

MINUTES
Scientific and Statistical Committee

Pacific Fishery Management Council
DoubleTree by Hilton Spokane City Center
Salon II
322 North Spokane Falls Court
Spokane, WA 99201
Telephone 509-455-9600

June 11-12, 2015

Members in Attendance

Mr. Alan Byrne, Idaho Department of Fish and Game, Boise, ID
Dr. Andrew Cooper, Simon Fraser University, Vancouver, B.C.
Dr. Martin Dorn, National Marine Fisheries Service, Seattle, WA
Dr. John Field, National Marine Fisheries Service, Santa Cruz, CA
Dr. Owen Hamel, National Marine Fisheries Service, Seattle, WA
Dr. Daniel Huppert, University of Washington, Seattle, WA
Mr. Tom Jagielo, Seattle, WA
Dr. Galen Johnson, Northwest Indian Fisheries Commission, Olympia, WA
Ms. Meisha Key, SSC Chair, California Department of Fish and Wildlife, Santa Cruz, CA
Dr. Todd Lee, National Marine Fisheries Service, Seattle, WA
Dr. Kevin Piner, National Marine Fisheries Service, La Jolla, CA
Dr. André Punt, University of Washington, Seattle, WA
Dr. David Sampson, Oregon Department of Fish and Wildlife, Newport, OR
Dr. William Satterthwaite, SSC Vice-Chair, National Marine Fisheries Service, Santa Cruz, CA
Dr. Cameron Speir, National Marine Fisheries Service, Santa Cruz, CA
Dr. Tien-Shui Tsou, Washington Department of Fish and Wildlife, Olympia, WA

Members Absent

Dr. Peter Lawson, National Marine Fisheries Service, Newport, OR

SSC Recusals for the June 2015 Meeting		
SSC Member	Issue	Reason
Dr. André Punt	G.2 Pacific Mackerel Assessment and Management Measures	Dr. Punt chaired the Pacific mackerel STAR panel
Dr. André Punt	G.4. Litigation Settlement Discussion	Dr. Punt contributed to the draft Terms of Reference for the Pacific sardine Distribution workshop
Dr. André Punt	D.10. Rebuilding Revision Rules	Dr. Punt contributed to the development of the MSE
Dr. Kevin Piner	G.2 Pacific Mackerel Assessment and Management Measures	Dr. Piner contributed to the Pacific mackerel assessment
Dr. Owen Hamel	D.8 Final Stock Assessments and Catch Reports	Dr. Hamel either contributed to or supervised staff who conducted the assessments and catch reports (all except for the chilipepper update)

A. Call to Order

Chair Meisha Key called the meeting to order at 0800. Dr. Donald McIsaac provided an overview of the agenda. Meisha announced her resignation from CDFW and the SSC at the end of the month to everyone’s surprise. She will be sorely missed in the process.

D. Groundfish Management

8. Final Stock Assessments and Catch Reports

I. Catch Reports, Update Assessments and Data-Moderate Assessment

The Groundfish Subcommittee met in Spokane on June 10 to review the catch reports and assessment documents. Representatives from the stock assessment teams (STATs) (Dr. Jason Cope – NWFSC, Felipe Hurtado-Ferro – UW, Dr. Melissa Haltuch – NWFSC, Kelli Johnson – UW, Christine C. Stawitz – UW) also attended the meeting, presented results from the assessments, and answered questions from the subcommittee. The Scientific and Statistical Committee (SSC) was briefed by its Groundfish Subcommittee regarding the following groundfish stock assessment items informing 2017-2018 management decision-making: (1) catch reports for three rockfish species managed under rebuilding plans (yelloweye rockfish, Pacific ocean perch (POP), and cowcod) (Agenda Item D.8, Attachment 9), (2) updated assessments for chilipepper rockfish, petrale sole, and sablefish (Agenda Item D.8, Attachments 6, 7, and 8), and (3) a data-moderate stock assessment for arrowtooth flounder (Agenda Item D.8, Attachment 5.)

The petrale sole and sablefish updates were conducted as a graduate course in applied stock assessment at the University of Washington, with Drs. Owen Hamel (NWFSC) and Melissa Haltuch providing training and guidance. The SSC would like to acknowledge the work by both the teachers and the students that went into these update assessments, which were very comprehensive and carefully prepared.

Catch Reports

The catch reports provide updated information on the rebuilding progress of yelloweye rockfish, POP and cowcod off the U.S. Pacific coast using data through 2014. The 2012-2014 total catches (landings plus dead discards) for all three species are estimated to be less than the annual catch limits (ACLs). Catches for all these species have declined since the start of the catch share program.

Update Assessments

Chilipepper Rockfish

The most recent full assessment of chilipepper rockfish was conducted in 2007. The current assessment represents the first update of that 2007 assessment. Changes from the 2007 assessment include using an updated version of the Stock Synthesis model, which results in better treatment of time-varying growth; updated historical catch estimates; a new 2003-2014 time block to account for changes in recreational fishery selectivity; updated maturity and fecundity relationships; updated ageing error estimates; and 8 additional years of data. Each of these changes is within the terms of reference (ToR) for updates, and caused minor changes to model results, which were consistent with the 2007 assessment. Recent recruitments have been higher than those seen in the early 2000s (following the strong 1999 year class), resulting in an upward trend in biomass.

The assessment update estimates a depletion in 2015 of 64%. The chilipepper rockfish update assessment represents the best available science for use in developing 2017-2018 management measures as a category 1 assessment. The SSC recommends that the next assessment of this stock be a full assessment due to the length of time since the last full assessment.

Petrale Sole

The most recent full assessment of petrale sole was conducted in 2013; therefore, this update includes only two years of additional data. The draft petrale sole assessment update in the briefing book was revised slightly by the STAT to include additional age composition data and to account for several other minor adjustments. The subcommittee reviewed the revised model, which will ultimately be documented in a revised assessment document. The subcommittee requested that the STAT also include additional information to more fully document the transition from the 2013 model to the base 2015 assessment update.

The assessment update estimates a depletion in 2015 of 30.8%. The ten year projections, assuming that the ACL's are attained, predict that the relative depletion will range between 28 and 30% of the unfished level. Improvement in the estimated stock status (relative to the 2013 model

projection) is attributed to greater strength of the 2006-2008 year classes, and a consistent increasing trend in the NWFSC trawl survey index.

The petrale sole update complies with the ToR for assessment updates and represents the best available science for use in developing 2017-2018 management measures as a category 1 assessment. The base update model indicates that the stock is above the B_{MSY} proxy of $B_{25\%}$. Since the SSC has previously recommended that a stock can be declared rebuilt based on an assessment update, the SSC recommends that petrale sole be declared rebuilt. The NWFSC trawl survey appears to be an excellent indicator of petrale sole trends, and should be monitored to evaluate the need for a new assessment. The SSC recommends the next assessment of petrale sole be an update assessment.

Sablefish

The last full assessment of sablefish was in 2011. There were only minor changes to the 2011 assessment when updating to the new version of Stock Synthesis. All data inputs were updated, additional corrections to data were made (e.g. discards), and new software was used to generate survey indices using delta-GLMM models.

A more thorough review is needed of standardized procedures and new software used to produce fishery size and age compositions, used for the first time in the current assessment cycle, especially in the context of sablefish. Port sampling data for sablefish are more complicated than for other groundfish species because there is a complex set of size-graded market categories for sablefish and many of the fish are landed in dressed condition.

The draft sablefish assessment update in the briefing book was revised slightly by the STAT to add additional age data and to improve the data weighting procedures. The subcommittee reviewed the revised model, which will ultimately be documented in a revised assessment document. The assessment update estimates a depletion in 2015 of 34.5%. The assessment shows similar trends to that of the 2011 assessment. Data reweighting and model tuning caused the largest differences in biomass from the last full assessment, but these procedures followed current best practice and are permissible in update assessments. The sablefish update complies with the ToR for assessment updates and represents the best available science for use in developing 2017-2018 management measures as a category 1 assessment. The SSC recommends the next assessment of this stock be a full assessment.

Data-Moderate Assessment

The SSC was briefed on the subcommittee's review of the data-moderate assessment of arrowtooth flounder that was conducted by Dr. Jason Cope. These types of assessments are informed by data on catches as well as one or more indices of abundance. The SSC has endorsed two data-moderate assessment methods, extended Simple Stock Synthesis (XSSS) and Extended Depletion-Based Stock Reduction Analysis (XDB-SRA). A stock assessment review (STAR) Panel in April 2013 identified a set of review criteria for assessments conducted using XSSS and XDB-SRA (Agenda Item F.5.a, Attachment 2, June 2013).

The last assessment of arrowtooth flounder was conducted in 2007. The assessment of arrowtooth flounder presented to the SSC this year involved fitting a population dynamics model using three approaches: maximum likelihood estimation (MLE), Markov Chain Monte Carlo (MCMC) and XSSS. The latter two methods are Bayesian, which is the estimation framework on which past data-moderate assessments have been based. However, the assessment of arrowtooth flounder differed from past data-moderate assessments in that results of the 2007 assessment were used to inform stock depletion and selectivity was set based on the results of the 2007 assessment.

The SSC identified model scenarios in MLE and XSSS configurations of the assessment that merited further exploration. However, the SSC was unable to endorse any of the model runs presented in the draft assessment report as providing a suitable basis for management decision making for the 2017-18 management cycle. This is because the Bayesian analyses all exhibited results that were unexpected given the observed data or had reused the data inappropriately, and MLE-based approaches are not endorsed for data-moderate assessments. The difficulty in obtaining robust results using data moderate methods may be due to the history of light exploitation of arrowtooth flounder, and survey indices that show flat or increasing trends. The SSC commends Dr. Cope for the extensive work undertaken on the assessment of arrowtooth flounder, which will inform refinement of how data-moderate assessments are to be conducted in the future.

The 2007 assessment could be used as the basis for projecting overfishing limits (OFLs) for arrowtooth flounder. The SSC recommends providing new OFL projections using actual catches since 2007. These new projections will provide the best available science to support management decision making for 2017-18 fisheries. While the analyses included in the assessment report were not endorsed for management decision-making, there was no evidence that the stock is below the management target of 25% of unfished biomass. The SSC recommends that the next assessment of arrowtooth flounder be a full assessment given that the current assessment is eight years old.

II. Full Stock Assessments

The Scientific and Statistical Committee (SSC) reviewed the full assessments of canary and darkblotched rockfish and received the reports from the STAR panel review that took place during April 27-May 1. Representatives from the assessment teams (Drs. James Thorson and Vladlena Gertseva—NWFSC) presented results from the assessments and answered questions.

Canary Rockfish

The last full assessment of canary rockfish was conducted in 2007. Stock assessment updates were done in 2009 and 2011. A number of revisions were made to the data used for stock assessment, including 1) a new method of index standardization for NWFSC trawl survey using a geo-statistical delta-GLMM model, 2) a new steepness value (0.773) based on an updated meta-analysis of steepness, 3) a re-estimated relationship for maturity, 4) new ageing error tables, and 5) a re-estimated length-weight relationship. Ageing data based on surface otolith reads were added to the assessment using an ageing-error table appropriate to surface reads. This added about 10 years of historical ageing data to the model.

The new assessment is an innovative spatial model with three areas corresponding approximately to the waters off the states of Washington, Oregon, and California. Population trends by area can

differ according to exploitation histories and deviations from a shared stock recruit relationship. Best practices for spatial models are not well developed; however, the SSC regards the model as a promising development. In future assessments, the SSC requests that greater attention be given to examining results by spatial areas in addition to the overall assessment, since results should be plausible locally as well as globally.

Dr. Thorson provided an addendum to the stock assessment that corrects an error in NWFSC trawl survey size composition used in the model. The annual size compositions were replicated in each area rather than using area-specific information. The correction had relatively little effect on assessment results (depletion in 2015 changed from 56.0% to 55.5% of unfished). A revised document will be made available in September with revised tables and figures.

Stock status is estimated to be at 55.5% depletion in 2015, which represents a substantial improvement in status from previous canary rockfish assessments. The primary factors driving the improvement in stock status are the use of a higher steepness value, the reduction in harvest due to the rebuilding plan, and above average recruitments in 2001-2003, and in 2007 and 2010. The relatively strong effect of steepness on estimated stock status is a reason for concern about the reliability of model results, since steepness is a relatively uncertain parameter value. However it should be noted that even a relatively low steepness of 0.6 (e.g., the low state of nature in the steepness decision table) results in a biomass estimate above the rebuilding target.

The SSC endorses the use of the 2015 canary rockfish assessment as the best scientific information available for status determination and management as a category 1 assessment. The canary rockfish spawning stock biomass is estimated to be above the B_{MSY} proxy of $B_{40\%}$, and has therefore achieved the rebuilding target. Two decision tables were provided in the executive summary, a table for different levels of steepness, and another for different levels of natural mortality of males and young females. Both of these parameters are relatively uncertain and strongly affect assessment results, and therefore both decision tables should be considered by the Council when setting the ACL. Canary rockfish is recommended for an update when it is next assessed.

Darkblotched rockfish

The last full assessment of darkblotched rockfish was conducted in 2013. Revisions that were made to the data used for stock assessment included 1) a new method of index standardization for NWFSC trawl survey using a geo-statistical delta-GLMM model, 2) a new steepness value based on an updated meta-analysis of steepness, 3) a new value for natural mortality, 4) an updated maturity at length relationship, 5) a re-estimated length-weight relationship, and 6) additional ageing data. Changes to the assessment model were relatively minor, but included a change from two fleets to three fleets, with at-sea hake fishery now modeled as a separate fishery, and a change from asymptotic selectivity for the shore-based fishery to dome-shaped selectivity.

The SSC identified a potential issue related to the inclusion of shrimp trawl size composition data with the shore-based fishery data, since these are very different fisheries. There was concern that these data had a large influence on the estimated selectivity of the shore-based fishery, which showed that the smallest fish (< 20cm) were about 10% selected. Dr. Gertseva presented results from a sensitivity run that demonstrated that even when the shrimp trawl data were excluded the

selectivity of smallest fish was greater than zero, indicating the small darkblotched rockfish are also caught in other components of the shore-based fishery. While this result helped to alleviate the SSC concerns, the SSC nevertheless recommends that future darkblotched rockfish assessments explore models in which the shrimp trawl fishery is modeled separately.

The base model estimate for 2015 spawning depletion is 39%. Several factors were identified as being responsible for the slower than expected rebuilding of darkblotched rockfish, which were projected to be rebuilt by 2015. The model results were very sensitive to the addition of the 2014 NWFSC survey age composition data, which showed strong recruitment but reduced numbers of older mature fish. Furthermore, biomass index in the NWFSC survey for darkblotched rockfish has shown a slight downward trend during 2003-2014, with consistent drops in 2013, and again in 2014.

The SSC endorses the use of the 2015 darkblotched rockfish assessment as the best scientific information available for status determination and management as a category 1 assessment. Darkblotched rockfish is recommended for an update assessment during the next assessment cycle.

SSC Notes:

Catch reports: For clarity, it would be useful if the catch reports could use the terminology “total catch” (landings plus dead discards) in lieu of “fishing mortality”, which is typically associated with fishing rate, not volume.

Chilipepper rockfish: In Figure 27, “extend time block” is the BASE model. The STAT should make that clear in the captions.

Petrable sole:

Additional information is needed to track the transition of the 2013 base model to the base 2015 assessment update, including comparison of the 2013 and 2015 delta-GLMM indices, sequential tracking of changes to the model structure, a clear statement regarding how compositional data weighting was conducted regarding state-specific expansions, and documentation of the commercial age compositions added since the draft document was circulated.

Research recommendations: The fact that this is a transboundary stock and greater consideration and/or coordination of data collection and modeling with Canada would be beneficial, a management strategy evaluation which focused on potential shortcomings of not accounting for stock structure (U.S./Canada) and in which harvest control rules vary would be a strong research priority, and additional studies into maturity and fecundity (some of which are ongoing) are additional priorities.

Sablefish: The next STAT should consider separating the hook and line fleet into sectors fished under trawl IFQ, where full retention is required, and for the other hook and line fleets, where discarding may occur.

There is a relatively new way of processing sablefish onboard fishing boats. New conversion factors are needed to maintain data quality and consistency. This could affect size composition

estimates and catch weights.

Final document should include area swept to plot of slide 7 of presentation. Comparisons should be made routinely between the delta-GLMM estimates and area-swept biomass estimates for all surveys.

In the final version of the document, include a sensitivity including the 1997 data point from the EDCP study that was dropped.

Arrowtooth flounder: The performance criteria for evaluating the adequacy of data-moderate assessments identified by the April 2013 STAR Panel are:

Performance criteria for evaluating data moderate assessments
1. Do the diagnostics for the posterior sampling algorithm indicate that the model has converged?
2. Are the indices used in the assessment sufficiently precise to provide a signal for the assessment?
3. Is an adequate fit achieved to indices of abundance used in the assessment?
4. Does the model capture the evident trends in the abundance indices, or, if not, can the residual pattern be explained by model's inability to account for increases in recruitment? This would only occur when the index is trending more strongly upwards than the model predictions.
5. Do sensitivity analysis indicate the results are robust to uncertain model assumptions?
6. In comparison to catch-only assessments (SSS and DB-SRA), does the addition of index data update the prior distributions in a sensible way, rather than giving strongly divergent results?
7. Is the updating of the distribution of key parameters from prior to posterior reasonable given the likely information content of the indices? For example, a posterior distribution of B_{MSY}/B_0 that is very different than the prior distribution could be a concern because the data are not likely to be very informative about this quantity.
8. Are the estimates of catchability for survey indices within reasonable limits ($0.1 < q < 3$) for assessments that use survey indices?
9. In cases where a previous assessment has been accepted for the stock, are results reasonably consistent with the previous assessment?

Future assessments of arrowtooth should explore whether the reported WA historical catches include catches from British Columbia and Canada and should exclude such catches if the current WA catch series includes catches from outside of the US west coast.

Model selection for predicting discard should be based on AICC and not AIC because of small sample sizes. Application of AICC will lead to selection of a simpler model than that included in the assessment. In addition, it is necessary to provide fit diagnostics (observed versus predicted values; deviance tables) to enable the predictive skill of the model to be evaluated.

The selection between splitting the triennial survey into two indices or creating a single triennial survey index should be based (inter alia) on whether densities change across the deepest strata. In the case of arrowtooth flounder, the highest densities occur at 366m and densities decline with increasing depth. In contrast, mean weight increases with increasing depth. Both of these observations imply that the assumption that the triennial survey data pre- and post-1995 can be combined is questionable for arrowtooth flounder. Consequently, the SSC prefers scenario 8 over the base-case scenario.

The choice between splitting or not splitting the triennial survey should be based on a multispecies analysis of the available data.

The geo-statistical delta-GLMM model was based on default assumptions. However, for completeness, the assessment report should include full details of how the model was applied.

If a Bayesian analysis is to be conducted for arrowtooth flounder it should be based on a prior for stock status (2006 depletion) based on the 2007 assessment and update the priors using data not included in the 2007 assessment (i.e. the NWFSC shelf-slope survey index). This is scenario 14 in the draft assessment report. In addition, the SSC would like to see a straightforward application of XSSS that is completely uncoupled from the 2007 assessment, with the standard depletion prior of 0.4, and the standard selectivity assumption that selectivity equals maturity.

There is marked difference between the prior for depletion and the posterior for this quantity from the Bayesian analysis. This is likely a consequence of the shape of the joint posterior surface. The SSC encourages more work to identify when Bayesian methods will lead to updating of the prior for depletion and R_0 when this is unexpected as this will help future analysts applying data-moderate assessment methods.

The SSC should reconsider whether MLE-based assessments can form the basis for data-moderate assessments rather than Bayesian methods.

Canary rockfish: Recent recreational size composition data in California show a shift to smaller sizes which the assessment model is unable to fit. Shifts in size composition are likely to be due of management restrictions on the depths and areas open for recreational fishing. In future canary rockfish assessments, models with shifts in recreational fishery selectivity should be considered. Under the stock assessment TOR, changes in selectivity can be considered for assessment updates as well for full assessments.

Size compositions for discard should have been compared to retained size compositions to justify the decision not to model discard separately.

In evaluating models with spatial structure, the STAT should look at the correlations in the residuals of recruitment and other annually-changing parameters across areas.

It is unclear whether it is better to do separate spatial analyses of survey data by area, or to do combined area analysis and then to extract indices for each area. Future assessment should compare these methods and evaluate assessment impacts.

Darkblotched rockfish: Do likelihood profiles on R_0 with and without the 2014 NWFSC survey composition age data to evaluate why the model scale is so sensitive to these data. Likelihood components should be kept separate as much as possible in the plots and tables, rather than lumping age and length composition likelihoods together.

Stock Synthesis: Ballpark F has been used in previous versions of SS3 to stabilize estimation in

early phases, but was not included in the final phase of estimation. However, in the current versions of SS3, including v3.24u, ballpark F is not turned off in the final phase and thus affects the final fit and likelihood of the model. This appears to be a newly introduced bug in SS3. Therefore, ballpark F should be turned off in assessments using the current versions of SS3 (by setting the associated year to a negative value).

Terms of Reference: For future reference, revisions to the terms of reference should include that STAT's should supply both R4SS summary outputs (pdf files) and SS3 (or relevant) report files for updates to facilitate review.

For terms of reference more generally, one additional suggestion is to include the equilibrium relative abundance reference points in each row of the decision table associated with each run (to facilitate an understanding of when and why relative spawning biomass is or is not converging to the expected value under respective control rules).

Provide a table that lists all changes to data input and model changes, why the change was made, etc. A set of future should also be provided. An example of what is expected should be included in the TOR. "Good" species specific examples could be identified, for both updates and full assessments.

A recommendation should be added to the TOR that STATs should contact past STATs whenever the procedures and assumptions in old stock assessments are unclear. This could be important in documenting changes from previous assessments to the current assessment or update.

10. Rebuilding Revision Rules

Scientists at the Northwest Fisheries Science Center (NWFSC) and the University of Washington (UW) have been working on a management strategy evaluation (MSE) to compare different strategies to rebuild overfished groundfish stocks. This research evaluates how to monitor progress towards achieving rebuilding goals and how often (if at all) to adjust the parameters of the rebuilding plans as new information and stock assessments become available (rebuilding revision rules). Ms. Chantel Wetzel (NWFSC and UW) presented initial results of an MSE she had been conducting with Dr. André Punt (UW) at the April 2015 meeting of the Scientific and Statistical Committee (SSC). The report "Evaluating alternative rebuilding strategies to meet management goals for rebuilding overfished U.S. West Coast groundfish stocks" (Agenda Item D.10, Attachment 1) presents revised results from the MSE, which is structured to compare strategies across different groundfish life history types, ranging from a productive flatfish species to a much less productive rockfish species. The MSE is designed to evaluate performance with respect to the following management objectives:

1. Rebuilding revision rules are robust to statistical uncertainty.
2. The stock is rebuilt quickly while taking into account socioeconomic impacts.
3. Changes in harvest rates are limited during rebuilding (predictability).

Although the MSE does not include any direct analysis of socioeconomic impacts, many of these impacts are indirect because stocks being rebuilt constrain opportunities to harvest healthy stocks. Results from the MSE can be used in subsequent analyses to quantify socioeconomic impacts.

The SSC reviewed the revised MSE report, endorses the structure of the MSE, and supports its use for informing a Council decision on revisions to groundfish rebuilding rules.

The SSC suggests the MSE would benefit from the following additional options:

- An alternative rule that maintains a constant probability of 50% for rebuilding by the target year (or other fixed probability greater than 50%). Such an option is likely to have poorer performance due to its tendency to follow assessment noise.
- An alternative rule (Alternative 2b) that sets the initial probability to 75% for rebuilding by the target year (or any other value higher than 60%).
- An alternative rule implementing a mid-course correction at halfway to the target year for rebuilding.
- An alternative rule that decouples the timing for stock assessments and revising rebuilding plans. One possibility for stocks with long rebuilding times (e.g., greater than 10 years) is a fixed, but infrequent, schedule for application of the rebuilding revision rules (an example is 16 years or halfway to the target year for rebuilding, whichever is smaller) along with more frequent assessments. The SSC identified this alternative in April; however, the analysts did not have time to complete the work.

The revisions to the National Standard 1 (NS1) guidelines include an option of setting the maximum time to rebuild (T_{MAX}) as two times the minimum time to rebuild (T_{MIN}), rather than what is currently $T_{MIN} +$ one mean generation time. Exploring the relative performance of the rebuilding strategies when $T_{MAX} = 2 * T_{MIN}$ would require major changes to the MSE code and is not feasible at this time. However, the SSC suggests that the MSE software report the estimates of $2 * T_{MIN}$ and ($T_{MIN} +$ one mean generation) when T_{MAX} is first estimated so that these different rebuilding timelines can be compared.

Lastly, the SSC recommends that the Council consider the use of different revision rules for different taxa. The rules for adjusting the rebuilding of flatfish stocks do not need to be the same as the rules for rockfish stocks.

SSC notes:

The following additional performance metrics were suggested by Andre:

- *the fraction of simulations in which a future assessment incorrectly estimates that a stock that was overfished never dropped below the minimum stock size threshold.*
- *the fraction of simulations in which a future assessment incorrectly estimates that a stock has rebuilt when it has not yet rebuilt.*
- *the fraction of simulations in which a future assessment fails to estimate that a stock has rebuilt when it has rebuilt.*

The SSC needs to be ready to provide more guidance in September regarding how to interpret the MSE results.

G. Coastal Pelagic Species Management

4. Litigation Settlement Discussion

The Scientific and Statistical Committee (SSC) discussed plans for the upcoming August workshop to examine the Pacific sardine harvest control rule DISTRIBUTION parameter, and potential alternative means of accounting for the portion of the northern sub-population that is subject to harvest outside U.S. waters. The discussion focused on 1) the roles of workshop participants, and 2) a workshop process that is likely to succeed in developing an objective report of scientific knowledge on this topic for use by the Council for decision-making. To facilitate achieving the workshop's ambitious set of objectives, the SSC recommends that an additional half-day be added to the workshop agenda.

In planning the workshop, it will be useful to categorize workshop participants as either: 1) Analysts/Advisors, or 2) Reviewers. The Analyst/Advisor participants will consist of both: 1) individuals who will produce work products and give presentations (Analysts), and 2) other persons who have useful knowledge to help inform the discussions (Advisors). The Reviewers will consist of individuals charged with the task of synthesizing the information provided to the workshop, developing recommendations/findings, and writing the workshop report. Additionally, the SSC recommends adding persons with knowledge of the stocks in Canada and Mexico to the list of participants. A draft list of prospective participants is provided below:

Tentative Workshop Reviewers

André Punt (Workshop Chair)
Tom Jagielo, Owen Hamel (SSC representatives)
Alec MacCall (Sardine Expert, NMFS Retired)
Geostatistician: TBD
Conservation scientist: TBD

Tentative: (Analysts/Advisors)

Coastal Pelagic Species (CPS) Management Team representative: TBD
CPS Advisory Subpanel representative: TBD
Diane Pleschner-Steele
Geoff Shester
Richard Parrish, (Original CPS Fishery Management Plan Amendment 8 analysts)
Council Member: TBD
Kevin Hill and Paul Crone (Assessment Biologists, Southwest Fisheries Science Center)
David Demer and Juan Zwolinski (Southwest Fisheries Science Center Acoustic trawl method survey data analysts)
Canadian and Mexican fisheries representatives

The SSC recommends that a scientist familiar with geo-statistics be included in the workshop as a Reviewer, and notes that Dr. Cleridy Lennert-Cody (IATTC) has the skills needed to review

the geo-statistical aspects of the analyses. The list of Workshop Reviewers also includes a conservation scientist. To improve the likelihood of workshop success, the conservation scientist Reviewer should not be an advocate for any particular method. The SSC suggests that nominations for potential conservation scientists should be submitted to the Chair of the workshop, along with their CVs. The Chair, in conjunction with the Chair and Vice-Chair of the SSC, will then select the review panel member.

The SSC recognizes that considerable work will need to be undertaken prior to the workshop for it to be a success, and notes that the Southwest Fisheries Science Center (SWFSC) has the expertise to provide analytical support related to methods 1-5 in the draft Terms of Reference (Agenda Item G.4, Attachment 4). The SSC recommends that the proposed Chair of the workshop develop, in conjunction with SWFSC, a work plan for the analysts and an agenda in conjunction with Council Staff soon after the present Council meeting to ensure that documents are available for discussion at the workshop.

The SSC also discussed method 2 (i.e., using landings from Canada and Mexico), and how it related to the recommendation made in G.4.b, Supplemental Public Comment recognizing both of these are similar in nature, and could be discussed together. The SSC notes that the definition of DISTRIBUTION in the fisheries management plan is “*the average portion of biomass assumed to be in U.S. waters.*”

2. Pacific Mackerel Assessment and Management Measures

Dr. Paul Crone from the Southwest Fisheries Science Center (SWFSC) presented the results of the Pacific mackerel stock assessment, and Dr. André Punt of the Scientific and Statistical Committee (SSC) presented a report on the Pacific mackerel Stock Assessment Review (STAR) Panel that convened at the SWFSC in La Jolla, CA on April 27-29, 2015.

The Stock Assessment Team’s (STAT’s) preferred assessment model is a modification of the Stock Synthesis model used in the previous full assessment in 2011. It includes commercial fishery age composition data as well as abundance indices and length compositions developed from Commercial Passenger Fishing Vessel (CPFV) logbooks. The California Recreational Fishery Survey (CRFS) CPUE index, which had been used in the 2011 assessment, was removed from the current assessment model. The Acoustic-Trawl (AT) survey indices and length composition data were included in some model runs, but were not included in the STAT’s preferred model. The current model shows a strong positive retrospective pattern, as was true to a lesser extent in the 2011 model, and which is indicative of model misspecification.

In contrast to the recent assessment updates for this species, current and future recruitment is projected directly from the stock-recruitment curve instead of using an average of recent years’ recruitment deviations, since recent recruitments have not been consistently above or below the stock-recruit curve. The biomass at the start of the 2016 fishing year is projected by assuming catch during the 2015 fishing year will equal the harvest guideline (HG) rather than forecast from the previous year’s catch, due to the expectation of higher mackerel harvest given the closure of the directed sardine fishery for the 2015 fishing year.

The STAR Panel did not endorse any of the models explored as being adequately defensible in terms of both fitting the data and providing reasonable parameter and stock size estimates. While recognizing the substantial issues that remain in determining the scale of the stock, the SSC

endorses the STAT-preferred assessment model as the best available scientific information for management of Pacific mackerel. The SSC further endorses the overfishing limits (OFLs) of 25,291 mt for 2015-16 and 24,983 mt for 2016-17. The 2016-17 OFL should be recalculated if the acceptable biological catch (ABC) for 2015-16 is less than the HG for that year. ABC alternatives should be based upon the category 2 sigma of 0.72 in the assessment for the upcoming two fishing seasons, rather than the category 1 sigma used following the 2011 assessment. The new category designation is due to the uncertainty in stock levels demonstrated by the retrospective pattern. The ABC alternatives depend on the Council's risk policy as reflected in the choice of P*.

There remain several critical data and research needs for this stock. Both the SSC and the STAT emphasize the importance of a fishery-independent survey, preferably as part of a multi-species coastal pelagic survey. As was noted by the SSC in 2011 (Agenda Item G.2.c, Supplemental SSC Report, June 2011), the AT survey is potentially well-suited to provide an index; however, it would need to be expanded to encompass Mexican waters, and ideally Canadian waters as well, to be useful for Pacific mackerel assessment. In addition to the current AT survey design being not ideal for Pacific mackerel, the associated trawling strategy is ineffective at catching Pacific mackerel. This results in small sample sizes to estimate size compositions as well as high uncertainty in the species composition observed in the acoustic portion of the AT survey.

SSC notes:

The FMSY value used for Pacific mackerel has not been recently updated and appears to be based at least partly on qualitative considerations. The SSC recommends that FMSY be reevaluated using more current information and analytical approaches.

The AT survey could be included by taking the highest point (with CV) and include that as a single absolute biomass index.

Information on the size and age of mackerel caught off Oregon and Washington would be helpful.

Empirical weight at age may be useful for this stock. How well IS mean weight-at-age estimated?

E. Highly Migratory Species Management

2. Final Approval of Resubmitted Exempted Fishing Permit (EFP) Application

The Scientific and Statistical Committee (SSC) reviewed the revised exempted fishing permit proposal (Agenda Item E.2, Attachment 1) for the drift gillnet swordfish fishery, submitted by the Alliance of Communities for Sustainable Fisheries (ACSF). At its March 2015 meeting, the SSC reviewed an earlier version of the ACSF proposal. This pilot study will provide useful information on catch rates for swordfish using the experimental gear. It is not designed to measure bycatch rates of protected or non-target species; however, bycatch information will be collected and this may identify fishing practices with high bycatch rates. The SSC notes that the proponents propose to evaluate several gear modifications such that "Each proposed gear modification will be tested separately on different sets so that the effects of different methods can be identified." While this approach may detect differences among the gear modifications in swordfish catch rates, the

proposed study will not conduct enough sets to detect differences among the gear modifications in their interactions with species with low bycatch rates. However, the pilot project has the potential to identify economically viable gear that could be used to quantify bycatch rates in a future, more comprehensive study.

3. Swordfish Management and Monitoring Plan Hardcaps

Dr. Stephen Stohs (SWFSC) presented the results of the “Ecological Applications” manuscript (Martin et al. 2015) that evaluated an alternative Bayesian method to estimate bycatch rates for rare event bycatch species. The manuscript presents a model-based approach to better characterize bycatch rates inferred from observed bycatch counts, as well as to predict unobserved bycatch counts or rates for unobserved fishing effort. The SSC concludes that the approach developed here is an improvement over existing ratio estimators, particularly in the face of less than 100% observer coverage in this fishery. However, the SSC highlighted two concerns regarding specific elements of the modeling: 1) the inability to address potential behavioral changes of fishermen in response to observer coverage (also recognized to be a concern with the existing method); and 2) the potential to underestimate uncertainty for species that occur in aggregations (as the current model assumes that encounters are independent events).

With respect to the question of an appropriate level of observer coverage in this fishery, the SSC notes that the Bayesian framework could be used to conduct an analysis evaluating observer coverage. However, that analysis will require information on bycatch rates and fisheries effort, total bycatch limits (hard caps), and acceptable threshold probabilities of exceeding those limits.

SSC Notes:

Current methods based on single season samples suffer from a high degree of both process and observation error.

Although the methods do not address non-independence of samples as currently implemented, the framework could be modified to address this issue.

D. Groundfish Management, continued

7. Inseason Adjustments

In April 2015, the Groundfish Management Team (GMT) requested that the Scientific and Statistical Committee (SSC) review whether the available data supports the application of a revised discard mortality rate for big skate (Agenda Item E.8.a, GMT Report 2, April 2015). The GMT suggested using a 50% discard mortality rate (instead of the current 100% discard mortality rate) for big skate caught as bycatch with trawl gear.

Per the recommendation of the SSC, Dr. Melissa Monk presented the results of a literature review by the GMT on skate discard mortality from trawl gear studies (Agenda Item D.7.a, GMT Report). The SSC endorses the use of a 50% discard mortality rate for big skate caught as bycatch with trawl gear. Additionally, the SSC commends Colby Brady, Lynn Mattes, and Melissa Monk for their work on this issue.

SSC Notes:

- *Winter skate, small-eyed skate most similar in depth distribution*
- *Rates in the reviewed studies ranged from 19-50 percent, not accounting for post-discard mortality*
- *Depth distribution is a proxy for tow duration*
- *Canada uses 50% in their stock assessments*
- *All studies in the review were based on observations with trawl gear*

F. Council Administrative Matters

1. Legislative Committee

The Scientific and Statistical Committee (SSC) discussed the current House and Senate Magnuson-Stevens Act (MSA) Reauthorization bills (HR 1355, Don Young, AK and S 1403, Marco Rubio, FL; respectively). Ms. Jennifer Gilden was available to answer questions. The Council has already commented on HR 1355, so the SSC limited its discussion to S 1403.

The Transparency clause in the S 1403 bill would require that all SSC meetings be recorded and made publicly available within 30 days of the meeting. The SSC is concerned that this may stifle scientific debate, affect how the meetings are run, and deter participation at these meetings which are already open to the public.

The Data Collection and Use clause in S 1403 will require stock assessments for all stocks under a fishery management plan (FMP). However, S 1403 does not define what constitutes a stock assessment. The SSC assumes the data-poor stock assessment methodologies currently in use (e.g., DCAC, DB-SRA) would satisfy this requirement. Additionally, the SSC assumes the survey-based assessment methodologies for coastal pelagic species monitored stocks would satisfy this requirement. If both of these assumptions are true, then the Council is close to satisfying the requirement for having assessments for all stocks under an FMP. If the SSC's assumptions are incorrect, then it is unlikely with current resources and data availability that this requirement can be satisfied. The bill needs to give clear guidance as to what would qualify as a stock assessment.

SSC notes:

The Data Collection and Use clause in S 1403 requires, "The Secretary and SSCs shall develop a report on facilitating greater incorporation of data, analysis, stock assessments and surveys from nongovernmental sources (fishermen, fishing communities, universities, etc.) into fisheries management decisions." As a review body, the SSC should not dictate a priori what information is appropriate, and processes are already in place for nongovernmental sources to contribute information. Producing such a report would require a great deal of effort, staff, and funding.

The MSA Reauthorization bills currently preserve the status quo process for gaining access to confidential fishery data. However, HR 1355 does prevent observer data from being used for coastal and marine spatial planning unless the Secretary determines it constitutes essential information. S 1403 does not contain such a provision.

A. SSC Administrative Matters, continued

9. Fishery-Specific Habitat Objectives

SSC Notes:

The SSC received a presentation from Matt Yergey (PSMFC) regarding the document “Fishery Specific Habitat Objectives – West Coast Pilot Report (May 19, 2015) by Korie Schaeffer, et al.

The authors selected a set of species to focus on: four groundfish species and one salmon species, having a range of associations with coastal habitats. They followed with risk assessments (probability and magnitude of potential loss) for the chosen fish species. They calculate relative risk scores, based upon qualitative scorings of “exposure-habitat vulnerability” and “sensitivity”. Because exposure is generally more subject to management control than sensitivity (largely a function of species' intrinsic biology), exposure-habitat vulnerability scores weighed more heavily (qualitatively) into prioritization.

The SSC noted that the two-dimensional metrics used here are not ideal as the “sensitivity” score mixes actual (or perceived) sensitivity of a species to a stressor and the intrinsic productivity and resilience of a species in a single metric. An alternative three dimensional version has the “sensitivity” metric limited to actual sensitivity and resilience to the stressor, and combines the “exposure” and “sensitivity” metrics to produce a susceptibility score to be used, analogous to the PSA, with the independent productivity score.

The SSC expressed preference for a more readily interpretable and consistent metric. The SSC noted that although scores are “qualitative”, each stressor/stage is nevertheless scored a 1, 2, or 3 such that implicitly the analysts are assuming that a medium stressor is twice as strong as a weak stressor while a strong stressor is 50% stronger than a medium stressor. Additionally, risk scores are not readily comparable among species.

The maximum exposure across space is scaled to 1, so the absolute exposure level is removed from the metric, nor does it appear that the sensitivity metrics are related to this maximum exposure value or an average exposure value, so the resulting metrics do not appropriately show the relative impacts of different stressors. This issue is not a new one, but is an important one nonetheless.

Stressor scores were evaluated at each life stage, and then the composite scores for each life stage were used to create a weighted average based on adult equivalent scores derived from stage-specific survival estimates. The SSC suggested explicit consideration of lifetime reproductive output as well.

The analysts asked the SSC for advice on whether there are other species to focus on, other measures of risk, other geographic regions, and other stressor data sets that they could use. The analysts acknowledged significant shortcomings with the dataset used for the draft analysis and put little faith in rankings derived from it.

The SSC suggested an additional dataset: Miller RR, Field JC, Santora JA, Schroeder ID, Huff DD, et al. (2014) A Spatially Distinct History of the Development of California Groundfish Fisheries. PLOS ONE 9(6): e99758. doi:10.1371/journal.pone.0099758.

From the Hamel et al. version in the IEA:

Productivity Axis

Productivity *P* for each species was taken from Cope et al. (2011), which used a weighted average of 10 criteria (The intrinsic rate of population growth, *r*; maximum age; maximum size; the von Bertalanffy growth coefficient *k*; natural mortality rate *M*; fecundity; a metric of breeding strategy; a metric of temporal recruitment variability; age at maturity; and mean trophic level). Each criterion was designated 1, 2, or 3 (Table GFR7). Naturally, values for *P* varied only across species, not across life history stages within each species.

Eventually, the productivity axis could be expanded to reflect resilience to the particular threat including productivity and other factors specific to the particular threat being considered

Susceptibility Axis

Susceptibility is calculated as the product of Exposure and Sensitivity. This is similar to the concept from Patrick et al. (2009; 2010) for fisheries susceptibility. In that case exposure can be thought of as the areal overlap of fishing and habitat along with the intensity of fishing, and sensitivity can be thought of as catchability and selectivity of the fisheries for that species, along with habitat impacts, etc. Here we have instead the areal overlap of the threat and the habitat for that species/stage, along with the intensity of the threat for exposure, while the sensitivity of the species/stage to the threat represents direct and indirect impacts to that species/stage.

SSC Subcommittee Assignments, June 2015

Salmon	Groundfish	Coastal Pelagic Species	Highly Migratory Species	Economics	Ecosystem-Based Management
Pete Lawson	David Sampson	André Punt	Kevin Piner	Todd Lee	Martin Dorn
Alan Byrne	Andrew Cooper	Alan Byrne	Andrew Cooper	Dan Huppert	John Field
Owen Hamel	Martin Dorn	Owen Hamel	John Field	André Punt	Pete Lawson
Galen Johnson	John Field	Dan Huppert	André Punt	David Sampson	Galen Johnson
Meisha Key	Owen Hamel	Tom Jagielo	David Sampson	Cameron Speir	Todd Lee
Will Satterthwaite	Tom Jagielo	Meisha Key			Kevin Piner
Cameron Speir	Meisha Key	Will Satterthwaite			André Punt
	André Punt				Will Satterthwaite
	Tien-Shui Tsou				Tien-Shui Tsou

Bold denotes Subcommittee Chairperson

PFMC
08/25/15

DRAFT Tentative Council and SSC Meeting Dates for 2015

Council Meeting Dates	Location	Likely SSC Mtg Dates	Major Topics
<p>March 7-12, 2015 Advisory Bodies may begin Fri, March 6 Council Session begins Sat, March 7</p>	<p>Hilton Vancouver Washington 301 W. Sixth Street Vancouver, WA 98660 USA Phone: 360-993-4500</p>	<p>One-day CPS Subcm Session Thu, March 5 Two-day SSC Session Fri, March 6 – Sun, March 7</p>	<p>IEA annual report Final CPS EFP Pacific mackerel set-aside Final CPS methodology review Salmon review/Pre I CA current & IEA reports Unmanaged forage fish FPA</p>
<p>April 11-16, 2015 Advisory Bodies may begin Fri, Apr 10 Council Session begins Sat, Apr 11</p>	<p>DoubleTree by Hilton Sonoma One Doubletree Drive Rohnert Park, CA 94928 Telephone: 707-584-5466</p>	<p>Two-day SSC Session Fri, April 10 – Sat, April 11</p>	<p>Pacific sardine assess. Groundfish methodology review COP – final Salmon methodology topic selection NS1 guidelines comments</p>
<p>June 10-17, 2015 Advisory Bodies may begin Thu, June 11 Council Session begins Fri, June 12</p>	<p>DoubleTree by Hilton Spokane City Center 322 N. Spokane Falls Court Spokane, WA 99201 Phone: 509-455-9600</p>	<p>One-day GF Subcm Session Wed, June 10 Two-day SSC Session Thu, June 11 – Fri, June 12 One-day GF/Econ Subcms Session Sat, June 13</p>	<p>Mackerel assess. & mgt. measures Anchovy update Groundfish stock assess. Groundfish spex process and schedule Rebuilding Revision Rules</p>
<p>September 9-16, 2015 Advisory Bodies may begin Thu, Sept 10 Council Session begins Fri, Sept 11</p>	<p>DoubleTree by Hilton Hotel Sacramento 2001 Point West Way Sacramento, CA 95815 Phone: 916-929-8855</p>	<p>One-day Ecosystem Subcm Session Wed, Sept 9 Two-day SSC Session Thu, Sept 10 – Fri Sept 11</p>	<p>Plan science improvements Salmon methodology topic priorities Tule control rule review Groundfish stock assess. Groundfish EFH amendment</p>
<p>November 14-19, 2015 Advisory Bodies may begin Fri, Nov 13 Council Session begins Sat, Nov 14</p>	<p>Hyatt Regency Orange County 11999 Harbor Blvd. Garden Grove, CA 92840 Phone: 714-750-1234</p>	<p>Two-day SSC Session Fri, Nov 13 – Sat, Nov 14</p>	<p>CPS methodology topic selection Groundfish stock assess, and reb. anal. Groundfish biennial spex Salmon methodology review</p>

SSC meeting dates and durations are tentative and are subject to change in response to Council meeting dates, agendas, workload, etc.

Proposed Workshops and SSC Subcommittee Meetings for 2015

Tentative – Depended on funding, dates subject to change

Prep. Work Underway, Scheduled to Occur;
 Status of Supporting Analyses Uncertain, Remains a Priority;
 Setbacks exist, Questionable;
 Funding or Prep. Not Avail, likely to be canceled or postponed

Workshop/Meeting		Potential Dates	Sponsor/ Tentative Location	SSC Reps.	Additional Reviewers	AB Reps.	Council Staff
1	National SSC Meeting	Feb. 23 - 25	WPFMC/ Honolulu	Key, Dorn, Hamel, Satterthwaite	TBD	NA	DeVore
2	Pacific Sardine Update Review	Mar. 6	Council/ Vancouver, WA	CPS Subcommittee	None	CPSMT CPSAS	Griffin
3	Nearshore Assessments Workshop	Mar. 31 – Apr. 2	Council/ Portland	Sampson, Cooper, Key, Dorn	None	GMT GAP	DeVore
4	Canary/Darkblotched Rockfish STAR	Apr. 27 – May 1	Council/ Seattle	Jagielo	2 CIE + Ianelli	GMT GAP	DeVore
5	Pacific Mackerel STAR	Apr. 27-29	Council/ La Jolla	Punt, Jagielo	2 CIE + 1	CPSMT CPSAS	Griffin
6	Review for Sablefish, Petrale Sole, and Chilipepper Rockfish Updates; Arrowtooth Data- Moderate Assessment, and Catch Reports	June 10	Council/ Spokane	GF Subcommittee	None	GMT GAP	DeVore
7	Review Trawl IFQ Model	June 13	Council/ Spokane	GF & Econ Subcommittees	None	GMT GAP	DeVore
8	Bocaccio/China STAR	July 6-10	Council/ Santa Cruz	Dorn	2 CIE + 1	GMT GAP	DeVore

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	Workshop/Meeting	Potential Dates	Sponsor/ Tentative Location	SSC Reps.	Additional Reviewers	AB Reps.	Council Staff
9	Black RF STAR	July 20-24	Council/ Newport, OR	Cooper	2 CIE + 1	GMT GAP	DeVore
10	Kelp Greenling/Widow STAR	July 27-31	Council/ Newport, OR	Sampson	2 CIE + 1	GMT GAP	DeVore
11	Pacific Sardine Distribution Workshop	Aug. 17-18	Council/ La Jolla	CPS Subcommittee	None	CPSMT CPSAS	Griffin
12	Mop-up STAR	Sept. 28 – Oct. 2	Council/ TBD	GF Subcommittee	TBD	GMT GAP	DeVore
13	Salmon Methodology Review	Late Oct.?	Council/ Portland	Salmon Subcommittee	None	STT SAS MEW	Burner
14	Data-Weighting Workshop	Oct. 19-23	CAPAM/ La Jolla	TBD	TBD	NA	DeVore?
15	Methods for Data Reweighting Workshop	TBD	NWFSC/ Council	GF & CPS Subcommittees	TBD	GMT GAP	DeVore
16	Reference Points (Bzero) Workshop II	TBD	TBD	GF Subcommittee	CIE/External 1-3:	GMT GAP	DeVore

Proposed Workshops and SSC Subcommittee Meetings for 2015

Tentative – Depended on funding, dates subject to change

☐ Prep. Work Underway, Scheduled to Occur; ☐ Status of Supporting Analyses Uncertain, Remains a Priority;

▨ Setbacks exist, Questionable; ■ Funding or Prep. Not Avail, likely to be canceled or postponed

	Workshop/Meeting	Potential Dates	Sponsor/ Tentative Location	SSC Reps.	Additional Reviewers	AB Reps.	Council Staff
17	Evaluation of Stock Productivity Methodological Approaches	Spring 2016?	TBD	GF Subcommittee	TBD	GMT GAP	DeVore
18	Groundfish Historical Catch Reconstructions	Summer 2016?	TBD	GF Subcommittee	TBD	GMT GAP	DeVore
19	Transboundary Groundfish Stocks	?	Council	2 TBD?	?	GMT GAP	DeVore