DRAFT
MINUTES
SCIENTIFIC STATISTICAL COMMITTEE
DECEMBER 8-10, 2003

The Science Statistical committee met December 8-10, 2003 at the Hilton Hotel in Anchorage, AK. Members present:

Rich Marasco, Chair,	Pat Livingston	Keith Criddle
Mark Herrmann	Doug Woodby	Ken Pitcher
George Hunt	Sue Hills	Terry Quinn
Gordon Kruse	Farron Wallace	

Review Data Quality Act

The consequences of OMB's proposed bulletin on peer review and information quality will depend on how provisions of the Act are construed. If the bulletin is interpreted as a reinforcement of existing review mechanisms, the structure and operation of current Council review processes could be construed as more than fully compliant. If the bulletin is interpreted as taking precedence over current review structures, current Council review processes could be construed as completely inadequate with respect to compliance. Compliance would become an onerous burden that would reduce the role of science in Council decision-making. It is incumbent on the Council to consult with OIRA regarding the relationship of the proposed bulletin with the requirements of the MSFCMA and with the Council's existing review processes.

From the perspective of the SSC, a body of nationally and internationally prominent research scientists, the existing processes for the review of information and analyses prepared in support of Council decision-making constitute a rigorous peer review with excellent opportunity for public review and comment. Indeed, the *raison d'être* for the SSC and Plan Teams is to provide independent peer review of information and analyses prepared in support of Council decision-making. If the review of information and analyses provided by the SSC and Plan Teams is judged to be non-compliant with guidelines in the proposed OMB bulletin, there may be little benefit in continuing the existence of the SSC or Plan Teams. In defense of the continuation of the SSC and Plan Teams, we note that: 1) SSC and Plan Team members are selected through an annual nomination process; 2) members are selected for their expertise; 3) members are active in the research community and often serve as peer reviewers for scientific journals and as reviewers of fishery programs elsewhere in the US and internationally; 4) the review process is public; 5) during the review process, the SSC and Plan Teams regularly solicit participation of interested public and other researchers; and 6) that the input of these participants is often reflected in the recommendations that emerge from the SSC and Plan Team meetings.

If current Council review processes are deemed non-compliant, there may be need for costly modifications of the structure and timing of Council decision-making. We note that a strict reading of OMB's proposed bulletin suggests a review process that would likely involve a substantial increase in direct costs to the Council and NMFS to solicit peer reviews and to convene meetings to support the peer reviews. There would likely be substantial increases in cost to the public associated with delayed decision-making occasioned by the need to accommodate a review process that is unlikely to be as closely attuned to the decision-cycle as are the current review processes. There would also likely be substantial costs to individual researchers asked to serve as peer reviewers. There is a limited pool of individuals with appropriate expertise and the disposition to participate in public service activities such as the review of information and analyses that support government decision-making. It is unlikely that an exhaustive peer review process could be conducted without reliance on consulting firms and payment for review services.

The SSC is concerned that a strict reading of the guidelines in the proposed bulletin may have the unintended effect of discouraging agencies from basing decisions on scientific information or analyses.

D-1 Groundfish specifications

Groundfish SAFE Reports

The SSC recommends the Council release the SAFE to the public.

Spawner-recruit relationships

The SSC is encouraged that several assessment authors are investigating spawner-recruit relationships in their assessments (e.g., Pacific cod, several BSAI flatfish). This raises the possibility that some assessments can move up to Tier 1 from Tier 3 and thus more fully consider stock productivity. The SSC encourages investigations of this type while recognizing some difficulties. In particular, there may be some confounding of environmental effects with density dependence in the time series. For example, many flatfish stocks had low biomass during the 1970s and early 1980s and then increased dramatically. The resultant spawner-recruit curves consist of data points on the left side of the graph from the early period and on the right side of the graph from the most recent period. Nevertheless, authors could explore alternative spawner-recruit analyses based on subsets of the data and contrast those with an analysis using all of the data.

Species at the Periphery of its Range

Variation in distribution or productivity of a species at the periphery of its range has different management implications than variation of a similar magnitude at the center of the range. At the periphery of a species range, small variations in the natural environment may exceed the tolerance of the species and cause large rapid changes in local population size and distribution. In contrast, changes of similar magnitude in the center of the species range may be within the limits of tolerance of the species and therefore may result in little or no change in productivity. Recognizing the above relationships, the SSC recommends that, where possible, the assessment teams differentiate stocks or portions of stocks at the periphery of their ranges.

D-1(a) Final GOA Groundfish Specifications for 2004

POLLOCK

This assessment updates the age-structured model with recent survey, fishery and biological information. In addition, a sensitivity analysis is conducted in which each of the various data sources is excluded from the analysis to see if it has a major effect on estimates of population parameters.

In 2003, NMFS bottom trawl survey biomass increased 86% over a comparable area in 2001 and the ADF&G nearshore trawl survey declined 30%. The 2003 Shelikof Strait survey had an increase of 26% in biomass. When these data are integrated into the assessment model, results are similar to previous years: a large increase in biomass during the 1970's and 1980's and an overall pattern of decline since then with some fluctuations due to periodic strong year-classes. Current biomass is estimated to be about 31% of unfished abundance in the absence of density dependence.

Of the six models evaluated in the assessment, model 2 is comparable to last year's reference model. Model 1 estimates NMFS trawl survey catchability, but is not significantly different from Model 2 with q fixed at 1.0. A likelihood profile for catchability shows that the change in log likelihood is very small between models with fixed and estimated catchability, indicating that despite the large change in biomass, there is no objective basis for choosing one model over another. Model 2 provides conservative biomass estimates and represents the obvious choice for reference model. Results from the remaining models show that removing data sources tends to decrease the robustness of the assessment model, leading to greater variations in estimated population parameters.

Many aspects of conservatism are built into the assessment: (1) there is no correction for catchability, which would tend to increase biomass (as mentioned above), (2) there is no correction for a lower than expected proportion returning to Shelikof Strait in 2002 and 2003, (3) average recruitment is used in place of the higher estimated recruitment for the 1999 year-class, and (4) an even more risk-averse harvest policy is used than that approved for the Steller sea lion measures.

The SSC concurs with the analysts and the Team in the use of this extremely conservative approach, given the concern about the low level of this population. GOA pollock are located in Tier 3b. The resulting ABC is 64,740 t (F_{ABC}=0.16) and the overfishing level is 91,060 t (F_{OFL}=0.22) for the W/C/WYK portion of the GOA (including an adjustment for Prince William Sound). The recommended ABC is about 12,000 t lower than the maximum permissible. Based on biomass from the bottom trawl survey and a Tier 5 calculation, there is also an ABC of 6,520 t (F =0.75*M) and OFL of 8,690 (F=M) for the EYK/SEO portion. The SSC further supports the breakdown by smaller management areas.

It was not clear from the assessment document how the apportionment was done among management areas, until it was clarified in discussion. Projected harvest for PWS (920 t) is subtracted from the W/C/WYK ABC (65,660) leaving a remainder of 64,740 t. This is then apportioned regionally and seasonally using available data from a composite of winter EIT surveys and the summer bottom trawl surveys. In light of the unexpected concentrations of pollock found in Sanak Gully and not found in Shelikof, the SSC recommends that the Plan Team carefully examine the method of seasonal and area apportionments and provide a detailed explanation and rationale. The small sample size for portions of the area, and lack of synoptic coverage may limit the utility of these data for the assigned purpose.

PACIFIC COD

The Pacific cod stock assessment was updated with new catch and size composition data from 2002-2003 commercial fisheries and the 2003 GOA trawl survey. Also, historical catch and survey data were recompiled. Recompiled survey data affected the reconstructed model estimates of biomass. Biomass estimates early in the time series declined (most notably a 29% decrease in the revised 1987 survey estimate) whereas biomass estimates in recent years increased. The resultant increase in projected spawning biomass for 2004 raises the stock from slightly below to 16% above $B_{40\%}$, thereby moving the fishery from Tier 3b to Tier 3a.

The SSC supports the authors' and team recommendations for the 2004 specifications: ABC = 62,810 t and OFL = 102,000 t. This ABC corresponds to F = 0.29 or 87% of the maximum permissible ABC under $F_{40\%}$ = 0.34. Similar to the specifications in 2000-2003, this adjustment was made to compensate for large uncertainty in model parameters M and q. Also, the SSC supports their recommended ABC allocation according to the biomass distribution in the three most recent surveys: 36% (22,610 t) in Western, 57% (35,800 t) in Central, and 7% (4,400 t) in Eastern GOA.

The SSC appreciates the authors' inclusion of a stock-recruitment relationship into this year's assessment. For next year's assessment, the SSC encourages the authors to consider incorporation of ADF&G trawl survey data into the GOA cod assessment, as has been done for pollock. These data are particularly relevant for cod, because cod in state and federal waters are considered to be one stock. **The current method of apportioning part of the federal TAC to the fishery in state waters does not appear to be biomass-based. Potential disproportionate removals of cod from 0-3 miles would not be consistent with other mitigation measures currently in place for Steller sea lions.**

SABLEFISH

The sablefish population increased to a peak in the mid-1960's and declined in the 1970's. Abundance peaked once more in 1987 due to exceptional year classes in the 1970's and decreased to lows from 1998 – 2000, followed by modest increases in recent years. The relative abundance in 2003, although somewhat lower than 2002, remains 10% above the 2000 estimate. The strong 1997-year class is an important part of the population and is projected to account for 31% of the 2004 spawning biomass. Sablefish biomass has increased to a moderate level and projected spawning biomass is 40% of the unfished biomass. Population biomass is well estimated from the data, with some uncertainty in the future related to the strength of the 1998 year-class that may be above average.

The maximum permissible yield obtained from an adjusted $F_{40\%}$ policy is 25,400 t in 2004 for the combined BSAI and GOA regions. The Plan team expressed concern that this would represent a substantial increase (22%) while abundance is projected to decline slightly (1%) in the future. **The SSC shares these concerns and endorses Plan Team 2004 ABC recommendation of 23,000 t ($F_{40\%adj}$=0.112) computed as 90% of the adjusted $F_{40\%}$ value.** This represents a moderate 10% increase above the 2003 ABC of 20,900 t. The OFL fishing mortality rate (F_{OFL} =0.16) computed under Tier 3b for combined areas results in a 2004 OFL of 30,800 t.

The SSC endorses the analysts' approach to apportion ABC and OFL by regions using a weighted average of the last five years of both fishery and survey information. This results in final OFL's apportioned to the Bering Sea (4,020 t), Aleutian Islands (4,620 t), Gulf of Alaska (22,160 t) and ABC'S of:

2004 Sablefish ABC Apportionment

REGION	BSAI			GOA					Grand Total
	EBS	AI	Subtotal	WGOA	CGOA	WYK	SEO/EYK	Subtotal	
ABC	3,000	3,450	6,460	2,930	7,300	2,550	3,770	16,550	**23,000**

The SSC supports this year's decision analysis, which considers Council established harvest policies. This analysis adjusts catch with abundance when projecting abundance and analyzing the effect of catch. The catch level equal to 90% of the adjusted $F_{40\%}$ value was recommended, as it is unlikely to have a negative effect on spawning biomass and will be re-evaluated annually. The SSC notes that EBS ABC reported in Appendix A of the SAFE was in error (3,010 t) and should be 3,000 t.

FLATFISH

The flatfish group is partitioned for management purposes into deep-water flatfish, rex sole, shallow-water flatfish, flathead sole, and arrowtooth flounder. Deep-water flatfish consists of Dover sole, Greenland turbot and deep-sea sole and the shallow-water complex is comprised of northern and southern rock sole, yellowfin sole, butter sole, starry flounder, English sole, Alaska plaice and sand sole. This year an age-structured assessment for Dover sole was presented as an appendix to the deep-water flatfish chapter and the SSC agrees that the model should be brought forward next year for assessing Dover sole, which will continue to be part of the deep-water complex for management purposes. Assessments were updated to reflect the 2003 bottom trawl survey results.

The SSC noted the lack of detailed ecosystem consideration information in the flatfish chapters and encouraged the authors to include this information in future years. Also noted was the lack of fit between the 2003 survey and the age-structured flatfish model assessments. This lack of fit may be related to the warm bottom temperatures observed during 2003 and the model's lack of variables to represent environmental fluctuations. The SSC encourages the authors to explore survey catchability and temperature relationships for these stocks. Finally, it was noted that some flatfish species for which a Tier 5 calculation is used have not had natural mortality rate evaluated for about 15 years. The SSC recommends that age data be obtained and that M be re-evaluated for these species.

The SSC concurs with the recommendations of the plan team. The recommended 2004 ABC's and OFL's are as follows:

	ABC (t)	OFL (t)	Biomass (t)	F_{ABC}	F_{OFL}
Deep-water flatfish	6,070	8,010	99,620	0.064	0.085
Rex sole	12,650	16,480	99,950	0.15	0.20
Shallow-water flatfish	52,070	63,840	375,950	0.15-0.20	0.20-0.25
Flathead sole	51,720	64,750	292,670	0.47	0.63
Arrowtooth flounder	194,930	228,130	2,453,390	0.142	0.168

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

	WESTERN	CENTRAL	WYAK	EYAK/SEO	TOTAL
Deep-water	310	2,970	1,880	910	6,070
Rex sole	1,680	7,340	1,340	2,290	12,650
Shallow-water	21,580	27,250	2,030	1,210	52,070
Flathead sole	13,410	34,430	3,430	450	51,720
Arrowtooth flounder	23,590	151,840	10,590	8,910	194,930

ROCKFISH – General Considerations

1. $F_{40\%}$ Report Recommendations

The SSC received a report in 2002 from Goodman et al., known as the "F40 report," that recommended consideration of more conservative harvest rates for rockfish species in the GOA and the BSAI. In response, the SSC requested that stock analysts evaluate the harvest strategy for rockfishes during the 2003 TAC setting process. Stock analysts completed two types of analyses. The first analysis, reported in the BSAI SAFE for POP and northern rockfish, was an incorporation of process and measurement error in estimating $F_{35\%}$. The result was a finding that the added uncertainty did not produce a lower F_{ABC} than the status quo harvest policy. The second analysis was reported in a draft manuscript by Drs. Paul Spencer and Martin Dorn, in which they evaluated BSAI POP management parameters using Bayesian stock-recruit analysis. Dr. Spencer summarized that report for the SSC at the December 2003 meeting with a conclusion that the $F_{35\%}$ and $F_{40\%}$ policies are not overly aggressive for the BSAI POP stock. The SSC appreciates the efforts by Drs. Spencer and Dorn, and offers the following considerations for further analysis.

The SSC notes that the Bayesian stock-recruitment analysis used methods adapted from Dorn (2002) applied to the BSAI POP stock. The SSC notes that use of the early 1980's data that exhibit extremely high year class success is very influential in determining the results. Different data sets with weak recruitment could yield different results. Further, caution is warranted in extrapolating these results to other species. Nevertheless, the SSC supports further analyses and encourages authors to explore alternative spawner-recruit analyses based on subsets of the data and contrast those with an analysis using all of the data.

It is unknown if the loss of older age classes have measurable consequences to stock productivity. The implications depend on whether older/larger individuals contribute to stock productivity disproportionate to their biomass. Relevant questions include: (1) do older individuals have higher reproductive success?, (2) do they spawn in more favorable habitats?, (3) do they spawn at more favorable times of the year?, (4) do the progeny have a higher survival rate?, and (5) do fisheries cause genetic selection such that heritable growth and mortality traits are lost when old fish no longer survive to contribute to reproduction? The answers to these questions are unknown for rockfishes in Alaska, but there are some hints from other species. Older herring consistently spawn days to weeks earlier than younger herring. Genetic selection has resulted from size-selective harvests of populations of short-lived fishes in laboratory studies within just a few generations. Studies on Atlantic cod suggest that migration pathways to spawning grounds may be a learned attribute from older cod. Closer to home, one study in California suggests differential spawning time and increased viability of young from old versus young adult black rockfish. Owing to lack of studies, it is difficult to quantify and incorporate such considerations into harvest specifications. The SSC is concerned that undesired outcomes could occur if exploitation rates are too high for the most productive individuals in the population. This is an area of needed research.

2. Local Depletion

The SSC requests that additional analysis be provided for rockfish regarding:

a. A listing of species of rockfish which are most likely to be subject to local depletions either due to specific life history characteristics or fishing practices;
b. The availability of data for those species which could be used to evaluate the occurrence of local depletion; and
c. The quality of data that would be needed to detect local depletion with reasonable certainty.

3. Disaggregation of ABCs

The general direction of rockfish management is towards increased splitting out of ABCs stock segments. More often than not, there are insufficient or unreliable data to fully support these splits. This characteristic of the data requires that care be taken in determining the splits to ensure that they achieve the Council's conservation objectives, while not inflicting undue economic hardship on members of the fishing community. Where data are found lacking or inadequate, a recommendation should be made on how to improve data availability.

PACIFIC OCEAN PERCH (POP)

The 2003 assessment uses the same model as last year with a few improvements, including revised input data for weight at age and for length at age. The resulting model is more stable with a better fit to observed data. Four alternative models were run in addition to the base model. The SSC concurs with the plan team's choice of model 5 to compute the ABC, recognizing that this model provides a much better fit than did the previous year's model. The SSC appreciates the SAFE authors' attention to SSC comments from December 2002 with respect to overly constrained catchability (q), and notes that model 5 allowed greater freedom in estimating q. Given the confounded relationship between M and q, and that q seems high for this species, the SSC requests that the authors investigate a greater range of q and M values.

The SSC concurs with the Plan Team determination under Tier 3a of F_{ABC} = 0.060 with ABC = 13,340 t, and the OFL (given $F_{35\%}$ = 0.071) is 15,840 t. The SSC supports the geographic distribution of the ABC as 2,520 t for the western GOA, 8,390 t for the Central GOA, and 2,430 t for the eastern GOA. OFLs are 2,700 t, 9,960 t, and 2,880 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 830 t of the eastern section ABC to the West Yakutat area where trawling is permitted.

NORTHERN ROCKFISH

The SSC concurs with the Plan Team determination that GOA northern rockfish falls into tier 3a, where the F_{ABC} = 0.056, ABC = 4,870 t, and the OFL (given $F_{35\%}$ = 0.068) is 5,790 t. The SSC supports the geographic distribution of the ABC, with 770 t in the western area, 4,100 t in the central area, and only 1 t in the eastern area, which is combined with other slope rockfish in that area for orderly fishery management concerns.

In the SAFE the stock assessment authors indicates that a study of the northern rockfish fishery for the period 1990-98 showed that an estimated 89% of the catch was taken from just five relatively small fishing grounds: Portlock Bank, Albatross Bank, an unnamed bank south of Kodiak Island that fishermen commonly refer to as the "Snakehead", Shumagin Bank, and Davidson Bank. In particular, Snakehead was the most important fishing ground, as it accounted for 46% of the catch during these years. The SSC requests examination of this fishery feature to determine if there is any biological significance.

SHORTRAKER, ROUGHEYE, and OTHER SLOPE ROCKFISH

The SSC accepts the SAFE authors' estimate of biomass as an unweighted average of the last three trawl surveys, where data from above 100m depth is removed to exclude juvenile fish, which are not part of the exploitable biomass. The SSC concurs with the authors' and Plan Team's determination of ABCs for shortraker and rougheye, using a tier 5 method for shortraker where F_{ABC} = 0.75M = 0.023 and a tier 4 method for rougheye with a precautionary and conservative F_{ABC} = 0.025.

The ABCs, if taken individually, would be 753 t for shortraker and 1007 t for rougheye. The SSC continues to be concerned with lumping these two species into one ABC. Acknowledging that observer coverage is inadequate to monitor the individual species catches, the SSC accepts a joint ABC provided that the joint ABC is set conservatively to guard against excessive harvests of either species. Presently, shortraker rockfish appear to be favored in commercial landings. The SSC recommends that the lumped ABC equal the ABC for shortraker adjusted upward to account for the expected proportion of shortraker catch relative to total catch for shortraker and rougheye combined. That is, the total ABC = 753/P, where P = the proportion of shortraker/rougheye 2000-2002 average catch accounted for by shortraker. Where P = 0.57, the combined ABC is 1,318 t. **The SSC concurs with the geographic apportionment of the ABC as 19.0% (254 t) to the western area, 49.7% (656 t) to the central area, and (408 t) 31.2% to the eastern area.**

The ABC determination recommended by the SAFE authors and Plan Team for other slope rockfish is acceptable to the SSC, such that the total ABC is 3,900 t, apportioned to the western, central, and eastern areas as 40 t, 303 t, and 3,557 t, respectively. The SSC concurs with the further subdivision of the ABC for the eastern area into separate ABCs of 128 t for the West Yakutat area and 3,429 t for the East Yakutat/Southeast Outside area.

PELAGIC SHELF ROCKFISH

Assessment of the pelagic shelf group was improved this year with use of a refined model for light dusky rockfish, and the SSC agrees with the Plan Team decision to use the model derived biomass estimates in a tier 3a calculation of $F_{ABC} = F_{40\%} = 0.123$. **The corresponding ABC level for light dusky rockfish is 4,000 t and the OFL, where $F_{35\%} = 0.153$, is 4,900 t. The SSC accepts the tier 5 ABC calculations for yellowtail, widow, and dark dusky rockfish (F = 0.75M = 0.0675), resulting in a combined ABC of 470 t and OFL = 670 t (F = M = 0.09).**

The SSC concurs with the geographic apportionment of the ABC to the western, central, and eastern areas as 8.3% (370 t), 67.3% (3,010 t), and 24.4% (1090 t), respectively. This apportionment is based on a weighting scheme of the past three surveys (1999, 2001, and 2003) of 4:6:9.

The SSC notes that the calculations for further apportionment of the eastern section into west Yakutat and Southeast Outside areas is based on biomass estimates with high variance and of uncertain reliability. The actual survey biomass estimates for the west Yakutat area in 1990, 1993, 1996, 1999, and 2003 are 4,756, 3,989, 10,211, 442, and 1,513 t, respectively. These data were provided separately at the December meeting to augment Table 10-2 in the GOA SAFE. The data listed under "Yakutat" in that table are apparently combined data for the east and west Yakutat areas. The SSC requests that data tables in future SAFE reports include separate values for areas where apportionments are recommended. Noting that the time series for biomass in the west Yakutat area indicates a declining trend, the SSC concurs with the recommendation for a somewhat more precautionary apportionment method than the one used last year (upper 95% confidence interval), and supports the ABC based on apportionment of 19% of the eastern GOA to the west Yakutat area based on a weighted average of the past three surveys.

DEMERSAL SHELF ROCKFISH

The biomass estimate for this complex is based on the biomass for yelloweye rockfish**. The SSC agrees with the precautionary use of a lower F (= 0.02) than the maximum permitted (F = 0.023) under the tier 4 designation, given the particular vulnerability of demersal shelf rockfish to overfishing. The calculated ABC of 450 t takes into account that an estimated 10% of the available biomass is composed of species other than yelloweye. The OFL fishing mortality rate under Tier 4 is $F_{35\%}$=0.031. Adjusting for the 10% of other species in the complex gives an overfishing level of 690 t.**

The SSC agrees with the Plan Team and SAFE authors that there needs to be a full accounting of mortality that includes removals by the recreational fishery, and requests that appropriate steps be taken to accomplish this.

SHORTSPINE THORNYHEAD ROCKFISH

The Plan Team and SAFE authors agree that the available data, particularly age data, are inadequate to support the use of the age-structured model presented in the SAFE. **The SSC concurs with this position, and supports the tier 5 calculation using the average of the two most recent survey biomass estimates, F = 0.75M = 0.0025, and F_{OFL} = 0.03. The resulting ABC and OFL levels are 1,940 t and**

2,590 t, respectively. The SSC concurs with the area apportionments of the ABC as 407 t, 1,009 t, and 524 t to the western, central, and eastern areas, respectively.

ATKA MACKEREL

Variation in distribution or productivity of a species at the periphery of its range has different management implications than variation of a similar magnitude at the center of the range. At the periphery of a species range, small variations in the natural environment may exceed the tolerance of the species and cause large rapid changes in local population size and distribution. In contrast, changes of similar magnitude in the center of the species range may be within the limits of tolerance of the species and therefore may result in little or no change in productivity. Recognizing the above relationships, the SSC recommends that, where possible, the assessment teams differentiate stocks or portions of stocks at the periphery of their ranges.

In the case of Atka mackerel in the Gulf of Alaska, it is not known if the stock is at the periphery of the BSAI stock or a stock in its own right. **Consequently, the assessment scientists and GOA Plan Team have developed a conservative approach in which the ABC is set at 600 t to provide for unavoidable bycatch. This level is far below the maximum permissible level of 4,700 t, from a Tier 6 calculation of 75% of average catch between 1978 – 1995. The OFL is that average catch of 6,200 t. The SSC concurs with this approach.** Nevertheless, there should be research efforts to determine whether GOA Atka mackerel is the same stock as BSAI Atka mackerel. Whether this is true or not, an alternative assessment strategy should be evaluated, in which the combined GOA and BSAI is assessed and then partitioned into components, similar to the way assessment is done for sablefish. There are obvious difficulties with this approach, because it has not been possible to estimate GOA biomass from the bottom trawl survey. Nevertheless, it may be possible to develop an expansion factor for the combined stock from the data in the two areas.

SKATES

As articulated in our October 2003 minutes the SSC supports the separation of skates from the “other species” group. Their unique life history characteristics (longevity and very low fecundity), vulnerability to overexploitation, and recent development of a target fishery are sufficient reasons for the separation.

The 2004 SAFE summarizes available survey and fishery data and other information available for skates in the GOA. The SSC remains particularly concerned about the recent concentration of harvests from the Central GOA Management Area. While skate harvests appear to be increasing, accurate enumeration of total skate harvest by species is problematic owing to a large proportion of harvests from unobserved small vessels. Limited catch sampling data suggest that the fishery may be disproportionately focusing on big skates and, in particular, large females in the Central GOA. Skate stock structure is unknown, and virtually no information is available on age, growth, and other life history traits. For these reasons, precaution is warranted despite an increasing trend in skate biomass since the mid 1980s.

The SSC supports the assessment authors’ and plan team’s recommendation to place skates into Tier 5 for management purposes. Reasonable estimates of *M* are borrowed from related elasmobranch species.

The stock assessment authors and plan team have divergent recommendations about establishment of ABCs and OFLs. For the two large *Raja* skates, big skate and longnose skate, the assessment authors recommended 6 separate ABCs and OFLs – one for each of the three areas (Eastern GOA, Central GOA, Western GOA) for each of the two species. For all remaining *Bathyraja* skates, the authors recommended a gulf-wide ABC and OFL. On the other hand, the plan team recommended combined big-longnose skate ABCs for each of the three areas, a gulfwide ABC for other skates, and a combined gulf-wide OFL for all skate species. The differences reflect the difficulty in reconciling desires to establish stock-specific harvest controls with the lack of reliable catch and bycatch data on a species-specific level needed for their implementation. The SSC struggled with these same issues.

As an interim approach, the SSC recommends the establishment of two sets of ABCs and OFLs. The first group includes both big and longnose skates in the Central GOA: ABC = 4,435 (2,463 + 1,972, see p. 719 of SAFE) and OFL = 5,914 (3,284 + 2,630). The second group would include big and longnose skates in the Eastern and Western GOA plus *Bathyraja* skates gulf-wide: ABC = 3,709 and OFL = 4,945. The SSC believes that this breakout plus one other measure (described below) would be a practical, albeit imperfect, way to address immediate management concerns in the Central GOA, given current data limitations. Though the SSC does not advise the Council on specific TAC levels, the SSC urges the Council to be precautionary in TAC setting for the Central GOA for reasons previously stated. The plan team proposed one such TAC.

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

D-1(b)(1) Final BSAI Groundfish Specifications for 2004

POLLOCK

EBS

The EBS pollock population continues to be strong, holding at near record levels of abundance. Current age 3+ biomass is estimated to be 11.0 million mt. The population continues to be supported by the above average 1996 year-class and currently the 1999 and 2000 year classes appear slightly above average. The 2003 bottom trawl survey estimated a biomass of 8,510,000 t, an increase of 77% relative to the 2002 estimate and highest estimate in the time series. ABC is determined under tier 1a. This year's assessment uses an improved method to compute the maximum permissible ABC more consistent with Tier 1a formula and is based on the ratio between MSY and equilibrium age 3+ biomass corresponding to MSY. The harmonic mean of this ratio (0.233) is multiplied by the geometric mean of projected age 3+ biomass for 2004 (11.0 million t) to obtain the maximum permissible ABC for 2004, which is 2,560.000. This method is somewhat lower since uncertainty in the F_{MSY} and future stock size are both considered.

The SSC supports this method, which is more consistent with Amendment 56, tier 1a where the harmonic mean value is considered to be a risk averse policy when reliable estimates of F_{MSY} and its pdf (probability density function) are available. Using methods from previous assessments, the harmonic mean would be computed from an estimated pdf for the year 2004 yield under F_{MSY} rather than first finding the harmonic mean of F_{MSY} and then applying its value to the geometric mean of the 2004 stock size.

Projected 2004 spawning biomass is 4.08 million t, with F_{MSY} set at 0.47. **The SSC concurs with the Plan Team recommended ABC of 2.56 million t.** OFL levels for this stock are 2.74 million t at a fishing mortality rate (F_{OFL}) of 0.74.

The authors evaluated an alternative model (Model 2) that included an aging error matrix. The authors believe that the aging error matrix may bias the estimated age composition for large year classes. However, the SSC notes that an aging error matrix is included the GOA Pollock assessment and recommends that the authors include further analysis on this issue in the next assessment.

AI

This year's assessment compared 17 new models of AI stock west of 174 W. The SSC concurs with the Plan Team that there was insufficient time for review of these models and that they should not be used for management proposes at this time. SSC encourages further model development and believes it would improve our ability to fully assess this stock.

Recent research in the eastern and central Aleutian Islands suggests a major biogeographical boundary at Samalga Pass that is reflected in the physical and biological oceanography. Samalga Pass is the last area through which the Alaska Coastal Current passes. The information suggests a shelf ecosystem east of Samalga Pass and the biology and physics west of Samalga Pass suggest a more oceanic system. There may also be further biogeographical boundaries to the west where the Alaska Stream diverges from the Aleutian Island Chain. For assessing stocks it may be useful to employ these natural break points for the geographic bounds in stock assessment.

Aleutian Island pollock ABC is set using tier 5 procedures. The Aleutian Islands were not surveyed this year and the best available estimate is 175,000 t from the 2002 bottom trawl. **The SSC concurs with the Plan Team's Aleutian Islands pollock ABC set at 39,400 t**. This is based on a harvest rate of 75% of M where M=0.30, and biomass of 175,000 t estimated from bottom trawl survey. The 2004 OFL is identical to the 2003 OFL of 52,600 t.

Bogoslof:

The SSC disagrees with the Plan Team's recommended ABC. Under tier 5 the maximum ABC for the Bogoslof area is estimated to be 29,700 mt (Plan Team ABC recommendation) with a companion OFL of 39,600 t for 2004. Traditionally, the SSC has recommended down-weighting the ABC proportionately to the ratio of current to target stock biomass following the tier 3b procedure. The current stock biomass estimate resulting from the 2003 hydroacoustic survey is 198,000 mt, down from 227,000 in 2002. Previously, the SSC has estimated a B_{target} of 2 million mt. We treat the target biomass as a proxy for $B_{40\%}$. The $F_{40\%}$ level is set at 0.27, and thus the tier 3b adjusted F_{ABC} is 0.014. The calculations follow.

$$F_{ABC} = F_{40\%}\left(\frac{B_{2002}}{B_{40\%}} - 0.05\right)\Big/(1-0.05) = 0.27\left(\frac{198{,}000}{2{,}000{,}000} - 0.05\right)\Big/(1-0.05) = 0.014$$

The resultant down-weighted ABC is 2,570 mt and an OFL of 39,600.

PACIFIC COD

This year's Pacific cod stock assessment was updated with new catch and size composition data from recent commercial fisheries and the bottom trawl survey. The SSC appreciates the authors' inclusion of a stock-recruitment relationship into this year's assessments, as requested.

Estimated spawning biomass for 2004 is 435,000 mt, up about 3% from last year's estimate for 2003 and down about 1% from last year's projection for 2004. Estimated spawning biomass slightly exceeds $B_{40\%}$, thus qualifying this stock for management under Tier 3a.

The SSC supports the authors' and team's recommendations to set the 2004 ABC = 223,000 mt, equal to the ABC levels in 2002 and 2003. This ABC equates to F = 0.29, which is 25% below the maximum permissible ABC corresponding to $F_{40\%}$ = 0.39. The SSC agrees that this ABC adjustment is prudent given uncertainties in estimated values of natural mortality rate and survey catchability. The model estimates a dome-shaped selectivity curve, implying that significant amounts large cod are missed by the shelf trawl survey. The SSC also supports the use of the Tier 3a formula that sets OFL = 350,000 mt corresponding to F = 0.47.

As recommended by the plan team and as noted by the SSC in their minutes last year, a comparison of slope and shelf survey length composition data may provide insight into the reliability of the dome-shaped selectivity curve used in the model. Inclusion of new age data into the assessment is very worthwhile, as proposed by the team and author.

The ABC for BS/AI cod is not currently allocated by area. If the ABC were apportioned by the same multiplier used to expand the EBS assessment to the full BS/AI area, the ABC would be 191,000 mt and 32,000 mt for the EBS and AI areas, respectively. The team and authors were concerned that this apportionment may have implications on cod fishery management and allocation. The SSC believes that the ABC should be split among BS and AI areas, but we are not in a position to address the concerns expressed by the authors. Therefore, for the 2005 specification process, the SSC requests the authors to evaluate the methods used to split the ABC and their potential management implications, so that specific recommendations can be made to the Council on this issue in the future.

YELLOWFIN SOLE

The stock assessment this year is a straight-forward update of last year's assessment that includes new fishery and survey age composition and survey biomass. As was done last year, authors allowed survey catchability to differ from 1.0 and included a temperature effect. Spawner-recruit relationships were evaluated for considering a move from tier 3 to tier 1 but these relationships require further evaluation. **The SSC supports the plan team Tier 3A recommendation for 2004 ABC and OFL for yellowfin sole (mt) based on F_{ABC} = 0.12 and F_{OFL} = 0.14:**

Age 2+ Biomass = 1,560,00 t
OFL = 135,000 t
ABC = 114,000 t

GREENLAND TURBOT

The stock assessment incorporated new fishery and survey data and an aggregated longline survey index. **Although the stock qualifies for Tier 3 management, the SSC concurs with the stock assessment authors and the plan team and recommends setting the ABC at a value lower than the maximum permissible because of concerns for continued stock decline and lack of substantive recruitment since 1982. The recommendation to set F_{ABC} equal to the 5 year average value of 0.07 was accepted. OFL is computed under Tier 3a with F_{OFL}=0.32. Area apportionments of ABC on the basis of relative survey biomass was accepted.**

Age 1+ biomass = 132,000 t
OFL = 19,300 t
ABC = 4,740

BS ABC = 3,162 t
AI ABC = 1,578 t

ARROWTOOTH FLOUNDER

The assessment this year provided new survey data and estimated shelf survey catchability as a function of annual bottom water temperature. It also used observed shelf survey sex ratios as a Bayesian prior for inclusion in the model used to derive population estimates. It is anticipated that additional age data would improve model fit. **The SSC concurs with the plan team recommendations of the maximum permissible ABC level allowed under Tier 3a with F_{ABC} = 0.28 and F_{OFL}=0.36.**

Age 1+ biomass: 696,000 t
OFL = 142,000 t
ABC = 115,000 t

ROCK SOLE

New fishery and survey data were incorporated into the assessment this year. Also, the authors used a prior of q=1.4 obtained from a trawl herding experiment. The effect of this prior in combination with other model information resulted in a posterior estimate of q=1.45. This resulted in higher biomass levels than last year but lower than previous estimates. Biomass is expected to decline over the next few years. **The SSC concurred with a Tier 3a calculation of ABC and OFL for this stock using F_{ABC} = 0.17 and F_{OFL} = 0.21and continued evaluation of spawner recruit relationships for movement to Tier 1.**

Age 2+ biomass = 1,160,000 t
OFL = 166,000 t
ABC = 139,000 t

FLATHEAD SOLE

The assessment incorporated new survey information and also investigated a relationship between temperature anomalies and survey biomass anomalies. Survey catchability was modeled as a function of temperature. **The SSC concurred with Tier 3a calculations of OFL and ABC for this stock for 2004 using F_{ABC} = 0.30 and F_{OFL} = 0.37**:

Age 3+ biomass: 505,000 t
OFL = 75,200 t
ABC = 61,900 t

ALASKA PLAICE

The model this year was changed slightly to have a starting year of 1975 instead of 1971 and changed the age of recruitment into the model from age 1 to age 3. New survey and fishery catch information were also added. The main change to the model was the addition of a matrix to convert numbers at age to numbers at length, which allows the authors to input length data from the fishery. There was a large change in the age at 50% selection in the fishery selectivity curve from 8.5 to 10.3 years, which results in a doubling of the value of $F_{40\%}$ from last year's assessment (0.28) to this year's assessment (0.57). No correlation between survey catchability and temperature was found for this stock. The biomass for this stock has leveled off from the peak biomasses observed in the early 1980's. **The SSC concurred with a Tier 3a calculation for 2004 OFL and ABC levels based on F_{ABC} = 0.57 and F_{OFL} = 0.78:**

Age 3+ biomass: 1,050,000 t
OFL = 258,000 t
ABC = 203,000 t

OTHER FLATFISH COMPLEX

This complex consists of Dover sole, rex sole, longhead dab, Sakhalin sole, starry flounder and butter sole in the EBS and Dover sole, rex sole, starry flounder, butter sole, and English sole in the AI. Starry flounder, rex sole, and butter sole comprise the majority of landings. The SSC encourages a more thorough evaluation of seasonal distribution of butter sole in the Bering Sea from historical winter survey data. The continued evaluation of species-specific natural mortality rates that was recommended by the SSC last year is still encouraged. The assessment incorporates new catch and survey information. The 2003 survey indicated an 8% decrease from the 2002 survey estimate. **The SSC agreed with a Tier 5 calculation for this complex for 2004 ABC with F_{ABC} = 0.20 and an F_{OFL} value of 0.20.**

Age 1+ biomass: 90,300 t
OFL = 18,100 t
ABC = 13,500 t

ROCKFISH

General Considerations

See related section in GOA Groundfish Specifications.

PACIFIC OCEAN PERCH (POP)

The 2003 assessment is an update of last year's where the significant changes are just the addition of 2002 catch and survey data**. The SSC agrees with the Plan Team and the SAFE authors that the data warrant a tier 3b calculation resulting in the OFL = 15,800 t, the ABC = 13,300 t. The SSC concurs with the ABC area apportionment recommended by the Plan Team and SAFE authors: 2,128 t to the eastern Bering Sea, 3,059 t to the eastern Aleutian Islands, 2,926 t to the central Aleutian Islands, and 5,187 t to the western Aleutian Islands.**

NORTHERN ROCKFISH

New this year was the first application by the SAFE authors of an age-structured model to the BSAI northern rockfish stock. **The SSC concurs with the Plan Team that we now have reliable estimates of $B_{40\%}$, $F_{40\%}$, and $F_{35\%}$, and therefore support tier 3 designation. Given that female spawning biomass exceeds $B_{40\%}$, the tier designation is properly 3a. The SSC agrees with the calculated area-wide ABC of 6,880 t and area-wide OFL of 8,140 t, but disagrees with disaggregation into separate ABCs for the eastern Bering Sea and the Aleutian Islands. The SSC bases this decision on genetic information summarized by Dr. Paul Spencer that found little evidence for genetic differentiation into separate stocks, and the view by Dr. Spencer that the eastern Bering Sea is a fringe segment of the population.**

Given the small sample size upon which the genetic determination was made, the SSC requests that additional genetic analysis be conducted to achieve a more solid basis for apportionment determinations.

SHORTRAKER AND ROUGHEYE ROCKFISH

Shortraker and rougheye rockfishes were split out from the other red rockfish group in 2003 and an assessment model was used for the first time for these species in the BSAI. The assessment includes a Kalman filter procedure for incorporating observations and variances associated with the multiple data sources used in the analysis. Because the Kalman filter is unfamiliar to members of the Council family, it may be advantageous to highlight the potential advantages and limitations of this application of the Kalman filter during the October 2004 review of innovations to the stock assessment models.

The SSC agrees with the Plan Team and SAFE authors' recommendation for separate tier 5 calculations of ABC and OFL for shortraker and rougheye rockfishes in the BSAI area. This agreement is based on the expectation that the observer program will adequately account for catches of the individual species. The ABC and OFL levels for shortraker are 526 t and 700 t, respectively, and 195 t and 259 t for rougheye, respectively.

The SSC recommends that additional genetic analysis be undertaken to more fully investigate the potential segregation of these species between the Aleutians and the eastern Bering Sea.

OTHER ROCKFISH

Complexity of this group was reduced from 28 species to 8 by the removal of 20 species that were encountered only infrequently in survey trawls and in commercial catches. Recognizing that shortspine thornyheads comprise the vast majority of the commercial removals for this group, the SAFE authors' recommend splitting out this species. The SSC agrees with the Plan Team to not make this split at this time, and that this proposal be brought forward early on in the 2004 SAFE process to allow adequate review and public comment.

The SSC concurs with the Plan Team that, lacking new survey data, the assessment is the same as last year, with separate ABCs and OFLs for the eastern Bering Sea and the Aleutian Islands based on tier 5 calculations. The reference points are F_{ABC} = 0.75M = 0.053, and F_{OFL} = M = 0.07. The ABC and OFL values are 960 t and 1,280 t in the eastern Bering Sea, and 634 t and 846 t in the Aleutian Islands, respectively.

ATKA MACKEREL

The authors updated the assessment model with more recent data and performed sensitivity analysis related to estimates of catchability and natural mortality. They concluded that a model with fixed values of catchability and natural mortality should be used. The model estimates 2004 spawning biomass to be slightly greater than the target $B_{40\%}$ level and the 1998 and 1999 year-classes appear to be relatively strong.

Therefore the stock qualifies for management under Tier 3a, and the resultant ABC is 66,700 mt, from the $F_{40\%}$ value of 0.67. The corresponding OFL from Tier 3a is 78,500 mt, from the F35% value of 0.83. ABC is partitioned into subareas using a weighted average of the 4 most recent survey estimates, resulting in the following ABCs: 11,240 t in the EBS/Eastern AI, 31,100 t in the Central AI, and 24,360 t in the Western AI. The SSC concurs with these estimates.

SQUID AND OTHER SPECIES

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

Other species. The "other species" group includes sculpins, skates, sharks, and octopi. The SSC believes that reliable biomass estimates exist for sculpins and skates, but remains somewhat wary of biomass estimates for sharks and octopi. Therefore, the SSC recommends a mix of Tier 5 and Tier 6 management for the other species group, rather than Tier 5 management for all other species as recommended by the plan Team. Also, the authors and Team recommended specification of ABCs and OFLs by group (i.e., one specification for sculpins, another for skates, etc.), however it is the SSC's understanding that such group-level specifications would not be compliant with the current FMP. **Thus, the SSC recommends one set of ABCs and OFLs for the other species complex.**

In 1998 the SSC recommended Tier 5 procedures for specification of other species ABC involving multiplication of the natural mortality rate by estimated biomass. At the time, this shift in methodology would have indicated nearly a 4-fold increase in maximum allowable ABC. The SSC was uncomfortable with such a large increment and implemented a 10-year stair-step process to gradually change the ABC. We are currently in the 6^{th} year of this stair-step process.

The following table shows the SSC's ABC and OFL computations for other species. For sharks and octopi, average catch over 1992-2002 come from Table 16-11 of the SAFE document. For skates and sculpins, the SSC debated simply adding together the latest biomass estimates from the most recent surveys from each area: 2003 EBS shelf survey, 2002 slope survey, and the 2002 AI survey. However, the SSC ended up endorsing the plan team's biomass estimation procedure (summarized on page 27 of the SAFE) based on the most recent 10-year average biomass estimates from the EBS shelf and AI plus the latest (2002) EBS slope survey, which was conducted just once in the last 10 years.

Species	Biomass	M	OFL	Max ABC
Sculpins	212,000	0.15	31,800	23,800
Skates	484,000	0.10	48,400	36,300
Sharks			579	434
Octopi			371	278
Total			81,150	60,812

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 (60,812) and then adds that amount to the 1997 ABC. **Thus, the SSC recommends setting the other species ABC as 46,810 mt (25,800 + (6/10)*(60,812-25,800)). The SSC recommends OFL to be the sum of the Tier 5 and 6 estimated OFL values or 81,150 t.**

The SSC agrees with the plan team recommendation to place these other species into bycatch-only status. In addition, the SSC recommends not permitting directed fisheries for other species without an industry-proposed, Council-approved data collection program that minimally provides accurate data on location of catch, total fishery removals by species, and opportunities for biological sampling of the catch for age, length, weight, and sex. Finally, the SSC recommends initiation of a FMP-amendment process to allow setting of group-specific (one for each of the four groups) ABCs and OFLs rather than complex-wide specifications.

ECOSYSTEM CONSIDERATIONS SECTION

Pat Livingston (AFSC) presented a summary of the Ecosystems Chapter to the SSC. No public testimony was offered. As has been the case since its inception in 1995, the Ecosystem chapter has grown in the amount of both qualitative and quantitative data, and the SSC applauds the effort. The summary of indicators included in the chapter was especially helpful. A noteworthy addition is the new Ecosystem Assessment section that synthesizes data to predict ecosystem effects. Because the Ecosystems chapter is useful in providing a broad context in which to place the species accounts of the SAFE documents, the SSC will begin with it in future discussions of the SAFEs.

The Ecosystems Chapter for 2004 adds to an on-going collection of useful summaries of the state of the GOA and BS/AI ecosystems and the expected effects of fisheries actions on these ecosystems. The section begins with a tabulation of ecosystem status indicators and then discusses the status of the physical and biological systems of each region. The report assembles a tremendous amount of data from a variety of disciplines from climatology to marine mammals, and provides an entrée into the growing literature on the ecosystems of these regions.

The Ecosystem chapter has multiple objectives and, now that the amount of information included is much more extensive, failure to explicitly differente among the objectives makes the document less useful than it could be. One objective is to bring time series of physical and biological factors to the attention of single-species analysts. Clearly they would be most useful in electronic form and the SSC encourages continued efforts to identify and make available electronic versions of time series data to the individual species authors. The introduction (page 11) points to a concern: a great deal of time and effort goes into the production of the Ecosystems Considerations Section, yet it is uncertain how it will be used. It is imperative to work toward incorporating this information into the setting of the ABCs. The SSC strongly encourages the ongoing effort to incorporate these data in the individual chapters. A good example is in the Bering Sea SAFE where flatfish assessments use water temperature as a covariate for survey biomass estimates. However, the data could be used more effectively in other assessments. For example, in the GOA pelagic shelf rockfish assessments, a consideration of long term water temperature changes would have been interesting in relation to the change in species composition of the survey and the increase in silvergray rockfishes.

Condensing the document and emphasizing summaries and syntheses could increase its utility. At present the report contains a mix of detailed results of data compilations, reports on studies yet to be commenced, and evaluations of the impacts of fishing activities. This mixture makes for hard reading and the loss on emphasis on the important changes or conditions. Because the present document is the amalgamation of many separate reports, interpretations differ from one report to another, potentially leaving the reader confused. For example, the issue of regime shifts was the focus of one report, and was mentioned as an explanation of various changes throughout the chapter. Unfortunately, chapter authors were inconsistent in their consideration of regime shifts and in their characterization of timing and attributes of regime shifts, leaving a confused impression. A carefully edited document that provides not only the dominant view, but also the differences of opinion would have been helpful. Perhaps more clear guidance to authors of individual sections on what is to be included and discussed would make a more cohesive document.

The SSC agrees with and encourages the planned work for future Ecosystems chapters to continue to develop multispecies models, food webs and mass balance models, regime shift scenarios, more informative methods of summarizing ecosystem indicators, and improvements to ecosystem data for target species authors, e.g., food webs centered on target species. The models being developed in the Ecosystem Assessment section have not been used previously in the SAFEs. The SSC would like to review the modeling approach and requests a detailed presentation on the models at a future meeting.

The SSC recommends that time series on zooplankton abundance in each of the major fisheries areas be identified and included. These should be stabilized in terms of methodology, location and season of sampling. Addition of zooplankton data to the annual or biannual trawl surveys would help to provide a link between water temperature, primary production and the abundance of food for larval and juvenile fish. Its omission in the indicator summary is a major hole in our assessments of the marine ecosystems under management. The SSC suggests that PICES Continuous Plankton Recorder data may be available and should be included.

The discussions of forage fish need to recognize two groups of fish - the officially designated forage fish group, and a second grouping that include age-0 and age-1 pollock. Also, adult herring are not forage for seabirds. However, they are potentially forage for pinnipeds, cetaceans and large upper trophic level fish.

It would be useful to expand the marine mammal section to include discussions of declines of sea otters and harbor seals. While the emphasis in the NPFMC arena has been on SSLs there have been equally severe declines in sea otter and harbor seal populations in portions of their ranges in Alaska. The spatial relationships of the declines have been similar in most cases. The possibility that these declines are somehow related needs to be considered. Sea otters are well known for their impacts on the nearshore community and the current low abundance in the Aleutian Islands has resulted in an increase in sea urchins and concurrent reduction in the kelp forest. The kelp forest is thought to be important fish habitat, particularly for juveniles of some species.

The section on reasons for decline in marine mammals needs far better balance with brief mention of declines and of the several hypotheses that have been put forward. No one hypothesis is clearly right and no one clearly excluded. We will make better progress when we use multiple working hypothesis approach and when we look at the various regions with different SSL population trajectories separately. And, in looking at the marine mammals, observations from other taxa, including marine birds with similar diets should be brought in. It is better not to address reasons for marine mammal declines or seabird declines unless it is done sufficiently evenhandedly that the reader knows what the alternative hypotheses are. Reading this section, it appears that direct and indirect competition with fisheries is the only hypothesis.

In general, the bird and mammal sections might be more powerful if they were shorter and focused on the issues of greatest concern. Most of the other material is available in other reports or could be in appendices, if needed for backup. A few time-series graphs and some discussion of how trends varied geographically might be most helpful. As it is, there is too much detail- e.g., 6 pages of tables on incidental take of seabirds, with no information on the relation of the take to the population size. The overall conclusion that this source of mortality of seabirds is trivial except a few cases that should be pointed out.

Specific comments and suggestions

Under the EBS summer temperature indicator, it would be worthwhile to specify the age class of pollock involved, because the implications of the distribution of age-1 versus age-3+ are quite different.

Under interpretation of EBS sea ice extent, an important aspect is the timing of the spring bloom and the water temperatures in which zooplankton must try to graze the bloom.
A simple, but non-trivial improvement would be to number figures and tables sequentially throughout the document. Since most often hard copies will be in black and white, be certain that essential information can be seen in figures. In many the scale was such that features of importance could not be seen or variations in screens were not detectable.

In the marine mammal section, the incidental take information needs to be clarified. In the Stock Assessment reports for marine mammals, incidental take is reported as it is here but additional caveats regarding observer coverage etc were not included. Also, PBR is not the only threshold of marine mammal take in commercial fisheries; the Zero Mortality Rate Goal (ZMGR) should be discussed.

Page 33, fig 2: Where are these strata? GOA, EBS, AI?

Page 39 second paragraph: The negative trend is not obvious, depending on the years selected. Put in a trend line and do statistics.

Page 44 middle: These temperatures are probably above those preferred by capelin; how do they compare with what age-1 pollock like? Where possible, relate the physical findings to their biological implications.

Page 63, Fig 2: Try a lagged correlation or a cross-correlation analysis to see when toxin appears in shellfish compared to when the HAB is found in the water column.

Page 107, fig 1: Include a graph for age-1 pollock, even though it is not officially a “forage fish” it plays an important role in providing forage. It might be useful to plot capelin versus bottom temperature.

Page 110: Herring seem to be acting much like pollock, with big year classes shortly after the 1976 regime shift.

Page 125, Fig 1, top: what caused the 1991 drop in pollock biomass? In the GOA, even though biomass was stable from 1985 to 1993, wasn’t there a big change in species composition?

Page 126, top: Why not use bottom trawl survey data for estimates of halibut in the EBS?

Page 126, middle: since wind forcing may be an important variable, shouldn’t there be one or more indices of wind forcing for the EBS?

Page 130, Fig 5. It appears that EBS pollock spawner recruit anomalies were in phase between the EBS and the GOA from 1977 to 1990, and then were out of phase. Any ideas why and what the implications might be?

Page 136, Fig 2: What are the age-classes being graphed? Please put this in the legend.

Page 154, top: The two years with anomalously high dogfish numbers were both warm years. With a warming EBS, will we see more dogfish?

Page 142-153 and pages 159-168: Way too much detail for an overview document. This needs to be in a separate report, or in an Appendix.

Page 249, middle: Are these changes in bycatch indicative of a change in the stocks of the prohibited species or changes in fishing practices?

Page 287: need to define the predator and what it takes as forage. As above, not all forage fish are used by all predators.

Page 298, birds: As stated above, what is the population-level significance of 4,000 dead birds?

Page 303, near top: Do you mean species or stocks of crabs? Are Pribilof Island and St Matthew blue king crab different species?

D-1 GOA/BSAI SAFE: Economic Status

Although the SSC did not receive a staff presentation on the SAFE appendix "Economic Status of the Groundfish Fisheries off Alaska, 2002", we engaged in a brief discussion regarding the content, history and possible future evolution of the appendix.

The Economic SAFE document contains a useful summary of the limited economic data collected regarding Alaska Region fisheries. The compilation of these data in a consistent and readily accessible time series provides a valuable characterization of trends in landings, prices, revenues, consumption, effort, number of participating vessels, employment, and key economic indicator variables. In addition, the appendix included sections on regional economic information and fishing capacity and capacity utilization. Regrettably, with the exception of these latter sections, the Economic SAFE is largely lacking in analysis. Frankly, the Economic SAFE suffers in comparison with the Stock Assessment and Ecosystem appendices.[1]

There are two root causes of the limitation of the Economic SAFE: firstly, data on cost of production, locus of expenditures, and disposition of products is grossly simplified or sadly missing; secondly, data that are available have not been as fully exploited as they could be. 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.

[1] We note in passing that there is not as yet a SAFE appendix to address the status and trends of social and demographic characteristics of the Alaska Region fisheries and suggest that the development of such a document be considered.

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. For example, the Council is being asked to consider actions related to the nascent fishery for skates. Public testimony asserted that the current exvessel price for skates is attractive relative to the exvessel price for other species, sufficiently so that they have become a target species. However, without information on the markets in which skates are sold and whether these markets are likely to remain strong in the long-term it is difficult to conclude that the Council has an appropriate foundation of information and analysis on which to base decisions regarding the development and management of a directed skate fishery.

Two of the highlights of the 2002 Economics SAFE are the sections on regional economic information and fishing capacity and capacity utilization. Although the regional economic information section reports some useful information, the lack of information on processor expenditures precludes the opportunity to devise a comprehensive impact analysis. Also missing was documentation on whether the multipliers for Kodiak were from the canned IMPLAN model or whether the Kodiak model was groundtruthed. The last section presents a rigorous model of the measurement of fishing capacity, capacity utilization and participation. These are very important measures when examining the effects of current or proposed fishery rationalization measures. However, the SSC strongly agrees with the authors that, once again, this study (and others) suffer from a lack of basic economic cost and performance data.

C-2 Observer Program

The SSC was unable to formally consider the draft EA/RIR for the establishment of a new observer program. The following are a couple of notes for the authors to consider as they prepare a revision to the document.

1. A fee based on the exvessel value of landed catch will have differential impacts on rationalized and derby fisheries. The effect in a derby fishery will be to reduce the profitability of participants, potentially leading to the financial failure of marginal participants. The effect in rationalized fisheries will be a reduction in the capitalized value of the IFQ/Co-op permit.
2. A fee based on the exvessel value of landed catch is equivalent to a landings tax. Taxes on market transactions affect both the buyer and the seller no matter which faces the statutory burden. The incidence of the tax depends on the elasticity of exvessel demand and the elasticity of supply. It is reasonable to characterize the exvessel demand for groundfish as relatively elastic and to characterize the elasticity of supply as relatively inelastic. Consequently, the burden of the fee will fall mostly on the harvester. That is, a fee based on exvessel revenue is likely to reduce the earnings of harvesters and have a relatively small effect on the earnings of processors.

D-1 Halibut Discard Mortality Rates

Gregg H. Williams gave the SSC a presentation on Alaska Groundfish Fisheries discard mortality rates. Upon examination, these rates were determined to be stable and we endorse their use for 2004-2006.