

# North Pacific Fishery Management Council

Eric A. Olson, Chairman  
Chris Oliver, Executive Director



605 W. 4th Avenue, Suite 306  
Anchorage, AK 99501-2252

Telephone (907) 271-2809

Fax (907) 271-2817

Visit our website: <http://www.alaskafisheries.noaa.gov/npfmc>

Certified: \_\_\_\_\_

Date: \_\_\_\_\_

**FINAL REPORT of the**  
**SCIENTIFIC AND STATISTICAL COMMITTEE**  
**to the**  
**NORTH PACIFIC FISHERY MANAGEMENT COUNCIL**  
**January 31<sup>st</sup> –February 2<sup>nd</sup>, 2011**

The SSC met from January 31<sup>st</sup> through February 2<sup>nd</sup>, 2011 at the Renaissance Hotel, Seattle, WA.

Members present were:

**Pat Livingston, Chair**

*NOAA Fisheries—AFSC*

**Susan Hilber**

*Oregon Dept. of Fish and Wildlife*

**George Hunt**

*University of Washington*

**Jim Murphy**

*University of Alaska Anchorage*

**Kate Reedy-Maschner**

*University of Idaho Pocatello*

**Farron Wallace, Vice Chair**

*Wash. Dept. of Fish and Wildlife*

**Sue Hills**

*University of Alaska Fairbanks*

**Gordon Kruse**

*University of Alaska Fairbanks*

**Lew Queirolo**

*NOAA Fisheries—Alaska Region*

**Ray Webster**

*International Halibut Commission*

**Robert Clark**

*Alaska Department of Fish and Game*

**Anne Hollowed**

*NOAA Fisheries—AFSC*

**Franz Mueter**

*University of Alaska Fairbanks*

**Terry Quinn**

*University of Alaska Fairbanks*

Members absent were:

**Jennifer Burns**

*University of Alaska Anchorage*

**Doug Woodby**

*Alaska Department of Fish and Game*

**Kathy Kuletz**

*US Fish and Wildlife Service*

**Seth Macinko**

*University of Rhode Island*

**Election of Officers** – The SSC re-elected Pat Livingston for chair and Farron Wallace as vice chair. The SSC would like to welcome three new members to the committee, Kate Reedy-Maschner, Jennifer Burns and Jim Murphy. Kate's expertise in social anthropology and Jim's expertise in economics will improve our ability to be responsive to a wide range of issues and analyses. Jennifer Burns's expertise in marine mammals will be essential as the Council continues to deal with difficult Steller sea lion issues. We would also like to express our sincere best wishes and gratitude for many years of dedication to the SSC for two members Keith Criddle and Sue Hills who will no longer be participating on the SSC.

## **C-3(a) BSAI Chum Salmon Bycatch – Preliminary Review Draft EA and RIR**

Diana Stram (NPFMC), Nicole Kimball (NPFMC), Jim Ianelli (NMFS-AFSC), and Alan Haynie (NMFS-AFSC) presented details from the preliminary draft Environmental Assessment (EA) and Regulatory Impact Review (RIR) concerning analysis of alternatives and assessment of potential impacts of addressing chum salmon bycatch (PSC) in the BSAI groundfish fisheries. Topics discussed in the EA were the background and rationale for the action, a description of the affected fisheries (including state-managed salmon fisheries), the range of management alternatives considered, potential analytical

techniques for assessing the implications of chum salmon PSC at the drainage and region level, and evaluating the impacts of the alternatives. There was no public testimony.

Alternatives discussed in the EA include: 1) status quo, with the current system of area closures along with exemption to these closures by pollock vessels participating in the Voluntary Rolling Hotspot inter-cooperative agreement (VRHS ICA); 2) a hard cap on chum salmon bycatch, with options for sector splits, sector transfers, and cooperative provisions; and 3) chum salmon bycatch triggered closures, with options for sector splits, sector transfers, cooperative provisions, area and timing considerations, and a rolling hotspot system.

The SSC commends the authors for the impressive amount of work completed to date. The analysts have clearly benefited from their experience conducting the Amendment 91 analysis of Chinook salmon PSC and have applied these lessons in this preliminary version of the EA. In particular, the background section is well written and the description of the alternatives is clear and concise despite their complexity. The AEQ and selection of closure area methodologies, as previously reviewed by the SSC, are sufficient for this type of analysis. The SSC has the following recommendations for improving the document:

- Although the alternatives are clearly articulated, the analysis would greatly benefit from a clear, concise problem statement and description of the purpose and goals of this management action.
- Alternative 3, component 5 describes a rolling hotspot system in addition to the triggered closures that are the main thrust of this alternative. This component may need further clarification from the Council to ensure this component fits within the overall alternative.
- The EA should include appropriate caveats on the unpublished or soon to be published nature of estimates of the proportion of chum salmon PSC samples in each stock grouping.
- Discrepancies between temporal stratification of genetic data and temporal/areal stratification of PSC need to be resolved, so that genetic data can be appropriately weighted to estimate chum salmon PSC by regional stock groupings.
- Estimates of chum salmon PSC proportions by stock grouping need to be analyzed for a ‘year effect’ before estimates are averaged and then used to estimate total chum salmon PSC for years when no genetic sampling occurred. If a year effect is evident, the analysis may need to be restricted to years when estimates of chum salmon PSC for stock groupings are available (2005-2009).
- The assumption that a pooled (among years) age-length key for chum salmon is sufficient to estimate age composition of PSC needs to be tested. One way to investigate this is to examine variation in mean length at age, by sex, among years when sufficient age-length samples are available.
- The EA would greatly benefit from a table of annually estimated PSC by subregional or drainage groupings (e.g., Norton Sound drainages, Yukon River summer chum drainages) alongside estimates of total inriver run, inriver harvest, inriver harvest rate, and chum salmon PSC, so the reader can see the estimated impact of chum salmon PSC on annual run strength. Determination of groupings to be used in this analysis should be facilitated through a workshop with the analysts and ADF&G fishery managers.
- The authors need to fold the analyses of status quo management of chum salmon PSC in the January 25, 2011 action memo into the EA. Plans for analyses of status quo management seem to be reasonable, but also need to investigate the effect of individual vessel behavior on variation in PSC rates with respect to current closed areas and rolling hotspots. Although the status quo analysis speculates on the effect of Amendment 91 management actions on chum salmon PSC, the analysis of impacts of the alternatives in the EA and RIR will have to rely on the assumption that fleet behavior will remain constant. The SSC looks forward to seeing analyses of the effect of base PSC rate, closure area limitation, and the modifications to the tier system on the efficacy of the VRHS ICA.

The SSC also has some minor corrections to the EA document as follows:

- We are assuming that sections indicated with placeholders will be filled in with the relevant information, and the number of tables and figures in section 5 will be integrated into the remainder of the document.
- In section 5 on page 173, reconstructed total run information for Kotzebue area chum stocks may exit. Check with ADF&G staff to see if these data are available.
- On page 100, the definition for Sustainable Escapement Goal (SEG) has changed recently to include lower bound SEGs, as well as SEG ranges. The revised text is in the current version 5 AAC 39.222(f)(36).
- In section 3.1 on page 68, the last sentence on the page references Chinook salmon, instead of chum salmon.
- The website URL in footnote 2 on page 13 is outdated. The correct website is [www.habitat.adfg.alaska.gov](http://www.habitat.adfg.alaska.gov).

The SSC offers the following observations concerning the Preliminary Draft RIR. The staff noted that there is not a Council-endorsed Problem Statement for this proposed action and their intention to highlight this deficiency when presenting this agenda item to the Council later this week. A fully articulated problem statement will greatly improve the analysts' ability to complete this analysis.

As the RIR author acknowledged in the document, and made clear in staff presentation, this is a very preliminary draft of the chum salmon PSC reduction program analysis. Effectively, none of the mandatory elements prescribed under Magnuson, EO12866, and RFA are present yet in the draft document.

The contents of the document, beyond placeholder RIR headers, include descriptive information and historical empirical statistics on the development, operation, production, and economics of the Bering Sea pollock sectors. Similarly, the extensive subsistence-use/dependent community profile narratives in the document are important and informative; however, the SSC encourages a more inclusive but concise description of all western Alaska chum user groups beyond Yup'ik communities, and suggests shortening the dog team section. The SSC also encourages the analysts to carefully re-evaluate the extensive profile discussion for relevance to the chum salmon PSC reduction program for the BSAI pollock fishery action. Both sets of information (i.e., BSAI AFA pollock fishery; chum salmon escapement/subsistence/in-river commercial salmon status) provide context, which are key to construction of the required RIR elements in the next phase of its development.

The SSC was very encouraged by staff efforts to integrate genetic region-of-origin research results for the chum salmon PSC in the Bering Sea pollock fisheries. These data are crucial to the analysis of the potential economic, socioeconomic, and cultural impacts that may emerge from each alternative chum salmon PSC avoidance action. Without the integration of region-of-origin information, any meaningful interpretation of the potential relationship between chum salmon PSC removals in the EBS pollock fisheries, and the status of subsistence and commercial users of chum salmon resources that derive from North American sources will be problematic. Further, the ability of the RIR to address the requisite "net National benefit" assessment is highly dependent on regional source composition of chum salmon PSC. The SSC encourages the analysts to integrate this crucial contextual information in the next iteration of the draft. When evaluating the impacts of chum salmon PSC removals on subsistence users, the SSC encourages the analysts not to limit their evaluation just to impacts on run size relative to subsistence needs, but also to consider the possibility of increased harvest costs imposed on subsistence users as run size decreases. Examples could include changes in fuel costs and the opportunity cost of time spent harvesting. The SSC also encourages analysts to evaluate human population trends in impacted communities and regions.

The SSC notes that, based upon our review of the document package and the presentations received from staff, a substantial amount of work remains to be completed before the June 2011 target date for an Initial Public Review Draft RIR/IRFA.

#### **C-4(a) EFH discussion paper/finalize alternatives on HAPC-Skate sites**

A discussion paper and initial alternatives for HAPC Skate Nursery Areas was presented by Sarah Melton (NPFMC) and Matt Eagleton (NMFS-AKR). HAPCs are areas within EFH that are rare and are ecologically important, sensitive to disturbance, or stressed. At the October 2010 meeting, the Council selected an AFSC proposal on skate nursery HAPCs for consideration for analysis. Six skate nursery sites in the BSAI management area were identified for potential HAPC designation. At this meeting, the Council intends to decide whether to initiate a full analysis and to finalize the alternatives.

The SSC appreciates analysts' efforts to develop this discussion paper. The SSC agrees with the HAPC ranking of skate nursery areas, as determined by the Plan Team, and supports initiation of a full analysis of the proposed alternatives. The proposed three alternatives, as well as the options listed under alternative 3, appear to be complete.

The SSC offers the following suggestions for consideration in the development of the full analysis:

- The selection of six skate nursery areas was determined by identifying areas exceeding a threshold of 1,000 eggs/km<sup>2</sup>. The basis for choosing a threshold should be justified. The SSC recommends considering the development of species-specific thresholds based on considerations of egg density at these sites with respect to their estimated mean egg case densities. Presumably different thresholds may be necessary for each species based on its abundance and fecundity.
- The SSC understands that the choice of six areas for research resulted from a screening process involving examination of trawl survey and observed fishery catches of skates and follow-up field research. The analysts should consider meeting with fishermen to seek their knowledge in selecting the subset of nursery areas for action and/or future research. Discussions with fishermen could also uncover the degree to which these areas are known to fishermen and avoided already.
- The SSC recommends considering the appropriate shape for nursery area designation. Given that concentrations are found in the center of the distribution and decrease with distance from the center, an ellipse may best fit the actual shape of the nursery area. An ellipse could be chosen to include a given proportion of total number of egg cases in a given nursery area (e.g., 50%) as estimated by fitting a bivariate normal model to these data. The SSC also questioned the confidence in zero values on the periphery of the sampling area for use in defining the total extent of the area to be designated.
- It may be necessary to determine a threshold for the minimum size of an area for which closures are enforceable. The analysts should receive guidance about the minimum size (and shape) of the areas from the Enforcement Committee.
- The SSC noted that the six areas identified amounted to 0.05% of the estimated area of the EBS. During questioning, the analysts indicated that the reported potential for discovery of up to 300 additional sites is misleading and highly speculative, and that this issue would be more accurately addressed during the full analysis. The SSC noted that the proposed 6 sites do not afford protection to all skate species and include only two sites each for Aleutian skate and Bering skate.
- A full analysis should analyze the potential effects of fishing on embryo survival and population-level effects. A review of gear types employed and their potential differential effects on the mortality of egg cases and reproductive adults should be considered in the document. Additional

justification should be provided regarding damage and mortality of egg cases by fishing gears. This information is necessary to inform the selection of Alternative 3 options.

- The full analysis should describe the procedure by which additional sites are added to or subtracted from HAPC in the future, after consulting the Council. Presumably, potential new sites would be bundled into a future plan amendment. The Council could, perhaps, consider such modifications to skate nursery area designations on a periodic basis as a standing priority.
- The SSC supports the option to monitor skate nurseries every few years, but it is not clear that the best way of highlighting this priority is by including this in an amendment to the FMP, which is not updated frequently. This priority should be included as part of the Council's list of research needs, drafted by the Plan Teams, and evaluated by the SSC annually.

#### **C-4(b) Initial review EA EFH omnibus amendment**

A summary of the preliminary review draft EA for EFH omnibus amendments was provided by Diana Evans (NPFMC) and Matt Eagleton (NMFS-AKR).

Based on the recently completed EFH 5 year review, the Council identified various elements of the EFH descriptions that merit revision, and initiated an analysis to address the recommendations. The EFH initial review document summarized information on prospective changes to EFH for FMP groundfish, crab, scallop, and salmon species, respectively. Amendments will apply to the Arctic, BSAI, and GOA regions. Eight actions are recommended.

#### **The SSC recommends that this document be released for public review.**

The SSC provides the following comments and suggestions to be included before release to the public:

- **The Council's approach to updating the EFH analysis is founded on the conclusion from review of updated information that the spatial footprint of fishing activity has not changed substantially over the last 5 years. Given the central importance of this finding, it is critical that this be explicitly mentioned in the document.**
- The SSC agrees that the document should separate BSAI Kamchatka flounder as a separate species. We also note that in the future, BSAI Bering flounder may be broken out from the flathead sole assessment and, if that occurs, EFH descriptions of this species will also be needed.
- The SSC requests that the authors select a standard unit (complex or species) and use that unit consistently throughout the document. In the current version, there is a mix of species in some tables and species groups in others. For an example of the problem refer to Tables 5 and 6.
- The SSC agrees that Action 6 (EFH conservation recommendations for non-fishing activities) should be considered. When developing this document, it would be useful to provide a short discussion that clarifies that climate change (global warming) and ocean acidification are related to the build-up of green house gases in the atmosphere and these changes are likely to impact EFH, especially in the Arctic. The build-up of greenhouse gases in the atmosphere could be addressed in the summary of non-fishing human activities.
- The SSC reviewed the description of the proposed new method for designating salmon EFH. While this method appears to be an improvement over previous approaches, the SSC will reserve judgment on its merits until it is able to review the technical memorandum that provides the details of the technique used.
- The SSC understands that the revised analysis of the effects of fishing on EFH for crab will be available in April 2011. The SSC also understands that, if the crab EFH white paper identifies a need to consider further FMP amendments, these may be treated in a separate action.
- The SSC requests that objectives be included in the research priorities on page 52, and research questions and activities should also continue to be included.

### **C-5(a) Discussion paper on BSAI Pacific cod split**

The SSC received a staff presentation from Jon McCracken (NPFMC). Public testimony was provided by Dave Fraser (Adak Community Development Foundation), Frank Kelty (City of Unalaska), Jon Warrenchuk (Oceana), Kenny Down (Freezer Longliner Coalition), and Brent Paine (United Catcher Boats).

The paper discusses various alternative approaches to sector allocation revisions, should cod BSAI ABC and TAC be separated into BS and AI. A substantial amount of uncertainty remains with respect to these action alternatives, especially in light of the 2010 SSL BiOp and RPAs. We have, at present, no empirical experience to understand fishing sector behavioral responses to the RPA's. As the author demonstrated, until these uncertainties can be clarified, it is difficult to arrive at a clear understanding of the "reasonably likely" outcomes that may emerge from each apportionment alternative identified in the paper. The SSC has previously expressed concern, when reviewing the Draft RIR/IRFA supporting the 2010 SSL RPA action, that the document contained expectations and assertions concerning cod fishing patterns and redeployment that conflict with cod effort redeployment assumptions used in other recently proposed management actions (e.g., Amend. 90 RIR). These conflicting assumptions further confound analysis of impacts of AI and BS sector apportionment splits. Last, but certainly not least, is the prospect of triggering another ESA consultation on AI Steller sea lions, adding to the difficulty of rapidly moving forward with this action.

It is noteworthy that recent cod biomass estimates indicate that the proportion of the combined BSAI biomass that AI represents is smaller than previously estimated (i.e., historical estimate >16%; new estimate ~9%). As AI cod allotments are reduced on the basis of the revised biomass, some sectors' shares may become inaccessible (e.g., NOAA may not be able to open a fishery, due to limited TAC). This may have very significant implications for apportioning future AI cod fishing opportunities necessary to sustain patterns of historical dependency (e.g., catch distributions by area, operating mode, and gear type). Splitting the cod allocation between the BS and AI is likely to reduce the potential for localized depletion of AI cod by the BSAI cod fleet. However, the SSC notes that the potential still remains for localized depletion, given that a large portion of the fishable AI area may be closed under SSL RPAs, concentrating effort in those remaining open areas.

The SSC recommends that the stock assessment author and Plan Team develop a plan of action for how the BSAI cod assessment should evolve. The possibilities include, maintaining the status quo of a modeling approach in the BS and survey biomass in the AI, having separate models for the BS and AI, or having a single BSAI model (with or without geographic stratification and movement).

The discussion paper cites several aspects of a future AI cod sector apportionment action that may require the Council to revisit its original Problem Statement and 'purpose and need' rationale. Formal clarification of the Council's desire in regards to, for example, examining limits on EBS TACs, specifying area-specific allocations, and the disposition of latent permits are identified by the analyst. The interplay between the Federal AI cod fisheries and the State's parallel-waters AI fishery will also require Council examination and guidance, particularly in light of the most recent actions by the Alaska Board of Fisheries and ADF&G regarding SSL mitigation, and several pending lawsuits challenging the 2010 BiOp and RPAs.

Depending upon the Council's expectations for further analysis of this topic, revisions to this discussion paper could advance the development of the initial documents (e.g., RIR, IRFA), necessary to support formal Council action. If the discussion paper were revised, the SSC recommends expressly incorporating the recently announced State of Alaska AI cod management changes into the analytical baseline.

## **C-6 (b) Initial review of BSAI crab IFQ/IPQ application deadline**

The SSC received a concise staff report from Mark Fina (NPFMC) on this agenda item. No public testimony was provided. The draft document is a straightforward presentation of the arguments for and against the proposed modification of existing regulations specifying application deadlines for BSAI crab fishing cooperatives, IFQ, and IPQ privilege holders. The action is largely an administrative adjustment initiated with the expectation of improving operational efficiency and promoting more complete utilization of the crab resources of the BSAI, while reducing the regulatory burden on fishery participants.

The proposal does not appear to present any novel or complex scientific or statistical issues. The draft analysis would benefit from a thorough editing to enhance clarity. To this end, the SSC will provide the author with specific suggestions and recommendations. The author is requested to elaborate on, for example, the unexplained assertion in sections 2.4.2 and 3.5 that the date change should not impose an undue hardship. On the issue of reducing the period within which to file an appeal, the analysis should explicitly affirm that there are no regulatory or legal mandates that would conflict with the proposed interval change. The IRFA is incomplete and will require the addition of tabulations of entities expected to be directly regulated by the proposed action, including, to the extent practicable, an evaluation of their size for RFA purposes, based on SBA criteria.

**The SSC recommends that the document be sent out for public review after our recommended edits are addressed.**

## **D-1 (a) Discussion paper on sablefish recruitment factors**

Jon Heifetz (NMFS-AFSC) presented a discussion paper on factors affecting sablefish recruitment in Alaska. The overview was provided in response to Council's request for additional information on sablefish recruitment in regards to possible development of small EFH research closures, in areas of intense fishing. Linda Behnken (Alaska Longline Fishermen Association) provided public comment.

The presentation and white paper provided an overview of the current knowledge of sablefish recruitment and possible factors affecting episodic recruitment events, as well as a description of ongoing and future research projects that will help fill in data gaps and enhance our knowledge of sablefish recruitment. Assessment authors conclude that at this time it is premature to recommend EFH measures, given our lack of sufficient information to understand the effects of fishing on sablefish recruitment.

To date, there has not been an adequate assessment of the impact of fishing on sablefish essential fish habitat, and the effects of these impacts on sablefish growth, recruitment, and spatial distribution. Given that the time series of growth, recruitment, and spatial distribution for sablefish is among the longest for any groundfish managed by the NPFMC, some effort to provide a statistical assessment of the implications of fishing on sablefish EFH is warranted. **The SSC agrees that there is insufficient information to justify small research closures. If such closures are considered in the future, the SSC recommends that proposed areas include a study design and clear objectives.**

The SSC notes that the spatial distribution of sablefish spawning potentially includes a region where trawling has been prohibited (SE Alaska). This may provide a rare opportunity to assess growth, recruitment, and spatial distribution before and after the closure, and to assess habitat changes and estimate habitat recovery rates in SE Alaska.

It was noted in public testimony that Saint John the Baptist Bay has been a site of large sablefish recruitment events in the past. Development of possible EFH sites in State waters warrants further consideration and cooperation between Federal and State representatives to develop EFH initiatives.

Jeff Fujioka (NMFS-AFSC) has been involved in sablefish assessment and research for many years. Jeff has recently retired and the SSC would like to thank him for his dedication, and acknowledge his years of work that have greatly improved our understanding of population dynamics of this valuable resource.

#### **D-1 (c) Estimation of non-target species catch in the halibut fishery**

Cindy Tribuzio (NMFS-AFSC), with Olav Ormseth (NMFS-AFSC), presented a summary report prepared by a working group examining methods to estimate catch of non-target species in the unobserved halibut IFQ fleet. While recognizing the limitations of the data sources, the SSC agrees that the working group is doing the best it can with the available information. **We support the recommendations of the report that catch of non-target species be estimated using the CPUE catch estimation method, utilizing proportionally weighted survey data.**

The SSC requests clearer documentation of the statistical methods used to estimate catch. In particular, the inclusion of mathematical formulae to precisely describe the methods used would be very helpful, and would ensure that those reviewing this work in the future have a clear understanding of what was done. Finally, we recommend that the working group review the commercial catch records for the areas in which its report shows no commercial catch was taken (a large area west of Kodiak and a smaller area in SE Alaska). This could be done in conjunction with IPHC staff.

#### **D-1 (d) NOAA/BSFRF survey results for snow crab**

The SSC received a presentation by David Somerton (NMFS-AFSC) and Steve Hughes (BSFRF) on the analysis of 2010 data from a cooperative study conducted by NMFS and BSFRF to estimate selectivity of the NMFS survey trawl for snow crab. This was a well-designed, thorough field study. The SSC appreciates the enormous efforts by BSFRF and NMFS to evaluate and estimate snow crab selectivity to inform the snow crab assessment.

The 2010 results generally agree with results from previous studies in 2008 and 2009, which imply that the NMFS survey trawl selectivity for snow crab is much less than 1, over most of the range of snow crab sizes. The new results are based on estimating a smooth, non-parametric selectivity curve, as a function of crab size, that is allowed to vary with net width, depth, and grain size (representing substrate).

For males, the results show a sharp increase in survey selectivity starting at about 30 mm carapace width, a leveling out or slight increase past 50 mm, and then a sharp increase at 100 mm (see Figure 8 in the associated document). The sharp increase at the end is somewhat counterintuitive; the usual expectation is that the shape of the selectivity curve is logistic, with an asymptote at the upper end. This may be an artifact of the small number of large crabs encountered or, perhaps, due to unknown behavior or gear effects.

For females, estimated survey selectivity rises rapidly to a maximum near 55 mm and then decreases slightly to the upper end at 70 mm (also see Figure 8). For both males and females, the estimates are highly uncertain at the larger crab sizes. The results also suggest that selectivity is higher in sand than mud, and in shallow waters than deep waters, although this is confounded because sand is typically associated with shallow water. The latter result is consistent with studies on capture efficiency of a similar bottom trawl for snow crab in Newfoundland (Dawe et al 2010, Fish. Res. 101: 70-79). The question of how to incorporate these results into the snow crab assessment model is one topic to be considered at a crab modeling workshop in February 2011.



The SSC provides the following recommendations to the analysts:

- The SSC agrees that the experimental data from 2010 could be combined with 2009 data to reduce the uncertainty about the estimated selectivity curve. This would, in particular, improve selectivity estimates at larger sizes, because more large crabs were observed in 2009.
- The SSC understands that the analysts will present a detailed summary of the analysis at the modeling workshop. The summary should include a presentation of observed proportions in each size bin and each station, as well as the GAM fits and model diagnostics to allow for a full evaluation of the estimated selectivity curves. Therefore, the best empirical estimate of gear and survey selectivity, and its use in the model, must await the conclusions from the workshop and further analysis by the researchers.
- The SSC recommends that the analysts also consider a semi-parametric approach that uses a logistic form of selectivity at size, combined with a non-parametric smooth function of the covariates, to model differences in selectivity by depth and grain size. This would allow a more formal comparison of a logistic selectivity curve with a more flexible curve. Truncation of the data at 100 mm-120 mm could also be considered.

The SSC requests that models considered during the next assessment cycle include options to fix selectivity at the best estimate from these analyses, to use a flexible selectivity curve with priors on selectivity parameters derived from the field experiments, and to freely estimate selectivity using a flexible selectivity curve. It may be worth exploring the use of more flexible functions than the two-parameter logistic, such as the generalized logistic models in Dawe et al. (2010) or the general growth models of Schnute and Schnute and Richards (Quinn et al. 1999, Quantitative Fish Dynamics. Oxford Univ. Press).

### **SSC Workshop on Socioeconomic Research and Economic SAFE**

The SSC is impressed with the variety and quality of economic research being conducted at AFSC. The SSC appreciates the excellent staff presentations during the workshop. Presentations included:

#### Economic SAFE Report (Groundfish)

- Overview of fishery trends and content (Felthoven)
- Revenue decompositions (Dalton)
- Proposed new market and risk indices (Fissel)

#### Economic SAFE Report (BSAI King and Tanner Crab)

- Overview of fishery trends and content (Garber-Yonts)
- Bioeconomic models, population dynamics, and the estimation of maximum economic yield for North Pacific crab stocks (Dalton)

#### Community Research and Data Collection

- Community meetings, profile updates, and AK community survey (Himes and Sepez)
- Quantifying community-level diversity of fisheries involvement as an indicator of resilience (Sepez)

#### Economic Research and Data Collection

- Charter halibut survey (Garber-Yonts)
- Regional economic impacts of SSL protection measures (Seung)
- Climate change and the pollock catcher-processor fleet (Pfeiffer)

And,

Economics in the Regulatory Process (Mark Fina - NPFMC)

Comments and suggestions from SSC members include:

- Encouragement to maintain communication and strengthen collaboration among scientists working on economic and social science issues for the AFSC, Alaska Region, and the Council.
- The groundfish economic SAFE reports may benefit from expanded discussion of new market opportunities and challenges, and how those would affect the fisheries. In particular, it would be useful to examine the harvest control rules governing fisheries of other nations that compete in supply markets, to assess whether the supply is sustainable, cyclical, or temporary.
- The crab economic SAFE presents an opportunity to look at the effects of rationalization and test indices of sustainability. New literature is emerging that suggests incentives like rationalization may lead to sustainable resources (Gutierrez et al. 2011, *Nature*)
- To the extent practicable, the analysis of MEY/MSY should be incorporated into Grant Thompson's decision theoretic approach, as part of the review of groundfish ACLs.
- Regarding the proposed Fishery Involvement Diversity (FID) assessment, the SSC notes that some of the indices are interrelated (e.g., range of areas fished, seasonal distribution of species, landings distribution by species, and range of species). The authors should strive to minimize redundancy in their indices, to avoid unintended over-weighting of an index. To be useful for comparisons, considerable care is needed to establish a common level of aggregation over space, time, fishing sector(s), and species. Finally, the presenter indicated that the FID may provide an index of resilience. The analysts should identify factors in that consideration, because perceptions of community resilience will differ, depending on forcing factor(s). Moreover, the link between diversity and resilience is unclear.
- The SSC recommends that the Council investigate means of adjusting the confidentiality rules, for example, by adopting a sunset provision, such that after some period of time, say 2 or 3 years, confidential data are made available to the public.

No public testimony was received.