• *Explore matching VMS and logbook locations using both VMS as the baseline and logbook data as the baseline to see if a similar percent of tows are captured.*

E. Ecosystem-Based Management

2. Climate and Communities Initiative

The Scientific and Statistical Committee (SSC) received a presentation from Mr. Jonathan Star on the climate and communities initiative (Agenda Item E.2, Situation Summary, September 2019).

Mr. Star presented a preliminary list of "driving forces of change" which may form the basis of scenarios and asked for input from the SSC. The preliminary list includes drivers of change described in very general terms. It includes aspects of climate change but also a variety of potential future social, economic, and policy developments. The SSC suggested a number of additional or more specific drivers of change to consider in scenarios including:

- physical changes in the California Current ecosystem including upwelling, wind, currents, and dissolved oxygen;
- changes in the amplitude and periodicity of climate variability;
- changes in ecosystem function and productivity;
- more frequent and/or larger harmful algal blooms;

- changes in the cost and methods of collecting data and doing research driven by technological developments and budget constraints;
- increasing public pressure to reduce human impact on ecosystems;
- changes to national fishery policy; and
- changes to national legislation including the Magnuson-Stevens Act, the Marine Mammal Protection Act, and the Endangered Species Act.

The SSC noted, and Mr. Star agreed, that physical changes related to climate change, as well as other driving forces described in general terms, must be translated into outcomes that directly impact fishing communities (e.g., relative changes in acceptable biological catches or prices for particular species) when constructing scenarios. The SSC has expertise relevant to the scenarios being developed and can, if requested, participate in the scenario validation process.

A. Call to Order

Dr. John Field called the meeting to order at 0800. Mr. Chuck Tracy began his briefing by thanking Dr. Aaron Berger, Dr. Dave Sampson, and Dr. Rishi Sharma for their service. He also thanked the groundfish folks for a good stock assessment review season this year. It appeared to go smoothly. The SCS6 proceedings have been sent to the printer and should be available soon. The Council will enter a contract with PSMFC to develop a Research and Data Needs database. He would like SSC feedback on how to set up the database by November. Mr. John DeVore will be the staff lead. The goal is to have the database completed by the end of next year. There is consideration for a groundfish stock assessment post-mortem meeting this year which is always a good idea. This is the last opportunity for the SSC to comment on COP 22, which prescribes the Council's EFH process. Chuck asked the SSC to characterize the greater uncertainty on the cowcod assessment to communicate risk with setting new harvest specifications. It would also be helpful to provide details regarding the sablefish assessment given the importance of that stock. The National Marine Fisheries Service is requesting comment on the draft Geographic Strategic Plan. The SSC does not need to produce a statement if there are no substantive comments to make. There are a number of salmon methodology review topics to consider for a methodology review next month. This potentially includes analysis regarding Southern Resident Killer Whales, which will be available any day now. This may be a good review topic since the analysis was not provided in time for SSC review at this meeting. The salmon rebuilding plans are scheduled for adoption at this meeting and a final review of analyses is needed. Scoping phase-in approaches for setting groundfish ABCs is on the agenda. There are a number of questions the Council would like SSC responses for in this scoping process. There are also new draft NS1 guidelines in a draft NOAA Tech Memo regarding phase-in control rules. NMFS is requesting comments on these draft guidelines. The groundfish methodology review topic selection process is clear. One question is, if the ODFW hydroacoustic

The draft June minutes need to include the notes on the Gunderson comment. The table on page 18 needs to be reformatted.

H. Groundfish Management

5. Adopt Final Stock Assessments

The Scientific and Statistical Committee (SSC) received a report from Prof. David Sampson on the results of a Groundfish Subcommittee meeting held August 20-21 to review 2019 stock assessments, stock assessment updates, catch-only projections, and catch reports. These include the benchmark assessments that were reviewed by stock assessment review (STAR) Panels throughout 2019, two stock assessment updates that were reviewed at the subcommittee meeting, 11 catch-only projections, and one catch report. The subcommittee report is appended to this statement, and Table 1 summarizes the assessments, associated category levels, and future assessment recommendations. The SSC commends the assessment authors and STAR panel reviewers for their extensive and thorough work. In particular, the SSC expresses appreciation to the stock assessment teams for working around the loss of preparation time due to the extended government shutdown earlier this year.

Cabezon

The current stock assessment for cabezon (Agenda Item H.5, Attachment 1) includes separate benchmark assessment models for two California sub-stocks and an Oregon stock, last assessed in 2009, as well as a data-poor assessment for the Washington stock. Model structure and data were modestly changed in the California and Oregon models. Changes include the addition of the California Collaborative Fisheries Research Program (CCFRP) survey index and use of informative priors for natural mortality (M) and the growth coefficient (k) in the central/northern California model (NCS). The Oregon model (ORS) has considerable compositional data yet estimated implausibly high estimates of natural mortality. Consequently, the Oregon M is fixed at the northern California model estimate. Due to a lack of age data, the Southern California model (SCS) fixes growth at the central/northern assessment estimates, constraining the model's ability to estimate uncertainty and natural mortality. Major uncertainties include M for all three full assessments, and growth for the California models, which are informed by little (NCS) or no (SCS) age data. The Washington assessment (WAS) was conducted using a catch-only Simple Stock Synthesis model.

The two California models and the Oregon model all estimate depletion levels above the management target, with 2019 depletion estimates of 49 percent (SCS), 65 percent (NCS) and 53 percent (ORS), respectively. The SSC endorses the four Cabezon assessments (SCS, NCS, ORS, and WAS) as providing the best scientific information available and suitable for informing management decisions. The SSC concurs with the STAR panel recommendations that the SCS, NCS, and ORS be assigned to category 1. The Washington assessment should continue to be category 3. The SSC recommends that updates are sufficient for the next California assessments unless substantial additional age data or other data sources become available. For the Oregon model, a full assessment would allow incorporation of further information on spatial structure and geographic stratification. The next Washington stock assessment should be a full assessment, if adequate index and compositional data are available.

Longnose Skate

The 2019 longnose skate stock assessment (Agenda Item H.5, Attachment 5) includes considerable improvements to landings and discard estimates relative to those in the 2007 assessment, a particular challenge for skate stocks given that landings were not routinely recorded to the species level prior to 2009. Natural mortality and the West Coast Groundfish Bottom Trawl Survey (WCGBTS) catchability coefficient (q) are estimated using informative priors. The estimated depletion in 2019 is 57 percent. The catchability of the WCGBT survey is used to set the low and high states of nature in the decision table.

The SSC endorses the longnose skate assessment as the best scientific information available and suitable for informing management decisions. Given the lack of recruitment deviations in the assessment model, the model's inability to fit the indices, and the weak information content of the available data, the SSC recommends that the stock be assigned to category 2. The SSC concurs with the STAR Panel recommendation that the next assessment could be an update, provided future fishing removals remain well below the overfishing limit (OFL).

Big Skate

The big skate stock assessment (Agenda Item H.5, Attachment 3) is the first for this species off the U.S. West Coast, and is modeled as a coastwide assessment. Strong assumptions were required to estimate historical discards (and dead catches), as big skate have only been sorted from other skate species since 2015. The model includes a new prior for the WCGBT survey q developed by the Stock Assessors Team (STAT) during the STAR Panel review. The assessment model provided weak support for the assumed steepness of 0.4. As in longnose skate, the major axis of uncertainty in the decision table was q of the WCGBT survey. Depletion in 2019 is estimated to be 79 percent.

The SSC endorses the big skate assessment as the best scientific information available and suitable for informing management decisions. Given the lack of recruitment deviations in the assessment model for big skate, the SSC recommends that the stock be assigned to category 2. The SSC concurs with the STAR Panel recommendation that the next assessment could be an update, provided future fishing removals remain well below the OFL.

Sablefish

The last full assessment of sablefish for the U.S. West Coast was in 2011, with an update completed in 2015. Major changes in the 2019 assessment (Agenda Item H.5, Attachment 7) include pooling of hook-and-line and pot gear into a single fixed gear fishery, the exclusion of all the length composition data (except data associated with the WCGBTS) due to tensions among data sources in the model, a change in the fixed steepness value from 0.60 to 0.70, and the inclusion of a recruitment index based on the environmental time series of sea level. In addition to tension between length and age data, other major uncertainties were associated with spatial and temporal variability in growth, spatial stock structure, and the modeling of retention curves. Despite these uncertainties, the WCGBTS index and compositional data are informative with respect to both abundance trends and recruitment variability.

Spawning output has been relatively stable over the past decade with depletion close to the management target level during that time. In 2019, the sablefish stock is estimated to be at 39 percent of unfished spawning output. However, abundance is projected to increase, and the spawning output is projected to be above the target level in 2021. This trend is driven in part by

the estimated, but highly uncertain, size of the 2016 year class. The assessment document includes an extensive analysis of ecosystem considerations, and the STAT reported progress of on-going investigations into the regional spatial structure of the population, spatial patterns in growth, and initial efforts to consider a spatially explicit NE Pacific model.

The SSC endorses the sablefish stock assessment as the best scientific information available and suitable for informing management decisions. As the assessment has reliable age composition data to inform growth and recruitment and an informative survey trend, the SSC recommends that sablefish be assigned to category 1. The SSC recommends that the next sablefish assessment be a full assessment due to the technical issues discussed in the STAR Panel and Groundfish Subcommittee reports, pending research advances in these areas. However, an update in the near future may be appropriate given recent indications of potentially strong incoming year-classes.

Cowcod

The current assessment for cowcod south of Point Conception (Agenda Item H.5, Attachment 9) uses the Stock Synthesis model rather than the Bayesian surplus production model (XDB-SRA) used in the 2013 assessment. The new assessment includes indices from six fishery-independent data sources (most of which were also included in the 2013 model), as well as length and age composition data. A major contributor of uncertainty with the cowcod assessment is the lack of adequate data (particularly age data) for estimating growth, natural mortality, and recruitment.

The base model estimates that spawning output has been steadily increasing since the late 1980s when the stock was estimated to be at 9 percent of unfished level. The current depletion estimate is 57 percent of unfished spawning output in 2019. Sensitivity analyses demonstrate that when the lower productivity assumptions associated with the 2013 model are applied to the current model (e.g., lower steepness and M), the model results are very comparable to those of the 2013 model.

The SSC endorses the cowcod stock assessment as the best scientific information available and suitable for informing management decisions. The SSC recommends that cowcod be assigned to category 2, as recruitment deviations were not estimated. The SSC recommends that an update assessment would be sufficient unless substantial new information is available. The SSC strongly recommends that if a fishery for cowcod resumes, collecting age data from fisheries landings should be a high priority.

The SSC notes that near-term harvest levels based on standard projections would imply taking annual harvests substantially above the long-term equilibrium maximum sustained yield (MSY) estimate (73 mt) for this stock. The SSC also notes that under the low state of nature, the stock is not currently rebuilt, and does not rebuild during the projection period under base model catch assumptions (although it also does not decline during the projection period). The low state of nature stock trajectory does rebuild under the low state of nature catch projections. These observations may be worth consideration in choosing an annual catch limit (ACL) for this stock.

Gopher Rockfish / Black-and-Yellow Rockfish Complex

This is the first full assessment for gopher rockfish and black-and-yellow rockfish (GBYR) as a species complex (Agenda Item H.5, Attachment 11). The current assessment includes information from landings, discards, age and length composition data, and six sources of fishery-dependent and fishery-independent abundance indices, including indices and age data from the CCFRP. Spawning output has been steadily decreasing since the mid-2000s when the stock was estimated to be at 77 percent of unfished spawning output, the highest level since the early-1970s, to a current

depletion estimate of 44 percent of the unfished level. Major sources of uncertainty are the potential for spatial and species-specific differences in life history parameters (e.g., growth) and that the abundance indices were not fit well in the model. Steepness and M were fixed in the base model, while recruitment deviations and growth were estimated.

The SSC endorses the GBYR stock assessment as the best scientific information available and suitable for informing management decisions. The SSC recommends that GBYR be assigned to category 2, largely due to the fact that this assessment is for a species complex. The SSC recommends that the next GBYR assessment be a full assessment if there are substantial increases in information (i.e., improved information on growth, or an improved age-0 index); otherwise, it could be an update assessment.

Petrale Sole

The petrale sole update (Agenda Item H.5, Attachment 13) is the second update of a 2013 benchmark assessment. The most influential new information is the updated WCGBTS index, which initially continued the sharply increasing trend observed in the 2011-2014 time period, with indications of a leveling off and a downturn in the latest year (2018). Landings have increased in the last four years (2015-2018) relative to the previous four years (2011-2014), consistent with the stock being rebuilt and continuing to increase in abundance. The current depletion estimate for 2019 is 39 percent; however, the trajectory of the stock is forecast to decline as the large 2006-2008 cohorts are fished down, as recent recruitments (2010-2016) have been below average. The estimated steepness in the new assessment declined slightly (from 0.90 to 0.84) relative to the 2015 assessment estimate.

Both the Groundfish Subcommittee and the SSC discussed technical aspects of how the low and high states of nature for the decision table were developed. The final decision table should better reflect the uncertainty of the assessment.

The SSC endorses the petrale sole stock assessment update as the best scientific information available and suitable for informing management decisions. The SSC recommends this assessment be assigned to category 1 as was done for the 2015 update. The SSC recommends that, barring unexpected or conflicting indicators from survey or catch data, the next petrale sole assessment could be an update, due to the high information content of the survey.

Widow Rockfish

The widow rockfish update (Agenda Item H.5, Attachment 14) is the first update of the 2015 benchmark assessment. The updated data and time series include a notable (albeit noisy) upward trend over most of the last few years that was fit reasonably well by the model and driven by several recent strong year classes (2008, 2010, 2013, and 2014). The revised depletion estimate was slightly lower than what was projected in the 2015 assessment, but maintains the ongoing increase in abundance, such that the model estimated a 2019 depletion of 92 percent. The axis of uncertainty for the decision table was a combination of natural mortality, steepness, and the strength of the 2013 recruitment.

The SSC endorses the widow rockfish update stock assessment as the best scientific information available and suitable for informing management decisions. The SSC recommends this assessment be assigned to category 1 (as was the 2015 benchmark). The SSC recommends that the next widow rockfish assessment could be an update, although a benchmark assessment may be appropriate if catches continue to increase substantially.

Catch-Only Projections

The SSC reviewed catch streams and model results from 11 catch-only projections. In each case, comparisons were made between the projected catches from the last assessment and the catch streams used in the catch-only projections, which were provided by the GMT. These GMT-provided values were also compared against the recently released Groundfish Expanded Mortality Multiyear (GEMM) product from the West Coast Groundfish Observer Program (WCGOP). Projected biomass from the last assessment and from the catch-only projections were compared to ensure any differences were consistent with projected versus realized catches.

The SSC recommends that the catch-only projections for black rockfish (CA, OR, and WA), blackgill rockfish (S. of Cape Mendocino), the blue/deacon rockfish complex (CA only), darkblotched rockfish, Dover sole, lingcod, rougheye/blackspotted rockfish, longspine thornyhead, and China rockfish to be the best scientific information available and suitable to support management decisions. The SSC identified minor problems or pending questions related to the catch-only projections for canary rockfish and shortspine thornyhead, which will be revised for the November 2019 Council meeting.

Yelloweye Rockfish Catch report

Recent catches have all been below the 20 mt ACL. The WCGOP values (18.4 and 17.2 mt) are very close to those given in the catch report.

Future SSC Considerations

The SSC notes that the current spawning potential ratio (SPR) target for elasmobranchs (0.5) is not consistent with the steepness value (0.4) and the biomass target of $B_{40\%}$ assumed in the assessments for longnose and big skate, as the SPR harvest rates will lead to equilibrium biomass levels significantly lower than the 40 percent level assumed by the harvest control rule. A meta-analysis of productivity estimates for elasmobranchs should be conducted to explore possible revisions to the current steepness value, SPR proxy for F_{MSY} and/or biomass target.

Table 1. Summary of stock assessments, category recommendations, and recommendations for future assessments. Note that the "next assessment" column does not reflect numerous and varied caveats that are reflected in this report, as well as the STAR panel reports, which should be considered when future decisions are being made.

Species / Complex	Area	Category	Next Assessment
Cabezon	S of Point Conception	1	Update OK
Cabezon	Pt Conception to OR Border (42°)	1	Update OK
Cabezon	OR	1	Full (with caveats)
Cabezon	WA	3	Full (with caveats)
Big Skate	Coastwide	2	Update OK
Longnose Skate	Coastwide	2	Update OK
Sablefish	Coastwide	1	Full (with caveats)
Cowcod	S of Point Conception	2	Full (with caveats)
Cowcod	Pt Conception to Cape Mendocino	3	Update OK
Gopher / Black-and-Yellow Rf Complex	S of Cape Mendocino	2	Full (with caveats)
Petrale Sole	Coastwide	1	Update OK
Widow Rockfish	Coastwide	1	Update OK

SSC Notes:

Cabezon: A lot of discussion about how to best model growth, given differences between data-rich OR and data poor CA estimates, particularly as nearly all CA data were from the "southern" end of the "central/north" cabezon population- which may be helpful given it was used for southern California, but may have not been the most appropriate for northern California.. There was more age data to inform growth in the Oregon model, age data were limited in the central California model. This is something to think about recommendations for the next assessment. Also noted that the latest assessment for CA do indicate that the stock was overexploited over some period in the past. Some concerns that the southern California model approximate asymptotic confidence limits may not have been developed appropriately. A profile over the ending spawning biomass would have been a more appropriate way to look at this, this would have taken a bit of extra work.

The SSC noted that the criteria for assigning cat 2 to cat 1 were not clear for this stock; the GFSC

discussed the absence of age data in the SCS assessment and that the CAAL was borrowed from the northern California model, and recommended applying a category 2. However, growth is rapid, natural mortality is higher, and cohorts inform recruitment, so a category 1 is – barely-warranted. The WA model has very limited length and age data, wasn't clear how the model went from SPR to depletion in SSS, this is not well documented in the assessment document. If you know SPR, depletion should be less than that if you've reached equilibrium. The STAT noted that they were not originally tasked with developing a Washington assessment, thus the documentation is less than ideal. Last time , WA cabezon based on the OR depletion to set the prior for WA in DB-SRA, the SSC discussed whether using the SPR estimate as a course measure of relative stock status (with some associated sensitivity) used to establish the prior for SSS is an improvement for this model. The documentation for this approach was not completely adequate, the Groundfish subcommittee chair will work with the STAT to improve this documentation. Noted that many of the uncertainties that should be in the final documentation were not included in the final document as well.

Longnose skate: The catch and discard reconstruction was based on linear regression model of Longnose skate total mortality (Y) versus Dover sole total mortality (X), from total mortality estimates from WCGOP for 2009-2017. Major axis of uncertainty is the WCGB survey catchability coefficient (q), which was the focus of considerable discussion at the STAR panel. It was noted that the SSC should provide some guidance on best practices for deriving q priors in future assessment cycles.

The SSC was not prepared to provide a robust alternative to the default SPR harvest rate at this meeting and noted that in the near term the default rate is not likely to lead to conservation concerns. The current SPR for elasmobranchs was changed in 2013 from 0.45 to 0.5 based on an analysis of results from a meta-analysis by Zhou et al. (2012) by Dr. Martin Dorn of the AFSC (PFMC 2013).

Big Skate: Use of the catch multiplier feature in SS3 was a novel application.

Sablefish notes: The estimation of natural mortality (M) was greatly influenced by the data weighting, specifically the relative weight given to the length data versus the age data. The length data, which suggested higher values of M, were only informative for relatively small (young) fish, while age data generally suggested lower values of M and were informed by both young and old fish.

It was also noted that it was very unusual that the scale of the model is being determined by the recruitment deviations, they should not be driving the R0 scale. Residual patterns in the rec devs were also concerning, but it would likely take a more complex S/R relationship to improve this. Noted that it would be helpful to see if R0 profiles have a similar pattern for Pacific hake, which has the same Sigma R.

Cowcod notes: The SSC notes that the uncertainty associated with the decision table's low state of nature was little different from that for the base model, which is typically not the expectation in a decision table. Identifying a low state of nature farther from the base model was problematic

because the very low stock sizes in the late 1980s were constricting, such that standard approaches to formulate the low state of nature lead to stock collapse.

Petrale sole notes: The catchability coefficient for the WCGBTS has been unusually high for some time, this remains a concern by the SSC and something to investigate further. A sensitivity run using new fecundity data suggested that inclusion of this information (in a future full assessment model) would lead to a slightly more pessimistic perception of current stock status (from 39 to 35% of unfished level), as would deviations to the assumption of a 50:50 sex ratio of age-0 recruits (an additional ~1% reduction in relative stock status).

The SSC notes that the decision table may overestimate the uncertainty associated with this model but is an accurate replication of the decision table that was approved and adopted in previous assessments. Specifically, the incorrect log-likelihood value may have been used to choose values for the low and high states of nature, and moreover that changes in natural mortality may simply be compensated for in altered model estimates of steepness (in the future, steepness should likely be fixed at the estimated value for purposes of a decision table).

Catch-only update notes: the "Executive Summary" format for catch-only updates is very onerous, the TOR should be revised to reflect that basic needs are tables of prior and recent (2019) projections of OFLs, ABCs, spawning output and depletion (noting difference between projected and actual catches for intervening years), ensuring that the numbers are plausible given differences in assumed and realized catches. It was noted that the SSC should develop recommendations for exactly how to use GEMM reports for recent years in catch-only estimates (possibly do these after GEMM reports are available in Sept., for use in Nov. Council meeting).
Catch-only updates notes: with respect to slight discrepancies in the ABCs, this is primarily a concern for rougheye/blackspotted rockfish, for which there were minor discrepancies in the intended versus realized buffer values in the projections specifications, there was some discussion of whether it was necessary to redo this analysis, given that the resulting changes are within the rounding error of the ultimate values. Given the very low turnover nature of this stock, minor differences in catch are very unlikely to influence the 2022 OFL and ABC values. Also noted that we need the depletion projections for Lingcod for the final documentation.

Report of the Groundfish Subcommittee Review of the 2019 Groundfish Stock Assessments

The Auditorium
NOAA Fisheries, Northwest Fisheries Science Center
2725 Montlake Boulevard East
Seattle, Washington 98112

20 – 21 August 2019

Introduction

The Groundfish Subcommittee (GFSC) of the Scientific and Statistical Committee (SSC) met at the Northwest Fisheries Science Center (NWFSC) facility in Seattle on 20-21 August 2019 to review the new groundfish stock assessments that will be considered by the full SSC and the Pacific Fishery Management Council (PFMC) at the September 2019 Council meeting. These included the benchmark assessments that were reviewed by STAR Panels throughout the Spring and Summer of 2019, two stock assessment updates that were reviewed only at this meeting (noting that updates serve the purpose of "resetting" the sigma clock), and numerous "catch only" projections that were also only reviewed at this meeting (noting that "catch only" projections do not reset the sigma clock, but often lead to changes in OFL and ABC projections by virtue of accounting for differences between forecast and realized catches from past assessments). As laid out in the Terms of Reference for Stock Assessments, this late-summer meeting is intended to provide time for a more thorough review of the new assessments than would otherwise be available to the SSC at the September Council meeting, when the assessments must be formally accepted for use in the groundfish harvest specifications process.

The workshop began with a welcome by the GFSC chair, Dr. David Sampson, followed by a round of self-introductions from the workshop attendees. A list of attendees and the meeting agenda are appended to this report.

Disclaimer

This report describes presentations and documents reviewed at the GFSC meeting on 20-21 August 2019. Some of the documents were revised as a result of the GFSC's review and a few of the comments below no longer apply.

Cabezon Full Assessment

Dr. Jason Cope and Dr. Aaron Berger of NWFSC, who were leads for the stock assessment team (STAT), presented the Cabezon stock assessments (Agenda Item H.5, Attachment 1). Two sub-stocks were assessed in California in addition to separate assessments in Oregon and Washington. The California and Oregon assessments were full benchmark assessments, while the Washington stock assessment, previously assessed with data-poor DB-SRA methods, utilized a different data-poor assessment platform.

Although the structure of the California stock assessment did not change appreciably from 2009 when the CA stocks were last assessed, there were some changes. The recreational catch estimates from the Marine Recreational Fisheries Statistical Survey for 1980-1995 were stratified at 36° N.

lat. rather than Point Conception at 34°27' N. lat., which delineates the assessment areas. To align catch estimates with the assessment area stratification, the historical catches from 1996-1999 were used to reapportion catch north and south of Point Conception. The outcome was a reduction in the scale of the southern stock assessment. The other major change was addition of the California Collaborative Fisheries Research Program (CCFRP) survey index. Also, natural mortality and the growth coefficient *k* were estimated using priors.

The CV for 2019 spawning biomass was 38% for the northern California substock (NCS) (52% for the OFL) and 42% for the southern (SCS) California substock (46% for the OFL). Removal of the age composition data for the NCS had a significant effect on status, otherwise the model was robust. The SCS assessment was sensitive to the removal of the length composition data from boat-based fleet and little change was observed with removal of index information.

The Oregon assessment had a lower CV of 14% for spawning biomass (10% for the OFL), in part due to having fixed natural mortality. The 2009 stock assessment for Oregon had less composition data available than the 2019 assessment and many changes were made in the 2019 assessment to make use of these data and provide additional indices of abundance. The natural mortality coefficient was fixed at the value estimated in the model for the northern California substock; the *M* was similar to the 2009 Oregon assessment values. If *M* was estimated, the OR assessment produced estimates that were deemed implausibly high given life history information, at near 0.4 y^{-1}, mostly due to information from the boat-based recreational composition data. Conflict in the data affecting natural mortality estimates may be resolved in the future. Estimates of growth were another source of potential error in the Oregon assessment.

Concerns were expressed by the GMT representative Lynn Mattes of the Oregon Department of Fish and Wildlife about the lower biomass scale of the Oregon assessment compared to the 2009 assessment, despite increasing trends in abundance from indices for the recreational fishery. Given the magnitude of recent catch, the OFL resulting from the model will constrain fishing opportunities. Decision tables were based on the natural mortality values consistent with the 12.5^{th} and 87.5^{th} percentiles of 2019 spawning biomass.

The Washington assessment was conducted using a catch-only Simple Stock Synthesis (SSS) model instead of the previously applied DB-SRA method. The 2009 vs 2019 models also differed in using different productivity assumptions. A series of weighted and unweighted ensemble models were used, with weighting from a range of stock status priors determined using the LBSPR (Length-based Spawning Potential Ratio) software. The new estimate of MSY from the model was higher than the previous methods.

Endorsement as the Best Scientific Information Available

The GFSC endorses the four Cabezon assessments (SCA, NCA, ORS, and WAS) as providing the best scientific information available and suitable for informing management decisions.

Major Uncertainties and Considerations for Management Decision-Making

Major uncertainties are natural mortality for all three full assessments. Collection of length and age data by sex to address sexual dimorphism in growth rates would reduce the uncertainty associated with growth. Recruitment is the major contributor to the total likelihood informing *M*, largely resulting from a lack of age data in the south, making the pulse of recruitment and decline of cohorts the only information on *M*.

Stock Category and the Sigma Recommendations

The GFSC recommends that the northern California and Oregon substocks be assigned a category 1 designation with the default sigma value of 0.5 for calculating the scientific uncertain buffer; the Washington assessment should continue to be category 3 with a default sigma of 2.0. The GFSC recommendations for these three stocks are consistent with the STAR Panel recommendations. Regarding the southern California substock (SCS), the GFSC discussed the absence of age data in the SCS assessment and that the growth curve was borrowed from the northern California model, and recommended applying a category 2 sigma for the SCS with the default sigma value of 1.0 for calculating the scientific uncertainty buffer. The STAR Panel recommended that the SCS be assigned a category 1 designation because the model estimated numerous parameters including *M*, which is integral in this assessment. The only borrowed parameters were for growth, which were fixed at the values estimated by the NCS model.

For the SSC review of new assessments, the GFSC recommends basing sigma calculations on the CV of spawning biomass. In addition, the Executive Summary of each 2019 assessment document should report a sigma value based on the CV for the estimated OFL to provide a better understanding of uncertainty.

Benchmark or Update Recommendation for the Next Assessment

An update is sufficient for the next California assessments unless substantial additional age data or other data sources become available. For the Oregon assessment a full assessment would allow incorporation of further information on spatial structure and geographic stratification. The next Washington stock assessment should be a full assessment, assuming adequate composition data and an index series are available.

Recommended OFLs for 2021 and 2022

The OFLs by stock for the next management cycle are laid out in the table below. The OFLs for 2022 are based on the assumption that the Council choses P* values of 0.45 for the 2021 ACL for all four stocks.

Stock	2021 OFL (mt)	2022 OFL (mt)
Southern CA (SCS)	23.3	22.5
Northern CA (NCS)	201.8	187.6
Oregon (ORS)	58.3	56.1
Washington (WAS) *	18.3	14.9

* The OFL values here are the ensemble averages based on equal weighting of the alternative scenarios.

Notes

- *The Terms of Reference for Stock Assessments should be updated in the future to address the ambiguous language regarding "sigma", to clarify whether sigma is defined in terms of estimates of spawning biomass or estimates of OFL, and, if in terms of OFL, which year's OFL (the ending year or two years later, when the new harvest specifications will first apply). These points should be discussed at the post-mortem in December.*

- *In past assessment cycles only the CVs of spawning biomass (or spawning output) were considered when the SSC made its determination of sigma because the basis for sigma was biomass-based (from a meta-analysis of between-assessment uncertainty in spawning biomass). In this assessment cycle (and going forward) "sigma" refers to uncertainty in estimates of OFLs. Information provided in the Cabezon assessments illustrated that there can be appreciable differences between the CV for spawning biomass vs the CV for the OFL. Ideally the CV for both the spawning biomass and the OFL should be reported in the future for comparison.*
- *Display of the confidence interval corresponding to the CV in the spawning output and relative stock status provides a visual comparison that is useful in reporting in addition to the CV values for the ending year SB and the first-year forecast of the OFL.*
- *The decision tables in the assessment documents provide extreme values to capture uncertainty in the reference models as well, but it is not always clear how to quantify the amount of uncertainty corresponding to each state of nature. It would be helpful if assessments compared the low and high values of M (for example) used to define the states of nature with low-high range for M values implied by the likelihood profile over M.*

Longnose Skate Full Assessment

Dr. Vlada Gertseva of the NWFSC presented the new assessment for the longnose skate stock (Agenda Item H.5, Attachment 5), which was last assessed in 2007. California, Oregon and Washington were included in a single coastwide assessment area based on a lack of apparent size structure and because no genetic differences were expected given extensive movement. Four fishing fleets were used in a single sex model. Updated maturity data were used. *M* and the West Coast Groundfish Bottom Trawl Survey (WCGBTS) catchability coefficient (*q*) were estimated using informative priors. The trawl surveys and fishery data provided compositional data to inform selectivity. Factors influencing the availability of longnose skate to the WCGBTS and their probability of capture were encapsulated in the prior for *q*. All of the indices of abundance from the five surveys had flat trends, although the Triennial survey and WCGBT indices appear to reflect a slight increase in abundance that was not captured in the model estimates. The cause of the lack of fit is an area for additional (future) analysis. Sensitivity runs that excluded the indices with increasing trends did not result in appreciable changes to the model fit or results.

Compared to the 2007 assessment, improvements were made to discard estimates and landings based on results of the skate historical catch reconstruction and resulted in enhanced estimates of catch history. The catch reconstruction was improved using data reflecting recent sorting requirements, allowing species to be sorted in the catch. Data from the 1988 Pikitch study were used in the previous assessment to estimate historical discards based on a single assumed discard fraction. Because there were limited markets for skate prior to 1995, landings were a very small fraction of the catch. Landing increased dramatically starting in 1995. In the new assessment annual total catch estimates from the West Coast Groundfish Observer Program (WCGOP) for longnose skate and Dover sole (2009-2017) were shown to be closely linearly related and the relationship was applied to annual Dover sole total mortality estimates (from the Dover sole assessment) to estimate annual total mortality of longnose skate for years prior to 2009. The historical catch multiplier feature in Stock Synthesis was used during the STAR panel to explore the potential impacts of alternative catch histories.

Sensitivity analyses indicated that maturity is a major source of uncertainty, with a new maturity curve resulting in a large increase in the spawning biomass scale compared with the 2007 assessment, though only a small change in total biomass, and a ~12% change in proxy MSY. Assumptions about the catchability coefficient (q) from the WCGBTS and its interaction with recruitment were explored. The estimated growth curve was sensitive to data weighting in the model, with the Dirichlet multinomial (DM) approach used in the base model compared to a combination of Francis and McAllister/Ianelli weighting used in the pre-STAR model. The pre-STAR model, with age data substantially down-weighted, produced a poorer fit to the age-at-length data, lower M estimates, and a three-fold increase in biomass scale. The final base model resulted in a good fit to the age at length data and the produced estimates of M that better correspond to the observed maximum age (26 years). Further examination would be worthwhile of the response of the model to the use of DM weighting compared to other weighting methods. The main issue appears to be that the very short time-series of age-composition data limited the utility of the Francis method, which relies on having multiple years with estimates of mean age. Also, weighting of the composition data from discards and retained catch was problematic because both were treated as coming from the same fleet and therefore received the same weighting. Independent weighting of composition data from discards versus retained catch might prove advantageous.

The catchability of the WCGBT survey was used to set the low and high states of nature in the decision table. Survey catchability for all three states of nature was estimated to be greater than one, implying that perceived fish density in the trawl path was greater than the fish density overall. It is unknown which of several possible mechanisms cause the WCGBTS catchability to be greater than one. Studies to provide more information on time-varying estimates of natural mortality, growth, and recruitment might be useful in a future assessment. The current model structure (especially the lack of recruitment deviations) did not include any biological processes to fit the increasing trend in stock biomass implied by the WCGBT survey index. Research and data needs included further review of movement / migration and discard mortality, as well as further evaluation of q for the WCGBTS.

The STAR panel Chair Dr. David Sampson spoke to the value of switching to the Dirichlet Multinomial data weighting during the STAR meeting. The change in weighting moved the estimates of ln(q) away from the mean of the lognormal prior, improved the model fits to the age-at-length data, and resulted in an estimate of M that was much more consistent with the observed maximum age. The STAR Panel recommended a category 2 designation due to the lack of recruitment deviation estimates.

The CV based on spawning biomass estimates was 0.27. The associated sigma value[1] and year-specific buffer values for scientific uncertainty were not reported in the assessment document reviewed by the GFSC but are included in the version in the September Briefing Book. The STAR panel recommended that an update assessment will be sufficient if removals remain below the OFL.

The target SPR value of 0.5, given the low h of 0.4, will (at equilibrium, without application of the 40-10 rule) decrease the B_{MSY} to 20% of the unfished level rather than the 40% level assumed by

[1] If Sigma represents the log-scale standard deviation of spawning biomass (SB), Sigma is related to the CV of SB by the following,

$$\text{Sigma} = \text{sqrt}(\ln(1 + \text{CV}(SB)^2)).$$

the 40-10 harvest control rule. Consequently, the SPR for elasmobranchs may need reconsideration. The SPR harvest rate for elasmobranchs was changed in 2013 from 0.45 to 0.5 based on an analysis of results from a meta-analysis by Zhou et al. (2012) by Dr. Martin Dorn of the AFSC (PFMC 2013).

Endorsement as the Best Scientific Information Available

The GFSC endorses the longnose skate assessment as providing the best scientific information available and suitable for informing management decisions.

Major Uncertainties and Considerations for Management Decision-Making

Due to the paucity of age-compositional data the model could not support the estimation of recruitment deviations. The biomass indices in the model were only weakly informative regarding the biomass scale and trends in the indices were not well fit by the model. The main sources of information determining $\ln(R_0)$ and the biomass scale were tension between the length compositional data and the prior distributions for M and WCGBT Survey q.

Stock Category and the Sigma Recommendations

Given the lack of recruitment deviations in the assessment model for longnose skate, the GFSC recommends that the stock be assigned a category 2 designation with a default sigma value of 1.0 for calculating the scientific uncertain buffer. The estimated CV for the estimated 2019 spawning biomass was 0.268, corresponding to a sigma (on the log-scale) of 0.264; the estimated CV for the estimated 2019 OFL catch was also 0.268 (sigma = 0.264).

Benchmark or Update Recommendation for the Next Assessment

The GFSC concurs with the STAR Panel recommendation that the next assessment for longnose skate could be an update assessment, given the caveat that future fishing removals remain well below the OFL.

Recommended OFLs for 2021 and 2022

The OFLs for the next management cycle are 2,086 mt for 2021 and 2,036 mt for 2022, based on the assumption that the Council choses a P* of 0.45 for the 2021 ACL.

Notes

- *Evaluation of the upper end of the likelihood profile on q may provide a logical bound for the range of the state of nature for evaluation in addition to the 12.5 % and 87.5% confidence interval estimates. Use of the likelihood profile in defining the values that frame the states of nature could be a subject for further discussion; further guidance in the TOR may be advisable.*
- *The STAR Panel suggested that the STAT produce likelihood profiles in which the parameters associated with the Dirichlet multinomial (DM) weighting were fixed at the values estimated in the base model. If these DM parameters are not fixed, the scale of the log-likelihood will change as the model's parameters move from the maximum likelihood values. A similar problem arises with any estimated extra_SD parameters associated with survey indices. This issue of how to construct likelihood profiles when DM weighting is used (or when there are extra_SD parameters) should be discussed at the post-mortem. The SSC should consider the topic and provide guidance prior to the next assessment cycle.*

Big Skate Full Assessment

Dr. Ian Taylor of the NWFSC presented the big skate stock assessment (Agenda Item H, Attachment 3), which is the first integrated assessment for this species off the US West Coast. Data from California, Oregon and Washington were combined in a single assessment area given the evidence from tagging studies that this species is capable of long-distance movement. Unlike longnose skate, big skate have dimorphic growth, with females attaining much greater lengths than males. The STAT implemented sex-specific, length-based selectivity to address the apparent skew in sex ratio with length and used a growth cessation model to better mimic an unusual bimodal pattern evident in the length distributions for males but not for females.

Strong assumptions were required to estimate historical discards (and dead catches) because big skate have been sorted from other skate species only in recent years. Historical dead catch was reconstructed using slightly different methods from those applied to longnose skate. There were too few years with estimates of big skate annual total mortality to derive a relationship with the total mortality of other co-occurring species. The STAT assumed that estimated discard rates for longnose skate could serve as a proxy for the discard rates of big skate. Landings of big skate were divided by the associated retention rates to estimate total catch, with averaging applied to dampen large inter-annual variations in landings. To evaluate the sensitivity of the model results to the historical catch series, the STAT developed runs using the time series of petrale sole catches and F trends. The model was relatively insensitive the different methods for estimating the historical catch.

The STAT used the catch multiplier method in Stock Synthesis applied to decadal time-blocks to evaluate whether information in the model would cause the historical catches to differ from the values in the historical catch series. Using the catch multiplier approach increases the uncertainty in the model's estimates. However, in the final base model the catch multipliers were fixed at 1.0 (i.e., no change from the input historical catch series). Further exploration of using the catch multiplier approach might be fruitful as a mechanism for propagating uncertainty in the historical catches.

The assessment model essentially used the WCGBT survey index as an absolute estimate of abundance, subject to the prior on the survey *q* that was developed during the STAR meeting. The *q* prior used in the pre-STAR base model was the same prior used for longnose skate, even though big skate are known to occur in shallower depths than longnose skate. To derive the prior for big skate (during the STAR meeting) the STAT analyzed data on big skate densities in depths shallower than the WCGBT survey coverage in each of four latitudinal regions along the coast, accounting for the relative catch rates from the commercial fishery across the shallowest three depth bins. The catch rates for the shallowest two depth bins from the survey were extrapolated from the next shallowest depth bin for which data were available using proportions derived for each depth bin based on the fishery data in each latitudinal zone. Further analyses of the depth distributions of big skate using additional information on bathymetry, bottom sediments, and un-towable grounds may be useful in future refinements of the *q* prior, especially given the evidence of a high proportion of big skate biomass in Northern California. The survey *q* prior for big skate, relative to the *q* prior for longnose skate, was scaled down and wider.

The STAT chose to use a growth cessation model, with male growth ceasing at around 120 cm, which helped in fitting the bimodal pattern in the observed male length compositions. The length at which female growth ceases is roughly the same as the length at 50% maturity in females. The

available age-at-length data (from the fishery and the WCGBTS) were best fit by the growth cessation model.

The length composition data and the WCGBT survey *q* prior dominated the model fit to the data. However, the model could not well fit the WCGBT survey index, which showed a trend that was generally increasing in recent years. Without a prior on the survey *q* parameter, the model hit a lower bound for *q* consistent with very high stock sizes. There was little change in trend or scale across the sensitivities that were explored; the prior on WCGBTS *q* anchors the biomass scale. Comparisons of DM and Francis weighting of age data showed that the Francis weighting provided a better fit.

The assessment model provided weak support for the assumed steepness of 0.4. Steepness was fixed at 0.4 primarily for consistency with the longnose skate assessments (2009 and 2019) and due to the general understanding that fecundity of skates and other elasmobranchs is relatively low. The SSC's recommendation to the Council of a target SPR of 50% was based Dorn's review of a meta-analysis by Zhou et al. (2012) of 12 *Chondrichthyes* species.

The GFSC suggested that the STAT provide additional catch projections that use an SPR value of 0.6, for comparison with the $F_{SPR=50\%}$ projections. The GFSC also suggested that the STAT produce an additional decision table for inclusion in the September Supplemental Briefing Book that includes a set of rows with the catch streams associated with $F_{SPR=60\%}$ (applying the same uncertainty buffer as in the current version of the decision table). Given the results of the assessment, the big skate stock appears to be in good condition and fishing at the default SPR (50%) is not likely to have an adverse effect on its status.

The major axis of uncertainty in the decision table was catchability (q) of the WCGBT survey, which was also the major axis of uncertainty in the decision table for longnose skate. In both decision tables the variability of the WCGBTS ln(q) was the base model's estimated standard deviation for ln(q), with appropriate adjustments of the low and high ln(q) values to achieve at least as much uncertainty as indicated by the base model's estimated standard deviation for 2019 spawning biomass.

Endorsement as the Best Scientific Information Available

The GFSC endorses the big skate assessment as providing the best scientific information available and suitable for informing management decisions.

Major Uncertainties and Considerations for Management Decision-Making

The survey biomass indices in the model for big skate were only weakly informative regarding the biomass scale and trends were not well fit by the model. The main sources of information determining ln(R_0) were the tension between the age-compositional data (favoring a larger ln(R_0)) and the priors plus the length data. Although the biomass scale is very uncertain, there was no evidence in the assessment document indicating that the stock was in a depleted condition. The GFSC notes that the projected ACL for 2021 is three times higher than the ACL for 2019, and the stock would be greatly fished down by 2030 with full ACL attainment.

Stock Category and the Sigma Recommendations

Given the lack of recruitment deviations in the assessment model for big skate, the GFSC recommends that the stock be assigned a category 2 designation with a default sigma value of 1.0

for calculating the scientific uncertain buffer. The estimated CV for the estimated 2019 spawning biomass was 0.366, corresponding to a sigma (on the log-scale) of 0.354; the estimated CV for the estimated 2019 OFL catch was also 0.340, corresponding to a sigma of 0.331.

Benchmark or Update Recommendation for the Next Assessment

The GFSC concurs with the STAR Panel recommendation that the next assessment for big skate could be an update assessment, given the caveat that future fishing removals remain well below the OFL.

Recommended OFLs for 2021 and 2022

The OFLs for the next management cycle are 1,689.6 mt for 2021 and 1,605.8 mt for 2022, based on the assumption that the Council choses a P* of 0.45 for the 2021 ACL.

Notes

- *Further exploration of using the catch multiplier approach might prove fruitful as a mechanism for propagating uncertainty in historical catches.*
- *In general, there needs to be further consideration of whether the target SPR harvest rate applied to a given stock is consistent with the level of steepness associated with the stock. Requiring that a STAT provide an SPR associated with the steepness applied in the assessment would be worth considering for inclusion in the Terms of Reference for Stock Assessments. Having such information available in each future assessment would help draw attention to potential mismatches between the F_{MSY} proxy and the B_{MSY} proxy.*

Sablefish Full Assessment

The last full assessment of Sablefish for the U.S. West Coast was in 2011, with an update assessment completed in 2015. The current assessment (Agenda Item H.5, Attachment 7) used Stock Synthesis version 3.30 and included updates to the historical catch reconstruction, age and length composition data, abundance indices, and the recruitment index based on the environmental time series of sea level. Hook-and-line and pot gear were combined in this assessment and treated as a single fleet. Steepness was fixed at 0.70, a change from previous assessments that fixed steepness at 0.60. The change in *h* was justified on the basis of increasing evidence of good stock productivity even at relatively small stock sizes and because a value of 0.70 is more consistent with other groundfish species. Annual recruitment variation (sigma-R) was fixed at 1.4 and natural mortality rates were estimated by gender using the Hamel prior (based on maximum ages of 102 years for females and 91 years for males).

The approach for data weighting was an important source of uncertainty in this assessment. The pre-STAR base model, which included all the length and age data and used DM weighting, was not sensitive to the choice of data weighting method. The post-STAR base model, which included length data only from the WCGBTS and applied the Francis method for data weighting, had improved fits to the index data and more consistently weighted the single set of length composition data with all of the age composition data. The DM weighting was not used in the post-STAR base model as it heavily weighted the single length composition data set (from the WCGBTS), resulting in poor fits to the WCGBTS survey index. During the STAR meeting the decision was taken to exclude all the length composition data except data associated with the WCGBTS due to a general inability of the model to resolve tensions amongst the different data sources. Specifically, the

estimation of *M* was sensitive to varying model weights of the length data versus the age data. Also, the Panel were provided evidence of regional differences in growth that could complicate signals in the length data if there were temporal changes in the spatial distribution of catches. The approach taken in the post-STAR base model (excluding most of the length compositions) better allowed the age composition data to inform the estimation of *M*. Other major uncertainties were associated with spatio-temporal invariant growth, spatial stock structure, and the modeling of retention curves.

Spawning stock biomass has been relatively stable over the past decade with depletion hovering at, or just below, the management target level during that time. In 2019, the sablefish stock is estimated to be at 39% of unfished biomass (i.e., depletion = 0.39).

Endorsement as the Best Scientific Information Available

The GFSC endorses the sablefish stock assessment as providing the best available scientific information available and suitable for informing management decisions.

Major Uncertainties and Considerations for Management Decision-Making

- The estimation of natural mortality (*M*) was greatly influenced by the data weighting, specifically the relative weight given to the length data versus the age data. The length data, which suggested higher values of *M*, were only informative for relatively small (young) fish, while age data generally suggested lower values of *M* and were informed by both young and old fish.
- The estimated size of the 2016 recruitment is one of the largest since 1970, but has only been observed as 0, 1, and 2 year olds. Thus, the strength of this cohort is very uncertain in the current assessment, but the uncertainty should diminish in future assessments with additional observations from the WCGBTS and the fishing fleets. There were also some signs in the current assessment of a strong incoming 2018 year class.
- The approach for estimating retention for discards was unusual in that the retention curves were estimated in earlier runs and then fixed in the final model run. Consequently, the uncertainty associated with the estimated retention curves was not propagated into the output quantities used for management.
- Spatial stock structure for sablefish is a source of uncertainty. Genetic work shows that the stock spans the NE Pacific, meaning it falls under three management authorities (PFMC, NPFMC, and DFO Canada). On-going investigations into spatial structure of population parameters suggest structuring of growth and movement within this NE Pacific population using a model that spans the above management entities. Greater consideration of the potential to improve the model by splitting fleets into different areas may benefit future assessment efforts.

Stock Category and the Sigma Recommendations

The GFSC notes that the assessment has reliable age composition data to inform growth and recruitment, and an informative survey trend. Consequently, the GFSC recommends that sablefish be designated as a category 1b stock with a default sigma of 0.5 for calculating the scientific uncertain buffer. The sigma value derived from the base model's estimate for the 2019 spawning

biomass is 0.219; the sigma value derived from the base model's estimate for the 2019 OFL catch is 0.249.

Benchmark or Update Recommendation for the Next Assessment

The GFSC recommends that the next sablefish assessment be a full (benchmark) assessment, due to the technical issues leading to model structural uncertainty as mentioned above (and discussed more fully in the STAR Panel report), pending research advances in these areas. In lieu of new information, an update may be appropriate given recent indications of potentially strong year-classes that may not yet fully realized in survey or fishery data.

Recommended OFLs for 2021 and 2022

The OFLs for the next management cycle are 9,402 mt for 2021 and 9,040 mt for 2022, based on the assumption that the Council choses a P* of 0.40 for the 2020 ACL.

Notes

- *Given the above data conflicts, the base model developed during the STAR excludes almost all the length composition data. The decision to exclude these data should be revisited in future assessments given that the excluded length data suggested different dynamics (due to a different M).*
- *The level of growth variability in the model seems to be at odds with observed empirical data (e.g., mean weights-at-age). Future model developments should consider the empirical weight-at-age approach to capturing time varying growth to see if model improvements can be made. Spatial differences in growth could be a contributing factor to this finding, as these were also clearly demonstrated during the review, particularly north and south of 36° N in the assessment area, corresponding to spatial shifts in the distribution of catch and effort.*
- *It was unclear whether the data used in the VAST index standardization model (and the environmental sea level index) were independent and identically distributed random variables, as assumed by the VAST model.*
- *There was a research recommendation to look at age-varying natural mortality (e.g., the Lorenzen curve approach) for this species in preparation for the next assessment.*
- *A question was posed as to possibly rethinking the states of nature in a decision table when tasked with producing a 2021 OFL Catch CV versus a 2019 Spawning Biomass CV for informing the sigma used in projections. (See the comment that J. Budrick captured earlier in the meeting about using an OFL CV).*
- *It would be useful to have a discussion at the post-mortem meeting on alternative ways of dealing with discard issues. This discussion could lead to the SSC providing guidance in the Accepted Practices document about how to deal with discard data, retention curves, and related issues.*
- *It was noted that it might be informative to run future models with the length data included (length data was removed during the STAR panel due to conflicts with age data), but completely omit it from the model fitting (i.e., lambda = 0) in order to visualize length fits relative to other data sources being fit (similar to looking at marginal age compositions when only fitting conditionals).*

- *The STAT suggested that the index and composition data are quite informative to the assessment and consequently that information could be used on an annual basis to "monitor" the stock or inform the timing or type (full or update) of the next assessment.*
- *GFSC indicates that the major uncertainties presented here are largely in line with those captured in the STAR panel report.*

Cowcod Full Assessment

The previous full assessment for cowcod south of Point Conception was based on a Bayesian surplus production model (XDB-SRA). The current full assessment (Agenda Item H.5, Attachment 9) is a statistical catch-at-age integrated model that used Stock Synthesis version 3.30 and included indices from six fishery-independent data sources, length and age composition information, and historical catch.

A major issue and uncertainty associated with the cowcod assessment is the lack of adequate data (particularly age data) for estimating recruitment deviations, growth, and natural mortality. Steepness was fixed at the mean of the rockfish prior, 0.72, and a single gender-invariant natural mortality coefficient was estimated. Recruitment deviations were not estimated because the model was unable to discern between individual year-classes given the data.

Spawning stock biomass has been steadily increasing since the late 1980s when the stock was estimated to be at 9% of unfished biomass, surpassing the management target of 40% in 2010 to a current depletion estimate of 57% of unfished biomass.

Endorsement as the Best Scientific Information Available

The GFSC endorses the cowcod stock assessment as providing the best available scientific information available and suitable for informing management decisions.

Major Uncertainties and Considerations for Management Decision-Making

The GFSC suggests extra caution be taken when setting ACLs for this stock given that near-term harvest levels based on projections would imply taking annual harvests above the estimated MSY level. Further, the GFSC notes that the uncertainty associated with the decision table's low state of nature was little different from that for the base model, which is typically not the expectation in a decision table. Identifying a low state of nature farther from the base model was problematic because the very low stock sizes in the late 1980s were constricting, such that standard approaches to formulate the low state of nature lead to stock collapse.

Another key source of uncertainty in the cowcod assessment is the general lack of data for this stock, particularly age data, with which to estimate recruitment deviations. Recruitment was treated as deterministic from the stock-recruitment curve with a fixed value for steepness (0.72). Uncertainty associated with steepness is not captured in the assessment model.

Stock Category and the Sigma Recommendations

The GFSC recommends a category 2 assignment, because recruitment deviations were not estimated (i.e., recruitment was deterministic following the stock-recruitment curve), with a default sigma of 1.0 for calculating the scientific uncertainty buffer. The estimated CV for the estimated 2019 spawning biomass was 0.103, corresponding to a sigma (on the log-scale) of 0.103; the estimated CV for the estimated 2019 OFL catch was 0.179 (sigma = 0.178).

Benchmark or Update Recommendation for the Next Assessment

The GFSC recommends that the next cowcod assessment be a full (benchmark) assessment if substantial new information is available from fishery age compositions (if a fishery resumes), or if a new visual survey is developed, or if the trawl survey is expanded into the Cowcod Conservation Areas (CCAs). Otherwise, an update assessment would be sufficient.

Importantly, if an appreciable fishery for cowcod is started again, it should be a high priority to closely monitor landings and collect associated fishery data, particularly age data.

Recommended OFLs for 2021 and 2022

The OFLs for the next management cycle are 95.0 mt for 2021 and 93.9 mt for 2022, which are higher than the MSY estimated for this stock (81 mt). These OFLs assume the Council chooses a P* of 0.45 for the 2021 ACL.

Notes:

- *The uncertainty associated with the decision table's low state of nature was not very different than that for the base model. Identifying the low state of nature was problematic given the cowcod stock trajectory is constricting given the two-way trip (i.e., traditional formulations of the low state of nature lead to stock collapse).*
- *Although the SSC usually avoids commenting on management issues, the GFSC suggests the SSC urge the Council to take extra caution when setting ACLs for this stock given that near-term harvest levels based on standard projections would imply taking annual harvests above the MSY for this stock.*

Gopher Rockfish / Black-and-Yellow Rockfish Complex

This is the first full assessment for gopher rockfish and black-and-yellow rockfish (GBYR) as a species complex (Agenda Item H.5, Attachment 11). Gopher rockfish south of Point Conception was last assessed in 2010 using the depletion-corrected average catch (DCAC) method for data poor species, whereas north of Point Conception gopher rockfish was last assessed as a full assessment in 2005. Black-and-yellow rockfish was assessed in 2010 using the depletion-based stock reduction analysis (DB-SRA) method for data poor species. The current assessment, which combines the two species into a single complex, uses Stock Synthesis version 3.30 and includes information from landings, discards, age and length composition data, and six sources for abundance indices.

Spawning stock biomass has been steadily decreasing since the mid-2000s when the stock was estimated to be at 77% of unfished biomass, the highest level since the early-1970s, to a current depletion estimate of 44% of unfished biomass. Major sources of uncertainty associated with this assessment are the potential for spatial and species-specific differences in life history parameters (e.g., growth) and that the abundance indices were not fit well in the model. Steepness and natural mortality were fixed in the base model, while recruitment deviations and growth were estimated.

The GFSC notes that the uncertainty associated with the decision table's low state of nature is not as wide the uncertainty implied by the base model, which is not what is expected when considering a decision table. However, it appears to be adequately close given the constraints that the stock has experienced a long history of near constant catch.

Endorsement as the Best Scientific Information Available

The GFSC endorses the GBYR stock assessment as providing the best available scientific information available and suitable for informing management decisions.

Major Uncertainties and Considerations for Management Decision-Making

A major source of uncertainty for this assessment was that the model was for a complex of two species rather than a single species. There are uncertainties regarding the structure of the individual component species, the contribution of each species in the complex to the overall assessment, and differences between the two species in their biological parameters. Additionally, there is currently no information for either species on regional differences in biological parameters and contributions to the complex.

Other key sources of uncertainty stem from the approach to data weighting, the negative correlation between natural mortality and the von Bertalanffy *K* parameter, and differences in the commercial length composition data depending on the database source (CALCOM or PACFIN).

Stock Category and the Sigma Recommendations

The GFSC recommends a category 2 assignment, because this assessment is for a species complex, with a default sigma of 1.0 for calculating the scientific uncertainty buffer. The sigma based on the estimated 2019 spawning biomass is 0.197. The estimated CV for the estimated 2019 OFL catch was 0.178, corresponding to a sigma of 0.177.

Benchmark or Update Recommendation for the Next Assessment

The GFSC recommends that the next GBYR assessment be a full assessment if there are substantial increases in information (i.e., improved information on growth, particularly targeted sampling of the most small/young and larger/old fish for both Black-and-yellow rockfish and Gopher rockfish, or an improved age-0 index), otherwise it could be an update assessment.

Recommended OFLs for 2021 and 2022

The GFSC recommends OFLs of 136.3 mt for 2021 and 137.5 mt for 2022. These OFLs assume the Council chooses a P* of 0.45 for the 2021 ACL.

Notes

- *The STAT should include a profile over the K growth parameter and present that information in the final assessment document using likelihood profiles that show data-source specific composition data contributions to the likelihood ("Piner plots"). Melissa indicated the profile was included in "the advanced briefing book assessment document".*
- *The high state of nature in the decision table provides adequate contrast from the base model but the low state provides less contrast (perhaps less than ideal). The STAT and STAR indicated that the low state of nature was difficult to specify to achieve the requested 25% probability given the stock's long history of near constant catch. The low state of nature does not incorporate as much uncertainty as implied by the base model's uncertainty for ending spawning biomass. However, the STAR panel report indicated that the low state of nature was close enough given the constraints.*

Petrale Sole Update Assessment

The GFSC received an overview from Dr. Chantel Wetzel (NWFSC, the STAT lead) of the update stock assessment for petrale sole (Agenda Item H.5, Attachment 13). This is the first update assessment of the 2015 assessment, which was an update to a 2013 full assessment. Key changes from the 2015 assessment include using an updated version of the Stock Synthesis model (SS 3.30.13); an updated natural mortality prior; the addition of four years of commercial length and age (composition) data (noting that new queries and data processing was done for all years); updated discard rates and discard compositional data; a reprocessed triennial survey index; and an updated and extended index for the WCGBT survey (new 2015-2018 data, with the entire time series re-estimated using VAST).

For the petrale sole natural mortality prior, the STAT noted that the maximum age estimates had not changed (32 years for females, 29 years for males). Rather, the approach to developing the prior has changed modestly since the 2015 update. The new prior slightly increased the median female *M* and decreased the male median *M*, and both have slightly larger standard deviations. However, there were no substantive differences in the final model estimates of natural mortality. With respect to the WCGBTS index, the STAT noted that the updated index initially continued the sharply increasing trend observed in the 2011-2014 time period, with indications of a leveling off and a possible downturn in latest year (2018). Landings have increased in the last four years (2015-2018) relative to previous four years (2011-2014), consistent with the stock being rebuilt and continuing to increase in abundance.

The STAT reported that as part of the re-estimation of composition data with the new PacFIN.Utilities R code package, **all** of the Oregon petrale sole samples collected prior to 1987 were removed from the compositional data used in the assessment because these data were understood to be from special projects (e.g., non-random samples). Members of the GFSC, particularly Dr. David Sampson, questioned the conclusion that all of these data would have been from special projects, noting that routine port sampling procedures in Oregon were well established by the early 1980s and that port samples of petrale sole almost certainly had been routinely collected. This topic was highlighted as needing further investigation. Reports later in the day seemed to confirm that work related to this issue was ongoing and that sample data from standard data collection efforts prior to 1987 would be properly identified in PacFIN, pending additional investigations.

The STAT also noted that the mean length of commercial catches has increased modestly in recent years for most fisheries, consistent with an increase in the mean age of the catch observed in the commercial age data, possibly due to reduced recruitment in recent years. Similar increases in mean length and age were also observed in the WCGBTS data. It was noted that age structures are available for California (southern) fisheries for the recent time period, but those structures were not aged, due to miscommunication. It was also noted that the number of age structures coming from CA fisheries is modest relative to those collected from the northern fisheries.

The STAT conducted bridging analyses indicating that recent abundance estimates were more optimistic than the 2015 model projections as new survey, length and age data were added sequentially to the model. The estimated stock status in 2019 was estimated to be 39.1% of the mean unfished level, well above the management target (25%). However, the trajectory of the stock is forecast to decline as the large 2006-2008 recruitment events work through the fishery, as most recent year recruitments (2010-2016) have been below average. Overall population and

recruitment trends are consistent with recent benchmark and update assessments through the time periods at which they overlap, although some early recruitment estimates have shifted, likely as a result of the removal of the early compositional data from Oregon, described earlier. The estimated steepness in the new assessment declined slightly (to 0.90 from 0.84) relative to the 2015 assessment estimate, while the estimates of natural mortality have increased very slightly. Likelihood profiles over key parameters (steepness, natural mortality, log R_0) were consistent with those from the 2015 benchmark.

The assessment provides results from several sensitivity analyses, including low and high natural mortality rate estimates, inclusion of new fecundity estimates, and alternative weighting approaches. Other than (expected) responses to changes in natural mortality, none of these sensitivities were indicative of substantive changes in the perception of stock status. A sensitivity run using new fecundity data suggested that inclusion of this information (in a future full assessment model) would lead to a slightly more pessimistic perception of current stock status (from 39 to 35% of unfished level). The STAT's exploration of deviations to the assumption of a 50:50 sex ratio of age-0 recruits (i.e., to assume a lower fraction of females in the settling recruits), combined with the inclusion of the new fecundity data, seemed to fit the observed survey data slightly better, and similarly resulted in a slightly more pessimistic estimate of stock status (an additional ~1% reduction in relative stock status) relative to sensitivity with only the new fecundity data.

The STAT noted that a modest change to the decision table was required to correct a minor issue in the forecasts, such that when catches are fixed in the forecast period for all years and fleets, the fixed catches will not perfectly match a subsequent revision, because the distribution of catches by fleet will vary between the two runs. Some guidance on how to address this for scenarios with multiple fleets (and thus multiple selectivity curves) would be helpful for future update assessments. It was agreed that using the default SPR in projections, as the STAT did, was appropriate for this update.

It was also noted that when using a likelihood profile to estimate the inner 75th percentile (to derive fixed parameter values to represent the lower and upper quartiles of a distribution), the correct change in log-likelihood is 0.66 units[2], rather than 1.15 units[3] (shown rounded to 1.2 in the 2019 assessment document), as the 2015 assessment had done. The 2019 update exactly followed the protocol underlying the 2015 decision table. As a consequence, the lower and upper states of nature in the 2019 decision table may be more extreme than expected. The alternative states of nature should be at least as wide as the base model's 25% confidence limits estimated for the 2019 spawning biomass (*SB*).

There was discussion about how to construct the low and high states of nature for the decision table. Because steepness was estimated in base model, it was also estimated in the models

[2] A likelihood profile shows how the negative log-likelihood (NLL) changes as a function of a single fixed parameter. The change in NLL relative to the model with the parameter freely estimated (i.e., the maximum likelihood estimate) is a likelihood ratio with one free parameter. The variable -2 * log-likelihood is distributed as a Chi-square with one degree of freedom. The value 2*0.6617 corresponds to the 75th percentile of a Chi-square with one degree of freedom.

[3] The value 1.15 is the number of standard deviations associated with the lower and upper quartiles of a normal distribution.

associated with the low and high states of nature. Thus, it seems likely that any alternate models might compensate for the forced changes in *M* by making changes in steepness. A potential approach to producing the alternate states of nature could be to fix steepness at the value estimated in the base model when making the forced changes to *M*.

The GFSC requested that the STAT revise the decision table to evaluate whether this approach would provide appropriate contrast between the low and high states of nature (e.g., greater than that inferred by the CV of the 2019 *SB* estimate) for the decision table, and if not to use the CV of the 2019 *SB* estimate.

Endorsement as the Best Scientific Information Available

The GFSC endorses the petrale sole update assessment as providing the best scientific information available and suitable for informing management decisions.

Major Uncertainties and Considerations for Management Decision-Making

- The estimated WCGBTS catchability coefficient (q = 2.851) seems very large. The mechanism(s) responsible for such a large q are not well understood and has been an outstanding question since the 2011 assessment of petrale sole. Here, for comparison, are the estimated WCGBTS q values for some other demersal species: Dover sole q = 0.696; English sole q = 0.574; longnose skate q = 1.568; big skate q = 0.668.
- Natural mortality by sex and steepness are uncertain for petrale sole. Currently, both natural mortality and steepness are estimated within the model and are negatively correlated. This provides information regarding these parameters' combined values, but there is large uncertainty regarding the value of each parameter individually.
- New fecundity data for petrale sole supports a fecundity relationship that differs from the current assumption (fecundity proportional to body weight). However, there were differences in fecundity estimated between petrale sole observed in the north and south off the U.S. west coast. Some of the contrast in estimates between the northern and southern fish may be due to sample sizes differences. Additionally, future assessments may want to explore methods of creating a weighted coast-wide fecundity based on the observed biomass by area.

The STAT noted several points of possible concern regarding the petrale sole projections: (1) the current update assessment model does not fit the 2018 decline in the survey index; (2) recruitment in recent years has been below average (the effects of which are incorporated into the forecasts); and (3) the updated fecundity data (which would presumably be included in the next benchmark but was not included here) would also lead to a more pessimistic perception of stock status. All of these factors should be considered when adopting future harvest levels. It was also noted that the projections all assume average recruitment, which could be overly optimistic if there is strong autocorrelation or regime-like behavior in recruitment trends.

Stock Category and the Sigma Recommendations

The GFSC recommends a category 1 assignment (as was assigned to the 2013 benchmark), with a default sigma of 0.50 for calculating the scientific uncertainty buffer. The estimated CV for the estimated 2019 spawning biomass was 0.09, corresponding to a sigma (on the log-scale) of 0.09; the estimated CV for the estimated 2019 OFL catch was 0.19 (sigma = 0.19).

Benchmark or Update Recommendation for the Next Assessment

The GFSC recommends that the next petrale sole assessment could be an update assessment. This recommendation is due in part to the high information content of the survey, as well as the importance of this stock to the fleet. Barring unexpected or conflicting indicators from survey and catch data, a benchmark assessment is likely not necessary in the near term. The updated fecundity information should be included in a future update assessment.

Recommended OFLs for 2021 and 2022

The OFLs for the next management cycle are 4,402 mt for 2021 and 3,936 mt for 2022, based on the assumption that the Council chooses a P* of 0.45 for the 2021 ACL.

Notes

- *It would be helpful to know the age at which a cohort of petrale sole reaches its peak biomass under unfished and fished conditions (e.g., a yield per recruit type of analysis). This would help evaluate the potential for growth overfishing of strong and weak recruitment pulses in the population.*
- *The SSC should provide the STATs with better guidance on how to develop and refine decision tables, especially for update assessments given that there is no formal interaction with the SSC in advance of the review of the assessment. This should be discussed in greater detail at the post-mortem workshop for the 2019 assessment cycle. Revisions to the Terms of Reference for Stock Assessments may be needed.*
- *The Terms of Reference for Stock Assessments (or the Accepted Practices Guidelines) should be revised to include guidance on the technically correct method for selecting values of a parameter (e.g., M or steepness) from a log-likelihood profile, to produce lower and upper states of nature that are consistent with the 12.5th and 87.5 percentiles of a model's uncertainty. The current TOR only describes the approach that uses a parameter (or a derived spawning biomass estimate) and its estimate standard deviation.*
- *The current Terms of Reference for Stock Assessments are vague regarding whether an update assessment can use revise reproductive ecology parameters with new data.*
- *Is the drop in mean age pre- and post-1987 a consequence of the removal of the Oregon data? It would be helpful to take a closer look at these data to better understand their potential influence, and the consequences of what seems to be an abrupt shift in mean age pre-1987 versus post-1987. A cursory examination during the GFSC review of graphs from the 2015 assessment (which included the pre-1987 OR data) indicated that the seeming abrupt shift was also apparent in the 2015 assessment that, implying that the shift in mean age was not due to excluding the OR data from the 2019 assessment.*
- *There should be a rigorous evaluation of what caused the evident confusion regarding the suitability of the Oregon compositional data from prior to 1987. There should also be a determination of whether any issues that validly apply to petrale sole also apply to other species. The widow rockfish update assessment used OR compositional data that extended back to 1976 for lengths and to 1979 for ages.*

Widow Rockfish Update Assessment

The GFSC received an overview of the update stock assessment for widow rockfish (Agenda Item H.5, Attachment 14) from Mr. Grant Adams (UW School of Aquatic and Fisheries Sciences). This is the first update assessment of the 2015 benchmark assessment for widow rockfish. Key additions and changes from the 2015 assessment include using an updated version of the Stock Synthesis model (SS 3.30.13); updated natural mortality prior estimates; an updated steepness prior (0.72); the addition of four years of commercial length and age composition data (noting that new queries and processing of commercial compositional data was done for all years); updated discard rates and discard composition data (with average rates and lengths); an updated pelagic juvenile abundance index, and an updated relative abundance index and compositional data for the WCGBTS (new 2015-2018 data, with entire time series re-estimated using VAST, noting that the 2015 index was done using the delta-GLMM structure).

The survey index showed a notable (albeit noisy) upward trend over most of the last few years, a trend reasonably well fit by the model. The STAT noted that survey length and age expansions were done using the current NWFSC Survey R code package for composition data for all survey years. (Oregon data collected prior to 1987 were not excluded.) The pelagic juvenile survey index was also updated with coastwide data from 2015-2018. This index continues to show a strong 2013 and 2014 year classes, and also estimates a strong 2016 year class. The updated commercial fishery length and age data show declines in mean length and age in recent years for bottom and midwater trawl fisheries, although that decline is not observed in widow rockfish bycatch in the hake fishery. It was noted that there seems to be a greater fraction of significantly older fish (older than 15-20 years), particularly females, relative to the age composition of catches historically.

Sequential additions of data from the 2015 benchmark (a "bridging analysis") resulted in subtle shifts in the estimates of spawning biomass and depletion trends, although these were all generally very similar to the trend from the 2015 assessment. It was noted that the model was fairly responsive to tuning of compositional data. The final result was slightly more pessimistic from the 2015 trend but maintained the ongoing increase in abundance estimated in the 2015 assessment. The fits to new commercial discard data (length compositions) degraded in recent years relative to the pre-2015 time period for bottom trawl as well as hook and line fisheries. Time-blocking in the fishing fleet selectivity did not allow for improved fits to the post-2010 discard length composition data for the bottom trawl fishery, apparently due to low discard rates and inflexibility in the retention curve. Fits to retained length and age data from the commercial fisheries did not change notably from the 2015 assessment.

Model results indicated a slightly higher initial biomass and spawning output, a slightly lower (0.144 from 0.157) estimate of the female natural mortality rate (the estimate for males also declined slightly), and a modest but somewhat unexpected decrease in the estimate of the von Bertalanffy growth parameter (K; from 0.199 to 0.172) which was presumably informed by recent compositional data that likely included more young fish from recent strong recruitment events. The CVs of size at age (associated with growth) also decreased. The update assessment estimates that current depletion is approximately 92% of the unfished level, with ongoing increases in abundance largely driven by several strong recent recruitments (in 2008 and 2013), and with several more strong recent year classes (2014 and 2016) beginning to work their way into the spawning population.

The model was quite sensitive (but not in unexpected ways) to alternative values of steepness, natural mortality, selectivity pattern assumptions, and weighting (with a scaling down of biomass when estimating Dirichlet multinomial weight for the compositional data). Likelihood profiles over natural mortality and steepness appeared reasonable and consistent with the benchmark model (noting that for these profiles, female and male natural mortality were fixed at the same value). As in the 2015 benchmark assessment, the profiles were consistent with high values of steepness for the stock. Also, as in the 2015 benchmark, the decision table was based on a combination of three factors: uncertainty in natural mortality, steepness, and the strength of a recent year class (2013 for the assessment update, rather than 2010, which was used in the 2015 assessment).

Issues that should be considered for future assessments include efforts to improve fits to discard compositional data, validating recent strong year classes with compositional data, improving the means of expanding survey compositional data using VAST, understanding what external drivers might exist for the apparent changes in growth observed between the 2015 assessment and the current update (including whether there are indications of time-varying growth), and more rigorously investigating the sensitivity to data weighting.

The GFSC noted that the strength of the very high 2013 year class could be partially validated by re-running the model with an artificial reduction to the high midwater trawl catches in very recent years, to ensure that the recent high catches and associated compositional data are not exaggerating the strength of the 2013 recruitment. This could be explored in the next benchmark assessment. Finally, the next benchmark assessment might benefit from exploring the feasibility of using an empirical weight at age approach (as in the Pacific hake assessment). The widow rockfish fishery is very well sampled in terms of length and age compositional data compared to almost all other West Coast groundfish species.

Endorsement as the Best Scientific Information Available

The GFSC endorses the widow rockfish update stock assessment as providing the best available scientific information available and suitable for informing management decisions.

Major Uncertainties and Considerations for Management Decision-Making

- Currently there is no survey that adequately samples widow rockfish, which often occur off bottom.

Stock Category and the Sigma Recommendations

The GFSC recommends a category 1 assignment (as was assigned to the 2015 benchmark), with a default sigma of 0.50 for calculating the scientific uncertainty buffer. The estimated CV for the estimated 2019 spawning biomass was 0.198, corresponding to a sigma (on the log-scale) of 0.196; the estimated CV for the estimated 2019 OFL catch was 0.226 (sigma = 0.223).

Benchmark or Update Recommendation for the Next Assessment

The GFSC recommends that the next widow rockfish assessment could be an update assessment. However, a benchmark assessment may be appropriate if catches continue to increase substantially, as they have over the past few years.

Recommended OFLs for 2021 and 2022

The OFLs for the next management cycle are 15,749 mt for 2021 and 14,826 mt for 2022, based on the assumption that the Council choses a P* of 0.45 for the 2021 ACL.

The estimated *MSY* for this stock is 8,169.

Notes

- *The 2019 assessment cycle "post-mortem" workshop should consider an approach for systematically evaluating the performance and challenges associated with different data weighting approaches, with the aim of providing guidance for future assessments.*

Catch-Only Projections

The GFSC reviewed catch streams and projections from 11 catch-only projections and one catch report presented by Dr. Owen Hamel (NWFSC). In each case, comparisons were made between the projected catches from the last assessment and the catch streams used in the new catch-only projection, which were provided by the GMT. These GMT-provided values were also compared against values in the recently released GEMM database from the West Coast Groundfish Observer Program (WCGOP). Projected biomass from the last assessment and projected biomass from the catch-only projection were compared to ensure any differences were consistent with any differences between projected and realized catches. Any large differences between the catch streams were noted, along with any unexpected biomass values.

01. Black Rockfish Catch-Only Projection

The black rockfish catch-only projection added realized catches from 2015 to 2018, and projected catches for 2019 and 2020. In California, realized catches were lower than projections resulting in OFL projections for 2021 and 2022 that are higher than those in the 2015 assessment. In Oregon, realized catches were closer to projected catches in 2015-2017, but lower in 2018. Resulting OFL projections for 2021 and 2022 are slightly higher than the previous assessment. In Washington, realized catches were higher than the projections in 2015 and 2016, but lower in 2017-2018. Updated OFL projections for 2021 and 2022 are slightly higher than in the previous assessment. There were no notable differences between the catches in the GEMM database and those provided by the GMT in any of the three regions.

02. Blackgill Rockfish Catch-Only Projection

The blackgill rockfish catch-only projection added total removals for 2017-2018 that were considerably lower (about 30%) than the catches used in the 2017 projection. GMT projected removals for 2019 and 2020 were roughly half the OFL, resulting in projected OFLs for 2021-2022 that are higher than the previous assessment. Actual removals provided by the GMT for 2017 and 2018 were similar to those in the GEMM database.

03. California Blue/Deacon Rockfish Complex Catch-Only Projection

The catch-only projection for California blue/deacon rockfish complex added total removals for 2017-2018 that were higher by 30-70 mt than the previous assessment's projection. Comparing these to the GEMM database, it was noted that the geographic boundaries of the assessment, the landings in GEMM, and what the GMT provided may not be correctly aligned. GEMM reports mortality for the full state, while the assessment is for the area of the state north of Point

Conception. It is unclear if the GMT reported catches were for the whole state or only the region covered by the assessment. Therefore, the mortality values provided by the GMT need to be rechecked to ensure they represent California north of Point Conception; consequently, this catch-only projection may need to be re-run.

04. Darkblotched Rockfish Catch-Only Projection

The darkblotched rockfish catch-only projection added total removals for 2017-2018 that were considerably lower (about 30-50%) than the catches used in the 2017 projection. GMT projected removals for 2019 and 2020 were much lower than the OFL, resulting in projected OFLs for 2021-2022 that are higher than the previous assessment. Actual removals provided by the GMT for 2017 and 2018 were similar to those in the GEMM database; small differences were likely due to the addition of discards to the landings values provided by the GMT.

05. Dover Sole Catch-Only Projection

The Dover sole catch-only projection added total removals for 2011-2018. Removals have been much lower than what was projected in the last assessment. GMT projected removals for 2019 and 2020 were much lower than the OFL; together these resulted in projected OFLs for 2021-2022 that are higher than the previous assessment. Actual removals provided by the GMT for 2011-2018 were similar to those in the GEMM database (nearly all within 1%).

06. Canary Rockfish Catch-Only Projection

The canary rockfish catch-only projection added total removals from 2015-2018. Removals have been much lower than what was projected in 2015, resulting in the new projections having higher biomass and OFLs. Actual removals from the GEMM database were in line with the values from the GMT, although the 2016 value differed somewhat (75 mt from GEMM vs 54 mt from the GMT).

07. Lingcod Catch-Only Projection

The lingcod north (OR/WA) catch-only projection added catches from 2017 and 2018. Catches were slightly below the projection for 2017 and 2018. Projected removals were provided by the GMT by assessment area. Values from the GEMM database weren't directly comparable because they used a different geographic break, but differences are around 1-2% in each year.

For lingcod south (CA), the catch-only projection assumed full ACL attainment in 2021 and 2022, which is probably unlikely. It was noted that depletion in the 2019 projection is lower than the old projection value even though catches are less. This does not make intuitive sense and needs to be investigated further and verified by the STAT.

08. Rougheye/Blackspotted Rockfish Complex Catch-Only Projection

The catch-only projection for the rougheye / blackspotted rockfish complex added catches from 2013 to 2018. Updated catches were generally lower than in the previous projection, resulting in higher biomass and OFLs in 2021-2022. Comparing catches used in the projection with the GEMM database values, it was noted that the GEMM values were all higher than those used in the projection. Because this could result in overestimating biomass, this projection should be re-run with values from the GEMM database. Follow-up with the GMT may also be needed to revise catch projection.

09. Shortspine Thornyhead Catch-Only Projection

The shortspine thornyhead catch-only projection added removals from 2013-2018. These values were all smaller than what was projected in 2013, and therefore biomass and OFLs are higher in the projection. Total mortality from the GEMM database is slightly higher than the values used in the projection (landings plus modeled discards), but the differences were small given the scale of the ABC.

10. Longspine Thornyhead Catch-Only Projection

The longspine thornyhead catch-only projection added removals from 2013-2018. Most of the catches have been well below those used in the 2013 projection, resulting in a larger population and OFL in the projections. Catches used in the projection were roughly 10 mt below those provided in GEMM, a small difference given the size of the ABC for this stock.

11. China Rockfish Catch-Only Projection

The China rockfish catch-only projection added removals from 2015-2018. In the North (WA), catches were lower than the earlier projection, so 2019 biomass was higher and OFL went up. Similar trends were observed in the Central region. In the South, the new OFL projection for 2021 is very similar to what it was previously. All values from the GEMM database were within 5% of those used in the updated projection, and most were much closer.

12. Yelloweye Rockfish ABC Projections/Catch report

Recent catches have all been below the 20 mt ACL. The WCGOP values (18.4 and 17.2 mt) are very close to those given in the catch report.

Notes

- *The GFSC should discuss further how to make future review of catch-only projections as transparent and efficient as possible and provide further guidance on which data sources to use for catches. The Terms of Reference for Stock Assessment document will require suitable revision to reflect agreed changes.*
- *In general, future catch-only projections could rely on the GEMM database for total mortality estimates to update past catches*
- *Any catch streams provided by the GMT should be in total catch (landings plus dead discards)*
- *GMT provided projected catch streams for use in catch-only projections should be risk-neutral. There was consensus that what was provided this year was indeed risk neutral and well justified but confirming that this is in the TOR would also be useful.*
- *In future years, catch reports should not be needed because near real-time estimates of total mortality could be pulled from WCGOP's GEMM database.*

References

PFMC. 2013. Agenda Item G.7.b, SSC Groundfish Subcommittee Statement Regarding a Change in Target SPR Rate for West Coast Elasmobranch Species. http://www.pcouncil.org/wp-content/uploads/G7b_GF_SSCSUB_ELASMOBRACH_SPR_SEPT2013BB.pdf.

Zhou, S., Yin, S., Thorson, J., Smith, T., Fuller, M. 2012. Linking fishing mortality reference points to life history traits: an empirical study. *Can. J. Fish. Aquat. Sci.* **69**: 1292–1301.

Summary of GFSC Recommended Category Assignments

Species / Complex	Area	Assess. Type	Category
Cabezon	S Cal	Full	2
Cabezon	N Cal	Full	1
Cabezon	OR	Full	1
Cabezon	WA	DP	3
Big Skate	Coastwide	Full	2
Longnose Skate	Coastwide	Full	2
Sablefish	Coastwide	Full	1
Cowcod	S of Pt Conc.	Full	2
Cowcod	Pt Conc. to Cape Mend.	DBSRA	3
Gopher/Black-and-Yellow Rf Complex	CA S of Cape Mendocino	Full	2
Petrale Sole	Coastwide	Update	1
Widow Rockfish	Coastwide	Update	1

Appendix A. Meeting Attendees

SSC Groundfish Subcommittee Members

David Sampson, Oregon Department of Fish and Wildlife, Chair
Aaron Berger, National Marine Fisheries Service Northwest Fisheries Science Center
John Budrick, California Department of Fish and Wildlife
John Field, SSC Chair, National Marine Fisheries Service Southwest Fisheries Science Center
Owen Hamel, National Marine Fisheries Service Northwest Fisheries Science Center
Kristin Marshall, National Marine Fisheries Service Northwest Fisheries Science Center
Jason Schaffler, Muckelshoot Indian Tribe
Rishi Sharma, National Marine Fisheries Service Northwest Fisheries Science Center

Stock Assessment Team (STAT) Members

Grant Adams, University of Washington
Jason Cope, National Marine Fisheries Service Northwest Fisheries Science Center
Edward Dick, National Marine Fisheries Service Southwest Fisheries Science Center
Vladlena Gertseva, National Marine Fisheries Service Northwest Fisheries Science Center
Melissa Haltuch, National Marine Fisheries Service Northwest Fisheries Science Center
Maia Kapur, University of Washington
Kristin McQuaw, University of Washington
Melissa Monk, National Marine Fisheries Service Southwest Fisheries Science Center
Andi Stephens, National Marine Fisheries Service Northwest Fisheries Science Center
Ian Taylor, National Marine Fisheries Service Northwest Fisheries Science Center
Stephanie Thurner, University of Washington
Chantel Wetzel, National Marine Fisheries Service Northwest Fisheries Science Center

Advisors

Lynn Mattes, Oregon Department of Fish and Wildlife, Groundfish Management Team
Gerry Richter, B&G Seafoods, Inc., Groundfish Advisory Subpanel
John DeVore, Pacific Fishery Management Council

Appendix B. Agenda

PROPOSED AGENDA

Scientific and Statistical Committee's Groundfish Subcommittee

The Auditorium
NOAA Fisheries, Northwest Fisheries Science Center
2725 Montlake Boulevard East
Seattle, Washington 98112
Online Webinar
Telephone: 206-860-3200

August 20-21, 2019

This is a meeting of the Scientific and Statistical Committee (SSC's) Groundfish Subcommittee, with remote attendance via webinar (see webinar information below). SSC subcommittee meetings are open to the public, and public comments will be taken at the discretion of the SSC Groundfish Subcommittee Chair.

A suggestion for the amount of time each agenda item should take is provided. All times are approximate and subject to change. At the time the agenda is approved, priorities can be set and these times revised. Discussion leaders should determine whether more or less time is required, and request the agenda be amended.

To Attend the Webinar:

1. Use this link: *https://nwfscfram.webex.com/nwfscfram*
2. Enter the Webinar Access Code: 626 668 260
3. Please enter your name and email address (required)
4. Connect to the audio portion of the meeting by dialing this TOLL number 1-650-479-3208 or connect audio using your computer

System Requirements

- PC-based attendees: Required: Windows® 7 or newer
- Mac®-based attendees: Required: Mac OS® X 10.10 or newer
- Webex supports all major iPhone®, iPad®, Android™ phone or Android tablet OS 4.3 or newer (See webex system requirements: https://help.webex.com/en-us/nki3xrq/Webex-Meetings-Suite-System-Requirements#reference_91D7DC41368764B9E37B8593ED86A11C).

Meeting materials are available on the Council's ftp site at ftp://ftp.pcouncil.org/pub/!Aug_20-21_SSC_GF_Subcm_Mtg/.

TUESDAY, AUGUST 20, 2019 – 8:30 AM

A. Call to Order - SSC Groundfish Subcommittee Administrative Matters

1. Call to Order and Introductions — Dave Sampson
2. Webinar Instructions — John DeVore
3. Approve Agenda
4. Rapporteur Assignments

(8:30 a.m., 0.5 hours)

B. Review New Benchmark Assessments and Stock Assessment Review Panel Reports

1. Review the Cabezon Assessments
   a. Brief Overview of the Assessments — Rishi Sharma, Jason Cope, and Aaron Berger
   b. Consider Endorsing the Assessments as Best Scientific Information Available

   If Endorsed:
      i. Identify Major Uncertainties and Considerations for Management Decision-Making
      ii. Recommend the Stock Category and the Sigma
      iii. Review and Recommend the 2021 and 2022 Harvest Specifications
      iv. Recommend Whether the Next Assessment Should be a Benchmark or Update

   If Not Endorsed:
      v. Recommend Whether the Assessment Should be Reviewed at the 2019 Mop-Up Panel
      vi. Recommend What Revisions are Needed Before Further Review

   (9 a.m.; 1.25 hours)

BREAK (10:15 – 10:30 a.m.)

2. Review the Big Skate Assessment
   a. Brief Overview of the Assessment — Dave Sampson and Ian Taylor
   b. Consider Endorsing the Assessment as Best Scientific Information Available

   If Endorsed:
      i. Identify Major Uncertainties and Considerations for Management Decision-Making
      ii. Recommend the Stock Category and the Sigma
      iii. Review and Recommend the 2021 and 2022 Harvest Specifications
      iv. Recommend Whether the Next Assessment Should be a Benchmark or Update

   If Not Endorsed:
      v. Recommend Whether the Assessment Should be Reviewed at the 2019 Mop-Up Panel
      vi. Recommend What Revisions are Needed Before Further Review

   (10:30 a.m.; 1 hour)

3. Review the Longnose Skate Assessment
   a. Brief Overview of the Assessment — Dave Sampson and Vlada Gertseva
   b. Consider Endorsing the Assessment as Best Scientific Information Available

If Endorsed:

i. Identify Major Uncertainties and Considerations for Management Decision-Making
ii. Recommend the Stock Category and the Sigma
iii. Review and Recommend the 2021 and 2022 Harvest Specifications
iv. Recommend Whether the Next Assessment Should be a Benchmark or Update

If Not Endorsed:

v. Recommend Whether the Assessment Should be Reviewed at the 2019 Mop-Up Panel
vi. Recommend What Revisions are Needed Before Further Review

(11:30 a.m.; 1 hour)

LUNCH (12:30 – 1:30 p.m.)

4. Review the Sablefish Assessment
   a. Brief Overview of the Assessment — John Field and Melissa Haltuch
   b. Consider Endorsing the Assessment as Best Scientific Information Available

   If Endorsed:

   i. Identify Major Uncertainties and Considerations for Management Decision-Making
   ii. Recommend the Stock Category and the Sigma
   iii. Review and Recommend the 2021 and 2022 Harvest Specifications
   iv. Recommend Whether the Next Assessment Should be a Benchmark or Update

   If Not Endorsed:

   v. Recommend Whether the Assessment Should be Reviewed at the 2019 Mop-Up Panel
   vi. Recommend What Revisions are Needed Before Further Review

   (1:30 p.m.; 1.5 hours)

BREAK (3 – 3:15 p.m.)

5. Review the Cowcod Assessment
   a. Brief Overview of the Assessment — Owen Hamel and E.J. Dick
   b. Consider Endorsing the Assessment as Best Scientific Information Available

   If Endorsed:

   i. Identify Major Uncertainties and Considerations for Management Decision-Making
   ii. Recommend the Stock Category and the Sigma
   iii. Review and Recommend the 2021 and 2022 Harvest Specifications
   iv. Recommend Whether the Next Assessment Should be a Benchmark or Update

   If Not Endorsed:

   v. Recommend Whether the Assessment Should be Reviewed at the 2019 Mop-Up Panel
   vi. Recommend What Revisions are Needed Before Further Review

   (3:15 p.m.; 1 hour)

6. Review the Gopher/Black-and-Yellow Rockfishes Assessment

a. Brief Overview of the Assessment Owen Hamel and Melissa Monk
b. Consider Endorsing the Assessment as Best Scientific Information Available

If Endorsed:

i. Identify Major Uncertainties and Considerations for Management Decision-Making
ii. Recommend the Stock Category and the Sigma
iii. Review and Recommend the 2021 and 2022 Harvest Specifications
iv. Recommend Whether the Next Assessment Should be a Benchmark or Update

If Not Endorsed:

v. Recommend Whether the Assessment Should be Reviewed at the 2019 Mop-Up Panel
vi. Recommend What Revisions are Needed Before Further Review

(4:15 p.m.; 1 hour)

WEDNESDAY, AUGUST 21, 2019 – 8:30 AM

C. Review New Update Stock Assessments

1. Review the Petrale Sole Assessment
   a. Brief Overview of the Assessment Chantel Wetzel
   b. Consider Endorsing the Assessment as Best Scientific Information Available

   If Endorsed:

   i. Identify Major Uncertainties and Considerations for Management Decision-Making
   ii. Review and Recommend the 2021 and 2022 Harvest Specifications

   If Not Endorsed:

   iii. Recommend What Revisions are Needed Before Further Review

   (8:30 a.m.; 1 hour)

2. Review the Widow Rockfish Assessment
   a. Brief Overview of the Assessment Grant Adams
   b. Consider Endorsing the Assessment as Best Scientific Information Available

   If Endorsed:

   i. Identify Major Uncertainties and Considerations for Management Decision-Making
   ii. Review and Recommend the 2021 and 2022 Harvest Specifications

   If Not Endorsed:

   iii. Recommend What Revisions are Needed Before Further Review

   (9:30 a.m.; 1 hour)

BREAK (10:30 – 10:45 a.m.)

D. Review New Catch-Only Updates of Past Assessments

1. Review the Black Rockfish Catch-Only Update
   a. Brief Overview of the Catch-Only Update Andi Stephens

b. Consider Endorsing the Catch-Only Update as Best Scientific Information Available
If Endorsed:
i. Review and Recommend the 2021 and 2022 Harvest Specifications
If Not Endorsed:
ii. Recommend What Revisions are Needed Before Further Review
(10:45 a.m.; 0.5 hours)

2. Review the Blackgill Rockfish Catch-Only Update
a. Brief Overview of the Catch-Only Update Owen Hamel
b. Consider Endorsing the Catch-Only Update as Best Scientific Information Available
If Endorsed:
i. Review and Recommend the 2021 and 2022 Harvest Specifications
If Not Endorsed:
ii. Recommend What Revisions are Needed Before Further Review
(11:15 a.m.; 0.33 hours)

3. Review the California Blue/Deacon Rockfishes Catch-Only Update
a. Brief Overview of the Catch-Only Update Chantel Wetzel
b. Consider Endorsing the Catch-Only Update as Best Scientific Information Available
If Endorsed:
i. Review and Recommend the 2021 and 2022 Harvest Specifications
If Not Endorsed:
ii. Recommend What Revisions are Needed Before Further Review
(11:35 a.m.; 0.33 hours)

4. Review the Canary Rockfish Catch-Only Update
a. Brief Overview of the Catch-Only Update Owen Hamel
b. Consider Endorsing the Catch-Only Update as Best Scientific Information Available
If Endorsed:
i. Review and Recommend the 2021 and 2022 Harvest Specifications
If Not Endorsed:
ii. Recommend What Revisions are Needed Before Further Review
(11:55 p.m.; 0.33 hours)

LUNCH (12:15- 1:15 p.m.)

5. Review the China Rockfish Catch-Only Update
a. Brief Overview of the Catch-Only Update Owen Hamel
b. Consider Endorsing the Catch-Only Update as Best Scientific Information Available
If Endorsed:
i. Review and Recommend the 2021 and 2022 Harvest Specifications
If Not Endorsed:
ii. Recommend What Revisions are Needed Before Further Review
(1:15 p.m.; 0.5 hours)

6. Review the Darkblotched Rockfish Catch-Only Update
a. Brief Overview of the Catch-Only Update Owen Hamel

b. Consider Endorsing the Catch-Only Update as Best Scientific Information Available
If Endorsed:
i. Review and Recommend the 2021 and 2022 Harvest Specifications
If Not Endorsed:
ii. Recommend What Revisions are Needed Before Further Review
(1:45 p.m.; 0.33 hours)

7. Review the Dover Sole Catch-Only Update
   a. Brief Overview of the Catch-Only Update — Chantel Wetzel
   b. Consider Endorsing the Catch-Only Update as Best Scientific Information Available
   If Endorsed:
   i. Review and Recommend the 2021 and 2022 Harvest Specifications
   If Not Endorsed:
   ii. Recommend What Revisions are Needed Before Further Review
   (2:05 p.m.; 0.33 hours)

8. Review the Lingcod Catch-Only Update
   a. Brief Overview of the Catch-Only Update — Owen Hamel
   b. Consider Endorsing the Catch-Only Update as Best Scientific Information Available
   If Endorsed:
   i. Review and Recommend the 2021 and 2022 Harvest Specifications
   If Not Endorsed:
   ii. Recommend What Revisions are Needed Before Further Review
   (2:25 p.m.; 0.5 hours)

BREAK (2:55 – 3:10 p.m.)

9. Review the Longspine Thornyhead Catch-Only Update
   a. Brief Overview of the Catch-Only Update — Grant Adams
   b. Consider Endorsing the Catch-Only Update as Best Scientific Information Available
   If Endorsed:
   i. Review and Recommend the 2021 and 2022 Harvest Specifications
   If Not Endorsed:
   ii. Recommend What Revisions are Needed Before Further Review
   (3:10 p.m.; 0.33 hours)

10. Review the Rougheye/Blackspotted Rockfishes Catch-Only Update
    a. Brief Overview of the Catch-Only Update — Owen Hamel
    b. Consider Endorsing the Catch-Only Update as Best Scientific Information Available
    If Endorsed:
    i. Review and Recommend the 2021 and 2022 Harvest Specifications
    If Not Endorsed:
    ii. Recommend What Revisions are Needed Before Further Review
    (3:30 p.m.; 0.33 hours)

11. Review the Shortspine Thornyhead Catch-Only Update
    a. Brief Overview of the Catch-Only Update — Ian Taylor

b. Consider Endorsing the Catch-Only Update as Best Scientific Information Available
If Endorsed:
i. Review and Recommend the 2021 and 2022 Harvest Specifications
If Not Endorsed:
ii. Recommend What Revisions are Needed Before Further Review
(3:50 p.m.; 0.33 hours)

12. Review the Revised Yelloweye Rockfish ABC Projections and Catch Report
a. Brief Overview of the Revised ABC Projections Vlada Gertseva
b. Consider Endorsing the Revised ABC Projections as Best Scientific Information Available
If Endorsed:
i. Review and Recommend the 2021 and 2022 Harvest Specifications
If Not Endorsed:
ii. Recommend What Revisions are Needed Before Further Review
c. Review the Catch Report Chantel Wetzel
(4:10 a.m.; 0.33 hours)

E. Review Remaining Projections and Identify Which Stocks Require Further Analysis for Informing the 2021-2022 Biennial Specifications Process

(4:30 p.m., 1 hour)

F. Other Business?

ADJOURN

8. Initial Harvest Specifications and Management Measure Actions for 2021-2022 Management

The Scientific and Statistical Committee (SSC) reviewed a report by the SSC Groundfish Subcommittee (GFSC) of their August 2019 meeting (Groundfish Subcommittee Report, August 2019; attached to Agenda Item H.5.a, Supplemental SSC Report 1) and Agenda Item H.8, Supplemental REVISED Attachment 1 provided by Council staff. The SSC evaluated 1) the overfishing limits (OFLs) for the 2021-2022 management cycle, 2) the time-varying sigmas (i.e., increasing scientific uncertainty with age of assessment) used to calculate annual acceptable biological catch (ABC) buffers, and 3) the category designation for each stock and area.

Reviewed OFLs were obtained directly from 2019 assessments (including updates) because projections therein already included time-varying sigmas for calculating ABCs. For assessments conducted prior to 2019, new projections were requested from Northwest Fisheries Science Center (NWFSC) and Southwest Fisheries Science Center (SWFSC) stock assessment staff that incorporated the new time-varying uncertainty buffers for calculating ABCs. The OFLs for shortspine thornyhead, canary rockfish, English sole, and brown rockfish were not yet available for review, or need additional examination, and will need to be considered at the November SSC meeting. The SSC endorses all remaining OFLs and category designations in Tables 1 and 2 in Agenda Item H.8, Supplemental REVISED Attachment 1 as the best scientific information

available, pending the following decisions or outcomes.

The OFLs adopted for 2022 are contingent on the assumption of ABC removals in 2021, which are in turn contingent on the Council's choice of the probability of overfishing (P*;), use of alternative harvest control rules, or other phased-in approaches as discussed under Agenda Item H.7, and may need to be revised based on Council decisions or changes to P* values. Further, there was a mix of approaches used for specifying the catch used during the projection period when updating OFL projections to incorporate time-varying sigmas used to determine new ABC buffers. A standardized approach for specifying this catch, which could include a process similar to a catch-only projection, should be defined in the next Terms of Reference for the Groundfish and Coastal Pelagic Species Stock Assessment Review Process. The SSC may need to further review OFLs at the November meeting if alternative projections are requested or new discrepancies discovered.

The stock assessment category designation for shortbelly rockfish was changed from category 2 to category 3, because the time since the last assessment (2007) now exceeds half the life span of this species and the time-varying sigma for a category 2 stock with a P* of 0.40 in 2021 (14 years since last assessment) and 2022 (15 years) is approaching the category 3 sigma.

The SSC expresses appreciation to the NWFSC and SWFSC stock assessors for completing the additional projections needed for all category 1 and 2 assessments that are currently being used to provide management advice with respect to the specifications process and the new time-varying sigmas. These new projections amounted to a considerable increase in workload during the 2019 assessment cycle.

SSC Notes:

There is a mix of ways in which catch was specified in updated OFL projections including (but not limited to) full attainment, a continuation of previous catch assumptions, actual catch, or some version of those three. The SSC, for internal purposes, should produce a full list of the assumptions used for each OFL projection completed in 2019 to better understand this source of variability (some of those assumptions are highlighted just below).

The SSC noted that full attainment was assumed in the projection of 2021-2022 OFLs for copper rockfish, rex sole, English sole, sharpchin rockfish and greenstriped rockfish, while previous projections resulting in the 2020 OFLs were based on an assumed average catch due to low attainment. These differences in assumed catch resulted in substantial decreases (24% to 61%) in the OFLs between 2020 and 2021. In the future, catch based projections reflecting actual attainment may be considered to provide more representative OFL values for these stocks.

The groundfish/cps stock assessment TOR should clearly layout how to do SPEX related to OFL projections (e.g., catch assumptions since the last assessment) to account for the time-varying sigma. It should also clearly define what the SSC reviews when confirming OFL calculations (e.g., how deep to go to ensure OFL is correct?).

The SSC noted that there were small differences between the 2021 OFLs presented in the original assessment document versus the updated projections conducted for this cycle SPEX. It was noted

that differences could be due to alternative Stock Synthesis versions.

Some of the catch-only projection documentations didn't make it into the briefing book with respect to SPEX.

The SSC suggests that the post-mortem discussion (December 2019) should include simplifying catch-only update documentation requirements, and the possibility that new OFL projections conducted for SPEX could/should be a catch-only update (understanding the associated workload needs) or some other approach for specifying the historical interim catch. It should also include clarification on the Stock Synthesis version that should be used in SPEX projections.

The SSC suggests that the post-mortem discussion include defining TOR specifications about necessary columns in projection tables. Columns for Year, Catch Used, OFL, and ABC should be included for sure.

The SSC suggests that the post-mortem discussion should include revisiting the metric used to calculate sigmas (i.e., the CV associated with the terminal year spawning biomass and/or the CV associated with the terminal year OFL).

The SPEX database provided by the Pacific States Marine Fisheries Commission will reduce the SSCs and Council staff workload in future years as the SSC will only need to verify OFLs. The database shows real time updates as made by Council staff.

There was an error in the arrowtooth flounder projections in the 2017 assessment where catch from fleets were mis-specified. This error has since been fixed, so new OFL projections will not quite match those from the assessment.

There is a yelloweye rockfish assessment and a rebuilding analysis in 2017 and it was discussed which should be used for OFLs. The SSC noted that the rebuilding analysis software does not currently include a way to incorporate OFLs using time-varying sigma's so in cases like this the most current assessment should be used to do OFL projections. Of course, outcomes from TOR discussions about how to specify 'interim' catches (those values input for years between the most recent assessment and the SPEX management cycle) when doing OFL projections will be important.

There is a need to confirm values for English sole and brown rockfish because of discrepancies arising during the Bayesian based data moderate process. The assumed catch histories should also be checked for English sole.

Depletion values are still required for the projections provided for lingcod for completeness.

C. Council Administrative Matters, Continued

1. National Marine Fisheries Service Strategic Plan

Mr. Scott Burkart from the West Coast Regional Office presented a summary of the National Oceanic and Atmospheric Administration Fisheries West Coast Geographic Strategic Plan for

2020-2024. The Scientific and Statistical Committee (SSC) had a few comments. The SSC noted that Section 2 of Key Strategies for 2020-2024 ("Increase U.S. marine aquaculture production", page 11) includes reference to hatchery salmon production in the Columbia River Basin. Hatchery salmon released into the wild are not typically considered a type of aquaculture.

F. Salmon Management

1. Methodology Review-Final Topic Selection

The Scientific and Statistical Committee (SSC) discussed a list of proposed topics for the 2019 Salmon Methodology Review provisionally scheduled as a webinar for October 22.

The topics ready for review are:

1. **A technical analysis needed to inform a change of the salmon management boundary line** from latitude 40° 05' (Horse Mountain, California) five miles north to latitude 40° 10'. (STT).
2. The data and models used to forecast impacts on Columbia River summer Chinook to determine whether a change in methodology is warranted. (MEW).
3. Documentation of the abundance forecast approach used for Willapa Bay natural Coho. (STT).

The SSC reiterates the need to complete the documentation of the development of the new Chinook Fishery Regulation Assessment Model base period including algorithms.

Materials submitted for review should be technically sound, comprehensive, clearly documented, and identified by author. Materials to be reviewed should be submitted no later than October 8, 2019, to Robin Ehlke. If this deadline cannot be met, it is the responsibility of the author to contact Robin Ehlke, the SSC Salmon Subcommittee Chair, and the SSC Chair prior to the deadline, so appropriate arrangements, rescheduling, and cancellations can be made in a timely and cost-effective manner.

SSC Notes:

The issue of whether the Southern Resident Killer Whale ESA Consultation Risk Assessment should be reviewed by the SSC Salmon Subcommittee was raised. The SSC would like specific direction from the Council about the scope and timing of any review by the SSC.

2. Rebuilding Plans-Final Action

The Scientific and Statistical Committee (SSC) reviewed rebuilding plans for Strait of Juan de Fuca, Queets River, and Snohomish River Coho (Agenda Item F.2, Attachments 1-3), with Dr. Michael O'Farrell (Southwest Fisheries Science Center) and the rest of the Salmon Technical Team (STT) available to answer questions. In June, the SSC endorsed the quantitative analyses in the three Coho rebuilding plans and requested that the STT clarify some of the language and tables in the Socioeconomic sections. These requests were addressed in the latest versions, and the SSC reiterates its endorsement of the future abundance projections and the economic analyses in the three Coho rebuilding plans.

SSC Notes:

It is important to note that impacts are not additive across stocks as the impact in any given year depends on the most constraining salmon stock(s).

H. Groundfish Management, Continued

7. Phased-In Approach to Changing Harvest Limits – Scoping

The Scientific and Statistical Committee (SSC) reviewed the working draft of National Standard 1 (NS1) Technical Guidance for Designing, Evaluating, and Implementing Carry-over and Phase-in Provisions within ABC Control Rules (Agenda Item H.7, Attachment 1). Dr. Dan Holland, the lead author on the technical memorandum, provided an overview of the report, including approaches to and considerations for implementing phase-in.

A major change in NS1 guidance for phase-in since 2016 is that it can now be applied to acceptable biological catch (ABC) values, limited to a 3-year period (i.e., in the third year, the ABC must be at the prescribed ABC without phase-in [though it may still be modified by carry-over]).
Phase-in can provide greater stability and less variability in ABCs and annual catch limits (ACL) over time, resulting in lower management uncertainty. It may be applied for both decreases and increases in ABC. As ABCs and ACLs are modified with phase-in, associated biomass projections and overfishing limits (OFL) will change in response.

While phasing in a new scientific uncertainty buffer approach has a different basis than phasing in a change in ABC due to a new assessment, both involve a change in perception, of either the status and/or scale of the stock or the uncertainty in the assessment, and both result in similar changes in management.

Any proposed phase-in approach must be accompanied by comprehensive analysis and continue to prevent overfishing in each year (i.e., OFLs cannot be exceeded). Factors considered should include species mean generation time, assessment precision, stock structure, and management uncertainty. The overall impact of the status quo versus a phase-in approach depends on the frequency of phase-in. Multiple applications of phase-in to a single stock in a limited time frame is possible but should only be implemented following a robust analysis of potential impacts. The Council may want to identify a minimum buffer between the OFL and ABC for phase-in, either in general or on a case-by-case basis. Management strategy evaluation is an ideal way to evaluate phase-in provisions relative to the above factors. Within individual assessments, decision table projections with and without phase-in would provide useful information on potential impacts.

SSC Notes:

Carry-over is used frequently within the U.S. and elsewhere through control rules that limit the frequency of amount of change in TAC and usually tested with MSE.

U.S. fisheries have implemented phase-in in one-off cases, while elsewhere phase-in has been used more frequently, with simulation/MSE testing.

Next steps: Tech memo has been reviewed within NMFS and is now being presented to Councils and SSCs for review. The plan is to present the Tech memo to the CCC in November 2019 and to finalize the memo in January 2020.

It would be helpful to have the technical guidance within the Tech Memo about the allowed frequency of implementation of phase-in for individual stocks, whether this is prescribed in general or described relative to analyses for each stock.

Feedback should be sent by October 18th to Dan Holland and Kathryn Frens.

10. Methodology Review-Final Topic Selection

The Scientific and Statistical Committee (SSC) reviewed two proposals for new methodologies to inform groundfish assessments and management, and discussed the possibility of revised steepness, biomass target and/or the proxy MSY SPR for elasmobranchs.

Combined visual-hydroacoustic survey of Oregon's nearshore semi-pelagic black, blue and deacon rockfish

Dr. Leif Rasmuson (ODFW) provided an overview of the proposed methodology, including the technology for conducting the acoustic and visual survey components, the design for a survey off Oregon in 2020, and the analytical methodology used to provide estimates of abundance. The methodology involves combining camera drops to assess length and species composition with estimates of acoustic backscatter from acoustic transects. The need for estimates of fishery-independent abundance has been identified in the assessments for black and blue/deacon rockfish. Two years of pilot survey data are already available, as well as the results from several hundred camera drops. A full survey was conducted at Seal Rock in 2017, with acoustic results compared to those from pit tagging.

A survey covering the entire Oregon coast is planned for spring 2020, which will allow a methodology review to take place in fall 2020. The SSC endorses conducting a methodology review for this survey, noting that the CIE reviewers should include someone with expertise in acoustics.

Data-moderate approaches that are highly reliant on length data

Dr. Jim Hastie outlined plans for development of data-moderate stock assessment methods which primarily use length data for parameter estimation. There are no such approved methods even though there are several rockfish stocks (particularly those in the nearshore) that have limited index data but some length data, which could potentially be assessed using methods such as the Length-based Integrated Mixed Effects (LIME) assessment method or a simple implementation of Stock Synthesis (SSS). Use of such methods should reduce time for model development and review.

The SSC endorses conducting a methodology review for LIME and SSS. The review should take place before March 2020, to allow time to revise the TOR for stock assessments in time for

the 2021 assessment cycle. The review could take place in conjunction with the workshop on data-poor methods.

Reference points for elasmobranchs
The current SPR target for elasmobranchs (0.5) is not consistent with the steepness value (0.4) and the biomass target of $B_{40\%}$, assumed in the assessments for longnose and big skate (Agenda Item H.5.a, Supplementary SSC Report 1). A meta-analysis of productivity estimates for elasmobranchs should be conducted to enable the current steepness value, SPR proxy for F_{MSY} and/or biomass target to be revised. The NWFSC may conduct this meta-analysis, with the possibility of a review in summer 2020.

SSC Notes:

Combined visual-hydroacoustic survey

- *The review needs to evaluate the probability of species identification error and consider the implications of such errors.*
- *The results of the ROV review should be available by fall 2020 and could inform the review of the combined visual hydroacoustic survey*

Data-moderate approaches

- *The Northwest Fisheries Science Center (NWFSC) is planning to conduct further simulation tests for LIME based on life histories and data series that more closely reflect west coast groundfish species that are likely to be assessed based primarily on length data. In addition, the NWFSC is planning to compare the results from data-moderate length-based methods when they are applied to data for stocks that already have reliable benchmark assessments.*
- *The review should consider training for use of these methods.*
- *LIME would need to be extended to compute the reference points (e.g., OFLs and ABCs) used in groundfish management.*
- *The review should consider how to review assessment methods that are based primarily on length data.*

C. Council Administrative Matters, Continued

5. Future Council Meeting Agenda and Workload Planning

The Scientific and Statistical Committee (SSC) discussed future workload planning and has the following updates and recommendations.

The SSC continues to recommend a "Groundfish STAR Process Review" (aka, "post-mortem") workshop take place in December 2019, to include all STAT leads, STAR Panel chairs, advisory body representatives and other reviewers and participants as appropriate.

The SSC notes the Remotely Operated Vehicle (ROV) survey methodology review is scheduled for February 3-7.

The SSC recommends the Pacific sardine stock assessment be reviewed in a week-long STAR Panel, to be held in La Jolla, tentatively during the week of February 24th, 2020.

The SSC recommends a groundfish methodology review of "Data-moderate assessment approaches that are highly reliant on length data" (Agenda Item H.10, Attachment 2). This review could be combined with a workshop to further evaluate alternative data-poor and data-moderate assessment methods. This review could take place in January or February of 2020, given that the reports from both the review and the workshop would be helpful in planning for the 2021 stock assessment plan.

The SSC recommends the March Council meeting include an agenda item in which reports from the above two groundfish methodology review items are delivered. The SSC also notes that the Pacific hake treaty joint management committee meeting is currently set for March 11-13, therefore the Council may wish to move the Whiting treaty implementation agenda item from March to April 2020.

The SSC recommends a groundfish methodology review of the Oregon combined visual-hydroacoustic survey of Oregon's nearshore semi-pelagic rockfish (Agenda Item H.10, Attachment 1) be scheduled for the fall of 2020.

SSC Notes:

André will write a very short summary of reasonable workshop review options related to the data poor methods review/workshop. A Doodle poll to schedule this meeting should include SSC members as well as Chantel Wetzel, Jason Cope, E.J. Dick and Merrell Rudd.

SSC Subcommittee Assignments, September 2019

Salmon	Groundfish	Coastal Pelagic Species	Highly Migratory Species	Economics	Ecosystem-Based Management
Alan Byrne	**David Sampson**	**André Punt**	**Aaron Berger**	**Cameron Speir**	**Dan Holland**
John Budrick	Aaron Berger	Aaron Berger	John Field	Michael Harte	John Field
Owen Hamel	John Budrick	John Budrick	Marisol Garcia-Reyes	Dan Holland	Michael Harte
Michael Harte	John Field	Alan Byrne	Michael Harte	André Punt	Marisol Garcia-Reyes
Galen Johnson	Owen Hamel	John Field	Dan Holland	David Sampson	Galen Johnson
Will Satterthwaite	Kristin Marshall	Marisol Garcia-Reyes	Kristin Marshall		Kristin Marshall
Jason Schaffler	André Punt	Owen Hamel	André Punt		André Punt
Rishi Sharma	Jason Schaffler	Will Satterthwaite	David Sampson		Will Satterthwaite
Ole Shelton	Rishi Sharma	Tien-Shui Tsou	Rishi Sharma		Ole Shelton
Cameron Speir	Tien-Shui Tsou				Cameron Speir
					Tien-Shui Tsou

Bold denotes Subcommittee Chairperson

PFMC
10/19/19

Council Meeting Dates	Location	Likely SSC Mtg Dates	Major Topics
November 13-20, 2019 Proposed Subcommittees may meet Wed, Nov 13 Advisory Bodies may begin Thur, Nov 14 Council Session may begin Fri, Nov 15	Hilton Orange County/Costa Mesa 3050 Bristol Street Costa Mesa, CA 92626 Phone: 714-540-7000	Two-day SSC Session **Thur, Nov 14 – Fri, Nov 15**	CPS Methodology Topic Selection CSNA Methodologies and Specifications 2021-2022 Groundfish Spex Groundfish Stock Assessment Methodology Topic Priorities Salmon Methodology Review SRKW Risk Assessment
March 3-9, 2020 Proposed Advisory Bodies may begin Tue, Mar 3 Council Session may begin Wed, Mar 4	DoubleTree by Hilton Sonoma One Doubletree Drive Rohnert Park, CA 94928 Phone: 707-584-5466	Two-day SSC Session **Tue, Mar 3 – Wed, Mar 4**	Identify Salmon Management Objectives (possible test fishery alternatives) Salmon Review/Pre I CA Current IEA Report Climate and Communities Initiative Identify New FEP Initiatives and 5-year Review Groundfish Stock Assessment Priorities
April 3-10, 2020 Proposed Subcommittees may meet Fri, Apr 3 Advisory Bodies may begin Sat, Apr 4 Council Session may begin Sun, Apr 5	Hilton Vancouver Washington 301 W. Sixth Street Vancouver, WA 98660 USA Phone: 360-993-4500	Two-day SSC Session **Sat, Apr 4 – Sun, Apr 5**	Pacific Sardine Assessment and Management Measures Pacific Sardine Rebuilding Plan Groundfish Science Improvement WS Reports Salmon Methodology Review Topic Selection
June 11-18, 2020 Proposed Subcommittees may meet Tues, June 11 Advisory Bodies may begin Wed, June 12 Council Session may begin Thur, June 13	DoubleTree by Hilton San Diego – Mission Valley 7450 Hazard Center Drive San Diego, CA 92108 Phone: 619-297-5466	Two-day SSC Session **Wed, June 12 – Thur, June 13**	Final groundfish Stock Assessment Plan and Terms of Reference DGN bycatch Performance Report Research and Data Needs Process

Council Meeting Dates	Location	Likely SSC Mtg Dates	Major Topics
September 10-17, 2020 Proposed Subcommittees may meet Thur, Sept 10 Advisory Bodies may begin Fri, Sept 11 Council Session may begin Sat, Sept 12	DoubleTree by Hilton Spokane City Center 322 N. Spokane Falls Court Spokane, WA 99201 Phone: 509-455-9600	One-day SSC Ecosystem Subcommittee Session **Thur, Sep 10** Two-day SSC Session **Fri, Sep 11 – Sat, Sep 12**	Pacific Sardine Rebuilding Plan Groundfish Methodology Review Topic Selection Salmon Methodology Review – Adopt Priorities HMS Biennial Management Measures and Harvest Specifications FEP 5-year Review
November 13-20, 2020 Proposed Subcommittees may meet Fri, Nov 13 Advisory Bodies may begin Sat, Nov 14 Council Session may begin Sun, Nov 15	Hyatt Regency Orange County 11999 Harbor Blvd. Garden Grove, CA 92840 Phone: 714-750-1234	Two-day SSC Session **Sat, Nov 14 – Sun, Nov 15**	CPS Methodology Review Topic Selection CPS Prelim. EFP Review Salmon Methodology Review Final Report Research and Data Needs Update

Proposed Workshops and SSC Subcommittee Meetings for 2019 and 2020							
	Workshop/Meeting	**Potential Dates**	**Sponsor/ Tentative Location**	**SSC Reps.**	**Additional Reviewers**	**AB Reps.**	**Council Staff**
1	Groundfish STAR Process Review	Dec. 13, 2019	Council/ Webinar	Groundfish Subcommittee members	NA	GMT GAP	DeVore Phillips
2	Data-Limited Methodology Workshop, Possibly Combined with Length-Based Data-Moderate Assessment Methodologies Review	Jan/Feb 2020	Council/ TBD	GF & CPS Subcommittee members	TBD	TBD	DeVore
3	Review of Nearshore ROV Survey Designs and Methodologies	Feb 3-7, 2020	Council/ Santa Cruz, CA	Hamel (Chair), Shelton, Tsou, Field	CIE, Pacunski	None	DeVore
4	Oregon Combined Visual-Hydroacoustic Survey Methodology Review	Fall 2020	Council/ TBD	GF Subcommittee	CIE – Acoustics Expert	TBD	DeVore