North Pacific Fishery Management Council

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Certified: Dave Benson
Date: 9/28/00

MINUTES
Scientific Statistical Committee
September 6-8, 2000

The Scientific Statistical Committee met September 6-8, 2000 at the Sheraton Hotel in Anchorage, Alaska. All members were present except Steve Hare, Doug Larson, and Seth Macinko:

Rich Marasco, Chair	Jack Tagart, Vice Chair	Keith Criddle
Doug Eggers	Jeff Hartman	Sue Hills
Dan Kimura	Terrance Quinn II	Al Tyler
Steve Berkley		

C-2 STELLER SEA LION/PACIFIC COD

The SSC listened to staff presentations by Mike Payne, Shane Capron, Ben Muse and Dave Ackley (NMFS-AKR), Lowell Fritz and Lew Queirolo (NMFS-AFSC), Kristin Maybry (ADF&G), and Jim Richardson (ResourceEcon, Inc). In addition public comment was provided by Dr. John Burns (Aleut Enterprise Corp.), Thorn Smith (North Pacific Longline Association), Clem Tillion (Aleut Enterprise Corp.), Dave Fraser (Highseas Catcher Boats), Dr. Vidar Wespestad (Aleut Enterprise Corp.), Dr. Ed Richardson (Pollock Conservation Cooperative), Donna Parker (Arctic Storm), Bob Storrs (Unalaska Fisheries Association), Ken Stump (Greenpeace), Phil Klein (American Oceans Campaign), Beth Stewart (Aleutians East Borough), John Gauvin (Groundfish Forum), Chris Blackburn (Alaska Groundfish Databank), Steve Hughes (Natural Resource Consultants and United Catcher Boats), and Paul MacGregor (At-Sea Processors Association).

Preamble

Fishery management policy should be promulgated with (1) a clear statement of problems, goals, and objectives; (2) a rational set of alternatives; and (3) a science-based process predicated on the best available information and analysis for choosing among the alternatives. When uncertainties create doubt about the best course of action, a cautious and precautionary approach is warranted, with actions designed to reduce the uncertainties and to increase understanding of the situation creating the problem.

In the context of the Steller sea lion decline, the above policy attributes have rarely been evident due to conflicting mandates of the MSFCMA, NEPA, and the ESA, the lack of knowledge and understanding of factors affecting Steller sea lions, and the absence of a proactive research and management plan for resolving this issue.

This EA/RIR and previous BiOps address potential interactions of groundfish fisheries and Steller sea lions because the major Federal action subject to NEPA is the groundfish fishery. This does not necessarily imply that the fishery is a major cause of the decline and/or that it is responsible for the lack of recovery of Steller sea lions.

No one would object to the adoption of reasonable measures to arrest the decline of Steller sea lions if there was some assurance that those measures would lead to some improvement. However, the premise upon which the proposed alternatives are based is so tenuous that adoption of the alternatives seems imprudent. If there is a connection between current fisheries and Steller sea lion declines and no action is taken, the Council would be derelict in its responsibility to conserve resources under its domain. If other factors are responsible and the Council imposes draconian measures, then the Council actions would needlessly deprive individuals and even communities of their livelihoods.

The only way out of this morass it to design a research and management plan that tests hypotheses related to the Steller sea lion decline and increases the understanding of the potential interactions between groundfish fisheries and Steller sea lions. The draft research plan attached to Tom Loughlin's memo of July 27, 2000 is a good first step in this direction. What is sorely needed is a comprehensive management plan that addresses holistically the Steller sea lion/ fishery interaction issues to complement the research plan, along with a set of specific studies and timetable. In particular, a solid understanding of spatial and temporal distributions of fish and sea lions by size and age is a prerequisite for science-based management measures. These management measures necessarily must be adaptive in character and based on a formal experimental design. This would permit learning about the system and allow the change of management measures as we find out what works and what doesn't.

Examples of adaptive management measures for Steller sea lions have already been proposed. One way to evaluate the effect of critical habitat restrictions on cod fisheries would be to open some rookeries to controlled fishing in connection with observation on the foraging of Steller sea lions in the area. Another example is the controlled experiments near Kodiak Island.

EA/RIR

The SSC appreciates the variety and extent of information and thought provided in the document (subject to comments and criticisms detailed below). In particular, extensive graphical and tabular summaries of catches, biomass and exploitation rates are provided in space and time, and an innovative study of fishery CPUE in the winter offers an important complement to summer survey biomass distributions. A study of depletion in the SCA is a potentially useful activity, although we consider the results of such a study in this analysis to be flawed. Qualifications of belief or opinion by NMFS are frequently identified, although there are some statements of belief not properly labeled. Attempts are made to estimate social and economic impacts of the alternatives.

The SSC recommends the following changes to the document before it is released for public review:

1. Improvements to the analysis and discussion of local depletion are warranted. First of all, the document needs to explicitly define local depletion and how it is estimated. A natural mortality term could be added to the regression equation. Truncation of data after the directed fishery occurs will prevent possibly erroneous conclusions of significant depletion due to cod dispersion or catchability changes. (Querying fishery participants might be useful to determine potential truncation points.) Plots of data and fitted regression lines would be useful to understand the magnitude of declines and the variability of the results. Fine spatial-scale analyses would be necessary to demonstrate local depletion. Hypothesis tests comparing depletion coefficients to the overall exploitation rate would be

useful to see if differential rates of depletion (one possible approach to assessing local depletion) are occurring for particular spatial or temporal components. In the study a significant regression is not evidence of local depletion, but could instead be due to natural mortality, expected exploitation declines, catchability changes, or dispersal. Therefore, the SSC disagrees with the statement on page 49 that asserts "local depletions, resulting from fishing, are likely to be occurring." A statement in the same paragraph reads: "From the information currently available, it does not appear that there is a massive migration of the species." The SSC notes that this statement is contradicted by a published article on cod migration (Shimada and Kimura, 1994), cited in the references, that is based on a 10 year series of tagging data.

Additional issues that should be addressed in the revised EA/RIR include:

(a) Analysis of the economic impact on various industry sectors should differentiate between pollock catcher-processors and catcher-processors that target a suite of species.

(b) An important difference between the pollock fishery and the cod fishery is that the cooperative organization of the pollock fishery may provide options for accommodating RPA's that are unavailable in the cod fishery. Consequently, the economic impact of RPA's on the cod fishery may be more pronounced than might be assumed from simple extrapolation of the outcome in the case of pollock. The utility of expanding the cooperative structure to Pacific cod should be examined.

(c) The comment on page 72 implicates bottom trawling in the decline of spectacled eiders. Because trawling has not taken place in regions identified as critical habitat for spectacled eiders the comment seems unjustified and should be eliminated.

(d) The extremely low goodness-of-fit R^2 reported for the localized depletion analysis suggest that significant explanatory variables were omitted from the model. The omission of significant explanatory variables leads to biased and inconsistent estimates of model parameters and invalidates conclusions with respect to the direction or magnitude of those estimates.

(e) Analysis of the GOA fisheries and interactions with Steller sea lions could use ADF&G statistical areas rather than the coarse-scale federal statistical areas.

(f) The lack of detailed information hampers the analysis and has led to many unsupportable or weak assumptions. RPAs that improve the scientific basis for these assumptions could be explored in the EA/RIR. Additional investigations could include more frequent surveys or use of tracking devices on sea lions and fishing vessels.

(g) Page 87 of the Pacific cod EA/RIR presents language that concludes that "action undertaken to maintain and enhance western Steller sea lion resource results by definition, in a benefit stream to the Nation." We note that the societal benefits of preserving a species may be high (because society has decided to "preserve" the species), but it cannot be inferred that the economic benefits of RPA's exceed the economic costs. Consequently, it should not be surprising if adoption of RPA's fails the net benefit test.

2. Exploitation rates of Pacific cod have been in the range of 5-20% in the recent past. Furthermore, the Pacific cod population has been relatively abundant since the regime shift in the 1970's. Even allowing for potentially higher exploitation rates in critical habitat, there remains a large amount of Pacific cod available for Steller sea lions. The document should discuss this information in relation to the

hypotheses in the document that food limitation is the most likely explanation of Steller sea lion declines and that the cod fishery contributes to this limitation.

3. The fishery CPUE analysis necessarily uses observer-sampled trips to identify location. Efforts should be made to determine if non-observed trips have similar distribution patterns by examining vessel logbooks or fish tickets if available. Furthermore, it would be useful to know the amount of catch from observed and unobserved trips by vessel class to see if unobserved catch is an appreciable portion of the total.

4. The EA should put the food-limitation hypothesis in context of the suite of hypothesis regarding factors that may impede for the recovery of Steller sea lions. Specifically, how important is potential food limitation due to competition with cod fisheries relative to, for example, killer whale predation or an environmental regime shift? This discussion is necessary so that the efficacy of the alternatives on Steller sea lions recovery is adequately addressed in the document.

5. Under the null hypothesis of food competition, evaluation of the potential for fishery/sea lion interaction should initially attempt to determine the probability of simultaneous pursuit of prey by sea lions and the fishery. This evaluation should focus at the population level and can be illustrated by the joint probability of Steller sea lions and fisheries occupying the same space, in pursuit of prey of the same size. See appendix A for an example of this approach. RPA's should then be constructed to reduce the likelihood of such interactions.

6. The reliance on correlation between short time series of fishery removals and Steller sea lion counts is subject to several flaws. First, because Steller sea lions do not prey on fish that have been removed by the fishery, the relevant time series for comparison is the abundance of prey in areas frequented by Steller sea lions <u>not</u> the quantity of fish harvested from those areas. This distinction is important because the spatial distribution of catches is strongly influenced by management restrictions on fishing areas and bycatch, and harvesting costs and cannot be assumed to closely mirror the distribution of stock abundance. Second, it is important to remember that correlation is not causation. [That is, the demonstration of significant correlation between data series A and data series B is consistent with the hypothesis that A causes B or the hypothesis that B causes A or with the hypothesis that some other process C causes both A and B.] Focusing on time series that coincidentally correspond with the period following a known regime shift creates the strong possibility that the series are only correlated with each other through their shared correlation with the regime shift. Third, the short time series usually used to examine contemporaneous correlations that are unrelated to Steller sea lions biology. Longer time series would allow examination of lagged correlations that offer more plausible mechanisms for food availability affecting Steller sea lion population trends.

   While resolution of these issues is constrained by the extremely abbreviated data series on Steller sea lion abundance, the data series on Pacific cod and other fish species are more extensive and convey important understanding about the long-period dynamic variability of the marine ecosystem. For example, the time series of cod biomass estimates extends into the 1950's and evidences that abundance was low during the 1950's, 60's, and 70's. Similarly, Pacific cod catch data series are available or can be constructed extending back into the 1800's. Examination of the catch data suggest that cod abundance has varied through time with periods of high and low abundance that may differ by one or more orders of magnitude. While Steller sea lion population counts are only available for recent years, it is possible that traditional knowledge could be used to extend the time series of population indices. At a minimum, the revised EA/RIR should more fully reflect the available data on cod stock abundance and catches.

7. The SSC is concerned that the EA/RIR fails to clearly differentiate between conjectures and facts. Examples - p.22, first 2 sentences. A period should be placed after spring or identify the rest as a hypothesis. Other hypotheses could also explain the data. Also p.21 (bottom) "areas critical to the foraging success of Steller sea lions." should be changed to "designated Critical habitat."

8. The EA/RIR should clearly state that the effects of the proposed alternatives on Steller sea lion abundance are unknown and, without a well-crafted experimental design, the outcomes of adopting the alternatives will also be unknown. That is, if one or more of these alternatives is adopted and the Steller sea lion population increases (decreases), it will be impossible to know which if any of the alternative contributed to or impeded stock recovery unless an orthogonal control (a region that is not subject to the alternative) is established. While the establishment of control and treatment regions presents an ethical dilemma, similar dilemmas are often encountered in medical research where it has been widely recognized that without controls, the efficacy of treatments cannot be determined. Because treatments are costly and may be detrimental, the concept of controlled experimentation has been accepted as necessary even in cases that may include significant risk.

9. Caution should be exercised in consideration of the projected economic impacts. The impacts are expressed in terms of gross revenue losses (gains) and do not estimate associated changes in costs. The impact to net revenues (profits) will be less that the impact to gross revenues. In addition, it is likely that some of the catches foregone in the areas closed under the various alternatives could be taken outside the closed areas, albeit at higher variable costs. Because the proposed alternatives could lead to temporal and spatial shifts in fishing effort, they will affect the catch of prohibited species and the potential for interaction with short-tailed albatross. Bycatch caps could prevent the fishery from meeting seasonal and spatially apportioned TACs increasing losses to the fishery.

10. The Purpose and Need statement on page 8 of the P-Cod EARIR defines the working objective for the entire analysis.

    "The purpose of this action is to develop and implement management measures that reduce or eliminate competition between the Pacific cod fisheries and Steller sea lions by precluding fisheries around rookeries and major haulouts and by dispersing the fishery over time and space to minimize the likelihood of locally depleting prey resources to foraging sea lions that might lead to adverse modification of habitat."

    We are concerned that the Purpose and Need statement draws specific conclusions that are not consistent with other statements under 2.2.2 (Management Framework Specific to Formulating the Alternatives for this Federal Action). For example, page 19 states that there is a "potential" for competition. The Purpose and Need statement states that competition between P-Cod fishing and Steller sea lions exists and must be eliminated or reduced. The Purpose and Need Statement also does not allow for alternatives that would enhance our understanding about predator/prey relationships, and learning from research or adaptive management. In addition the Purpose and Need Statement is constraining to other possible alternatives that might consider tools other than precluding fisheries and dispersing the fishery.

    To correct these misspecifications in the Purpose and Need statement we suggest that the Council consider recommending alternative formulations that reflect a more holistic and science-based approach to management of Pacific cod and recovery of Steller sea lions.

11. The document should include additional information about Steller sea lion biology, distribution, and dynamics, which can be extracted from previous Biological Opinions . What evidence supports the

hypothesis that Steller sea lions are food-limited? Are there actual estimates of juvenile survival standard errors? Which areas have shown the largest declines and have these been correlated to other variables? Were the alternatives developed with particular life history stages (e.g. juveniles)? Should alternatives be considered that focus on juvenile distribution and diet?

12. Where possible, all estimates should be reported with standard errors, confidence intervals, or credibility intervals.

Appendix A. Probabilistic Approach to Interaction Between Steller Sea Lions and the P. Cod Fishery

The objective here is to present a conceptual model for quantifying the potential interactions front between Steller sea lions and the fishery. The size of this front could be a useful criterion for classification of jeopardy to recovery of Steller sea lions due to fishery management practices. Moreover, it could also serve to index changes in the front resulting from proposed alternatives. The mechanism relies on estimation of the probability that sea lions and the commercial fishery simultaneously pursue the same prey.

We recognize that parameter values for the various levels discussed in this framework are subject to qualifications, and that there are limited data upon which to estimate these values. We also acknowledge that other levels of interaction may need to be incorporated into the conceptual model. Regardless, a quantitative approach of this type is necessary to generate a perspective on the relative significance of potential interactions. At a minimum, a Delphi-type process involving fishery and marine mammal scientists could be invoked to identify the approximate range of parameter values.

A simple example with five levels of interactions (3 spatial, 1 temporal and 1 trophic) can be used to illustrate the approach.

Spatial

1. Total fraction of the sea lion population that is exists within 20 nautical miles of significant fishing locations. Use the proportion of sea lions counted at rookeries and haulouts during the most recent annual census. (For illustration, it will be assumed that somewhat less than 80% of the Steller sea lion population is to be found within 20 nautical miles of these haulouts and rookeries.)
2. Fraction of sea lions in the vicinity of active P. cod fisheries that transpire more than 10 nautical miles away from rookeries and haulouts. (For illustration, we will assume that sea lions are distributed log-normally with respect to their distance from land and; that 50% of sea lion foraging on any given day takes place at least 10 nautical miles away from rookeries and haulouts.)
3. Fraction of the sea lion foraging dives that reach depths greater than 60 meters. (For illustration, it will be assumed that 30% of the foraging dives exceed this depth.)

Temporal

1. Fraction of the total sea lion foraging days that overlaps with the period of time when P. cod are being fished. (For illustration, assume that the fishery is open for 180 days (90 in the winter and, 90 in the fall), i.e., 50% of possible sea lion foraging days.)

Trophic

1. Fraction of the size distribution selected by the fishery that overlaps the preferred size of prey sought by sea lions. (For illustration, there is assumed to be a 30% prey overlap.)

In this example, the probability of an interaction with the fishery is the simple product of the individual probabilities. That is the joint probability of a sea lion and P. cod fisher affecting the availability of the same

prey. Given the probabilities assumed above, the probability of interaction is 0.8*0.5*0.5*0.3*0.3=0.018. That is, the probability of simultaneous competition for the same prey would be less than 2%. Seasonal probabilities could easily differ from these presumptive rates, and the potential for interaction may be different among seasons accordingly. For example, during the active P. cod fishery the fraction of sea lion foraging days that overlaps fishing days is 100% and the resultant probability of interaction during those days rises to 6% all else being equal in the above scenario. This type of approach to gaining some perspective on the potential interaction should be evaluated. Other approaches that meet this conceptual model may be appropriate and we encourage their development.

Note, that after having established an estimate of the probability of interaction, it would still need to be determined whether the potential adverse interaction is likely to represent a realistic impediment to Steller sea lion population recovery, or more to the point, the degree to which reasonable and prudent alternatives to current management practices reduce the probability of adverse interactions and improve the likelihood of Steller sea lion population recovery.

C-1 MRAG - INDEPENDENT OBSERVER PROGRAM REVIEW

Dr. Graeme Parkes presented an independent program review of the North Pacific Groundfish Observer Program (NPGOP). Dr. Dan Ito and Martin Loefflad presented the Observer Program Office (OPO) response to the MRAG report. Public testimony was provided by Trevor McCabe (At-Sea Processors), Ron Dearborn (Sea Grant, University of Alaska), and John Gauvin (Groundfish Forum).

The purpose of the MRAG report is to provide an independent review of the NPGOP, and provide recommendation for its improvement. As a review and report, MRAG has clearly described the program and the critical issues and problems surrounding it. Although, the issues surrounding NPGOP are generally well known among stakeholders, MRAG's experience in evaluating observer programs internationally suggests that their recommendations for change should be thoughtfully considered. Dan Ito, Program Leader of the OPO concurred with most recommendations. Key recommendations are:

1. Revise program goals and objectives.
2. Develop a service delivery model (SDM) with NMFS as the client.
3. Develop more equitable sharing of program costs.
4. Place observers to insure random sampling when there is less than 100% coverage.
5. Develop a less confrontational evaluation and better support of observers.

The OPO has made the revision of program goals and objectives a top priority. The SSC notes that the core goals and objectives of the observer program are to provide catch, bycatch, and biological data necessary to support in-season monitoring and stock assessment and should not be compromised by other competing goals and objectives.

There appears to be a growing interest in defining the level of observer coverage. The SSC recommends that observer coverage levels and alternatives for achieving them consider both benefits and cost of the options . To accomplish this, a mechanism should be devised to obtain improved observer cost data from the six observer contracting companies.

The OPO plans to explore alternative SDM by contracting out the AFA catch/processor mothership fishery as an observer module. This approach appears to be of interest to the fishing industry. However, public testimony indicated that another module, quite different from the catcher/processor module should be included

in the pilot program. This would provide contrast and a more realistic evaluation of the feasibility of this OPO contracting approach.

The SSC noted a need to better attract and retain observers. Although the rate of observer turnover appears no greater than similar programs, better retention could significantly improve program efficiency. Giving observers more professional responsibility through the OPO might help. Also, changing observer qualification criteria to accept individuals who lack a bachelor degree, but have other relevant experience could result in a larger hiring base with greater observer retention.

Concerning observer coverage, the SSC has several times noted that when observer coverage is less than 100%, observer placement must be random over available vessels. The SSC concurs with MRAG that NMFS should control the placement of observers on vessels.

In its December 1995 minutes, the SSC noted that the observer program should:

1. Have statistically sound levels of coverage.

2. Be flexible enough to provide representative data from all fisheries.

3. Provide "arms length" relationship between observers and recipients.

These are echoed in the current MRAG report.

In fact, the last 5 years, the SSC has examined aspects of the observer program and total catch measurement in September 1995, December 1995, January 1996, April 1996, June 1997, February 1998, June 1998, October 1998, February 2000 and April 2000. The SSC attempts to review some aspect of this program at its February meeting when staff is available.

C-5 (b) SOCIAL AND ECONOMIC DATA COMMITTEE REPORT

The SSC received a report from Chuck Hamel (NPFMC) on the August 15 meeting of the Social and Economic Data committee. This meeting, requested by the Council and suggested in the June 2000 SSC minutes, discussed current problems with the Alaska Fishery Science Center (AFSC) groundfish survey of costs, earnings and other economic variables. This survey was characterized by the committee as an initial step in developing a database for the analysis of some net social benefits and costs of Federal fishery management actions. It was also recognized that the Council itself may have additional data needs, and these should be considered in future meetings of the committee. The primary difficulty with the survey based pilot project is that some industry sectors have strongly objected to providing individual firm level data. Consequently, the survey response rate has been very low.

Participants from the Factory trawling sector and inshore pollock sector have suggested as an alternative that industry might be willing to provide aggregate reports for NMFS using an industry generated and controlled data set. Social and Economic Data Committee agreed that a working group should be formed to evaluate and report on the feasibility of such an effort.

While the SSC regards this working group as a potential starting point for negotiation leading to enhanced data collection, we see a need for Council to set some specific timelines for progress. The quality of economic information for the regulatory process has not kept pace with other management information. As a consequence, the quality of analysis that can be conducted may have difficulty withstanding legal challenge

under, for example, the Regulatory Flexibility Act. We believe that the level of urgency for progress is high. In addition to a need for time certain results from this cooperative effort, we are also concerned that there may not be sufficient industry participation in the work group. For example, there were no representatives from the catcher vessel sector during the August 15, 2000 meeting and those industry members who were present were not empowered to commit their company's participation, let alone that of other members in their sector. We need active participation from all sectors to avoid collapse of data collection efforts.

The social and economic data committee will hold further meetings to discuss an array of approaches to develop a comprehensive data collection system for the needs of the North Pacific Fishery Management Council.

C-5(c) HABITAT AREA PARTICULAR CONCERN (HAPC)

The SSC heard a report from Dave Witherell regarding process on HAPC initiatives. The SSC commends Dave Witherell and Cathy Coon for publication of a paper on protection of Gorgonian Corals off Alaska.

MISCELLANEOUS

The SSC reviewed two Plan Team nominations. The first, Mr. Herman Savikko for membership on the Bering Sea/Aleutian Islands Crab Plan Team and the Scallop Plan Team, submitted by the State of Alaska, Department of Fish & Game. The second was nomination of Ms. Kathy Kuletz by the United State Department of the Interior, Fish & Wildlife Services. The SSC recommends approval of these nominations.