

**DRAFT REPORT  
of the  
SCIENTIFIC AND STATISTICAL COMMITTEE  
to the  
NORTH PACIFIC FISHERY MANAGEMENT COUNCIL  
February 6-8, 2006**

The Scientific and Statistical Committee met during February 6-8, 2006 at the Doubletree Hotel in SeaTac, WA . Members present were:

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

Members absent:

**Ken Pitcher**  
*Alaska Department of Fish and Game*

### **Election of Officers**

Gordon Kruse and Pat Livingston were re-elected as SSC Chair and Vice-Chair, respectively, for the coming year.

### **C-3 Pacific Cod Allocations (BSAI Amendment 85)**

Nicole Kimball and Jim Richardson (Council Staff) presented an initial review draft EA/RIR/IRFA for Amendment 85 to the BSAI FMP. Public testimony was provided by Stephen Taufen (Groundswell Fisheries Movement), Clem Tillion (Aleut Enterprise Corp.), and Donna Parker (FV Sea Storm).

The proposed actions largely reflect recent patterns of directed and incidental catches. However, some of the proposed actions reduce the catch shares of some participants while increasing the catch shares of other participants, whereas other proposed actions are intended to pre-allocate area-specific catch shares in anticipation of splitting the BSAI Pacific cod ABC and TAC into BS and AI components. **The SSC recommends releasing the draft EA/RIR/IRFA for public review subject to the following recommended revisions:**

- Consideration of the alternatives should be expanded to include a discussion of the anticipated changes in the timing and distribution of landings and the associated impacts on communities.

- Discussion of the net benefits of changes in the CDQ share should acknowledge that the payment of CDQ royalties will reduce net revenues for firms that make the royalty payments.
- The biological basis for managing cod as separate BS and AI stocks rather than as a single BSAI stock needs to be elaborated. What evidence is there that the BS and AI stocks are separate? Is there evidence to suggest that cod form a single stock throughout the AI, or is there evidence to suggest that cod form a suite of independent or partially independent stocks along the length of the Aleutian Islands?
- The section that addresses the alternatives for pre-allocation of possible area-specific allocations of catch shares should include an expanded discussion of the effect that the choice of the time frame for determining eligibility will have on the composition of participants, the regional implications of these alternatives, recent trends in development of state waters fisheries, and the extent to which the alternatives favor or preclude local access to P-cod fisheries distributed along the Aleutian Island chain.
- The extent to which catches of cod in the crab bait fishery and halibut IFQ fishery are included in the ABC and stock assessments for cod should be clarified.

The SSC also received an oral presentation synthesized from publicly available data about prices, product forms, and import/export markets for Pacific cod. Although this information was not instrumental in differentiating among the alternatives, it provides context for the analyses. Because the alternatives could involve changes in the seasonal distribution of catches and product forms, examining these markets on a monthly or weekly time scale would have been more instructive. The SSC realizes that this data collection has just recently started and in the future looks forward to additional market data that is directed toward the management issue at hand.

### **C-5 Observer Program**

The SSC received a presentation from Nicole Kimball (Council staff), Bill Karp (AFSC) and Kent Lind (Contractor). This was an initial review of a revised analysis to restructure the funding and deployment mechanism in the North Pacific Groundfish Observer Program. The analysis is a restructuring of a suite of alternatives presented at the June 2005 Council meeting and the number of alternatives has decreased from seven to five.

Dr. Karp discussed a letter from NOAA Fisheries outlining numerous difficulties that essentially eliminated three of the remaining five alternatives at the present time due to cost and/or statutory authorization uncertainties. Many of the cost uncertainties relate to observer pay, including how to account for hours worked by the observer and whether they will be classified as professional or technician employees. As a result, NOAA recommended that the current structure of the Observer Program be retained and the Council should adopt the alternative (#2) that removes the sunset date as a short-term solution.

This preliminary draft is much improved from the earlier preview drafts, providing better explanation and discussion of the benefits of observer coverage (p.77-80). The alternatives are appropriate and cover the main issues. However, given the complexity of the comprehensive alternative (Alternative 5), it might be appropriate to develop a suboption for a phase-in of BSAI as a whole or BSAI 100% covered and greater vessels. Alternative 3 needs to be labeled as a restructured GOA and BSAI rollover option since a BSAI rollover is part of this alternative. Summaries of the alternatives also need to better label the type of fee collection (exvessel based fee/daily obs coverage fee). For instance, this isn't clear in the description (p.iii) of Alternatives

3 and 4. The SSC looks forward to hearing the results of the video monitoring pilot projects, which were presented to the observer committee.

**The NOAA recommendation that the Council select Alternative 2 alters the playing field for this analysis. The SSC suggests taking a fast track/slow track approach with regard to the alternatives.** Alternatives 1 and 2 can be moved forward on a fast track to safeguard the Observer Program for the near term. For this fast track analysis, an extended examination of the impacts of selecting Alternative 1 is required. The work to date on Alternatives 3-5 should be continued and brought forward. However, by proceeding at a slower pace, this analysis is positioned to respond to any progress made on the aforementioned obstacles to implementation. **Should a fast track/slow track approach be taken, the Problem Statement for Alternatives 1 and 2 would need to be revised as neither of those alternatives address the current Problem Statement.**

Given the obstacles to restructuring the Observer Program, the uncertain costs and concern over NMFS control over placement of observers, it may be worthwhile revisiting the possibility of hiring observers as federal employees. An alternative along these lines was considered and discarded about five years ago in previous attempts to redesign the Observer Program. Given the current uncertainties, at the very least it would be worthwhile revisiting the arguments advanced against an Observer Program comprised of federal employees.

**With regard to the expanded discussion of the benefits of observer coverage and the newly proposed slow/fast track for the alternatives, the SSC would like to reiterate the importance of the data collected by observers and the improvements that would result from being able to allocate observer effort temporally and spatially under Alternatives 3-5.** The PSEIS-selected alternative identified the improved data quality and management that would accrue under a new observer delivery model. **The SSC strongly recommends that this continue to be a priority issue that should be dealt with once the funding uncertainties are resolved.** Failing to do so would compromise our ability to evaluate stock status and the Council's management of groundfish resources.

The SSC suggests the following editorial corrections to the document:

- P. x Table ES-3 What are the units of Observer cost (Millions?).
- P. xii Conclusions. There is no mention under Alternative 2 (rollover alternative) that it would not advance the objectives in the PSEIS selected alternative. There needs to be more emphasis on the importance of advancing the observer program-related objectives of the PSEIS. This could be reiterated in many places such as the introduction (p 1) and in the discussion of impacts of the alternatives.
- P.17. Alt 3, first box at top. There is an incomplete sentence. Perhaps this should be "...for each GOA vessel class."
- The benefits accruing to the halibut vessels resulting from the fees that will be paid need to be clarified.
- P. 28. Table 2.3-2 Report the average and confidence intervals between observer reports and WPR. The last column indicates that there is a bias between the two types of reporting, but it does not indicate if the bias is large. This could be quantified differently. Note the misspelling of "yellowfin" sole in the species column.

- P.73 Ecosystem considerations section. The text is unclear with regard to whether aggregate indicators and/or ecosystem issues in the individual stock assessment chapters were used for significance determinations; it appears that ecosystem issues were used. Significance determinations of ecosystem impacts also need to consider the aggregate effects across the fisheries of each target groundfish species. Thus, total catch, discards, etc. are aggregate indicators that should be considered.

## **C-6 Charter Halibut GHL**

Jane DiCosimo (Council Staff) and Jonathan King (Northern Economics) presented an initial review draft analysis of action and no-action alternatives related to the charter-based sport fishery for halibut in IPHC management areas 2C and 3A. There was no public testimony.

### **The SSC suggests the following issues be addressed before the draft analysis is released for public review:**

- Discussion of the no-action alternative should be expanded to include estimates of the losses (quantity and value) to the commercial fishery and consumers due to reductions in the commercial TAC if the charter-based sport fishing overages were to continue at the levels observed in 2004. While this type of comparative static analysis ignores variations in halibut biomass, exvessel and wholesale prices, and demand for charter-based sportfishing, it can provide a useful basis for characterizing the effects of the no-action alternative. Although there are many factors that affect the demand for charter-based halibut sportfishing trips, the 20-year average annual rate of increase in halibut sportfishing catches (about 6.2% in 2C and about 5.5% in 3A) could be used as a reasonable projection of the future rate of increase in charter-based sportfishing catches of halibut under the no-action alternative. Five- and ten-year projections of growth in charter-based sportfishing catches of halibut could be combined with information about 2004 exvessel and wholesale prices to generate comparative static estimates of losses to the commercial fishermen and consumers under the no-action alternative.<sup>1</sup>

To maintain balance in this review of the no-action alternative, there should be a discussion of changes in angler surplus that could be anticipated from the projected increase in charter-based sportfishing for halibut.<sup>2</sup> Because the number of halibut sportfishing charter service providers is large and barriers to entry are low, halibut sportfishing charter service providers can be assumed to behave as “perfect competitors.” Consequently, the principal source of net national benefits from the charter halibut fishery is angler surplus—the difference between the benefits that anglers derive from sportfishing for halibut onboard charter boats and the costs that they incur. While the magnitude of changes in regional economic benefits will vary, it is unlikely that the changes in regional expenditures will result in changes in net national benefits. Moreover, increases in regional expenditures associated with increases in charter-based sportfishing are likely to be offset by decreases in regional expenditures associated with commercial fishing. This evaluation of the no-action alternative should also recognize that the commercial fishery has consistently underharvested the commercial TAC,

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<sup>1</sup> Estimates of consumer surplus could be based on models of halibut demand reported in: Herrmann M. and K.R. Criddle. 2006. An econometric market model for the Pacific halibut fishery. *Marine Resource Economics*. 21:xxx-xxx (forthcoming).

<sup>2</sup> These estimates could be ballparked using models reported in: Criddle K.R., M. Herrmann, S.T. Lee and C. Hamel. 2003. Participation decisions, angler welfare, and the regional economic impact of sportfishing. *Marine Resource Economics* 18:291-312.

thus it would be reasonable to deduct the average commercial catch underage from the projected charter-based sportfishing overage in the determination of potential losses to the commercial fishery.

- Discussion of the potential impact and efficacy of the action alternatives should reflect an anticipation that halibut sportfishing charter service providers and their clients will respond strategically to the proposed management measures. For example, it should be anticipated that some anglers will substitute bare-boat charters and other self-guided activities for charter halibut trips if such trips become less attractive due to restrictive annual bag limits. It should also be anticipated that some charter service providers, and some anglers, would shift their effort to alternative fisheries or alternative recreation services and activities. Similarly, it should be anticipated that some anglers faced with restrictive bag limits in area 2C may shift their effort to area 3A. These strategic responses will reduce the efficacy of the proposed action alternatives and will reduce the potential opportunity costs to the halibut charter industry and its customers of the proposed action alternatives.
- While the analysis suggests that most of the proposed actions would have failed to reduce charter-based catches of halibut to the GHL in 2004, the analysis suggests that alternative 3 might reduce charter-based catches in area 3A to below the GHL. Discussion of this finding should note that this outcome would result in a loss of angler surplus.
- The study should extend its evaluation of the effects of the different alternative halibut measures to 2002 and 2003. Although the trend in guided sportfishing halibut trips is upward, a comparison of the 2004 findings for two additional years will prove useful when discussing the robustness of the 2004 findings.

The SSC notes that the approach the Council has adopted to management of the charter-based sport fishery for halibut presents a clear example of the types of problems that can emerge when there are substantial temporal delays between prosecution of the fishery, generation of data on the magnitude of removals, and tweaking of management measures intended to influence the magnitude of future removals. This type of problem is commonly known as a delayed feedback loop. Delayed feedback loops exhibit cyclic overshoot and undershoot around the intended target, but control rules can be designed to dampen the oscillation if the system is stationary and deterministic. If the system includes a random element, or a trend or other nonstationarity, management actions will tend to exacerbate cyclic overshoot and undershoot. The upshot of this is that it is unlikely that catches in the charter-based halibut sport fishery can be constrained to intended targets when there is a 1-2 year delay between prosecution of the fishery and generation of data regarding the magnitude of removals and another 1-2 year delay between when the data are available and management measures are selected and implemented. One solution to the delayed feedback problem is to shorten the delays. In the case of management of the charter-based halibut sport fishery, this would involve development of indices of removals that can be used to estimate catches as the season progresses coupled with the adoption of management measures that could be automatically triggered if removals were projected to exceed the GHL. The SSC is pleased to learn that ADF&G will resume inclusion of halibut in the charter logbook program in 2006; the logbook data could serve as an instrument for more timely assessment of charter-based catches of halibut.

Finally, the SSC observes that the inexorable consequence of a GHL that is non-binding within a season, coupled with management instruments for limiting catches by the charter-based halibut sport fishery that are potentially ineffectual, is that the Council should anticipate an ongoing *de facto* reallocation of catches from the commercial fishery to the charter-based sport fishery for halibut. If the charter-based sport fishery were subject to binding limits under an IFQ program, the reallocation between commercial and charter-based fisheries would take place through

voluntary transactions in a market. In the absence of tradable harvest shares, the Council will, consciously or unconsciously, serve as the arbitrator between the commercial and charter industries with actions taken to benefit one sector resulting in uncompensated costs to the other sector. Within such a political market, each sector is left with an individually rational but collectively irrational incentive to squander potential benefits of increased shares in an endeavor to influence the Council's active or passive decisions.

Minor editorial notes:

- The first paragraph on page 19 seems to be a holdover from the document used as a template for this analysis and does not appear to be relevant to this analysis.
- There are numerous instances in the document where “analysts” should be replaced with “analysis” or “analyses”.

### **D-1(a) Chiniak Gully Experiment**

Libby Logerwell (AFSC) gave a presentation on an EA/RIR/IRFA for a regulatory amendment to close trawl fishing in Chiniak Gully from August 1 as late as September 20 during three out of the next five years (2006-2010). The proposed closure is intended to facilitate continued research on the effects of fishing on the local abundance and distribution of pollock, which may affect the availability of pollock as prey for Steller sea lions.

The main impact of the proposed action would be a relatively minor redistribution of trawl fishing effort on the east side of Kodiak Island. The EA examined potential effects of this redistribution on target species, marine mammals, and EFH and concluded that there would be no significant effects. The RIR estimated potential costs associated with the action, including potential revenue losses due to displacement of fishing vessels and the costs of the experiment itself. Benefits of the research are impossible to quantify, but include an improved understanding of the impacts of fishing on Steller sea lions, which may help NOAA fisheries design more effective and potentially less costly (to industry) RPAs to protect Steller sea lions.

**The SSC recommends release of the EA/RIR/IRFA for public review with the following minor changes:**

- Some inconsistencies were noted in Tables 4.1-1 and 4.1-2, which describe the criteria for determining significance of impacts to target species and marine mammals. These tables describe potential adverse impacts, while stating that “there is no beneficial impact”. Clearly, the redistribution of fishing activity may have beneficial as well as adverse impacts relative to the status quo. For example, a potentially beneficial impact on Steller sea lions in the closed area is the possible reduction in competition and disturbance as described on p. 25.
- Results from the 2000 and 2002 experiments were not included in the summary of past research because commercial removals from Barnabus Gully, the treatment site, were negligible. However, these results nevertheless provide valuable information on the within-season variability in abundance and distribution that should be included.

**The SSC supports this proposed research and looks forward to seeing the results.** If and when the studies are conducted, the SSC urges the investigators to make every attempt to complete two full “passes” before and two full “passes” after the opening of the commercial fishery. The SSC also re-iterates concerns expressed in minutes from December 2005:

“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.”

#### **D-1(b) Review of proposed EFP for an Aleutian Islands pollock survey**

Steve Barbeaux (AFSC) gave presentations on (1) a proposed study to test the feasibility of using commercial fishing vessels for acoustic surveys of pollock in the Aleutian Islands, (2) a draft Environmental Assessment of the proposed experiment, and (3) an application for an exempted fishing permit requested by the Aleut Enterprise Corporation to support the proposed experiment. Public testimony was received from Sandra Moeller (Aleut Enterprise Corporation), Dave Fraser (consultant), and Dr. Jim Norris (consultant).

The SSC commends AFSC and the Aleut Enterprise Corporation for their creative collaboration on a promising feasibility study, which has the potential to improve our understanding and management of pollock in the Aleutians. The EFP is necessary to allow the applicant to harvest pollock in areas currently closed to fishing. These harvests are necessary to verify acoustic data and to compensate the participants for conducting the survey. The draft EA did not identify any significant effects of the proposed action on marine mammals or prohibited species. Nevertheless, because the experiment takes place in Steller sea lion critical habitat, an ESA Section 7 consultation has been initiated and must be completed prior to issuing the EFP.

Because written materials were not provided in advance, a thorough review of the proposed research and draft EA by the SSC was not possible. **Nevertheless, the SSC is supportive of the proposed research and the EFP required for conducting the research.**

#### **D-1(c) Other species assessments: Grenadiers, Sharks, Sculpins, Squids, and Octopuses**

##### General considerations

The SSC received presentations on 5 “other species” assessments, introduced by Jane DiCosimo (NPFMC). Preliminary assessments of these species assemblages were prepared as part of ongoing efforts by the Council family to develop innovative approaches for species and assemblages that are not targeted in groundfish fisheries.

Public testimony was provided by Jon Warrenchuk (Oceana), who supported splitting out these species from “other species” and recommended considering squid as a forage fish and banning development of a targeted squid fishery. Gerry Merrigan (Prowler Fisheries) expressed concern that OFL calculations for sharks could become constraining even though no conservation concern exists, and recommended that the new assessments should list the various precautionary assumptions used.

Some general issues emerged in consideration of these assessments. First, it is not surprising that these species suffer severe data limitations that inhibit the ability to evaluate population status. Uncertainties are pervasive about the range of species in the complex, spatial distributions, species identifications, differences by sex, size, and age, and the applicability of information borrowed from related species or areas. **In general, the analysts have made reasoned choices**

**about interim values for population parameters, but it is clear that much additional data must be collected for prudent management.**

Second, a common feature of these assessments is that a choice must be made between managing under Tier 5 (based on a biomass estimate) and Tier 6 (usually based on average catch). Determination of a Tier 5 OFL is problematic due to survey limitations or lack of a robust estimate of natural mortality. Use of average catch in Tier 6 could be problematic for several reasons: (1) the time series of catches may be of indeterminate accuracy due to difficulties in species identification, (2) the time series may be short because catch monitoring did not separately identify the species in the past, or (3) the bycatch of the species may be very low in relation to its population size, so that average catch is not a meaningful measure of an overfishing limit. The application of Tier 6 calculations could unreasonably constrain any directed fishery that might develop, and overly restrictive OFLs could unreasonably constrain other fisheries, such as the cod pot fishery that takes octopus as bycatch. **In these situations, the SSC recommends that the analysts consider reasonable alternative approaches (such as a reasonably low catch that buffers bycatch needs in groundfish fisheries), as permitted in the definition of Tier 6: “OFL = the average catch from 1978 through 1995, unless an alternative value is established by the SSC on the basis of the best available scientific information.”** The SSC looks forward to reviewing such alternatives.

While the intention would not be to implement ABCs and OFLs for these complexes for 2007, the SSC requests revision of these other species assessments for presentation to the plan teams in September 2006 and the SSC in October 2006 for another iteration of review and refinement of status determination criteria (tier designation, OFL, and ABC). In preparing revised assessments, the SSC recommends that the authors clearly articulate the assumptions, including those that afford precaution in the assessment of biomass or estimation of ABC and OFL (e.g., choice of M, assumed discard mortality rate, survey coverage relative to distribution of the stock catchability adjustments).

#### BSAI and GOA Grenadier

David Clausen (AFSC) presented the results of his analysis of grenadiers, presently in the non-specified category of species in the groundfish FMPs. The SSC thanks the author for his efforts to gather the information on this group of species. The SSC notes that this is a data-poor assemblage of species and that research efforts should be made to gather additional information on the stock status and life history.

The SSC requests that the author prepare a more complete description of the potential market for grenadiers. The author reported that previous studies have shown that the palatability of giant grenadier is relatively low. However, it is reported that a small market for grenadiers exists in Europe.

The natural mortality rate (0.074) used for the Tier 5 evaluation was based on maximum age (56) derived from samples from giant grenadier from Alaska. The estimate of maximum age for giant grenadier is similar to estimates for roundnose grenadier (70 yrs) and Pacific grenadier (60 – 70 yrs). The SSC encourages the author to pursue efforts to collect additional baseline life history information including maximum age by region. The author noted that age structures have been collected and the SSC recommends that these samples be aged in the near future.

The author also evaluated the maturity of grenadiers captured in the longline survey. Results of this analysis indicate that the survey only captures mature fish. The SSC notes that this



preliminary result suggests that the grenadiers captured in the sablefish fishery may also be mature. The SSC encourages the author to collect maturity data for fish captured in the sablefish fishery to evaluate this possibility. In addition, the SSC requests that sex and length frequency data be collected from the commercial fishery. The SSC requests that the author examine the evidence for the depth stratification of the sexes and the sex ratio of the survey.

The SSC requests that the author expand the discussion of the survey relative to the range of the species. The SSC concurs that the biomass estimates based on slope surveys for the GOA and EBS are useful. However, the AI trawl survey does not cover the depth range of grenadiers. The SSC reviewed the author's proposal to estimate expansion factors for the AI based on relative population weight (RPWs) from the sablefish longline survey. The SSC requests that, if this technique for expansion is used, the author should carefully review the rationale for excluding the GOA results from this effort. The SSC also notes that the ROV data from the Aleutian Islands could be used to evaluate the fraction of the range covered by the survey.

#### Management considerations:

The grenadier complex constitutes a major component of the deep-water system and serves as both important prey and predator species. It is interesting that the sum of the average survey biomass estimates for the BSAI and GOA is near 2 million mt, making grenadiers one of the most abundant species in the North Pacific. Furthermore, it seems to be abundant in all three areas (BS, AI, and GOA). The complex is currently non-specified, so the Council should formally evaluate whether this complex should become an FMP species. The high catch rate of grenadiers (mostly in the sablefish fishery), its high discard mortality rates, and the potential for development of a market are additional reasons to consider bringing this complex into the BSAI and GOA FMPs.

The SSC concurs with the author's recommendation that the three grenadier species (giant grenadier, Pacific grenadier and popeye grenadier) be managed as a complex. Of these, giant grenadier is the dominant species in the survey and could be used as the index for this complex. Based on an analysis of the depth distribution of these three species, it is likely that the catch is also dominated by giant grenadier, as the other two species generally occur deeper than depths fished by current fisheries.

The SSC considered the issue of whether the ABC and OFL for these stocks should be based on Tier 5 or Tier 6. Tier 6 estimates are based on catch only from 1994 onward, but this does not seem problematic. The SSC considers that available data for grenadiers in the GOA and BS are sufficient to set harvest recommendations on a Tier 5 basis so that one option would be to manage grenadiers as Tier 5 for the EBS and GOA and tier 6 for the AI. Further work is needed to estimate biomass in the AI, including further consideration of RPW data.

In estimating ABC and OFL, the authors used a very conservative estimate of  $M = 0.05$  that results in an OFL and ABC of 75% and 50% of  $M$  respectively. The uncertainty adjustment should be made to the ABC and not the OFL (because OFL is formally defined in Tier 5 as the product of  $M$  and biomass).

As bycatches seem to be dominated by mature females, suggesting that there is sex segregation by depth, the SSC encourages the author to evaluate the implications of a single sex fishery. The SSC also requests that the author consider a recent publication by Devine et al. (2005) that documents a case in the Atlantic where grenadiers were overfished.

## BSAI and GOA Sharks

Dean Courtney (AFSC) presented an update of information on the status and trends of BSAI and GOA shark species.

The SSC requests that the authors describe what is known about the distribution and the migratory behavior of these species. This will help evaluate the utility of various surveys to adequately index shark biomass. The SSC also encourages research on the spatial and temporal distribution of sharks, including depth distribution and segregation by sex.

The author noted that there has not yet been a significant market for sharks from the BSAI or GOA. The SSC requests that the authors include a description of the potential markets for these species. For example, world markets exist for dogfish.

Catch data exist from the “pseudo-blend” 1990-1998, “improved pseudo-blend” 1997 – 2002 and from NMFS Alaska Regional Office 2003-2005. The authors should develop a single set of best catch estimates for sharks in consultation with AFSC and Regional office staff. Catches are categorized as spiny dogfish, Pacific sleeper shark, salmon shark, and unidentified shark.

The author noted that none of the sleeper sharks sampled during the longline survey were mature in the GOA region. In addition, the author noted that several requests have been made to collect age and size composition data for sharks.

Although, the quality of the catch information for this species is quite good for observed fisheries, there are potentially substantial catches in the halibut and other unobserved fisheries; estimates of these catches should be included in the analysis. Observers identify the species composition of the catch. The SSC encourages the authors to include bycatch estimates from halibut and other fisheries.

The author recommends managing Pacific sleeper shark as an indicator species for the BSAI shark assemblage. In the BSAI, Pacific sleeper shark is the dominant species. In the GOA, spiny dogfish and Pacific sleeper shark dominate and salmon sharks are a minor component. The author noted that one option would be to manage spiny dogfish in the GOA as a separate species and manage Pacific sleeper shark as part of the other shark assemblage.

The SSC notes that the natural mortality rate used in the assessment comes from an Atlantic dogfish species that does not live as long as dogfish on the west coast. Thus, the use of this value of mortality may not be appropriate. The SSC inquired about the possibility of obtaining estimates of maximum age for Alaskan shark species. The author noted that he is conducting aging studies on sharks from Alaska to establish a maximum age and hopes that results from this effort will be available in the fall.

The author noted that the biomass estimates for sharks are uncertain and variable. Salmon sharks are highly migratory and potential seasonal residents in the GOA and BSAI. Current biomass estimates do not suggest evidence of a conservation concern for the GOA stocks. Biomass trends are stable. The SSC encourages using the longline survey data for biomass estimates. Also, the SSC requests that authors include the coefficient of variation in the survey.

The SSC requests that the author provide information that would allow estimation of Tier 5 and Tier 6 management of sharks as a complex or as individual species. They note that the authors

could consider development of tier 5 biomass estimates for the abundant species and a tier 6 alternative recommendation for the others.

### GOA Sculpins

Todd TenBrink (AFSC) presented this assessment, which is a useful compilation of information about species, catch history, survey biomass, life history, and status determination criteria. The sculpin complex is dominated by three of the largest sculpin species groups (yellow Irish lord, a group of *Myoxocephalus sp.*, and bigmouth sculpin). CVs for survey biomass of these groups are very low, suggesting high precision. Most sculpin species show no trend since 1984, except bigmouth sculpins have declined. A conservative estimate of natural mortality of 0.19 has been made for all species. Consequently, ABC and OFL can be determined under Tier 5. There is a need for better life history information about sculpins, because life histories vary by species. Some field studies in the Bering Sea have been proposed to NPRB, although no studies are under consideration for the GOA. Further retrospective analyses of sculpin biomass would be useful to explore spatial and species patterns.

### GOA Octopus

The SSC received a presentation by Elizabeth Connors (AFSC) of a preliminary SAFE report on Gulf of Alaska octopus stocks that she coauthored with Elaina Jorgensen (AFSC). The purpose of the report was to review available information in the event that GOA octopus stocks are to be split out from the other species complex for single species or assemblage management. The SSC appreciates the authors' efforts to assemble the GOA octopus stock assessment data and to clearly identify the issues.

The authors provided estimates of potential ABCs and OFLs for all octopus species considered together as a group under both Tier 5 and Tier 6 designations. The authors identified several concerns with these estimates and the SSC highlights the following for further consideration. The first concern is that the species composition of the commercial catch is not well defined. However, due to the large size of the animals captures, mostly in the cod pot fishery, it is suspected that the predominant species is *Enteroctopus dolfeini*, the giant Pacific octopus. A related problem is that the NMFS trawl survey primarily catches much smaller octopuses, presumably a different species or species assemblage. This discrepancy seriously compromises the use of trawl survey data in a Tier 5 calculation of catch limits for the larger species taken primarily in commercial pots. The SSC recommends increased effort to sample octopus catches to clarify the species composition.

A second concern is the need to include catch information from state waters, which may harbor a large fraction of the octopus resource. State fish ticket data on octopus landings should be included.

The lack of life history data is also a concern. For the giant Pacific octopus, it is suspected that the animals undergo a seasonal mating migration. Yet it is not known when this occurs, if this would seasonally alter the distribution of octopus between state and federal waters, or how this would affect biomass estimates. The estimate of natural mortality is also uncertain, with  $M=0.53$  adopted because it is the most conservative estimate for *E. dolfeini*.

## GOA Squids

The SSC received a presentation by Sarah Gaichas (AFSC) of a draft stock assessment for the GOA squid complex. The GOA squid complex includes at least 18 species distributed mainly along the shelf break. The authors did an excellent job describing life history and ecosystem considerations in the document. They used available catch history, survey data, and life history characteristics for the assemblage to estimate the ABC and OFL for both Tier 5 and Tier 6 levels.

Because squids are not a fishery-targeted assemblage, landings records are not indicative of useful catch limits for Tier 6. Due to poor survey estimates for squids, Tier 5 is problematic for a number of reasons. The biomass estimate must be qualified because squid spatial and temporal distributions are not known compared to survey effort distribution. In addition, the survey history is only useful for 2003 and 2005 because the 2001 survey did not sample the eastern GOA and prior surveys (e.g., 1999) are unlikely to reliably indicate current biomass for such short-lived species.

Traditional methods to estimate natural mortality do not yield estimates commensurate with the high-turnover rates of these species. The author's creative use of the Baranov catch equation to estimate natural mortality within a year is a constructive approach. The SSC also encourages opportunistic sampling of landed catch of squid taken in the pollock fishery in Kodiak to help provide needed biological samples. Sampling by the observer program should also be explored.

The SSC notes the significant role of the squid complex as a major forage source for several groups, such as sperm and beaked whales, grenadiers, and sablefish. This ecosystem information should be incorporated into a well-described precautionary approach to setting the ABC and OFL.

### **D-1(d) Species Assessment of Concern**

The SSC received a presentation by Rebecca Reuter (AFSC) on the preliminary results from the Species Assessment of Concern analysis. A standard set of information was collected using a questionnaire completed by stock assessment scientists and fishery biologists for a wide variety of target and non-target species. The intent of the analysis was to evaluate whether this approach could provide a method for identifying species of concern. **The SSC had considerable discussion and concludes that the tabular approach and metrics used were insufficient to assess conservation concerns.** The reasons for this include the fact that some questionnaire rank scores are too subjective and the questionnaire collected other information that bears on whether a concern really exists, but these caveats were not represented in the table. For instance, the validity of the biomass estimates and natural mortality values are not factored into the (C/B)/M calculation. For many species, there is simply no information to make a reasoned evaluation of their status. This lack of information must be made explicit in a summary table to avoid misleading inferences. **Although it is useful to have all these species on a table, the SSC recommends that a more thorough evaluation be used to help direct further research and explore other methods to assess species with little information, including the best available information from the SAFEs.**

### **D-1(e) Workshop on Lower Trophic Level Modeling**

The SSC conducted a workshop on lower trophic level modeling, organized by Jeff Napp (FOCI, AFSC) and Phyllis Stabeno (FOCI, PMEL). **The workshop provided an excellent opportunity for the SSC to interact with AFSC and PMEL staff on new and ongoing modeling studies conducted by the FOCI group.** Jim Overland provided an overview of recent trends in climate

that suggest a very different climate regime for the Bering Sea and a continuing warming trend (although 2006 seems to be a cold year with early ice formation). Al Hermann reported on the Regional Ocean Modeling System (ROMS) models for the Bering Sea and Gulf of Alaska. ROMS model output can be used to provide indices of transport and mixing processes and can be linked to lower trophic level models. Sarah Hinckley described an NPZ model that is driven by an earlier version of the ROMS model, which in turn drives an individual-based model for pollock in the western Gulf of Alaska. Janet Duffy-Anderson presented ongoing research on several flatfish species that provides good evidence for an important role of larval advection in the recruitment process. Bern Megrey presented some results from a basin-wide NPZ model that includes age-structured dynamics of Pacific saury (western Pacific) and Pacific herring (eastern Pacific). The model has been used to examine saury and herring dynamics in a number of specific locations around the Pacific Rim. Jeff Napp and Phyllis Stabeno provided an overview of projects funded through the North Pacific Climate Regimes and Ecosystem Productivity (NPCREP) initiative. These include monitoring efforts in the Bering Sea to continue and expand existing time series such as Mooring 2 on the southeastern Bering Sea shelf, statistical approaches to develop and refine aggregate ecosystem indices for the Bering Sea and Gulf of Alaska, attempts to incorporate such indices into stock assessments, and a project to make real-time data available to stakeholders through the Internet.

The SSC was impressed with the range of modeling activity conducted by FOCI researchers and recognizes the value of these models for incorporating observations and producing indices of physical processes (such as transport or mixing processes) and biological indices such as recruitment indices for pollock or flatfish. The SSC expressed concerns over the adequacy of data used to parameterize and tune models, or for “ground truthing” existing and new models. Like all models, these models are only as good as the data going into them. Thus, there is a critical need to maintain existing time series to verify models and to collect new data as needed. Also, there is a need for additional field studies on the biology, life history, and ecology. The SSC felt that improved coordination between modelers, field researchers and the user community is required to improve physical and lower trophic level models and increase their utility in a management context,. For example, existing models should be used to inform new scientific programs, such as BEST.

**The SSC recommends that workshops of this nature be continued on a regular basis at the February Council meetings when the issue of research priorities is generally discussed.** As recommended for the workshop held during the February 2005 meeting, the SSC recommends that “...PowerPoint presentations and short summaries of each talk be posted on a website so that the information can be made broadly available to other interested members of the Council family who were unable to attend.”

#### **D-2 Research Priorities**

Diana Stram (Council Staff) and Jim Ianelli (AFSC, GOA Groundfish Plan Team Chair) presented the research priorities for the Groundfish Plan Teams. No public testimony was received.

The SSC acknowledges that there are many purposes for the NPFMC’s research priorities. It was noted that we could attempt to identify research issues that are of high priority to the NPFMC and of critical need for attention. It was also suggested that the list could use NPRB’s categories of pressing fisheries management issues and long-term ecosystem research. Alternatively, the latter list could be refined to emphasize research needed to advance ecosystem approaches to management. It was noted that review of progress on previous research might be informative. The SSC reviewed its 2003 list and identified what progress had been made on topics included in

the list. An SSC working group was formed to draft an updated list of research priorities to be considered by the full SSC in April. The following SSC members will serve on the working group: Gordon Kruse, Sue Hills, George Hunt, Keith Criddle, Anne Hollowed, Franz Mueter, and Doug Woodby.

## **Other SSC Topics**

### Rockfish Presentation

The SSC received a presentation from Paul Spencer (AFSC) on his recent work to model the hypothetical effects of a disproportionate contribution to productivity by older female Pacific ocean perch. This work, also presented at the 2005 Lowell Wakefield Symposium and the 2006 Western Groundfish Conference, incorporates laboratory observations that suggest black rockfish larval survival rates increases with age of the spawner. The analysis show that the reduction in reproductive output is counterbalanced by an increase in resiliency in the stock recruitment curve resulting in stable *Fmsy* estimates for three different measures of reproductive output. The SSC questioned the applicability of data on one species (black rockfish) to another species (POP) and the extrapolation of laboratory results to the field. The SSC notes that larval viability studies have been initiated for POP from the Kodiak area by the Alaska Fishery Science Center in cooperation with the University of Oregon. Measures of oil globule sizes may also be a useful index of larval viability in field-collected specimens. The SSC appreciates these efforts and is looking forward to further analyses as Alaska-specific information becomes available.

### Review of Economic Research

Ron Felthoven (AFSC, Economic and Social Science Research Program) presented an overview of ongoing and recently concluded economic and socioeconomic research conducted or coordinated by the AFSC ESSRP. Harrison Fell (University Washington and AFSC ESSRP) presented results of an analysis of trends in wholesale pollock prices.

The breadth and diversity of research projects is impressive. While many of the projects address basic research questions, many projects are directly applicable to retrospective and prospective evaluation of regulatory actions adopted by or contemplated by the Council. **The SSC strongly encourages Council staff to consult with AFSC ESSRP at early stages in the preparation of regulatory analyses to incorporate results from applicable AFSC ESSRP studies.** In addition, the SSC encourages the AFSC ESSRP to include accessible summaries of ongoing and recently completed studies as the body of the Economics SAFE, retaining the current tables as appendices. The SSC also encourages the Council and AFSC to explore the possibility of organizing occasional economics and social science research workshops that would help facilitate exchange of recent research findings among agency and university economists relevant to Council managed fisheries.