North Pacific Fishery Management Council

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Date: _4/3/98_

MINUTES
Scientific and Statistical Committee
February 2-4, 1998

The Scientific and Statistical Committee of the North Pacific Fishery Management Council met February 2-4, 1998 at the Anchorage Hilton Hotel in Anchorage, AK. All members were present with the exception of Al Tyler:

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

C-3   Inshore-Offshore 3

The SSC heard staff presentations by Darrell Brannan, Chris Oliver and Lowell Fritz. Public testimony was given by Jude Henzler of the Bering Sea Fishermen's Association; Rebecca Baldwin of Economic and Environmental Analysts; John Gauvin of Groundfish Forum; Paul MacGregor and Ed Richardson of At-Sea Processors Association; John Iani of UniSea; and Donna Parker, Arctic Storm.

The SSC discussed several fundamental, and problematic, issues with the analysis, including (a) utilization (product recovery) rates; (b) price data; © employment, markets, and spillover effects; and (d) how to utilize industry-supplied data to help fill holes in analytical documents.

a) Utilization rates - In the section of the report that treats utilization rates, care should be taken to describe the data used and their sources.

Caution must be used in comparing utilization rates across sectors, because "percent utilization" is not necessarily a good proxy for "net economic value." Product forms with higher utilization rates do not necessarily have higher net economic values. Furthermore, utilization rates are not constants-- they are decision variables by firms responding to the marketplace, and vary by time and operator.

These limitations should receive more emphasis in the report to provide better context for interpreting comparative utilization rates

b) Price Data - There are major data gaps at both the exvessel and first wholesale level for the offshore sector. The SSC encourages staff to consult a larger cross-section of the industry to develop an estimate of the fraction of onshore price to be used as the offshore exvessel price paid vessels delivering cod-ends to at-sea

processors. At the first wholesale level, it appears that it will be necessary to use industry data. To reduce concerns about the credibility of such self-reported data, every effort should be made to verify it by an independent source where possible. The SSC notes that it often encounters data of varying quality in analytical documents, and judgments about its suitability depend on the degree to which the data can be replicated and verified.

Difficulties with basic price data underscore the need for caveats in interpreting gross revenue predictions for Council allocation alternatives. We do not have good information on how price changes with allocations, and in some cases don't even have good information on the levels of prices, so changes in gross revenues to sectors are driven completely by the Council's basic choices on allocating quantities of pollock.

c) Employment, markets, and spillover effects - It may be necessary to depend in part on industry-supplied employment data for the offshore sector, and the same concerns about validation apply here. The sections on product mix and markets should be expanded where possible, but treatment will likely have to be qualitative in nature due to the lack of quantitative models to predict market responses to Council allocations. It appears unlikely that much hard evidence on market concentration can be provided.

The tables on pages 57-61 are very useful indicators of when, in time, current fisheries take place, and indicate the likely alternatives that will be available if changes in pollock allocations force fleets to look elsewhere. The staff should, where possible, replace ranges of catch with specific total quantities by week, and develop similar tables that indicate the number of participants. Tables presenting prices by fishery/species should also be developed to provide perspective on how much effort will be required to replace foregone revenues due to Council allocations.

d) Use of industry-supplied data - In general the SSC is supportive of any and all efforts to improve our understanding of fisheries with credible, unbiased data. Where such data are supplied by industry, they should be independently verified to be considered most reliable. Providing such data to all participants in the Council process in a timely manner for comment and evaluation is essential. The staff's proposed policy on use of this data (see pp. 42 and 72), is a reasonable start, though the SSC suggests replacing the phrase "and result in symmetry in the information across sectors" with "and result in more comparable information for all sectors."

The fact that the Council must consider reliance on industry-supplied data underscores the need for (a) mandatory reporting of prices along with catch data; and (b) collection of needed economic data on costs from the industry.

The SSC reminds staff that documents larger than 50 pages need to be received at least 2 weeks prior to the meeting to permit an adequate review.

C-4   Essential Fish Habitat

This topic was presented by Dave Witherell, Cindy Hartman, and Jeff Short. The presentation focused on three main topics: the preliminary EFH reports, the concepts of Complementary Criteria, and the Strategic Investment Framework. John Gauvin (Alaska Groundfish Forum), Chris Blackburn (Alaska Groundfish Data Bank), and Dorothy Childers (Alaska Marine Conservation Council) gave public testimony.

The SSC commends the staff and core teams for a good beginning on a large task in a short time. In particular, the SSC commends their development of the "Level 0" information level. The fact that it is now being used by the other regions points to its utility. Individual documents for some fishes in the "other species" category such as capelin and eulachon will be very useful as will the inclusion of data on herring and halibut in the appendix. The more detailed mapping approach based on fishing data also looks like it will be informative.

The SSC recognizes that these are preliminary reports and assumes that the inconsistencies and editorial technicalities will be corrected in the next versions. The format of the salmon report is inconsistent with the other reports and it does not contain an assessment of the level of information available. The SSC suggests that the Vining and Witherell report on the effects of fishing on habitat be updated with some of the additional data and references provided in the written public testimony.

The SSC suggests that citations be used in all text sections, including the life history sections, so that a statement can be traced to its source. In many sections of these reports, especially the effects of fishing section, the data come from other areas, different oceanic regimes, or very limited sample sizes. Although it is useful at this preliminary stage to assess all available information on a particular topic, the SSC cautions that data from other areas and conditions may or may not be applicable to Alaska. In addition, some of the studies do not give sufficient detail (for example, bottom type, trawl type) to support detailed conclusions.

Jeff Short's complementary criteria work appears to be a reasonable beginning to develop a tool that will be necessary in some of the next phases of the EFH process. It attempts to incorporate life history data, risk and sensitivity into an index for prioritization. It is an integration over critical core habitats that will be useful for data reduction and may provide guidance in consultations in the future.

C-7   Catch & Bycatch Estimation

Catch Estimation

The SSC received a full-day presentation from Galen Trumble, Bill Karp, and Sarah Gaichas, NMFS on catch and bycatch estimation. The presentation was based on the following reports: (1) Determination of Catch Quantity and Composition in the Federal Groundfish Fisheries off Alaska (February 1998), (2) Observer Coverage Needs (Karp, June 1997), (3) Estimation of Salmon Bycatch in the 1995 Pollock Fishery in the BS/AI (Turnock and Karp, June 1997), (4) Analytical and Statistical Review of [Data Collection Procedures] ... (Versar, Inc., Volstad et al, Oct 1997), and (5) Evaluation of Haul Weight Estimation Procedures (Dorn et al, Oct 1997). In addition the SSC heard public testimony from Brent Paine (UCB), Ed Richardson (ASP), and Chris Blackburn (AGDB).

The SSC commends NMFS for its work improving catch estimation and documenting protocols and procedures and encourages further work in this direction, as noted below. The SSC intends to review catch estimation each February, as this is a central topic in groundfisheries management. The SSC did not have time to address the subtopic of catch & bycatch estimation at the individual vessel level and requests that appropriate staff prepare an outline highlighting key findings and issues.

The first issue before the Council is to approve measures to ensure total catch measurement. Based on its review of the information provided, the SSC agrees with the Executive Director's suggestion in the cover memo that existing measures for observer, reporting, and monitoring requirements provide for a reasonable system of total catch & bycatch estimation. In many respects, the system in place is better than any found around the world. Nevertheless, improvements in all aspects of data collection are crucial to successful fisheries management in the future.

The SSC believes the following topics are particularly important:

- Revise the "blend" system algorithm:

(1) For some fisheries with high observer coverage, a statistical system of estimation based solely on the observer data should be considered, as described in the Versar Report. (The major advantage of using observer data is the ability of calculation of variances).

(2) Better information is needed to discriminate when WPR information should be used in place of observer data. The current substitution algorithm at 80% (or 70% for pollock as the target species) of the WPR weight creates a major discontinuity without having a strong justification.

(3) Better documentation of the blend algorithm and justification for its decision points are needed.

(4) Investigation of a calibration factor for adjusting reported catches of unobserved processor vessels is warranted. Currently, WPRs are used exclusively. An alternative approach would establish a calibration factor from observed vessels which could then be applied to unobserved vessels.

(5) Use of observer species composition data should be considered when the blend algorithm selects the WPR over observer data. Currently, the entire observer record is not used when this happens, but observer species composition data may be better than found on the WPR.

• Establish a protocol for revising product recovery rates (PRR's). A standard set of PRR's has been established for use in converting processed weights to round weights. Documentation and justification for these standard rates would be desirable. Furthermore, there is need for a scientific protocol for changing PRR's based on new information and a process for validating their rates and how they may change over time, fleet sector, and perhaps vessel.

• Validation of shoreside WPR's is needed. WPR's are made by the processors and should be audited periodically for accuracy. A comparison with ADF&G fish tickets would be useful.

• Similarly, the logbooks and WPR's of at-sea processors should be corroborated against the weights of finished products. Statistical estimation is needed of PRRs.

• Improvements to the sampling design of the observer program are needed.

(1) Methods to better randomize the placement of observers aboard vessels in the 30% category should be pursued. Non-random placement introduces bias.

(2) Further refinement of observer coverage levels may be possible, and efforts to increase the number of vessels observed will improve estimation. For estimation of biological characteristics needed in stock assessment, coverage levels of 20-30% appear sufficient, as long as the sampling is representative of the catch. Recent studies suggest that it might be desirable to vary observer coverage by season and fishery.

(3) The Versar report suggests that the current 200% (100% of vessels with two observers) observer coverage for the CDQ fishery needs to continue for valid catch and bycatch estimation.

(4) To estimate bycatch for some prohibited species, coverage levels close to 100% may be required (which comes from previous studies), because of high variability.

(5) Currently, subsampling information on hauls is not recorded, just the aggregate of the subsamples. Hence, it is not possible to estimate the total sampling variance of observer estimates. Further attention to this problem is needed. Short of recommending that such subsampling information be collected, the

SSC suggests some special project activities for some observers to assess the magnitude of subsampling variability.

(6) SSC recommends that NMFS and ADF&G explore further the issues of discard estimation.

- The SSC received a brief overview of the ADF&G catch estimation program from Earl Krygier, ADF&G. This program is complementary to the NMFS data collection program and provides information on crabs, herring, and demersal shelf rockfish among others. The SSC requests further documentation of this program, including reports of any efforts to validate information, in time for its next meeting on this topic in February 1999.

- An evaluation of protocols for establishing historical data sets is needed. Currently the collection of information is designed to provide for in-season management of fisheries. Once data have been collected for the fishing year, additional analytical activities such as data set auditing and comparisons among different data sets may be useful.

Catch Weighing

This manuscript by Dorn et al. (Oct., 1997) reports on a preliminary evaluation of the flow scale, and uses the flow scale to evaluate in situ catch estimates based on codend volume and bin volume estimates. The work presented in this report was systematically performed under carefully controlled conditions and represents the best available work in this subject area performed on north Pacific groundfish. As such the SSC concurs with the warning and recommendations found on page v of the Dorn et al report.

Volumetrics and flow scales provide accurate total catch weight estimates under proper conditions. An important consideration in applying the bin volume method of estimating total catch is water content in the bins. Excess water increases volume, so that a lower value of density would be appropriate. However, because increased water implies increased variability in the bin volume estimate, it makes sense, for the sake of precision, to minimize the amount of water in the bins. The SSC heard testimony arguing that the NMFS study overestimates density, though this is not evident from the available data. Nevertheless, further study may be warranted to assure that the prescribed density values are appropriate for application according to common industry practices.

Flow scales provide potentially the most accurate method for catch weight estimation. However, with well-marked bins of known volume estimates of catch weight can be precise. Accuracy for this method is dependent upon have valid density adjustment factors. The accuracy of haul weights obtained from flow scale readings depends on the accurate accounting of the fish passing across the scale on a 24-hour basis, frequent calibration, and daily materials testing. At current observer staffing levels and sampling workload, independent verification of the accuracy of flow scale weights in not possible. Consequently, reliance on vessel personnel involvement is greater for the flow scale than other haul weight estimation methods. Platform scales were used to calibrate the flow scales and may represent another catch weight estimation method for some vessels and fisheries.

An important finding is that the density estimate (0.93t/m3) which has been used to convert pollock catch volumes to catch weights has been significantly underestimating total catch weights. The report recommends density values for pollock of 1.02t/m3 for codends, and 0.98t/m3 for bin volumes. It also recommends that further studies with flow scales be used to estimate fishery specific density values, and that density estimation using basket samples be discontinued. The small size of sampling baskets has distinctly biased density estimates based on basket sampling.

Although codend measurement can provide precise estimates under proper conditions, the study also recommends against the use of the codend volume method, for monitoring the catch of individual vessels as in the CDQ

fishery. This is especially true for vessels where codends consistently overflow the trawl alley or codends are not completely accessible to the observer.

Salmon Retention

The manuscript by Turnock and Karp (June 1997) has several important findings related to salmon bycatch estimation:

    (1) It is possible to obtain salmon bycatch estimates using statistical methods, which allows evaluation of the estimates with respect to variability. This is a theme similar to that in the Versar report.

    (2) An interesting aspect of this report is that it includes a study of within haul sampling variability. According to Dr. Karp's cover letter this is the first study which does this. It accomplishes this by *simulating* within haul samples as Poisson random variables with mean fC, where f is the fraction of the haul being sampled and C is the whole haul catch of salmon. It does not seem the full simulation study is really necessary since simply assuming the sampling variance is fC would appear to accomplish the same result. The authors are correct in stating this formula likely underestimates the true within haul variability, because salmon are probably not randomly distributed within hauls.

    (3) Observer estimates of salmon bycatch are larger than the estimates based on retained fish for all fleet sectors examined.

    (4) Although Figs. 3 and 4 indicate that within haul sampling fractions of 0.1-0.2 can provide useful estimates of salmon bycatch, attaining these sampling levels will not always be possible when dealing with large landings or difficult sampling situations. At lower sampling fractions, there is some tendency for observer estimates to be higher than at higher levels. This result would not be expected from sampling theory.

    (5) A further caveat by the authors notes that sampling variability of salmon bycatch for any particular vessel will typically be large, and this must be understood when using these data.

The SSC heard testimony that questioned whether observer estimates might be too high rather than retention data being too low. The SSC agrees that it is important for observers to follow sampling protocols so that estimates are not biased. It also seems that the lack of focused responsibility among crew and observers in the Salmon Retention Program might have made retention data less reliable.

Because the true number of salmon caught was not known, it is impossible to know which of the two estimates (observer and retained) is true. If some vessels did not report all salmon, then the observer estimates are probably more correct. If the basket sampling procedure contains a sampling bias, then the salmon retention information may be better. To properly resolve this issue, an experiment needs to be done in which the true number of salmon (or some other object) can be determined and the basket sampling procedure is evaluated at a variety of sampling fractions. The SSC notes that this problem of accurately estimating the catch of rarely occurring species within a larger total catch is likely to arise in other contexts. Accuracy will be an especially difficult problem for estimates by individual vessels such as in the multi-species CDQ program and any future vessel bycatch accounting or multi-species IFQ programs.

Council staff pointed out that the law requires vessels to record all salmon catch in their logbooks anyway. Observers were simply asked to place their "stamp of approval" on retained salmon counts whose quality they cannot control.

C-9 Research Priorities

The SSC reviewed Groundfish Plan Team recommendations for additional research and updated its February 1997 recommendations. The SSC emphasizes that this list is not inclusive of all needed research nor is it prioritized; rather it represents a compilation of research ideas recognized by the SSC as deserving attention by NMFS, ADF&G, IPHC, other agencies, and institutions of higher learning. The SSC also requests that the Crab Plan Team provide research recommendations.

While the SSC has periodically attempted to prioritize the research items found below, we have never been able to arrive at a consensus on these priorities. It is therefore somewhat historic, that **the SSC wishes to emphasize the critical need for the Council to support the development and maintenance of basic social and economic data on the fisheries and fishery dependent communities of the GOA and BS/AI.**

A.   Critical Assessment Problems

1.   Rockfish: There is a general need for better assessment data, particularly investigation of stock structure and biological variables.

        a)   Supplement triennial trawl survey biomass estimates with estimates of biomass or indices of biomass obtained from alternative survey designs.

        b)   Obtain age and length samples from the commercial fishery, especially for Pacific ocean perch, northern rockfish, and dusky rockfish.

        c)   Increase capacity for production ageing of rockfish so that age information from surveys and the fishery can be included in stock assessments in a timely manner.

2.   Walleye pollock: There is a continuing need for research on stock structure as it relates to assessment. There is a critical need for a tagging study to focus on stock interactions. We continue to emphasize the need for age-structured assessments of recognized stock units. As the Bering Sea pollock population has declined, the forecasts of future pollock recruitment have undergone greater scrutiny. Research on alternative forecasting methods is needed

The SSC believes that the magnitude of the catch, size and age structure of the EBS stock harvested in the Russian zone in the vicinity of the transboundary area is needed. It may be necessary to consider fishing removals from the Russian zone and their impact on EBS pollock mortality in the estimates of ABC and TAC.

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. Various ways of supplementing the triennial survey data should be evaluated. The relationship between fish in Prince William Sound to those in the Gulf of Alaska needs to be elucidated.

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

4.   Age- and length-structured assessments: These assessments integrate several data sources using some weighting scheme. Little research has gone into evaluation of different weighting schemes, although the weight can have a large effect on the assessment results. Research is

needed on which weighting schemes are robust to uncertainties among the different data sources. Age structured assessments depend upon age determination techniques and ongoing age validation is needed.

Correct model specification is critical to stock assessment. Further research is needed on model performance in terms of bias and variability. In particular, computer simulations, sensitivity studies, and retrospective analyses are needed. As models become more complex in terms of parameters, error structure, and data sources, there is a greater need to understand how well they perform.

5.   Life history information, e.g., growth and maturity data, is incomplete for a number of stocks. This information is essential for determination of ABC, OFL and preferred fishing mortality rates. Maturity data are lacking for: Pacific cod, Dover sole, other flatfish, sablefish, and many species of rockfish. Life history and distributional patterns of Greenland turbot are lacking. To better understand sablefish recruitment variability, additional information on the geographical distributional and movement of juvenile sablefish is needed.

6.   Identification of the origin of chum and chinook salmon stocks captured incidentally in the groundfish fisheries is needed. The chum salmon stocks in particular are recognized as a mixture of Asian and North American origin. Resolution of stock origin is important in the consideration of bycatch management.

7.   There is need for information about stock structure and movement of walleye pollock, Atka mackerel, Pacific cod, POP, and other rockfish.

8.   Further research is needed about management strategies that provide for conservation of aquatic resources. Topics that need attention include: which measure of biomass should be used in biomass-based adjustment of ABC and OFL; what measure of average recruitment to use in $B_{40\%}$; the effect of seasonality in spawning, recruitment, and harvest on optimal harvest rate; adaptive management schemes which are designed to provide understanding of multispecies interactions and spatial population dynamics.

9.   Presentation of uncertainty in stock assessments is often lacking or incomplete. Further research is needed into which methods are most appropriate for capturing uncertainty in the status of populations.

10.   Management measures such as time-area closures and other restrictions are frequently imposed, but rarely rescinded. Studies are needed to evaluate the effectiveness of management measures on conserving populations, achieving management goals and assessing other ecosystem effects.

B.   Stock survey concerns

1.   Conservation of aquatic resources in the North Pacific is critically dependent on a consistent time series of trawl, hydroacoustic, and longline surveys. The continuity of these series must remain one of the highest priorities of NMFS and the Council.

2.   Explore ways for inaugurating or improving surveys to assess rockfish (including nearshore pelagics), pollock, squid and Atka mackerel.

3. Expand bottom trawl surveys in the Gulf of Alaska and Bering Sea to include slope areas that encompass the population range of Greenland turbot, rockfish, thornyheads, and sablefish.

4. Conduct surveys of the Aleutian Islands management area to assist in the assessment of groundfish stocks found in this region.

5. Improve surveys for Bering Sea crab complementary to the existing Bering Sea crab/groundfish survey (e.g. Norton Sound, Pribilof Islands, St. Matthew Island, and Bristol Bay).

6. Direct observation (e.g. submersible and dive surveys) offers unique opportunities to directly examine gear performance, fish behavior in the proximity of gear, gear related habitat impacts, and differences of fish density between trawlable and nontrawlable habitat.

7. There is a continuing need to perform gear calibration and fish observation studies to validate indices of abundance (e.g. fishing longline and trawl gear side-by-side, and fishing different baits on longline gear over the same stations).

8. Within the EEZ are seamounts that are unsampled for groundfish, halibut, and crab abundance. Surveys that sample these seamounts may improve estimates of total abundance in the EEZ, particularly for sablefish and rockfish stocks.

9. Data from annual ADF&G crab surveys should be examined and their usefulness for assessing groundfish abundance in near-shore areas should be evaluated. Dialogue between ADF&G and NMFS assessment scientists regarding ways of gaining more useful groundfish data from this survey should be encouraged.

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 among oceanographic conditions, conditions and animal condition and health should be explored. Research should be done on sources of age-specific fish mortality.

2. Effort is needed on status of stocks and distribution of forage fishes, such as capelin, eulachon, and sand lance. Forage fish are an important part of the ecosystem , yet little is known about these stocks. The Lowell-Wakefield Symposium (October 1996) presented current research on forage fishes.

3. Studies of the effects of harvesting and processing activities on the ecosystem and habitat should be instituted. For example, studies contrasting species diversity and abundance in the red king crab savings area with that in adjacent regions.

4. Trophic dynamics research should be undertaken on the relationships among critical species, e.g., Pacific cod and its prey (including shrimp and crabs). The feasibility of constructing multispecies models using ongoing collection of gut contents data should be investigated.

5. 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?

6. Studies are needed to identify essential habitat for groundfish and forage fish species in the Gulf of Alaska and Bering Sea. This identification is required by the MSFCMA and would benefit from field studies conducted across a matrix of spatial temporal, and life history stages.

7. Expand studies of distribution, abundance, and productivity of seabird populations and ensure that data are collected in ways that provide for rigorous analyses of seabird/marine mammal/oceanographic/fisheries interactions. The majority of data on seabirds in Alaska was collected during the 1970s (through OCSEAP); the quantity of data collected afterwards has been insufficient to adequately examine these interactions.

8. Multivariate statistical analysis of the time series of annual survey data may identify which species regularly occur in assemblages. Mapping these assemblages through space and time may reveal changes in the distribution and abundance of the species of the Eastern Bering Sea. These mappings and trajectories may be applicable to adaptive management approaches suggested for exploring ecosystem concerns. Although related analyses were started by NMFS in the late 1970's , they have not been conducted in recent years. Recent advances in spatial statistics may prove fruitful tools for re-examining these existing data.

D.   Socioeconomic research

There is a critical need for the development and continued maintenance of basic social and economic information databases on the fisheries and fisheries dependent communities 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.

1. There is a need to develop a cross section-time series of data on:

   a) Exvessel and wholesale prices (information is needed on actual transactions and sources of variability).

   b) Inventories and exports (greater detail on product form, volume, and transactions prices).

   c) Cost of variable inputs to fishing

   d) Patterns of ownership in fishing and processing operations (concentration, vertical integration, foreign participation).

   e) Employment and earnings for crew and skippers

   f) Patterns of employment/unemployment, earnings, transfer payments in fishery dependent communities, and

   g) The location where goods and services are purchased.

2. There is a need for economic analyses of:

a)   The demand for fisheries products (exvessel, wholesale, international, and retail markets)

b)   Production functions for catch and processing

c)   Regional models of economic activity in fishery dependent communities,

d)   An assessment of the cumulative efficiency and equity consequences of management actions that apply time/area closures

e)   An assessment of the consequences of the halibut/sablefish IFQ program (changes in product markets, characteristics of quota share markets, changes in distribution of ownership, changes in crew compensation, etc.)

f)   Estimates of the net economic benefits of recreation and subsistence harvests, and,

g)   And improved representation of fleet behavioral response to alternative fishing opportunities to provide better prediction of how fishing effort will shift in response to time/area closures.

3.   Research pertinent to assessment of the social impacts of actions contemplated by the Council include:

a)   Fishery/Community Linkages: Field research aimed at capturing the full array of linkages between fisheries and social and economic life in fishery dependent communities.

b)   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.

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

d)   Develop better methods for determining the social costs and benefits of management actions (e.g. through the use of non-market valuation techniques).

E.   Bycatch problems

1.   Research on gear modification and other methods for reducing bycatch should be expanded.

2.   A better quantification of discard mortality rates is needed, especially for halibut and crab.

4.   Data on size/age and sex of crabs taken as bycatch are needed to assess impacts.

5.   Comprehensive evaluations are needed of single and multiple time/area closures and other bycatch management measures.

6.   Develop better methods for assessing the social costs of bycatch.

7.   Identify sources of variability in actual and estimated bycatch rates.

F.   Fishery Monitoring

   1.   Inseason management and stock assessment are critically dependent on catch estimates. There is a need to conduct ongoing analyses of the accuracy and precision of catch estimates in all fisheries. An analysis of the utility of fishery logbook information should be conducted. In particular, determine if it is possible to gain insight into fleet performance from such information. Examine feasibility for developing a representative CPUE index and determine if it is proportional to stock size

   2.   Evaluate sampling procedures used by observers and various catch estimation procedures.

   3.   Development of catch and bycatch sampling procedures for individual vessel accountability programs.

D-1(d) Revise the Annual Specification Process

The SSC supports the release of the EA/RIR for public review. The proposed amendment would make the specification process more efficient and allow the SSC to spend more time on reviewing stock assessment models and harvest strategies at the October meeting. The SSC recommends that an outline of information to be presented at the October meeting be developed for SSC comment at the April meeting when final review of this amendment takes place.

D-2(c) Bycatch Amendments

Dave Witherell provided a staff report on the status of four bycatch amendments under development. Dorothy Childers (AMCC) and John Gauvin (Groundfish Forum) provided public testimony.

Staff indicated that numerous issues must be resolved before further development occurs for the amendments addressing an individual checklist program and halibut mortality avoidance. Staff indicate that two amendments - limiting directed pollock harvest to pelagic trawls and further limiting chinook salmon taken in BSAI fisheries - are sufficiently well developed that they can be ready for initial review at the Council's April meeting.