DRAFT

MINUTES
SCIENTIFIC STATISTICAL COMMITTEE
October 4-6, 2004

The Science Statistical committee met October 4-6, 2004 at the Centennial Hall in Sitka, AK. Members present:

Rich Marasco, Chair	Gordon Kruse, Vice Chair,	Keith Criddle
Mark Herrmann	Sue Hills	Anne Hollowed
Franz Mueter	Ken Pitcher	Terry Quinn
David Sampson	Doug Woodby	

Members absent:

Steve Hare	George Hunt	Seth Macinko
Farron Wallace		

B-7 Protected Species Reports

Staff presentations were primarily by Bill Wilson (NPFMC) with additional information provided by Bridget Mansfield (NMFS AK region), Thorn Smith (North Pacific Longline Association), and Paul McGregor (At-Sea Processors Association). Public testimony provided by Terry Leitzel of Icicle Seafoods.

The SSC found the inclusion of a Protected Species Report to be a valuable addition and complements NPFMC staff member Bill Wilson on both the detailed report and his succinct presentation to the SSC.

C. Seabirds. The SSC, after hearing presentations by Thorn Smith and Paul McGregor, was impressed and supportive of research and technique development by both longline and trawl fishery groups to avoid seabird mortality. This proactive approach is a model that might be considered by both industry and agencies to address potential issues.

E. Northern Fur Seals (NFS). The SSC received reports on a) the Draft EIS on renewing the fur seal subsistence harvest regulations, and b) a status report on most recent counts of NFS in Alaska. The draft EIS raises the issue of the cumulative indirect effects of commercial fisheries on NFS, giving it a negative conditional significant rating, without providing an in-depth assessment. We were told that NMFS is planning a new EIS on NFS management in general that will include a more in-depth assessment incorporating new data and changes in the fishery, but no timeline was given. The SSC encourages NMFS not to delay in producing the new EIS. The SSC notes that the CS- rating is likely to attract the public's attention. It would seem advisable to review what is known about the foraging range of reproductive females with pups on the Pribilof rookeries, what prey are utilized and the relationship with current fisheries. A useful exercise would be to plot the female foraging areas, what is known about prey utilization, and overlay this with fishery harvest data. Also it would be useful to review what is known about reproduction and age-specific survival and insights into mechanisms involved in the decline. The planned EIS is the appropriate place to include a thorough review of the current state of knowledge of fur seal biology, particularly in regard to possible relationships with fisheries. Although management of fur

seals is an important consideration, it is unlikely that directed harvest of the magnitude currently occurring is a driving factor in the decline.

Although the absolute number of NFS is large (~750,000), the continued unexplained decline in NFS numbers raises concerns. NFS have declined by about 60% since the early 1970s and there is a suggestion that the decline may be accelerating. NMFS should be encouraged to intensify research with focus on population limitation.

G. Steller Sea Lion Recovery Team. The SSC notes that the definition of critical habitat has been of concern to the Council and that we have understood in the past that this issue will be dealt with in the Recovery Plan. The draft table of contents mentions habitat only in the descriptive section under "Habitat Characteristics and Use." The SSC encourages the Recovery Team to address this issue substantively, incorporating what has been learned about SSL critical habitat since publication of the most recent Biological Opinion.

L. List of fisheries for 2003. The LOF summary document should not be released without the accompanying analysis and without careful qualifications regarding the assumptions underlying Table 1. It should be prominently noted that the values of "*Estimated Incidental Annual Mortality and Serious Injury*" for killer whale and humpback whale reported in Table 1 reflect a decision to double-count mortality-serious injury events. Faced with insufficient information to assign mortality-serious injury events to specific marine mammal stocks, the analysts chose to assign single mortality-serious injury events involving killer whales to both the transient and resident sub-units of Eastern North Pacific killer whale stocks. Similarly, the analysts chose to assign single mortality-serious injury events involving humpback whales to both the western and central sub-units of North Pacific humpback whale stocks. A more appropriate approach would have been to have weighted the mortality-serious injury events by the probability that they involved marine mammals from particular population sub-units. For example, if it was equally likely that incidents which were observed in the BSAI Pacific cod longline fishery involved transient and resident killer whale population sub-units, then the estimated incidental annual mortality and serious injury values reported in Table 1 should be 0.8*0.5=0.4 for Eastern North Pacific transient killer whales and 0.8*0.5=0.4 for Eastern North Pacific resident killer whales. Similarly, if there is a 75% probability that mortality-serious injury events involving humpback whales in the Bering Sea sablefish pot fishery involved whales from the central North Pacific population sub-unit and a 25% probability that the mortality-serious injury events involved whales from the western population sub-unit, the estimated incidental annual mortality and serious injury incidence for western North Pacific humpback whales in the Bering Sea sablefish pot fishery should be 0.2*0.75=0.15. Similarly, the estimated incidental annual mortality and serious injury incidence for central North Pacific humpback whales in the Bering Sea sablefish pot fishery should be 0.2*0.25=0.05. As presently constituted, Table 1 includes biased and inconsistent estimates of incidental annual mortality and serious injury for killer whales and humpback whales; the table should be revised before being released for public review.

N(3). New trade-off tool. The SSC encourages development of a Trade Off Tool (TOT, Bump II) to sort through proposals for changes to SSL protection measures so that the concept of "no net loss" of protected areas can be assured. SSC would like to review the TOT formulation and weighting factors before it is used formally.

As stated in Appendix I page 5 from BSAI FMP revisions:

> Management measures are in place in the BSAI and GOA groundfish fisheries to protect SSL…were deemed necessary based on the hypothesis that the continued decline of the western stock of the Steller sea lion is due to nutritional stress and that groundfish fisheries contribute to this stress by competing with sea lions for their key prey species. Management measures were specifically developed to reduce competitive interaction between SSL and the groundfish fisheries…

The nature and uncertainty surrounding the magnitude of the connection (if any) between any restrictions of harvest or protection of space around SSL areas and changes in SSL numbers is unknown. As stated in the June 2001 SSC minutes, "The SSC believes that caution should be exercised in using the results of the analysis. The results should not be relied upon as indicative of actual population trajectories or as a reflection of statistically significant differences in trajectories as a consequence of alternative RPA proposals."

That is, we do not know if protection of an additional 100 square km of habitat near a rookery will result in an increase of 5 or 100 SSL or any at all. Thus any assessment framework that uses the scoring of alternative actions should be examined carefully and used with caution. Thus, TOT analyses do not represent a rigorous scientific assessment of what we expect to happen to SSL population size as a result of management actions. However, the TOT analysis could be useful to achieve a "legal" objective of not straying "too far" from the suite of protection measures that passed muster in the courts and the SSC encourages its development in that context.

C-3 EFH and HAPC

C-3a. EA/RIR/IRFA on HAPC proposals

Cathy Coon (NPFMC) and Marcus Hartley (Northern Economics) made presentations on the draft EA/RIR/IRFA for Habitat Areas of Particular Concern (HAPC). The SSC provided editorial comments and, given attention to these, agrees that the document is ready for release for public review.

C-3b. CIE Review

The SSC received a presentation by Dr. Ken Drinkwater (Marine Research Institute, Bergen Norway) summarizing the Center for Independent Experts (CIE) panel review of the effects of fishing analysis contained in Appendix B of the EFH EIS. Dr. Craig Rose (AFSC) presented the NMFS response to the review, focused solely on technical issues and recommendations for short term actions to take place prior to publication of the final EIS in January, 2005. Public comment was given by Ben Entiknap of the Alaska Marine Conservation Council, Ed Richardson of the Pollock Conservation Cooperative, Jon Warrenchuk of Oceana, and John Gauvin of the Groundfish Forum.

The SSC identified three issues for comment: 1) the use of MSST as a criterion for evaluating effects of fishing on FMP species, 2) the fishing effects model and recommendations for further analysis, and 3) the need for a precautionary approach in interpreting model results.

The MSST Criterion. The SSC sought clarification from the CIE panel chair regarding their evaluation of the MSST criterion. The CIE panel chair stated that they believe the MSST should be included as part of the impact consideration but that other information should be reviewed to complete the evaluation. The SSC agrees with this view and recommends that the final document 1) more fully describe the factors and available information considered and 2) be expanded to include additional information as indicated by Dr. Rose. The types of additional information include: time series of recruitment and spawning biomass, a comparison of the status of the stock relative to biological reference points, an analysis of spatial variation

in CPUE from the survey and possibly fishery data, analysis of the effort time trend in heavily fished and lightly fished areas, and a comparison of fish condition and food habits inside and outside heavily fished regions. The SSC requests that NMFS provides a statement of the rationale for the determination of fishing impacts on habitat. Further there is a need to clarify the meaning of "professional judgment".

The Fishing Effects Model. The SSC emphasizes the limitations of the model to assess impacts of fishing on habitat and target species. The model output largely reflects fishing intensity as modified by highly uncertain estimates of recovery rate. Given our lack of understanding of how reductions in habitat quantity and quality may affect fish productivity, the model in its current form does not support scientifically based, quantitative conclusions regarding the effects of habitat disturbance on target species. However, it can help in the qualitative interpretation of spatial patterns in CPUE, condition indices, etc., as pointed out in the CIE review. As noted in the CIE report, various potential improvements to the model are unlikely to provide significant changes in the pattern of habitat effects. For this reason, the SSC recommends that further work with the fishing effects model in the short term be focused on validation, which was a principal recommendation of the CIE review report. Validation efforts might be most productive if focused on available data from closed waters and adjacent open waters in two areas: Bristol Bay and Kodiak where data are available on fishing intensity, benthic species, and habitats in recent research by NMFS scientists (R. McConnaughey and R. Stone).

In the long-term, additional model development and improvement is recommended, focusing on obtaining more finely scaled substrate data, improvements in parameter estimates, and further validation efforts, which might include testing the model with data sets from other regions, such as eastern Canada, perhaps through collaboration with other scientists familiar with those data. The USGS sediment chart for the NGOA should be considered as a source of broader area information on substrate characteristics.

Precautionary Approach. As stated in the CIE report, "In recent years, fisheries science has been applying the precautionary approach. That is, in the absence of conclusive proof, once should proceed cautiously. Yet, there is little to no discussion within Appendix B of the precautionary approach with regards to EFH." The SSC feels that there are two places for considering precaution, one is in the interpretation of results and the other is in the specification of management actions. The latter is the purview of the Council, and, for example, in the SSC's March 2004 minutes we commented that a requirement of demonstrable linkage between habitats and fish productivity is a very high standard to achieve prior to taking management action, a standard that may not be consistent with the Council's precautionary approach. However, the former consideration of precaution should be considered in Appendix B. One example highlighted in the CIE report is the fact that 40% of the individual evaluations are considered as "unknown", yet the overall conclusions of the report (no significant effects) are at odds with the findings of the NRC (2002) report. A precautionary approach, given the large percentage of "unknown" evaluations, would bring into question the conclusiveness, if not the veracity, of the finding of no significant effects. Conclusions should be appropriately couched relative to the level of uncertainty in the analysis upon which they are drawn.

C-3c. Comment and Response report on EFH EIS

Dr. Jon Kurland presented a report summarizing public comments and the NMFS draft responses to those comments. The SSC thanks Dr. Kurland and his staff for preparation of this report.

C-4 IR/IU Amendment 80

John McCracken (NPFMC) provided the SSC with an overview of the outline for three analyses: an EA/RIR/IRFLA for amendment 80 to the BSAI groundfish management plan, a discussion paper on

subdividing BSAI TACs, and a discussion paper on the impacts of amendment 80 on BSAI parallel fisheries. It is anticipated that these analyses would proceed together with initial review in February 2005 and final action in April 2005. Public testimony was provided by Ed Luttrell (Groundfish Forum).

This is an ambitious schedule for a major analysis. The SSC would appreciate an opportunity to comment on the analysis as it is developed; a progress report should be presented to the SSC in December, 2004. Based on the draft outlines for the three analyses and discussions with staff, the SSC offers the following suggestions:

1. The analyses should address the rational for allocating bycatch based on catch history. Basing bycatch allocations on past bycatches effectively rewards those who have catch histories with large amounts of bycatch even if their bycatch rates have exceeded fleet averages; it may be perceived as rewarding "dirty" fishing.

   Alternative rules for allocating bycatch could be considered. For example, bycatch could be allocated based on target catch history and industry average bycatch rates. Another alternative would be to apply a variant of the zero-revenue auctions used in the Clean Air Act's Acid Rain Program to control sulfur emissions[a]. It is not necessary to consider an infinite variety of possible allocation criteria, but the analysis should include an explanation of why this particular criterion was selected and whether it is consistent with the objectives outlined in the Council's problem statement.

2. The analysis should include motivation for the proposed criteria for in-season reallocation of unharvested bycatch to "most similar" fisheries. Alternative rules for in-season reallocation could be considered. For example, an auction of unneeded bycatch allocations would ensure that the bycatch allocations would be available to those fisheries for which bycatch limits impose the highest opportunity costs. Such an allocation criterion could be justified as a mechanism for recovering costs associated with management and observer costs needed for verifying the magnitude and composition of bycatches. Alternatively, the revenues generated from auctioning the unneeded bycatches could be returned to the fishery that released the unneeded quota, thereby providing a monetary incentive to reduce bycatches. Other possibilities include the zero-revenue auction approach referenced above and the so-called "Australian drop through" system[b]. (Both of these systems are discussed in the NRC report *Sharing the Fish*). These and other alternative allocation criteria offer the prospect of reducing bycatches. Although it is not necessary to consider an infinite variety of possible in-season reallocation criteria, the analysis should include an explanation of why a particular criterion is selected and whether it is consistent with the objectives outlined in the Council's problem statement.

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[a] Hausker, K. 1990. Coping with the cap: How auctions can help the allowance market work. *Public Utilities Fortnightly* 125:28-34.

Hausker, K. 1992. The politics and economics of auction design in the market for sulfur dioxide pollution. *Journal of Policy Analysis and Management* 11(4):553-572.

Tietenberg, T.H. 1985. *Emissions Trading: An Exercise in Reforming Pollution Policy*. Resources for the Future, Washington, D.C.

Tietenberg, T.H. 1990. Economic instruments for environmental regulation. *Oxford Review of Economic Policy* 6(1):17-33.

Tietenberg, T.H. 1995. Pp. 15-32 in S. Hanna and M. Munasinghe (eds.), Design Lessons from Existing Air Pollution Control Systems: The United States. Property Rights in a Social and Ecological Context: Case Studies and Design Applications. The World Bank, Washington, D.C.

[b] Young, M.D. 1995. The design of fishing-right systems: The New South Wales experience. *Ocean and Coastal Management* 28:54-61.

Young, M.D., and B.J. McCay. 1995. Building equity, stewardship, and resilience into market-based property-rights systems. Pp. 87-102 in S. Hanna and M. Munasinghe (eds.), *Property Rights and the Environment: Social and Ecological Issues*. The Beijer International Institute of Ecological Economics and The World Bank, Washington, D.C.

3. The analysis should include a discussion of the motivation for and implications of basing the allocation on the average of catch history over the "X best years" rather than simply using the average catch history. One implication of this approach is that it will result in an allocation of catch history that is less than the best-years average. A similar approach was applied in the initial allocation of halibut and sablefish IFQ and resulted in a widespread perception that individuals received less than their past catch average. In addition, basing the allocation on a subset of the catch history reallocates catches from low variance harvesters to high variance harvesters, disadvantaging the most consistent harvesters.

4. The potential impact of the alternatives considered in this suite of analyses on the quality of data collected for management and the cost of collecting that data through the North Pacific Observer program need to be carefully explored. In addition, there should be an examination of the tradeoff between increasingly fine scale management and confidence in bycatch estimates.

5. The analysis should include a discussion of potential spillover effects for other BSAI and GOA fisheries and of implications for the processing sector.

6. The analysis should include a discussion of transfer provisions and transfer restrictions, and the rational for limits on transferability within the fishery and between fisheries. Specifically, the analysis should discuss within-season transfer provisions, provisions related to annual transfers, and provisions related to permanent transfers. In addition, the analysis should consider the impact of provisions related to the divisibility of bycatch allocations, for example, can crab bycatch allocations be transferred independently of halibut bycatch allocations.

7. To date, the regulatory impact reviews prepared for Council consideration have adopted a cost-benefit analytic (CBA) framework. Under a CBA framework, the analysis seeks to characterize the magnitude of consumer and producer surplus under the status quo and under the proposed alternatives; and thus requires statistical models of the demand for and supply of market and non-market goods and services. The SSC is concerned that data necessary for developing quantitative estimates of the costs and benefits associated with the alternatives are unavailable, and that even if the data were available, that the econometric analyses based on the data could not be completed in time to be included in the analytic package. OMB Guidelines[c] suggest that cost effectiveness analysis (CEA) may be an appropriate complement or alternative to CBA for certain regulatory decisions. While CEA is most often applied to rule-making related to health and safety, it may provide a useful framework for analyses where the primary benefits are non-monetary. Because the purpose of amendment 80 is improved retention and improved utilization of groundfish catches, objectives that are primarily non-monetary, CEA may be a useful framework for the analysis of this suite of proposed actions. The SSC is not aware of other applications of CEA to the analysis of alternative management measures for fisheries, consequently use of a CEA framework may attract a heightened level of review by the Secretary of Commerce and OMB. Nevertheless, if the choice is between preparing a qualitative CBA and preparing a CEA, there may be advantages to adopting the CEA framework. OMB (2003) notes:

> Cost-effectiveness analysis can provide a rigorous way to identify options that achieve the most effective use of the resources available without requiring monetization of all of relevant benefits or costs. Generally, cost-effectiveness analysis is designed to compare a set of regulatory actions with the same primary outcome (e.g., an increase in the acres of wetlands protected) or multiple outcomes that can be integrated into a single numerical index (e.g., units of health improvement).
>
> …
>
> When you have identified a range of alternatives (e.g., different levels of stringency), you should determine the cost-effectiveness of each option compared with the baseline as well as its

[c] Office of Management and Budget, September 17, 2003. Circular A-4—Guidance to Federal Agencies on the Development of Regulatory Analysis as Required under Section 6(a)(3)(c) of Executive Order12866.

> incremental cost-effectiveness compared with successively more stringent requirements. Ideally, your CEA would present an array of cost-effectiveness estimates that would allow comparison across different alternatives. However, analyzing all possible combinations is not practical when there are many options (including possible interaction effects). In these cases, you should use your judgment to choose reasonable alternatives for careful consideration.
>
> …
>
> You also may use CEA to compare regulatory alternatives in cases where the statute specifies the level of benefits to be achieved.

In the context of amendment 80, it could be argued that the level of benefit (improved retention-improved utilization) are defined in statute and cannot be readily monetized because they are non-monetary and are broadly distributed through society to citizens who cannot be readily identified a priori. The character of the benefits is that of a public good. It could also be argued that the market-based alternatives are intended to reduce the opportunity cost of achieving the management objective. Although we are unprepared to advise that CEA is the most appropriate framework for the analysis of amendment 80, we encourage staff to consider using CEA in place of or in addition to CBA.

8. In addition to considering the benefits of the proposed alternatives, the analysis needs to include an examination of the distributional consequences of the alternatives. The SSC suggests that the distributional impacts be evaluated on the basis of anticipated changes in the distribution of catches, landings, and revenues to the homeport of vessels affected by the proposed actions. While input-output analysis would provide a more detailed representation of regional economic impacts, the difficulty in assembling and refining an input-output model for the potentially affected communities are prohibitive and it is unlikely that an appropriately tuned input output model could be assembled for this analysis. Updated information on the community profiles should be included or referenced where available.
9. Characterization of the no action (status quo) alternative should account for anticipated evolution of the fishery in response to current regulations, and anticipated changes in market conditions and the availability of target and incidental stocks.

C-6 IFQ Program

Council staff, Jane DiCorso, presented the initial review of the RIR/IRFA for regulatory amendments for IFQ and CDQ halibut in areas 4C and 4D and a suite of housekeeping amendments of the IFQ program. Public testimony was provided by Joel Hanson (Boat Co.) and Simeon Spotzof Jr.

Quota harvest in halibut management areas 4C and 4D.

The SSC received the report for the regulatory amendment to modify harvest restrictions for the IFQ and CDQ fisheries in area 4C and 4D. The purpose of the proposed action is to provide additional options for area 4C QS holders to increase their catches. Area 4C QS holders have not harvested their full entitlements in recent years and allege that they would be better able to harvest their full entitlement if they were permitted to fish area 4C quota share in area 4D. The SSC notes that the proposed action to allow class D quotashares in areas 3A and 4 (below) to be fished on class C or class B vessels might affect the perceived need to allow area 4C quotashare to be harvested in area 4D.

The SSC recommends that the analysis be revised to include a discussion on whether the TAC in area 4C is simply too high relative to halibut stocks in area 4C or whether the TAC is proportional to stock abundance but halibut are unavailable to area 4C quotashare holders given the type of gear that they are

able to deploy with the vessels authorized for use in the area 4C fishery. If the area 4C TAC is too high, there should be a discussion of why it is better to allow for 4C harvest to be taken in 4D instead of reducing area 4C quota.

The SSC notes that the term "non-market values" is misused in Table 19. Instead, from the description following the use of this term it is evident that this discussion is instead dealing with "economic impacts".

This analysis typifies the continued limitations to the quality of empirical economic analysis conducted for the Council. In this analysis, as in most recent analyses, evaluation of the costs and benefits of regulatory actions is limited to a brief discussion of possible changes in exvessel revenues. The lack of cost data precludes a quantitative cost/benefit analysis and reduces the analysis to discussion of hypothetical net benefits. The lack of data and economic analysis also prevents the report author from obtaining quantitative estimates of the magnitude of economic impacts that the proposed actions may have on affected communities. The purpose and need statement speaks to concern about the significant loss of potential revenues due to unharvested catches. The magnitude of these foregone revenues does not rise to the level of significance under EO 12866, indeed, the estimated foregone revenues are nearly two orders of magnitude smaller than the level of significance recognized under EO 12866. This suggests that the Council's concern in this action is not motivated by concerns about lost net benefits to the nation, but instead about regional economic impacts. While this may obviate, in part, the need for a cost-benefit analysis, it heightens the need for a careful analysis of regional economic impacts and suggests that the analysis should have endeavored to provide a more careful assessment of regional economic impacts to fishermen and fishery dependent communities that exploit halibut stocks in areas 4C and 4D.

The SSC recommends that the analysis be released for public review after the above concerns have been addressed.

Seven proposed actions to amend halibut and sablefish IFQs

The SSC recommends that the analysis of the seven proposed actions be released for public review. Again, the general comment holds that there was very little economic analysis performed (or possible) for any of the seven amendments.

Of the seven proposed amendments the SSC made specific comments on just two. On the medical transfer amendment, the SSC notes that the issuance of medical transfers is likely to limit the ability of fisheries managers to enforce effective limits on the leasing of IFQs. Policing the validity of medical transfers, determining whether they should be limited to physical health or extended to mental health, treatment for substance abuse, limited to the quota share holder or extended to dependents, etc.

On the proposed amendment to allow class D quotashares to be fished up in areas 3B, 4A, 4B, 4C, and 4D, the SSC notes that there needs to be a discussion of the effects of these proposed alternatives on opportunities for new entrants. It is not surprising that current quotashare holders favor liberalization of restrictions on transfer and vessel size category. Potential new entrants are unlikely to be aware of the Council process or to testify regarding the potential impact of reducing the availability of class D quotashares. For example, if class D quotashares can be fished on class C vessels how will this affect the ability of new fishery entrants to purchase category D quotashares? Another issue that needs to be discussed is if class D quotashares are allowed to be harvested by class C vessels whether this might mitigate some of the problems in area 4C to catch up to their quota allocation.

C-7 Halibut Subsistence

Jim Fall (ADF&G) provided an overview of the protocol and preliminary analysis of the 2003 survey of subsistence harvests of Pacific halibut. Jane DiCosimo (NPFMC) provided a brief overview of proposed amendments to subsistence halibut fishery regulations. Public testimony was provided by Sky Starsky (Alaska Native Subsistence Halibut Commission) and Kevin Kristovich (Ketchikan?).

Subsistence Harvest Survey

The subsistence halibut registration certificate (SHARC) program was implemented in May 2003. Consequently, the 2003 survey of SHARC holders does not reflect a full calendar year of harvests and may not provide an accurate estimate of annual subsistence harvests for 2003. Moreover, because 2003 was the first year for the Halibut Subsistence program, the number and mix of SHARC holders and the magnitude of their catches may not reflect the number or composition of SHARC holders or the volume of catches in future years. Nevertheless, this survey provides a crucial baseline that will aid understanding of changes over time in the number and makeup of subsistence halibut harvesters and subsistence harvests of halibut. Administering a mail survey in rural Alaskan communities poses substantial challenges; the survey protocol involved a direct mailing to all SHARC holders, with two follow-up mailings to non-respondents, on-site interviews in some communities, and discussions with community leaders in some communities, and ultimately resulted in a 65% response rate.

Additional surveys following the same protocol are planned for 2004 and 2005. The 2004 and 2005 surveys will provide insight into changes in participation rates in the subsistence and sport fisheries in response to the liberalized gear and harvest limits in the subsistence fishery. Conduct of the 2004 and 2005 surveys may be hampered by increased numbers of invalid addresses because the SHARCs are issued for 2-years or 4-years; consequently non-response bias in likely to increase in the 2004 and 2005 surveys. In addition, familiarity with the SHARC program and annual survey could result in decreased response rates unless the 2004 and 2005 surveys are accompanied by a publicity campaign that motivates the purpose and need for gathering information about subsistence catches.

While analysis of responses to the second and third mailings in the 2003 survey did not indicate statistically significant differences between responses to the first mailing and responses to subsequent mailings, the analysis does not demonstrate that the responses received are characteristic of the fishing activities of the non-respondents (35% of SHARC holders). Many of the SHARC holders did not fish under subsistence halibut rules in 2003. It would be useful to ascertain why they did not fish. Some may have obtained SHARCs because of their novelty; others may have obtained SHARCs with the intent to participate in 2003, but were unable secure boats and gear or free time to participate; still others may have obtained SHARCs with the intent of ensuring themselves the option of participating in 2003 or in some subsequent year. In addition, it is alleged that some obtained SHARCs at the encouragement of community leaders who may have wished to demonstrate community interest in the subsistence halibut fishery.

Survey responses from Toksook Bay and from SHARC holders who resided outside of Alaska were not expanded. While the rational for not expanding these observations is reasonable, it is likely to have resulted in an underestimate of catches for residents of Toksook Bay and SHARC holders who resided outside of Alaska. To the extent that other tribes and rural communities included SHARC holders who did not intend to fish, expansion of reported catches from those communities is likely to have resulted in overestimation of catches. This highlights the need for a documented understanding of the reason why SHARC holders did not fish, as well as an estimate of the number of individuals who engaged in the subsistence fishery, but did not obtain SHARCs. (Some subsistence harvesters do not recognize state or federal authority over management of customary subsistence resources and may have refused to obtain SHARCs or refused to respond to the survey as acts of civil disobedience.)

In the future, consideration should be given to changing the survey protocol from a census of SHARC holders to a random sample of SHARC holders. The sample properties of responses drawn from a random sample are often superior to the sample properties of responses drawn from an incomplete census. For example, in the case of a random sample, it is relatively easy to structure a test of non-response bias. Moreover, the costs of administering a random sample survey are generally lower than the costs of administering a census. (These advantages are why the Alaska Statewide sport harvest survey is administered as a random sample survey rather than as a census.)

The SSC finds it difficult to evaluate whether the 2003 harvest level is, in fact, "consistent" with the 2001 estimate derived by R. Wolfe. Moreover, we recommend against using the term "consistent" when comparing those harvest levels because it implies some sort of vague equality when in fact differences in the basis for deriving the two values makes comparison difficult. The unfounded implication is that there has been little change in subsistence harvests between those years. The liberalization of gear restrictions and bag and possession limits for both rural and traditional subsistence users would intuitively suggest that overall harvests would increase. The suggestion that subsistence harvesting is self-limiting begs additional and more robust testing for changes in patterns of harvest. If self limitation of overall harvest is occurring, then collection of information of catch per trip and number of trips should demonstrate a more rapid and efficient satisfaction of catch objectives that is halted once individual needs are met.

In addition to seeking information about the number and weight of halibut caught by SHARC holders, the 2003 survey sought information about catches of lingcod and rockfish. There are concerns that estimates of lingcod catches may include catches of greenlings, cabezon and other species with big heads, elongated bodies and obscure scales (e.g. cod and sablefish). Similarly, there are concerns that estimates of rockfish catches may include various *Sebastes* and *Sebastalobus* species as well as sculpins and other assorted fishes. Moreover, because of conflict between state and federal regulation, some catches of rockfish and lingcod may have occurred in state waters using gear that is legal for the federally managed halibut subsistence fishery but not legal for catches of rockfish or lingcod in state waters. Some survey respondents may have under reported catches of rockfish and lingcod because those catches were in violation of state regulations. Because rockfish and lingcod stocks are often discrete and because these are long-lived low fecundity species, there are concerns that the subsistence halibut fishery could result in unsustainable removals of some stocks. Directed and incidental catches of rockfish and lingcod in various sport and commercial fisheries along west coast and in Alaska have reduced some stocks precipitously. The present survey of SHARC holders does not provide enough information about lingcod and rockfish catches and should be complemented with a port-sampling or carcass collection program that would allow refined estimates of removals by species. Port sampling could be costly and because fishermen may not fillet their catches and carcass bins are malodorous, a carcass collection program might be ineffective. However, because many rockfish species can be differentiated on the shape, color, and number of fin-rays on the anal fin and by the presence and pattern of spines on the gill covers, a program of dockside bins for anal fins and gill covers might provide the information needed to assign reported catches of rockfish to particular species.

Halibut Subsistence Amendments

Time constraints and the need to focus on other agenda items prevented the SSC from reviewing the full suite of 6 proposed amendments to the subsistence halibut fishery regulations. However, we note the following:

- Changing federal and state regulations to ensure that incidental catches of rockfish and lingcod taken on gear that is legal for the subsistence harvest of halibut is crucial. Without such changes, it is unclear that the SHARC survey will provide a reliable estimates of aggregate removals or localized depletion of rockfish and lingcod, let alone information about removal and mortality rates for individual rockfish species or stocks.

- Replacement cost is an inappropriate measure of the value of subsistence catches. Replacement cost assumes that demand is perfectly inelastic, that is, that there is no substitution or income effects associated with demand for the subsistence catch and that costs are irrelevant. In addition, replacement cost ignores cultural values associated with the catch and ignores the opportunity cost of time. OMB guidelines (Circular A4, September 17, 2003) support the use of willingness-to-pay or willingness-to-accept measures of benefits and costs. In this case, willingness-to-accept would be the most appropriate measure.
- "Barter for cash" is nonsensical doublespeak. There are many instances where individuals knowingly engage in monetary transactions at prices well-above or well-below prevailing market prices. Nevertheless, by definition, the transfer of goods or services in exchange for cash constitutes a "sale". Barter is the exchange of goods and services for other goods and services, not the exchange of goods and services for monetary remuneration.

> **bar·ter**
>
> **bar·ter** (bär′tər) *verb*
> **bar·tered, bar·ter·ing, bar·ters**
>
> *verb, intransitive*
> To trade goods or services without the exchange of money.
>
> *noun*
> **1.** The act or practice of bartering.
> **2.** Something bartered.
>
> *adjective*
> Of, relating to, or being something based on bartering: *a barter economy.*
>
> [Middle English *barteren*, probably from Old French *barater*. See barrator.][d]

D-2 Crab Management

Daina Stram (NPFMC) and Bob Otto (NMFS) presented an overview of the minutes from the Crab Plan Team Meeting held during September 20-22, 2004 and Bob Otto presented an overview of the 2004 Crab SAFE. There was no public testimony.

The SSC noted continued improvement in the quality of the Crab SAFE document and commends the preparers of this document for these improvements. The sections on bycatch, treatment of GHL versus actual harvest and the updated economics sections are appreciated. The SSC also noted the improved Crab SAFE despite the very short time frame between the crab plan team meeting and the October Council meeting.

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Dr. Otto reviewed catch tables from the SAFE. The SSC noted that the catch of snow crab tends to exceed the GHL on a systematic basis (Table 4 of SAFE). The SSC encouraged the CPT to investigate this further.

Dr. Otto reviewed a new section on crab bycatch mortality. The SSC was pleased to receive this new information and noted that tables 3 – 6 should be modified to include a column of estimated bycatch.

SSC members commented on the use of varying natural mortality rates in the length based stock assessment model for Bristol Bay at the end of the time series. SSC members requested a rationale for the adjustments to natural mortality at the end of the time series. It is not clear that these relatively minor adjustments to natural mortality are necessary given the expected measurement error in the survey. The SSC recommends that the analysts consider a model with constant natural mortality at the end of the time series. Comparison of model runs with and without variable natural mortality rate should address the cost of added parameters relative to improved fit to the data.

The SSC offers a comment on the Plan Team meeting minutes. Regarding the plan team's desire to equalize harvest rates on snow crabs north and south of 58.5^{o} N, the SSC endorses the team's desire to conduct further analysis of this issue but the SSC cautions that estimates of exploitation rate may be tenuous because of seasonal movement of crabs between the summer trawl survey and winter pot fishery. Nonetheless, a further analysis of clutch fullness, including the percentage of females with empty clutches, may be interesting. If the data lend themselves to such an analysis, the analysts should attempt to relate interannual and geographic changes in clutch fullness to mature male and female abundance, sex ratio, and harvest rate. Although the SSC realizes the stated motivation to equalize harvest rates, another approach may be to assure that regional harvest rates do not exceed levels that compromise female reproductive potential regardless of whether the rates themselves are equal between areas. Given the prevailing direction of bottom currents, it may well be that larvae released from the south provide important contributions to overall recruitment, so concerns about female reproductive potential in the southern region may be well placed.

The SSC appreciates the progress made to date regarding the Crab Working Group. However, the SSC remains concerned about the amount of remaining work to be done, even if the review date is shifted from March 2005 (as proposed originally) to June 2005, as now proposed. The SSC requests a report from the Working Group at each Council meeting until completed, starting with the December 2004 meeting. In the meantime, the SSC noted Grant Thompson's alternative to the fixed buffer between ABC and OFL that appeared in Alternative 3B of the SEIS and requests that the Working Group consider this option.

Finally, the SSC wishes to acknowledge and commend Doug Pengilly (ADF&G) and Gretchen Harrington (NMFS) for their work as co-chairs of the Crab Plan Team for the past six years. Their time efforts are very much appreciated.

D-3 Groundfish Management

D-3(a) Aleutian Islands Walleye Pollock ICA

Ben Muse (NMFS) gave the SSC a presentation on the determination of an incidental catch allowance of 2000 mt for the Aleutian Islands walleye pollock fishery.

D-3(b,c) Non-Target Species Committee Report and Rockfish Management Discussion Paper

Jane DiCosimo provided a report from the non-target species committee. The presentation included a problem statement developed by the Council's non-target committee. The SSC encourages the committee to continue to pursue efforts to identify management alternatives for species capture incidentally in target fisheries. The committee should strive to define thresholds for council action including a description of what protection measures would be imposed, and under what circumstances they would be required.

The SSC agrees with the Council's Non-Target Committee's assessment that proposed revisions to National Standard Guideline 1 (NSG1) and reauthorization of the MSFCMA would require management of non-target species as core species or as assemblages of species with similar life history characteristics. In the case of assemblage management, biological reference points (e.g. Flim, Blim, Ftarget, Btarget) would be required for the assemblage or a representative member of the assemblage. If the guidelines are approved, the SSC concurs with the Council's Non-Target Species Committee's assessment that the implementation of the ad-hoc working group proposal would require removal of non-target species from the FMPs. Members of the SSC and Council raised this concern in comments to NMFS regarding proposed revisions to NSG1. The SSC does not consider removal of non-target species from the FMP to be a preferred approach. To guard against the possibility that the guideline is not changed, the non-target committee might consider an alternative that would be consistent with the proposed guidelines.

D-3(d) Initial Groundfish Specifications

1. Management strategy evaluation

AFSC has established a working group to follow up on recommendations from the Goodman et al. review of NPFMC harvest strategies. The SSC strongly supports this work and agrees with the working group that management strategy evaluation has continually been a major activity of NPFMC over its history. The Working Group appears to have two major goals in its terms of reference: first to determine if the current management strategies are suitably considerate of various components of the ecosystem, and second, to determine what alternative strategies should be considered if the current approach is deficient. Beyond the considerable work already done in the PSEIS and various amendment packages, new developments are likely to require a lot of effort over a multiple year time period. The SSC urges that the working group be given the flexibility to proceed in a deliberative manner and that periodic updates be given to the Council family on future directions.

2. Aleutian Islands Walleye Pollock Assessment

The SSC reviewed the most recent stock assessment for Aleutian Island pollock and appreciates the authors' efforts to develop a detailed age-structured model and improved indices of abundance. Considering the large uncertainties in stock structure, the uncertainty in the catchability coefficient, the lack of a satisfactory biomass index, and unknown movements of pollock within and between seasons and regions, further development will be required before the model can be adopted to specify ABCs. Nevertheless, the current effort is a step in the right direction to improving our understanding of the stock.

In light of the uncertain stock structure, the SSC recommends that the analysts re-examine the rationale for the stock boundaries that were adopted for this analysis. We note that the justification for splitting off the NRA region west of 174ºW was based on differences in length-frequency between this region and the eastern Bering Sea. However, as the stock assessment authors demonstrate (Figure 7 of the assessment) these difference likely relate to differences in the time of year the fishery was conducted rather than true differences in the length-frequency composition of the population. Therefore, the original justification for the geographical split may no longer be valid.

3. Pacific Cod Biomass Distribution

Grant Thompson, AFSC, presented different weighting schemes to estimate the distribution of Pacific cod biomass between the Aleutian Islands and the Bering Sea as requested by the SSC (December 2003 minutes). Although such weighting may no longer be necessary if a new, spatially disaggregated model is adopted for Pacific cod in the future, the SSC recommends using a weighting approach to estimate biomass distributions in the interim. Specifically, the SSC recommends the Kalman filter approach to estimate current biomass because it has a strong theoretical justification and appeared to result in sensible weights, with the most recent survey estimates receiving the highest weight. The SSC advises against an approach that uses relatively large weights on the initial survey year, such as those resulting from exponential weighting with a small *p* parameter.

4. Bering Sea Aleutian Islands Shortspine Thornyhead Assessment

The SSC received a preliminary groundfish SAFE section for BSAI shortspine thornyheads, which had been grouped in the "other rockfish" category and have not previously been assessed. The SSC commends the author for exploring possible methods for assessing this stock. The author attempted to model the available catch and survey biomass data using a surplus production approach, but the fit of the model to the survey biomass estimates was not reasonable. The SSC recommends dropping the surplus production model approach and instead suggest that a refined assessment should be developed using a delay-difference, biomass dynamics, or age-based approach. Age composition data for this stock are expected to become available in two years.

5. Sharks

The SSC received a draft chapter on sharks in Council waters. The chapter, which will be included as an appendix to the GOA SAFE, will provide a compilation of available information.

6. Gulf of Alaska Rex Sole Assessment

The first age-structured assessment model for rex sole has been constructed and provided to the Plan Team and SSC for comments. The SSC endorses the new modeling effort and noted that most parameters are estimated with high precision. One main result from the model is that the fishery selectivity curve is centered toward old ages, whereas the age at maturity curve is centered toward lower ages. This creates the perception of a highly resilient stock, because individuals can reproduce several times before the fishery starts. The SSC requests that the analysts provide further insight into whether this situation is really true and what changes might occur in the future in fishery selectivity if the ABC and/or TAC were increased. Furthermore the estimated biomass is larger than survey biomass, because survey selectivity is estimated. The SSC is interested in whether the analysts believe the survey selectivity curve is well estimated, so that ABC could be determined from biomass estimated from the model rather than from the survey.

7. Dusky Rockfishes

Based on new taxonomic findings, NMFS now recognizes two species of rockfish, dusky rockfish (*Sebastes variabilis*, formerly light dusky rockfish) and dark rockfish (*Sebastes ciliatus*, formerly dark dusky rockfish). The SSC received GOA plan team recommendations to remove dark rockfish to state management, both in the Gulf of Alaska and Bering Sea / Aleutian Islands regions. The SSC encourages the Plan Teams to develop a sound rationale for this suggested FMP amendment.

8. EA/RIFR Issues

Public testimony was received by Paul McGregor (At Sea Processors), Donna Parker (Arctic Storm), and Ed Latrell (Groundfish Forum).

The SSC noted several significant beneficial or significant adverse ratings in the EA significance determinations that appeared non-intuitive. Two recommendations were made that could help clarify these and other determinations:

- The authors should clearly distinguish cases where significance is measured against an objective benchmark from cases where significance is determined relative to the status quo. The latter case implicitly assumes that harvest specifications under the preferred Alternative 2, which represents the status quo (or minor changes from it), have insignificant impacts. It should be made clear where these determinations are based on previously published findings and were not re-examined in the current EA.
- The determination of "significant beneficial" for effects on target species (Table 4.1-2) is based on the criterion that the "Action allows the stock to return to its unfished biomass". It is unclear whether a "significant beneficial" rating requires the stock to fully return to unfished biomass. If so, the benchmark appears to be impossibly high considering the relatively short time frame used in the analysis. The SSC recommends that a significant beneficial rating use a less stringent criterion based on expected increases in abundance. As another example, the introduction of nonnative species gets an S- rating for Alternative 1 for using the F for maxABC but not for others with lower F. Yet there is no quantitative criteria to explain why the magnitude of catch increase has resulted in significance.

9. Skates

In the table of GOA Plan Team ABC and OFL recommendations (part 2 of 2, page 3 of agenda D-3(d)(1)), the Plan Team followed recommended setting skate ABC and OFL levels for 2005 and 2006 following procedures adopted in 2004. Lacking a new skate stock assessment, the SSC continues to support this interim approach, which is restated here for completeness (see minutes, SSC meeting, December 2003): "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. The second group would include big and longnose skates in the Eastern and Western GOA plus *Bathyraja* skates gulf-wide. 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 Council GOA for reasons previously stated." Our minutes went on to state: "In addition to these ABC and OFL recommendations, the SSC strongly recommends that no directed fishery should be allowed for skates until a data collection plan is submitted by the industry and approved by the Council."

10. Biennial Assessments: Except for walleye pollock, Pacific cod, and sablefish, assessments for the Gulf of Alaska will now follow a 2-year cycle in synchrony with new survey information. The Plan Team will allow stock assessment authors to perform off-cycle assessments at their discretion. The SSC agrees with this approach but requests the Plan Team to establish a set of criteria to aid a stock assessment author in deciding whether the off-cycle assessment is desirable.

D-3(e)

The SSC received a report from Diana Evans on the FMP updates. The SSC thanks staff for completion of revisions to the FMPs. Ms. Evans sought input from the SSC regarding the future schedule for reviews of MSY and OY specifications. The SSC recommends that future reviews of MSY and OY specifications should occur as part of comprehensive reviews of the FMPs that will be conducted during preparation of future programmatic environmental impact s

Other Issues

Bering Sea Fisheries Research Foundation

The SSC received a presentation from Mark Maring, Gary Painter and Dr. Gary Stauffer that described the mission and goals of the new created foundation. They also described work undertaken by the Foundation during 2004. The SSC looks forward to receiving research products produced by Foundation.

Gulf Plan Team Membership

The SSC recommends that the Council appoint Mr. Nick Sagalkin to the Gulf of Alaska Groundfish Plan Team. Mr. Sagalkin will replace Mr. Mike Ruccio.

Cold Storage Holdlings Data

The SSC was informed that NMFS discontinued the collection of the fishery cold storage holdings at the end of 2002. The SSC notes the seriousness of this loss of these data on the ability to perform cost/benefit analysis. The loss of inventory data presents a significant impediment to the development of models of supply and demand for fish products, thereby limiting the quality of cost-benefit analyses required under EO 12866.

Over the last two decades a great deal of work has been performed to increase the quality of fishery market models and significant advances have been made in the market modeling for Alaska salmon, halibut, pollock, crab and a variety of other species. These market models have been used to address important management policies such as the effects of total allowable catches on industry revenues and the price-revenue effects of transferable quota programs to both fishermen and processors. In these models inventory holdings are absolutely critical. Without inventory holdings the modeler cannot estimate domestic disappearance (hence demand equations cannot be estimated) and cannot estimate beginning available supplies (hence supply equations cannot be estimated). Next to harvest and production levels, and their associated prices, there is no more critical data to modeling markets (and therefore estimating benefits) then inventory levels.

The SSC notes that NMFS was concerned over the quality of the collected data. This is indeed a noteworthy concern. However, even though the voluntarily submitted data may have been inaccurate, the data were still valuable in estimating changes in total available supply and domestic disappearance. Even if the monthly data were somewhat suspect, modelers using the annual data found inventory levels to conform to economic theory indicating that at least the directional movements in the inventory were accurately reflected in the observations.

The discontinuation of the cold storage holdings data series could not come at a worse time for ongoing analyses of recent controversial changes in the regulatory structure of the Alaska crab fisheries. While

there is presently a working model of the pre-rationalization fisheries for snow and king crab in Alaska, the model relies, in part, on inventory levels to model supply and demand. It was anticipated that the model would be used over the next few years to analyze the post-rationalization fishery, much as similar models have recently been used to assess changes in revenues accruing to harvesters and processors in the halibut fishery before and after implementation of the IFQ program. Without information about inventory levels, it is unlikely to be possible to discriminate between the effects of the two-pie rationalization scheme and the effects of changes in catches, demand, and substitute supplies. At a time that the North Pacific Fisheries Management Council has begun to implement a mandatory collection of cost data, it is difficult to reconcile the loss of inventory data.

The SSC strongly recommends that the Council encourage NMFS to continue to support the collection and reporting of estimates of cold-storage holdings and other inventories. If this data can no longer be collected at a national level, the SSC encourages the Council to request that the Alaska region office initiate a program of collecting and reporting inventory data for the Alaska and Pacific Northwest regions. Moreover, we recommend consideration of a mandatory reporting program for cold storage holdings.

While OMB guidelines acknowledge that it may be necessary to conduct qualitative analyses of costs and benefits when data are unavailable for the development of quantitative assessments, the onus is on regulatory agencies to address data limitations through improved data collection and scientific investigations. **If there are problems with the quality of inventory data, the solution is to remediate the problems, not to discontinue data collection and reporting.**