

DRAFT MINUTES
Scientific Statistical Committee
June 3-5, 2002

The Scientific Statistical Committee met June 3-5, 2002 in Dutch Harbor, Alaska. The following members were present:

Jack Tagart, Vice Chair	Steven Hare	Jeff Hartman
Mark Herrmann	Sue Hills	Dan Kimura, and
Seth Macinko		

Absent SSC members were: Steve Berkeley, Keith Criddle, Doug Eggers, George Hunt, Rich Marasco, Ken Pitcher, and Terry Quinn.

C-2 EFH IMPACTS METHODOLOGY

The SSC was briefed by Dave Witherell and Craig Rose on the development of methods for evaluation of Essential Fish Habitat (EFH) impacts. Public testimony was provided by Ben Enticknap, AMCC. Staff are working diligently to develop a tractable methodology to determine the extent of fishery impacts on EFH. Simultaneously, they are wrestling with definitions of terms introduced in the EFH rules. Models being evaluated are complex, require significant data inputs and are substantially constrained by the availability of necessary data. Nonetheless, these models will become the basis for decision making at future stages of development of the EFH EA. Staff advise the SSC that they plan to present their EFH mitigation alternatives at the October Council meeting. Given the number of SSC members unable to participate at this meeting, we asked staff to circulate copies of their draft analytical approach to the entire SSC.

C-3 CRAB RATIONALIZATION SOCIOECONOMIC DATA COLLECTION

Council staff member Darrel Brannon reviewed the encouraging progress that has been made on mandatory social and economic data collection called for in the April 2002 motion on crab rationalization. Public testimony was offered by John Garner, of the North Pacific Crab Association. **The SSC believes that it is essential for the Council to indicate to Congress that collection of this information must occur no matter which alternative is forwarded to Congress.** Currently, the Magnuson Stevens act may prohibit the mandatory collection of economic data, and generic authorizing language is necessary to address this problem.

The SSC notes that existing language on economic data collection in the April 2002 Council motion is not properly located in the current motion. It appears under the heading of Taxes in the April motion, and should be placed in a more prominent location. Further progress on specific data variables to collect was presented in the Initial Agency Thoughts on Economic Data Collection for the BSAI Crab Fisheries (Appendix A3 of the Crab Rationalization analysis). This documentation was developed from the first industry and agency meeting on economic data for evaluating the crab rationalization that occurred after the April NPFMC meeting. The SSC also briefly reviewed draft forms for collection of economic data from BSAI crab catcher vessels, motherships, catcher processors, shorebased processors and floating processors.

Methods for allocating fixed costs, and enforcement issues were among the topics raised in public testimony.

Also raised, was a significant concern over data confidentiality.

As stated in previous minutes, the implementation of mandatory collection of economic data continues to be a high priority with the SSC, and is necessary to accomplish the stated Council goals of tracking post rationalization changes in the net economic benefits of BSAI crab fisheries, distribution of rents and/or sector asset values, regional economic impacts, and other community and social effects of the program. The SSC is supportive of the additional industry and agency planning, recommended by the council staff, required to prepare the necessary documentation to implement the data collection.

C-8 RESEARCH PRIORITIES

The SSC last revised its “research priorities” in February 2000. Typically an annual endeavor, research priorities went unaddressed in 2001 due to pressing Council concerns over groundfish/SSL management measures. Historically, the SSC list of research priorities has been a vehicle to convey to the Council and parties interested in Council activities those areas of study the SSC deemed worthy of focused attention. The priority list is extensive and addresses six topical areas of research. Nevertheless, the list is not inclusive of all needed research nor is it prioritized.

In April 2002, Clarence Pautzke, Executive Director of the newly formed North Pacific Research Board (NPRB), requested the SSC’s help in identifying topical areas of applied research that might be used to focus applicant proposals submitted to the Board for funding. Dr. Marasco, on behalf of the SSC, agreed to organize a working group to draft strawman thematic priorities to be reviewed and finalized by the SSC at the June 2002 NPFMC meeting. A draft set of 18 thematic areas of research was provided to the SSC for review. In addition, the SSC received public comment on research priorities from Ed Richardson representing the Pollock Conservation Cooperative.

Following lengthy discussion, the SSC chose to roll over, with minor edits, its previous research priority list as amended by the BSAI and GOA Plan Teams (Appendix I).

The SSC considered further numerical prioritization of the research list and editing of some items to shape the research focus. However, the SSC members represent a broad spectrum of academic disciplines and wide scope of research interests within their discipline and we recognized that numerical prioritization by a group as diverse as ours would be difficult if not impossible to achieve. Inevitably, the SSC decided that a shortened list would unnecessarily exclude from consideration legitimate areas of needed research and we reverted to the broader listing. Consequently, the SSC has not provided the narrowed research focus sought by the NPRB.

The goal of the SSC in developing its research priority list is to serve the Council by outlining areas of research that are most proximal to the Council’s management actions. From this perspective, we view the request by the NPRB as peripheral to that of the Council. Nevertheless, the SSC asks that our research priority list be made available to researchers seeking NPRB funding.

Finally, the SSC notes that it is important to understand the relationship between short-term issue-specific research projects and long-term monitoring projects. Short term projects tend to dominate the Council arena but they are often constrained by the lack of appropriate data. Long-term monitoring projects are essential to resolving the persistent data problems afflicting analyses across a broad spectrum of issues (i.e., biological, economic, and social). Data obtained from long-term monitoring provide the basic inputs for specific short-

term projects but short-term projects are unlikely to produce results that can simply be aggregated to form long-term data bases. The SSC believes that the NPRB has an excellent opportunity to provide funding for long-term monitoring projects that will ultimately provide critical inputs into the short-term projects often sought by the Council.

D-1(a) TAC SETTING PROCESS

The SSC received a briefing from NMFS staff (Jay Ginter, Melanie Brown, Dr. Jim Ianelli) on an EA/RIR/IRFA to amend the annual harvest specification (TAC setting) process.

This is the fourth time this issue has come before the SSC. In February 2001, the SSC reviewed a First Draft and recommended it be sent out for public review. The report was tabled, subsequently modified and has now returned for Initial Review. The draft report has incorporated a number of earlier SSC comments and four Alternatives have been defined along with two options. The range of options offered in these four Alternatives are considerably less broad than offered in previous drafts of this report. Additionally, the report includes new simulation and retrospective analyses on the potential effects of adopting one of the three Alternatives. The SSC has a number of substantive concerns about the report, and we recommend withholding the report from public review until these concerns are addressed.

As the SSC said in our February 2001 minutes: “*The problem with the current annual specifications process, as well as the objectives from the evaluating alternative specification processes should be clarified. While the SSC is sympathetic with the need to comply with administrative requirements it is more concerned with ensuring that the alternative selected preserves the integrity of stock assessments.*”

NMFS staff acknowledged that the real “problem” here is a bureaucratic one. Over time, the TAC-setting process has evolved to its current form – a system that works well, allows the analysts to incorporate the latest survey data, gives the Plan Teams, SSC and AP adequate time to review the assessments and ABCs, and allows the Council time to recommend TACs for the upcoming fishing year. The basic problem here is concern over compliance with the APA (Administrative Procedures Act). One aspect of the current procedure is the annual use of Emergency Rules to implement the TACs. There is a belief among NMFS staff that this use will eventually be challenged. A number of other perceived problems with the current process were also mentioned in the report. These include lack of adequate time for public review, review of interim TACs and outdated language in the FMPs.

It remains the SSC’s view that this is an administrative problem that should receive an administrative solution. The three alternatives (those other than Alternative 1, status quo) are all variations on a theme that extends the time between the collection of stock abundance survey data and establishment of annual TACs. Alternative 2 requires that TACs be based on surveys from 2 years previous. Alternative 3 delays the start of the fishing year thereby introducing a longer lag between survey and TAC setting. Alternative 4 is a variant on Alternative 2 that includes an extra projection year to allow for setting of TACs. Missing from the Report is a viable alternative that satisfies the APA and maintains the current timeline of our annual harvest specifications.

Among the requirements that must be met for setting annual harvest specifications, use of the “best scientific information available” is paramount (i.e., National Standard 2). All of the Alternatives (other than status quo) compromise this process. The greater the time lag between observation of the population and setting of the

TACs, the less appropriate the recommended harvests are likely to be. The SSC questions whether, in adopting one of the three proposed Alternatives, there is a danger of violating National Standard 2.

The retrospective and simulation analyses attempt to determine the extent to which the alternative harvest specification processes produced ABCs that deviated from status quo (Alternative 1). While there are some potential issues with the modeling procedure, the results illustrate the potential losses that might accrue from basing TACs on older survey data. In general, catches (technically, ABCs) tended to be lower and more variable when based on multi-year biomass projections. The probability of exceeding F_{OFL} also increased substantially. These effects were greatest for short-lived species. The modeling issues noted above had to do with how recruitment is handled in the simulations. Recruitment enters the simulations in two areas – first as a place holder in the two year projections and then as a simulated value. The place holder value is the median value of historical recruitment; the simulated values are drawn from a distribution using the historical mean and variance. Much of the misperformance of the Alternatives derive from the mismatch between the place holder value and the simulated value. As such, the analysis might benefit from a more detailed examination of the influence of different assumptions about the recruitment process. Suggestions included use of mean recruitment as a place holder and introducing serial correlation in the simulations.

The SSC also perceived that the potential benefits of adopting one of the Alternatives were sometimes overly optimistic or promising. It is not clear that the additional time offered by the Alternatives would, in fact, produce better assessments or more detailed peer review.

In summary, prior to release for public review, the SSC recommends the following changes to the analysis: 1) a focused problem statement, 2) addition of an alternative that maintains the current harvest specification timeline; i.e., promotes use of the best scientific information available, and 3) modification of text to avoid overstating the perceived benefits of the alternatives.

APPENDIX 1: SSC 2002 RESEARCH PRIORITIES

A. Stock Assessment Concerns

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. Stock assessments at the assemblage level (sharks, skates, squid, sculpins, and octopus) are planned in the near future.
3. Rockfish: There is a general need for better assessment data, particularly investigation of stock structure and biological variables.
 - a) Supplement biennial 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. Pacific cod: Recent research into aging Pacific cod is being completed and looks promising. The next step would be to evaluate its application to production-aging for Pacific cod.
5. Walleye pollock: There is a continuing need for research on stock structure as it relates to assessments. There is a critical need for stock interactions studies and pollock recruitment patterns. We continue to emphasize the need for age-structured assessments of recognized stock units.

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. 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).

More research using acoustic data should be conducted.

6. Crab research: Research should be expanded on handling mortality, stock structure and life history parameters.
7. 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.

8. 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. An opportunity exists for collecting Pacific cod ovaries and determining maturity during winter surveys scheduled for 2001. Life history and distributional patterns of Greenland turbot are lacking. To better understand sablefish recruitment variability, additional information on the geographical distribution and movement of juvenile sablefish is needed. More research should be done on sources of age-specific fish mortality.
9. 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.
10. There is need for information about stock structure and movement of walleye pollock, Atka mackerel, Pacific cod, POP, and other rockfish. Specifically, we need information on temporal and spatial distributions of spawning aggregations of fish (especially Pacific cod).⁷
11. 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.
12. 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.

13. 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.
14. The Groundfish Teams expressed concern regarding the lack of coverage by trawl survey in both the eastern GOA and in all deepwater strata during 2001 and strongly recommended continued coverage of deeper stations in future surveys.

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 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. 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).
5. 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.
6. 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).
7. 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.
8. 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. Explore the utility of placing trained marine mammal/seabird observers onboard vessels conducting fishery surveys. Such observations may contribute to abundance estimates, or to provide indices of abundance and associations with oceanography and prey distributions. In particular, relationships among oceanographic conditions and animal condition and health should be explored.
 - (a) More research should be collected by placing trained marine mammal/seabird biologists on line transect surveys to begin an index of abundance for birds.
 - (b) Encourage data exchanges between USFWS and NMFS RACE and NMML.
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. -Historic data on seabirds in Alaska was collected during the 1970s (through OCSEAP); but the quantity of data collected afterwards has been insufficient to adequately examine trends in these interactions.
10. Historic (i.e., OCSEAP) data existing in the USFWS Pelagic Database needs be reformatted to update and make the data accessible, to enable analysis on seabird/fishery interactions.

11. More recent (1990's - present) data needs be consolidated and added to the pelagic database.
12. Seabird diet needs to be described for more areas and species, including winter diet needs of seabirds. Existing and historic diet data needs to be consolidated and put into a format accessible and appropriate for examination of long-term trends. Very little is known about winter diets of birds.
13. 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.
14. 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:

What is the distribution of fish in relation to areas used for fishing, and what are the seasonal changes?
15. What is the distribution of fish in fishing areas before and after fishing?
16. How do Steller sea lions use pollock in relations to pollock distributions?
17. How does the Steller sea lion's pollock feeding habits influence sea lion population dynamics?
18. Does the fishery effect Steller sea lions in other ways (e.g., behavioral disturbance)?
19. How much is needed per SSL compared to what is there seasonally and geographically – demand vs. availability, to address localized depletion?
20. More research should be conducted to estimate jellyfish abundance trends because it may be an ecosystem indicator (it is a habitat for pollock).
21. There is an apparent increase of a parasite occurrence in some flatfish stocks (flathead sole and Greenland turbot) in the Bering Sea. This may signal changes in the ecosystem and has important consequences for the fishery. Research on this should be pursued.
22. Killer whale depredation of sablefish catches has been a problem in the Bering Sea since the beginning of the survey. Additional information on the impacts of killer whale depredation on sablefish in the ecosystem and in the sablefish survey should be assessed.

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 collect, monitor, develop and maintain economic data sets
 - a) Existing market data needs to be collected so that retail, wholesale and ex-vessel demand models can be developed. This includes domestic and international quantity and price data on fish and fish substitutes at the ex-vessel, wholesale and retail level. Also needed are data on fish inventories, income levels, price indices, population levels and all other relevant demand determinants.
 - b) Primary cost and employment data, both fixed and variable costs, need to be collected by survey.
 - c) Community profiles and tax data sets need to be developed and maintained.
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.
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 concerns

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 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. Research efforts should also include development of video monitoring options.

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.