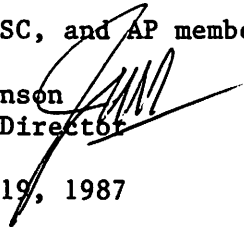


M E M O R A N D U M

TO: Council, SSC, and AP members

FROM: Jim H. Branson
Executive Director 

DATE: September 19, 1987

SUBJECT: Gulf of Alaska Groundfish Fishery Management Plan

ACTION REQUIRED

1. Council approval of Amendment 16 for Secretarial review.
2. Review Resource Assessment Document (RAD) recommendations for ABC.
3. Set initial TACs and apportionments for 1988.

BACKGROUND

Amendment 16 Package.

In May the Council reviewed Amendment 16 and associated draft Environmental Assessments and Regulatory Impact Review. Following public comments the Council chose to adopt the status quo alternatives for all but two amendment topics, essentially reducing the package to a "housekeeping" amendment. The amendment package was revised and sent out for public review on June 1. The amendment contains two topics:

1. Revised definition of "prohibited species" (to coincide with Council approval of an identical definition in the Bering Sea/Aleutian Islands FMP).
2. Update the plan's descriptive sections, reorganize chapters and incorporate current Council policy.

The review period ended on August 3 with no comments received. The plan team did make several improvements, all of which were editorial in nature. The Amendment 16 package reflects current management of the Gulf groundfish fishery and the descriptive sections reflect current stocks status and fishery trends. Copies of the amendment package were sent to you in an earlier Council mailing.

Final action on Amendment 16 is scheduled for this meeting. Council approval of the package is necessary prior to submission to the Secretary for review and approval. The amendment should be implemented by March 1988.

Review Status of Stocks and Set Preliminary 1987 TACs and Apportionments for Public Review.

This meeting begins the Council's annual groundfish cycle with review and release to the public of preliminary estimates of 1988 groundfish total allowable catch (TAC), their apportionment to domestic annual processed catch (DAP), joint venture processed catch (JVP), total allowable level of foreign fishing (TALFF), halibut prohibited species catch limit (PSC) or rates, and preliminary PSC limits or rates for fully U.S.-utilized groundfish species.

The Gulf of Alaska Groundfish Plan Team met on September 8-11 to prepare this year's initial Resource Assessment Document (RAD). A copy of the RAD is included in your notebooks as item D-3(a)(1). The RAD is a key element in the OY framework approved in Amendment 15. The document presents status of stocks information, the plan team's Acceptable Biological Catch (ABC) recommendations and information necessary to utilize the halibut PSC and OY frameworks (i.e., halibut bycatch and mortality rates, status of halibut resource, sablefish bycatch rates, etc.). Table 1 in the RAD provides the team's findings.

This summer the Northwest and Alaska Fisheries Center conducted the second survey in its Triennial Survey Program in the Gulf of Alaska. This survey will generate new biomass estimates and allow for more detailed stock assessment analysis. The survey has just been completed and its results will not be known for all managed groundfish species until later this year. Until then, with possibly the exception of pollock and sablefish (there is an annual hydroacoustic survey for pollock and a longline survey for sablefish), we must continue to use biomass estimates based on the 1984 trawl survey. Therefore, initial 1988 ABCs, with the exception of pollock, Pacific cod, and rockfish, remain unchanged from the team's 1987 recommendations. The plan team intends to review the most recent survey information available in November prior to finalizing the RAD and its 1988 ABC recommendations.

Pollock ABC for the Western/Central Gulf has been revised upward from 95,000 mt in 1987 to 200,000 mt in 1988, as a result of a biomass forecasting model. The recommendation for 1988 for Pacific cod ABC, set at 125,000 mt in 1987, is specified as a range of 111,000-206,900 mt in recognition of use of a more appropriate yield model. The suggested rockfish ABC is 625 mt for the demersal shelf rockfish group found in the Southeast Outside District and 10,500 mt for all remaining rockfish of the *Sebastes* genus. This differs from that specified in 1987 because of a new grouping of species [see RAD and Rockfish Discussion Paper, D-3(a)(1)].

Table 2 of the RAD provides current TAC and catch-to-date statistics. Comparing these numbers with the plan team's initial 1988 ABC recommendations will aid in determining initial 1988 TAC estimates for public review. The Council will want to keep in mind the potential bycatch of halibut and fully U.S.-utilized groundfish species as you set the TACs. The FMP requires that initial DAP and JVP PSC limits of halibut, and JVP PSC limits of fully utilized species (i.e., sablefish, rockfish) also be sent out to public review. Several members of the plan team are available to review the RAD. A computer spreadsheet is also available to help you keep track of all the numbers.

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 1988 at this meeting, the proposal 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 1988 should be based on the 1987 DAP and JVP harvest, plus additional amounts necessary for the 1988 domestic fishery. Estimates of 1987 DAP and JVP harvests will be provided at this meeting. The National Marine Fisheries Service (NMFS) will conduct a survey of the domestic industry later this fall to determine the additional DAP needed for 1988.

Worksheets for preliminary TACs and apportionments are provided following the RAD as item D-3(a)(2).

RESOURCE ASSESSMENT DOCUMENT
FOR THE
GULF OF ALASKA GROUND FISH FISHERY

Prepared by the Gulf of Alaska Groundfish Plan Team

September 14, 1987

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INTRODUCTION

This Resource Assessment Document (RAD) for the Gulf of Alaska groundfish resources is applicable for management of the 1988 fishery under the Gulf of Alaska Groundfish Fishery Management Plan (FMP). In this RAD, the rationale and management recommendations are presented mainly from a biological perspective. These recommendations, together with socioeconomic considerations, will be used by the North Pacific Fishery Management Council to determine target quota and other management strategies for the fishery under the Magnuson Fishery Conservation and Management Act.

The RAD is organized by topic. The first part is the biological section which presents a plan team review of the condition of each target species or species groups and recommendations for acceptable biological catch (ABC). The second part is the bycatch section which provides information needed to support the halibut PSC framework. No new information for 1988 is available relative to PSC limits for fully utilized groundfish species.

The plan team (PT) for the Gulf of Alaska Groundfish FMP met in Seattle on September 8-11, 1987 to review the status of stocks of eight species or species groups which are managed under the plan. The team review and discussions were based on ADFG and NWAFC technical papers, and presentations by NMFS scientists. Results from the NMFS 1987 Gulf of Alaska trawl and longline surveys were not available at this time. Current biomass estimates from these surveys are lacking. Therefore, the team, as in the previous year, relied on data from the NMFS 1984 Gulf of Alaska survey. New information and analyses available at the time were summarized, but it is intended that this RAD will be updated to incorporate any available current biomass estimates and revised analyses at the November 1987 meeting. Current status of stocks, catches, and biological parameters are shown in Tables 1, 2 and 3, respectively. Attendance at the plan team meeting included:

Plan Team Members: J. Balsiger, R. Berg, B. Bracken, J. Fujioka,
L. Halverson, S. McDevitt, J. Taggart, T. Smith,
R. Trumble, P. Jackson

NMFS Scientists: T. Wilderbuer, H. Zenger, C. Rose, P. Dawson, J. Terry

Public Attendance: W. Orr - Alaska Factory Trawlers' Association

PART 1. STATUS OF STOCKS AND DETERMINATION OF 1988 ABCs

The following is a summary of the condition of each target groundfish species or species group in the Gulf of Alaska. Detailed discussion is provided in individual species sections:

Pollock - The 1986 biomass of 496,300 mt was projected to reach 687,100 mt in 1987 and 866,600-1,051,500 mt in 1988 depending on the various recruitment and catch levels used in the projection. The forecasting model predicted increasing trends in biomass for catch levels up to 200,000 mt. A catch level of 250,000 mt resulted in a decreasing trend in biomass after 1988. The predicted increases in biomass are primarily due to the strong 1984 year class. The PT set the ABC in the Central and Western Regulatory Areas at

Table 1.-- Current status of Gulf of Alaska groundfish resources. All figures in metric tons.

Species	1987 TAC	Projected 1987 Catch**	Stock Condition	Current Trend in Abundance	ABC	TAC
Pollock	84,000	58,200	Fair	Exploitable biomass increasing	200,000**	
Pacific cod	50,000	30,100	Good	Stable; ABC=MSY	111,000- 206,900	
Flounders	19,000	7,500	Good	Stable	537,000	
Pacific ocean perch	5,000	4,100	Depressed	Stable	10,500	
Sablefish	20,000	22,300	At MSY level	Stable; ABC=MSY	25,000	
Rockfish	4,000	4,200	Depressed	Unknown Gulfwide	10,500	
Demersal shelf rockfish	1,250	700	Depressed	Depressed and declining	625	
Thornyheads	3,750	1,700	Fair	Declining	3,750	
Other species	10,312	100	Appears good	Assumed stable	Not Applicable	

*From August 1987 NMFS DAP survey.

**Pollock not available for Eastern Area.

Table 2.--Gulf of Alaska groundfish total allowable catch (TAC) and 1987 catch statistics for domestic annual processing (DAP), reported through August 22, and joint venture processing (JVP), reported and compiled through September 5. Foreign allocations are zero and catches are excluded. All figures are in metric tons.

Species	Area	1987 TAC	Domestic Landings	JVP Catches	Total Catches
Pollock	W/C	84,000	8,744	38	8,782
	E	4,000	110	0	110
	Total	88,000	8,854	38	8,892
Pacific cod	W	15,000	790	194	984
	C	33,000	10,886	0	10,886
	E	2,000	31	0	31
	Total	50,000	11,707	194	11,901
Flounders	W	3,000	76	0	76
	C	10,000	799	1,547	1,547
	E	500	41	0	41
	Total	13,500	916	1,547	2,463
Pacific ocean perch	W	1,500	984	0*	984
	C	1,500	1,151	2*	1,153
	E	2,000	377	0*	377
	Total	5,000	2,512	2*	2,514
Sablefish	W	3,000	3,360	0*	3,360
	C	8,800	12,418	8*	12,426
	W.Yak	4,000	3,198	0*	3,198
	E.Yak/S.E.	4,200	3,264	0*	3,264
	Total	20,000	22,240	8*	22,240
Atka Mackerel**	W	100	0	0	0
	C	100	0	0	0
	E	40	0	0	0
	Total	240	0	0	0
Other Rockfish	Gulfwide	4,000	4,000	4*	4,004
	S.E.O.	1,250	700	0*	700
	Total	5,250	4,700	4*	4,704
Thornyheads	Gulfwide	3,750	1,684	0	1,684
Squid**	Gulfwide	5,000	0	0	0
Other Species	Gulfwide	9,537	5	26	31
GULF OF ALASKA TOTAL		196,552	52,618	1,819	54,437

*Prohibited species in JV fisheries.

**Will be combined with "other species" in 1988.

Table 3.--Gulf of Alaska Stock Assessment Summary

Species	Maximum Sustainable Yield (MSY)	Threshold Biomass (TB)	Current** Biomass (B)	Equilibrium Yield (EY)	Acceptable Biological Catch (ABC)
Pollock	116,000-334,000	Unknown	496,300	Unknown	200,000
Pacific cod	125,000	Unknown	538,820	Unknown	111,000-206,900
Flounders	477,853	Unknown	2,056,808	Unknown	537,000
Rockfish*	17,000-31,000	Unknown	583,842	Unknown	10,500
Demersal shelf rockfish (S.E. Outside District)	Unknown	Unknown	Unknown	Unknown	625
Thornyheads	3,750	Unknown	83,000	Unknown	3,750
Sablefish	25,000	Unknown	535,918	Unknown	25,000

*Rockfish includes all the species of the shelf and slope assemblages except for species of the demersal shelf assemblage in the Southeast Outside District.

**Current biomass levels at this time are from the NMFS 1984 trawl survey except for pollock biomass which was estimated from the NMFS 1986 hydroacoustic survey.

200,000 mt. There is no information to estimate an ABC for the Eastern Area and the PT recommends that a TAC be established for bycatch amounts for trawl fisheries in the Eastern Area.

Pacific cod - The Pacific cod stock was determined to be in good condition in the 1986 RAD based on biomass estimates from the NMFS 1984 trawl survey. Current estimates of biomass will be available from the NMFS 1987 trawl survey. Estimates of potential yield from the stock range from 111,000-206,900 mt based on biomass estimates from 1984. Recent catches of Pacific cod have been well below these estimates of potential yield. The PT set the 1988 Gulfwide ABC at 111,100-206,900 mt.

Flounders - The flounder group is determined to be in good condition. Potential yield from this group was estimated by applying the exploitation rate at the FO.1 level to the 1984 biomass estimate, resulting in a yield of 537,000 mt. Gulfwide flounder catches are well below this estimate of potential yield. The PT recommends an ABC of 537,000 mt apportioned to the individual management areas as follows: 101,000 mt to the Western Area; 346,000 mt to the Central Area; and 90,000 mt to the Eastern Area. The PT recommends that these results be viewed with caution due to the limitations in the data.

Rockfish - The PT recommends that a single ABC be applied to all rockfish species. The ABC will include all the proposed assemblages in Amendment 16 with the exception of the demersal shelf assemblage of the Southeast Outside District. The PT set a Gulfwide ABC for rockfish (exclusive of the Southeast Outside demersal shelf assemblage) of 10,500 mt. Based on the distribution of the rockfish biomass estimates from the NMFS 1984 survey, the ABC is apportioned to the management areas as follows: 2,520 mt to the Western Area; 3,465 mt to the Central Area; and 4,515 mt to the Eastern Area. There are currently no target fisheries for the pelagic shelf rockfish. There is no information to derive an ABC for the pelagic shelf rockfish assemblage.

Demersal shelf rockfish - There are no biomass or yield estimates for the demersal assemblage of the shelf rockfish. The demersal shelf rockfish are the target of a longline fishery in the Southeastern Area. The ADF&G information on the shelf demersal assemblage suggests that the population is declining. The PT set the ABC for the Southeast Outside District at 625 mt.

Thornyhead rockfish - Longline survey indices and mean lengths in trawl surveys have shown recent declines. The PT recommends an ABC equal to 3,750 mt.

Sablefish - Sablefish have been determined to be in good condition due to good recruitment from the 1977 and the 1980 or 1981 year classes. The 1987 Japan-U.S. cooperative longline survey and the NMFS trawl survey will provide more current information on the resource. Estimates of the potential yield from the stock are still being evaluated, therefore the PT recommends that the ABC remain at 25,000 mt.

Other species - No recommendations were made by the PT for this group. FMP procedures define the reasonable quota for this category to be set at 5% of the sum of the TACs established for the other species categories.

Pollock

Annual catches of pollock in the Gulf of Alaska increased steadily from 1978 to 1984 (Table 4). Dramatic declines in the spawning pollock biomass in Shelikof Strait after 1984 led to a somewhat reduced harvest in 1985 and sharply curtailed fishing in 1986. The Council established a zero quota for joint venture roe fisheries in Shelikof Strait in 1987, and the harvest through August 1, 1987, has been 8,615 mt, all in DAP fisheries.

Hydroacoustic (H/A) surveys conducted since 1981 in Shelikof Strait during the spawning period have been used to estimate biomass and have provided a basis for the status of stocks analyses. The H/A survey was repeated in 1987; however, because of hardware failure no biomass estimate can be obtained. Consequently, the 1987 biomass projected from the 1986 H/A survey provides the best estimate of current biomass. This estimate is 687,000 mt (three years old and older) compared to 496,000 mt in 1986.

Although no biomass estimate could be made from the 1987 survey, the trawl samples that were taken in conjunction with the H/A survey did provide an estimate of the relative year class strengths present during the time of the survey (Figure 1). The age structure analysis showed that 58% of all fish were three years old (the 1984 year class), and that 32% of all fish were two years old (the 1985 year class). Only 10% of the fish were four years old or older.

Biomass projections for 1988 were made using the same age structured model that has been used for the past three years. This projection begins with the latest available H/A biomass estimate and accounts for catches by age class since the estimate.

The projections were made for two recruitment scenarios, A and B, and for 12 catch scenarios, A through L (Table 5). Both recruitment scenarios use poor recruitment for 1986 (the 1983 year class) and strong recruitment for 1987 (the 1984 year class). The recruitment strength used for 1988 (the 1985 year class) was strong for scenario A and only average for scenario B. Recruitment for 1989 (the 1986 year class), for which we have very little information and which has a lesser effect on model projections through 1988, was input as average in both scenarios.

The model requires expected catch for each half year for 1987 and 1988. The catch scenarios shown in the table cover two expected catch levels for the second half of 1987 (25 or 50 mt), and a variety of expected catches for 1988 ranging from 20,000 mt to 250,000 mt.

Model results are shown in Table 6. Under recruitment scenario A, no catch schedule examined (not even the catch at 250,000 mt) will prevent the biomass from increasing through 1989. Even under the less optimistic recruitment scenario B, a 1988 catch of 200,000 mt allows the biomass to increase into 1989. Only at the 1988 catch level of 250,000 mt under recruitment scenario B does the modeled biomass decrease between 1988 and 1989.

The team has identified the 1988 catch of 200,000 mt which allows the modeled population to reach approximately 900,000 mt in 1989 as the best estimate of 1988 ABC for the combined Western and Central Areas.

Table 4.--Annual pollock catch in the Gulf of Alaska by foreign and U.S. fisheries, 1977-86 (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	20.5	232.3	9.1	261.9
1986	0.1	63.0	10.0	73.1

Table 5.--1987 Gulf of Alaska pollock projection parameters.

Recruitment Scenarios			
Year	Year Class	A	B
1986	1983	P	P
1987	1984	S	S
1988	1985	S	A
1989	1986	A	A

Strong = 1.7 billion
 Average = 0.9 billion
 Poor = 0.3 billion

Catch Scenarios (1st half/2nd half)						
Year	A	B	C	D	E	F
1986	63/10	63/10	63/10	63/10	63/10	63/10
1987	10/25	10/25	10/25	10/50	10/50	10/50
1988	10/10	50/10	50/50	10/10	50/10	50/50

Catch Scenarios (1st half/2nd half)						
Year	G	H	I	J	K	L
1986	63/10	63/10	63/10	63/10	63/10	63/10
1987	10/25	10/25	10/25	10/50	10/50	10/50
1988	100/50	150/50	200/50	100/50	150/50	200/50

Table 6.--1987 Gulf of Alaska pollock projection summary.

RECRUITMENT SCENARIO A

Catch Scenario

(population biomass in 1000 metric tons)

Year	A	B	C	D	E	F
1986	496.3	496.3	496.3	496.3	496.3	496.3
1987	687.1	687.1	687.1	687.1	687.1	687.1
1988	1,051.5	1,051.5	1,051.5	1,033.0	1,033.0	1,033.0
1989	1,335.3	1,287.2	1,254.7	1,319.2	1,271.0	1,238.5

Year	G	H	I	J	K	L
1986	496.3	496.3	496.3	496.3	496.3	496.3
1987	687.1	687.1	687.1	687.1	687.1	687.1
1988	1,051.5	1,051.5	1,051.5	1,033.0	1,033.0	1,033.0
1989	1,194.3	1,133.4	1,072.7	1,178.1	1,116.9	1,056.0

RECRUITMENT SCENARIO B

Catch Scenario

(population biomass in 1000 metric tons)

Year	A	B	C	D	E	F
1986	496.3	496.3	496.3	496.3	496.3	496.3
1987	687.1	687.1	687.1	687.1	687.1	687.1
1988	885.1	885.1	885.1	866.6	866.6	866.6
1989	1,109.5	1,062.6	1,029.1	1,093.4	1,046.3	1,012.9

Year	G	H	I	J	K	L
1986	496.3	496.3	496.3	496.3	496.3	496.3
1987	687.1	687.1	687.1	687.1	687.1	687.1
1988	885.1	885.1	885.1	866.6	866.6	866.6
1989	969.9	910.9	851.7	953.6	894.4	835.1

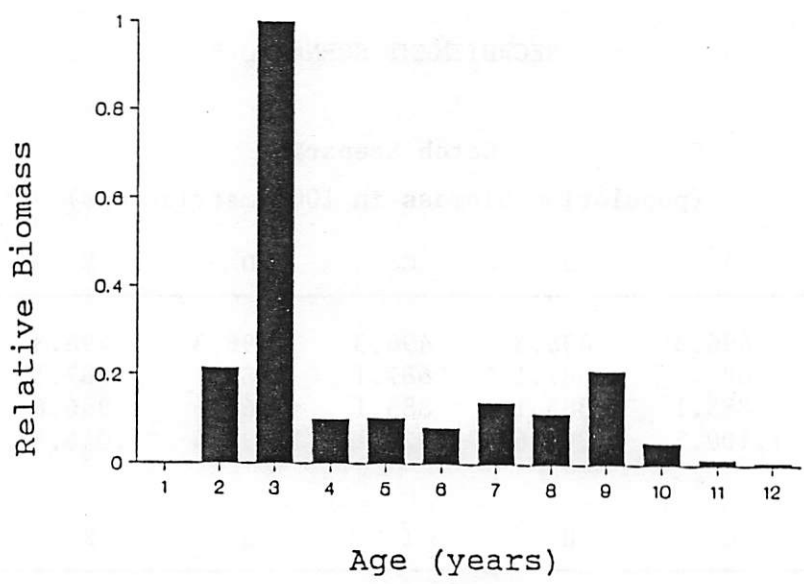
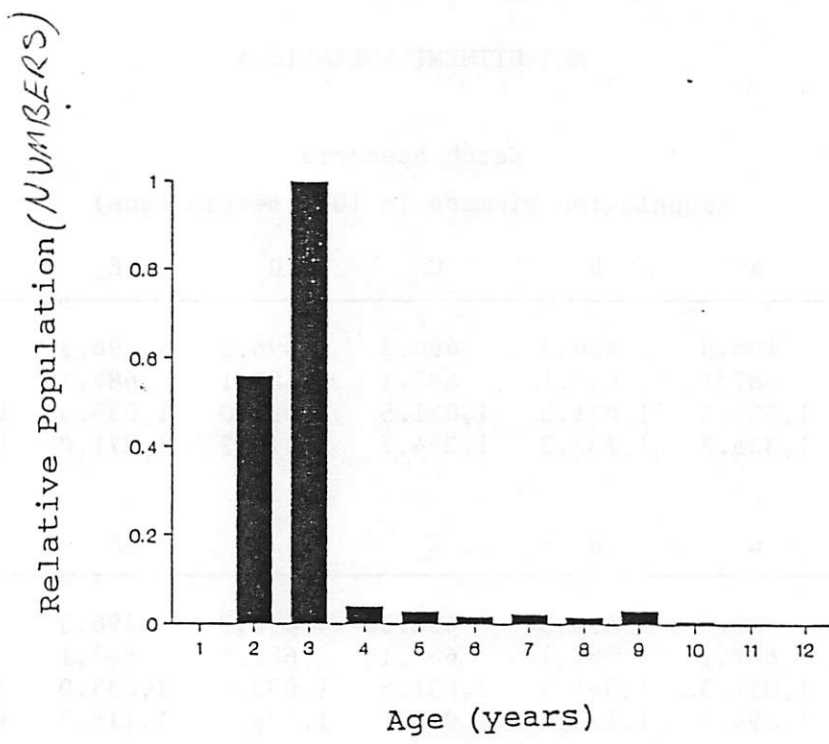


Figure 1.--Relative Age Distribution for Pollock, 1987

The current pollock population in the Gulf of Alaska is composed almost entirely of the 1984 and 1985 year classes. Between 1988 and 1989, these fish will be growing very rapidly. With an assumed strong year class (1.7 billion fish, Table 5), followed by an average year class, catches that seem large relative to the last two years' harvests have little impact on this large influx of fish.

The team notes that the model has had varied success in predicting the biomass which will return to Shelikof Strait. The 1985 estimate projected from the 1984 H/A biomass estimate was 71% high. In contrast, the 1986 estimate projected from the 1985 H/A estimate was 14% low.

The team will examine the results of the 1987 Gulf of Alaska trawl survey when they become available. While young pollock are often not sampled well by bottom trawl gear, some information should be provided by the survey. The team will also examine model projections under more pessimistic recruitment scenarios prior to development of the final RAD in November 1987.

There is no data to estimate an ABC for the Eastern Area. The team recommends that the Council establish a TAC for the Eastern Area that would provide sufficient bycatch in other Eastern Area fisheries and the opportunity for exploratory fishing for pollock in that area. Approximately 70 mt of pollock were reported landed in the Eastern Area in 1986.

Pacific Cod

The 1987 Pacific cod catch in the Gulf of Alaska was taken entirely by domestic fishermen; as of August 22, total catch was 8,900 mt: 17% taken by trawl fishermen and 83% by longline fishermen. The 1986 Pacific cod catch was 21,911 mt: 5,343 mt from domestic fisheries and 16,568 mt from foreign and joint venture fisheries (Table 7). The bulk of the domestic catch (84%) was taken by the groundfish trawl fishery while the Japanese longline fishery accounted for 92% of the combined foreign and joint venture catch. As in past years, the domestic catch was primarily from the INPFC Kodiak area while the foreign catch was predominately from the Shumagin area.

The condition of the Pacific cod stock in the Gulf of Alaska as reported in the 1986 RAD was determined from estimates of biomass obtained from the 1984 NMFS triennial trawl survey. Results from the 1987 triennial survey are not yet available; consequently, there are no revised estimates of current biomass. The 1986 estimate of maximum sustainable yield from the Pacific cod stock was 125,000 mt. This MSY estimate was derived by assuming that the 1984 survey estimate of exploitable biomass (538,820 mt) represented virgin biomass then applying the method of Alverson and Pereyra (1969) such that:

$$Y = XMB$$

where, Y is yield;

X is Alverson's and Pereyra's constant (0 X 1);

M is instantaneous natural mortality; and

B is virgin biomass.

Table 7.--Catch (mt) of Pacific cod in the Gulf of Alaska by
NPFMC regulatory area, 1977-1986.

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	8,426	5,915	102	14,442
1986	12,649	8,136	360	21,145

Using this procedure, MSY in the Western and Central Gulf was estimated at 115,000 mt; an additional 10,000 mt were added to account for potential yield in the Eastern Gulf.

Current wisdom regarding Pacific cod in the Gulf of Alaska suggests that past estimates of the instantaneous rate of natural mortality ($M=0.45$) are too high. A more appropriate estimate of M is 0.22 as determined by Thompson and Shimada (1987) for Pacific cod in the Bering Sea. Alternative estimates of potential yield from Gulf of Alaska Pacific cod were computed using natural mortality and growth data for Bering Sea Pacific cod and a yield-per-recruit model (Beverton and Holt, 1957) to estimate fishing mortality. Zenger estimates that yield-per-recruit could be maximized at an instantaneous fishing mortality rate of $F=0.55$.

If it is assumed that exploitable Pacific cod biomass has not changed since the 1984 triennial survey, then a new estimate of potential yield can be approximated^{1/} by multiplying the exploitation rate (U) by the exploitable biomass:

$$Y = UB$$

The exploitation rate which corresponds to $M=0.22$, $F=0.55$ is $U=0.384$. Potential yield is therefore 206,900 mt. A more conservative estimate of potential yield is obtained by applying Deriso's (Deriso, 1987) approximation of $F_{0.1}$. Using this method $F_{0.1}=0.26$, $U=.206$, and $Y=111,000$ mt.

The Gulf of Alaska plan team acknowledges that the assumption of virgin biomass in 1984 can be called into question and that the use of the natural mortality rate of $M=0.45$ is probably inappropriate. As a result, the 1986 estimate of MSY is not particularly supportable. Nonetheless, we continue to use 125,000 mt as the estimate of MSY. The new estimates of potential yield are usable to determine a range of acceptable biological catch.

Recent catches of Pacific cod have been well below the estimates of potential yield. Overall, the stock is assumed to be healthy. New estimates of stock biomass are due at the conclusion of the 1987 triennial survey. The plan team recommends that the 1988 Gulfwide ABC be set between 111,000 mt and 206,900 mt.

Flounders

The 1987 Gulf of Alaska (GOA) flounder catch through August 25 is about 2,400 mt. Approximately 900 mt of this total has been harvested by the DAP fisheries with the remaining 1,500 mt being harvested by the JVP fisheries.

The GOA flounder fishery (except Pacific halibut) between 1978 and 1986 changed from one dominated (98%) by foreign harvesting to one where 58% of the catch is harvested by the domestic fleet (Table 8 and Table 9). Total catch

^{1/} The U used here is an approximation which accounts for mortality rates but not growth rates and is not generally applicable to calculating yield in weight.

Table 8.--Catch (in metric tons) of flatfish in the Gulf of Alaska, by International North Pacific Fisheries Commission statistical area and fishery category, 1978-1986.

Fishery Category	Western Gulf	Central Gulf	Eastern Gulf	Total
Foreign				
1978	2,538	6,312	5,491	14,341
1979	2,817	5,026	5,631	13,474
1980	3,022	6,885	5,590	15,497
1981	3,224	5,759	5,461	14,444
1982	1,412	7,516	58	8,986
1983	2,020	7,459	51	9,530
1984	603	2,430	0	3,033
1985	115	55	0	170
1986	56	15	0	71
Joint Venture				
1978	5	0	0	5
1979	7	62	1	70
1980	11	198	0	209
1981	0	18	0	18
1982	6	12	0	18
1983	171	2,521	0	2,692
1984	566	2,882	0	3,448
1985	234	2,123	0	2,447
1986	302	641	0	961
Domestic				
1978	6	86	760	852
1979	0	55	329	384
1980	0	46	94	140
1981	0	77	327	404
1982	0	71	203	274
1983	0	88	351	439
1984	5	246	181	432
1985	10	254	197	461
1986	362	774	273	1,409
Total				
1978	2,549	6,371	6,251	15,171
1979	2,824	5,143	5,962	13,929
1980	3,033	7,129	5,684	15,846
1981	3,224	5,854	5,788	14,866
1982	1,418	7,599	261	9,278
1983	2,191	10,068	402	12,661
1984	1,174	5,558	181	6,913
1985	449	2,432	197	3,078
1986	720	1,448	273	2,441

Table 9--Composition of the 1986 Gulf of Alaska flatfish catch (t), by fishery category and species (percentages of the grand total are in parentheses).

	<u>Foreign</u> <u>catch</u> (%)	<u>Joint venture</u> <u>catch</u> (%)	<u>Domestic</u> <u>catch</u> ^a (%)	<u>Total</u> <u>catch</u> (%)
<u>Deep-water species</u>				
Arrowtooth flounder	55 (77)	514 (54)	95 (6)	664 (27)
Flathead sole	9 (12)	60 (6)	0 ^b (0)	69 (3)
Rex sole	1 (1)	41 (4)	51 (4)	93 (4)
Dover sole	0 (0)	23 (2)	156 (11)	179 (7)
Other	<u>0 (0)</u>	<u><1 (<1)</u>	<u>22 (2)</u>	<u>22 (1)</u>
All deep-water	65 (92)	638 (66)	324 (23)	1,027 (42)
<u>Shallow-water species</u>				
Rock sole	4 (6)	212 (22)	772 (55)	988 (40)
Yellowfin sole	2 (2)	3 (<1)	1 (<1)	6 (<1)
Butter sole	<1 (<1)	87 (9)	0 ^b (0)	87 (4)
Starry flounder	0 (0)	7 (1)	159 (11)	166 (7)
Other	<u>0 (0)</u>	<u>14 (2)</u>	<u>153 (11)</u>	<u>167 (7)</u>
All shallow-water	6 (8)	323 (34)	1,085 (77)	1,414 (58)
All flatfish	71 (100)	961 (100)	1,409 (100)	2,441 (100)

during this period declined 84%, from 14,866 mt to 2,441 mt. This decline is attributed primarily to restrictions on the foreign fisheries, and not to a decline in the resource which is being harvested at a level well below its potential yield.

The Kodiak area continues to produce more than half of the GOA flounder catch. While the domestic fishery in this area doubled, this did not completely compensate for a substantial drop in the joint venture catch. Substantial catch increases occurred in the Shumagin and Yakutat areas due to increases in domestic catches, while the catch in the Chirikof area declined substantially.

Revised estimates of mortality and growth parameters and yield analyses were derived from 1984 survey data. Analysis of the effect of fishing rates on yield indicated that cohorts of the four major species reach maximum biomass before they enter the fishery and before the age of sexual maturity.

The ABC was calculated at the F0.1 exploitation rate described by Gulland and Boerma (1973) applied to the 1984 biomass estimates (Rose, 1986) (Table 10). The ABC of 537,000 mt is apportioned to the individual management areas as follows: 101,000 mt to the Western area, 346,000 mt to the Central Area, and 90,000 mt to the Eastern Area. The team recommends that the ABC remain at 537,000 mt and be apportioned between the management areas based on biomass.

In view of the overlapping distributions of these species, the possibility of them simultaneously being fished at an optimum level is unlikely. If catches of these species were to approach the established ABC levels, they would likely be limited by the potential for high bycatches of Pacific halibut.

Results of the 1987 triennial survey are not yet available, necessitating continued reliance on the 1984 survey results. These data must be viewed with caution, however, as they are being used to estimate current conditions. In particular, mortality estimates are based on catch curves for a single year's data. A good deal of uncertainty exists relative to stock condition of the GOA flounder resource, particularly in respect to the mortality estimates.

Introduction to Rockfish

In previous RADs the team has reported Sebastes rockfish in two categories, the POP complex which included Pacific ocean perch (S. alutus) and four associated slope dwelling species and "other rockfish" which included all other species in the genus Sebastes. Consistent with Amendments 14 and 16 to the Gulf of Alaska Groundfish Fishery Management Plan, this year's RAD separates the Sebastes by assemblage and recommends that management authority be given to the State of Alaska for demersal shelf rockfish in the Southeast Outside district under certain conditions. See Table 11 for a list of species by assemblage and the attached discussion paper (Appendix A) for a detailed description of management recommendations for 1988. It should be noted that while the team endorses the assemblage management approach, data is lacking to set separate ABC levels for the various assemblages in many areas of the Gulf. In those cases the team recommends that all Sebastes rockfish be managed in a single category with TACs set according to the best available information concerning the entire complex.

Table 10--Biomass estimates (t) for Gulf of Alaska flatfish, based on 1984 bottom trawl surveys, by North Pacific Fishery Management Council regulatory area and species (percentages of the grand total are in parentheses).

	Area			Total (%)
	Western	Central	Eastern*	
<u>Deep-water species</u>				
Arrowtooth flounder	99,422	927,316	318,267	1,345,005 (65)
Flathead sole	60,789	208,203	50,265	319,257 (16)
Rex sole	10,476	49,555	14,857	74,888 (4)
Dover sole	4,704	54,678	10,834	70,216 (3)
Other	<u>113</u>	<u>250</u>	<u>362</u>	<u>725 (<1)</u>
All deep-water	175,504	1,240,002	394,585	1,810,091 (88)
<u>Shallow-water species</u>				
Rock sole	56,152	71,392	561	128,105 (6)
Yellowfin sole	53,321	22,773	88	76,182 (4)
Butter sole	1,222	16,976	151	18,349 (1)
Starry flounder	1,085	9,182	428	10,695 (<1)
Other	<u>484</u>	<u>3,907</u>	<u>8,995</u>	<u>13,386 (1)</u>
All shallow-water	112,264	124,230	10,223	246,717 (12)
All flatfish	287,768	1,364,232	404,808	2,056,808 (100)

*Biomasses in shallow areas of the eastern area were indirectly estimated due to lack of survey coverage (see text).

Table 11.--Rockfish species in the genus Sebastes and Sebastolobus contributing to the rockfish assemblages adopted in Amendment 16 to the FMP.

Slope Rockfish

Aurora rockfish (Sebastes aurora)
 Blackgill rockfish (S. melanostomus)
 Chilipepper rockfish (S. goodei)
 Darkblotch rockfish (S. crameri)
 Greenstriped rockfish (S. elongatus)
 Harlequin rockfish (S. variegatus)
 Northern rockfish (S. polyspinus)
 Pacific ocean perch (S. alutus)
 Pygmy rockfish (S. wilsoni)
 Red banded rockfish (S. babcocki)
 Rougheye rockfish (S. aleutianus)
 Sharpchin rockfish (S. zacentrus)
 Shortbelly rockfish (S. jordani)
 Shortraker rockfish (S. borealis)
 Splitnose rockfish (S. diploproa)
 Stripetail rockfish (S. saxicola)
 Vermilion rockfish (S. miniatus)
 Yellowmouth rockfish (S. reedi)

Thornyhead Rockfish

Longspine thornyhead (Sebastolobus altivelis)
 Shortspine thornyhead (S. alascanus)

Demersal Shelf Rockfish

Boccacio (Sebastes paucispinus)
 Canary rockfish (S. pinniger)
 China rockfish (S. nebulosus)
 Copper rockfish (S. caurinus)
 Quillback rockfish (S. maliger)
 Redstripe rockfish (S. proriger)
 Rosethorn rockfish (S. helvomaculatus)
 Silvergray rockfish (S. brevispinus)
 Tiger rockfish (S. nigrochinctus)
 Yelloweye rockfish (S. ruberrimus)

Pelagic Shelf Rockfish

Black rockfish (Sebastes melanops)
 Blue rockfish (S. mystinus)
 Dusky rockfish (S. ciliatus)
 Widow rockfish (S. entomelas)
 Yellowtail rockfish (S. flavidus)

Three sections follow. The first, entitled "Rockfish", contains recommendations for a Gulf of Alaska ABC of 10,500 mt for all rockfish other than demersal shelf rockfish in the Southeast Outside District, and a breakdown of that ABC by regulatory area. Because there are no available data to indicate that an exploitable biomass of either of the shelf rockfish assemblages exists outside of the Southeast Outside District, the team recommends that, for 1987, all Sebastes rockfish including the shelf and slope assemblages be grouped in the category "rockfish" and that the group be managed as one unit.

The second section, entitled "shelf rockfish", presents available information on the demersal and pelagic shelf assemblages. The team recommends that a separate ABC of 625 mt be set for demersal shelf rockfish in the Southeast Outside District.

The third section discusses available information on thornyhead rockfish and recommends a Gulfwide ABC of 3,750 mt for the two species of Sebastes.

Rockfish

Until the 1987 triennial trawl survey results become available, biomass estimates for rockfish in the Gulf will continue to be based primarily on results of the 1984 survey. The 1987 biomass estimates show a minor change from 1986 estimates in the previous RAD and are based on results from both the 1984 survey and the joint U.S.-Japan longline survey data for 1979-1986.

The 1986 RAD estimated the Gulfwide POP complex biomass at 552,000 mt, with 335,000 mt of Pacific ocean perch (S. alutus). The 1987 estimate of total rockfish biomass is 583,842 mt of which 370,673 mt are S. alutus (Table 12). Since the POP complex represents virtually all (99.4%) of the documented Gulfwide biomass, the plan team is recommending that a single ABC be applied to all rockfish species. The ABC will apply to all of the proposed assemblages in Amendment 16 with the exception of the shelf demersal complex in the Southeast Outside District, which will be managed separately by ADF&G. The single rockfish ABC is unchanged from the recommended ABC for the POP complex in the 1986 RAD. The management area allocations of the Gulfwide rockfish ABC are proportional to the distribution of POP complex biomass in the three management areas.

The ABC for Gulfwide rockfishes (exclusive of the Southeast Outside District shelf demersal assemblage) is 10,500 mt. Based on the distribution of rockfish biomass estimates, the ABCs for rockfishes in the management area are:

Western	24%	2,520 mt
Central	33%	3,465 mt
Eastern	43%	4,515 mt

The ABC is based on Stock Reduction Analysis, therefore a change in ABC is not warranted at this time, even though biomass estimates have been revised upward since 1986. Should the Council wish to continue the rockfish rebuilding program in 1988, it may exercise the option to establish a TAC at a lower value than ABC.

Table 12.--1987 biomass estimates of rockfishes in the Gulf of Alaska,
 based on 1984 triennial trawl survey data and 1979-1986 joint
 longline survey data.

Species	Western	Central	Eastern	Total
POP Complex				
Pacific ocean perch	77,885	91,961	200,827	370,673
northern rockfish	42,417	33,307	7	75,731
roughey rockfish	13,845	51,407	9,116	74,368
shortraker rockfish	8,174	12,536	32,951	53,661
sharpchin rockfish	0	1,544	4,445	5,989
SUB TOTAL	142,321	190,755	247,346	580,422
All other rockfish	61	727	2,633	3,420
TOTAL	142,382	191,482	249,979	583,842

The plan team emphasizes that the combined ABC estimates are for management purposes, and are not intended to replace the assemblage management approach outlined in Amendment 16. The team recommends that catch reporting include a breakdown by assemblage; and that port sampling and observer coverage be increased, in order to document the contribution of assemblage species groups to catch totals. The Council also may wish to implement some measures designed to encourage exploratory fishing for species that are poorly represented in trawl survey results.

Shelf Rockfish

Shelf rockfish as proposed in Amendment 16 to the Gulf of Alaska Groundfish Fishery Management Plan include two separate assemblages. The demersal shelf rockfish includes 10 species of bottom dwelling species which are the target of a longline fishery in the Southeastern area. The pelagic shelf rockfish assemblage includes five species of rockfish that live in waters generally shallower than 200 meters and spend at least a portion of their life off bottom. While some incidental landings of pelagic shelf rockfish are reported from the Southeastern area, the catches are small and there are currently no target fisheries for pelagic rockfish.

There are no biomass estimates available for either of these species groups and no yield estimates have been calculated. The Alaska Department of Fish and Game has, however, established preliminary harvest limits for the demersal shelf assemblage in the Southeastern area based upon fisheries performance indicators collected in port sampling programs from 1982 through 1986.

In the area with the longest history of exploitation, the Central Outside (CSEO) area near Sitka, the Council set a harvest level of 600 mt for the 1985 season. Based upon a rockfish habitat comparison of the outside management areas made by ADF&G, the team recommended last year that the 600 mt TAC be expanded to include the other areas of the Southeast Outside District and, in response, the Council set a TAC of 1,250 mt for demersal shelf rockfish for the entire Southeast Outside District for the 1987 season. In addition, Amendment 14 to the Gulf Plan provided for the State of Alaska to assume management responsibility for this fishery under certain conditions.

The ADF&G reviewed fisheries performance data from the CSEO area and is concerned that CPUE values appear to be declining in the fishery even though more species of fish are being marketed than when the fishery first started. They also noted that the 600 mt quotas set for the area has never been reached, and, in fact, landings dropped off sharply during 1985 and 1986 (Table 13) even though the fishery was unregulated prior to 1987. Market demand and exvessel prices for rockfish increased over that time period. In addition, landing records show that fishermen are traveling progressively further from the port of landing to maintain productive fishing. As a result of that analysis, the ADF&G used inseason management action to close the CSEO area to target fishing for demersal shelf rockfish after approximately 300 mt were harvested from that area. That level was selected because it is slightly below the 1985 and 1986 harvest levels and ADF&G felt that it more closely reflected the sustainable harvest than the 600 mt quota. The ADF&G adjusted the recommended harvest levels for the adjacent outside management areas proportional to the reduction for the CSEO area. Thus, the entire Southeast Outside area was closed to target fishing for demersal shelf rockfish when approximately 700 mt was taken.

Table 13.--Shorebased landings of demersal shelf rockfish from the Central Southeast Outside Management area of the Southeast Outside District, 1982-86.

Year	Harvest (mt)	Vessels	Landings
1982	104	50	184
1983	167	43	220
1984	521	104	577
1985	362	118	434
1986	349	109	463
Average	300	85	376

The team notes that the five-year average harvest from the CSEO area is identical to the 300 mt preliminary harvest limit set by ADF&G for that area (Table 13). The ADF&G information suggests that demersal shelf rockfish populations are declining and the unconstrained harvest averaged only 300 mt from the area from 1982 through 1986 even with increasing market opportunities. For those reasons, the team believes that the 1986 ABC estimate of 600 mt for the area in the 1986 RAD is too high. Therefore, the team recommends that the ABC for the CSEO area be set at 300 mt, the five-year average harvest level from that area. In addition, the ABC levels for the adjacent areas should be adjusted downward proportionately, resulting in a recommended ABC for demersal shelf rockfish of 625 mt for the entire Southeast Outside District. There is currently no information available from which to estimate ABC levels for the demersal shelf rockfish in other areas of the Gulf. The 1984 and 1987 triennial surveys did not detect these species in harvestable amounts outside the Southeast area. However, it should be noted that the surveys are not designed to survey the rough habitat where these species are normally encountered.

There is no information available upon which to base an ABC estimate for pelagic shelf rockfish anywhere in the Gulf. Schools of mixed pelagic species have been reported by ADF&G from the Southeast area. Abundance appears to vary seasonally and annually and the biomass has not been quantified. The Council may wish to establish an experimental fishery for this species group, but if such a fishery is conducted, a cautious approach is recommended.

Exploitable concentrations of shelf species have not been identified in areas other than the Southeast Outside District. Therefore, the team recommends that the shelf assemblages be included with the slope assemblage for management in all areas except the Southeast Outside District until such time that adequate data becomes available to determine separate ABC levels. The team also recommends that observer coverage of the rockfish fishery be increased, the industry be educated and encouraged to report rockfish catch by species rather than by market category, and other means be developed to better define the species composition of the commercial harvest.

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 continental slope. The thornyhead rockfish is harvested in a deep-water fishery and also as a bycatch in the directed sablefish fisheries. The annual harvest of about 1,350 mt in 1980 and 1981 declined to about 750 mt in 1982 and 1983 (Table 14). With the reduced level of the foreign longline fishery for sablefish, the observer-reported bycatch of thornyhead rockfish dropped to 108 mt in 1984. The domestic fishery displaced the foreign fishery in 1984 and reported landings of 24 mt, 27 mt, and 713 mt in 1984, 1985, and 1986, respectively. In 1987 the catch has been 1,684 mt (preliminary through August).

The Japan-U.S. cooperative longline survey index of relative biomass for thornyhead rockfish progressively declined 54% over the period 1980-84. The index increased slightly in 1985 and then declined again in 1986. The statistical significance of changes in the index have not yet been evaluated. No appreciable changes in the mean length of thornyhead rockfish captured in

Table 14.--Catch (in metric tons) of thornyheads in the Gulf of Alaska by International Pacific Fisheries Commission statistical area and fishery category, 1980-87.

Year	Nation	Western	Central	Eastern	Total
1980	Japan	129	588	499	1,216
	ROK	99	-	33	132
	USSR	1	2	-	3
	Total	229	590	532	1,351
1981	Japan	203	373	544	1,120
	ROK	154	54	12	220
	Total	357	427	556	1,340
1982	Japan	134	461	64	659
	ROK	32	31	65	128
	Total	166	492	129	787
1983	Japan	148	478	53	679
	ROK	10	23	4	37
	JV	12	1	-	13
	Total	170	502	57	729
1984	Japan	47	112	-	159
	ROK	3	2	-	5
	Poland	-	1	-	1
	JV	18	1	-	19
	U.S.	9	1	14	24
	Total	77	117	14	208
1985	Japan	4	0	-	4
	JV	2	7	-	9
	U.S.	6	22	41	69
	Total	12	29	41	82
1986	JV	1	-	-	1
	U.S.	322	282	109	713
	Total	323	282	109	714
1987*	U.S.	367	931	333	1,631

*Preliminary through August 1987.

Sources: Foreign and joint venture catches: personal communication with Jerald Berger, U.S. Foreign Fisheries Observer Program, NWAFC, NMFS, NOAA, BIN C15700, Building 4, 7600 Sand Point Way N.E., Seattle, WA 98115.
 U.S. catches: Pacific Fishery Information Network (PacFIN), Pacific Marine Fisheries Commission, 305 State Office Building, 1400 S.W. Fifth Avenue, Portland, OR 97201.

the longline survey were observed during 1980-86, however, mean lengths observed in trawl surveys showed declines after 1982.

The MSY given in the FMP for the thornyhead rockfish is 3,750 mt. This MSY is 4.5% of the estimated biomass. Relative to yield-per-recruit analysis and the biomass estimate, an ABC of 3,750 mt appears to be conservative. However, because of recent declines in the longline survey index and the mean length of fish observed in trawl surveys, the current population is probably below MSY levels. Until 1987 survey results are analyzed, the PT recommends leaving ABC at the current level of 3,750 mt.

Sablefish

The 1987 Gulf of Alaska sablefish fishery so far has landed nearly 20,420 mt of sablefish with 6,462 mt taken from the Eastern Regulatory Area, 10,595 mt taken from the Central area, and 3,363 mt taken from the Western Regulatory Area (Table 15). The catch exceeds the 1987 TAC of 20,000 mt, with the Central and Western areas exceeding their respective apportionments of TAC, while the catch in the Eastern area is less than its portion of TAC. A short season is scheduled in late September to catch the remainder of the Eastern area portion of TAC.

The TAC was raised from 1983-85 levels of 8,980 mt to 15,000 mt in 1986 and to 20,000 mt for 1987 in response to various indications that the condition of the stocks had improved since the late 1970s and early 1980s. The Japan-U.S. cooperative longline survey showed significant increases since 1979, and in 1985 indicated strong recruitment of a 1980 or 1981 year class as well as an increase in availability of older year classes. The 1986 longline survey index in the 201-1,000 m depths increased slightly over 1985 (Figure 2). The 1984 triennial survey trawl survey indicated strong recruitment of a 1980 or 1981 year class and an estimate of biomass of 536,000 mt, larger than most previous estimates.

The 1987 Japan-U.S. cooperative longline survey and the 1987 NWAFC longline survey will be analyzed and preliminary results will be available sometime in November. Computations of sustainable yields from estimates of recruitment, growth and natural mortality are still being evaluated, therefore, the PT recommends last year's value of 25,000 mt as a preliminary estimate of ABC.

Recent tagging studies suggest that movement of sablefish between areas is more significant than previously believed and some size specific movement may occur, the team recognizes that a more optimal apportionment strategy may exist that takes into account fish movement, as well as socioeconomic factors and differences in size or growth potential of fish residing in different areas and strata. Quantitative evaluation of the effects of geographically concentrated harvests or estimates of an optimal geographic apportionment of the harvest has not been done. Until such an analysis can be done, the team is concerned that an unapportioned or improperly apportioned Gulfwide TAC would result in a disruption in the distribution of the spawning stocks or a depletion of a possibly aggregated spawning stock. The PT does not feel that minor departures from the present apportionment scheme are of concern. Last year the Council apportioned the 20,000 mt TAC in proportion to the distribution of biomass in the 401-1,000 m depths as estimated from the 1986 longline survey (Table 16).

Table 15.--Total catch (mt) by regulatory areas and TACs for sablefish in the Gulf of Alaska for years 1977-1987. [Catch data for 1977-1984 from McDevitt (1986), for 1985 from Fujioka (1986), for 1986 from PacFIN, for 1987 from NMFS Alaska Region].

Year	Western	Central ^{a/}	Eastern ^{a/}	Total	TAC
1977	2,969	4,272	9,892	17,133	22,000
1978	1,419	3,090	4,360	8,869	15,000
1979	1,000	3,225	6,124	10,349	13,000
1980	1,452	3,044	4,015	8,511	13,000
1981	1,594	3,435	4,888	9,917	14,349 ^{b/}
1982	1,489	2,944	4,123	8,556	12,300 ^{b/}
1983	1,513	2,968	4,568	9,049	8,980 ^{b/}
1984	1,484	3,436	5,403	10,326	8,980 ^{b/}
1985	2,059	4,104	6,291	12,454	8,980 ^{b/}
1986	3,247	8,011	9,277	20,535	15,000 ^{b/}
1987	3,363	10,595	6,462	20,420	20,000 ^{b/}

Estimate of MSY = 25,000

Threshold Biomass (TB) = not estimated

Estimated Biomass (B) = 536,000 (1984)

Acceptable Biological Catch (ABC) = MSY = 25,000

a/ Includes catch taken from waters under jurisdiction of the State of Alaska, 1977-1986.

b/ An additional 700 mt was allocated to waters under jurisdiction of the State of Alaska in 1981-82 and 500 t in 1983-87.

Table 16.--Apportionment of a 25,000 mt ABC and the 1987 TAC of 20,000 mt in proportion to the estimated 1986 relative biomass in the 401-1000 m depth range and the apportionment of the 1986 OY of 15,000 mt.

	Western	Central	W. Yak	Southeast and E. Yak	Total
25,000 mt apportioned to 1986 relative biomass at 201-1,000 m	2,750 (11%)	15,000 (60%)	3,000 (12%)	4,250 (17%)	25,000
1987 TAC = 20,000 mt apportioned to 1986 relative biomass at 401-1,000 m	3,000 (15%)	8,800 (44%)	4,000 (20%)	4,200 (21%)	20,000
25,000 mt apportioned to 1986 relative biomass at 401-1,000 m	3,750 (15%)	11,000 (44%)	5,000 (20%)	5,250 (21%)	25,000
25,000 mt apportioned as 1986 OY was apportioned	4,750 (19%)	10,250 (41%)	4,250 (17%)	5,750 (23%)	25,000
Apportionment of 1986 OY = 15,000 mt	2,850 (19%)	6,150 (41%)	2,550 (17%)	3,450 (23%)	15,000

Relative Population Weight Gulf of Alaska Sablefish

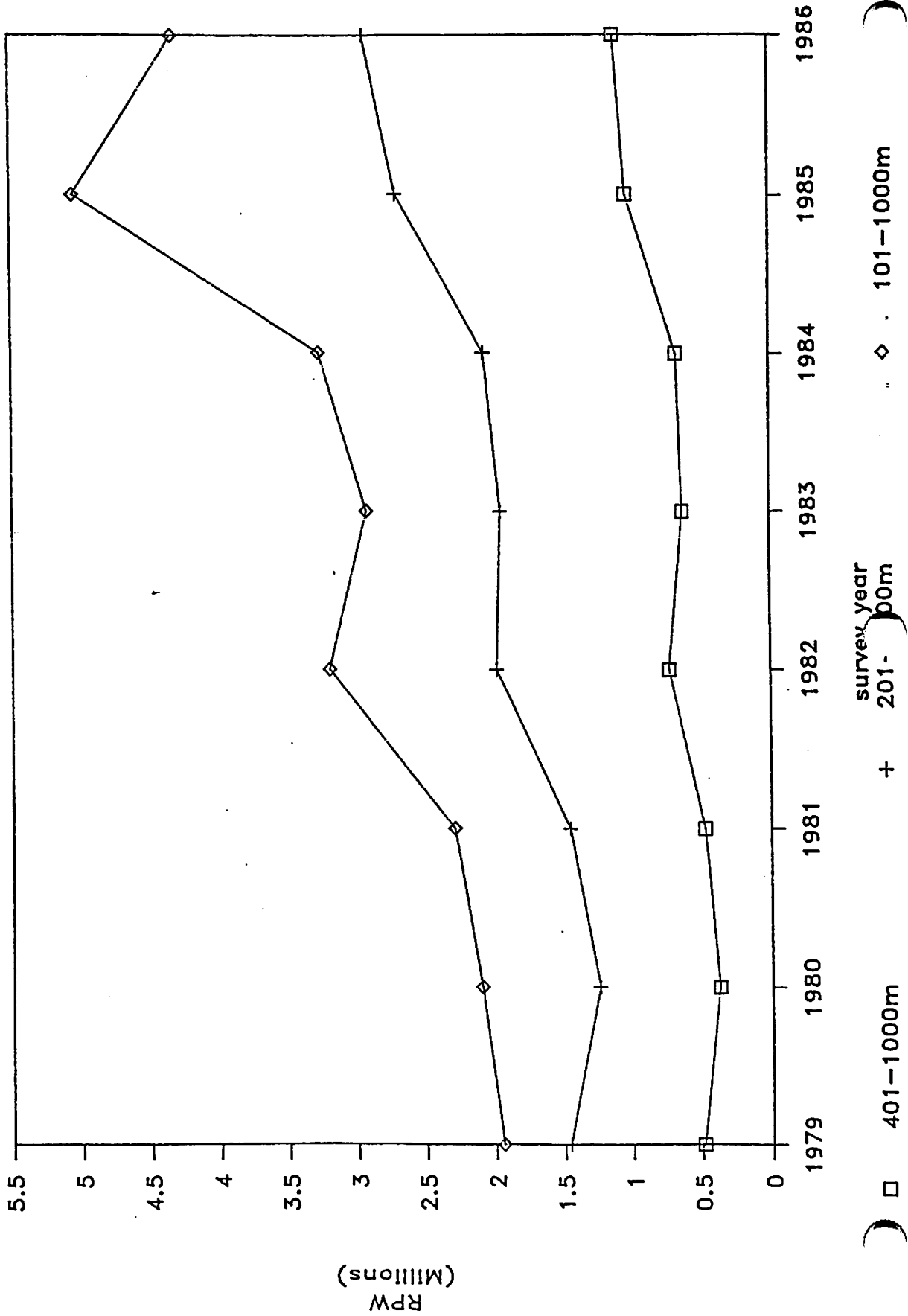


FIGURE 2.

PART 2. HALIBUT PSC LIMITS

The halibut bycatch section in the 1986 RAD includes a discussion of the relevant issues concerning halibut bycatch, and the team has no reason to change the basic information provided. However, the team is concerned that (1) halibut bycatch rates in the domestic groundfish fisheries are probably much higher than those used in predicting bycatch for purposes of establishing a halibut PSC, (2) bycatch regulations that close only the bottom trawl fishery when the PSC limits are reached fail to recognize the importance of bycatch in the longline fisheries, and (3) continued discard of nontarget species in the longline fisheries is a wasteful and costly practice.

Estimated Halibut Bycatch for Previous Years

Estimates of halibut bycatch for foreign and joint venture fisheries are provided by the Foreign Vessel Observer Program, and are provided in Table 17 for 1977 through June 1987. The table also includes estimates for the resulting halibut mortality based on discard mortality rates in the trawl and longline fisheries of 100% and 25%, respectively.

Similar estimates are not available for the wholly domestic groundfish fisheries because there is not a comprehensive domestic observer program in place. The team currently believes that the best available information is from the foreign and joint venture observer data in the Gulf of Alaska. The estimates of halibut bycatch rates are presented in Table 18. The recent increasing trend in DAP harvest makes the lack of bycatch data critical if accurate estimates are to be obtained. The fully domestic fishery took 33,176 mt of groundfish in 1985, 44,072 mt in 1986, and 37,778 mt through July 1987.

Preliminary data from the ADF&G observer program, primarily from trips in the Kodiak Island area, indicate that bycatch rates for halibut estimated for those data are substantially higher than the assumed rates obtained from foreign and joint venture fisheries, perhaps by as much as an order of magnitude.

Bycatch Regulations

The longline fisheries for sablefish, Pacific cod, and rockfish incidentally catch halibut. The regulations implementing the halibut PSC limits, however, close only the bottom trawl fisheries when the PSC limit is reached. Therefore, if new data show large halibut bycatch mortality attributable to the longline fisheries, current regulations do not provide the opportunity to close longline fisheries. The team strongly recommends that the regulations be corrected as rapidly as possible.

Longline Bycatch

The four longline fisheries (halibut, sablefish, Pacific cod, and rockfish) each catch the other species incidentally. Current management effectively prevents retention of the species mix. Waste of resource occurs from discard mortality. The team strongly recommends that the Bycatch Committee and limited entry discussions explore alternative management options that would

Table 17.--Estimated halibut bycatch and mortality in the foreign and joint venture groundfish fisheries in the Gulf of Alaska, 1977-1986.

(metric tons)

Year	Bycatch			Total	Bycatch Mortality		
	Foreign Trawl	Foreign Longline	Joint Venture		Foreign	Joint Venture	Total
1977	2200	0	0	2200	2200	0	2200
1978	1217	72	0	1289	1235	0	1235
1979	2065	210	21	2296	2118	21	2139
1980	2086	1119	48	3253	2366	48	2414
1981	1192	1307	5	2504	1519	5	1524
1982	1175	1515	4	2694	1554	4	1558
1983	772	2463	356	3591	1388	356	1744
1984	517	989	590	2096	764	590	1354
1985	24	217	300	541	78	300	378
1986	0	347	81**	428	87	81	168
1987*	0	0	0	0	0	0	0

*January-June

**Excluding the longline joint venture

Table 18.--Estimated 1987 Gulf of Alaska halibut bycatch rates by gear.

	Bottom Trawl - All Areas			Midwater Trawl - All Areas		
DAP	2.53%			0.06%		
JVP	2.53%			0.06%		
TALFF	2.53%			0.06%		
	Pacific Cod Longline			Sablefish Longline		
	Western	Central	Eastern	Western	Central	Eastern
DAP	5.23%	9.15%	9.15%	1.20%	1.20%	1.20%
JVP	5.23%	9.15%	9.15%	1.20%	1.20%	1.20%
TALFF	1.49%	4.97%	4.97%	1.20%	1.20%	1.20%

increase the retention of presently discarded species in all longline fisheries. Management contingent on bycatch caps cannot be implemented without accurately monitored bycatch. The Technical Subcommittee (TSC) of the International Groundfish Committee also recognized the importance of bycatch data, and recommended in 1987 that fishery management agencies of the U.S. and Canada provide such data (TSC recommendation attached as Appendix B). The team concurs with the TSC recommendation, and further recommends that a comprehensive domestic observer program be established on a priority basis.

Halibut Resource Condition

The exploitable biomass of halibut is at high levels in the Gulf of Alaska, and abundant 8- and 9-year-old halibut will recruit to the exploitable biomass over the next several years. The population size does not seem to be growing as in the past, but appears to be leveling off. Harvest of Pacific halibut since 1980 (Table 19) follows this pattern. The 1987 catch limits set by the International Pacific Halibut Commission were approximately 5,700 mt, 18,700 mt, and 6,900 mt, respectively, for the Western, Central, and Eastern regulatory areas. These quotas were set after reducing the available removals by estimated bycatch mortality, wastage from the directed fishery, and recreational catch.

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Table 19.--Commercial catch (mt) of Pacific halibut for all areas and for the Gulf of Alaska.

Year	Gulf of Alaska	All IPHC Areas
1980	9,400	13,200
1981	11,300	15,600
1982	13,200	17,500
1983	17,100	23,200
1984	19,500	27,200
1985	24,800	33,900
1986	32,900	42,000
1987*	26,500	38,400

*Preliminary

APPENDIX A

DISCUSSION PAPER

Management of Rockfish and Pacific Ocean Perch (POP)
in the Exclusive Economic Zone of the Gulf of Alaska
for the 1988 Fishing Year

Prepared by the
Groundfish of the Gulf of Alaska Plan Team
September 1987

I. Introduction

"Other rockfish", POP, and demersal shelf rockfish were among the 10 species or species groups of groundfish for which 1987 target quotas (TQs) were specified. In 1987 the group "POP" meant Sebastes alutus (Pacific ocean perch), S. polyspinus (northern rockfish), S. aleutianus (roughey rockfish), S. borealis (shortraker rockfish), and S. zacentrus (sharpchin rockfish). The group "demersal shelf rockfish" meant, and continues to mean, species listed in the Attachment. The group "other rockfish" meant, for the Southeast Outside District of the Eastern Regulatory Area, those species that were not POP or demersal shelf rockfish. However, in the rest of the Eastern Regulatory Area and in the Central and Western areas, "other rockfish" meant all Sebastes species, excluding POP.

1987 TQs for the rockfish groups were as follows:

"Other rockfish"	Gulf of Alaska-wide	4,000 mt
POP	Western	1,500 mt
	Central	1,500 mt
	Eastern	2,000 mt
Demersal shelf	Southeast Outside	1,250 mt

POP and "Other Rockfish".

On July 15, 1987 the TQ of 4,000 mt for "other rockfish" was reached. The Secretary closed fishing for "other rockfish" throughout the Gulf of Alaska, and in addition closed the Eastern area to trawling for all species. The difference in the management response in the Eastern Regulatory Area was based on the Northwest and Alaska Fisheries Center's 1984 triennial survey information that indicated that POP occurred in water depths shallower than 100 fm, where "other rockfish" occur. Further trawling for POP might have caused additional mortality on "other rockfish".

Demersal Shelf Rockfish.

The Alaska Department of Fish and Game (ADF&G) has divided Southeast Alaska into five management areas for groundfish management. Two of these are in internal waters and three are along the outer coast. The three outer coastal areas include both state and federal waters. Separate rockfish harvest limits have been established for each management area based on the best available data. Preliminary harvest limits for demersal shelf rockfish in the three outer coastal areas total 625 mt. Under authority contained in the FMP (see discussion under State Regulation of Shelf Rockfish, below) the ADF&G closed the Southeast Outside District to further fishing after about 700 mt of demersal shelf rockfish were harvested.

The following FMP section outlines state involvement in the management of demersal shelf rockfish.

Section 8.3.1.1. "Domestic Season, Gear, Area, and Catch Restrictions.

(I) State Regulation of Shelf Rockfish

The State of Alaska's management regime for demersal shelf rockfish is directed at managing these rockfish stocks within smaller management units than are provided for by the FMP. Such state regulations are in addition to and stricter than federal regulations. They are not in conflict with the FMP as long as they are (1) consistent with specific provisions of the FMP, and (2) limited to establishing smaller areas and quotas, which would result in a harvest of demersal shelf rockfish in each FMP management area at levels no greater than that provided in the FMP. Such state regulations may apply only to those vessels registered/licensed under the laws of the State of Alaska.

II. Management Problems

Management of rockfish stocks in the Gulf of Alaska is hampered by inadequate information on their abundance and distribution. Certain of the "other rockfish" species are red in color and, thus, may at times be reported by the industry as being in the POP category. The reverse is also true. Some of the POP catches are reported as being "other rockfish". Information from the fishing industry suggests that POP is distributed in deeper water throughout the Gulf of Alaska (i.e., deeper than 115 fathoms) than "other rockfish". Management actions in 1987 were based on data that showed POP in the Eastern Regulatory Area to occur in shallower water in the Eastern Regulatory Area and, thus, are mixed with the "other rockfish".

III. Proposed 1988 Management

Because the OY is expressed as a range, the Council may reorganize the rockfish assemblages and recommend changes in the TACs for them without invoking an FMP amendment. Under Amendment 16 to the FMP three categories of rockfish species in the genus Sebastes are identified: (1) demersal shelf, (2) pelagic shelf, and (3) slope (see attachment).

For the 1988 fishing year reorganizing rockfish groups is intended to simplify rockfish management. Except for Southeast Outside District, "other rockfish" in the Gulf of Alaska will include all three assemblage components-- demersal shelf, pelagic shelf, and slope species. Instead of managing "other rockfish" with a Gulf TAC, separate TACs will be established for each of the three regulatory areas. When a TAC for "other rockfish" in any of the management areas or districts is reached, further retention of "other rockfish" will be prohibited in the applicable area.

In the Southeast Outside District of the Eastern area, however, a separate TAC for demersal shelf rockfish will be established, and, therefore, the "other rockfish" group will include just the pelagic shelf and slope assemblages. The Council will continue to recognize the State of Alaska's role in the management of demersal shelf rockfish as it did in 1987, limited by the FMP as

discussed above. Once the TAC for demersal shelf rockfish is reached, the state will close the fishery to target fishing for that species group. The plan team is studying available data on pelagic shelf rockfish and may recommend a separate TAC for this assemblage in future management changes.

Given the complexities involved in rockfish management, this plan outlines a simpler approach than that used in 1987. Fishermen will benefit from the single "other rockfish" management approach in the Western and Central areas. Single TACs in these two areas should ameliorate rockfish management problems. Fishermen will also benefit from the two-assemblage approach in the Eastern Regulatory Area. The more commonly fished demersal shelf rockfish species can be managed with more attention to local stocks in this area. The combined "other rockfish" species should reduce species identification problems and increase the accuracy of reporting catches.

IV. Conclusion

For the 1988 fishing year the five species of the POP complex can be combined with the slope assemblage of "other rockfish". Separate total allowable catch (TAC) for "other rockfish" can be established for the Eastern, Central, and Western Regulatory Areas. In the Southeast Outside District of the Eastern Regulatory Area demersal shelf rockfish will be managed with a separate TAC as it was in 1987.

ATTACHMENT

Rockfish species in the genus Sebastes contributing to the rockfish assemblages adopted in Amendment 16 to the FMP.

Slope Rockfish

Aurora rockfish (S. aurora)
Blackgill rockfish (S. melanostomus)
Chilipepper rockfish (S. goodei)
Darkblotch rockfish (S. crameri)
Greenstriped rockfish (S. elongatus)
Harlequin rockfish (S. variegatus)
Northern rockfish (S. polyspinus)
Pacific ocean perch (S. alutus)
Pygmy rockfish (S. wilsoni)
Red banded rockfish (S. babcocki)
Rougheye rockfish (S. aleutianus)
Sharpchin rockfish (S. zacentrus)
Shortbelly rockfish (S. jordani)
Shortraker rockfish (S. borealis)
Splitnose rockfish (S. diploproa)
Stripetail rockfish (S. saxicola)
Vermilion rockfish (S. miniatus)
Yellowmouth rockfish (S. reedi)

Demersal Shelf Rockfish

Boccacio (S. paucispinus)
Canary rockfish (S. pinniger)
China rockfish (S. nebulosus)
Copper rockfish (S. caurinus)
Quillback rockfish (S. maliger)
Redstripe rockfish (S. proriger)
Rosethorn rockfish (S. helvomaculatus)
Silvergray rockfish (S. brevispinus)
Tiger rockfish (S. nigrochinctus)
Yelloweye rockfish (S. ruberrimus)

Pelagic Shelf Rockfish

Black rockfish (S. melanops)
Blue rockfish (S. mystinus)
Dusky rockfish (S. ciliatus)
Widow rockfish (S. entomelas)
Yellowtail rockfish (S. flavidus)

APPENDIX B

1987 TECHNICAL SUBCOMMITTEE RECOMMENDATIONS

International Implications of Bycatch and Discard Mortalities in the Groundfish Fisheries.

Bycatch and at-sea discard rates in groundfish fisheries are poorly known. Until such rates are known, total catch and associated mortality cannot be accurately estimated, and the attendant economic effects of bycatch mortality cannot be determined.

The U.S.-Section identified halibut bycatch as an example with international implications. The rapidly growing domestic fisheries, especially in Alaska, have the potential to intercept large quantities of juvenile halibut which migrate southward into British Columbia, Washington, and Oregon areas. This interception impacts potential adult harvest in more southern areas.

As a second example, bycatch of crab is currently constraining development of groundfish fisheries in the Central Gulf of Alaska, and yet the bycatch problem has not been quantified.

To provide the data necessary for improved groundfish management, the Technical Subcommittee strongly recommends that the responsible management agencies take appropriate measures to determine bycatch, bycatch mortality, and at-sea discard rates in the groundfish fisheries.

Adopted

REGULATORY CHANGES TO REPORTING REQUIREMENTS FOR THE GULF OF ALASKA AND BERING SEA/ALEUTIAN ISLANDS

Augment the Current Catcher/Processor Weekly Catch Report by Adding At-sea Transfer Information.

Section 672.5 (Gulf of Alaska) and Section 675.5 (Bering Sea/Aleutian Islands). [changes from status quo are underlined]

Catch/receipt and product transfer report. After notification of starting fishing by a vessel under paragraph (a)(3)(i) of this section, and continuing until that vessel's entire catch or cargo of fish has been offloaded, the operator of that vessel must submit a weekly catch/receipt and product transfer report, including reports of zero tons caught or received, for each weekly period, Sunday through Saturday, GMT, or for each portion of such a period. The catch/receipt and product transfer report must be sent to the Regional Director within one week of the end of the reporting period through such means as the Regional Director will prescribe upon issuing that vessel's permit under Section 672.4 of this Part. This report must contain the following information:

- (A) Name and radio call sign of the vessel;
- (B) Federal permit number for the Gulf of Alaska groundfish fisheries;
- (C) Month and days fished or during which fish were received at sea;
- (D) The estimated round weight of all fish caught or received at sea by that vessel during the reporting period by species or species group, rounded to the nearest one-tenth of a metric ton (0.1 mt), whether retained, discarded, or offloaded;
- (E) The number of cartons of product, and the unit net weight, in kilograms, ^{or} of the ^{each} carton of processed fish by species or species group produced by that vessel during the reporting period;
- (F) The area in which each species or species group was caught; and
- (G) If any species or species groups were caught in more than one area during a reporting period, the estimated round weight of each, to the nearest 0.1 mt by area. *rounded*
- (H) The product weight, ^{rounded} to the nearest one-tenth of a metric ton (0.1 mt) and the number of cartons transferred or offloaded by product type and by species or species group. *rounded*

Add the Requirement For a Cargo Transfer/Offloading Log

Cargo transfer/offloading log. For each transfer or offloading of processed product, the operator of each fishing vessel must record, in a separate transfer log, each transfer or offloading of any fishery product in the EEZ, and also quantities transferred or offloaded outside the EEZ, within any states' territorial waters, or within the internal waters of any state, the following information within twelve hours of the completion of the transfer or offloading:

(A) The time and date (GMT) and location (in geographic coordinates or if within a port, the name of the port) the transfer began and was completed;

(B) The product weight and product type, by species or species group of all fish products transferred or offloaded to the nearest tenth of a metric ton (0.1 mt);

(C) The name and permit number of vessel offloading to or, if to a shoreside facility, the name of the commercial facility receiving the product; and

(D) The intended port of destination of the receiving vessel if offloaded to another vessel.

FMP CHANGES TO REPORTING REQUIREMENTS FOR THE GULF OF ALASKA AND BERING SEA/ALEUTIAN ISLANDS

Changes to Gulf of Alaska FMP text in Section 4.3.1.4 and to Bering Sea/Aleutian Islands FMP text in Section 14.4.5.D.

Add the following paragraphs (3) and (4):

- (3) Catch/receipt and product transfer report. Operators of catcher/processor and mothership/processor vessels must submit a weekly catch/receipt and product transfer report. This report will be required after notification of starting fishing by a vessel and continuing until that vessel's entire catch or cargo of fish has been offloaded for each weekly period, Sunday through Saturday, or for each portion of such a period. This report must be sent to the Regional Director within one week of the end of the reporting period through such means as the Regional Director will prescribe by regulations and must contain the following information:
- (A) Name and radio call sign of the vessel;
 - (B) Federal permit number for the Gulf of Alaska groundfish fisheries;
 - (C) Month and days fished or during which fish were received at sea;
 - (D) The estimated round weight of all fish caught or received at sea by that vessel during the reporting period by species or species group, rounded to the nearest one-tenth of a metric ton (0.1 mt), whether retained, discarded, or offloaded;
 - (E) The number of cartons of product, and the unit net weight, in kilograms, of the carton of processed fish by species or species group produced by that vessel during the reporting period
 - (F) The area in which each species or species group was caught; and
 - (G) If any species or species groups were caught in more than one area during a reporting period, the estimated round weight of each, to the nearest 0.1 mt by area.
 - (H) The product weight, to the nearest one-tenth of a metric ton (0.1 mt) and the number of cartons transferred or offloaded by product type and by species or species group.

(4) Cargo transfer/offloading log. Operators of catcher/processor and mothership/processor vessels must record certain information in a separate transfer log. He must record, for each transfer or offloading of any fishery product in the EEZ, and also quantities transferred or offloaded outside the EEZ, within any states' territorial waters, or within the internal waters of any state, the following information within a time specified by regulations:

(A) The time and date (GMT) and location (in geographic coordinates or if within a port, the name of the port) the transfer began and was completed;

(B) The product weight and product type, by species or species group of all fish products transferred or offloaded to the nearest tenth of a metric ton (0.1 mt);

(C) The name and permit number of vessel offloading to or, if to a shoreside facility, the name of the commercial facility receiving the product; and

(D) The intended port of destination of the receiving vessel if offloaded to another vessel.

I. NOTES

Only three king crab have been taken in the venture so far; also 1439 tanner crab and 84 salmon. All bycatches remain well within acceptable bycatch rates excepting halibut, which we are having a great deal of trouble. Especially as noted in the last two days of fishing. We have abandoned these grounds (Portlock Bank) and moved to another area which seem to be much cleaner. We only have one day of fishing before the weather blew up and in our next report will have an update on the halibut bycatch.

The other species we are having a problem with is Pacific Cod. We are not targeting on Pacific Cod and are, in fact, attempting to minimize our catch in order that we will not have to discard acceptable fish.

At this time, it is my opinion, that a flatfish target either joint venture or DAF needs to be monitored carefully in order to minimize the impact on other viable species.

To date, we have picked up 97 crab pots, 27 in good condition, only 3 of them with escape panels. A total of 4 crab have been observed in the pots. The remainder of the pots could be considered derelict pots.

II. Groundfish Mix

<u>Species</u>	<u>Percentage of total groundfish catch</u>
Butter Sole	8.5
Rock Sole	46.1
Pacific Cod	14.7
Pollock	1.0
Arrowtooth	4.9
English Sole	1.3
Flathead	1.7
Rex Sole	.7
Alaska Plaice	.1
Skates	1.6
Yellowfin	.2
Discards	19.2

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September 21, 1987

Groundfish Catch Totals

<u>Day</u>	<u>Total MT</u>	<u>Day</u>	<u>Total MT</u>
8/19 - 8/30/87	1122.1	9/10/87	22.1
8/31/87	73.8	9/11/87	45.0
9/01/87	227.8	9/12/87	226.0
9/02/87	149.9	9/13/87	81.5
9/03/87	74.1	9/14/87	79.2
9/04/87	7.5	9/15/87	156.0
9/05/87	183.1	9/16/87	80.0
9/06/87	38.6	9/17/87	69.5
9/07/87	30.0	9/18/87	65.0
9/08/87	43.8	9/19/87	71.9
9/09/87	83.0	9/20/87	<u>235.0</u>
Total			3164.9

In the total 22 days of the JV, the fleet has shifted ten (10) times. Areas covered are from Dangerous Cape to South of Nuka Bay; the Gravel Pit South of Blying Sound and the North end of Shelikof Strait.

Prohibited Species Bycatch

I. Halibut

8/19-9/20/87 31494 87.8042 MT

*Note: A move to Portlock Bank on 9/05 increased halibut bycatch for that day to 8 MT. Special efforts were again made to decrease that amount on the days following.
(Note: total pounds are calculations from Rep. information given in kilograms/MT.)

<u>Date</u>	<u>Total Pounds</u>	<u>Pounds/ MT</u>
9/01/87	7221	31.7
9/02/87	7180	47.9
9/03/87	6505	87.8
9/04/87	630	84.0

Member
Alaska Driggers Association
Alaska Groundfish Data Bank

<u>Date</u>	<u>Total Pounds</u>	<u>Pounds/MT</u>
*9/05/87	24553	134.1
9/06/87	2123	55
9/07/87	2580	86
9/08/87	2584	59
9/09/87	3237	39
9/10/87	1282	58
9/11/87	2295	51
9/12/87	14645	64.8
9/13/87	4547	55.8
9/14/87	6415	81
9/15/87	7020	45
9/16/87	3712	46.4
9/17/87	3781	54.4
9/18/87	3335	51.3
9/19/87	10174	141.5
9/20/87	25357	107.9

Bycatch of the following species does not appear to be a problem so is done only as total catch to date rather than by day:

	<u>Total No.</u>	<u>Total Kilograms</u>	<u>Approx Pounds</u>
II. King Crab			
8/19-9/20/87	3	5.2	12
IV. Tanner Crab			
8/19-9/20/87	1439	853.1	1877
V. Salmon (chinook)			
8/19-9/20/87	84	218.5	481
VI. Black cod			
8/19-9/20/87		8.1 MT	
VII. Prohibited Rockfish			
8/19-9/20/87		3.1 MT	
VIII. Other Rockfish			
8/19-9/20/87		3.6 MT	

KANAI FISHERIES JV
SUMMARY BY WEEK
1987

Week	Butter sole	Rock sole	Cod	Pollock	Arrow-tooth	English	Flat-head	Rex Sole	Alaska plaice	Skate	Yellowfin sole	Factory	Discard	Total
1. 8/19 - 22/87	6.6	87.9	34.9	11.0	56.3	13.1	9.2	9.4	.0	6.3	.0	234.7	87.5	322.2
2. 8/23 - 8/31/87 8/31 correction	185.2	390.3 4.6	51.7	1.0	15.4	14.7	31.1	6.4	.3	22.4	5.3	723.8 4.6	145.3	869.1 4.6
3. 9/01 - 05/87	1.1	395.6	75.8	5.6	39.3	.2	3.3	2.1	.9	6.6	.2	530.7	111.7	642.4
4. 9/06 - 12/87	60.8	201.4	51.9	12.9	15.6	10.2	6.8	3.1	.0	8.6	1.2	372.5	116.0	488.5
5. 9/13 - 19/87	15.5	277.2	176.9	.4	25.3	1.7	4.0	.3	.0	4.9	.4	506.6	96.5	603.1
6. 9/20/87	1.1	102.9	75.8	.0	3.5	.0	.3	.0	.0	1.4	.0	185.0	50.0	235.0
TOTAL	270.3	1459.9	467.0	30.9	155.4	39.9	54.7	21.3	1.2	50.2	7.1	2557.9	607.0	3164.9

KANAI FISHERIES JV
 WEEK 6
 NOON REPORT

1. Today's date (AK time) 9/21/87

2. Area (Noon AK time) _____

3. Fleet Activity (currently):

A.

B.

4. Fleet catch (GMT, date) by processor:

Date	Tomi Maru No.	Butter sole	Rock sole	Cod	Pollock	Arrow-tooth	English	Flathead	Rex Sole	Alaska plaice	Skate	Yellowfin sole	Factory	Discard	Total
9/20/87	81	.1	33.7	20.2	.0	.4	.0	.2	.0	.0	.0	.0	54.6	15.9	70.5
	83	.4	25.0	34.6	.0	2.9	.0	.1	.0	.0	1.0	.0	64.0	9.5	73.5
	85	.6	44.2	21.0	.0	.2	.0	.0	.0	.0	.4	.0	66.4	24.6	91.0
Day total		1.1	102.9	75.8	.0	3.5	.0	.3	.0	.0	1.4	.0	185.0	50.0	235.0

NOON REPORT

Date	Tomi Maru No.	Butter sole	Rock sole	Cod	Pollock	Arrow-tooth	English	Flathead	Rex Sole	Alaska plaice	Skate	Yellowfin sole	Factory	Discard	Total
9/16/87	81	.0	6.3	11.5	.0	.0	.0	.1	.0	.0	.0	.0	17.9	1.1	19.0
	83	.0	12.2	5.5	.0	.0	.0	.0	.0	.0	.1	.0	17.8	1.2	19.0
	85	.0	14.1	13.3	.0	2.1	.0	.1	.0	.0	.6	.0	30.2	11.8	42.0
Day total		.0	32.6	30.3	.0	2.1	.0	.2	.0	.0	.7	.0	65.9	14.1	80.0
9/17/87	81	.0	.6	1.9	.0	.0	.0	.0	.0	.0	.0	.0	2.5	2.0	4.5
	83	.0	.2	22.6	.0	.0	.0	.0	.0	.0	.0	.0	22.8	2.2	25.0
	85	.0	17.0	13.2	.0	4.2	.1	.1	.0	.0	.3	.0	34.9	5.1	40.0
Day total		.0	17.8	37.7	.0	4.2	.1	.1	.0	.0	.3	.0	60.2	9.3	69.5
9/18/87	81	.0	10.1	6.2	.0	5.0	.0	.4	.2	.0	.0	.0	21.9	7.1	29.0
	83	.0	2.1	14.7	.4	1.3	.0	.3	.0	.0	.2	.0	19.0	9.0	28.0
	85	.0	1.9	6.0	.0	.0	.0	.0	.0	.0	.0	.0	7.9	.1	8.0
Day total		.0	14.1	26.9	.4	6.3	.0	.7	.2	.0	.2	.0	48.8	16.2	65.0
9/19/87	81	.0	2.4	1.9	.0	.1	.0	.1	.0	.0	.0	.0	4.5	.5	5.0
	83	.1	29.9	3.3	.0	.5	.0	.0	.0	.0	.4	.0	34.2	8.8	43.0
	85	.0	4.3	11.3	.0	1.5	.0	1.4	.0	.0	.2	.0	18.7	5.2	23.9
Day total		.1	36.6	16.5	.0	2.1	.0	1.5	.0	.0	.6	.0	57.4	14.5	71.9
Week #5		15.5	277.2	176.9	.4	25.3	1.7	4.0	.3	.0	4.9	.9	506.6	96.5	403.1

JMF

NOON REPORT

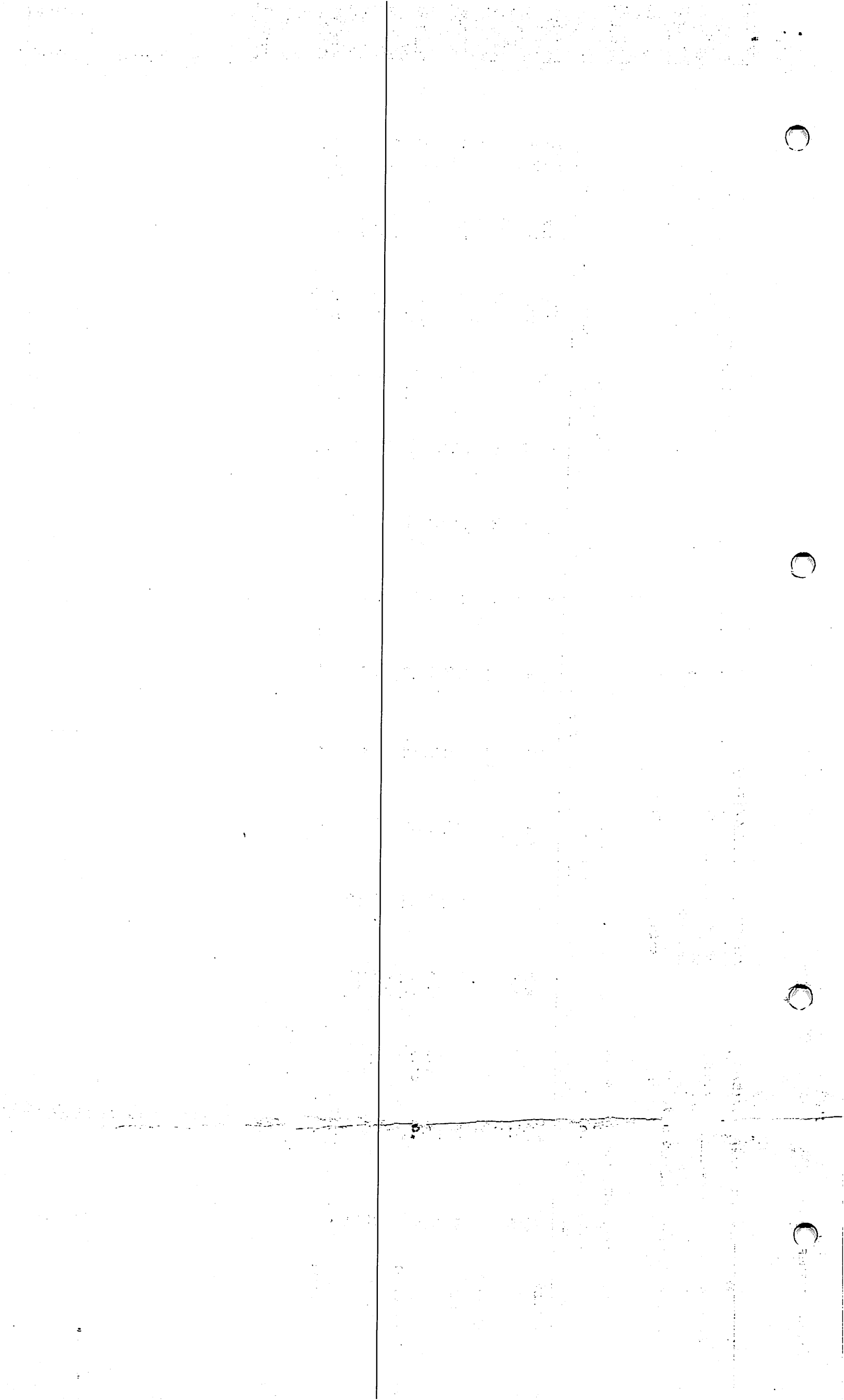
1. Today's date (AK time) 9/15/87 9/16/87 9/17/87

2. Area (Noon AK time) Portlock Bank 58 18 Portlock
151 00 Bank

3. Fleet Activity (currently):
A. Fishing Fishing
B. Fishing Fishing

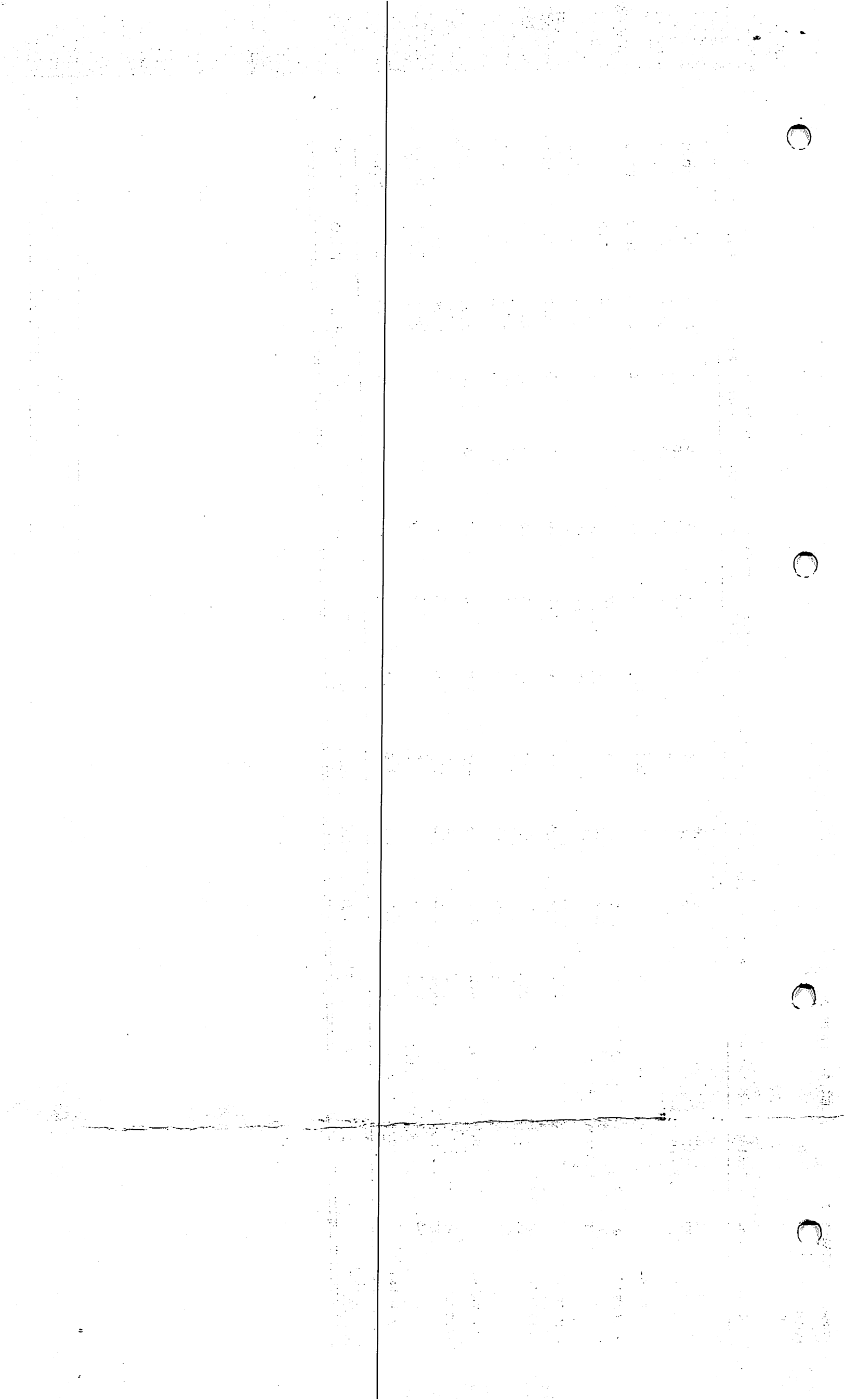
4. Fleet catch (GMt date) by processor:

Date	Tomi No.	Maru	Butter sole	Rock sole	Cod	Pollock	Arrow-tooth	English	Flathead	Rex Sole	Alaska Plaice	Skate	Yellowfin sole	Factory	Discard	Total
9/13/87	81		8.8	11.6	.6	.0	.1	.8	1.1	.0	.0	.0	.0	23.4	2.1	25.5
	83		.6	13.3	8.7	.0	9.6	.2	.0	.0	.0	.4	.0	32.8	8.7	41.5
	85		.1	10.2	1.1	.0	.3	.1	.0	.1	.0	.4	.0	12.3	2.2	14.5
Day total			9.5	35.1	10.4	.0	10.0	1.1	1.1	.1	.0	.8	.4	68.5	13.0	81.5
9/14/87	81		2.8	19.1	.8	.0	.1	.2	.1	.0	.0	.0	.0	23.1	.1	23.2
	83		2.1	9.1	.6	.0	.0	.2	.0	.0	.0	1.1	.0	13.1	3.9	17.0
	85		.4	19.7	18.1	.0	.0	.1	.0	.0	.0	.3	.0	38.6	.4	39.0
Day total			5.3	47.9	19.5	.0	.1	.5	.1	.0	.0	1.4	.0	74.8	4.4	79.2
9/15/87	81		.1	41.8	16.4	.0	.0	.0	.2	.0	.0	.0	.0	58.5	7.0	65.5
	83		.4	37.5	6.2	.0	.3	.0	.1	.0	.0	.6	.0	45.1	11.4	56.5
	85		.1	13.8	13.0	.0	.2	.0	.0	.0	.0	.3	.0	27.4	6.6	34.0
Day total			.6	93.1	35.6	.0	.5	.0	.3	.0	.0	.9	.0	131.0	25.0	156.0



Date	Toml Maru No.	Butter sole	Rock sole	Cod	Pollock	Arrow-tooth English	Flathead	Rex Sole	Alaska Plaice	Skate	Yellowfin sole	Factory Discard	Total
9/09/87	81	8.2	13.7	1.6	.0	.0	.8	.0	.0	.0	.2	24.9	28.5
	83	3.9	4.8	.8	.0	.1	.2	.0	.0	.0	.2	10.5	13.0
	85	5.5	13.3	6.6	.0	.3	1.4	.0	.0	.0	.2	28.8	41.5
Day total		17.6	31.8	9.0	.0	.3	2.3	.0	.0	.0	.5	64.2	83.0
9/10/87	81	.1	.2	1.9	1.5	.6	.1	.7	.0	.0	.0	5.8	9.0
	83	.0	.4	3.4	1.1	1.3	.0	.4	.0	.0	.0	3.2	9.0
	85	.0	.8	.7	.0	.1	.0	.2	.0	.0	.0	7.0	9.0
Day total		1.1	1.4	6.0	2.6	1.0	1.0	1.2	.0	.0	.0	14.7	22.1
9/11/87	81	3.6	6.2	.6	.0	.0	.3	.0	.0	.0	.0	10.9	11.0
	83	1.7	3.9	3.6	6.7	4.6	2.1	.0	.0	.0	.0	24.2	34.0
	85	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	9.8	11.0
Day total		5.3	10.1	4.2	6.7	4.6	2.4	.0	.0	.0	.0	35.1	45.0
9/12/87	81	15.5	16.4	1.6	.0	.2	1.3	.3	.0	.0	.4	36.9	42.0
	83	3.4	30.4	10.6	2.3	5.7	2.5	.5	.0	.0	.0	58.2	104.0
	85	.0	61.8	7.7	.0	.3	.0	.0	.0	.0	.0	69.9	80.0
Day total		18.9	108.6	19.9	2.3	6.2	3.8	.8	.0	.0	.4	165.0	226.0
Sub # 4		60.8	201.4	51.9	12.9	15.6	10.2	4.8	3.1	.0	8.6	372.5	488.5

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KANAI FISHER) JV
WEEK 4
NOON REPORT

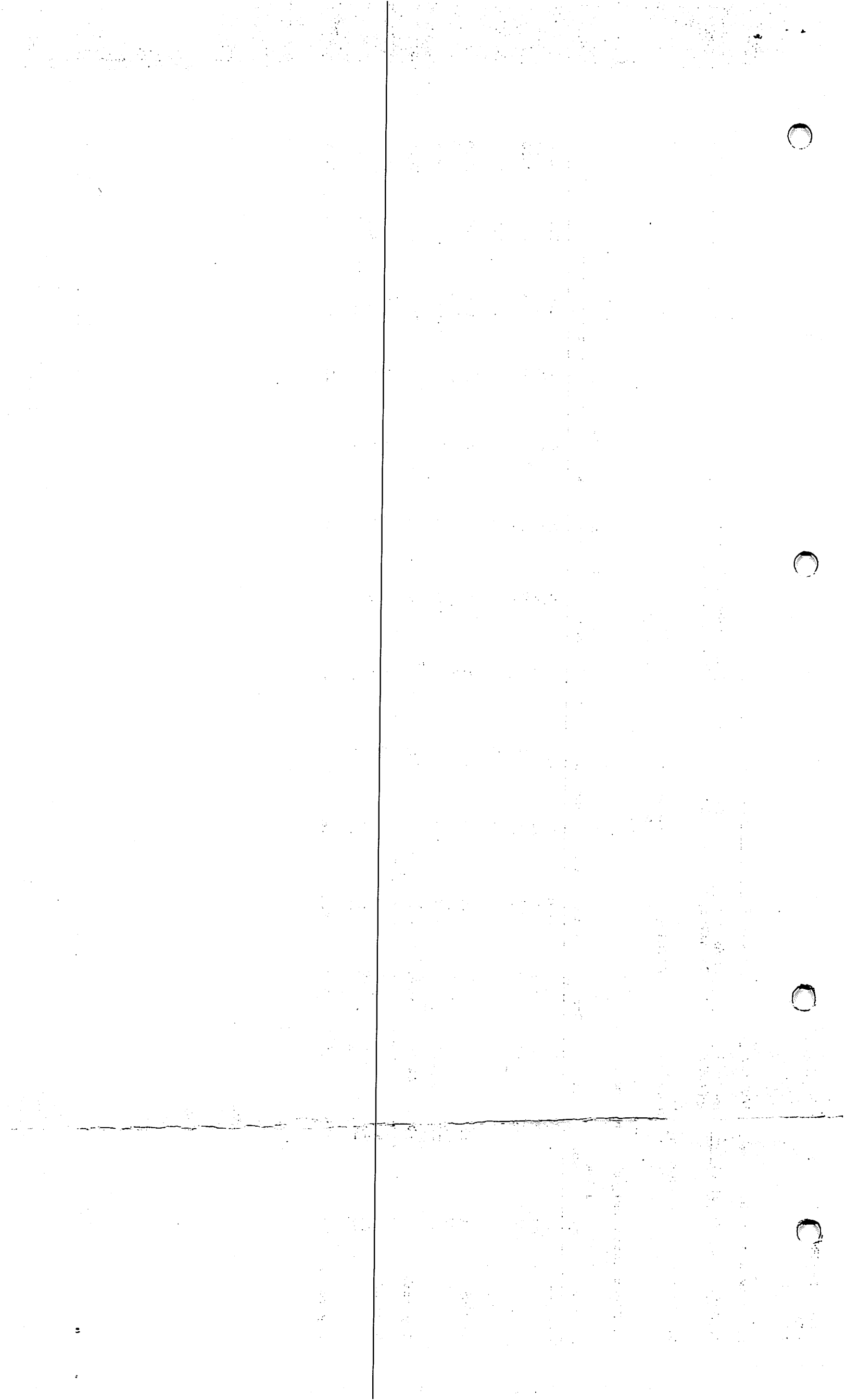
1. Today's date (AK time) 9/07/87 9/08/87 9/11/87 9/14/87

2. Area (Noon AK time) Cape Barnavus Cape Barnavus 57 09 152 41 North Position Portlock Bank

3. Fleet Activity (currently):
A. Storming Fishing Searching to So.
B. Move to East 2 Fishing
of Trinity?

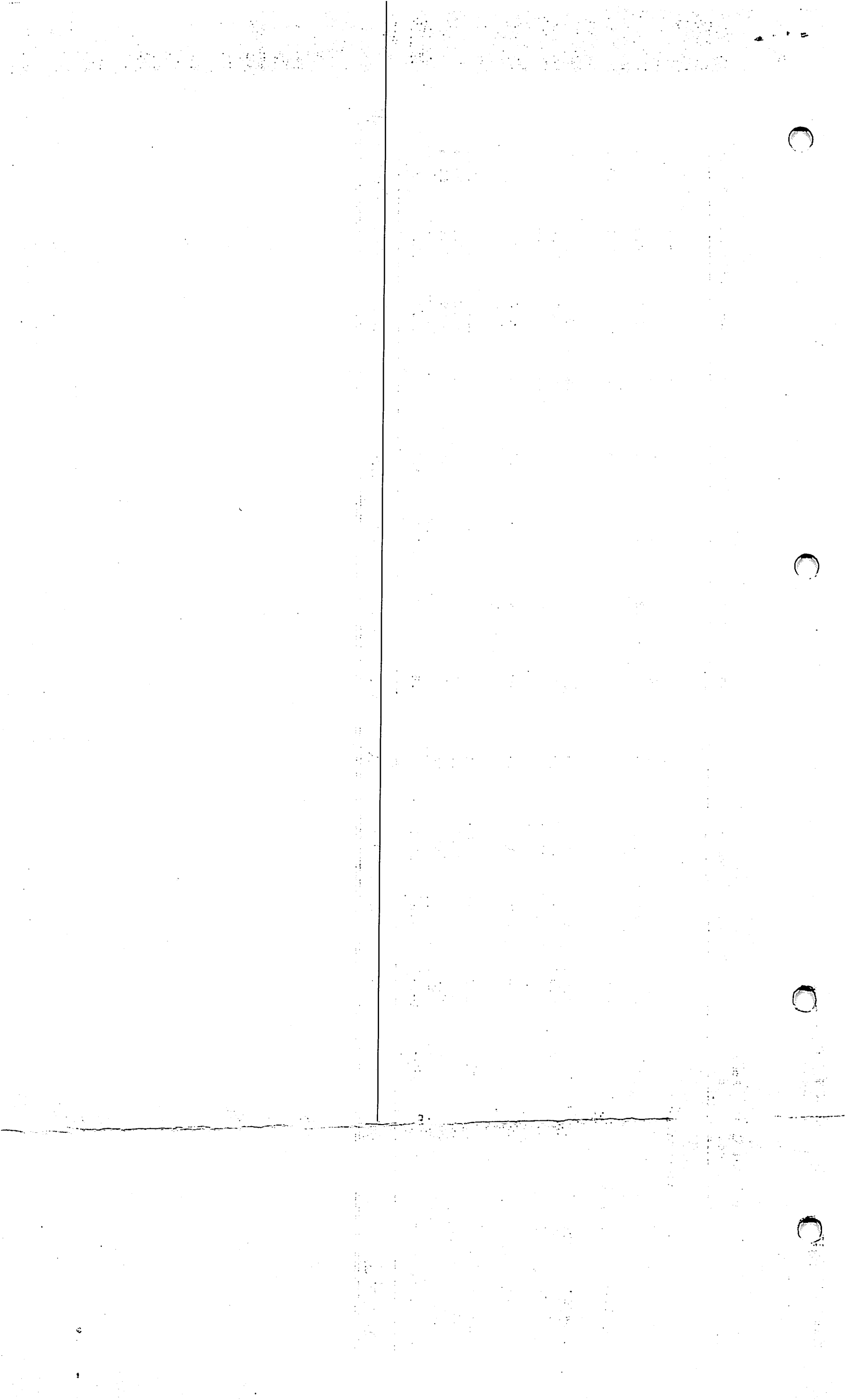
4. Fleet catch (GMT,date) by processor:

Date	Tomi Maru No.	Butter sole	Rock sole	Cod	Pollock	Arrow-tooth	English	Flathead	Rex Sole	Alaska plaice	Skate	Yellowfin sole	Factory	Discard	Total
9/06/87	81	.0	.1	2.1	.0	.7	.0	.0	.0	.0	.0	.0	2.9	3.1	6.0
	83	.0	3.0	3.1	.0	.1	.0	.1	.0	.0	.3	.0	6.6	.0	6.6
	85	1.9	11.9	4.5	.1	1.1	.3	.3	.0	.0	1.5	.0	21.6	4.4	26.0
Day total		1.9	15.0	9.7	.1	1.9	.3	.4	.0	.0	1.8	.0	31.1	7.5	38.6
9/07/87	81	3.4	5.9	.1	.0	.0	.1	.1	.0	.0	.0	.0	9.6	.4	10.0
	83	1.7	3.4	.2	.0	.0	.0	.0	.0	.0	.9	.0	6.2	.8	7.0
	85	2.7	6.0	.1	.0	.0	.1	.1	.0	.0	.9	.1	10.0	3.0	13.0
Day total		7.8	15.3	.4	.0	.0	.2	.2	.0	.0	1.8	.1	25.8	4.2	30.0
9/08/87	81	4.0	6.7	1.1	.0	.0	.5	.2	.0	.0	.0	.2	12.7	.0	12.7
	83	4.2	6.3	1.0	1.2	.6	.5	1.3	.4	.0	.3	.0	15.8	6.3	22.1
	85	1.0	6.2	.6	.0	.0	.1	.1	.0	.0	.1	.0	8.1	.9	9.0
Day total		9.2	19.2	2.7	1.2	.6	1.1	1.6	.4	.0	.4	.2	36.6	7.2	43.8



NOON REPORT

Date	Tomi Maru No.	Butter sole	Rock sole	Cod	Pollock	Arrow-tooth	English	Flathead	Rex Sole	Alaska plaice	Skate	Yellowfin sole	Factory	Discard	Total
9/03/87	81	.2	32.1	1.5	.0	.0	.0	.2	.0	.0	.0	.0	34.0	3.1	37.1
Offloading	83	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
	85	.0	12.2	3.3	.0	5.7	.0	.1	.2	.0	.9	.0	22.4	14.6	37.0
Day total		.2	44.3	4.8	.0	5.7	.0	.3	.2	.0	.9	.0	56.4	17.7	74.1
9/04/87	81	.0	.0	1.0	1.0	1.1	.0	1.0	.0	.9	.1	.2	5.3	2.2	7.5
None	83	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Offloading	85	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Day total		.0	.0	1.0	1.0	1.1	.0	1.0	.0	.9	.1	.2	5.3	2.2	7.5
Offloading	81	.0	17.7	2.3	.0	.7	.1	.5	.7	.0	.0	.0	22.0	15.1	37.1
9/05/87	83	.0	29.9	8.9	3.1	16.3	.1	.8	.9	.0	1.2	.0	61.2	23.2	84.4
	85	.0	13.4	9.6	1.5	11.0	.0	.5	.3	.0	.5	.0	36.8	24.8	61.6
Day total		.0	61.0	20.8	4.6	28.0	.2	1.8	1.9	.0	1.7	.0	120.0	63.1	183.1
<u>Week #3</u>		1.1	395.6	75.8	5.6	39.3	.2	3.3	2.1	.9	6.6	.2	530.7	111.7	642.4



NOON REPORT

1. Today's date (AK time) 9/02/87 9/03/87 9/04/87

2. Area (Noon AK time) 58 22 58 32 58 35
151 10 151 00 153 22

3. Fleet Activity (currently):

A.	Fishing	Storming	Fishing
B.	4 catchers	4 catchers	3 catchers
	3 processors	1 p.offloading	85 offloading

4. Fleet catch (GMT date) by processor:

Date	Tomi Maru No.	Butter sole	Rock sole	Cod	Pollock	Arrow-tooth	English Flathead	Rex Sole	Alaska plaice	Skate	Yellowfin sole	Factory	Discard	Total
9/01/87	81	.0	100.1	3.5	.0	.0	.0	.0	.0	.3	.0	103.9	1.1	105.0
	83	.0	39.3	3.1	.0	.7	.0	.0	.0	.2	.0	43.3	.5	43.8
	85	.0	66.1	4.2	.0	.3	.0	.1	.0	1.3	.0	72.0	7.0	79.0
Day total		.0	205.5	10.8	.0	1.0	.0	.1	.0	1.8	.0	219.2	8.6	227.8
9/02/87	81	.0	16.6	8.8	.0	.0	.0	.0	.0	.0	.0	25.4	.0	25.4
	83	.9	51.0	19.1	.0	3.5	.0	.1	.0	1.3	.0	75.9	14.6	90.5
	85	.0	17.2	10.5	.0	.0	.0	.0	.0	.8	.0	28.5	5.5	34.0
Day total		.9	84.8	38.4	.0	3.5	.0	.1	.0	2.1	.0	129.8	20.1	149.9