

DRAFT SUMMARY MINUTES
Scientific and Statistical Committee

Pacific Fishery Management Council
Hilton Orange County/Costa Mesa Hotel
Emerald Bay 2 Room
3050 Bristol Street
Costa Mesa, California 92626
Telephone: 714-540-7000

November 13-14, 2014

Members in Attendance

Mr. Alan Byrne, Idaho Department of Fish and Game, Boise, ID
Dr. Martin Dorn, National Marine Fisheries Service, Seattle, WA
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. Peter Lawson, National Marine Fisheries Service, Newport, OR
Dr. Todd Lee, National Marine Fisheries Service, Seattle, WA
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
Ms. Cindy Thomson, National Marine Fisheries Service, Santa Cruz, CA
Dr. Tien-Shui Tsou, Washington Department of Fish and Wildlife, Olympia, WA

Members Absent

Dr. Andrew Cooper, Simon Fraser University, Vancouver, B.C.

SSC Recusals for the November 2014 Meeting		
SSC Member	Issue	Reason
Dr. Todd Lee	F.2 Salmon Methodology Review	Dr. Lee contributed to the development of the IO-PAC model and therefore recused himself from the discussion regarding recommended changes to the IO-PAC model.
	J.5 Economic Data Collection Program Report on Fishery Status and Overview on Social Science Research	Dr. Lee contributed to the development of the Economic Data Collection Program reports.
Dr. Galen Johnson	F.2 Salmon Methodology Review	Dr. Johnson contributed to the

A. Call to Order and Scientific and Statistical Committee (SSC) Administrative Matters

Chair Meisha Key called the meeting to order. Dr. McIsaac addressed the SSC and reviewed the agenda to identify SSC tasks.

Dr. Satterthwaite volunteered to serve on the CPS Subcommittee.

Dr. Sampson briefed the committee on yesterday’s Groundfish Subcommittee meeting regarding methodology reviews for upcoming groundfish stock assessments. The SSC elected not to convene a webinar to come up with final methodology recommendations. Dr. Sampson will finalize the report of the Salmon Subcommittee and send it to the entire committee soon. If there are any great concerns regarding the subcommittee recommendations, then a webinar will be scheduled. Formal SSC discussion and potential blessing of subcommittee recommendations will be scheduled for the March meeting.

Dr. Dorn is organizing the upcoming December SSC Ecosystem Subcommittee meeting to review the IEA report. A draft agenda has been circulated for comment and the meeting has been noticed.

Chair Meisha Key discussed the upcoming National SSC meeting in February. Dr. Punt is an invited speaker. Chair Key, Mr. DeVore, Dr. Dorn, Dr. Hamel, and Dr. Satterthwaite are all interested in attending if they are granted travel approval.

J. Groundfish Management

4. Groundfish Management Ongoing Rulemaking

Subsequent to the adoption of 2015 and 2016 harvest specifications for groundfish, it was discovered that the overfishing limits (OFLs) for yellowtail rockfish north of 40⁰10’ N lat., sharpchin rockfish, rex sole, and English sole were mis-specified. To correct this error, the SSC recommends using the values calculated as medians of the posterior distribution, as given in Agenda Item J4.a, Attachment 2, Table 1.

SSC Notes:

A deadline should be established for the delivery of final stock assessment drafts, perhaps by the end of January following the assessment year.

In the future, the SSCs groundfish subcommittee chair will coordinate an additional final check of the recommended OFLs to verify that they have been properly calculated and reported.

6. Methodology Review Process Council Operating Procedure

The Scientific and Statistical Committee (SSC) reviewed the draft Council Operating Procedure (COP) 25 for Methodology Reviews for groundfish (Agenda item J.6.a, Attachment 1). The draft COP describes a process to begin in September and November during even years (2016, 2018 ...) to review methods associated with deciding new groundfish harvest specifications and would conclude in September of odd years. The SSC recommends that a separate review process be established in the COP with a different timetable for methods used in stock assessments. This process would begin in September of odd years (2015, 2017 ...). The reviews would be scheduled during even years and would need to be completed at least by March of odd years so methods would be available for use in stock assessment.

In planning methodology reviews, the SSC will consider what type of review is most appropriate. Reviews can range from reviews by the SSC, reviews by the SSC groundfish and economics subcommittees, and finally to formal reviews conducted under the Terms of Reference (TOR) for methodology reviews where a panel of Center for Independent Experts (CIE) reviewers, outside experts, and SSC members conduct the review. Review with involvement of external reviewers is appropriate for methods that could have a strong impact on Council-managed fisheries or requires particular knowledge to evaluate new methodologies. It is the responsibility of the SSC to recommend to the Council the type of review that is needed.

The last paragraph of the draft COP should clarify that the SSC is responsible for determining whether the methodology is acceptable for use in stock assessments and in analysis of harvest specifications, and then forwarding its recommendations to the Council.

SSC Notes:

Recently published guidance on National standard 2 should be consulted for a description of the factors that need to be taken into account when deciding on the type of review to be conducted.

For reviews of methodologies used in harvest projections and their analysis, there should be a more explicit process to solicit information on known, planned, and/or proposed changes to models and data collection. The solicitation process could be initiated by Council staff by sending out a timely email.

F. Salmon Management

2. Salmon Methodology Review

The Scientific and Statistical Committee (SSC) discussed the topics reviewed at a joint meeting of the Salmon Subcommittee of the Scientific and Statistical Committee, Salmon Technical Team (STT), and the Model Evaluation Workgroup (MEW) in Portland, Oregon on October 21-23, 2014. At that meeting proposed changes to salmon methodologies were reviewed for use in 2015 management.

Status Determination Criteria for Willapa Bay Natural Coho

Dr. Robert Kope (STT) gave a presentation on status determination criteria (SDC) for Willapa Bay natural coho (Agenda Item F.2.a. Attachment 1).

F_{MSY} and S_{MSY} were estimated based on a Ricker stock-recruit function fit to log-transformed data on recruits per spawner from 1996-2012, with appropriate back transformation. Spawner counts included both natural- and hatchery-origin fish, and recruits were reconstructed from spawners using run reconstruction based on terminal catch data and pre-terminal ocean exploitation rates of unmarked fish calculated using the fishery regulation assessment model (FRAM). The analyses are appropriate and the data used are the best available. Therefore the SSC supports $F_{MSY}=0.74$ and $S_{MSY}=17,200$ natural-area spawners.

Development of Escapement Goals for Grays Harbor fall Chinook Using Spawner-recruit Models

Dr. Pete McHugh and Dr. Kris Ryding presented the results of their recent stock-recruitment analyses for Grays Harbor fall Chinook, which produced a biologically-based spawner escapement goal to replace the current capacity-based escapement goal (Agenda Item F.2.a. Attachment 2). Escapement, terminal run reconstruction, and ocean abundance datasets were updated for this analysis. The two major populations of Grays Harbor fall Chinook, and Chehalis and Humptulips, were analyzed separately. This river system has been successfully managed to achieve an escapement goal, so there has been a narrow range of escapements over the 20 years of data and no observations of the very high or low escapements that would help define a spawner-recruit relationship. Although there was little evidence for a link between spawners and recruits over the observed range, the recommended S_{MSY} of 13,326 ($S_{MSY} = 9,753$ for the Chehalis and 3,573 for the Humptulips) is based on the best available science.

Standardized Method to Calculate Chinook Age 2 FRAM Stock Recruit Scalars, Based Upon the Age 3 Forecasts

Mr. Andy Rankis (MEW) gave a presentation on a new method of developing age-2 abundance inputs for Chinook FRAM (Agenda Item F.2.a. Attachment 3). Ms. Angelika Hagen-Breaux (MEW), Mr. Larrie LaVoy (MEW, STT), and Dr. Pete McHugh (WDFW) were also available to answer questions.

Currently, true age-2 forecasts based on full life cycle models or information specific to the cohort that will constitute age-2 fish in the upcoming year are not made for most stocks in Chinook FRAM. Instead, age-2 inputs for Chinook FRAM are generated using different methods for different stocks, with a variety of assumptions.

Chinook FRAM has four model time steps, with time periods 1 and 4 spanning the same set of months in consecutive years, and assumes that fish “age up” between time steps 3 and 4. This means that the age 2 abundance in period 3 becomes the age 3 abundance (minus mortalities) in period 4. In Chinook FRAM's calculation of exploitation rates, fishing mortality is summed over time periods 2-4 while escapement is summed over time periods 1-3. Thus, the calculated exploitation rate is sensitive to the modeled number of age 3 fish in time step 4, which is driven not by the age-3 forecast inputs (which determines age-3 abundance at the start of time steps 1) but by the age-2 input.

The proposed method (specifically, equation 3 of F.2.a. Attachment 3) derives initial age-2 abundance in time period 1 such that it will project forward to an age-3 abundance in period 4 that matches the forecast abundance of age-3 in period 1. Using the current system of ad hoc age-2 inputs, modeled age-3 abundances in time periods 1 and 4 could be very different. In reality, age-

3 fish in time period 1 and age-3 fish in time period 4 come from different cohorts (they were born one year apart) so the two abundances need not be equal. However, cohort strength tends to be autocorrelated: on average the two values should be close.

The SSC supports using this approach to generate age-2 inputs in Chinook FRAM in 2015. Exceptions should be stocks with age-2 forecasts shown to predict better than this default method. This will increase the accuracy of FRAM exploitation rate calculations but will not provide any new information on the strength of the actual age-2 cohort in the upcoming year.

A Method for Utilizing Recent Coded Wire Tag Recovery Data to Adjust FRAM Base Period Exploitation Rates

Dr. Galen Johnson gave a presentation on a method to adjust FRAM base period exploitation rates (BPERs) using recent coded wire tag (CWT) recoveries (Agenda Item F.2.a. Attachment 4). The recent FRAM-modeled Deep South Puget Sound Fall Fingerlings (SPS FF) catch in Hood Canal is much higher than the proportion of SPS FF CWT recoveries in the Hood Canal fishery. Adjusting BPERs using estimates from recent CWT recoveries was proposed as a short term solution specifically to reduce the modeled non-local catch of SPS FF in the Hood Canal fishery, however, it was noted that any stock in FRAM could be adjusted using this method.

The SSC agreed that a problem was identified; FRAM substantially over-estimates SPS FF catch in Hood Canal. The overestimate was quantified, and a sound solution proposed. If this adjustment is implemented, the FRAM output of SPS FF catch in Hood Canal would be reduced, and likely more realistic. However, concerns were voiced by several of the FRAM modelers about changing BPERs because reducing one BPER technically requires increasing all others slightly to maintain the model calibration. The larger problem is that arriving at a set of BPERs is a delicate balancing act. After a base period has been developed we inevitably identify areas where adjustments need to be made. The SSC recommends the development of standard procedures for identifying when adjustments are necessary and how the adjustments are implemented.

An Evaluation of the Effectiveness of the Cape Flattery Control Zone Closure at Reducing Non-treaty Troll Fishery Impacts on Puget Sound Chinook

Dr. Pete McHugh (WDFW) presented a series of analyses of the effectiveness of the Cape Flattery Control Zone closure in reducing impacts of the non-treaty troll fishery on three hatchery coded-wire tagged (CWT) indicator stocks that are believed to be closely aligned with the natural-origin Hood Canal, Mid- and South Puget Sound fall fingerling type Chinook salmon (Agenda Item F.2.a. Attachment 5).

The Cape Flattery Control Zone was closed to non-treaty trollers (NT) in 1999 but remained open to the Treaty Indian troll fleet (TI).

The analyses presented used CWT recovery data to estimate and quantify the statistical significance of:

- 1) the difference in exploitation rates (ER), normalized to catch in the NT fishery before and after the closure, to test whether the NT closure coincided with a reduction in ER,
- 2) the difference in ER in the TI fishery before and after the closure, to serve as a control, testing whether ER changed between the two time periods in a fishery expected to be largely unaffected by the NT closure, and

3) the difference in the ratio between ER of the NT and TI fisheries before and after the closure, with the expectation that NT ER would be reduced relative to TI if the closure reduced impacts of the NT.

Additionally, fishing mortalities estimated from CWT recovery data were compared to those calculated by Chinook FRAM, to determine an appropriate multiplier to apply to the Chinook FRAM-calculated NT fishing mortalities, which are driven by a base period prior to the closure.

The SSC finds the analyses technically sound and an appropriate use of the available data. The analyses show that ER in the NT fishery was lower, after the closure, although the difference is of marginal statistical significance, while ER in the TI fishery was very similar before and after the closure. Similarly, the NT:TI ER ratio became lower after the closure, but again statistical significance was marginal. Taken together, these results suggest that the closure was likely effective in reducing NT ER, although the magnitude of the reduction is uncertain. In addition, the size of reduction in ER may vary among individual stocks and across years.

The analysis found that the point estimate for the ratio of CWT-derived mortality estimates to FRAM mortality calculations was 0.56 (95% confidence interval of 0.25-0.86), or a 44% reduction. The SSC agrees that this is the best available point estimate. Using a value of 0.75, which was used last year, would be a precautionary policy decision. There was no risk assessment presented.

Conservation Objective for Southern Oregon Coastal Chinook

Todd Confer and Matt Falcy (ODFW) presented Conservation Objective for Southern Oregon Coastal Chinook (Agenda item F.2.a. Attachment 6). This document is based on the “Conservation Plan for Fall Chinook Salmon in the Rogue Species Management Unit” that was adopted by the Oregon Fish and Wildlife Commission in 2013. A version of this document submitted for methodology review in 2013 was not reviewed. The present document addresses most of the major concerns from 2013.

The analysts objective was to update the current Status Determination Criteria (SDC) to measures compatible with the Salmon Fishery Management Plan (FMP) Amendment 16, and for the FMP SDCs and Oregon conservation objectives to be compatible. Rogue River fall Chinook are the escapement indicator stock for Southern Oregon Coastal Chinook (SOCC) which, in turn, are part of the Southern Oregon Northern California Chinook (SONCC) complex. Klamath fall Chinook are the ocean exploitation rate indicator stock for the SONCC. Ocean exploitation rates are not assessed for Rogue River fall Chinook.

Rogue escapements are calibrated to seine samples at one station (Huntley Park) and summer flows. Ocean exploitation rates are from Klamath fall Chinook as reported in Preseason Report I. A Ricker stock-recruitment function was fit to data from brood years 1972 through 2006. Point estimates from the analysis were: $S_{MSY} = 34,992$ and $F_{MSY} = 0.54$. Oregon chose to use the 75th percentile estimate of S_{MSY} as a conservation buffer, resulting in $S_{MSY} = 36,880$. MSST was calculated as 50% of the buffered S_{MSY} , or 18,440. Oregon also adopted an F_{MSY} of 0.78; the proxy for stocks without estimates of F_{MSY} , even though there is now an estimate (0.54) for this population.

The SSC found the point estimates to be the best available science and recommends that the Council adopt $S_{MSY} = 34,992$ and $F_{MSY} = 0.54$ for Rogue River fall Chinook. The choice of MSST is a policy decision as long as it is at least 50% of S_{MSY} .

Economic Impacts of Processing in Commercial Fisheries

The SSC Economics Subcommittee reported to the full SSC on their meeting in Spokane, Washington on September 10, 2014 where they compared the Fishery Economic Assessment Model (FEAM) and the Input-Output Model for Pacific Coast Fisheries (IO-PAC) models for analyzing economic impacts of processing in commercial salmon fisheries (subcommittee report attached). The SSC endorses the recommendations of the Economics Subcommittee.

The SSC recommends that IO-PAC apply its current dollar mark-up approach to estimate economic impacts for the 2015 Salmon SAFE. The 2015 Salmon SAFE should document the change from FEAM to IO-PAC and include a comparison of the economic impacts for the past few years using both models. The SSC supports supplementing the EDC with a salmon processor survey and shares the concern that a voluntary survey often has a low response rate.

SSC Notes:

Status Determination Criteria for Willapa Bay Natural Coho

Although the reported ratio of natural- to hatchery-origin catch in the 2005 commercial terminal fishery was somewhat surprising, and different from the ratios in the recreational terminal catch and in the escapement, this was deemed a plausible consequence of spatial and temporal patterns in the terminal fishery. FRAM calculations of pre-terminal ocean exploitation rates of unmarked fish were deemed more appropriate than attempting to estimate these rates from CWT recovery data.

When should stock-recruit models be re-visited since we get an additional data point every year? Future work should include exploration of environmental effects on recruitment and autocorrelation in recruitment.

Development of Escapement Goals for Grays Harbor fall Chinook Using Spawner-recruit Models

A bootstrapped Ricker function with multiplicative errors best described the Chehalis fall Chinook data, with an S_{MSY} value of 9,753. Humptulips fall Chinook were best described by a Ricker model, adjusted for autocorrelation, with an S_{MSY} of 3,573.

The data for this area lacked contrast, due to previous management to an escapement goal (14,600), which likely influenced the results. The scatter plots didn't show a relationship between spawners and recruits.

Standardized Method to Calculate Chinook Age 2 FRAM Stock Recruit Scalars, Based Upon the Age 3 Forecasts

Updating the age-2 input methodology will change the exploitation rates FRAM calculates, increasing ER for some stocks and decreasing ER for others. The magnitude of these differences

may reach at least 1-3 percentage points, which has substantial implications for allocation and management. However, the revised calculations are a substantial improvement over the status quo and better supported scientifically.

There are clear advantages to applying a consistent approach for all age-2 inputs, but for the few stocks which actually have age-2 forecasts based on lifecycle models, well-supported environmental drivers, and/or information on hatchery releases, it might make sense to use true age-2 forecasts as inputs for these stocks, if the performance of these age-2 forecasts has been sufficiently demonstrated.

Ks values are usually near (slightly less than) 1.0 as would be expected if there are minimal fishery-related mortalities of age-2 fish. The exceptions, two stocks from Georgia Strait (U-LwGeo S and M-LWGeo S), were subject to fisheries with small size limits and thus more substantial age-2 fishing mortality during the base period. These size limits have since been raised, so these low Ks may not be appropriate but the effects of the updated size limits should be reflected in the revised base period.

The method of calculating exploitation rates in Chinook FRAM (p 3 of document) is driven by management considerations rather than biology and thus necessitates 4 time periods spanning more than one year rather than 3 time periods spanning one year.

Practically speaking, time period 4 is mostly relevant to capturing the "credit card" fishery - pre-terminal, mixed stock, ocean fishery; primarily in Puget Sound.

ER in Chinook FRAM is not age-specific, and also is not a true exploitation rate in that it is not harvest/pre-harvest abundance but rather harvest/(harvest+escapement) [pre-harvest abundance is harvest+escapement+fish lost to natural mortality]

Because age-2 fish are included in FRAM's summed fishing mortality but not in its escapement (and time step 4 does not contribute to escapement, thus input age-2 fish do not contribute to escapement at age-3 in time step 4) increasing the number of age-2 fish input into FRAM can only increase the calculated ER.

A Method for Utilizing Recent Coded Wire Tag Recovery Data to Adjust FRAM Base Period Exploitation Rates

During the discussion that followed, two alternative methods were proposed that would achieve the goal of reducing the SPS FF catch in Hood Canal without changing base period BPERs. FRAM's code could be modified to allow time-stock-fishery-age specific scalars in addition to the current time-stock-fishery specific scalars, allowing an equivalent change in ERs. Alternately, a non-age-specific scalar could be calculated for inputting into the current code such that comparable adult-equivalent removals occurred, although age-specific exploitation rates would not much the proposed method. These methods were not reviewed by the committee. The SSC salmon subcommittee felt that a solution to this problem should be at the discretion of the FRAM modelers.

Although reducing one BPER technically requires increasing all others slightly to maintain the calibration, the practical importance of doing so is likely minimal, and this objection did not

prevent application of the Cape Flattery Control Zone closure adjustment last year, and was not raised as an objection this year by any advisory body.

An Evaluation of the Effectiveness of the Cape Flattery Control Zone Closure at Reducing Non-treaty Troll Fishery Impacts on Puget Sound Chinook

The SSC salmon subcommittee could support the use of a multiplier of 0.56 as the best available estimate. However a value of 0.75 has been used already and thus in the face of substantial uncertainty the use of 0.56 runs a risk, relative to the "status quo", of over-estimating the conservation benefit of the CFCZ closure. An alternate "precautionary" value would be 0.88, which corresponds to the highest stock/age specific estimate, made for age 4 Mid-Puget Sound. This is the stock/age with the highest recoveries and thus the most precise stock/age-specific estimate, but this estimate is less precise than the estimate of the overall mean from the mixed effects model (pre/post fixed effect, year and stock random effects).

Chinook FRAM's base period does split out the three stocks* used in this analysis whereas only a composite multiplier for all stocks combined was analyzed. Arguably, lumping stocks is appropriate in this case due to the low number of overall recoveries and the reduced precision possible for stock-specific estimates. However, the potential for one stock to have benefited less than the aggregate from the closure is a further argument to err on the side of a large multiplier so as not to overstate the conservation benefit of the closure.

* the 'Green River derivatives': (1) George Adams Hatchery (GAD) in the Skokomish Basin of Hood Canal, (2) Nisqually Hatchery (NIS) in the Nisqually Basin of 'Deep South' Puget Sound, and (3) Mid-Puget Sound I (MPS; a CWT aggregate comprising Soos Creek [majority of CWT codes/releases], Issaquah, and Grovers hatcheries). These stocks correspond to FRAM's Hood Canal, Deep South Puget Sound, and Mid-Puget Sound fall fingerling model stocks, respectively.

Other Puget Sound stocks were not considered in this analysis because they have a more northerly distribution and thus have minimal representation in PFMC-managed fisheries.

Impact is measured as expanded CWT recovered per 10K fish caught.

The issue here is similar to the Hood Canal but the solution to each problem differs. SSC discussed whether it is acceptable to have different solutions to similar problems. Would it not be better to have a standard methodology/protocols in place to deal with similar problems in a similar manner?

Conservation Objective for Southern Oregon Coastal Chinook

The stock-recruitment models included environmental variables in the density-independent parameter of the Ricker stock-recruitment relationship. The environmental variables were normalized to have a mean of zero and the SMSY estimate was based on setting the environmental variable to zero. The extent of bias caused by the approach should be evaluated, for example using simulation.

Updates and Progress Reports

Comparing Income Impact Estimates from IOPAC and FEAM (Salmon Review) Models

Ms. Cindy Thomson and Mr. Ed Waters updated the committee on the policy decision to replace the FEAM model with the IOPAC model in the upcoming salmon 2015 SAFE. This will be the first time the IOPAC model is used to assess economic impacts of salmon fisheries. Evaluation of results and differences in trends should continue.

IOPAC was developed for groundfish. The data in the FEAM model are outdated; IOPAC uses recent data. FEAM assumed all of the landed catch was processed locally while IOPAC uses data from IMPLAN to determine how much of the catch was processed locally. FEAM is based on landed weight, while IOPAC is based on ex-vessel value. A side by side comparison of the two models for the years 2010 to 2013 was presented. Transfer of catch to non-local processors was an important factor driving the differences in model output. The statewide level and port level economic impacts will change once the IOPAC model is implemented.

Progress Report: New Chinook Fishery Regulation and Assessment Model (FRAM) Base Period

Mr. Larrie LaVoy presented a progress report on the development of a new base period for the Chinook Fishery Regulation Assessment Model (FRAM) by a workgroup of state, tribal and federal modelers. The new base period will use Coded Wire Tag (CWT) recoveries, escapements and fishery catches from the 2007-2012 fishing years to estimate FRAM parameters. This will replace the old base period which relies on data from 1979-1982 when fishery structure and stock abundances were quite different. To date, the workgroup has updated the base period calibration software, compiled a CWT recovery data base as well as fishery catch and escapement, age, and growth data by stock, and performed initial test runs of the programs on the marked portion of the new data. The workgroup intends to finish the development, documentation, and testing of the new base period prior to the October 2015 Methodology Review. The new base period should be fully documented. The SSC expects to review the new base period in 2015.

Remaining tasks for the new Chinook FRAM base period include reviewing the FRAM code for modeling stock assignment for sublegal Chinook, reviewing procedures to handle "out-of-base" tag groups, and testing and documentation of the new method. The use of GSI data from recent years was suggested as a source of data to supplement and cross-check CWT recovery information.

J. Groundfish Management, Continued

5. Economic Data Collection Program Report on Fishery Status and Overview on Social Science Research

Dr. Todd Lee and Ms. Erin Steiner (NWFSC) made a presentation to the Scientific and Statistical Committee (SSC) on the status of the Economic Data Collection (EDC) Program. The presentation focused on reports prepared by the Northwest Fisheries Science Center (NWFSC) that cover four fishery sectors involved in the groundfish catch shares fishery: first receivers/shorebased processors, catcher vessels, catcher processors, and motherships (Agenda Item J.5.b, NWFSC

Reports 1-4). The reports provide detailed information that is useful for understanding the current economic status of the catch shares fishery and evaluating economic effects of the catch shares program. The reports satisfactorily respond to recommendations made by the SSC Economics Subcommittee.

To ensure proper interpretation of results, it is important to note that many of the indicators included in the EDC reports (e.g., revenues, costs, crew compensation) are not specific to groundfish but pertain to participation in all West Coast fisheries by entities involved in groundfish catch shares. Thus the values of these economic indicators are contingent on the number of days fished in West Coast fisheries. Due to the lack of cost data for Alaska fisheries, these indicators exclude participation in Alaska fisheries – an omission which is most relevant to entities that participate in the whiting fishery. Also, because the coverage of fixed costs in the EDC surveys is limited to costs directly related to maintenance and operation of vessels and processing facilities and excludes items such as office space, transportation of fish, and accounting services, net revenue estimates derived from these surveys overestimate true net revenue.

Dr. Suzanne Russell (NWFSC) presented a report to the SSC entitled “The Pacific Groundfish Fishery Social Study” (Agenda Item J.5.b, NWFSC Report 5). This report provides an initial look at the results of in-person interviews of groundfish catch share stakeholders from Morro Bay to the Canadian border conducted by Dr. Russell and her research team. These voluntary interviews were administered in the form of standardized surveys or semi-structured questions, and conducted in 2010 (before the catch shares program) and 2012 (after catch shares implementation but before quota trading was allowed). Additional interviews are planned for 2015 (one year after quota trading was allowed), contingent on funding. A more extensive report on this study – including the 2015 interviews – will be provided to the Council for the five-year review of the catch shares program.

The vessel owners and processors interviewed were identified from known sampling frames (limited entry permit holders for the 2010 interviews, quota share permit holders for the 2012 interviews). However, no such frames exist for stakeholders such as crew members, processing plant workers, fishery-related businesses such as fuel suppliers, and fishermen’s spouses. Instead, these latter stakeholders were identified through a process of personal referrals. Samples derived in this manner are not necessarily representative and make it difficult to compare results from the 2010 and 2012 interviews. The SSC recommends that further efforts be made to validate the social changes identified in this study, to the extent possible, with verifiably representative data, such as EDC survey data.

One important aspect of the social study is the attention given to stakeholder groups that are rarely considered in regulatory analysis, largely due to lack of data. The ability to obtain contact information on crew members and processing plant workers would help collect data to ensure that the effects of regulations on these groups receive more attention in the future.

The SSC commends economists and social scientists at the NWFSC for their work on the EDC Program and the Pacific Groundfish Social Study. Both projects involve considerable commitment of time and resources and contribute to an in-depth understanding of the effects of groundfish catch shares.

SSC notes on the EDC Program reports:

Production volumes are reported in metric tons and prices in dollars per pound. The same units (preferably metric) should be used for both.

To the extent possible, measures of uncertainty should be provided for each economic indicator (e.g., production, revenues, costs, labor compensation).

Ensure that axis labels on charts are clear and that trends are standardized to the extent possible. For instance, the horizontal axis in Figure 6 of the Catcher Vessel Report seems to suggest that the costs reported are annual, even though some costs (e.g., crew compensation) pertain only to the portion of year when the individual was engaged in West Coast fisheries. To help determine extent to which this trend is due to change in compensation rate or number of participation days, consider reporting not just total crew compensation but also crew compensation per day.

Consider using median as well as mean values, particularly for variables that have skewed distributions.

Use prediction intervals rather than confidence intervals to detect unusual data points.

Distinguish, to the extent possible, effects of catch shares from other factors that affect trends in economic indicators.

Once data on quota trades become available, report quota prices and compare to variable cost net revenue.

SSC notes on the Pacific Groundfish Fishery Social Study:

Relate attributes of respondents to their responses.

Do separate analysis of return respondents to see how their responses change over time.

Distinguish, to the extent possible, effects of catch shares from other factors that affect respondent perceptions of the groundfish fishery.

Provide information on the homeport distribution of vessel owners, captains, and crew.

To the extent possible, use other, representative data sources to help validate the results of the Social Study.

Obtain contact info through some type of license system?

E. Coastal Pelagic Species Management

2. Sardine Harvest Fraction

The Scientific and Statistical Committee (SSC) reviewed the draft Environmental Assessment (EA) related to harvest control rules for Pacific sardine (Agenda Item E.2.a, Attachment 1). Ms. Lorna Wargo (Coastal Pelagic Species Management Team [CPSMT] Chair) gave a presentation on the alternatives for determining the FRACTION parameter in the harvest guideline (HG) control rule, and outlined the CPSMT analysis of the Alternatives (Agenda Item E.2.b, CPSMT Report). The No Action Alternative bases the HG on temperature measured at Scripps Institution of Oceanography (SIO) and a range for FRACTION of 5 to 15%. The Action Alternatives differ from the No Action Alternative by basing the HG on CalCOFI temperature, and a set of ranges for the FRACTION parameter.

Ms. Wargo summarized how often each of the Action Alternatives would have led historically to equal, higher or lower harvest rates than the current HG control rule. The SSC recommends this information be included in the EA.

Table 1 of the draft EA includes performance measures for a No Action Alternative and Alternatives 2a-2d. However, the technical bases for the calculations underlying the performance measures for the No Action Alternative and for Alternatives 2a-2d are different. Any comparisons between these sets of performance measures are consequently misleading. The analyses on which the performance measures for the No Action Alternative are based did not account for the Overfishing Level (OFL) and Acceptable Biological Catch (ABC) control rules, which will be part of management decision making even if the HG control rule is not changed. This is because there was no requirement for OFLs and ABCs when Amendment 8 to the Coastal Pelagic Species Fishery Management Plan (FMP) was adopted.

The SSC provides the following two options to compare Alternatives 2a-2d with what would happen if HGs are computed using a control rule based on SIO temperature and constraining FRACTION to lie between 5% and 15%. The OFL and ABC control rules will need to be applied along with the HG control rules for both options.

1. Conduct two projections setting FRACTION to 5% and 15% respectively. These two projections will provide results which will bound the outcomes of the No Action Alternative.
2. Conduct projections in which actual CalCOFI temperature data (repeated to yield a long-term time-series) drives recruitment. The performance measures for the No Action Alternative would be computed by basing HGs on Scripps Institute of Oceanography temperature, while the performance measures for Alternatives 2a-2d would be computed by basing HGs on CalCOFI temperature. The SIO and CalCOFI indices will need to be paired to ensure valid comparisons can be made.

Either of these options will allow a comparison between the Action Alternatives and the No Action Alternative.

3. Methodology Preliminary Topic Selection and Review Process

The SSC did not prepare a statement for this agenda item but did discuss future methodology topics as captured in the notes below.

SSC Notes:

Potential CPS Methodology Reviews for future:

Evaluation of the DISTRIBUTION term could be addressed, as suggested in previous HCR workshops.

The distribution of northern vs. southern subpopulations of sardines and approaches to differentiating populations and catch could be further reviewed. Better separation of the populations and respective removals should lead to better assessments of the northern subpopulation, but note that the population size, relative recruitments, Emsy, etc. could all change.

As of yet, no progress has been made on the proposed work plan for the acoustic survey– and SSC concerns have not been addressed. They should be.

Proposed HCRs should be reviewed, particularly if they differ substantially in structure from currently implemented CPS HCRs

If data poor or data moderate methods are to be used for CPS assessments, the proposed methods need to be reviewed prior to their application.

C. Council Administrative Matters, Continued

9. Future Council Meeting Agenda and Workload Planning

The SSC reviewed two reports prepared by Council staff summarizing models that may require review by the SSC in preparation for the next biennial groundfish harvest specifications process. Mr. John DeVore (Council) was available to answer questions.

There are several models used by the Groundfish Management Team (GMT) that have not previously been reviewed by the SSC, and some models that were previously reviewed have been revised and may need to be reviewed again. After the GMT meets in January 2015, there should be greater clarity regarding which models will have adequate documentation available to allow review. The SSC was informed that documentation is expected to be available in June for a review of the GMT's Trawl Individual Fishing Quota (IFQ) model. The SSC proposes that this model review would occur at a meeting of the Groundfish and Economics subcommittees on June 13th, 2015, the day after the meeting of the full SSC.

The SSC also proposes that time be set aside on the agenda for its April meeting to discuss work that is currently being conducted by Chantel Wetzel (NWFSC) on developing a management strategy evaluation (MSE) of possible revisions to the rebuilding rules for overfished groundfish stocks. The SSC anticipates that it will conduct a technical review of the MSE during a meeting of the SSC Groundfish Subcommittee in September.

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	NA
2	Pacific Sardine Update Review	Mar. 5	Council/ Vancouver, WA	CPS Subcommittee	None	CPSMT CPSAS	Griffin
3	Canary/Darkblotched Rockfish STAR	Apr 27 – May 1	Council/ Seattle	Cooper	2 CIE + 1	GMT GAP	DeVore
4	Pacific Mackerel STAR	Week of Apr 27	Council/ La Jolla	Punt, Jagielo	2 CIE + 1	CPSMT CPSAS	Griffin
5	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
6	Review Trawl IFQ Model	June 13	Council/ Spokane	GF & Econ Subcommittees	None	GMT GAP	DeVore

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8	Black RF STAR	July 20-24	Council/ Newport, OR	Jagielo	2 CIE + 1	GMT GAP	DeVore
9	Kelp Greenling/Widow STAR	July 27-31	Council/ Newport, OR	Sampson	2 CIE + 1	GMT GAP	DeVore
10	Mop-up STAR	Late Sept.?	Council/ TBD	GF Subcommittee	TBD	GMT GAP	DeVore
11	Salmon Methodology Review	Late Oct.?	Council/ Portland	Salmon Subcommittee	None	STT SAS MEW	Burner
12	Groundfish Historical Catch Reconstructions	TBD	TBD	GF Subcommittee	TBD	GMT GAP	DeVore
13	Methods for Data Reweighting Workshop	TBD	NWFSC/ Council	GF & CPS Subcommittees	TBD	GMT GAP	DeVore

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	Workshop/Meeting	Potential Dates	Sponsor/ Tentative Location	SSC Reps.	Additional Reviewers	AB Reps.	Council Staff
14	Reference Points (Bzero) Workshop II	TBD	TBD	GF Subcommittee	CIE/External 1-3:	GMT GAP	DeVore
15	Evaluation of Stock Productivity Methodological Approaches	TBD	TBD	GF Subcommittee	TBD	GMT GAP	DeVore
16	Transboundary Groundfish Stocks	?	Council	2 TBD?	?	GMT GAP	DeVore

4. Electronic Technology Plan

The Scientific and Statistical Committee (SSC) reviewed the National Marine Fisheries Service (NMFS) Policy Directive 30-133 (Agenda Item C.4.a, Attachment 1) and the Regional Electronic Technologies Implementation Plan for West Coast Marine Fisheries (Agenda Item C.4.a, Attachment 2). Dr. Steve Freese (NMFS) met with the SSC to go over the draft plan and answer questions.

The SSC makes the following points for consideration in the Implementation Plan.

- The plan should discuss the importance of providing data in support of stock assessments. The potential ability for electronic technologies to provide fishery-dependent data that are spatially explicit could be transformative for stock assessments.
- Confidentiality issues will need to be addressed to reap the full benefits of enhanced data collection. Some issues include how the data will be reported, and who will have access to the data and in what form (e.g., raw versus aggregated).
- Increased electronic data collection will also require increased staffing for management and analysis of the new data. This is particularly true if timeliness of the data reporting is a primary goal for implementing electronic technologies.
- The implementation plan should consider how fishery-dependent data are currently used to ensure a smooth transition to electronic monitoring.

H. Ecosystem Management

1. Report on the Atlantis Model Review

Dr. Isaac Kaplan (NWFSC) presented an overview of the Atlantis model for the California Current ecosystem and its potential applications for Council decision-making. During June 30-July 2, 2014, a panel of outside experts from the Center for Independent Experts (CIE), Scientific and Statistical Committee (SSC) Ecosystem Subcommittee members, and National Marine Fisheries Service (NMFS) researchers reviewed the model following the Council's Terms of Reference for Methodology Review. Dr. Kaplan and Dr. Martin Dorn (AFSC) summarized the Methodology Panel report (Agenda Item H.1.a, Attachment 1.). The Panel reviewed two implementations of Atlantis, the most recent established model (Horne et al. 2010) and a model under development that has increased geographic coverage, provides greater detail for lower trophic levels, and links to the IO-PAC model. The SSC concurs with the findings of the Methodology Review Panel and supports continued model development to assist the Council in evaluating ecosystem impacts of fisheries management actions.

The SSC emphasizes several key points from the review:

- (1) Atlantis results should be presented and interpreted qualitatively rather than quantitatively for Council applications.
- (2) Atlantis applications and results should be used for addressing strategic issues rather than tactical issues. For example, Atlantis could be used to evaluate the impact of increased ocean acidification on the performance of harvest policies. Atlantis is not intended to replace single species stock assessments, nor should it be used to determine annual Overfishing Limits (OFLs) or Acceptable Biological Catches (ABCs) to set precise quotas.

(3) Standards for model performance should be developed prior to model calibration. The model calibration process is otherwise generally appropriate, but some key species groups demonstrate unrealistic model behavior, including sardines and hake. The Atlantis team is taking steps to address this in the model under development.

(4) Best practice in the field of ecosystem modeling is to run a carefully chosen set of scenarios to characterize the uncertainty and sensitivity of the results. The SSC recommends that Atlantis model applications for Council purposes include appropriate exploration of uncertainty.

(5) Full and formal documentation should be made available.

(6) The Atlantis team should continue their engagement with the Council and its advisory bodies, both to foster understanding of ecosystem modeling by the Council and advisory groups and to collaboratively develop relevant management scenarios.

(7) The Atlantis model is an appropriate tool for addressing several of the Ecosystem-Based Management initiatives in the Council's Fishery Ecosystem Plan, including food web impacts of fisheries and the evaluation of risks of climate change and ocean acidification. Specific applications of the model will need to be reviewed by the SSC.

SSC notes:

SSC members noted that Terms of Reference for ecosystem model review would be helpful in the future (separate from the current Terms of Reference for Methodology Review), and Dr. Kaplan noted that this Review process was a step towards establishing review standards.

The SSC notes the importance of the continuation or expansion of diet data collection and analysis for ecosystem models such as Atlantis, one of many recommendations for future research and data collections.

C. Council Administrative Matters, Continued

5. National Marine Fisheries Service West Coast Region Strategic Plan

The SSC did not prepare a statement for this agenda item.

I. Highly Migratory Species Management

2. International Activities

The Scientific and Statistical Committee (SSC) reviewed the draft of a resolution intended for consideration by the Inter-American Tropical Tuna Commission (IATTC) regarding the Evaluation of Candidate Target and Limit Reference Points and Decision Framework for North Pacific Albacore (Agenda Item I.2.a, Attachment 4). The resolution tasks the IATTC scientific staff to work with the International Scientific Committee's Albacore Working Group (ALBWG) to develop a Management Strategy Evaluation (MSE). The MSE will analyze the effects of harvest control rules under a range of reference points and evaluate the degree to which each scenario would meet performance criteria.

The SSC notes that full description of the operating model of an MSE is crucial to providing a meaningful evaluation of its potential utility. The resolution does not mention the operating model to be used in the MSE, except that it may "to the extent deemed appropriate by the IATTC scientific staff and the ALBWG, tak[e] advantage of the ALBWG's stock assessment model". Using the stock assessment model as the basis of the operating model will overstate the understanding of true system dynamics. The SSC recommends developing a set of operating model scenarios that adequately encompasses the plausible range of uncertainty. Each operating model scenario would reflect an alternative understanding of the stock and the associated fishery. For example, multiple scenarios for how a total allowable effort system is implemented should be examined.

SSC Subcommittee Assignments, November 2014

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

Bold denotes Subcommittee Chairperson

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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 12-17, 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</p>
<p>September 11-16, 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>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.

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Draft Minutes

Scientific and Statistical Committee Webinar

January 6, 2015

A. Call to Order and Approval of the Agenda

Chair Meisha Key called the meeting to order. The proposed agenda was approved as presented. The purpose of the meeting was to review a report from the 12 November 2014 meeting of the Groundfish Subcommittee and develop recommendations regarding two primary methodology issues relevant to the 2015 groundfish stock assessment cycle.

B. Using Geostatistical Delta-Generalized Linear Mixed Models (GLMMs) to Develop Trawl Survey Catch per Unit of Effort Indices

During its 12 November 2014 meeting, the Groundfish Subcommittee of the SSC (GFSSC) agreed that the use of geostatistical delta-GLMM methodology would be an improvement over the methodology which has been used over the last few assessment cycles. It was agreed that this new methodology was suitable for use in groundfish stock assessments and recommended that the full suite of diagnostics applied in the past to evaluate Bayesian stratified methods for analyzing survey data be developed for the new methodology, applications of the methodology for the current assessment cycle not include covariates other than vessel, and that comparisons be made between the results of the new methodology and those from the methodology that has been applied in the past. The GFSSC also recommended that guidelines be developed for use of the new methodology.

The SSC endorsed the conclusion of the GFSSC that the geostatistical delta-GLMM methodology was suitable for use in assessments, in particular because it uses more of the data and does not impose arbitrary spatial-temporal bounds. The SSC agreed that use of this methodology is not mandatory for the 2015 assessment cycle and that if applied, results should be shown for the default settings of the method, no covariates other than vessel should be included in the analyses, and assessment sensitivity tests should be presented that use abundance indices based on the GLMM method used for the last assessment cycle.

The SSC recognized the importance of the guidelines for applying the geostatistical model, which will be developed by Dr. James Thorson; therefore, requested that a draft of these guidelines be reviewed by the SSC at the March 2015 meeting. The SSC also agreed that there is value in conducting additional simulation studies, e.g., to determine whether the method can detect trends in abundance when there are such trends. One of the first applications of the geostatistical delta-GLMM methodology will be to canary rockfish and Dr. Thorson is the lead assessment author for that assessment. The application to canary rockfish should help assessment authors who choose to apply the new methodology.

C. Consider the Groundfish Subcommittee Recommendations Regarding Methods to Address Concerns with Modeling Steepness in Stock Assessment

The SSC discussed options related to the development of a new or updated prior probability distribution for steepness (h) for stock assessments in the 2015 assessment cycle. The GFSSC had been briefed by staff at the NWFSC regarding concerns over the way the prior has been developed in the past, noting both that there is some evidence that the current prior may be too diffuse by virtue of not considering autocorrelation (or by virtue of being derived from profiles in which other key parameters, such as natural mortality, are fixed). There was recognition that fully accounting for these factors could result in a more appropriate prior, one that would be sufficiently diffuse as to allow steepness to range widely around the point estimate of the prior (as observed values of steepness have in more informed models). Despite these concerns, the recommendation from the GFSSC was the status quo option, recognizing the need for additional off-year science workshops and efforts to address this question for future assessment cycles. After some discussion, and noting that the NWFSC staff do not have the time available to fully explore alternative means of developing or refining a prior steepness, the SSC agreed with the recommendation to update the current meta-analysis using the rockfish assessments developed during the last assessment cycle. The SSC also clarified that the update should continue the practice of only including distributions from Tier 1 stocks, thereby excluding Rougheye/Blackspotted rockfish, such that the updated prior would include only new profiles of steepness for Aurora, Bocaccio and Darkblotched Rockfish. The SSC would like to reiterate the need to prioritize a productivity workshop to more thoroughly address these (and other) issues related to the use of meta-analyses and the most appropriate means of developing priors in 2016.

D. Other Issues

There was brief discussion of plans for a workshop scheduled for March 31 – April 2 on Nearshore Data and Assessments, involving GMT reps, State data stewards and STATs. Issues that need to be discussed and resolved include geographic boundaries for assessments that are not conducted coastwide, approaches for post-stratifying assessment results to conform with management boundaries, and review of any methods for developing recreational CPUE indices that have not previously undergone SSC review.

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