North Pacific Fishery Management Council

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FINAL

SCIENTIFIC AND STATISTICAL COMMITTEE
to the
NORTH PACIFIC FISHERY MANAGEMENT COUNCIL
February 8-10, 2010

The SSC met during February 8-10, 2010 at the Benson Hotel, Portland, Oregon. Members present were:

Pat Livingston, Chair	Farron Wallace, Vice Chair	Milo Adkison (for Terry Quinn)
NOAA Fisheries—AFSC	*Washington Depart of Fish and Wildlife*	*University of Alaska Fairbanks*
Robert Clark	Gordon Kruse	Anne Hollowed
Alaska Department of Fish and Game	*University of Alaska Fairbanks*	*NOAA Fisheries—AFSC*
George Hunt	Franz Mueter	Kathy Kuletz
University of Washington	*University of Alaska Fairbanks*	*US Fish and Wildlife Service*
Seth Macinko	Doug Woodby	Lew Queirolo
University of Rhode Island	*Alaska Department of Fish and Game*	*NOAA Fisheries—Alaska Region*
Keith Criddle		
University of Alaska Fairbanks		

Members absent were:

Terry Quinn II	Sue Hills
University of Alaska Fairbanks	*University of Alaska Fairbanks*

SSC Nominations

The SSC reappointed Pat Livingston as chair and elected Farron Wallace as vice chair. The SSC would like to extend great appreciation for Keith's commitment and dedication as vice chair and his SSC *modus vivendi*.

B-8 CIE Terms of reference review

The SSC was asked to review the Terms of Reference in the Draft Statement of Work for an independent peer review by the Center for Independent Experts (CIE) of the 2010 Draft National Marine Fisheries Biological Opinion on the Effects of the Bering Sea/Aleutian Islands and Gulf of Alaska Federal Groundfish Fisheries and the State of Alaska Parallel Fisheries on ESA Listed Species and Designated Critical Habitats, including Steller Sea Lions and their Designated Critical Habitat. Jon Warrenchuk (Oceana) provided public testimony.

Statement of Work vs. the Terms of Reference
The Statement of Work calls for an evaluation of the scientific information in the Biological Opinion. There are, however, apparent contradictions between the Statement of Work on page 3, which calls for the CIE review to focus on "…the scientific information contained in the Biological Opinion and not on the conclusions of the Opinion as per the ESA thresholds." and the final bullet in the Terms of Reference

on page 10, which calls for the review to answer the question "…does the Biological Opinion draw a reasonable conclusion based on the evidence with respect to the standard of "jeopardy" for the listed species….?". The SSC suggests that the two sentences on page 3 following the one quoted above provide a better sense of what is required of the review than the one from page ten, under (3), also quoted above.

Requirements for CIE Reviewers
The SSC suggests that it would be advantageous for the CIE Review Team to include individuals with expertise in population dynamics and predator-prey interactions.

Pre-review Documents
In addition to the documents listed, the SSC recomends sending to the CIE reviewers copies of the SSL Recovery Plan and all substantive orders by Judge Zilly dealing with Alaska groundfish fisheries and Steller sea lions. Additionally, the SSC reommends sending to the CIE reviewers a selection of review articles examining all major hypotheses dealing with the decline and subsequent failure of the SSL to fully recover, as well as bibliographies of recent literature on the SSL (e.g., the Taggart and Loughlin SSL bibliography, the recent update of this bibliography by Council Staff and the URLs of websites (e.g., Alaska SeaLife Center) that could provide copies of recent articles on sea lion demography and ecology). It is essential that the CIE reviewers receive the most recent pup and non-pup counts, if these are not already included in the Biological Opinion.

Schedule of Milestones and Deliverables
The timeline as described on pages 6 and 7 does not appear to provide sufficient time for the CIE reviewers to do their job. It appears that the reviews are to be completed between the 1st and 12th of March. There is then a gap until 26 March when the reviews are due. If the full time for the review is 1-26 March, the time available to complete the reviews is short, but probably manageable. If there are 12 days or less for the reviews, then the time line should be relaxed to give the reviewers 15 to 20 working days to complete the reading of the background material and the preparation of their reviews. The final date should be 2010 not 20109.

Terms of Reference 3, bullet 2
The SSC suggests the insertion of the words "and apply valid analytical and statistical methods to" after the words "thoroughly describe".

C-3 (b) – West Region WAG King Crab Landing Requirement Exemption

The SSC received a presentation of the Initial Review Draft of the RIR/IRFA for this proposed Regulatory Amendment from Mark Fina (NPFMC). Public comment was provided by Everett Anderson (APICDA).

Economic conditions have not and do not presently appear to provide sufficient private economic incentives to induce and sustain economic and operational investment in crab processing capacity in the West region, despite the Council's effort to facilitate Adak's participation in the BSAI region fish processing sector. The resulting outcome has necessitated emergency rulemaking to temporarily resolve an economic crisis in the WAG and the advancement of this amendment that proposes to either provide an exemption from the West region landing requirement or remove the landing requirement altogether.

The SSC appreciates the concise presentation in the draft RIR document. Owing to its initial status, the SSC recognizes that the document cannot address several of the key requirements until the Council identifies its "preferred alternative."

The SSC believes that the document is ready to be sent out for public review after the following items are addressed:
- The Council's original expression of "purpose and need" in establishing a regional delivery scheme for the Western Aleutian Golden King Crab (WAG) fishery, as reflected in the Crab Rationalization amendment, should be fully described in the document. This will provide critical context for understanding the present action. Examining the original purpose and need argument in this way reveals a conflict with the purpose and need statement of the proposed action that will require resolution by the Council.
- The initial draft RIR exposes a potential internal inconsistency between the Council's statement of purpose and need for the subject action, and the suite of alternatives under consideration in the analysis (i.e., Alternative 3 cannot achieve the Council's objectives for this action).

C-3(c) Net efficiency studies and selectivity of snow crab

Diana Stram (NPFMC) introduced this topic, which included reports from; 1) Steve Hughes and Jack Taggart for the Bering Sea Fisheries Research Foundation (BSFRF) on cooperative NOAA Fisheries - Industry experiments and surveys, 2) Dave Somerton (NMFS-AFSC) on estimating trawl selectivity for snow crab based on these surveys, and 3) Jack Turnock (NMFS-AFSC) on alternative snow crab models that estimate selectivity and/or natural mortality. Public testimony was received from Frank Kelty (City of Unalaska) and Leonard Herzog (Alaska King Crab Harvesters Co-op).

Steve Hughes and Jack Taggart reported on the history of cooperative surveys conducted by NOAA Fisheries and BSFRF and summarized recent results. In the summer of 2009 a side-by-side experiment was conducted with three different types of nets to improve estimates of selectivity of the NMFS annual Bering Sea trawl survey. In addition, BSFRF conducted a separate survey in parallel with the NMFS trawl survey that randomly sampled 27 of the same blocks sampled by NMFS using four replicate tows of 5-min duration each. The survey was conducted with a Nephrops trawl that is used in the North Atlantic. The results convincingly demonstrate that the NMFS trawl is much less efficient than the Nephrops trawl across all size ranges of crab and that its efficiency increases almost linearly with crab size. However, the survey-to-survey comparisons, which covered a much larger area, revealed an anomaly in that the NMFS survey estimated a considerably higher density of small female crab. It is not clear if this is a result of sampling variability due to a greater patchy distribution of female crab. However, these results and the length-frequency distribution reported by Jack Turnock suggest that males and females may have very different selectivities. **The SSC notes that all estimates of efficiency are estimates of relative efficiency and assume that the Nephrops trawl has a selectivity of 1 across all sizes of crab. The validity of this assumption has not been evaluated to date. The SSC encourages the industry and NMFS to evaluate this assumption during planned surveys in 2010. This may be accomplished, for example, by attaching cameras to the net to observe potential herding or escapement.**

Dave Somerton showed how results from the side-by-side experiments and survey-to-survey comparisons can be used to estimate selectivity by size across the survey area. Analyses suggest that selectivity and catchability vary significantly by depth, sediment type, and other covariates. These spatial effects seem to reconcile some of the apparent conflicts between the 2009 side-by-side comparisons and earlier experimental results. While there are still considerable uncertainties, **the SSC believes that the estimated selectivity function, based on catch ratios by 5 mm increments across 27 NMFS survey areas (Fig. 5 in Somerton et al. 2010 report), provides the most reasonable estimate of survey selectivity by size for the time being**, considering that the areas surveyed by BSFRF in 2009 are broadly representative of the NMFS survey area. Because of the apparent differences, separate selectivity functions by sex should be examined. **The SSC notes that the upcoming 2010 BSFRF/NOAA trawl survey will be very important in describing inherent bias in the current survey and the SSC would like to receive a presentation on survey design during the April meeting.**

Jack Turnock (NMFS-AFSC) provided results from a sensitivity analysis of the current snow crab model to alternative specifications of selectivity and natural mortality and an evaluation of using the 2009 industry survey data as an additional survey in the snow crab assessment model. If selectivity is estimated within the model, the curve generally rises much more steeply than estimated by experimental results. Model estimates of catchability are much higher (Q=1.0 to 1.2) and the difference in selectivity between the BSFRF and NMFS survey within the survey area is much smaller than estimates outside of the model. When model selectivity was fixed at the values estimated by Somerton et al. (2010), the model fit to both the length frequency data and to the survey data deteriorated considerably. Model estimates of selectivity and catchability are clearly different from external estimates, suggesting that the model has some mis-specification or that the 2009 survey data are not informative with respect to the selectivity parameters estimated across all years.

To help resolve this conflict, the SSC offers the following recommendations:
- The analysts should carefully examine differences in selectivity between male and female snow crab, both external to the model and inside the model. If we interpret model results correctly, it appears that, except for Q, the same selectivity parameters (L_{50}, L_{95}) were used for males and females. On the contrary, these should be allowed to differ between sexes. If all parameters cannot be estimated simultaneously, a model run fixing L_{50} for male snow crab at the externally estimated value should be considered.
- A review of natural mortality estimates would be very timely to re-evaluate the current best independent estimates of natural mortality and to assess the plausibility of higher mortality rates for snow crab. In the longer run, the SSC encourages studies on natural mortality including tagging and other field studies.
- Sensitivity analysis with respect to growth parameters in the model should be conducted to assess the plausibility of current growth assumptions.
- The assessment authors should continue to bring forward an alternative model run that fixes the selectivity for at least for male snow crab at the values estimated by Somerton et al (2010).

C-3(d) ACL Methodology

The SSC received a report from Diana Stram (NPFMC) and presentations by André Punt (UW) on possible approaches for the crab ACL analyses. Specifically, the SSC received the following documents: (1) an updated description of alternatives for ACL and rebuilding analyses, (2) a draft ACL analysis for the Bristol Bay red king crab stock, (3) a brief summary of a data weighting workshop, and (4) a description and preliminary ACL analysis for Tier 5 stocks.

The SSC reviewed the current draft alternatives and options for the combined crab ACL and rebuilding analysis. There were few changes besides incorporating a previous SSC recommendation to extend the rebuilding time frame for snow crab to 8 years. The SSC believes that the alternatives and options as laid out in the revised document provide a reasonable foundation for the analyses and the SSC has no additional recommendations.

André Punt provided an overview incorporating additional uncertainty in the ACL analyses beyond parameter uncertainty captured in the model. He strongly urged the SSC to consider including additional variance beyond what would be captured in a standard retrospective analysis, although the amount of extra variance (buffer) to include is necessarily arbitrary. The SSC previously recommended use of a standard retrospective analysis (i.e. the current model is assumed to be the "correct" model and its performance in predicting future reference points is evaluated retrospectively, see Dec. 2009 minutes).

The SSC agrees that the analyses should attempt to account for additional uncertainty, as long as a consistent approach is used across stocks, and has the following specific recommendations:

- Because of the short timeline for the current analyses and because of the lack of other options, we support the use of the relatively arbitrary, fixed levels of extra variance like those that were used in the Bristol Bay red king crab example ($\sigma = 0.2$ and $\sigma = 0.4$). These values roughly bracket the range of uncertainty from historical retrospective analyses for Alaska crab stocks and approach the levels reported for West Coast groundfish stocks (Steve Ralston, pers. comm.). The SSC requests that the ACL analyses and rebuilding plans clearly explain and, to the extent possible, provide a clear rationale for choosing the levels of extra variance.
- For consistency, the current analyses should use the same levels of extra variance across stocks unless a clear rationale can be developed to use different levels for different stocks. However, the SSC recommends comparing the analyses across tiers to check if the implied buffer sizes between ABC and OFL increase across tier levels (from Tier 1 to Tier 5), consistent with the idea that uncertainty about stock status increases from Tier 1 to Tier 5. Thus, the specified or implied buffer size for a Tier 4 stock should generally be larger than the buffer for a Tier 3 stock in the assessment context (under a given level of precaution). Of course, for the ACL analyses a range of buffer sizes and P^* values should be evaluated for each stock.
- The additional buffer appears to be required for simulating stock dynamics in the analysis to properly account for uncertainty within the simulations. This is due to sources of uncertainty, such as author's assumptions on parameters or choices of datasets that are not expressed in model uncertainty.

The SSC endorses the draft ACL impact analysis for the Bristol Bay red king crab stock presented by André Punt and recommends extending a similar analysis to other Tier 3 and Tier 4 stocks. The analysis, among other things, computes the probability that ABC exceeds the "true" OFL (assumed known in the simulation) in a given year, the probability that MMB is less than MSST ($= 0.5*B_{MSY}$) by year, and catches by year. The analysis will be extended to include an economic impact analysis. With regard to summarizing population trajectories for evaluating population impacts, the SSC recommends that the analysts provide summary output over a shorter time frame of 5 or 6 years. The shorter time frame would be of more immediate interest to the public, would be less influenced by assumptions about future recruitment, and would provide more robust economic projections, given the large uncertainties about future macro- and micro-economic factors.

The SSC received a short presentation on a preliminary ACL analysis for Tier 5 stocks. We appreciate receiving a report on these analyses, which provide one possible approach to quantifying uncertainty in extremely data-poor stocks. These stocks use an MSY proxy that is based on average retained catch over some pre-specified time period. Uncertainty in the OFL proxy was estimated as the standard error of the selected catch time series. However, the amount of variance quantified by either the t-distribution or the bootstrap distribution is small relative to the overall uncertainty. Therefore, it makes little difference in the choice of method.

The analysis demonstrates the large variability in the resulting uncertainty across stocks, much of which is very likely unrelated to the reproductive capacity of the stocks. Because few reasonable options are available, the SSC recommends that this analysis be brought forward with the following additional options for quantifying uncertainty:

- If the average catch is a reasonable proxy for OFL, the length of the time series over which catches appeared to be sustainable, along with the longevity of the crab species, gives some indication of the uncertainty in OFL. Therefore, the fixed buffer or the P^* value could be scaled to the ratio of the length of the time series relative to the life span of the species.

- To reflect the large uncertainty in the OFL proxy of Tier 5 stocks, additional uncertainty should be incorporated, for example through an extra variance term that is at least as large as the extra variance used for stocks in higher tiers (i.e., those with more information).
- Consideration should be given to increasing the measure of uncertainty in proportion to the length of time since the last year of the reference period because uncertainty about a stock's OFL would increase over time

The plan team requested clarification on the SSC recommendation from December 2009 "*...that all of the alternatives include a performance measure to evaluate the probability that the stock does not rebuild by a certain year (for example after 10 years), similar to the B20% threshold for some groundfish. This would provide a stronger incentive to avoid a potential stock collapse.*" This comment applies to rebuilding calculations only and was intended to provide a measure of performance that would discourage applying a rebuilding strategy that is too optimistic and may imply a high risk of continued overfishing. We recommend that the analysts quantify the probability of overfishing (i.e. $Pr(MMB < 0.5\ B_{MSY})$) for each year within the rebuilding time frame, and that this measure is presented along with the probability of rebuilding (i.e. $Pr(MMB > B_{MSY})$).

C-4 Groundfish ACLs

Jane DiCosimo (NPFMC) and Melanie Brown (NMFS-AKR) provided an overview of the draft EA to amend the BSAI and GOA FMPs to bring them in compliance with the ACL provisions of the MSA. Jon Warrenchuk (Oceana) provided public testimony.

The SSC reviewed the EA and recommends releasing it for public review. The SSC notes that Appendix A provides specific text to clarify how housekeeping changes to the BSAI and GOA groundfish FMPs will be changed to bring the Groundfish FMPs into compliance with the National Standard 1. The EA provides a reasonable range of alternatives for which species should be identified as target species, ecosystem component species and species that should be removed from the FMP.

The SSC provides the following minor technical comments.
- The SSC agrees in principle that the NPFMC can delay consideration of how to treat grenadiers in the FMP to some future date. However, we continue to acknowledge that the vulnerability scores for this species group indicates a need for the NPFMC to address the incidental catch of grenadiers in groundfish fisheries in a future action.
- The SSC agrees that the analysis of P* amount of uncertainty incorporated in the current groundfish specifications presented last fall showed that "*the range of resulting probabilities provide sufficient protection against overfishing, at least for the time being*". However the SSC notes that the current treatment of uncertainty could be improved. The SSC encourages future development of alternative methods for addressing uncertainty in groundfish assessments.
- The SSC notes that status determination criteria (SDC) used for management of BSAI and GOA groundfish is defined in section 3.2.3.5.2 of Appendix A. This definition should be referenced in the EA for clarification. Specifically, language is needed to acknowledge that for stocks managed in Tiers 4, 5 and 6, the available information is insufficient to determine whether the stock is overfished or approaching an overfished condition. For these groups (complexes) the SDC would only address whether overfishing has occurred.
- The SSC recommends that the Final EA contain a framework for the periodic evaluation of whether the vulnerability of a species or species group that is not included in the FMP has changed so that amendments could be considered to include the species or species group in the fishery.
- The SSC recommends that in addition to the list of expected actions in the reasonable and foreseeable future, the EA should also include future considerations of the uncertainty in the groundfish tier

system and consideration of inclusion of grenadiers in the FMP. In addition, the EA should include planned changes in MRAs or spatial management.

- The SSC acknowledges that total catch estimation will require additional work and resources to enable estimation of groundfish catch in fisheries managed by other agencies (e.g. State of Alaska and IPHC). The procedures used to estimate total catch may require review by the SSC as part of the annual review of SAFE documents.
- With specific reference to forage fish under Alternative 2, the SSC requests that the EA/Amendment packages clarifies that the NPFMC will continue to use MRAs as management measures for these species.

C-5 (a) Amendment 80 Co-op Lost Vessel Replacement

The SSC received a report of the draft analysis for the proposed Council action concerning vessel replacement within the Amendment 80 sector, from Glenn Merrill (NMFS-AKR). No public testimony was given.

The proposed action sets out alternative conditions under which an Amendment 80 vessel may (or may not) be replaced. The need for this action has been motivated by a recent Federal Court decision. The U.S. District Court for the Western District of Washington found that the Agency's interpretation of the Congressional Capacity Reduction Program was arbitrary and capricious. The court ordered the Secretary of Commerce (SOC) to rectify these errors.

In general, the SSC finds the draft to be a comprehensive and thoroughly documented characterization of the circumstances necessitating the action under review. **The SSC recommends release of the draft for public review and comment after the following changes are incorporated into the document.**

The description of the baseline alternative should be improved. The narrative casts the status quo condition in confusing and conflicting ways. This results in inconsistent characterizations of the analytical baseline and how various alternative/option combinations differ or do not differ from Alternative 1 (e.g., p.56, last paragraph in Sect. 2.4.2). The document would benefit from a systematic revision of the treatment of the baseline alternative, especially within Section 2.4, before release for public review. The NOAA Guidance on preparation of Economic Analyses, which provides for a distinction between the analytical "No Action" and "Status Quo" alternatives, might be the preferred way of dealing with the present confusing treatment of Alternative 1, under Council consideration.

The analysts also indicate that the Council has not developed or adopted a "Purpose and Need" statement, nor identified and endorsed the suite of alternatives to be considered. This should be completed before the document is released to the public.

The draft IRFA appears to have presupposed the Council's selection of a Preferred Alternative (PA), as reflected by presentation of those elements of the document that may only be completed after a PA has been selected. Those sections should be corrected before the draft is released for public review.

C-6 (b) GOA Rockfish Program analytical approach

Jon McCracken and Mark Fina (NPFMC) presented an overview of the EA/RIR/IRFA for a proposed action addressing the central Gulf rockfish program. This was a preliminary review and initial review is anticipated in April. The SSC believes the analytical approach outlined by staff is adequate, albeit ambitious, and looks forward to a more detailed review in April. The SSC notes that the anticipated schedule precludes any plausible quantitative analysis of changes in net benefits to the Nation. The SSC encourages the analysts to more fully explain the relationships between the alternatives and the rockfish

pilot program, and statements concerning the distribution of benefits and impacts on various parties (e.g., crew).

D-2 Data Collection Discussion Paper

Mark Fina (NPFMC) provided an overview of the draft discussion paper. There was no public testimony. The discussion paper presents a well reasoned treatment of this issue and clearly identifies the primary issues confronting the Council, Agencies, and stakeholders in regard to economic and operational data collection programs. It fairly characterizes the inherent conflicts that exist between regulators/analysts who desire more data, and industry participants who may be suspicious of motivations behind data collection, concerned about the way such data may be applied and interpreted, and who incur direct costs of compliance.

The paper also correctly describes the complexities of overcoming these conflicting needs and expectations, emphasizing the critical contribution that open, collaborative, reasonably paced, and collegial development of these data collection programs, inviting and insuring all stakeholders are party to the process, may yield. The paper suggests a series of possible strategies (e.g., incremental data development, experimental design and applied pre-application testing) to accomplish that end, each of which offers insights and opportunities worthy of Council and stakeholder consideration.

The SSC agrees that an ongoing baseline economic data program should be initiated as a standalone action to be applied to all fisheries subject to FMPs that are not already subject to specific requirements to report economic data. Economic data are as critical to required regulatory analyses as are data on the biological status of stocks. The SSC has repeatedly commented on the need for baseline data to enable analysts to anticipate economic consequences of actions contemplated by the Council, and to conduct post-implementation analyses to determine the extent to which anticipated economic objectives are realized. The Council and NMFS have both the need and authority to acquire these data. It should be made clear that failure to comply with established data reporting requirements could result in loss of fishing privileges.

D-3 (a) BSAI chum salmon bycatch

Diana Stram (NPFMC) gave an overview of the data available to evaluate chum salmon PSC in Bering Sea groundfish fisheries, and a timeline for the development of additional analysis. She also presented the approaches being considered, and discussed the additional limitations in estimating the impacts of chum PSC compared to estimating the impacts of Chinook PSC. Jeff Guyon (NMFS) presented the results of a genetic analysis of chum salmon PSC composition in the 2005 Bering Sea groundfish fisheries. He pointed out that the genetic sampling was not designed to estimate the overall PSC composition, and has the potential to lead to biased results when used for this purpose.

The SSC agrees with the approach described for the analysis of chum salmon PSC data, particularly the analysis of fleet behavior and the attempt to develop AEQ analyses for as many stock groupings as practical. The SSC recommends that stock groupings from the genetic analysis, particularly for the Western Alaska grouping, should be subdivided, if possible. This would allow a better match to the scale of the available data and the management issues for chum stocks**. The SSC asked that issues arising from non-representative sampling of chum PSC be highlighted in any report, so that readers are made aware of the resulting uncertainty. The SSC also cautioned against using the MALBEC model for purposes for which it was not designed (i.e., regional analyses), although it may be appropriate for evaluation of Bering Sea wild versus hatchery stocks.**

D-3 (b) BSAI chum salmon area closure options

Diana Stram (NPFMC) presented analyses of the historical spatial and temporal pattern of chum salmon PSC. She gave an overview of the area closure options that were being considered and the approach that

would be taken to analyze their effects. The SSC notes that this analysis, based on current fishery behavior and regulations, could be limited, due to unforeseen changes to fishing patterns resulting from Amendment 91.

The SSC thought that the analyses based on average catches might be overly influenced by a few years of high catches, and **recommended performing analyses based on spatial and temporal patterns, normalized by each year's PSC level, be performed**. **The SSC believes that an analysis of oceanographic drivers of these patterns might be fruitful and should be explored.**

D-3(c-d) EFH Report and HAPC Criteria

A preliminary report on the 5-year review of Essential Fish Habitat (EFH) and on revised HAPC criteria was presented by Diana Evans (NPFMC), Matt Eagleton (NMFS-AKR) and John Olson (NMFS-AKR). Public testimony was provided by Nadeem Kazmi (concerned citizen), Jon Warrenchuk (Oceana), George Pletnikoff (Greenpeace and Alaska Intertribal Council), Karin Holser (Pribilof Islands Stewardship), Shelby Spencer (concerned citizen), Sofia Gridlund (Greenpeace NW), and Bubba Cook (World Wildlife Fund).

The EFH report was prepared for the December 2009 meeting, but the SSC deferred consideration of the report until the current meeting due to time constraints. The report provides a review of EFH for the 5-year period following completion of the EFH EIS in 2005, with the purpose of informing the Council for its decision in April, as to whether to initiate FMP amendments to update EFH components in the FMPs. The EFH review was limited to the BSAI and GOA groundfish FMPs, as well as a review of non-fishing activities that might impact EFH. A review of EFH for the scallop, crab, and salmon FMPs is in preparation, and **the SSC requests that potential changes to EFH information for those three FMPs be brought before it in April**.

The SSC appreciates the considerable effort made by the stock assessment authors, the groundfish plan teams, and the report authors to identify potential changes to the description of EFH for all groundfish FMP species, as reflected in both the report and Appendices 1 and 2. We also appreciate the effort to update the non-fishing impacts component, including the consideration of additional conservation and enhancement recommendations.

For the LEI model, it is important to identify and describe any new information on recovery rates of habitat types damaged by fishing gear, or to otherwise verify that there have been no changes in estimates of recovery rates. **If new information provides a significant improvement in our knowledge of EFH, the SSC recommends that the model be run again.** We also request that the report provide a more detailed summary of research results that are relevant to EFH determinations, including those from NPRB funded studies and those conducted by the HEPR program of NOAA. The case for a medium priority designation for sablefish was not well documented or justified, **and the SSC requests that this information be clarified in future documents.**

In preparing future reviews, the SSC suggests that consistent criteria be used by the various plan teams in designating priority changes to EFH descriptions, noting that the GOA groundfish descriptions have considerably more medium or high priority recommendations for changes than do the BSAI groundfish descriptions (Tables 4 and 6), despite having similar issues of concern.

The SSC supports the need to validate the LEI model and to improve estimates of recovery rates, particularly for the more sensitive habitats. We also encourage research on the effectiveness of existing habitat conservation areas, in meeting management and conservation objectives. Further, research to improve our understanding of EFH for squid and for forage fish will be important as the Council

considers moving GOA squid from the other species category, into a separate target species category, and assigning forage fish as being in the fishery or being in the ecosystem component category.

The SSC concurs with the revised evaluation criteria for HAPC proposals, and thanks the workgroup members for their efforts to improve these. The SSC requests the footnoted definition of habitat that accompanies the revised criteria be extended to include the water column, as well as the seafloor substrate. Suggested wording is: "Habitat includes living (infauna, epifauna, megafauna, etc.) and non-living substrate (rock, cobble, gravel, sand, mud, silt, etc.), as well as pelagic waters important to managed species."

D-3 (e) AI FEP

The SSC received an informative presentation by Diana Evans (NPFMC) on the progress of the Aleutian Island Fishery Ecosystem Plan (AI FEP). Supporting material sent to the SSC included a draft meeting report of the AI Ecosystem Team and Ecosystem Committee Minutes. No public testimony was given for this item.

The SSC concurs with the AI Ecosystem Team's proposed timeframe for providing updates to the FEP, developing Terms of Reference for the AI Ecosystem Team (AIET), and plans for a presentation to the Council at the February 2011 meeting. The SSC also agrees that it will be helpful for the AIET to identify a framework for using the AI FEP, while noting that the AIET will need to operate without duplicating existing efforts to compile, synthesize, and assess information on indicators of ecosystem status and trends in the Ecosystem SAFE. The SSC considers the current process of vetting this information through the Plan Teams, SSC, and Council to be valuable. The SSC also sees value in considering the AI a separate ecosystem in the Ecosystem Considerations chapter of the SAFE reports, where it may best inform management.

The SSC concurs with the AIET and Ecosystem Committee that the Team should include an economist. Additionally, given the importance of shipping safety and spill response in the highly-trafficked Aleutian Islands, the Team might consider including a representative who is already involved in and knowledgeable about shipping and spill response issues for this region.

OTHER MISCELLANEOUS ITEMS:

NS-2 Proposed Rule

The SSC reviewed the proposed rule concerning Magnuson-Stevens Act Provisions: National Standard 2 concerning Scientific Information. There was no staff report, but brief comments were provided by Chris Oliver (NPFMC), who pointed out that the guidelines should more clearly articulate that the SSC suffices as a peer review body and that additional reviews are optional, as necessary or desired.

The SSC is pleased that the proposed guidelines largely follow the advice of a report of the National Research Council published in 2004. In general, the proposed rule is very reasonable and provides clear guidance on the use of scientific information, role of the Scientific and Statistical Committee (SSC), and peer reviews in the Council process. We offer the following comments, intended to improve the clarity and function of the guidelines.

1. Optional peer review process. P. 65725 (right, top). The reference to 302(g)(1)(E) should be clarified to indicate that this section allows Councils to use SSCs for peer review, but also provides for an optional peer review process to be used at the discretion of the Council. Likewise, on p. 65729 (left, para. (b)), this section should be titled "Optional peer review process," instead

of "Peer review process". In this section, the text should again clarify that section 302(g)(1)(E) allows the Councils to use their SSCs for peer review, and also provides for an optional peer review process by the Councils at their discretion. The paragraph should clarify that it goes on to describe this optional peer review process. This clarification is necessary to avoid subsequent confusion. For instance, if it is not clarified that it is the optional peer review process being described, then the last sentence in the right column of p. 65729 ("reviewers should not be employed by the Council or entity that produces the product for management decisions") would be misinterpreted to indicate that NMFS and state fishery agency scientists could not serve as SSC members to review documents produced by those agencies.

2. <u>Role of SSCs and optional peer review process.</u> P. 65726 (right, top) and 65730 (middle, bottom). See: "The SSC should not repeat the peer review process by conducting a subsequent detailed review." Our concern is that this may be misinterpreted to infer that SSC input is not warranted if a peer review is conducted. To correct such a misunderstanding, we recommend adding: "but this provision is not intended to thwart or constrain the scope or depth of SSC comments." A similar follow-up statement occurs on p. 65726 (middle) on "optional peer review process" where it says: "However, NMFS believes that section 302(h)(6) should not be interpreted so as to displace the SSC's role in providing advice and recommendations to the Council."

3. <u>Inclusion of EFH information in the SAFE report.</u> P. 65727 (left, top), 65730 (right, middle), 65731 (middle, para. (v)). We recommend clarifying that EFH information may be included by reference and contained in standalone, separate documents, rather than physically merged into the annual SAFE report. The North Pacific Fishery Management Council (NPFMC) prepares annual SAFE reports for the annual specification process, whereas EFH information is prepared less frequently and for different purposes. The guidelines indicate that the SAFE report can exist as a collection of documents, so we recommend minor clarification that some documents (e.g., EFH) can be included in the SAFE by reference.

4. <u>Use of Local and Traditional Knowledge (LTK).</u> P. 65728 (middle, para. (C)). While we recognize and appreciate the value of LTK, the SSC notes that it can be very difficult to assess the objectivity or to verify and validate some LTK information. Also, as written, the last sentence on p. 65728 (middle, para. (C)) can be misconstrued to mean that scientific information needs to be reconciled to conform to LTK information. Therefore, we recommend revising this sentence to read: "To the extent possible, an effort should be made to consider both scientific information and local and traditional knowledge, when such knowledge has been verified and validated."

5. <u>Use of results from incomplete studies.</u> P. 65728 (right, para. (B)). Because not all incomplete results should be brought forward, we recommend changing "must be brought forward" to "may be brought forward".

6. <u>Accuracy and precision.</u> P. 65729 (top, para. (B)). We recommend changing "the precision of the estimates is adequate, model estimates are unbiased" to "the accuracy and precision of the estimates is adequate". We recommend this change as the parameter estimates in many nonlinear models have some bias that is tolerable.

7. <u>Clarification of text.</u> P. 65729 (left, (viii), 1st sentence). Insert "evaluation of" before "substantial". It is the evaluation that is peer reviewed, not the alternatives themselves.

8. <u>Timing of peer review.</u> P. 65729 (middle, (ii)). This section inadvertently indicates that the peer review is needed only at the start of the process. We recommend that it be revised to indicate that peer review is needed at all stages of the process, but that it should commence early on, so as to avoid major criticisms at the end of the process.

9. <u>Early disclosure of reviewers' identities.</u> P. 65730 (left, para. (3), last sentence). This sentence says that "Names and organizational affiliations of reviewers also should be publicly available prior to review." We do not fully agree with this mandate. If the peer review is conducted by the SSC or a panel during a public meeting, then names and affiliations are public information. However, it may be desirable to conduct some peer reviews by independent reviewers. Publication of the names of these independent reviewers prior to the review could open the door

to meddling in the review process by individuals or organizations wishing to bias the outcomes. Moreover, it could open the door to political interference in the selection of independent reviewers. Therefore, we recommend that the guidelines allow for the option that an independent set of reviewers are selected who remain anonymous until the reviews are completed.

10. Editorial comment. P. 65731 (left, para. (3)). We recommend inserting "To the extent possible" at the start of this sentence, because the items to be included in SAFE documents cannot be calculated for all stocks (e.g., minimum stock size threshold cannot be calculated for a data-poor stock with incomplete catch records).

11. Stock Rebuilding. P. 65731 (left, para. (B)). We do not believe that the SAFE report is the appropriate place to develop a rebuilding plan. Rather, we believe that development of a rebuilding plan and analysis of alternatives should be developed in a separate document, such as a plan amendment. The SAFE document should be used to report progress toward stock rebuilding.

12. Assessing the success of state fishery management. P. 65731 (left, top). This paragraph appears to require that SAFE reports include an assessment of the "relative success of existing state and federal fishery management programs." We note that a number of state fishery management programs address non-federally managed species. Therefore, we recommend revising this statement to read: "relative success of existing federal and relevant state fishery management plans."

VMS-Observer Enabled Catch-in areas database methodology

The SSC received a presentation from Steve Lewis (NMFS-AKR) reviewing the VMS-Observer enabled Catch-in-Areas database. The project aims to allocate all catch to approximately 7 km^2 grid cells using a six-step process, where the catch allocated at each step depends on the quality of the information associated with that catch. **The SSC greatly appreciates the work that has gone into this new database, and notes that it provides a significant improvement over existing geographic catch accounting.**

As presented, allocation based on VMS points and observer data (step 1) would be equal among any cell which contains either a VMS point or is crossed by a line joining the observed start and end fishing locations. T**he SSC recommends the following improvements:**

- For each record, a single track line connecting the VMS points and observed start and end points be developed, and that the allocation of catch be proportional to the fraction of the track that crosses each cell.
- Continued work to resolve the mismatches between VMS ID and Vessel ID that necessitate step 2, which would allow at least a portion of this catch to be allocated in step 1.
- Because of the greater uncertainty in the parts of the allocation process for which no observer data are available, including deciding when a vessel was actually fishing, **an analysis of catch for which observer data are available should be undertaken in order to assess this uncertainty.** Such an analysis would compare the allocation of catch to cells assuming no observer data with the allocation making use of observer data.
- **When computing distances, a method should be used that accounts for the curvature of the Earth's surface, rather than one based on a flat projection.** Algorithms for such distance calculation are readily available and easy to implement. For example, see http://www.movable-type.co.uk/scripts/latlong.html

Data weighting workshop

The SSC received a report from Dr. André Punt (UW) on a workshop that was convened in May of 2009 by the Crab Plan Team (CPT) to discuss: 1) standardization of the organization and content of SAFE

reports on Alaska crab stocks; 2) methods and rationale for weighting of different data sources in stock assessment models; and 3) methods and rationale for choice of a specific value of gamma ($\gamma \approx F_{MSY}/M$) for specifying OFLs for tier 4 crab stocks. The SSC had previously raised these issues during reviews of crab SAFE documents in our October 2008 and June 2008 reports as recommendations to the CPT and assessment authors.

The SSC greatly appreciates the conveners of the workshop and invited speakers for their insights into the stock assessment modeling process. As part of the report, there was agreement on a set of recommendations for assessment authors in preparation of the SAFE document, standardization of model weighting philosophy and procedures, and methods for determining gamma for tier 4 stocks. **The SSC agrees with all of the recommendations as summarized in section E of the workshop report and recommends that the CPT consider implementing these recommendations and documenting them in SAFE documents.** In particular, the SSC strongly suggests that assessment authors avoid the use of arbitrary weights for components of their assessment models and express weights as standard deviation (index data sources) or effective sample size (composition data sources). The SSC also supports the investigation into alternative likelihood functions, especially those robust to outliers (e.g., Dirichlet instead of multinomial likelihood for composition data sources).

SSC Workshop on Ecological and Economic Indicators

Stefani Zador (UW-JISAO), Kerim Aydin (NMFS-AFSC), and Sarah Gaichas (NMFS-AFSC) gave an overview of the current Ecosystem Chapter, including their ideas for changes in format, content and orientation. They sought SSC feedback on what to synthesize, when and how to present it, and how to represent uncertainty. Regarding format, they are thinking about reorganizing the chapter into a short (3-5 page), highly focused "glossy" executive summary ("Report Card"), a 20 p. synthesis, and the body of the chapter merging status indicators and management indices. Unlike the individual species' SAFE chapters, which include an ecosystem consideration section for each individual species, the synthesis in the Ecosystem Chapter is proposed to be organized by ecosystem (GOA, AI, and BS). It was proposed that the ecosystem-wide syntheses would include some indices on global to regional scales. Regional indices would include status of trophic guilds plus some other standard indices, such as trophic level of the catch, fishery is balanced (FIB) index, etc. The presenters suggested that an ecosystem team could be assembled to write the synthesis section of the ecosystem chapter.

The SSC greatly appreciates the ongoing efforts to continue improving the Ecosystem Chapter. The SSC notes that the Ecosystem Chapter serves three quite different objectives: To provide immediate update of current conditions in each region that could affect the setting of ABCs; an overview of the state of the ecosystem and the effectiveness of management actions relative to the goals and objectives of ecosystem approaches to management; and an update on new findings that may be of long-term significance to management (e.g. regime shifts).

The SSC offers the following comments:
- The SSC wishes to emphasize the continued importance of the Ecosystem Chapter to the plan teams on an annual basis. In particular, it is important for annual updates to be brought to the attention of plan team members, so that relevant ecosystem considerations can be included in the annual SAFE chapters for each fish stock.
- The SSC supports the overall proposed new organization of the ecosystem chapter into a 3-5 page highly focused executive summary, a 20-page synthesis, and a body of text with ecological indicators and management indices. The FEP teams should exercise their collective wisdom to consider the relevant contents of the executive summary and synthesis. The SSC supports the general approach for the ecosystem-level synthesis to include global to regional indices, use of

guild indices, etc. For guilds that may be dominated by one species (e.g., pollock or arrowtooth flounder), this effect should be discussed when the guild indices are presented.

- The SSC discussed the use of Fishery Ecosystem Plan (FEP) teams to decide on indices to summarize for each ecosystem. Perhaps initially, and then on a 5-year basis, the ecosystem teams could help distill the large set of indicators into a core set to bring forward in the executive summary and synthesis. In addition to those core indicators that capture key elements of ecosystem status and trends, the SSC also emphasized the need to highlight those significant annual changes that may affect management decisions and thus should be considered by individual SAFE chapter authors in their ecosystem considerations. In particular, large changes in an indicator (e.g., coccolithophore blooms, seabird dieoffs) could be reported. Also, major new research findings or breakthroughs should be summarized and their significance for management addressed.

- Concerning the section of the Ecosystem Chapter on ecosystem and management indicators, the SSC recommended consideration be given to some new indices. First, as sea ice and temperature change, the geographic distributions of species change, as well. For some species, changes in geographic distribution may be as ecologically consequential as changes in biomass. Thus it would be valuable to have an index of geographic distributions of key species. Second, the SSC recommends considering including trends of ESA-listed species. As trends in these species can have large effects on fishery management, treatment of their status and trends (perhaps following the guild idea) may be a useful indicator. In addressing both temporal and spatial trends, it will be important to be cognizant of the relevant temporal and spatial scales. Trends over a 5 year period may not be particularly useful, especially when dealing with long-lived organisms.

- An area that might be of interest is the exploration of possible predictive relationships between environmental indices and responses of fish (changes in growth, survival, recruitment, etc.). The eventual goal would be to develop quantitative indices that could inform the stock assessment process.

- The question was raised about how to represent uncertainty. The SSC advises against cluttering figures with measures of uncertainty. However, when an indicator is brought forward, uncertainty should be considered when evaluating its utility. Possibly, consideration could be given to a brief description of the level of uncertainty associated with each indicator in the summary section of each indicator, following the brief description of the index.

- The SSC suggests that the presentation of the Ecosystem Chapter should come at the start of the December meeting before the presentation of the individual species' assessments. Discussions of the Economic SAFE might be best done in February to maintain separation of biological information critical for setting of the ABCs and OFLs, and the economic implications of those decisions.

Ron Felthoven (NMFS-AFSC) gave a presentation on the development of economic indicators. Topics included analyses of revenue decomposition, price forecasts, principal component analysis (PCA) of variations in ex vessel revenues, and models of fishery participation decisions.

- The SSC appreciates hearing about the ongoing research in these areas by AFSC economists.
- The revenue decompositions provide a concise representation of how fishing revenues depend on changes in the magnitude of commercial harvests and changes in market prices.
- The price forecasts provide an important extension to analyses of historic market conditions included in the Economic SAFE. While information about anticipated market conditions may be readily available to individuals engaged in those fisheries, it has not been readily available to other stakeholders and decision-makers. It may be helpful to pre-filter the data used in the VAR models to account for past structural shifts.
- The PCA analysis of fisheries that drive variation in regional fishery revenues may be improved if it was conducted at a resolution that matches the resolution of individual FMPs or of the

ecosystem analyses. PCA may also he a useful tool for teasing out the relative magnitude of inherent variability in salmon PSC from variability subject to operational choices.

- Models of participation in fisheries could be very helpful in evaluation of alternative Council actions. For example, such models could have been a very useful addition to the draft RIR/IRFA on exemption to West Region landing requirement in the Western Aleutian Islands golden king crab fishery.

Chang Seung (NMFS-AFSC) gave a presentation on a Multi-attribute utility function (MAUF) approach on socioeconomic indicators. MAUF is a mathematically and logically consistent approach to aggregation of multiple indices or objectives. While it is difficult to meet the conditions necessary for MAUF, there is substantial pressure to provide aggregate "report cards" or other summary measures of the status of ecosystems and socioeconomic performance of fisheries. The credibility of such summary performance scores depends on the extent to which their construction is consistent with the necessary conditions identified for MAUF.

Kerim Aydin (NMFS-AFSC) reported on assessments of an ecosystem approach to fisheries, using the Integrated Fisheries Risk Assessment Method for Ecosystems (IFRAME), which is a nested set of risk indices, including indices of fishery management objectives (sustainability, habitat, biodiversity, and socioeconomics), species, fisheries, and ecosystems. This approach was developed by Dr. Chang Ik Zhang and has been subsequently applied to some fisheries in Korea and Alaska, in cooperation with AFSC scientists.

The SSC notes that the IFRAME approach is interesting and provides some useful indices of status. However, there are questions about perceived levels of risk, and potential differences in the direction of the indicator and the realization of effect. For example, indices of habitat protection (trawl tows, areas trawled) may give quite different information than measures of the actual response of the habitat to the change in fishing effort.