DRAFT REPORT
of the
SCIENTIFIC AND STATISTICAL COMMITTEE
to the
NORTH PACIFIC FISHERY MANAGEMENT COUNCIL
January 30th – February 1st, 2012

The SSC met from January 30th through February 1st, 2012 at the Renaissance Hotel, Seattle WA.

Members present were:

Pat Livingston, Chair *NOAA Fisheries—AFSC*	Farron Wallace, Vice Chair *Wash. Dept. of Fish and Wildlife*	Robert Clark *Alaska Department of Fish and Game*
Alison Dauble *Oregon Dept. of Fish and Willife.*	Anne Hollowed *NOAA Fisheries—AFSC*	George Hunt *University of Washington*
Gordon Kruse *University of Alaska Fairbanks*	Kathy Kuletz *US Fish and Wildlife Service*	Seth Macinko *University of Rhode Island*
Lew Queirolo *NOAA Fisheries—Alaska Region*	Terry Quinn *University of Alaska Fairbanks*	Kate Reedy-Maschner *Idaho State University Pocatello*
Ray Webster *International Pacific Halibut Commission*		

Members absent were:

Jennifer Burns *University of Alaska Fairbanks*	Jim Murphy *University of Alaska Anchorage*	Franz Mueter *University of Alaska Fairbanks*

SSC Nominations
The SSC reappointed Pat Livingston as chair and Farron Wallace as vice chair. The SSC also wants to express how much it values the stock assessment expertise and institutional memory of Farron Wallace on the SSC. This type of expertise is important and needed and it is our hope that Farron can be retained on the SSC once he assumes his new position in the NMFS Observer Program.

B-1 Plan Team nominations
The SSC reviewed the nomination of Dr. Jason Gasper to the Crab Plan Team, replacing Gretchen Harrington who is moving on to another position. Jason's experience with stock assessment and management will provide a good contribution to the CPT. The SSC recommends that the Council approve his nomination.

C-2 Initial review Halibut PSC Limits
The SSC received a presentation of the initial review draft of an EA/RIR/IRFA to revise the Pacific halibut PSC from Jane DiCosimo (NPFMC), Darrell Brannan, and Mike Downs (consultants). Public testimony was provided by Julie Bonney (Alaska Groundfish Data Bank) and Jon Warrenchuk (Oceana).

The current revision of the draft analysis addresses the vast majority of the SSC concerns expressed after our previous initial review of this proposed action package. The analysts have confronted a complex body of information and statistical data pertaining to this action. The SSC appreciates the excellent progress demonstrated since our last review, especially the attention given to our earlier questions and

suggestions. The SSC also extends its appreciation for the concerted effort made by the analysts/authors to use accurate and consistent terminology throughout the narrative.

Although the draft is a substantial improvement over the earlier version, the SSC suggests additional attention to several elements of the descriptive narrative. The SSC previously commented on the confounding of "personal-use" and "subsistence-use" aspects of Pacific halibut removals. This distinction has important legal, management, social, and cultural implications. We acknowledge the authors' efforts to improve the treatment, particularly in the Community Impact appendix. The SSC suggests comparable treatment in the RIR.

A related matter concerns whether the analysis tracks impacts of changes in halibut PSC mortality on all prospectively impacted users (see p. xxiii). There appears to be a too-narrow characterization of impact distribution. For example, changes in halibut biomass resulting from reductions in PSC removals may influence subsistence user costs and success, benefits accruing to personal use fishermen, etc.

Another consideration the authors of the analysis may wish to revisit is the occasional imprecise substitution of the terms "halibut mortality rate" and "halibut PSC rate". The two can be quite different, owing to the estimation of <100% handling mortality assumption. It is not always clear from the context in the draft which measure is being referenced. In other passages, the wrong term appears to have been used (see p. xix).

The SSC suggests that it may be time to formally reassess exactly what constitutes "confidential" information under Council protocol. As both Federal and State of Alaska statutes contain mandatory criteria for judging whether information is or is not governed by "confidentiality" rules, there should not be substantial uncertainty. Yet there appears to be varied definitions employed in the document. This is endemic to many of the analyses coming before the SSC and Council. In most instances, Council and Agency staff go to extremes to err on the side of nondisclosure. But, unless these legal thresholds are at risk of being infringed, withholding relevant information or declining to use data (see p. xxi), by asserting confidentiality, does not serve science or the public interest. An effort to obtain definitive, unambiguous, and officially sanctioned direction on this topic, to inform Council, SSC, NOAA, and State of Alaska personnel subject to these data protection protocols seems prudent. The SSC recommends that the Council seek legal guidance from NOAA General Counsel and the State of Alaska as to the finer points of interpreting and applying the confidentiality protocols, as they apply to the Council's management process. Possibly, the legal guidance is clear but there are inconsistencies in the application of the rules.

Regarding sections on protected species in the EA (i.e., Seabirds; 3.5), the SSC recommends background information be updated and more specific to this particular document. Likewise, broad generalizations about the lack of impact of fisheries on seabirds (3.5.2.4.2) are not substantiated with citations and are probably not supportable. The SSC will provide the analysts with specific editorial recommendations for their consideration and treatment, as time allows.

Appendix 7 includes new fieldwork in Kodiak, the results of which better describe the significance of this action for this community. The methodology describing the nature of this fieldwork is needed. The document could also benefit from a broader description of the potential impacts on the resident processing labor force, since public testimony indicated that the action could affect retention of labor and change the community structure. The document could also better reflect the potential consequences of switching to pelagic trawl gear, which would put vessels in a Chinook salmon PSC situation. Tables 3a and 4a on pages 10-11 may contain errors in the ex-vessel gross values and need to be reviewed. **The SSC recommends that the document be released for public review, incorporating the suggested edits to the extent practicable.**

C-3(a) Pribilof Island blue king crab rebuilding analyses

The SSC received a presentation from Diana Stram (NPFMC) that reviewed survey distribution of Pribilof Islands blue king crab (PIBKC) and fishery catch in relation to State and Federal regulatory areas and alternative closure configurations. Public testimony was given by John Gauvin (Alaska Seafood Cooperative), Donna Parker (Arctic Storm) and Arni Thomson (Alaska Crab Coalition).

During the October 2011 meeting the Council requested staff to provide additional information on a number of discussion items associated with the PIBKC rebuilding plan. The SSC was specifically asked to consider information in relation to area stock boundaries used to define the spatial area over which the PIBKC OFL is currently applied and the associated bycatch accrual over alternative areas. These issues have major implications in rebuilding analyses and the development of alternatives for the PIBKC rebuilding plan. Available information suggested that the current area may not adequately cover the spatial extent of the stock, as indicated by survey and PSC. Given the limited time for review, questions about the information presented, and the lack of review and input by the CPT, **the SSC is not able to recommend changes to the currently defined spatial extent over which the PIBKC OFL is currently applied. The SSC requests the CPT to conduct a detailed review of current spatial information, additional information requested by the SSC below, and comment on the most appropriate spatial extent to accumulate catch for computing OFL.**

The SSC request the analysts provide additional information on:

- Sex and season of PIBKC survey catch and PSC in groundfish fisheries
- Numbers of crab actually observed and extrapolated numbers to total estimates
- Size composition of survey catch and PSC in groundfish fisheries
- Potential influence of the cold pool on survey catch distribution

The SSC requests this information to help judge the veracity of purported BKC bycatch observations particularly in areas 509 and 516, the possibility of seasonal movements that may reconcile divergent BKC distribution from survey (summer) and groundfish fishery PSC (winter?) observations, and current understanding of BKC life history and distribution.

C-3(b) Crab model workshop report

Tanner Crab Model

A report on the Tanner crab portion of the NPFMC Crab Modeling Workshop, was presented by Diana Stram (NPFMC), Jim Ianelli (NMFS-AFSC), Lou Rugolo (NMFS-AFSC) and Jack Turnock (NMFS-AFSC). As with GKC, the crab modeling workshop provided an excellent opportunity for a detailed examination of the Tanner crab model. Workshop participants identified and recommended a number of issues for resolution before the model can be accepted for fishery management. A few of the major issues that were addressed during the workshop included:

1. Large variability in survey catchability among time periods. The analysts provided a list of factors that changed over time, but workshop participants felt that these factors were insufficient to explain such large changes. While participants encouraged further analysis of survey data in attempts to reconcile the differences, most discussion focused on modeling alternatives that might explain the data better. This led to two sets of model runs: (1) “Hide’em” scenarios in which the low survey estimates over 1982-87 were due to unavailability of crabs to the survey gear for some unknown reason, and (2) “Kill’em” scenarios in which these low estimates were due to heightened but unobserved crab mortality. Both scenarios mimic the data better than the previous base model that included seemingly unrealistic changes in survey catchability.

2. There appears to be a data conflict between the length frequency of the Tanner crab bycatch in the red king crab fishery and other data. The fit to survey data improved when the bycatch length-frequency data were downweighted.
3. Input sample size specifications appear to play a role in model results. Assumptions about sample size appear to be particularly consequential in fisheries with Tanner crab bycatch or PSC for which few animals were measured for size. Workshop participants recommended that sample sizes should be specified by year. An analysis of the spatial coverage of size frequency data may help.
4. A number of model coding issues were identified by the workshop chair after the conclusion of the workshop. These issues included non-differentiability of the double-logistic discard selectivity curve, need for greater clarity on the many components included in the objective function, and complexity of coding that require recompiling the model each time new model scenarios are run. Conversion to a more general model code using switches in input control files would be beneficial. A similar recommendation to use such a general model coding was made for the Aleutian Islands golden king crab assessment.
5. Other post-workshop advice from the workshop chair includes a general desire to simplify the estimation of parameters such as maturity, growth, and natural mortality, as well as the use of fishing effort, rather than limited catch data, to estimate crab fishery bycatch and groundfish fishery PSC discards by assuming a relationship between this fishing mortality and fishing effort from the various fisheries that take Tanner crab as bycatch.

The workshop report provides a more comprehensive description of these and other issues, along with a full list of recommendations for further model development. Since the conclusion of the workshop, the analysts developed a draft work plan and have begun to address a few of these workshop recommendations. Model 1 is now being used as the new base model. Changes made since the workshop include new sample size weights, a one-time increase in mortality in 1983 applied to mature crabs, and change in the fishing mortality penalty. Preliminary model results as a consequence of these changes are very encouraging.

The SSC greatly appreciates the intensive effort of the analysts and workshop reviewers. **The SSC supports all of the workshop recommendations for the Tanner crab model.** The SSC wonders whether any ancillary data may be useful to help evaluate the operative mechanism (i.e., hide-'em or kill-'em) that may have been operating in the early to mid-1980s. For example, an apparent increase in mortality of large male crab only may be indicative of a fishing effect, whereas an apparent increase in mortality in crabs of all sizes and both sexes may be indicative of a natural die-off. Potential synchrony with similar observations for Bristol Bay red king crab may help to uncover the cause. Depressed prices paid for Tanner crabs in primary foreign markets might imply unreported, illegal harvests.

Whereas preliminary new mortality runs included a one-time increase in mature crab in 1983 only, **the SSC requests that the assessment authors explore evidence for increased mortalities for all modeled sized classes for both sexes, as well as evidence that the mortality event may have occurred in one year versus several years.** When reporting new model results, **the SSC requests that the analysts include Model 1 without the "kill 'em" option. Analysts should report model results separately for some of the more significant changes (e.g., mortality shift), so the reasons for improved future model fits can be judged.** Model diagnostics will also be helpful to evaluate alternative model configurations. **Finally, the SSC requests that the analysts explore model sensitivity to growth and mortality assumptions.** The SSC is very optimistic that a base model can be recommended for use in annual catch specifications by the Crab Plan Team in May and the SSC in June. Because of the pressing importance of this effort, the SSC requests a report on model progress at the SSC meeting in April 2012.

Tanner Crab Rebuilding

The SSC was provided a very brief summary of workshop discussions about models and scenarios for use in projections for Tanner crab rebuilding analyses. At the time, workshop participants had the understanding that rebuilding analyses could not await further model development and must proceed prior to adoption of a base Tanner crab model. However, it was explained to the SSC at this meeting that it would be acceptable to conduct rebuilding analyses using a base model, which might be accepted in May/June 2012. With this in mind, **the SSC anticipates receipt of an acceptable Tanner crab and refined, more comprehensive plans for rebuilding analyses in June 2012. Rebuilding scenarios outlined in the workshop report appear to be well advised, including the no-fishing scenario. One very important decision concerns the recruitment scenarios to use in the projection analysis.** The issue is that selection of the time period will have big effects on expectations of stock productivity and, therefore, rebuilding probabilities and time frames. Bookends proposed during the workshop included recruitment scenarios based on periods of high (1974 through 1980) and low (1982 through 2011) productivity. **Rebuilding scenarios including these optimistic and pessimistic recruitment projections would be useful, but the SSC also requests scenarios including recruitments drawn from the full set of recruitment observations.** There remains considerable uncertainty about the roles of fishing (e.g., catch, PSC and bycatch) versus climate (e.g., temperature) versus ecological (e.g., predation) factors on Tanner crab stock status and recruitment.

Aleutian Islands Golden King Crab

Diana Stram (NPFMC) and Steve Martell (University of British Columbia, Crab Plan Team) provided an overview of the outcome of the crab modeling workshop for golden king crab (GKC). M.S.M. Siddeek (ADF&G) provided an overview of model developments for the Aleutian Islands GKC stock. David Fraser (Adak Community Development Corporation), Linda Kozak (Golden King Crab Harvesters) and Steve Hughes (Natural Resource Consultants) gave public testimony.

Dr. Martell reported that the participants in the workshop concluded that the GKC model was not ready for use as the basis of a Tier 4 status determination. **The SSC agrees that additional work is required on the model before it can be used for Tier 4 status determinations.** The SSC will review additional model developments in June 2012.

Dr. Martell explained that workshop participants reviewed the GKC model code and discussed modifications to test assumptions. Some of these modifications were tested during the meeting. He recommended that future crab reviews should consider this workshop format. The format allowed participants to more fully understand the model assumptions and their implementation. Dr. Martell developed new data input code that provided a more flexible platform for modeling. The SSC greatly appreciates Steve's time and his efforts to improve the GKC model. Dr. Ianelli (AFSC, Workshop Chair) reported that efforts are underway to create a generic crab modeling platform. **The SSC agrees that a more flexible modeling platform would be a useful new development and supports continued interim reviews of crab models if they are deemed necessary.**

The workshop report provides a list of activities that should be considered and progress can be discussed during the Crab Plan Team (CPT) meeting in May. In general, the SSC agrees with the work plan and supports the recommendations in the workshop report. In particular, the SSC agrees that the author should carefully examine the fishery CPUE data to look at effects of soak time, and other explanatory variables. The SSC suggests that, in addition to soak time, other explanatory variables might include time blocks, depth strata, pot design and size, and possibly tide. Fishery CPUE might decline over time due to local depletion. Therefore, breaking the data into temporal blocks may provide a more reliable index of abundance.

The workshop report recommends that the tagging data should be incorporated into the model and suggests that the analysts should attempt to estimate molting probabilities and growth in the model. The SSC supports this approach. The SSC also supports the collection of improved shell condition data on surveys and by onboard observers to allow better estimation of molting probability, as well as continued tagging studies to improve growth estimates.

The workshop report recommended that the author should compare the observer catch estimates with the dockside estimates as a method to estimate discard. The SSC approved this approach for Tanner crab and agrees that the author should consider this approach for GKC.

ADF&G plans to conduct a survey of the Eastern Aleutians in 2012. The SSC strongly supports this activity. The survey would provide the 5th fishery independent data point for this population. The SSC learned that ADF&G is considering minor modifications to the survey design. The SSC cautions against making changes that will alter the integrity of the time series unless they are critical. If changes must occur, the SSC recommends that experiments are conducted to assess how the new approach will compare with the old approach.

PDF of OFL

Diana Stram (NPFMC) and Jim Ianelli (NMFS-AFSC) presented a summary of a workshop on estimating the probability density function (pdf) of the overfishing limit (OFL) for crab stocks. Discussions focused on the need to clarify the definitions of various OFL terms, calculation of variance, and methods to deal with the types of uncertainty not included in assessments. A review of the approaches used for groundfish was helpful to these deliberations. For crab, discussions focused on the computation of pdfs for stocks in Tiers 3 and 4. Workshop participants provided a set of three short-term and seven long-term recommendations.

The SSC extends its appreciation to the workshop participants for making excellent progress on this difficult issue. **The SSC fully endorses the workshop recommendations.** The SSC understands that Jack Turnock and Andre Punt have developed some simulation software applications that may facilitate the estimation of the pdf of OFL. The SSC recommends that they combine their efforts to develop a standard software package with documentation that can be distributed and utilized by all crab stock assessment authors for calculating the pdf of OFL. **The SSC requests that all crab assessment authors implement recommendations 1 through 3 in the upcoming assessment and encourages other efforts to make progress on the remaining workshop recommendations in the not-too-distant future.**

C-3(e) Final Action Crab EDR and CIE review

The SSC received a presentation of the subject draft RIR-IRFA package from Mark Fina (NPFMC). Public comment was offered by Steve Minor (PNCIAC).

The SSC appreciates the effort that has been made to bring a very complex and multifaceted issue into a relatively manageable framework. The analyst suggested that, within the constraints provided by Council action *as per* our comments at the October 2011 meeting, changes had been made to address SSC issues. Because the Council has determined that final action on this amendment will occur at this meeting, the SSC is limited in its ability to offer meaningful comment. Nonetheless, the SSC wishes to make several observations. First, the CIE Review made a series of useful and insightful observations concerning the need for and benefit of an EDR. Based upon these, the CIE reviewers made several specific recommendations, each of which should be considered by the Council. The summary remarks, provided by the CIE panel chairman, are particularly informative. Among the most compelling of these is the recommendation that scientific data collection and interpretation in the subject areas of economics,

anthropology, and sociology would benefit from a dedicated Economic and Social Science Plan Team, equivalent to the biological Plan Teams that serve the Council so effectively.

The SSC endorses the proposal to remove blind formatting, currently mandated under status quo. It appears to the SSC that any potential benefit in additional confidentiality protection that might be attributed to blind formatting is substantially exceeded by the cost, complexity, and risk of introduction of data error.

The critical importance, yet continued absence, of basic economic (and other social science) data have been the focus of SSC comment and concern for many years. The SSC has repeatedly gone on record challenging the adequacy of economic and socioeconomic impact assessments provided in support of Council actions. With the advent of fishery rationalization programs, expectations for meaningful improvement in economic analyses seemed attainable. The BSAI crab rationalization program, initiated by Congressional action and elaborated by the Council, was expressly framed as a social contract between the public and those private individuals and entities that were recipients of substantial economic value, embodied in tradable IFQ and IPQ access guarantees. That social contract was founded partly on exchanging privately held access privileges for detailed proprietary economic data with which to understand the changes caused by rationalization (e.g., quasi-rents, shares markets, crew compensation, community stability and welfare effects, wealth consolidation, behavioral changes in fishing and processing practices and behaviors, net welfare changes to the Nation). The alternatives under consideration by the Council seem to represent a retreat from the balance struck in this contract.

As we noted in our October, 2011 minutes, the status quo EDR has been judged to be excessively burdensome, given the benefit it yields. Yet, the alternatives to the status quo appear in many ways to be a substantial retreat from meaningful collection of economic performance data. Neither extreme appears to be a rational or desirable course. The SSC believes that the loss of this opportunity will critically impair the Council's ability to meet future management objectives and it will be hard to recover the collective will and momentum to collect such data in the foreseeable future.

The SSC urges the Council to seek opportunities to meaningfully enhance the scope and detail of the revised EDR program they adopt. We believe that there must be some acceptable middle-ground between the status quo EDR program and the incomplete and inadequate data acquisition programs reflected in the two action alternatives.

C-4(a) Initial review GOA trawl sweep modification

An initial review draft EA/RIR/IRFA for GOA trawl sweep modifications was presented by Diana Evans (NPFMC) and Craig Rose (NMFS-AFSC). Public testimony was given by Julie Bonney (AK Groundfish Databank) and John Gauvin (AK Seafood Cooperative). This action is a trailing amendment to Amendment 89 to require trawl sweep modifications on non-pelagic trawl vessels fishing for flatfish in the Central GOA to reduce unobserved Tanner crab mortality. Two alternatives were presented in the draft analysis: 1) status quo with no trawl sweep modifications or 2) require trawl vessels targeting flatfish in the Central GOA with non-pelagic trawl gear to use elevating devices on trawl sweeps to raise them off the seafloor.

The analysis borrows and benefits from information gained from the analysis and implementation issues of trawl sweep modifications for trawl vessels fishing for flatfish in the Bering Sea (cf. Amendment 94). Field experiments conducted with various configurations of trawl sweeps in the GOA showed results similar to those found in the Bering Sea that were found effective in raising the sweeps above the seafloor and limiting the reduction in groundfish catches in modified trawls. The SSC also appreciates the authors' use of surveys of vessel operators for describing current trawl sweep configurations in the Central GOA and the potential impediments to implementation of trawl sweep modifications if this action is taken. One

important aspect of the analysis is the flexibility provided in implementation of the performance standard via a combination of disk size and disk spacing gear standards that achieve the performance standard.

The SSC recommends that the draft document be released for public review with minor modifications as follows:

- Tables 1-2 and 2-4 need to be corrected so that the percentage of PSC is accurately displayed.
- If available, a map of bottom sediments in the Central GOA along with a map of catches of flatfish should be included in the EA.
- Include a discussion that compares the size composition of groundfish catches made with modified and unmodified sweeps.
- Black–footed Albatross need to be removed from the list of ESA candidate species in Table 1-10. Was the bycatch of BFA actual reports of bycatch or extrapolated numbers of birds taken?
- The document would benefit greatly from a careful and thorough proof-read.

C-4 (c) 2012 01 30 Skate Nursery HAPC

The SSC received a presentation by Sarah Melton (NPFMC), with the assistance of Gerald Hoff (NMFS-AFSC) and John Olson (NMFS-AKR). Public comment was provided Merrick Burden (Marine Conservation Alliance), John Gruver (United Catcher Boats), Donna Parker (Arctic Storm) and John Gauvin (Alaska Seafood Cooperative). The SSC commends the analytical team on their presentation.

The SSC reviewed a discussion paper in February 2011 on this topic and offered several suggestions for the full analysis. The SSC recognizes the considerable work and resulting improvement in the document since we last reviewed it. In response to these SSC comments, the authors adequately explained the practical rationale for choice of areas and the size of the areas to be acted on. They also initiated the quantification of the significance of these sites to the overall recruitment of skates and the potential for additional sites in the Bering Sea. However, there are some areas that still require more analysis and clarification.

We need to know more about the population-level importance of these areas and their potential protection. Is there a higher than average incidental catch of skates in the proposed HAPC areas, and if so, would closing them to fishing improve stock status? Is there evidence that the areas of high egg concentration that have been subject to a high level of bottom-contact fishing have lower densities of egg cases or a higher proportion of non-viable eggs? Of the viable eggs located in the surveys for areas of high concentration of skate eggs, what proportion of viable eggs are in the areas of high concentration and what proportion are in areas of lower density or spread out across the shelf? If the presumed fishing-related mortality of skate eggs were to cease, what effect might this have on skate populations and the ecosystem components with which skates interact? There is a need for a clearer justification for the use of a density of 10,000 egg cases km^2 as the threshold for deciding that a location is an area of high egg concentration. Finally, since the goal of this action is to protect spawning and breeding habitat necessary to support a sustainable skate fishery and the managed species contribution to a healthy ecosystem, there should be a discussion of the status of the Alaska skate population relative to B_{msy}.

A number of questions were raised, especially in public testimony, concerning the estimation of the economic impacts of the proposed HAPCs, should they be closed to fishing. In addition to the overall mean impact, it would be helpful to know the extreme values when these areas may have been particularly important fishing grounds. Thus, it would be useful to examine how often these areas have been of importance in the past. At present, the VMS data from 2003 through 2011 serve as the analytical frame over which impacts are evaluated. The SSC suggests that earlier data on fishing activity in the regions of the designated HAPC sites be investigated. Fisheries data from the early 2000s and mid- to

late-1990s, while not equivalent to electronic monitoring, may provide useful insights into historical fishing patterns that pre-date VMS. It would also be useful to determine which of the proposed areas would create difficulties for avoidance given their proximity to closed areas or know obstacles.

The SSC recommends that the analysts add a more elaborated discussion of the "catch-at-risk" methodology employed to characterize potential changes in fishing in response to HAPC designation. We also recommend adding the modifier "gross" to estimated measures of economic values.

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The SSC suggests that the treatment of enforcement issues associated with the proposed HAPC action be reconsidered. Reliance on the enforcement committee report and crab fishing enforcement example is inappropriate to the HAPC program. There also appears to be an opportunity to address proposed skate egg HAPC restriction impacts by gear-type category. That is, fixed gear implications are very different from mobile gear impacts. Likewise, it is not clear that the buffers around the proposed HAPC areas need to be as large as suggested because all tows will be observed, and the observer would be able to determine whether tows with bottom-trawls were in the proposed HAPC areas. Regardless of the size of the buffers, it would help greatly if the authors would clearly define the HAPC area, the buffer area around it, if any, and the area used to determine the economic impact of the proposed closure.

There are also some terminology issues. Although the Council has stated that it wishes to call the proposed HAPC areas "areas of skate egg concentration", frequently in the document they are referred to as nursery areas. This is confusing, even though the term commonly used in the literature is "nursery area." Additionally, the authors propose a unique definition of "bycatch". The SSC sees benefit in keeping the definitions of commonly used terms as precise and consistent as possible.

Finally, the SSC notes that the inclusion of "Research Priorities" as an option in the action alternatives short-circuits the evaluation and ranking of priorities usually provided by the Plan Teams, which are then revised and recommended by the SSC to the Council. The SSC recommends that the Council postpone decisions on research priorities for this action until the Plan Teams have the opportunity to evaluate all suggested research needs. The list of potential research needs should be forwarded to the Groundfish Plan Team. An additional research issue for them to evaluate is the level of suspended sediment in the vicinity of the areas with high concentrations of skate eggs, with and without trawling, and the effects of the suspended sediment on the ability of developing skates to circulate water through their egg cases.

Given the number of confusing issues in the current version of the document, t**he SSC recommends that the document be returned to staff for additional work and that the SSC have an opportunity to review the next version prior to public release.**

C-4(c) Updated discussion paper BBRKC spawning area

Diana Evans (NPFMC) presented a revised and expanded discussion paper on the evaluation of adverse impacts from fishing on crab EFH, previously presented in April 2011. The revisions were largely to incorporate survey and PSC information from the area southwest of Amak Island in Bristol Bay, including exploration of the relationships between the trawl survey data, temperature, and PSC amounts. Options for Council action with respect to protection of this area were also presented in the report. John Gauvin (Alaska Seafood Cooperative) provided public testimony.

The information presented in the revised report is suggestive of the importance of the area southwest of Amak Island, but it is not conclusive. The SSC considers that at present there is insufficient evidence to support any management action but does support further research (see page 35 of the discussion paper). Regarding the relationship between survey CPUE and temperature in that area, the SSC recommends

considering the mean temperature across the range of BBRKC habitat and the extent of the cold pool, rather than simply local temperature.

C-4(d) 2012-2015 Deep Sea coral research

The SSC received a presentation from Chris Rooper (NMFS-AFSC) on the fieldwork planned for the Alaska Coral and Sponge Initiative (AKCSI; 2012-2014), sponsored by the NOAA Deep Sea Coral Research and Technology Program (DSCRTP). Public testimony was received from Jackie Dragon (Greenpeace).

A number of ongoing research priorities and objectives in the Alaska region were identified by the DSCRTP, the North Pacific Fishery Management Council and Essential Fish Habitat-Environmental Impact Statement (EFH-EIS) process and is the focus of this initiative. The SSC believes this research will provide extremely valuable information to inform the Council process to better understand the location, distribution, ecosystem role, and status of deep-sea coral and sponge habitats. The objectives are consistent with the Council's Five-Year Research Priorities (Council Priorities) identified in June 2011, specifically an immediate concern, "Evaluating habitats of particular concern" (III.A) and an ongoing need, "Habitat mapping" (III.A and III.B). One exception was noted, pertaining to assessments of the distribution and prevalence of coral and sponge habitat specifically in Bering Sea canyons (III.A.1). The SSC noted that at the time the Council Priorities were identified, this particular concern was thought to be partially underway. At present, the AKSCI does not include any Bering Sea research projects. It is unclear if the Bering Sea coral research that is currently underway is sufficient to meet Council needs. This could be evaluated by the AKSI program in out-years.

The SSC encourages the ACSI to continue or pursue cooperative efforts with the National Park Service, the Gulf of Alaska Integrated Ecosystem Research Program, and the Aleutian Bering Sea Islands Landscape Conservation Cooperative. SSC members suggested an Automated Underwater Vehicle may be more appropriate than Remote Operated Vehicles for assessments in the deeper habitats. Overall, the SSC considers the AKCSI research to be highly relevant to multiple Council Priorities identified in June 2011 and will provide timely information for upcoming Council activities related to EFH.

SSC Workshop on Use of Stock-Recruitment Relationships in Stock Assessments

At its December 2011 meeting, the SSC chose stock-recruitment issues as its topic for its workshop held February 1, in conjunction with the SSC meeting. The following key issues were identified:

- criteria for moving from Tier 3 to Tier 1 based on whether a spawner-recruit (SR) relationship was credible (and had a corresponding pdf for F_{msy}),
- detecting regimes for when an SR relationship changed,
- estimation of an SR relationship within the assessment or outside,
- how much weight to give the SR relationship if inside the assessment.

In addition, there are several related issues that pertain specifically to the effort to examine the implications of incorporating uncertainty buffers into the groundfish management system. Key questions include:

1. Should form and steepness be constrained? If so, on what basis (e.g., meta-analysis to determine similar stock groupings)?
2. Should the initial SR model be estimated by assuming B35% is BMSY and F35% is FMSY?
3. What are the best methods for estimating uncertainty when estimating the SR model?

The following presentations were given at the workshop to help discussion of these issues and questions:

- Tom Wilderbuer (AFSC) – Tier 1 management overview and experience with advancing stocks to Tier 1
- Megan Stachura (UW) - Multivariate analysis of groundfish recruitment to understand environmental forcing.
- Cody Szuwalski (UW) - Identifying recruitment regimes and specifying BMSY proxies, a case study for snow crab.
- Teresa A'mar (AFSC) - Identifying recruitment regimes and specifying BMSY proxies, a case study for walleye pollock.
- Martin Dorn (AFSC) – Use of stock-recruit steepness priors based on meta-analysis in West Coast rockfish assessments.
- Grant Thompson (AFSC) - Some problems associated with estimating relative recruitment without first integrating out random effects.
- Jim Ianelli (AFSC) - Issues and concerns in modeling stock recruitment for EBS walleye pollock.

The SSC thanks the presenters for their useful presentations. Three presentations considered analytical approaches to address regime shifts in stock production (Stachura, Szuwalski, A'mar). These presentations applied statistical methods to identify shifts in recruitment and evaluated the implications of shifting time frames on harvest control strategies. The SSC recommended that analysts should consider estimating the power to detect environmental change and the vulnerability and susceptibility of different species to these changes. This could be used to evaluate the risk of calling a regime if one had not occurred. The presentation by Dr. A'mar revealed that if a real regime shift is not identified in the assessment, then the biological reference points slowly moved in the correct direction of change anyway. This property could be used if the detection power was low and the risk of mis-specifying the regime shift was high. Some authors utilized management strategy evaluations to analyze the implications of shifting biological reference points when detection skill was low. The SSC agrees that this is a promising analytical approach.

Dr. Ianelli and Mr. Wilderbuer provided approaches in which variables representing environmental forcing are incorporated into the SR relationship. This type of approach requires collection of additional data, which can be expensive or time-consuming to collect, but has the desirable quality of accounting for environmental variability in the assessment. With this type of approach, it is then necessary to select biological reference points that are intended to reflect the long-term average productivity of the stock. One approach is to make forecasts of future values of the environmental variables. Another approach that is similar to current BRP's is to use an average of the historical time series of environmental conditions over a selected time period thought to be an accurate representation of the average condition.

Drs. Dorn, Thompson, and Ianelli provided three different approaches to incorporate spawner recruitment relationships into stock assessment. Dr. Dorn noted that west coast assessment scientists inform steepness in the stock recruitment relationship by either estimating steepness with a prior based on a meta-analysis, or by fixing steepness at the mean of the meta-analysis. The SSC noted that, if this approach was used, the analysts might consider using the cluster analysis techniques shown in the presentation by Ms. Stachura as a basis for grouping stocks for the meta-analysis. If this approach was used it appears that cod, pollock and sablefish stocks would be grouped together. Dr. Thompson introduced a statistical method to estimate mean recruitment and sigma_R. Dr. Ianelli provided an example where he conditioned the spawner-recruit parameters on the basis of the assumption that $F_{35\%}$ was equal to F_{msy}. The SSC encourages stock assessment analysts and the Plan teams to evaluate all three of these approaches.

Workshop participants discussed the criteria needed to transition a stock to Tier 1 and commented that the pdf of Fmsy should incorporate several sources of error in growth, natural mortality, selectivity, and the SR relationship.

The SSC and PT members discussed timelines to continue research on this topic. The SSC supports the previous recommendation of the Groundfish PT that the next step would be to hold a workshop to develop guidelines on how to address environmental changes in the SR relationship into biological reference points and how to model environmental forcing in stock projection models. The discussions from the SSC workshop should be helpful in identifying terms of reference for the next workshop. The SSC believes it would be useful to have members from both the Groundfish and Crab Plan Teams present, because the issues are common to both groups. Also, it would be useful to have some Groundfish Plan Team members attend the May Crab Plan Team meeting to provide input into these issues as they relate to the Tanner crab rebuilding analysis and some Crab Plan Team members attend the September Groundfish Plan Team meeting for the same reason.