

North Pacific Fishery Management Council

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Date: 11/14/07

**DRAFT REPORT
of the
SCIENTIFIC AND STATISTICAL COMMITTEE
to the
NORTH PACIFIC FISHERY MANAGEMENT COUNCIL
October 1-3, 2007**

The SSC met during October 1-3, 2007 at the Hilton Hotel, Anchorage, Alaska. Members present were:

Pat Livingston, Chair
NOAA Fisheries—AFSC

Keith Criddle, Vice Chair
University of Alaska Fairbanks

Bill Clark
International Pacific Halibut Commission

Anne Hollowed
NOAA Fisheries—AFSC

George Hunt
University of Washington

Lew Queirolo
NMFS—Alaska Region

Seth Macinko
University of Rhode Island

Franz Mueter
SigmaPlus Consulting

Farron Wallace
Washington Dept of Fish and Wildlife

Doug Woodby
Alaska Department of Fish and Game

Members absent were:

Sue Hills
University of Alaska Fairbanks

Gordon Kruse
University of Alaska Fairbanks

Terry Quinn II
University of Alaska Fairbanks

C-1 (a) & (e) ADF&G 2006 Charter Harvest Estimates and Estimation Procedures

Scott Meyer (ADF&G) presented (1) a staff report on the 2006 final estimates for charter halibut harvests in Area 2C and in Area 3A, and (2) a discussion paper on procedures for estimation of recreational catch of halibut, DSR, and sharks. Mike Jaenicke (ADF&G) provided answers to questions about the Area 2C creel surveys. Public testimony was provided by Dan Hull (Cordova District Fishermen United), Dan Falvey (Alaska Longline Fisheries Association), Donald Westland (Silver King Charters, Ketchikan), and Rick Bierman (Juneau Charter Boat Operators Association).

Estimation procedures are rules for generating estimates. The statistician's problem is to select an estimation procedure that provides good estimates, estimates that are often close to the true value. Nevertheless, good estimation procedures often lead to estimates that are incorrect. The charter harvest projections are based on simple 5-year linear trends in charter harvests. Recent discrepancies between the projections and estimates based on the Statewide Harvest Survey (SWHS) have ranged from -22.6% to +17.7% for Area 2C and -13.8% to +24.4% in Area 3A. The SWHS has received extensive review and is considered to be among the best in the U.S. Nevertheless, it is important to recognize that the estimates

based on the SWHS are uncertain. The uncertainty associated with SWHS estimates is represented by the standard errors (se) of the estimates. The 95% confidence intervals associated with the 2006 SWHS estimates are the point estimates, plus or minus the product of 1.96 and the standard errors of the estimates:

	Current Estimate (Mlbs)	SE	standard deviations	~95% LB	~95% UB	GHL	2006 Projection
2C	1.804	0.089	1.96	1.628	1.979	1.432	2.029
3A	3.664	0.108	1.96	3.451	3.876	3.650	3.948

Based on these estimates of the confidence intervals, there is less than a 2.5% probability that the 2006 level of charter harvests in Area 2C was less than 1.628 million lbs. Because the Area 2C GHL (1.432 million lbs) is less than 1.628 million lbs, there is less than a 2.5% probability that the Area 2C GHL was not exceeded in 2006. In contrast, because the Area 3A GHL is above the lower bound of the 95% confidence interval, the possibility that the GHL was not exceeded cannot be rejected at the 95% confidence level. Although the 2006 projections exceed the upper bound of the 95% confidence intervals in both Area 2C and 3A, the recent range of deviations between the projections and the SWHS estimates overlap for both areas.

The SSC is pleased to note that the analysts evaluated the use of exponentially weighted smoothing (EWS) as an alternative to 5-year linear trends as estimators for developing projections of charter harvests. The results of EWS are similar to the results of the simple 5-year linear trends. Providing confidence intervals for estimates and projections would help notify the public of uncertainty associated with the projections.

The precision and accuracy of catch estimates and projections are limited by the quality of information currently collected. The SSC notes that the data collection program is evolving and that improvements may be required to meet management objectives in the future. In particular, the SSC notes that biological sampling of sharks in the SE is minimal and additional sampling is warranted. **The use of improved in-season assessments to narrow the confidence interval on this information and to reduce time lags should be considered.**

C-1(b) 3A GHL

Jane DiCosimo (NPFMC) and Jonathan King (Northern Economics) presented an overview of the initial review draft EA/RIR/IRFA for implementing GHL measures in the halibut charter fishery in IPHC Regulatory Area 3A. There was no public testimony on this agenda item.

This draft analysis was patterned after the analysis included in the Area 2C GHL amendment package, which was approved. The current draft analysis relied on the 2006 charter harvest projections, because the 2006 SWHS estimates were not available until after the draft analysis had been completed. As noted in section C-1 (a and e), above, although the 2006 SWHS estimate exceeds the GHL, it is considerably smaller than the 2006 projection. The analysts have indicated that the SWHS estimates will be incorporated into a revision of the draft initial review EA/RIR/IRFA. **The SSC approves the document for release for public review, but makes the following recommendations regarding improvements before its release.**

In addition to changes associated with incorporation of the 2006 SWHS estimates, **the analysis could benefit from addressing, to the extent practicable, the following specific issues:**

1. Confidence intervals should be added to figure (1) and figure (8).

2. The analysis should address the likely differential responses of resident and nonresident anglers to action options.
3. Table 10 should be expanded to include an analysis of Alternative 1.
4. The analysis should include a discussion of the effect of the alternatives on the capitalized value of commercial QS.
5. The analysis should include a discussion, to the extent that data permit, of the residency of owners, operators, and crew in the commercial and charter fisheries.
6. The analysis should include an explicit discussion of the expected enforcement costs for each option.

C-1(c) Charter Halibut Allocation

Jane DiCosimo (NPFMC), Darrell Brannan (NPFMC), and Jonathan King (Northern Economics) presented an overview of the preliminary review draft EA/RIR/IRFA for setting an initial allocation between charter and commercial sectors in the halibut fishery and to allow for “compensated reallocation” between sectors in IPHC Regulatory Areas 2C and 3A. Public testimony was provided by Kathy Hansen (SE Alaska Fisheries Alliance and United Fishermen of Alaska), Donald Westland (Silver King Charters, Ketchikan), Larry McQuarrie (Sportsman’s Cove Lodge, Prince of Wales Island), Dan Falvey (Alaska Longline Fisheries Association), and Rick Bierman (Juneau Charter Boat Operators Association).

At the outset, the analysts characterized this document as a preliminary draft that requires further specification from the Council before the analysis can be completed. **The SSC concurs that the current draft EA/RIR/IRFA is incomplete and should not be released for public review, because it does not provide sufficient detail for the public to frame informed opinions about the impact of the alternatives.** For example: (1) the mechanism for determining the amount of IFQ that would “need” to be reallocated from the commercial fishery to the charter fishery has not been defined; (2) the mechanism for determining the magnitude of compensation, if any, to IFQ holders for transfers of halibut “needed” for the charter fishery has not been specified; (3) the mechanism for determining whose IFQs would be reduced to support charter “needs” has not been defined; (4) the mechanism for enforcing a GHL has not been identified; (5) the tax implications of the pro-rata payment for transfers of IFQ versus transfers of QS have not been discussed; and (6) the mechanism for transferring funds collected from charter operators through regional, State, and Federal entities and on to commercial fishermen have not been identified.

In addition, it should be noted that the analysis does not provide quantitative estimates or confidence intervals for the magnitude of net national benefits or to determine the regional economic impacts generated under the alternatives and it is unlikely that a revised analysis will be able to definitively identify an optimal allocation. A complete characterization of net national benefits affected by this action would require consideration of the contribution to national welfare of all commercial removals (i.e., charter, halibut longline, other fixed gear fisheries, and trawl). Such an analysis exceeds reasonable expectations for the present action. More to the question at hand, selecting an allocation to maximize net national benefits would require detailed information on operation and capital costs in the charter and commercial sectors as well as detailed information about the ex-vessel demand for IFQ halibut, angler willingness-to-pay for charter trips, as well as the ‘input value’ of halibut bycatch in the production of other fishery production. Acquiring such information would be expensive and time consuming. Because changes in the demand or supply functions in the commercial fishery, changes in the willingness to pay or cost of participating in the charter sport fishery, and changes in ocean productivity affect the optimal

sustainable yield and the optimal allocation of the optimal sustainable yield, any initially optimal allocation may be suboptimal in subsequent periods. Consequently, to maximize net benefits, allocations need to be modified whenever the economic or biological conditions change. Although theoretically possible, the knowledge and control needed to maximize overall net benefit through political-regulatory management regimes is overwhelming and such systems have consistently failed to sustain overall net economic benefits. When allocations are determined in a political process, interest groups have an incentive to overstate the marginal value of additional shares. The resultant allocations cannot be expected to maximize overall net economic benefits. An integrated commercial-sport quota market-based management regime would shift the allocation decision from the management arena into the market place. However, the mere act of adopting an integrated commercial-sport quota market will not, by itself, ensure that overall net benefits are maximized. The use-shares must be defined in a way that causes the value of consumer and angler surpluses to be expressed in the market price for use shares and the market is allowed to efficiently apportion shares to their highest and best use.

While development of a model of the determinants of angler demand for sportfishing trips (by demographic category, residency, region, type of charter operation, costs of licenses and halibut stamp surcharges, etc.) would be desirable, development of such a model is beyond the scope of this analysis. Nevertheless, because projections of charter catches are needed for management and for comparison of management alternatives, a forecasting rule must be selected. It is reasonable to assume that past SWHS estimates of charter catches provide information about future catches, however because past SWHS estimates have varied considerably, there will be substantial uncertainty about the projections and uncertainty about optimal rules for deriving projections from past SWHS estimates. In the absence of a behavioral model, there are many ways to use the information embodied in the 30 SWHS estimates. The possible forecasting rules range from weighting each past observation as equally likely, to ignoring all but the most recent observation. For short-term forecasts, locally-linear time trends such as the 5-year trends currently used for charter catch projections are often used. In general, forecasts should not extend beyond 20% to 50% of length of observations used to generate the forecasts. That is, 10-year forecasts should be based on trends estimated over at least 20 to 50 years of observations. Because there are only 30 annual SWHS estimates of charter catches, all 30 observations should be used in generating 10-year forecasts. The SSC suggests that the analysts consider one or more of the following models:

1. Random walk model: Time series that follow a random walk, or a random walk with drift, are inherently unpredictable (although the range of possible variation can be simulated for fixed forecast horizons). The annual SWHS estimates should be examined with a test for unit roots to determine whether it is possible to reject the hypothesis that the history of charter catches can be characterized by a random walk or a random walk with drift. If the observations fail the unit root test, strong consideration should be given to basing the projections on a random walk or random walk with drift model.
2. Globally linear trend model: Linear regression with adjustment to account for heteroskedasticity (differences in the annual SWHS coefficients of variation). This model would reduce the influence of high variance estimates.
3. Weighted globally linear trend model: The above model could be further adjusted by weighting the observations by the inverse of the lag length from the present. This model would reduce the influence of the earliest observations in the data series.
4. ARIMA model: ARIMA models are often useful for generating forecasts that incorporate the influence of past observations with data-determined weighting on the window of observations that influence forecasts. An advantage of ARIMA models is that they allow for dynamic responses that can be nonlinear.

5. Exponentially weighted smoothing (EWS) model: EWS is a procedure for estimating locally-linear trends where the most recent observations are most influential, and where the data are used to determine the weights. The EWS model could also include adjustment for heteroskedasticity.

For all of the above, it would be helpful to provide upper and lower confidence bounds to characterize the degree of uncertainty associated with the projections of growth. However, the SSC recognizes that there is a great deal of year-to-year variability in SWHS estimates of harvest and the processes influencing future changes in non-commercial harvest of halibut are not well-known. Thus, the suggested analyses may not improve the projections currently provided in the document.

C-1(d) Charter Halibut Discard Mortality

Scott Meyer (ADF&G) presented a discussion paper on halibut discard mortality in recreational fisheries in IPHC Areas 2C and 3A. Public testimony was provided by Rex Murphy (Alaska Charter Association) and Donald Westland (Silver King Charters, Ketchikan).

The SSC applauds ADF&G's efforts to include discard mortalities in the estimation of total halibut mortality in the recreational fishery. The analyst provided reasonable estimates of discard mortalities for different gear types, based on existing literature. While there are many sources of uncertainty and potential biases, results suggest that discard mortality is likely a small fraction of total harvest.

A major source of uncertainty in the estimation is the average weight of discarded fish relative to retained fish. To obtain an estimate, the analyst assumed size-selective retention that favored larger fish (i.e. lower retention rates for smaller fish) and followed a logistic function. With some strong assumptions, bounds for average size were obtained based on a single year of size composition data (retained catch) and an estimate of the total number of fish landed.

To reduce uncertainty in the estimates, the SSC encourages ADF&G to conduct small-scale studies on handling mortality and on the size composition of released fish in different sectors.

C-3(c) Initial review of BSAI Crab "C" shares 90/10 exemption

Mark Fina (NPFMC) presented an overview of the initial review draft RIR/IRFA for extending the exemption of C shares from processor share and regional landing requirements. Public testimony was provided by Tim Hinkle (Deep Sea Fisherman's Union).

The SSC notes that two years of experience with C-share use may not be sufficient to support conclusions as to how this program will perform over time. Further development of the analytical package depends upon selection of a preferred alternative by the Council. The analysis or action memo should include an explanation for why an EA was not prepared as a component of this analysis. **The SSC supports the release of this initial analysis for public review.**

C-3(d) Initial review of BSAI crab custom processing

Mark Fina (NPFMC) presented an overview of the initial review draft RIR/IRFA for a provision exempting certain custom processing from use caps on processor shares. Public testimony was provided by Dave Fraser (Adak Fisheries).

The SSC appreciates the efforts made by the analysts to be responsive to SSC comments, offered during the SSC meeting in February, 2007. The analysis or action memo should include an explanation for why

an EA was not prepared as a component of this analysis. **The SSC supports release of this draft for public review.**

C-3(e) Initial review of BSAI crab post-delivery transfers

Mark Fina (NPFMC) presented an overview of the initial review draft RIR/IRFA for an action allowing post-delivery transfer of shares to cover catch overages. There was no public testimony on this agenda item.

The analysis or action memo should include an explanation for why an EA was not prepared as a component of this analysis. **The SSC supports release of this draft RIR/IRFA for public review.**

C-4(a) Preliminary review of GOA Pacific cod sector split

Jeannie Heltzel (NPFMC) presented an overview of the preliminary draft EA/RIR/IRFA for allocations of Pacific cod among sectors in the western and central Gulf of Alaska. There was no public testimony on this agenda item.

The SSC appreciates the opportunity to learn about the analysis at an early stage. The SSC notes that some of the potential sectors appear to involve very small numbers of participants and wonders whether confidentiality issues will preclude meaningful analysis. The SSC suggested that the analysts consider adding residency information into future iterations of the analysis.

The SSC notes that although the EA includes a brief discussion of potential impacts on seabirds, it does not explicitly address the role that alternative choices of the qualifying years would have on impacts to seabirds.

C-4(d) Initial review CGOA rockfish post-delivery transfers

Mark Fina (NPFMC) presented an overview of the initial review draft RIR/IRFA for an action allowing post-delivery transfer of shares to cover catch overages. There was no public testimony on this agenda item.

While the SSC did not have specific questions or concerns with the analysis itself, the SSC does request that a short explanation be provided as to why there is no accompanying EA. **The SSC recommends that the analysis be released for public review.**

C-5 LLP Trawl Recency

Jim Richardson (NPFMC) presented an overview of the initial review draft EA/RIR/IRFA for groundfish license limitation for BSAI trawl catcher vessels and GOA trawl catcher vessels and catcher processors. Public testimony was provided by Julie Bonney (Alaska Groundfish Databank).

Staff noted that several tables in the draft analysis include incorrect numbers, other tables are missing from the draft analysis, and additional discussion will be added to the analysis; thus, it is unclear if the current draft analysis is representative of the document that would be released for public review.

The SSC notes that, while the analysis suggests that there might be costs and that there might be benefits associated with these alternatives, it does not provide estimates of the costs or benefits and, thus, the

analysis does not provide information that would support differentiating the alternatives on the basis of quantitative estimates of net national benefits, regional economic impacts, or differences in net benefits that accrue to the various sectors included or excluded under the alternatives.

The SSC does not presently support public release of this analysis and would appreciate an opportunity to review the completed document, reflecting all the proposed corrections and additions, prior to release.

C-7 Social and Economic Data Collection

Ron Felthoven (NMFS AFSC) presented an overview of a discussion paper characterizing data to include in a comprehensive social and economic data collection program for fisheries in and off Alaska. Public testimony was provided by Tim Hinkle (Deep Sea Fisherman's Union).

Collection of comprehensive social and economic data is a necessary basis for elevating the quality and rigor of analyses undertaken in support of contemplated management actions. For example, our June 2007 report notes:

The need for the development and continued maintenance of basic economic and social information databases on the fisheries and fisheries dependent communities of GOA and BSAI is made ever more pressing as the Council continues to adopt actions that are intended to improve the long term net benefits derived from fisheries. This information is required for establishing a baseline to be used in identifying stakeholders to be included in the distribution of dedicated access privileges (e.g., harvesting quotas and processing quotas), a baseline to be used for projecting the likely consequences of alternative management measures, and as a baseline for retrospective analysis of management actions that have been taken.

While the analytical rigor and quality of information applied to stock assessments has evolved from crude back-of-the-envelope estimates employed at the onset of Council management, to the sophisticated state-of-the-art assessments that characterize our current stock assessments, the rigor of economic and social analyses has not evolved in a similar fashion. This is not a fault of the analysts or an expression of the inherent analytic limitations of the disciplines. The fault lies with a failure to collect basic information, information that is typically available for other industry sectors, such as agriculture.

For example, over the past two decades, lack of data on crew participation in the fisheries off Alaska has precluded serious consideration of crew impacts in various Council actions. The SSC notes that the Council formally requested the collection of data on crew participation in 1995 (as a general provision of the LLP programs). *Whether* crew should be included in any particular allocation scheme is a policy decision for the Council to make, however, such a decision cannot be empirically informed until a data collection program on crew participation is initiated.

The proposed data collection program is substantially scaled-back from previous proposals and represents a pragmatic compromise, focusing on the most critically important data that will assist most in Council analyses. While collection of the data described in the discussion paper will not resolve all of the information deficiencies that limit economic and social impact analyses of management actions, as the depth and breadth of cross-sectional and time series data available to analysts grows, there will be substantial improvements in empirical estimates of benefits and costs, their temporal and geographic distribution, and the net benefits that may be expected to accompany each of the alternative management mechanisms considered by the Council. Data proposed for inclusion in the comprehensive database will support, inter alia, pre- and post-implementation empirical estimates of: net benefits under alternative management actions; regional economic impacts under alternative management actions; costs and benefits of alternative management actions by sector; social impacts of alternative management actions by

community and for crew; and, the consistency or divergence between outcomes and stated management objectives.

D-1(b) Initial review WGOA pollock trip limit

Jim Richardson (NPFMC) presented an overview of the initial review draft RIR/IRFA. An EA has not been prepared for this analysis; staff intends to request a categorical exclusion, under NEPA, precluding the need for preparation of an EA. There was no public testimony on this agenda item.

The SSC supports release of the draft for public review.

D-1(c) Groundfish Specifications

Diana Stram (NPFMC) presented the plan team recommendations on the preliminary 2008-2009 groundfish specifications. Public testimony was provided by Dan Falvey (Alaska Longline Fisherman Association) related to the weighting of fishery data and survey data in the apportionment of sablefish.

The SSC concurs with the preliminary groundfish specifications suggested by the plan teams. The public should be aware that these preliminary numbers will be revised in December.

D-1(d) Review of new stock assessment models

Pacific cod

Grant Thompson (NMFS AFSC) reported on the Pacific cod workshop held in April 2007 and a discussion paper entitled "An exploration of alternative models of the Bering Sea Pacific cod stock." Public testimony was provided by Mark Maunder (Freezer Longliner Coalition).

The 2006 assessment, done with the Stock Synthesis 2 assessment package, was the first to estimate the "catchability" coefficient from the Bering Sea trawl survey data, previously fixed at 1. Other features of this assessment were fixed natural mortality (0.37), double normal (in place of the previous double logistic) selectivity functions, and influential prior distributions on some parameters.

An external review and independent model estimates derived after the September 2006 plan team meeting resulted in a number of recommended changes to the assessment and a quick revision of the assessment shortly before the December 2006 Council meeting. In view of the numerous questions about the assessment and uncertainty about the biomass estimate, the SSC recommended that NMFS hold a public workshop to examine the assessment and explore alternative models. This workshop was held in April 2007. A number of alternative models were fitted in advance of the workshop, and additional models were fitted during the course of the workshop. At the end of the workshop, participants suggested a number of other possibilities for the assessment team to consider.

AFSC assessment scientists investigated these alternative models during the summer and presented a range of four possible model fits at the September 2007 plan team meeting. In all of these models, natural mortality (M) and trawl survey catchability were estimated, January-May commercial trawl selectivity was forced to be monotonic, other selectivities were modeled as double normals, with annually varying ascending limbs; all priors were uniform. The four alternative models differed in respect of beginning year (1976 or 1982), influence of commercial trawl and longline CPUE, variation of natural mortality with age after age 8, influence of age data, and data weighting (in one model the data were iteratively reweighted). Predictably, each of the models achieved better fits to some data types and worse fits to others.

The age reading data were ignored in one model because of some apparent inconsistencies between the progression of trawl survey length frequency modes and the mean length at ages 1-4 shown by the age readings. Observed survey length frequencies and those predicted by a model fitted to the age data were presented. The model predictions generally failed to match the height of the observed modes among smaller fish, lending some support to suspicions about the accuracy of age readings of younger fish.

At this point, none of the models fit all the data well, and there are substantial differences in estimated abundance among the models. The SSC is impressed with the talent and effort being applied to this assessment, and we see progress in identifying a suite of model configurations for eventual selection of a preferred assessment. The assessment scientists raised a number of specific questions about the data and the model configuration. The SSC suggests that the analysts consider the following in some of the models brought forward in December:

- (i) -One or more model fits in which the value of natural mortality (M) is fixed. We are skeptical of model estimates of M , including the previous fixed value $M=0.37$. Purely for purposes of comparison we would like to see one fit with $M=0.37$. We would suggest that the author investigate the possibility of choosing a different fixed value based on life history theory (i.e., the value of M for which the observed growth and maturity schedules are optimal).
- (ii) Plots of the empirical length-at-age distributions calculated by keying out the survey length distributions using the length-stratified survey age readings. These empirical length-at-age frequencies must sum to the observed survey length frequencies, including the strong modes that the model fits fail to predict. This exercise may reveal differences between the empirical and estimated length-at-age distributions that will shed some light on the apparent inconsistencies between the age and length data.

Another suggestion to the assessment scientists to help resolve the aging issue (not a request to do this for December) is that they examine residual plots of age conditioned on length by year for clues of where the model fits the data well and where it does not.

Skates

Olav Ormseth (NMFS AFSC) presented a new age-structured Stock Synthesis 2 model for Alaska skates. The SSC commends the author for clear presentation on a new stock assessment and for considerable effort to develop an age-structured model for skates. There was no public testimony on this agenda item.

The base model started in 1992, used length-based selectivity, and incorporated the EBS shelf survey biomass and a level of equilibrium catch equal to the 1992 catch. The authors also explored an alternative model that was started in 1958, incorporating the entire historical catch record. The early catch estimates were based on the 1997-2006 species composition, which raises questions about how consistent these proportions are over time, particularly when extrapolating back in time, e.g., could the fairly dramatic increase in biomass in the 1980s be attributed to changes in species composition, changes in spatial distribution, or both?

The SSC encourages further development of the age-structured model and recommends that the authors consider the following issues in future updates to the model:

1. Run several alternative models that look at plausible lower and upper bounds of historical catch.
2. Examine any historical evidence for changes in species composition that may have occurred during the time of rapid increase, as well as the evidence for movement of skates onto the shelf over time, which may imply that a larger proportion of the population was unavailable to the survey in the early 1980s.

3. Examine and show the observed level of variability in species composition in both the catch and the survey over time for the years where data are broken down by species.
4. If possible, incorporate an alternative growth model into SS2 that may improve the model fit to the available length-at-age data.
5. Examine potential problems with aging of older fish (i.e. do they all accumulate in a large size class without further growth and without depositing growth rings in vertebrae).
6. Include a discussion of trophic relationships and other ecosystem relationships for Alaska skate (ecosystem considerations, similar to other assessments), with attention to the main prey and predators (based on available diet data) and including evidence for predation on adult skate.
7. The base model is not responsive to the recent increase in the trawl survey biomass, apparent since 2001, and further evaluation of possible misspecification should be made.
8. Consider using an average recruitment level, rather than trying to fit a Beverton-Holt model that appears to fit poorly and has issues with strong autocorrelation in the residuals.
9. Fix Fig A5 to clarify the ages represented on the x-axis.

D-1(f) Management of Other Species

Scott Miller (NMFS AKR) gave an overview of a discussion paper on the implications of a proposed amendment to set overfishing and allowable biological catch specifications for the other species assemblages in the BSAI and GOA. At the current time, 5 alternatives are under consideration. The discussion paper provided plots of monthly cumulative catch by fishery and sector, and the spatial distribution of other species catch. The analysts expect that the action will trigger a regulatory amendment and will require an EA/RIR/IRFA. The analysts plan to develop a fishery activity model for target fisheries. The effort would include an analysis of temporal and spatial distributions of fisheries on a 5 km grid. This would allow the ability to assess what types of management measures (quotas, time and area closures, or gear restrictions) that would be most effective at maintaining catch at a biologically acceptable level and to evaluate revenue at risk, mitigation of revenue at risk, and operational implications.

Jane DiCosimo (NPFMC) provided background information on the larger effort to manage non-target species. At the current time, rule making on the feasibility of distinguishing between target and non-target management is uncertain. The NPFMC is recommending moving forward with the other species breakout as an interim step. **The NPFMC anticipates that future rule making would propose species specific management measures for every non-target species.** Council staff also noted that grenadiers are currently considered to be of “no management concern” and, therefore, asked the SSC to comment on whether Alternative 5 should be included in the amendment package.

There was no public testimony on this agenda item.

The SSC agrees with the NPFMC plan to proceed with an interim measure to break the other species complex into its component species complexes. This effort, and its associated analysis, should provide useful insight into the potential implications of proposed species specific management of non-target management. **The SSC does not recommend dropping Alternative 5 on adding grenadier to the specification process from the amendment package.** In the GOA, where incidental catch is approximately 40% of a potential ABC, it is premature to drop this species group from the analysis.

Furthermore, inclusion of grenadier in the analysis would provide useful insight into the implications of management of a non-target species group.

The SSC agrees that the proposed work plan for development of the EA/RIR/IRFA is reasonable. **However, additional detail would be required for the SSC to provide more specific comments and suggestions.** Analysts should include an analysis of prospective markets for these species, and the anticipated rate of developing markets. The analysis should also include an analysis of the impacts of the proposed species breakout on existing target fisheries and markets.

The SSC recommends that future discussion papers differentiate between bycatch (i.e., incidental groundfish catch that is discarded), versus incidental catch (i.e., which is, by definition, retained). The SSC notes that the label “management concern” is a value judgment. This label appears to be linked to whether recent observed catches of a group approached the group ABC or OFL. The SSC recommends that this criterion be more clearly defined. The SSC notes that, for example, 41 species of sculpins were identified in the Eastern Bering Sea (EBS) and 22 species in the Aleutian Islands (AI) region. Thus, the analysis will need to point out that the assessment of concern applies only at the group level, and that species level impacts might still be incurred in this management system.

D-2 (a,b) Salmon Bycatch Workgroup Report/Refine problem statement and alternatives

Diana Stram (NPFMC) presented a report from the Salmon Bycatch Workgroup, pointing to the need for SSC comments on analytical methodologies proposed to address the bycatch issue. Jim Ianelli (NMFS, AFSC) reported on his recent efforts to develop a method to estimate the impact on salmon run sizes in western Alaskan rivers, due to bycatch in the BSAI pollock trawl fishery. Jim Ianelli also reported on work by Alan Haynie (NMFS, AFSC) to model the optimal design for BSAI pollock fishery closures to effectively reduce salmon bycatch. Cathy Coon (Council staff) presented a series of maps showing potential GIS approaches to establishing closed areas based on bycatch rate-based or threshold criteria. Public testimony was provided by Becca Robbins Gisclair (Yukon River Drainage Fisheries Association).

The issue of salmon bycatch in the pollock trawl fishery has been before the SSC numerous times in recent years, and we convened a salmon bycatch workshop in April of this year. At that meeting, the Council established a salmon bycatch workgroup (SBW), which met most recently in August. The current suite of alternatives before the Council includes just two, the status quo and an alternative with 4 elements:

1. Hard caps,
2. Fixed area closures,
3. Triggered area closures, and
4. A modified PSC accounting period,

with various options under the first 3 elements.

The SSC agrees that the newly developed “adult equivalency” modeling approach is promising and highly responsive to our suggestions made in April for approaches that might be possible for estimating bycatch impacts on returns to western Alaskan rivers. The preliminary form of the model shows considerable promise to provide these estimates, and moreover, offers the possibility of selecting a bycatch limit based on probabilistic statements of estimated run size impacts. Also, the sensitivity analysis of effects of uncertainty in run sizes, survival rates, river of origin assignments, and inter-annual variability in run size provides useful insight into the importance of those factors in the analysis and its outcomes. **We encourage further development of this model, to include greater realism regarding age of returning salmon,** with the anticipation that the model will be available for development of analytical results, once the critical parameters, including the proportional assignments to river systems, are more precisely estimated.

The SSC reviewed Alan Haynie's approach for identifying optimal area closures to reduce salmon bycatch. This modeling approach uses a computationally intensive analysis of a large number of area closure possibilities in an effort to simultaneously optimize pollock catch, while minimizing salmon bycatch. We provide the following comments in regards to the fundamental assumption of reallocating vessel effort from closed areas to open areas in proportion to other effort (page 2 of the D-2(b)(4) report). First, it is unclear if effort is being reallocated in proportion to other effort, or to anticipated catch, as given in the report's example (also on page 2 of the report). Also, we recommend that the analysts consider the potential for increasing salmon bycatch if effort is redistributed to areas with lower pollock catch rates, which would require increased efforts to achieve desired pollock catch levels, particularly if the reallocated effort is added to existing high effort, as the model assumes. We encourage enhancing the model to include realistic considerations for vessel/skipper behavior in selecting where vessels relocate following closures.

In regards to Alan Haynie's model, as well as the approach presented by Cathy Coon, we **suggest inclusion of spatial data on river of origin, if and when the data become available, would be a useful enhancement.** The cost-benefit approach presented by Cathy Coon might also be enhanced by increased temporal resolution, such as monthly distributions of salmon and pollock catch rates.

Finally, the SSC reiterates our concern that the goals for the salmon bycatch issue should be clearly specified. Our understanding is that the MSA requires reduction of bycatch, and that reducing bycatch rates may not be an adequate measure of success.

D-2(c) Salmon Excluder EFP Report

A presentation was made by John Gauvin (MCA Foundation) on recent field testing results of salmon excluder devices for pollock trawls. The SSC considers this collaborative work on gear technology as producing potentially valuable contributions to reducing salmon bycatch. The SSC encourages further work in this research area. We recommend that this research effort include repeated experiments in different years to examine the impact of changing environmental conditions.

D-3 (a) Crab Plan Team Report and Crab SAFE

Diana Stram (NPFMC) presented the crab plan team report and the 2007 crab SAFE, including a brief summary of the status of annually surveyed stocks. No public testimony was received.

The plan team and the authors have been very responsive to previous SSC comments and the organization of the SAFE has greatly improved over time. In particular, the SSC appreciated inclusion of an Executive Summary with concise summaries of stock status. In addition, the SSC recommends adding a section at the beginning of the document that summarizes assessment author's responses to previous Plan Team and SSC comments. The Plan Team may also want to further streamline the document by structuring it along the lines of the groundfish SAFEs (Summary of Plan Team recommendations followed by individual assessments), which would facilitate the SSC review.

Diana Stram pointed out several concerns raised by the Plan Team regarding inconsistencies in the estimation (by weight) of crab bycatch for making OFL determinations. These issues need to be resolved if and when Amendment 24 (Revised Overfishing Definitions) is adopted and **the SSC urges the Plan Team to start working on these and other implementation issues, as soon as possible.**

Regarding the stock assessments for snow crab and Bristol Bay red king crab, a number of concerns were raised by the stock assessment authors and by the plan team that should be addressed by the authors in future assessments. Specifically, there are serious concerns about high fishing mortalities on the southern

portion of the snow crab stock, which may exacerbate observed northward shifts in their distribution. The SSC recommends an analysis of the potential consequences of this high fishing mortality and of options for apportioning catch spatially. A second issue of concern is the presence of disturbing trends in the residuals of the fit to size frequency data, which may be a result of uncertainty in the practice of using shell condition as a proxy for shell age. We anticipate that these and other issues will be addressed in a requested CIE review of the snow crab assessment and the SSC looks forward to receiving a report on the review. **The SSC approves the BSAI crab SAFE.**

D-3(b) Crab overfishing definitions

The SSC received a summary of the revised initial review draft of the crab overfishing environmental assessment from Diana Stram (NPFMC). No public testimony was received.

The Committee had reviewed the last draft in June and, while approving the technical analysis, had requested that the document be reorganized and revised in a number of ways so as to better explain the effect of the new definition on crab harvests. The Crab Plan Team and the analysts have done an excellent job. New tables and figures in the present version clearly show the differences in overfishing levels between the old and new definitions, and the effect that the new definitions would have had on retained catch in the major fisheries in recent years.

The Team noted in its report that the new definition, if adopted, would entail a number of implementation issues, including the assignment of responsibilities for assessments, OFL determinations, and tabulation of catch. **The SSC agrees with the team that the agencies need to begin planning for implementation well in advance of adoption. The SSC recommends that this initial review draft be released for public review.**