

**DRAFT REPORT  
of the  
SCIENTIFIC AND STATISTICAL COMMITTEE  
to the  
NORTH PACIFIC FISHERY MANAGEMENT COUNCIL  
December 5-7, 2005**

The Scientific and Statistical Committee met during December 5-7, 2005 at the Hilton Hotel in Anchorage, AK. Members present were:

Gordon Kruse, Chair <i>University of Alaska Fairbanks</i>	Pat Livingston, Vice Chair <i>NOAA Fisheries—AFSC</i>	Keith Criddle <i>Utah State University</i>
Steven Hare <i>International Pacific Halibut Commission</i>	Mark Herrmann <i>University of Alaska Fairbanks</i>	Sue Hills <i>University of Alaska Fairbanks</i>
Anne Hollowed <i>NOAA Fisheries—AFSC</i>	George Hunt <i>University of Washington</i>	Franz Mueter <i>University of Washington</i>
Ken Pitcher <i>Alaska Department of Fish and Game</i>	Terry Quinn II <i>University of Alaska Fairbanks</i>	David Sampson <i>Oregon State University</i>
Farron Wallace <i>Washington Dept of Fish and Wildlife</i>	Doug Woodby <i>Alaska Department of Fish and Game</i>	

Members absent:

Seth Macinko  
*University of Rhode Island*

### **B-1 Plan Team Nominations**

The SSC reviewed the nomination of Dr. Ginny Eckert to the Crab Plan Team. **The SSC finds her well-qualified for this position and recommends approval of this nomination by the Council.**

### **B-2 Chiniak Gully Experiment**

The SSC received an informational report from Libby Logerwell (AFSC) on a regulatory proposal to close all trawl fishing in Chiniak Gully (near Kodiak) from 1 August through 20 September 2006-2010. This closure is needed to provide a control area to evaluate a localized depletion hypothesis for the pollock trawl fishery. This project is part of a larger fishery/Steller sea lion interaction study. Two years have already been completed. Results from the first year (2001) suggested that the fishery had no effect on biomass, mean depth, or mean distance above bottom. The second year (2004) suggested a fishery-related decline in biomass. Additional years of study are needed to resolve this issue and to evaluate annual variability. The agency is now preparing an Environmental Assessment for the proposed regulatory change for final action in June 2006.

**The SSC recognizes the importance of evaluating localized depletion and potential effects on Steller sea lions but has some concerns about the confounding effects of natural variation in pollock abundance and distribution making it difficult to actually evaluate fishery effects. A suggestion was made that it might be beneficial to switch experimental and control areas. Some concern was expressed that it might take a number of years to come to a firm conclusion about localized depletion and that adding only one additional year of study is unlikely to provide definitive results.**

## **B-6 Protected Resources**

The SSC received an informational briefing from Bill Wilson (NPFMC) on nine protected resource issues; northern right whale critical habitat, Steller sea lion recovery plan status, recent Marine Mammal Commission meeting, marine mammal research permit lawsuit, short-tailed albatross recovery plan, 2005 Steller sea lion pup counts, 2005 northern fur adult male counts, State of Alaska pollock fishery proposals, and incidental catches of endangered Chinook salmon. Public comment was received from Thorn Smith (North Pacific Longline Association) and Paul McGregor (At-sea Processor's Association).

SSC discussion focused on northern right whale critical habitat and conservation issues. It was emphasized that the northern right whale population in the eastern North Pacific Ocean is the most highly endangered whale species with an extremely small population, most certainly less than 100 individuals and perhaps less than 50 animals. It was emphasized that such a small population is extremely vulnerable to extinction and warrants protection from identified threats.

The staff summary report of fishery information, including gear type, and historical whale distribution in the proposed critical habitat areas is a valuable document. **It would be useful to also summarize what is known about the seasonal use of right whales in the proposed critical habitat areas.**

North Pacific right whale feeds exclusively on zooplankton, primarily copepods. A large copepod, *Calanus marshallae*, is thought to be of particular importance in the Bering Sea. No competitive relationship with fisheries is thought to occur. Potential negative interactions with fisheries include collisions with vessels and entanglement with fishing gear (primarily fixed gear such as long-lines and pots) as occurs in the North Atlantic. There are no documented occurrences of mortality from these sources in the North Pacific, but additional investigations into these potential mortality sources are recommended. **Photographs taken during aerial and vessel surveys should be carefully examined for scars resulting from entanglements or collisions. The observer database might also provide information on fishery/right whale interactions.**

The SSC discussed recent, reduced abundance of *Calanus marshallae* in the southeastern Bering Sea that includes the proposed area of critical habitat. It is thought that this copepod requires an early, ice-associated bloom to ensure strong recruitment of copepodites in spring. Recent warm water in the Bering Sea and recession of the ice edge has possibly reduced the availability of prey for whales in the southeastern Bering, including much of the area designated as critical habitat. Should water temperatures revert to a colder stage, this critical habitat would remain a potentially productive foraging ground. If warm conditions persist, preferred habitat might shift northward.

An industry organization, Marine Conservation Alliance, has taken a proactive approach to reducing the probability of negative interactions with commercial fisheries. In cooperation with NMFS, they designed an educational handout to assist fishers in identifying right whales and providing advice on appropriate responses when encountering right whales. Information and photographs of right whale sightings will provide valuable information on distribution and perhaps abundance. The SSC appreciates this effort.

It was recognized that some threats to right whales, both within and outside of the proposed critical habitat areas, are not within the jurisdiction of the NPFMC and will require attention of other agencies. These include collisions with cargo ships and potential oil and gas development.

## **C-2 Halibut and Sablefish IFQ Program**

Jim Richardson and Jane DiCosimo (NPFMC) presented a draft analysis for four actions to be considered as amendments to the halibut and sablefish IFQ program. Public testimony was provided by Linda Kozak (Alaska Leader Fisheries).

The first proposed action (allow non-IFQ species to be frozen aboard) would allow processing of non-IFQ species aboard freezer-longliners engaged in the halibut and sablefish IFQ fisheries. The SSC suggests that the analysis should include quantitative estimates of the potential increases in net revenues that could arise from this action. While generating these quantitative estimates may be problematic for the halibut fishery, it should be straightforward for the sablefish fishery. **In addition, The SSC notes that the discussion of the net national benefits could be strengthened to remark that the proposed action will lead to a clear increase in producer surplus and that, while the change in consumer surplus could be positive or negative, it is most likely that it would be positive.** Even if it were negative, it is likely to be much smaller than the increase in producer surplus. This is due to the fact that unprocessed incidental catch has little commercial value to the consumer and that the abundance of substitute sources of white fish causes the demand for cod and rockfish to be highly elastic for small changes in supply. Thus, noticeably higher average prices to US consumers are unlikely from this proposed alternative. Consequently, the change in net national benefits associated with the proposed action is unambiguously positive. In addition, the SSC notes that:

- **The difficulty in generating estimates of the potential benefits to the halibut fishery that could derive from this proposed action appears to arise from either a failure in the encoding of data on non-target catches taken in the halibut fishery and/or a failure to preserve information that ties target and non-target catches to specific hauls. The cause of this loss of data should be remedied by the IPHC and NMFS.**
- The determination of changes in net national benefits hinge on the relative elasticities of demand and supply (market allocation) for each species. Developing reliable estimates of elasticities, especially for Alaska groundfish, has repeatedly been identified by the SSC as a high priority for economic research.

The second proposed action (use of longline gear in BS sablefish fishery in June) would eliminate the June closure of the longline-pot fishery for sablefish in the BSAI. The SSC notes that the several actions are explored in section 3.5 that are not related to the problem statement for elimination of the June closure. **The SSC suggests expanding the draft analysis to include a discussion of the potential bycatch that could arise from this action. In addition, the SSC notes that, because the sablefish fishery does not harvest the full BSAI TAC, elimination of the June closure may facilitate an increase in total landings and a reduction in fishing costs. As the demand for sablefish is likely elastic, this will result in an unambiguous increase in producer surplus.** Changes in consumer surplus are uncertain because of the lack of detailed information about domestic and international demand for sablefish. However, because the predominant volume of catch is sold into international markets, changes in domestic consumer surplus are likely to be small and changes in consumer surplus of fish sold into the international market are irrelevant in the determination of net benefits to the nation. Specifically, the summary of cost and benefit analysis in Table 3.5, under Benefits, needs to include a statement about the potential benefits of harvesting closer to the optimal yield in addition to the discussion of economic efficiencies arising from reductions in fishing costs.

The third proposed action (withdrawal of unfished halibut and sablefish quota shares) would reduce the number of unfished halibut and sablefish IFQ quota shares through voluntary or administrative actions. While this action could lead to increased target catches of halibut and sablefish, current management strategies assume that these harvests will occur, thus this proposed action is not expected to have a measurable effect on halibut or sablefish stocks. However, this action can be expected to lead to additional bycatches of rockfish and Pacific cod. Bycatch should be examined in an revised analysis. **Based on recently completed analyses of the demand for Pacific halibut (Herrmann and Criddle, An Economic Analysis of the Pacific Halibut Commercial Fishery, MRE, 2006), it can be confidently stated that the additional landings of halibut resulting from this action will lead to increases in consumer and producer surplus.** While the lack of a concurrent reliable model of supply and demand for sablefish precludes definitive prediction of the magnitude of direction of changes in net benefits to the nation from the proposed action, the volume of the potential increase in landings is small

and serves an international market. Thus, the increase in benefits to US harvesters is likely to be greater than any potential the change in consumer surplus to US citizens (whether positive or negative). The SSC notes that, under the crew lottery option, the value of the halibut quota to be distributed in the lottery could be quite large for the individual lottery winners, substantially larger than the value of potential gains to be distributed in the sablefish quota share lottery. The SSC notes that the cost of redistributing the quota shares through an auction could be recovered through a fee for entry into the auction.

The SSC does not have any comments regarding the fourth proposed action (temporary transfer of IFQs held by activated reservists).

### **D1(a) BSAI and GOA Harvest Specifications for 2006 – 2007**

Ben Muse (NMFS AK Region) summarized the EA and updated the SSC on changes to the document relative to the October version. The SSC welcomes review of this document and acknowledges that the document provides a comprehensive review of the impacts of TAC setting.

The authors addressed several of the SSC comments made during the October meeting. The authors provided more documentation on the projection methods and briefed the Plan Teams at their November meetings on this aspect of the document. **It was noted that the projections could be improved by involving stock assessment authors earlier in the process to reduce the need for changes in September.**

Preliminary projections indicated that GOA pollock catches would increase and in October the SSC discussed the need to monitor these increases with respect to Steller sea lion status and trends. The EA authors noted that this SSC concern was no longer relevant because the final projected GOA pollock ABC will decline rather than rise in 2006.

In October, the SSC also requested that the EA authors consider estimating error bounds on economic estimates. The authors noted that this request could be accommodated but the drafters sought guidance on methodology. The SSC is encouraged that future EA analyses will attempt to incorporate estimates of uncertainty in economic projections. While there are many different sources of uncertainty that could be incorporated into economic projections, in the near term, data should be readily available to quantify uncertainty due to variability in exvessel and first-wholesale prices and variability in the mix of product forms. In the long term, it is anticipated that models will be developed to formally represent supply, demand, and trade relationships. The SSC anticipates that, as these models are developed, they will be documented in Appendix D—Economic Status of the Groundfish Fisheries.

**The SSC requests documentation of changes in forecasts of OFLs and ABCs over time as they change throughout the two-year harvest specification cycle.** This type of information would be useful to validate the process, inform the public on the expected impacts of an action, and to identify stocks for which projections are problematic and in need of improvement.

The SSC offers the following editorial comments and suggestions for future EA documents.

- P. 47. Terminology – The authors should consider selecting either “ecosystem based management” or “ecosystem approaches to management” and should be consistent in their usage.
- P. 47 – The authors mention the potential use of ecosystem indicators as an early warning of potential regime shifts. The authors should note that, in addition to exploring changes to harvest controls to adjust for changes in productivity resulting from regime shifts, assessment authors are conducting MSE type analyses to evaluate whether their harvest policies are robust to regime shifts. The latter approach may be more practical as it is often difficult to identify a regime shift with confidence early in the time series.

- P. 64 – The authors should consider inclusion of results from the U.S. GLOBEC studies that were published in a recent volume of Deep Sea Research.
- P. 69 - 71. The SSC notes that the importance of factors leading to concentration of fisheries in time or space has been removed from the target species impacts. This is an important potential impact that could be expressed through genetic impacts and reproductive success. The authors should note this in the description of significance criteria.
- P. 83, 88, 93. The authors mention the benefits of ecosystem approaches to management. However, the item might be better titled “Ecosystem Research.” The types of activities listed are not management issues. Rather, they are benefits of ecosystem research.
- P. 85 – The authors should clarify that aquaculture is not allowed in AK, at least not in state waters, so the impacts of aquaculture are likely to be limited to impacts on fish prices.
- P. 90 – The authors should reconsider the threshold for significance for forage fish given that current impacts by fishing activities are so small.

### **D-1(b&c) Final Groundfish Specifications GOA/BSAI: General Comments**

The SSC offers some general comments to the plan teams and assessment authors. The SSC wishes to commend the authors and teams on the overall excellent improvements and quality of this year’s SAFEs. Plan team minutes were helpful to understand the reasoning for the team’s recommendations. The SSC offers two general comments to the assessment authors:

- The SSC appreciates the inclusion of phase-plane diagrams of relative harvest rate versus biomass, but we recommend standardization of units along the axes in all chapters to facilitate comparisons across species. The SSC suggests considering a quad plot based on  $F/F_{35\%}$  versus  $B/B_{35\%}$ .
- The SAFEs have been improved overall by expanded sections on ecosystem considerations to include discussion of predator-prey interactions. To this end, tables and figures have been added from ECOPATH models. One problem that has arisen is that there is some confusion about whether the information presented is stomach contents data, output from a single-species model, or output from an ECOPATH model. Figures and tables should more explicitly describe the source of the information presented. To avoid confusion between statistically-driven single species models and manually-adjusted ECOPATH models, the word “estimate” should be reserved for output from single-species models. In the absence of a statistical fitting procedure, outputs from ECOPATH/ECOSIM models should be referred to as adjusted parameters or just outputs. When ECOPATH/ECOSIM parameters are assumed to take on particular values, such assumptions should be stated explicitly. Care should be taken to avoid mixing results from different model structures.

### **D-1(b) GOA Groundfish Specifications for 2006 and 2007**

#### **Overview of SSC Recommendations on ABCs and OFLs**

The GOA SAFE was presented by Jim Ianelli (AFSC). The SSC received public comment on the GOA SAFE document for Pacific cod and skates only, as reported below.

**The SSC concurs with the Plan Team’s recommendations for ABCs and OFLs for all GOA stocks with one exception, Pacific cod. For GOA cod, the SSC recommends a stair-step approach for setting the ABC at 68,859 t for 2006.** The SSC agrees with the Plan Team’s recommended OFL of 95,500 t for 2006. For 2007, the SSC concurs with the Plan Team’s recommended ABCs and OFL for 2007, realizing that these will be updated and reviewed next year.

## Walleye Pollock

This assessment is a straightforward update of last year's assessment. The SSC commends the authors for the extensively revised section on ecosystem considerations, confirming the important role of pollock in the diets of several predatory species.

Of the four alternative models considered, the SSC concurs with the Plan Team and stock assessment authors that Model 2 with catchability fixed to 1 should be used for 2006, because of its precautionary nature. As has been the case for several years, recruitment is sporadic for this stock, with no strong events since 2000. It is projected that the stock will decline in the future from its current level of about  $B_{35\%}$ , which is below the target level of  $B_{40\%}$ . This stock qualifies for management under Tier 3b, and since 2001, ABC has been set using a constant buffer adjustment, which reduces maximum permissible ABC by a constant amount. **Following the authors and the Plan Team, the SSC recommends a 2006 ABC of 80,390 mt and a 2006 OFL of 110,100 mt (after a reduction for PWS GHL of 910 mt). The projected 2007 ABC and OFL are 64,150 mt and 85,190 mt. Area apportionments follow standard methodology.**

**For the East Yakutat/SE Outside district, the SSC follows the authors and Plan Team in recommending a Tier 5 calculation based on natural mortality and the 2005 bottom trawl survey biomass. This results in the ABC of 6,157 mt and OFL of 8,209 mt for both 2006 and 2007.**

SSC comments to the assessment authors:

- The SSC notes that FOCI predictions of year-class strength have been done for many years, so it might be timely to do a formal evaluation of the ability to forecast recruitment from environmental variables. The SSC requests that the authors do a retrospective analysis of the FOCI forecasts (and the components going into the forecasts) to determine the accuracy of these forecasts.
- The authors should consider reducing the number of selectivity parameters estimated in the model, in which selectivity is allowed to change each year. Perhaps an approach like the EBS pollock assessment, in which selectivity varies every three years, would be better.
- The SSC commends the authors for their excellent approach to incorporating historical data from IPHC and ADF&G surveys into the assessment, which may serve as encouragement to other authors, particularly of the Pacific cod and flatfish assessments, to make use of the same data sources for extending existing time series. While improved historical data may not have a large impact on estimates of current biomass or reference points, they provide valuable information on variability over time and historical biomass levels.
- The SSC also appreciates the discussion of maturity-at-age and notes that walleye pollock in the GOA is the only stock off Alaska with a time series of maturity-at-age. In the long term, the SSC recommends that the authors investigate the changes in maturity-at-age over time and evaluate the consequences on population dynamics of walleye pollock.

## Pacific Cod

The assessments for Pacific cod in the BSAI and GOA were presented together this year by Grant Thompson (AFSC) because the models were used in both regions. Public testimony was received from Gerry Merrigan (Prowler Fisheries) and Julie Bonney (Alaska Groundfish Databank). Comments included encouragement for additional research on maturity-at-age and expression of preference for taking the maximum permissible ABC when the opportunity arises, rather than trading off catches for stability in catches over time.

The Pacific cod assessment is a substantial revision of the previously used assessments. The SSC thanks the authors for their hard work in moving to the new software, for their responsiveness to previous SSC comments, and for additional improvements to the assessment. **Major changes include the use of new**

**assessment software (Stock Synthesis II) and a new maturity-at-length schedule that implies earlier maturation.** Major advantages of the new software include an improved algorithm for estimating parameters, the ability to estimate confidence intervals or posterior distributions for any quantity of interest, and a more flexible approach to estimating selectivity curves. The SSC endorses the use of the new modeling software as well as the new maturity-at-length schedule. **Although we concur that sufficient justification was provided for adopting the new maturity schedule, there is some concern over the timing (GOA) and location (BSAI) of the samples that were used for histological examination.** For example, maturity data for the BSAI were obtained only on the spawning grounds and may lead to an underestimation of length-at-maturity if small mature fish have a higher probability of entering the spawning grounds than immature fish of the same size.

Using the new software, the authors compared two models that either fixed both natural mortality M and survey catchability Q (model 2) or estimated both parameters freely (model 3). To obtain what the authors believed to be reasonable estimates of M and Q, strong constraints on the prior distributions of both parameters had to be used in model 3. Even with these strong constraints the Bering Sea model suggested a value for M (0.3) that was substantially smaller than the currently used rate of M=0.37, while the model for the GOA estimated a natural mortality rate that was slightly larger than the historically used estimate. **The SSC concurs with the Plan Team’s recommendation to use model 2 with M and Q fixed for establishing the 2006/07 ABC and OFL limits, but encourages further work to estimate M and/or Q in future assessments.** The main rationale for adopting model 2 this year in both the BSAI and GOA is to take a more gradual approach to introducing a substantially updated model, before investigating potentially important changes to natural mortality and/or survey catchability.

For Pacific cod in the GOA, the model implies a substantial increase in spawning stock biomass (largely due to the revised maturity schedule, which implies earlier maturation) and an associated increase in maximum permissible ABC under Tier 3. To stabilize catches the Plan Team recommended a lower TAC but did not feel that conservation concerns warranted a reduced ABC. **The SSC agrees with the Plan Team to use model 2 but disagrees with the use of maximum permissible ABC because of the SSC’s conservation concerns. In particular, the SSC did not feel comfortable with the large implied increase in fishing mortality because of some concerns over the new maturity schedule (see above comments), a series of very low recent recruitments in 2001-2004, and limited experience with the new model.**

Based on model 2, the maximum permissible ABC under Tier 3a was 79,618 t for 2006, compared to a 2005 ABC of 58,100 t. **The SSC recommends using a stair-step approach and setting the ABC for 2006 at 68,859 t [ $ABC_{2005} + 0.5 * (ABC_{2006} - ABC_{2005})$ ]. The SSC endorses the Plan Team’s recommended OFL for 2006 of 95,500 t.** The biomass is projected to decrease substantially in 2007 because the 2001-2004 year classes are estimated to be below average. **As an ad-hoc measure the SSC recommends ABC and OFL levels for 2007 of 49,466 t and 59,100 t, respectively, as recommended by the Plan Team, while realizing that these will be reviewed and updated in 2006.**

The resulting area apportionments (in metric tons) are based on recent biomass distributions:

	<b>Apportionment</b>	<b>2006</b>	<b>2007</b>
West	39%	26,855	19,292
Central	55%	37,872	27,206
East	6%	4,132	2,968
		68,859	49,466

SSC recommendations to assessment authors (applicable to both BSAI and GOA):

- The Bering Sea model in particular suggests very high uncertainty about the true values of M and Q, and the SSC suggests that the authors try to estimate only one of these parameters at a time, while leaving the other parameter fixed.
- The SSC requests a brief update on stock structure of Pacific cod when new genetic data become available. Although the assessments for the Bering Sea and Gulf of Alaska have “converged” on the same model in this year’s assessment, there is little *a priori* reason to emphasize the use of the same model or the same parameter values across regions.
- We endorse the Plan Team’s recommendation to continue work on size-at-maturity. To reiterate, although we concur that sufficient justification was provided for adopting the new maturity schedule, there is some concern over the timing (GOA) and location (BSAI) of the samples that were used for histological examination. For example, maturity data for the BSAI were obtained only on the spawning grounds and may lead to an underestimation of length-at-maturity if small mature fish have a higher probability of entering the spawning grounds than immature fish of the same size.
- The SSC encourages the authors to explore the use of longer time series of CPUE in the GOA using ADF&G and IPHC trawl survey data, similar to the GLM approach used in the GOA pollock assessment.
- In next year’s assessment, the SSC would like to see a summary table of the overall likelihood of the models that were fit and the contribution to this likelihood of the various components, similar to tables provided in other assessments.

### Sablefish

The SSC notes that senior authorship for the BSAIGOA sablefish assessment has changed. The SSC would like to thank the previous author, Dr. Michael Sigler, for his excellent work on the sablefish assessment over the years. The major changes to the Alaska sablefish assessment this year were the inclusion of Markov Chain Monte Carlo (MCMC) runs to depict uncertainty, and a change in the area specific apportionments. The area apportionments changed because analysis of RPWs from the survey and fishery data showed a higher proportion of the stock in the BS, AI and western GOA regions in 2005. **The SSC agrees with the Plan Team’s ABC and OFL recommendations (see below). Also, the SSC agrees with the area apportionment, which was consistent with the previously accepted methodology.**

Region	2006 ABC (mt)	2007 ABC (mt)	2006 OFL (mt)	2007 OFL (mt)
W	2,670	2,360		
C	6,370	5,630		
WYAK	2,280	2,014		
SEO	3,520	3,116		
Total GOA	14,840	13,120	17,880	15,800
Bering Sea	3,060	2,700	3,680	3,260
Aleutian Islands	3,100	2,740	3,740	3,300
<b>Total</b>	<b>21,000</b>	<b>18,560</b>	<b>25,300</b>	<b>22,360</b>

The SSC makes the following specific comments and recommendations to the authors:

- The SSC appreciates the author’s efforts to explain the unusual pattern of standard errors, with the smallest errors associated with the largest estimates of age 2 recruits. The SSC agrees that pattern of residuals shown in Figure 3-11 b appears to be more reasonable than that shown in Figure 3-11a. The SSC recommends that authors use a sensitivity analysis to explore an optimum value for  $\sigma_r$  and, if warranted, fix it at that value instead of estimating it within the model.



- The SSC recommends that authors explore more complicated criteria for defining sablefish target catches, such as at least 50% sablefish and not POP or northern rockfish.
- Given differences in size by sex, the authors might consider whether there is there a need to have a sex-specific model.
- We appreciate the author's efforts to estimate the probability that the stock will fall below threshold biomass levels. However, the historical rationale for using the 30% unfished biomass threshold is no longer relevant and could be dropped.
- The phase-plane plot reference points (p. 311 of the GOA SAFE) should be made relative to  $B_{35\%}$  and  $F_{35\%}$ .
- The SSC endorses the list of recommended studies (section 3.6.3, p. 272) and encourages research on these issues.
- The apportionment scheme was established as an adjustment for a highly mobile stock. The  $\frac{1}{2}$  weighting scheme is applied to the most recent 5 years. The apportionments were originally compared to a migratory movement model. This model has not been updated with more recent tagging information and the SSC requests that the authors consider re-examining movement rates of sablefish given more recent information.

### **Atka Mackerel**

**The SSC agrees with authors and Plan Team that there is not a reliable estimate of Atka mackerel biomass and recommends continuing management under Tier 6. The SSC concurs with the Plan Team to set the 2006 and 2007 ABC to the maximum permissible of 4,700 t and the 2006 and 2007 OFL = 6,200.**

**The SSC agrees with the Plan Team that additional data for this stock is necessary and is sympathetic to a Plan Team recommendation to develop an experimental fishing permit for limited targeting of Atka mackerel in the western GOA for purposes of collection of much needed data, such as age.** Survey information indicates that biomass is centered in the far western GOA and that the strong 1999-year class correlates with predictions from the AI assessment. The SSC notes that additional genetic studies are planned to test whether GOA Atka Mackerel represents a separate stock from the AI stock.

### **Flatfish**

The flatfish group is partitioned for management purposes into deep-water flatfish, shallow-water flatfish, rex sole, arrowtooth flounder, and flathead sole. Species in the deep-water flatfish complex are Dover sole, Greenland turbot, and deep-sea sole. Species in the shallow-water complex are northern and southern rock sole, yellowfin sole, butter sole, starry flounder, English sole, Alaska plaice and sand sole. The GOA bottom trawl survey is the principal source of information for evaluating stock status of the GOA flatfish stocks. Age-structured assessment models are available for Dover sole, rex sole, arrowtooth flounder, and flathead sole.

General comments to the assessment authors:

- The SSC requests that the next round of assessments consider the possible use of ADF&G bottom trawl survey data to expand the spatial and depth coverage.

### **Deep-water Flatfish Complex**

The deep-water flatfish are Dover sole, Greenland turbot, and deep sea sole. Dover sole, which dominates the complex, was assessed using an age-structured model; the others were assessed using the bottom trawl survey estimates of biomass.

The Dover sole assessment is an update to the 2004 assessment that includes 2004 fishery catch and length compositions, the 2005 GOA trawl survey estimates of biomass and length composition, preliminary 2005 fishery catch biomass, and revised survey biomass estimates and length compositions for all survey years. The assessment model was first used for setting OFLs and ABCs in 2004. The 2005 survey estimate of biomass decreased 19% from 2003 to 80,500 t but was higher than the values estimated for the earliest years of the series, 1984 and 1987. The model's estimates of spawning biomass indicate a slow but steady decline since 1991. Potentially large year-classes for 1999 and 2000 could reverse the downward trend in spawning biomass, but these year classes have not yet recruited to the fishery and their strength remains highly uncertain.

Dover sole qualifies for management under Tier 3a, but Greenland turbot and deep sea sole qualify for management under Tier 6. The SSC recommends that Dover sole be kept in the deep-water flatfish complex to provide a reliable measure of changes in the complex. **The SSC concurs with the Plan Team's recommended OFLs and ABCs:**

	<u>2006</u>	<u>2007</u>
<b>OFL</b>	<b>11,008 t</b>	<b>11,022 t</b>
<b>ABC</b>	<b>8,665 t</b>	<b>8,677 t</b>

The SSC also agrees with the Plan Team's recommendations for regional ABC apportionments:

<u>Year</u>	<u>Western</u>	<u>Central</u>	<u>W.Yak.</u>	<u>E.Yak./SE</u>	<u>Total</u>
2006	420	4,139	2,661	1,445	8,665
2007	421	4,145	2,665	1,446	8,677

SSC comments to the assessment authors:

- Because adjacent age-classes are likely to overlap in size and spatial distribution, the fishery selectivity curves estimated by the model seem implausibly steep, possibly indicating misspecification of the age-length transition matrices. The SSC requests that the growth model and age-length transition matrices be re-evaluated in the next assessment.
- The SSC also requests that the next assessment provide likelihood profiles or similar analyses that illustrate the consistency of model fits to the various input data sources.

### **Shallow-water Flatfish Complex**

The shallow-water flatfish are northern rock sole, southern rock sole, yellowfin sole, butter sole, starry flounder, English sole, sand sole, and Alaska plaice. Relative to the 2003 GOA survey biomass estimates, sand sole showed the largest increase in the 2005 survey biomass estimate (+75.1%) and starry flounder showed the largest decrease (-54.6%). The two rock sole species, which dominate the complex, both increased by more than 14%.

Northern and southern rock sole qualify for Tier 4 management; other shallow-water flatfish qualify for Tier 5 management. **The SSC concurs with the Plan Team's recommended OFLs and ABCs:**

	<u>2006</u>	<u>2007</u>
<b>OFL</b>	<b>62,418 t</b>	<b>62,418 t</b>
<b>ABC</b>	<b>51,450 t</b>	<b>51,450 t</b>

The SSC also agrees with the Plan Team's recommendations for regional ABC apportionments:

<u>Year</u>	<u>Western</u>	<u>Central</u>	<u>W.Yak.</u>	<u>E.Yak./SE</u>	<u>Total</u>
2006	24,720	24,258	628	1,844	51,450
2007	24,720	24,258	628	1,844	51,450

SSC comments to the assessment authors:

- Natural mortality rates for the species in the shallow water flatfish complex have apparently not been re-evaluated since the 1988 assessment. The SSC recommends obtaining age data and conducting a literature review so that M be can re-evaluated for these species. Also, a management strategy evaluation approach could be taken to determine whether the current management strategy safeguards against overfishing weak stocks in the complex.

### Rex Sole

The new rex sole assessment includes the following new data: 2004 fishery length compositions, the 2005 GOA summer bottom trawl survey estimates of biomass and length composition, and preliminary 2005 fishery catch biomass. The age-structured model for rex sole was first presented for review in 2004. The 2005 survey estimate of biomass increased slightly from 2003 to 101,300 t, the peak value in the series. Female rex sole reach maturity several years before they recruit to the fishery. As a consequence the estimated values for  $F_{35\%}$  and  $F_{40\%}$  are very large, implying that the stock could sustain substantial removals.

Although rex sole qualify for management under Tier 3, due to concern about the stability of the selection and maturity curves, the SSC concurs with the assessment authors' and Plan Team's recommendation to adopt a Tier 5 approach. **Likewise, the SSC concurs with the authors' and Plan Team's recommended OFLs (based on  $F = M$ ) and ABCs (based on  $F = 0.75 M$ ):**

	<u>2006</u>	<u>2007</u>
<b>OFL</b>	<b>12,000 t</b>	<b>11,400 t</b>
<b>ABC</b>	<b>9,200 t</b>	<b>8,700 t</b>

The SSC also agrees with the assessment authors' and Plan Team's recommendations for regional ABC apportionments:

Year	Western	Central	W.Yak.	E.Yak./SE	Total
2006	1,159	5,506	1,049	1,486	9,200
2007	1,096	5,207	992	1,405	8,700

SSC comments to the assessment authors:

- The SSC greatly appreciates the assessment authors' responsiveness to the SSC's request for an evaluation of the reliability of the estimated fishery selection curve. However, the SSC remains concerned by the very high values of  $F_{35\%}$  implied by the apparent selection and maturity curves.
- The SSC requests that the next assessment re-evaluate the assumed age-length transition matrix to determine how it influences the estimated selection curve. Also, the next assessment should provide analyses of mechanisms (e.g., gear selection versus spatial distribution of fishing relative to fish age) that might account for the large differences between the survey and the fishery selection curves.
- The SSC also requests that the next assessment provide likelihood profiles or similar analyses that illustrate the consistency of model fits to the various input data sources.

### Arrowtooth Flounder

The new arrowtooth flounder assessment updated the 2004 assessment to include the following data: updated 2003 catch biomass and fishery length compositions, 2004 catch biomass and fishery length compositions, preliminary 2005 catch biomass and fishery length compositions, and the 2005 survey biomass and length compositions. The 2005 GOA survey estimate of biomass decreased 33% from 2003 to 1,899,800 t but was higher than the value estimated for 2001 and much higher than the values estimated for the earliest years of the NMFS triennial series, 1984 and 1987. The model estimates that

spawning biomass has increased almost every year since 1961, with age-3 recruitment reaching a peak in 2002.

**This stock qualifies for management under Tier 3a and the SSC concurs with the authors' and Plan Team's recommended OFLs (based on F<sub>35%</sub>) and ABCs (based on F<sub>40%</sub>):**

	<u>2006</u>	<u>2007</u>
<b>OFL</b>	<b>207,678 t</b>	<b>216,500 t</b>
<b>ABC</b>	<b>177,844 t</b>	<b>185,403 t</b>

The SSC also agrees with the assessment authors' and Plan Team's recommendations for regional ABC apportionments:

<u>Year</u>	<u>Western</u>	<u>Central</u>	<u>W.Yak.</u>	<u>E.Yak./SE</u>	<u>Total</u>
2006	20,154	134,906	15,954	6,830	177,844
2007	21,011	140,640	16,632	7,120	185,403

SSC comments to the assessment authors:

- The authors continue use of survey Q = 1 in the assessment. Initial results from a NMFS study indicate that herding of arrowtooth flounder results in an overall Q of 1.3. The SSC looks forward to resolution of this question in the next assessment and incorporation of a supported value of catchability.
- Given the large and growing importance of arrowtooth flounder and likely impacts of this stock on other Council managed species and the ecosystem in general, an expanded ecosystem section is warranted in future assessments.

### **Flathead Sole**

The new assessment updated the 2004 assessment to include the following data: updated 2004 catch biomass and fishery length compositions, preliminary 2005 catch biomass and fishery length compositions, the 2005 GOA survey biomass and length compositions, and revised survey biomass estimates and length compositions for all survey years. The 2005 GOA survey estimate of biomass decreased 17% from 2003 to 213,200 t, comparable to average levels for the series. The model estimates that there has been a slight but steady decline in spawning biomass since 1989, but above average age-3 recruitment each year during 2000-2003.

**This stock qualifies for management under Tier 3a and the SSC concurs with the authors' and Plan Team's recommended OFLs (based on F<sub>35%</sub>) and ABCs (based on F<sub>40%</sub>):**

	<u>2006</u>	<u>2007</u>
<b>OFL</b>	<b>47,003 t</b>	<b>48,763 t</b>
<b>ABC</b>	<b>37,820 t</b>	<b>39,196 t</b>

The SSC also agrees with the assessment authors' and Plan Team's recommendations for regional ABC apportionments:

<u>Year</u>	<u>Western</u>	<u>Central</u>	<u>W.Yak.</u>	<u>E.Yak./SE</u>	<u>Total</u>
2006	10,548	25,195	2,022	55	37,820
2007	10,932	26,111	2,096	57	39,196

SSC comments to the assessment authors:

- The SSC notes that a new analyst took over as lead for the flathead sole assessment. SSC recommendations from December 2004 are reiterated: (1) consider adding more detailed ecosystem considerations and (2) explore whether there could be an important relationship between survey catchability and bottom water temperature.

## **Pacific Ocean Perch (POP)**

The 2005 assessment uses the same model as last year with updated catch, biomass, and age data. The stock assessment authors provided responses to three requests made by the SSC last year. The first request was for alternative spawner-recruit analyses based on subsets of the recruitment data to test the robustness of prior results. The SSC appreciates this work and has no further requests on this issue at this time. The authors also evaluated the possibility of age truncation, concluding that there are fewer old fish than existed in 1984, but that this is not necessarily due to fishing. Third, the authors reported on two analyses to investigate the potential occurrence of localized depletions. The SSC appreciates the thoroughness of these two analyses, which looked at reductions in CPUE within and across years for local areas.

**The SSC agrees with the Plan Team determination under Tier 3a of  $F_{ABC} = 0.062$  that yields the 2006 ABC = 14,261 t and the OFL (given  $F_{35\%} = 0.074$ ) is 16,927 t. The SSC supports the geographic apportionment of the ABC as 4,155 t for the Western GOA, 7,418 t for the Central GOA, and 2,688 t for the Eastern GOA. The 2006 OFLs are 4,931 t, 8,806 t, and 3,190 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 1,101 t of the Eastern section portion of the 2006 ABC to the West Yakutat area where trawling is permitted and 1,587 t for the SEO area.**

**The SSC also concurs with Plan Team recommendations for 2007; ABC=14,726 t is allocated to subareas: Western = 4,290 t; Central = 7,660 t; WYAK = 1,137 t; SEO = 1,639 t. The 2007 OFL is 17,152 t allocated to subareas as: Western = 4,997 t; Central = 8,992 t; and Eastern = 3,223 t.**

## **Northern Rockfish**

The SSC appreciates the extensive development and analysis of model alternatives by the assessment authors. New data available this year included trawl survey data, catch data, and age compositions. The SSC accepts the Plan team's recommendation to carry forward last year's determination of ABC under Tier 3a to this year, but to use model alternative 4 results for the overfishing level determination.

**The SSC concurs with the Plan Team that Gulf-wide ABC = 5,091 t and the OFL is 7,673 t for 2006. Corresponding values for 2007 are ABC = 5,091 t and OFL = 7,618 t. The SSC supports the geographic apportionment of the 2006 and 2007 ABCs, with 1,483 t to the western area, 3,608 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.**

## **Rougheye Rockfish**

The model recommended by the Plan Team and author includes a revised ageing error matrix developed specifically for rougheye rockfish and a revised estimate of the catch history.

**The SSC agrees with the Plan Team to use the Tier 3a maximum permissible ABC derived from the author's recommended model resulting in a 2006 ABC of 983 t and 964 for 2007. The OFL for 2006 is 1,180 mt and 1,160 for 2007. Area apportionment of the 2006 ABC in the Gulf of Alaska is 136 t for Western, 608 for Central, 239 for Eastern and for 2007 is 133 t for Western, 596 for Central, and 235 for Eastern.**

SSC comments to assessment authors:

- The SSC requests that the authors provide a sensitivity analyses on the relative weighting between surveys to explore model fit to the data. This may provide some insight into the model trade offs of incorporating both surveys.

- The SSC also requests that the authors provide additional analysis and consideration of the Type 1 and 2 genotypes, including their geographic separation and the potential for distinct population assessments and catch accounting.

### **Shortraker and Other Slope Rockfish**

The assessment of shortraker rockfish and "Other Slope" rockfish is updated with biomass estimates from the 2005 trawl survey and the SSC recommends continuing management under tier 5. **The SSC concurs with Plan Team and SAFE authors recommended shortraker ABC of 843 t and an OFL of 1,124 t for both 2006 and 2007. Area apportionment of the 2006 and 2007 ABC for shortraker rockfish in the Gulf of Alaska is 153 for Western, 353 for Central and 337 for Eastern. The SSC also agrees with the Plan Team recommended ABC and OFL for "Other Slope" rockfish. In 2006 and 2007 the "Other Slope" rockfish ABC is 4,152 t and OFL is 5,394 t. The GOA area apportionments of ABC for "Other Slope" rockfish is 577 for Western, 386 for Central, 317 for WYAK and 2,872 for SEO.**

SSC comments to assessment authors:

- Exploitable biomass for shortraker rockfish is estimated by the average biomass of the most recent trawl surveys (2001, 2003, 2005) where the 1-100 M depth stratum was removed, because most rockfish in this stratum were "juvenile" fish younger than age of recruitment and not considered "exploitable". The SSC recommends that the authors to evaluate this assumption to better define segregation of juvenile and adults with depth.
- Trawl surveys do a relatively poor job assessing abundance of shortraker rockfish because much of their habitat is located in the 300-500 m untrawlable zone, whereas the longline survey routinely fishes this area. Given this, the SSC would like to see an evaluation of the longline survey data to determine whether this information may provide a better understanding of shortraker rockfish distribution and abundance.
- Silvergray and several of the other slope rockfish comprise a significant portion of the biomass in the Gulf of Alaska, and the SSC requests that the authors more closely evaluate SAFE report statements indicating that the center of abundances for these species, other than harlequin rockfish, are to the south. On the other hand, the SSC concurs with removal of aurora and shortbelly rockfish from the other slope group, because, as the SAFE authors note, published information indicates that these two species do not occur north of Vancouver Island.

### **Pelagic Shelf Rockfish**

The assessment model for dusky rockfish was updated this year (model 2) to include a change in natural mortality ( $M=0.07$ ) and an updated size-age matrix. The authors addressed requests from the SSC regarding age truncation of older females and the potential effects of localized depletions; the SSC appreciates receiving these analyses. The revised estimate of  $M$  (0.07) was also applied to the Tier 5 species: dark, widow, and yellowtail rockfish.

**The SSC agrees with the Plan Team decision to use model 2 to derive biomass estimates and to apply tier 3a calculations for dusky rockfish, with  $F_{ABC} = F_{40\%} = 0.088$ . The corresponding 2006 ABC level for dusky rockfish is 4,885 t and the OFL, where  $F_{35\%} = 0.108$ , is 5,927 t. In 2007, ABC is 4,979 t and OFL is 6,044 t.**

**The SSC accepts the tier 5 ABC calculations for yellowtail, widow, and dark rockfish ( $F = 0.75M = 0.0525$ ), resulting in a combined 2006 ABC of 551 t and OFL = 735 t ( $F = M = 0.07$ ). The ABC and OFL for 2007 will be the same for these tier 5 species.**

**The SSC agrees with the geographic apportionment of the 2006 combined pelagic shelf rockfish ABC to the Western, Central, West Yakutat, and combined East Yakutat/SEO areas as 1,438 t,**

**3,262 t, 301 t, and 435 t, respectively. Apportionment of the 2007 ABC to the Western, Central, West Yakutat, and combined East Yakutat/SEO areas is 1,463 t, 3,318 t, 306 t, and 443 t, respectively.**

### **Demersal Shelf Rockfish (DSR)**

The biomass estimate for the DSR 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 with new survey data in the SSEO area, new average weight data, and new age data.

**The SSC is concerned that the DSR stock is at risk of overfishing. As recommended elsewhere in these minutes for GOA skates, the SSC recommends that the Council set up an interagency group to examine yelloweye rockfish catch statistics and estimation methods for bycatch in the halibut fishery.**

**Given these concerns, the SSC agrees with the precautionary use of a lower  $F$  ( $= 0.02$ ) than the maximum permitted ( $F = 0.026$ ) under the tier 4 designation. The calculated 2006 ABC of 410 t takes into account that an estimated 4.2% of the available biomass is composed of species other than yelloweye rockfish. The OFL fishing mortality rate under Tier 4 is  $F_{35\%}=0.032$ . Adjusting for the 4.2% of other species in the complex gives an overfishing level of 650 t. ABC and OFL levels continue unchanged into 2007.**

Specific Comments to the Assessment Authors:

- The SSC appreciates efforts to further enumerate mortality in sport and subsistence fisheries and looks forward to improved estimation procedures, particularly in the recreational fisheries. The SSC is concerned that the estimates of mortality in the commercial halibut fishery are imprecise, and requests additional attention to analysis of the reliability of statistics resulting from the full retention provisions for rockfish bycatch in both the state and federal fisheries.

### **Thornyhead Rockfish**

**The SSC continues to support the tier 5 calculation using the average of the two most recent survey biomass estimates from 2003 and 2005,  $F = 0.75M = 0.0025$ , and  $F_{OFL} = 0.03$ . The resulting 2006 and 2007 ABC is 2,209 t and OFL is 2,945 t. The SSC concurs with the area apportionments of the ABC as 513 t, 989 t, and 707 t to the Western, Central, and Eastern areas, respectively.**

### **Skates**

Public testimony was received by Gerry Merrigan (Prowler Fisheries). Comments were directed toward the need for tables that distinguish directed catch versus bycatch, including retained and discarded. Also, it was suggested that caveats about data limitations and assumptions made in extrapolations should be included.

The SSC compliments the authors for developing a thorough SAFE chapter for GOA skates with extensive treatment of skate life history as well as skate fishery and survey data. The new SAFE chapter is a major advance towards more informed management of this species group.

The SAFE report emphasizes ongoing problems to obtain adequate catch information despite the heightened efforts of the authors to improve the sampling program. The SSC continues to be grateful to ADF&G samplers who collected catch data and biological samples for Kodiak landings and for similar samples of Homer landings.

The SSC agrees with the authors that significant improvements are needed in the federal catch data collection system, and that improved and more formal cooperation between NMFS, the IPHC, and ADF&G is needed. We recommend that the Council establish an interagency group to conduct a review and recommend actions to address the adequacy of the sampling and reporting program for bycatch in the Pacific halibut fishery, as the bycatch in that fishery appears to be much higher than previously estimated. In particular, we request review of the: (1) adequacy of sampling only the first 20 hooks of each IPHC survey set, (2) method used to extrapolate IPHC survey data to estimate skate bycatch for the entire halibut fishery, and (3) assumption that bycatch = mortality. Because the IPHC survey extends over a broad range of depths to cover the halibut distribution, survey estimates of bycatch may not be representative of the fishery that likely concentrates in areas of higher halibut densities that may have lower bycatch rates than overall survey averages. Further, the SSC reiterates our concerns about developing a directed fishery for skates before an adequate data collection program is developed as we described in detail in our December 2003 minutes.

In regards to future catch levels, the SSC agrees with the Plan Team to continue with area-specific ABCs and Gulf-wide OFLs for big and longnose skates, and Gulf-wide specifications for skates in the genus *Bathyraja*. The Gulf-wide OFLs are: 4,726 t for big skates, 3,860 t for longnose skates, and 2,156 t for *Bathyraja* skates. Area specific ABCs are 695 t for big skates in the Western section, 2,250 t in the Central section, and 599 t in the Eastern section. Area-specific ABCs for longnose skates are 65 t, 1,969 t, and 861 t in the Western, Central and Eastern areas, respectively. The gulf-wide ABC of all other skates is 1,617 t. These ABCs apply to both 2006 and 2007.

SSC comments to the assessment authors:

- The SSC requests clarification on Figure 16-16 as to how the overall mortality rate of 0.2 was determined.
- Also, figure captions in this chapter should indicate data sources. For instance, the SSC was uncertain whether figures on diet represented estimates from NMFS summer food habits samples or outputs from ECOPATH models.

#### **D-1(c) BSAI Groundfish Specifications for 2006 and 2007**

##### **Overview of SSC Recommendations on ABCs and OFLs**

The BSAI SAFE was presented by Grant Thompson (AFSC). The SSC received public comment on the BSAI SAFE document for Pacific cod and Squid and Other Species, as reported below.

**The SSC concurs with the Plan Team's recommendations for ABCs and OFLs for all BSAI stocks with two exceptions. First, for Bogoslof District pollock, the SSC recommends an ABC of 5,500 t for 2006 and 2007 using the same approach as last year based on Tier 5 and a biomass target of 2 million mt. Regarding OFL, the SSC agrees with the Plan Team and recommends 50,600 mt for both 2006 and 2007.**

**Second, although the SSC agrees with the Plan Team that reliable biomass estimates exist for skates and sculpins, the SSC does not agree that reliable biomass estimates exist for sharks and octopuses. For this reason, the SSC recommends the same method used last year for calculating the other species specifications as sums of tier 5 calculations for skates and sculpins and tier 6 calculations for sharks and octopuses. On this basis, the SSC recommends setting the other species ABC as 58,882 t and the OFL to be 89,404 t for 2006. For 2007, the SSC's recommended ABC value is 62,950 t and the OFL for 2007 remains the same as in 2006.**



## Walleye Pollock

### Eastern Bering Sea (EBS)

This assessment is a straightforward update of last year's assessment. Of the six alternative models considered, the SSC concurs with the Plan Team and stock assessment authors that Model 1 should be used for 2006. It is essentially identical to last year's model. The EBS stock remains in excellent condition, and the 2000 year-class appears even stronger than in previous assessments.

The SSC concurs with the Plan Team that this stock should be managed under Tier 1 with an ABC set to the maximum permissible (using the harmonic mean of  $F_{msy}$ ), given that no problems appear to exist with this stock. **Thus, the 2006 ABC and OFL are 1,930,000 mt and 2,090,000 mt, and the projected 2007 ABC and OFL are 1,790,000 mt and 1,930,000 mt, respectively.**

### Aleutian Islands (AI)

The stock assessment authors continue to make progress on developing an age-structured model for AI pollock. The authors consider the NRA portion of the AI to the west of 174°W with the option of including survey information to the east. As noted in our minutes of December 2004, the main problem is that additional field research is needed to understand stock and spatial structure of pollock in the AI, before confidence in the model can be established. **Therefore, the SSC concurs with the Plan Team that like last year, the AI stock is best managed under Tier 5 at present. With the maximum permissible approach, the 2006 and 2007 ABC and OFL are 29,400 mt and 39,100 mt, respectively.**

The SSC learned that a proposal is being developed for an experimental fishing permit (AFSC and Adak Fisheries) to learn more about the stock structure and abundance of AI pollock. The SSC looks forward to seeing the proposal.

### Bogoslof

As noted in October 2005, the stock assessment authors have developed an intriguing age-structured model for Bogoslof pollock. However, the authors have not yet been able to explore the effect of Donut Hole catches in the 1980s on the stock assessment results. Therefore, the SSC agrees with the Plan Team to postpone acceptance of the model until this research is done. **Using last year's approach of management under Tier 5 and the usual biomass target of 2,000,000 mt, the SSC proposes ABC and OFL of 5,500 mt and 50,600 mt, respectively, for 2006 and 2007. The SSC's recommended ABC is more conservative than the maximum permissible ABC recommended by the Plan Team.**

SSC comments to the authors:

- Juvenile pollock: Large numbers of age 1 and 2 fish were observed in early EIT surveys (p. 44), with an apparent reduction in these ages more recently (Figure 1.30) and relative scarcity in all but a few years (Figure 1.25). These ages of pollock are important prey for marine birds, mammals, and adult pollock. The authors should discuss if these observations are meaningful and whether the scarcity of these prey may lead to shifts in the trophic structure in the eastern Bering Sea.
- Diet data: The document addresses the diets of pollock and the importance of cannibalism. If zooplankton prey become scarce in the southeastern Bering Sea, adult pollock may become more cannibalistic. The authors should examine diet data from the past 30+ years to see if there has been a season-adjusted shift in pollock diets.
- Juvenile weight-at-age: Accurate data on weights of age-1 fish and condition indices of age-0 and age-1 fish in summer or fall would be useful as indicators of prey availability and robustness of individual fish. These data may give early warning of when foraging conditions in the eastern Bering Sea deteriorate sufficiently to have a negative impact on pollock condition. Currently, an

average value over years is used (Table 1.13 and Figure 1.13). The authors should determine what it would take to obtain reliable annual estimates of weight-at-age of age-0 and age-1 pollock.

- Bycatch categories: Table 1.26 indicates that there has been a change in the categories by which bycatch is tabulated. The authors should describe what categories would be most useful for timely retrieval of information on species of concern.
- Table 1.25 lists ecosystem considerations of BSAI pollock. Given the recent very low abundances of zooplankton, especially the copepod *Calanus marshallae*, on the middle shelf of the southeastern Bering Sea, it would seem that there should be either moderate or high concern about these low levels. Either here or in the Ecosystem SAFE, it should be discussed whether warming temperatures in the southern Bering Sea are adversely affecting the production of large species of zooplankton.
- Model evaluation: The SSC appreciates the discussion on model selection and agrees with the author's recommended approach to evaluate the performance of the current model(s) in the context of a management strategy evaluation (MSE). As the authors note, the approach that has been used in the past tried to balance concerns about biological realism, process errors, observation errors, and conservation. Many of the choices about model structure and the various assumptions made in developing the models are invariably subjective due to model complexity. There remains a great deal of (often unacknowledged) model uncertainty and decisions about appropriate harvest levels are made conditional on the final model choice, assuming that it is the "best" model for the job. The MSE approach uses many of the same assumptions that underlie the model to test the model's performance in a management context, but may not address the underlying assumptions themselves and uncertainty about model structure. Therefore, it remains important to continually examine important aspects of model structure such as the choices for the coefficient of variation for various data components, sample sizes for length and age composition data, the assumed error distributions (multinomial, log-normal, etc), the shape and flexibility of selectivity curves, and changes over time in selectivity. As the authors of this and other assessments continue to explore alternative models they should clearly lay out the rationale and criteria used for choosing the "best" model, in particular when subjective criteria are used to "overrule" objective criteria based on traditional significance tests or model selection criteria.
- Russian catches: The SSC appreciates the efforts to formally include Russian catches in the pollock model. If or when additional data become available (such as Russian CPUEs from pelagic surveys done by TINRO), we encourage the authors to evaluate the consequences of possibly missing a substantial portion of the pollock stock that may reside outside the historical assessment area. That this has been the case, at least in recent years, is clearly indicated in the 2004 EIT survey and in recent BASIS surveys, which suggest a continuous distribution of age-0 pollock throughout the Eastern Bering Sea as far north as St. Lawrence Island (Ecosystem chapter, p. 131). If current climate conditions in the eastern Bering Sea persist, we may expect an increasing portion of the stock to reside in Russian waters (at least during the summer).
- Temporal stratification for age-composition estimates: The current stratification scheme uses temporal strata for Jan-Jun and Jul-Dec, respectively, primarily to stratify with respect to the A and B seasons. The SSC notes that in recent years the B season has started in mid June. Therefore, the SSC recommends that the authors modify their stratification scheme to separate A-season from B-season samples.

### **Pacific Cod**

A combined GOA and BSAI cod presentation was made. For an extended SSC discussion of the Pacific cod models that were used in both the BSAI and GOA and for public comments, see the GOA Pacific cod section (D-1(b)).

Pacific cod qualify for management under Tier 3 because reliable estimates of B40%, F40%, and F35% exist. Using model 2, projected biomass for 2006 (279,000 t) is about 5% below B<sub>40%</sub>, therefore management under sub-tier 'b' is appropriate. **We concur with the Plan Team recommendation to set**

**ABC and OFL of Pacific cod in the BSAI at the maximum permissible values (under Tier 3b) of 194,000 t and 230,000 t, respectively. The recommended ABC and OFL for 2007 are 148,000 t and 176,000 t, respectively.** There are no separate allocations to the EBS and AI at present. Model projections indicate that this stock is neither overfished nor approaching an overfished condition.

SSC comments to assessment authors:

- See the GOA Pacific cod section of these minutes for SSC comments

### **Atka Mackerel**

This assessment is a simple update of the 2004 model that now incorporates the 2004 fishery and 2004 survey age composition data. SSC notes that the large increase in biomass presented in the 2004 assessment resulted from an estimated recruitment of an exceptionally strong 1999 year class. This is supported by recent age data from the 2003 and 2004 fisheries and the 2003 GOA survey that were primarily comprised of fish from the 1999 year class. **The SSC supports the Plan Team's and Authors recommended Tier 3a calculations for 2006 and 2007 ABCs of 110,000 t and 91,000, respectively, with corresponding OFLs of 130,000 t and 107,000. Also, the SSC agrees with Plan Team's and authors' recommended 2006 ABC apportionment for the eastern Bering Sea and Eastern Aleutians = 21,780 t (19.8%), Central Aleutians = 46,860 t (42.6%), and Western Aleutians = 41,360 t (37.6%). For 2007, these same ABC apportionments are 18,020 t, 38,760 t, and 34,220 t.**

SSC comments to assessment authors:

- The SSC would like to thank the authors for examining data and providing analyses to support model assumption of no differential growth between sexes. The SSC would also like to express appreciation for the authors' presentation of an exceptional analysis of Atka mackerel's predators and prey.
- The SSC continues to request a rationale for, and examination of, the assumed steepness parameter (0.8) for the Beverton-Holt stock recruitment relationship implied in the model (see the December 2004 SSC minutes).

### **Yellowfin Sole**

The new assessment is an update to the 2004 assessment that includes the following new data: 2004 fishery and survey age compositions and the fishery catch biomass, the 2005 EBS shelf trawl survey biomass estimate, and preliminary 2005 catch biomass. The EBS trawl survey estimate of biomass (2,768,000 t) continued an increasing trend observed since 1999 and was the highest observed since 1984. The assessment again included a temperature effect on survey catchability and the average estimated survey q was 1.27.

**This stock qualifies for management under Tier 3a and the SSC concurs with the authors' and Plan Team's recommended OFLs (based on F<sub>35%</sub>) and ABCs (based on F<sub>40%</sub>):**

	<u>2006</u>	<u>2007</u>
<b>OFL</b>	<b>144,000 t</b>	<b>137,000 t</b>
<b>ABC</b>	<b>121,000 t</b>	<b>116,000 t</b>

SSC comments to the assessment authors:

- The SSC looks forward to results of the management strategy evaluation exercise that is exploring the consequences of a non-stationary spawner-recruit relationship.
- The SSC 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 yellowfin sole. If there is sexual dimorphism in growth, then size-based fisheries selection will generate temporal variations in sex ratios consequential to the stock's productivity.

## Greenland Turbot

The new assessment updated the 2004 assessment to include the following new data: 2004 and 2005 catch biomass, 2004 fishery length compositions, the 2005 EBS shelf survey biomass and length composition estimates, revised 2004 EBS slope survey biomass and length composition estimates, and an updated longline survey data index for the EBS and AI regions. The EBS shelf survey estimate of biomass decreased 24% from 2004 to 16,000 t, 33% of the peak value estimated for 1994. Greenland turbot is the only known BSAI flatfish species that remains at low levels relative to the 1970s.

This stock qualifies for management under Tier 3b. Despite conservative management, recruitment remains at low levels and the stock continues to decline. The SSC agrees with the assessment authors and Plan Team that the ABC should be set at a value lower than the maximum permissible. **The SSC concurs with the Plan Team's recommended OFLs and ABCs. The ABC is computed using a  $F_{ABC}$  5-year average. This value is expected to halt the decline in biomass over the short term while still providing sufficient bycatch for other fisheries.**

	<u>2006</u>	<u>2007</u>
OFL	14,200 t	13,400 t
ABC	2,740 t	2,630 t

The SSC also agrees with the Plan Team's recommendations for regional ABC apportionments:

<u>Year</u>	<u>EBS</u>	<u>AI</u>
2006	1,890 t	850 t
2007	1,815 t	815 t

SSC comments to the assessment authors:

- Many of the length frequency plots show very large proportions of fish in the largest length class. The SSC requests that the authors consider extending the range of length bins to better mimic the dynamics of the larger fish.

## Arrowtooth Flounder

The new assessment updated the 2004 assessment to include the 2005 EBS shelf trawl survey estimates of biomass and length composition, revised 2004 catch biomass, and preliminary 2005 catch data. The EBS shelf survey estimate of biomass increased 38% from 2004 to 758,000 t, the highest value in the series. The assessment included a temperature effect on shelf survey catchability. The model assumes a higher natural mortality for males (0.33/yr) compared to females (0.2/yr) to account for the preponderance of females in the surveys and fishery.

**This stock qualifies for management under Tier 3a and the SSC concurs with the authors' and Plan Team's recommended OFLs (based on  $F_{35\%}$ ) and ABCs (based on  $F_{40\%}$ ):**

	<u>2006</u>	<u>2007</u>
OFL	166,000 t	174,000 t
ABC	136,000 t	142,000 t

SSC comments to the assessment authors:

- Given the large and growing importance of arrowtooth flounder and likely impacts of this stock on other Council-managed species and the ecosystem in general, an expanded ecosystem section is warranted in future assessments.

## Northern Rock Sole

The new assessment updated the 2004 assessment to include the following new data: 2004 age composition from the fishery and the EBS shelf survey, the 2005 biomass estimate from the EBS shelf

survey, revised 2004 catch biomass, and preliminary 2005 catch biomass. The EBS shelf survey estimate of biomass decreased slightly from 2004 to 2,119,000 t, 73% of the peak value estimated for 1994. The assessment explored the possible effect of bottom temperatures on survey catchability and concluded that there was little effect. Survey catchability (q) was estimated in the model but constrained to be close to the value of q derived from experiments with the standard EBS survey trawl. The natural mortality coefficient was freely estimated in this assessment. The final estimated values were  $q = 1.52$  and  $M = 0.16/\text{yr}$ .

**This stock qualifies for management under Tier 3a and the SSC concurs with the authors' and Plan Team's recommended OFLs (based on  $F_{35\%}$ ) and ABCs (based on  $F_{40\%}$ ):**

	<u>2006</u>	<u>2007</u>
OFL	<b>150,000 t</b>	<b>145,000 t</b>
ABC	<b>126,000 t</b>	<b>122,000 t</b>

SSC comments to the assessment authors:

- The SSC looks forward to seeing the results of the management strategy evaluation to explore the consequences of a non-stationary spawner-recruit relationship.
- The age-structured assessment model uses combined sex data but the size composition data shown in the figures suggests sexual dimorphism in growth and sex ratios that differ from 50:50. 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. The SSC requests that the authors evaluate whether sex ratios differ from 50:50 and if there have been trends in sex ratio.

### Flathead Sole

The new assessment updated the 2004 assessment to include the 2005 biomass estimate from the EBS shelf trawl survey and 2004 data on catch, fishery length compositions, the AI trawl survey biomass, and the EBS trawl survey age compositions. The EBS shelf survey estimated biomass decreased 2% from 2004 to 620,000 t, 76% of the peak value estimated for 1997. The assessment again included a temperature effect on survey catchability with the mean survey selectivity fixed at 1.0, consistent with the previous assessment.

The flathead sole assessment combines data for two *Hippoglossoides* species, flathead sole and Bering flounder. The SSC notes that while the trawl survey estimates of biomass for *Hippoglossoides*, which are dominated by flathead sole (*H. elassodon*), are currently at reasonably high levels, the estimates of biomass for Bering flounder in recent years are substantially lower than the levels that were observed in the 1980s and 1990s. **Continued declines in the survey biomass of Bering flounder could be cause for concern.**

**This stock qualifies for management under Tier 3a and the SSC concurs with the authors' and Plan Team's recommended OFLs (based on  $F_{35\%}$ ) and ABCs (based on  $F_{40\%}$ ):**

	<u>2006</u>	<u>2007</u>
OFL	<b>71,800 t</b>	<b>67,900 t</b>
ABC	<b>59,800 t</b>	<b>56,600 t</b>

SSC comments to the assessment authors:

- The mixed stock fishery for *Hippoglossoides* is a good candidate for a management strategy evaluation to determine whether the current management approach, which focuses on the dynamics of the much larger stock of flathead sole, provides adequate protection of Bering flounder. The SSC requests that the assessment authors attempt to evaluate the relative productivity of the two species in the next assessment.

- The SSC requests that the assessment authors explore the survey data on spatial distributions of the flathead sole versus Bering flounder to evaluate whether the fishery is likely to have differential impacts on the two species.

### Alaska Plaice

The new assessment updated the 2004 assessment to include the 2005 biomass estimate and length composition data from the EBS trawl survey and the 2004 catch data. The EBS survey estimated biomass increased 3% from 2004 to 504,000 t, 64% of the peak value estimated for 1984. The assessment explored the possible effects of bottom temperatures on survey catchability by comparing a smoothed, detrended estimate of survey biomass with bottom temperature anomalies but found no evidence for a relationship.

**This stock qualifies for management under Tier 3a and the SSC concurs with the authors' and Plan Team's recommended OFLs (based on  $F_{35\%}$ ) and ABCs (based on  $F_{40\%}$ ):**

	<u>2006</u>	<u>2007</u>
OFL	237,000 t	231,000 t
ABC	188,000 t	183,000 t

SSC comments to the assessment authors:

- The SSC 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 Alaska plaice. If there is sexual dimorphism in growth, then size-based selection in the fisheries will generate time-variations in sex ratios consequential to the stock's productivity.
- Many of the length frequency plots show very large proportions of fish in the largest length class. The SSC requests that the authors consider extending the range of length bins to better mimic the dynamics of the larger fish.

### Other Flatfish

Survey biomass estimates are the principal data sources for assessing this complex, which consists of 15 species, including 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 88% of the preliminary 2005 catch. The new assessment included updated 2004 catch data, the 2005 EBS trawl survey biomass estimate, and a derived estimate for 2005 for the AI trawl survey. The estimated 2005 biomass for the EBS and AI trawl surveys combined was 120,900, down 15% from 2004.

This stock qualifies for management under Tier 5. The assumed rate of natural mortality for the complex is 0.20 per year. **The SSC concurs with the authors' and Plan Team's recommended OFLs (based on  $F = M$ ) and ABCs (based on  $F = 0.75 M$ ):**

	<u>2006</u>	<u>2007</u>
OFL	24,200 t	24,200 t
ABC	18,100 t	18,100 t

SSC comments to the assessment authors:

- The SSC requests an evaluation of species-specific natural mortality rates for the species in this complex.
- The SSC appreciates the exploration of bottom water temperature effects on Sakhalin sole biomass estimates and encourage similar explorations of other species in the other flatfish

complex. It would be useful to be able to identify indicator species that are particularly sensitive to changes in environmental conditions.

- The SSC notes that the exploitation rate on butter sole, implied by fishery catches relative to survey biomass, is very high and the cause of this warrants further investigation.

### **Pacific Ocean Perch (POP)**

The 2005 assessment is a simple update of last year's model with the addition of recent catches. **The SSC agrees with the Plan Team and the SAFE authors that the data warrant a tier 3b calculation resulting in the OFL = 17,600 t and ABC = 14,800 t for 2006 and 2007. The SSC agrees with the ABC area apportionment recommended by the Plan Team and SAFE authors of: 2,960 t to the eastern Bering Sea, 3,260 t to the eastern Aleutian Islands, 3,210 t to the central Aleutian Islands, and 5,370 t to the western Aleutian Islands.**

The SSC appreciates the efforts of the SAFE authors in providing an appendix report with an analysis of the effects of disproportionate contribution to productivity by old females.

SSC comments to the assessment authors:

- Year classes (>34 years old) used as the standard for old-aged fish in the analysis were intensely fished during the 1960s and comparison of age compositions from this period would likely underestimate relative changes when compared to age classes from current fisheries. The SSC requests further comparison of alternate year classes that were not as heavily exploited.
- The SSC notes that the analyses assumes that larval viability is similar to black rockfish and fecundity is assumed to be the same as splitnose rockfish; and that studies are in progress to evaluate both of these assumptions. The SSC looks forward to results.
- The SSC notes that one of the model results presented in the appendix report was an apparent counterbalancing of reduced larval production by an increased resiliency in the spawner-recruit relationship. As this may be counterintuitive, and possibly based on the assumption of fixed recruitment schedules, the SSC asks that the authors evaluate the realism of the fixed recruitment assumption and provide additional discussion of this issue.
- The SSC recommends that the authors explore alternate models that consider changes in selectivity over time.
- The SSC requests that the authors continue towards completing a management strategy evaluation.
- The SSC suggests that future genetic studies consider the possibility for genetic selection resulting from selective harvest of larger/older fish. The genetics of old versus young fish could be compared for levels of genetic variability.

### **Northern Rockfish**

This assessment is a simple update of the assessment presented in 2004, with minor changes due to the addition of new catch data. **The SSC agrees with Plan Team and authors that the data warrant tier 3a calculations for combined BSAI ABC and OFL. The 2006 BSAI ABC = 8,500 t and OFL = 10,100 t and the 2007 BSAI ABC = 8,300 and OFL = 9,900.** The SSC notes that genetic sampling for northern rockfish began in September 2005. The SSC expresses our appreciation for conducting this analysis in a timely manner.

### **Shortraker and Roughey Rockfish**

The 2005 assessment is an update of the assessment presented in 2004. **The SSC concurs with the Plan Team recommendation to retain BSAI-wide tier 5 calculations of ABC and OFL for the two species of rockfishes. The ABC = 580 t and OFL = 770 t for shortraker for both 2006 and 2007. The roughey ABC= 220 t and OFL=300 t for both 2006 and 2007.**

Per SSC request, the authors summarized existing genetic analyses for both shortraker and rougheye. The SSC concluded that sampling was insufficient for comparison of presumptive shortraker stocks in BSAI, owing to a lack of samples from the Bering Sea. Samples are needed from the Bering Sea to evaluate whether differences exist between these two regions. Information presented from a recent microsatellite study on rougheye rockfish (Gharrett et al.) concluded that there are two distinct forms (Type 1 and Type 2), but Type 1 is the largely dominant form found in both the AI and BS. Microsatellite information may suggest that BS and AI are separate stocks, but mtDNA analysis was inconclusive. The SSC received testimony by Andy Smoker (NMFS-AK Region) suggesting that current regulations would likely prevent the fishery from exceeding separate BSAI ABC levels. The SSC concurs with Plan Team's request that authors provide additional information on the distribution of fishery catches during the next stock assessment cycle in 2006.

### **Other Rockfish**

The SSC concurs with the Plan team to apply tier 5 calculations for this species group and, because there are no new survey data for 2005, the ABCs and OFLs for this year's assessment remain unchanged from last year. **The OFL values for both 2006 and 2007 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.**

### **BSAI Squid and Other Species**

Public comment was provided by Gerry Merrigan (Prowler Fisheries). Comments included observations that sleeper sharks are encountered in the eastern Bering Sea, but not so many salmon sharks and dogfish. Concern was expressed about the need to move these other species from tier 6 to tier 5, and support was expressed for the generation of M estimates necessary to do so. Additionally, concern was expressed that future split of other species and continued application of tier 6 would be problematic, especially if abundance of these species increases.

The SSC greatly appreciates the SAFE authors' efforts to develop stand-alone subsections using the SAFE format for squid, skates, sculpins, octopuses and sharks. This is not only helpful in assessing the tier status and evaluating the appropriate approach to specifying allowable biological catch levels, but will also be helpful in the event that an amendment is approved allowing for group-specific ABCs.

***Squid.* The SSC agrees with the authors' and team's recommendations for management to continue under Tier 6, acknowledging that reliable biomass estimates do not exist, but that catch data are reliable. The SSC supports OFL set equal to average catch over the period 1978-1995, and ABC set equal to 75% of this value. The SSC supports the recommended ABC = 1,970 mt and OFL = 2,620 mt for both 2006 and 2007.**

***Other species.* Sculpins, skates, sharks, and octopuses comprise the "other species" group. As last year, the SSC supports the Plan team and SAFE authors' recommendation for group level specifications; however, as before, group level specifications would not be compliant with the current FMP. Recognizing this, and in concurrence with the Plan Team, the SSC recommends one set of ABCs and OFLs for the other species complex.**

**The SSC agrees with the Plan Team and assessment authors that reliable biomass estimates exist for skates and sculpins, and accepts the OFL determinations by the Plan Team of 49,200 and 39,300 mt for skates and sculpins, respectively, for both 2006 and 2007. The corresponding ABC levels for both years are 36,900 and 29,500 mt.**



**The SSC does not agree with the Plan Team and assessment authors that reliable biomass estimates exist for sharks and octopuses.** The Plan Team’s rationale in this regard is that the biomass estimates are sufficient to set precautionary ABC levels; however, the SSC does not find any new information suggesting that biomass estimates are more reliable than they were last year for sharks and octopuses in the BSAI. **For this reason, we recommend using the same 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 octopuses.**

For sharks, the SAFE authors recommended a base period of 1997 to 2005 for incidental catches. The SSC accepts this as the scientifically best alternative to the 1978 to 1995 period typically specified for Tier 6 determinations; **however, the SSC cautions the authors and Plan Team that the final year should be fixed, in this case at 2005, so that we do not entrain a continuously shifting baseline. For sharks, the average incidental catch is 552 mt for this period, as given in Table 3 of the Shark section (page 905); hence the OFL is 552 mt and the ABC is  $0.75 \times 552 = 414$  mt.**

For octopuses, the author’s recommended base period for incidental catch records is 1992 to 2005, and the SSC accepts this as the scientifically best alternative to the 1978 to 1995 period, provided that the final year is fixed for subsequent analyses, as recommended for the shark time series. **The average incidental catch in this period is 352 mt (data in Table 16.5.2, page 943), such that the OFL is 352 mt and the ABC is  $0.75 \times 352 = 264$  mt.**

The table below summarizes the ABC and OFL determinations for other species.

<u>Species</u>	<u>Biomass</u>	<u>M</u>	<b>2006 &amp; 2007</b>		<u>Recommended</u>	<u>Recommended</u>
			<u>OFL</u>	<u>Max ABC</u>	<u>2006 ABC</u>	<u>2007 ABC</u>
Sculpins	207,000	0.19	39,300	29,500		
Skates	492,000	0.10	49,200	36,900		
Sharks			552	414		
<u>Octopuses</u>			<u>352</u>	<u>264</u>		
Total			89,404	67,078	<b>58,882</b>	<b>62,950</b>

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 8<sup>th</sup> year of this stair-step process, and 2007 will be the 9<sup>th</sup> year.

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 (67,078) and then adds that amount to the 1997 ABC. **Thus, the SSC recommends setting the other species 2006 ABC as 58,882 t ( $25,800 + (8/10) \times (67,078 - 25,800)$ ).** The SSC recommends the 2006 OFL to be the sum of the Tier 5 and 6 estimated OFL values or 89,404 t. The corresponding ABC

**value (using the 9/10 stair-step) for 2007 is 62,950 t. The OFL for 2007 remains the same as in 2006.**

### **GOA/BSAI Ecosystem SAFE**

The SSC received a brief summary of the ecosystem considerations chapter from Jim Ianelli (AFSC). New developments include an executive summary of recent trends for the ecosystem considerations chapter, a new trial website that will have status and trend information with links to data, updates to existing indices, and several new sources of information and indices such as distributional maps of juvenile sockeye and age-0 pollock during BASIS surveys and a new community-level index derived from small-mesh trawl surveys in the GOA. In addition, this year the GOA Plan Team summarized the main findings relevant to stocks in the GOA. Notable trends include recent warm conditions in the eastern Bering Sea and a long-term warming trend in shallow waters of the Gulf of Alaska.

The SSC appreciates continuing updates to the Ecosystem Considerations chapter and supports efforts by the Plan Teams and by individual assessment authors to incorporate relevant ecosystem information into individual assessment chapters in a unified format. The information serves both as useful background information for putting into context the status and trends of individual groundfish stocks and as an “early warning system” for potentially important changes that may affect these stocks.

**This year, there were two apparent “red flags” in the eastern Bering Sea. First, there was a persistent decline of summer net zooplankton (e.g., large copepods such as *Calanus marshallae*), which are important prey for fish, including pollock, seabirds, and baleen whales.** If the low abundances of these prey items continue, there may be declines in consumer populations or range shifts northward to areas where these copepods might be expected to remain abundant. **The second flag was less certain. Declines in annual surplus production in the eastern Bering Sea were observed, in spite of relatively stable abundances and exploitation levels.** These declines may be a reflection of changes in either annual primary production, or changes in food web structure. If these declines in annual surplus production are the result of climate change and if the current climate conditions persist, future fish production in the eastern Bering Sea is expected to be lower than in previous decades. However, if the declines in surplus production are a function of density dependent factors resulting from moderate to high biomass levels, then the declines are not a “red flag” but a natural response to changes in stock size.

SSC comments to Ecosystem Chapter authors:

The SSC suggested that, if in the future the principal discussion of the Ecosystem Considerations chapter was to be conducted during the October SSC meeting, that there should be a brief review of the most salient points in December, with an emphasis on those findings that could impact decisions about the setting of ABCs.

### **GOA/BSAI SAFE Appendix D: Economic Status of the Groundfish Fisheries in 2004**

The SSC did not receive a staff presentation on the Appendix D: Economic Status of the Groundfish Fisheries off Alaska, 2004. The SSC notes that this document provides a useful summary of the limited economic data collected regarding Alaska Region fisheries. The SSC also notes that, in addition to the information tables, the document includes a brief summary of recent and ongoing research conducted by AFSC social scientists. Inclusion of this information is responsive to a request included in the SSC minutes for December 2004. The SSC approves of the addition of this information and encourages the preparers to continue to expand Appendix D to more fully represent the assumptions and statistical properties of models used to generate estimates of social and economic impacts reported in the EA and prepared as background or a basis for estimates of social and economic impacts reported in analyses prepared in support of Council decision-making. The December 2003 SSC minutes note that:

... There is a striking contrast between the level of investment in data collection and analysis relative to the assessment of stocks and modeling of population dynamics and the level of investment in data collection and analysis relative to the social and economic condition of the fishery. Absent the information derived from fishery surveys, observer reports, landings reports, and processor reports, it would not have been possible for the stock assessments and population models to have evolved to the level of sophistication that they presently exhibit. Absent a requirement that mandates a regular reporting of the level and cost of labor and other variable inputs, the locus of expenditures, disposal of products, etc, it is not and will not be possible to address regulatory requirements that stipulate an assessment of the net benefits and regional impacts of contemplated management actions. Without such analyses, EA/RIR/IRFA documents prepared in support of Council decision-making are deficient and open the door for legal challenge based on procedural inadequacies.

There are a number of studies that could be conducted using the available data. While information limitations may force the adoption of naïve structures and assumption in the initial models, starting with simple models and building towards more sophisticated models as additional information becomes available would mimic the maturation trajectory of the stock and ecosystem assessments. Towards this end, the SSC believes that it would be useful to perform a price analysis of each major species to identify the major market factors that affect the wholesale and exvessel prices as well as estimates of elasticities (or flexibilities) of demand, cross-price elasticities, income elasticities and total revenue curves. If information is particularly limited, simple reduced-form exvessel inverse demand equations could be estimated in lieu of more complex equation systems. Basic questions such as whether a species price is determined on the world market, largely invariant to Alaska landings, or whether prices are sensitive to Alaska landings would be a useful gauge of the potential sensitivity of total revenues and the distribution of total revenues to alternative management policies. At a minimum, in lieu of formal modeling, the qualitative structure of markets for important fish species should be described. Basic information as to what forms the products take (by major species), where the major markets are, and what the competing products are in the market place is needed.

The SSC commends the authors of Appendix D for progress that has begun to be made to address these recommendations and encourages the authors to continue to strive to increase the rigor and scope of Appendix D.

The SSC notes that cold-storage holdings data that were previously reported in Tables 48 and 49 of Appendix D have been omitted this year because NMFS-DC ceased to collect and report cold-storage holdings data after 2002. In October 2004, the SSC minutes commented on the devastating consequences of the discontinuance of the cold-storage holdings data to the ability of economic modelers to perform required economic analyses. Our comments and concerns were echoed in a letter from the Council to Bill Hogarth (Director of NMFS-DC). Similar concerns have been voiced by economics researchers in other Council regions, all to no avail. **Because it seems unlikely that NMFS-DC will reverse its decision to discontinue collecting and reporting nation-wide data on cold-storage holdings, the SSC strongly suggests that the Council encourage the AFSC or NMFS-AKR to implement an ongoing data collection program that would compile data on ex-vessel prices, first wholesale prices, cold-storage holdings, and disposition of landings for all FMP species harvested off Alaska.** These data are essential to the development of models of price formation that can provide critical information about market structure, market power, gross revenues, and consumer surplus, information that is needed to determine the net benefits to the nation of alternative actions considered by the Council. Absent credible information regarding these values, it is not and will not be possible to address regulatory requirements that stipulate an assessment of the net benefits and regional impacts of contemplated management actions. Without such analyses, EA/RIR/IRFA documents prepared in support of Council decision-making are deficient and open the door for legal challenge based on procedural inadequacies.

The SSC would welcome an opportunity to receive staff presentations on recent and ongoing research related to Appendix D, perhaps in conjunction with the scheduled February 2006 meeting in Seattle.

#### **D-1(d) Review Discussion Paper on BSAI Pollock A-Season Start Date**

Bill Wilson (Council Staff) provided a discussion paper on issues associated with changing the Eastern Bering Sea Pollock fishery “A” season. Public testimony was provided by Paul McGregor (At-Sea Processors Association) and Brett Payne (United Catcher Boats).

The SSC heard a presentation on moving the start of the EBS pollock fishery to three to seven days prior to the current January 20<sup>th</sup> start date to enable the EBS pollock fleet to harvest higher-quality roe. While this proposal was initiated at industry request, and was represented as an important issue for maintaining industry profitability, public testimony indicated that the proposal would be withdrawn because NMFS indicated that the proposal would likely trigger a formal Section 7 consultation under the ESA. Nevertheless, the SSC decided to comment on the proposal, suggesting areas that could be improved or expanded upon if further Council analysis were undertaken.

Stellar sea lion conservation has been raised as an issue with the proposal for an earlier opening of the eastern Bering Sea pollock A season. The concern is that an earlier opening would be detrimental to sea lions. Based on knowledge of the timing of weaning and the reproductive energetics of adult females, the SSC feels that this is likely not a concern. Weaning normally occurs during late winter and spring. The energetic demands of adult females progressively increases throughout winter and spring as dependent offspring require increasing amounts of energy in the form of milk. Pregnant females require increasing amounts of energy (prey) with increasing fetus size throughout gestation. **While a 5-day advance in the start of the A season is likely to be relatively insignificant to SSLs, the effect if any would likely be positive.**

The SSC believes that the discussion of the original impetus for the January 20<sup>th</sup> start date (changed from January 1) needs to be expanded to further clarify that one of the reasons for the later start-date was to address a feature of the then open-access fishery where the race-for-fish was leading industry to catch pollock before the roe was fully ripe. **With implementation of the AFA and the end of the race-for-fish, there is no longer a need for the pollock industry to have a late starting date to protect themselves from harvesting the roe too early.**

**Variation in the timing of peak roe condition, industry interest in additional flexibility for adjusting the timing of the pollock A-season, and the possibility that small changes in the A-season start date could trigger potentially extensive section 7 consultations highlight the need for care in the motivation and structuring of RPAs and other regulations.** The GOA and BSAI are dynamic ecosystems that have undergone substantial regime shifts historically, with the current period being characterized by warmer surface and bottom temperatures. In addition to changes in the timing of reproduction, changes in the environment can be expected to lead to changes in the abundance, rate of increase, and geographic distribution of stocks. Because environmental variability can be expected to result in changes in the preferred timing of roe fisheries, it would be desirable to include alternatives that allow some ability to respond to such environmental changes.

**The discussion of roe values and markets could be expanded into a more detailed economic analysis of the earlier season given various assumptions about improved roe quality.** At the very least, a definitive statement can be made that, to the pollock fishing industry, there are great benefits associated with harvesting higher quality roe. With minimal changes in fishing costs, the ability to harvest higher quality roe has the possibility of bringing the pollock industry significant benefits. Indeed, examining pollock roe alone, the inability to harvest roe at its highest quality is a waste of the resource. **Of course, the economic gain to the commercial pollock fishery is only one aspect of a full benefit/cost analysis; a comprehensive analysis of benefits and costs would also need to consider potential spillover effects on other fisheries and the costs and feasibility of changes in monitoring and enforcement.**

#### **D-1(e) BS Habitat/EFH**

The SSC received a report from Cathy Coon (Council staff) and Craig Rose (AFSC) on Bering Sea habitat conservation. The item covered two issues. First, the SSC reviewed recent research on gear modifications in the Bering Sea to mitigate effects of bottom trawl fisheries. **This report provided**

**preliminary results that the placement of rollers on the sweeps may actually have increased catches of some target species.** Video observations of the operation of the rollers suggested that bottom contact was reduced, but there were no data on whether there was a change in bycatch of invertebrates or in damage to living habitat.

The second item was a review of the proposed problem statement and some preliminary alternatives for Bering Sea habitat conservation. Public comments were provided by John Gauvin (on behalf of Head & Gut fleet). The Head & Gut fleet prefers new and innovative approaches to gear modification for mitigating habitat impacts.

**The SSC has no comment on the problem statement but discussed preliminary alternatives for analysis. There was concern that the former Alternative 5 with rotation between adjacent zones may not accomplish the intended results, as was also suggested by previous analyses of this alternative in the EFH EIS.** Unintended consequences could include: (1) insufficient time between openings for recovery to occur; (2) areas not previously of interest to the fishery become fished because of a required rotation, thereby affecting previously unaffected areas; and (3) displacing the fishery to areas with a lower CPUE, thus requiring more bottom contact for the same number of fish to be caught. If rotational area closures are to be implemented, it is essential to determine the length of time of closure to provide sufficient time for “complete” recovery before reintroduction of fishing. Alternatively, areas “upstream” of the net flow over the shelf might be set aside as areas from which “seed” could disperse to aid in recover of fished areas down stream. Studies of the currents on the shelf are available, as are models to aid with selection of appropriate locations. Data are needed on dispersal mechanisms.

**The SSC saw considerable merit in focusing effort on gear modification as an important approach to protecting EFH.** Modifications of the sort presented by Craig Rose, though preliminary, may provide a reasonable a gear alternative. However, time lines for regulatory action would need to reflect time lines for gear development and testing. Reconvening of the EFH Committee could be worthwhile to examine new available information and the efficacy of potential gear modifications, as well as habitat closures of various sorts.

#### **D-1 (f) BSAI Salmon Bycatch**

The SSC received a progress report on salmon excluder research and an overview of salmon bycatch alternatives for the Bering Sea. No public testimony was received on either item.

Progress Report on Salmon Excluder EFP Research. John Gauvin (Groundfish Forum), John Gruver (United Catcher Boats), and Craig Rose (AFSC) reported results to date from this research. Results are promising, but effectiveness appears to be sensitive to vessel effects. One problem has been the difficulty of getting true paired tows for statistical comparison of the effectiveness of the gear design. Presenters sought advice from the SSC on statistical analysis of existing data and future experimental designs. **The SSC encourages a power analysis to determine the number of paired tows necessary to detect an effect of a certain magnitude. The SSC also recommends using a simple one-way t-test of the null hypothesis that salmon bycatch taken in the modified net is greater than or equal to that in the unmodified net.** This is a stronger test than the two-tailed test that was applied. **The SSC encourages preparation of a written report on the results for a more thorough review.**

Review of BSAI salmon bycatch alternatives/options for closure areas The SSC received a report from Diana Stram (NPFMC staff). SSC input was sought on two issues stemming from previous (June 2005) comments: (1) analysis of a bycatch cap and data requirements for setting the cap and (2) analyses to evaluate the effectiveness of the voluntary rolling hot spot (VRHS) closure system versus the current or alternative approaches.

**Regarding the cap, merits of alternative methods could be examined during the proposed salmon workshop in April 2006.** Perhaps BASIS survey results could be examined for density of stocks of different origins and the utility of preseason run forecasts developed by ADF&G could be considered. Some possibility might exist of generating salmon biomass estimates for the Bering Sea. Appropriate agency staff should be invited to the workshop to report on the utility of these (and other) approaches.

Evaluation of the effectiveness of the VRHS program would be difficult unless some vessels would be allowed into the closed area on an experimental basis. Right now all sectors will be participating in the program so that will not be a possibility. **Some measure of effectiveness could be developed by examining bycatch rates in the closure area just before closure and outside the closure area just after closure. Also, annual maps of pollock catch and salmon bycatch could reveal patterns.** Other suggestions were provided in the SSC's June 2005 minutes.

### **Review of Scallop Assessment Methodology**

Ken Goldman (ADF&G Research Biologist Central Region), Rich Gustafson, Charlie Trowbridge provided a presentation on the survey techniques utilized by ADF&G to assess weathervane scallops in Kamishak Bay and Kayak Island. Gregg Rosenkranz (ADF&G) gave a presentation on the video-based stock assessment along with a description of the present survey methodology. He also presented a description of the fishery and observer and trawl survey data. No public testimony was received.

Only a few scallop vessels are participating in this fishery. Dredge tracks may vary from about 2-15 cm in depth. NMFS survey data shows that scallops occur throughout many parts of the shelf and to the shelf edge from Cape Fairweather in the GOA and up through the Bering Sea. Seasonal differences in catch estimates appear to occur along with high variability in catch by date in same area. No direct estimates of dredge efficiency exist.

ADF&G has been conducting dredge surveys off Kayak Island and in Kamishak Bay. For instance, dredge surveys were conducted in Kayak Island in 1998, 2000, 2002, 2004. The SSC continues to be concerned that, when conducting dredge surveys, ADF&G differentiates between total scallop abundance and scallop abundance on beds that will be commercially harvested. Though understandable from a management perspective, this approach makes it difficult or even impossible to assess trends in scallop abundance.

**The SSC encourages the development of an adaptive, systematic design for dredge surveys.** The SSC commented that there is a growing body of literature on this type of design. The SSC cautions the authors to consider the technique for selecting thresholds for adding stations very carefully. If the threshold is set too high the agency may not budget enough time to fully sample the region, and if the threshold is set too low the agency may not adequately sample the beds. The SSC encourages the investigators to examine a variety of techniques for setting thresholds to ensure that they select a method that is best suited for the situations that may be encountered on a variety of different beds. **Also, the SSC encourages the continued development of an age structured model for this species.**

**More recently, ADF&G has been development video scallop survey methods, which the SSC encourages.** A simple random sampling scheme is used as the design of video surveys. Video stock assessment seems to be a non-intrusive, cost-effective method, at least for relatively small areas. The video survey techniques show promise, as reported in Rosenkranz and Byersdorfer (2004). However, expansion of video surveys to assess abundance over larger areas may be cost prohibitive owing to the time required the process videos. In this regard, development of automated methods for video processing would be a big breakthrough. A new system will improve the shell height estimates taken by video due to higher pixel resolution.

A key issue in using the video survey technique is that some method is needed to collect age samples unless only size-based assessment models are developed. In the case of dredge surveys, ADF&G compared the age structure of the fished populations with surveyed populations and found the results were similar. This suggests that age composition information could potentially be obtained from fishery samples. However, selectivity is likely much different between dredges and videos. Another caution is that, if fishers know the spatial distribution of age across the beds, they may not randomly sample the age distribution of the population on the beds.

ADF&G conducted paired studies using video and dredge surveys to evaluate the abundance estimates between the two surveys. The surveys showed similar abundance levels. Comparison of dredge surveys on the east and west beds in Kamishak Bay show some indication of differences in age composition. Comparison of dredge surveys in Kayak Island do not show differences in age composition on the east and west beds.

In addition to the paired survey techniques, ADF&G conducted video surveys after dredge tows to assess catchability. The SSC notes that some movement of scallops is possible. Thus, some of the counts could be attributed to immigration into the path after the dredge passes by. The SSC also notes that it may be difficult to re-trace the trawl path of the dredge path.

The SSC very much appreciates the presentations given and encourages further development of these methods. **The SSC also noted the importance of coordination among staff developing the two types of surveys and reporting of those results in the Scallop SAFE document.**