

North Pacific Fishery Management Council

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MINUTES
Scientific and Statistical Committee
September 25-26, 1989
Anchorage, AK

The Scientific and Statistical Committee of the North Pacific Fishery Management Council met September 25-26 at the Sheraton Hotel in Anchorage, Alaska. Members present were:

Richard Marasco, Chairman
Doug Eggers, Vice Chairman
Jack Tagart
Larry Hreha
Dana Schmidt

Terry Quinn
Bill Aron
Don Rosenberg
Don Bevan
Bill Clark

C-7 FUTURE MANAGEMENT PLANNING

b. Sablefish Management

The SSC reviewed the draft EA/RIR dated September 9, 1989, with replacement chapters 5 and 6 dated September 21, 1989, an addendum with a new Option 4 dated September 14, 1989, Appendix IV and heard a presentation on this topic by Council staff. Alternative 4, if approved by the Council for inclusion in the package, should be modified to eliminate reference to IFQ and substitute AFA (Annual Fishing Allotment) to avoid confusion with alternative 2. Appendix IV - Fleet Profit Estimation Model - needs modification and clarification. The appropriate SSC members and staff of the Alaska Fishery Science Center (AFSC) will assist in making the recommended changes. The SSC recommends approving this document for public review following the inclusion of the suggested modifications

D-1 SALMON FMP

The SSC has reviewed the draft of the revised Fishery Management Plan for the Salmon Fisheries in the EEZ off the Coast of Alaska and suggested a number of minor editorial changes to the authors.

We suggest one major revision of the current draft. We believe the draft does not clearly describe the differences between the management measures under option 1: Defer regulations to the State and option 2: Retain the status quo. We suggest the text be modified similar to the wording below:

Comparison of the Two Options Proposed
For Managing the Salmon Fisheries in the EEZ Off Alaska

Management Retain Measure	Option 1: <u>Defer</u> <u>Regulation to Alaska</u>	Option 2: <u>Retain</u> <u>The Status Quo</u>
Limited Entry	Same as now: ACEFC & RD	Same as now: ACEFC & RD
Harvest Levels	Same Pacific Salmon Commission Quotas and other constraints. Alaska Board of Fisheries Decisions on Allocations among the Groups of Fishermen.	Same Pacific Salmon Commission Quotas and other constraints. Alaska Board of Fisheries Decisions on Allocations among the Groups of Fishermen.
Fishing Seasons and Areas		
West Area	Same	Same
East Area	Established, in general, by the Board of Fish.	Established, in general, by the Alaska Board of Fisheries, subject to approval by NPFMC.
Inseason Adjustments	Made by ADF&G	Made by NMFS in close coordination with ADF&G.
Legal Gear	Established by Board	Established in the FMP (in close coordination with AK Board of Fish.)
Fish Size		
-Chinook	Same Established by PSC	Same Established by PSC
-Other species	Established by Board	Fixed in the FMP (in close coordination with the Board).

Landing Require- ments	Established Coast-wide by Pacific Salmon Comm.	Same.
Possession Restrictions	Established by Board	Established by FMP (in close coordination with the Board.)
Inseason Adjustments to Accommodate Vessel Safety	Deferred to Alaska	FMP says Council may do so upon consultation with USCG and industry
Inseason Adjustments to protect Coho	Established by Board Implemented by ADF&G	Set in FMP Implemented by NMFS in close coordination with ADF&G
Require- ment of Fishermen report their harvests	Established by Board	Set in FMP. Deferred to ADF&G for the most the most part.
Need for Reports of Fishery Data to be submitted to Secretary of Commerce	Required by MFCMA	Same
Need for Reports on Status of Fishery to be submit- ted to Council, "SAFE" Rpt.	Required by NOAA Regulations. State could provide using ADF&G annual report and PSC Coho and Chinook Joint Technical Comm's reports.	Same, but Salmon Plan Team could provide

D-2 CRAB FISHERY MANAGEMENT FMP

The SSC received a report from AFSC staff summarizing the status of commercially important crab species in the eastern Bering Sea. It was indicated that sometime in the early mid-1980's a major recruitment event occurred for both species of Tanner crab, resulting in improved survival of larvae to juveniles. These juveniles are slowly recruiting to both the survey gear and the exploitable population. Blue king crab in the Pribilof and St. Matthew Island regions, and Hair crab may have also been affected by the same recruitment event. It was indicated that Red king crab still show no signs of improved recruitment, but the survey has

generally been unsuccessful in detecting such crab until they are typically 50-75 mm cl, or 5-8 years of age.

D-3 GENERAL GROUND FISH

a. Pollock Roe-Stripping Amendment

The SSC reviewed the Environmental Assessment/Regulatory Impact Review for Amendment 19 to the FMP for Groundfish of the Gulf of Alaska and Amendment 14 to the FMP for Groundfish of the Bering Sea/Aleutian Islands. The document identifies four management problems associated with the practice of roe-stripping. These management problems are 1) moral or aesthetic concerns, 2) biological concerns, 3) non-utilization concerns, and 4) allocation.

With regard to the biological concerns the SSC found that the document is inconclusive. Information on the ability of the fishery to target by sex is lacking. The SSC believes that the seasonal distribution of fishing mortality has little effect on the productivity of the stock. The document provides no analysis that indicates any adverse effect of fishing during the spawning season as opposed to fishing later in the year.

With respect to non-utilization, the document does not provide sufficient information on the costs and benefits of requiring use of male and female carcasses. While an attempt was made to determine the value of the additional products produced, no information was supplied on either the sensitivity of these values to price changes or on how much it costs to produce them.

With regard to allocation issues the SSC notes that any re-allocation that might occur as a result of a change from the status quo to, for example, Alternative 2 or 3 would very likely be only short-term. Expansion in the number of at-sea processors would alter the distribution of catch which would initially result from adoption of either of these alternatives.

The SSC is unable to assess the moral or aesthetic concerns associated with the dumping of carcasses. If there are moral or aesthetic concerns, they should not be limited to just pollock roe stripping.

The SSC believes that the document does not supply sufficient information to assist in selecting among the alternatives. The SSC still believes that the problem to be solved by the amendment is not clearly defined. Without a clear problem to be addressed the staff and team had a difficult time in providing an appropriate analysis.

D-4 GULF OF ALASKA GROUND FISH FMP

a. Allowable Biological Catch

Pollock

The SSC reviewed the SAFE document and noted our previous requests for additional information from the previous set of minutes. This information included an estimate of statistical error in biomass, a quadratic function for natural mortality rate, analysis of residuals of the age composition of the catch and surveys, in addition to other factors. The plan team stated that the requested information would be provided in 1990 SAFE document. Following the comments provided at the June Meeting, the SSC agrees with the analytical approach used in the stock synthesis model and believes the analysis provided makes best use of the available data. The exploitable biomass estimates from the synthesis model recommended by the plan team were supported by the SSC.

To fully evaluate the effects of alternative exploitation rates, the SSC recommends that the plan team provide projected yields with variable levels of F, using the assumptions of the synthesis model A. This model assumes pollock are not fully recruited to the bottom trawl and/or hydro-acoustic surveys and age specific selectivity or availability values can be estimated for each survey. Natural mortality is constant at 0.4. In addition, the SSC requests that a frequency distribution of spawning biomass at variable levels of fishing mortality be prepared where F is not constrained with a threshold. Finally, the SSC requests that an analysis be provided that portrays long term yield variations with variations in threshold values.

In accord with its previous actions, the SSC recommends that a threshold combined with a fixed exploitation rate policy be implemented for Gulf of Alaska pollock, where the ABC follows a constant exploitation rate when above a threshold level and the ABC is set to zero when the spawning biomass falls below a threshold. The SSC requests that the plan team examine the 394,000 metric tons used in the current analysis as a constraint, for its appropriateness as a threshold. The threshold prepared should provide appropriate justification for its selection.

Given the current information, the SSC recommends the preliminary Gulf of Alaska pollock ABC be set equal to 58 thousand metric tons. A new analysis will be provided in the final document that also incorporates the 1989 age composition from the hydro-acoustic survey, which may change the final ABC. This value is from Table 1-11 of the SAFE document. This assumes failure of the 1987 year class, a condition which the SSC believes is the most realistic assumption of the recruitment scenarios provided. This provides an exploitation rate of .091, similar to the level at which stock biomass increased from previous low levels in the 1970's, and similar to the .10 used for 1989 in calculation of the current years ABC. This value is the level of fishing effort that kept the biomass from falling below threshold less than 10% of the time,

using a deterministic model with the recruitment being the mean of years 1980 to 1989.

The SSC notes that under a low recruitment rate scenario and a 58 thousand ton harvest rate, the spawning biomass is predicted to fall below 394,000 mt in 1991. If this prediction proves accurate and the current threshold level is adopted, then a zero ABC could be recommended for the 1991 season. Given this possibility the Council may wish to set TAC below the ABC level, to provide for some rebuilding and to reduce the likelihood of a zero ABC in 1991.

The SSC also notes that the additional analysis on the effects of variable F values on long term yield using the different assumptions requested, may provide additional insight for the December meeting that could result in significant changes in the recommendation of the ABC provided.

The SSC also discussed the pollock stock changes with regard to marine mammals, specifically the northern sea lion population. In light of the continuing decline of the northern sea lion population, and recent speculation that sea lion mortality maybe affected by pollock fishing (Loughlin and Merrick, 1988¹) the SSC requests that the plan team coordinate with marine mammal scientists to consider the interactions between pollock stocks and sea lions in future ABC determinations. If adverse impacts are demonstrated by pollock exploitation on the northern sea lion stocks, then management action by the Council may be necessary.

The SSC discussed the effects of quarterly harvests of the pollock resources, as opposed to removal of the annual quota during one period of time. Collection of data from the commercial fisheries, over a broader window of time, was considered desirable by the SSC, to further the understanding of the population dynamics of the species. The council would have to weigh this benefit against any allocative concerns which arise from a quarterly harvest schedule.

The SSC supports the plan team's recommendation for TAC from the Shelikof Strait of 6,250 mt, with appropriate data collection mechanisms in place (observers or port samplers) to provide continued data collection on this stock. In addition, the SSC supports the plan team recommendation that a 10,000 metric ton quota be established for an experimental fishery in the eastern portion of the central district, limited to the spawning period of the spring of 1991, beginning January 15 and terminating on April 15. This fishery should be limited to midwater trawling. The purpose of this fishery is to determine if there are pollock biomass aggregates not included within the current survey areas, which would add significantly to the Central Gulf of Alaska pollock

¹Loughlin, T.R. and R.L Merrick, 1988. Comparison of commercial harvest of walleye pollock and norther sea lion abundance in the Bering Sea and Gulf of Alaska. Proc. Int. Symp. Biol. Mgt. Walleye pollock, November 1988, Anchorage, AK., pp. 679-700.

biomass estimates. The SSC recommends this fishery be permitted only if observers are present on all fishing vessels and that the western boundary be clearly established to ensure the fishing activity occurs in new areas, rather than on the periphery of known stocks. A southern boundary added to the existing boundaries provided should be examined to determine if such a boundary would aid in insuring any new fishery would target on new areas for which data are unavailable. Also, should excessive bycatch of salmon and herring occur, the experimental fishery should be terminated.

The SSC also heard a proposal to initiate an experimental fishery on spawning pollock in the Davidson Bank area south of Unimak Island. Because of westward and northward direction of the prevailing currents, it is doubtful if the spawning aggregations in this area are from the Gulf of Alaska stock. The SSC believes that the biological data collected from this fishery would be useful, however such information can only be evaluated in the context of a wider synoptic survey of spawning pollock from the Aleutian Islands, Aleutian Basin, Eastern Bering Sea, and Gulf of Alaska. The SSC recommends that this experimental fishery not take place until a research plan is developed and funds made available to collect, process, and analyze samples from the synoptic survey of spawning pollock.

Pacific Cod

The Pacific cod population is currently healthy. The SSC concurs with the Plan Team that the best estimate of exploitable biomass is 498,000 mt. However, the SSC felt that the Team's recommended exploitation rate of 0.1015 was too low, being based on an overly conservative choice of the recruitment parameter A in stock reduction analysis. The SSC recommends an exploitation rate based on an $F_{0.1}$ value of 0.25, resulting in an ABC of 120,000 mt. The $F_{0.1}$ strategy is considered conservative. The SSC agrees with the Team that the apportionment to management areas should be based on biomass distribution of 19% to the Western region, 73% to the Central region and 8% to the Eastern region. Recommended ABC's are 22,800 mt for the Western region, 87,600 mt for the Central region, and 9,600 mt for the Eastern region.

Flatfish

The SSC endorses the split of flatfish ABC into the shallow flatfish, deep flatfish, and arrowtooth flounder categories. The SSC notes that this division is beneficial, because arrowtooth flounder is highly abundant but commercially less important than other species in the flatfish group and because bycatch rates differ among these categories. The SSC did not agree with the Team's use of F_{max} to determine exploitation rate for arrowtooth flounder, rock sole, and yellowfin sole, because use of F_{max} exploitation rates over a long time period is generally considered to result in over exploitation. The SSC recommends the use of $F_{0.1}$ for all categories as a conservative exploitation rate for all components. This reduces the ABC's by about 50%, resulting in 129,200 mt for deepwater species, 84,500 mt for shallow-water

species, and 194,600 mt for arrowtooth flounder. The recommended breakdown by area is:

	<u>Western</u>	<u>Central</u>	<u>Eastern</u>	<u>Total</u>
Deepwater	21,500	89,900	17,800	129,200
Shallow-water	30,200	52,200	2,100	84,500
Arrowtooth	27,000	141,000	26,600	194,600
Total	78,700	283,100	46,500	408,300

Sablefish

The Team analysis, based on stock reduction analysis tied to survey indices, is similar to last year's. New analyses will be completed for the December meeting, incorporating the 1989 longline survey, an important piece of information which may alter the values of biomass and ABC. For now, the SSC concurs with the Team's ABC range of 24,900 to 36,300 mt. The SSC recommends that the team work toward the integration of results from the 1989 longline survey into the stock synthesis analysis.

Slope Rockfish

In addition to the SAFE document, the SSC heard testimony from the industry suggesting that this fishery was important to them and that they felt the population was in better condition than indicated by the SAFE analysis. George Anderson volunteered to make available his information as long as confidentiality concerns were resolved and to collect information from his vessels in collaboration with the Alaska Fisheries Science Center. The SSC did not believe that the extra conservatism provided by reducing ABC's by 50% to protect shortraker and roughey rockfish was warranted, because conservative estimates of biomass and exploitation rate were already used. There is clearly a need to obtain better information on species catches for this complex; the observer program for 1990 should provide this information. The SSC notes that no new information is available on this complex since last year's analysis. The SSC recommends the same ABC as it recommended last year or 23,600 mt, the midpoint of the range of ABC's that would have been obtained without reducing the estimates by 50% with distribution of this ABC among management regions as suggested by the Team.

Pelagic Rockfish

No new information about this complex is available this year. The SSC recommends the same ABC as last year, or 6,600 mt. This ABC should be distributed among management regions as suggested by the Team.

Demersal Rockfish

This complex is managed under the FMP by the State of Alaska. No

information is currently available to determine exploitable biomass or ABC.

Thornyhead Rockfish

Information from longline surveys suggests that the population is at lower levels than those from the early 1980's. A yield per recruit analysis suggested that no change in last year's ABC of 3,800 mt was indicated. The SSC concurs with this recommendation.

PSC limits

The SSC reviewed the PSC limits in the SAFE document. With regard to the SAFE document, the SSC recommends that a more complete analysis be incorporated to facilitate scientific review of the bycatch rates. The SSC also heard testimony from Linda Kozak of the Kodiak Longliners Association that the halibut bycatch rate of 39.8 per metric ton of sablefish in the sablefish longline fishery was too high. The SSC also received descriptions of limitations of the ADF&G data from a sablefish fisherman from Kodiak (Robert Wurm, fishing vessel Moriah) who participated in the voluntary program and Leslie Watson from ADF&G, who suspected that some trips were conducted while prospecting for halibut before the opening. It appears that the sample size for determining this rate was extremely small (17 trips) and may have not represented actual fishing practices in some cases.

Given the limitations in the rates presented, the lack of information about the rates, and documentation justifying the choice of rates, the SSC recommends that the plan team reconsider the rates used in the document, especially those for the longline. It is possible that taking into account depth, time, and area, may provide more accurate estimates. There may also be other sources of information, such as the International Pacific Halibut Commission. Biases and lack of coverage in area and time should be examined. Use of in-season observer data may be preferable to the proposed rates.

The SSC also heard information from the Eagle Fisheries representative regarding halibut bycatch observer data. The SSC notes that procedures set out in the January 1989 SSC meeting to ensure the data were representative of the Eagle Fisheries bycatch, were followed. However it could not be ascertained as to whether the bycatch rates from the Eagle Fisheries is representative of the Gulf of Alaska bottom trawl fisheries.

The SSC also recommends that the data from the 1990 observer program be used as much as possible for estimating bycatch in the 1990 fishery.

D-5 BERING SEA GROUND FISH

Pollock

Eastern Bering Sea This year's assessment employed the same methods and exploitation rate as last year's. Stock size was estimated by cohort analysis, adjusted either to the trend in survey abundance or to the pattern of recent recruitment strengths. The former produced a somewhat higher estimate of present biomass.

ABC was calculated by applying the $F_{0.1}$ fishing mortality rate (.31) to estimated biomass. This ABC is 1.14 million or 1.47 mt, depending on the stock size estimate. The Team chose the lower value. The SSC prefers to keep the range 1.14-1.47 as a preliminary ABC with the aim of choosing one biomass estimator in December, when additional information from the 1988 NMFS survey is integrated into the analysis.

[Technical note: The Committee noted that the calibration of the cohort analysis to survey catch rates and age composition could be done more objectively and straightforwardly by employing one or another form of catch-age analysis, e.g. CAGEAN or stock synthesis. This procedure would produce a single estimate with a variance rather than a range of point estimates.]

Aleutian Islands The SSC agrees with the Team's recommended ABC of 149,000 mt, calculated by applying $F_{0.1}$ (0.31) to an updated estimate of biomass.

Bogoslof/Basin/Donut/Soviet Fish The SSC remains concerned about the stock identity and status of fish in the Aleutian Basin, which are exploited in the Soviet zone, in the Donut Hole, and in the area around Bogoslof Island. The Bogoslof fish are treated as part of the EBS for purposes of management but not assessment-- catches around Bogoslof count against the EBS quota, but they are not included in the catch or survey data on which the EBS ABC is based.

The Basin fish are tentatively regarded as distinct from both EBS and Aleutian Islands fish. There is insufficient information to estimate biomass or rate of exploitation. The SSC therefore does not believe an ABC can be calculated at this time for this group.

The SSC's preferred management approach for pollock would allow a separate TAC to be set for the EBS, Aleutian Islands, and Basin areas. The SSC recommends that the Team develop a Plan amendment that will enable the Council to adopt and change pollock management areas in the Bering Sea and GOA in the future.

It was reported that plans are being made for a joint US-USSR meeting to pool knowledge of all Bering Sea pollock. This could serve as a basis for discussion of management by all countries involved in the fisheries. The SSC believes that consolidated assessment and management are essential, and strongly supports efforts in that direction.

Pacific Cod

The SSC heard a presentation from Dr. Grant Thompson explaining a Bayesian decision theory approach used to develop a new preferred fishing mortality estimator. Dr. Thompson calls this fishing mortality rate F_{msy} (maximum expected logarithm of the sustainable yield). The SSC needed more time to examine the derivation of the estimator and requested a copy of Dr. Thompson's paper explaining the method. The SSC will revisit this issue in December. In the interim, the SSC recommended adoption of the F_{msy} (0.18) rate of exploitation, and the resultant ABC of 345,399 mt.

Yellowfin Sole

Stock size was estimated by adjusting cohort analysis to trends in survey biomass, and ABC was calculated by applying the $F_{0.1}$ rate of fishing mortality to the projected 1990 biomass. The SSC, like the Team, endorses this approach, which produces an ABC of 279,000 mt.

[Technical note: the available data for this stock make it another natural candidate for one of the recent forms of catch-age analysis.]

Greenland turbot

Trawl survey estimates of Greenland turbot biomass suggest a dramatic decline in abundance precipitated by substantial drops in recruitment. However, the SSC finds it difficult to identify a credible estimate of the current stock biomass. The 1988 trawl survey suggests a total biomass of 57,500 mt while the SRA projected 1990 biomass is 356,628 mt. The trawl survey biomass may be low because it does not include estimates for the 800 to 1000 m isobaths. The SRA estimate may be high because it assumes too large a value for recruitment. The SSC requests the Plan team attempt to extrapolate the 1988 survey biomass estimate to cover the 800-1000 m isobath, and revisit its SRA projections of 1990 biomass utilizing a lowered rate of annual recruitment, at least for the period since 1984. At this time, the SSC recommends an ABC range of 7,000 to 20,000 mt.

Arrowtooth Flounder

This stock is large and increasing, with a projected 1990 biomass of 434,000 mt. In view of this high abundance, the Team recommended the F_{MAX} (0.41) rate of fishing mortality, with an ABC of 135,000 mt. However, after reviewing available information, the SSC recommends an ABC of 65,000 mt based on the $F_{0.1}$ rate (0.18), for reasons indicated below.

Fishing arrowtooth at F_{MAX} rate in the short term should not cause a problem, but the SSC is extremely reluctant to endorse an F_{MAX} of fishing mortality on any stock in any circumstances. F_{MAX} is the fishing rate that provides the greatest possible yield from the available recruitment to a stock, without regard to whether enough

of those recruits will survive and spawn to maintain recruitment in the future. For most stocks, an F_{MAX} strategy will, if pursued consistently, reduce the spawning stock to such a low level that recruitment and yield are also reduced, in some cases drastically. In other words, F_{MAX} applied for any length of time is overfishing.

Other exploitation strategies, such as F_{MSY} or related rates like $F_{0.1}$, will, if pursued, consistently provide a sustained yield very close to the maximum obtainable, with little or no risk of overfishing. In the short term, these yields can be very different from the corresponding F_{MAX} yields, but in the long term it can be guaranteed that the yields obtained at these lower rates cannot be much less and may well be much more than the yields obtained at higher rates of fishing mortality.

The reason that F_{MAX} yields are so much higher than the F_{MSY} or $F_{0.1}$ yields in any one year is that the F_{MAX} yields are not sustainable. They include a large component of fishing down the stock, which can be viewed as liquidation. For these reasons, the SSC recommends that ABC be calculated by applying an exploitation rate equal to or less than the estimated F_{MSY} .

Rock sole

The SSC concurs with the Plan Team's assessment that the rock sole stock is in excellent condition. We also agree that the best estimate of current biomass is an average of the past three year's estimates from the trawl survey. However, the SSC does not agree with the Plan Team's use of F_{msy} (0.155) as derived from a biomass based cohort analysis. This parameter is estimated by least squares; the 0.155 value was obtained when the model was fit to data through 1984. The correlation coefficient is high for these data but drops to a very low value when recent data are used. Therefore, the SSC concluded that the biomass based model is an unreliable estimator of F_{msy} . The SAFE presents two alternative estimates of a preferred fishing mortality rate, F_{msy} (0.176), as derived from a dynamic pool model, and a yield per recruit model estimate of $F_{0.1}$ (0.23). The SSC was unable to identify a preference among these two estimators, and the SSC consequently calculated an ABC range using both values. The SSC's recommended ABC is 245,115 to 320,000 mt. The SSC requested that the Plan Team identify a preferred fishing mortality estimator (other than the biomass based model) in the final version of the SAFE document.

Other flatfish

Other flatfish ABC's are computed as a fraction of the rock sole ABC. The SSC has computed an ABC range consistent with the revised estimates for rock sole mentioned above. The recommended ABC is 200,900 to 262,300 mt.

Sablefish

The assessment document contains a range of ABC's, depending on which survey data are used to estimate biomass. The ranges are

1700-2400 mt in the EBS and 2500-6600 mt in the Aleutians. The Team preferred the higher values because they were based on surveys in the EBS/AI area.

The SSC prefers to adopt the ranges as preliminary ABC's and choose a final value in December. In the meantime, the Committee requests that the Team re-evaluate the effect of killer whale depredation on the trend in longline survey indices of abundance in the Bering Sea and integrate the results of the 1989 survey.

Remaining species

POP (EBS 6,300; AI 16,600), Other Rockfish (EBS 500; AI 18,500), Atka Mackerel (24,000), Squid (10,000), and Other Species (59,000). The SSC concurs in the Team's recommendations.

Table 1. 1990 SSC, ABC Recommendations.

GULF OF ALASKA		
SPECIES	AREA	ABC
Pollock	Western/Central	58,000
	Shelikof	(6,250)
	Eastern	3,400
	TOTAL	61,400
	Experimental ^{1/}	(10,000)
Pacific Cod	Western	22,800
	Central	87,600
	Eastern	9,600
	TOTAL	120,000
Flatfish (deep water)	Western	21,500
	Central	89,900
	Eastern	17,800
	TOTAL	129,200
Flatfish (shallow)	Western	30,200
	Central	52,200
	Eastern	2,100
	TOTAL	84,500
Arrowtooth Flounder	Western	27,000
	Central	141,000
	Eastern	26,600
	TOTAL	194,600
Sablefish	Western	3,600 - 5,300
	Central	11,200 - 16,300
	W. Yakutat	4,400 - 6,400
	E. Yakutat/ S.E. Outside	5,800 - 8,300
	TOTAL	25,000 - 36,300
Rockfish (slope)	Western	6,797
	Central	9,983
	Eastern	6,820
	TOTAL	23,600
Rockfish (Pelagic Shelf)	Western	1,000
	Central	4,800
	Eastern	800
	TOTAL	6,600
Rockfish		-
Thornyhead		3,800
Other Species		NA

^{1/} Pollock TAC for experimental fishery between 151°30" and 147°, January 15 - April 15, 1990 only.

Table 2. 1990 SSC, ABC Recommendations.

BERING SEA ALEUTIAN ISLANDS		
<u>SPECIES</u>	<u>AREA</u>	<u>ABC</u>
Pollock	Bering Sea	1.14 - 1.47 mt
	Aleutian Islands	149,400 t
Pacific Cod		345,399 t
Yellowfin sole		279,000 t
Greenland Turbot		7,000 to 20,300 t
Arrowtooth		65,100 t
Rock Sole		245,115 to 320,000 t
Other Flatfish		200,900 to 262,300 t
Sablefish	Eastern Bering Sea	1,700 - 2,400 t
	Aleutian Islands	2,500 - 6,600 t
POP	Eastern Bering Sea	6,300 t
	Aleutian Islands	16,600 t
Other rockfish	Eastern Bering Sea	500 t
	Aleutian Islands	1,100 t
Atka Mackerel		24,000 t
Squid		10,000 t
Other species		59,000 t
	TOTAL	2,553,614 - 3,037,999 t