North Pacific Fishery Management Council

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REPORT
of the
SCIENTIFIC AND STATISTICAL COMMITTEE
to the
NORTH PACIFIC FISHERY MANAGEMENT COUNCIL
March 26th – March 28th, 2012

The SSC met from March 26th through March 28th, 2012 at the Hilton Hotel, Anchorage AK.

Members present were:

Pat Livingston, Chair *NOAA Fisheries—AFSC*	Farron Wallace, Vice Chair *NOAA Fisheries—AFSC*	Jennifer Burns *University of Alaska Anchorage*
Henry Cheng *Wash. Dept. of Fish and Wildlife*	Robert Clark *Alaska Department of Fish and Game*	Alison Dauble *Oregon Dept. of Fish and Wildlife*
Sherri Dressel *Alaska Department of Fish and Game*	Anne Hollowed *NOAA Fisheries—AFSC*	George Hunt *University of Washington*
Gordon Kruse *University of Alaska Fairbanks*	Franz Mueter *University of Alaska Fairbanks*	Jim Murphy *University of Alaska Anchorage*
Lew Queirolo *NOAA Fisheries—Alaska Region*	Terry Quinn *University of Alaska Fairbanks*	Ray Webster *International Pacific Halibut Commission*

Members absent were:

Seth Macinko *University of Rhode Island*	Kate Reedy-Maschner *Idaho State University*	Kathy Kuletz *US Fish and Wildlife Service*

B-1 Plan Team Nominations and SSC elections

The SSC reviewed the Plan Team nominations of Craig Faunce to the Gulf of Alaska Groundfish Plan Team, and Quinn Smith and Brad Harris to the Scallop Plan Team. The SSC finds all three individuals to be well qualified, with appropriate expertise that will assist each of the Plan Teams. The SSC recommends that the Council approve these nominations.

The SSC revisited its leadership, given the current vice-chair's move from Washington Department of Fish and Wildlife to the Alaska Fisheries Science Center and the need for organizational balance in the leadership. The SSC elected Bob Clark as the new vice-chair of the SSC for the coming year and thanked Farron Wallace for his excellent service to the SSC over the last few years in this position.

C-2 (a) Update on salmon genetics

Jeff Guyon (NMFS-AFSC) gave an overview of genetic stock composition analyses of Chinook and chum salmon sampled from the pollock fishery PSC in the Bering Sea. In 2010, genetic samples were taken from the PSC as part of the species composition analysis of the Observer Program. Although this sampling design differed somewhat from that during 2005-2009, stock composition estimates in 2010 were similar to those estimated from samples taken in 2005-2009. There was general agreement between the timing of samples taken and the timing of chum salmon PSC during 2010, but some areas were overrepresented in the samples relative to the PSC. Analysts continue to caution that stock composition estimates derived from these samples may not accurately represent the stock composition of the PSC. Dr. Guyon also noted that sampling in 2011 followed the recommendations of the Pella-Geiger report which stipulates systematic sampling for a representative sample of the PSC. There was no public testimony.

The SSC looks forward to seeing results of the 2011 sample collections. We also have the following recommendations for the collection and analysis of genetic stock composition data:

- It remains unclear how much bias there is in stock composition estimates from 2005-2010. The potential for bias due to oversampling of one or more statistical areas or time periods should be examined in an analysis that attempts to weight estimates from samples so they represent the spatial/temporal occurrence of the PSC. Dr. Guyon is working on an analysis that apportions the chum salmon stock composition data to the actual PSC. We would like to see the results of this work once it is available.
- In the future, genetic sampling designs need to put more importance on obtaining location data of individual hauls for samples taken from offloads from catcher vessels, or should modify sampling so that greater effort is directed at obtaining samples onboard vessels so that accurate location data are available.
- Efforts should be made to update the current genetic baseline for chum salmon so that it includes populations in Cook Inlet. These populations are not in the baseline used to estimate stock composition for 2005-2010 and are potentially important to ESA considerations for Cook Inlet beluga whale.
- We support efforts to utilize the time series of stock composition data to map the spatial and temporal extent of PSC of important stock groupings such as coastal western Alaska to better inform avoidance measures by the pollock fleet.
- We caution that estimated proportional stock compositions that are less than 20% are most likely biased. We recommend consideration of methods to reduce such bias when this situation is encountered.
- We support the provision of sufficient funding for the analysis of all necessary genetics samples.

C-2(b) Initial review Bering Sea Non-Chinook salmon PSC management measures

The SSC received presentations on the EA, RIR, IRFA, as well as a pollock fleet performance model from Diana Stram (NPFMC), Jim Ianelli (NMFS-AFSC), Alan Haynie (NMFS-AFSC), and Scott Miller (NMFS-AKR). Public testimony was provided by Tim Smith (Norton Sound Bering Strait Regional Aquaculture), Roy Ashenfelter (Kawerak), Tim Andrew (Association of Village Council Presidents), and Donna Parker (Arctic Storm).

EA

The SSC first wishes to express its appreciation to the analysts for the presentations and their help in understanding the changes made to the documents. The SSC reviewed an earlier version of the EA and RIR during the June 2011 meeting and recommended that a series of changes be made before the document is released for public review. Relative to the EA, the analysts have improved the document from the version that the SSC reviewed in June, 2011:

- A summary of alternative hypotheses for the declines of chum salmon stocks in western Alaska was included. In particular, the analysts expanded a section in Chapter 5 that discusses the

hypothesized effects on marine survival of chum in the Bering Sea and a possible mechanism for high PSC in particular years. A section was added that discusses ocean carrying capacity and an overview of run size of chum salmon in Alaska. A statewide summary of chum salmon stock status was moved forward and expanded in Chapter 5.

- The analysts also included a discussion of the rationale for using a pooled age-length key for estimating age composition of chum salmon requested by the SSC in June 2011.
- We also noted that the cumulative impacts section of the EA was incomplete in the June 2011 version and this was rectified in this version. A new section on the policy implications of this action was also added to the document.
- This draft of the EA also more completely describes and discusses the impacts of each alternative on chum salmon runs, particularly in western Alaska.

There were also several new developments in the EA that the SSC noted and commented on:

- We appreciate that stock status data for chum salmon was updated through 2011.
- Alternatives 2 and 3 were revised and restructured so that options of each alternative are similar to each other in effect (i.e., June-July measures versus entire B-season measures). This restructuring helps to clarify and increase understanding of each of the options in the analysis.
- The analysts applied a regression approach to estimate adult equivalents (AEQs) from annual PSC numbers for each of the alternatives. The SSC approves of this method, but recommends that the analysts provide a plot of the fit to the data and residual plots of the analysis so the reader can assess the utility of this approach. The coefficient of determination (R^2) of the analysis is misleading and should not be reported because no intercept was estimated in the regression model.
- The analysts made use of a variable (lambda) to express how the pollock fleet would respond to area closures in June and July by either waiting to fish until later in the season (lambda = 0) or seeking to fish for pollock in other areas (lambda ranging from greater than 0 to 1). While this seems a reasonable approach, the SSC recommends that, in addition to scenarios with a lambda of zero, scenarios with lambda of 1 be presented in the summary tables that compare outcomes of the alternatives to represent a range of possible reactions of the pollock fleet to the alternatives.

Although the EA correctly documents the potential for bias in the estimates of stock composition from the genetic analysis, in some places (e.g., Section 5.3.2), the text states or implies that such biases are corrected in the EA analysis. The EA analysis attempts to account for the non-random nature of the genetic sampling in the estimation of variance, but it does not directly address biases that may result from such sampling. Any biases in stock composition estimates from the genetic analysis carry through to the estimated impacts on chum salmon in the EA, and the SSC requests changing the text of the EA where necessary to avoid giving the impression that such biases are accounted for.

We also recommend that the analysts confer with pollock industry stakeholders on their potential responses in fishing behavior relative to the alternatives and provide this information in the EA.

RIR/IRFA

The present draft document is a revision of an earlier analysis that the SSC concluded needed substantial work prior to public distribution. While the authors responded to many of our concerns and recommendations, some improvements should still be made before release of this document. The treatment of the predicted impacts of the alternatives provides only superficial treatment of any affected user group other than commercial pollock fisheries. While the ability to comprehensively quantify economic impacts may be data limited, it does not exempt the analysis from assessing these effects to the fullest extent practicable.

Although the RIR contains substantial information documenting the importance of chum salmon to subsistence communities in western Alaska, the SSC expresses concern that the RIR contains minimal information about the likely impacts of the proposed actions on these communities of users. This is particularly problematic since, under both federal and state law, subsistence is the highest priority use. The SSC recognizes that data limitations can create challenges for developing reliable quantitative estimates of these impacts. Section 3.4 does enumerate some of the vulnerabilities that subsistence-dependent populations face, but there is no meaningful attempt to link these vulnerabilities to whether or how the proposed alternatives may affect them. The RIR would benefit from a more focused discussion on this issue. Examples include:

- Asking whether the Amount Necessary for Subsistence (ANS) estimates, provided by the Alaska Board of Fisheries, are reasonably current (data in Table 3-1 are about 15 years old and populations in these communities have grown substantially).
- Table 3-14 relates estimated subsistence harvests in the Yukon River area to the ANS findings. The document should contain similar comparisons for other regions for which data are available, such as the Kuskokwim.
- Extrapolation should be made of data-supported impact estimates, referenced above, to other areas for which data are not available, carefully identifying the assumptions, limitations, and relative confidence in those.
- The impact assessment should try to link the genetic analysis of chum salmon PSC more directly to impacts on terminal area chum users (e.g., subsistence, commercial, and joint-production harvests) to the extent practicable.
- ADF&G has reasonably good subsistence data based on household surveys. While ADF&G does not have the capacity to analyze these data to inform the RIR, it is reasonable to investigate whether these data could be made available to develop a subsistence model that could be incorporated into the RIR.
- There is a paper by Bob Wolfe et al. (June 2011) that developed a model of subsistence demands in the AYK region. At a minimum, this paper should be cited, and some of the reported analysis might be incorporated into the RIR.
- The SSC received public testimony stating that the timing of salmon runs can be as important as the aggregate subsistence harvest or total run size. In particular, should subsistence fishing be delayed until later in the summer, there is an increased likelihood of weather events adversely affecting the ability to dry fish. This should be incorporated into the RIR, particularly whether some alternatives are more likely to exacerbate this problem.

The deficiencies that were identified in the scope, quality, and reliability of subsistence harvest estimates of chum and Chinook in the AYK (and presumably in other regions) impose another significant barrier to a full understanding of the relative regional dependence of subsistence communities on salmon resources. It would be valuable to actively solicit the assistance of regional resident experts among the impacted subsistence groups and users to improve the quality and breadth of information in this subject area. While formal outreach has been done, perhaps release of the document for public review will yield additional information and local knowledge.

The SSC has similar concerns about the lack of impact analyses on the commercial chum salmon industry throughout the North American range of these stocks. In this case, however, there is less of a problem with data availability. The RIR documents chum harvests and market value over time in several, but not all, relevant regions, but there is no analysis of the potential impacts of the alternatives on these commercial chum salmon fisheries. While this would require making some simplifying assumptions, doing so would be no different than the types of assumptions already used in the pollock commercial sector impact analysis. This analysis is important because public testimony highlighted links between commercial and subsistence use of this resource, with commercial activities often subsidizing subsistence use.

The SSC reiterates its long-standing concerns about the lack of pollock industry cost data that are critical to estimating impacts on industry net performance. The RIR acknowledges that estimates of potentially foregone gross revenues may have no meaningful relationship to the economic performance, viability, or profitability of these commercial fisheries. In addition, the retrospective analysis of pollock industry revenue at risk implicitly assumes that there would be no changes in industry behavior in response to the proposed alternatives. While this approach yields some insights into a worst-case outcome, and recognizing that it would be difficult to quantify how behavioral changes induced by each alternative would affect revenue at risk estimates, the RIR would benefit from a qualitative discussion of the likely ways in which behavior could change, and how this might affect these estimates.

Additional effort must be made to ensure that the RIR complies with the procedural requirements of EO12866 and other applicable laws. Given that the PSC of chum in the BSAI pollock fisheries accrues widely to many areas, uses, and users, some supplemental treatment of the broader community of users affected by PSC removals is necessary. This observation was made by the SSC in previous review comments. Need for this extension persists in the current draft and is a serious deficiency in the scope of the RIR. There is a disproportionate emphasis on the potential adverse impacts on the Western Alaska Region, literally to the exclusion of the other impacted regions. While there is ample reason to assess the relationship, if any, between chum PSC in the BSAI pollock trawl fisheries and diminished runs of chums in the western Alaska region, it is not the sole dimension of this management action. The available stock-of-origin data identify losses of non-Chinook salmon PSC accruing to most of the Pacific coast of North America, extending to southern Oregon, yet western Alaska seems to be the only region of interest and concern. As the SSC previously urged, effort must be made to improve the balance of the regional impact analysis; if not before release for public review, certainly in the next iteration.

The SSC was asked by the analysts for our opinion concerning retaining a stand-alone Environmental Justice chapter in the document. The SSC observes that there are important procedural reasons to retain the Environmental Justice analysis as a unique element of the integrated document.

Authors should delete estimated replacement costs for subsistence foods from the discussion of food budgets on page 52. These estimates ($3 and $5 per pound) were taken from a study by Wolfe (2000), and are pure conjectures for a "what if" analysis and have no empirical justification.

The SSC was informed by the analysts that subsequent versions of the RIR will be updated to reflect 2010 census data. We look forward to the incorporation of those new data.

The SSC recommends release of the draft document for public review after addressing the principal concerns identified by the SSC and resolving editorial problems.

C-3(a) Initial review HAPC skate sites

Sarah Melton (NPFMC) and Gerald Hoff (NMFS-AFSC) provided an overview of an initial review draft EA and RIR that describes action alternatives to identify or identify and protect six HAPC sites of skate egg concentrations in the Bering Sea. Public comment was provided by Kenny Down (Freezer Longline Association), John Gauvin (Alaska Seafood Cooperative), Merrick Burden (Marine Conservation Alliance), Donna Parker (Arctic Storm), and Jackie Dragon (Greenpeace).

The SSC reviewed an earlier version of the initial review draft of this document in February 2012 and recommended at that time that the document should be returned to staff for additional work. The SSC recognizes the considerable work and resulting improvement in the document since we last reviewed it. In response to our February 2012 comments, the authors provided clarification on the importance of these sites to the overall abundance of skates, the potential for additional egg concentration sites in the Bering

Sea, and provided more information on the history of fishing activities in these areas. Descriptions of the alternatives were also updated and clarified, including changes to the option to suggest that additional research and monitoring be prioritized for these HAPC sites. However, there remain areas of the document that require additional clarification to increase the focus on what is known and not known concerning the effects of these actions on skates and on the potentially affected fisheries. Specific changes suggested for the EA are:

- Discussion regarding the potential for fishing activities to physically disrupt adult skate spawning at the areas of skate egg concentration during the spawning season (summer) and for fishing activities to affect the benthic habitat of the egg concentration sites.
- Additional information on the methodology used to estimate the potential total number of areas of skate egg concentration, including a discussion of the limitations of the method, and how the young-of-the-year information from the trawl survey versus the stock assessment may change the estimate of potential number of sites.
- Additional information on the persistence of the areas and sizes of egg concentration areas over longer times and the evidence for this persistence.
- Update the descriptions of gear and its effects on bottom habitat, particularly the description for bottom trawling, which needs to include the current use of modified trawl sweeps.
- Clarify the distinction between information derived from research trawl surveys and information from commercial bottom trawling.

There are specific deficiencies in several elements of the RIR. Suggested improvements are:

- Clarification of the language regarding the areas utilized for the economic impacts analysis, following the determination of the size of the areas themselves.
- Re-structuring the RIR to separate impacts by alternative might improve the flow and clarify the information presented.
- Expanded information on how the fleet may recover potentially foregone catch. Language should describe the difficulties the fleet may experience should these areas be closed.
- Economic impacts need additional clarity. While the total catch and gross value may represent the outcome of a complete, uncompensated loss to the respective impacted vessel/fleet/sector, these estimates constitute extremes. Given the expected size and shape of HAPC closures, and potential differential constraints (e.g., gear-type, temporal), more explicit accounting of the likelihood of recovering catch/earnings in remaining open areas is necessary.
- Editing the reported economic revenues to more appropriately reflect the precision of the underlying data sets (e.g., round to nearest $1,000).
- Greater detail on the inter-annual use of the respective HAPCs by sector, gear-type, and operating mode should be included across a longer time-series. Assertions of the economic and operational importance of each HAPC to the various fishing sectors, as described in public testimony, could be better evaluated with a longer time series mapping historical fishing activity.
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- The specified size of each proposed HAPC management area, the associated closures or constraints, differential temporal application by gear-type, etc., combine to define the terms-of-reference for the economic and socioeconomic impact assessment. This necessarily results in a strong sequential relationship between these physical and regulatory attributes of each HAPC and estimated economic and operational implications. The ability to evaluate the economic impacts of competing HAPC alternatives, to a sufficient degree, is dependent upon greater clarity in the physical and regulatory attributes of each.
- The document contains a significant number of editorial issues that were identified by the SSC and will be provided to the authors.

The SSC believes that, while many improvements have been made in the analytical package, it remains premature for release for public review. We look forward to reviewing the next iteration of this document, with an expectation that the revisions will result in a fully compliant draft.

C-5 Scallop SAFE

A report on the 2012 Scallop SAFE and Scallop Plan Team minutes was presented by Diana Stram (NPFMC). There was no public testimony.

The Scallop Plan Team recommended setting the 2012/13 scallop ACL equal to an ABC of 1.161 million pounds of shucked meats. This ACL is estimated using the maxABC control rule of 90% of the OFL, which includes discards. **The SSC supports the Plan Team's recommended ACL/ABC of 1.161 million pounds of shucked meats, which includes all catch including discards for which a 20% discard mortality rate will be applied.** In the future, it would be good to include the ACL/ABC recommendations directly into the SAFE in section 2.1.2.1**,** so that the SAFE documents can serve as archives of scallop fishery management over time.

The SSC appreciates the Scallop Plan Team's responses to SSC comments on last year's SAFE. Several responses were deferred to next year's SAFE. The SSC continues to have interest in these items and looks forward to Plan Team responses to those comments next year. The SSC offers the following comments on this year's SAFE:

1. In reviewing this year's SAFE report, the SSC notes some potential conservation concerns. **Two areas of some concern are the Kayak Island west bed and the Alaska Peninsula area.** However, as both areas have been closed to fishing in the last 2 and 3 years, respectively, no further conservation action is warranted at this time. **It would be useful if future SAFE documents could describe the criteria by which these areas would be reopened to fishing.** For the Kayak Island west bed, presumably a biomass-based threshold could be established using the biennial dredge survey. For the Alaska Peninsula, presumably a "test" fishery would be undertaken, barring implementation of a new survey in the area. However, given poor fishery performance in 2000/01 and extremely poor fishery performance in 2006/07 and 2008/09, an extended fishery closure would seem to be warranted. Moreover, 18,302 Tanner crabs were taken as bycatch in the 2008/09 fishery that yielded a mere 2,460 pounds of shucked meats, indicating a potential bycatch issue for any future fisheries in this area.

2. The SSC wishes to highlight two other fishing areas for additional consideration in next year's SAFE. **Recent declines in fishery CPUE for District 16 and the Kayak Island east bed seem to parallel those for the Kayak Island west bed, which has been closed to fishing since 2010/11.** The GHL for District 16 was increased from 21,000 to 25,000 lbs shucked meats in 2009/10. However, fishery CPUE for District 16 has generally declined since peaking at 65 lbs/hr in 2000/01 (see Figure 3-3) including the lowest CPUE on record of 27 lbs/hr in 2010/11. For comparison, CPUE at the west bed at Kayak Island (PWS area) declined from 120 lbs/hr in 2005/06 to 44 lbs/hr in 2009/2010 prior to fishery closures in the past two years (Table 3-6). Dredge surveys on the Kayak Island west bed indicated that low scallop densities (20 lbs/nm) are associated with the decline in CPUE. It is not clear whether fishery CPUE can be distinguished among the east and west beds of Kayak Island (see Tables 3-4, 3-5, and 3-6), however dredge surveys perhaps indicate more stable scallop densities on the east bed than on the west bed (Table 3-3). If CPUE can be estimated separately for the east and west Kayak Island beds, they should be reported separately in Tables 3-5 and 3-6.

3. **Declines in scallop densities indicated by fishery CPUE (above) suggest that it may be prudent for the Scallop Plan Team to undertake a fresh review of weathervane scallop fishery management.** Such a review could include a re-evaluation of the natural mortality rate used to prescribe OFL, target harvest rates, and the potential for some sort of rotational harvest

scheme. A review of scallop fishery management, including spatial harvest strategies and/or exploitation rates, in other parts of the world may yield some fresh insights.

4. The SSC appreciates the presentation of estimated discard mortality (assuming 20% discard mortality rate) in Table 2-2 to allow easy evaluation of the total fishing mortality (catch plus discards) relative to the statewide ACL. Table 2-2 may be sufficient in this regard, but the Plan Team could consider taking a similar approach in Tables for individual fishing areas (e.g., Table 3-1 for Yakutat). At a minimum, footnotes for tables for individual fishing areas should indicate that a 20% discard mortality rate and meat recovery rates are applied to estimates of whole scallop discards for purposes of catch accounting.

5. The SSC looks forward to the Plan Team response to last year's SSC request that the team consider exploring other methods for estimating biological reference points, such as Productivity Susceptibility Analysis or Depletion-Corrected Average Catch. Given the use of inseason fishery CPUE in fishery management decisions in several management areas, the SSC appreciates additional explanations of this process, such as the minimum performance standard reported in Appendix 1. **The team should consider formally describing the use of such inseason data in the management process in the body of the SAFE document.**

6. The team is encouraged to consider whether the utility of fishery CPUE as an index of relative changes in scallop abundance can be evaluated in PWS and Cook Inlet, where dredge abundance surveys are conducted.

7. Table 2-4 (p. 23) on crab bycatch limits is very useful. However, for areas in which the crab bycatch limit is 0.5% or 1.0% of estimated crab abundance, the actual number of crabs equating to these limits is not specified. The SSC recommends adding a column in Table 2-5 that provides area-specific crab bycatch limits (in numbers of crabs) to facilitate comparison to the estimated number of crabs taken as bycatch.

8. Figure 3-4 indicates a shift to significantly higher discard rates for scallops >110 mm SH in District 16 in 2009/10 and 2010/11. **Please explain the cause of these high discard rates in District 16.**

9. Figure 3-5 does not have axis labels and CPUE is not correctly plotted.

10. The sections on PWS and Cook Inlet could clarify whether the same catchability (q) and 5% harvest rate is used to estimate the annual GHL. For Cook Inlet, it is stated on p. 50 that ADF&G applies a 5% exploitation rate to the biomass data to set the GHL. However, p. 54 indicates that state regulations set a GHL range of 10,000-20,000 lbs. This seems inconsistent with information in Table 3-8, which indicates that the GHL calculation can result in GHLs less than 10,000 lb (2005 and 2006) and more than 20,000 lbs (1996). Please clarify the role, if any, of the 10,000-20,000 lb GHL range. Is natural mortality from the time of the survey to the time of the fishery used to discount abundance estimates, as is done with BSAI crabs? If not, the actual harvest rate would be higher than 5% under the current procedure.

11. On p. 49 it is stated that "Much of Cook Inlet is closed to scallop dredging" with a reference to Figure 2-1. However, Fig. 2-1 is a map of the scallop management areas and does not show closed areas in Cook Inlet. Figure 2-4 shows the two main scallop beds in Kamishak Bay. Are all other areas closed other than the two "main beds"?

12. The SSC appreciates new research with the sledge-dredge in the Central Region and looks forward to new estimates of survey catchability and improved estimates of stock biomass. Also,

now that aging issues seem to have been largely resolved and biometric support has been arranged, the SSC looks forward to the age-structured model for Central Region stocks.

13. For the Kodiak Shelikof District, there is a comment (p. 61) that reduced CPUE of 58 lbs/hr in 2007/08 may be due to the participation of a small vessel with a single 10-ft dredge. However, CPUE continued to decline to 49-52 lbs/hr in subsequent years. Did this small vessel continue to participate or is this a real decline in CPUE? The Team should consider separately reporting CPUE data from vessels towing a single, small dredge to maintain some consistency in "core fleet" CPUE estimates for evaluation of fishery trends.

14. The SAFE indicates that the Kodiak SW District opened to fishing in 2009/10 after closure since 1969 due to crab bycatch concerns. Please report the CPUE for this new fishery. This could have been an excellent opportunity to examine scallop densities in an unfished (43 years) bed and its response to fishing. It would have been ideal if a CamSled survey was conducted in this area to obtain valuable baseline data. **The SSC recommends conducting CamSled surveys in previously unfished scallop beds, or in areas that have been closed for extended periods, prior to future new fishery openings, if and when possible.**

15. In the Dutch Harbor Area, scallop size distributions are shown in Fig. 3-22 for 2010/11. It would be useful to also report size distributions for prior years to evaluate whether changes in size composition support the current GHLs.

16. The SSC appreciates the improvements in the Ecosystem Considerations section, and the SSC appreciates the Team's intent to continue improving the section. In particular, the SSC looks forward to additional information on ocean acidification and dredging effects next year.

17. Section 4.2 indicates that data before the current observer program (1993) are scarce. However, there are old observer data (late 1960s – early 1970s) available for Yakutat and Kodiak, as well as time series of CPUE for vessels with standard New Bedford dredges. Can any comparisons be made? Declines in CPUE and truncation of age structure in the early 1970s contributed to management restrictions at that time. For a review of those data from the 1960s and 1970s, see: Hennick, D.P. 1973. Sea scallop, *Patinopecten caurinus*, investigations in Alaska. Alaska Department of Fish and Game, Division of Commercial Fisheries, Completion Report 5-23-R, Juneau.

18. The section on the fishery effects on the ecosystem can be expanded. There have been many studies on the effects of scallop dredges (and other mobile bottom contact gear) on seafloor habitats by bottom habitat type and several reviews, including a somewhat dated section of the state FMP report (Kruse 1994) and a National Academy of Sciences report, among others.

19. There is opportunity to expand the treatment of scallop predators. Consider exploring the groundfish stomach database for evidence of predation on scallops. Are skates predators of scallops? There are reports of crab predation on scallops, as well.

20. The SSC appreciates the economic overview of the fishery. Potential additional information to include is port of landings, updated price of scallop per lb with size, crew size, and crew wages. Some of these are described in historical reports, such as:
    a. Kruse, G.H., and S.M. Shirley. 1994a. The Alaskan scallop fishery and its management. In: N.F. Bourne, B.L. Bunting, and L.D. Townsend (eds.), Proceedings of the 9th International Pectinid Workshop, vol. 2. Can. Tech. Rep. Fish. Aquat. Sci. 1994:170-177.
    b. Shirley, S.M., and G.H. Kruse. 1995. Development of the fishery for weathervane scallops, Patinopecten caurinus (Gould, 1850), in Alaska. J. Shell. Res. 14:71-78.

c. Miller, S.A. 2006. Economic factors in the scallop fishery off Alaska.

21. The SSC noted a number of typos and other errors; a list will be provided to the Plan Team separately.

D-1(a) BSIERP MSE Management Strategy Evaluation Workshop

The SSC received a report from Jim Ianelli (NMFS-AFSC) about a recent workshop on a Management Strategy Evaluation (MSE) project that is part of the NPRB-funded Bering Sea Integrated Ecosystem Research Program (BSIERP). The SSC previously requested periodic progress reports about this project and appreciates this update. The operating model for the MSE is a highly complex, vertically-integrated model (climate to lower trophic levels to fish to fisheries) that is still under development.

Single-species and multi-species models, including a multi-species statistical age-structured model (MSMt) and a food-web ECOSIM model, will be used as assessment models in the MSE. Correspondingly, both traditional single-species and new multi-species harvest control rules will be evaluated within the same framework. The MSE and multi-species harvest control rules will be further refined at the BEST/BSIERP PI meeting in Anchorage, March 28-30, 2012. The SSC would appreciate a presentation on the multi-species control rules that are being considered and their implementation at an upcoming meeting. In addition, the MSE is a potential topic for the annual SSC workshop in February, 2013.

The number of simulations that can be run with this complex operating model is very limited (a 35-year simulation takes approximately 7 days). Thus, the number of scenarios that can be examined is very limited. Perhaps the analysts could reuse parts of the operating model to conduct further explorations of the harvest control rules. These explorations could include contrasting economic scenarios (e.g., changes in world markets or oil prices) using the existing climate scenarios.

D-1(c) Programmatic Groundfish SEIS

Diana Evans (NPFMC) provided information about progress toward current PSEIS objectives and changes in ecosystem conditions that have occurred since the PSIES was completed in 2004. The Council requested input from the SSC to inform their decision regarding whether there is a need for an update or revision of the PSEIS. Diana Evans reported that there is no statutory time frame for updating a PSEIS, although review of case law suggests that a time frame of 5-10 years is appropriate. The Council is two years shy of the 10-year time frame and is considering whether the time is right to revise the 2004 Groundfish PSEIS.

The SSC agrees that it is a useful exercise to consider the impacts of Council action in a comprehensive manner and to periodically review the progress toward implementing the stated goals of the PSEIS. The SSC noted that there are at least 3 reasons to update the PSEIS:

1. To ensure that the environmental impact assessment reflects our current understanding of the implications of federal actions regarding groundfish fishing, thus enabling NMFS and the Council to tier off the findings of the PSEIS when conducting Environmental Assessments,
2. To review NPFMC performance relative to the stated goals of the adopted PSEIS alternative, and
3. To assess whether there is a better or more effective way to manage Alaskan groundfish resources and to update the PSEIS objectives to reflect any new priorities.

The SSC considers the first two reasons for updating to be high short-term priorities. Review of the briefing materials shows that the NPFMC has made considerable progress towards achieving the goals and objectives of the preferred alternative. The SSC recommends that, if the NPFMC elects to update the PSEIS, they may wish to request a review of what issues and concerns would require Council action. This proved to be an effective approach for the EFH 5 year review.

The SSC discussed the questions posed by the NPFMC and provides the following responses:

1. **How has fisheries management changed since the objectives and analysis were originally prepared?** As documented in the briefing materials, the NPFMC management has approved several amendments that are consistent with the goals and objectives identified by the PSEIS (see the list prepared by NPFMC staff in D-1(c)(5)).

2. **How have environmental conditions affecting the fisheries changed?**

    a. Since passage of the PSEIS, environmental conditions have varied. In the EBS, 2000-2005 were characterized as warm years while 2006-present were cold years; similar environmental variations were observed in the GOA. In the EBS, shifts in ocean temperature coincided with shifts in lower trophic level production, which impacted the productivity and distribution of some groundfish stocks. Similar to the period in the early 1970s, the recent patterns of sea ice retreat (2000-2005) and advance (2006-2011) in the EBS shows more year to year coherence than was observed in the 1980s and 1990s.The range of these variations in the EBS falls largely within the range observed in historical time series (see excerpts from the ecosystem SAFE chapter, page 9). While future climate conditions are expected to be affected by climate change, it appears that interannual and decadal climate variability continue to be the dominant climate pattern in the region.

    b. Changes in fishery impacts can also be considered a change in the environment. The spatial and temporal distribution of groundfish fisheries has changed in response to NPFMC management actions. These changes together with technical innovations (such as the halibut excluder) may have altered the environmental impact of fishing and, in some cases, the efficiency of some fisheries.

3. **Has the status of the fish stocks and other marine life changed?**

    a. The status of groundfish stocks has not changed substantially (no new stocks are overfished or subject to overfishing).

    b. The decline in the eastern portion of the western DPS of SSLs appears to have stabilized. However, the western portion of the western DPS of SSLs continues to decline.

    c. Northern fur seal populations on the Pribilof Islands have exhibited a declining trend of approximately 5% per annum, while increases at Bogoslof have slowed and do not compensate for the larger declines at the Pribilofs. Conservation measures may come into play in the future.

    d. In the last decade, many whale populations (e.g. gray, humpback and fin) have increased dramatically after being depleted by whaling. These increases in abundance have the potential to alter lower trophic level energy pathways in the region.

    e. Short-tailed albatross appear to be recovering slowly and, as this population recovers, existing incidental take standards may require modification to sustain fisheries without impeding the rebuilding of the albatross population.

    f. Tanner crab was recently listed as overfished and Pribilof blue king crab remains in an overfished status. Council action to rebuild these stocks may impact groundfish fisheries.

    g. Arrowtooth flounder and Pacific halibut populations in the Gulf of Alaska and Bering Sea have increased in the last decade. The size at age of Pacific halibut is declining. These changes suggest that the carrying capacity for Pacific halibut in the GOA may be limiting, resulting in shifts in the population dynamics of this population.

4. **Has new information become available which may indicate the necessity for revised analyses?**

    a. The NSF/NPRB BEST/BSIERP and NPRB GOAIERP programs are providing new information regarding mechanisms underlying species interactions within the GOA and BSAI ecosystems. Models are beginning to emerge that synthesize current knowledge of processes influencing the distribution and abundance of marine life in the Bering Sea. Extensions of these models will inform the Council with respect to the expected performance of management actions under changing environmental conditions. In the near term, results could be used to inform estimates of growth, mortality , and survey/fishery catchability and selectivity. These improvements to stock assessments fall within those anticipated in the PSEIS. It is too early to determine whether the modeling tools developed will reveal a need for re-evaluation of the overall management strategy for these stocks.

    b. Changes in ice extent and season in the northern Bering Sea and Arctic Ocean are having impacts on the distribution and behavior of cetaceans and pinnipeds (especially benthic foraging and ice-dependent species), as well as lower trophic levels and patterns of productivity. The progression of these changes and the resultant direct and indirect impact of fishing activity are not well understood. Changes may not be linear or incremental.

    c. As noted above, improvements in the status of listed seabird populations may require a re-evaluation of the incidental take standards under Section 7. Likewise, if northern fur seals continue to decline, or if ice seal conservation status changes (ringed and some DPSs of bearded seals are proposed as threatened) the Council may need to re-assess the fisheries interactions with these species. Finally, NMFS is evaluating critical habitat designations for northern right whales, which may impact groundfish fisheries in the region.

    d. Substantial changes to the Observer Program are expected to take place within the next two years. These changes are expected to improve the quality of catch estimates in the future. These changes will not necessitate a change in management strategy.

5. **Does the Council want to change the objectives, policy statements, or overall management approach for the groundfish fisheries?**

    a. The SSC notes that:

        i. The AFSC will be exploring the implications of incorporating stock-specific uncertainty buffers through an ACL analysis.

        ii. The NPFMC and AFSC will be developing an EIS for Steller Sea Lion protection measures.

        iii. The NSF/NPRB BEST/BSIERP program will provide an evaluation of the performance of various harvest control rules using assessment models with different levels of complexity, including multispecies models.

        iv. In the last decade, fisheries scientists have endeavored to assess the status of global marine fish stocks. Recent studies have used these global assessments to evaluate the performance of different management strategies. These papers may reveal useful information to the NPFMC if it elects to expand the scope of the PSEIS to include alternative management scenarios.

The SSC also considered the NPFMC's overarching question "**Do we understand the environmental impacts of our groundfish management program today?**"

- The NPFMC posed two sub-questions relative to this overarching issue. Question 1 focused on changes to the environment. Our responses to the questions listed above addressed this issue. Question 2: *Have the cumulative impacts of the groundfish fishery management program on the BSAI or GOA environment changed significantly since the baseline analyzed in the PSEIS, in ways beyond what has been described in subsequent analyses?* The SSC does not know of a significant change in the cumulative effects of fishing that has not been described in subsequent analyses. In the previous PSEIS, the NPFMC acknowledged that it was not possible to fully understand cumulative environmental impacts of groundfish management. The previous PSEIS identified several key sources of uncertainty and data gaps that impeded the ability to comprehensively understand the cumulative effects of groundfish fishing on the marine ecosystem. Many of these sources of uncertainty and data gaps still exist. The SSC recognizes that the current state of knowledge has improved since the last PSEIS and the Council has taken actions to address several of the environmental impacts identified in the 2004 assessment. While the knowledge base for decision making has improved, unknowns will continue to exist and conclusions will continue to be uncertain. Thus, the Council should expect that the existing knowledge will provide a better, but still incomplete, basis for evaluating the cumulative effects of fishing in a similar manner to the previous PSEIS.

The SSC requests in preparation for the June 2012 meeting, that a list of pending actions likely to occur in the near future be added to the existing summary of Council-approved actions. This would help inform the discussion of the purpose and need for a PSEIS review and update.

D-1(e) Tanner crab model review

The SSC received a presentation of recent Tanner crab model revisions from Lou Rugolo (NMFS-AFSC) and Jack Turnock (NMFS-AFSC). Jim Ianelli (NMFS-AFSC) gave a brief overview of Tanner crab model recommendations made during the January, 2012 crab modeling workshop. Public testimony was provided by Edward Poulsen (Alaska Bering Sea Crabbers).

Following advice from the workshop, CPT, and SSC, the authors made numerous revisions to both model code and model assumptions, including new sample size weights, selectivity function, accounting for discards before 1992, a penalty on fishing mortality, and a new parameterization of natural mortality (see next paragraph). The work was not an exhaustive exploration of model fit to the data but was intended to inform the SSC that model development was continuing, as requested at the last SSC meeting. **It is apparent that the authors have made significant improvements to the Tanner crab model.**

Recent analyses of the length composition information indicate a simultaneous loss to all Tanner crab size classes during the early to mid-1980s. This suggests that a mortality event may be responsible for the apparent population decline. The authors incorporated a model change to estimate a separate natural mortality parameter between 1980 and 1984, instead of just the single year 1983, similar to that employed in the Bristol Bay red king crab model. Although model fit was much improved with the increased natural mortality estimate over the 5 years, there remains considerable uncertainty about the mechanism that drove the decline in Tanner crab stock status during this time period. The SSC encourages the authors to examine other ancillary information, such as Pacific cod diet data or other potential mechanisms as discussed in the Bristol Bay red king crab assessment that may help to explain mechanisms driving population dynamics during this time period. In addition, there are still some strong residual patterns in the fits to the size composition data, including the average size composition across years that need to be further examined.

Continuation of model development is extremely important to ensure that the population dynamics model is appropriately applied to this stock. **The SSC recommends that the authors review and address other SSC and workshop recommendations prior to the CPT meeting in May, 2012 to the extent practicable**. In particular, Dr. Ianelli suggested that it might be useful to explore simpler models. This

can be accomplished by fixing some parameters that are currently estimated in the model; candidates include the maturity schedule, growth, and natural mortality. This will allow the authors to evaluate model sensitivity to these parameters**. If the model is approved by the CPT in May 2012 and SSC in June 2012, it will apply to OFL-setting and stock status determination in the 2012/13 assessment cycle and to the development of the rebuilding plan.**