North Pacific Fishery Management Council

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MINUTES
Scientific and Statistical Committee
January 17-18, 1993

The Scientific and Statistical Committee of the North Pacific Fishery Management Council met January 17-18, 1993 at the Anchorage Hilton. Members present were:

William Aron	Larry Hreha	Bill Clark, Chair
Keith Criddle	Jack Tagart	Phil Rigby
Doug Eggers	Rich Marasco	Albert Tyler (alt. for Quinn)
Marc Miller	Bud Fay	

C-1 COMPREHENSIVE RATIONALIZATION PLAN

The SSC received a status report from Council staff on the status of the Comprehensive Rationalization Plan. In addition, it was presented with an agenda for the Comprehensive Planning Committee's January 17, 1993 meeting, the January 15, 1993 memorandum from Dr. Pautzke to the Comprehensive Planning Committee, and a copy of a questionnaire that was used to solicit public input on the ability of various management measures to alleviate a suit of problems, and a summary of the results.

The staff report indicated that a five-part analytical approach will be used to examine the economic/social impacts of three alternatives: (1) status quo, (2) license limitations, and (3) IFQs. As currently structured, effort initially will be devoted to development of representative economic profiles, for various components of the fleet, including a determination of economic profit for the most recent year. Upon completion of this evaluation, the impact of each alternative on profit, employment and other relevant economic and social indexes will be determined.

Given the length of time available for the analysis, methodological issues associated with determining how the economic performance of the fishing industry and community/social indicators will be affected by the different alternatives must be resolved as quickly as possible. To expedite the process and to ensure that SSC input is received in a timely fashion, a subcommittee has been named to work with the analytical team. Members of the subcommittee are Keith Criddle, Dan Huppert, Rich Marasco, and Marc Miller.

C-4 Research Priorities

The SSC reviewed research recommendations made by the groundfish and crab teams. The SSC drew from these and last year's Research Priorities in developing this year's list. The SSC emphasized that this selection of projects is in addition to the ongoing NMFS programs. There is no suggestion that those programs that NMFS considers as baseline work should be curtailed.

A. Critical Assessment Problems

1. Rockfish. There is a general need for better assessment data, particularly investigation of stock structure and biological variables. These activities are included in the AFSC Rockfish Research Plan.

2. Walleye pollock. There is a continuing need for research on stock structure as it relates to assessment. Also, an age-structured analysis of the Aleutian Island stock should be done. Assessment of the status of the Gulf of Alaska resource is critically dependent upon results of resource surveys. Currently, these surveys are conducted every three years. The usefulness of various ways of supplementing the triennial survey data should be evaluated.

3. Crab research. Research should be expanded on handling mortality, stock structure and life history parameters.

The SSC notes also that additional studies are needed on ageing techniques and age validation of several species. Stock identification research should be conducted on Atka mackerel, walleye pollock, POP and other rockfish

B. Improved stock surveys

1. Improvements in surveys can sometimes be made without great increase in cost. Rockfish, Atka mackerel, and pollock surveys are possibly in the category for which improved statistical sampling design may result in improved data.

2. Calibrations should be carried out between the two longline surveys for sablefish, and between trawl survey data and longline survey data.

3. Explore the possibility of fishing surveys by organizing joint agency and commercial fishing effort.

4. Increased emphasis should be put on deepwater longline surveys for Greenland turbot.

C. Expanded Ecosystem Studies

1. Because of the importance of marine mammal and seabird considerations in fisheries management, further studies are needed on interactions among fisheries, marine mammals, and seabird populations. In particular relationships should be explored between oceanographic conditions and feeding conditions in relation to animal condition and health. Research should be done on age-specific mortality. Effort is

needed on status of stocks and distribution of forage fishes, such as capelin, eulachon, and sand lance.

2. Trophic dynamics research should be undertaken on the relationships among critical species, e.g. Pacific cod its prey - shrimp and crabs; and particularly the possibility that the large arrowtooth flounder stocks may interfere with the productivity of more valuable species. There may also be a linkage between population increases of arrowtooth flounder and pinniped declines due to competition for prey.

3. Groups of species in the rockfish and flatfish families are now managed as "species complexes." Research should be expanded on the question of biological linkages among the components of "species complexes" that justify this management approach. Further, are there other, unidentified groups of species that are ecologically related and could be managed as a unit? Assemblage management has to be evaluated to determine its ecological validity.

D. Socioeconomic research

1. There is a critical need for the development and continued maintenance of basic economic information databases on the fisheries of GOA and BS/AI. This information is required for establishing a baseline to be used in the evaluation of the impacts of alternative management measures. At a minimum, there is a need for reliable information on: the cost and revenues of fishing operations, the nature, magnitude and location of where goods and services are purchased, and the nature of markets for various fish products.

2. Social research of two kinds is pertinent to comprehensive rationalization design and implementation.

(a) Social Assessments

Selected community and industry assessments should be conducted to establish baseline conditions underlying social problems identified by, the Council and the Advisory Panel. As appropriate, these projects can be extended to generate time series information.

(2) Social Impacts

Social impact and policy research should be conducted regarding the identification and potential effects of alternative management actions.

E. Bycatch problems

1. Gear research should be expanded on methods of reducing bycatch, and fishing gear design that would make fishing methods more selective. Trawl mesh experiments are one area of promise, but gear design engineering and biology should be conducted within the broadest and most imaginative context.

2. A better quantification is needed of discard mortality rates of Pacific halibut.

3. Fisheries catch and effort data should be reviewed for the possibility that selected time/area closures, could reduce bycatch.

F. Alaska Fishery Monitoring

1. An analysis of fishery logbook information should be conducted to determine its usefulness.

2. Observer data would be more credible in stock assessments if NMFS were authorized to determine the dates and localities for observer coverage of vessels in the 30% coverage category. More meaningful analysis could then be pursued.

D-3(a) BS/AI Chinook Salmon Bycatch

The SSC reviewed the EA/RIR/IRFA for amendment 21b (Salmon Bycatch Management) to the FMP for the Groundfish Fishery of the Bering Sea and Aleutian Islands. The stated purpose of the proposed action is to reduce the bycatch of chinook salmon in BS/AI groundfish fisheries and to help alleviate conservation problems in North America chinook salmon spawning populations, particularly on the Nushagak, Yukon, Kuskokwim, and Kenia Rivers. Alternatives considered included:

Alternative 1: status quo - no chinook PSC limit for the groundfish fisheries in BS/AI.

Alternative 2: implement chinook salmon PSC limits for BS/AI trawl fisheries that would trigger a time/area closure. Option 1 would close the entire BS/AI when the PSC limit is reached. Option 2 would close selected three digit federal management statistical areas when PSC limits for each area are met. A suboption that closed areas during the bycatch season was also considered, and

Alternative 3: closure of a zone along the 200 meter contour line (shelf break), the Horseshoe area, and the area north of Unimak Island.

The bycatch simulation model was used to estimate the consequences of the three alternatives. The analysis shows that implementation of PSC caps reduced bycatch of chinook salmon to within the range of the caps. However, the loss of groundfish catch due to large chinook PSC closures, i.e. eastern Bering Sea or selected combinations of three digit management statistical areas, resulted in significant cost to groundfish fisheries. The magnitude of losses in net benefits was reduced when the size of the closure during the bycatch season (first 4 and last three months of the year) was reduced and chinook salmon PSCs dropped. The SSC notes that the current version of the bycatch model treats harvesting costs as being constant across areas, which will result in changes in harvesting cost being underestimated. Furthermore, in using the bycatch model to calculate costs associated with closures of the buffer strips in Alternative 3, the fishery was excluded from an area including but larger than the buffer strip. This was necessary because of the limited spatial resolution of the bycatch model and would result in the overestimation of costs associated with Alternative 3. These features of the analysis should be noted in the text prior to its release for public review.

The analysis does not effectively address the impacts of interceptions of chinook salmon as bycatch in the groundfish fisheries on chinook salmon runs to specific River systems. The SSC recommends that the analysis be revised to estimate these impacts where possible. Estimates of stock specific

interceptions of mature chinook salmon can be made by applying the stock composition estimates from Meyers and Rogers (1988) to the bycatch estimates, discounted for natural mortality using published rates for chinook salmon (i.e., those used in the Pacific Salmon Commission's chinook model). The estimates of chinook salmon interceptions can be compared to estimates of total run size for selected river systems and years where such data are available (i.e., recent years for Yukon and Nushagak Rivers).

The SSC notes that it is possible for interception fisheries to reduce escapements to inshore areas for the situation where high levels of bycatch occur on weak runs. If this occurs losses will include reduced reproductive capacity. The SSC recommends that the analysts address this concern for the Yukon and Nushagak rivers where estimates interceptions in the groundfish fishery and total runs are available.

The SSC notes that estimates of stock composition for chinook salmon bycatch used in the document were made from samples taken from the foreign fishery during the late 1970's and early 1980's. These salmon bycatches came from different areas than chinook salmon bycatches in the present domestic fishery, and their use may not be reflective of the stock composition of present bycatches. However, the Meyers and Rogers (1988) studies are the only available scientific data and should be used to estimate stock specific interceptions of chinook salmon by the groundfish fishing.

In the bycatch model, bycatch value was taken to be present wholesale value of the non-Asian origin bycatch that would have survived to maturity. This definition of bycatch value may be conservative since it does not consider: (1) differences among river systems in prices paid to fishermen for chinook salmon, and (2) the relatively high social value of subsistence catch. The SSC recommends that the analysts consider these potential components of bycatch value and clarify them in the revised document.

The SSC recommends that an executive summary for Section 3, Analysis of Alternative, should be provided in the document.

The SSC recommends that the document be revised to address the above issues and sent out for public review.

D-3(b) Aleutian Subareas

The SSC received a presentation on the EA/RIR/IRF analyzing the proposal to create districts within the Aleutian Islands Management Area. The SSC received staff and public testimony and discussed the three alternatives presented. The purpose of the amendment is to avoid localized depletion of Atka mackerel by providing the Council with a mechanism to spatially allocate harvest. Alternative 1 (status quo) retains single TACs by species or species groups. Alternative 2 would create two districts separating the Aleutian area at 177 degrees west longitude. Alternative 3, selected as the preferred option by the analysts, creates three districts with boundaries at 177 degrees west and east, permitting harvests to be distributed among the districts based on available biomass.

The SSC concurred with the analyst's preferred option. Alternative 3 provides for greater protection of localized Atka mackerel stocks, particularly those in the eastern Aleutians. Alternative 3 also provides managers with greater flexibility to adjust harvests. All alternatives had minor bycatch implications. The possible impact to marine mammals was extensively discussed in the document. The 10 mile annual and 20 mile seasonal trawl exclusion areas around Steller sea lion rookeries are

expected to protect sea lions even with trawl effort dispersed farther to the west while permitting greater amounts of Atka mackerel to be harvested without localized depletion. The SSC suggests that, because analyses were only provided for Atka mackerel, allocations by district be limited to Atka mackerel until additional species analyses can be provided.

D-4(a) Gulf of Alaska Rockfish Rebuilding Plan

The SSC discussed the issue of rockfish rebuilding. The SSC received testimony from the plan team and the public. Two issues were highlighted: (1) Can populations of longlived slow growing species such as POP be rebuilt? For example, have other species occupied the niche previously occupied by Pacific ocean perch? There are few examples of successful stock rebuilding for rockfish. Aleutian POP stocks may be at historical abundance levels, and evidence of successful but limited recruitment is evident from GOA age samples for POP. (2) Can we determine the status of POP populations in the Gulf of Alaska relative to historic levels. Foreign catch per unit of effort declined dramatically between the early 1960s and mid 1980s. Triennial surveys have indicated further declines in biomass, yet biomass may nonetheless be close to the Bmsy level. The SSC recommends further review by the plan team of these issues prior to a further analysis of rebuilding alternatives.

The four rebuilding strategies and associated stock projections considered in the paper by Heifetz are based on some 30 years of spawner-recruit data. These data indicate a low level of density dependence. If an exploitation rate were chosen on the basis of these data, it would probably be substantially lower than the F35% rate recommended in the 1992 assessment. The SSC believes that the stock assessment and the rebuilding analysis should be done using consistent methods and assumptions. To that end, as a first step the analysts should critically review the spawner-recruit estimates and their sensitivity to alternative assumptions in the stock synthesis model. At that point they should decide whether they believe the spawner-recruit data are sufficiently reliable for use in both the stock assessment (i.e., ABC determination) and rebuilding analysis.

If they decide to accept the spawner-recruit data, it will be possible to perform a regular stock assessment on that basis, including estimates of unfished spawning biomass and Bmsy that can be compared with estimates of present stock size. It will also be possible to calculate expected stock trajectories based on a range of exploitation rates from the bycatch-only level up to Fmsy.

Without a reliable spawner-recruit relationship, stock size targets would have to be chosen more or less arbitrarily. The Council may still choose to rebuild rockfish populations; however, stock trajectories could not be tightly estimated nor could net present benefits of the action be calculated.

ABC/OFL Definitions

At its January 1992 meeting, the SSC noted several difficulties in applying the Council's overfishing definition, including the correspondence of ABC and OFL in some cases, the difficulty of deciding when an estimate of F_{msy} was acceptable for setting OFL and/or ABC, and the question of whether the Council's sliding scale should be applied to a depleted stock even when and estimate of F_{msy} was not available. The Committee named a working group (Clark, Methot, Quinn, Thompson) to develop alternative definitions of ABC and OFL to solve these problems, for consideration as a plan amendment proposal.

At its June meeting, the SSC received a set of proposal from the working group and approved circulating it to the Teams and others for review and discussion. The essence of the working group's proposal was that ABC be set no higher than the $F_{35\%}$ level and that OFL always be set at the $F_{30\%}$ level. This proposal avoided the determination of F_{msy} altogether and guaranteed a margin between ABC and OFL. The great majority of ABC and OFL determinations are in fact made this way at present, and under all proposals for the future.

A number of people, Team members and others, objected to the working group proposal because in dispensing with F_{msy} it effectively dispensed with fishery research and precluded the application of new knowledge to management (e.g., to exploitation of a stock where it was clear that fishing mortality should be substantially higher than $F_{35\%}$ or even $F_{30\%}$). The SSC was persuaded by these arguments at its September meeting, and directed the Chair to prepare a set of suitably revised definitions for consideration at the Teams' November meeting.

Under the advised proposal prepared by the Chair, F_{msy} would be used for the ABC determination if it was known, and in those cases OFL would be based on an estimate of the maximum sustainable fishing mortality rate from the same model, or some multiple of F_{msy}, thus maintaining a margin between ABC and OFL. Where F_{msy} was not known, the $F_{35\%}/F_{30\%}$ rule would apply.

At their November meeting, the Teams decided to oppose any plan amendment at this time, and proposed adopting by agreement (memo of understanding) a set of rules that closely resemble the original working group proposal, as set out in their memos. The important difference from the working group proposal is that lacking a plan amendment F_{msy} is perforce retained in the OFL definition, but any estimates of F_{msy} higher than $F_{30\%}$ are to be dismissed automatically as unreliable.

The Team proposals conflict with the SSC's earlier decision to retain at least the option of using F_{msy} in the ABC determination. The automatic exclusion of estimates of F_{msy} higher that $F_{30\%}$ from the OFL determination also has the potential not just of disregarding good science, but even overruling it.

In an attempt to resolve the differences, the Chair prepared yet another set of proposed definitions. In this proposal, when, F_{msy} is known, it is used to set both ABC and OFL, so in these cases there is no margin. When F_{msy} is not known, the $F_{35\%}/F_{30\%}$ rules apply, and there is always a margin. It can be argued that in cases where F_{msy} is known, TAC can always be set by applying a lower fishing mortality rate (e.g., $F_{0.1b}$) with hardly any loss in long-term yield.

It should be understood that at present the practical difference between the proposals is minor because we have adopted and applied an estimate of F_{msy} for only one stock, Bering Sea pollock. The philosophical difference is important, however, and as knowledge improves the practical effects will increase.

At the present meeting, the SSC reviewed the various proposals. Dr. Aron reported that NMFS was organizing a national workshop on overfishing definitions for mid-1993. In anticipation of a stronger consensus on overfishing after the workshop, and in view of the press of other work, the Committee decided not to proceed with a plan amendment proposal. As a set of working rules for 1993, the SSC endorsed the latest set of proposals developed by the Chair, which are in essentially the rules followed in 1992.

SAFE Report Guidelines

During the January 1992 SSC meeting, we reviewed "guidelines for the organization and content of the annual Stock Assessment and Fishery Evaluation (SAFE) documents." Grant Thompson, NMFS/AFSC, presented us with an "OUTLINE OF SAFE CHAPTER (Revised November 1991)" which he had prepared as a strawman for consideration by the SAFE chapter authors, Plan Team and SSC members. The SSC was in general agreement with the outline but we suggested some changes and additional elements. Subsequently, the outline was revised in July 1992. When the revised outline was presented to the SAFE chapter authors and Plan Team members, the Plan Team chairs protested, in a letter to the SSC, that the revised guidelines "require the inclusion of far too much information". They requested that the SSC reconsider the necessary items to be included in outline of SAFE chapters.

The SSC has reconsidered the items to be included in the OUTLINE OF SAFE CHAPTER and we present our revisions below. In addition to the specification of items in the outline of SAFE chapters, the SSC discussed the introductory sections of the SAFE which we label the Plan Team summary of the status of stocks. The SSC requests that a table of annual regulatory actions (Opening dates, closing dates, gear restrictions, area closures, etc) be prepared for BS/AI and GOA SAFES and presented in the summary. We further request that a table of historic catch (similar to one found in the BS/AI SAFE) be presented in the GOA SAFE. While believing that a historical review of management actions would complement the status of stocks portion of the annual SAFE and move to address the "Fishery Evaluation" intent of the SAFE, due to recognized overburdened staff workloads, the SSC withdraws its earlier request to incorporate this information at this time.

The Chairman of the SSC will convey the SSC's revision to the Plan Team chairs for final comment. The SSC will adopt the final revisions at it's April 1993 meeting.

OUTLINE OF SAFE CHAPTERS (Revised by the NPFMC SSC, January 1993)

Definitions: The SSC defines exploitable biomass as follows: given that a_r is the youngest age recruited to the fishery, N_a is number of fish at age, w_a is the weight at age, and s_a is the selectivity at age, then exploitable biomass (*EXB*) is:

$$EXB = \sum_{a=a_r}^{\infty} s_a N_a w_a \qquad (1)$$

If knife-edge recruitment is assumed, then the age of knife-edge selection is also the age at first recruitment (a_r) and $s_a = 1.0$ for all $a \geq a_r$ and 0 for all $a < a_r$.

All references to instantaneous fishing mortality refer to the fishing mortality rate for the fully recruited age classes (s_a=1.0)

Introduction (include scientific name, general distribution, management unit[s], and evidence of stock structure [or lack thereof])

Catch History (include table showing catch [including discards] and TAC [to the nearest ton] by gear type and management area [i.e., areas for which the Council has set an ABC] over time, beginning with 1977; reference table in SAFE summary section that lists catches for all years [Note this table has to be created for the GOA SAFE]; indicate average catch since 1977; include description of current fishery)

Assessment Parameters (for all items in this section, indicate any known changes that have occurred over time)

> **Natural Mortality, Age and Size of Recruitment, and Maximum Age** (if recruitment is not knife edge, list age and size of 50% recruitment.
>
> **Length and Weight at Age** (equations [including coefficient values] or schedules, by sex as appropriate)
>
> **Maturity at Age** (again equations [including coefficient values] or schedules; include age and length at 50% maturity, by sex as appropriate)
>
> **Selectivity at Age** (schedules, by sex as appropriate; list age of full selection, by sex as appropriate; note any known changes in selectivity over time)
>
> **Other Parameters** (as appropriate)

Assessment Methodology (describe methods used to estimate quantities presented in the remaining sections; discuss any changes in methodology incorporated since the previous assessment)

Abundance and Exploitation Trends

> **Trends in Abundance** (include table showing exploitable biomass over time from as far back as possible up to the present; include table showing the corresponding time series of total numbers at age; include a table comparing past and current estimates of exploitable biomass from the previous two assessments; include table showing standard errors of estimated exploitable biomass or a discussion of the uncertainty surrounding those estimates, discuss trends in year-class strength)
>
> **Trends in Fishing Mortality** (include a table showing full-selection *F* [F where s_a=1.0] by year since 1977)

Spawner/Recruit Relationship (if a spawner/recruit relationship is estimated, include stock-recruitment table, figure, and equation [with coefficient values])

Reference Fishing Mortality Rates and Yields (calculate $F_{0.1}$ and F levels at which spawning biomass per recruit and exploitable biomass per recruit are reduced to 30, 35, and 40% of their respective maxima, and the respective yields for the coming year generated at these rates, plus F=M)

Maximum Sustainable Yield (when estimated, include estimates of MSY, F_{MSY}, B_{MSY}, and pristine biomass)

Projected Catch and Abundance (include tables and figures showing projected catch [in weight], spawning biomass, and exploitable biomass for the coming 5 years for a range of fishing mortalities including that used to determine ABC)

Prevention of Overfishing (calculate values for both the fishing mortality rate and the catch corresponding to overfishing [see Plan Team Policy on Acceptable Biological Catch])

Acceptable Biological Catch (the ABC calculation is based on single-species considerations which may be modified by quantifiable ecological factors [where appropriate]. Further adjustments to the ABC may be based on unquantifiable ecological relationships and other considerations. Detailed justifications for each modification should be presented)

Other Considerations (e.g., a comparison of TAC and ABC in previous years, recommendations for temporal or geographic distribution of ABC and/or TAC)

Summary (include table showing M, age of full selection, $F_{0.1}$, the fishing mortality rates that reduce spawning biomass per recruit to 30% and 35% of its pristine value, F_{MSY}, B_{MSY}, the equilibrium unfished exploitable and spawning biomass levels, exploitable and spawning biomass levels as projected for the coming year, ABC and fishing mortality rate recommended for the coming year, the overfishing level and the overfishing fishing mortality rate)

Election of Officers

Bill Clark and Terry Quinn II were re-elected.