North Pacific Fishery Management Council

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MINUTES
Scientific Statistical Committee
September 21-24, 1992
Anchorage, Alaska

The Scientific and Statistical Committee of the North Pacific Fishery Management Council met September 21-24, 1992 at the Hilton Hotel. All members except John Burns, Gordon Kruse and Dan Huppert, were present, namely:

Bill Clark, Chair	Terry Quinn, Vice Chair
Larry Hreha	Phil Rigby (alternate-Kruse)
Richard Marasco	Al Tyler (alternate-Quinn)
Jack Tagart	Doug Eggers
Don Rosenberg	Marc Miller
Bill Aron	

C-4   MARINE MAMMALS

The SSC heard reports by Ferrero (AFSC) on harbor seal population status, Merrick (AFSC) on results of 1992 Steller sea lion population estimates, Trites (UBC) on a historical review of Steller sea lion population status, and Mello (NMFS-AK Region) on a regulatory amendment to Amendment 25 to the Gulf of Alaska groundfish management plan and Amendment 20 to the Bering Sea/Aleutian Island groundfish plan proposing expansion of the groundfish trawling prohibition zone around Ugamak Island's Steller sea lion rookery.

Ferrero briefly outlined the contents of a draft report on harbor seal population status and summarized current NMFS survey results. The report, which will be issued shortly, indicates high variability in local population trends across regions, with healthy stocks in Bristol Bay and the north side of the Alaska Peninsula and declines in the Gulf of Alaska populations, particularly in the Tugidak Island area and Prince William Sound. It is anticipated that additional surveys will be conducted in Southeast Alaska and the Aleutian Islands.

Merrick's report indicated a continuing overall decline in the Steller sea lion population of about 5% in the past year. Local population status was variable with largest declines in the Eastern Gulf and Central Aleutians and increases in the Eastern and Western Aleutians. Overall pup counts also

declined, but this decline is largely driven by the pup counts of the Central Gulf which fell 29.2% since 1989-90, while pup counts during this period increased in all other areas from 9.3-15.1%.

Merrick also reported the latest findings on pup behavior indicating that they feed primarily in the upper 30m and within 20 miles of the rookeries.

Trites reported on his study, co-authored with Peter Larkin, which examined historic population trends of the Steller sea lion. The report essentially confirms the declines during the decade of the 80's and that the cause of these declines is uncertain. The study also contains recommendations for additional research, particularly long-term research on ecosystem dynamics. The report recommends continuing prudent restraints on fisheries as suggested by the sea lion recovery team and NMFS.

Mello discussed the proposed regulatory amendment to expand the groundfish trawling prohibition zone around the Ugamak Island sea lion rookery. The SSC concurs with the draft EA/RIR statement that

> "the 20 nm closure around Ugamak Island, in conjunction with the closures around Akun and Akutan Islands, would create a large contiguous area where groundfish trawling could not occur. Data from sea lion tracking studies and fish surveys indicate that this region is probably an important feeding area for Steller sea lions in the eastern Aleutian Islands, particularly for juveniles whose foraging depth range and prey appear more limited than adults. Most trips by juvenile animals tagged in the eastern Aleutian Islands in the winter of 1992 were within the boundaries of this zone. Preliminary data from winter 1992 NMFS hydroacoustic surveys indicate that there were dense, mid-water aggregations of small pollock in this region. Conversely, pollock aggregations east of $164° 45'W$ on the shelf and in the Basin waters surrounding Bogoslof Island were generally comprised of large fish, oriented on or near the bottom. Presumably, smaller, mid-water fish provide a more attainable food source for young sea lions.
>
> The proposed closed area will further reduce the amount of fish, including bycatch, harvested from an area that appears to be particularly important for Steller sea lion foraging. Although there are no data that elucidate the effects of commercial fishing, if any, on the Steller sea lion's ability to obtain adequate food, decreased fishing effort may improve sea lion foraging success and will reduce negative interactions between sea lions and fishing vessels/gear. Increased juvenile survival may be attained, which would aid recovery of the species."

The SSC noted that over 25% of the GOA Pacific cod TAC came from the proposed no-trawl zone during the first quarter of 1992. The proposed amendment does not discuss why this cod fishery could not be allowed. We were informed that this fishery is an on-bottom trawl fishery and was below the foraging depth of juvenile sea lions. This SSC was informed that allowing the cod trawl fishery would present an enforcement problem.

C-7 COMPREHENSIVE RATIONALIZATION

The SSC considered a set of proposals from the Executive Director for expediting the development of the comprehensive rationalization program for all groundfish and crab fisheries, and reviewed the paper prepared by Russell Harding. We strongly support the development of a new fishery management system, and we agree that the analytical work should begin as soon as possible. However, we expect the analysis will be a major undertaking. The Council must select a limited number of

well-defined alternatives before it will be productive to form focus groups to design the analysis and to begin the gathering data process. The best way to start the process may be for the Council to set out the objectives it wants to achieve by adopting a new management system, or a list of problems it wishes to solve, or a set of criteria by which it would judge different regimes.

C-8 ABC/OVERFISHING REDEFINITION

Since July, when the SSC submitted a plan amendment proposal for redefining ABC and the overfishing level (OFL), two substantive and constructive responses have been received. Pamela Mace, a scientist working on fishing mortality levels, had several suggestions, including not abandoning F_{msy} and frameworking the minimum percentage of spawning stock biomass per recruit. The Plan Teams also provided a response with several good suggestions, including a modified set of definitions. Bill Clark will attempt to merge the SSC and Plan Team versions and to incorporate Mace's comments into a new draft which will be sent to the Teams in time for their November meeting. The SSC will then consider final action in either December or January.

D-3   GROUNDFISH SPECIFICATIONS

The SSC reviewed the SAFE reports and the Team's recommendations. For the great majority of stocks the SSC endorses the Team's recommendation. For most stocks OFL exceeds ABC, but the two coincide for Basin pollock, rock sole, all BS/AI rockfish, and Gulf POP.

Gulf of Alaska - Regional ABC and OFL

For Gulf of Alaska stocks, the SSC recommends that ABC be distributed regionally in proportion to abundance, but that OFL be set Gulf-wide except where there is evidence of stock separation for any species. Some stocks, particularly rockfish, appear to have low mixing rates and would be subject to local depletion if ABC's are not distributed regionally.

Gulf of Alaska - Pollock

The SSC received a supplementary report on the status of Gulf of Alaska walleye pollock in which stock biomass was estimated using the stock synthesis model after incorporating data from the 1992 NMFS GOA hydroacoustic survey. The SSC expressed concern that Model E may be overparameterized, particularly with respect to fishery selectivity, and requests that the analysts provide a more extensive discussion of this issue for the December SAFE. Consequently, the SSC supports a range of biomass estimates as reported in the supplementary analysis (models G and E, 0.701-1.112 million t) and therefore recommends an ABC range of 70,000 to 111,000 t based on an annual 10% exploitation strategy (F=0.12). Overfishing is defined as the rate of exploitation which drives spawning biomass per recruit to 30% of the unfished level and is estimated to be F_{OF}=0.283. Since F_{OF} is much greater than the suggested harvest rate, the recommended ABC is well below the overfishing level. The SSC estimates the OFL (163,200 to 258,800 t) using simple ratio expansion of OFL/ABC from the SAFE document (156,880/67,400), times the mid-year biomass from the supplemental analysis.

Finally, the SSC wishes to advise the Council that Gulf pollock exploitation rates are being examined by the stock assessment analysts who are presenting a paper for peer review at an upcomming

symposium. This paper will be available to the Plan Team for their consideration in preparation of ABC recommendations for the December SAFE.

Gulf of Alaska - Pacific Cod

The SSC agrees with the Team's specification of ABC and overfishing limit for Pacific cod. ABC (50,00 mt) was calculated by applying the $F_{0.1}$ rate (0.177) to the projected 1993 exploitable biomass (324,000 mt) estimate by SRA fitted to the 1984, 1987 and 1990 bottom trawl survey results. The overfishing limit (78,100 mt) was calculated by applying the $F_{30\%}$ rate (0.245) to the 1993 exploitable biomass.

Gulf of Alaska - Flatfish

Flatfish stocks in the Gulf of Alaska are at high levels and generally stable, excepting arrowtooth flounder which is increasing. The SSC concurs with the Plan Team's determinations of ABC which used methods consistent with last year's determinations. Some biomass estimates have been updated for this year after the 1990 trawl survey results were re-edited. Biomass is estimated directly from the 1990 trawl survey, except for the deeper dwelling Dover sole for which 1987 survey estimates were used for depths between 500m and 1000m. The $F_{0.1}$ exploitation rate was used to calculate the 1993 ABC, and the overfishing level was set at $F_{30\%}$.

The 1993 ABCs are :

deepwater flatfish	- 45,530 mt;
shallow water flatfish	- 50,480 mt;
flathead sole	- 49,450 mt;
arrowtooth flounder	- 321,290 mt.

These ABCs represent increases from 1992 for deepwater flatfish, flathead sole, and arrowtooth flounder.

Gulf of Alaska - Sablefish

The SSC concurs with the Plan Team's recommended ABC. Sablefish biomass was estimated using an SRA model adjusted by relative population weights from longline surveys scaled to trawl survey biomass. The method is identical to that used in 1991. Estimated biomass is 178,700 mt. The preferred fishing mortality rate is calculated using the $F_{0.1}$ strategy and is estimated to be 0.13. ABC is computed to be 20,800 mt. The overfishing level (28,200 mt) is derived from the fishing mortality that drives spawning biomass per recruit to 30% of the unfished spawning biomass (F_{OF}=0.18).

Gulf of Alaska - Slope Rockfish - POP

The SSC commends AFSC scientists for using stock synthesis and believes that this will be the technique of choice for future assessments. The SSC has asked Team and Center scientists to examine inconsistencies in both the survey and stock synthesis biomass estimates. Specifically, we recommend: (1) an analysis to determine if new fishing power correction factors will change survey biomass estimates, (2) examination of fishery data to determine if it can be integrated into the analysis, and (3) further examination of the inconsistencies in the various biomass estimates. In the meantime, the SSC recommends that the preliminary ABC be determined using the 1991 procedure. This estimate was developed by applying F=M=0.05 to the average of the 1987 and 1990 survey biomass estimates (229,100 mt) and applying the overfishing definition. As last year, the ABC should

be distributed among the three management areas in the following manner: Western - 1,620 mt, Central - 1,720 mt, and Eastern - 2,390 mt.

Gulf of Alaska - Shortraker/Rougheye

The SSC concurs with the Team's recommendation that the ABC for these two species should be set at the 1992 level, 1,260 mt. This ABC was obtained by applying the appropriate natural mortality for each of these species (0.03 for shortraker and 0.025 for rougheye) to the respective average 1987/1990 survey biomass (28,493 mt - shortraker and 44,469 mt - rougheye). Based on results of the 1987 and 1990 trawl surveys, the ABC should be distributed among regulatory areas in the following manner: 5.3% in the Western area (100 mt), 65.5% in the Central area (1,290 mt) and 29.1% in the Eastern area (570 mt). The SSC concurs with the Team's recommendation that $F_{30\%}$ (0.046) and F=M be used to define overfishing (2,900 mt) for rougheye and shortraker, respectively.

Gulf of Alaska - Other Slope Rockfish

The SSC concurs with the Team's recommendation that the ABC for this group of rockfish be set at last year's level (14,060 mt). This value was obtained by applying estimates of natural mortality (northern - 0.06, sharpchin - 0.05, redstripe - 0.10, silvergray - 0.04, harlequin - 0.06, and others - 0.06) to the average of the 1987/1990 survey biomass estimates (northern - 96,071 mt, sharpchin - 51,768 mt redstripe - 23,096 mt, silvergray - 8,697 mt, harlequin - 49,386 mt, and others - 1,459 mt). The regional distribution of the proposed ABC is 1,390 mt for the Western, 6,510 mt for the Central, and 6,160 mt for the Eastern areas. As last year, the SSC recommends that overfishing be set at the $F_{30\%}$ levels of 0.113 for northern and 0.08 for sharpchin rockfish, and F=M for other species. The resulting overfishing level is 20,706 mt for this group of rockfish.

Gulf of Alaska - Pelagic Shelf Rockfish

The SSC concurs with the Team's recommendation that the ABC for pelagic shelf rockfish be set at the 1992 level, 6,890 mt. This ABC was calculated by determining the average survey biomass for 1984, 1987, and 1990. To get around the lack of 1984 survey biomass estimates for black, widow, and blue rockfish, the assessment used the 1987/1990 average for the missing data point. The 6,890 mt ABC was obtained by applying F=M=0.09 (M for dusky rockfish)to the exploitable biomass of 76,501 mt. The SSC agrees with the Team that overfishing be determined by applying $F_{30\%}$ for dusky rockfish (11,500 mt).

Gulf of Alaska - Demeral Shelf Rockfish

The SSC supports the Team's recommended ABC for this complex, 801 mt. This value was obtained by applying F=M=0.02, the natural mortality for yelloweye rockfish, to the lower 90% confidence limit of the biomass estimate obtained from line transect data. Because yelloweye rockfish dominate both target landings and bycatch of the DSR complex, a decision was made by those responsible for conducting the assessment to use it for calculating ABC. The SSC suggests that the line transect data be examined to determine if usable density estimates for the other seven species are possible. Alternatively, the SSC would like the Team to explore other techniques to estimate the biomass of species other than yelloweye in this complex.

The catch level that would constitute overfishing was determined in the SAFE by applying F=M=0.02 to the estimated (midpoint) biomass for yelloweye rockfish (48,366 mt). The SSC believes that the overfishing cap should be determined by applying the appropriate exploitation rate

to the best estimate of current exploitable biomass. Since the Team used the lower 90% confidence limit of the estimated yelloweye biomass estimate to calculate ABC, the SSC interpreted it to be the best estimate of current biomass. Further, since the Council's overfishing definition requires that $F_{30\%}$ be used when it is available, the SSC recommends that overfishing for this complex be defined as 0.04*40,049 mt = 1600 mt. Bycatch of DSR taken in the halibut fishery will be counted against the TAC for DSR.

Gulf of Alaska - Thornyheads

The 1990 estimated survey biomass for thornyheads was reported to be 26,207 mt, with a 90% confidence interval of 21,411 mt to 31,003 mt. This represents a revision of the estimate used last year, 25,697 mt. The Team used the lower end of the 90% confidence interval as an estimate of the 1993 biomass because of uncertainties associated with abundance estimates. Sources of uncertainty included: (1) the downward and upward trends in the abundance indexes for the cooperative and domestic longline surveys, respectively, for 1988-1991, (2) large declines in bottom trawl survey CPUEs between 1987 and 1990, and (3) length frequency distributions for the bottom trawl surveys that do not indicate any incoming year classes. While recognizing uncertainties associated with biomass estimates, the SSC believes that the point estimate represents the best estimate of biomass. Therefore, the SSC recommends that the ABC be set at 1,830 mt (F=M=0.07* 26,207 mt). The SSC suggests that as last year, $F_{30\%}$=0.095 be used to determine the overfishing catch level, 2,490 mt.

Gulf of Alaska - Other Species

The TAC for other species is determined as 5% of the sum of the TACs for target species. The SSC recommends that this TAC be allocated to management areas based upon recent catch levels. The intent of this recommendation is to prevent Atka mackerel catches in the western Gulf from precluding miscellaneous fisheries for other species such as octopus in the central and eastern Gulf. The SSC recommends that the Council consider the reestablishment of an ABC for Atka mackerel in the Gulf.

Bering Sea/Aleutian Islands - Pollock

Eastern Bering Sea

Four different age-structured methods are used to estimate exploitable biomass and all methods showed the same trends in biomass over time. The SSC agrees with the Team that the status quo method, cohort analysis tuned to survey biomass and age composition estimates, should be used to determine exploitable biomass. Exploitable biomass in 1993 from this method was estimated to be 7.9 million tons and represents a substantial increase from last year's assessment. The increase is due to the incorporation of data from ages 10-16 which were not available before this year and to recruitment from the 1989 and 1990 yearclasses. The SSC accepts the Team's recommendations for ABC and overfishing limit, which are based on $F_{0.1}$ and $F_{30\%}$, respectively. The reasons for not using F_{msy} are that the population was in a period of decline since 1985, that recruitment from the 1989 and 1990 yearclasses is subject to uncertainty, and that there is concern over the potential impact of removals from the Basin area on EBS populations.

Aleutian Islands

The 1993 pollock biomass was based on the 1991 bottom trawl survey estimates expanded for the off-bottom component and projected to 1993 based on the relative population change observed in the

EBS stock. The SSC accepts the Team's recommendation for ABC and overfishing limit. The SSC recommends that the analyst and the Team consider the development of estimates of ABC and overfishing limit based on age-structured analyses and appropriate estimates of growth and natural mortality which use data collected from the Aleutian Islands population and explain the advantages and disadvantages in the final SAFE document. An $F_{0.1}$ estimate for the Aleutian Islands should be calculable from existing information.

Bogoslof Area

The SSC believes the Aleutian Basin pollock population should be managed separately from the EBS and AI populations. The Basin population has a different age structure, a different size at age, a different area and time of spawning, a different migration pattern, and has experienced a different level of exploitation. Available evidence indicates that the fishery that occurs in the international zone of the Bering Sea (i.e., the Donut Hole) exploits the Basin stock. A portion of the stock spawns in the vicinity of the Commander Islands and another portion spawns in the vicinity of Bogoslof Island. It is generally believed that a majority of the Basin pollock originate from the Bogoslof component.

The SSC strongly supports the international effort (P.R.C., Japan, R.O.K, Poland, U.S.S.R., and U.S. scientists) to develop a comprehensive assessment and management of Aleutian Basin pollock. A second workshop was held in late February 1992 in Seattle to assemble available data and to refine and expand population models. A major development was an agreement in August, 1992 by these nations to cease fishing in international waters for two years and to cooperate in further research.

A precipitous decline in the biomass of the Bogoslof pollock has occurred since the 1989 survey. Available evidence strongly suggests that the Bogoslof stock has been overexploited. Recent hydroacoustic surveys provide estimates of biomass of 600,000 tons in 1991 and 800,0000 tons in 1992. The SSC could not concur with the Team's estimate of biomass projected for 1993, because the Team assumed that natural mortality M was 0.3. Because the Bogoslof population is much older than EBS population, the SSC believes the best estimate of natural mortality is 0.2, which is the value accepted by scientists in the assessments of Aleutian Basin pollock. Assuming that little or no recruitment has occurred recently, the best estimate of 1993 biomass is obtained from the 1992 survey decayed by natural mortality, which is 655,000 mt.

The SAFE indicates that the current Basin biomass as predicted by the preliminary Aleutian Basin stock cohort analysis is only about 10% of the largest observed biomass and well below B_{msy}. A precise estimate of the ratio B/B_{msy} is impossible, but it is probably on the order of 1/4. Given the low level of abundance, the SSC believes that under the Council's overfishing definition an exploitation rate of 1/4 of the natural mortality (F=1/4*0.20) is appropriate. Following the same procedure that the Council accepted last December, the SSC applied this rate (M/4) to the 1993 biomass estimate to obtain an ABC of 33,000 tons. This is also the overfishing limit.

Because of the current status of the Bogoslof population, the importance of supporting international efforts to curtail fishing on the Basin population, and the potential impacts on marine mammals and seabirds, the SSC strongly recommends that the TAC be set at a level to provide for bycatch only.

Bering Sea and Aleutian Islands - Pacific Cod

The SSC agrees with the Team's specification of ABC and overfishing limit for Pacific cod. ABC (178,000 mt) was calculated by applying the $F_{0.1}$ rate (0.145) to the 1993 exploitable biomass

(825,000 mt) projected by the EBS cod model. The overfishing limit (183,000 mt) was calculated by applying the $F_{30\%}$ rate (0.149) to the projected 1993 exploitable biomass.

The SSC commends the Team for developing the stock synthesis approach for BS/AI Pacific cod assessment and notes that the results of the stock synthesis model are similar to the EBS cod model.

Bering Sea/Aleutian Islands - Flatfish Summary

The methods used to calculate ABC for this complex are generally the same as for prior years. The SSC encourages the analysts and Plan Teams in their efforts to use new methods such as the stock synthesis model which can make use of additional sources of information. The estimates for ABC and overfishing are expected to be revised by the November Plan Team meetings when the 1992 trawl survey results are available.

Bering Sea/Aleutian Islands - Yellowfin Sole

The SSC concurs with the Plan Team approach. Yellowfin sole abundance is high and stable. Survey results have been somewhat variable and three methods were used to estimate exploitable biomass. Applying $F_{0.1}$ to a projected exploitable biomass (2.66 million mt) estimated by the stock synthesis model yields an 1993 ABC of 372,00 mt, the same as for 1992. Overfishing level is calculated by applying $F_{30\%}$.

Bering Sea/Aleutian Islands - Greenland Turbot

Continuous poor recruitment has been observed since the early 1980s and biomass of the adult population is expected to decline throughout the 1990s. Given continued recruitment failure, the Plan Team rejected an ABC of 14,100 mt based on $F_{0.1}$. The Team believes that no increases in exploitation on this species are warranted and recommends a continuation of the 1992 ABC of 7,000 mt. Given the poor stock conditions, the SSC agreed with this approach. However, the SSC did not accept the estimate of F_{msy}, based on an assumed spawner recruit relationship, used to calculate overfishing. The SSC calculated on OFL of 34,600 mt from average catch. The SSC recommends that the Team calculate $F_{30\%}$ for the determination of OFL.

Bering Sea/Aleutian Islands - Arrowtooth Flounder

Recruitment from the 1986 and 1987 year classes was good. Biomass, although slightly reduced in 1990 and 1991, remains high. In the absence of a stock recruitment relationship, $F_{0.1}$ was applied to a projected biomass for the 1991 survey to calculate a 1993 ABC of 68,000 mt, a reduction of 14,300 mt from the 1992 calculation. Overfishing is calculated at $F_{30\%}$. The methodology used remains similar to the prior year.

Bering Sea/Aleutian Islands - Rock Sole

A projected biomass from the 1991 trawl survey and an exploitation rate of F_{msy} provide an estimated ABC for 1993 of 311,000 mt, 50,000 mt above 1992. ABC is equal to the level of overfishing.

Bering Sea/Aleutian Islands - Other Flatfish Complex

Reliable estimates of B_{msy} and F_{msy} are not available for this group of species. Consequently $F_{0.1}$ was applied to an increased biomass estimate based on the 1991 survey to calculate an ABC of 226,000 mt, 26,000 mt above 1992. Overfishing was calculated using $F_{30\%}$.

Bering Sea/Aleutian Islands - Sablefish

The SSC agrees with the Plan Team's recommended ABCs. Sablefish is assessed jointly in the Gulf of Alaska, Bering Sea and Aleutian Islands. Consequently, the methods are identical to those discussed in the Gulf of Alaska section above.

Estimated biomass is 25,700 mt and 11,700 mt respectively for the Aleutian Islands and Bering Sea. ABCs are estimated to be 3,000 and 1,400 mt with companion overfishing levels of 4,040 and 1,840 mt.

Bering Sea/Aleutian Islands - POP Complex

True POP

The SSC recommends acceptance of the last years ABC pending clarification of issues that surfaced during its review of the assessment. Prior to the December meeting the SSC requests clarification of the following:

1. Why were selectivity functions of different forms used for the trawl survey and the fishery?

2. Why were 1990 and 1991 length frequency data not used in the analysis?

3. Is there a difference in the age composition between the fishery and survey?

4. How does ABC compare between F35% with estimated selectivity, and F=M with knife edge recruitment.

Pending responses to these questions the SSC recommends that the preliminary ABCs for true POP be set as last year's levels for both the eastern Bering Sea (3,540 mt) and Aleutian Islands (11,700 mt). These values were obtained by applying F=M=0.05 to estimates of the current exploitable biomass for the eastern Bering Sea (70,800 mt) and Aleutian Islands (234,000 mt). The stock assessment authors (but not the Team) once again recommended dividing the Aleutian ABC up into 4 parts to reduce the possibility of the entire ABC being removed from a portion of the region. As stated below, the SSC favors a plan amendment to redefine management areas in the BS/AI region.

Lacking a value of $F_{30\%}$, the F=M criterion was used to define overfishing for true POP, which is therefore equal to ABC.

Bering Sea/Aleutian Islands - Other Red Rockfish

The SSC accepts the Team's ABC recommendations for species in this group. ABCs were calculated by using F=M for exploitation rates and average biomass estimates from bottom trawl surveys to obtain an estimate of current biomass. Natural mortalities used were 0.06 for northern and sharpchin, 0.025 for rougheye, and 0.03 for shortraker. Biomass estimates were as follows: northern/sharpchin

(EBS) 17,500 mt; (AI) 94,500 mt; rougheye (EBS) 3,000 mt; (AI) 25,300 mt; and shortraker (EBS) 9,200 mt; (AI) 19,700 mt.

The other red rockfish ABC for the eastern Bering Sea is 1,400 mt. The SSC does not recommend splitting this complex up. It still believes that the added protection afforded rougheye and shortraker by separating them into their own group is insignificant. The SSC recommend that this complex be divided into two groups for the Aleutian Islands: rougheye and shortraker, and all remaining species. The ABC for rougheye/shortraker is 1,220 mt and 5,670 mt for northern/sharpchin.

Lacking a value of $F_{30\%}$, the F=M criterion is used to define overfishing (ABC=OFL).

Bering Sea/Aleutian Islands - Other Rockfish

The SSC accepts the Team's ABC recommendation for this complex. ABCs were calculated by applying an exploitation rate equal to natural mortality for POP, (0.05), to the estimate of current exploitable biomass, 8,000 mt for the eastern Bering Sea and 18,500 mt for the Aleutian Islands. Current biomass estimates were obtained by averaging recent trawl survey results. The F=M criterion was used to define overfishing (lacking $F_{30\%}$), which is therefore equal to ABC.

Bering Sea/Aleutian Islands - Atka Mackerel

The SSC accepts the Team's determination that the best estimate of ABC, given information now available is 351,000 mt. The ABC was derived by applying the estimated rate of natural mortality (0.30) to the 1993 exploitable biomass (1,121,000 mt) based on the stock synthesis model fitted to catch at age data (age 3+) and bottom trawl survey results. The SSC notes the biomass projections are higher than the 1992 projection due to updated 1991 survey data and inclusion of fish older than age 7 that appear in the fishery catches. This biomass estimate is conservative because some fraction of Atka mackerel biomass is distributed in mid-water and nearshore, and therefore is not included in the standard bottom trawl survey estimate.

While accepting the Team's ABC determination, the SSC is concerned that the series of trawl surveys is short and inconsistent in their extent of coverage. We are also apprehensive about the possible environmental problems that may result from an increased catch of the magnitude implied by the 1992 and 1993 ABC estimate. Atka mackerel is a prey species of northern fur seals and northern sea lions. During their migrations, northern fur seals (a depleted species) feed heavily on Atka mackerel as they move through the Aleutian passes.

In these circumstances, the SSC prefers to phase in the new higher ABC over a six-year period, adopting the current biomass estimate and raising the exploitation rate in steps from M/6 in 1992, M/3 in 1993, to M in 1997. According to the this schedule, the recommended ABC for 1993 is (0.30/3)* 1,171,000 = 117,100 mt. While this approach provides a 6 year schedule for increasing ABC, it should be clear that the estimate and procedures will be reviewed annually. The main purpose of the gradual approach is to postpone a large ABC increase until its correctness has been confirmed by additional data and analysis.

The SSC accepts the Team's overfishing limit calculated by applying the $F_{30\%}$ rate (F=0.506) to the 1993 exploitable biomass.

The SSC is particularly concerned about the need to distribute a greatly increased harvest over the range of the stock in proportion to the distribution of biomass. This would require 70% of the catch

to be taken west of 180° W. The SSC recommends that ABC for the eastern Aleutians be 32,100 mt and for the Western Aleutians be 85,000 mt.

The SSC notes that almost all of the 1992 catch of Atka mackerel was taken in the eastern Aleutian Islands area. The 1993 ABC is at a level that cannot be safely taken entirely from eastern Aleutians area, and may impact marine mammals. It is critical that the Council develop a plan amendment that will allow TAC's to be allocated geographically. In the absence of means to apportion ABC's, the SSC recommends the ABC for BS/AI Atka mackerel should be constrained to 32,100 mt, which can be safely taken in the eastern Aleutians area.

Bering Sea/Aleutian Islands - Other Species

At present the ABC for other species is calculated as the average recent catch, which is steadily dropping. The SSC requests the Team to consider an alternative procedure, such as calculating ABC as a proportion of total biomass.

Bering Sea/Aleutian Islands - Management Areas

The SSC received a proposal from the Alaska Groundfish Data Bank to consider a review of the current boundaries between the Aleutian subarea and the Gulf of Alaska management area. Additionally the SSC during its deliberations discussed the need to make regional distribution of ABC for such species as rockfish and Atka Mackerel. The SSC recommends that the Gulf of Alaska and Bering Sea/Aleutian Islands Plan Teams examine this issue and develop a plan amendment for consideration during 1993 to make appropriate modifications.

ECONOMIC ASSESSMENT

The SAFE report contains important information documenting some economic variables and characteristics of the fishery. It does not contain a concise analysis of the status of the fishery. An attempt should be made to include indicators of economic performance (profitability, efficiency, employment generation, impacts on key communities, etc.).

Specific comments:

(1)   Presentation of catch by Alaska resident and non-resident boat owners is easily confused with the concept of catch by Alaska resident and non-resident fishermen. In fact, this mistake is so tempting that the report itself slips into this error (p.3., second line from bottom). It is clear that information on residence of harvester is of great interest, while classification of catch by vessel owner residence is the only simple procedure for developing such information. The problem is that this does not measure the extent to which Alaskans participate in harvesting, processing,, or other activities of the groundfish industry. The tables and text should be more clearly labeled to warn readers of the restricted meaning of the existing resident/non-resident categories.

(2)   A striking fact in the report is the $353.7 million increase in groundfish product value from 1990 to 1991. This increased value derives largely from increasing prices for roe and surimi. In Table 26 surimi product value increased from $276.9 to $438.7 million from 1990 to 1991, due to an apparent doubling of price from $0.7092/lb (226.4 yen/kg) to $1.423/lb (423.1 yen/kg). However, based upon the monthly average price of "kneaded product" (surimi) in

Japan (Table 33), the price increased only 12.5% from 462.38 yen/kg to 519.9 yen/kg. Did the U.S. value per unit double due to increasing the "grade" of surimi product? The apparent price of roe in Table 26 increased from $3.46 to $5.18/lb, but no price series on roe is displayed in the remaining tables. Given the importance of these two prices, and the difficulty encountered in establishing accurate values for surimi and roe prices during the inshore/offshore economic analysis, there is a need for more thorough documentation.

D-4 EASTERN GULF TRAWL CLOSURE (AMENDMENT 26A)

The SSC reviewed the document entitled "Supplemental Information for the Proposed Eastern Gulf Trawl Closure and Future Management of Rockfish in the Gulf of Alaska". We received a presentation from the staff on the material presented in the document. The SSC had specific questions regarding the meaning of certain statements within the document and has requested that the authors clarify specific statements in the final document. The SSC also received comments from George Anderson of the trawl industry and Barry Bracken of ADF&G.

Our review of Amendment 26A was guided by the biological and social/economic problems listed in the draft EA/RIR/IRFA. Our conclusions are:

Problem 2. Concerns with further depletion of Eastern Gulf rockfish stocks which are still considered by many to be depressed.

The supplemental document provides a detailed discussion of the procedures used by the Council in setting the ABC's for the various rockfish species. The SSC and Team have employed conservative procedures in setting ABC. Conservative estimates of biomass (from trawl surveys) have been used. Exploitation rates have been set low and when the industry targeted on a specific species in a rockfish complex a separate ABC was established. Likewise when regional subdivision of ABC and TAC were required such subdivisions were made. Exploitation rates for depleted stocks (mainly POP) have been further reduced according to the Council's overfishing definition. As we stated in June, even if there still concerns about ABC, we do not believe that gear allocation is an appropriate way to address them.

Problem 3. Concern over high trawl bycatch levels of salmon in the Eastern Gulf.

As stated in June, the analysis does not demonstrate a problem with the bycatch of salmon by trawls in the Eastern Gulf. No new information was provided in the supplemental document.

Problem 4. Concern over potential declines of marine mammals and seabirds as a result of trawl fishing activity in the Eastern Gulf.

No new information is provided in the supplemental document. The SSC did receive a presentation on the status of the threatened Steller sea lion. For the SE Alaska area, trend site counts indicated a small decrease in adults while the pup counts indicated an increase. There is no need for concern regarding the effect of trawling on marine mammals at this time.

Problem 5. Concern over the potential impacts of trawling on deep water corals and benthic habitat.

The supplemental information provides a review of the status of knowledge regarding damage to the benthic environment by fishing gear, the importance of coral habitat to rockfish stocks, and the

distribution of coral in the Eastern Gulf. The SSC notes that both trawl and non-trawl gear have impacts on the benthic environment and that there is no estimate of the actual extent of damage by either gear. The SSC notes that since both gear types can damage the benthic environment, banning one gear type is not the most effective means of providing protection. If coral is determined to be a critical habitat, then such habitats should be identified and steps taken to provide adequate protection. At present the impact has not been assessed and there was testimony that trawlers avoid dense coral beds to prevent net damage. Impacts of trawling can continue to be monitored through the observer program.

Problem 1. Anticipation of unprecedented levels of factory trawler participation in the SEO during 1991 and even greater future expansion.

Current data indicates that a large expansion of the factory trawler participation in SEO has not occurred.

Problem 6. Grounds preemption and economic displacement of the local shore-based hook and longline fleet, and Problem 7. Concern that important traditional fisheries for groundfish and halibut could be curtailed if trawl harvests exceed the TAC's for some species.

The supplemental information provides a discussion of grounds preemption, gear conflicts and gear loss. The report indicates that recent management measures have successfully reduced or resolved many of the gear conflicts and grounds preemptions. The report indicates that there are problems in estimating the effects of fishing by one gear type or CPUE of another gear type.

It was pointed out by Mr. Bracken that one of the preemption problems was the harvest of slope rockfish. During the last year the trawl fishery reportedly took most of the allocation of this complex before the fall halibut opening. This required vessels in the halibut fishery to discard these species. This discard is largely unaccounted for in the longline fishery because of a lack of observers on these small fishing vessels. Steps should be taken to account for all sources of mortalities of this complex and if possible NMFS should take the steps necessary to allocate sufficient TAC among the directed and bycatch fisheries.

In summary, the assembled information does not contain convincing scientific evidence that trawling should be banned.

D-5(a) PRIBILOF ISLAND TRAWL CLOSURE

The SSC reviewed the draft EA/RIR/IRFA for chapter 4 of Amendment 21 to the Bering Sea FMP. The new draft has addressed our concerns over the inconsistent results of previous model runs. The SSC has provided the staff with some additional comments, including a reference on a report regarding critical rearing habitat for blue and red king crab.

We recommend that the amendment be released for public review.

D-5(b) POLLOCK "B" SEASON DELAY/EXCLUSIVE REGISTRATION EA/RIR/IRFA

The SSC reviewed the EA/RIR/IRFA proposing amendments to delay the pollock "B" season (non-roe fishing season) and provide for exclusive area registration. We heard a presentation by Drs.

Terrence Smith, Matthew Berman and Gunnar Knapp, University of Alaska Anchorage, of the economic analyses contained in the proposal. The SSC believes the economic analyses were comprehensive in their scope including estimates of income distribution from I/O models, a benefit/cost analysis, and an analysis of impacts on bycatch. Furthermore, we believe the economic analytical methods were appropriate. Nevertheless, the SSC recommends that prior to releasing the document for public review, the analysts expand their discussion of how the choice model was used to determine net economic benefits. The discussion at the bottom of page 3-21 that describes how compensation was calculated is confusing. There also is a need to expand the description of the underlying reasons for the results reported in the economic impact section, section 3.5.

The SSC recommends that the environmental and biological impacts section be revised prior to sending the document out for public review. Specifically, the SSC notes that the economic analysis contains a concise examination of bycatch consequences as evaluated with the bycatch model. The discussions in the environmental and biological section on bycatch are redundant and inconsistent with the results represented in the economic analysis. The EA should consolidate this discussion and resolve the inconsistencies. Next, the SSC recommends that the analysts compute instantaneous rates of growth for pollock, predict in-season changes in pollock mean weight appropriate for alternative season opening dates and compute the number of pollock which will be harvested at each date. These quantitative data can be used to evaluate the assumed benefits of a delayed season on pollock mortality.

The SSC recommends that the amendment be released for public review after the changes suggest above are made.

D-5(c) PREFERENTIAL ALLOCATION OF PACIFIC COD TO GEAR TYPES (AMENDMENT 24)

The SSC received a report from Dr. Joe Terry summarizing the contents of the amendment package and "Revisions to Council Review Draft" which was received at this meeting. Dr. Terry identified a number of changes that are planned. For example, IPHC staff is expected to have estimates of discard mortality rates and yield loss to the halibut fishery caused by each bycatch fishery based on 1991 observer data. Since additional work on the amendment is planned, the SSC would like the opportunity to review the modified document in December prior to its release for public review.

The results of the benefit/cost analysis are dependent upon (a) the allocation of fixed costs among multiple fisheries and (b) the measurement of "impact costs" of prohibited species discards. Economists frequently struggle with the need to allocate fixed costs among products of multi-product firms. Unfortunately, it is difficult to find a more defensible procedure than the type of allocation used in this document (based upon an average proportion of weeks and catch). However, the proportions used are of "groundfish catch and weeks" not total catch or weeks fished by the vessel. As noted in this report, this procedure overstates costs attributable to cod fishing for pot gear because it ignores the fishing for crab. If the definition of groundfish excludes halibut (as is usual), then this procedure would also overstate the fixed costs of longline vessels. A logical escape from these problems would be to adopt as a benefit measure the quasi-rents for each vessel type (i.e. subtract only non-sunk costs from revenues). It is suggested that the authors consider subtracting the usual variable costs (vessel operating costs, crew payments, bait, ice, etc.) and any incremental annual fixed costs attributable to fishing for the species in question (incremental costs associated with setting up to longline for cod rather than sablefish/halibut or fish pots for cod rather than crab). In the longer term, establishment of an open access equilibrium in all fisheries will assure that there are no significant net benefits left in any segment of the fishery.

These points need to be applied to the "impact costs" of discarded fish as well as to the target species. The report (p. 50 and Table 4.2) adopts the halibut impact cost of about $2,900/mt that was used in Amendment 21 (Appendix I, Table 4). Then a range is added to yield a halibut discard impact cost of $2,900 to $2,200/mt. This range is poorly explained. A greater concern, however, is that the impact cost deducts only variable costs which are estimated to be 47% of wholesale value. Consistency would require either (i) a proportional allocation of fixed costs to halibut fishing and processing, or (ii) adoption of the quasi-rent measure of benefits for the non-halibut fisheries.

The SSC recommends that the authors consider these issues in the development of the next draft of the document.

In the construction of Table 3.20, the discard mortality rates for the PSC species other than halibut were assumed to be 1.0 for all gear types. The SSC recommends that the validity of this assumption be examined.

D-7(a) PSC ALLOWANCES FOR THE INSHORE-OFFSHORE AND CDQ POLLOCK FISHERIES

This amendment analyzes 3 alternatives to allocate the pollock fishery prohibited species catch (PSC) among the 3 pollock allocation fisheries: CDQ fisheries, vessels delivering pollock onshore, and vessels that process at-sea.

The SSC recommends the amendment go out for public review, when the changes detailed under section 1.8, page 1-6 are completed and included in the document.

D-8(e) PETITION FOR POLLOCK RESEARCH FROM ST. PAUL ISLAND

The SSC reviewed a petition from the City of St.Paul to examine the theories regarding eastern Bering Sea pollock stock structure. The petition asks the Council to direct NMFS to support independent research using Japanese and Russian data as well as the best available technology to resolve the issue of stock distribution and migration. The SSC was informed that NMFS has already provided the petitioners' representative, former Governor Steve Cowper, a package of material describing the work in progress, including international research with Japan, Russia, Poland, Korea, and China.

D-8(f) EXPERIMENTAL RETENTION OF PSC

The SSC heard an explanation by Tuck Donnelly of Terra Marine Research of his group's request for an experimental fishery permit to retain halibut and salmon bycatch, which otherwise would have to be discarded, for processing and distribution to needy people. This would be a worthwhile study. The SSC recommends that the proposers complete a formal application for an experimental permit, which would necessarily contain answers to questions such as how the operators would decide which fish to retain and which to release.

D-8(g) MEASUREMENT OF PRODUCT RECOVERY RATES

The SSC heard a proposal from Steve Hughes for an industry-government program to gather hard data on pollock product recovery rates in shore plants and shipboard factories. Good data of this sort are needed to allow better estimates of pollock removals in recent years and to provide accurate efficiency comparisons for decisions on matters such as inshore-offshore allocations and the timing of fishery openings. Product recovery rates are also used for enforcement purposes. The SSC recommends that NMFS and industry design a program to estimate product recovery rates during normal factory operations according to season, fish size, filleting machine type, product, and type of operation.

Stock	Region	B_{92}	B_{MSY}	F_{msy}	ABC Strategy	ABC	Overfishing Definition	Y_{of}	Notes
Pollock	EBS	7.96M	6.0M	0.38	$F_{0.1a}=.31$	1.69M	$F_{msy}=.38$	2.39M	Cohort Analysis
	AI	277K	?	0.38	$F_{0.1a}=.31$	67.0K	$F_{msy}=.38$	83.1K	
	Bogoslof	655K	?	?	F=M/4=.05	33K	F=M/4	33K	$B/B_{msy}=1/4$
Cod	BSAI	825K	?	?	$F_{0.1a}=.145$	178K	$F_{30\%}=.149$	183K	
Yellowfin sole	BSAI	2.7M	?	?	$F_{0.1a}=.14$	372K	$F_{30\%}=.17$	452K	
Greenland turbot	BSAI	292K	?	?	Bycatch only	7K	Ave.Catch	34.6K	1977-1987
Arrowtooth	BSAI	378K	?	?	$F_{0.1a}=.18$	68.0K	$F_{30\%}=.25$	94.5K	
Rock sole	BSAI	1.71M	904K	.176	$F_{MSY}=.176$	311K	$F_{msy}=.176$	311K	
Other flatfish	BSAI	1.42M	?	?	$F_{0.1b}=.159$	226K	$F_{30\%}=.23$	327K	
Sablefish	EBS	11.7K	?	?	$F_{0.1a}=.13$	1400	$F_{30\%}=.18$	1840	
	AI	25.7K	?	?	$F_{0.1a}=.13$	3000	$F_{30\%}=.18$	4040	
POP complex									
True POP	EBS	70.8K	?	?	F=M=.05	3540	F=M	3540	SRA & trawl survey
	AI	234K	?	?	F=M=.05	11700	F=M	11700	
NO/SC/RE/SR	EBS	29.7K	?	?	F=M	1400	F=M	1400	
NO/SC	AI	94.5K	?	?	F=M	5670	F=M	5670	
RE/SC	AI	45.K	?	?	F=M	1220	F=M	1220	
Other Rockfish	BS	8K	?	?	F=M	400	F=M	400	Surveys
	AI	18.5K	?	?	F=M	925	F=M	925	
Atka Mackerel	BS/AI	1.17M	?	?	F=M/6=.05	32.1K[a]	$F_{30\%}=.5$	771K	Stairstep ABC
Squid	BS/AI	?	?	?	Ave. Catch	3400	Ave. Catch	3400	
Other species	BS/AI	794K	?	?	Ave. Catch	26,600	Ave. Catch	26,600	

a/ If there is a Plan Amendment to separate eastern and western Aleutian Island - ABC =117K

Stock	Region	B_{92}	B_{MSY}	F_{msy}	ABC Strategy	ABC	Overfishing Definition	OFL	Notes
Pollock	W/C	701,000 - 1,112,000	?	?	$F_{hist}=10\%$	70,100 - 111,200	$F_{30\%}=.283$	163,200 - 258,800	SS Model E, G
	E					3,400	$F_{30\%}=.283$	7,880	1990 Trawl survey
Cod	W					18,700			
	C					35,200			
	E					2,800			
	GOA	324,000	?	?	$F_{0.1a}=.177$	56,700	$F_{30\%}=.245$	78,100	Survey B 84, 87, 90 in SRA Model
Deepwater flat	W					2,020			
	C					35,580			
	E					7,930			
	GOA	227,656	?	?	$F_{0.1a}=.20$	45,530	$F_{30\%}=.265$	59,650	Survey B 90
Shallow flat	W					27,480			
	C					21,260			
	E					1,740			
	GOA	261,724	?	?	$F_{0.1a}=.20$	50,480	$F_{30\%}=.26$	70,860	Survey B 90
Flathead	W					12,580			
	C					31,830			
	E					5,040			
	GOA	247,247	?	?	$F_{0.1a}=.20$	49,450	$F_{30\%}=.26$	64,780	Survey B 90
Arrowtooth	W					38,880			
	C					253,330			
	E					29,080			
	GOA	1,889,922	?	?	$F_{0.1a}=.17$	321,290	$F_{30\%}=.30$	451,690	Survey B 90
Sablefish	W					2,500			
	C					9,570			
	WYK					3,740			
	SEO					4,990			
	GOA	179,000	?	?	$F_{0.1a}=.13$	20,800	$F_{30\%}=0.18$	28,200	Constant R Longline, trawl surveys in SRA model

Stock	Region	B_{92}	B_{MSY}	F_{msy}	Strategy	ABC	Overfishing Definition	OFL	Notes
Slope rockfish:	W					1,620			
POP	C					1,720			
	E					2,390			
	GOA	229,100	?	?	F=M/2	5,730	F=M/2	5,730	B_{92}/B_{msy}=1/2
SR/RE	W					100			
	C					1,290			
	E					570			
	GOA	72,960	?	?	F=M	1,960	$F_{30\%}$(RE) F=M (SR)	2,900	Ave. Survey B 87, 90
Other slope	W					1,390			
	C					6,510			
	E					6,160			
	GOA	230,480	?	?	F=M	14,060	$F_{30\%}$ and F=M	20,710	Ave. Survey B 87, 90
Pelagic shelf rockfish	W					1,210			
	C					4,400			
	E					1,280			
	GOA	?	?	?	F=M	6,890	$F_{30\%}$	11,550	Includes black rockfish. Ave. Survey B 84, 87, 90
Demersal shelf rockfish	GOA	?	?	?	F=M=0.02	800	$F_{30\%}$	1,600	Lower 90% CI submersible Survey B
Thornyhead	GOA	26,210	?	?	F=M=.07	1,830	$F_{30\%}$=0.095	2,490	Survey B 90