

DRAFT
MINUTES
SCIENTIFIC STATISTICAL COMMITTEE
December 6-8, 2004

The Science Statistical committee met December 6-8, 2004 at the Anchorage Hilton in Anchorage, AK.
Members present:

Rich Marasco, Chair	Gordon Kruse, Vice Chair	Keith Criddle
Steve Hare	George Hunt	Pat Livingston
Seth Macinko	Franz Mueter	Terry Quinn
David Sampson	Farron Wallace	Doug Woodby

Members absent:

Mark Herrmann	Sue Hills	Ken Pitcher
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B-1(e) Plan Team Nominations

It is recommended that Ms. Michele K. Culvar, Washington Department of Fish and Game, be appointed to both the Bering Sea/Aleutian Islands and Gulf of Alaska Groundfish Plan Teams. In addition, it is recommended that Mr. Scott Miller, NMFS, be appointed to the Alaska Scallop Plan Team.

B-7 Protected Species Reports

Bill Wilson (NPFMC) presented information regarding progress in the development of a Steller sea lion recovery plan, preparations for a conference on Northern fur seals, and a proposal to consider changes in the trawl exclosures around St. George Island. Robin Angliss (NMFS) presented information and responded to questions about the MMPA List of Fisheries for 2005. Public testimony was provided by Paul McGregor (At-Sea Processor Association), Gerry Merrigan (Prowler Fisheries), Thorn Smith (North Pacific Longline Association), and Donna Parker (Arctic Storm Fisheries).

A. List of Fisheries (LOF). The SSC was provided with a white paper, “Summary of Analysis for the Proposed List of Fisheries for 2005”, to review in advance of the meeting. Three additional documents were provided to the SSC immediately before presentation of this agenda item: a supplement to the white paper that provides a more detailed description of the mortality/severe injury incidents; a NOAA technical memorandum “Compilation of Marine Mammal Incidental Take Data from the Domestic and Joint Venture Groundfish Fisheries in the US EEZ of the North Pacific, 1989-2001” (Perez, M.A. 2003); and, a draft NOAA technical memorandum “Analysis of Marine Mammal Bycatch Data from the Trawl, Longline, and Pot Groundfish Fisheries of Alaska, 1998-2003, Defined by Geographic Area, Gear Type, and Target Groundfish Catch Species” (Perez, M.A., 2004). SSC comments are based on the Summary Analysis, supplemental table, and staff analysis, alone.

It ain't what we don't know that gets us in trouble; it's what we know that ain't so.
Will Rogers (1879-1935).

The LOF determination process poses several challenges. While the analysts have used a reasoned approach to address these challenges, the robustness of the analysis is conditional on the reasonableness of the assumptions and methods used in the analysis. Consequently, the reasonableness of the approach should be explicitly examined. Three critical issues that should be explored are:

1. Incidents of serious injury and mortality in commercial fisheries are rare. Sampling rare events is problematic. In practice, unusual observations are often characterized as “outliers” and omitted from data used for estimation. While incidents of mortality and serious injury are unusual, it would not be appropriate to treat observed incidents as “outliers”. When unusual observations are retained in data used for estimation, they can have a pronounced influence on the resulting estimates. The best defense against unusual observations exerting undue influence on the resulting estimates is to increase sample size as much as practicable. This would argue for basing the estimates on an average of the full time series of observations.
2. Data used in the LOF determination may have been generated under conditions that are not characteristic of current fisheries. For federally managed fisheries, this problem involves a tradeoff of increased observations over a longer time series and changes in the characteristics of fishing gear, and how and where that gear is used. The choice of a 5-year window is reasonable, but so would a longer or shorter window. The problem with many state-managed fisheries is the lack of recent verifiable information about marine mammal mortalities and serious injuries. Unless new information is developed for these fisheries through a verifiable sampling program, there does not seem to be a good alternative to continued use of estimates based on old information. Because estimated mortalities and serious injuries in state-managed fisheries affect overall estimates of mortality-serious injury for the state fisheries and related federally managed fisheries, it may be expedient to use funding earmarked for management of federal fisheries to develop a monitoring or sampling program for marine mammal mortalities in the state-managed fisheries.
3. Scaling from observed mortality to estimated mortality necessitates specific assumptions regarding the representativeness of observed hauls. These assumptions and the limitations of these assumptions are not unique to scaling observed mortality to estimates mortality; similar assumptions and limitations are at play in the estimation of target and incidental catches of fish. Specifically, it is assumed that the likelihood of incidence of serious injury or mortality is invariant across vessel size, fishing location, fishing time, gear configuration, etc. Concern about these types of limitations was instrumental to the decision to segregate the six fisheries defined in 2003 into the 22 fisheries defined for 2005. Because the area fished by unobserved vessels are not coincident with the areas fished by observed vessels, scaling observed mortality-serious injury incidents to include catches by unobserved vessels may not provide good estimates of overall mortality-serious injury incidents. Scaling observed incidents of mortality and serious injury from observed hauls to unobserved hauls on observed vessels may be less problematic. However, if observers are notified by crew whenever mortality-serious injury incidents occur, it may be that all hauls are, in effect, observed for mortality and serious injury to marine mammals. If all hauls are, in effect, observed for mortality and serious injury to marine mammals, the observations are for the population of hauls and should not be expanded for unobserved hauls on observed vessels. (These issues may be considered in the Perez (2003) and Perez (2004), but these documents have not yet been reviewed by the SSC.)

Because some marine mammal stocks may overlap in space and time, and because the patterns of overlap are not well-understood, the analysts were not comfortable with assigning particular mortality-serious injury events to either the transient or resident sub-units of Eastern North Pacific killer whale stocks. Similarly, the analysts were not comfortable with assigning particular mortality-serious injury events to the western or central sub-units of North Pacific humpback whale stocks. In October, the SSC suggested that one approach to this dilemma would be to weight the mortality-serious injury events by the probability that they involved marine mammals from particular population sub-units. The analysts have instead taken the stance that because they cannot rule out the possibility that particular mortality-serious injury events involved animals from particular population sub-units, the LOF determination with respect to each population sub-unit should allow for the possibility that mortality-serious injury event involved animals from that population sub-unit. While the approach taken by the analysts is not inappropriate for

estimating the mortality-serious injury incidence for particular population sub-units, the Summary of Analysis should clearly note that it would not be consistent to sum the mortality-serious injury incidence across population sub-units. Samples taken from marine mammals killed incidental to fishing may help to assign particular mortality-serious injury incidents to particular population sub-units. While on-going research on the distribution of marine mammal stocks may help assign particular mortality-serious injury incidents to particular population sub-units, the lack of information about the stability of stock distributions over time may preclude using new information to assign historic mortality-serious injury incidents. In addition, we note that research on the distribution of marine mammal stocks may lead to the definition of additional population sub-units.

The SSC recommends that the Council consider asking NMFS to extend the comment period on the proposed LOF for 2005. An extended comment period will permit time for the SSC and public to review the Technical Memoranda (Perez 2003, Perez 2004) that document mortality-serious injury incidents, how observed mortalities are assigned to target fisheries, and how observed mortalities are scaled to estimated mortalities.

B. Steller Sea Lion Recovery Plan. It is anticipated that the Steller seal lion recovery team will complete work on a draft recovery plan in February or March, 2005.

C. Northern Fur Seal. The Pribilof Islands Collaborative Northern Fur Seal working group has scheduled a 3-day scientific workshop on Northern fur seals for January 28-30, 2005.

D. Steller Sea Lion—Trawl Closures Around St. George Island. The Council has received a request to reexamine the size of trawl exclosure zones around the Pribilof Islands.

C-4 EFH and Habitat Areas of Particular Concern

The SSC received presentations from Cathy Coon (NPFMC) and John Olson (NMFS) on the following: alternative 5B options analysis, review of the HAPC process and the proposed Dixon entrance HAPC. Ben Entiknap (Alaska Marine Conservation Council), Jon Warrenchuk (Oceana), John Gauvin (Groundfish Forum) and Whit Sheard (Ocean Conservancy), gave public comment.

The SSC provides the following comments and recommendations.

C-4a. Alternative 5B options analysis and finalize alternatives

There are now three sub-options for the Aleutian Islands portion of alternative 5b of the EFH EIS including the original, an option revised by Oceana and an option revised by the fishing Industry. The revised alternative proposed by Oceana targeted bottom trawl fisheries and proposed open/closed areas based on historic bottom trawl effort. This proposal was then modified by the fishery industry to account for important fisheries area where bottom trawl groundfish catch is greater than or equal to 200 mt, based on observer data for 1991-2003.

The SSC recommends that future analyses of alternative 5B options include, if possible, overlays of coral and sponge catch data and coral and sponge areas previously identified by the industry for each of the sub-options. Further, the analysis should include an overlay with specific areas recently identified to contain endemic species and areas of high diversity. This would help the evaluation of the ability of the alternatives to meet the purpose of the action. The SSC recommends that GIS maps be provided that clearly display differences in area coverage between each sub-option to aid

comparison among sub-options. The SSC recommends that the option proposed by Oceana and the option reflecting industry input go forward as separate alternatives (e.g. 5b and 5c).

C-4b. Review HAPC process

The SSC notes the difficulty in evaluating current proposals in a consistent manner following established criteria. **The SSC recommends that rating criteria be presented to the SSC for review prior to releasing the RFP. These criteria should be made available to the public when RFP is released.**

C-4c. Review proposed Dixon Entrance HAPC area

No comments.

C-6 Observer Program

The SSC received a report on the preliminary draft of the EA/IRFA for a fishery management plan amendment to establish a new program for observer procurement and deployment in the North Pacific from Kent Lind and Nicole Kimball. Public testimony was given by Robert Mikol of Ocean Logic.

The report contains expanded alternatives that include implementation of the program to the BSAI and GOA instead of just the GOA. The SSC commended the preparers on providing clear statements of the need for action and problems with the current observer program.

The following is a list of issues that should be addressed in the document. First, the next draft should include a detailed discussion of the benefits that would arise from implementation of the alternatives being considered. It was clear from the needs statement that the new program would be implemented to address data quality issues and bias in estimates of catch and bycatch that are thought to exist in the present program. However, there was no mention of the possible beneficial effects resulting from a reduction in the levels of uncertainty and bias in fishery catches.

Second, there should be a section in the document that discusses how government operating costs will be affected by the various alternatives. For example, the check-in/check-out system would impose considerable costs on the agency responsible for program implementation. Marginal costs of implementation need to be identified, as well as, who would pay for these costs.

Third, the document would benefit from more detail and examples of implementation issues. For example, what kind of algorithm would be used to allocate coverage to tier 3 and 4 vessels? Calculations could be run on 2004 data to show how different components of the fleet are going to be impacted by the alternatives. Other examples could be given as to the types of instances in which 200% vessel coverage might be reduced and what would trigger increases in the level of coverage in the 30% vessels.

Finally, Congressional action required to implement the program should be discussed. Overtime and hazard pay issues should also be discussed.

The SSC believes that incorporation of the items identified above will be important for the evaluation of the overall benefits and costs of the new observer program, as well as, the distribution of costs and benefits.

D-1(a) AI Special Management Area

The SSC received the staff presentation from Diana Evans and heard public testimony from Donna Parker (Arctic Storm). The staff prepared an excellent and informative discussion paper on future management alternatives for the Aleutians, including a special management area within the BSAI FMP, a separate FMP for the Aleutian Islands, or a fishery ecosystem plan. The motivation for this paper is the recurrent focus of management issues in the Aleutian Islands, including Steller sea lions, pollock stock issues, the pollock allocation to the Aleut Corporation, the discovery of cold-water coral gardens, and issues related to habitat.

The SSC encourages further development of this discussion paper. As the paper is further developed, a statement of goals and objectives of the proposed action will have to be developed. Also, Council staff should consult with State of Alaska scientists and the USFWS for their input. To aid in selection of alternatives, Council staff should consider (1) physical factors (oceanography, climate), (2) biological factors (species ranges and abundances, life history characteristics), and (3) socio-economic factors (fishing fleets, communities, fisheries). There seems to be a change in oceanographic conditions at about 170°W, which is the current boundary of the Aleutian Islands management area. However, fishery considerations may warrant inclusion of the Fox Islands group to the east. A special volume will soon appear in the journal of Fisheries Oceanography devoted to the scientific understanding of the Aleutian Islands ecosystem. Papers from this volume may be helpful in the development of the discussion paper.

D-1(b) BSAI Salmon Bycatch

The SSC received a briefing from David Witherell (NPFMC staff) on the dramatic increase in salmon bycatch in the Pollock "B" season over the last two fishing seasons. Public testimony was provided by Karl Haflinger (SeaState). Bycatch of other salmon (nearly all chum salmon) for 2004, as of 11/15/04, is 456,885 salmon compared to the 1990-2001 annual average of 69,322 salmon; as of 11/15/04 the 2004 bycatch of Chinook salmon (62,471) has triggered ESA Section 7 consultation. In view of the magnitude of the problem the SSC recommends a thorough review of the entire approach to salmon bycatch management in the BSAI. Some information suggests that exclusion from the salmon savings areas may be increasing rather than decreasing salmon bycatch. The SSC recommends a full analysis to verify whether this is the case. Salmon savings areas were established as fixed spatial entities whereas the marine ecosystem is inherently dynamic. In addition, the regulatory environment has changed considerably since the establishment of the savings areas. The end result is a rigid management regime when adaptive flexibility appears to be necessary. The SSC recommends that the Council consider exploring a variety of mechanisms for introducing individual vessel or vessel-pool accountability for bycatch. While previous attempts at introducing individual vessel accountability (e.g., Salmon VIP program) have suffered from operational difficulties, new options may be available under contract-type arrangements that are possible within some segments of the fishing fleet as a consequence of changes in the management environment (e.g., CDQs, AFA). In the short-term, an experimental approach may be warranted as the Council endeavors to achieve their goals for salmon bycatch management.

D-1(c) Review Rockfish Management Discussion Paper

Jane DiCosimo (NPFMC) presented an outline for a discussion paper on rockfish management developed by Council staff and the AFSC rockfish working group (RWG). Public testimony was given by Ben Entiknap (Alaska Marine Conservation Council), Gerry Merrigan (Prowler Fisheries), and Jon Warrenchuk (Oceana).

The SSC appreciates the cooperative effort given to development of the discussion paper on rockfish management and looks forward to receiving the full report as expected in February 2005. In addition, to the items listed in the outline, which includes some of the items previously requested by the SSC, the SSC requests that Council staff and the RWG include a discussion of bycatch management and under item 5, a listing of species and the pertinent issues for each species or species groups. Also, the SSC requests that the discussion paper address the local depletion issues as previously requested by the SSC in December 2003.

D-1(d) Receive Report from Non-target Species Committee

Jane DiCosimo (NPFMC) gave a report from the non-target species committee with alternatives for amendments to the FMP to improve management of non-target species. The SSC commends the non-target species working group for its work. The SSC recommends that criteria be clearly specified by the working group in determining which species are sensitive and clearly define the threshold for which species are non-specified.

D-1(e&f) Final Groundfish Specifications GOA/BSAI: General Comments

Two-year Specifications and Projections:

Due to Amendments 48/48, groundfish specifications will now be made for the next two years instead of just one year. The Plan Teams had limited time to deal with the second year of projections and thereby used the projection tables typically available for determining overfishing and overfished condition. Fisheries for four stocks in the EBS start very early in the year (walleye pollock, Pacific cod, rock sole, and Atka mackerel), and alternative projections were prepared by Jim Ianelli (AFSC) that use more realistic projections of catch in 2005 for determining ABC in 2006. The projection of catch for pollock is the 2004 TAC minus 18,000 mt for the Aleutian Islands. For Pacific cod, the minimum of the 2004 TAC and the 2005 ABC projection was used (which turned out to be the latter). For rock sole and Atka mackerel, the 2004 projected catch was rolled over into 2005. **The SSC concurs with the use of these alternative projections for this assessment only.**

The Plan Teams have formed a working group to come up with a standard algorithm for doing for out-year projections. The SSC would like to work with this group. **It may be useful to have a workshop involving Plan Teams, SSC, NMFS, and Council staff to come up with a consistent set of standards to be used for projections of all stocks and areas.**

Gulf of Alaska Projections:

The SSC requests that the GOA Plan Team come up with a general policy regarding updates of stock assessments in the off-year of the 2-year assessment cycle. This year, some authors reran their models with updated catch data, while others used results from the previous stock assessment. Also, the amount and types of information presented varied between assessment chapters. A common method should be used by all stock assessment authors and the rationale for the choice should be developed by the Plan Team.

SAFE Chapter Contents:

In its review of the SAFE chapter, the SSC noted that there is variation in the information presented. Several years ago, the SSC developed a list of items that should be included in the document. The SSC

requests that stock assessment authors exert more effort to address each item contained in the list. Items contained in the list are considered critical to the SSC's ability to formulate advice to the Council. The SSC will review the contents of this list at its February meeting.

D-1(e) GOA Groundfish Specifications for 2005 and 2006

Walleye pollock

This assessment updates the age-structured model with recent survey, fishery and biological information. In addition, a sensitivity analysis was conducted in which either ADF&G survey data or EIT survey data series were downweighted in the analysis to see if it had a major effect on estimates of population parameters.

Biomass as estimated by the 2004 ADF&G trawl survey (which samples a portion of the shelf in the nearshore environment) increased 48% and the 2004 Shelikof Strait survey suggested an increase of 8% in biomass over the 2003 survey. No new bottom trawl survey was done in 2004. When these data are integrated into the assessment model, results are similar to previous years: a large increase in biomass in the late 1970s and early 1980s and an overall pattern of decline since then with some increase expected in 2004 and 2005 due to the above average 1999 and 2000 year classes entering the fishery.

The model's estimate of 1999 year class strength further declined from last year's assessment and is now believed to be just above average with high confidence. Differences among assessments are likely due to the fact that natural mortality was fixed at a conservatively low level. Actual mortality of juveniles may have been much higher because of predation from arrowtooth flounder, resulting in progressively smaller estimates of 1999 year class strength. In contrast, the estimate of 2000 year class strength has shown the opposite trend in recent assessments and is now believed to be just below average, implying lower than expected mortality. Recent surveys suggest that year classes since 2000 have been poor. **The SSC recommends that the assessment authors consider the role of arrowtooth flounder predation within the assessment model, for example by using arrowtooth biomass (or estimates of predation) as a covariate in estimates of natural mortality for younger age classes.**

Of the 6 models evaluated in the assessment, model 2a is comparable to last year's preferred model and keeps survey catchability fixed at $q=1$. Model 1 estimates NMFS trawl survey catchability, but results in a log-likelihood that is only marginally smaller than if catchability is fixed, indicating that the available data do not justify the free estimation of q . Model 2a provides more conservative biomass estimates and **we concur with the plan team that model 2a is the best choice for reference model.**

Several aspects of conservatism are built into the assessment: (1) catchability is fixed at $q=1$, which results in a lower biomass estimate than an assessment that accounts for catchability, (2) there is no correction for a lower than expected proportion returning to Shelikof Strait in 2002, 2003, and 2004, and (3) a slightly more risk-averse harvest policy is used as in previous years. The stock assessment authors recommend a further downward adjustment to the harvest rate allowed under this policy by temporarily using an $F_{50\%}$. **The Plan Team did not see a compelling reason for this ad hoc adjustment and instead recommended setting the 2005 ABC equal to the average of the 2004 ABC and the projected 2005 yield under an adjusted $F_{40\%}$ harvest strategy (Tier 3b). The SSC concurs, resulting in a 2005 pollock ABC for GOA waters west of 140°W of 85,190 t (excluding 910 t for PWS) and an OFL of 144,340 t and corresponding sub-area apportionments. The corresponding ABC and OFL for 2006 are 85,390 t and 103,250 t.**

The SSC concurs with the Plan Team recommendation to use a “step-up” approach, primarily as a buffer against future declines in spawning biomass and against further declines in the number of older fish in the population. These concerns are exacerbated by the large abundance of predatory arrowtooth flounder in the Gulf of Alaska.

Specific Comments to the Plan Team:

The SSC recommends that the GOA plan team develop a sound rationale for stepping-up and stepping-down ABCs when large changes occur between assessments, including a strategy to evaluate appropriate trade-offs between maximizing and stabilizing catches.

Eastern Gulf of Alaska

The SSC concurs with the Plan Team recommendation for the Eastern Gulf of Alaska east of 140 degrees W. Based on biomass estimates from the 2003 bottom trawl survey (no new survey in 2004) and a Tier 5 calculation, the recommended ABC for both 2005 and 2006 is 6,520 t ($F = 0.75^*M$) and the OFL for 2005 and 2006 is 8,690 t ($F=M$) for the EYK/SEO portion.

Specific Comments to Assessment Authors:

- p. 45, 1st paragraph: Based on cut-offs, values in the table suggest an average year class in 2003, not a weak year class.
- p. 49: The aging-error transition matrix should include a probability that both readers are off by one year in opposite directions for consistency (a maximum difference of 2 years).
- Table 1.12 should include a break-down of the different likelihood components in addition to the total log-likelihood for a full evaluation of differences among models.
- p. 53: Residual plots in Fig 1.14 – 1.16 appear to correspond to model 2a. Figure legends say model 3.
- Fig 1.21 is very difficult to read. It would be preferable to use the same style that was used for Fig 1.6 and 1.7.

Pacific cod

For the 2005 Pacific cod assessment, the previous assessment model was applied with updated catch data. However, the assessment describes a new method for adjusting the maximum permissible ABC. Owing to uncertainty about model parameters (i.e., natural mortality rate and survey catchability) and a desire for a risk-averse harvest strategy, an adjustment has been applied since 1997 to the maximum permissible F_{ABC} to obtain a recommended F_{ABC} . For the 2000 to 2003 assessments, an adjustment factor of 87% was used, based on the ratio of the F_{ABC} to $F_{40\%}$ in the 1999 assessment. As it has been several years since this factor has been recalibrated, the authors applied a new approach that considers the tradeoff between average yield and variability in yield (estimated as one-half the average squared first difference). This quantity is maximized when F_{ABC} is equal to 77% of the maximum permissible F_{ABC} . The SSC agrees with the Plan Team that this adjustment is appropriate for now, because risk-averse adjustments have not been recomputed since 1999. However, the SSC also agrees that this should be considered an interim approach as modifications are likely with the future development of a new cod assessment model and further analyses of this and alternative methods.

The estimated 2005 spawning stock biomass is 91,700 t, which is above $B_{40\%}$, thus placing cod in tier 3a. The SSC concurs with the author's and Plan Team's recommendation to set the 2005 ABC at 58,100 t (and 51,100 t for 2006), based on a fishing mortality rate of 0.24, equivalent to 77% of the

maximum permissible fishing rate ($F_{40\%}$). This adjustment factor is based on the author's new method that considers a tradeoff between average yield and variability in yield. The SSC agrees with the author and Team's recommended apportionment of cod in the eastern (7%), central (57%), and western gulf (36%), which results in 4,067 (east), 33,117 (central) and 20,916 t (western) in 2005 and 3,577 (east), 29,127 (central) and 18,396 t (west) in 2006. The SSC further concurs with the OFL estimates under tier 3a of 86,200 t for 2005 (and 65,800 t) in 2006.

SSC Recommendations to the Stock Assessment Authors:

- The SSC was intrigued by the stock-recruit fits for the two periods 1977-1988 and 1989-2001 and we thank the authors for including this analysis. For the 2006 assessment, the SSC asks the authors to explore whether these findings can be used to elevate the BSAI cod stock to tier 1 or 2. If it is deemed that MSY is too variable between periods to apply any MSY estimates to this stock, then next year's assessment should consider potential implications of this variability in stock productivity on estimation of the $F_{35\%}$ and $F_{40\%}$ reference points.
- The authors are asked to examine interannual variability in cod weight-at-length estimates (index of condition) and potential relationships with cod density, stock-recruit, or environmental conditions. Condition indices have been useful metrics in analyses of the health of Atlantic cod stocks.
- The SSC also requests that the authors provide justification for their assumption that there are no gender-based differences in length-at-age or weight-at length for Pacific cod. If there is sexual dimorphism in growth, then size-based selection in the fisheries will generate time variations in sex ratios that can have important consequences to the stock's productivity.

Sablefish

The new assessment for the sablefish stock in the BSAI and GOA areas uses the same basic age-structured modeling approach used in recent previous assessments, with the addition of new input data from the 2004 longline survey and from the 2003 longline survey and fishery. The survey biomass index shows decreases in 2003 and again in 2004, but both are above the low point of the series observed in 2000. The projected spawning biomass for 2005 is 37% of the estimated unfished level and is projected to decline further, with the depth of the decline largely depending on the uncertain strength of the 2000 year class.

The SSC supports the Plan Team's recommended ABC and OFL levels for all areas and the survey-based scheme for apportioning ABC and OFL to areas.

Area	2005		2006	
	ABC	OFL	ABC	OFL
Total	21,000 t	25,400 t	19,895 t	23,100 t
EBS	2,440 t	2,950 t	2,310 t	2,690
AI	2,620 t	3,170 t	2,480 t	2,880 t
GOA	15,940 t	19,280 t	15,105 t	17,530 t

These ABC values are the maximum permissible yield from an adjusted $F_{40\%}$ harvest strategy.

The SSC also agrees with the Plan Team's recommended apportionment of the sablefish ABCs by area. For 2005, these ABCs are 3,570 t (SEO), 2,580 t (WYAK), 7,250 t (C), and 2,540 t (W). For 2006, these ABC apportionments are 3,383 t (SEO), 2,445 t (WYAK), 6,870 t (C), and 2,407 t (W).

The new assessment estimates the natural mortality coefficient rather than using an assumed value, but the coefficient of variation specified for the prior probability distribution ($CV = 0.001$) was constraining, which implies that the estimates of uncertainty about the model results (e.g., the 5th and 95th confidence intervals depicted in Fig. 3.10) understate the true level of uncertainty.

The new assessment fit a Beverton-Holt stock-recruitment relationship with log-normally distributed recruitment within the assessment model. The predicted recruitment levels are essentially constant over the range of spawning biomass values estimated by the model, which implies that this stock has extremely high resilience.

Specific Comments to the Assessment Authors:

- The plot of the model estimates of recruitment (Fig. 3.11) shows an unusual pattern in the standard errors, with the smallest errors associated with the largest estimates of recruitment. The SSC requests that the authors double-check their calculations and the data plotting procedure that produced this figure.

Flatfish

The flatfish group is partitioned for management purposes into deep-water flatfish, rex sole, shallow-water flatfish, flathead sole, and arrowtooth flounder. Deep-water flatfish consists of Dover sole, Greenland turbot and deep-sea sole and the shallow-water complex is comprised of northern and southern rock sole, yellowfin sole, butter sole, starry flounder, English sole, Alaska plaice and sand sole. This group is now being assessed on a biennial cycle and no updated information was presented for deep-water flatfish and shallow-water flatfish. This year an age-structured assessment for Dover sole, which had been presented last year as an appendix was brought forward, updated and used for setting ABC and OFL. However, it will continue to be part of the deep-water complex for management purposes. In addition, an age-structured model for rex sole was presented for review.

The SSC commended the authors for the work to develop age-structured models for these species and reminds the authors of the SSC 2003 recommendations to consider adding more detailed ecosystem consideration information in the flatfish chapters and exploring survey catchability and temperature relationships. The need for this latter analysis is highlighted in the preliminary model for rex sole, which showed a poor fit to the 2003 survey data point and may be related to the warm bottom temperatures observed in that year. Also recommended last year was a re-evaluation of the natural mortality rates used for the tier 5 flatfish species, whose rates have not been evaluated for about 15 years. The SSC noted inconsistencies in the presentation of material in the rex and Dover sole sections. Some material in the executive summary was not presented elsewhere in the section, citations to some references at the end of the section were missing, and inconsistencies between tables of data sources and years and text describing which years of data were used. A section for data gaps and research priorities was in the Dover sole section but did not contain any material. The rex sole section would benefit from a table of survey biomass by depth zone, as was shown in the Dover sole section. Tables of trawl survey estimates need to more clearly indicate depth ranges for each survey. Some material presented on mean length-at-age was interesting and suggested the need for further exploration of the role of density-dependence in influencing these trends for Dover and rex sole. The rex sole assessment lacked description of the assumptions used regarding survey estimates for q.

The SSC concurs with the recommendations of the plan team. The recommended 2005 and 2006 ABCs and OFLs are as follows (biomass for each year corresponds to the projection given in the SAFE report issued in the preceding year):

Species	Year	OFL	ABC
Deep-water complex	2005	8,490	6,820
	2006	8,490	6,820
Rex sole	2005	16,480	12,650
	2006	16,480	12,650
Shallow water complex	2005	63,840	52,070
	2006	63,840	52,070
Flathead sole	2005	56,500	45,100
	2006	53,800	42,850
Arrowtooth flounder	2005	253,900	216,900
	2006	270,050	230,740

The SSC agrees with the plan team recommendation for regional ABC apportionments, which are as follows:

Species	Year	Western	Central	WYAK	EYAK/SEO	TOTAL
Deep water flatfish	2005	330	3,340	2,120	1,030	6,820
	2006	330	3,340	2,120	1,030	6,820
Rex sole	2005	1,680	7,340	1,340	2,290	12,650
	2006	1,680	7,340	1,340	2,290	12,650
Shallow water flatfish	2005	21,580	27,250	2,030	1,210	52,070
	2006	21,580	27,250	2,030	1,210	52,070
Flathead sole	2005	11,690	30,020	3,000	390	45,100
	2006	11,111	28,527	2,842	370	42,850
Arrowtooth flounder	2005	26,250	168,950	11,790	9,910	216,900
	2006	27,924	179,734	12,539	10,543	230,740

Rockfish: General Considerations

The SSC appreciates the attention given by the SAFE authors and the Plan teams to the recommendations that the SSC made last year regarding the “F40 report” by Goodman et al., the contributions to stock productivity of older female rockfish, local depletion, and the effects of disaggregation of ABCs. Recognizing that the request entails substantial ongoing work to fulfill the request, and that the rockfish working group and Council staff have been preparing an outline of issues to address in a discussion paper on rockfish management, we provide a select list of issues here that we request attention to, pending completion and our review of the discussion paper next year.

SSC Comments to the Assessment Authors:

Regarding the contribution of older females to stock productivity, the SSC requests that the SAFE authors examine the consequences for rockfish management in both the BSAI and GOA if it is true that older females have a disproportionate large contribution to stock productivity, and are also disproportionately harvested due to their size. We request that this type of management strategy evaluation be done for those species for which loss of older females is most prevalent or suspected. We also request that an evaluation

of the actual degree of loss of older aged females be provided, including an evaluation of how to adjust for early fishery data where there may have been intense fishing prior to historic age collections. We encourage comparison of BSAI and GOA results.

Pacific Ocean Perch (POP)

The 2004 assessment uses the same model as last years updated with catch data for 2004. Several additional analyses were presented as appendices to the assessment in response to past SSC comments. These included a (1) draft manuscript from a Bayesian spawner-recruit analysis presented to the SSC in December 2003, (2) an evaluation on the effects of “larval viability” on spawning biomass, and (3) several alternative projection strategies. The Bayesian spawner-recruit analysis suggests that the current harvest rate is reasonable. However, as noted in the past by both the SSC and authors, the resiliency of GOA POP is largely influenced by several large recruitments in the late 1980’s. The SSC supports further analyses and encourages authors to explore alternative spawner-recruit analyses based on subsets of the data and contrast those with an analysis using all of the data. Regarding the analysis of the effect of selective removal of older females, the SSC commends the authors for conducting this analysis, and points to requests made above in the BSAI section.

The SSC agrees with the Plan Team determination under Tier 3a of $F_{ABC} = 0.060$ with 2005 ABC = 13,575 t, and the OFL (given $F_{35\%} = 0.071$) is 16,266 t. The SSC supports the geographic distribution of the ABC as 2,567 t for the Western GOA, 8,535 t for the Central GOA, and 2,473 t for the Eastern GOA. 2005 OFLs are 3,076 t, 10,266 t, and 2,964 t, for those areas, respectively. Recognizing the effects of the trawl closure on harvest opportunities in the eastern area, the SSC supports the Plan Team recommendation to apportion 841 t of the Eastern section 2005 ABC to the West Yakutat area where trawling is permitted.

The SSC also concurs with Plan Team recommendations for 2006, where ABC=13,292 t, allocated to subareas as: Western = 2,525 t; Central = 8,375 t; WYAK = 813 t; SEO = 1,579 t. 2006 OFL is 15,887 t allocated to subareas as: Western = 3,019 t; Central = 10,008 t; and Eastern = 2,860 t.

Northern Rockfish

The SSC concurs with the Plan Team determination that GOA northern rockfish falls into tier 3a, where the $F_{ABC} = 0.056$, ABC = 5,091 t, and the OFL (given $F_{35\%} = 0.068$) is 6,050 t for 2005. Corresponding values for 2006 are ABC = 4,750 t and OFL = 5,640 t. The SSC supports the geographic apportionment of the 2005 ABC, with 808 t to the western area, 4,283 t to the central area, and only 2 t to the eastern area, which is combined with other slope rockfish in that area for orderly fishery management concerns. The 2006 ABC geographic apportionments are 775 t in the Western area, 3,995 t in the Central area, and 2 t in the Eastern area. Note that in the eastern area, 2 t of northern rockfish are combined with other slope rockfish for orderly fishery management concerns.

The 2004 assessment is an update of last year’s model that incorporates recent catches from 2002 (3,713 mt), 2003 (5,343 mt) and 2004 (4,736 mt) for purposes of revising projections. The same apportionments were recommended as last year, based on survey biomass estimated proportions from the past three years.

The SSC appreciates the SAFE author’s attention to SSC comments from December, 2003 and looks forward to the planned analyses regarding local depletion and the concentration of catches from just five relatively small fishing grounds, with one area (“Snakehead”) producing nearly half the catch.

Shortraker, Rougheye, and Other Slope Rockfish

No survey was conducted in 2004 and biomass estimates remain unchanged. Biomass estimates for the shortraker/rougheye rockfish management group are calculated as the unweighted average of the last three trawl surveys. Data from above 100-m depth is removed to exclude juvenile fish, which are not part of the exploitable biomass. This results in an exploitable biomass of 32,723 t for shortraker, 40,281 t for rougheye and 89,460 t for “other” rockfish.

A new age-structured model for rougheye was presented in appendix 9A to the SR/RE SAFE report. The model incorporates the bottom trawl and longline survey data and two years of survey age composition data. The SSC encourages further development of this model, but estimates of recruitment, natural mortality and catchability parameters will be problematic until more data are available. The SSC concurs with the authors that an independent ageing error matrix be constructed instead of relying on the error structure borrowed from the POP assessment.

In response to SSC concerns, the authors prepared appendix 9A to the SR/RE SAFE report detailing alternative ABCs for these species individually as well as a complex. Four separate alternatives were presented: (1) combined shortraker/rougheye ABC of 1,760 t, (2) combined shortraker/rougheye ABC based on the 2003 SSC method, (3) a combined shortraker/rougheye ABC based on the 2003 SSC method, but using a revised estimate of shortraker and rougheye catches based on Observer data and proportion applied to the shortraker ABC, and (4) separate GOA ABC’s for shortraker and rougheye.

The SSC accepts Plan Team’s recommendation to adopt separate ABC’s for shortraker and rougheye, based on assurances from management staff that accurate species composition estimates will be available in 2005. The SSC endorses the 2005 NMFS and Alaska Longline Fisherman’s Association’s cooperative project to obtain information on the species catch composition.

The SSC agrees with the authors’ and Plan Team’s determination of setting a single OFL for rougheye rockfish for the GOA of 1,531 t for both 2005 and 2006. The SSC also agrees with setting separate ABCs apportioned by area: 188 t to the Western area, 557 t to the Central area, and 262 t to the Eastern area for a total of 1,007. Apportioned ABCs for 2006 are the same values.

The SSC agrees with the authors’ and Plan Team’s determination of setting a single OFL for shortraker rockfish for the GOA of 982 t for both 2005 and 2006. The SSC also agrees with setting separate ABCs apportioned by area: 155 t to the Western area, 324 t to the Central area, and 274 t to the Eastern area for a total of 753 t. Apportioned ABCs for 2006 are the same values.

The ABC determination recommended by the SAFE authors and Plan Team for “other” slope rockfish is acceptable to the SSC, such that the total 2005 ABC is 3,900 t, apportioned to the Western, Central, West Yakutat, and combined East Yakutat/SEO areas as 40 t, 300 t, 130 t, and 3,430 t, respectively. These are the same values also apply to 2006. The OFL level remains unchanged as well at 5,150 t for 2005 and 2006.

Pelagic Shelf Rockfish

The SSC notes that the dark and light forms of dusky rockfish are now formally recognized as two species. The dark species (*Sebastodes ciliatus*, common name is dark rockfish) inhabit shallow water areas and the variably colored species (*Sebastodes variabilis*, common name is dusky rockfish) inhabit deeper waters. Both species continue to be assessed within the pelagic shelf rockfish complex, but dusky rockfish is independently assessed in an age-structured model and dark rockfish exploitable biomass is estimated from trawl survey data. The Plan Team has recommended that dark dusky be removed from the FMP, and the SSC has previously requested a rationale for this. The SSC thanks the Plan Team for

providing this rationale in their minutes for 2004, and we endorse the three points of the rationale: (1) separation at species level, (2) distribution of dark rockfish to nearshore habitats that are not specifically assessed by the GOA trawl survey, and (3) the risk of overfishing dark rockfish in local areas given the relatively high TAC for the pelagic shelf rockfish assemblage as a whole.

Substantial data enhancements were made to this year's model for light dusky rockfish because new age data became available. New information include: (1) age data from the 2000 and 2002 fisheries, (2) the 2003 survey results, (3) additional age data from the 1987-2001 surveys, (4) updated 2003 and 2004 fishery catch, and (5) 2004 fishery lengths.

The authors provided three alternative model configurations detailed in appendix 10A to the pelagic shelf rockfish SAFE report. Model alternative 1 was the same model presented in last year's assessment with a simple update of recent catches and alternative 2 included all of the new information. In response to Plan Team concerns in 2003, authors model 3 alternative down-weighted the catch time series and increased survey biomass weight to account for inaccurate catch accounting during the beginning of the fishery and provide a better fit to survey data that had showed strong positive residuals.

The SSC agrees with the Plan Team decision to use model 3 to derive biomass estimates and tier 3a calculation of FABC = F40% = 0.12. The corresponding 2005 ABC level for light dusky rockfish is 4,060 t and the OFL, where F35% = 0.148, is 5,020 t. In 2006, ABC is 3,920 t and OFL is 4,830 t.

The SSC accepts the tier 5 ABC calculations for yellowtail, widow, and dark rockfish ($F = 0.75M = 0.0675$), resulting in a combined 2005 and 2006 ABC of 497 t and OFL = 663 t ($F = M = 0.09$).

The SSC agrees with the geographic apportionment of the 2005 combined pelagic shelf rockfish ABC to the Western, Central, West Yakutat, and combined East Yakutat/SEO areas as 377 t, 3,067 t, 211 t, and 898 t, respectively. Apportionment of the 2006 ABC to the Western, Central, West Yakutat, and combined East Yakutat/SEO areas is 366 t, 2,973 t, 205 t, and 871 t, respectively. This apportionment is based on a weighting scheme of the past three surveys (1999, 2001, and 2003) of 4:6:9.

Demersal Shelf Rockfish

The biomass estimate for this complex is estimated from a habitat-based stock assessment based on yelloweye rockfish density derived using line transects conducted from submersibles. Computations for biomass were updated using recent fish weight data. Given the particular vulnerability of demersal shelf rockfish to overfishing, **the SSC agrees with the precautionary use of a lower F (= 0.02) than the maximum permitted (F = 0.023) under the tier 4 designation. The calculated 2005 ABC of 410 t takes into account that an estimated 10% of the available biomass is composed of species other than yelloweye. The OFL fishing mortality rate under Tier 4 is F35% = 0.031. Adjusting for the 10% of other species in the complex gives an overfishing level of 640 t. ABC and OFL levels continue unchanged into 2006.**

Specific Comments to the Assessment Authors:

The SSC appreciates the efforts by the authors to enumerate mortality in non-commercial fisheries and looks forward to seeing these estimates in future assessments, as available. The SSC recommends that the authors provide further analysis and estimation procedures for the 10% ABC adjustment for non-yelloweye rockfish species.

Shortspine Thornyhead Rockfish

No survey information is available for this year. The 2005 and 2006 ABCs and OFLs are a rollover of 2004 specifications.

The SSC continues to support the tier 5 calculation using the average of the two most recent survey biomass estimates, $F = 0.75M = 0.0025$, and $F_{OFL} = 0.03$. The resulting 2005 and 2006 ABC is 1,940 t and OFL is 2,590 t. The SSC concurs with the area apportionments of the ABC as 410 t, 1,010 t, and 520 t to the Western, Central, and Eastern areas, respectively.

Atka Mackerel

No assessment model has been developed for GOA Atka mackerel, which are managed under Tier 6. The 2004 catch through early November 2004 was 817 t, 35% above the 2004 TAC of 600 t. The ABCs and OFLs for 2005 and 2006 are the same as the 2004 specifications where ABC = 600 t and OFL = 6,200 t.

Skates

Skates in the GOA are assessed on a biennial schedule and there are no new assessment data in 2004. The issues surrounding ABC and OFL specification continue, and revolve around the degree to which ABCs and OFL should be ascribed to individual species and geographic areas. The SAFE authors recommended separate ABCs for big and longnose skates apportioned across the three geographic areas, and gulf wide specifications for skates in the genus *Bathyraja*.

The plan team recommended that OFLs be set gulf-wide, rather than area specific, but retained the author's recommendation for area specific ABCs for the two major species.

The SSC concurs with the plan team's recommendation as a reasonable step forward, and agrees to gulf-wide OFLs for big skates of 5,332 t, longnose skates of 3,757 t, and all other skates of 1,769 t. The SSC agrees with area specific ABCs for big skates of 727 t in the Western section, 2,463 in the Central section, and 809 t in the Eastern section. Area-specific ABCs for big skates are 66 t, 1,972 t, and 780 t in the Western, Central and Eastern areas, respectively. The gulf-wide ABC of all other skates is 1,327 t. These ABCs apply to both 2005 and 2006.

Specific Comments to Assessment Authors:

The SSC is grateful to samplers with ADF&G who collected catch data and biological samples for Kodiak landings. We encourage similar sampling of Homer landings. However, the SSC reiterates its recommendation from the December 2003 minutes:

"that no directed fishery be allowed for skates until a data collection plan is submitted by the industry and approved by the Council. The primary data collection need is the collection of accurate skate species composition data so that harvests of big skate, longnose skate, and *Bathyraja*-species complex can be monitored relative to their individual biomass levels. Means to collect these data could include onboard observers, video recording of longline catches (perhaps using systems similar to those developed in British Columbia), logbooks, dockside sampling, or some combination of these. Also, an ability to collect representative samples of age, weight, length, and sex data is important to characterize the fishery removals from the stocks. These recommended data-collection requirements are necessary owing to the significant portion of the skate catch that is unobserved. A directed skate fishery should be allowed only if such a data collection program is approved and provided that annual bycatch needs of other fisheries have been safely accommodated."

Other Species

The GOA Plan Team made a compelling argument that the TAC for other species should change from 5% of the TAC of all species to less than or equal to 5% for additional flexibility and conservatism. **The SSC recommends moving forward with this change but also suggests considering whether it might be possible to move directly to specifying aggregate ABC and OFL for the other species group in the GOA.**

D-1(f) BSAI Groundfish Specifications

Walleye Pollock

Eastern Bering Sea:

The EBS stock assessment for walleye pollock continues to be a world-class assessment that integrates multiple data sources in a holistic manner. The EBS stock continues to be at high levels about B_{msy} although it is likely that the population will decline in the near future. The SSC agrees with the Plan Team that the reference model (Model 1) provides the basis for estimating population parameters. The SSC further agrees that no change is needed in the harvest policy, so that ABC and OFL are set under Tier 1a. Thus, 2005 ABC is 1,960,000 mt and 2005 OFL is 2,100,000 mt. Using the Ianelli alternative projection (see our comments in the preamble, titled “D-1(e&f) Final Groundfish Specifications GOA/BSAI: General Comments”), 2006 ABC is 1,617,000 mt and 2006 OFL is 1,944,000 mt (based on a projected 2005 catch of 1,474,000 mt).

Bogoslof Islands:

There is no new information, so the SSC recommends a rollover of last year’s Council-approved ABC and OFL under Tier 5. Thus, 2005 ABC is 2,570 mt and 2005 OFL is 39,600. The same values are to be used for 2006 as well. The SSC ABC is set lower than that for the Plan Team, based on a target biomass of 2,000,000 mt, for additional conservatism. The Council has approved this adjustment for several years.

Aleutian Islands:

Stock assessment authors have made a valiant effort to produce an age-structured assessment for the Aleutian Islands using the Near, Rat, Andreanof (NRA) sub-area. The assessment attempts to integrate all data sources, although there continues to be great uncertainty in stock identification for pollock in this area. Because of very low trawl survey biomass in 2004 in the area west of 174°W, the authors needed to add in survey biomass, primarily from one large tow, in the area from 174°W to 170°W to achieve model stability. At the same time, they needed to delete catches from that same area, because they may have actually been a part of the EBS or Bogoslof stock. The SSC was concerned about the uncertainties in the survey and catch data to the extent that it could not place much confidence in the stock assessment results. This is regrettable, because the SSC firmly believes that the authors are moving in the right direction in pursuing the age-structured model. Until greater confidence in the stock structure and spatial distribution of pollock in the Aleutians Islands can be obtained through additional field research, the SSC recommends continuation of the status quo approach using Tier 5. The 2005 survey estimate of pollock biomass in the Aleutians is 130,451. Thus the ABC is obtained by multiplying by 0.75 M, in which M = 0.3, resulting in a 2005 ABC of 29,400 mt. The OFL is obtained by multiplying by M, resulting in a 2005 OFL of 39,100 mt. The same values are to be used for 2006 as well.

Specific comments to assessment authors:

EBS

- The description in the text (p. 46) and Fig 1.22 of the EBS assessment suggest that the age component of fishery selectivity is allowed to change every 3 years, which is inconsistent with model details provided in the Appendix (p. 117)
- The SSC appreciates and encourages efforts to develop more objective ways of choosing among alternative models. Other, less compute intensive model selection approaches may be explored including cross-validation approaches and bootstrap model selection with small numbers of replicates. Shao (1996, Bootstrap model selection. *J. Am. Stat. Assoc.*, 91, 655-665) provides an overview of the use of the bootstrap in model selection. Bootstrap methods can be adapted to a wide variety of modeling situations with independent and identically distributed errors, and have also been applied to autoregressive time series and other dependent data (Shao and Tu 1995, The jackknife and bootstrap. New York: Springer). The use of cross-validation for model selection is detailed in Zhang (1993, Model selection via multifold cross validation. *Ann. Statist.*, 21, 299-313) and Shao and Tu (1995).

AI

- Shading is not visible in Table 6.14
- Fig 1.24 suggests some problems with the convergence of q in the model that freely estimates q, suggesting that the estimate is either unstable or that convergence is extremely slow. It is not clear which and a figure of the posterior distribution of q or results from longer MCMC chains (with different starting values) would help.

Pacific cod

This year's Pacific cod stock assessment represents a substantial revision from last year's assessment. Major changes include the use of a Kalman filter approach to split the BSAI cod ABC into BS and AI components, and a revision of the assessment model to include recent age data for 1998-2003, as well as size compositions and biomass estimates from the slope surveys conducted in 2002 and 2004. The new assessment model that includes this new information is called model 2, whereas the old assessment model that does not include age data and slope survey results is model 1. The authors also illustrated differences in the stock-recruit relationship between year classes spawned during the periods 1977-1988 and 1989-2002. The authors and the Plan Team recommend model 2 for use in estimating ABC. The SSC agrees that model 2 is the better model. The SSC thanks the author's fine work to include these components and feels that these additions represent substantial improvements to the cod assessment.

The estimated 2005 spawning biomass for the BSAI stock is 295,000 t, about 3% below $B_{40\%}$, thus qualifying Pacific cod qualify for tier 3b. However, since 1998, ABC has been set at less than the maximum permissible ABC obtained from $F_{40\%}$, because of concerns about statistical uncertainty in the assessment, particularly model parameters (i.e., natural mortality and survey catchability). During 2001-2002, the recommended F_{ABC} was estimated as 87% of $F_{40\%}$, based on the ratio of F_{ABC} to $F_{40\%}$ from the 1999 assessment. During 2003 and 2004, concerns about performance of the assessment model led to fixing ABC at the 2002 level of 223,000 t. Given the projected 32% reduction in spawning biomass for 2005 compared to 2004, a method other than this fixed ABC is needed for 2005. The assessment authors proposed an approach that considers the trade-off between average yield and variability in yield (estimated as one-half the average squared first difference), a quantity that is maximized when F_{ABC} is set equal to 90% of the maximum permissible F_{ABC} .

The SSC concurs with the author's and Plan Team's recommendation to set the 2005 ABC at 206,000 t, which is 9% below the maximum permissible ABC of 227,000 t. The SSC also concurs

with their recommended 2005 OFL level of 265,000 t, based on the tier 3b formula. Likewise, the SSC agrees with the Plan Team's recommended 2006 ABC of 195,000 t and 2006 OFL of 226,000 t. In agreeing to the use of a new method of calculating a recommended ABC for 2005 (an adjustment based on a tradeoff between yield and variability in yield), the SSC is not necessarily endorsing formal adoption of this particular approach on an ongoing basis. Over the long term, the performance of this method, as well as possible alternatives, should be evaluated. However, from a practical standpoint, the adjustment factor (0.9) is very similar to the factor (0.87) used 3-4 years ago, and it maintains the practice of setting ABC slightly below maximum permissible ABC, given some of the uncertainties in this stock assessment.

SSC Recommendations to the Stock Assessment Authors:

- The SSC was intrigued by the stock-recruit fits for the periods 1977-1988 and 1989-2002 and we thank the authors for including this analysis. For the 2006 assessment, the SSC asks the authors to explore whether these findings can be used to elevate the BSAI cod stock to tier 1 or 2. If it is deemed that MSY is too variable between periods to apply any MSY estimates to this stock, then next year's assessment should consider potential implications of this variability in stock productivity on estimation of the $F_{35\%}$ and $F_{40\%}$ reference points.
- The authors are asked to examine interannual variability in cod weight-at-length estimates (index of condition) and potential relationships with cod density, stock-recruit, or environmental conditions. Condition indices have been useful metrics in analyses of the health of Atlantic cod stocks.
- The SSC also requests that the authors provide justification for their assumption that there are no gender-based differences in length-at-age or weight-at length for Pacific cod. If there is sexual dimorphism in growth, then size-based selection in the fisheries will generate time-variations in sex ratios that can have important consequences to the stock's productivity.
- Lastly, the SSC requests that the assessment authors provide likelihood profiles or similar analyses that illustrate the consistency of model fits to the various input data sources. This is especially important in situations where new data sources (e.g., age data) are incorporated into an assessment model.

Sablefish

The SSC's comments on the assessment for the BSAI and GOA stock are given in the GOA section above.

BSAI Flatfish

General Comments

Assessments are conducted for six individual flatfish species – yellowfin sole, Greenland turbot, arrowtooth flounder, northern rock sole, flathead sole and Alaska plaice - and for a combination “other flatfish” group. With the exception of Greenland turbot (which is discussed separately below), the Bering Sea flatfish stocks all show a common trend over the past two decades. All of these stocks peaked in biomass sometime during the mid 1980’s to early 1990’s and have declined slightly or held relatively stable up to the present. Survey estimates of biomass are higher for all flatfish stocks and increases ranged from 4% to 41%. Projections indicate that none of the stocks are overfished or approaching an overfished condition (this determination cannot be made for the other flatfish complex because they are managed under Tier 5). The flatfish stocks all fall under Tier 3a management as reliable point estimates

exist for B, B_{40%}, F_{35%}, and F_{40%}. For each of these stocks, the Plan Team recommended ABCs and OFLs be set at F_{35%} and F_{40%}, respectively. The SSC concurs with the Plan Teams recommendations.

As part of the continuing effort to incorporate ecosystem effects, detailed examination of stock recruitment relationships were made for several flatfish stocks, specifically: flathead sole, northern rock sole, arrowtooth flounder, Alaska plaice and yellowfin sole. As part of these explorations, the assessment authors fit separate stock recruitment models to subsets of the data to examine the possible effect of a 1989 climatic regime shift. For yellowfin sole, the spawner-recruit analysis focused on the 1976-77 regime shift. If a reliable stock-recruitment relationship is found, a stock could be considered for management under Tier 1. In all cases, significantly different stock recruitment relationships were found for subsets of the data. These results appear to illustrate the non-stationarity of stock-recruitment relationships over time for Bering Sea flatfish stocks and provide the basis for questioning whether a single stock-recruitment curve adequately captures the dynamics of the stock. These stocks are excellent candidates for ongoing harvest policy investigations in a Management Strategy Evaluation framework, and the SSC looks forward to results from these analyses.

Yellowfin Sole

The stock assessment this year is a straight-forward update of last year's assessment that incorporates new catch and survey information. For the past couple of years, the assessment has allowed catchability to differ from 1.0 by allowing a temperature effect. For this year, the temperature effect is modeled exponentially rather than linearly as in past years. The recommended OFLs and ABCs are:

	<u>2005</u>	<u>2006</u>
OFL	148,000 t	133,000 t
ABC	124,000 t	114,000 t

Greenland Turbot

The stock assessment is a straight-forward update of last year's assessment and incorporates new catch and length frequency data from the fishery as well as updated aggregated longline survey index. Natural mortality is currently assumed to be 0.18 but auxiliary information indicates this may be too high and a full evaluation of alternative rates is forthcoming in future assessments. Although the stock qualifies for Tier 3 management, the SSC concurs with the stock assessment authors and the plan team and recommends setting the ABC at a value lower than the maximum permissible. The stock continues its longterm decline, estimated at about 9% annually in the longline survey. Recruitment continues to hover around the relatively low levels seen since the late 1970s. On the basis of these concerns, the recommendation to set F_{abc} equal to the 5-year average value of 0.07, as was done last year, was accepted. OFL is computed under Tier 3a with F_{OFL}=0.32. Area apportionments of ABC on the basis of relative survey biomass were accepted. The recommended OFLs and ABCs are:

	<u>2005</u>	<u>2006</u>
OFL	19,200 t	11,100 t
ABC	3,930 t	3,600 t

The ABC was apportioned to the Bering Sea and Aleutian Islands as follows:

	<u>2005</u>	<u>2006</u>
BS	2,720 t	2,500 t
AI	1,210 t	1,100 t

Arrowtooth Flounder

The assessment is a straight-forward update of last year's assessment with the incorporation of new EBS shelf and slope trawl survey and 2003 and 2004 fishery data. The authors continued exploring a temperature effect on catchability but concluded that q was not freely estimable given the present level of information. An unequal sex ratio was allowed in the model this year by using a prior on the sex ratio estimated from the trawl surveys. The recommended OFLs and ABCs are:

	<u>2005</u>	<u>2006</u>
OFL	132,000 t	103,000 t
ABC	108,000 t	88,400 t

Northern Rock Sole

This chapter has been retitled this year from rock sole to northern rock sole, reflecting the fact that two species of rock sole – northern and southern – are found in the Bering Sea. Northern rock sole are dominant, comprising an estimated 98% of commercial catch. The assessment is a straight-forward update of last year's assessment with some exploration of variability in catchability and natural mortality. Similar to other flatfish assessments, a temperature effect on catchability was explored, however, no effect was detected. Catchability was allowed to be different from 1.0, the value used in previous assessments. A prior, based on the results of a herding experiment, was used in the model and the resultant value was approximately 1.5. Natural mortality was also freely estimated in this assessment and the resultant estimate of 0.16 is lower than the value of 0.18 used for the past 11 assessments. The recommended OFLs and ABCs are:

	<u>2005</u>	<u>2006</u>
OFL	157,000 t	129,000 t
ABC	132,000 t	111,000 t

Flathead Sole

The assessment is a straight-forward update of last year's assessment with updates in catch, survey biomass, length and age data. Additionally, the growth schedule, maturity schedule and age-length transition matrix were re-estimated. A temperature effect on catchability was again explored and a significant effect was found. The recommended OFLs and ABCs are:

	<u>2005</u>	<u>2006</u>
OFL	70,200 t	56,100 t
ABC	58,500 t	48,400 t

Alaska Plaice

The assessment is a straight-forward update of last year's assessment with updates in catch, survey biomass, length and age data. Additionally, the growth schedule, maturity schedule and age-length transition matrix were re-estimated. A temperature effect on catchability was again explored but no significant effect was found. The estimated age at 50% selectivity increased again in this year's assessment from 10.3 years to 10.9 years, following an increase from 8.5 years to 10.3 years in the previous year's assessment. This had the effect of greatly increasing $F_{40\%}$ and $F_{35\%}$ since 50% selectivity to the fishery occurs more than 2 years later than the age at 50% maturity (8.5 years). The recommended OFLs and ABCs are:

	<u>2005</u>	<u>2006</u>
OFL	237,000 t	115,000 t
ABC	189,000 t	109,000 t

Other Flatfish Complex

This complex consists of Dover sole, rex sole, longhead dab, Sakhalin sole, starry flounder and butter sole in the EBS and Dover sole, rex sole, starry flounder, butter sole, and English sole in the AI. Starry flounder and rex sole comprised 95% of the landings in 2004. For this year's assessment 2003 catch data was updated and 2004 data included and 2004 EBS and AI trawl survey biomass estimates included. The continued evaluation of species-specific natural mortality rates that was recommended by the SSC for the past two years is still encouraged. The recommended OFLs and ABCs are:

	<u>2005</u>	<u>2006</u>
OFL	28,500 t	28,500 t
ABC	21,400 t	21,400 t

Rockfish: General Considerations

Under the GOA section, the SSC provided some general comments apropos to GOA and BSAI rockfish stock assessment authors.

Pacific Ocean Perch (POP)

The 2004 assessment is an update of last year's model with the addition of 2004 survey data, 2003 age composition from the AI fishery, and an update of recent catches in 2003 and 2004.

The SSC agrees with the Plan Team and the SAFE authors that the data warrant a tier 3b calculation resulting in the OFL = 17,300 t for 2005 and 17,408 t for 2006, and ABC = 14,600 t for 2005 and 2006. The SSC agrees with the ABC area apportionment recommended by the Plan Team and SAFE authors for both 2005 and 2006: 2,920 t to the eastern Bering Sea, 3,210 t to the eastern Aleutian Islands, 3,165 t to the central Aleutian Islands, and 5,305 t to the western Aleutian Islands. ABC levels and apportionments for 2006 are the same as for 2005, but the OFL is 17,408 t.

The SSC appreciates the efforts of the SAFE authors in providing an analysis of the effects of disproportionate contribution to productivity by old females. Requests for further analysis are provided above.

Northern Rockfish

In 2003, an age-structured model was used for the first time for the BSAI northern rockfish stock. The current model follows similar methodology, with new data on fisheries catch, survey estimates for 2004 and age compositions for 2003 and 2004. Citing difficulties with fitting the model, authors presented alternative models with and without constraints on survey catchability. The SSC agrees with authors and Plan Team recommendation to use of the more conservative model with constrained catchability.

The SSC concurs with the Plan Team that data support tier 3a calculation. The SSC agrees with the 2005 BSAI ABC of 8,260 t and OFL of 9,810 t. The 2006 BSAI ABC is 8,040 and OFL is 9,480.

The SSC recognizes that additional genetic sampling was conducted, and we encourage the genetic analysis to be conducted in a timely manner to achieve a more solid basis for apportionment determinations.

Shortraker and Rougheye Rockfish

The 2004 assessment is an update of the Kalman filter approach to estimate biomass incorporating new survey information. The SSC notes that the NMFS Regional Office and Observer Program developed a catch accounting program that now separates shortraker and rougheye rockfishes by area.

The SSC agrees with the Plan Team and SAFE authors' recommendation for separate tier 5 calculations of ABC and OFL for shortraker and rougheye rockfishes in the BSAI area. This agreement is based on the expectation that the observer program will adequately account for catches of the individual species. The ABC and OFL levels for shortraker are 596 t and 794 t, respectively, and 223 t and 298 t for rougheye, respectively, for both 2005 and 2006. The SSC agrees with the Plan Team recommendation to set BSAI-wide quotas for each species.

Comments to Assessment Authors and Regional Fishery Managers:

The SSC is sympathetic to the author's recommendation to apportion the EBS and AI areas as a precautionary measure to protect a presumptive stock structure. However, the SSC notes that the appropriate boundary for a geographic split is uncertain, and requests that the assessment authors examine recent genetic data and provide their recommendation in this regard. The SSC is also concerned with the potential for exceeding harvest specifications and requests that management closely monitor bycatch of these species.

Other Rockfish

The 2004 assessment includes new survey data for the Aleutian Islands, southern Bering Sea, and eastern Bering Sea slope; updated catches in the EBS and AI; and updated length frequency data. There are 8 rockfish species within the "other rockfish" complex for the purposes of setting ABCs and OFLs with the majority of biomass from dusky and shortspine thornyhead.

The authors developed a Schaefer surplus production model and additionally provide separate tier 5 calculation for shortspine thornyheads. The authors provided tier 6 calculation for the remaining species; however, the SSC agrees with the Plan team that the biomass estimates for the remaining rockfish are unreliable. Therefore, we do not agree to splitting out SST from other rockfish in specifying ABCs, and recommend that the ABC and OFL be set for the entire "other rockfish" complex, with the OFL being set for the entire BSAI, and ABCs apportioned geographically..

In agreement with the plan team, the SSC recognizes tier 5 calculations with reference points $F_{ABC} = 0.75M = 0.053$, and $F_{OFL} = M = 0.07$. The OFL values for both 2005 and 2006 are 1,870 t, and the ABC levels are 810 t and 590 t in the Bering Sea, and Aleutian Islands, respectively, for both 2005 and 2006.

Atka Mackerel

The new assessment for Atka mackerel in the Aleutian Islands uses the same age-structured modeling approach as in recent years, with the addition of catch updates, 2003 fishery age composition data, 2002 AI bottom trawl survey age composition data, and 2004 AI bottom trawl survey biomass estimates and

length composition data. The survey biomass estimates indicate a steady increase since 1997, the series lowest point.

The authors explored several alternative model formulations. The SSC concurs with the recommendation by the assessment authors and the Plan Team to use the Model 4 configuration as the basis for the ABC calculations. This formulation adjusts for within-year mortality to estimate survey biomass, assumes lognormal error for the survey biomass estimates, and estimates the survey catchability coefficient (subject to moderate constraints).

The Model 4 estimates of stock biomass indicate a steep increase in biomass from 2002, resulting from recruitment of an exceptionally strong 1999 year class. The female spawning biomass is projected to be above the $B_{40\%}$ level in 2005 but below it in 2007.

The SSC supports the Plan Team's recommended ABC for 2005 of 124,000 t with a corresponding OFL of 147,000 t. For 2006 the SSC supports use of Ianelli's alternative projections for an ABC of 107,000 t and OFL of 127,000 t, based on an expected catch in 2005 of 63,000 t.

The SSC supports the survey-based scheme for apportioning ABC to areas:

<u>Area</u>	<u>2005</u>	<u>2006</u>
EBS and Eastern Aleutians	24,550 t	21,190
Central Aleutians	52,830 t	45,580
Western Aleutians	46,620 t	40,230

These ABC values are the maximum permissible yield from an adjusted $F_{40\%}$ harvest strategy.

The new assessment, like previous assessments, uses an assumed value for the natural mortality coefficient. This implies that the estimates of uncertainty about the model results (e.g., the 5th and 95th confidence intervals depicted in Fig. 15.15) underestimate the true level of uncertainty.

The new assessment fit a Beverton-Holt stock-recruitment relationship with log-normally distributed recruitment within the assessment model but with an assumed steepness parameter of 0.8. The estimated relationship had recruitment values that were essentially constant over the range of spawning biomass values estimated by the model for 1977 to 2004.

Specific Comments to the Assessment Authors:

The SSC requests that the assessment authors provide support for the assumptions that there is no sexual dimorphism in the schedules for length-at-age and weight-at-length.

Squid and Other Species

The SSC appreciates the SAFE authors' efforts to assemble and to present reviews of life history and fishery information for the other species groups, skates, sculpins, octopus and sharks, which is helpful in assessing the tier status and evaluating the appropriate approach to specifying allowable biological catch levels.

Squid. The SSC agrees with the SAFE authors and Plan team that reliable biomass estimates do not exist for squid, but catch data are reliable. So, **the SSC agrees with the authors' and team's recommendations for management under Tier 6. OFL is set equal to average catch over 1978-1995,**

and ABC is set equal to 75% of this value. The SSC supports the recommended ABC = 1,970 mt and OFL = 2,620 mt for both 2005 and 2006.

Other species. The “other species” group includes sculpins, skates, sharks, and octopi. The SSC supports the Plan team and SAFE authors’ recommendation for group level specifications; however, we understand, as was true last year, that group level specifications would not be compliant with the current FMP. Further, we agree with the SAFE authors that reliable biomass estimates exist for skates and sculpins, but not for sharks and octopus. Hence, we fall back to the method used last year of calculating the other species specifications as sums of tier 5 calculations for skates and sculpins, and tier 6 calculations for sharks and octopus, and **recommend one set of ABCs and OFLs for the other species complex.**

In 1998 the SSC recommended Tier 5 procedures for specification of other species ABC involving multiplication of the natural mortality rate by estimated biomass. At the time, this shift in methodology would have indicated nearly a 4-fold increase in maximum allowable ABC. The SSC was uncomfortable with such a large increment and implemented a 10-year stair-step process to gradually change the ABC. We are currently in the 7th year of this stair-step process, and 2006 will be the 8th year.

The following table shows the SSC’s ABC and OFL computations for other species. For octopi, average catch over 1992-2002 is taken from Table 16-20 of the SAFE document (no new values are available for 2003 and 2004). For sharks average catch data from 1997 to 2001 are taken from Table 6 of the appendix to the other species SAFE. For skates and sculpins, the SSC endorses the plan team’s biomass estimation procedure based on the most recent 10-year average biomass estimates from the EBS shelf and AI plus the latest (2002) EBS slope survey, which was conducted just once in the last 10 years.

Species	Biomass	M	OFL	Max ABC
Sculpins	206,000	0.19	39,200	29,400
Skates	478,000	0.10	47,800	35,800
Sharks			550	412
<u>Octopus</u>			<u>371</u>	<u>278</u>
Total			87,921	65,890

The stair-step procedure computes the proportion of the difference between the 1997 other species ABC (25,800) and the current estimate of the maximum ABC (59,715) and then adds that amount to the 1997 ABC. Thus, the SSC recommends setting the other species 2005 ABC as 53,863 t (25,800 + (7/10)*(65,890-25,800)). The SSC recommends the 2005 OFL to be the sum of the Tier 5 and 6 estimated OFL values or 87,921 t. The corresponding ABC value (using the 8/10 stair-step) for 2006 is 57,872 t. The OFL for 2006 remains the same as in 2005.

D-1 (e&f) APPENDIX C Ecosystems Considerations For 2005

The Ecosystems Considerations for 2005 Appendix of the groundfish SAFEs provides a most useful overview of the status of the Bering Sea and Gulf of Alaska ecosystems and the environmental conditions that affect and are affected by fisheries. Over time, the Ecosystem Consideration Report has grown in size and complexity. To be most useful to the assessment authors, plan team members and the SSC in assessing the conditions in which the fished populations exist, the document needs a concise overview section that emphasizes a few critical points that may need to be taken into consideration in the development and evaluation of the SAFE documents. The Ecosystem Assessment section of the report serves this purpose but needs more work to be most useful. Elements that should be included are: major changes in ocean climate that could affect recruitment (e.g., changes in advection patterns, water

temperature, or mixing events that could affect ecosystem productivity), changes in prey populations, changes in predator populations, and major changes in impacts on other or protected species, and the aggregate effects of humans on the ecosystem. In addition, where possible, analyses of the biological and fisheries implications of these changes should be provided where known. Thus, this section of the document would provide a heads-up to changes that could affect managed fish population in the short or long term, or for critical conservation issues. Additionally, when appropriate, this section could point to gaps in our ability to interpret the changes noted and the potential need for research.

The purposes of the Ecosystem Consideration Report will be best served if it does not become a repository of annual progress reports that provide information on the status of research programs, but little in the way of results and analysis of their significance. These might best be included as appendices that could inform the reader about ongoing work that addresses information needs identified in the chapter.

D-1(e&f) GOA/BSAI SAFE Appendix D: Economic Status

The SSC did not receive a staff presentation on the Appendix D: Economic Status of the Groundfish Fisheries off Alaska, 2003. While this document continues to provide a useful summary of the limited economic data collected regarding Alaska Region fisheries, it could become much more. Rather than simply repeating verbatim a discussion on regional economic analyses presented in last year's document, the Economics SAFE should have presented rigorous descriptions of the models used in the EA. Specifically, Appendix D should have included a detailed discussion of the assumptions and statistical properties of the model used to generate the estimates of gross revenues reported in the EA^a. Similarly, Appendix D should have included a detailed discussion of the assumptions and properties of the model used as a basis for the estimates of fleet overcapacity reported in the EA. Without detailed descriptions of these models, it is difficult to judge the credibility of conclusions regarding the economic consequences of the five alternatives.

D-1(e&f) Harvest Specification EA/IRFA

1. Changes to the categories of social and economic impacts listed on Page 97 are not fully encompass the suite of impacts included in the original categories. Specifically, *subsistence* does not encompass the full suite of *non-market use values*. Non-market use values include recreational, subsistence and other cultural harvests, values associated with observing fish in nature, harvest values of ecologically related species, the value of ecosystem services contributed by a sustainable fishery, and values associated with preserving the opportunity to use a fishery resource at some future time, as well as the value of preserving the opportunity to use other resources that are dependent on the resource.
2. Pages 98 & 99 of the EA provided estimated and projected revenues. Table 4.11 and the accompanying discussion should be augmented to include actual revenues where estimates of actual revenues are available. Including actual revenues will help to convey information about the coherence between model-based estimates of revenue and observed revenues. The text should be carefully edited to specify whether statements such as "From 2002 though 2004, an increasing trend in overall revenue is evident" (Page 99) refer to trends in actual revenues or merely trends in model projections.
3. The discussion on Page 103 on Operating Cost Impacts should be modified to recognize that the classification of costs into variable costs and fixed costs is not exact, but is instead dependent on the timeframe considered and expectations. It is important to recognize that fishers may incur loans to pay for capital goods over extended periods and that the associated costs may not be avoidable over

^a The brief discussion included as Appendix F was uninformative about model structure, assumptions, and statistical properties.

- the length of the loan. Similarly, operators may incur maintenance costs for fishing and processing gear even if that gear is unemployed in a particular year. Consequently, it is inappropriate to assert that variable costs are avoidable under Alternative 5.
4. The discussion page 104 suggests conclusions about changes in net revenue associated with the proposed Alternatives. However, because the Alternatives are likely to result in different costs and different revenues, it is not possible to determine whether net revenues will increase or decrease without additional information on the structure of the cost and revenue functions.
 5. It is surprising that the estimates of excess capacity reported on page 108 are similar across fisheries that have been “rationalized” and those that have not. For example, despite being “rationalized” in 1998 and despite a persistence of near-record pollock stock biomass, the pollock fishery is estimated to have a higher level of excess capacity than any other fishery discussed. Moreover, there is some inconsistency between the implicit invocation of the Gordon-Schaefer bioeconomic model in the discussion of net returns (page 104) and the suggestion (page 108) that a fleet unconstrained by TAC “would” catch more than that level. Although little can be done to address these puzzles before the document is finalized, further consideration is warranted in future drafts.
 6. The EA assumes that demand for fish from the BSAI/GOA is perfectly elastic, but some of the conclusions are not consistent with the assumption of perfectly elastic prices. For example, the discussion about consumer effects (pages 106 and 107) is incorrect if demand is perfectly elastic. Under the assumption of perfect elasticity, changes in the quantity of fish landed from the BSAI/GOA are too small to affect price, thus consumer surplus is invariant with respect to landings from the BSAI/GOA. Clearly, the problem here is with the assumption of perfectly elastic demand.
 7. The discussion on subsistence (page 109) should be expanded to note that commercial fishing often provides the employment/income needed to support the purchase of inputs used in the pursuit of subsistence activities. Consequently, alternatives that affect employment and wages in the commercial fishery can be expected to have indirect impacts on subsistence activities.
 8. Passive use values (page 110) should not be treated as synonymous with non-consumptive benefits from ecosystems. Passive use values can also arise from activities such as commercial fishing. Just as some people (even those living in distant urban centers) receive value knowing that cowboys still exist, some people find value in the sheer existence of commercial fishing.
 9. The section on communities (page 111) should be broadened to recognize that communities may derive value from fishing activities that are not solely dependent on gross and net revenues derived from fishing. For example, there seems to be potential to inform the discussion of both community impacts and impacts on subsistence by considering the on-going debate in the Pribilofs over closed areas designed to protect marine mammals. This debate clearly illustrates the breadth of non-monetary concerns that can be associated with the linkages between communities and marine resources.
 10. Footnote 8 (page 101) may be incorrect regarding the magnitude of CDQ program-wide royalties. For example, at the recent “Managing Our Nation’s Fisheries” conference, a presentation by a representative of a CDQ group indicated that annual royalties to the CDQ groups, collectively, were on the order of \$50 million. While this figure presumably included royalties from CDQ crab allocations in addition to CDQ finfish allocations, it would be prudent to review information used to derive the estimate of aggregate CDQ royalties reported in the EA and to reference those sources.

Miscellaneous

While it is invaluable for the SSC to meet in conjunction with the Council meetings, our agenda is so full at these regular meetings that we are not often able to explore fundamental issues such as the role and development of multispecies models and multispecies management regimes or mechanisms to increase the sophistication and predictive power of economic and anthropological analyses of fisheries management measures. We propose that the SSC be provided with a regularly scheduled (perhaps 1x per

year) opportunity to hold a 1-2 day workshop on topics of interest. This workshop could be scheduled on additional days either preceding or following a regularly scheduled meeting, or at a separate time.^b

We propose that the first such meeting be scheduled in association with the February Council meeting, either on the Friday or Saturday preceding the Council meeting. We anticipate that this first meeting will provide an opportunity for the SSC members and ASFC scientists to discuss multispecies statistical models that have been included in the BSAI SAFE and alternative conceptual frameworks for multispecies modeling. At the same meeting or at a future meeting, we would have an opportunity to meet with AFSC and NMFS-AKR staff to discuss future directions for the Economics SAFE and the extension of the Economics SAFE to include analyses of other social dimensions of fisheries.

Report from BSAI Crab Overfishing Definition Working Group

We received an oral progress report from Shareef Siddeek (ADF&G) on recent work by the Working Group to develop new overfishing definitions and harvest control rules for BSAI crab fisheries. The approach being taken is similar to that used by Clark to develop the $F_{35\%}$ type of F_{MSY} proxy, but includes the additional feature of depensation in the spawner-recruit relationship. The WG is making good progress on developing the framework for revising the overfishing definitions.

Many BSAI crab stocks appear to undergo cycles in population size, which suggests that any overfishing definition will need to account for such natural variation. The authors should strive to develop a harvest control rule that avoids forcing the fishery into unnecessary rebuilding restrictions during naturally occurring periods of low productivity. For example, a harvest control rule that has a relatively high and fixed MSST will send such a cyclic population in and out of rebuilding. The authors will need to evaluate simulated crab populations that exhibit natural cyclic fluctuations.

^b The disadvantage of holding a meeting on Wednesday is that some potential participants may be precluded from attending because they would need to be available to the Council. The disadvantage of holding a meeting on the Friday or Saturday preceding the Council meeting is that it would require participants to be away from home over the weekend. Holding a dedicated (6th) annual meeting, while very desirable, could be difficult to schedule and would be more costly than piggybacking off one of the regularly scheduled meetings.