

North Pacific Fishery Management Council

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MINUTES Scientific and Statistical Committee September 25-28, 1995

The Scientific and Statistical Committee of the North Pacific Fishery Management Council met September 25-28, 1995 at the Radisson Hotel in Seattle. All members were present:

Terrance Quinn II, Chair
Doug Eggers
Rich Marasco
Jack Tagart
Phil Rigby
Marc Miller

Keith Criddle, Vice-Chair
Al Tyler
Harold Weeks
Bill Aron
Sue Hills
Doug Larson

The morning of September 25 was devoted to a video and slide presentation of ocean circulation in the Gulf of Alaska (Jim Ingraham, AFSC) and a workshop on the stock synthesis model used in many Council stock assessments (Jim Ianelli, AFSC). The SSC thanks both for excellent presentations.

B-5 STELLER SEA LION REPORT

Richard Merrick provided a status report on the Steller sea lion status review under the ESA. The species is currently listed as threatened and is considered to be one stock. It is under consideration for relisting as an endangered species. If so, it is likely that the stock will be considered in two parts, an eastern component which would retain threatened status and a western component (west of Prince William Sound) that would be listed as endangered.

The implications to management for an endangered listing are not clear, but it is likely that no further restriction on commercial fisheries will be legally required by the revised listing because no Alaska fishery has been designated as having a high interaction rate with marine mammals. However, increased public sensitivity generated by the new status could increase pressure to further restrict commercial fisheries and possibly reduce the number of animals taken by subsistence hunting.

Cluster analysis of the rate of decline at sea lion rookeries, combined with diet analysis from 560 scats from the same rookeries, showed that large rates of decline were correlated with less diverse diets. The proportion of pollock in the diet declines from east to west while the proportion of Atka mackerel in the diet declines from west to east. Diets in the Dutch Harbor-Unimak Island area were the most diverse and the rate of decline was lowest there.

Examination of the possibility of sleeper shark predation as a source of sea lion mortality has begun through a request to industry contacts for information and stomach samples from sharks taken during fishing operations. Sleeper sharks are well known as mammal predators in the North Atlantic and the one record of a 13 foot specimen from Kachimak Bay indicated that 3 harbor seals were in its stomach.

C-2(a) HALIBUT/SABLEFISH IFQ's

The SSC heard the presentation about an IFQ Evaluation Plan by Phil Smith of the RAM Division, NMFS. **The SSC commends the Division for undertaking this project, as so often fishery management measures get approved and are never evaluated again. The SSC suggests a further improvement for the Plan, which would make it a more complete evaluation: to include a section which relates information gained about the program back to the myriad problems identified in the EA/RIR.**

C-2(c) EARLY SABLEFISH OPENING IN ALEUTIAN ISLANDS

The SSC reviewed the RIR and found that it contains sufficient information to evaluate the proposal to extend the sablefish season. However, a review of recent (1994 and first half of 1995) price data indicated lower prices during the first quarter of each of these years. This is contrary to the price pattern suggested by the proposers of the amendment. **Nevertheless, the alternatives provide additional flexibility to harvesters in this area, without any substantial biological impacts.** Extension of the season may result in a small increase in halibut mortality, unless sablefish harvesters are required to hold IFQ shares for the bycaught halibut. The SSC also considered whether season extensions would be desirable in other areas. However, the situation in other areas is quite different in terms of bycatch so further analysis would be required.

C-2(e) HALIBUT BYCATCH COMPENSATION

The SSC heard a presentation by Bill Clark and Steve Hare describing a proposed revision to the halibut bycatch compensation procedure used by IPHC. The SSC also heard public testimony concerning the procedure from Joe Blum. The proposal seeks to improve halibut bycatch accounting by incorporating stock migration and by separating juvenile and adult bycatch. The principal issue in making the change is whether sufficient information exists to unambiguously apply the new procedures; a simpler approach may be warranted depending on how sensitive the new procedure is to migration schedules. The proposed procedure may reduce the quantity of halibut available to the directed fishery in some areas. **The SSC suggests that the Plan Teams review this model and examine the potential consequences that the proposal may have on Council fisheries.**

C-3(c) POLLOCK IFQ WORKPLAN

The SSC heard a presentation from Marcus Hartley about the workplan for preparing an EA/RIR for pollock IFQs. The SSC also received public testimony by John Gauvin of AFTA. The workplan provides extensive detail on the possible features of an IFQ system for pollock but does not contain any detail about how the benefits and costs (item 5e) or distributional impacts (item 5f) are to be analyzed. To enable the staff to do a more effective and complete job, **the SSC encourages the Council to simplify, to the extent possible, the list of proposed features or "decision points" for detailed analysis.**

The SSC discussed the importance of assessing the changes in price of pollock and the costs of both harvesting and processing that will likely occur as a result of this fundamental change in management strategy. Predicting changes in the fishery, estimating changes in benefits and costs, and forecasting distributional consequences will necessitate considerable effort. **It is unlikely that rigorous quantitative analyses of these issues can be concluded in time for public review in June 1996. If the Council desires to proceed with a June release of the draft EA/RIR, it will probably be necessary to settle for a qualitative assessment.** The SSC is further

concerned that a qualitative analysis may not provide an adequate documentation of the net economic benefits of the proposed action as well as its distributional consequences.

Forecasting changes in the pollock fishery is difficult because basic economic data on fishing and processing are unavailable and because firms can be expected to change their business practices in ways that may not be reflected by their current operation. These changes are difficult to predict by statistical or mathematical modeling even when extensive data are available. Alternatively, industry participants can be directly surveyed and asked to predict their response to proposed management actions. While the latter approach is appealing, it is possible that industry participants may not have a sound basis for formulating their predictions or that their answers may be strategic and chosen to influence management actions. The SSC generally favors the spirit of this approach, though it may be difficult to use the resulting information in a formal analysis of benefits and costs. **One way to help ensure that this survey occurs would be through formation of a small industry advisory group to help in formulating the analysis.**

Difficulties encountered in development of cost data series have been discussed previously in the context of License Limitation and CRP and were the subject of a meeting of the SSC Economics Subcommittee in August. Dave Colpo (Alaska Fishery Science Center) indicated that efforts to define representative vessels and to develop cost estimates for vessel categories were frustrated by the extent of heterogeneity within the industry and a reluctance by industry to reveal sensitive information. John Gauvin indicated that some industry segments might be willing to support a data collection comparable to the OMB survey if they were convinced that it was necessary. The SSC cautions the analysts to be careful to justify the approach chosen for collecting cost data based on analytical needs. Because of the importance of cost data in analyses of the economic impacts of management actions, **the SSC recommends that a system be implemented for collecting and monitoring cost data.** Data provided would make it possible to evaluate the economic effects of future proposed IFQ programs. A report by the SSC subcommittee will be given to the SSC soon.

Potential changes in the magnitude of benefits and costs and changes in distribution should be examined in the analysis. It can be anticipated that there will be significant changes in the revenues earned by and costs incurred by harvesters, catcher processors, and shore-based processors. In turn, these changes could affect the regional distribution of economic activities. The SSC concurs with Council staff's decision to examine distributional impacts using a combination of the Fisheries Economics Assessment input-output model (FEAM) for large communities and economic base models for smaller communities. The EA/RIR should reference relevant sections of the community profiles that have already been developed.

The SSC's Economics Subcommittee also conducted a preliminary review of the paper, "Toward A More Complete Model of Individual Transferable Fishing Quotas: Implications of Incorporating the Processing Sector," by Professor Scott Matulich and his colleagues at Washington State University, which was received last week. We commend the authors for contributing a timely piece of public policy analysis to the Council's deliberations. The paper establishes that a likely effect of allocating IFQs to harvesters only is that processors will suffer a loss in short-run profits. While the direction of impact is clear, the magnitude of the impact, large or small, is unknown and will vary from fishery to fishery. It depends on the extent to which processors have non-moveable capital invested in the fishery, how much higher variable costs of processing are under a derby fishery than an IFQ fishery, and relative bargaining power of processors in the ex-vessel market. The SSC notes that it has brought issues contained in this paper to the Council's attention before. As noted in our January 1994 minutes,

"It's important to recognize that access control will affect wealth, the worth of assets, in both the harvesting and processing sectors. Under a harvester-shareholder-only ITQ system, wealth is foregone by, for example, recent entrants not qualifying for an initial allocation and qualified active participants if their holdings are diluted by liberal qualification standards. Loss of wealth can also occur in the processing sector especially if capital doesn't have alternative uses. In this situation, some processors would be willing to bid the price of raw fish up until they cover only average variable costs. This

willingness to pay higher raw fish prices results in redistribution of wealth from processors to harvester shareholders. The degree to which this will occur is difficult to predict, a priori, because of lack of information on alternative uses of capital and the relative bargaining power of individual processors and harvesters."

While the insights contributed by the paper are interesting and suggest that the Council may wish to allocate harvest shares to processors, the SSC wishes to caution that there is no scientific basis for recommending a 50/50 split of harvest quota shares between processors and harvesters as suggested by the paper's concluding paragraph.

C-4 OBSERVER PROGRAM/DATA QUALITY

OBSERVER PROGRAM

The SSC received a report from Chris Blackburn, Observer Oversight Committee Chair, and discussed the possible loss of the research plan.

The SSC has serious concern over future data quality. Regardless of the funding mechanism chosen, the SSC believes there are several elements essential to an effective program:

- * **Observer placement must be flexible, in order to be representative of the fleet.**
- * **Compensation and treatment of observers must be sufficient to retain experienced and well-trained personnel.**
- * **There is need for flexibility in establishing coverage levels and distribution of coverage across the fleet. Although well distributed observer coverage at 20 to 30% may be adequate for stock assessment, bycatch estimation levels for some species are closer to 90%, and management programs requiring individual compliance will require 100% (or more).**
- * **The Observer Program should undergo a periodic, independent evaluation of objectives, methodologies and data collected.**
- * **Annually, data needs and priorities should be assessed and provided to the observer program managers.**

DATA QUALITY

Successful management of North Pacific fisheries is critically dependent upon the availability of high quality data. The current data collection system includes the use of a variety of methods ranging from research surveys to the submission of reports by participants in fisheries that are managed by the Council.

The current commercial fishery data collection system was implemented in the early 1990s. This program has not been reviewed, but problems with the system surface from time to time (e.g. see SSC Teleconference minutes, August, 1995). **The SSC was informed that NMFS and ADF&G have initiated an examination of the system to determine if management needs are being met and if improvements can be made. Council staff will be included in the effort. The SSC believes that this evaluation is both needed and timely.**

The SSC also was told that NMFS has funded a contract that will examine observer program procedures for the collection of data necessary for stock assessments and management. This examination is timely and the SSC looks forward to receiving the report that describes the results.

The SSC notes that Congress is in the process of examining alternative ways to conduct stock surveys, such as using commercial vessels. The SSC notes that at-sea surveys are essential for collecting data for the assessments of changes in the stocks of ocean fish. These surveys provide the biological information necessary for estimating

biomass, distribution, and recruitment to fish stocks, as well as other biological parameters including size-at-age, maturity, and reproductive condition. These attributes of stocks change radically during the course of a decade as they are influenced by oceanographic factors and the fishery. The SSC has identified a need to expand particular surveys to provide essential information on stock structure and other population parameters. **Without the work at sea on research ships, the management work of the North Pacific Fisheries Management Council could be severely compromised.** Reductions in the present level of surveys will increase the uncertainty associated with stock biomass estimates and thus increase the risk of overfishing.

C-5 FULL UTILIZATION AND DISCARD REDUCTION

The SSC received reports on these issues at its April 1995 meeting. Presentations highlighted implementation issues. With respect to harvest priority, the SSC suggested in September 1994 that the approach should be experimented with on a small scale prior to full implementation. Experience gained will assist in the avoidance of potential design flaws.

Once the Council is ready to have EA/RIRs developed for these two proposals, the SSC is prepared to comment on study content as necessary.

D-1 CRAB MANAGEMENT

The SSC received the report of the Bering Sea/Aleutian Islands Crab Plan Team. The SSC supports the Crab Plan Team request that an economist be assigned to the Team. Regarding status of stocks, Bristol Bay red king crab is projected to be below threshold for adult females and the fishery will not be opened in 1995. Other king crab stocks will support small fisheries. C. bairdi Tanner crab continues to decline; the guideline harvest level will be 5.5 million pounds, a 27% decrease from 1994. C. opilio snow crab has declined, but strong recruitment is expected.

D-3(a) BERING SEA/ALEUTIAN ISLANDS

The SSC is not providing comments on those ABCs which are unchanged from 1995. Summaries of Plan Team and SSC recommendations are found on the attached tables.

EBS AND ALEUTIAN ISLANDS POLLOCK

Preliminary 1996 ABCs represent no change from those adopted in December 1995.

BOGOSLOF POLLOCK

New hydroacoustic estimates of pollock biomass in the Aleutian Basin and specifically in the Bogoslof area were available in 1996. Estimated biomass is 1,020,000 mt. The new biomass estimate represents a doubling in biomass over the 1994 estimate. Biomass has increased with the recruitment of the 1988 and 1989 year classes and is anticipated to continue to increase as these year classes are completely recruited to the basin population. Given the variability inherent in surveys, the SSC requests that the Team examine the spreadsheet model developed at international workshops as a possible alternative for estimating Bogoslof biomass.

The SSC recommends setting an ABC for the Bogoslof area based on an M/2 exploitation rate. The SSC's 1995 ABC recommendation was based on an M/4 exploitation rate. The factor 1/4 is the OFL adjustment, reflecting the ratio of current stock biomass to the level which produces MSY. Because the stock has doubled, the OFL adjustment is now equal to 1/2. The substantial increase in abundance also alleviates our concern regarding fishery impacts on marine mammals and birds and, like the Team, we no longer recommend the fishery be prosecuted as bycatch only.

Natural mortality for this stock is 0.20, therefore, the SSC's recommended ABC is 102,000 mt. The overfishing level is equal to the ABC. The SSC notes that the Plan Team's OFL was derived using the $F_{30\%}$ exploitation rate (0.30). At this rate, their OFL is 306,000 mt.

BSAI - GREENLAND TURBOT

The SSC continues to recommend an ABC of 7,000 mt. The downward biomass trend and lack of strong recruitment were reasons for the SSC's conservative 1995 ABC recommendations. This recommendation will be re-evaluated in light of the updated analysis that will be presented at the December 1995 Council meeting.

BSAI - SABLEFISH

In the absence of new survey information and analyses, the SSC concurs with the Plan Team's rollover of 1995 ABCs as preliminary 1996 specifications. These are 1,600 mt in the Bering Sea and 2,200 mt in the Aleutian Islands. The preliminary overfishing level is 4,900 mt for the combined BS/AI area. No new survey information is expected to be incorporated into the final 1996 SAFE document.

BSAI - PACIFIC OCEAN PERCH COMPLEX

The analyses for Bering Sea/Aleutian Islands rockfish are not complete at this time. Based on the 1994 triennial survey biomass estimates and inclusions of 1994 catch and length composition-data, the Plan Team expects 1996 ABC estimates to be similar to those of 1995. These 1995 ABCs for the complex follow:

Eastern Bering Sea

True POP 1,850 mt
Other Red Rockfish 1,400 mt

Aleutian Islands

True POP 10,500 mt
Northern/Sharpchin 5,670 mt
Roughey/Shortraker 1,220 mt

Other Rockfish Complex

The rollover of 1995 ABCs for thornyheads and the other remaining rockfish combined are:

Eastern Bering Sea 365 mt
Aleutian Islands 770 mt

The SSC recommends that the analysts proceed with an analysis looking at managing rockfish in the Aleutian area by subarea.

BSAI - SQUID AND OTHER FLATFISH

The SSC concurs with the Plan Team's recommendation to rollover the 1995 ABC of 3,110 mt for squid and 27,600 mt for other species pending incorporation of 1996 trawl survey into the final 1996 SAFE document.

BSAI - ATKA MACKEREL

The recommended ABC (138,000 mt) for this species was developed by applying the $F_{35\%}$ rate to the projected 1996 exploitable biomass (578,000 mt) obtained from the stock synthesis model. The SSC supports the recommended ABC as the initial specification for this species; however we suggest that the Team consider applying the $F_{40\%}$ rate for calculating ABC appropriate for a species with recruitment that's highly variable and

uncertain. The SSC notes a correction in the regional apportionment of ABCs. The Eastern region's ABC should be 47,100 mt rather than 47,600 mt as indicated by the Plan Team.

D-3(c) GULF OF ALASKA

GOA POLLOCK

The SSC reviewed an updated stock assessment for GOA pollock. New information provided in this analysis includes (1) biomass estimates from the 1995 echo integration trawl survey of Shelikof Strait, (2) age data from the 1994 fishery, (3) 1995 length frequency data from the Shelikof survey, (4) revised biomass estimates for a portion of the hydroacoustic survey time series, 1981-1985, (5) revised estimates of weight-at-age, and (6) updated catch data.

Four versions of the stock synthesis model were presented. The plan team accepted, and the SSC concurred, that Model C was the preferred configuration. Model C changes the configuration used in 1994 by estimating the initial age composition rather than assuming it to be in equilibrium prior to the onset of the fishery and incorporating revised weight-at-age parameters.

The SSC notes that while the population biomass is estimated to continue to decline through 1996, biomass is projected to increase in subsequent years following recruitment of the strong 1994 year class. The appearance of this year class is good news in light of the downward trend in this population over the past few years.

Considering the projected improvements in stock biomass the SSC endorses the stock assessment authors' recommended 1996 ABC's of 50,000 mt for the Western and Central Gulf, and 2,700 mt for the Eastern Gulf. This ABC is the upper bound of the range proposed by the Plan Team. The lower bound comes from the fishing mortality that results in less than a 5% chance that the stock drops below the threshold, which was used last year ($F=0.20$). The new fishing mortality rate ($=0.30$) is a tradeoff between the risk of spawner biomass falling below the threshold and increasing yield as a function of fishing mortality.

This rate is less than the $F_{40\%}$ rate and as such is regarded as a conservative exploitation strategy. The overfishing rate is obtained from the $F_{30\%}$ fishing mortality level (0.50) and is equivalent to a harvest of 79,000 mt in the Western and Central Gulf and 4,300 mt in the Eastern Gulf.

One issue of some concern is the status of the stock found in Prince William Sound. This aggregation may represent a segment of either the western/central or eastern pollock population, or it may be a separate stock entirely. If it is a separate stock, the allowable catch would have to be determined independently of the other stocks in the Gulf of Alaska. If it is part of a recognized stock, the catches from this fishery must be appropriately credited to the catch. The SSC has requested that the Plan Team examine available biological data (length, age, sex, weight) from the Prince William Sound samples and contrast these data with data obtained from the recognized stocks and then report back to the SSC at the December meeting with any evidence linking Prince William Sound pollock to currently recognized stocks.

GOA - PACIFIC COD

The Plan Team developed a range of ABC values of 65,000 to 110,000 mt, with the best fit of the Stock Synthesis model being at the 110,000 mt level. The analyst used the more conservative $F_{40\%}$ catch rate level that the SSC recommended last year. There was discussion of the difficulties of simultaneously fitting the asymptotic survey selection curve and a natural mortality rate. The best curve fit for survey selectivity was with a combination of a high natural mortality rate and a dome shaped selection curve. Discussion followed on the difficult interpretation of dome-shaped selection. It was also noted that the higher natural mortality rate was biologically possible. Because of the difficulties of interpretation, the fact that the stock has been fished since

1977 at levels less than 80,100 mt, and that the stock has been declining since 1987 (according to the Synthesis model), the SSC recommends that the Council select the lowest ABC value provided by the Plan Team, namely 65,000 mt.

Concerns regarding the continuing decline of spawning stock leads the SSC to request that the analysts and Plan Team develop a threshold approach to the assessment next year. This practice has been developed with other stocks, especially where declining trends have been a concern, e.g. GOA walleye pollock. There are existing approaches to setting a threshold that might be adopted, or the Team might develop a new method of calculation.

GOA - SABLEFISH

The SSC recommends that the 1995 ABC of 21,500 mt (apportioned as 2,600 mt to the Western Gulf, 8,600 mt to the Central Gulf, 4,100 mt to West Yakutat, and 6,200 mt to Southeast Outside be rolled over as the preliminary 1996 ABC. The Gulf-wide preliminary overfishing level of 28,040 mt would also roll over from 1995. Incorporation of 1996 longline survey data is expected in the final 1996 SAFE document.

The SSC does not concur with the Plan Team recommendation that was developed by projecting the 1995 biomass ahead to 1996 taking into account 1995 catch and recruitment. While the spirit and intent of this adjustment is appreciated, supporting documentation that could be used to evaluate the Team's recommendation was not given (there is no sablefish section in the SAFE).

The SSC appreciates the efforts taken by longline fishers to avoid interfering with the 1995 longline survey. During discussion of this issue, it was noted that trawl vessel activity in early July may have inadvertently affected the longline survey in the Chirikof area. The SSC has asked the analysts to investigate which target fisheries may have been involved, and to work with industry to identify possible mechanisms to avoid future interference, for inclusion in the final 1996 SAFE document.

GOA - ROCKFISH

Pacific Ocean Perch

The synthesis model, first used for the 1993 assessment, for Pacific ocean perch was updated with 1995 fishery data and run ahead for one more year using the 1995 GOA TAC as the 1996 projected catch. New maturity data and information were summarized in the analysis but were not incorporated in the synthesis model. Further significant changes to the model will wait until new fecundity and survey biomass estimates are available in late 1996. For December, the SSC asks the Plan Team and analysts to report on the feasibility of running the model separately for the Western/Central and the Eastern areas, providing two ABCs for POP in the Gulf.

An estimate of current exploitable biomass of 163,220 mt is an increase above last year's estimate of 142,470 mt. The ABC was calculated using the optimal fishing mortality (F_{msy} of 0.078 adjusted by the ratio of the current (125,704 mt) to target (150,000 mt) females spawning biomass to provide for rebuilding, which results in an ABC of 10,165 mt, an increase of 1,935 mt over the 1995 analyst's estimated ABC. Because this ABC is equal to the overfishing level, the Plan Team further reduced this number by $F_{35\%}/F_{30\%}$ to provide a buffer between the ABC and OFL. The SSC does not agree with the latter adjustment. As it did last year, the SSC accepted the analysts' ABC, which is also equal to OFL. The ABC was apportioned by management area based on the area biomass estimates from the 1987, 1990, and 1993 trawl surveys; weighting each previous survey at 2/3 of the next later survey, a ratio of 4:6:9, respectively. The SSC ABC area allocations for the Western (18.1%), Central (47.9%), and Eastern (34.0%) areas are respectively, 1,840 mt; 4,869 mt; 3,456 mt and for the Team are 1,460 mt; 3,860 mt; and 2,740 mt. Under the POP rebuilding plan, TAC is calculated from the average of the optimal F and the fishing mortality rate sufficient to provide for unavoidable bycatch (based on 1992 rates). For 1996

this fishing mortality corresponds to $F_{55\%}$. To calculate TAC, this rate is further reduced by the ratio of current biomass to optimal-biomass (corresponding to $F=0.44$).

Other Rockfish

ABCs for the following rockfish species groups were rolled over from 1995:

Shortraker/rougheye	1,910 mt
Northern	5,270 mt
Other slope	7,100 mt
Pelagic shelf (dusky)	5,190 mt
Demersal shelf	580 mt

Pelagic Shelf Rockfish

For pelagic shelf rockfish, the Plan Team recommended that dusky rockfish be separated from the other species in the group. Black rockfish, and other nearshore pelagics, are not protected from overharvest because the current assessment is dominated by dusky rockfish, which is much more abundant in the offshore trawl surveys. The Plan Team has proposed an amendment for alternative management of the nearshore component of the assemblage. **The SSC requests the Team to provide a more extensive report in December on management and stock assessment alternatives and recommends that the Council proceed with the development of a plan amendment analyzing management alternatives for pelagic shelf rockfish.**

GOA- THORNYHEADS

For the second year a length based synthesis model has been used for the assessment. For 1996 analysts examined geographic distribution and incorporated 1994 fishery and longline survey data. The primary reason for the reduced 1996 ABC (1,560 mt) from the 1995 ABC (1,899 mt) was the incorporation of an increased size at 50% maturity. The analysts and Team expressed concern that future shifts toward trawl gear not accounted for in the model could potentially exceed the overfishing level because of the greater vulnerability of younger fish.

GOA - ATKA MACKEREL

For the 1996 fishing year, the SSC recommends that the Team's calculated ABC be reduced by one-half, consistent with last year's recommendation. This conservative approach is recommended because of uncertainty in the abundance of Atka mackerel and concerns for marine mammals. Atka mackerel is an important prey species for sea lions and occurs in abundance near sea lion rookeries. Following this procedure, the ABC is 3,240 mt ($M/2 = 0.15$ times the projected 1996 biomass of 21,600 mt). We recommend this rate be used until the next survey is completed and incorporated into the assessment; we thus abandon the stair-stepping of F until an improvement in stock condition is seen. The SSC agrees with the Team's overfishing limit of 9,800 mt.

D-3 ECOSYSTEMS

The SSC thanks the Plan Teams for their continued efforts to highlight additional ecosystem information and concerns and agrees with their plan to continue yearly additions with periodic revisions and updates of the entire package of ecosystem information. **We reiterate our recommendations from January 1995 that a working group including members from the Plan Teams, SSC, AP, Council, and industry be formed to further discuss possible approaches to incorporating ecosystem concerns more fully.**

D-3(f) HALIBUT DISCARD MORTALITY RATES

The SSC received a report from Gregg Williams of the IPHC. Halibut bycatch rates in the groundfish fishery have been computed with available data through 1994 (and 1995 for the Pacific cod longline fishery). Fishery-specific 1996 bycatch rates are estimated from the mean of the 1993 and 1994 rates. Prior to the December Council meeting, Gregg will review the high 1994 bycatch rate in the BSAI sablefish line fishery, examine the possibility of separating the BSAI and GOA Atka mackerel fishery, as well as the flathead and rex sole fisheries, and further examine the recommended bycatch rate for the Pacific cod line fishery. **The SSC concurs with the need for the review of these bycatch rates, but otherwise concurred that these rates should be used as preliminary specifications.**

D-4(b) PACIFIC OCEAN PERCH REBUILDING AMENDMENT

The SSC received a report from Kaja Brix and Sally Bibb on the draft EA/RIR to modify the Pacific ocean perch rebuilding amendment. The SSC recommended that the authors add the following information to the draft document:

1. A statement which notes that harvest at the prescribed rates under the current rebuilding plan is not regarded as jeopardizing the rebuilding of Pacific ocean perch.
2. Provide information on the accuracy of catch monitoring, the size of vessels participating in the fishery, and the observer coverage provided. Describe as well as possible the likelihood of exceeding the prescribed TAC when a directed fishery occurs versus a bycatch only fishery.
3. The SSC noted that presently the calculation of TAC is not directly linked to ABC. With respect to the flexibility in setting TAC, the document should note the possibility that ABC could be set lower than TAC under the current rebuilding plan. For example, due to concerns for recruitment, survey accuracy, or other ecosystem considerations, the plan team or SSC may recommend an ABC which is lower than one computed using the optimal F. While this outcome may be unlikely it can not be excluded as a possibility.
4. Provide a catch history table reflecting the bycatch and directed fishing history.

Once these elements are in the document, it can go out for public review.

D-4 (d) KING CRAB RECRUITMENT AND TRAWLING CLOSURES

Dave Ackley (ADF&G) presented the revised EA/RIR for a contemplated Bering Sea trawl closure to protect red king crab between 164 degrees to 162 degrees W. longitude. The SSC commends Dave for his incorporation of requested changes to the EA/RIR document before its release for public review.

The SSC also commends Dave Witherell and Gretchen Harrington for their report evaluating alternative management measures to reduce the impacts of trawling and dredging on Bering Sea crab stocks. This paper represents a report of the Fluharty committee investigating means to rebuild Bering Sea crab stocks; **the SSC recommends that this committee continue its work to address crab rebuilding in a comprehensive fashion.** As a contribution to crab rebuilding, bycatch management should be reviewed in perspective with other actions that have been or could be taken to attain a rebuilding goal.

With the emergency closure in place during the early part of 1995, the Council has a unique opportunity to view the impact of one of its alternatives prior to adoption. **It appears that the rock sole fishery successfully harvested similar levels of retained rock sole as in 1992 and 1993, but with substantially lower red king**

crab bycatch than in previous years. However, direct comparisons of the 1995 rock sole fishery with prior years are confounded by other natural and management changes. The changes in net benefits projected by the EA/RIR to result from the contemplated closures are small, **and likely well within the range of uncertainty of the information.**

The SSC repeats its previous recommendation that the Council address bycatch management in a comprehensive fashion. The widespread distribution of prohibited species in the Bering Sea for which bycatch management measures are in place, and the fully subscribed nature of groundfish fisheries which are limited by PSC caps as much as quota attainment, means that individual bycatch management measures can only be evaluated for efficacy, efficiency and allocative fairness when viewed in a broader context. For example, public testimony indicated that a likely effect of additional trawl closures to protect red king crab is an increase in bairdi and opilio Tanner crab and halibut bycatch in other areas and other fisheries. Overall, it appears that Bering Sea trawl fisheries may take 1 - 1.5% of the mature red king crab. **However, the actual impact of trawling on RKC populations is unknown.**

Public testimony to the SSC suggested that hot-spot closure authority or seasonal closures could have the same effect in reducing RKC bycatch with less disruption to fisheries or displacement to other areas ^{because of} with consequent constraints imposed by other PSC limits. Given the time available, the SSC did not consider a seasonal option to the 7 alternatives. **The SSC does note that the 1995 emergency closure from 20 January through 21 April - effectively a seasonal closure - greatly reduced king crab bycatch in Zone 1. In this sense, the EA/RIR contains information analyzing the efficacy of a seasonal closure.**

In general, area closures to protect species and their habitat can contribute to successful recruitment and population rebuilding. Witherell & Harrington review evidence that specific **early-life history stages** of red king crab require rocky bottom with living substrate for settling and then gravel sediments in the early juvenile stages. **These bottom types** are limited in extent and **lie towards the shore in Bristol Bay.** There is sufficient evidence of the importance of these sediments, **and consequently proposals for the protection of these areas from trawling activities have to be taken seriously.** It was proposed that the effects of closures be evaluated against their effects on brood strength of the king crab stocks. It must be realized, however, that the life history of red-king crab is extremely complex, much more so than many groundfish species. There are several critical control points in the life history that have to be factored into any evaluation of the development of king crab brood strength. This means a multivariate study of factors, only one of which is improved survival while juveniles are on rocky and cobble bottom. Some of the needed time-series of data are not being collected at the present time. Because of these deficiencies it would not be possible to quantify the effects of protecting benthic habitat on year-class strength.

D-4 (e) FORAGE FISH

The SSC regards forage fish as a group of great importance and potentially an indicator of ecosystem health and a source of socio-economic interest. In discussing the draft plan the SSC suggested a number of modifications:

- (a) Reframe the plan to manage the forage fish, rather than provide a blanket prohibition on taking.
- (b) Clarify the relationship of the plan to ongoing and potential artisanal fisheries.
- (c) Consider the species covered in the plan to eliminate those that are exclusively in State waters and those (such as sandfish) that may not be true forage fish.

The SSC suggests the author revise the plan for further review by the Council family prior to public review.

D-5(a) GROUND FISH AMENDMENT PROPOSALS

The SSC did not have time to review the 41 new proposals from the public. However, it is clear from the Plan Team's summary of the proposals that most proposals deal with management and allocative problems. However, the SSC urges the Council to maintain priority for comprehensive solutions to overcapitalization and bycatch management (which repeats our recommendation from January 1995).

D-5(b) TRAWL MESH STUDY AND REVIEW

The SSC received a brief report from Sue Salveson (NMFS-AKR) on the proposed regulatory amendment to adopt minimum mesh sizes in pollock, cod, and rock sole fisheries and the related Alaska Fishery Development Foundation (AFDF) pollock cod-end mesh study.

The AFDF study is suggestive that larger mesh sizes select for larger pollock by allowing increased escapement of smaller pollock. Square mesh appears to show substantially greater size selectivity than diamond mesh for round fish such as pollock. However, the study also suggests that escapement diminishes at large tow sizes, due to plugging of the codend. When trawls catch more than 40 mt, the increased size selectivity of larger meshes is insignificant. The potentially confounding effects of vessel size and power, particularly as they relate to tow size, are not addressed in this study.

The AFDF raises the possibility that mesh size regulation might be ineffective when large catches occur or diamond mesh is used. However, the results from the AFDF study cannot be directly extrapolated to the NMFS proposed rule, as mesh sizes proposed in the rule are smaller than those used in the study and the study involved only pollock, not rocksole or cod. This affirms our previous conclusion from September 1994 that further research is necessary to determine if mesh restrictions can reduce the catch of smaller fish.

GROUND FISH PLAN TEAMS

The SSC agrees with the Teams that adding a seabird specialist is desirable. The SSC reviewed the qualifications of Victoria O'Connell, Ivan Vining, and William Bechtol and recommends they be appointed.

Gulf of Alaska Groundfish

Species	Area	PT ABC	SSC ABC	PT OFL	SSC OFL
Pollock	W/C	34,000 - 50,000	50,000		79,000
	E	1,800 - 2,700	2,700		4,300
	Total	35,800 - 52,700	52,700		83,300
Pacific cod		65,000 - 110,000	65,000		149,000
Deepwater flatfish			14,590		17,040
Rex Sole			11,210		13,091
Shallow water flatfish			52,270		60,262
Flathead Sole			28,790		31,557
Arrowtooth flounder			198,130		231,416
Sablefish		18,700	21,500	22,400	28,040
Other slope rockfish			7,110		8,395
Northern rockfish			5,270		9,926
POP Complex					
	W	1,460	1,840	1,840	1,840
	C	3,860	4,870	4,870	4,870
	E	2,740	3,455	3,455	3,455
	Total	8,060	10,165	10,165	10,165
Shortraker/Rougheye			1,910		2,925
Pelagic Shelf rockfish			5,190		8,704
Demersal Shelf rockfish			580		1,044
Thornyhead rockfish			1,560		2,200
Atka mackerel		6,480	3,240		9,800
GOA TOTAL		460,640 - 522,540	479,215	744,525	750,165

Bering Sea and Aleutian Islands Groundfish

Species	Area	PT ABC	SSC ABC	PT OFL	SSC OFL
Pollock	EBS		1,250,000		1,500,000
	AI		56,600		60,400
	518	265,000		102,000	306,000
Pacific Cod	EBS/AI		328,000		390,000
Yellowfin Sole	EBS/AI		277,000		319,000
Greenland Turbot	EBS/AI	18,500		7,000	27,200
Arrowtooth	EBS/AI		113,000		138,000
Rock Sole	EBS/AI		347,000		388,000
Flathead Sole	EBS/AI		138,000		167,000
Other flatfish	EBS/AI		117,000		137,000
Sablefish	EBS		1,600		
	AI		2,200		
	Total		3,800		4,900
POP Complex					
True POP	EBS		1,850		2,910
Other POP	EBS		1,400		1,400
True POP	AI		10,500		15,900
Sharp/Northern	AI		5,670		5,670
Short/Rougheye	AI		1,220		1,220
Other rockfish	EBS		365		365
	AI		770		770
Atka mackerel	Western		71,600		
	Central		19,300		
	Eastern		47,100		
	Total		138,000		164,000
Squid, Other species	EBS/AI		30,710		139,100
BS/AI TOTAL		3,104,385	2,929,885	3,768,835	3,564,835