AGENDA D-1
SEPTEMBER 1985

M E M O R A N D U M

TO: Council, SSC, and AP members

FROM: Jim H. Branson
Executive Director

DATE: September 4, 1985

SUBJECT: Gulf of Alaska Groundfish Fishery Management Plan

ACTION REQUIRED

Review preliminary DAP, JVP, and OY estimates for 1986 and release to public review.

BACKGROUND

This meeting begins the Council's annual groundfish amendment cycle with review and release to public of preliminary estimates of domestic annual processed catch (DAP), joint venture processed catch (JVP), and optimum yield (OY) for 1986. The Gulf of Alaska Groundfish Plan Team met on September 9-13 to prepare this year's status of stocks report, included in your notebooks as item D-1(a). Table 1 which summarizes the team's findings is item D-1(b). Comparing the projected 1986 EYs with the 1985 EYs and OYs in that table will aid in determining initial 1986 OY estimates for public review. Several members of the plan team are available to review the status of stocks report. A report on the Gulf Plan Team meeting is attached in your supplementary file.

Amendment 11 frameworked the determination of DAP and JVP in the Gulf of Alaska. It calls for the Council to propose DAPs and JVPs for 1986 at this meeting, the proposals to be published in the Federal Register for comment for 30 days, and the Council to finalize them at the December meeting, after which the Regional Director will implement them administratively.

DAP and JVP for 1986 should be based on the 1985 DAP and JVP harvests, plus any additional amounts necessary for the 1986 domestic fishery. Estimates of 1985 DAP and JVP harvests will be provided at this meeting. The National Marine Fisheries Service will conduct a survey of the domestic industry later this fall to determine the additional DAP needed for 1986.

GOA Groundfish FMP Update

The plan team has started work on revising the Gulf Groundfish FMP. Writing assignments have been made and the project is on schedule. The team will probably need to meet with the Council's Goals Subgroup sometime next month as problems and questions arise.

Status of Amendment 14

Secretarial review of Amendment 14 concludes on September 26. A report on NMFS's decision should be available at this meeting.

GULF OF ALASKA GROUNDFISH PLAN TEAM MEETING REPORT
September 9-13, 1985

Northwest and Alaska Fisheries Center
Seattle, Washington

The Gulf of Alaska Groundfish Plan Team met in Seattle on September 9-13, 1985. The principal topic was to review the condition of the 10 groundfish species managed by the Gulf of Alaska Groundfish FMP. Several other issues were also discussed. Plan Team Members in attendance were: Gary Stauffer, Jeff Fujioka and Joe Terry, NWAFC; Barry Bracken, Pete Jackson and Fritz Funk, ADF&G; Steve Hoag, IPHC; and Steve Davis, NPFMC. Advisors to the team included Eric Brown, Miles Alton, Craig Rose, Murray Hayes, Marty Nelson and Dan Ito, NWAFC; Fred Gaffney, ADF&G; and Will Barber, UA. Members of the public observing the meeting were: Paul McGregor, Japanese Longliner's Association; Steve Dickinson, Japan Deep Sea Trawlers Association, and Hokuten Trawler's Association; and Jay Hastings, Japan Fisheries Agency.

Status of Gulf of Alaska Groundfish Stocks, 1985

A team report entitled "Status of Gulf of Alaska Groundfish Stocks, 1985", was drafted during the meeting. The team examined the current information on the status of stocks available from NMFS and ADF&G. The report identified those species for which we concluded the condition of resource differs from our 1984 assessment. Significant adjustments of ABC are being recommended for two species, pollock and sablefish. The team did not develop OY options at this meeting. This report will be updated in November based on the stock assessment documents prepared for INPFC.

Additional Pollock Recommendations

Following the review of the Gulf pollock resource, the team discussed the risks of resource damage by continuing to fish pollock during the remainder of 1985. As of September 13, there exists approximately 40,000 mt of pollock as TALFF, 5,000 mt being unallocated. Unharvested pollock of about 40,000 mt also exists in the DAP category. The 1985 JVP has been taken and there are no reserves remaining. The plan team recommends that given a 1986 ABC of zero, and the need to maximized the reproductive potential next winter, the Council should close or strictly limit the pollock fishery for the remainder of 1985. Foreign harvests to date have been small and the direct fishing has yet to begin in earnest. Domestic catches have also been well below the DAP estimate. A limitation or closure of the remaining pollock fishery would greatly improve the chances for a successful production of the 1986 year class. It was also noted that given the likelihood of a reduced pollock fishery in 1986, most fish unharvested in 1985 would constitute the majority of fish available for harvest in 1986.

Halibut Bycatch Limits

Included in Amendment 14 is a framework procedure for the annual setting of halibut bycatch limits. Currently, the FMP specifies that no more than 29 mt and 52 mt of halibut in the Western and Central Areas can be taken by domestic/joint venture trawlers during the period December 1 through May 31.

For 1984 and 1985, the Council raised the bycatch limits to 270 mt and 768 mt in the Western and Central Areas, respectively, by emergency rule to avoid a premature closure of the Shelikof Strait pollock fishery. The new framework will allow the Council to review and set halibut bycatch limits annually without requiring an emergency rule or plan amendment. In addition, bycatch limits specified using the framework will be effective for an entire year. In anticipation of Secretarial approval of the framework, the plan team has prepared a brief report on the status of the halibut resource, an examination of observed bycatch rates, and proposed halibut bycatch limits for 1986. The report is included in your supplemental materials. The Council will want to review this report and release proposed bycatch limits for public review.

Gulf of Alaska Groundfish FMP Rewrite Status Report

Following a review of the August Council meeting, the plan rewrite schedule, and work done to date, the team discussed the limited manpower available for this project. The ADF&G has notified the team that its members will be unable to work on the initial redrafting of the plan. Also, other team members have committed themselves to further analysis of the status of Gulf groundfish stocks. It is clear that given the complexity of the proposed framework measures and the limited manpower, it may be difficult to complete the full assignment by the December deadline. In an attempt to help solve this problem, the Northwest and Alaska Fisheries Center has provided three additional scientists to help the team. The Council staff is also at full strength, thereby providing additional support. The team identified the following individuals to comprise an FMP workgroup: Steve Davis (Coordinator), Terry Smith and Ron Rogness NPFMC; Jim Balsiger, Grant Thompson, Dick Major and Joe Terry, NWAFC; Will Barber, UA; and Ron Berg, NMFS. A workgroup meeting has been scheduled for October 3-4, 1985, at the Northwest and Alaska Fisheries Center. The primary purpose of the meeting is to further develop the conceptual model for setting harvest levels and to issue writing assignments. As progress is made, or as questions or problems develop, the workgroup will meet with the Council FMP Workgroup for guidance. It is anticipated that biweekly progress reports will be made to keep the Council informed.

Other Topics

Due to a promotion and a change in responsibilities, the plan team was notified that Dr. Gary Stauffer will be unable to remain a member of the team. The NWAFC is recommending that Dr. Jim Balsiger be added to the team as Gary's replacement. Dr. Stauffer has been a major contributor of scientific information to the Council. He will be sorely missed by the Council family. Dr. Balsiger was an original member of the Gulf Groundfish Plan Development Team. He is a familiar face to the Council and we welcome him back to the team.

DRAFT

Gulf of Alaska Plan Team Report

Status of Gulf of Alaska Groundfish Stock, 1985

September 13, 1985

STATUS OF GULF OF ALASKA GROUNDFISH STOCKS - 1985

This paper reports the condition of stocks in the Gulf of Alaska. The first section provides a concise summary of management recommendations for each species or species group. This is followed by a summary of the team's review of condition of each and recommendations based on their condition.

The Plan Team (PT) for the Groundfish Fishery Management plan (FMP) of the Gulf of Alaska met in Seattle for five days, September 9-13, 1985, to conduct a preliminary review on the status of stocks of the ten species or species groups which have a specified OY in the FMP. The PT review and discussions were based on draft 1985 INPFC documents and presentation by NMFS scientists. These documents contained preliminary data and information. Therefore, our discussions and recommendations for 1986 harvest levels and any changes in OY are preliminary.

The following recommendations for harvest levels in 1986 are based on the PT's assessment of the current productivity of fishery resources in the Gulf of Alaska. The establishment of a final harvest level or OY values must also take into account the potential bycatch of fully utilized species, i.e. Pacific Ocean perch complex, Atka mackerel, and sablefish.

SUMMARY RECOMMENDATIONS

1. POLLOCK - The biomass is projected to decline to about 445,000 mt for 1986, well below the threshold level of 600,000 to 700,000 mt. Therefore, the PT determined that ABC is zero for 1986 to provide the maximum potential for reproductive success by the declining but dominant 1978 and 1979 year-classes during the 1986 and 1987 spawning season. The PT

recommends that, if a directed pollock fishery is allowed in 1986, it should be delayed until after the January-March spawning period. In addition, a delay in the fishery would allow the analysis of the 1986 hydroacoustic survey prior to a directed pollock fishery.

2. PACIFIC COD - The ABC is estimated to be about 136,000 mt. In the past OY has been set well below ABC to control halibut bycatch. The halibut PSC measures included in Amendment 14, if approved, may provide an alternative method of controlling halibut bycatches for those fisheries where observers are present. The 1985 OY is 60,000 mt, with the distribution among the western, central, and eastern areas of 16,560, 33,540, and 9,900 mt, respectively.

3. FLOUNDER - The PT recommends that the Gulf-wide ABC be set at the MSY of 141,081 mt because the stocks are in good condition due to high biomass and relatively low exploitation rates in this fishery.

4. PACIFIC OCEAN PERCH COMPLEX - The PT considers the stock to be depressed. To maximize resource rebuilding, it is recommended that OY be set at a level which allows an incidental catch only.

5. SABLEFISH - The PT considers ABC to be between the lower bound of 12,630 mt (EY for 1983-85) and the maximum upper limit of 25,000 mt. The biomass in the Gulf of Alaska is estimated to be 516,000 mt.* A large portion of this biomass is attributed to large 1980 or 1981 year class. Estimates of current annual surplus production are very sensitive to measures of recruitment, which are generally unknown. The PT is continuing its investigation of harvest levels appropriate for current sablefish stock levels. Historical catches average 25,000 mt annually over the period.

* That will change slightly —

6. ATKA MACKEREL - There is no new information to indicate that there should be a change in the ABC of 4,678 mt for the Western Management Area. The 1984 survey found significant numbers in the western area only. The biomass estimate for this survey was 36,000 mt, with 500 mt in the central area and no catch in the eastern area. Catches continued at low levels, there is no indication of recruitment from 1968 to 1977 resulted in marked reductions of the Gulf of Alaska sablefish stocks.
7. OTHER ROCKFISH - The PT estimates an ABC of 2,300 mt for the western, central, and a portion of the eastern area. No estimate is available for the whole eastern regulatory area. Because of the extreme longevity of many rockfish species, sustained yield is assumed to be very low.
8. THORNYHEAD ROCKFISH - The PT recommends no change in the current 3,750 mt MSY. There is no new information which would suggest altering the current MSY.
9. SQUID - There is no new information to suggest a change in the current 5,000 mt OY level.
10. OTHER SPECIES - No recommendations were made by the Team for this group. FMP procedures define that OY's for this group be set at 5% of the sum of OY's established for the other OY species categories.

Table 1.--Current status of Gulf of Alaska groundfish resources (mt).

Species	1985 OY	Projected 1985 catch	Stock condition	Current trend in abundance	Preliminary 1986 ABC
Pollock	321,600	275,129	Depressed.	Exploitable biomass declining to 445,000 mt in late 1985.	ABC = 0.
Pacific cod	60,000	18,800	Good.	Stable.	ABC = 136,000.
Flounders	33,500	2,300	Good.	Assumed stable.	Maintain ABC at 141,000.
Pacific ocean perch	6,083	1,430	Depressed.	Stable.	Rebuild; incidental catch only.
Sablefish	9,480	11,184	Good.	Increasing	ABC is between 12,500 and 25,000.
Atka mackerel	5,300	355	Depressed.	Depressed; no apparent recruitment in eastern/central area.	Unknown; set equal to OY in 1985.
Other rockfish	5,000	1,105	Depressed.	Unknown.	ABC = 2,300 mt
Thornyhead	3,750	110	Unknown.	Estimated biomass = 21,000 mt in central and western area.	Unknown; MSY = 3,750.
Squid	5,000	70	Appears good.	Assumed stable.	Unknown; set equal to OY in 1985.
Other species	22,435	2,645	Probably good.	Assumed stable.	Unknown; set equal to OY in 1985.

Table 2. NPFMC DOMESTIC PERIOD REPORT: MONTHLY COMMERCIAL GROUNDFISH LANDED CATCH (METRIC TONS) FOR 1985 FOR ALL AREAS

SPECIES	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
ARROWTOOTH FLOUNDER	-	-	-	3	-	-	-	-	-	3
___TURBOTS	-	-	-	3	-	-	-	-	-	3
PETRALE SOLE	-	-	-	-	-	-	TR	-	-	TR
ROCK SOLE	-	3	17	-	TR	-	-	-	-	19
STARRY FLOUNDER	32	TR	2	2	TR	-	-	-	-	36
OTHER FLATFISH	4	TR	-	-	TR	13	3	TR	-	22
UNSP. FLATFISH	TR	2	2	TR	1	-	TR	-	-	5
___ALL FLATFISH	36	4	21	5	1	13	4	TR	-	85
BLACK ROCKFISH	TR	1	2	6	1	1	6	TR	1	18
CANARY ROCKFISH	1	TR	2	1	1	1	1	TR	-	7
SILVERGREY ROCKFISH	-	-	TR	TR	TR	3	-	-	-	3
YELLOWEYE ROCKFISH	17	19	72	70	74	69	45	31	1	398
YELLOWTAIL ROCKFISH	-	TR	-	TR	TR	-	-	-	-	TR
OTHER ROCKFISH	6	7	17	30	53	35	18	12	TR	178
PACIFIC OCEAN PERCH	1	-	-	192	350	346	46	48	-	983
___POP GROUP	1	-	-	192	350	346	46	48	-	983
THORNYHEADS	TR	TR	1	4	19	5	4	1	-	34
UNSP. ROCKFISH	10	11	14	45	18	38	6	8	2	152
___ALL ROCKFISH	35	38	109	348	517	498	125	101	3	1774
LINGCOD	4	2	7	8	13	5	4	2	TR	47
PACIFIC COD	2351	16666	14149	13937	10026	2394	1359	275	-	61156
SABLEFISH	236	557	1312	3201	3825	2184	1099	241	1	12658
WALLEYE POLLOCK	304	1480	600	90	967	1028	218	29	-	4716
___ALL ROUNDFISH	2895	18705	16069	17236	14831	5611	2680	548	1	78576
SPINY DOGFISH	TR	-	-	-	-	-	-	-	-	TR
UNSP. GROUNDFISH	2	-	1	1	TR	3	TR	TR	-	6
___MISC. GROUNDFISH	2	-	1	1	TR	3	TR	TR	-	6
ALL GROUNDFISH	2968	18748	16199	17589	15350	6125	2809	649	5	80441

THIS REPORT INCLUDES ONLY DATA FOR NORTH PACIFIC COUNCIL INPFC AREAS
TR = LANDED CATCH LESS THAN 0.5 METRIC TONS, OR METRIC TONS PER DELIVERY LESS THAN 0.005

NPFMC SOURCE REPORT: COMMERCIAL GROUNDFISH LANDED CATCH (METRIC TONS) FOR 1985 FOR THE GULF AREA

SPECIES	ADFG	WDF	DAP	JVP	DAH	JAPAN	FOREIGN	TOTAL
ARROWTOOTH FLOUNDER	3.0	-	3.0	-	3.0	-	-	3.0
___TURBOTS	3.0	-	3.0	-	3.0	-	-	3.0
PETRALE SOLE	TR	-	TR	-	TR	-	-	TR
ROCK SOLE	16.6	-	16.6	-	16.6	-	-	16.6
STARRY FLOUNDER	36.2	-	36.2	-	36.2	-	-	36.2
OTHER FLATFISH	0.1	-	0.1	-	0.1	-	-	0.1
UNSP. FLATFISH	4.9	-	4.9	664.0	668.9	27.2	27.2	696.1
___ALL FLATFISH	60.7	-	60.7	664.0	724.7	27.2	27.2	751.9
BLACK ROCKFISH	17.7	-	17.7	-	17.7	-	-	17.7
CANARY ROCKFISH	7.1	-	7.1	-	7.1	-	-	7.1
SILVERGREY ROCKFISH	3.4	-	3.4	-	3.4	-	-	3.4
YELLOWEYE ROCKFISH	348.5	-	348.5	-	348.5	-	-	348.5
YELLOWTAIL ROCKFISH	0.1	-	0.1	-	0.1	-	-	0.1
OTHER ROCKFISH	146.9	-	146.9	-	146.9	-	-	146.9
PACIFIC OCEAN PERCH	447.5	21.7	469.2	-	469.2	-	-	469.2
UNSP. POP GROUP	-	-	-	21.3	21.3	0.3	0.3	21.6
___POP GROUP	447.5	21.7	469.2	21.3	490.5	0.3	0.3	490.8
THORNYHEADS	26.8	-	26.8	TR	26.9	-	-	26.9
UNSP. ROCKFISH	128.5	0.5	129.0	8.6	137.6	0.9	0.9	138.5
___ALL ROCKFISH	1126.5	22.2	1148.7	29.8	1178.5	1.2	1.2	1179.7
ATKA MACKEREL	-	-	-	3.2	3.2	-	-	3.2
LINGCOD	46.8	0.1	46.9	-	46.9	-	-	46.9
PACIFIC COD	2131.2	0.1	2131.3	1618.5	3749.9	9073.4	9073.4	12823.3
SABLEFISH	10805.9	0.7	10806.6	24.4	10831.0	8.7	8.7	10839.7
WALLEYE POLLOCK	1663.3	-	1663.3	220731.4	222394.7	14.6	14.6	222409.3
___ALL ROUNDFISH	14647.2	0.9	14648.2	222377.6	237025.7	9096.7	9096.7	246122.4
SPINY DOGFISH	TR	-	TR	-	TR	-	-	TR
UNSPECIFIED SQUID	-	-	-	5.9	5.9	0.1	0.1	6.0
UNSP. GROUNDFISH	5.9	-	5.9	1987.4	1993.3	90.3	90.3	2083.6
___MISC. GROUNDFISH	5.9	-	5.9	1993.3	1999.2	90.4	90.4	2089.6
ALL GROUNDFISH	15840.3	23.1	15863.5	225064.7	240928.2	9215.5	9215.5	250143.7

THIS REPORT INCLUDES ONLY DATA FOR NORTH PACIFIC COUNCIL INPFC AREAS
TR => LANDED CATCH LESS THAN 0.05 METRIC TONS, OR METRIC TONS PER DELIVERY LESS THAN 0.005

NOTE: THIS REPLACES THE TABLE ON PAGE 5 OF THE GULF OF ALASKA STATUS OF STOCKS REPORT.

POLLOCK

Annual foreign and U.S. catches of pollock in the Gulf of Alaska have increased steadily since 1978 (Table 3). U.S. catches by domestic fishermen delivering to U.S. processors continue to remain small. U.S. catches by domestic fishermen delivering to foreign processors in joint ventures operating in Shelikof Strait have increased markedly from 1,100 mt in 1980 to over 222,400 mt in 1985 (as of September 6). U.S. catches surpassed foreign catches for the first time in 1983.

Table 3.--Annual pollock catch in the Gulf of Alaska by foreign and U.S. fisheries, 1977-85 (in 1000's metric tons).

Year	Foreign fisheries	Joint-Venture Fisheries	Domestic	Total
1977	120.4	--	N.A.	120.4
1978	96.3	--	N.A.	96.3
1979	103.2	--	4.5	107.7
1980	113.0	1.1	2.2	116.3
1981	130.3	16.9	1.8	149.0
1982	92.6	73.9	2.2	168.8
1983	81.4	134.1	0.1	215.5
1984	99.3	207.1	.3	306.6
1985	14.5[a]	222.0	1.7	222.4

[a] Preliminary estimates as of September 6, 1985.
N.A. = Not available.

The abundance of pollock in the Gulf of Alaska as measured by acoustic trawl surveys in Shelikof Straits during spawning period has declined from a high of 3,770,000 mt in 1981 to 700,000 mt in 1985 (Table 4). The 1985 biomass is a 62% decline from the estimate of 1984 biomass of 1,840,000 mt and is more precipitous than projected for 1985 in 1984. This estimate is nearly half of the projected 1985 estimate of 1,200,000 to 1,270,000 mt given to the Council in the fall of 1984. Contributing to the decline is the poor recruitment of the 1980, 1981, and 1982 year classes. The 1985 survey results compared to 1984 show an unexpected sharp drop in the abundance of the 1978 and 1979 year classes (Fig. 1). These year classes have been the main contributor to the fisheries catch in recent years. The mortality rate suggested by the survey results for these two year classes combined was 35% between 1983 and 1984 as compared to 73% between 1984 and 1985. If this decline cannot be entirely attributed to increased mortality, then the difference in these estimates could be due to statistical variability in the estimates or to changes in availability of the pollock in these year classes to the survey sampling gear.

Catch-at-age analysis of the past fishery data suggests that the catchability of pollock to the fisheries peaks at age 5 with older fish being less available to fishing. This has been more apparent in the Shelikof Strait fishery than in the summer fisheries on the outer shelf, and this might be a factor contributing to the observed excessive decline in the abundance of the 1978 and 1979 year-classes between 1984 and 1985.

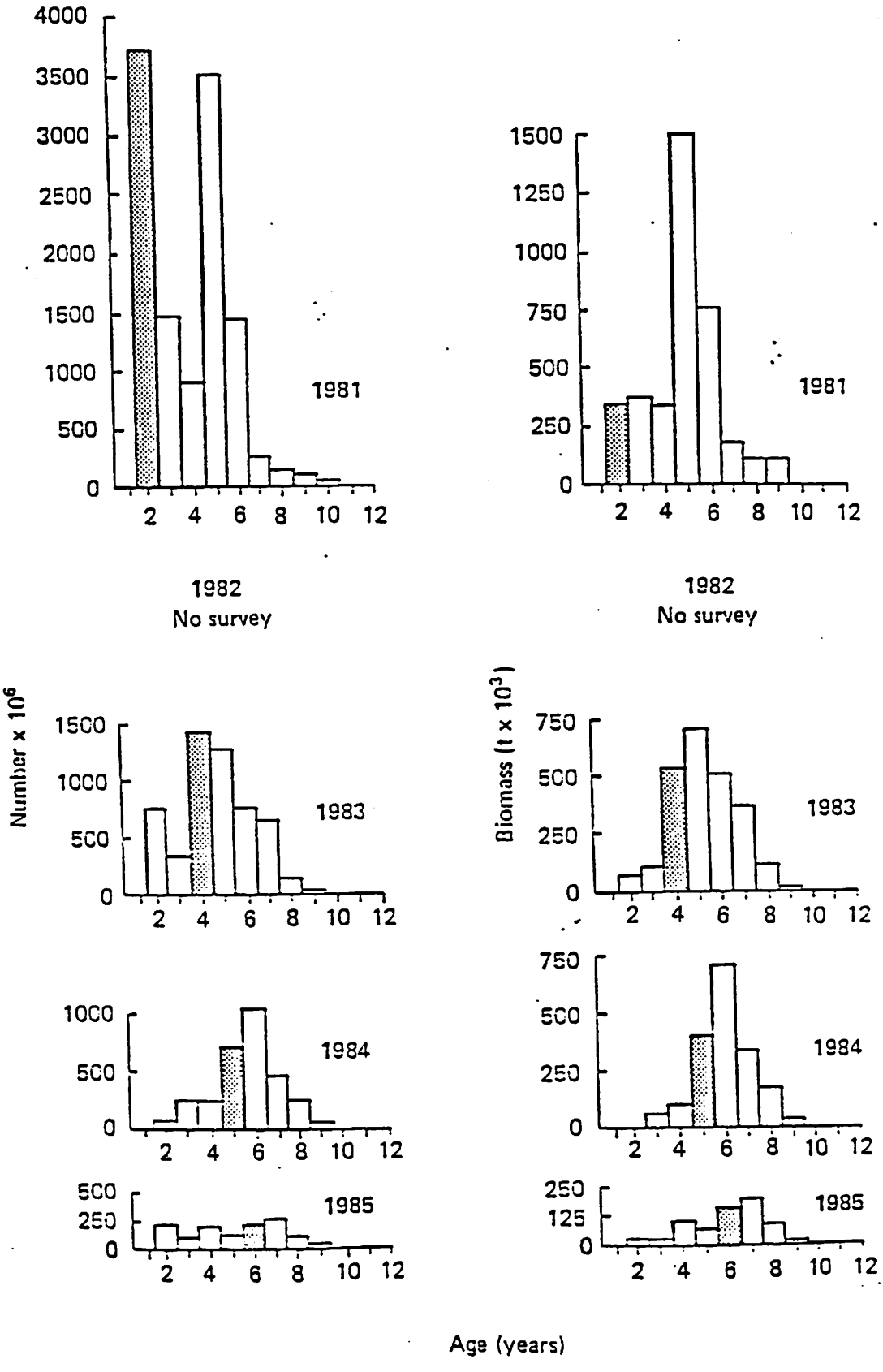

Figure 1. Pollock age distribution (numbers and biomass) estimated from 1981 and 1983-85 Shelikof Strait hydroacoustic-midwater trawl surveys (from Nelson and Nunnallee, 1985).

The hydroacoustic surveys provide information on the abundance of age 2 and, to a very limited extent, age 1 pollock. These age groups are substantially less available to the surveys than fish age 3 through age 5 and, as a result, estimate of abundance or relative year class strength for these younger ages are not very reliable. However, age 1 fish in 1985 from the 1984 year class were aggregrated in a readily detectable midwater layer and were considerably more abundant than age 1 fish in earlier years. This marked difference suggests that the 1984 year class could be strong as it recruits to Shelikof Strait spawning concentration in 1987.

Trends in CPUE for JV and foreign fisheries do not match the downward trend in the hydroacoustic estimates. Due to the schooling nature of pollock, CPUE data are not likely to reflect stock abundance. We have assumed that most pollock in the central and western regulatory areas spawn in Shelikof Strait region. Although there is evidence of spawning pollock elsewhere in the Gulf beside Shelikof St., we do not know of any concentrations that are important or large relative to Shelikof St. spawning group. The total pollock biomass derived from the 1984 bottom trawl survey in the western and central areas is 1,200,000 mt. Most of this biomass consisted of age 3 fish and older. This estimate is considered to be conservative since trawls were less than 100% efficient in catching fish in their path and some unknown fraction of the population was off bottom and unavailable to the sampling gear. This bottom trawl estimate is consistent with the March 1984 estimate if we assume that one third of the total biomass is unavailable to the bottom trawl, yet it is much higher than the 1985 acoustic estimate of 700,000 mt.

Projections of exploitable biomass in Shelikof Strait for early 1986 and subsequent years (1987-88) were examined for various recruitment scenarios and annual catch levels. The projections are initiated with the range of exploitable biomass (95% confidence intervals) as estimated from acoustic surveys in early 1985 (501,000 to 910,000 mt). Alternative harvest levels are from 0 to 300,000 mt at 50,000 mt intervals. Recruitment is at age 3 and at three levels: 500 x 10^6 fish for poor recruitment; 1500 x 10^6 fish for average recruitment; 2500 x 10^6 fish for strong recruitment. The biomass projections include only age 3 and older fish. The most likely scenario has the following recruitment schedule:

Year:	1985	1986	1987	1988
Year class:	(1982)	(1983)	(1984)	(1985)
Scenario:	poor	poor	strong	average

Age composition data from the fisheries and surveys shows the 1982 and 1983 year classes as weak. The unusual abundance of the 1984 year-class as age 1 fish encountered by the hydro-acoustic survey in 1985 is indicative of a strong year-class.

Given that recruitment is likely to be poor in 1985, abundance of the spawning stock is projected to continue declining into early 1986. The exploitable biomass by early 1986 is expected to be between 325,000 and 565,000 mt (Table 5). We expect an increase in early 1987 for all catch levels, if we are projecting from the low level of 325,000 mt in 1986. If we project from the high side in 1986 (565,000 mt), then biomass would increase in 1987 if catch levels in 1986 were kept at 100,000 mt or less.

The annual surplus production between the years 1986 and 1987 appears to be about 150,000 mt if anticipated strong 1984 year-class recruits to the fishable stock. A removal of this 150,000 mt in 1986 would result in a 34% rate of exploitation.

These forecasts assume that the unexplained high mortality observed between 1984 and 1985 does not reoccur. If the high mortality continues, then the forecasts are over estimating stock production and biomass. Additional production is projected between 1987 and 1988, increasing the biomass to over 700,000 mt in 1988.

Alton and Deriso (1984) reported that the low exploitable biomass estimates of 600,000 to 700,000 mt observed for years 1976-78 were capable of producing strong year-classs. In 1984 the team recommended that harvest levels be set such that the exploitable biomass does not fall below this minimum to protect the reproductive potential of the stock. Using this threshold criterion, ABC for 1986 would be zero, given the projected exploitable biomass of 325,000 to 565,000 mt. A planned update of the catch-at-age analysis should be available by November to allow the team to reevaluate this threshold level.

The OY values in 1984 and 1985 were set at 23.5 and 25.4% rates of exploitation based respectively on forecasted level of spawning biomass of 1,800,000 mt and 1,200,000 mt in Shelikof Strait. Given the actual catch and the actual survey estimates, the observed rates of exploitation are 17% for 1984 and almost 32% for 1985 to date. If the survey estimate had been in line with the forecast, then the 1985 exploitation rate would have been 18% to date. Previous analyses indicated that an exploitation rate of 28.5% would produce the long-term average surplus production (MSY) of 408,000 mt at an average exploitable biomass of 1,430,000 mt. Given that this rate was derived for the years when the population was increasing because of successive years of strong recruitment, the 28.5% average rate is probably an upper limit, particularly for a declining or depressed stock. The current exploitation

rate of 32% is much higher than the Council intended for the 1985 season and is too high at current biomass levels.

The biomass is projected to decline to about 445,000 mt for 1986, well below the threshold level of 600,000 to 700,000 mt. Therefore, the PT determined that ABC be set at 0 for 1986 to provide the maximum potential for reproductive success by the declining but dominant 1978 and 1979 year-classes during the 1986 and 1987 spawning season. The team recommends that, if a directed pollock fishery is allowed in 1986, it should be delayed until after the March spawning period to protect the reproductive potential of the 1986 spawning stock. By delaying the fishery, results of the 1986 hydroacoustic survey would be available to assess the actual status of the pollock stock prior to a directed pollock fishing.

Table 4.--Pollock biomass estimates determined from 1981 and 1983 through 1985 Shelikof Strait acoustic-midwater trawl surveys.

Year	Survey number and period	Mean density (kg/10^3m^2)	Total area (km^2)	Biomass (t x 10^6)	95% confidence interval (t x 10^6)
1981[a]	1 March 3-15	637.6	6,870	4.38	2.92 to 5.84 (±33.3%)
	2 March 24-27	363.6	8,674	3.15	2.07 to 4.23 (±34.3%)
	3 April 4-10	251.0	12,138	3.06	2.02 to 4.08 (±33.3%)
1982	- - - - - - - - - - - - - - - - No survey - - - - - - - - - - - - - - - -				
1983[a]	1 March 6-15	144.9	17,587	2.46	1.54 to 3.40 (±37.7%)
	2 March 16-19	194.7	12,123	2.36	1.26 to 3.46 (±46.6%)
	3 April 6-13	41.2	19,733	0.82	0.57 to 1.07 (±30.5%)
1984[a]	1 March 3-9	133.6	16,567	2.03	1.43 to 2.64 (±29.9%)
	2 March 9-16	107.1	15,043	1.57	1.31 to 1.84 (±17.1%)
	3 March 16-18	139.3	14,383	1.90	1.06 to 2.75 (±44.2%)
	4 March 22-25	127.5	15,641	1.72	0.98 to 2.46 (±42.9%)
	5 April 1-7	119.8	15,147	1.66	1.19 to 2.13 (±28.3%)
1985[a]	1 Feb. 21-28	39.6	16,361	0.65	0.47 to 0.82 (±27.3%)
	2 March 1-9	43.8	15,975	0.70	0.48 to 0.92 (±31.3%)
	3 March 14-20	46.8	16,389	0.77	0.55 to 0.98 (±27.8%)
	4 March 21-28	51.9	13,736	0.71	0.51 to 0.91 (±27.8%)

Annual estimates

Year	Biomass (t x 10^6)	95% confidence interval (t x 10^6)	Source of estimates
1981	3.77	2.86 to 4.67	Mean of estimates for surveys 1 and 2
1982	- - - - - - - - - - - - - - - -	No survey	- - - - - - - - - - - - - - - -
1983	2.43	1.69 to 3.13	Mean of estimates for surveys 1 and 2
1984	1.84	1.21 to 2.47	Mean of estimates for surveys 1, 2, 3
1985	0.70	0.50 to 0.91	Mean of estimates for surveys 1, 2, 3

[a]Estimates for 1981, 1983 and 1984 include very small amounts of age 1 fish, e.g., the biomass of age 1 fish in the "annual estimates" for these years did not exceed 0.024% of the total biomass. The 1985 estimates include only fish age 2 and older.

Table 5.--Estimates of exploitable biomass (1,000 t) projected for early 1986, 1987, and 1988 given various catch levels. Recruitment is of age 3 fish in the early part of the year: poor = 500 x 10^6 fish; average = 1,500 x 10^6 fish; strong = 2,500 x 10^6 fish. Projection is from a 1985 acoustical survey biomass estimate of 501 to 909 thousand t. Recruiting year-class is indicated in brackets.

Recruitment in 1985-1986				Exploitable biomass in early 1987 and early 1988 given the most likely recruitment scenario	
1985 (82)	1986 (83)	Exploitable biomass in early 1986	Catch level (1986-88) (1,000 t)	1987 (strong) (84)	1988 (average) (85)
Poor	Poor	325-565	0	480-605	825-870
			50	460-590	785-835
			100	444-570	740-800
			150	415-550	700-765
			200	395-530	655-730
			250	375-515	610-695
			300	350-495	570-655

PACIFIC COD

The total 1984 catch of Pacific cod fell to 23,217 mt from a 1980-1983 annual catch of approximately 35,000 mt (Table 6). This was primarily due to the restrictions on foreign longlining in the central area because of the domestic fishery harvest of the sablefish OY. The bulk of foreign catches came from the Shumagin and Chirikof INPFC statistical areas, and the U.S. and joint-venture catches were concentrated in the Kodiak INPFC statistical area.

Table 6.--Catch (mt) of Pacific cod in the Gulf of Alaska, by North Pacific Fishery Management Council regulatory area, 1977-85.

Year	Western	Central	Eastern	Total
1977	626	1,238	359	2,223
1978	5,591	6,195	374	12,160
1979	3,981	10,370	518	14,869
1980	8,704	24,498	2,237	35,439
1981	11,579	22,149	2,358	36,086
1982	7,344	19,903	2,132	29,379
1983	9,178	25,243	1,981	36,402
1984	11,202	11,981	34	23,217
1985[a]	8,691	4,016	57	12,764

[a] As of September 6, 1985

Information on stock condition is from resource assessment surveys and catch per unit effort of the Japanese longline fishery.

The NMFS triennial trawl survey showed the highest CPUE was found in the 101-200 m depth interval in all areas, with the highest regional catch rate found in the Shumagin INPFC statistical area (Table 7). Cod abundance was low in waters deeper than 300 m. Total biomass from all three FMP management areas is about 603,000 mt. The combined total for the western and central Gulf is 549,000 with 95% confidence intervals of 390,000 to 708,000 mt. The 182,000 mt in the western and the 366,000 mt in the central regulatory areas

is close to the current 1:2 proportional allocation used to assign current regional OY's in these two areas. The biomass estimate in the eastern area is roughly 55,000 mt, which is double that of the survey biomass for the west Yakutat area.

Table 7.--Catch per unit effort (CPUE) in kilograms per square kilometer (kg/km^2) and biomass in metric tons (mt) of Pacific cod by 100 fathom depth intervals in the Shumagin, Chirikof, Kodiak, and western half of the Yakutat INPFC statistical areas as estimated from results of the 1984 Gulf of Alaska triennial groundfish trawl survey.

Depth interval	Shumagin		Chirikof		Kodiak		Yakutat*	
(meters)	kg/km^2	mt	kg/km^2	mt	kg/km^2	mt	kg/km^2	mt
0-100	2,641	117,251	1,839	49,074	1,099	43,021	784	9,621
101-200	4,341	63,108	3,474	82,508	3,930	169,699	2,079	16,717
201-300	823	2,253	896	10,305	1,017	11,275	1,251	438
301-500	2	6	77	125	41	122	--	--
501-700	--	--	--	--	2	4	--	--
0-700		182,618		142,012		224,121		26,776

*Western section of the Yakutat INPFC area, 144 - 147 deg. W long.

In the period between 1978 and 1984, Japanese longline CPUE for Pacific cod has increased in the Shumagin, Chirikof, and Kodiak INPFC statistical areas. Part of that trend, in addition to the increased cod abundance, may be associated with increased knowledge of cod abundance distribution.

Age and length information from the triennial survey shows that the 1977 is still contributing to the total biomass in the 80-94 cm size class. Additionally, indications are that recruitment has mostly been strong enough to maintain the GOA Pacific cod stocks at a relatively high level. Whether

the 1984 year class is strong will be investigated in the 1985 juvenile survey in the Kodiak area.

The 1984 survey indicates 1985 MSY, based on the potential yield model, is 124,000 mt. This is similar to estimates of 133,000 and 142,000 mt based on earlier trawl surveys in the Gulf of Alaska. However, this estimate does not include the small 12,000 mt estimate for the Yakutat and southeastern INPFC statistical areas. This would give a total 136,000 mt Gulf-wide MSY.

In summary, the Pacific cod stock in the Gulf of Alaska generally appears to be in good condition and stable. The best available information indicates that the total ABC is 136,000 mt. On the basis of results of the triennial survey, the team recommends that the distribution of ABC throughout the Gulf of Alaska be maintained at the current 28 percent, 56 percent, and 16 percent of Gulf OY for the three regulatory areas.

In the past OY has been set well below ABC to control halibut bycatch. The halibut PSC measures included in Amendment 14, if approved, may provide an alternative method of controlling halibut bycatches for those fisheries where observers are present. The 1985 OY is 60,000 mt, with the distribution among the western, central, and eastern regulatory areas of 16,560, 33,540, and 9,900 mt, respectively.

FLOUNDER

The fishery for flatfish, excepting halibut, has usually been incidental to fisheries for other species. Arrowtooth flounder is the dominant species in the catch, although all species are managed as a single stock. The foreign catch dropped sharply from 14,460.1 mt in 1981 to 3,033 mt in 1984, probably as a result of reduced foreign fishing effort. The 1984 domestic and joint-venture fisheries harvested 397 and 3,448 mt, respectively. The domestic catch in 1984 was similar to that in 1983, whereas the joint-venture catch in 1984 increased by 856 mt. The majority of the joint-venture catch occurred in the central area. The biomass estimates from the 1984 survey for the western and central Gulf is 1,760,000 mt. Estimates for the eastern area are not available. On the western and central areas, arrowtooth flounder made up 62% of the biomass followed by flathead sole and rock sole at 16% and 7%, respectively. The MSY has been calculated at 22,832 mt in the western Gulf, 101,449 mt in the central Gulf, and 16,800 mt in the eastern Gulf. Because of the relatively low exploitation rates, ABC is considered to be equal to MSY. If the total MSY of flatfish were taken, the bycatch of halibut in the western and central areas was projected to be almost 15,000 mt. There is also a potential for a 136 mt (300,000 lb) king crab bycatch in a flounder fishery. OY has been set below ABC to reduce halibut bycatch. The halibut PSC measures included in Amendment 14, if approved, may provide an alternative method of controlling halibut bycatches for those fisheries where observers are present. The OY in 1985 was 33,500 mt overall; 10,400 in the western area; 14,700 in the central area; and 8,400 in the eastern area.

PACIFIC OCEAN PERCH COMPLEX

Estimates of current biomass are available but are highly variable. The point estimate of current biomass for S. alutus in the Gulf is 360,000 mt with confidence intervals for most areas exceeding ± 100%. The current biomass estimate for the POP complex is 599,100 mt with similar reliability.

Comparison between 1981 and 1984 catch rates at index sites in the eastern area shows no significant improvement. Based on historical trends in CPUE from the Japanese trawlers, the team considers the stock to be depressed, although there is slight improvement in 1984 catch rates over the 1980-83 period for the Japanese trawlers. This improvement could be the result of an early recruitment of the 1976 year-class which showed up in the 1984 trawl survey. This year-class should contribute to the spawning stock for the first time in 1986.

Last year the PT estimated EY for S. alutus at 7,232 to 19,432 mt and for the POP complex, 11,474 to 30,830. These estimates were based on stock reduction analysis, assuming current biomass was 152,000 to 508,000 for S. alutus (241,000 to 806,000 for the POP complex) and that current biomass was 11.8% to 30.8% of virgin biomass. The use of last year's assumptions and EY's is the practical and recommended estimate of current EY.

The OY for 1985 was set at 75% of the apportioned EY in the western (1,302 mt) and central (3,906 mt) areas and 875 mt for the eastern area. To maximize the opportunity to rebuild the resource, the Council may want to set the OY at a level which allows for incidental catch only.

There are five species included in the Pacific Ocean perch complex. Some of these are increasing in relative abundance and prior to 1984 Pacific ocean perch (S. alutus) did not dominate this complex in the commercial harvest. If the objective is to rebuild S. alutus, then the PT recommends

the POP complex be managed such that catches of the complex are set below the EY for S. alutus. The PT also notes that rebuilding will take place slowly and significant results of rebuilding efforts may not be observed for some time. A point estimate of ABC is not available, but the PT considers ABC to be between zero and 13,000 mt, the midpoint of the EY for S. alutus for a biomass of 360,000 mt.

Foreign catch levels have decreased, while the U.S. catch levels have increased. Recent foreign and U.S. Catches of POP samples are as follows:

		Western	Central	Eastern	Total
1981	Foreign	1,233	4,268	6,675	12,176
	US and JV	1	7	0	8
		1,234	4,275	6,675	12,184
1982	Foreign	1,746	6,223	17	7,986
	US and JV	0	5	0	5
		1,746	6,228	17	7,991
1983	Foreign	671	4,726	18	5,415
	US and JV	1,941	49	0	1,990
		2,612	4,775	18	7,405
1984	Foreign	214	2,385	0	2,599
	US and JV	1,441	293	0	1,734
		1,655	2,678	0	4,333
1985	Foreign	0	0	0	0
	US and JV[a]	389	16	39	445
		389	16	39	445

[a] As of September 6, 1985.

SABLEFISH

Gulf of Alaska Sablefish stocks appear to have recovered from their depressed conditions of the late 1970's and early 1980's. The strong 1977 year class which has contributed substantially to the fishable biomass in recent years, is now declining in importance. All relative abundance indicators have now levelled off after increasing markedly with the recruitment of the 1977 year class. There are some indications of the presence of strong year classes occurring in the population after 1977. Future increases in the stock will depend on the magnitude of the recruitment from these other year classes.

Relative population numbers and weights (RPN and RPW) from the U.S.-Japan cooperative longline survey increased more than 50% from 1979 to 1983, primarily due to the recruitment of the 1977 year class. Estimates of the variance of RPN have now become available and demonstrate that this increase was statistically significant. RPN for 1984 is similar to that of 1983. RPN estimates from the 1985 survey are not yet available.

Time trends in relative abundance indicators based on fishery CPUE were disrupted in 1984 by the transition from foreign to domestic directed sablefish fisheries. Foreign directed sablefish fisheries were confined to the Western Gulf in 1984 and were excluded from all areas of the Gulf in 1985. The foreign observer based CPUE's for medium sized (57-66 cm) fish had increased 69% in 1982 compared to 1979 as the 1977 year class recruited to the fishery. In 1983 the foreign CPUE for medium fish declined 23%.

Domestic fishery CPUE's are available from Alaska Department of Fish and Game port sampling in the Southeast area from 1980-1985. CPUE's were collected from the West Yakutat and Central Gulf areas in 1984 and 1985 as

the domestic fishery expanded into those areas. Unfortunately, the domestic fleet began converting to more efficient circle hook gear in 1983, so that recent CPUE's cannot be directly compared with those of earlier years. In the Southeast area, domestic fishery circle hook CPUE's increased 27% in 1984, probably due to the influence of the 1977 year class. Domestic fishery CPUE's from Southeast Alaska remained constant from 1984 to 1985. Trends in domestic CPUE from the West Yakutat and Central Gulf areas from 1984 to 1985 have not yet been analyzed.

The National Marine Fisheries Service has conducted a sablefish pot indexing survey in the Southeast area annually since 1978. The 1977 year class increased the abundance indices for small fish from 1980 to 1983 at various sites included in the pot survey. The index for large fish increased at several sites in 1985, again probably due to the abundant 1977 year class. Index values for large fish had been at very low levels since 1980 at most sites. Index values for small fish have not indicated the presence of any strong year classes after the 1977 year class.

Biomass estimates which were available in earlier years were based on correlations of RPW from the U.S.-Japan longline survey with area swept expansions from trawl tows in nearby areas. These biomass estimates were assumed to have high variability because of the small number of trawl tows used to standardize RPW and because the correlations were not based on tows from the same areas as the longline survey sample sites.

In the summer of 1984, the U.S. and Japan cooperated in a trawl and longline survey of the Gulf of Alaska. Preliminary comparisons of paired tows from the two different types of nets used on the survey indicate widely differing fishing efficiencies between the two nets, resulting in

widely varying biomass estimates. The biomass estimate based on the fishing efficiency of the U.S. net is 238,877 metric tons while the biomass estimate based on the fishing efficiency of the Japanese net is 516,084 metric tons. At this time, it appears that the Japanese net provides more realistic estimates of abundance, although further investigatios of the comparisons of the fishing efficiencies of the two nets are continuing. Over 50% of the sablefish biomass estimate results from small fish from the 100-200 m depth zone of the Kodiak, Yakutat and Southeast areas, with 31% fof the Gulf-wide biomass estimate occurring in this depth zone in the Kodiak area alone. The high Kodiak estimates appear to have resulted from concentrations of small fish encountered at survey stations over a relatively small area at the head of Amatuli Trench. Confidence limits for biomass estimates from these shallow strata are considerably wider that for those of the deeper strata. The large catches of small fish from these shallow areas indicate the presence of a strong 1980 or 1981 year class. RPN of small fish from the U.S.-Japan longline survey in the 100-400 m depth zone also increased in 1984, providing additional evidence of a strong year class in this area. The weight-frequency distribution of the domestic longline fishery catch in the Central Gulf also indicates the presence of large numbers of small fish. This abundant year class of small fish has not been detected in the relative abundance indicators from the eastern or western Gulf.

Previous EY's for sablefish in the Gulf of Alaska were determined by modifying a Maximum Sustained Yield (MSY) by the declines observed in relative abundance indicators. MSY was estimated from a stock production model fit to a time series of catch and effort from the Japanese longline fishery. The stock was assumed to be at MSY levels at the time that Japanese longline CPUE peaked in 1970, so that EY = MSY at that time. EY's have generally been

determined from the MSY by reducing EY proportional to the declines observed in relative abundance indices since 1970. Because it has not been possible to update the stock production estimate with a continuous time series of catch and effort data since the mid-1970's, the PT recommends that alternative methods of determining EY be used.

The PT has attempted to compute EY's from forward simulation models which are based on maintaining constant biomasses over time given estimates of current biomass, growth, natural mortality and future recruitment. The PT finds that when EY is determined as Annual Surplus Production (ASP) by these methods, EY is very sensitive to the as yet unknown levels of recruitment used for years beyond which survey estimates are available.

The PT is continuing its investigation of harvest levels appropriate for current sablefish stock levels. Historical catches averaging 25,000 tons annually over the period from 1968 to 1977 resulted in marked reductions of the Gulf of Alaska sablefish stocks. The PT considers that ABC to be between the lower bound of 12,630 metric ton (EY for 1983-85) and the maximum upper limit of 25,000 mt.

ATKA MACKEREL

Atka mackerel, Pleurogrammus monopterygius, have historically been distributed throughout the Gulf of Alaska (GOA), but are most abundant in the Central and Western Management areas at depths ranging from 50-350 m. While this fishery was exploited exclusively by directed foreign fleets (USSR, Republic of Korea and Japan) through 1982, joint venture (JV) operations began in 1983, and the first domestic landing, although a trace amount, was reported in 1984. Atka mackerel landings by JV fleets in 1984 comprised 51% (585 mt) of that year's total catch of this species. Annual Atka mackerel catches from the GOA have declined dramatically over the last 10 years from a high of roughly 28,000 mt in 1975 to a plateau of about 19,000 mt in 1976-78, followed by an abrupt decline to an historic low of 1,152 mt in 1984. Most of the GOA Atka mackerel catches through 1983 came from the Central Area, with fleet effort shifting in 1981 from the Kodiak Island grounds to those in the southwest portion of this management area immediately adjacent to the Alaska Peninsula. Fleet effort in 1984, however, shifted still further west to the Western Area where 94% of that year's Atka mackerel catch was taken. The 1985 reported catch as of September 6 was 3.2 mt.

Effort to obtain a precise measure of Atka mackerel stock condition in the GOA using conventional indicators such as catch-per-effort and age composition have been continually beset with difficulties. These problems, which include the intense schooling behavior of this species, the sporatic nature of available data base, as well as the different ageing methods and interpretative techniques used by U.S. and Soviet scientists in analyzing age composition complicate the interpretation of long-term trends. In light

of these factors, assessments of stock condition to date have been based primarily upon total catch data. It appears that data on total catch, even those without accompanying effort data, can be useful in a general sense in assessing stock condition, so long as any trends seen are supported by collaborating trends by other biological indicators of stock strength. Two primary indicators have been used for this purpose--biomass estimates and fish length-frequency information from U.S. and Soviet trawl surveys. The sharply declining catches seen in the Central Area between 1981 and 1984 coincide with extremely low catches by U.S. and Soviet research vessels--catches so low, in fact, that one vessel was unable to obtain catch samples. Unfortunately, the short history of the Atka mackerel fishery and the near absence of stock assessment surveys in the Western Area preclude any similar determination of trends in these areas. The 1984 trawl survey found significant numbers of Atka mackerel in the Western Area only, the area from which 94% of that year's total GOA catch was taken. The biomass estimate for this survey was 3600 mt, with 500 mt in the Central Area and no catch in the Eastern Area. Bottom trawl surveys are not necessarily appropriate for assessing Atka mackerel since a significant portion of the stock is off bottom. The second of these biological indicators, size composition as determined from fish length-frequency samples, is used as an index of recruitment success. Temporal increases or decreases in mean and modal lengths accompanied by the presence or absence of year-class pulses in the lower size ranges are interpreted to be indicative of fluctuating recruitment levels. Comparison of recruitment trends in the Kodiak Island portion of the Central Area interpreted in this manner show recruitment to be higher (as indicated by reduced mean length) during the high production years (1971-77), and

substantially lower (as indicated by increased mean length) from 1981-84. Unfortunately, interpretations of these trends in the Chirikof Island portion of the Central Area as well as in the Western Area are not as clear due to the short term and sporadic nature of the available data base.

Numerous and widely varying MSY estimates for Atka mackerel in the GOA have been made by both Soviet and U.S. investigators since 1977. The first, 33,000 mt, was made on rather subjective grounds by the Soviets in 1977. They subsequently revised this estimate in 1979 to 28,300 mt. As this latter estimate was based on years of high biomass, it was subsequently modified based on an equation developed by Alverson and Pereyra (and later modified by Gulland) to 21,680 mt. Subsequent studies of GOA Atka mackerel stocks suggest, however, that the large catches and biomass estimates of the 1970's may have been the result of a "population explosion" and an accompanying, though temporary, geographic expansion of the stock. Recent analyses indicate that the best estimate of MSY for Atka mackerel in the GOA is 7,800 mt.

In summary, the Atka mackerel fishery in the GOA since 1981 has been characterized by successive and dramatic catch declines, low recruitment levels, and the exploitation of new grounds in the Western Area following the apparent depletion of the resource in the Central Area. The coincidence of these factors led the NPFMC in 1984 to reduce the OYC in the Central and Eastern regulatory areas to by-catch levels only in an effort to rebuild these stocks. In addition, the NPFMC maintained OT in the Western Area at 4,678 mt. No new information has been presented to the plan team that would suggest any deviation from this management decision.

OTHER ROCKFISH

Other rockfish as defined in the FMP include all species of Sebastes not included in the POP complex. This group can be separated into three assembleges by habitat and/or behavioral preferences. Over twenty species occur in the commercial landings. Deep water species of the slope assemblege have been harvested in the foreign fisheries for POP along the edge of the continental shelf throughout the Gulf. The nearshore on-bottom or demersal species are the target of the rapidly developing domestic fishery in the southeastern Gulf.

The Gulf-wide OY for other rockfish was originally set at 7600 mt which is the lower bound of the average other rockfish harvest in the foreign POP fishery from 1973-1975. At that time the other rockfish category included all rockfish other than POP. Since the original OY was established, the four dominant Sebastes species in the foreign by-catch and two species of Sebastolobus were removed from the other rockfish category with no adjustment to the other rockfish OY.

Amendment 14 to the FMP reduces the Gulf-wide other rockfish OY from 7,600 mt to 5,000 mt and specifies that, due to concern for the status of the shelf demersal rockfish assemblege in a portion of the southeastern area, no more than 600 mt of shelf demersal rockfish may be harvested in the area between 56 N latitude and 57 N latitude west of 137 W longitude. Results of the 1984 NMFS triennial survey indicate that all but one rockfish species occurred in very low density. The dusky rockfish biomass was estimated at 25,700 mt in the Central and Western Gulf. Dusky rockfish were also present in low densities in the Yakutat area. Biomass estimates were not made for other species due to the extremely low densities encountered and the extreme

variabilty in the catch. No surveys have been conducted for nearshore species in the Eastern Gulf.

The average harvest of other rockfish in the foreign and joint-venture fisheries in the Central and Western Gulf between 1978 and 1984 is 1,700 mt with the 1984 harvest declining to 715 mt. Less than 10 mt have been reported in the joint-venture fishery this year. The reduction in catch the past two years may be the result of changes in regulations rather than an indication of stock decline.

In 1984 domestic landings totaled 800 mt with aproximately 600 mt from the Southeastern demersal rockfish quota area. Landings reported through August 1985 total approximately 650 mt with approximately 350 mt reported from the Southeastern quota area. The 1985 landings from the quota area are substantially below the same period last year. It is unclear whether that reduction is the result of reduced abundance or other factors in the fishery.

With the poor showing of other rockfish in the triennial survey in the Central and Western Gulf, there is no evidence that a harvest greater than the recent year average catch of 1,700 mt in the foreign and joint venture fisheries can be sustained.

Acceptable biological catch is not expected to exceed the recent year average harvest of 1,700 mt for those areas. No time series of data exists for the two nearshore species assembleges. Little data other than species composition and spacial distribution is available for the nearshore pelagic assemblege. Some evidence of decline in the nearshore demersal stocks occurred in the Sitka area of Southeastern with a peak harvest of 600 mt. Preliminary results of biological studies show that the primary target species in the nearshore fishery, yelloweye rockfish, is much older than previously thought

and ages in excess of 90 years are not uncommon. Average age ranged from 35 years to over 60 years for samples from different areas.

Given the above, the best estimate of ABC for other rockfish is 1,700 mt for all other rockfish in the Central and Western regulatory areas and 600 mt for shelf demersal rockfish in the quota area of the Eastern regulatory area for a combined ABC of 2300 mt. No data is available to estimate ABC for the remainder of the Eastern regulatory area.

Data for all other rockfish species is incomplete and appropriate EY levels cannot be established at this time. However, due to the complex multi-species nature of the other rockfish complex, the extreme longevity of many of these species, and an apparent sensitivity to stock reduction at low exploitation levels, sustainable yield is presumed to be very low.

SQUID

The commercial catch of squid has been primarily taken by foreign trawlers in the central and western areas. The annual foreign squid catch averaged nearly 550 mt during 1978-1983 which were essentially incidental to the directed fisheries of other species. The harvests of squid for 1984 and 1985 as of September 6 are 125 mt and 6 mt, respectively.

Squid abundance and potential yield in the Gulf of Alaska has not been evaluated through research findings. Results of the 1984 U.S.-Japan cooperative bottom trawl survey show an estimated squid biomass at 2,566 mt in the western and central regulatory areas combined. It is noted that most of the squid resource is pelagic and not available to bottom trawls. There has been no assessment of the squid resource in the eastern area. Catches of Berrytheuthis magister, B. anonoychus, and Gonatus sp. by commercial fishing and research vessels and their occurrence in the stomach of fish and marine mammals indicate a large standing stock. OY has been set at 5,000 mt which is far greater than the present and past harvest levels.

THORNYHEAD ROCKFISH

Two species of Sebastolobus are commonly referred to as thornyhead rockfish. The shortspine thornyhead is the more abundant of the two species in the Gulf of Alaska and occurs primarily on the continential slope. The thornyhead rockfish are harvested in association with deep-water fishery for sablefish. The annual harvest of about 1,350 mt in 1980 and 1981 declined to about 750 mt in 1982 and 1983. With the reduced level of foreign longline fishery for sablefish, the observer reported bycatch of thornyhead rockfish dropped to 208 mt in 1984. The domestic fishery which displaced the foreign fishery reported landings of 24 mt in 1984 and 27 in 1985 as of September 6. The actual catch, including discarded fish, was probably much greater than the reported landings if we assume the domestic longliners had bycatch rates similar to the prior foreign fisheries.

No information on recent trends in abundance or fish length can be gleaned from foreign CPUE or length frequency data, because the results are confounded with changes in the target species and fishing depths of the foreign fisheries. Biomass estimates from the 1984 U.S.-Japan trawl survey of the Western and Central Gulf of Alaska is 80,700 mt.

The MSY given in the FMP for thornyhead rockfish is 3,750 mt, however, the derivation is undocumented. This MSY is 5% of the estimated biomass for the western and central areas. If the standing stock were expanded to include the eastern area, this percentage would decrease. Because we lack information on rates of growth, mortality, and recruitment, we have no means to estimate ABC. Relative to the 1984 biomass estimates, MSY in the FMP is quite conservative. Furthermore, future domestic landings are likely to remain insignificant. As a result, there is no justification to alter MSY from 3,750 mt.

OTHER SPECIES

The other species group includes sculpins, sharks, skates, octopus, eulachon, smelts, and capelin. The highest domestic and foreign catch during the period 1977 through 1984 was about 10,000 mt in 1981. The average catch for this period is approximately 4,875 mt, far below the OY level. The 1984 joint-venture and foreign fisheries were 1,268 mt and 576 mt, respectively. There are no biomass estimates available for these species. The OY for the other species group was originally derived from the lowest historical catch levels. There is no information available to set ABC. Under procedures currently described in the FMP, the OY is set at 5% of the sum of the OY's for the other nine OY species categories. Using this procedure, the 1985 OY was 22,460 mt.

DRAFT

Gulf of Alaska Groundfish Plan Team Report
(Draft)

Halibut Bycatch Measures for the Gulf of Alaska
Groundfish Fishery

September 20, 1985

COM1/BYCATCH/1

One section of Amendment 14 to the Gulf of Alaska FMP will implement a framework procedure for the establishment of halibut prohibited species catch (PSC) measures. This report outlines that procedure and presents information that can be used in the determination of the PSC measures to be established for 1986.

The procedure is as follows:

A. Separate PSC limits will be established for the wholly domestic fishery and the joint-venture fishery for each area;

B. The Regional Director in consultation with the Council will annually determine:

1. the areas for which PSC limits will be established;
2. the numbers of PSC limits per area and fishery;
3. the level of each PSC limit;
4. whether PSC limits will be allocated to individual operation;
5. the methods of allocation to be used; and
6. the types of gear or modes of operation to be prohibited once a PSC limit is taken.

C. The annual determination will be based upon the following types of information:

1. estimated halibut bycatch in years before that for which halibut PSC measures are being set;
2. expected changes in groundfish catch;
3. expected changes in groundfish biomass;
4. current estimates of halibut biomass and stock condition;
5. potential impacts of expected fishing for groundfish on halibut stocks and United States halibut fisheries;
6. the methods available for and costs of reducing halibut bycatch in groundfish fisheries; and
7. other biological and socioeconomic information that affects the consistency of halibut PSC measures with the objectives of this Part.

D. The Regional Director may, by rule-related notice, change halibut PSC measures during the year for which they were specified, based on new information of the types listed above.

Information of each of the aforementioned types is presented below.

1. Estimated Halibut Bycatch for Previous Years

The Foreign Vessel Observer Program is thought to provide accurate estimates of halibut bycatch in the foreign and joint venture fisheries. Observer Program estimates for 1977 through August of 1985 are presented in Table 1. Similar estimates are not available for the wholly domestic fisheries because there has not been an adequate observer program for the domestic fisheries. However, until quite recently, the level of effort in these fisheries has probably not been high enough to result in significant levels of halibut bycatch.

Table 1.--Estimated halibut bycatch in the foreign and joint-venture groundfish fisheries in the Gulf of Alaska, 1977-1985.

(metric tons)

Year	Foreign Trawl	Foreign Longline	Foreign Total	Joint Ventures	Total
1977	2200	0	2200	0	2200
1978	1217	72	1288	0	1289
1979	2365	210	2575	21	2596
1980	2086	1119	3205	48	3253
1981	1192	1307	2499	5	2504
1982	1137	1514	2651	4	2655
1983	772	2463	3235	356	3591
1984	513	1077	1590	572	2162
1985*			326	46	372

* January-August

It should be noted that although the observer program is thought to provide good estimates of bycatch, the estimates of bycatch mortality are potentially less accurate because the handling or discard mortality rates are not known with certainty. These mortality rates are thought to range from 10

to 50 percent for longliners and from 50 to 100 percent for trawlers. The upper part of the latter range is probably more appropriate for joint ventures and the lower part is more appropriate for small shorebased trawlers.

2. Expected Changes in Groundfish Catch

Based on the status of stocks report for the Gulf of Alaska, expect a decrease in total groundfish catch in 1986 is expected with a dramatic change in catch composition. These changes would be caused by a very large decrease in pollock catch and potentially large increases in sablefish, Pacific cod, and flatfish catch. Such changes are likely to increase halibut bycatch because halibut bycatch rates tend to be much lower for the pollock fishery than for the fisheries in which an expansion of effort and catch is expected.

3. Expected Changes in Groundfish Biomasses

The pollock biomass is expected to be at a very low level in early 1986. The biomass of sablefish is expected to increase, and the biomasses of the other target species are expected to be relatively stable. The sablefish, flatfish, and Pacific cod stocks are thought to be in very good condition. The status of stocks report provides additional information.

4. Current Estimate of Halibut Biomass and Stock Condition

The halibut biomass is increasing and stocks are in good condition. The catch limit for the directed setline fishery was set at 45 million pounds (eviscerated-head off) or about 20,400 t for the Gulf of Alaska (areas 2C, 3A, and 3B). The bycatch in the groundfish fishery in 1985 was expected to be about 5 million pounds (2,300 t). Hence, the total halibut harvest in the Gulf of Alaska in 1985 was expected to be at least 50 million pounds (22,700 t).

5. Potential Impacts of Expected Fishing for Groundfish on Halibut Stocks and the Domestic Halibut Fisheries

The International Pacific Halibut Commission attempts to adjust the harvest of the directed halibut setline fishery to account for halibut bycatch in other fisheries. As long as the IPHC is successful in properly adjusting the directed halibut harvest, bycatch will not adversely affect the condition of the resource. However, bycatch directly impacts the directed fishery. The estimated reduction in directed halibut catch per metric ton of halibut bycatch is from approximately 1 t to over 3.3 t (round weight), depending on the average bycatch size, if the discard mortality rate is 100 percent. Assuming: 1) a round weight to dressed weight conversion factor of 0.75; 2) exvessel and retail prices of $1.00 and $2.00 per pound, respectively; and 3) no price response to the decrease in supply caused by the bycatch, the impact per metric ton of halibut bycatch is from $1,700 to $5,500 at the exvessel level and from $3,400 to $11,000 at the retail level. The lower ends of these ranges are probably appropriate for the average bycatch sizes that have been observed in the foreign and joint-venture fisheries. Both of these measures of impacts are in terms of changes in gross, not net, earnings. They, therefore, overstate the net impacts. The assumptions of no-price response and a handling mortality of 100 per cent also tend to make these upper bound estimates of the impacts. Estimates of the impact per metric ton of halibut bycatch based on alternative assumptions concerning the handling mortality rate and the average size of bycatch halibut are presented in Table 2.

6. Methods Available for and Costs of Reducing Halibut Bycatch in Groundfish Fisheries

Bycatch can be reduced by changing fishing strategies including gear and effort. The experience with PSC limits in the Bering Sea and discussions with fishermen suggest that bycatch rates can be reduced sharply if proper incentives are used. Because bycatch can be reduced by reducing target groundfish catch and because other methods of bycatch reduction are probably less costly, the cost of reducing bycatch by reducing target catch provides an upper-bound estimate. An estimate of this cost that is comparable to the impacts estimated above is provided by: 1) the product of the exvessel price and the inverse of the bycatch rate or 2) the product of the retail price, the inverse of the bycatch rate, and the round weight to product weight conversion factor. The former would be appropriate for a joint- venture fishery and,

Table 2.-- Estimated impact per metric ton of halibut bycatch for alternative combinations of handling mortality rates and average sizes of bycatch halibut.

Impact on Exvessel Value
(dollars)

Handling Mortality (%)	Average Size (kg/halibut) 1.38	2.73	4.69	7.25	10.35	13.87	17.71	21.71
10	546	344	251	203	177	165	162	165
20	1091	688	503	407	354	331	324	331
30	1637	1032	754	610	531	496	486	496
40	2183	1376	1005	813	708	661	648	661
50	2728	1720	1257	1017	885	827	810	827
60	3274	2064	1508	1220	1062	992	972	992
70	3819	2407	1759	1424	1238	1157	1134	1157
80	4365	2751	2011	1627	1415	1323	1296	1323
90	4911	3095	2262	1830	1592	1488	1458	1488
100	5456	3439	2513	2034	1769	1653	1620	1653

Impact on Retail Value
(dollars)

Handling Mortality (%)	Average Size (kg/halibut) 1.38	2.73	4.69	7.25	10.35	13.87	17.71	21.71
10	1091	688	503	407	354	331	324	331
20	2183	1376	1005	813	708	661	648	661
30	3274	2064	1508	1220	1062	992	972	992
40	4365	2751	2011	1627	1415	1323	1296	1323
50	5456	3439	2513	2034	1769	1653	1620	1653
60	6548	4127	3016	2440	2123	1984	1944	1984
70	7639	4815	3519	2847	2477	2315	2269	2315
80	8730	5503	4021	3254	2831	2646	2593	2646
90	9821	6191	4524	3661	3185	2976	2917	2976
100	10913	6878	5026	4067	3538	3307	3241	3307

Note: The impact estimates are in terms of reduced value.

perhaps, a domestic fishery. The latter may be appropriate for a domestic fishery.

The following examples are useful in understanding this method of estimating the cost of reducing halibut bycatch. If the bycatch rate is 5 per cent (i.e. if on average 0.05 t of halibut are taken per 1 t of groundfish) or if equivalently 1 t of halibut is taken for each 20 t of groundfish and if the exvessel price of groundfish is $220 per t, then at the exvessel level the cost of reducing halibut bycatch by reducing target catch is $4,400 per metric ton of halibut. With the additional assumption of a retail price of $2.50 per pound and a product weight conversion factor of 0.33, the comparable estimated cost at the retail level is approximately $37,000. Estimates of the cost of reducing bycatch by decreasing the target groundfish catch based on alternative assumptions concerning bycatch rates and groundfish prices are presented in Table 3.

7. Other Biological and Socioeconomic Information

Other information is presented in this section by topic.

a. Bycatch Rates

Halibut bycatch rates vary by area, season, year, target species, and fishing strategy. The dependence of bycatch rates on such a large number of factors makes it difficult to determine what the bycatch rate will be or should be in a given fishery. Table 4 includes bycatch rate estimates from the Foreign Vessel Observer Program.

The 1981 through 1984 annual bycatch rates for foreign trawlers ranged up to 6.1 percent and were typically close to 2 percent for the vessel classes that took relatively large amounts of flounder, POP, and Atka mackerel. In the western Gulf, the annual bycatch rates of joint ventures defined by nation ranged up to 4.1 percent for a joint venture that had a catch composition dominated by flounder and sablefish. In the central Gulf, the annual joint-venture bycatch rates ranged up to 4.9 percent for a joint venture in which cod and flounder accounted for over 80 percent of the groundfish catch.

Table 3.-- Estimated cost of reducing halibut bycatch by reducing target groundfish catch for alternative combinations of bycatch rates and groundfish prices.

Cost at the Exvessel Level
(dollars)

Bycatch Rate (%)	Exvessel Groundfish Price ($ per pound round weight) 0.05	0.10	0.15	0.20	0.25	0.35	0.50	0.75
1	11023	22046	33069	44092	55115	77161	110230	165345
2	5512	11023	16535	22046	27558	38581	55115	82673
3	3674	7349	11023	14697	18372	25720	36743	55115
4	2756	5512	8267	11023	13779	19290	27558	41336
5	2205	4409	6614	8818	11023	15432	22046	33069
6	1837	3674	5512	7349	9186	12860	18372	27558
7	1575	3149	4724	6299	7874	11023	15747	23621
8	1378	2756	4134	5512	6889	9645	13779	20668
9	1225	2450	3674	4899	6124	8573	12248	18372
10	1102	2205	3307	4409	5512	7716	11023	16535

Cost at the Retail Level
(dollars)

Bycatch Rate (%)	Retail Groundfish Price ($ per pound product weight) 1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00
1	91858	110230	128602	146973	165345	183716	202088	220460
2	45929	55115	64301	73487	82672	91858	101044	110230
3	30619	36743	42867	48991	55115	61239	67363	73487
4	22965	27557	32150	36743	41336	45929	50522	55115
5	18372	22046	25720	29395	33069	36743	40418	44092
6	15310	18372	21434	24496	27557	30619	33681	36743
7	13123	15747	18372	20996	23621	26245	28870	31494
8	11482	13779	16075	18372	20668	22965	25261	27557
9	10206	12248	14289	16330	18372	20413	22454	24496
10	9186	11023	12860	14697	16534	18372	20209	22046

Note: The cost estimates are in terms of reduced value.

ANALYSIS OF FOREIGN AND JOINT VENTURE BYCATCHES
1981-1985

1 TABLE 4. CATCH AS A PERCENTAGE OF TARGET CATCH PER OBSERVATION (ROW).

BCATCH SPECIES: ATKAMK RKFISH POPC BLKCOD REGION:

SUMMARY					TARGET						PROHIBITED						
NATION	VESSEL	YR	MO	AREA	POLLOK	PACCOD	ATKAMK	FLOUND	RKFISH	THNYHD	POPC	BLKCOD	SALMON	HALBUT	K CRAB	T CRAB	COST %
JAPAN	SML TR	81	13	C GULF	75.52	4.30	5.74	18.78	3.36	1.40	11.70	0.82	0.02	1.12	0.00	0.00	28.9
JAPAN	SUR TR	81	13	C GULF	95.72	2.36	4.16	1.83	0.44	0.10	0.84	0.30	0.07	0.55	0.00	0.00	9.4
JAPAN	FRZ TR	81	13	C GULF	75.17	7.18	17.37	16.09	3.75	1.56	29.09	1.93	0.05	2.44	0.00	0.00	48.4
JAPAN	SAB LL	81	13	C GULF	1.68	96.13	0.00	1.48	0.29	0.71	0.24	15.36	0.01	5.46	0.03	0.37	25.8
POLAND	FRZ TR	81	13	C GULF	99.59	0.40	0.25	0.02	0.01	0.00	0.06	0.01	0.14	0.02	0.00	0.00	0.6
KOREA	SML TR	81	13	C GULF	74.00	18.54	51.31	7.44	1.08	0.01	3.99	0.30	0.02	2.06	0.00	0.02	38.9
KOREA	FRZ TR	81	13	C GULF	72.27	17.32	47.25	10.30	2.09	0.12	3.70	0.39	0.01	0.53	0.00	0.00	37.5
KOREA	SAB LL	81	13	C GULF	0.00	3.25	0.00	0.00	0.00	96.75	6.49	1756.82	0.27	76.14	1.06	1.86	96.6
US	J V	81	13	C GULF	99.55	0.34	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.0
FOREIGN	ALL	81	13	C GULF	72.95	20.97	13.72	5.66	1.15	0.42	4.20	3.36	0.06	1.47	0.01	0.06	27.4
ALL	ALL	81	13	C GULF	76.74	18.03	11.76	4.87	0.98	0.36	3.60	2.89	0.05	1.27	0.00	0.05	25.2

1 TABLE 4. CATCH AS A PERCENTAGE OF TARGET CATCH PER OBSERVATION (ROW).

BCATCH SPECIES: ATKAMK RKFISH POPC BLKCOD REGION:

SUMMARY					TARGET						PROHIBITED						
NATION	VESSEL	YR	MO	AREA	POLLOK	PACCOD	ATKAMK	FLOUND	RKFISH	THNYHD	POPC	BLKCOD	SALMON	HALBUT	K CRAB	T CRAB	COST %
JAPAN	SML TR	82	13	C GULF	80.24	4.85	1.23	13.43	1.49	1.48	15.91	1.46	0.03	2.69	0.00	0.00	31.6
JAPAN	SUR TR	82	13	C GULF	98.83	0.55	0.01	0.60	0.05	0.02	0.21	0.10	0.01	0.09	0.00	0.00	1.3
JAPAN	FRZ TR	82	13	C GULF	42.38	8.23	0.51	46.92	10.16	2.48	46.57	1.62	0.08	3.51	0.00	0.01	47.4
JAPAN	SAB LL	82	13	C GULF	2.79	39.62	0.17	23.52	8.05	34.07	10.66	893.71	0.00	11.93	0.08	3.81	94.5
JAPAN	COD LL	82	13	C GULF	1.18	97.79	0.00	0.80	0.09	0.23	0.10	3.88	0.00	7.09	0.00	0.05	8.1
KOREA	SML TR	82	13	C GULF	88.10	7.14	3.60	4.75	0.92	0.01	3.38	0.37	0.01	1.38	0.00	0.00	14.5
KOREA	FRZ TR	82	13	C GULF	82.95	8.76	16.72	8.24	0.67	0.05	1.99	0.37	0.01	1.21	0.02	0.02	20.7
KOREA	SAB LL	82	13	C GULF	0.00	0.00	0.00	0.00	0.00	100.00	1.46	1556.31	0.00	215.49	0.00	1.33	96.2
US	J V	82	13	C GULF	99.75	0.23	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
FOREIGN	ALL	82	13	C GULF	66.95	22.81	4.60	9.61	1.59	0.63	7.96	3.70	0.02	2.54	0.01	0.03	26.7
ALL	ALL	82	13	C GULF	82.89	11.84	2.36	4.95	0.82	0.32	4.09	1.90	0.01	1.30	0.00	0.01	18.2

1 TABLE 4. CATCH AS A PERCENTAGE OF TARGET CATCH PER OBSERVATION (ROW).

BCATCH SPECIES: ATKAMK RKFISH POPC BLKCOD REGION:

SUMMARY					TARGET						PROHIBITED						
NATION	VESSEL	YR	MO	AREA	POLLOK	PACCOD	ATKAMK	FLOUND	RKFISH	THNYHD	POPC	BLKCOD	SALMON	HALBUT	K CRAB	T CRAB	COST %
JAPAN	SML TR	83	13	C GULF	66.50	4.58	1.76	25.70	2.53	3.22	16.28	1.32	0.04	1.97	0.00	0.00	29.3
JAPAN	SUR TR	83	13	C GULF	98.60	0.49	0.00	0.88	0.14	0.03	0.13	0.05	0.03	0.16	0.00	0.00	1.1
JAPAN	FRZ TR	83	13	C GULF	48.38	10.75	13.72	39.26	8.82	1.61	36.29	1.83	0.09	3.52	0.00	0.00	46.7
JAPAN	SAB LL	83	13	C GULF	1.19	95.75	0.01	2.65	0.15	0.40	0.15	10.91	0.00	1.36	0.04	0.59	19.7
KOREA	SML TR	83	13	C GULF	95.46	2.07	37.06	2.47	1.10	0.00	0.29	0.27	0.02	0.90	0.00	0.01	34.5
KOREA	FRZ TR	83	13	C GULF	83.73	5.19	57.32	11.05	1.53	0.03	2.17	0.40	0.02	0.98	0.00	0.00	42.0
KOREA	SAB LL	83	13	C GULF	0.00	69.15	0.00	2.22	0.00	28.63	0.19	352.88	3.73	0.21	0.88	2.18	87.5
US	J V	83	13	C GULF	96.76	1.42	0.00	1.82	0.01	0.00	0.03	0.10	0.01	0.20	0.01	0.04	0.6
FOREIGN	ALL	83	13	C GULF	60.74	27.74	12.84	10.79	1.76	0.73	6.83	3.65	0.03	1.26	0.01	0.16	28.4
ALL	ALL	83	13	C GULF	84.74	10.20	4.28	4.82	0.59	0.24	2.30	1.28	0.02	0.55	0.01	0.08	14.7

1 TABLE 4. CATCH AS A PERCENTAGE OF TARGET CATCH PER OBSERVATION (ROW).

BCATCH SPECIES: ATKAMK RKFISH POPC BLKCOD REGION:

SUMMARY					TARGET						PROHIBITED						
NATION	VESSEL	YR	MO	AREA	POLLOK	PACCOD	ATKAMK	FLOUND	RKFISH	THNYHD	POPC	BLKCOD	SALMON	HALBUT	K CRAB	T CRAB	COST %
JAPAN	SML TR	84	13	C GULF	92.00	1.16	0.24	5.96	0.66	0.88	8.79	0.24	0.01	0.64	0.01	0.00	20.9
JAPAN	SUR TR	84	13	C GULF	98.79	0.48	0.00	0.73	0.02	0.00	0.04	0.05	0.01	0.39	0.01	0.01	0.4
JAPAN	FRZ TR	84	13	C GULF	42.10	8.42	1.75	47.82	14.17	1.66	77.40	0.75	0.03	3.39	0.03	0.01	58.6
JAPAN	SAB LL	84	13	C GULF	0.93	98.81	0.00	0.26	0.00	0.00	0.00	1.72	0.00	0.00	0.00	0.00	3.7
JAPAN	COD LL	84	13	C GULF	0.31	97.95	0.00	1.74	0.00	0.00	0.03	2.27	0.00	9.11	0.00	0.02	4.8
ROREND	SRZ TR	84	13	C GULF	93.88	2.36	0.00	3.57	0.08	0.08	0.09	0.87	0.05	0.03	0.00	0.00	2.8
KOREA	FRZ TR	84	13	C GULF	93.88	2.18	0.01	3.93	0.14	0.01	0.24	1.20	0.02	1.12	0.00	0.00	6.2
US	J V	84	13	C GULF	96.50	2.11	0.00	1.40	0.04	0.00	0.14	0.12	0.08	0.21	0.01	0.01	1.1
FOREIGN	ALL	84	13	C GULF	87.84	8.23	0.09	3.76	0.57	0.18	3.66	0.55	0.04	1.29	0.01	0.00	11.8
ALL	ALL	84	13	C GULF	94.43	3.56	0.02	1.96	0.17	0.04	0.98	0.22	0.07	0.47	0.01	0.01	4.1

1 TABLE 4. CATCH AS A PERCENTAGE OF TARGET CATCH PER OBSERVATION (ROW).

BCATCH SPECIES: ATKAMK RKFISH POPC BLKCOD REGION:

SUMMARY					TARGET						PROHIBITED						
NATION	VESSEL	YR	MO	AREA	POLLOK	PACCOD	ATKAMK	FLOUND	RKFISH	THNYHD	POPC	BLKCOD	SALMON	HALBUT	K CRAB	T CRAB	COST %
JAPAN	COD LL	85	13	C GULF	0.14	99.72	0.00	0.14	0.01	0.00	0.00	0.01	0.00	6.09	0.00	0.00	0.0
US	J V	85	13	C GULF	99.41	0.48	0.00	0.11	0.00	0.00	0.01	0.01	0.00	0.01	0.00	0.00	0.1
FOREIGN	ALL	85	13	C GULF	0.14	99.72	0.00	0.14	0.01	0.00	0.00	0.01	0.00	6.09	0.00	0.00	0.0
ALL	ALL	85	13	C GULF	98.63	1.26	0.00	0.11	0.00	0.00	0.01	0.01	0.00	0.05	0.00	0.00	0.1

1 TABLE 4. CATCH AS A PERCENTAGE OF TARGET CATCH PER OBSERVATION (ROW).

BCATCH SPECIES: ATKAMK RKFISH POPC BLKCOD REGION:

SUMMARY					TARGET						PROHIBITED						
NATION	VESSEL	YR	MO	AREA	POLLOK	PACCOD	ATKAMK	FLOUND	RKFISH	THNYHD	POPC	BLKCOD	SALMON	HALBUT	K CRAB	T CRAB	COST %
JAPAN	SML TR	81	13	W GULF	81.33	5.64	2.57	11.31	1.01	1.72	6.27	0.92	0.03	0.08	0.00	0.00	18.7
JAPAN	SUR TR	81	13	W GULF	94.90	1.14	1.71	3.81	0.17	0.16	0.36	0.21	0.02	0.13	0.00	0.00	4.4
JAPAN	FRZ TR	81	13	W GULF	74.48	9.44	25.16	13.74	0.95	2.34	22.38	3.30	0.01	0.80	0.01	0.01	46.2
JAPAN	SAB LL	81	13	W GULF	1.14	96.68	0.01	1.37	0.37	0.81	0.57	13.91	0.00	3.59	0.01	0.04	24.2
POLAND	FRZ TR	81	13	W GULF	99.68	0.25	1.35	0.07	0.08	0.00	0.18	0.01	0.19	0.00	0.00	0.00	2.6
KOREA	SML TR	81	13	W GULF	77.21	13.01	26.60	8.66	14.64	1.12	3.17	0.93	0.00	0.99	0.00	0.00	41.8
KOREA	FRZ TR	81	13	W GULF	80.07	10.06	10.03	9.27	7.02	0.59	2.03	0.50	0.01	0.36	0.00	0.00	25.3
KOREA	SAB LL	81	13	W GULF	0.00	14.37	0.00	1.20	0.00	84.43	0.00	634.25	0.00	10.74	0.27	1.36	91.4
US	J V	81	13	W GULF	99.95	0.05	0.00	0.00	0.00	0.00	3.35	0.00	0.00	0.00	0.00	0.00	9.2
FOREIGN	ALL	81	13	W GULF	76.15	18.12	5.56	5.16	2.91	0.57	1.98	2.51	0.06	0.71	0.00	0.01	20.9
ALL	ALL	81	13	W GULF	76.16	18.11	5.56	5.16	2.91	0.57	1.98	2.51	0.06	0.71	0.00	0.01	20.9

1 TABLE 4. CATCH AS A PERCENTAGE OF TARGET CATCH PER OBSERVATION (ROW).

BCATCH SPECIES: ATKAMK RKFISH POPC BLKCOD REGION:

SUMMARY					TARGET						PROHIBITED						
NATION	VESSEL	YR	MO	AREA	POLLOK	PACCOD	ATKAMK	FLOUND	RKFISH	THNYHD	POPC	BLKCOD	SALMON	HALBUT	K CRAB	T CRAB	COST %
JAPAN	SML TR	82	13	W GULF	91.38	3.19	8.51	4.71	0.43	0.72	5.41	0.73	0.01	0.42	0.00	0.00	22.4
JAPAN	SUR TR	82	13	W GULF	98.37	0.85	2.83	0.77	0.08	0.01	0.28	0.15	0.00	0.14	0.00	0.00	5.3
JAPAN	FRZ TR	82	13	W GULF	80.54	9.52	30.17	9.07	3.39	0.88	30.50	1.20	0.02	3.04	0.00	0.00	53.5
JAPAN	SAB LL	82	13	W GULF	2.20	40.47	0.00	22.34	12.64	34.99	16.731	204.76	0.00	26.60	1.29	9.44	95.8
JAPAN	COD LL	82	13	W GULF	1.06	97.61	0.01	0.94	0.21	0.38	0.23	3.99	0.00	2.67	0.00	0.00	8.6
KOREA	SML TR	82	13	W GULF	90.28	4.58	53.13	4.74	4.88	0.40	1.69	0.05	0.00	9.69	0.00	0.00	44.8
KOREA	FRZ TR	82	13	W GULF	94.26	2.66	4.45	3.02	1.12	0.06	1.72	0.22	0.01	0.50	0.00	0.00	12.7
KOREA	SAB LL	82	13	W GULF	0.00	1.05	0.00	2.09	0.00	96.86	0.00	645.55	0.00	13.56	1.35	23.13	91.2
US	J V	82	13	W GULF	84.39	12.18	0.00	3.43	0.00	0.00	0.00	0.02	0.00	1.63	0.00	0.10	0.1
FOREIGN	ALL	82	13	W GULF	82.37	14.40	6.48	2.89	0.85	0.34	3.57	3.05	0.01	1.01	0.00	0.03	23.3
ALL	ALL	82	13	W GULF	82.38	14.39	6.45	2.89	0.85	0.34	3.56	3.04	0.01	1.01	0.00	0.03	23.2

1 TABLE 4. CATCH AS A PERCENTAGE OF TARGET CATCH PER OBSERVATION (ROW).

BCATCH SPECIES: ATKAMK RKFISH POPC BLKCOD REGION:

SUMMARY					TARGET						PROHIBITED						
NATION	VESSEL	YR	MO	AREA	POLLOK	PACCOD	ATKAMK	FLOUND	RKFISH	THNYHD	POPC	BLKCOD	SALMON	HALBUT	K CRAB	T CRAB	COST %
JAPAN	SML TR	83	13	W GULF	92.08	2.79	5.58	3.50	0.38	1.63	2.00	0.22	0.04	0.21	0.00	0.00	12.3
JAPAN	SUR TR	83	13	W GULF	98.91	0.83	2.13	0.20	0.03	0.06	0.28	0.31	0.02	0.07	0.00	0.00	5.1
JAPAN	FRZ TR	83	13	W GULF	63.03	13.54	50.53	22.64	5.25	0.79	19.92	0.82	0.08	3.30	0.00	0.01	48.4
JAPAN	SAB LL	83	13	W GULF	1.48	96.64	0.02	1.42	0.43	0.45	0.19	13.51	0.00	0.74	0.01	0.62	23.5
KOREA	SML TR	83	13	W GULF	96.93	1.25	5.70	1.79	0.63	0.03	0.26	0.98	0.02	0.06	0.00	0.00	12.9
KOREA	FRZ TR	83	13	W GULF	91.85	2.37	4.52	5.76	1.42	0.02	0.63	0.48	0.02	0.28	0.00	0.00	11.6
KOREA	SAB LL	83	13	W GULF	0.00	0.00	0.00	6.64	0.00	93.36	8.88	1814.40	0.33	0.00	0.11	59.04	96.7
US	J V	83	13	W GULF	43.30	40.83	68.64	14.86	23.61	1.01	168.31	11.68	0.04	6.63	0.01	0.00	80.2
FOREIGN	ALL	83	13	W GULF	78.43	17.22	5.18	4.03	0.94	0.32	1.34	2.72	0.02	0.40	0.00	0.11	17.6
ALL	ALL	83	13	W GULF	77.64	17.75	6.60	4.27	1.45	0.33	5.08	2.92	0.02	0.54	0.00	0.10	25.0

1 TABLE 4. CATCH AS A PERCENTAGE OF TARGET CATCH PER OBSERVATION (ROW).

BCATCH SPECIES: ATKAMK RKFISH POPC BLKCOD REGION:

SUMMARY					TARGET						PROHIBITED						
NATION	VESSEL	YR	MO	AREA	POLLOK	PACCOD	ATKAMK	FLOUND	RKFISH	THNYHD	POPC	BLKCOD	SALMON	HALBUT	K CRAB	T CRAB	COST %
JAPAN	SML TR	84	13	W GULF	92.70	1.63	6.18	5.32	0.28	0.35	2.16	0.75	0.04	0.64	0.00	0.00	14.9
JAPAN	SUR TR	84	13	W GULF	99.00	0.39	0.48	0.58	0.06	0.03	0.09	0.10	0.04	0.17	0.00	0.00	1.6
JAPAN	FRZ TR	84	13	W GULF	51.64	34.11	42.30	10.32	0.62	3.93	13.14	3.35	0.02	1.98	0.00	0.00	40.6
JAPAN	SAB LL	84	13	W GULF	1.22	30.82	0.00	34.54	8.61	33.42	10.25	1268.81	0.00	23.57	0.62	6.61	95.9
JAPAN	COD LL	84	13	W GULF	0.48	98.66	0.01	0.82	0.07	0.04	0.11	2.86	0.00	5.49	0.00	0.03	6.2
KOREA	SML TR	84	13	W GULF	96.92	2.30	0.06	0.77	0.07	0.01	0.38	0.38	0.01	0.13	0.00	0.00	3.1
KOREA	FRZ TR	84	13	W GULF	98.12	1.10	0.01	0.77	0.06	0.01	0.21	0.25	0.00	0.09	0.00	0.00	2.0
US	J V	84	13	W GULF	90.02	3.43	6.49	6.36	2.24	0.20	16.18	3.18	0.01	1.58	0.00	0.00	41.0
FOREIGN	ALL	84	13	W GULF	78.77	20.01	0.89	1.12	0.09	0.09	0.40	1.40	0.02	1.22	0.00	0.01	7.1
ALL	ALL	84	13	W GULF	80.37	17.66	1.68	1.87	0.39	0.11	2.63	1.66	0.02	1.27	0.00	0.01	13.6

1 TABLE 4. CATCH AS A PERCENTAGE OF TARGET CATCH PER OBSERVATION (ROW).

BCATCH SPECIES: ATKAMK RKFISH POPC BLKCOD REGION:

SUMMARY					TARGET						PROHIBITED						
NATION	VESSEL	YR	MO	AREA	POLLOK	PACCOD	ATKAMK	FLOUND	RKFISH	THNYHD	POPC	BLKCOD	SALMON	HALBUT	K CRAB	T CRAB	COST %
JAPAN	COD LL	85	13	W GULF	0.17	99.56	0.00	0.27	0.01	0.00	0.00	0.12	0.00	3.15	0.00	0.00	0.3
US	J V	85	13	W GULF	99.11	0.64	0.30	0.25	0.00	0.00	0.55	0.04	0.01	0.61	0.00	0.01	2.2
FOREIGN	ALL	85	13	W GULF	0.17	99.56	0.00	0.27	0.01	0.00	0.00	0.12	0.00	3.15	0.00	0.00	0.3
ALL	ALL	85	13	W GULF	12.60	87.14	0.04	0.27	0.01	0.00	0.07	0.11	0.00	2.83	0.00	0.00	0.4

Replaced.

TABLE 4. CATCH AS A PERCENTAGE OF TARGET CATCH PER OBSERVATION (ROW).

NATION	VESSEL	YR	MO	AREA	POLLOCK	PACCOD	ATKAMK	FLOUND	RKFISH	THNYHD	POPC	BLKCOD	SALMON	HALBUT	K CRAB	T CRAB	COST %
JAPAN	SML TR	81	13	W GULF	73.42	5.09	2.32	10.21	0.91	1.55	5.66	0.83	0.03	0.07	0.00	0.00	0.0
JAPAN	SUR TR	81	13	W GULF	92.62	1.11	1.67	3.72	0.17	0.15	0.35	0.21	0.02	0.13	0.00	0.00	0.0
JAPAN	FRZ TR	81	13	W GULF	49.07	6.22	16.58	9.05	0.63	1.54	14.74	2.17	0.00	0.53	0.01	0.00	0.0
JAPAN	SAB LL	81	13	W GULF	1.00	84.16	0.01	1.20	0.32	0.70	0.50	12.11	0.00	3.13	0.01	0.03	0.0
POLAND	FRZ TR	81	13	W GULF	98.09	0.25	1.33	0.07	0.08	0.00	0.18	0.01	0.18	0.00	0.00	0.00	0.0
KOREA	SML TR	81	13	W GULF	53.13	8.95	18.30	5.96	10.07	0.77	2.18	0.64	0.00	0.68	0.00	0.00	0.0
KOREA	FRZ TR	81	13	W GULF	66.97	8.42	8.38	7.75	5.87	0.50	1.69	0.42	0.01	0.30	0.00	0.00	0.0
KOREA	SAB LL	81	13	W GULF	0.00	1.96	0.00	0.16	0.00	11.50	0.00	86.38	0.00	1.46	0.04	0.18	0.0
US-JAPA	J V	81	13	W GULF	96.71	0.05	0.00	0.00	0.00	0.00	3.24	0.00	0.00	0.00	0.00	0.00	0.0
FOREIGN	ALL	81	13	W GULF	67.42	16.04	4.92	4.57	2.58	0.51	1.75	2.22	0.05	0.63	0.00	0.01	0.0
ALL	ALL	81	13	W GULF	67.43	16.03	4.92	4.57	2.57	0.51	1.75	2.22	0.05	0.62	0.00	0.01	0.0
JAPAN	SML TR	82	13	W GULF	79.40	2.77	7.39	4.10	0.37	0.62	4.70	0.64	0.01	0.36	0.00	0.00	0.0
JAPAN	SUR TR	82	13	W GULF	95.19	0.82	2.74	0.75	0.08	0.01	0.27	0.15	0.00	0.13	0.00	0.00	0.0
JAPAN	FRZ TR	82	13	W GULF	48.73	5.76	18.26	5.49	2.05	0.53	18.45	0.73	0.01	1.84	0.00	0.00	0.0
JAPAN	SAB LL	82	13	W GULF	0.16	3.03	0.00	1.67	0.95	2.62	1.25	90.30	0.00	1.99	0.10	0.71	0.0
JAPAN	COD LL	82	13	W GULF	1.02	93.46	0.01	0.90	0.20	0.37	0.22	3.82	0.00	2.55	0.00	0.00	0.0
KOREA	SML TR	82	13	W GULF	56.51	2.87	33.26	2.97	3.06	0.25	1.06	0.03	0.00	6.06	0.00	0.00	0.0
KOREA	FRZ TR	82	13	W GULF	87.68	2.48	4.14	2.81	1.04	0.05	1.60	0.21	0.01	0.47	0.00	0.00	0.0
KOREA	SAB LL	82	13	W GULF	0.00	0.14	0.00	0.28	0.00	12.99	0.00	86.59	0.00	1.82	0.18	3.10	0.0
US-POLA	J V	82	13	W GULF	99.95	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
US-W. GY	J V	82	13	W GULF	81.21	14.65	0.00	4.12	0.00	0.00	0.00	0.02	0.00	1.96	0.00	0.12	0.0
FOREIGN	ALL	82	13	W GULF	72.29	12.63	5.68	2.54	0.75	0.30	3.14	2.68	0.01	0.88	0.00	0.02	0.0
ALL	ALL	82	13	W GULF	72.32	12.63	5.66	2.54	0.75	0.30	3.13	2.67	0.01	0.89	0.00	0.02	0.0
JAPAN	SML TR	83	13	W GULF	85.12	2.58	5.16	3.23	0.35	1.51	1.85	0.20	0.03	0.19	0.00	0.00	0.0
JAPAN	SUR TR	83	13	W GULF	96.26	0.81	2.08	0.19	0.03	0.06	0.27	0.30	0.02	0.07	0.00	0.00	0.0
JAPAN	FRZ TR	83	13	W GULF	35.71	7.67	28.63	12.82	2.98	0.45	11.29	0.46	0.04	1.87	0.00	0.01	0.0
JAPAN	SAB LL	83	13	W GULF	1.30	84.67	0.02	1.25	0.37	0.40	0.17	11.83	0.00	0.65	0.01	0.55	0.0
KOREA	SML TR	83	13	W GULF	90.11	1.16	5.30	1.66	0.59	0.02	0.24	0.91	0.01	0.05	0.00	0.00	0.0
KOREA	FRZ TR	83	13	W GULF	85.80	2.21	4.22	5.38	1.33	0.02	0.59	0.45	0.02	0.26	0.00	0.00	0.0
KOREA	SAB LL	83	13	W GULF	0.00	0.00	0.00	0.35	0.00	4.85	0.46	94.34	0.02	0.00	0.01	3.07	0.0
US-KORE	J V	83	13	W GULF	11.63	10.97	18.44	3.99	6.34	0.27	45.22	3.14	0.01	1.78	0.00	0.00	0.0
FOREIGN	ALL	83	13	W GULF	71.19	15.63	4.70	3.66	0.86	0.29	1.22	2.47	0.02	0.36	0.00	0.10	0.0
ALL	ALL	83	13	W GULF	66.91	15.30	5.68	3.68	1.25	0.29	4.38	2.52	0.02	0.47	0.00	0.09	0.0

TABLE 4. CONTINUED -- CATCH AS A PERCENTAGE OF TARGET CATCH PER OBSERVATION (ROW).

NATION	VESSEL	YR	MO	AREA	POLLOCK	PACCOD	ATKAMK	FLOUND	RKFISH	THNYHD	POPC	BLKCOD	SALMON	HALBUT	K CRAB	T CRAB	COST %
JAPAN	SML TR	84	13	W GULF	84.77	1.49	5.65	4.87	0.26	0.32	1.97	0.68	0.04	0.59	0.00	0.00	0.0
JAPAN	SUR TR	84	13	W GULF	98.29	0.39	0.47	0.57	0.06	0.03	0.09	0.10	0.04	0.17	0.00	0.00	0.0
JAPAN	FRZ TR	84	13	W GULF	32.39	21.40	26.54	6.47	0.39	2.47	8.24	2.10	0.01	1.24	0.00	0.00	0.0
JAPAN	SAB LL	84	13	W GULF	0.09	2.22	0.00	2.49	0.62	2.41	0.74	91.43	0.00	1.70	0.04	0.48	0.0
JAPAN	COD LL	84	13	W GULF	0.47	95.74	0.01	0.80	0.07	0.04	0.11	2.78	0.00	5.32	0.00	0.03	0.0
KOREA	SML TR	84	13	W GULF	96.08	2.28	0.05	0.76	0.07	0.01	0.37	0.38	0.01	0.13	0.00	0.00	0.0
KOREA	FRZ TR	84	13	W GULF	97.60	1.09	0.01	0.77	0.06	0.01	0.21	0.25	0.00	0.09	0.00	0.00	0.0
US-SOVI	J V	84	13	W GULF	9.65	9.43	0.13	64.93	0.01	0.14	1.48	14.22	0.02	4.12	0.03	0.03	0.0
US-KORE	J V	84	13	W GULF	70.65	2.59	5.16	4.48	1.78	0.15	12.84	2.35	0.01	1.21	0.00	0.00	0.0
US-POLA	J V	84	13	W GULF	97.42	0.29	0.00	1.33	0.00	0.29	0.66	0.02	0.18	0.31	0.00	0.00	0.0
FOREIGN	J V	84	13	W GULF	29.83	18.75	1.48	24.49	1.88	0.00	3.20	20.38	0.05	3.05	0.00	0.01	0.0
FOREIGN	ALL	84	13	W GULF	76.61	19.47	0.86	1.11	0.09	0.09	0.39	1.38	0.02	1.19	0.00	0.01	0.0
ALL	ALL	84	13	W GULF	75.56	16.60	1.58	1.75	0.37	0.10	2.48	1.56	0.02	1.19	0.00	0.01	0.0
JAPAN	COD LL	85	13	W GULF	0.17	99.43	0.00	0.27	0.01	0.00	0.00	0.12	0.00	3.14	0.00	0.00	0.0
US-KORE	J V	85	13	W GULF	98.22	0.64	0.29	0.25	0.00	0.00	0.55	0.04	0.01	0.58	0.00	0.00	0.0
UNKNOWN	J V	85	13	W GULF	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.22	0.00	1.28	0.0
FOREIGN	ALL	85	13	W GULF	0.17	99.43	0.00	0.27	0.01	0.00	0.00	0.12	0.00	3.14	0.00	0.00	0.0
ALL	ALL	85	13	W GULF	12.57	86.94	0.04	0.27	0.01	0.00	0.07	0.11	0.00	2.82	0.00	0.00	0.0
JAPAN	SML TR	81	13	C GULF	62.09	3.54	4.72	15.44	2.76	1.15	9.62	0.67	0.01	0.92	0.00	0.00	0.0
JAPAN	SUR TR	81	13	C GULF	90.53	2.23	3.93	1.73	0.42	0.09	0.79	0.28	0.06	0.52	0.00	0.00	0.0
JAPAN	FRZ TR	81	13	C GULF	49.41	4.72	11.42	10.57	2.46	1.03	19.12	1.27	0.03	1.61	0.00	0.00	0.0
JAPAN	SAB LL	81	13	C GULF	1.45	82.95	0.00	1.28	0.25	0.62	0.20	13.26	0.01	4.71	0.02	0.32	0.0
POLAND	FRZ TR	81	13	C GULF	99.26	0.39	0.25	0.02	0.01	0.00	0.06	0.01	0.14	0.02	0.00	0.00	0.0
KOREA	SML TR	81	13	C GULF	47.23	11.84	32.75	4.75	0.69	0.01	2.55	0.19	0.01	1.31	0.00	0.01	0.0
KOREA	FRZ TR	81	13	C GULF	47.10	11.29	30.80	6.71	1.36	0.08	2.41	0.25	0.01	0.35	0.00	0.00	0.0
KOREA	SAB LL	81	13	C GULF	0.00	0.17	0.00	0.00	0.00	5.19	0.35	94.28	0.01	4.09	0.06	0.10	0.0
US-KORE	J V	81	13	C GULF	99.55	0.34	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.0
FOREIGN	ALL	81	13	C GULF	59.58	17.13	11.21	4.62	0.94	0.34	3.43	2.75	0.05	1.20	0.00	0.05	0.0
ALL	ALL	81	13	C GULF	64.36	15.12	9.87	4.08	0.83	0.30	3.02	2.42	0.04	1.06	0.00	0.04	0.0

TABLE 4. CONTINUED -- CATCH AS A PERCENTAGE OF TARGET CATCH PER OBSERVATION (ROW).

NATION	VESSEL	YR	MO	AREA	POLLOCK	PACCOD	ATKAMK	FLOUND	RKFISH	THNYHD	POPC	BLKCOD	SALMON	HALBUT	K CRAB	T CRAB	COST %
JAPAN	SML TR	82	13	C GULF	66.81	4.04	1.03	11.18	1.24	1.23	13.25	1.22	0.03	2.24	0.00	0.00	0.0
JAPAN	SUR TR	82	13	C GULF	98.47	0.55	0.01	0.60	0.05	0.02	0.21	0.10	0.01	0.09	0.00	0.00	0.0
JAPAN	FRZ TR	82	13	C GULF	26.68	5.18	0.32	29.53	6.40	1.56	29.31	1.02	0.05	2.21	0.00	0.01	0.0
JAPAN	SAB LL	82	13	C GULF	0.28	3.91	0.02	2.32	0.80	3.36	1.05	88.26	0.00	1.18	0.01	0.38	0.0
JAPAN	COD LL	82	13	C GULF	1.14	93.96	0.00	0.77	0.09	0.22	0.09	3.73	0.00	6.81	0.00	0.04	0.0
KOREA	SML TR	82	13	C GULF	81.37	6.59	3.32	4.39	0.85	0.01	3.12	0.34	0.01	1.28	0.00	0.00	0.0
KOREA	FRZ TR	82	13	C GULF	69.27	7.32	13.97	6.88	0.56	0.05	1.66	0.31	0.01	1.01	0.01	0.02	0.0
KOREA	SAB LL	82	13	C GULF	0.00	0.00	0.00	0.00	0.00	6.03	0.09	93.88	0.00	13.00	0.00	0.08	0.0
US-KORE	J V	82	13	C GULF	99.71	0.26	0.00	0.02	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.0
US-POLA	J V	82	13	C GULF	99.82	0.17	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
US-JAPA	J V	82	13	C GULF	99.83	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
FOREIGN	ALL	82	13	C GULF	56.81	19.35	3.90	8.16	1.35	0.53	6.75	3.14	0.02	2.15	0.00	0.02	0.0
ALL	ALL	82	13	C GULF	75.93	10.84	2.16	4.53	0.75	0.30	3.75	1.74	0.01	1.19	0.00	0.01	0.0
JAPAN	SML TR	83	13	C GULF	54.55	3.76	1.45	21.09	2.08	2.64	13.35	1.09	0.03	1.61	0.00	0.00	0.0
JAPAN	SUR TR	83	13	C GULF	98.28	0.49	0.00	0.88	0.14	0.03	0.13	0.05	0.03	0.16	0.00	0.00	0.0
JAPAN	FRZ TR	83	13	C GULF	30.12	6.69	8.54	24.44	5.49	1.00	22.59	1.14	0.06	2.19	0.00	0.00	0.0
JAPAN	SAB LL	83	13	C GULF	1.07	86.10	0.01	2.38	0.14	0.36	0.13	9.81	0.00	1.22	0.04	0.53	0.0
KOREA	SML TR	83	13	C GULF	68.82	1.49	26.71	1.78	0.79	0.00	0.21	0.20	0.01	0.65	0.00	0.01	0.0
KOREA	FRZ TR	83	13	C GULF	51.88	3.21	35.51	6.85	0.95	0.02	1.34	0.25	0.02	0.60	0.00	0.00	0.0
KOREA	SAB LL	83	13	C GULF	0.00	15.26	0.00	0.49	0.00	6.32	0.04	77.89	0.82	0.05	0.19	0.48	0.0
US-SOVI	J V	83	13	C GULF	49.18	20.15	0.03	27.05	0.35	0.02	0.79	2.44	0.16	3.60	0.01	0.52	0.0
US-KORE	J V	83	13	C GULF	99.70	0.21	0.00	0.05	0.00	0.00	0.01	0.03	0.00	0.02	0.00	0.00	0.0
US-JAPA	J V	83	13	C GULF	99.70	0.28	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
UNKNOWN	J V	83	13	C GULF	13.70	31.60	0.00	53.05	0.16	0.00	0.15	1.33	0.10	4.89	0.51	1.26	0.0
FOREIGN	ALL	83	13	C GULF	48.56	22.18	10.26	8.63	1.40	0.58	5.46	2.91	0.03	1.00	0.01	0.12	0.0
ALL	ALL	83	13	C GULF	78.13	9.40	3.95	4.44	0.55	0.22	2.12	1.18	0.02	0.51	0.01	0.07	0.0

TABLE 4. CONTINUED -- CATCH AS A PERCENTAGE OF TARGET CATCH PER OBSERVATION (ROW).

NATION	VESSEL	YR	MO	AREA	POLLOCK	PACCOD	ATKAMK	FLOUND	RKFISH	THNYHD	POPC	BLKCOD	SALMON	HALBUT	K CRAB	T CRAB	COST %
JAPAN	SML TR	84	13	C GULF	83.69	1.05	0.22	5.43	0.60	0.80	8.00	0.22	0.01	0.58	0.01	0.00	0.0
JAPAN	SUR TR	84	13	C GULF	98.68	0.48	0.00	0.73	0.02	0.00	0.04	0.05	0.01	0.39	0.01	0.01	0.0
JAPAN	FRZ TR	84	13	C GULF	21.69	4.34	0.90	24.64	7.30	0.85	39.88	0.39	0.01	1.75	0.02	0.00	0.0
JAPAN	SAB LL	84	13	C GULF	0.91	97.14	0.00	0.26	0.00	0.00	0.00	1.69	0.00	0.00	0.00	0.00	0.0
JAPAN	COD LL	84	13	C GULF	0.30	95.71	0.00	1.70	0.04	0.00	0.03	2.21	0.00	8.90	0.00	0.02	0.0
POLAND	FRZ TR	84	13	C GULF	98.03	0.35	0.00	0.80	0.03	0.04	0.48	0.26	0.64	0.13	0.00	0.00	0.0
KOREA	SML TR	84	13	C GULF	95.05	1.74	0.00	2.55	0.03	0.00	0.03	0.60	0.00	1.04	0.00	0.00	0.0
KOREA	FRZ TR	84	13	C GULF	92.40	2.15	0.01	3.87	0.13	0.01	0.24	1.18	0.02	1.10	0.00	0.00	0.0
US-SOVI	J V	84	13	C GULF	80.39	10.75	0.02	7.48	0.03	0.00	0.38	0.94	0.03	0.94	0.03	0.11	0.0
US-KORE	J V	84	13	C GULF	99.17	0.24	0.01	0.06	0.10	0.00	0.42	0.00	0.00	0.04	0.00	0.00	0.0
US-POLA	J V	84	13	C GULF	97.44	0.57	0.00	1.73	0.01	0.00	0.07	0.18	0.67	0.34	0.00	0.02	0.0
US-JAPA	J V	84	13	C GULF	99.62	0.30	0.00	0.05	0.00	0.00	0.03	0.01	0.01	0.00	0.00	0.00	0.0
US-W. GY	J V	84	13	C GULF	99.68	0.29	0.00	0.01	0.00	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.0
UNKNOWN	J V	84	13	C GULF	33.58	39.13	0.02	24.99	0.33	0.00	0.22	1.73	0.07	3.57	0.20	0.25	0.0
FOREIGN	J V	84	13	C GULF	14.29	43.11	0.00	36.59	0.25	0.00	0.12	5.63	0.04	4.88	0.17	0.22	0.0
FOREIGN	ALL	84	13	C GULF	83.24	8.11	0.08	3.83	0.54	0.17	3.47	0.57	0.04	1.26	0.01	0.01	0.0
ALL	ALL	84	13	C GULF	93.13	3.52	0.02	1.93	0.16	0.04	0.97	0.22	0.07	0.46	0.01	0.01	0.0
JAPAN	COD LL	85	13	C GULF	0.14	99.69	0.00	0.14	0.01	0.00	0.00	0.01	0.00	6.09	0.00	0.00	0.0
US-KORE	J V	85	13	C GULF	99.66	0.32	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
US-POLA	J V	85	13	C GULF	99.71	0.23	0.00	0.05	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.0
US-JAPA	J V	85	13	C GULF	99.42	0.53	0.00	0.04	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.0
UNKNOWN	J V	85	13	C GULF	41.13	23.38	0.00	33.26	0.22	0.00	0.38	1.63	0.00	2.93	0.00	1.48	0.0
FOREIGN	ALL	85	13	C GULF	0.14	99.69	0.00	0.14	0.01	0.00	0.00	0.01	0.00	6.09	0.00	0.00	0.0
ALL	ALL	85	13	C GULF	98.62	1.26	0.00	0.11	0.00	0.00	0.01	0.01	0.00	0.05	0.00	0.00	0.0

Note: Month 13 indicates annual data and the 1985 data are for the first half of the year.

Bycatch rates from the Japanese Pacific cod longline fishery may provide a good estimate of the halibut bycatch rates that can be expected for a cod fishery. The bycatch rates in that fishery have ranged from 0.7 to 8.9 per cent and have typically been greater than 5 per cent. It is not known if a trawl fishery would have had similar bycatch rates.

Other sources of bycatch rate estimates are the status of stocks report and the ADF&G observer program. The former assumes a bycatch rate of approximately 10.5 percent in a flounder fishery. The latter reports annual bycatch rates for the ADF&G observer program as a whole of from 1.40 to 5.7 percent. This range was for trawlers targeting on pollock, Pacific cod, or bait. The data have not been disaggregated to estimate bycatch rates in separate fisheries, such as Pacific cod and flounder. The small sample sizes may prevent such a disaggregation from providing useful estimates.

b. Changes in Fishing Opportunities

With the expected sharp decline in the amount of pollock available to commercial fisheries in the Gulf, fishermen will be looking for alternative fisheries to enter. The strengths of the Pacific cod, flounder, and sablefish stocks may permit substantial increases in catch. However, if the halibut PSC limits are set at the bycatch levels of recent years, this will not be a viable alternative because the bycatch rates tend to be much higher in these fisheries than in pollock fisheries. Other alternatives include fisheries of the Bering Sea and Aleutian Islands.

c. Ability to Enforce PSC Limits

The Foreign Vessel Observer Program is thought to provide sufficiently good estimates of halibut bycatch that PSC limits can probably be enforced in the joint-venture fisheries at no additional cost. For the domestic fisheries, the lack of observers makes enforcement difficult. One solution for the domestic fisheries is to use historical bycatch data from the joint venture and foreign fisheries to estimate what the bycatch rate will be in the domestic fisheries and then use that estimated bycatch rate together with current groundfish catch data to estimate when a domestic PSC limit has been

taken. For example, if the estimated bycatch rate is 5 percent, or equivalently 20 t of groundfish per 1 t of halibut, and if the halibut PSC limit is 1,000 t of halibut, we would estimate that the PSC limit will have been taken once 20,000 t of groundfish have been taken. In this hypothetical example, the domestic fishery could then be closed when 20,000 t of groundfish are taken unless the domestic fleet had adequately demonstrated that its actual bycatch rate is less than 5 percent.

d. Allocating PSC Limits Between Domestic and Joint Venture Fisheries

Assuming that a market oriented mechanism will not be used to set PSC limits, there are two basic ways that PSC limits can be established for domestic and joint venture fisheries: 1) an overall PSC limit can be determined and then split between the two types of fisheries; or 2) the PSC limit for each type of fishery can be determined independently. If the former approach is used and if the PSC limits are expected to constrain target fisheries with high bycatch rates, the following question is relevant. Should all of the overall PSC limit be allocated to the domestic fisheries if necessary to minimize the constraint placed on that fishery by its PSC limit, or should the allocation be based on some other criteria that may result in a partial allocation to joint ventures at some cost to the domestic groundfish fisheries? This issue can be avoided if the PSC limits for the two types of fisheries are set independently of each other. For example, this could be done based on the benefits of the PSC limit for each fishery compared to the costs of each limit.

e. Allocations by Operation

Whether or not target species quotas are allocated by nation or operation, it may be desirable to allocate PSC limits to as narrowly defined operational units as is practicable. The advantages of doing this are: 1) it provides each operational unit a stronger incentive to reduce bycatch; and 2) the actual bycatch of one unit will not affect the ability of other units to proceed with their planned fishing activities. The latter will result in a more orderly and less costly fishery and what some would consider a more

equitable fishery. The disadvantage of such allocations include the difficulty of determining what these allocations should be.

f. Gear to Prohibit Once a PSC Limit is Taken

Because halibut bycatch rates are very low with off-bottom trawls, it is probably appropriate to prohibit on-bottom trawling once a PSC limit is taken.

AGENDA D-1
SUPPLEMENTAL

ALASKA PACIFIC SEAFOODS, INC.

HOME OFFICE: 2155 N. NORTHLAKE WAY • P.O. BOX 31179 • SEATTLE, WASHINGTON 98103 • (206) 632-9900
PROCESSING PLANT: P.O. BOX 1126 • KODIAK, ALASKA 99615 • (907) 486-3234

September 19, 1985

ACTION	ROUTE TO	INITIAL
	Exec. Dir.	
	Deputy Dir.	
	Admin. Off.	
	Asst. Dir.	
	Staff Asst.	
	Staff Asst.	

Mr. James O. Campbell, Chairman
NORTH PACIFIC FISHERIES MANAGEMENT COUNCIL
411 W. Fourth Avenue
Anchorage, Ak 99510

Dear Mr. Campbell,

As you are aware Alaska Pacific Seafoods is presently engaged in proving that surimi can be successfully produced in an Alaska shore-based plant. Through our contract with the Alaska Fisheries Development Foundation we have been developing our surimi process in Kodiak and, while we have produced some good quality product, we still have much to learn.

When we took on the project we studied some of ~~the information available~~ about the pollock resource in the Kodiak area ~~and although there was~~ clearly a larger biomass in the Bering Sea, ~~there certainly appeared to~~ be plenty of pollock for the relatively small operation involved for this project. It has been with considerable shock that we now understand the resource to be appearing quite weak in the Central Gulf and that there have been suggestions of a zero harvest for 1986 and even a curtailment or elimination of fishing during the remainder of 1985.

One of the major problems we have had in working with the AFDF to distribute the surimi that has been produced to date is that many of the potential U.S - based surimi buyers want to be assured of continuity of supply. Many of them have been concerned about purchasing our product and possibly jeopardizing their present sources of surimi to the point where they would be very dependent upon a supply from us at least until other American-based sources of supply get developed. Nevertheless all of our initial production has been sold and we are just beginning to produce surimi to continue the supply line.

As you can see, the program to produce surimi in an Alaskan, shore-based plant and to provide continuity of supply to these surimi users would be destroyed if we cannot get adequate quantities of pollock into our plant for processing. While Alaska Pacific Seafoods in no way would like to seriously adversely effect the resource by its operations I must say that it is very important that should there be resource justifiably available for harvest it is critical that we have access to it to confirm what we set out to prove: That good quality surimi can be successfully produced in Alaskan plants and that our industry can soon be in position to begin utilizing larger and larger proportions of the Alaskan pollock resources.

From an economic standpoint this is a very marginal product for us at this point and it is essential to process a large volume to bring the per pound cost to an acceptable level. Our capacity for running pollock during the initial processing period was about 75 tons per day. We hope

through line modifications to be able to improve on that. A rough calculation of our pollock requirements if we were to run at presently established peak production levels would be about 7000 tons for the remainder of 1985. For 1986 we have been planning a production period covering approximately eight months which would create an optimal requirement of 18,000 tons. Please note that these are optimal figures and actual production requirements will be somewhat less. Alaska Pacific Seafoods respectfully requests that the NPFMC in establishing a Domestic OY, provide a harvest level that in addition to other domestic requirements, would provide us access to resource of this magnitude for our operations. We would be able to advise the Council on a regular basis of our actual harvest data so that these numbers could be modified if necessary as production occurs. Futhermore, it is important that these fish be available during the time periods we need them which would be from January 1 through mid-March and from mid-July through the end of the year.

I plan to attend next week's Council meeting in Anchorage and will be available for comment or questions.

Sincerely,

Brian Kelly

BK:lw

GULF OF ALASKA GROUNDFISH 1986 ABCs, 1985 OYs, DAPs, JVPs, AND TALFF (MT)

SPECIES	AREA	1986 ABC	1985 OY	1985 PROJECTED DAP	1985 PROJECTED JVP	1985 PROJECTED TALFF
POLLOCK	WESTERN/CENTRAL	100,000	305,000	10,000	235,000	35,000
	EASTERN	16,600	16,600	1	0	0
PACIFIC COD	W	37,500	16,560	3,000	300	7,600
	C	76,000	33,540	1,300	4,000	2,600
	E	22,500	9,900	60	0	0
FLOUNDERS	W	23,000	10,400	30	600	200
	C	101,000	14,700	20	1,200	250
	E	17,000	8,400	40	0	0
PACIFIC OCEAN PERCH	W	3,500	1,302	1,300	10	30
	C	4,000	3,906	100	20	16
	E	5,500	875	40	0	0
SABLEFISH	W	1760-3520	1,670	2,100	0	140
	C	6080-12160	3,060	3,800	0	31
	W. YAKUTAT	*2210-4420	1,680	2,600	0	0
	E. YAKUTAT		1,135	3,000	0	0
	S.E.OUTSIDE	2450-4900	1,435		0	0
ATKA MACKERAL	W	4,678	4,678	0	300	100
	C	0	500	0	5	20
	E	0	100	0	0	0
ROCKFISH	S.E.CENTRAL			150	0	
	OUTSIDE	600	600	460	0	0
	REMAINING GULF	1,700	4,400	340	15	25
THORNYHEAD	GW	3,750	3,750	50	5	50
SQUID	GW	5,000	5,000	10	10	50
OTHER SPECIES	GW	**	22,460	20	2,300	325
TOTAL			471,651	28,421	243,765	46,437

* ABC for Western Yakutat and Eastern Yakutat combined.

** Unknown.

MS RACE 1.43.1

Table 1.--Current status of Gulf of Alaska groundfish resources (mt).

Species	1985 OY	Projected 1985 catch	Stock condition	Current trend in abundance	Preliminary 1986 ABC
Pollock	321,600	275,129	Depressed.	Exploitable biomass declining to 445,000 mt in late 1985.	ABC = 0.
Pacific cod	60,000	18,800	Good.	Stable.	ABC = 136,000.
Flounders	33,500	2,300	Good.	Assumed stable.	Maintain ABC at 141,000.
Pacific ocean perch	6,083	1,430	Depressed.	Stable.	Rebuild; incidental catch only.
Sablefish	9,480	11,184	Good.	Increasing	ABC is between 12,500 and 25,000.
Atka mackerel	5,300	355	Depressed.	Depressed; no apparent recruitment in eastern/central area.	Unknown; set equal to OY in 1985.
Other rockfish	5,000	1,105	Depressed.	Unknown.	ABC = 2,300 mt
Thornyhead	3,750	110	Unknown.	Estimated biomass = 21,000 mt in central and western area.	Unknown; MSY = 3,750.
Squid	5,000	70	Appears good.	Assumed stable.	Unknown; set equal to OY in 1985.
Other species	22,435	2,645	Probably good.	Assumed stable.	Unknown; set equal to OY in 1985.

D-1 Gulf of Alaska Groundfish

Pollock

The AP recommends that the Council advise the public that we anticipate an OY of 50,000 mt to be designated as DAP. Yet we are interested in encouraging exploration for pollock resources outside of the Shelikof Strait area and are seeking methods to accomplish this. We do not anticipate any TALFF in 1986, and JVP, if any becomes available, would be excluded from Shelikof Strait and limited to exploration during the first four months of the year.

This motion passed 12 to 7.

9/25/85

THRESHOLD BIOMASS

Team Definition

The threshold biomass is defined as that level below which if the exploitable biomass were to drop its ability to produce strong recruitment would be adversely affected.

SSC Definition

The threshold biomass is defined as that level below which if the exploitable biomass were to drop the reproductive success of the population would be endangered.

Table A. Preliminary estimates* of the effect of various bycatch limit on directed halibut fishery.

Western Gulf			Central Gulf			Total		
Halibut MSY	PSC Limit	Directed Setline Catch Limit	Halibut MSY	PSC Limit	Directed Setline Catch Limit	Halibut MSY	PSC Limit	Directed Setline Catch Limit
3,500 mt	0	3,500	17,500	0	17,500	20,000	0	~~3,500~~ 21,000
3,500	1,000	2,500	17,500	2,500	15,000	20,000	3,500	16,500
3,500	2,000	1,500	17,500	5,000	12,500	20,000	7,000	13,000
3,500	3,000	500	17,500	10,000	7,500	20,000	17,000	3,000
3,500	3,500	0	17,500	17,500	0	20,000	20,000	0

*Assumes no density dependent effects and no lost growth or reproductive effects.

GULF OF ALASKA

	1985 DAP PROJECTED CATCHES	DAP SURVEY RESULTS	1985 JVP PROJECTED CATCHES	JVP SURVEY RESULTS	1985 DAH PROJECTED CATCHES	DAH SURVEY RESULTS
POLLOCK						
W/C	10000	32633	225000	213205	235000	245838
PACIFIC COD						
WEST	3000	12308	300	4250	3300	16558
CENT	1300	9186	4000	6467	5300	15653
FLOUNDER						
WEST	30	400	600	0	630	400
CENT	20	745	1200	2800	1220	3545
POP						
WEST	1300	4242	10	2200	1310	6442
CENT	100	7596	20	0	120	7596
SABLEFISH						
WEST	2100	3762	60	0	2160	3762
CENT	3800	10965	30	0	3830	10965
ATKA MACK						
WEST	0	0	300	3300	300	3300
CENT	0	0	5	0	5	0
ROCKFISH	950	3952	15	0	965	3952
THORNYHD	50	0	5	0	55	0
SQUID	10	50	10	0	20	50
OTHERS	20	75	2300	0	2320	75
TOTAL	22680	85914	233855	232222	256535	318136