

North Pacific Fishery Management Council

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MINUTES Scientific Statistical Committee February 7-9, 2000

The Scientific Statistical Committee met February 7-9, 2000 at the Hilton Hotel in Anchorage, Alaska. All members were present except Sue Hills and Doug Eggers:

Richard Marasco, Chair	Jack Tagart, Vice Chair	Keith Criddle
Steve Hare	Dan Kimura	Hal Weeks
Doug Larson	Seth Macinko	Terry Quinn
Al Tyler	Jeff Hartman	

C-1 HALIBUT CHARTER GHL ANALYSIS

Council staff (Jane DiCosimo and Chuck Hamel) provided an overview of revisions to the halibut GHL EA/RIR/IRFA. Public testimony was provided by Patrick Bookey; Jerry Merrigan, (Petersburg Vessel Owners Association); Gail Vick (Afognak Native Corporation, Koning Inc, Kodiak Native Tourism Association, Gulf of Alaska Coastal Communities Coalition); Jon Sutinen (University of Rhode Island on behalf of Halibut Coalition); Tim Henkel and Alan Norris (Deep Sea Fisherman's Association); Bruce Gabrys, (Eagle River); Bob Alverson, (Fishing Vessel Owners Association); Robert Ward, (Anchor Point); and Donald Weslin, (Ketchikan).

The staff was responsive to SSC comments from the December meeting in making revisions to the draft sent out for public review. New information developed since December has also been presented, in the form of an Addendum sent out last week.

The analysis and addendum present a substantial amount of useful information about the sport and commercial halibut sectors. It discusses and attempts to quantify the relative effectiveness (or lack thereof) of different policy tools to curtail sport harvest once a GHL has been reached, and many implementation, monitoring, and enforcement issues. Nevertheless, several key caveats and issues highlighted in our December minutes remain relevant and are worth reiterating as the Council makes its decision:

(1) "The document does not provide definitive evidence of the net benefits of different options for halibut charterboat management... it is important that all participants in the Council process understand that even if a comprehensive set of studies were available, such models have limited ability to predict the consequences of major changes in regulatory structure or management strategy." Implementation of a binding GHL and enforcement of the GHL through restrictive daily or seasonal bag limits are major changes.

(2) "Overall, the analysis does not provide as comprehensive an evaluation of the commercial sector." And, the reported "... sport fishing studies address marine fisheries off the Kenai Peninsula" may not generalize to other regions. Nevertheless, these shortcomings are duly noted the analysis includes a reasonable qualitative discussion of potential impacts on the commercial fishery and on sport fisheries in regions outside the Kenai Peninsula area.

(3) ... "The EA/RIR/IRFA makes an interesting attempt to link the bag limit reduction to changes in participation and expenditures, but it is unclear exactly what the magnitude of the effects will be." The SSC notes that the participation rate model was developed from a set of questions designed to explore hypothetical rankings of trips with varying costs and catch attributes. Consequently, the model is best suited to address changes in the size and availability of halibut. While it is reasonable to infer that changes in participation due to changes in catches are a useful proxy for changes in retention limits, it is unlikely that there is a one-for-one correlation.

(4) "The EA/RIR/IRFA makes a generally persuasive case that most of the management measures under consideration for implementing the GHL will not be effective in constraining and reducing sport halibut harvests." Bag limits do appear to be the most effective measure but their quantitative effects are hard to predict, because the number of potential sport fishers vastly exceeds the number of participants in any one year. Models to predict how much of the latent capacity could become active in any given year are, at best, crude. Consequently, we wish to caution the Council that some information presented in the Addendum may be misconstrued to be more solid than it really is. In particular, the information in Section III, which details the implementation and enforcement of the GHL, contains several tables (6.18 and 6.19) and figures (6.5-6.8) which present "estimates" of the effects of different measures. These are better characterized as informed guesses by the agency staffs of the possible initial effects when different policies are implemented. In particular, while figures 6.7 and 6.8 may indicate the relative effects of different management measures, it is unrealistic to suggest that their absolute effects are known with any certainty.

(5) The SSC shares IPHC's concern about adoption of a GHL specified in number of fish. If the GHL is expressed in number of fish at a time when the halibut stock is characterized by large numbers of relatively small fish, a change in stock structure to fewer and larger fish will result in a large reallocation to the disadvantage of the commercial sector.

Management and implementation will require extensive coordination between ADF&G, NMFS and IPHC. The costs to these agencies associated with alternative management measures are not well developed in the analysis. The IPHC letter included in the briefing book expresses concerns that cost of enforcing a GHL may be high. Once a GHL has been adopted, and if it becomes binding, it may be necessary to couple on-water enforcement with log book and creel consensus sampling programs to guard against under reporting.

Finally, it was noted in the SSC December 1999 minutes and pointed out more than once during public testimony that under the current suite of management measures the Council will need to continually revisit this allocation issue. The SSC recommends that the Council seriously evaluate the feasibility of emerging IFQ proposals. Among the issues that would need considering are (a) whether to define the basic unit of share in pounds or fish; (b) how to ensure commercial and sport IFQs can be traded if denominated in different units; (c) how to determine who is qualified for what initial assignment of quota share; (d) whether quota shares defined over commercial regions can address local area management problems; (e) can a charterboat IFQ program be enforced; (f) do existing data sets provide a basis for an initial allocation; etc.

C-2 STELLER SEA LION RESEARCH

Anne Hollowed (AFSC-REFM) and Chris Wilson (AFSC-RACE) presented the draft EA for a proposed regulatory amendment to temporarily re-open the 10nm no trawl zones around Gull Point and Cape Barnabas. These regulatory changes would be effective from August 1 to no later than September 20 in years 2000-2003. These changes will allow analysts to employ hydro-acoustic surveys to further understand the impacts of fishing on pollock distribution and abundance as part of a more comprehensive research program on sea lion/fishery interactions. Public testimony was provided by Glenn Merrill (Aleutian East Borough), Ed Richardson (At-Sea Processors Association) and Chris Blackburn (AGDB).

The SSC is strongly supportive of this proposal. This research begins to respond to SSC research priority C(11). The proposal is well conceived, well written and represents the type of experimental and adaptive approach that is essential to resolve questions such as fishery/marine mammal interactions. We agree with the proponents' assessment that the proposed study has low power, i.e. there is substantial risk that statistically significant results may not be realized. Adding additional experimental units (locations) would likely be the most effective way to increase the power of the experiment. Public testimony suggested that industry platforms may be available to conduct these surveys in additional areas. Use of otherwise idle fishing vessels may be a means of economically increasing the number of areas surveyed. Deployment of NMFS personnel and equipment calibration would have to be addressed.

C-3(b) PROCESSING SIDEBOARDS/EXCESSIVE SHARE ANALYSIS

The SSC received a presentation of the draft analysis from Chris Oliver (NPFMC) and Marcus Hartley (Northern Economics). Public testimony was received from Earl Comstock (Fair Fisheries Coalition), Glenn Merrill (Aleutian East Borough), John Henderschedt (Groundfish Forum), Donna Parker (Arctic Storm), and Trevor McCabe and Ed Richardson (At-Sea Processors Association).

The draft analysis presents the SSC with something of a dilemma. On one hand, the draft analysis presents a considerable amount of relevant information in a clear and concise manner. On the other hand, there are a number of serious deficiencies in the analysis:

(1) The Council needs to clarify and focus the problem statement so that the analysis is driven by what the Council's objectives are and not the analysts' best guess of the Council's objectives. The analysts should then link sections of the analysis to the problem statement.

(2) The table (Table 2) that appears in several places in the document should be revised in a number of ways. First, the table should be more closely linked to the problem statement. Second, the issue of 'weighting' of the table cells should be discussed. Currently, all cells implicitly carry an equal weight. It is not clear that this equal weighting is appropriate. For example compliance with the Paperwork Reduction Act is not as relevant as responding to the problem statement. The analysis should note that the table presents the analysts' "best guess" as to how the various options address various perspectives. The analysts should attempt to ground truth this assessment with a broader spectrum of industry input. The SSC does note however that the table serves to illustrate the complexity of the choices facing the Council.

(3) Some of the assumptions and conclusions presented in the analysis are normative and too strong in light of the complexity of issues portrayed in the analysis. Some conclusions are unsupported by analysis (e.g. there is no basis for suggesting that a 20% limit is preferable to 10% or 30% or 17.5% or 22.5%).

(4) The discussion of impacts of alternatives considered in the document is minimal. The analysis is too quick to dismiss consideration of impacts on small entities.

(5) The analysis does not address implementation and management problems associated with enforcement (e.g., estimation precision) of species specific processing limits at plants, company and entity levels.

(6) The analysis is framed in terms of a static perspective of the status quo option. The SSC notes that the status quo is dynamic and that failure to consider where the fishery would go under the no action alternative is likely to mis-state the direction and magnitude of impacts.

The SSC recognizes the difficulty of the analytical task and commends the analysts for their efforts. The SSC recommends that the draft analysis be released for public review after the above issues are addressed.

Finally, the SSC notes that the Council is likely to face a continuing stream of AFA mitigation measures. In essence the Council is progressing down a path of piecemeal modification of the structure of North Pacific groundfish fisheries. A piecemeal approach may or may not be preferred to a comprehensive approach, nevertheless, caution is warranted to ensure that undesirable consequences are avoided.

C-4 PACIFIC COD LLP EA/RIR/IRFA AMENDMENT 67

The Council staff provided background information on the EA/RIR for Amendment 67, including previous amendments leading to the April 1999 proposal to implement a Pacific cod endorsement in the BSAI. The SSC recommends that the IRFA be sent forward to public review with the following revisions.

1. Potential spillover effects of the licensing program could extend beyond the EEZ to State of Alaska fisheries. These effects could arise from vessels excluded when the endorsements are implemented and could alter effort in adjacent fisheries. It is suggested that potential effects on these fisheries be discussed. In addition, there should be a discussion of the possible expansion of state waters fisheries as a response to the exclusion of vessels by the program.
2. Neither the indirect effects nor other distributional effects on localities are discussed in the analysis. An expanded treatment of these consequences should be included in the section on the Regulatory Flexibility Act. For example, there is some expectation that communities may be impacted as a result of adjustments to the exclusions associated with LLP.
3. As indicated in the analysis the number of vessels qualified under the LLP varies greatly according to the qualification criteria. Previous analyses indicate that a small number of participants account for the lion share of landings. Consequently, the qualification criteria would have to be very restrictive to have a meaningful effect on capacity. To illustrate this point, the analysis should include a series of plots that show both the number of qualified vessels and the magnitude of their catch as a function of the quantification criteria.
4. The analysis should include a section that summarizes regional, national and international experience with license limitation programs, focusing on the extent to which such programs have successfully constrained fishing power.
5. The static status quo adopted as a basis for evaluation of the alternatives is inappropriate. The no action alternative should reflect changes in fishery organization performance that are likely to occur in the absence of management action. In fact the problem statement expressly notes that the motivation

for exploring LLP is to "promote stability" suggesting that the no action alternative will result in a continuing influx of capacity. The analysis should address the efficacy of the alternatives in controlling capacity growth.

C-7 RESEARCH PRIORITIES

The SSC updated the list of research priorities from last year by incorporating Plan Team recommendations and its own new thoughts. 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. Items added this year are italicized.

A. Critical Assessment Problems

1. *Some of our stocks are disproportionately harvested across large areas of the GOA and BSAI due to area closures, other management actions, or fishery behavior. Additional analysis should be undertaken to examine potential effects of disproportional harvesting.*
2. *More information is needed on "other species." Observer data should be collected and analyzed for individual species. Better estimates of abundance are needed. Lastly, life history data is limited for many species in this complex.*
3. 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
4. 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. *Beginning next year, these surveys will be conducted every two years. While this is a positive development, various ways of supplementing the biennial survey data should be evaluated.*

More research should also be conducted on the movement of pollock between the GOA and BSAI and across regions within GOA and BSAI, (e.g., Bogoslof, Donut Hole, PWS, Shelikof, and SE inside).

5. Crab research: Research should be expanded on handling mortality, stock structure and life history parameters.
6. 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.

7. 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.
8. 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.
9. There is need for information about stock structure and movement of walleye pollock, Atka mackerel, Pacific cod, POP, and other rockfish.
10. 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. One objective is to develop multispecies analysis of stocks.
11. 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. *The use of Markov Chain-Monte Carlo (MCMC) methods appears to be a promising line of research and its use with AD Model Builder should be further explored.*

12. 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. Data analysis should be expanded to include non-target, non-FMP species.
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. Little scientific sampling has occurred of seamounts within the EEZ 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. *Considerable research is being conducted on the effects of climate on the biology and dynamics of marine populations. Research effort is required to develop methods to incorporate climate variability and its influence on processes such as recruitment and growth into our models of population dynamics.*

2. *There have been considerable recent advances in using naturally occurring stable isotopes in diverse types of studies. Examples include identifying residence times and areas at various life stages; computing trophic levels and food web dynamics; examining ontogenetic changes and patterns of migration. Studies using these natural markers should be encouraged.*
3. 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 and animal condition and health should be explored. Research should be done on sources of age-specific fish mortality.
4. 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.
5. Studies of the effects of harvesting and processing activities on the ecosystem and habitat should be instituted. One example would be a study contrasting species diversity and abundance in the red king crab savings area with that in adjacent regions.
6. 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.
7. 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?
8. 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. Mapping of nearshore and shelf habitat should be continued for FMP species.
9. 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.
10. 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.

11. Uncertainty about the relationship between the Steller sea lion population and groundfish fisheries has taken an elevated significance. With this uncertainty as to the extent of factors affecting Steller sea lions, it is critically important to investigate the effects of mitigation measures on the sea lions, the fisheries, and the ecosystem. The monitoring must be based on an experimental design that provides information about the interaction of fisheries and Steller sea lions. Five questions are central to future work:

- (a) What is the distribution of fish in relation to areas used for fishing, and what are the seasonal changes?
- (b) What is the distribution of fish in fishing areas before and after fishing?
- (c) How do Steller sea lions use pollock in relations to pollock distributions?
- (d) How does the Steller sea lion's pollock feeding habits influence sea lion population dynamics?
- (e) Does the fishery effect Steller sea lions in other ways (e.g., behavioral disturbance)?

D. Social and economic 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) 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.
4. 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.
 3. Data on size/age and sex of crabs taken as bycatch are needed to assess impacts.
 4. Comprehensive evaluations are needed of single and multiple time/area closures and other bycatch management measures.
 5. Develop better methods for assessing the social costs of bycatch.
 6. Identify sources of variability in actual and estimated bycatch rates.
 7. Collect bycatch information in the directed halibut fisheries using observer coverage. Current logbook information is inadequate to quantify this bycatch.
- 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. *Recent analyses have been conducted on efficient methods of collecting representative*

biological data from target species. Similar studies should be conducted on the collection of prohibited species biological data.

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

D-1 HABITAT AREAS OF PARTICULAR CONCERN (HAPC)

Dave Witherell (NPFMC) presented the staff report on this item. John Gauvin (Groundfish Forum) and Dorothy Childers (AMCC) presented public testimony.

This is the second phase of discussion of habitat issues; the first led to definition of essential fish habitat. In the second phase, habitat areas of particular concerns (HAPC) are considered, along with related management measures.

The SSC recommends that the Council take a measured, comprehensive and scientific approach to these habitat issues. The SSC is concerned that the current document is focusing on isolated habitat concerns without any strong connections drawn to resultant fish productivity. The SSC believes that aspects of a more comprehensive approach would include (1) experimental designs with controls and treatment that can evaluate the effectiveness of management measures, (2) process oriented research that establishes the connections between habitat and fish production, and (3) a full treatment of marine reserves (or refugia or closed areas). Therefore the SSC cautions against taking an incremental approach, because the management measures applied in this fashion could do more harm than good. Specifically, with respect to the current document, the SSC recommends sending out the portion of the document related to definition of HAPC but withholding the management measures in Part C until a more comprehensive plan is developed.

The SSC also has several specific comments:

- (1) The evaluation table for proposed HAPC types and areas (p.16) should be accompanied by increased discussion of definitions and rationale. We ask that the authors define the high-medium-low and 1-2-3 data level terms used in the table cells, and discuss the bases for their evaluations.
- (2) The document should provide an overlay of fishing activity and harvests in the proposed HAPC areas, particularly areas of Gorgonian coral abundance.
- (3) The document could better frame previous Council actions to protect habitat, and their evaluations, as accomplishments.
- (4) Notwithstanding our recommendation concerning incremental protective measures, conservation of Gorgonian corals warrants further analysis. Their long-life and slow growth means that changes to this habitat type from fishing activities could be irreversible.

Among the concerns over classification of HAPC is the apparent lack of integration with a comprehensive management plan for fishery regulation. The SSC believes the Council should evaluate a more integrated strategy for habitat protection and fish management.

As an illustration of an integrated habitat/fishery management regime, the Council might consider the longline fisheries of Southeast Alaska. The human population of the region is growing, with increasing pressure on vulnerable resources. Predominant fisheries are sablefish, halibut and rockfish. The rockfish fishery is managed around estimates of available habitat. Knowledge of the preferred habitats for these species is continuing to be acquired with commensurate revisions on estimates of available biomass. Sablefish and halibut are both mobile species, while rockfish tend to be more sedentary. This difference in life history complicates analysis of anticipated benefits from habitat protection measures. Evaluation of an integrated habitat fishery management regime could provide the Council with valuable input on the practicality of implementation, and the anticipated benefits of the habitat protection measure to the sustainable production of the managed fish resources.

ABC/OVERFISHING DEFINITIONS

The joint SSC/PT committee (Central Rule Alternatives workshop, Design, Analysis, Decision: CRAWDAD) met in Seattle January 31, 2000 to explore the process for a new ABC/overfishing protocol. The workshop was successful in exploring the scope of alternatives and analysis to be conducted, although much fleshing out of activity remains to be done. A report of the workshop is available from Grant Thompson, Chair of the Committee.

The SSC has one major concern over the simulation strategy proposed for estimating a generic MSY control rule for major stock types (i.e., gadid, pleuronectid, and scorpaenid). The suggested method assumes a stock-recruitment curve, age-structured model, and an MSY control rule which is optimized in the simulation. A problem arises because the optimal MSY control rule will strongly depend on the assumed stock-recruitment relationship which can easily be mis-specified. This perspective suggests an optimal MSY control rule may not be precautionary. Therefore, the robustness of the analyst's approach needs careful consideration in the alternative to be developed and in the study design. Furthermore, the SSC suggests that the timeline for the new analysis be sufficiently long enough to involve the SSC and Plan Teams in the range of alternatives and analytical approach. It is not necessary to rush this analysis; our current procedures can be used one more year if necessary.

The SSC has strongly criticized shortcomings in the NMFS guidelines for status determination in its previous minutes. The SSC intends to prepare a letter to NMFS outlining its concerns and requesting clarification about whether these guidelines can be modified in the new overfishing amendment.

PACIFIC COD DATA COLLECTION PROTOCOLS

Dan Ito (Observer Program Manager) and Shannon Fitzgerald reviewed the catch sampling protocols used by the Alaska Fishery Science Center Observer Program. The SSC commends the presenters for a highly organized and clearly focused review.

The sampling protocols for length frequencies and otolith collections were significantly changed in 1999, so distinct sampling methods were used in pre-1999 samples compared with current 1999+ sampling. The current protocols are characterized by much smaller random samples taken over a far greater number of hauls. In theory these smaller samples should provide greater statistical efficiency, while at the same time filling gaps in sampling strata that were apparent under the pre-1999 sampling scheme. However, since sampling protocols have changed so significantly, it is important that the results of the two sampling methods be carefully compared to assure that the smaller samples have not led to increased sampling bias.

In its October 1999 minutes, the SSC outlined a two-stage process to evaluate the adequacy of Pacific cod biological sampling relative to the needs of age-structured modeling. The first stage was an examination of sampling protocols and an audit to verify that they have been properly carried out. The second stage would evaluate the impact of sampling on the age-structured stock assessment model. Therefore, the SSC requests that the next Pacific cod assessment evaluate the adequacy of the length frequency sampling on the fishery strata used in the age-structured stock assessment model.

Historically, in Canada and the U.S., Pacific cod has proved to be an extremely difficult species to age. The lack of progress suggests that unusual growth characteristics of Pacific cod may play a role in the difficulties encountered ageing and, hence, modeling this species.