MINUTES
Scientific and Statistical Committee

Pacific Fishery Management Council
Hilton Orange County/Costa Mesa Hotel
Balboa Bay Room
3050 Bristol Street
Costa Mesa, CA 92626
Telephone: 714-540-7000

November 14-15, 2019

Members in Attendance

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

Members Absent

Dr. Michael Harte, Oregon State University, Corvallis, OR

SSC Recusals for the November 2019 Meeting		
SSC Member	**Issue**	**Reason**
Dr. Kristin Marshall	E.4 Southern Resident Killer Whale Endangered Species Act Consultation Update and Risk Assessment	Dr. Marshal is married to an analyst on the risk assessment
Dr. André Punt	D.4 Central Subpopulation of Northern Anchovy Nearshore Estimation Methodology, Frequency of Overfishing Limit Reviews, and Accountability Measures	Dr. Punt contributed to the analysis
Dr. William Satterthwaite	E.4 Southern Resident Killer Whale Endangered Species Act Consultation Update and Risk Assessment	Dr. Satterthwaite contributed to the risk assessment

A. Call to Order

Dr. John Field called the meeting to order at 0800. The Scientific and Statistical Committee (SSC) started with subcommittee assignments. Dr. Michael Harte was contacted before the meeting and agreed to chair the Highly Migratory Species Subcommittee. Dr. John Budrick agreed to chair the Groundfish Subcommittee after Dr. Dave Sampson vacates the SSC at the end of the year. Dr. Theresa Tsou will leave the Ecosystem Subcommittee and will join the Salmon Subcommittee. The SSC then discussed future workload planning and reviewed the September minutes while Mr. Chuck Tracy addressed another advisory body.

Mr. Chuck Tracy began his briefing with a briefing of last week's Council Coordination Committee meeting. The National Standard 1 guidelines are under revision and draft guidelines will be available for the SSC to review next year. The Council has a contract with Pacific States Marine Fisheries Commission to develop a research and data needs database. The approach is to model the database to that developed for the North Pacific Fishery Management Council. Ms. Meisha Key agreed to a contract to populate the database.

Mr. Tracy then briefed the SSC on their agenda and tasks for this week.

D. Coastal Pelagic Species Management

4. Central Subpopulation of Northern Anchovy Nearshore Estimation Methodology, Frequency of Overfishing Limit Reviews, and Accountability Measures

The SSC reviewed the documents "Report of the Joint Meeting of Representatives of the SSC Coastal Pelagic Species (CPS) Subcommittee, the Coastal Pelagic Species Management Team (CPSMT), and the Coastal Pelagic Species Advisory Subpanel (CPSAS)" (Agenda Item D.4, Attachment 1) and "A Further Updated Analysis of the Implications of Different Choices for the Frequency of Updates to overfishing limits (OFLs) and acceptable biological catches (ABCs) for the central sub-population of northern anchovy (CSNA)" (Agenda Item D.2, Supplemental

Attachment 2), and received presentations from, and discussed the contents of these reports with André Punt (University of Washington, SSC) and Greg Krutzikowsky (Oregon Department of Fish and Wildlife [ODFW], CPSMT). The SSC discussion focused on three main topics, which are reported below in turn: 1) data for informing harvest specifications and evaluation of the proposed management framework, 2) nearshore biomass estimation, and 3) aerial survey methodology. The SSC endorses the recommendations in Attachment 1 and finds that the analyses described in Attachment 2 were conducted in an appropriate manner.

Data Informing Harvest Specifications, Frequency of OFL and ABC Updates, and Triggers for Accountability Measures

The SSC agrees with the conclusion in Attachment 1 that the acoustic trawl method (ATM) survey (with nearshore correction) provides the best available index of anchovy biomass. Of the remaining sources, ichthyoplankton data analyzed using the full Daily Egg Production Method (DEPM) and the Southwest Fisheries Science Center (SWFSC) juvenile rockfish surveys have the best spatial coverage but the latter requires further evaluation. The full DEPM can be used without further review, but the "DEPM light" that lacks year-specific adult data also requires further evaluation. The SSC deemed several methods of nearshore correction acceptable, while finding direct synoptic observations are preferable. This is discussed in more detail in the following section "*Evaluate Nearshore Biomass Estimation*".

The 2018 Acoustic Trawl Methodology (ATM) Review report (Agenda Item C.3, Attachment 2, April 2018) referred to the need for a Management Strategy Evaluation (MSE) before using the ATM biomass estimate directly in management. The report contains many of the elements of a Management Strategy Evaluation (MSE), and the SSC finds it sufficient to inform choices of frequency of updates to the OFL and ABC based on ATM biomass estimates. A fuller MSE exploring the consequences of relying on potentially biased biomass estimates by including scenarios with alternative levels of survey bias would be desirable in the future.

The SSC agrees that the framework for updating the management reference points described in Agenda Item D.4, Attachment 1, November 2019 is appropriate. The simulations presented in Attachment 2 provide useful guidance on the tradeoffs involved between frequency of updates, triggers for actions (based on comparisons of the ABC to E_{MSY} x recent average biomass, and OFL to E_{MSY} x average biomass over a longer period), and buffers for uncertainty. However, the SSC cautions that the values for the performance statistics in Agenda Item D.4, Attachment 2, November 2019 should be interpreted in a relative sense rather than treating them as absolute estimates. The results of the simulations are particularly sensitive to, and thus choices are particularly consequential for, Q (the multiplier that determines ABC), whether catch is capped at MAXCAT (establishing MAXCAT can reduce some of the risk associated with large Q), and the number of years used to calculate short-term biomass (the risk of undesirable outcomes is lower when just the most recent biomass estimate is used). The smaller Q is (i.e., the greater the reduction in ABC compared to E_{MSY} x Biomass), the less sensitive the results are to the frequency of OFL and ABC updates. Results are relatively insensitive (at least within the range explored) to the frequency of assessments, to the triggers x_1 and x_2 for whether the OFL and ABC should be updated, or to the number of years used to calculate long-term biomass so long as at least 5 years are used. The frequency of updates to the ABC and OFL present a tradeoff between stability in OFLs and ABCs over a longer time period versus larger changes in those values when they do

change.

The sensitivity of the results to MAXCAT highlights that the ability to achieve management goals depends on how ACLs and harvest guidelines are set as well as how often OFLs and ABCs are re-evaluated. In addition, the assumption of 100 percent attainment of the ABC is not realistic, and this assumption introduces an upward bias to the conservation risk statistics. However, the net direction of bias throughout this analysis is uncertain due to possible biases introduced by other model assumptions (e.g., the assumption that the survey biomass estimates are unbiased) and uncertain parameters (notably steepness and natural mortality). A new stock assessment would likely better inform the biological parameters of the simulation and reduce these uncertainties, although it is unlikely to change the qualitative results.

Evaluate Nearshore Biomass Estimation

The SSC agrees with the conclusion in Agenda Item D.4, Attachment 1, November 2019 that methods for estimating biomass in nearshore waters based on direct synoptic observations are preferable to extrapolation, and that acoustic sampling conducted by industry vessels is most comparable to ATM surveys. However, while direct synoptic observations are the preferred approach, any of the four approaches described in the report are acceptable, including extrapolation. Logistical and timing constraints may limit the available options in any given year. Assessment analysts should determine the most appropriate approach in their particular case, so long as the caveats and limitations of different approaches are considered.

Agenda Item D.4, Attachment 1, November 2019 discussed alternative methods for extrapolation that vary in how much of the surveyed transect is used to inform the extrapolation to the unsampled nearshore area. If and when extrapolation is necessary, the choice of extrapolation method should be made and justified by the analysts. Validation exercises comparing various methods of extrapolation against direct observations, and comparing estimates from contrasting methods of direct observation, would be valuable and should be pursued when possible.

The SSC notes that not sampling the nearshore is only one potential source of bias in biomass estimates from the ATM survey. The ATM survey is also subject to biases of unknown directions due to issues such as uncertain target strength, species composition, and size composition. Therefore, regardless of whether a nearshore biomass correction is applied, the net direction of bias in ATM biomass estimates remains unknown.

Evaluate Aerial Survey Methodology

The SSC agrees with the recommendation that aerial surveys be conditionally approved for use to measure nearshore biomass, with an appropriate variance estimator and when conducted synoptically with ATM surveys. Estimates of variance can be obtained from between-transect variance as well as replicate surveys of a stratum. While basing variance estimates on replicates is the preferred approach, use of between-transect variance is acceptable. Variance estimates for a stratum should be based on data for that stratum and not obtained from a relationship between sampling coefficient of variation and mean biomass.

The SSC agrees that the approach for assessing spotter bias and the number of point sets informing

this approach for small schools of Pacific sardine is sufficient. Work is underway to validate biomass estimates for larger schools based on packing density and volume. However, substantially more work is needed for northern anchovy. Effort should be made to estimate school biomass for schools of age-0 anchovy. In addition, point sets are still needed across sizes of schools as well as size/age compositions reflecting observed schools.

The SSC agrees that extrapolating aerial survey estimates into unsampled areas is not advisable.

SSC Notes:

Data Informing Harvest Specifications, Frequency of OFL and ABC Updates, and Triggers for Accountability Measures

The meeting producing attachment 1 was in many ways similar to a methodology review but did not follow any Terms of Reference.

Food habit / diet data could be helpful in establishing lower bounds on plausible biomass during low abundance periods.

The variation in catch or ABC was not reported in the simulation results. This quantity may be of interest. However, properly characterizing catch variability in scenarios with long-period cycles is complicated because much of the variation in catch is driven by the biomass cycle.

The "assessment" performed under the proposed framework might be either a full or update assessment, the important part is updating the estimate of E_{MSY}.

It is not clear who would be responsible for determining Q, as its value should reflect consideration of both scientific uncertainty (typically the purview of the SSC) and risk tolerance (typically the purview of the Council). Appropriate values of Q would depend on other parameters that are within the Council's purview, such as frequency of updates and triggers for changes.

Figure 2 of Agenda Item D.4, Attachment 1, November 2019 *may not clearly reflect the intent that for years in which short-term biomass is not updated, ABC is set equal to the ABC value from the previous year, which may or may not be* ABC_d.

Steepness (h) is probably the most influential biological parameter for the simulations. Natural mortality (M) is unlikely to be constant, and its mean value is highly uncertain.

A modest amount of further simulation work would not be an unreasonable request.

The direction of bias in ATM biomass estimates at high abundance is unknown, but there is most likely a negative bias when estimates are very low (e.g., due to very few positive tows).

Evaluate Nearshore Biomass Estimation

Applying different methods of nearshore correction in different years may be problematic for abundance indices used as time series in assessments. This, and other topics, might be addressed

in a pre-assessment workshop.

The four approaches to nearshore biomass estimation described in the report are collaborative inshore acoustic surveys, sail drones, aerial surveys, and extrapolation of the ATM shoreward.

Extrapolation based on linearly extending transects into the nearshore is based on surface area rather than volume of water.

Evaluate Aerial Survey Methodology

Analyses should be conducted to evaluate the best allocation of survey effort among transects, replicates and strata.

Given the constraints presented by the capacity of the vessels providing point sets, very large schools could not be validated directly using the methods employed for smaller schools. The use of packing densities in combination with the volume of the schools from aerial photography and depth of observed schools from vessel based observations sampling for species composition can be used to estimate the biomass to validate spotter based estimates for larger schools.

It is currently not possible to obtain biomass estimates for every school in a shoal. Attempts should be made to overcome this problem and/or evaluate the consequences of estimating the biomass of shoals as the product of the number of schools and the biomass of a subset of the schools. The survey protocol should ensure that schools seen during off-transect school size estimation are not included in the biomass estimates.

I. Council Administrative Matters, continued

1. Legislative Matters, Including the Modernizing Recreational Fisheries Management Act Report to Congress

As required by the Modernizing Recreational Fisheries Management Act of 2018, the National Marine Fisheries Service Office of Science and Technology has prepared a report to Congress: "Section 201 of the Modernizing Recreational Fisheries Act", which focuses on the incorporation of data collected by state and nongovernmental organizations to inform recreational fisheries management. The SSC is providing comments on the draft report, as requested by the Council and NOAA Fisheries.

John DeVore presented a summary of the report and Daniel Stutd (Recreational Fisheries Coordinator, National Marine Fisheries Service [NMFS] West Coast Region) was present to answer questions.

The SSC could comment only on the current state of the West Coast region data gaps. The NMFS West Coast Region already provides guidelines and review procedures for data collected by state agencies and nongovernmental organizations. The SSC notes that a comprehensive summary of research priorities and data needs that might better inform a revised version of the report to Congress should be based on the existing PFMC Research and Data Needs Report, which provides a comprehensive list. The SSC would like to highlight some important data and procedure needs.

First, the SSC noted that the data needs and procedures for inclusion in management are similar for recreational and commercial fisheries, as management of both relies on data-informed stock assessments to make decisions. Therefore, any data included in stock assessments is of great importance. In general, for nearshore recreational species, there is a lack of fishery-independent sampling data and of catch index and age composition data. In terms of process for incorporating data, the SSC highlighted that in the West Coast region, methodology reviews are performed independently to the stock assessment process, and that having pre-assessment data review workshops would be a more robust way to identify new data sources and to ensure that the data are used correctly.

The SSC is willing to evaluate and review a future version of the report that includes more detailed information about the PFMC data needs and methodology to include nongovernmental and state data.

SCC Notes:

The SSC recommends more guidelines in the report on how to incorporate new data. For example, in the PFMC methodology review process, there is an established process and guidelines specified in a methodology review terms of reference for incorporating new data sources and endorsing new methodologies proposed for management decision-making.

The SSC notes that the comment on needing more composition data is specific to commercial and recreational fishery sampling in California.

H. Groundfish Management

6. Harvest Specifications for 2021-22 Including Final Overfishing Limits and Acceptable Biological Catches

Overfishing Limit (OFL) Determinations for the 2021-2022 Harvest Specifications

At the September 2019 meeting, the SSC evaluated, and the Council adopted, overfishing limits (OFLs) for most stock and area combinations (Agenda Item H.6, Attachment 1, November 2019). However, OFL values from catch-only projections were not yet available for canary rockfish, English sole, shortspine thornyhead and brown rockfish, as those values depended on the outcome of additional analyses. Projections for these stocks and for alternatives under consideration for cowcod, lingcod, black rockfish, petrale sole, and sablefish were provided in Agenda Item H.6, Attachment 2, November 2019. The SSC reviewed the updated basis for these values, confirmed that the resulting projections do not result in changes in the status of the stocks, and endorses them for use in management.

For canary rockfish, issues identified by the SSC at the September Council Meeting were addressed in the revisions to the catch-only projections.

For English sole, low OFLs resulting from unrealistic assumptions of full annual catch limit (ACL) attainment were recalculated using recent catch to provide more representative projections.

For shortspine thornyhead, an incorrect P* value was previously used, and the correct value was

used in the revised projections.

For brown rockfish, projections were not provided due to staff time constraints. Projections are now provided based on the 2013 data-moderate assessment using XDB-SRA under the default harvest control rule for this stock.

For cowcod, projections were provided reflecting the probability of overfishing (P*) of 0.45 under the default harvest control rule, as well as values of 0.4 and 0.3 under consideration to address the risk resulting from uncertainty in this relatively data-poor category 2 stock assessment. For each alternative, the OFLs for 2019 and 2020 should reflect the 61 mt and 62 mt OFLs in regulation, as opposed to the currently reflected values of 90.7 mt and 92.9 mt from the new assessment. While the assessment projections of OFL for 2019 and 2020 were not those currently specified in regulations, this error does not affect the resulting projections since the removal assumption was 3.1 mt each year in 2019 and 2020.

For black rockfish, the Oregon Department of Fish and Wildlife has proposed that the acceptable biological catch (ABC) for 2021 and 2022 be kept the same as in 2020, deviating from the values resulting from the 2015 assessment using default harvest control rules. This falls within the new National Standard 1 guidelines for phasing in changes to ABCs and provides a higher ABC in 2021 and 2022 than under the default harvest control rules in anticipation of the results of a full assessment in 2021 to inform future harvest levels. The SSC endorses the resulting ABCs for use in this management cycle, but this practice should be used sparingly in general and is not recommended on a recurring basis for any stock.

For petrale sole, Alternative 1 ACLs, which are predicted to keep the stock at equilibrium biomass and depletion in the next 10 years as well as Alternative 2 ACLs set equal to the ABC with a P* of 0.4 were provided for comparison to the projections under the default harvest control rule (ACL = ABC (P* = 0.45)). The SSC did not have concerns regarding the projections resulting from Alternatives 1 or 2.

For sablefish, the alternative reflecting an increase in the P* to 0.45 from the status-quo value of 0.40 were projected correctly.

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 P* or use of alternative harvest control rules and may need to be revised if new alternatives are adopted at this meeting. The SSC Groundfish Subcommittee can review and endorse additional changes to OFLs and ABCs between now and the March Council meeting, whether in person or via webinar as necessary.

The SSC would like to thank the assessment teams for the additional analyses conducted in time to inform final stock status and OFL determinations for the 2021-2022 management cycle.

Area Apportionment of Sablefish Annual Catch Limits

The SSC reviewed the document "Groundfish Management Team Report on Proposed short-term improvements to sablefish ACL apportionment methods" (Agenda Item H.6.a, GMT Report 1, November 2019) and received an overview of the report from Patrick Mirick (Oregon Department

of Fish and Wildlife, Groundfish Management Team [GMT]) and Chantel Wetzel (Northwest Fisheries Science Center, GMT). The SSC review focused on two alternative methods. The current method (Method 1) is based on the long-term average distribution of sablefish biomass observed in the West Coast Groundfish Bottom Trawl Survey north and south of 36° N. lat. The proposed alternative method (Method 2) uses a 5-year moving average of the survey distribution.

While the GMT's report requests that the SSC endorse a method for apportioning the coastwide ABC into area-specific ACLs, ACL apportionment is an allocation issue and outside the scope of SSC responsibilities. If the Council would like to use a method that apportions ACLs in proportion to the current distribution of sablefish biomass north and south of 36° N. lat., the proposed alternative method (Method 2) is likely to better achieve that goal than Method 1. The SSC notes that other policy considerations could affect apportionment. Neither method for apportioning ACLs presents a biological risk.

The SSC notes there are some limitations with spatially apportioning the ABCs according to the trawl survey distribution. For example, a portion of the sablefish habitat in the southern region occurs inside the Cowcod Conservation Areas (CCAs), which are not sampled by the trawl survey and could introduce bias. The research and data needs statement for the 2019 sablefish stock assessment identifies spatial structure as a future direction for model development. While a spatial stock assessment for sablefish would allow for integrating multiple datasets on the distribution of fish and could result in area-specific biomass estimates, the increased uncertainties that would result from the additional complexity may not make this a preferred approach.

SSC Notes:

Relative to shortspine thornyhead, for 2028 and beyond, the buffer for category 2 for a stock conducted in 2013 exceeds the fixed category 3 buffer and a new assessment will need to be conducted by 2025 to prevent the fixed category 3 buffer from being applied.

A shorter time period than 1916 to 2012 for allocation of brown rockfish ABCs may have been more representative of distribution of the stock since the fishery of each state started in different years.

Capture the category in the caption for cowcod tables to facilitate future replication of the projections.

There was some question about why the projections differ between catch-only projections for lingcod.

For Minor Nearshore Rockfish South, there is an error in the summation for the OFL and ABC that needs to be addressed on the floor. There is a need to work with Rick Pannell to address issues with the summation of values in the spex database.

Spatially apportioning catch according to the distribution of biomass spreads makes sense because it spreads the risk appropriately.

As the GMT report identifies, the alternative approach (Method 2) could lead to higher attainment

in the north, which could increase the risk of local depletion. However, given the scale of sablefish movement, this was not of major concern to the SSC.

The break at 36° N lat. is a management break, and not of biological significance. However, faster growth in the south than the north could affect changes in biomass distribution.

D. Coastal Pelagic Species Management, continued

3. Methodology Review Preliminary Topic Selection

No new proposed methodology review topics were submitted for SSC review. Therefore, this agenda item was not taken up by the SSC.

E. Salmon Management

2. Final Methodology Review

The SSC reviewed the document "Report of the Scientific and Statistical Salmon Subcommittee on Salmon Methodology Topics" that addressed four topics presented during a webinar on October 22, 2019 including 1) proposed 40° 10' N. lat. Salmon Management Boundary Line change, 2) Upper Columbia Summer Chinook Exploitation Rate, 3) Willapa Bay Natural Coho Forecast Method, and 4) Fishery Regulation Assessment Model (FRAM) User Manual. The Subcommittee report is appended to this statement.

The SSC endorses the methodology used to assess the likely impacts of a proposed change in the salmon management boundary line from 40° 05' N. lat. to 40° 10' N. lat. This change in the boundary line may have impacts to Endangered Species Act-listed California coastal Chinook and Southern Oregon/Northern California coast coho salmon which may be contacted in the recreational and commercial Chinook fishery, but little data exists to assess those impacts.

The exploitation rate for Upper Columbia River summer Chinook were potentially over-estimated relative to a historic perspective and from coded wire tag expansions. The SSC considered this to be a data issue because no FRAM algorithm changes were proposed. The SSC highlights that problems such as this in FRAM may be wider than this specific issue, because changes in exploitation rates to one stock will cause changes to exploitation rates in other stocks.

As noted in the SSC Salmon Subcommittee report, insufficient information was presented to allow an evaluation of the Willapa Bay natural coho forecast methodology. Washington Department of Fish and Wildlife staff indicated that complete documentation could be available by December 20, 2019 and could be reviewed in a webinar prior to the March Council meeting. The SSC will need to review the Willapa Bay natural coho forecast methodology prior to endorsing this forecast before the March briefing book deadline.

An online version of a FRAM user manual has been completed and will soon be made publicly available. The user manual does not document the technical details of the model structure and implementation, including algorithms behind FRAM that the SSC has repeatedly requested to review.

SSC Notes:

The SSC notes that a lack of fine-scale spatial data exists to evaluate a boundary line change from 40°05' N lat. This boundary line change is likely to better reflect current conditions in the recreational fishery.

The ER is high for Upper Columbia River Summer Chinook relative to a historic perspective and to CWT expansions. This highlights a problem in FRAM that may be much broader whereby changes to one stock cascade to other stocks.

FRAM users and stakeholders are more likely to find incorrect exploitation rates that are too high, because high ERs may adversely affect stakeholders' allocations. Like in the case of the Upper Columbia R. Summer Chinook. There is less incentive to scrutinize ERs that are too low, so these are less likely to be found and corrected.

The SSC would like to review the algorithms that form the core functions of the FRAM program.

H. Groundfish Management, continued

Groundfish Stock Assessment Planning

An SSC discussion occurred to prepare for the December 13, 2019 webinar to review the 2019 groundfish stock assessment process. The following items were proposed for detailed discussion at the webinar.

Aspects of the process that worked satisfactorily

- *Checklist of elements needed in an assessment documents and their Executive Summary. Was the checklist used by the STATs or STAR Panel Chairs?*

Aspects of the process that did not work satisfactorily

- *Inconsistencies among some assessment documents regarding included elements (e.g., no statement of regional management in the Executive Summary of the sablefish assessment document).*
- *Do not need complicated reports for catch-only updates. Streamline the report format.*
- *Need standard template for projection tables that include rows for the two-years specified under the current specifications plus a column showing the sigma buffer.*

Changes to Terms of Reference

- *Clarify how sigma is calculated (biomass based or OFL based or both).*
- *Appendix B in the 2019-20 TOR specified "Population numbers and biomass at age × year × sex (if sex-specific M, growth, or selectivity) (may be provided as a text or spreadsheet file)." Is there any need for the biomass values?*

Changes to Accepted Practices Guidelines

- *Need guidance on calculating input N values for compositional data, especially if the Dirichlet-multinomial approach is used. The Dirichlet approach will not allow weighting to exceed the input N value (sensible if the input N is the number of fish but not if the input N is the number of tows (for survey data) or trips (for fishery data).*

E. Salmon Management, continued

4. Southern Resident Killer Whale Endangered Species Act Consultation Update and Risk Assessment

Drs. Derek Dapp (WDFW) and Will Satterthwaite (SWFSC) met with the SSC to discuss the technical work of the Ad Hoc Southern Resident Killer Whale (SRKW) Workgroup, contained in Chapter 5 and the appendices of Agenda Item E.4.a, Supplemental SRKW Workgroup Report 2, November 2019. The Workgroup was tasked with quantifying the effects of Pacific Fishery Management Council (PFMC) Chinook salmon fisheries on SRKW demographics. The SSC found the data sets used and the analyses performed to be reasonable and appropriate for the questions at hand given the complexity of the problem and the challenges presented by small populations. The SSC thanks the analysts for the work that they have put into this project. The SSC notes that the analysts carefully spelled out their assumptions and caveats in preparing data sets and carrying out their analyses and produced helpful advice for future work.

The SSC agrees that further analyses are unlikely to yield more informative results, as the regressions, generalized linear models, and cluster analyses had similar results to each other and to previous analyses. Given the large amount of data usually required to detect small differences in survival of long-lived species, further work is unlikely to resolve these relationships.

The SSC did not find the available information sufficient to quantitatively justify a threshold at which risk may be greater for SRKWs due to the effects of PFMC salmon fisheries. An analysis that included fisheries impacts over a broader spatial scale (including Southeast Alaska, Canada, and the Puget Sound fisheries) may be more informative about the effects of fisheries on SRKW demographics, but such an analysis is beyond the scope of the Workgroup. It is likely that historical variability in salmon abundances outside of the range observed during the time period analyzed may have a more detectable effect on SRKW demographics. The Workgroup plans to synthesize their findings over the winter. The SSC does not see a need to review a purely qualitative synthesis, however, if the synthesis is quantitative, or additional quantitative analyses are developed, the Workgroup should notify the SSC Chair and Salmon Subcommittee Chair as soon as possible to discuss review of the methods before the March 2020 Council meeting.

SSC Notes:

Correlative work. Building on Ward et al, Velez-Espino et al, Independent Science Panel. Previously looked at stocks, stock aggregations—Workgroup is looking at specific area/time period, not a stock itself.

The Workgroup analysts compiled three data sets: Chinook salmon abundance estimates for three seasons (also referred to as time steps) per year, Chinook salmon distributions in three seasons, and SRKW population metrics by year. To explore the link between SRKW population metrics and

Chinook salmon abundances by area and season, the workgroup performed logistic regressions of Chinook abundance by season and area against SRKW age-specific fecundity and stage-specific survival, with and without time lags, and general linearized models of Chinook abundance by season and area against peanut head occurrence. The Workgroup also performed cluster analyses to try to identify years of high and low SRKW survival and fecundity, and their associated Chinook salmon abundances. This analysis is novel, building off new work by Shelton and colleagues, in that it looks at Chinook salmon abundance and distribution rather than just abundance by stock or stock aggregate.

Workgroup would have to agree on meaningful effect size and priors for Bayesian analysis to be useful. Consensus would be hard. Also, Bayesian approach doesn't fix linearity/stationarity.

Each SRKW pod has a different distribution, so level of aggregation of SRKWs matter too in terms of looking at spatial results. Not consensus from workgroup on areas/time steps to focus on yet. Distribution of whales = centered NOF, fisheries removals = centered SOF.

Advice offered to analysts to make the effects table easier to read.

Just looked at fishing in a single year. Andre: could take to demographics in a more meaningful way (what does it do to lambda). Fecundity is so variable, can make up in other years in many cetaceans.

There may be some benefit to examining the literature on North Atlantic Right Whales and Eastern Grey Whales in case they have used alternative approaches that might be applicable but not considered yet by the Workgroup or SSC.

Power analyses would be nice but are unlikely to radically change our understanding of the processes. They would potentially be useful in identifying areas for future analyses that are likely to be fruitful (fecundity analyses) and those that are not (survival).

The only thing you can conclude is that there may be a signal here. Don't know what the signal might be.

I. Council Administrative Matters, continued

5. Future Council Meeting Agenda and Workload Planning

The SSC reviewed and enumerated discussion topics for the Stock Assessment Process Review ("Post-Mortem") meeting to take place Friday, December 13th via webinar, and discussed other upcoming workshops.

The remotely operated vehicle (ROV) review will take place February 4-6 in Santa Cruz, California. Reviewers for this meeting will include two committee of independent expert (CIE) reviewers, four members from the SSC, and one representative from the state of Washington.

The methodology review for data-limited methods is being planned as a three-day meeting in early May, with final dates to be determined. This meeting will undertake review of a variety of data-limited approaches. The SSC does not see a need for a CIE reviewer, as adequate expertise already

exists within the SSC. The SSC recommends Drs. Tom Carruthers and Adrian Hordyk be invited to participate.

Other upcoming review meetings include: 1) the sardine stock assessment review (STAR) panel review, February 24-27, 2020; 2) the methodology review for the Oregon Department of Fish and Wildlife visual-hydroacoustic nearshore rockfish survey in the fall of 2020; and 3) a potential salmon methodology review webinar on the Willapa Bay Natural Coho Forecast Method in January or February 2020.

SSC Notes:

SCS7 meeting – August 2020 Sitka.

Topics suggested for Post Mortem:

There should be a review of this year's CIE reports to consider discussion topics at the post-mortem webinar.

Catch-only projections: Full Executive summary not needed, but complete comparison of catch assumptions/values in previous full, update or catch-only projections along with spawning biomass/output, OFL, ABC values. Some thought should go into what is really needed in terms of reporting for these analyses, and in developing a template for catch-only projections.

Need standard template for projection tables that include rows for the two-years specified under the current specifications plus a column showing the sigma buffer.

Sensitivities: make it clear that STATs redo all sensitivities (with the exception of those deemed trivial) with final model following STAR panel.

Discuss what documents are needed for Spex process.

Clarify that sigma coming out of assessment should be based on OFL (given consensus on that point). Consider the use of the sigma from meta-analysis to get values for decision table and other approaches.

Consider if we need biomass at age table or only number at age.

Develop better guidance for developing input N, especially for Dirichlet which cannot inflate the original input.

Make clear how recommendations from pre-assessment data workshops should be addressed in pre-STAR assessment documents, as well as documentation of how data is processed in general for the assessment.

Consider ecosystem considerations

Consider best practices regarding switching out STATs doing species assessments – including having STATs with staff from both science centers as possible.

Consider how to ensure assessments follow the TORs, including all required elements

CIE comments from 2017: Late delivery of data, increased collaboration with agencies collecting data including CA and Mex. More effort to process compositional data. Background materials to help outside reviewers. Issue of substantial changes to models in the interval between pre-STAR model submission and the STAR panel. Amount of work done within STAR panel increases likelihood of errors in models, or details being missed.

Particular TOR issues:
The Council has previously raised concern the ToR language is too prescriptive (e.g., too many "shoulds", etc.)
Need language from NWFSC about stock assessment coordination roles among staff.

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	Salmon Methodology Review of Willapa Coho Forecasting Methodology	Jan or Feb, 2020?	Council/ Webinar?	Salmon Subcommittee Members	NA	STT	Ehlke
3	Data-Limited Methodology Workshop, Combined with Length-Based Data-Moderate Assessment Methodologies Review	May, 2020?	Council/ TBD	GF Subcommittee Members	Carruthers, Hordyk	TBD	DeVore
4	Review of Nearshore ROV Survey Designs and Methodologies	Feb 4-6, 2020	Council/ Santa Cruz, CA	Hamel (Chair), Shelton, Tsou, Field	CIE, Pacunski	None	DeVore
5	Pacific Sardine STAR Panel	Feb 24-27, 2020	Council/ La Jolla, CA	Punt (Chair), Garcia-Reyes + 1 TBD	CIE	CPSMT CPSAS	Griffin

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Workshop/Meeting		**Potential Dates**	**Sponsor/ Tentative Location**	**SSC Reps.**	**Additional Reviewers**	**AB Reps.**	**Council Staff**
6	7th National Meeting of the Scientific Coordination Subcommittee of the Council Coordination Committee	Aug, 2020	NPFMC/ Sitka, AK	4 TBD	NA	NA	DeVore
7	Oregon Combined Visual-Hydroacoustic Survey Methodology Review	Fall, 2020	Council/ TBD	4 (?) GF Subcommittee Members TBD	CIE – Acoustics Expert	TBD	DeVore

SSC Subcommittee Assignments, November 2019

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

Bold denotes Subcommittee Chairperson

PFMC
02/10/19

Council Meeting Dates	Location	Likely SSC Mtg Dates	Major Topics
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
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							
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~~**4 a/**~~	~~Oregon Combined Visual-Hydroacoustic Survey Methodology Review~~	~~Fall, 2020~~	~~Council/ TBD~~	~~4 (?) GF Subcommittee Members TBD~~	~~CIE – Acoustics Expert~~	~~TBD~~	~~DeVore~~
5	Salmon Methodology Review	Fall, 2020	Council/ TBD	Salmon Subcommittee Members	NA	STT MEW	Ehlke

a/ ODFW recommends canceling the Oregon Combined Visual Hydroacoustic Survey Methodology Review.