North Pacific Fishery Management Council

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Date: 6/1/98

MINUTES
Scientific and Statistical Committee
April 20-22, 1998

The Scientific and Statistical Committee of the North Pacific Fishery Management Council met April 20-23, 1998 at the Anchorage Hilton Hotel in Anchorage, AK. All members were present:

Richard Marasco, Chair	Jack Tagart, Vice-Chair	Doug Larson
Harold Weeks	Dan Kimura (Alt.)	Phil Rigby (Alt.)
Sue Hills	Keith Criddle	Terry Quinn
Seth Macinko	Milo Adkison	

C-1 Inshore-Offshore 3

The SSC received staff presentations from Chris Oliver and Darrell Brannan. Mike Downs of Impact Assessment, Inc. presented the analysis in Appendix II titled "Inshore/Offshore-III Social Impact Assessment." Glenn Haight of Alaska Department of Community and Regional Affairs and Scott Miller of McDowell Group presented Appendix III titled "State of Alaska Analysis of Inshore/Offshore Impacts on the CDQ Pollock Program." Tim Ragen of NMFS AK Region discussed potential Steller sea lion impacts. Public testimony was received by John Gauvin for Groundfish Forum, Donna Parker representing Arctic Storm and Glacier Fish Co., Paul Peyton of Bristol Bay Economic Development Corporation, Rebecca Baldwin of Economic and Environmental Analysts, Eugene Asicksik of Norton Sound Economic Development Corporation, Jim Wilen for At-Sea Processors Association, Paul MacGregor and Ed Richardson of At-Sea Processors Association, and John Iani of Unisea.

The SSC wishes to commend Council staff for the manner in which the analysis was developed and presented. The SSC and other Council participants had opportunities to hear of the major analytical issues and data limitations at every meeting since July 1997. Equally important, the draft EA/RIR was made available to reviewers well in advance of the meeting so there was an opportunity to read and evaluate it.

The main body of the EA/RIR and Appendix I should be sent out for public review after making some relatively minor adjustments. Appendices II and III require somewhat greater modifications before release for public review, and should not be sent out until after they are revised.

EA/RIR and Appendix I (Sector Profiles)

As noted, these documents require some minor adjustments. A portion of Table E-4 on page E-6 is confusing and potentially misleading. The row dealing with catcher vessel revenues should be labeled as such. In this row, the value reported under the catcher-processor column should be footnoted to reflect that this value does not

include, or pertain to, the value of raw fish harvested directly by catcher-processors. Because new information has been received from NMFS about marine mammal concerns related to pollock catch in the CVOA, it would be helpful to highlight alternatives that are likely to result in constant or lower percentages of the pollock catch being taken in the CVOA. Finally, the presentation of utilization rates on page 85 notes the inclusion of CDQ pollock catch and production data but it is not clear whether other presentations of catch data that appear in numerous locations in the document (for example in Tabs 1-2 of Appendix 1) include CDQ pollock catch. This ambiguity should be eliminated.

A number of important limitations should be taken into account when interpreting the quantitative estimates presented in these documents. First, the analysis is linear in all variables, meaning that all changes identified are directly proportional to the basic changes in pollock quotas. Second, because the costs of operation are unknown, and potential changes in product price, product form, and recovery rates could not be predicted, the quantitative predictions of changes in gross revenue should not be considered to be indicative of changes in net economic benefit. Similarly, changes in overall utilization rates should not be equated with improvements in net economic benefit.

It is not clear that quantitative projections based on a particular point in recent history provide good predictions of what will in fact happen in the future under different Council allocation choices. Many of the indicators of interest to the Council, such as product recovery rates, catches of pollock by area, bycatch rates, prohibited species rates, Alaska employment, and wage rates, are themselves influenced by firm level decisions. They can be expected to change as the fleets become aware of Council concerns and respond to them, and as they respond to changes in the management environment. Their levels also tend to be variable both over time and across the fleets.

Third, methods used to estimate catch differ by sector. Little is know about the accuracy and precision of these estimates. This statement should not be interpreted as implying anything about the relative values of these two statistical criteria. It is for this reason that the document highlights the different bases used to construct utilization rates.

When considering I/O3 allocation choices in light of marine mammal concerns. The SSC suggests that the important concerns over marine mammal/fishery interactions are better addressed directly, through other measures, rather than by constraining choices in an allocation decision.

Appendix II (Socioeconomic Descriptions and Social Impact Assessment)

The SSC was concerned that this document presented assertions which were difficult to evaluate scientifically because of inadequate documentation of the underlying methodology and approach. Before release for public review, this document should be revised to include sections describing the methodologies employed, the sampling frame for data collection, and the field protocol or survey instrument(s) used to collect information. More information is needed on how many interviews were conducted, what they covered, and how the data they generated was used analytically to draw the conclusions presented in the document. In addition, the employment information needs to be updated to reconcile with the employment data recently supplied by Council staff as part of the EA/RIR analysis. Similarly, ownership data should be reconciled with that provided in the EA/RIR.

Appendix III (Analysis of Inshore/Offshore Impacts on the CDQ Pollock Program)

This document identified the methodology used, limitations, and qualifications to conclusions drawn, as well as presenting the survey instrument used to collect the data analyzed. The SSC requests that prior to release of this document for public review, the authors prepare an Appendix that reduces the survey responses into "bullets" that reflect the diversity of opinions offered by respondents, subject to maintaining confidentiality of individual entities.

C-2 Essential Fish Habitat

Dave Witherell of Council staff introduced this agenda item; Lowell Fritz (AFSC) and Cindy Hartman (NMFS-AKR) presented the Core Teams' and NMFS' recommendations for the identification and description of Essential Fish Habitat (EFH). Tory O'Connell (ADF&G) discussed a related proposal to close the Cape Edgecumbe pinnacles to all fishing, and showed a brief video of the seamount taken during a 1997 submersible dive.

This amendment proposal responds to the mandate of the Sustainable Fisheries Act; staff and NMFS have discussed their approach and progress with the SSC since 1996. The analysts have done an excellent job. Their efforts and initiative -- particularly in defining and using level O information -- has helped guide the development of NMFS policy guidelines on EFH identification and description at a national level. The entire process represents an important step in the evolution of fisheries management philosophy and practice toward a more risk averse and ecological approach.

The Council document incorporates new sections on habitat and distribution of non-FMP species, brings the salmon EFH document into a comparable format with those for groundfish, scallop, and crab; evaluates management measures and research needs for habitat protection; revises the section on fishing-related habitat threats; and expands the section on habitat areas of particular concern.

The SSC has several recommendations concerning the organization and content of this amendment package.

(1) We suggest that the definition and use of level O information be clarified in the discussion. As we understand it, level O may be used for three scenarios: no information; habitat inferred from similar species; and some opportunistic information. The first sub-tier would not be used for EFH identification, but the latter two sub-tiers would be. This distinction, and the use of the sub-tiers of level O information should be clarified.

(2) We suggest increased emphasis on the criteria for defining habitat areas of particular concern (HAPC-Section 14, Table 1, p. 327). Clear criteria will assist the public in putting forward proposals for designating HAPC, and will assist the staff and analysts in prioritizing and analyzing proposals. To avoid the need to go through a plan amendment process for each area to receive consideration for HAPC designation , the SSC suggests that the criteria and the process be frameworked in this amendment. Finally, we suggest that at least some burden of providing factual information and clear rationale be placed on the proposers of areas for HAPC designation. We also suggest that a draft monitoring plan for areas of particular concern be included when areas are designated. Long term monitoring will be essential if we are to evaluate the effectiveness of protection efforts, and as a means to help us understand the interplay of natural and human-caused environmental changes.

(3) We suggest that the proposal for closure of the Cape Edgecumbe pinnacles be made a distinct decision item within this amendment package. We suggest that the material pertaining to consideration of this closure be collected into one section of the document to frame and support the bases for an independent decision. As the first potential closure to protect EFH in association with the SFA mandate, this Council decision will set a precedent and thus, we also request that a brief narrative be included which outlines how this area meets the draft criteria presented in Section 14, Table 1, p 327.

With the inclusion of these change, we recommend this amendment package go forward for public review.

C-4(b) BSAI Pollock CDQ Rollover

Jane DiCosimo provided a brief introduction and Glenn Haight (AK Dept. of Community and Regional Affairs) and John McNair (ADF&G) presented a report on the implementation and regional impacts of the Councils pollock CDQ program. John Pipkin provided public testimony. We recommend that the amendment be sent out

for public review. We note that the document presented does not contain a thorough social and economic assessment. The SSC believes the Council has a long-term interest in directing attention to and assessing the economic and social impacts of its CDQ programs. The documents associated with the inshore-offshore agenda item indicated that there are at least three "perspectives" from which the effects of the programs can be viewed - the half-dozen CDQ groups; the industry partners, and the individual rural communities. We have the least understanding of the effects of the CDQ program at the individual community level, and that will be needed for a longer term assessment and understanding of this program. In general, consistent data on economic performance and employment are lacking.

C-6 Social and Economic Data Collection

Darrell Brannan (NPFMC) briefed the SSC on progress towards developing an amendment to mandate the collection of socioeconomic data. The Council has named a Socioeconomic Data Committee that will meet this week to help guide development of the amendment. The SSC lauds this effort and looks forward to reviewing the draft amendment.

D-1(a) Streamline the TAC Setting Process

The SSC received a briefing by Jane DiCosimo on the proposed Groundfish FMP amendment to streamline the annual TAC setting process. The Council is prepared to take final action on the amendment at this meeting. The SSC supports the adoption of Alternative 2 which replaces the current preliminary TAC setting process by carrying over the prior year's TACs. This action reduces the work load of the NMFS regional staff and stock assessment scientists who prepare the annual preliminary SAFE and interim TACs. The SSC notes that NMFS regional staff is drafting edited language for the proposed amendment to define and clarify the delegation of in-season management authority. This authority is necessary to provide flexibility in the TAC setting process for those instances where the Council's adopted final TACs vary substantively from the prior year's TAC. This authority is an essential element of the amendment. The SSC hopes the amendment can be implemented expeditiously and be in place for the 1999 TAC setting process.

Comments on Suggested format for the September SAFE report and Outline of December SAFE report Chapters.

Revise the suggested format for the September SAFE report.:

(1) For each species and area, summarize:
(a) what new information will be available and used in the December SAFE report,
(b) the methodology to be used (model and harvest strategy),
(c) what change(s) if any in the methodology are anticipated compared to last year,
(d) if possible, an appraisal of whether any significant changes in estimates of biomass, ABC, or other quantities.

(2) If new models and/or implementation software are to be used, then the analyst should present a preliminary report that describes the detailed changes in methodology, provides sufficient data and results to evaluate the appropriateness of the change and the impact of the new approach on yield projections.

Comments on the December SAFE report Outline:

The SSC intends to review this outline in detail in June. A subcommittee comprised of Quinn, Marasco, Tagart, and Weeks will conduct a preliminary review prior to the June meeting. The proposed outline will be compared to previous versions and to a checklist contained in the NRC Report "Improving Fish Stock Assessments."

Further comments by analysts and Plan Team members between now and then are welcome. Some items flagged at this meeting include:

(1) The new MSFCMA standards involve rebuilding to some target biomass level over a ten-year projected period. Therefore, the 5-year projections listed in the outline should be changed to 10-year projections, in order to assure that harvest policies do not lead to unwelcome changes in population condition.

(2) Uncertainty in estimates of population parameters, projections, and harvest strategies should be more explicitly referenced in the Outline, in line with previous SSC recommendations. Attempt to provide error estimates for essential population parameters and to undertake stochastic projections of future population biomass should be encouraged. Development of risk indices (such as probability of falling below a specified population level and probability of a significant reduction in harvest) should be developed.

(3) Under time series, two additional time series would be helpful:
(a) A time series of actual exploitation rates (or fishing mortality rates)
(b) an indication for the other time series of measures that were implemented that created discontinuities (e.g. changes in ABC guidance could have created discontinuities in the time series of catch; changes in area or gear allocations could have created discontinuities in catch at age or catch at length; changes in assessment models or techniques could have created discontinuities in estimated biomass).

D-1(c) Prohibit the use of bottom trawls in directed pollock fisheries of the Bering Sea and Aleutian Island and reduce PSC catch.

The SSC heard staff presentation from Dave Witherell and public testimony from Dorothy Childers, AMCC, and John Gauvin, Groundfish Forum.

The SSC recommends that the document be released for public review after addressing the following issues:

(1) An examination of bycatch rates of pelagic trawl gear pre and post closure of bottom pollock fishing (i.e. when the performance-based definition of pelagic gear comes into effect.)

(2) A determination and brief discussion of the number of operations targeting pollock with bottom trawl and alternatives available to them subsequent to a bottom-trawl prohibition.

(3) Standardize the methods for evaluating bycatch benefits and costs, and report savings of other groundfish as well as prohibited species resulting from a bottom-trawl prohibition.

(4) Thoroughly identify the flexibility to constrain bottom-trawling for pollock under the status quo, and discuss pros and cons of this approach contrasted with proposed alternatives.

(5) Contrast the gear based alternatives with performance based alternatives.

D-1(d) Groundfish Overfishing Definitions

NPFMC has had a long history of developing conservative management strategies to prevent overfishing. The actions contemplated under Amendment 56 to the BSAI and GOA groundfish plans seek to further improve these strategies using guidance from the MSFCMA and proposed NMFS guidelines (the latter of which have not been published but are available in draft form). It could be strongly argued that the current overfishing definitions are completely sufficient to meet the MSFCMA prescriptions, so that no further action would be required. Nevertheless, a counter point of view is that some parts of the current definitions should be modified to be more

conservative. Because new overfishing definitions need to be in place by October 1998, the SSC suggests that at this time a single alternative presented be limited to technical changes to improve internal consistency of the control rule among different information levels and to comply with the provisions of the MSFCMA.

The alternatives in Amendment 56 are fairly complex and difficult to compare in detail to the current approach. As noted in detail below, the SSC proposes a substitute Alternative 2 and recommends that Alternative 3 be dropped from this amendment package. Alternative 3 requires the subjective determination of relative stock level; the SSC believes it is premature to codify this practice at the current time and that there may be better alternatives. Other features of the original Alternative 2 and Alternative 3 should be further considered in a later amendment package to be submitted after consideration by stock assessment analysts, the Plan Teams, and the SSC. Since the analysis in Amendment 56 shows that there is little change in ABC under the alternatives, this two-phase approach should provide a more deliberative consideration of overfishing.

The substitute Alternative 2 appears in full at the end of this section. We have incorporated some salient features of the original Alternative 2 but not all. Major features incorporated include:

(1) probability density functions for biomass (when available) and use of the geometric mean as the default measure of the best estimate of biomass,
(2) a change to Tier 2 that sets the F_{OFL} to F_{MSY} (lower than before) and reduces F_{ABC} accordingly, and
(3) a change to Tiers 3 and 4 that replaces $F_{30\%}$ by its MSY surrogate $F_{35\%}$.

Major features not incorporated include:

(1) a change to Tier 3 replacing $B_{40\%}$ by $B_{35\%}$ (which would be less conservative than present),
(2) a more complicated set of proxies for biomass and fishing mortality depending on the amount of information (this needs consideration by analysts and the Plan Teams),
(3) determination of a set of minimum stock size thresholds (MSST) that trigger rebuilding actions according to the NMFS Guidelines (see our rationale below), and
(4) a change to Tier 6 using average catch over all years rather than the years 1976-1995 (our reason for a fixed period is so that a recommended ABC does not change simply because this year's catch is held below this year's ABC.)

The SSC is recommending in point 3 that the NMFS Guideline to establish MSSTs ***not*** be followed. The NMFS Guidelines are suggestions, not statutes. The Council policy of using a biomass-based policy that reduces fishing mortality as stocks decrease in size was deliberately selected to provide for automatic rebuilding. In contrast, the NMFS guideline does not require action until stocks approach the MSST. There is substantial literature to indicate that a biomass-based policy is comparable to or better than a threshold policy. The added complexity of a threshold policy on top of a biomass-based policy serves no useful purpose, is harder to implement, and will be harder for the public to understand. The current stock assessment approach is sufficient to assure that harvest levels provide for sufficient rebuilding within the specified period of 10 years found in the MSFCMA.

Further comments and suggestions:

Clarity: The EA/RIR is difficult to follow. Symbols are used inconsistently and several symbols referred to the same quantity. Several rules of thumb for making calculations are inadequately referenced. Explanations for many steps are lacking. The document needs to be more user-friendly.

Incorporation of uncertainty: The new procedure contained several methods for adding conservatism as uncertainty increased. This was achieved principally through adjusting quotas or target fishing rates using the ratio of the harmonic and arithmetic means of a probability distribution in reference points involving fishing mortality and the use of the geometric mean in probability distributions describing projected and reference

biomass levels. All sources of conservatism should be explicitly identified. The degree of adjustment for uncertainty could be better justified.

Use of proxies: When data preferred for setting the fisheries control rule and overfishing limits are unavailable due to limited data, proxy measures are calculated. These proxies were primarily chosen to achieve consistency in the control rule among different information states. However, with poorer information it might be appropriate to choose proxies to incorporate an increased level of conservatism. Some proxies are chosen for mathematical convenience but cause confusion (e.g. the use of current biomass as a proxy for B_{MSY} is done to make the formula work and does not really mean that we believe that current biomass is equivalent to B_{MSY}).

Subjective assessments: Alternative 3 of the proposal included a process whereby when little information was available regarding stock status, the SSC would provide a subjective judgement of the relationship of stock biomass to its MSY level. SSC members were uncomfortable with this idea, while acknowledging that they had done such things in the past. Alternatives to this approach should be explored. Adjustment of biomass levels based on variance estimates (e.g. use of lower limits of confidence intervals) might be considered.

Validation: It was clear that Alternatives 2 and 3 as presented provide elements necessary for an improved procedure (a consistent methodology for calculating ABC and overfishing limits, procedures became more conservative as uncertainty increased). However, it is not obvious that the alternatives proposed would necessarily perform better than the current policy in providing harvest and ensuring viability of the stock. The necessity for consistency in the control rule for these purposes is not obvious, nor is it guaranteed that the types and degree of conservatism incorporated to account for uncertainty are optimal. These questions could be answered with a simulation study that examined performance among a reasonable suite of models of groundfish population dynamics, such as Bill Clark's study of optimal harvest rates.

Substitute SSC Alternative 2 (underlining denotes additions; strikeout indicates deletions)

Overfishing is defined as any amount of fishing in excess of a prescribed maximum allowable rate. This maximum allowable rate is prescribed through a set of six tiers which are listed below in descending order of preference, corresponding to descending order of information availability. The SSC will have final authority for determining whether a given item of information is "reliable" for the purpose of this definition, and may use either objective or subjective criteria in making such determinations. For tier (1), a "pdf" refers to a probability density function. For tiers (1-3), the coefficient α is set at a default value of 0.05, with the understanding that the SSC may establish a different value for a specific stock or stock complex as merited by the best available scientific information. For tiers (2-4), a designation of the form "$F_{X\%}$" refers to the F associated with an equilibrium level of spawning per recruit (SPR) equal to $X\%$ of the equilibrium level of spawning per recruit in the absence of any fishing. If reliable information sufficient to characterize the entire maturity schedule of a species is not available, the SSC may choose to view SPR calculations based on a knife-edge maturity assumption as reliable. For tier (3), the term $B_{40\%}$ refers to the long-term average biomass that would be expected under average recruitment and $F=F_{40\%}$.

1) *Information available: Reliable point estimates of B and B_{MSY} and reliable pdf of F_{MSY}.*

   1a) *Stock status:* $B/B_{MSY} > 1$

   $F_{OFL} = \mu_A$, the arithmetic mean of the pdf

   $F_{ABC} \leq \mu_H$, the harmonic mean of the pdf

   1b) *Stock status:* $\alpha < B/B_{MSY} \leq 1$

   $F_{OFL} = \mu_A \times (B/B_{MSY} - \alpha)/(1 - \alpha)$

   $F_{ABC} \leq \mu_H \times (B/B_{MSY} - \alpha)/(1 - \alpha)$

   1c) *Stock status:* $B/B_{MSY} \leq \alpha$

   $F_{OFL} = 0$

   $F_{ABC} = 0$

If reliable pdf's for B and B_{msy} exist, the default point estimate is the geometric mean (this applies to biomass measures in the other tiers as well).

2) *Information available: Reliable point estimates of B, B_{MSY}, F_{MSY}, $F_{35\%}$, and $F_{40\%}$.*

   2a) *Stock status: $B/B_{MSY} > 1$*

   $F_{OFL} = F_{MSY} \times (F_{35\%}/F_{40\%})$ F_{MSY}

   $F_{ABC} \leq F_{MSY}$ $(F_{40\%}/F_{35\%})$ x F_{MSY}

   2b) *Stock status: $\alpha < B/B_{MSY} \leq 1$*

   $F_{OFL} = F_{MSY} \times (F_{35\%}/F_{40\%}) \times (B/B_{MSY} - \alpha)/(1 - \alpha)$

   $F_{ABC} \leq (F_{40\%}/F_{35\%})$ $F_{MSY} \times (B/B_{MSY} - \alpha)/(1 - \alpha)$

   2c) *Stock status: $B/B_{MSY} \leq \alpha$*

   $F_{OFL} = 0$

   $F_{ABC} = 0$

3) *Information available: Reliable point estimates of B, $B_{40\%}$, $F_{35\%}$, and $F_{40\%}$.*

   3a) *Stock status: $B/B_{40\%} > 1$*

   $F_{OFL} = F_{35\%}$

   $F_{ABC} \leq F_{40\%}$

   3b) *Stock status: $\alpha < B/B_{40\%} \leq 1$*

   $F_{OFL} = F_{35\%} \times (B/B_{40\%} - \alpha)/(1 - \alpha)$

   $F_{ABC} \leq F_{40\%} \times (B/B_{40\%} - \alpha)/(1 - \alpha)$

   3c) *Stock status: $B/B_{40\%} \leq \alpha$*

   $F_{OFL} = 0$

   $F_{ABC} = 0$

4) *Information available: Reliable point estimates of B, $F_{35\%}$, and $F_{40\%}$.*

   $F_{OFL} = F_{35\%}$

   $F_{ABC} \leq F_{40\%}$

5) *Information available: Reliable point estimates of B and natural mortality rate M.*

   $F_{OFL} = M$

   $F_{ABC} \leq 0.75 \times M$

6) *Information available: Reliable catch history from 1978 through 1995.*

   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

   ABC ≤ 0.75 × OFL

D-1(e) Seasonal/Area Apportionment of Atka Mackerel

Lowell Fritz (NMFS AFSC) and Tim Ragen (NMFS AKR) led the SSC through a review of the draft EA/RIR/IRFA for an amendment to further apportion the Atka mackerel TAC in the Aleutian Islands. John Gauvin (Groundfish Forum) and Fran Bennis (AMCC) testified, and Mike Symanski (Fishing Company of Alaska) commented from the gallery.

The proposed amendment is motivated by the apparent localized depletion of Atka mackerel during prosecution of the fishery. Evidence from scats suggests that Atka mackerel are a prominent feature of the diet of Steller sea lions in the neighborhood of their rookeries and haulouts in the Aleutian Islands. The majority of commercial fishing removals of Atka mackerel are from waters within 20 nautical miles of these rookeries and haulouts, a region identified as critical habitat for the Steller sea lion. While the overall exploitation rate for Atka mackerel is estimated to be about 12%, recent work by Fritz suggests that exploitation rates may exceed 90% in some heavily fished areas. There is concern that despite a modest overall exploitation rate, the high exploitation rates within critical habitat may present an impediment to the recovery of Steller sea lion populations.

Although the SSC is aware that the draft EA/RIR/IRFA would need to be released for immediate public review if the Council is to take final action in June, we cannot endorse its release at this time. The draft document is missing several sections and includes only preliminary analyses of the suggested alternatives. A clear problem statement would facilitate analysis and evaluations of the alternatives. In addition the SSC has several questions about the Leslie model upon which the apparent higher local exploitation rate is based. Also, it would be helpful if the analysts could examine more closely the apparent discrepancy between the overall exploitation rate derived from age-structured population models and the aggregate exploitation rate suggested by the Leslie model. Analyses examining CPUE trends by individual vessel could be useful to see if there are catchability changes overtime. Inclusion of additional explanatory variables such as tidal changes or changes in vessel operations (e.g. switching depths to catch other species) could be useful to validate local depletion in contrast to other phenomena.

The concentration of Atka mackerel provides an unique opportunity to design management and monitoring measures to understand effects of various management alternatives on local exploitation rates. An adaptive system wherein different management measures are used in different sub-areas could also be used to test the effects of management measures on sea lion population components, but it could take a decade or more to obtain clear indications of this relationship.

The SSC recognizes that the Council may wish to take some action that will affect the 1999 fishing season. The draft document does not give enough data and analysis to choose among the alternatives. Furthermore, there will not be sufficient time for a thorough review of a revised document in time for final action in June. Therefore, the Council might want to consider an interim measure with one year sunset that addresses the localized depletion concern. Such an interim measure would allow time for a more thorough analysis and debate of the proposed amendment.

D-2(b) Pollock Density Factors

The SSC received a report from Sarah Gaichas, NMFS, regarding further analysis of the pollock density factors used to estimate total catch weight from catch volumes. Public testimony was provided by Steve Hughes, NRC. The NMFS had conducted *in situ* tests of the use of "flow scales" to measure catch weight at sea. These tests were conducted aboard the F/V *American Triumph* in 1996/97. Concurrently, researchers used the flow scale experiments to estimate density factors needed to convert estimated catch volume into catch weight.

Prior to these experiments, NMFS required at-sea observers to estimate density through basket sampling. NMFS recognized the large measurement error associated with these estimates and sought to reduce that error during the flow scale experiments. The revised estimates reflected a higher density (1.02 t/m^3 for codend volumes, and 0.98 t/m^3 for bin volumes) than previously employed (0.93 t/m^3). Due to the change in rates, the results became controversial. Principle complaints were that the estimated rates were derived from measurements aboard an atypical vessel, and that experimental protocols were inconsistent with operational fisheries. Industry expressed concern that experimental procedures to limit the water entering the ship's bins failed to reflect actual practice of an active fishing vessel.

NMFS conducted additional analyses of data obtained from the F/V *American Triumph* to evaluate industry criticisms. First the representativeness of bin size and place were examined. The *American Triumph* bins were found to bracket the range of bin sizes observed in the fleet. Upper deck bins were small, lower deck bins large. Many vessels in the fleet are equipped with bins of intermediate size. No conclusions could be drawn regarding the contribution of bin size to potential errors in density estimates.

Next, NMFS tested the effect of water volume on the density estimate. Two hypotheses were evaluated: one that density would decline linearly with increasing water in the bin, and the second that density was constant with

increasing water. The evidence supported the second hypothesis. As a result, the revised density estimates are regarded by NMFS as applicable to operational fisheries. The SSC concurs.

D-3 Scallop Overfishing Definitions

Dave Witherell, and Peggy Murphy, ADF&G gave staff presentations. The SSC recommends that the document be released for public review.

The SSC noted the discrepancy between the groundfish FMP and proposed scallop definitions of overfishing, MSY, and OY. The definitions for similar levels of information (i.e., Tier 5 under the groundfish FMP for two scallop stocks and Tier 6 for all other scallop stocks) were more conservative (harvest levels would have been reduced 25%) using the groundfish FMP calculations than using the scallop teams methodology. The SSC recommended that in the future the scallop team examine reconciling their approach with that of the groundfish team.

D- 4 Crab Overfishing Definitions

The SSC heard from Peggy Murphy, ADF&G and Bob Otto, NMFS on this issue. Public testimony was received from Arne Thompson, Alaska Crab Coalition. Mr. Thompson was generally supportive of the document, but expressed concern about the ability of the procedure to accommodate a recovery in the Bristol Bay red king crab stock. The SSC recommends that the document be sent out for public review pending minor modification. The amendment specifies point estimates of MSY. The SSC believes that it is preferable to specify only the procedure that will be used to estimate MSY. This is especially important for crab stocks which tend to be volatile and affected by shifts in climatic regimes.

The SSC requested that examples illustrating methods that will be used to make annual overfishing determinations be included in the document. The connections between overfishing and MSY calculations and calculation of guideline harvest levels should be clarified.

The SSC noted the discrepancy between the groundfish FMP and proposed crab definitions of overfishing, MSY, and OY. It is recommended that in the future the crab team examine reconciling their approach with that of the groundfish team.

D-5 Salmon Overfishing Definition

Staff presented an overview of the draft EA/RIR which contained a summary of Magnuson-Stevens Act requirements, NMFS national standard guidelines, and presently revised state management policies, and policies of the Pacific Salmon Commission. The SSC recommended the document be released for public review.