DRAFT SUMMARY MINUTES

Scientific and Statistical Committee

Pacific Fishery Management Council
Sheraton Portland Airport Hotel
Mt. St. Helens C Room
8235 NE Airport Way
Portland, OR 97220
Telephone: 503-281-2500

April 5-6, 2018

Members in Attendance

Dr. Aaron Berger, National Marine Fisheries Service Northwest Fisheries Science Center, Newport, OR
Dr. Evelyn Brown, Lummi Nation, Bellingham, WA
Dr. John Budrick, California Department of Fish and Wildlife, Belmont, CA
Mr. Alan Byrne, Idaho Department of Fish and Game, Boise, ID
Dr. Martin Dorn, National Marine Fisheries Service Alaska Fisheries Science Center, Seattle, WA
Dr. John Field, National Marine Fisheries Service Southwest Fisheries Science Center, Santa Cruz, 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. André Punt, University of Washington, Seattle, WA
Dr. David Sampson, Oregon Department of Fish and Wildlife, Newport, OR
Dr. William Satterthwaite, SSC Chair, 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. Cameron Speir, National Marine Fisheries Service Southwest Fisheries Science Center, Santa Cruz, CA
Dr. Tien-Shui Tsou, Washington Department of Fish and Wildlife, Olympia, WA

Members Absent

None.

SSC Recusals for the April 2018 Meeting		
SSC Member	**Issue**	**Reason**
Dr. André Punt	C.3 Acoustic Trawl Survey Methodology Review - Final Approval	Dr. Punt has published research using the ATM survey results

A. Call to Order-SSC Administrative Matters

John Field called the meeting to order at 0800. Chuck Tracy provided the agenda item overview. He pointed out a new white paper on Best Scientific Information Available (BSIA). He urged Scientific and Statistical Committee (SSC) members to look it over and provide comments to him that can be forwarded to the Council Coordination Committee (CCC) in May. A revised version of the BSIA paper will be provided for the June Council meeting.

The Nature Conservancy is hosting an ecosystem meeting next month. Pacific Fishery Management Council (Council) is collaborating with Gway Kirchner to help with travel costs. SSC members are encouraged to attend.

The SSC discussed scheduling the new sigma methods review. There was a preference to schedule a Groundfish Subcommittee meeting to review new sigma analyses in conjunction with the November Council meeting. Council staff will explore the logistics for scheduling a November meeting.

The historical skate catch reconstruction workshop will need to occur by the end of the year if we will be doing skate assessments next year. Council staff will check in with the state proponents to check when they will be ready for the review. A follow-up conference call will be scheduled with Council staff, Dave Sampson, John Field, Owen Hamel, and Jim Hastie to further plan this review.

The proposed remotely operated vehicle methodology review for CA and OR nearshore species is tentatively scheduled for this fall. Council staff will check in with the state proponents to check when they will be ready for the review.

The draft 2018 Research and Data Needs document was sent out to Council advisory bodies for their review and comment. The instructions were to send their comments in track changes to Council staff by May 4. These comments will be forwarded to the SSC subcommittee chairs for their consideration. A revised draft from the subcommittee chairs will be sent to Council staff by May 11. This draft will be compiled and submitted to the advanced June briefing book.

C. Coastal Pelagic Species Management

2. 2018 Exempted Fishing Permits, Final Approval

The SSC reviewed two revised coastal pelagic species (CPS) exempted fishing permit (EFP) proposals (Agenda Item C.2, Attachments 1 and 2) and appreciates the efforts in addressing SSC concerns that were raised in November 2017 (Agenda Item C.2.a, Supplemental SSC Report 1, November 2017). Ms. Diane Pleschner-Steele, Mr. Mike Okoniewski, and Mr. Kirk Lynn (CDFW) were available to answer questions.

The SSC identified two issues in the California Wetfish Producers Association (CWPA) EFP (Agenda Item C.2, Attachment 1). First, an error was identified relating to the proportion of sardine observed from the 2016/17 aerial surveys. Sardine, as a proportion of sardine + anchovy, is 32% (instead of 47%) based on the numbers reported in Table 1. This correction may change the amount of sardine requested in the proposal. Secondly, the SSC requested a more detailed justification for choosing a target (*n*) of 23 in Table 2. It appears operational limits are driving this choice instead of this decision being statistically driven.

The unknown proportion of biomass in the nearshore areas remains a concern. The SSC continues to support the Acoustic Trawl Methodology (ATM) review panel's recommendation of developing an independent survey to estimate the proportion of the population in the nearshore as a high priority research item.

The SSC supports the two EFPs moving forward and commends the applicants for their dedication to the continued research needed to improve biomass and variance estimates for CPS. The proposed research has the potential to investigate several long-standing issues with the ATM survey.

SSC Notes:

- *Extremely small CVs are concerning in Table 2 (Attachment 1).*
- *There remains a concern that 23 sets may be insufficient to obtain representative large school samples, Table 3 (e.g., two large schools may not be enough).*
- *These EFPs have the potential to address several long-standing issues with the ATM survey; both will extend the survey to nearshore waters excluded in the ATM survey; both will increase sample sizes used to develop age structure and age-length keys and to estimate target strength; both will enable comparisons of day versus night catches to gauge the impact of using night sets to interpret daytime acoustic signal; both will provide data to address trawl efficiency and catchability via a comparison of seines or industry gear and the ATM trawl; the NW proposal will provide information to address vessel avoidance. More detail on the objectives for these proposals is included in the methodology review report also reviewed at this meeting (Agenda Item C.3, Attachment 2, April 2018, Appendix 7; vessel avoidance observations of page 68-69).*
- *When the SSC provides detailed suggestions to applicants, they should be appended to the statement in plain text rather than italics. This way they will be immediately available and don't have to be read aloud to the Council. Another option - possibly look at COP23 to see if some language could be useful here about process.*

3. Acoustic Trawl Survey Methodology Review - Final Approval

An ATM methodology review took place January 29 – February 2, 2018 at the Southwest Fisheries Science Center (SWFSC) in La Jolla, California. The review Panel, made up of three SSC members and three reviewers from the Center for Independent Experts (CIE), provided a report (Agenda Item C.3, Attachment 2) with several recommendations for research to improve the survey as well as to guide the use of the survey biomass indices in stock assessments or management procedures. The SSC echoes the Panel's commendation of the ATM team for their

thorough presentations and responsiveness to panel requests.

Dr. André Punt presented the report to the SSC. Overall, the Panel concluded that the design of the acoustic-trawl survey is satisfactory and could be used to provide indices of abundance for Pacific sardine, northern anchovy, jack mackerel, and Pacific mackerel, subject to caveats.

There are many areas in which improvements in documentation, methods, or in the evaluation of current approaches could be made. The report focused on eight topics specified for review, which included elements of the survey design, factors affecting estimation, bias and precision of biomass indices, uncertainty, and documentation. The review panel identified twenty-two recommendations for future work related to those eight topics. One of the major issues identified by the panel, spanning multiple topics, is the potential for bias in the survey estimates of biomass.

The SSC endorses the panel report's conclusions regarding the appropriate use of biomass indices from the survey for the five CPS stocks (Table 3 in the report; simplified as Table 1 below). Given concerns about potential bias, the use of survey indices to develop estimates of absolute biomass was not endorsed for any stock.

The SSC endorses the panel report's research recommendations, recognizing there may be a medium-term tradeoff between conducting research at the expense of the coefficient of variation of the survey indices, if some of the limited survey time is devoted to research. The SSC recognizes the need for annual survey indices for CPS stocks and does not recommend foregoing the summer survey, although a management strategy evaluation could more formally inform this issue.

One major issue to be addressed is bias due to the survey missing a portion of a stock that is outside the survey area. Treating survey results as indices addresses this issue if the proportion missed is small or constant. This is not considered to be the case for northern anchovy. Notwithstanding the other high priority recommendations, the SSC finds the following to be necessary to provide information for anchovy management:

- Continue to explore and expand independent nearshore survey methods and efforts to estimate the proportion of the populations not currently surveyed by the ATM survey.
- Develop extrapolation methods from the existing data that would extend biomass indices to the coastline and account for the additional uncertainty.

The SSC considers direct estimates of nearshore biomass to be far superior to extrapolated biomass indices. Although the panel recommended that the sardine index could be used even in the absence of an inshore correction factor, the SSC considers evaluating an annual nearshore correction factor to be highly important for sardine as well.

The SWFSC ATM Team provided a response to the review (Appendix 8 in the review report), focusing on the importance of uncertainties identified by the panel. The panel provided rationale as to why these areas of uncertainty are important (Appendix 9 in the review report). The SSC concurs with the Panel response that these areas of uncertainty are important and should be addressed.

Table 1. Possible use of ATM results in assessments and management. See Table 3 of the review report.

Species/Stock	Inclusion in an integrated stock assessment		Use biomass indices to directly inform management[1]
	Relative abundance (Q estimated)	Absolute abundance (Q=1)	
Pacific Sardine	Yes	No	Yes
Pacific mackerel	Yes, summer surveys only	No	Yes, summer only
Jack mackerel	Yes, summer surveys only	No	Yes, summer only
Northern sub-population of northern anchovy	Yes, summer surveys only, if inshore area is addressed	No	Yes, summer surveys only, if inshore area is addressed
Central sub-population of northern anchovy	Yes if inshore areas is addressed[2]	No	Yes if inshore areas is addressed[2]

1. Only with MSE. Harvest control rules that use indices of biomass that are not considered absolute have been developed for other fisheries using MSE and generally involve examining changes in biomass indices. It was beyond the terms of reference to explore how one could use a relative index of abundance in a management procedure.
2. For the central subpopulation of northern anchovy, the spring survey may adequately cover the offshore central subpopulation in some years, but may not in other years.

SSC Notes:

The panel found that the documentation was insufficient for a thorough review. That said, the team was very responsive to requests for clarification, but this did slow down the review.

Unlike the previous review, the conclusion is that the surveys can provide relative indices of abundance for all four species (including two anchovy stocks). These cannot be used as absolute indices of abundance due to the populations in areas outside of survey area, uncertainty in target strength (TS), vessel avoidance, and issues with nighttime trawl sampling.

The panel recommended continued work on target strength estimation.

There is not much evidence within age data that this survey is particularly good at following year classes.

The habitat model is used to define survey area, especially for the spring survey. But timing of this information vs. timing of survey may be an issue.

At different population sizes for each species, a different proportion of the stock may be in the surveyed area.

Sampling design is adaptive – increase survey density when find high densities – conclusion there is a variance-bias tradeoff so there is reason to do this, but need to investigate this further.
Trawling occurs at night, following the acoustic sampling during the day. This is not the standard way things are done in acoustic surveys throughout the world. There is concern that the populations sampled during the acoustics and those sampled through trawling at night may be different. Given the multispecies nature of the survey, if the relative proportion of each species

(sizes, ages) observed is incorrect, this can lead to bias in population estimates (indices) across species.

The mean length in a trawl cluster is used for TS calculation, so estimated biomass observed by acoustics is affected by length observed as well.

Different species have different diurnal patterns. The ATM survey assumes that they are available to trawl at night. Larger fish may outswim/evade the net. Panel made a number of recommendations for field experiments to address these issues.

With the decline of the Pacific sardine population, the trawls have been more mixed across species.

Vessel avoidance and the surface acoustic dead zone could lead to negative bias in the biomass estimates, as was a focus of the 2011 review of this survey (Agenda Item C.3.a, Attachment 1, April 2011; Also: Appendix 7 of current review, Page 68-69).

Offshore, north and south areas may have portions of populations of CPS, however the panel focused on the areas inshore of the survey grid. We were presented with CDFW aerial survey results and the acoustic work off of Oregon and Washington in 2017.

Currently for Pacific sardine, assume seeing all fish 1+ estimating q. In earlier assessments q set at 1 with length based asymptotic selectivity.

The SWFSC ATM Team provided a response to the review (Appendix 8) focusing on the importance of uncertainties identified by the panel. The Panel responded to this (Appendix 9), providing reasons why these areas of uncertainty may indeed by important.

The investment in survey time – panel would suggest using more time for research rather than adaptive sampling to reduce the CV.

Sardine MSE did not focus on the bias/variance tradeoff. If one does address bias in the survey – how does one deal with historical data?

Should continue to look at extrapolation for sardine (that number should be calculated and reported and provided to sardine assessment author). Value in extrapolating and calculating Sampling preferred, but if cannot, extrapolate.

Research crucial, but annual indices needed as well given short life spans (high M), but higher CVs acceptable to allow research.

Schmitt, CPSMT: appreciate panel and the team's responses. A number of the recommendations from 2011 remain. CPSMT prefers more focus on research questions – multiyear research program – even if it means forgoing adaptive sampling. Extrapolation using best info nearshore should be considered.

DP, CPSAS: appreciate CIE reviewers – reiterated concerns of CPSAS. Nearshore biomass is important, as is TS issue. Ignoring everything under 70m deep. Trawling at night is a concern.

Whole host of things that could be wrong. CPSAS essentially support CIE recommendations. MSE for anchovy needed. Support using survey time to do research. Accuracy is important. Recommend consideration of nearshore biomass for both sardine and anchovy.

What are likely consequences of the research: tradeoff between bias and variance? How far off could the TS be given information for other things? So need to try to look at how big some of these effects could be (e.g., it appears the inshore correction could be very important).

Near term do the research then can conclude which things are not important and which may be. Much higher uncertainty.

4. Process for Review of Reference Points for Monitored Stocks

The SSC considered the three questions raised by the Council at the April 2017 meeting (Agenda Item G.2, April 2017), which are relevant to setting of reference points (MSY – the Maximum Sustainable Yield; B_{MSY} - the biomass corresponding to MSY; OFL – the overfishing limit; ABC - acceptable biological catch), with focus on the central stock of northern anchovy (CSNA).

(1) Review of the Current OFL Method

The current OFL is based on a bioeconomic analysis of northern anchovy conducted in 1991 by Jon Conrad (Agenda Item C.4, Attachment 1) and an assumption about the proportion of the CSNA in U.S. waters (Agenda Item C.4, Attachment 2). The advantage of the Conrad method is that it is the status quo. However, the SSC has major concerns with this method. In particular, the analysis is based on old data collected during dramatically different environmental and abundance conditions. Moreover, the assessment on which the OFL was based was informed by Daily Egg Production Method (DEPM) estimates, but the DEPM does not cover the distribution of the entire stock. In addition, the estimation method applied would not be considered standard today, and attempts to replicate Conrad's analysis have not been successful.

(2) Alternative Methods for Calculating Long-term MSY for the CSNA

In theory, long-term MSY can be calculated based on F_{MSY} (the fishing mortality corresponding to MSY) and B_{MSY}. The review and re-evaluation of Minimum Stock Size Threshold (MSST) for CPS finfish (Agenda Item E.1.a, Supplemental NMFS Report, September 2016) provides estimates of F_{MSY} and B_{MSY} based on eight alternative models. Unlike the Conrad method, the MSST report is based on the most recent stock assessment of northern anchovy and it uses modern statistical methods. Unfortunately, the information on which the MSST report is based is dated and the inputs also depend on the DEPM method.

The SSC did not identify any alternative methods to recommend for calculating a long-term MSY. The SSC has previously discussed and rejected the use of average catches to provide estimates of MSY (Agenda Item G.2.a, Joint SSC/CPSMT Report, April 2017) for coastal pelagic species. This is still the view of the SSC.

(3) Computing an OFL Based on the Results of the ATM Survey

The SSC has endorsed the use of the ATM survey as a relative index of biomass for use in assessments and for direct setting of reference points (Agenda Item C.3.a, Supplemental SSC Report 1, April 2018). Prior to using ATM survey results in assessment or management of CSNA, it will be necessary to apply nearshore correction factors to the estimates for the survey area. While the SSC prefers that such a correction factor be based on sampling in the nearshore areas, the ATM review panel also suggested the use of extrapolation, which is also acceptable.

In the near-term, the results of the ATM survey (either the most recent estimate or an average of the 2016 and 2017 estimates) could be used to set an OFL by multiplying the biomass estimate by an estimate of F_{MSY} (expressed as a proportion). The buffer between the OFL and the ABC would need to be recalculated given that the current buffer is based on a long-term fixed OFL and not a recent estimate of biomass. There would be no need to apply a correction for the proportion of the CSNA in U.S. waters because the ATM estimate is for U.S. waters. Prior to the use of this approach, the SSC would need to evaluate whether the extent of extrapolation to account for nearshore areas is too large for the resulting value to be reliable for use in management. This approach would lead to OFLs and ABCs that could change over time – the frequency of revisions to OFLs and ABCs would need to trade off the impact of changing reference points less frequently against potentially increased risk associated with not basing reference points on the most recent data.

This approach is implicitly using the (corrected) estimate of biomass from the ATM survey as an absolute index, which contravenes the advice of the ATM Review Panel. This is justified, at least for the near-term, because the information available to the ATM Review Panel did not indicate bias, except in the case of nearshore areas. The effects of bias due to the uncertainties identified by the Panel would be accounted for when calculating the buffer between the OFL and ABC.

In 2-5 years, a Management Strategy Evaluation (MSE) should be conducted to evaluate the approach for computing OFLs, ABCs, and Harvest Guidelines. An MSE would require the development of models to represent a range of uncertainties (e.g., biological, sampling), and Council and advisory body input on candidate control rules and performance metrics. Such control rules would use the ATM survey results but also other potential indices of abundance, and could evaluate control rules that set the OFL and ABC for multiple years. In addition, the MSE could be used to assess which of the many uncertainties is likely to be most influential in terms of meeting Council objectives, and hence should be the focus for research, as well as to evaluate the consequences of different frequencies of conducting assessments for the design of surveys. The MSE would need to acknowledge more uncertainty than previous MSEs used by the Council owing to the lack of recent information on productivity, maturity, and selectivity.

In the longer term, a full stock assessment is generally the preferred approach when sufficient information are available and would provide a basis for more fully addressing any bias in the (corrected) ATM estimates and parameterizing/revising the MSE. However, a management approach that does not rely on frequent integrated assessments (such as survey-based approaches) may be more appropriate for a short-lived species (such as northern anchovy) and should be evaluated as part of the MSE.

SSC Notes:

- *The estimates of F_{MSY} and B_{MSY} depend on assumptions regarding biological parameters such as selectivity, growth, and natural mortality, whose past values may not be appropriate for the present.*
- *The estimates of F_{MSY} are based on a deterministic yield function, but it is preferable to base F_{MSY} on projections that account for future recruitment variation.*
- *If the MSST report-based estimate of F_{MSY} were to be updated, some of the eight models should be removed (e.g., those based on the normal distribution). In addition, model averaging could be applied.*
- *F_{MSY} for use with the ATM survey needs to be recalculated so that it applies to 1+ biomass instead of selected biomass and be on a stochastic projection model.*
- *The ATM Team would need to specify ranges for the various sources of uncertainty so they can used to compute an ABC buffer and as the basis for the MSE.*
- *Any MSE needs to consider uncertainty in biological parameters as well as the possibility of density-dependence in the proportion of the population inshore.*

5. Pacific Sardine Assessment, Harvest Specifications, and Management Measures – Final Action

Dr. Kevin Hill (SWFSC) presented the 2018 sardine update assessment (Agenda Item C.5, Attachment 1, April 2018) to the SSC. As with the 2017 full assessment (Agenda Item G.5.a, Stock Assessment Report, April 2017), the Stock Assessors Team (STAT) provided a model-based (ALT) and an acoustic-trawl survey-based (AT) assessment approach in the 2018 update assessment document. The ALT assessment model was the approach used in the 2017 full assessment to inform management, and therefore the update of the ALT approach was evaluated for use to inform management for the upcoming fishing year (2018/19). The SSC CPS subcommittee reviewed a draft of the 2018 update assessment on March 6, 2018 (report appended).

The SSC agreed that the 2018 update to the sardine assessment satisfies the Terms of Reference for Update Assessments. The results are consistent with the previous assessment given the new data, and hence represent the best available science for management of the northern subpopulation of Pacific sardine.

The projected stock biomass for the 2018/19 management period is 52,065 mt for July 2018, which is above the MSST (50,000 mt). The update assessment is designated as a category 2d assessment with a sigma of 0.72 for calculating the ABC buffer. A category 2d was assigned due to major uncertainties associated with:

- recent recruitment shows a strong retrospective pattern;
- the most recent recruitment is taken from the stock-recruitment curve rather than being estimated;
- population age structure, because a large proportion of the estimated population is composed of recent recruits, the estimates of which are highly uncertain, and could be biased given retrospective recruitment patterns; and
- the lack of recent fishery age composition data now spanning three years.

The SSC endorses the 2018/19 Pacific sardine OFL of 11,324 mt, which is shown in Table 15 of

the assessment document.**SSC CPS Subcommittee Report to the SSC on the 2018 Assessment of the Northern Subpopulation of Pacific Sardine**

General
Drs. Kevin Hill (SWFSC), Paul Crone (SWFSC), and Juan Zwolinski (UCSC) presented the 2018 sardine update assessment to the SSC CPS subcommittee on March 6th, 2018. As with the 2017 full assessment (Agenda Item G.5.a, Stock Assessment Report, April 2017), the STAT provided a model-based (ALT) and an acoustic-trawl survey-based (AT) assessment approach in the 2018 update assessment document. The ALT assessment model was the approach used in the 2017 full assessment to inform management, and therefore the update of the ALT approach was evaluated for use to inform management for the upcoming fishing year (2018-19). The SSC CPS subcommittee expresses appreciation to the STAT for a complete and well documented update assessment.

New data included in the 2018 update proposed by the STAT include: 1) landings data for 2016, with preliminary landings data for model year 2017 (which includes catch data for the first half of 2018); and 2) a new ATM biomass index and associated age composition from the summer 2017 survey. There was no spring survey (or associated spring abundance estimate) for sardine during 2017. The methodology used to calculate acoustic-trawl survey biomass in 2017 was the same as in the 2017 full assessment. There were no fishery age-composition data for 2017 in the update assessment because no directed fishery took place. Changes to model structure were within the Terms of Reference for update assessments, and included estimating one additional recruitment deviation and updating the recruitment bias ramp, both as a direct result of the additional year of data. The habitat model was also re-run to partition total 2017 landings to the northern subpopulation.

Total catch has generally been low in recent years, with the exception of an increase in catch (~8,000 mt) from the Ensenada portion of the MexCal fleet during early 2017. The summer 2017 ATM survey produced a biomass index of 36,644 mt (CV = 0.30, ln(SE) = 0.29). Projected stock biomass for the 2018/19 management period is 52,065 mt for July 2018.

Recruitment
Retrospective patterns in estimated annual recruitment deviations continue to be apparent in the 2018 update assessment, as observed in previous sardine assessments, with recruitment proving to have been overestimated based on subsequent information. The estimate of the 2016 recruitment from the update assessment is nearly one-third the size of that estimated in the 2017 full assessment, transitioning from an above average to a below average estimate of recruitment. The 2017 recruitment estimate is currently estimated to be twice that for 2016. The estimate of 2017 stock biomass decreased by half, from 86,586 mt last year to 43,483 mt this year, primarily driven by the updated estimate of 2016 recruitment, which is a consequence of the summer 2017 acoustic-trawl survey biomass estimate. During the forecast period (2018-19), recruitment was taken from the stock-recruitment relationship.

Conclusion
The SSC CPS subcommittee agreed that the 2018 update to the 2017 sardine assessment satisfies the Terms of Reference for Update Assessments. The results are consistent with the previous assessment given the new data, and hence represent the best available science for management of

the northern subpopulation of Pacific sardine. The biomass estimate and management quantities for this model are shown in Table 15 of the assessment document. The SSC CPS subcommittee recommends endorsing the 2018/19 Pacific sardine OFL of 11,324 mt in that table. If the assessment is considered to be a category 1 assessment, a sigma of 0.415 should be used to calculate the ABC buffer because the model-estimated uncertainty associated with the January 2019 spawning stock biomass estimate (sigma = 0.415) is higher than the category 1 default (sigma = 0.360).

E. Salmon Management

3. Methodology Review Preliminary Topic Selection

The SSC met with the Salmon Technical Team (STT) represented by Dr. Michael O'Farrell (SWFSC) to discuss possible methodology review topics for 2018. The STT had no new items for methodology review.

The SSC reiterates its annual request for documentation of the Fisheries Regulation Assessment Model (FRAM). The most recent Chinook FRAM documentation published on the Council website is dated October, 2008. The Model Evaluation Workgroup (MEW) plans to update the FRAM documentation to reflect changes that have been incorporated into the model. It may be possible for the SSC Salmon Subcommittee to review the FRAM documentation with a webinar rather than an in-person meeting.

Items for possible review are listed below with the responsible party listed in parentheses:

- Chinook FRAM model documentation including FRAM algorithms and a user's manual (MEW).

- Post-season metrics of model performance for FRAM.

SSC Notes:

Mike O'Farrell provided information to the SSC about some small changes to the Coho FRAM inputs in response to unusual high exploitation rates for Rogue and Klamath Coho stocks.

Robin Ehlke indicated that the SAS is likely to submit a Methodology Review topic on moving a management boundary line in northern California from 40°05' N lat. to 40°10' N lat.

F. Groundfish Management

3. Essential Fish Habitat (EFH) and Rockfish Conservation Area (RCA) Amendment 28 - Final Action – Part 1

The SSC's review of the Preliminary Draft Environmental Impact Statement for Amendment 28 to the Pacific Coast Groundfish Fishery Management Plan (Agenda Item F.3.a, Project Team Report 1) focused on the Supplemental Appendices D-1 and D-2 (Agenda Item F.3.a, Supplemental Project Team Report 3), with a specific focus on three items requested by Council staff: (1) the process used to select data sources for evaluating economic impacts; (2) the approach used to assign fish ticket data for landings and revenues to spatial locations; and (3) the method

used to identify "hotspot" locations for overfished species. Kerry Griffin and Brett Wiedoff (Council staff) and other members of the Groundfish EFH Project Team were present to answer questions. The documentation was provided as supplemental materials, which limited the time available to conduct a comprehensive review.

Data source selection process

As described in Appendix D-1, the Project Team selected two time periods to form the basis of their analyses of potential impacts of EFH openings and closures and RCA reopenings, 1997-2001 and 2011-2014. The potential data sets considered by the Team were previously discussed with the SSC's Economics Subcommittee via webinar during February 2017. The Project Team's choices for the particular data sets (1997-2001 and 2011-2014) adequately addressed the recommendations made by the Economics Subcommittee and endorsed by the full SSC in March 2017.

Spatial assignment of fish ticket data for landings and revenues

The Project Team considered various methods for assigning fish landings and associated revenue to spatial locations. Although Appendix D-1 provides no analysis to support the Team's decision to use only the tow start points, the SSC considers it to be a reasonable approach given the large technical hurdles posed by the alternative approaches.

Overfished species "hotspots"

At its November 2016 meeting, the SSC considered an "Overfished Species Hot Spots Analysis Tool" that applied a spatial clustering algorithm to fishery-dependent catch rate data to identify discrete areas that could potentially be closed, to protect overfished species. The SSC recommended "not basing identification of hot spots on fishery-dependent data, because few of the fishery-dependent data will have been collected from within the RCA". The SSC also had concerns about the analysis tool and recommended "using the results of habitat suitability modeling or a geostatistical hurdle approach". The Project Team's Discrete Area Closure Methodology/Hotspot Analysis presented in Appendix D-2 uses two methods that are both consistent with the SSC's recommendations. The models produce maps that depict areas with high probability of finding darkblotched rockfish, Pacific ocean perch, and yelloweye rockfish off Washington. Of these species, only yelloweye rockfish are still considered to be under rebuilding. Further, the data supporting the projected hotspots for yelloweye rockfish off Washington are not based on any direct observations off Washington of yelloweye rockfish on hard-substrate habitats due to the lack of visual submersible survey data.

Conclusions

As requested by Council staff, the SSC evaluated the three approaches applied by the Project Team. The SSC endorses the rationale for these approaches.

The SSC suggests that before the next review of groundfish EFH, the Council provide policy guidance on how to gauge the importance of EFH. All waters off the U.S. are essential habitat for some species. Analyses of EFH need direction on what species and habitat features the Council

considers to be important, as clear goals and objectives will facilitate the scientific analyses of the available data.

SSC Notes:

- *There are significant challenges in the available data due to temporal inconsistencies in how tow locations are recorded in trawl logbooks. Older data only report tow start locations. Consequently, the Project Team developed their analyses using only the tow start locations and considered five approaches to account for the areas covered by the trawl tow tracks. For assigning trawl tows to spatial polygons, the Team ultimately decided to base their analyses only on the tow starting locations.*
- *The Team applied geostatistical hurdle methodology to fishery independent survey data. The National Centers for Coastal Ocean Science (NCCOS) model uses data from the NWFSC bottom trawl survey. The NWFSC model also uses the NWFSC bottom trawl survey data but supplemented by data from visual submersible surveys off Oregon and California.*
- *The NCCOS and NWFSC models were documented in the NMFS Synthesis Report (Agenda Item D.6.b, NMFS Synthesis Report, April 2013). Although the SSC received a presentation (from Ole Shelton) on the models, the Appendices to the Report, which provided the documentation, were not available to the SSC in advance of its meeting and therefore were not reviewed.*
- *The Research and Data Needs document should identify the need for research that focuses on changes in newly closed and newly opened areas.*

SSC Subcommittee Assignments, April 2018

Salmon	**Groundfish**	**Coastal Pelagic Species**	**Highly Migratory Species**	**Economics**	**Ecosystem-Based Management**
Galen Johnson	**David Sampson**	**André Punt**	**Aaron Berger**	**Cameron Speir**	**Dan Holland**
John Budrick	Aaron Berger	Aaron Berger	John Field	Michael Harte	Evelyn Brown
Alan Byrne	John Budrick	Evelyn Brown	Michael Harte	Dan Holland	John Field
Owen Hamel	John Field	John Budrick	Dan Holland	André Punt	Michael Harte
Michael Harte	Owen Hamel	Alan Byrne	André Punt	David Sampson	Galen Johnson
Will Satterthwaite	Meisha Key	John Field	David Sampson		André Punt
Rishi Sharma	André Punt	Owen Hamel	Rishi Sharma		Will Satterthwaite
Ole Shelton	Rishi Sharma	Meisha Key			Ole Shelton
Cameron Speir	Tien-Shui Tsou	Will Satterthwaite			Cameron Speir
		Tien-Shui Tsou			Tien-Shui Tsou

Bold denotes Subcommittee Chairperson

Council Meeting Dates	Location	Likely SSC Mtg Dates	Major Topics
~~**March 8-14, 2018**~~ ~~Advisory Bodies may begin Thu, March 8~~ ~~Council Session may begin Fri, March 9~~	~~DoubleTree by Hilton Sonoma~~ ~~One Doubletree Drive~~ ~~Rohnert Park, CA 94928~~ ~~Phone: 707-584-5466~~	~~Two-day SSC Session~~ ~~**Thu, March 8 – Fri, March 9**~~	~~Election of new SSC officers~~ ~~Identify salmon management objectives~~ ~~Salmon review/Pre I~~ ~~CA current & IEA report~~ ~~FEP Climate Shift Initiatives Report~~ ~~Sablefish Ecosystem Indicators MSE~~ ~~Groundfish initial stock assessment plan and Terms of Reference~~ ~~Groundfish harvest specifications~~
~~**April 5-11, 2018**~~ ~~Advisory Bodies may begin Thu, April 5~~ ~~Council Session may begin Fri, April 6~~	~~Sheraton Portland Airport Hotel~~ ~~8235 NE Airport Way~~ ~~Portland, OR 97220~~ ~~Phone: 503-281-2500~~	~~Two-day SSC Session~~ ~~**Thu, April 5 – Fri, April 6**~~	~~Pacific Sardine Assessment~~ ~~Coastal pelagic species EFPs~~ ~~Salmon Methodology Topic Selection~~ ~~ATM Methodology Final Approval~~ ~~Process for Review of Ref. Points for Monitored Stocks~~
June 6-13, 2018 Proposed Subcommittees may meet Wed, Jun 6 Advisory Bodies may begin Thu, June 7 Council Session may begin Fri, June 8	DoubleTree by Hilton Spokane City Center 322 N. Spokane Falls Court Spokane, WA 99201 Phone: 509-455-9600	Two-day SSC Session **Thu, June 7 – Fri, June 8**	Final stock assessment plan and Terms of Reference Research and Data Needs, Prelim.
September 5-12, 2018 Proposed Subcommittees may meet Wed, Sept 5 Advisory Bodies may begin Thu, Sept 6 Council Session may begin Fri, Sept 7	DoubleTree by Hilton Hotel Seattle Airport 18740 International Boulevard Seattle, WA 98188 Phone: 206-246-8600	One-day Ecosystem Subcm Session? **Wed, Sep 5** Two-day SSC Session **Thu, Sep 6 – Fri, Sep 7**	Groundfish Stock Assessment Methodology Review Topic Selection Research and Data Needs, Final Salmon Methodology Topic Priorities

November 1-8, 2018 Proposed Subcommittees may meet Thu, Nov 1 Advisory Bodies may begin Fri, Nov 2 Council Session may begin Sat, Nov 3	San Diego Marriott Del Mar 11966 El Camino Real San Diego, CA 92130 Phone: 858-523-1700	Two-day SSC Session **Fri, Nov 2 – Sat, Nov 3**	CPS Methodology Topic Selection Groundfish Stock Assessment Methodology Topic Priorities Salmon Methodology Review

Proposed Workshops and SSC Subcommittee Meetings for 2018							
	Workshop/Meeting	**Potential Dates**	**Sponsor/ Tentative Location**	**SSC Reps.**	**Additional Reviewers**	**AB Reps.**	**Council Staff**
~~**1**~~	~~SCS6 Meeting~~	~~Jan. 17-19~~	~~Council & NMFS/ San Diego, CA~~	~~Satterthwaite, Holland, Punt, Berger, Budrick, Field, Hamel, Harte, Johnson, Sharma, Speir, Tsou~~	~~TBD~~	~~None~~	~~Tracy, DeVore Others? TBD~~
~~**2**~~	~~CPS ATM Methodology Review~~	~~Jan. 30 – Feb. 2~~	~~Council/ La Jolla, CA~~	~~Punt, Brown, Hamel~~	~~TBD~~	~~TBD~~	~~Griffin~~
~~**3**~~	~~GF Subcommittee Webinar Review of Harvest Specifications and GF R&D Needs~~	~~Feb. 8~~	~~Council/Webinar~~	~~GF Subcommittee~~	~~None~~	~~None~~	~~DeVore~~
~~**4**~~	~~CAPAM Workshop on Spatio-Temporal CPUE Indices~~	~~Feb. 26 – Mar. 2~~	~~CAPAM/ La Jolla, CA~~	~~TBD~~	~~TBD~~	~~None~~	~~TBD~~
~~**5**~~	~~Review of Sardine Update Assessment~~	~~Mar. 6~~	~~Council/ Webinar~~	~~CPS Subcommittee~~	~~None~~	~~CPSMT CPSAS~~	~~Griffin, DeVore~~
~~**6**~~	~~Review of Catch Estimation Methods in Sparsely Sampled Mixed Stock Fisheries~~	~~Mar. 28-29~~	~~Council/ Santa Cruz, CA~~	~~GF Subcommittee~~	~~TBD~~	~~TBD~~	~~DeVore~~

Proposed Workshops and SSC Subcommittee Meetings for 2018							
Workshop/Meeting		**Potential Dates**	**Sponsor/ Tentative Location**	**SSC Reps.**	**Additional Reviewers**	**AB Reps.**	**Council Staff**
7	Review of Proposed Sigma Methodologies	Nov. 4?	Council/ TBD	GF Subcommittee	TBD	TBD	DeVore
8	Review of Nearshore ROV Survey Designs and Methodologies	Oct. – Dec. timeframe?	Council/ TBD	GF Subcommittee	TBD	TBD	DeVore
9	Review of Historical Catch Reconstructions of Skate Species	Fall?	Council/ TBD	GF Subcommittee	TBD	TBD	DeVore
10	Data-Limited ToolKit Methodology Review	Fall/Winter?	Council/ TBD	GF & CPS Subcommittees	TBD	TBD	DeVore
11	CCIEA Indicator Review	Sep. 5?	Council/ Seattle, WA	Ecosystem Subcommittee	None	EWG EAS	Dahl
12	Salmon Methodology Review	Oct. TBD	Council/ TBD	Salmon Subcommittee	TBD	STT MEW	Ehlke

PFMC
05/07/18