MEMORANDUM

TO: Council, SSC and AP Members

FROM: Clarence G. Pautzke
Executive Director

DATE: December 1, 1994

SUBJECT: Final Gulf of Alaska (GOA) Groundfish Specifications for 1995

ESTIMATED TIME
8 HOURS
(for all D-3 items)

ACTION REQUIRED

(a) Finalize GOA Groundfish Specifications for 1995:

1. Approve final 1995 GOA Stock Assessment and Fishery Evaluation (SAFE) document.

2 Approve final 1995 Acceptable Biological Catch (ABC) limits and Total Allowable Catch (TAC) limits for GOA groundfish, and set PSC specifications and apportionments for halibut.

(b) Finalize discard mortality rates for halibut in the groundfish fisheries.

BACKGROUND

At this meeting, the Council will finalize specifications for groundfish ABCs, TACs, and bycatch allowances for 1995. The 1995 SAFE Report, groundfish specifications, and bycatch allowances need to be adopted. A final recommendation for halibut discard mortality rates also needs to be approved.

GOA SAFE Document

The groundfish Plan Teams met November 14-18 in Seattle to prepare the final 1995 SAFE documents. The final Gulf of Alaska (GOA) SAFE contains the Plan Team's estimates of biomass and ABCs for all groundfish species covered under the FMP and information concerning halibut bycatch to provide guidance to the Council in establishing PSC apportionments. Tables 1 - 3 from the SAFE summary chapter (Item D-3(a)(1)) list the 1994 ABCs, TACs, and catches through October 1994, and the Plan Team's recommended 1995 ABCs and corresponding overfishing levels for each of the species or species complexes. None of the Plan Team's recommended ABCs exceeds its corresponding overfishing level. Item D-3(a)(2) contains the Council's September 1994 initial recommendations for the 1995 fishing year.

Final ABCs, TACs, and Apportionments for the 1995 GOA Fisheries

Tables 1-3 provide current estimates of the biomass, ABC, overfishing level and stock status of seventeen GOA groundfish management groups compared to 1994. The Plan Team's sum of recommended ABCs for 1995 is 535,150 mt (almost identical to the 1994 combined ABC of 535,050 mt). The SSC and AP recommendations will be provided to the Council during the week of the Council meeting.

Set Final PSC Limits for Halibut

The PSC limits for halibut in the Gulf of Alaska are set by gear type and may be apportioned seasonally in accordance with the Council's objective to promote harvest of as much of the groundfish optimum yield as possible with a given amount of halibut PSC.

During 1994, halibut PSC mortality applied only to the bottom trawl and hook-and-line fisheries. The midwater trawl fishery for pollock was exempt from bycatch-related closures, as was the pot fishery for Pacific cod because of their minimal bycatch mortality contributions.

In September, the Council recommended the following halibut PSC apportionments for the Gulf of Alaska groundfish fisheries, dependent upon approval of a regulatory amendment to exempt the sablefish fishery from halibut PSCs, subject to annual review:

Trawl gear			**Hook and Line gear**		
1st quarter	600 mt	(30%)	1st trimester	80 mt	(26.7%)
2nd quarter	400 mt	(20%)	2nd trimester	200 mt	(66.7%)
3rd quarter	600 mt	(30%)	3rd trimester	20 mt	(6.7%)
4th quarter	400 mt	(20%)			
TOTAL	2,000 mt			300 mt	

Beginning last year, PSC limits for trawl gear were further apportioned by specific fishery, to the 'Shallow water complex' and the 'Deep water complex.' The shallow water complex includes pollock, Pacific cod, shallow water flatfish, Atka mackerel, and other species. Deep water complex species include deep water flatfish, rockfish, flathead sole, sablefish, and arrowtooth flounder. The following apportionments were made for 1994:

Quarter	Shallow water Complex	Deep water Complex	Total
1	500 mt	100 mt	600 mt
2	100 mt	300 mt	400 mt
3	200 mt	400 mt	600 mt
4	No Apportionment		400 mt

Discard Mortality Rates

The Council provides recommendations on discard mortality rates of halibut bycatch each year. In September the Council approved for public review the halibut mortality rates provided by the IPHC, with the following modifications:

1) a GOA pollock bottom trawl mortality rate of 54% for shoreside and 81% for offshore;

2) a BSAI Pacific cod hook and line mortality rate in the range of 12 to 18%.

The IPHC has provided revised mortality rates for GOA bottom trawl pollock by averaging the rates for 1992 and 1993. This results in a revised shoreside rate of 63% and offshore rate of 74 % (Item D-3(a)(3)).

Table 1. Gulf of Alaska groundfish 1994 and 1995 ABCs, 1994 TACs, and 1994 catches reported through October 29, 1994. MSY is unknown for all species.

Species	1994	ABC (mt) 1994	ABC (mt) 1995	1994 TAC	1994 Catch
Pollock	W(61)	22,130	30,380	22,130	20,020
	C(62)	23,870	15,310	23,870	22,725
	C(63)	56,000	16,310	56,000	62,326
	E	7,300	3,360	7,300	6,865
	Total	109,300	65,360	109,300	111,936
Pacific cod	W	16,630	31,300	16,630	14,712
	C	31,250	71,300	31,250	31,084
	E	2,520	5,400	2,520	1,707
	Total	50,400	108,000	50,400	47,503
Deepwater flatfish[1]	W	460	670	460	48
	C	12,930	8,150	7,500	3,544
	E	3,120	5,770	3,120	1,467
	Total	16,510	14,590	11,080	5,059
Rex sole[2]	W	800	1,350	800	49
	C	9,310	7,050	7,500	3,525
	E	1,840	2,810	1,840	85
	Total	11,950	11,210	10,140	3,659
Shallow water flatfish[3]	W	20,290	26,280	4,500	189
	C	12,950	23,140	12,950	3,694
	E	1,180	2,850	1,180	11
	Total	34,420	52,270	18,630	3,894
Flathead sole	W	9,120	8,880	2,000	498
	C	23,080	17,170	5,000	2,043
	E	3,650	2,740	3,000	13
	Total	35,850	28,790	10,000	2,554
Arrowtooth flounder	W	28,590	28,400	5,000	1,173
	C	186,270	141,290	20,000	21,178
	E	21,380	28,440	5,000	846
	Total	236,240	198,130	30,000	23,197
Sablefish	W	2,290	2,600	2,290	556
	C	11,220	8,600	11,220	9,536
	WY	4,850	4,100	4,850	4,541
	SEO	7,140	6,200	7,140	6,879
	Total	25,500	21,500	25,500	21,512
Other Slope rockfish	W	330	180	200	102
	C	1,640	1,170	990	713
	E	6,330	5,760	1,050	798
	Total	8,300	7,110	2,240	1,613
Northern rockfish	W	1,000	640	1,000	1,394
	C	4,720	4,610	4,720	4,521
	E	40	20	40	55
	Total	5,760	5,270	5,760	5,970
Pacific ocean perch	W	680	1,180	571	165
	C	850	3,130	714	922
	E	1,500	2,220	1,265	814
	Total	3,030	6,530	2,550	1,901

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Table 1. (continued)

Species 1994	1994	ABC (mt) 1994	1995	1994 TAC	Catch
Shortraker/rougheye	W	100	170	100	109
	C	1,290	1,210	1,290	887
	E	570	530	570	597
	Total	1,960	1,910	1,960	1,593
Pelagic shelf rockfish	W	1,030	910	1,030	290
	C	4,550	3,200	4,550	1,697
	E	1,310	1,080	1,310	997
	Total	6,890	5,190	6,890	2,984
Black rockfish	GW				681
	C		335		
Demersal shelf rockfish	SEO	960	580	960	515
Atka mackerel	W			2,500	2,661
	C			1,000	910
	E			5	0
	TOTAL	4,800	6,480	3,505	3,571
Thornyhead rockfish	GW	1,180	1,900	1,180	1,209
Other species	GW	NA		14,405	3,449
Total		553,050	535,150	304,500	242,119

1/ Shelikof Strait pollock is included within the W/C ABC range.
2/ "Deep water flatfish" means rex sole, Dover sole, and Greenland turbot in 1993. In 1994 rex sole is a separate target category.
3/ "Shallow water flatfish" means rock sole, yellowfin sole, butter sole, starry flounder, and other flatfish not specifically defined.
4/ Demersal shelf rockfish catch incudes 97 mt of unreported mortality from halibut fisheries.

NOTE: ABCs and TACs are rounded to nearest 10, except for Pacific ocean perch.
GW means Gulfwide.
Catch data source: NMFS Blend Reports.
Northern rockfish were separated from Slope rockfish in 1993.
Atka mackerel was separated from "other species" in 1994.
Black rockfish was recommended for separation from the pelagic shelf rockfish in the Central Gulf for 1995.
Redbanded rockfish was removed from DSR and combined with other slope rockfish for 1995.

Table 2. Gulf of Alaska exploitable biomasses, 1995 ABCs, and estimated trends and abundances for Western, Central, Eastern, Gulfwide, West Yakutat, and Southeast Outside regulatory areas.

Species	Exploitable Biomass (mt)		1995 ABC	1995 Overfishing Level	Abundance,[3] Trend
Pollock	553,000[1]	{ W(61)	30,380 }		Below, declining
		{ C(62)	15,310 }	266,000	
		{ C(63)	16,310 }		
		E	3,360	14,400	
		Total	65,360	280,400	
Pacific cod	573,000	W	31,300		Above, declining
		C	71,300		
		E	5,400		
		Total	108,000	126,000	
Deep water flatfish	116,710	W	670		Unknown, Unknown
		C	8,150		
		E	5,770		
		Total	14,590	17,040	
Rex sole	89,660	W	1,350		Unknown,[4] Stable
		C	7,050		
		E	2,810		
		Total	11,210	13,091	
Shallow water flatfish	355,590	W	26,280		Unknown,[4] increasing
		C	23,140		
		E	2,850		
		Total	52,270	60,262	
Flathead sole	198,470	W	8,880		Unknown,[4] stable
		C	17,170		
		E	2,740		
		Total	28,790	31,557	
Arrowtooth flounder	1,585,040	W	28,400		Above, stable
		C	141,290		
		E	28,440		
		Total	198,130	231,416	
Sablefish	194,900	W	2,600		Near, stable
		C	8,600		
		WYK	4,100		
		SEO	6,200		
		Total	21,500	25,730	
Other Slope rockfish	112,812	W	180		Unknown, Unknown
		C	1,170		
		E	5,760		
		Total	7,100	8,395	
Northern rockfish	87,845	W	640		Unknown, Unknown
		C	4,610		
		E	20		
		Total	5,270	9,926	
Pacific ocean perch	142,465	W	1,180		Below, increasing
		C	3,130		
		E	2,220		
		Total	6,530	8,230	

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Table 2. (continued)

Species	Exploitable Biomass (mt)		1995 ABC	1995 Overfishing Level	1995 Abundance,[3] Trend
Shortraker/ Rougheye	71,811	W	170		Unknown, Unknown
		C	1,210		
		E	530		
		Total	1,910	2,925	
Pelagic shelf rockfish[2]	57,644	W	910		Unknown, Unknown
		C	3,200		
		E	1,080		
		Total	5,190	8,704	
Black rockfish		CG	335	335	Unknown,[4] Unknown
Demersal shelf rockfish	26,093	SEO	580	1,044	Unknown, Unknown
Atka mackerel	21,000	GW	6,480	11,700	Unknown, Unknown
Thornyhead rockfish	30,341	GW	1,900	2,660	Unknown, Stable
Other species	NA	W	NA		TAC = 5% of the sum of TACs
		C	NA		
		E	NA		

1/ Biomass estimates includes only Western and Central Gulf areas.
2/ Pelagic shelf rockfish for 1994 includes black rockfish
3/ Abundance relative to target stock size as specified in SAFE documents.
4/ Historically lightly exploited therefore expected to be above the specified reference point.

Note: ABCs are rounded to nearest 10.
Overfishing is defined Gulf-wide.
Northern rockfish were separated from slope rockfish in 1993.
Atka mackerel will be separate from "other species" in 1994.
Rex sole was part of deepwater flatfish until 1994.
Black rockfish was separated from the pelagic rockfish in the Central Gulf for 1995.
Redbanded rockfish removed from DSR for 1995 and combined with other slope rockfish.

Table 3. Summary of fishing mortality rates for the Gulf of Alaska, 1995.

Species	ABC Rate[1]	FABC[2]	OFL Rate[3]	F_{OFL}
Pollock	0.200	F_{ABC}	0.510	$F_{30\%}$
Pacific cod	0.40	$F_{35\%}$	0.48	$F_{30\%}$
Deepwater flatfish	0.125	$F_{35\%}$	0.146	$F_{30\%}$
Rex sole	0.125	$F_{35\%}$	0.146	$F_{30\%}$
Flathead sole	0.145	$F_{35\%}$	0.159	$F_{30\%}$
Shallow water flatfish	0.145-0.149[5]	$F_{35\%}$	0.159-0.175[6]	$F_{30\%}$
Arrowtooth	0.125	$F_{35\%}$	0.146	$F_{30\%}$
Sablefish	0.125	$F_{35\%}$[4]	0.166	$F_{30\%}$
Pacific ocean perch	0.048	$F_{44\%}$	0.078	F_{MSY}
Shortraker/rougheye	0.03/0.025	F=M	0.03/0.046	F_{mix}[7]
Rockfish (other slope)	0.04-0.10	F=M	0.04-0.10	F_{mix}[8]
Northern rockfish	0.060	F=M	0.113	$F_{30\%}$
Rockfish (pelagic shelf)	0.090	F=M	0.151	$F_{30\%}$
Black rockfish				
Demersal Shelf Rockfish	0.020	F=M	0.040	$F_{30\%}$
Thornyhead rockfish	0.0359	$F_{35\%}$	0.0425	$F_{30\%}$
Atka mackerel	0.30	F=M	0.54	$F_{30\%}$

1/ Maximum 1993 catch level allowable under overfishing definition.
2/ Fishing mortality rate corresponding to acceptable biological catch.
3/ Maximum fishing mortality rate allowable under overfishing definition.
4/ Adjusted by current biomass.
5/ Shallow water flatfish; yellowfin sole 0.149, rocksole 0.147, others 0.145.
6/ Shallow water flatfish; yellowfin sole 0.175, rocksole 0.172, others 0.159.
7/ $F_{30\%}$ for rougheye, F=M for shortraker.
8/ $F_{30\%}$ for sharpchin, F=M for other species.

GULF OF ALASKA GROUNDFISH ABCs and TACs
Initial 1995 Plan Team, SSC, and AP recommendations (metric tons)

Species	Area	1994 ABC	1994 TAC	1994 Catch*	Plan Team 1995 ABC	SSC 1995 ABC	AP 1995 TAC	COUNCIL 1995 TAC
Pollock	W (61)	22,130	22,130	16,709	30,380	30,380	30,380	30,380
	C (62)	23,870	23,870	18,475	15,310	15,310	15,310	15,310
	C (63)	56,000	56,000	44,618	16,310	16,310	16,310	16,310
	E	7,300	7,300	6,848	3,360	3,360	3,360	3,360
	Total	109,300	109,300	86,650	65,360	65,360	65,360	65,360
Pacific Cod	W	16,630	16,630	14,679	29,900	16,630 - 29,900	29,900	29,900
	C	31,250	31,250	30,066	68,000	31,250 - 68,000	68,000	68,000
	E	2,520	2,520	1,646	5,100	2,520 - 5,100	5,100	5,100
	Total	50,400	50,400	46,391	103,000	50,400 -103,000	103,000	103,000
Flatfish, Deep Water	W	460	460	53	670	670	460	460
	C	12,930	7,500	2,344	8,150	8,150	7,500	7,500
	E	3,120	3,120	697	5,770	5,770	3,120	3,120
	Total	16,510	11,080	3,094	14,590	14,590	11,080	11,080
Rex Sole	W	800	800	50	1,350	1,350	1,350	1,350
	C	9,310	7,500	2,819	7,050	7,050	7,050	7,050
	E	1,840	1,840	5	2,810	2,810	2,810	2,810
	Total	11,950	10,140	2,874	11,210	11,210	11,210	11,210
Flathead Sole	W	9,120	2,000	495	8,880	8,880	2,000	2,000
	C	23,080	5,000	1,362	17,170	17,170	5,000	5,000
	E	3,650	3,000	2	2,740	2,740	3,000	3,000
	Total	35,850	10,000	1,859	28,790	28,790	10,000	10,000
Flatfish, Shallow Water	W	20,290	4,500	184	26,280	26,280	4,500	4,500
	C	12,950	12,950	2,549	23,140	23,140	12,950	12,950
	E	1,180	1,180	10	2,850	2,850	1,180	1,180
	Total	34,420	18,630	2,743	52,270	52,270	18,630	18,630
Arrowtooth	W	28,590	5,000	1,165	28,400	28,400	5,000	5,000
	C	186,270	20,000	14,141	141,290	141,290	25,000	25,000
	E	21,380	5,000	422	28,440	28,440	5,000	5,000
	Total	236,240	30,000	15,728	198,130	198,130	35,000	35,000
Sablefish	W	2,290	2,290	566	2,290	2,290	2,290	2,290
	C	11,220	11,220	8,112	11,220	11,220	11,220	11,220
	W. Yakutat	4,850	4,850	2,836	4,850	4,850	4,850	4,850
	E. Yak./SEO	7,140	7,140	6,292	7,140	7,140	7,140	7,140
	Total	25,500	25,500	17,806	25,500	25,500	25,500	25,500
Pacific Ocean Perch	W	680	571	170	1,370	1,780	1,195	1,195
	C	850	714	626	2,460	3,190	2,152	2,152
	E	1,500	1,265	121	2,970	3,860	2,630	2,630
	Total	3,030	2,550	917	6,800	8,830	5,977	5,977
Shortraker/Rougheye	W	100	100	77	170	170	170	170
	C	1,290	1,290	837	1,210	1,210	1,210	1,210
	E	570	570	554	530	530	530	530
	Total	1,960	1,960	1,468	1,910	1,910	1,910	1,910
Rockfish, Other Slope	W	330	200	74	170	170	170	170
	C	1,640	990	590	1,150	1,150	1,150	1,150
	E	6,330	1,050	726	5,610	5,610	5,610	5,610
	Total	8,300	2,240	1,390	6,930	6,930	6,930	2,235 - 6,930
Rockfish, Northern	W	1,000	1,000	1,610	640	640	640	640
	C	4,720	4,720	4,384	4,610	4,610	4,610	4,610
	E	40	40	49	20	20	20	20
	Total	5,760	5,760	6,043	5,270	5,270	5,270	5,270
Rockfish, Pelagic Shelf	W	1,030	1,030	253	910	910	910	910
	C	4,550	4,550	1,226	3,200	3,200	3,200	3,200
	E	1,310	1,310	888	1,080	1,080	1,080	1,080
	Total	6,890	6,890	2,367	5,190	5,190	5,190	5,190
Black Rockfish	Gulfwide	NA	NA	295	400	-	-	-
Rockfish, Demersal Shelf	SEO	960	960	406	960	960	960	960
Thornyhead	Gulfwide	1,180	1,180	1,068	2,320	1,450	1,450	1,450
Atka Mackerel	W		2,500	2,658			2,500	2,500
	C		1,000	5			1,000	1,000
	E		5	0			5	5
	Gulfwide	4,800	3,505	2,663	6,480	4,300	3,505	3,505
Other Species	Gulfwide	NA	14,405	2,913	NA	NA	15,549	15,314 - 15,549
GULF OF ALASKA	TOTAL	553,050	304,500	196,675	535,110	481,090 - 533,690	326,521	321,591 - 326,521

* Catch through August 6, 1994

** A D D E N D U M **

PACIFIC HALIBUT DISCARD MORTALITY RATES IN THE 1993 GROUNDFISH FISHERIES OFF ALASKA

by

Gregg H. Williams, IPHC
November 10, 1994

Introduction

Two additional issues regarding Gulf of Alaska trawl fisheries were discussed at the September meeting of the Plan Team. The first had to do with splitting the bottom trawl fishery for pollock into at-sea and shore-based processing components. The second was a request to examine splitting rex and flathead sole target fisheries out from the shallow water flatfish species complex. Results on the latter will not be available for 1995, but will be examined this winter and will be reported next fall. This report provides further information on the pollock fishery separation. The full set of discard mortality rate recommendations for 1995 are attached.

Splitting Bottom Trawl Pollock by Processing Mode

At the September meeting, information was provided that showed that the shore-based fishery for bottom trawl pollock had a much lower discard mortality rate that at-sea processing vessels: 54% versus 81%. The difference was large enough to support splitting the discard mortality rate into separate rates for each component for management of 1995 fisheries.

The current approach for determining a preseason assumed rate calls for averaging the rates in the two most recent years. In this case, rates for 1992 and 1993 would be used to determine the preseason assumed rate for 1995, not just the 1993 rate.

Data for 1992 were obtained and indicated discard mortality rates of 67% for at-sea processors and 72% for shore-based vessels (Table 1). Averaging the 1992 and 1993 data yields the following results for preseason assumed rates for this fishery for 1995:

Processing Mode	Discard Mortality Rate
At-Sea	74%
Shore-Based	63%

Table 1. Halibut condition and discard mortality rates in the 1992 and 1993 Gulf of Alaska bottom trawl pollock fishery.

Processing Mode	No. of Vessels	No. of Hauls	No. of halibut	% Exc	% Poor	% Dead	Discard Mortality Rate (%)
1992							
At-Sea	11	40	218	23	20	57	67
Shore-based	36	258	874	13	25	62	72
TOTAL	47	298	1,092	15	24	61	71
1993							
At-Sea	5	14	1,100	7	13	80	81
Shore-based	18	142	683	35	34	31	54
TOTAL	23	156	1,783	18	21	61	70

Table 2. IPHC recommendations for Preseason Assumed Discard Mortality Rates for monitoring halibut bycatch mortality in 1995. Rates shown under "Used in 1994" for hook & line fisheries represent rates applied to observed/unobserved vessels.

Region/Target	1990	1991	1992	1993	1992-93 Average	Used in 1994	Recommendation for 1995
BSAI TRAWL							
MWT Pollock	81	81	87	90	89	80	89
Atka mackerel	69	73	62	56	59	70	59
Rock sole/Oflats[1]	58	68	78	72	75	70	75
Pacific cod	68	60	67	62	65	60	65
BT Pollock	65	59	76	78	77	60	77
Rockfish	62	54	59	78	69	60	69
Yellowfin sole[1]	73	74	77	75	76	70	76
Arrowtooth	57	41	-	-	-	40	49[2]
Grnld. turbot	58	38	-	-	-	40	48[2]
GOA TRAWL							
MWT Pollock	63	74	69	63	66	75	66
Rockfish	61	65	69	62	66	60	66
BT Pollock	65	56	67/72[3]	81/54[3]	74/63[3]	55	74/63[3]
Shallwtr. flatfish	62	61	62	66	64	60	64
Pacific cod	61	55	59	56	58	55	58
Deepwtr. flatfish	57	52	59	59	59	55	59
BSAI H&L							
Pacific cod	17	21	18	18	18	18/18	18
Sablefish	13	18	19	14	17	12.5/15	17
Rockfish	18	29	-	-	-	12.5/15	24[2]
Grnld. turbot	-	-	17	21	19	12.5/15	19
GOA H&L							
Pacific cod	13	17	30	9	20	16/16	20
Sablefish	11	28	23	26	25	14/17	25
Rockfish	15	20	-	-	-	11.5/14	18[2]
BSAI POT							
Pacific cod	7	3	12	4	8	5	8
GOA POT							
Pacific cod	10	5	16	20	18	5	18

[1]During 1990 and 1991, "Other flatfish" was grouped with yellowfin sole. Since 1992, the target has been grouped with rock sole.
[2]Average of 1990 and 1991, the two most recent years.
[3]For the GOA BT pollock fishery, the first value represents at-sea processors, the second value represents vessels delivering to shoreside processors.

DRAFT

TABLE 1. GULF OF ALASKA GROUNDFISH ABCs and TACs
Final 1995 Council recommendations (metric tons)

Species	Area	1994 ABC	1994 TAC	1994 Catch*	Council 1995 ABC	Council 1995 TAC
Pollock	W (61)	22,130	22,130	20,020	30,380	30,380
	C (62)	23,870	23,870	22,725	15,310	15,310
	C (63)	56,000	56,000	62,326	16,310	16,310
	E	7,300	7,300	6,865	3,360	3,360
	Total	109,300	109,300	111,936	65,360	65,360
Pacific Cod	W	16,630	16,630	14,712	20,100	20,100
	C	31,250	31,250	31,084	45,650	45,650
	E	2,520	2,520	1,707	3,450	3,450
	Total	50,400	50,400	47,503	69,200	69,200
Flatfish, Deep Water	W	460	460	48	670	460
	C	12,930	7,500	3,544	8,150	7,500
	E	3,120	3,120	1,467	5,770	3,120
	Total	16,510	11,080	5,059	14,590	11,080
Rex Sole	W	800	800	49	1,350	800
	C	9,310	7,500	3,525	7,050	7,050
	E	1,840	1,840	85	2,810	1,840
	Total	11,950	10,140	3,659	11,210	9,690
Flatfish, Shallow Water	W	20,290	4,500	189	26,280	4,500
	C	12,950	12,950	3,694	23,140	12,950
	E	1,180	1,180	11	2,850	1,180
	Total	34,420	18,630	3,894	52,270	18,630
Flathead Sole	W	9,120	2,000	498	8,880	2,000
	C	23,080	5,000	2,043	17,170	5,000
	E	3,650	3,000	13	2,740	3,000
	Total	35,850	10,000	2,554	28,790	10,000
Arrowtooth	W	28,590	5,000	1,173	28,400	5,000
	C	186,270	20,000	21,178	141,290	25,000
	E	21,380	5,000	846	28,440	5,000
	Total	236,240	30,000	23,197	198,130	35,000
Sablefish	W	2,290	2,290	556	2,600	2,600
	C	11,220	11,220	9,536	8,600	8,600
	W. Yakutat	4,850	4,850	4,541	4,100	4,100
	E. Yak./SEO	7,140	7,140	6,879	6,200	6,200
	Total	25,500	25,500	21,512	21,500	21,500
Pacific Ocean Perch	W	680	571	165	1,180	
	C	850	714	922	3,130	
	E	1,500	1,265	814	2,220	
	Total	3,030	2,550	1,901	6,530	**
Shortraker/Rougheye	W	100	100	109	170	170
	C	1,290	1,290	887	1,210	1,210
	E	570	570	597	530	530
	Total	1,960	1,960	1,593	1,910	1,910
Rockfish, Other Slope	W	330	199	102	180	199
	C	1,640	988	713	1,170	988
	E	6,330	1,048	798	5,760	1,048
	Total	8,300	2,235	1,613	7,110	2,235 ***
Rockfish, Northern	W	1,000	1,000	1,394	640	640
	C	4,720	4,720	4,521	4,610	4,610
	E	40	40	55	20	20
	Total	5,760	5,760	5,970	5,270	5,270
Rockfish, Pelagic Shelf	W	1,030	1,030	290	910	910
	C	4,550	4,550	1,697	3,200	3,200
	E	1,310	1,310	997	1,080	1,080
	Total	6,890	6,890	2,984	5,190	5,190
Rockfish, Demersal Shelf	SEO	960	960	515	580	580
Thornyhead	Gulfwide	1,180	1,180	1,209	1,900	1,900
Atka Mackerel	W			2,661		2,310
	C			910		925
	E			0		5
	Total	4,800	3,500	3,571	3,240	3,240
Other Species	Gulfwide	NA	14,504	3,449	NA	12,944 ****
GULF OF ALASKA	**TOTAL**	553,050	304,589	242,119	492,780	271,829 ****

* through October 29, 1994
** to be determined prior to July opening
*** to be adjusted by NMFS
****pending Pacific ocean perch and other slope rockfish TAC determinations

DRAFT

GULF OF ALASKA PLAN TEAM MEETING
AUGUST 30 - SEPTEMBER 2, 1994

PLAN TEAM MEMBERS

Sandra Lowe, chairman	Jane DiCosimo, plan coordinator
Kaja Brix	Rich Ferrero
Jeff Fujioka	Lew Haldorsen
Jim Hastie	Tory O'Connell (for Barry Bracken)
Gregg Williams	Sam Wright

The GOA Plan Team met on Tuesday morning to review the GOA stock assessments. The first order of business was to nominate and elect a chairman. Sandra Lowe was commended for her exemplary past service as chairman and was nominated and reappointed chair by unanimous acclamation.

Slope Rockfish

Pacific Ocean Perch Jon Heifetz, NMFS-Auke Bay Lab, led the team through the 1994 Pacific ocean perch stock assessment, which estimated a 1995 ABC of 8,830 mt, a fourfold increase over the 1994 ABC of 2,550 mt. This increase is due the 1993 trawl survey results and new age composition data. Most of the biomass increase occurred in the central GOA. The model predicts an 80 percent recovery for POP (mostly in the western Gulf) compared with a 50 percent recovery last year. The strong 1986 year class should continue to contribute to recovery of the stock in upcoming years.

Considerable discussion occurred concerning the estimate of F_{MSY}. When F_{MSY} is known, the Council's overfishing definition sets F(OFL) equal to F_{MSY}, and if current biomass is below B_{MSY}, the rate is reduced proportionately. The stock assessment authors, as well as the plan team, could not determine if the optimal fishing rate ($F_{44\%}$=0.080) used to compute ABC is an appropriate determination of F_{MSY} and opted to remain with their 1993 position. If it is a true estimate, then the level of overfishing also corresponds to the recommended ABC of 8,830 mt. If the $F_{44\%}$ is not considered F_{MSY}, then OFL is determined by the application of $F_{30\%}$, resulting in an OFL = 15,925 mt, a greater level of fishing mortality of concern to the team and an unnecessarily large buffer between ABC and OFL. To provide a reasonable buffer between ABC and OFL, the Plan Team adopted guidelines for reducing ABC below OFL by the proportion of $F_{35\%}/F_{30\%}$ (Case I) which results in an ABC of 6,800 mt. Using the average distribution of exploitable biomass based on the 1987, 90, and 93 trawl surveys results in ABCs of 1,370 mt for the western area, 2,460 mt for the central area, and 2,970 mt for the eastern area. Alternative methods of apportionment that explicitly incorporate the selectivity pattern of the fishery and area specific age composition were discussed by the Plan Team.

The Plan Team also discussed the TAC for Pacific ocean perch which is determined from its rebuilding plan. The plan specifies that the fishing mortality rate is halfway between the optimal fishing mortality rate (F=.080) and the fishing mortality rate estimated to be sufficient to supply unavoidable bycatch of Pacific ocean perch in the Gulf based on 1992 bycatch rates. The fishing rate from this computation (F=0.054) corresponds to the $F_{55\%}$ rate and is adjusted downward by the ratio of current female spawning biomass to target female spawning biomass (0.812). This computation results in a F = 0.044 and a TAC for Pacific ocean perch for the 1994 fishery of 5,977 mt, to ensure continued recovery.

The Plan Team would like to emphasize to the Council their concern for POP rebuilding in the eastern Gulf, and recommended including aging data by area for calculating ABC apportionments.

Shortraker/Rougheye Jon continued his briefing with the shortraker/rougheye analysis. He explained that the 1984 and 1987 trawl survey results were revised to remove fishing power adjustments employed in earlier assessments which lowered biomass estimates. However, the 1984 survey was dropped from estimating ABCs and biomass estimates. The Plan Team discussed whether to use all available surveys or just the most recent three surveys. Different scenarios were discussed, depending on the life history of species (i.e., long-lived versus short-lived species) and the possibility of weighting more recent surveys more heavily than earlier surveys. A consistent application of surveys in the models is preferred to the ad hoc application currently used. The team will take this issue up again in the November meeting for application in the 1996 stock assessments.

The ABC for shortraker/rougheye component of the complex is 1,910 mt (170 mt, 1,210 mt, and 530 mt for the western, central, and eastern areas, respectively) based on an F=M (.03 and .025 for shortraker and rougheye respectively) strategy and an average of the 1987, 1990, and 1993 survey biomass estimates. An $F_{30\%}$ value of 0.046 was calculated for rougheye rockfish, which if applied to the rougheye rockfish biomass estimate of 48,123 mt results in an overfishing level of 2,214 mt. An $F_{30\%}$ for shortraker has not been computed because of a lack of growth data, therefore F=M=0.03 was applied to the biomass estimate of 23,689 mt to give an overfishing catch limit of 711 mt. The two overfishing levels were summed to obtain an overfishing limit for shortraker and rougheye of 2,925 mt.

The team discussed the species composition in the commercial fishery and the trawl survey. The commercial fishery has caught more shortraker than rougheye rockfish, while the trawl survey has sampled more rougheye than shortraker rockfish. Overall, the amount of each species is roughly equal, but biomass estimates of shortraker rockfish are twice that of rougheye rockfish. This is a concern of the Plan Team since the ABC is combined for both species. The team discussed setting a separate ABC for shortraker rockfish to afford it greater protection from overfishing, but declined at this time to recommend separation of this species.

Northern rockfish Based on the stock assessment, the team recommended an ABC using F = M = .06 for northern rockfish of 5,270 mt (640 mt, 4,610 mt, and 17 mt for the western, central, and eastern areas, respectively). The OFL for northern rockfish is based on $F_{30\%}$ and is equal to 9,926 mt. The team noted that the small ABC in the eastern might be causing high discards of northern rockfish in this area. The possibility of combining northern rockfish with other slope rockfish in the eastern area was discussed as a possible way to reduce discards.

Other slope rockfish The recommended ABC for this group is obtained by applying F = M fishing rates (0.04 - 0.10) to the average of the 1987, 1990, and 1993 trawl survey estimates of exploitable biomass for each species and summing to obtain a value of 6,930 mt (170 mt, 1,150 mt, and 5,610 mt for the western, central, and eastern areas, respectively). For the other slope rockfish, the rate of overfishing is determined by applying $F_{30\%}$ values of .080 for sharpchin rockfish and natural mortality rates for the remaining species. This results in an OFL of 8,229 mt for other slope rockfish.

The team noted a substantial increase in the catch of sharpchin, redstripe, harlequin, silvergrey, and yellowmouth rockfish with removal of northern rockfish from the other slope rockfish category in 1993. They expressed concern that some species of other slope rockfish (i.e., yellowmouth and silvergrey, targeted by catcher/processors) may be exploited at a rate disproportionately higher than their estimated abundance. These species are of higher commercial value than the other species because of their larger size. The Plan Team suggested that smaller, individual ABCs would afford greater protection to exploited stocks than one combined ABC, but did not recommend separation of those species at this time.

The Team noted that the proportion of discarded rockfish for some species has increased dramatically over the past four years. Most of these other species are of high value and discards should be discouraged. The team recommended that the directed fishing standards should be modified to allow for variable discard rates. This should help allow retention of legitimate bycatch while discouraging topping off or discard waste.

Pelagic Shelf Rockfish Dave Clausen, NMFS Auke Bay Lab, presented the stock assessment for pelagic shelf rockfish. This assemblage is comprised primarily of dusky rockfish. The 1984 and 1987 trawl survey results were also revised to remove the fishing power adjustments.

Current exploitable biomass for pelagic shelf rockfish is derived by averaging the biomasses for the 1987, 1990, and 1993 trawl surveys. This value, 57,644 mt, is lower than the estimate of 76,500 mt used in the 1994 assessment because the 1984 survey results were not included in the analysis and because the revised biomass estimate for 1987 is also much lower. The team recommended an ABC of 5,190 mt for 1995, down from 6,890 in 1994. Geographic apportionments as follows: 910 mt in the western area, 3,200 mt in the central area, and 1,080 mt in the eastern area.

The team recommended separating black rockfish from the assemblage and assigned a separate ABC. The fishery uses different gear, and the species has different habitat requirements. A jig fishery began for black rockfish in southeast Alaska, about equally in state and federal waters, and the team expressed concern that a combined ABC would not adequately protect this species as it experiences increasing fishing pressure. Assessment information on black rockfish is negligible, however, to prevent overfishing of black rockfish in the central area due to unrestrained fishing on the assemblage because the TAC is unmet, the team recommended a separate Gulf-wide ABC for black rockfish of 400 mt, an approximate average of historical catches since 1991. The commercial catches of black rockfish have increased to 295 mt through August 6, 1994, with most of the catch taken from a small area south of the Kenai Peninsula. There is insufficient data on catch distribution to recommend individual apportionments, and the team recommends not dividing TAC into apportionments by regulatory area. A Gulfwide ABC would constrain the existing fishery in the central area. It would also allow a fishery to develop in southeastern Alaska, where there has been some recent interest in harvesting this species.

Demersal Shelf Rockfish Tory O'Connell, ADF&G - Sitka, reported that the 1994 survey data is not yet available but would be available for the November 1994 meeting. Last year's reference numbers were used to calculate ABC and overfishing level. ABC was derived using $F_{ABC} = M$ applied to the lower 90% confidence interval of the biomass for yelloweye. This catch level was then adjusted to allow for bycatch of other DSR species by dividing it by the fraction of yelloweye in the commercial catch (0.88) for recommending an ABC of 960 mt. Tory reported that based on her recent submersible censuses the total biomass of this assemblage is probably going down and the 1995 ABC will likely be below 800 mt.

The Plan Team recommended removing redbanded rockfish from the demersal shelf rockfish group and returning it to the other slope rockfish assemblage. This species is a transitional species between nearshore and deep water. Previously, it had been landed primarily as a bycatch in the DSR longline fishery, but due to shifts in fishing patterns it is now landed as a bycatch in the slope rockfish trawl fishery. Consequently, relatively small amounts of redbanded rockfish trawler bycatch directly impacts the longline DSR fishery. The NMFS survey data will be used to assess the biomass of redbanded rockfish.

Atka Mackerel Sandra Lowe and Lowell Fritz presented the Atka mackerel assessment. The biomass estimate of 21,600 mt was used to calculate ABC. The fisheries stellar sea lion sections were expanded. The authors reported that the survey estimate of the population was down. The most recent biomass estimate for GOA Atka mackerel from the 1993 bottom trawl survey is 21,600 mt. Greater quantities of fish in more areas were surveyed in 1993, although they acknowledged the "hit-or-miss" quality of the survey design.

The team debated the appropriate fishing mortality to calculate ABC. Since there is evidence that Gulf of Alaska Atka mackerel may be a separate stock from those in the Aleutian Islands (based primarily on size- and weight-at-age data), the Team was hesitant to use the same approach used for the Aleutian Islands to arrive at an ABC for GOA Atka mackerel. Therefore, the Team used an exploitation rate of F = M = 0.3 applied to the most recent biomass estimate (21,600 mt) to compute an ABC of 6,480 mt. The Team recognizes that this approach results in a doubling of the exploitation rate from 1994 despite a decrease in the survey biomass estimate, but feels that this is the most appropriate means to arrive at an ABC.

There are several additional factors, along with the possible sensitivity of GOA Atka mackerel to fishing pressures, which suggest that TAC be lower than ABC. Recent Steller sea lion food habits data indicate that Atka mackerel is an important prey species in the Aleutian Islands, which includes the Western GOA management area. The Team is concerned about the high levels of fishery removals in the last 3 years (80-99%) that have occurred within 20 nm of important Steller sea lion habitat, specifically rookeries on Adugak, Ogchul, Atkins, and Chernabura islands. Furthermore, most of these removals have occurred in winter (November-March, a particularly sensitive period for juveniles and recently weaned pups) and the fishery has been brief (on the order of days to weeks). Therefore, the Team recommends that TAC be reduced below ABC due to concerns about possible fishery effects on the recovery of Steller sea lions in the western GOA, or that other measures be taken to minimize fishery/marine mammals interactions. These include: seasonal closure (November through March), hot spot closure or delayed seasonal opening, setting a limited (1-2 day) fishing season, expanding the buffer zone around sea lion rookeries, and setting other fishing zones to limit impinging on sea lion habitat.

Pacific cod Grant Thompson presented the stock assessment for Pacific cod. The biomass was calculated to be 542,000 mt, with a recommended 1995 ABC of 103,000 mt, significantly higher than the 1994 ABC of 50,400 mt. The higher biomass estimate and ABC arose primarily from the assumption of dome-shaped selectivity and a higher natural mortality rate. The team recommended separating out gear data in the model and using size composition data from the survey as a proxy for age composition to calculate area apportionments for the November 1994 SAFE.

The team discussed the data which indicates that the trawl surveys do not sample the adult population completely and that a selectivity pattern that decreases with larger sizes is warranted. The model prediction of age three and older biomass is, therefore, larger than the survey biomass levels.

The $F_{0.1}$ (0.57) rate was replaced by the $F_{35\%}$ value (0.40) for the ABC recommendation of 103,000 mt.

The 1995 ABC is higher because the biomass estimate is higher and a higher natural mortality rate was assumed. The new natural mortality rate (M=0.37) is equal to that used in the Eastern Bering Sea Pacific cod and also provided a good compromise to the model fit to the GOA data. The geographic apportionments are: 29% (29,900 mt) in the western area, 66% (68,000 mt) in the central area, and 5% (5,100 mt) in the eastern area. For the November 1994 meeting, the team suggested that the authors examine the area-specific apportionments based on the biomass available to the fishery as opposed to the survey biomass levels. They also expressed concern that large adult fish not well sampled by the surveys may be more abundant in certain areas.

The plan team indicated they would like to see the different fisheries (pot, longline and trawl) treated separately within the model because the selectivity of these gears is likely to be different. These factors may also affect the likelihood profile of terminal trawl survey selectivity and natural mortality.

Pollock Anne Hollowed, NMFS - Seattle, presented the pollock stock assessment. Chris Wilson, NMFS, discussed the 1994 Shelikof Strait hysroacoustic survey. The model predicts no significant change in biomass, but does indicate large area shifts in the population, which will greatly change ABC apportionments. The team discussed the distribution and abundance of pollock in the Shelikof area, and the timing of peak spawning.

Length frequency data from the 1994 hydroacoustic survey shows the progression of the strong 1988 year class through the population. A bimodal distribution of population numbers suggests that the 1993 year class may be an important contributor to the future pollock fishery. The 1992 hydroacoustic age composition showed the 1987 year class as the dominant age group. Previously, the 1987 year class was estimated as below average. Subsequent reevaluation of otoliths from this survey resulted in a change in the aging criteria. The team also discussed whether GOA pollock were really 1988 or 1989 year class Bering Sea fish migrating into the Shumagin area or possibly a new source of older recruits. The consensus was that the increase was probably due to migration form the Bering Sea, and the team suggested some methods (i.e., genetics, tagging, parasites) to determine the source. The team also discussed the size frequency shifts from the survey results (specifically a small surge of small fish in Kodiak).

The biomass is estimated to be 546,000 mt, with an F= 0.2. The threshold biomass was determined to be 370,000 mt. The fishery is characterized by recent poor recruitment and an older stock moving out of the selective range of the fishery. The Plan Team extensively discussed the appropriate fishing mortality rate to be applied in estimating pollock ABC.

In 1993, the Plan Team requested that additional exploitation strategies be explored and recommended an ABC based on the fishing mortality rate that produced a minimal (5%) probability of falling below the threshold spawner biomass level in the long-term (F0.2). The yield associated with an F of 0.2 is 62,000 mt. Stock projections were made for the optimal F of 0.3 and the minimal probability F of 0.2 in the current assessment. Based on the results of these projections, the Plan Team recommended an ABC of 62,000 mt for the Western/Central (W/C) Gulf for 1995. The Plan Team chose this exploitation strategy because of recent trends in poor recruitment of Gulf of Alaska pollock and ecosystem considerations.

In order to estimate an optimal fishing mortality rate, the tradeoffs between increased yield and the risk of falling below the threshold were evaluated. The optimal fishing mortality rate that simultaneously maximized yield and minimized risk was determined to be 0.3 (full selection value). This fishing mortality rate was associated with a yield of 90,000 mt which is the stock assessment authors' recommended ABC.

The Plan Team recommended using F = 0.2, rather than F = 0.3, to calculate the 1995 ABC of 62,000 mt to further protect the stock and limit stellar sea lion impacts. The Team agreed with this procedure, although they noted concerns over the specification and implications of the threshold level, and recommended an F consistent with the team's decision in 1993. Two team members dissented in applying this fishing mortality rate, suggesting that marine mammal (and other ecosystem) interactions and uncertainty in estimating stock size and ABCs should be addressed by the Council in setting TAC, and not in estimating ABC; they did agree with the rest of team that a conservative management approach should be taken with this stock. The team agreed to reexamine the applied rate for the November 1994 SAFE; alternatives for a short term risk analysis was requested.

The Team notes that although a fishing rate may be chosen for its optimal performance over the long term, it may not be the optimal rate for the short term, especially in regard to the risk of overfishing. Such a rate is one that would be chosen when conditions were expected to be average and if there was no provision for adjustment according to changing conditions. Under current conditions, continued use of the long term optimal F (0.3) results in biomass projections below threshold biomass by 1997. The Team remains concerned about the downward trend in pollock biomass and its approach to the threshold biomass reference point and is unaware of any compelling reason to adhere to a constant fishing rate. They noted that even with the more conservative F (0.2), which had only a 5% probability of falling below the threshold over the long term, the biomass is still likely to go below the threshold, now that the stock is at a low level, and expected recruitment is pessimistic. Suggestions were made for exploring short-term strategies that take into account the current stock level and knowledge of expected recruitment. Additional sources of stock information brought to our attention will be explored.

Apportionment of the pollock TAC was discussed in terms of the dramatic shift between 1990 and 1993 surveys and the resulting effects of increased TACs on stellar sea lion nursery grounds. The central Gulf has more critical sea lion pup habitat, while the western Gulf would not be as impacted. Some team members were interested in applying an average over the survey period to address the biomass shift. The team decided to apportion the TAC according to the 1993 trawl survey results: 49% in the Shumagin area (30,380 mt), 24.7% in the Chirikof area (15,310 mt), and 26.3% in the Kodiak area (16,310 mt).

The Team noted the lack of any new information with which to set an ABC for the eastern Gulf. Lack of age composition data has precluded any age-structured analysis similar to that conducted for the western and central areas. However, recruitment patterns appear similar to that observed in the western and central Gulf. Thus, the Team agreed that it would be appropriate to apply the ratio of current ABC to 1993 western and central survey biomass to the eastern Gulf 1993 biomass estimate and recommended an eastern Gulf ABC of 3,360 mt.

The Team noted that a lower exploitation rate could benefit the fishery and help address specific TAC considerations: 1) maintain the pollock population above threshold levels; 2) limit forage fish removals important to marine mammals and seabirds; and 3) increase the likelihood of higher long term yields.

Specific concerns are as follows:

1) Results of the stock synthesis model runs indicate that the Gulf of Alaska pollock biomass has been declining since the mid-1980s. Projections for 1995-97 based on the model used to compute ABC shows declines in both mid-year and spawning biomass levels which are among the lowest ever observed. Spawning biomass for 1996 is predicted to approach historic lows and to drop below threshold level in 1997.

2) Current knowledge of this stock suggests that a single above average year class (1988) will be supporting the stock for the next few years, given that the older portion of the population (age 6^+ years) is declining and the 1991 and 1992 year classes are not expected to be strong.

3) Different pollock recruitment patterns between the 1970s and 1980s as shown by the stock synthesis model suggests that the Gulf of Alaska ecosystem is undergoing changes which influence carrying capacity for pollock. Declines in some upper trophic level predators, such as Steller sea lions, harbor seals and marine birds, and increases in others, such as arrowtooth flounder and halibut over this period, further suggest that unexplained large scale changes are occurring. While the pollock fishery/sea lion relationship is uncertain, the team feels that limiting removals of pollock may be appropriate given the current low pollock stock level and continued sea lion population decline.

Chris Blackburn, Alaska Groundfish Data Bank, presented additional information on pollock stocks in the Gulf of Alaska to the Plan Team on Wednesday morning prior to deliberation of the recommended ABC. She reported that Japanese boats did find pollock in deep water and that older fish do return to the Gulf. She indicated that 1984 was an anomalous year, and the 1983 trawl survey does not accurately reflect the condition of the stock that year; the 1981 survey identified a lot of fish, while the 1981 stock assessment model reduced the hydroacoustic population by 50 percent; and the egg production results from 1994 were disturbingly inaccurate, indicating fish were spawning at a much later age. She cited four scientific sources of Gulf groundfish data which could be incorporated into the model: annual ADF&G bottom survey; FOCI egg density data using a Russian vessel; 1989 study by Brenda Norcross, UAF, on egg production in Prince William Sound, and the Prince William Sound Echo System Assessment. She described cyclic variations in fish populations and the effects of physical oceanographic effects (e.g., el Niño) on fish populations.

Sablefish An assessment update of sablefish will not be completed until after completion of the annual longline surveys which were still underway in August, but will be provided to the team in November 1994. While new assessment modeling methods are being explored and reviewed, no major change in the assessment methods and total stock harvest strategy used for the 1994 season is anticipated for 1995.

The team is anticipating a change to the method of apportioning the total quota between the Bering Sea, Aleutian Island, and Gulf of Alaska regions, and between the western, central, west Yakutat, and east Yakutat/Southeast areas within the Gulf of Alaska. In the past, the latest distribution of survey relative population weight (RPW) was used to apportion the total ABC, while a weighted running average of annual RPWs were used to apportion to areas within the Gulf. The team intends to use a consistent method to apportion to both regions and areas, a method that buffers rapid changes in apportionment due to annual variation in estimated RPW distribution, but is also responsive to current estimates. The exponential decrease method of weighting is most sensitive to the latest year, and least sensitive to the oldest year, while still providing some buffering to variability in annual distribution. Alternative approaches to apportioning, such as projecting trends in regional abundance were also discussed.

The team expressed little concern that apportionments may vary slightly from the true distribution, since sablefish exploitation rate is low and the rate of sablefish movement between areas is high. The team prefers to establish a method of apportionment that is reasonable biologically and minimizes unnecessary sensitivity of area-specific IFQ values to survey variation.

Flatfish Tom Wilderbuer, NMFS - Seattle, presented the flatfish assessment. There were no significant differences in trends from the previous assessment, but point estimates have decreased, thereby reducing the ABCs. The recommended ABC for flatfish is 304,970 mt. ABC and overfishing levels for the shallow water group have been determined by summing values calculated for rock sole, yellowfin sole, and other shallow-water species. The plan team recommends that ABCs for each group be apportioned among the three regulatory areas in proportion to biomass distributions in the 1993 trawl survey. The team discussed the need to obtain maturity data from the observer program to include in the models.

Thornyheads Jim Ianelli, NMFS - Seattle, presented the assessment. The new estimate of biomass (64,770 mt) is considerably larger than last year's estimate (26,207). The estimate was higher for the following reasons. First, the fishing power correction estimates were updated. Second, the 1990 and 1993 trawl surveys did not extend into deeper water (> 500 m) where concentrations of larger thornyheads are known to exist. This year the model set size selectivity asymptotic for the 1984 and 1987. Third, the model used a fishing mortality rate of 0.07 instead of 0.05, a new maturity schedule, and revised trawl survey biomass estimates. The team indicated their interest in incorporating the cooperative longline data to the model as it becomes available and that future NMFS trawl surveys sample deep water strata (> 500 m) in order to adequately sample adult thornyhead. The 1995 ABC for thornyheads is recommended to be 2,300 mt in the Gulf.

Halibut Discard Mortality Rates Gregg Williams reviewed this report for the team. For most fisheries, the 1993 rates were similar to 1992 values; exceptions were BSAI and GOA trawl rockfish, GOA hook & line cod, and BSAI pot cod. At the December 1993 Council meeting, discussions with the AP, SSC, and IPHC staff concluded that an average of the rates for the two most recent years would be an appropriate preseason assumed rate. Accordingly, the IPHC report lists an average of the 1992-93 data as a recommendation for 1995 bycatch monitoring. The Team discussed these results and concurred with the IPHC recommendation that these are the most appropriate rates to use in 1995.

The team also discussed whether to use separate discard mortality rates for at-sea and shore-based trawl operations, and different rates for observed and unobserved hook & line vessels, since the arrowtooth bycatch fishery (used to "ballast" pollock in 1993) has been precluded. The team concurred with the IPHC report in the use of a single rate of 64% for this fishery. Since hook & line fisheries rates were derived in the same manner as for pots and trawls, the team concurred with the use of a single discard mortality rate for all hook & line fisheries. The team also requested that IPHC break out rex sole and flathead sole targets in the discard mortality rate analysis for the November 1994 SAFE to determine if these fisheries exhibit unique rates.

Marine Mammals Rich Ferrero updated the team on recent activity related to ESA and MMPA. The four year data gathering cycle recently ended in Alaska; the implementation cycle is next. He described the "strategic stock" concept as a reference point identified as a "marine mammal group where total biological removal is exceeded by all known sources of human mortality." He described a potential biological removal (PBR) as a safety factor, defined as a minimum biological estimate X ½ the maximum net productivity rate X a recovery factor (0.1 - 1.0). He described the status of scientific reviews in the three regions (Atlantic, Pacific, and Alaska), reporting that a meeting will be convened in September 1994 to examine the draft assessments. He described the difficulty in meeting Congress' goals of assessing marine mammal populations; allowing 75 days since Congressional approval to complete 146 assessments. The formula for identifying a strategic stock was identified as being listed by ESA or MMPA, lack of good estimate of a minimum population size, where total human mortalities exceed PBR, and where fishing mortalities exceed PBR. He reported that no cases were identified in Alaska. Only inshore set net and gill net fisheries in Alaska might be considered due to insufficient monitoring. One case in the northeast was identified as the harbor porpoise in the northeast inshore set net fisheries.

Rich noted that the current level of legal subsistence takes of marine mammals are not addressed by either ESA or MMPA, and may far exceed the threshold reference levels (approximately 517 stellar sea lions). Subsistence takes dwarf the effort involved in reducing marine mammal takes by commercial fishing from 30 to 20 (approximately 6 - 30).

Rich described the Bering Sea ecosystem program recently approved by Congress and suggested it might shift emphasis away from the Gulf of Alaska. Plan Team members suggested that the Bering Sea study was designed with "new" money and may bring further attention to studies in both areas. Rich suggested that the limiting factor for the Gulf may be scientific personnel.

Proposals The Plan Team reviewed two proposals specific to the GOA Groundfish FMP and approved them for forwarding to the AP, SSC, and Council, although the team noted that they were each low priority items given the other management issues currently before the Council. They include a proposal by the Bill Alwert on allocating a fixed percentage of Pacific cod TAC to fixed gear; the City of Chignik on opening the cod fishery. These two are in addition to two that were approved in joint session.

Adjourn The Gulf of Alaska Groundfish Plan Team meeting was adjourned on Friday, September 2, 1994 at 11 a.m.

- DRAFT-

GULF OF ALASKA PLAN TEAM MEETING
NOVEMBER 15-17, 1994

PLAN TEAM MEMBERS

Sandra Lowe, chairman
Kaja Brix
Jeff Fujioka
Jim Hastie
Gregg Williams
Jane DiCosimo, plan coordinator
Rich Ferrero
Lew Haldorsen
Barry Bracken

The GOA Plan Team met on Tuesday morning to review the GOA stock assessments. Team members were awarded certificates of appreciation from the Council and Council pins for their service on the Gulf of Alaska Plan Team to conserve the groundfish stocks of the North Pacific. The contributions of Barry Bracken and Sam Wright to the Team was particularly acknowledged with announcements of their retirements.

Marine Mammals Rich Ferrero reported on the current status of Steller sea lions. The population estimate was 18,702 animals in 1994, down 9.6% from 20,679 animals in 1992. Pup counts were down at most locations. The Aleutian Islands population estimate was down 19.5 % from 1992 to 1994. Harbor seals were estimated to be 4,000 animals in the Bering Sea, 7,000 in the Gulf of Alaska, and 25,000 insoutheast Alaska. The Scientific Review Group will meet in Anchorage in late November to discuss the conservation plan for these species.

Pollock Chris Wilson reported on the 1994 Shelikof Strait hydroacoustic survey. Length frequency data shows the progression of the strong 1988 year class. He reported that the survey found a strong echo sign in late February 1994 in Shumagin and the project will spend five days in Shumagin in 1995 to search for a spawning aggregation of pollock, along with nine days in Shelikof Strait. The Team discussed whether the increased biomass in Shumagin was 1989 Bering Sea pollock that moved to the Gulf or mature 1988 pollock moving west.

Anne Hollowed, NMFS - Seattle, presented the pollock stock assessment. The Plan Team ABC recommendation of 65,360 mt did not change from the September SAFE.

The Team evaluated three stock synthesis (SS) models that differed as follows: Model A provides a comparison to the 1993 model configuration; Model B is similar to A, but several years with similar selectivity curves have been combined to reduce the number of parameters used in the model, and model C incorporates the 1993 bottom trawl age composition and the updated egg production spawner biomass. Models B and C were configured with a single selectivity curve for the period 1989-90 and the period 1992-95. Based on the exploratory runs and the data presented to the Team, the Team agreed that Model C was more appropriate.

In 1993, the Team requested additional exploitation strategies be explored and recommended an ABC based on the fishing mortality rate that produced a minimal (5%) probability of falling below the threshold spawner biomass level in the long-term (F=0.2). The yield associated with an F of 0.2 is 62,000 mt. In the preliminary SAFE the Team also requested that alternative short-term strategies be explored that take the current stock conditions into account. Stock projections were made for the optimal F of 0.3, the minimal probability F of 0.2, and a constant low level of catch intended to provide for bycatch only. Based on the results of these projections, the Team recommended an ABC of 62,000 mt for the Western/Central (W/C) Gulf for 1995. The Team chose this exploitation strategy rather than the optimal F strategy because of recent trends in poor recruitment of Gulf of Alaska pollock, concern about maintaining the pollock population above threshold levels and ecosystem considerations such as limiting forage fish (e.g., juvenile pollock and other species) removals important to marine mammals and seabirds. Furthermore, the Team did not choose a bycatch-only strategy or other alternatives (which were explored) below the 62,000 mt since: 1) conservative assumptions have been incorporated into the assessment which recommends a 91,000 mt ABC; and 2) short-term projections that show spawner biomass dropping below threshold in 1997 are based on assumptions of weak recruitment from the 1993 and 1994 year classes. The 1994 hydroacoustic survey indicates that the 1993 year class is more likely to be average, and the FOCI predictions are for average 1993 and 1994 year classes. Under the assumption of average 1993 and 1994 year classes, spawner biomass will be slightly above threshold in 1997 with an F of 0.2. The Team feels we now have more evidence to support the assumption of average recruitment from the 1993 and 1994 year classes.

The Team did discuss, however, providing to the SSC a "threshold" scenario of the range from 10,000 mt for a bycatch only fishery to the Team's ABC recommendation of 62,000 mt. The Team was concerned with potentially weaker recruitment than assumed in the model. The Team noted that the ABC could be stair-stepped, to choose a conservative ABC at the beginning or at the end of the projected time series. The Team discussed the conservative nature of the model's assumptions, and the ability of improving the model's projection with additional data next year.

The Team recommended that the ABC be apportioned according to the most recent distribution of biomass from the 1993 bottom trawl survey: 49% in the Shumagin area (30,380 mt), 24.7% in the Chirikof area (15,314 mt), and 26.3% in the Kodiak area (16,306 mt). The current distribution has shifted relative to the 1990 distribution, in which most of the biomass was found in the Kodiak area. Also, the increase in Shumagin biomass may be due to the presence of Bering Sea fish. However, until the degree of mixing and the regularity with which this occurs can be determined, the Team chose to apportion ABC according to the most recent distribution of survey biomass.

The overfishing mortality rate is $F_{30\%}$=0.51 which corresponds to a harvest of 266,000 mt for the Western and Central Gulf of Alaska. Therefore, pollock are not considered overfished at the ABC level. The threshold od 370,000mt is projected to be approached by 1997 (Table 21) under a pessimistic recruitment assumption.

The Team noted the lack of any new information with which to set an ABC for the Eastern Gulf. Lack of age composition data has precluded any age-structured analysis similar to that conducted for the W/C areas. However, analysis of Eastern Gulf length frequency data show that recruitment patterns appear similar to that observed in the W/C Gulf. Thus, the Team agreed that it would be appropriate to apply the ratio of current ABC to 1993 W/C survey biomass to the Eastern Gulf 1993 biomass estimate. The recommended Eastern Gulf ABC is 3,360 mt. Similarly, the overfishing level for the Eastern Gulf is 14,400 mt.

- DRAFT-

TAC considerations

1) Results of the stock synthesis model runs indicate that the Gulf pollock biomass has been declining since the mid-1980s. Projections for 1995-97 show declines in both mid-year and spawning biomass levels which are among the lowest ever observed. Spawning biomass for 1996 is predicted to approach historic lows and to drop below threshold level in 1997 under a pessimistic recruitment assumption for the 1993 and 1994 year classes.

2) Our current knowledge of this stock suggests that a single above average year class (1988) will be supporting the stock for the next few years, given that the older portion of the population (age 6+ years) is declining and the 1991 and 1992 year classes are not expected to be strong.

3) While the pollock fishery/sea lion relationship is uncertain, the team feels that limiting removals of pollock may be appropriate given the current low pollock stock level and continued sea lion population decline.

Atka Mackerel Sandra Lowe presented the Atka mackerel assessment. The Plan Team ABC recommendation of 6,480 mt did not change from the September SAFE.

The biomass estimate of 21,600 mt was used to calculate ABC. The Team discussed the SSC recommendation for a stairstep approach for setting Atka mackerel ABC over six years, culminating in an exploitation rate of F=M=0.3. The fourth year of the phase-in would occur in 1995, when the exploitation rate would be 0.2. Although one team member preferred the SSC approach to avoid the competition between Steller sea lions and commercial fisheries for Atka mackerel, the Team chose not to apply the same approach used for Aleutian Islands Atka mackerel since there is evidence the Gulf mackerel may be a separate stock. The Team used an exploitation rate of F=M=0.3 applied to compute an ABC of 6,480 mt following the Team's policy for setting ABC given the available information. The Team recognizes that this approach results in a doubling of the exploitation rate from 1994 despite a decrease in the survey biomass estimate, but lacks a basis for an alternate quantitative means to calculate an ABC. A TAC set below ABC is recommended in the face of this dilemma.

There are also ecosystem considerations suggesting that TAC should be set lower than ABC. Recent data of Steller sea lion food habits indicate that Atka mackerel is an important prey species in both the Aleutian Islands and in the Gulf of Alaska. The Team is concerned about the high levels of fishery removals in the last three years (80-99%) that have occurred within 20 nm of important Steller sea lion habitat, specifically rookeries on Adugak, Ogchul, Atkins and Chernabura Islands; most removals have occurred in winter (November to March), a sensitive period for juveniles and recently weaned pups. Furthermore, increases in the harvest of Atka mackerel have occurred during a period of decreasing pollock abundance in the GOA which could exacerbate efforts to recover the Steller sea lion population.

The Team acknowledged that both the SSC recommendation for ABC (4,300 mt) and the AP recommendation for TAC (3,505 mt) from the September 1994 Council meeting are consistent with the Team's opinion that the harvest level should be below ABC. In light of the many uncertainties surrounding both the reliability of the Atka mackerel surveys and the potentially important relationship between Atka mackerel and Steller sea lions, the Team could also support a much lowered TAC that would just allow for the collection of biological data. A TAC of 3,500 mt would allow a three day fishery for two or three factory trawlers, sufficient to collect data for age-composition estimate.

Flatfish There was no revision of the flatfish stock assessment. Industry reported that in 1994 concentrations of some flatfish species (Dover sole, rock sole, and flathead sole) were not found in their usual locations.

Demersal Shelf Rockfish

The 1995 ABC of 580 mt is derived by using the F=M (0.02) applied to the point estimate of the 1994 yelloweye biomass estimates from central SEO, northern SEO, and southern SEO and to the lower 90% confidence limit for the east Yakutat area. The ABC for east Yakutat remained unchanged from 1994 because there was no new information. The ABC for yelloweye rockfish is adjusted to allow for bycatch of the other six species by dividing it by the fraction of yelloweye in the commercial catch (0.90).

The 1994 line transect survey results are substantially different than past surveys. Tory O'Connell and Bary Bracken of ADF&G reported that some of these differences are due to the following:

1) The 1994 survey directly measured density of yelloweye in northern, central, and southern SEO. Past assessments expanded the stock density estimates obtained from a small portion of central SEO to the remainder of central SEO area and to southern SEO and northern SEO.

2) Line length estimates are more precise than in past years due to improvements in technology. Previously line lengths were underestimated, resulting in an overestimate of density.

3) There appears to be a relatively strong year class entering the central SEO and east Yakutat area and accounts for some decrease in average individual weights from the commercial catch data.

Jim Ianelli of NMFS-AFSC reported that he had examined the data for DSR species for applying the stock synthesis model.

Redbanded rockfish has been removed from this assemblage and combined with other slope rockfish. Some complications of moving this species to be included with other slope rockfish, include 1) harvest identified as shortraker rougheye may actually be redbanded rockfish; and 2) based on behavior, redbanded rockfish may more appropriately be grouped with shortraker rougheye.

Thornyheads Jim Ianelli, NMFS - AFSC, presented the assessment. The estimate of ABC (1,900 mt) is substantially lower than that presented in the September SAFE (2,320 mt), even though the same model was used. The primary difference is the result of using $F_{40\%}$ rather than $F_{35\%}$ as an exploitation rate, since it was determined that $F_{40\%}$ is more appropriate for longlived species, as found here. This more conservative approach also accounts for the current uncertainty surrounding the natural mortality rate for this species. The use of $F_{4\%}$ was suggested by the stock assessment authors and endorsed by the Plan Team. For Pacific ocean perch $F_{44\%}$ was recently used; Mace and Sissenwine discussed the application of $F_{40\%}$ which is more scientifically based than the stairstepping approach.

Other differences in the most recent analysis include the addition of data from the longline surveys and the use of gear-specific fishery selectivity functions. Both of these features were recommended by the Team in September 1994 and add substantially to the stock assessment document for this species. The Team continues to support their earlier recommendation that future trawl surveys sample deep water strata (> 500 m) to adequately sample adult thornyhead rockfish and other deep-water species.

Slope Rockfish

PACIFIC OCEAN PERCH

Jon Heifetz, NMFS-Auke Bay Lab, updated the Team on the stock synthesis model for Pacific ocean perch to include the biomass estimate and age composition from the 1993 triennial survey and length data from the 1992 fishery. The Plan Team ABC is revised to 6,530 mt. To provide a buffer between ABC and OFL the Team applied its guidelines for reducing the authors' ABC estimate by the proportion of $F_{35\%}/F_{30\%}$, which results in an ABC of 6,530 mt.

Jon discussed details of the assessment with the Team. Age composition data indicate an exceptionally strong 1986 year class, especially in the Central and Western areas. As in last year's assessment, the optimal $F_{44\%}$ rate adjusted by the ratio of current female spawning biomass (116,334 mt) to target spawning biomass level of 150,000 mt is used by the authors to determine their ABC recommendation of 8,230 mt. The current $F_{44\%}$ rate is estimated to be 0.078. The optimal F and target biomass were based on an analysis by Ianelli of spawner recruit data generated by the stock synthesis model. The current $F_{44\%}$ rate deviates from the rate presented in Ianelli et al. (1993) due to slight changes in the fishery selectivity pattern as estimated in the stock synthesis model.

The Team was concerned that the method of apportionment which gives equal weighting to each of the last three surveys does not reflect the current estimate of biomass distribution. In the 1993 survey, the proportion of estimated exploitable biomass in the Central Gulf increased to 56% compared to 29% and 23% based on the 1987 and 1990 surveys, respectively. The large amount of uncertainty associated with biomass estimates based on trawl surveys of rockfish, and their relatively slow growth, low natural mortality, and low migration, suggests that equal or nearly equal weighting be given to all surveys. However, age composition information that indicates an exceptionally strong 1986 year-class in the Central area gives an underlying explanation for the observed shift in biomass distribution. Alternative methods of apportionment that recognize the uncertainty in biomass estimates yet adapt to other information were discussed. The Team chose to employ a method of weighting prior surveys based on the relative proportion of variability attributed to survey error. If it is assumed that survey error contributes $^2/_3$ of the total variability in predicting the distribution of biomass, the weight of a prior survey should be $^2/_3$ the weight of the previous survey. Applying this assumption to the estimates of exploitable biomass from the 1987, 1990 and 1993 trawl surveys results in ABCs of 1,180 mt for the Western area, 3,130 mt for the Central area, and 2,220 mt for the Eastern area. Apportioning OFL by area results in OFLs of 1,480 for the Western area, 3,950 the Central area, and 2,800 mt in the Eastern area.

The TAC for Pacific ocean perch is determined from its rebuilding plan. In last year's assessment, the fishing rate from this computation corresponded to the $F_{55\%}$ rate. This rate is adjusted downward by the ratio of current female spawning biomass to target female spawning biomass. The Team used the currently adjusted $F_{55\%}$ rate to compute a TAC consistent with the rebuilding plan. The adjusted $F_{55\%}$ rate of 0.041 results in a TAC for Pacific ocean perch for the 1995 fishery of 5,630 mt with apportionments of 1,014 for the Western area, 2,702 in the Central area, and 1,914 in the Eastern area.

The Team discussed the implications of reproductive value examined by Leaman (1991) for Pacific ocean perch in British Columbia. In this study, shifts to a lower size-specific fecundity in response to reduced stock abundance was examined within the framework of rockfish management. The Team agreed that the method used to determine an optimum fishing rate for Pacific ocean perch should be robust to assumptions on size-specific fecundity.

SHORTRAKER/ROUGHEYE

The shortraker/rougheye Plan Team ABC is unchanged from September, at 1,910 mt

NORTHERN ROCKFISH

The Plan Team ABC of 5,270 mt (640 mt, 4,610 mt, and 20 mt for the western, central, and eastern areas, respectively) is unchanged from the September SAFE.

The small ABC in the Eastern was noted as possibly causing high proportion of discards of northerns in the Eastern area. The possibility of combining northern rockfish with other rockfish in the Eastern area was discussed as a possible way to reduce discards.

OTHER SLOPE ROCKFISH

The addition of redbanded rockfish along with other slope rockfish results in an increase of 170 mt of ABC to 7,100 mt (180 mt, 1,170 mt, and 5,760 mt for the Western, Central, and Eastern areas, respectively).

With removal of northern rockfish from the other slope rockfish group in 1993, there has been a substantial increase in the catch of sharpchin, redstripe, harlequin, silvergrey, and yellowmouth rockfish. Concern was expressed that some species of other slope rockfish (i.e., silvergrey and yellowmouth rockfish) may be exploited at a rate disproportionately higher than their estimated abundance. These species are of higher commercial value than the other species because of their larger size.

The Team noted that the proportion of catch of some slope rockfish species which is discarded has increased dramatically over the past four years. For example, the discard of POP, which averaged 18.6% during 1991-92 has averaged 69.6% during 1993-94. Average percentages of other slope rockfish discarded during the same two periods are 24.9% and 57.3%, respectively. As long as these fish are being accurately accounted for, this discard does not represent a conservation problem. However, the Team is concerned that more attention be directed towards determining whether minor changes in the structure of directing fishing standards might yield lower rates of discard, without encouraging targeting on species such as POP. In particular, the Team received comment that one reason the POP discard rate has risen is that the restrictions placed on the bycatch of all rockfish have encouraged fishery participants to retain higher-valued rockfish and discard POP in order to remain within the rockfish bycatch retention limit. If this is the case, reducing the standard for rockfish other than POP, while establishing a separate maximum retention rate for POP might facilitate greater retention of POP. The net effect on the long-term value of the fishery is likely to depend on whether the current catch rates of more lucrative rockfish species are truly incidental, or whether they reflect some degree of co-targeting or topping-off behavior. Also, it is not clear to what extent the current discard of POP is driven by the marketability of smaller POP, which may be more abundant now in some areas of the Gulf. The Team would like to see more analysis of the catch composition of operations discarding POP, as well as the length/age composition of the discarded and retained POP catch.

Pelagic Shelf Rockfish The Plan Team recommendation of 5,190 mt for PSR remains unchanged from the September SAFE.

Pacific cod Grant Thompson presented the stock assessment for Pacific cod. The Plan Team ABC recommendation was revised to 108,000 mt since the September SAFE. For calculation of ABC, the $F_{0.1}$ (=0.57) strategy was abandoned in favor of the $F_{35\%}$ (=0.40) strategy. Changes to the assessment consist of some minor fine-tuning of final estimates and the inclusion of additional supplemental runs of the model.

The authors also addressed SSC concerns related to the dome-shaped selectivity curve. Possible explanations for a decline in selectivity at larger sizes include: 1) larger fish may be more able to outswim sampling gear; 2) larger fish may inhabit habitat inaccessible to sampling gear; and 3) larger fish may differentially migrate out of the sampling area or to deeper depths. Grant identified two reasons for choosing M = 0.37: 1) conformity with the 1994 SAFE and the Bering Sea Pacific cod model; and 2) choosing the low end of the range minimizes the change fromM = 0.27 used in the 1994 SRA. Grant discussed other possible model configurations on page 2-8 of the SAFE.

The projected biomass for 1995 is 573,000 mt, up considerably from the 1994 projection of 296,000 mt given in last year's assessment. The reasons for these changes are the estimation of a dome-shaped selectivity pattern by the model which results in higher projected biomass estimates, and the new natural mortality rate of 0.37 which is equal to that used in the eastern Bering Sea Pacific cod assessment. While the Team acknowledges that this new natural mortality rate provides a good compromise fit in terms of the other data components in the model, they remained concerned about the selection of this value given the broad range of natural mortality rates for Pacific cod in the literature. The Team also acknowledges that the data indicate that the trawl surveys do not sample the adult population completely and that a selectivity pattern which decreases with larger sizes is warranted from a model fit standpoint, but has reservations about accepting the assumption of dome-shaped selectivity without more justifiable observations. For these reasons, the model prediction of ages three and older biomass is larger than the survey biomass levels.

The Plan Team feels that the 1995 ABC should be distributed by management area approximately as the 1993 survey biomass is distributed: 29% (31,300 t) in the western area, 66% (71,300 t) in the central area, and 5% (5,400 t) in the eastern area. At its September 1994 meeting, the Plan Team had suggested that the authors provide an alternative apportionment scheme by dividing the area-specific survey biomass-at-length distributions by estimated survey selectivity at length and then summing over length. However, given existing uncertainty regarding Pacific cod migration, it is difficult to reach firm conclusions about appropriate apportionments. Therefore, the Plan Team opted to remain with the traditional approach of apportioning ABC on the basis of the most recent trawl survey biomass distribution.

The Plan Team would like to see the different fisheries (pot, longline, and trawl) treated separately within the model because the selectivity of these gears is likely to be different. In addition, the Plan Team would like to encourage the assessment authors to explore the possibility of allowing trawl survey catchability to deviate from the conventional value of unity. These factors may affect the likelihood profile of terminal trawl selectivity and natural mortality.

TAC considerations

While the Plan Team agrees that use of a length-based stock synthesis model is an improvement over previous methods, concern was expressed that there is very little empirical evidence which indicates that setting TAC equal to the higher ABC is justified. For example, larger, older cod are not being harvested by the fishery and the selectivity function of the model assumes that they are present in the population. Setting TAC below ABC may be advisable until this uncertainty can be addressed.

Sablefish The Plan Team ABC has been revised from the 1994 rollover to 21,500 mt. There has been no major change in the assessment method and harvest strategy for computing the 1995 sablefish ABC.

Jeff Fujioka, NMFS-Auke Bay Lab, presented the model results to the Team. Catch data has been updated and incorporated in the assessment and the 1994 Cooperative and Domestic Longline Surveys have been completed and the abundance indices incorporated. The combined survey indices indicate an 8.3 % decrease in biomass from 1993 to 1994 in the combined Gulf of Alaska, Bering Sea and Aleutian Island regions, with a 9.7 %decrease in the Gulf of Alaska. The updated assessment results in a slight decrease in estimated survival and recruitment and projects a 1995 exploitable biomass of 225,370 mt for the combined regions, a decrease of 8.4 %from the 1994 value.

The assessment updates the biomass reference level, $B_{35\%}$, to 247,000 and adjusts the $F_{35\%}$ fishing rate (=.137) by the ratio, $B_{95}/B_{35\%}$, resulting in an $F_{adj} = 0.125$, (4.8% less than last year's $F_{adj} = 0.131$). The adjusted fishing rate is applied to exploitable biomass resulting in an ABC of 25,220 mt for the combined regions, a 12.6% decrease from last year's ABC.

A change has been made in the method of apportioning the total quota between the Bering Sea/Aleutian Islands and Gulf of Alaska, and between the Western, Central, West Yakutat, and East Yakutat/Southeast areas within the Gulf. In the past, the latest distribution of survey RPW was used to apportion the total ABC to regions, whilea weighted running average of annual RPWs were used to apportion to areas within the Gulf. For 1995 an exponential weighting scheme has been chosen to apportion to both regions and areas. This method buffers rapid changes in apportionments and is responsive to current RPW distribution by balancing survey measurement error against variability in recruitment, migration, and natural mortality. This method apportions the combined ABC: 21,500 mt to the Gulf of Alaska; 1,600 mt to the Bering Sea; and 2,200 mt to the Aleutian Islands.

Applying the same method used for apportioning between regions, the Gulf of Alaska ABC would be apportioned 2,600 mt to Western Area, 8,600 mt to the Central Area, 4,100 mt to the West Yakutat Area, and 6,200 mt to the East Yakutat/Southeast Area.

The overfishing level for the Gulf of Alaska is obtained by applying the $F_{30\%}$(=.166, exploitation rate=.146) to the estimated 1995 biomass for the combined regions (225,370 mt), and apportioning as was done for the ABC, resulting in a Gulf of Alaska OFL of 28,040 mt.

A review of an age-structured model applied to sablefish was presented to the Team by Mike Sigler of Auke Bay Lab. The model utilized information in sablefish length frequency and age composition to provide an estimate of absolute biomass. An estimate obtained in this manner can provide an alternative to the reliance on area-swept biomass estimates. The Team expressed interest in reviewing progress in this modeling approach as well as others being applied to sablefish.

With the advent of ITQ fisheries, the Team noted the likelihood of longline survey results being affected by fishing operations just prior to and during station sampling. Survey scientists have noted fishing operations oriented at survey stations in the past when the survey and open seasons coincided, usually occurring only occasionally in the Western Gulf. With seasons expected to last much longer under the ITQ system, there is the potential for the survey time series to be distorted by short term localized depletion at survey stations. The Team notes the importance of the survey index in determining ABC and understanding the dynamics of the sablefish stock. The existence of a population index series of this extent and consistency is rarely found in groundfish assessments and should be protected. The Team discussed whether regulated closures prior to survey sampling were practical or necessary, or if individual cooperation within the fleet would suffice. It should be obvious that significant removal of fish in the vicinity of sampling stations just prior to sampling will result in the calculation of a decreased ITQ, particularly for that area. The Team and the assessment scientists request Council guidance as to whether regulatory measures should be pursued to assure the integrity of the survey time series.

Halibut Discard Mortalities Gregg Williams of IPHC presented a revision of 1993 halibut discard mortalitiesin the groundfish fisheries. At-sea and shoreside discard mortality rates for bottom trawl pollock were revised to 74 % and 63%, respectively.

Adjourn The Gulf of Alaska Groundfish Plan Team meeting was adjourned on the afternoon of Thursday, November 17, 1994.

MEMORANDUM

TO: Recipients of the 1995 Gulf of Alaska Stock Assessment & Fishery Evaluation (SAFE)

FROM: Jane DiCosimo

DATE: December 1, 1994

SUBJECT: Replacement Pages for 1995 GOA SAFE

Please replace pages:

CURRENT	NEW
3-17 and 3-18	3-17 and 3-18
3-25 through 3-27	3-25 through 3-30
5-15 and 5-16	5-15, 5-15a - 5-15n, and 5-16

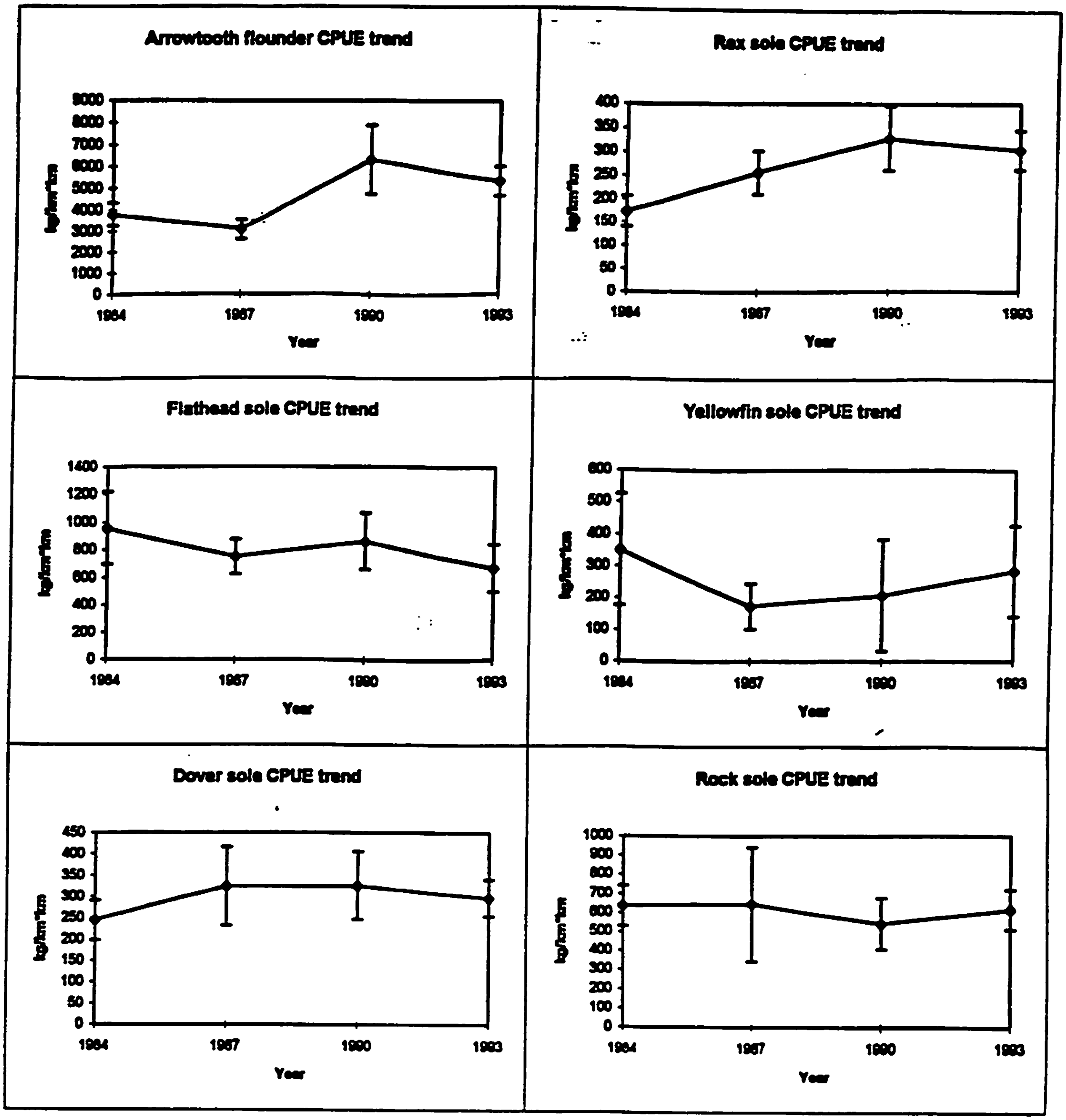


Figure 3.1--CPUE trend and 95% confidence intervals for six major flatfish species estimated from four triennial trawl surveys conducted from 1984-93.

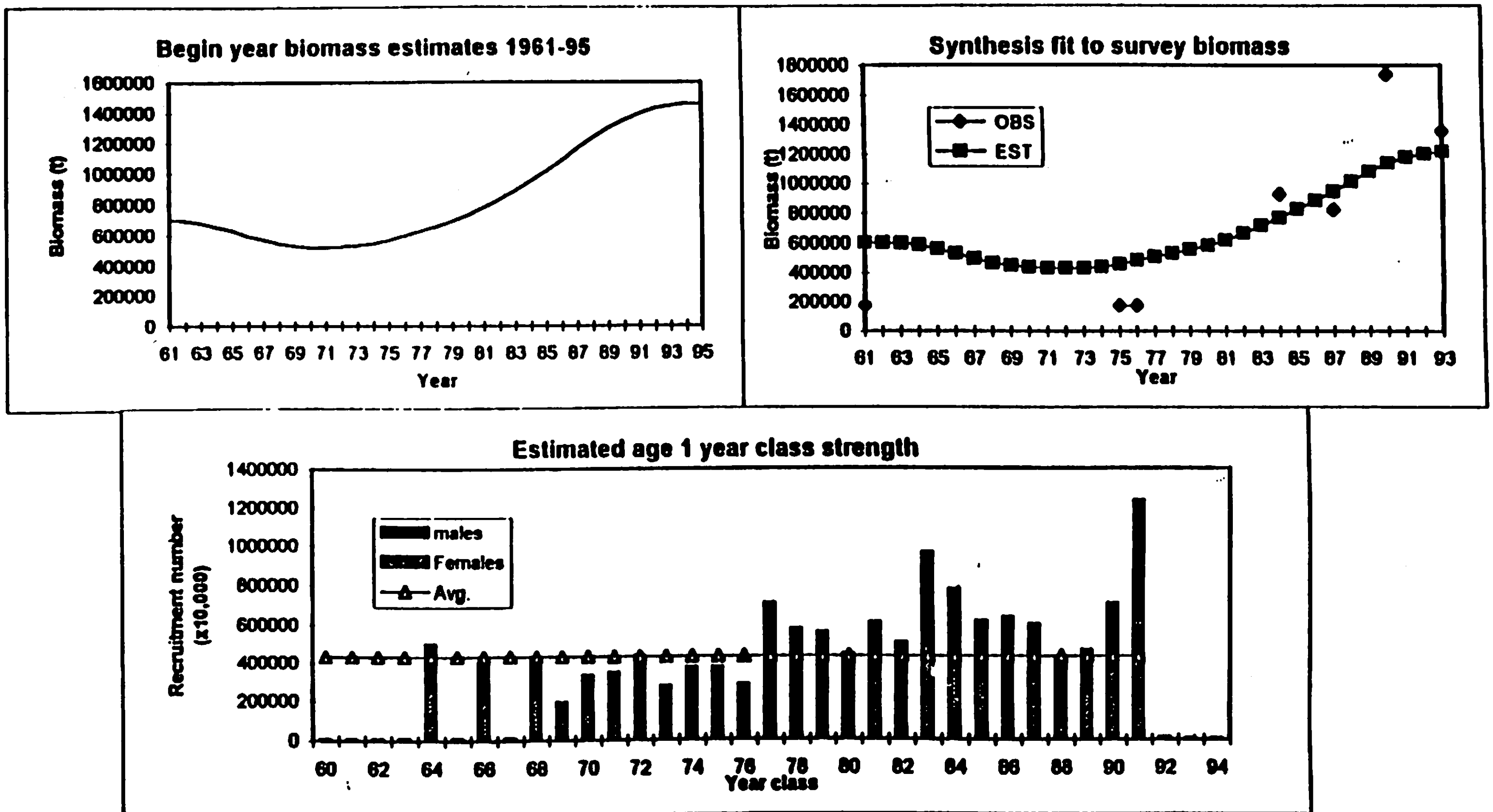
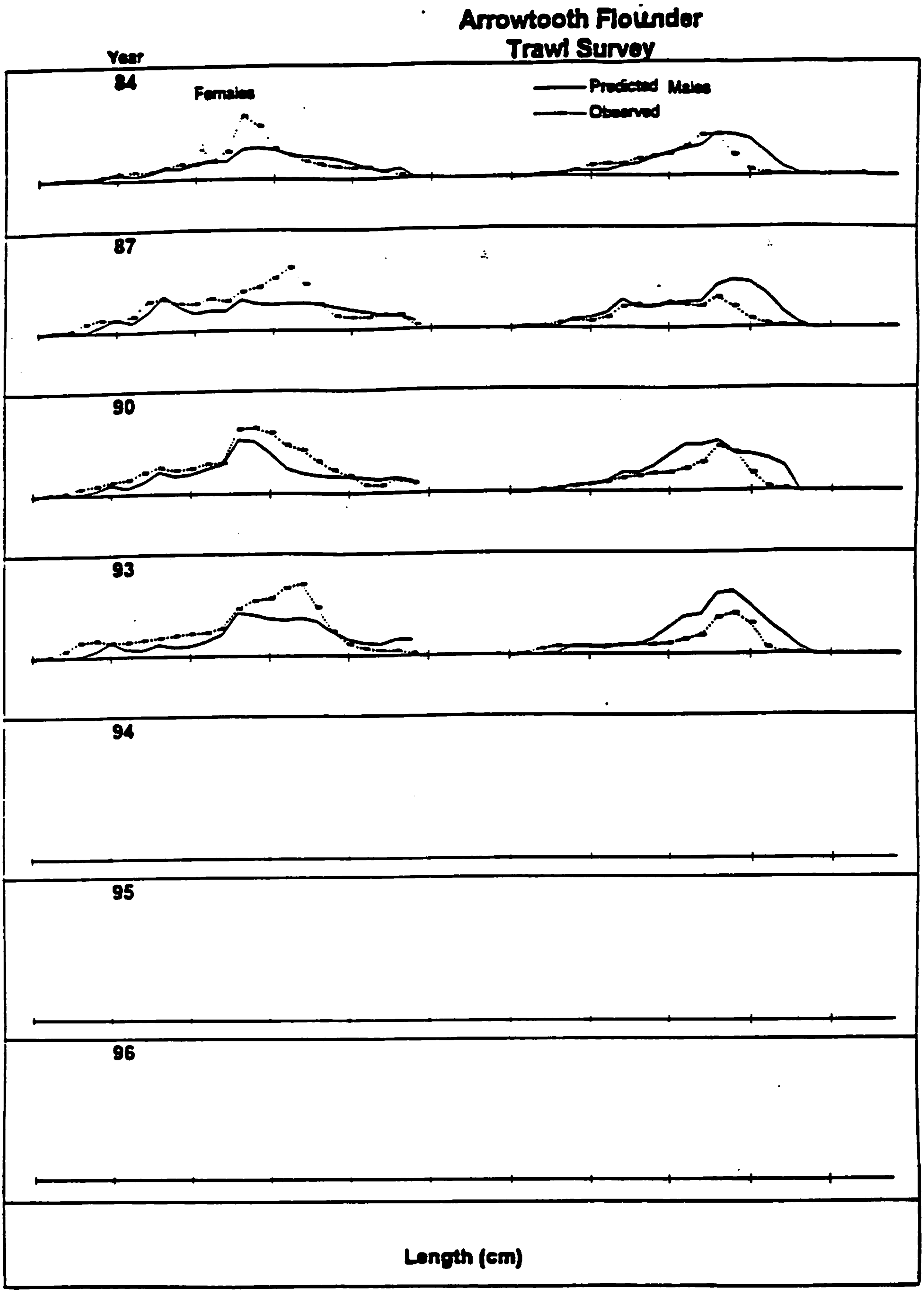
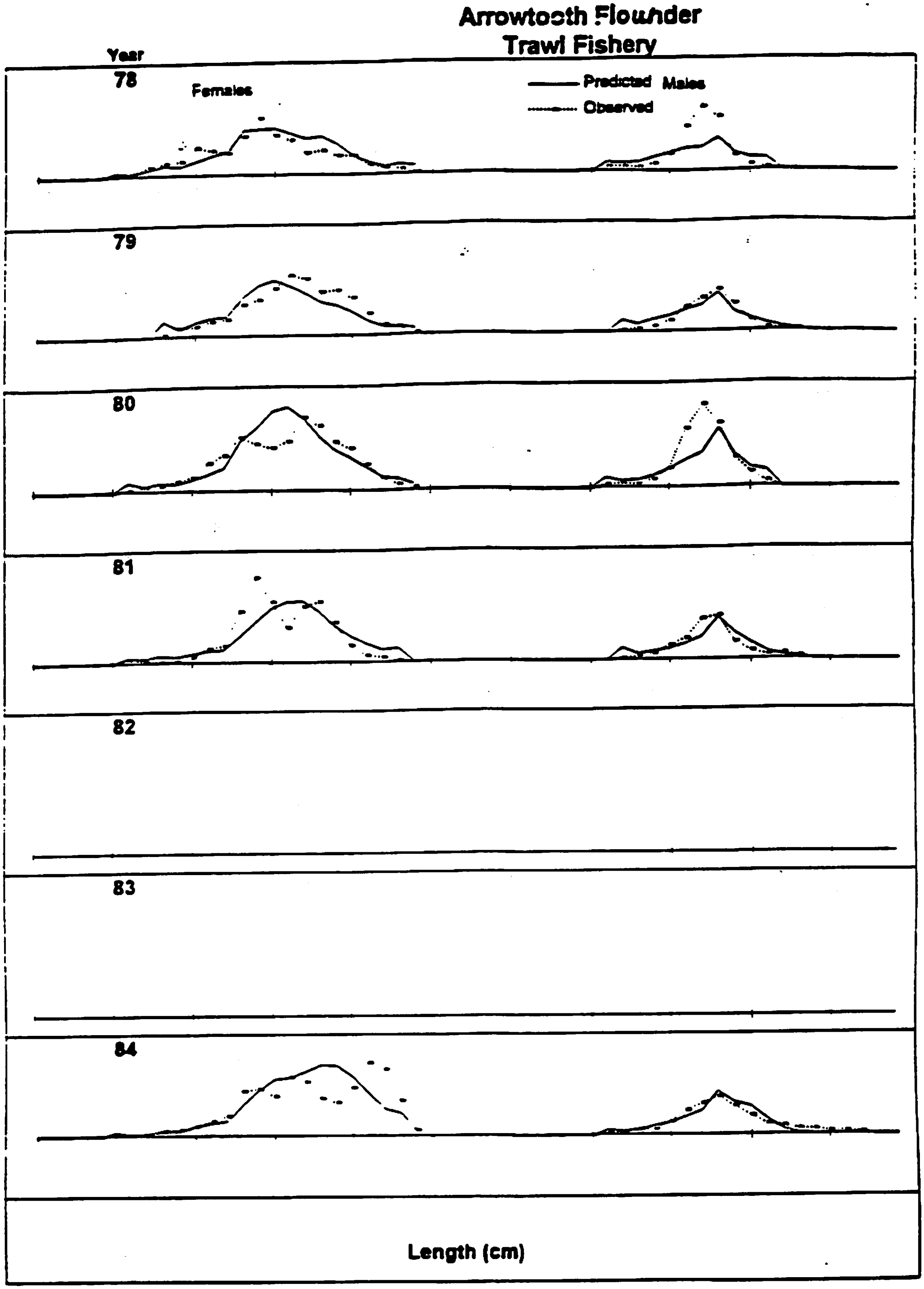


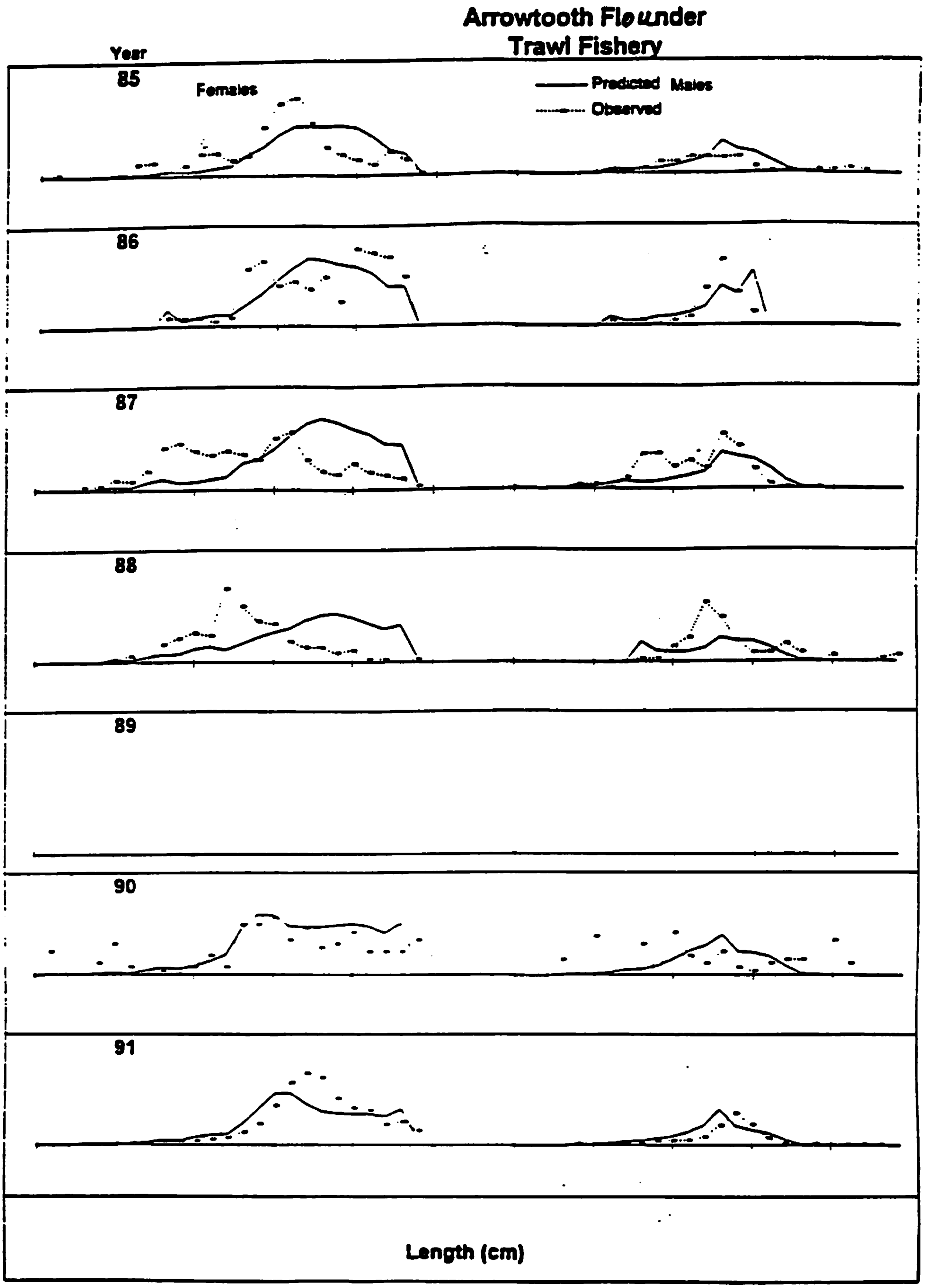
Figure 3.2--Selected results of a stock synthesis application to Gulf of Alaska arrowtooth flounder.

APPENDIX

Figures showing the fit of the stock synthesis model to the time-series of fishery and trawl survey size composiitions (survey and fishery observations are the dotted lines) and a table of the sex-specific estimates of population at age.


Arrowtooth Flounder
Trawl Survey
Year
84
Females
Predicted
Males
Observed
87
90
93
94
95
96
Length (cm)


Arrowtooth Flounder
Trawl Fishery
Year
78
Females
Predicted
Males
Observed
79
80
81
82
83
84
Length (cm)



Arrowtooth Flounder
Trawl Fishery
Year
85
Females
Predicted
Males
Observed
86
87
88
89
90
91
Length (cm)

Male Arrowtooth flounder

Year/Age	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
61	3794	106779	89058	72909	59683	48848	39970	32697	26741	21870	17686	14629	11965	9787	8005	6548	5356	4382	3584	2932	13188
62	3794	3106	89081	72915	59693	48864	39993	32725	26770	21894	17906	14644	11977	9796	8013	6554	5361	4385	3587	2935	13196
63	3794	3106	2543	72917	59698	48873	40007	32744	26793	21917	17925	14660	11989	9806	8020	6560	5366	4389	3591	2937	13209
64	6051	3106	2543	2082	59699	48876	40014	32755	26806	21936	17944	14676	12002	9818	8028	6567	5371	4393	3594	2940	13219
65	250947	4954	2543	2082	1705	48872	40008	32750	26807	21940	17953	14686	12011	9823	8034	6571	5375	4396	3596	2941	13228
66	5185	205458	4056	2082	1705	1396	40005	32746	26803	21939	17956	14693	12020	9831	8040	6576	5378	4399	3596	2943	13233
67	197935	4245	166207	3320	1704	1395	1141	32703	26759	21901	17926	14674	12008	9824	8035	6572	5375	4396	3596	2942	13226
68	5904	162055	3476	137696	2718	1394	1141	933	26725	21866	17896	14652	11993	9815	8030	6568	5372	4394	3594	2940	13219
69	212095	4834	132675	2645	112710	2224	1141	933	763	21847	17876	14632	11979	9806	8025	6566	5371	4393	3593	2939	13218
70	98941	173648	3957	108615	2329	92243	1820	933	763	624	17864	14616	11966	9797	8020	6564	5370	4393	3593	2939	13215
71	167491	79366	142165	3240	88899	1906	75446	1488	762	623	510	14599	11947	9780	8007	6555	5365	4390	3591	2938	13208
72	174943	137130	64979	118384	2652	72756	1559	61706	1216	623	510	417	11939	9770	7999	6549	5361	4388	3591	2937	13207
73	220143	143231	112259	53182	95213	2168	59413	1272	50278	991	508	415	340	9732	7965	6522	5340	4373	3579	2929	13172
74	136629	180237	117236	91836	43465	77663	1764	48213	1030	40694	602	411	337	275	7691	6460	5291	4333	3549	2906	13079
75	187608	113499	147546	95948	75125	35525	63417	1438	39260	838	33136	653	335	274	224	6431	5265	4313	3533	2894	13036
76	168206	153764	92918	120775	78517	61449	29038	51795	1174	32042	684	27061	534	274	224	183	5252	4300	3523	2886	13014
77	141530	154090	125881	76058	96831	64220	50224	23714	42272	956	26151	559	22062	436	223	183	150	4289	3512	2877	12968
78	351703	115675	126129	102995	62177	80676	52315	40611	19234	34273	777	21217	453	17926	354	181	149	122	3486	2856	12902
79	287009	267950	94852	103206	84217	50779	65773	42560	33149	15618	27638	631	17243	366	14575	288	148	121	99	2836	12827
80	278234	234962	236714	77621	84406	68806	41425	53560	34611	26951	12701	22644	514	14032	300	11664	234	120	98	81	12763
81	222063	227798	192356	192697	63484	68965	56135	33737	43564	28144	21921	10333	18427	416	11422	244	9661	191	98	80	10466
82	303591	181601	166479	157423	157782	51880	56267	45744	27461	35451	22906	17646	8414	15007	340	9305	199	7872	155	80	8599
83	251912	248569	148634	152639	128816	129042	42396	45957	37324	22403	26925	18694	14566	6967	12249	278	7597	162	6426	127	7068
84	480644	206248	203481	121617	124882	105321	105404	34591	37463	30420	16262	23583	15243	11676	5601	9992	227	6198	133	5245	5669
85	386480	393518	166853	166570	99700	102174	96126	86145	28259	30602	24851	14920	19266	12455	9706	4577	8166	165	5066	106	9102
86	307268	316423	322178	138236	136356	81604	83613	70464	70466	23115	25032	20329	12205	15763	10169	7940	3745	6681	152	4144	7536
87	317671	251570	259061	263765	113166	111616	96768	68420	57653	57653	16912	20481	16633	9967	12696	6338	6497	3064	5467	124	9566
88	300426	260250	206955	212064	215865	92579	91260	54571	55677	47079	47063	15446	16730	13567	8158	10537	6812	5309	2504	4407	7913
89	215258	245966	213062	168593	173555	176600	75696	74571	44570	45632	38451	38458	12618	13667	11101	6666	6610	5566	4338	2046	10116
90	232637	176238	201376	174426	138007	142043	144499	61920	60964	36446	37318	31446	31453	10320	11178	9079	5452	7043	4553	3549	9951
91	351536	190631	144260	164835	142734	112677	116096	118002	50533	49764	29745	30459	25669	25677	6425	9127	7414	4452	5752	3719	11027
92	617409	287615	156060	116094	134670	116716	92220	94751	96231	41204	40582	24261	24846	20941	20950	6875	7448	6051	3034	4695	12039
93	5766	506491	235606	127717	96593	110213	95251	75139	77109	78296	33532	33033	19752	20232	17065	17064	5601	6068	4931	2962	13041
94	3094	4737	413603	192621	104469	78942	89956	77627	61167	62757	63736	27302	26901	16066	16481	13695	13905	4564	4946	4019	13537
95	3094	2534	3678	338703	157773	85431	64502	73429	63317	49684	61168	51994	22275	21950	13126	13450	11341	11350	3726	4036	14336

Male Arrowtooth flounder

Year/Age	1	2	3	4	5	6	7	8	9	10	11
61	3794	108779	89058	72909	59683	48848	39970	32697	26741	21870	17886
62	3794	3106	89061	72915	59693	48864	39993	32725	26770	21894	17905
63	3794	3106	2543	72917	59696	48873	40007	32744	26793	21917	17925
64	6051	3106	2543	2082	59699	48876	40014	32755	26806	21936	17944
65	250947	4954	2543	2082	1705	48872	40008	32750	26807	21940	17953
66	5165	205458	4056	2082	1705	1366	40006	32746	26803	21939	17956
67	197936	4245	168207	3320	1704	1395	1141	32703	26759	21901	17926
68	5904	162065	3476	137698	2718	1394	1141	933	26725	21866	17898
69	212096	4834	132675	2845	112710	2224	1141	933	763	21847	17876
70	96941	173648	3957	108615	2329	92243	1820	933	763	624	17864
71	167491	79368	142165	3240	88899	1906	75446	1488	762	623	510
72	174943	137130	64979	116384	2652	72756	1559	61706	1218	623	510
73	220143	143231	112259	83182	95213	2166	59413	1272	60278	991	506
74	136629	160237	117236	91636	43465	77663	1764	48213	1030	40694	802
75	187608	113499	147546	95948	75125	35525	63417	1438	39260	838	33136
76	166206	153764	92916	120775	76517	61449	29038	51795	1174	32042	684
77	141530	154090	125881	76058	96831	64220	50224	23714	42272	958	26151
78	351709	115875	126129	102996	82177	80678	52315	40611	19234	34273	777
79	267009	267960	94852	103206	84217	50779	65773	42560	33149	15616	27836
80	278234	234962	236714	77621	84406	66606	41425	53560	34611	26951	12701
81	222063	227796	192356	102697	63484	66965	56135	33737	43564	26144	21921
82	303591	181601	186479	157423	157762	51680	56287	45744	27461	35451	22906
83	251912	248559	148834	152639	128816	129042	42396	45957	37324	22403	26925
84	480844	206248	203481	121817	124882	105321	105404	34591	37463	30420	18262
85	386480	393518	166853	166570	99700	102174	86126	86145	26259	30602	24851
86	307268	316423	322178	136236	136356	81604	83613	70464	70466	23115	25032
87	317871	251570	259061	263765	113166	111616	66766	66420	57653	57653	18912
88	300426	260250	205955	212064	215665	92579	91260	54571	55977	47079	47083
89	215258	245966	213062	168593	173555	176600	75696	74571	44570	45632	38451
90	232637	178238	201376	174426	136007	142043	144499	81920	60964	36448	37318
91	351536	190631	144260	164835	142734	112677	116096	118002	90533	49764	29745
92	617409	267815	156060	116094	134870	116716	92220	94751	96231	41204	40582
93	5768	505491	235606	127717	96593	110213	95251	75139	77109	78296	33532
94	3094	4737	413603	192821	104469	78942	89958	77627	61167	62757	63736
95	3094	2534	3676	338703	157773	85431	64502	73429	63317	49684	51186

Year/Age	12	13	14	15	16	17	18	19	20	21
61	14629	11966	9787	8005	6548	5356	4382	3584	2932	13188
62	14644	11977	9796	8013	6554	5361	4385	3587	2935	13196
63	14660	11989	9806	8020	6560	5366	4389	3591	2937	13209
64	14676	12002	9816	8026	6567	5371	4393	3594	2940	13219
65	14686	12011	9823	8034	6571	5375	4396	3596	2941	13226
66	14693	12020	9831	8040	6576	5378	4399	3598	2943	13233
67	14674	12008	9824	8035	6572	5375	4396	3596	2942	13226
68	14652	11993	9815	8030	6568	5372	4394	3594	2940	13219
69	14632	11979	9806	8025	6566	5371	4393	3593	2939	13216
70	14616	11966	9797	8020	6564	5370	4393	3593	2939	13215
71	14599	11947	9780	8007	6555	5365	4390	3591	2936	13206
72	417	11939	9770	7999	6549	5361	4388	3591	2937	13207
73	415	340	9732	7965	6522	5340	4373	3579	2929	13172
74	411	337	275	7891	6460	5291	4333	3549	2906	13079
75	663	336	274	224	6431	5265	4313	3533	2894	13036
76	27051	534	274	224	183	5252	4300	3523	2886	13014
77	859	22062	436	223	183	150	4289	3512	2877	12969
78	21217	453	17926	354	181	149	122	3496	2855	12902
79	631	17243	368	14575	268	148	121	99	2836	12827
80	22844	514	14032	300	11864	234	120	98	81	12763
81	10333	18427	418	11422	244	9661	191	96	80	10466
82	17846	8414	15007	340	9305	199	7872	155	80	8599
83	18694	14566	6867	12249	276	7597	162	6428	127	7066
84	23583	15243	11878	5601	9992	227	6196	133	5245	5669
85	14920	19268	12455	9706	4577	6166	165	5066	108	9102
86	20329	12205	15763	10169	7940	3745	6681	152	4144	7536
87	20481	16633	9967	12696	8338	6497	3084	5467	124	9556
88	15446	18730	13587	8158	10637	6612	5309	2504	4467	7913
89	38458	12618	13667	11101	6666	6610	5566	4338	2046	10118
90	31446	31453	10320	11178	9079	5452	7043	4563	3649	9951
91	30459	25669	25677	8425	9127	7414	4452	5752	3719	11027
92	24261	24846	20941	20950	6675	7448	6051	3634	4665	12039
93	33033	19752	20232	17055	17064	5601	6068	4931	2962	13641
94	27302	26901	16066	16481	13695	13905	4564	4946	4019	13537
95	51994	22275	21950	13128	13450	11341	11350	3726	4036	14335

Ianelli J., J. Hastie, and J. Heifetz. 1993. Environmental assessment/regulatory impact review/initial regulatory flexibility analysis of alternative harvest policies for rebuilding Pacific ocean perch in the Gulf of Alaska. North Pacific Fishery Management Council, P. O. Box 103136, Anchorage, AK 99510.

Ito, D. H. 1982. A cohort analysis of Pacific ocean perch stocks from the Gulf of Alaska and Bering Sea regions. U.S. Dept. Commer., NWAFC Processed Rept. 82-15.

Ito, D.H. 1987. Pacific ocean perch. In R.G. Bakkala and J.W. Balsiger (editors), Condition of groundfish resources of the eastern Bering Sea and Aleutian Islands region in 1986, p. 117-138. U.S. Dept. Commer., NOAA Tech. Memo. NMFS F/NWC-117.

Kappenman, R. F. 1992. Estimation of the fishing power correction factor. U.S. Dept. Commer., AFSC Processed Rept. 92-01.

Karinen, J. F., and B. L. Wing. 1987. Pacific ocean perch. In R. L. Major (editor), Condition of groundfish resources of the Gulf of Alaska region as assessed in 1986, p. 149-157. U.S. Dep. Commer., NOAA Tech. Memo. NMFS F/NWC-119.

Kimura, D.K., J. W. Balsiger, and D. H. Ito. 1984. Generalized Stock Reduction Analysis. Can. J. Fish. Aquat. Sci. 41: 1325-1333.

McDermott, S.F. 1994. Reproductive Biology of Rougheye and Shortraker Rockfish, *Sebastes aleutianus*and *Sebastes borealis*. Masters Thesis. Univ. Washington, Seattle. 76p.

Methot, R.D. 1990. Synthesis model: An adaptable framework for analysis of diverse stock assessment data. INPFC Bull. 50: 259-289.

Nelson, B.D. 1986. Population parameters of rougheye rockfish (Sebastes aleutianus). Masters Thesis. Univ. Alaska, Juneau, AK. 103 pp.

Nelson, B.D., and T.J. Quinn. 1987. Population parameters of rougheye rockfish (Sebastes aleutianus). In Proc. Int. Rockfish Symp. pp. 209-228. Univ. Alaska Sea Grant Report No. 87-2. Anchorage, AK.

Sasaki, T., and K. Teshima. 1988. Data report of abundance indices of flatfishes, rockfishes, and shortspine thornyhead and grenadiers based on results from Japan-U.S. joint longline surveys, 1979-1987. Unpubl. manuscr., 5 p. (Document submitted to the annual meeting of the International North Pacific Fisheries Commission, Tokyo, Japan, October 1988.) Fisheries Agency of Japan, Far Seas Fisheries Research Laboratory, 5-7-1 Orido, Shimizu, Japan 424.

Westrheim, S.J. 1970. Survey of rockfishes, especially Pacific ocean perch, in the northeast Pacific Ocean, 1963-1966. J. Fish. Res. Bd. Canada 27: 1781-1809.

Zenger, H. H., Jr., and M. F. Sigler. 1992. Relative abundance of Gulf of Alaska sablefish and other groundfish based on National Marine Fisheries Service longline surveys, 1988-90. U.S. Dep. Commer., NOAA Tech. Memo. NMFS F/NWC-216, 103 p.

Table 5-1.--Species comprising the slope rockfish assemblage in the Gulf of Alaska.

Common name	Scientific name	Management subgroup
Pacific ocean perch	Sebastes alutus	Pacific ocean perch
Shortraker rockfish	S. borealis	Shortraker/rougheye
Rougheye rockfish	S. aleutianus	Shortraker/rougheye
Northern rockfish	S. polyspinis	Northern rockfish
Sharpchin rockfish	S. zacentrus	Other slope rockfish
Redstripe rockfish	S. proriger	Other slope rockfish
Harlequin rockfish	S. variegatus	Other slope rockfish
Silvergrey rockfish	S. brevispinis	Other slope rockfish
Redbanded rockfish	S. babcocki	Other slope rockfish
Yellowmouth rockfish	S. reedi	Other slope rockfish
Bocaccio	S. paucispinis	Other slope rockfish
Greenstriped rockfish	S. elongatus	Other slope rockfish
Darkblotched rockfish	S. crameri	Other slope rockfish
Pygmy rockfish	S. wilsoni	Other slope rockfish
Splitnose rockfish	S. diploproa	Other slope rockfish
Aurora rockfish	S. aurora	Other slope rockfish
Blackgill rockfish	S. melanostomus	Other slope rockfish
Chilipepper	S. goodei	Other slope rockfish
Shortbelly rockfish	S. jordani	Other slope rockfish
Stripetail rockfish	S. saxicola	Other slope rockfish
Vermilion rockfish	S. miniatus	Other slope rockfish

Table 5-2.--Catch[a] (mt) of fish in the slope rockfish assemblage in the Gulf of Alaska, with Gulfwide values of acceptable biological catch (ABC) and fishing quotas[b] (mt), 1977-94. Updated as of October 29, 1994.

Year	Fishery category	Regulatory area			Gulfwide Total	Gulfwide Management value	
		Western	Central	Eastern		ABC	Quota
1977	Foreign	6,282	6,166	10,993	23,441		
	U.S.	0	0	12	12		
	JV	-	-	-	-		
	Total	6,282	6,166	11,005	23,453	50,000	30,000
1978	Foreign	3,643	2,024	2,504	8,171		
	U.S.	0	0	5	5		
	JV	-	-	-	-		
	Total	3,643	2,024	2,509	8,176	50,000	25,000
1979	Foreign	944	2,371	6,434	9,749		
	U.S.	0	99	6	105		
	JV	1	31	35	67		
	Total	945	2,501	6,475	9,921	50,000	25,000
1980	Foreign	841	3,990	7,616	12,447		
	U.S.	0	2	2	4		
	JV	0	20	0	20		
	Total	841	4,012	7,618	12,471	50,000	25,000
1981	Foreign	1,233	4,268	6,675	12,176		
	U.S.	0	7	0	7		
	JV	1	0	0	1		
	Total	1,234	4,275	6,675	12,184	50,000	25,000
1982	Foreign	1,746	6,223	17	7,986		
	U.S.	0	2	0	2		
	JV	0	3	0	3		
	Total	1,746	6,228	17	7,991	50,000	11,475
1983	Foreign	671	4,726	18	5,415		
	U.S.	7	8	0	15		
	JV	1,934	41	0	1,975		
	Total	2,612	4,775	18	7,405	50,000	11,475
1984	Foreign	214	2,385	0	2,599		
	U.S.	116	0	3	119		
	JV	1,441	293	0	1,734		
	Total	1,771	2,678	3	4,452	50,000	11,475
1985	Foreign	6	2	0	8		
	U.S.	631	13	181	825		
	JV	211	43	0	254		
	Total	848	58	181	1,087	11,474	6,083
1986	Foreign	Tr	Tr	0	Tr		
	U.S.	642	394	1,908	2,944		
	JV	35	2	0	37		
	Total	677	396	1,908	2,981	10,500	3,702
1987	Foreign	0	0	0	0		
	U.S.	1,347	1,434	2,088	4,869		
	JV	108	4	0	112		
	Total	1,455	1,438	2,088	4,981	10,500	5,000
1988	Foreign	0	0	0	0		
	U.S.	2,586	6,467	4,718	13,771		
	JV	4	5	0	8		
	Total	2,590	6,471	4,718	13,779	16,800	16,800

Table 5-2.--(Continued).

Year	Fishery category/ Management subgroup	Regulatory area Western	Central	Eastern	Gulfwide Total	Gulfwide Management value ABC	Quota
1989	U.S.	4,339	8,315	6,348	19,002	20,000	20,000
1990	U.S.	5,203	9,973	5,938	21,114	17,700	17,700
1991	POP	1,589	2,956	2,087	6,631	5,800	5,800
	Shortraker/ Rougheye	123	408	171	702	2,000	2,000
	Other slope	634	4,011	162	4,806	10,100	10,100
1992	POP	1,266	2,658	2,234	6,159	5,730	5,200
	Shortraker/ Rougheye	115	1,367	683	2,165	1,960	1,960
	Other slope	1,068	7,495	875	9,438	14,060	14,060
1993	POP	477	1,140	443	2,060	3,378	2,560
	Shortraker/ Rougheye	85	1,197	650	1,932	1,960	1,764
	Northern	902	3,778	145	4,825	5,760	5,760
	Other slope	342	2,423	2,658	5,423	8,300	5,383
1994	POP	165	922	814	1,901	3,030	2,550
	Shortraker/ Rougheye	109	887	597	1,593	1,960	1,960
	Northern	1,394	4,521	55	5,970	5,760	5,760
	Other slope	102	713	798	1,613	8,300	2,235

Note: There were no foreign or joint venture catches after 1988. Catches prior to 1989 are landed catches only. Catches in 1989 and 1990 also include fish reported in weekly production reports as discarded by processors. Catches in 1991-94 also include discarded fish, as determined through a "blend" of weekly production reports and information from the domestic observer program.

Definitions of terms: JV = Joint venture; Tr = Trace catches; POP = Pacific ocean perch management subgroup; Other slope = other slope rockfish management subgroup (in 1991-92 consisted of all species in the slope rockfish assemblage except for Pacific ocean perch and shortraker and rougheye rockfish; in 1993-94 consisted of all species in the slope rockfish assemblage except for Pacific ocean perch and shortraker, rougheye, and northern rockfish); Northern = northern rockfish management subgroup.

[a]Catch defined as follows: 1977, all Sebastes rockfish for Japanese catch, and Pacific ocean perch for catches of other nations; 1978, Pacific ocean perch only; 1979-87, the 5 species comprising the Pacific ocean perch complex; 1988-90, the 18 species comprising the slope rockfish assemblage; 1991-94, the 20 species comprising the slope rockfish assemblage.

[b]Quota defined as follows: 1977-86, optimum yield; 1987, target quota; 1988-94, total allowable catch.

Sources: Catch: 1977-84, Carlson et al. (1986); 1985-88, Pacific Fishery Information Network (PacFIN), Pacific Marine Fisheries Commission, 305 State Office Building, 1400 S.W. 5th Avenue, Portland, OR 97201; 1989-94, National Marine Fisheries Service, Alaska Region, P.O. Box 21668, Juneau, AK 99802. ABC and Quota: 1977-1986 Karinen and Wing (1987); 1987-93, Heifetz et al. (1993); 1994, North Pacific Fishery Management Council Newsletter, Dec. 21, 1993. P.O. Box 103136, Anchorage, Alaska 99510.

Table 5-3.--Species composition (percent) of the "shortraker/rougheye" and "other slope rockfish" management subgroups in the 1992 and 1993 Gulf of Alaska commercial catch, based on data collected in the domestic observer program.

Species	Regulatory area			Gulf of Alaska
	Western	Central	Eastern	
1992				
Shortraker/rougheye:				
Shortraker rockfish	45.8	49.1	70.1	53.1
Rougheye rockfish	54.2	50.9	29.9	46.9
Other slope rockfish:				
Northern rockfish	92.9	88.7	14.8	82.3
Sharpchin rockfish	0.4	2.3	29.5	4.6
Redstripe rockfish	0.0	1.0	21.3	2.8
Harlequin rockfish	6.6	7.5	12.9	7.9
Silvergrey rockfish	tr	0.1	14.0	1.4
Yellowmouth rockfish	0.1	0.5	7.2	1.1
Other species	tr	tr	0.2	tr
1993				
Shortraker/rougheye:				
Shortraker rockfish	73.3	62.7	82.8	68.7
Rougheye rockfish	26.7	37.3	17.2	31.3
Other slope rockfish:				
Northern rockfish	(removed from subgroup in 1993)			
Sharpchin rockfish	1.8	23.9	28.6	24.8
Redstripe rockfish	5.6	25.2	22.3	22.5
Harlequin rockfish	92.3	48.0	14.5	34.4
Silvergrey rockfish	tr	2.3	15.9	8.2
Yellowmouth rockfish	tr	0.7	18.1	9.2
Other species	0.2	tr	0.6	0.3

tr = trace

Table 5-4.--Relative population number (RPN) and relative population weight (RPW) of rougheye and shortraker rockfish in the Gulf of Alaska, based on results of the NMFS domestic longline survey, 1988-94. Values listed are for the upper continental slope only, 201-1,000 m depth.

	INPFC Areas					
Year	Shumagin	Chirikof	Kodiak	Yakutat	South-eastern	Gulfwide Total
			RPN for Rougheye and Shortraker Rockfish Combined:			
1988	7,234	2,227	4,855	8,751	5,872	28,939
1989	8,627	2,783	5,889	10,585	11,294	39,178
1990	7,847	1,807	8,998	12,961	6,793	38,405
1991	6,743	1,867	7,401	15,379	13,617	45,007
1992	9,071	1,527	5,570	13,086	6,475	35,729
1993	8,308	1,785	5,136	12,773	8,234	36,236
1994	6,472	1,356	2,999	8,173	12,323	31,323
			RPW for Rougheye Rockfish:			
1988	3,348	1,186	2,786	3,816	5,976	17,112
1989	6,610	2,414	3,752	5,116	13,068	30,960
1990	5,277	1,136	6,315	4,365	7,303	24,396
1991	3,856	1,268	5,246	6,420	15,326	32,116
1992	7,555	1,243	4,455	4,544	6,770	24,566
1993	5,936	1,775	4,158	4,965	8,184	25,018
1994	3,787	930	2,010	3,294	16,004	26,025
			RPW for Shortraker Rockfish:			
1988	4,924	2,574	5,010	13,233	2,458	28,199
1989	4,272	1,441	5,795	13,247	3,362	28,117
1990	4,972	1,208	6,742	19,382	2,199	34,503
1991	5,914	1,375	4,830	20,259	3,522	35,900
1992	2,059	904	2,784	16,672	2,040	24,458
1993	2,739	385	1,887	15,853	4,212	25,076
1994	3,984	1,147	2,567	10,680	3,051	21,430

Table 5-5.--Estimated biomass (mt), by area, for slope rockfish in the 1993 triennial trawl survey of the Gulf of Alaska. Gulfwide 95% confidence intervals (mt) are also listed.

	INPFC areas						
	Shumagin	Chirikof	Kodiak	Yakutat	South-eastern	Gulfwide total	Gulfwide 95% confidence interval
Pacific ocean perch	79,294	104,495	154,013	33,600	89,353	460,755	255,523 - 665,987
Shortraker rockfish	2,802	2,441	5,194	6,913	1,675	19,025	11,019 - 27,032
Rougheye rockfish	11,295	9,468	33,380	7,662	2,272	64,077	33,348 - 94,806
Shortraker/rougheye	14,097	11,909	38,574	14,575	3,947	83,102	52,604 - 113,600
Northern rockfish	15,838	41,979	51,990	28	0	109,835	32,559 - 187,111
Sharpchin rockfish	129	1	7,942	3,554	10,936	22,562	5,706 - 39,418
Redstripe rockfish	6	96	16	3	26,617	26,737	0 - 56,257
Harlequin rockfish	43	261	9,079	263	267	9,913	0 - 20,404
Silvergrey rockfish	0	81	478	704	15,728	16,991	6,296 - 27,685
Redbanded rockfish	11	117	327	1,103	1,986	3,544	1,579 - 5,509
Darkblotched rockfish	3	0	0	182	115	300	126 - 475
Greenstriped rockfish	0	0	0	9	241	250	9 - 491
Vermilion rockfish	0	0	21	0	0	21	0 - 64
Bocaccio	0	0	0	0	95	95	0 - 233
Pygmy rockfish	0	0	0	3	0	3	0 - 9
Yellowmouth rockfish	0	0	0	0	3,460	3,460	0 - 8,988
Total, other slope	192	556	17,863	5,821	59,445	83,876	48,646 - 119,106
Total, all species	109,421	158,939	262,440	54,024	152,745	737,568	517,662 - 957,474

Table 5-6.--Comparison of original ("old") versus revised ("new") biomass estimates for major species of slope rockfish in the 1984 and 1987 triennial trawl surveys of the Gulf of Alaska. "Old" biomass estimates were used in all previous SAFE reports (except for Pacific ocean perch, for which the the old estimates were used before the 1992 report). The "new" estimates are based on Kappenman's (1992) reanalysis of fishing power correction factors between survey vessels.

	Biomass (mt)			
	1984		1987	
Species	Old	New	Old	New
Pacific ocean perch	370,673	232,694	352,736	214,827
Shortraker rockfish	53,661	17,721	47,702	41,457
Rougheye rockfish	74,368	46,999	53,225	43,929
Northern rockfish	75,731	40,564	172,619	140,049
Sharpchin rockfish	5,989	7,219	70,155	70,160
Redstripe rockfish	n.a.	4,803	23,706	23,706
Harlequin rockfish	1,777	2,442	90,879	63,833
Silvergrey rockfish	n.a.	4,145	4,684	4,710

n.a. = not available

Table 5-7.--Comparison of biomass estimates for slope rockfish species in the Gulf of Alaska in the 1984, 1987, 1990, and 1993 triennial trawl surveys. Biomass estimates for 1984 and 1987 are based on Kappenman's (1992) reanalysis of fishing power corrections between survey vessels. This indicated that no corrections were necessary except for northern rockfish in 1987. Also, a computational error was discovered in the data for 1990, and as a result, the 1990 estimates have been slightly revised compared to those in previous SAFE reports.

Species	Biomass				% of assemblage biomass			
	1984	1987	1990	1993	1984	1987	1990	1993
Pacific ocean perch	232,694	214,827	138,003	460,755	64.8	35.5	34.0	62.5
Shortraker rockfish	17,721	41,457	10,809	19,025	4.9	6.9	2.7	2.6
Rougheye rockfish	46,999	43,929	46,142	64,077	13.1	7.3	11.4	8.7
Subtotal	64,720	85,386	56,951	83,102	18.0	14.1	14.0	11.3
Northern rockfish	40,564	140,049	112,948	109,835	11.3	23.1	27.8	14.9
Sharpchin rockfish	7,219	70,160	37,050	22,562	2.0	11.6	9.1	3.1
Redstripe rockfish	4,803	23,706	24,681	26,737	1.3	3.9	6.1	3.6
Harlequin rockfish	2,442	63,833	17,194	9,913	0.7	10.6	4.2	1.3
Silvergrey rockfish	4,145	4,710	13,774	16,991	1.2	0.8	3.4	2.3
Redbanded rockfish	1,400	1,561	3,173	3,544	0.4	0.3	0.8	0.5
Darkblotched rockfish	6	33	184	300	tr	tr	tr	tr
Splitnose rockfish	0	2	3	0	0.0	tr	tr	0.0
Greenstriped rockfish	16	62	156	250	tr	tr	tr	tr
Vermilion rockfish	0	0	0	21	0.0	0.0	0.0	tr
Bocaccio	502	38	176	95	0.1	tr	tr	tr
Pygmy rockfish	0	366	76	3	0.0	0.1	tr	tr
Yellowmouth rockfish	516	241	1,900	3,460	0.1	tr	0.5	0.5
Subtotal	21,049	164,712	98,367	83,876	5.9	27.2	24.2	11.4
Total, all species	359,027	604,974	406,269	737,568	100.0	100.0	100.0	100.0

Table 5-8.--Biomass estimates (mt) for Pacific ocean perch in the Gulf of Alaska based on trawl surveys. 1984 and 87 estimates are based on Kappenmen's (1992) reanalysis of fishing power correction factors between survey vessels. The 1990 estimates have been revised slightly compared to those in previous SAFE reports.

	Western	Central		Eastern		Total	95% Confidence interval
	Shumagin	Chirikof	Kodiak	Yakutat	South-eastern		
1984	59,710	9,672	36,976	94,055	32,280	232,694	101,550 - 363,838
1987	62,906	19,666	44,441	35,612	52,201	214,827	125,499 - 304,155
1990	24,375	15,991	15,221	35,635	46,780	138,003	70,993 - 205,013
1993	79,294	104,495	154,013	33,600	89,353	460,755	255,253 - 665,987

Table 5-9.--Estimates of exploitable biomass of slope rockfish in the Gulf of Alaska, by NPFMC regulatory area, based on the 1984, 1987, 1990, and 1993 triennial trawl surveys. Biomass estimates for 1984 and 1987 are based on Kappenman's (1992) reanalysis of fishing power corrections between survey vessels.

Species	Exploitable biomass (mt)			
	Western	Central	Eastern	Total
		1984		
Pacific ocean perch	59,598	46,645	126,291	232,534
Shortraker rockfish	5,114	5,170	7,347	17,721
Rougheye rockfish	9,342	32,346	4,320	46,008
Subtotal, shortraker/rougheye	14,456	37,516	11,667	63,729
Northern rockfish	7,091	9,990	6	17,087
Sharpchin rockfish	0	1,805	5,415	7,219
Redstripe rockfish	0	142	4,661	4,803
Harlequin rockfish	68	950	1,414	2,432
Silvergrey rockfish	0	54	4,091	4,145
Redbanded rockfish	0	184	1,216	1,400
Minor species	0	0	1,040	1,040
Subtotal, other slope rockfish	68	3,135	17,837	21,039
Total	81,213	97,286	155,801	334,389
Proportion of total (%)	24.3	29.1	46.6	100.0
		1987		
Pacific ocean perch	56,723	60,452	87,813	204,989
Shortraker rockfish	3,204	30,488	7,615	41,307
Rougheye rockfish	2,716	20,870	19,268	42,854
Subtotal, shortraker/rougheye	5,920	51,358	26,883	84,161
Northern rockfish	16,987	80,865	523	98,376
Sharpchin rockfish	3,223	43	66,894	70,160
Redstripe rockfish	1,208	1,919	20,571	23,698
Harlequin rockfish	6,909	15,137	35,958	58,003
Silvergrey rockfish	39	122	4,515	4,676
Redbanded rockfish	19	605	935	1,558
Minor species	68	42	433	544
Subtotal, other slope rockfish	11,466	17,868	129,306	158,639
Total	91,096	210,543	244,525	546,165
Proportion of total (%)	16.7	38.5	44.8	100.0

Table 5-9.--(continued).

Species	Exploitable biomass (mt) Western	Central	Eastern	Total
		1990		
Pacific ocean perch	22,061	30,926	82,415	135,402
Shortraker rockfish	363	3,944	6,502	10,809
Rougheye rockfish	1,165	29,537	7,403	38,104
Subtotal, shortraker/rougheye	1,528	33,481	13,905	48,913
Northern rockfish	13,701	74,287	354	88,342
Sharpchin rockfish	2	3,175	33,873	37,050
Redstripe rockfish	0	15	24,282	24,297
Harlequin rockfish	121	13,213	3,347	16,681
Silvergrey rockfish	0	297	13,470	13,768
Redbanded rockfish	0	218	2,954	3,173
Minor species	5	3	2,487	2,495
Subtotal, other slope rockfish	128	16,921	80,413	97,464
Total	37,418	155,615	177,087	370,121
Proportion of total (%)	10.1	42.0	47.9	100.0
		1993		
Pacific ocean perch	75,661	254,992	122,953	453,605
Shortraker rockfish	2,726	7,636	8,588	18,950
Rougheye rockfish	11,230	42,326	9,854	63,410
Subtotal, shortraker/rougheye	13,956	49,962	18,442	82,360
Northern rockfish	2,849	73,941	28	76,818
Sharpchin rockfish	22	7,943	14,490	22,455
Redstripe rockfish	0	111	26,620	26,731
Harlequin rockfish	30	8,060	530	8,619
Silvergrey rockfish	0	448	16,433	16,880
Redbanded rockfish	11	444	3,089	3,544
Minor species	0	0	4,105	4,105
Subtotal, other slope rockfish	63	17,006	65,267	82,334
Total	92,529	395,901	206,690	695,117
Proportion of total (%)	13.3	57.0	29.7	100.0

Table 5-10. Mortality rates, maximum age, and age of recruitment for slope rockfish. Area indicates location of study; West Coast of USA (WC), British Columbia (BC), Gulf of Alaska (GOA), Aleutians (AL), Bering Sea (BS). All mortality rates except where noted are for instantaneous rate of total mortality (Z) estimated with catch-curves.

Species	Mortality rate	Maximum age	Age of recruit-ment	Area	Refer-ence
Pac. ocean perch	0.02-0.08	90	-	BC	1,2
	-	79	10	GOA	3
	-	98	-	AL	4
Northern	0.06[a]	49	-	GOA	7
		56	-	AL	7
		57	-	BS	7
Rougheye	0.01-0.04	140	-	BC	1,2
	0.04	95	30	GOA	5,6
	0.030-0.039[b]	-	-	WC,BS,AL,GOA	8
Shortraker	-	120	-	BC	2
	0.027-0.042[b]	-	-	WC,BS,AL,GOA	8
Sharpchin	0.05	46	-	BC	1
Yellowmouth	0.06	71	-	BC	1,2
Darkblotched	0.07	48	-	BC	1
Harlequin	-	43	-	BC	2
Redstripe	0.10	41	-	BC	1,2
Silvergrey	0.01-0.07	80	-	BC	1,2

1) Archibald et al. 1981; 2) Chilton and Beamish 1982; 3) this report; 4) Ito 1987; 5) Nelson and Quinn 1987; 6) Nelson 1986; 7) Heifetz and Clausen 1991 8) McDermott 1994. [a]The mortality rate for northern rockfish is for the instantaneous rate of natural mortality (M) estimated by the method of Alverson and Carney (1975). [b]M based on the gonad somatic index method (McDermott 1994).

Table 5-11. Von Bertalanffy parameters and length-weight coefficients for some species of slope rockfish. Length-weight coefficients are for the formula $W=aL^b$ where W = weight in kg and L = length in cm.

Species	Length-weight coefficients a	b	t_0	k	L_{inf} (cm)	Reference
Pacific ocean perch	1.54×10^{-5}	2.96	-8.22	0.088	44.8	1,2
	—		-5.22	0.126	42.6	1
	—		-0.32	0.207	41.1	3
Northern	1.63×10^{-5}	2.98	-1.51	0.190	35.6	3,5
Rougheye	—		-4.21	0.050	54.7	4
Sharpchin	—		-2.12	0.095	34.9	1

1) Archibald et al. 1981; 2) Ito 1982; 3) Clausen and Heifetz 1989; 4) Nelson 1986; 5) Heifetz and Clausen 1991.

Table 5-12. Estimated numbers (thousands) of Pacific ocean perch at age in 1995 and schedule of age specific maturity, fishery selectivity, and mean weight based on the stock synthesis model.

Age	Numbers in 1995	Percent mature	Percent Selected	Weight (grams)
2	42,026	0	1	53
3	39,969	0	2	116
4	38,008	5	3	194
5	48,452	12	5	279
6	24,580	27	8	363
7	49,123	50	13	442
8	49,919	73	20	515
9	92,694	88	31	579
10	22,207	95	45	635
11	51,054	98	61	683
12	32,986	99	77	724
13	18,827	100	89	759
14	6,782	100	97	788
15	29,996	100	100	812
16	2,921	100	100	832
17	2,842	100	97	848
18	3,722	100	94	861
19	12,032	100	89	872
20	1,133	100	84	881
21	702	100	79	889
22	514	100	75	895
23	987	100	70	900
24	1,031	100	65	904
25+	14,974	100	61	907

Table 5-13. Summary of computations of ABC's and overfishing levels for slope rockfish. Since ABC's and overfishing levels are based on subgroups, individual species are shown only for illustrative purposes. Fishing rate and TAC based on rebuilding plan for Pacific ocean perch is given in parentheses.

Species	Exploitable biomass	F	ABC	Overfishing	
				rate	catch
Pacific ocean perch	142,465	0.060	8,232	F44%(adj)=.060	8,232
		(0.041)	(5,631)		
Shortraker rockfish	23,689	0.030	711	F=M=0.030	711
Rougheye rockfish	48,123	0.025	1,203	F30%=0.046	2,214
Subtotal rougheye/shortraker	71,811		1,914		2,925
Northern rockfish	87,845	0.060	5,271	F30%=0.113	9,926
Sharpchin rockfish	43,222	0.050	2,161	F30%=0.080	3,458
Redstripe rockfish	24,909	0.100	2,491	F=M=0.100	2,491
Harlequin rockfish	27,768	0.060	1,666	F=M=0.060	1,666
Silvergrey rockfish	11,775	0.040	471	F=M=0.040	471
Redbanded rockfish	2,758	0.060	166	F=M=0.060	166
Minor species	2,381	0.060	143	F=M=0.060	143
Subtotal other slope rockfish	112,812		7,098		8,395
Total	414,954		22,515		29,478

Table 5-14 Percentage of exploitable biomass by area for slope rockfish based on the 1987, 90, and 93 triennial trawl surveys.

	Western	Central	Eastern
1987			
Pacfic ocean perch	27.67%	29.49%	42.84%
Rougheye/shortraker rockfish	7.03%	61.02%	31.94%
Northern rockfish	17.27%	82.20%	0.53%
Other slope rockfish	7.23%	11.26%	81.51%
1990			
Pacfic ocean perch	16.29%	22.84%	60.87%
Rougheye/shortraker rockfish	3.12%	68.45%	28.43%
Northern rockfish	15.51%	84.09%	0.40%
Other slope rockfish	0.13%	17.36%	82.51%
1993			
Pacfic ocean perch	16.68%	56.21%	27.11%
Rougheye/shortraker rockfish	16.95%	60.66%	22.39%
Northern rockfish	3.71%	96.25%	0.04%
Other slope rockfish	0.08%	20.65%	79.27%
Average			
Pacfic ocean perch	20.21%	36.18%	43.60%
Rougheye/shortraker rockfish	9.03%	63.38%	27.59%
Northern rockfish	12.16%	87.51%	0.32%
Other slope rockfish	2.48%	16.43%	81.10%

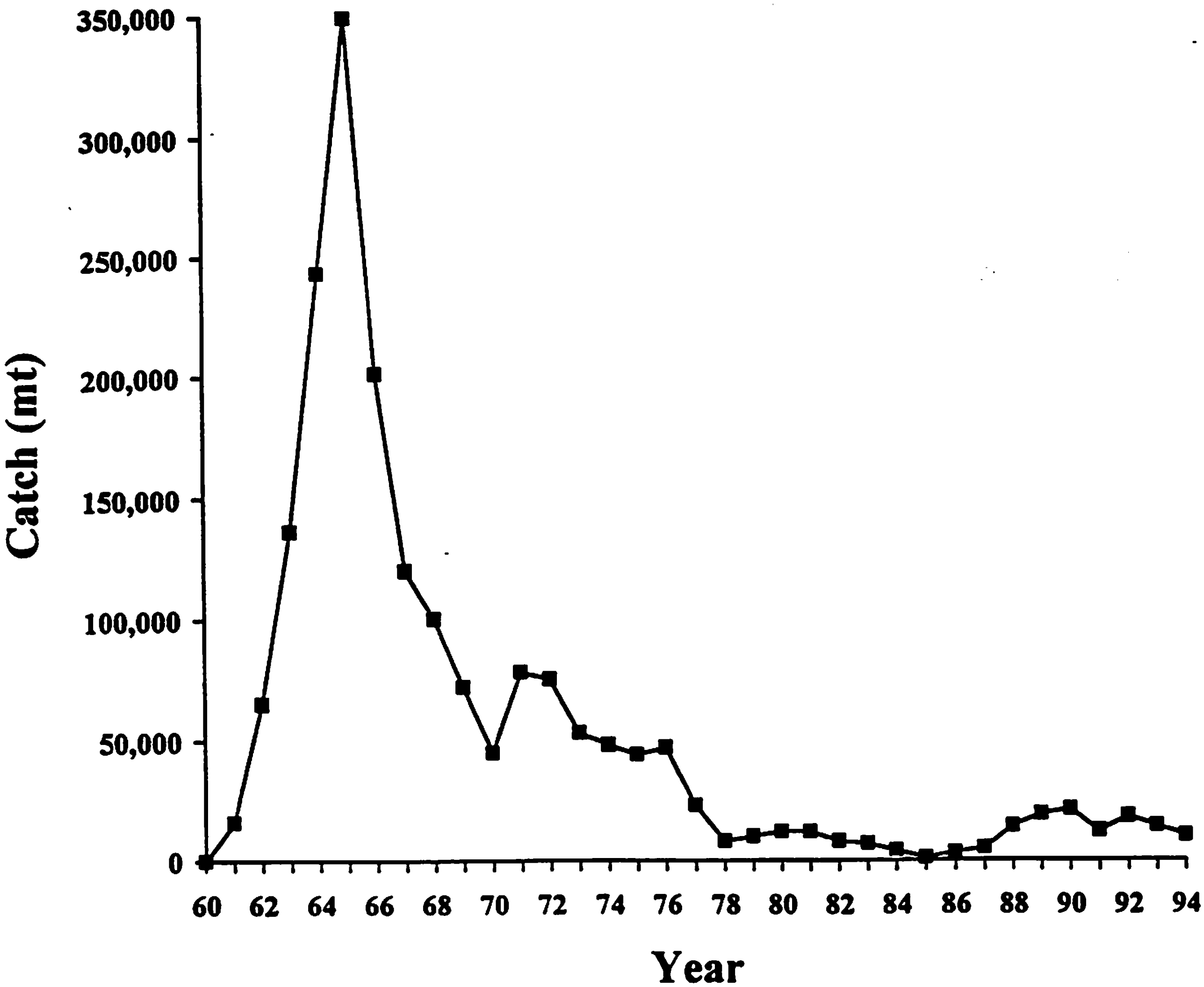


Figure 5-1. -- All nation catch of Pacific ocean perch and other slope rockfish in the Gulf of Alaska as of October 15, 1994. Data sources: 1960-63, Balsiger et al. (1985); 1964-84, Carlson et al. (1986); 1985-94, Table 5-2, this report.

AGENDA D-3
DECEMBER 1994
SUPPLEMENTAL

NEPTUNE MARINE PRODUCTS, INC.
P.O. Box 17417
Seattle, WA 98107
5330 Ballard Ave NW
Phone (206) 789-3790 FAX (206) 789-1795

RECEIVED DEC - 2 1994

Mr. Rick Lauber, Chairman
North Pacific Fishery Management Council
P.O. Box 103136
Anchorage, Alaska 99501

December 2, 1994

FAX TRANSMISSION SENT TO
907-271-2817

RE: CONTINUED EXEMPT STATUS FOR THE PACIFIC COD POT FISHERY FROM THE HALIBUT PSC CAPS ASSIGNED TO FIXED GEAR FISHERIES IN THE GOA AND BSAI. AGENDA ITEMS D-3a,b - GOA specs/SAFE and, D-3c,d - BSAI specs/SAFE

BACKGROUND:
The cod pot fishery for Pacific cod has been exempt from the fixed gear halibut PSC caps in the Gulf of Alaska and the Bering Sea since 1992. In granting this exemption, the NPFMC recognized that this developing gear type was very selective in it's pursuit of Pacific cod. The NMFS regulation that all groundfish pots have individual entrances no larger than 9" X 9" has proven to be very effective in keeping both halibut and crab from entering the cod pots. Catch and observer data over the past 3 years has proven that the Pacific cod pot fishery is one of the most selective fisheries undertaken in the GOA and BSAI.

CURRENT STATUS:
The continued exemption for the pot cod fishery from the halibut PSC caps will be considered during the December NPFMC meetings. IPHC has recommended an increase in the halibut discard mortality rate in both the GOA and BSAI cod pot fisheries. In the GOA, IPHC recommended an increase from 5% to 18%. In the BSAI, IPHC recommended an increase from 5% to 8%. To the uninformed, these halibut mortality rate increases might seem to be alarming, especially the increase in the GOA. This is not the case. These increases in halibut mortality percentages translates into a miniscule amount of additional halibut mortality as can be seen in the following analysis for both the GOA and BSAI cod pot fisheries.

RECOMMENDATIONS: The continued exemption for the cod pot fishery is warranted in both the Gulf of Alaska and Bering Sea. Even if the mortality rate increases recommended by IPHC are adopted by the Council, the cod pot fishery will continue to be the cleanest harvesting method for Pacific cod by a very large margin. The actual catch data developed over the past 3 years continues to confirm that this is the case. The continued exempt status for the cod pot fishery is warranted in both the Gulf of Alaska and the Bering Sea.

Sincerely,

Ed Wyman

Ed Wyman

HALIBUT BYCATCH MORTALITY BETWEEN GEAR TYPES IN THE PACIFIC COD FISHERY

GULF OF ALASKA FISHERY - 1993

GEAR TYPE	COD CATCH (MT)	HALIBUT YCATC (MT)	MORT-ALITY RATE	DISCARD AMOUNT (POUNDS)	(MT)	RATIO OF COD TO HALIBUT
TRAWL -SHORESIDE	29,457	641	55%	777,356	353.3	83:1
-OFFSHORE	833	13	55%	15,757	7.2	116:1
TRAWL TOTALS	30,290	654	55%	793,113	360.5	84:1
LONGLINE-SHORESIDE	2,835	298	16%	105,130	47.8	59:1
CATCHER/PROCESSOR	5,351	228	16%	80,425	36.6	146:1
LONGLINE TOTALS	8,186	526	16%	185,555	84.4	97:1
POTS - SHORESIDE	9,695	47	5%	5,187	2.4	4,112:1
(Note: If the pot mortality rate was increased to per the 1995 IPHC recommendations, this would have resulted in the following numbers using the 1993 data:			18%	18,612	8.5	1,140:1

BERING SEA FISHERY - 1993

GEAR TYPE	COD CATCH (MT)	HALIBUT YCATC (MT)	MORT-ALITY RATE	DISCARD AMOUNT (POUNDS)	(MT)	RATIO OF COD TO HALIBUT
TRAWL-SHORESIDE	26,408	1,148	60%	1,518,844	690	38:1
TRAWL-MOTHERSHIP	3,407	76	60%	100,082	45	76:1
TRAWL-FACTORY	24,879	580	60%	766,853	349	71:1
TRAWL TOTALS	54,694	1,804		2,385,779	1,084	50:1
LONGLINE-C/P	65,415	2,164	18%	858,896	390	168:1
LONGLINE-SHORESIDE	68	9	18%	3,375	1.5	45:1
LONGLINE TOTALS	65,483	2,173	18%	862,271	391.5	167:1
POT FISHERY						
SHORESIDE CATCHER	1,576	6	5%	654	0.30	5,253:1
CATCHER PROCESSOR	522	2	5%	237	0.11	4,745:1
POT TOTALS	2,098	8	5%	891	0.41	5,117:1
(Note: If the pot mortality rate was increased to per the 1995 IPHC recommendations, this would have resulted in the following numbers if the 1993 data is used:			8%.	1,408	0.64	3,278:1

Source: Discards in the Groundfish Fisheries of Bering Sea/Aleutian Islands & Gulf of Alaska During 1993 - ADF&G Report prepared by Pacific Associates -August 1994

Alaska Department of Fish and Game staff comments and recommendations regarding Gulf of Alaska rockfish management for 1995.

SLOPE ROCKFISH

PACIFIC OCEAN PERCH - The exploitable biomass as indicated by the triennial trawl survey more than tripled from 135,402 mt in 1990 to 453,605 mt in 1993 (Figure 1). Much of this change was the result of a dramatic increase in young fish which appeared for the first time in the 1993 survey in the Kodiak INPFC area. The department is encouraged by the apparent increase in POP biomass indicated by the 1993 survey. However, there is a great deal of uncertainty in the biomass estimate due to survey error inherent in using area swept trawl survey methods for assessing rockfish. Therefore, we recommend against relying too heavily on the results of the 1993 survey when establishing TAC levels until strength of the younger year classes can be confirmed.

The authors of the SOS document warn, "In past SAFE reports, we have speculated that a change in availability of rockfish to the survey, caused by unknown behavioral or environmental factors, may explain some of the observed variation in biomass. It seems prudent to repeat this speculation in the present r.eport..." As calculated according to the formula adopted by the Council under the POP rebuilding schedule, TAC would increase 121% from 2,550 in 1994 to 5,631 t in 1995 (Figure 2). Department staff questions whether one additional year of survey data provides adequate evidence of stock rebuilding to justify that level of increased harvest. Even if the indicated increase in biomass is real, virtually all of the increased biomass can be attributed to very young fish which were observed in the population for the first time during the 1993 survey.

There are several reasons the department encourages the Council to maintain a very conservative approach to POP management:

1. There is a great deal of uncertainty in the biomass estimate due to the high variability intrinsic in the use of area swept trawl surveys to assess rockfish. It is highly unlikely that the POP population has actually fluctuated (upward or downward) in the past decade to the extent indicated by the surveys.

2. Most of the increased biomass in the 1993 survey is attributed to young fish (<9 years) in the Central and Western Gulf. These fish are not fully mature and are not fully recruited to the fishery. A nine year old POP yields less than 0.3 pounds of fillets and, therefore, these young fish are of relatively little commercial value because of their small size (Figure 5-2, Table 5-12).

3. Directed fisheries for POP would likely occur if the TAC as calculated according to the rebuilding plan as currently written in the FMP. A directed fishery would target on the older and larger animals disproportionate to their abundance in the population with the potential of adversely impacting future rebuilding.

4. Of all POP caught in 1994, 84.2% were reported to have been discarded. It is presumed that many of the fish were discarded because such a large proportion of the population is currently comprised of fish too small to be of commercial value. This provides further justification to keep harvests at very low levels until the younger fish which apparently dominate the Central and Western Gulf POP population are larger and more valuable to the industry.

5. Directed POP fisheries would result in high bycatch levels of other species of concern such as shortraker/rougheye and thornyhead rockfish. If sufficient amounts of these other species are taken, fisheries for other species, such as deep-water flatfish or sablefish, could be impacted.

Recommendation:

Adopt a policy which restricts POP harvest to bycatch only until the apparent increase in the biomass estimate can be verified by the 1996 triennial trawl survey or other surveys, and until the young fish which currently make up most of the population in the Central and Western Gulf are fully recruited and reach a more desirable commercial market size. Adoption of this policy may require a modification to the current TAC-setting formula outlined in FMP.

<u>OTHER SLOPE ROCKFISH</u> - According to observer data, 65.3% of all other slope rockfish which were caught during 1994 were discarded. The department has gone on record voicing concern that many of the species in the other slope rockfish category are of little commercial value or are of limited abundance. Much of the fishery for other slope rockfish appears to be conducted to acquire ballast against which other more valuable bycatch species can be obtained. Most of the species which make up this group inhabit or overlap the same depth range as other rockfish species of concern including POP, shortraker/rougheye, and thornyhead rockfish, and high bycatch levels of these species can be anticipated.

The ABC for other slope rockfish is currently calculated as an accumulation of the estimated ABCs for the individual species which make up that group. An F = M exploitation rate is applied to the estimated biomass for each species as assessed by the triennial trawl survey. For many of the species where biology is poorly understood, natural mortality is assumed to be the average of the estimated natural mortality rates for several other similar species. There are several potential problems with this approach:

1. The triennial survey is not a reliable tool for assessing rockfish abundance. Therefore, biomass estimates for many of the species which make up the other rockfish group are questionable.

2. Because of the variability and uncertainty in natural mortality rates among the various species, there is a considerable risk of over-exploiting the slower-growing and older-aged species within the complex.

3. If any one of the species within the complex becomes the target of a directed fishery, that one species could potentially be harvested up to the TAC for the entire group, thus greatly exceeding the ABC (and OFL, if calculated) for that one species.

<u>Recommendation:</u>

The department urges the Council to consider adopting a policy which restricts harvest of other slope rockfish to bycatch only in fisheries for other species. Directed fisheries should not be allowed unless it can be demonstrated that there are species within the complex which are abundant enough, resilient enough, and valuable enough to support a directed fishery. Even if that determination is made, TAC should be set very low to reduce the risk that other species in the complex are over-exploited.

PELAGIC SHELF ROCKFISH

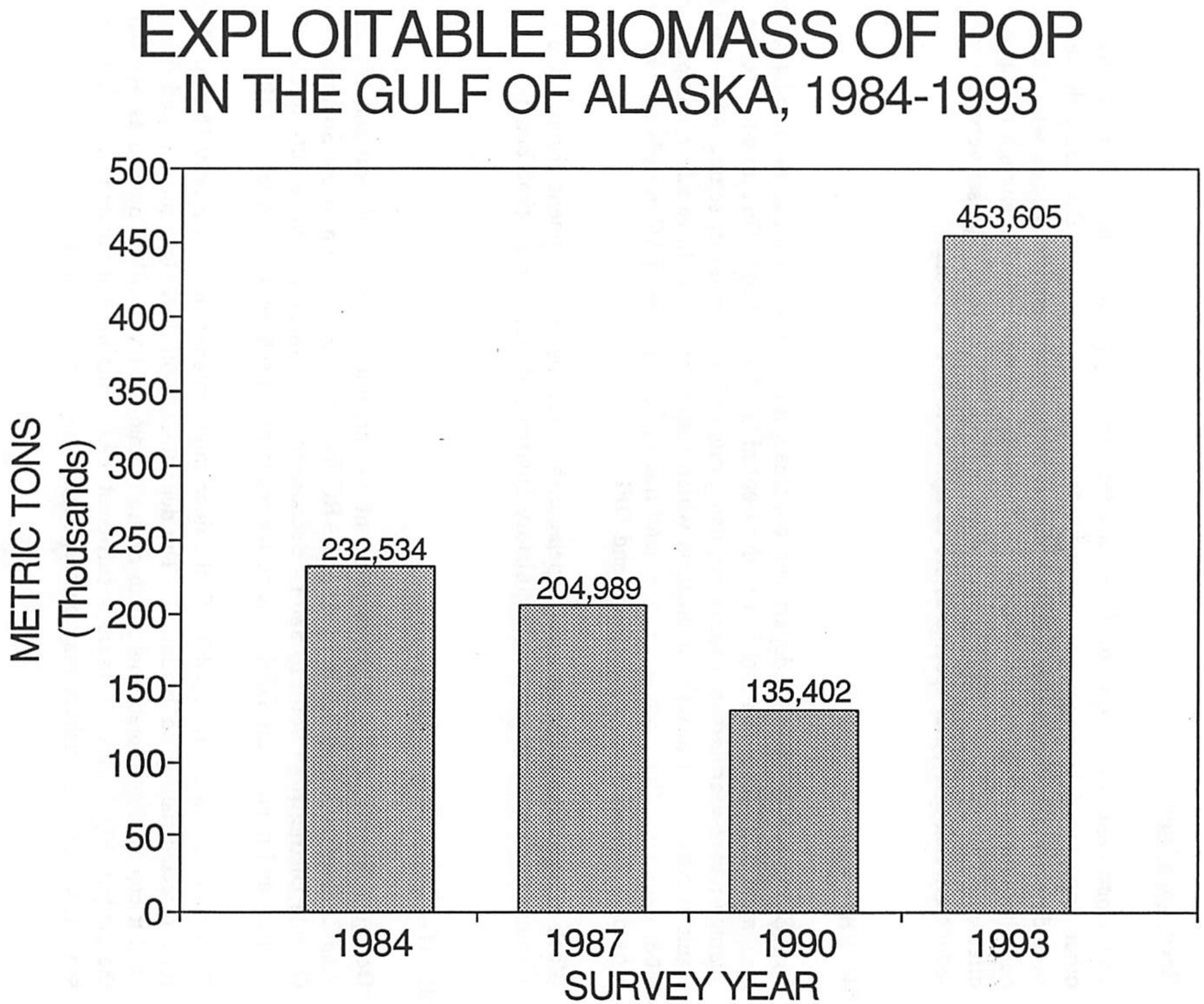
<u>BLACK ROCKFISH</u> - The department concurs with the Plan Team recommendation to set a separate ABC for black rockfish in the Central Gulf Regulatory District equal to the average recent-year harvest. However, using this default method of setting ABC would result in ABC equal to OFL, a situation which could potentially have adverse impacts on other fisheries. Therefore, we recommend that the Council set TAC at 90% of ABC to provide a 10% buffer between TAC and OFL.

Black rockfish should remain in the pelagic shelf rockfish management group in the Western Gulf and Eastern Gulf Regulatory Districts, at least for the time being.

DEMERSAL SHELF ROCKFISH

<u>Demersal Shelf Rockfish</u> - The department concurs with the SAFE Report author's and Plan Team's recommendation to reduce ABC for this species group in the Southeast Outside District from 960 t to 580 t. Because the department has the ability to closely monitor and manage the DSR fishery, we recommend setting TAC equal to ABC.

To remain within the reduced TAC, the department intends to release only 150 t of TAC for a directed fishery on January 1. The department will then close the directed fishery until it can be determined how much of the remaining TAC will be needed as bycatch in the halibut IFQ fishery. If there is sufficient TAC remaining at the end of the halibut season, the directed fishery may be reopened to harvest the balance.



EXPLOITABLE BIOMASS OF POP
IN THE GULF OF ALASKA, 1984-1993
METRIC TONS
(Thousands)
500
450
400
350
300
250
200
150
100
50
0
232,534
204,989
135,402
453,605
1984
1987
1990
1993
SURVEY YEAR

Figure 1

TOTAL ALLOWABLE CATCH OF POP
IN THE GULF OF ALASKA, 1991-1995

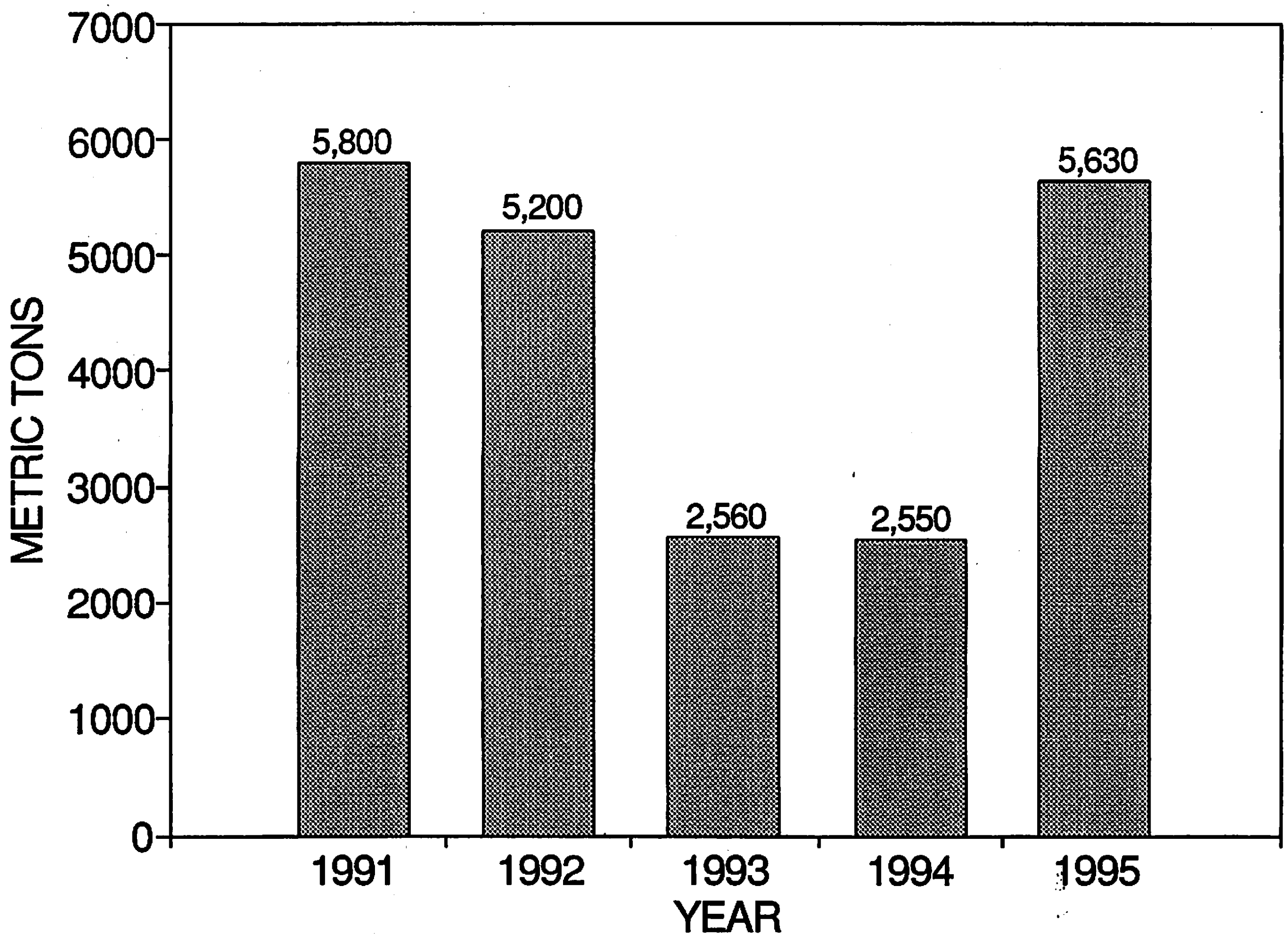


Figure 2

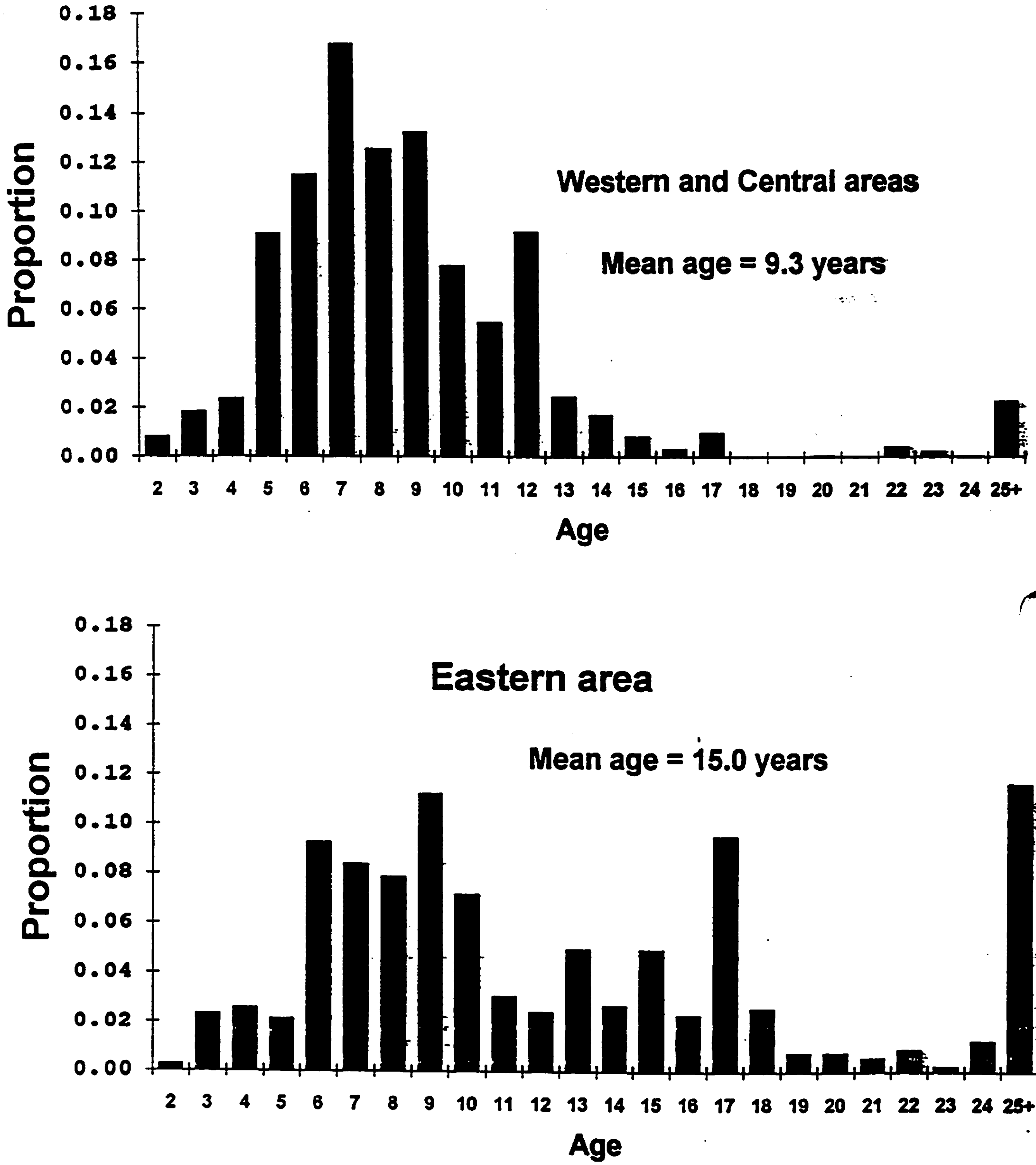


Figure 5-2. -- Age composition of the estimated population of Pacific ocean perch in the Gulf of Alaska based on the 1993 triennial trawl survey.

Table 5-12. Estimated numbers (thousands) of Pacific ocean perch at age in 1995 and schedule of age specific maturity, fishery selectivity, and mean weight based on the stock synthesis model.

	Age	Numbers in 1995	Percent mature	Percent Selected	Weight (grams)	
	2	42,026	0	1	53	
	3	39,969	0	2	116	
	4	38,008	5	3	194	
	5	48,452	12	5	279	
	6	24,580	27	8	363	
	7	49,123	50	13	442	
	8	49,919	73	20	515	
1986	9	92,694	88%	31	579	1.27 lbs
	10	22,207	95	45	635	(.28 lbs)
	11	51,054	98	61	683	
	12	32,986	99	77	724	1.6 lbs
	13	18,827	100	89	759	(.35 lbs)
	14	6,782	100	97	788	
	15	29,996	100	100	812	1.79 lbs
	16	2,921	100	100	832	(.39 lbs)
	17	2,842	100	97	848	
	18	3,722	100	94	861	
	19	12,032	100	89	872	
	20	1,133	100	84	881	
	21	702	100	79	889	
	22	514	100	75	895	
	23	987	100	70	900	
	24	1,031	100	65	904	
	25+	14,974	100	61	907	

D-3

Queen Anne Fisheries, Inc.
1939 Eighth Avenue West
Seattle, Washington 98119
(206) 284-9158
Fax (206) 282-6175

F/V MASONIC
Mark S. Lundsten, Operator

December 5, 1994

Rick Lauber, Chairman
North Pacific Fishery Management Council
P.O. Box 103136
Anchorage, Alaska 99510

Dear Rick,

I am writing to request the Council to set the TACs for sablefish in the Western Gulf, Aleutian Islands, and Bering Sea areas at lower levels than the 1995 reccomendations in order to rebuild the stocks.

In the late 1980s, we experienced good catch rates in those three areas. Each has fallen substantially since then. I think we should lower the TACs in those areas so that fish we once had there eventually will return.

A phenomenom common to quota share holders in those areas is a realization that it will take so much time to harvest the amount of quota share that is based on our historical average annual production. If the stocks were indeed in good shape now, the ability of boats to harvest fish under IFQs in 1995 would be no more onerous than it was in 1987 or 1989. In the Aleutians, for example, 25,000 pounds was considered a "fair to good" trip in 1988. Now that amount is considered a very good trip.

I would much rather take a cut now, reassess the whole situation after a year, and realize that we erred on the side of conservation than to realize that we had erred the other way. I'd just like to have good fishing again after a few years.

I don't have any problem with the suggestions for TACs for other areas or for the IPHC's general projections for halibut quotas, as little as I know about those yet. But the fish in these three areas just haven't come back for some years now.

I feel uncomfortable suggesting these actual numbers for TACs. I don't feel the stocks in any of them are in any real emergency; I simply think that for 1995, all the reccomendations for these three areas are too high. Please consider these suggestions as no more than ballpark numbers from a fisherman who thinks it's harder than it should be to find the fish, not from a biologist with an extensive data bank.

	1994 TAC	1994 Catch	1995 TAC from Team	1995 TAC suggestion
WG	2290	556 (closure due to bycatch)	2600	1800
BS	540	--	1600	1000
AI	2800	--	2200	1600

Thank you for your consideration and sorry for the lateness of this letter.

Sincerely,

[signature]

Mark S. Lundsten

North
Pacific
Longline
Association

December 1, 1994

Mr. Richard B. Lauber, Chairman
North Pacific Fishery Management Council
605 West 4th Avenue
Anchorage, AK 99501

RE: Assumed Halibut Mortality Rate - 1994 BSAI Longline Cod Fishery

Dear Rick:

Careful release works, and we are confident that we can maintain a 12.5% mortality rate in our halibut bycatch next year. We urge the Council to leave our assumed mortality rate at that level. Our purpose in writing is to explain our experience this year, and our plans for improved communications next year.

<u>1994 - Operating In the Dark</u>

1994 was the first year we had careful release regulations in place. The Observer Program did not inform most of our captains or vessel owners of any suspected problems during the season. Only in May, after our primary fishery closed, did the IPHC indicate that there might be a minor problem. We immediately requested vessel-by-vessel mortality data, but did not recieve it until September - well after the fall fishery had started. Nor were any citations issued for failure to carefully release halibut. In short, no one thought he had a problem until the end of the fishing year.

In September NMFS sent our vessels the attached bar chart, which shows that the program is largely successful. If you "eyeball" the halibut mortality rates of the first 32 of the 37 vessels participating in the 1994 BSAI cod fishery, you will see that on average they approached the 12.5% assumed rate (see vessel no. 16, the mean). Only five boats appear to have fallen outside this range.

The charts were sent to each company, with its own vessel(s) identified. I immediately got calls from two of the companies whose vessels appeared on the high end. In each case they were dumbfounded to learn that the observers had reported mortality rates so high, and asked why they had not been given this information earlier. They stated in the strongest terms (!) that

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TEL: 206-282-4639; FAX: 206-282-4684

the observers were wrong. Conventional wisdom is that you couldn't kill halibut at those rates unless you shot them in the head with a .44 magnum. I also spoke with some other owners, whose vessels were consistently under the assumed rate - demonstrating that the program does work.

FIS Study

Many freezer-longliners have submitted FOIA requests to the Observer Program so that Fisheries Information Services (FIS) can examine the haul-by-haul data and the observers' reports to determine the validity of the alleged mortalities. Note also that the individual vessel mortalities are not weighted - there is no way to tell what the real mortality rates are until you determine how much halibut each vessel handled. It is possible that we will have some preliminary impressions from FIS by the time of the Council meeting.

1995 - Improvements In Communications

This fall NMFS began reporting bycatch rates by vessel - bringing considerable peer pressure on bad actors. Next year we plan to FAX this information to the vessels each week. It has even been suggested that we broadcast this information by single sideband, so that any malfeasors will be suitably embarassed. We will also employ FIS to calculate mortality rates in real time and to identify bycatch hot spots. The vessels will FAX their weekly mortality and bycatch data to FIS. FIS will calculate their mortality rates and identify any high bycatch areas - and inform the vessels by immediate return FAX. Any captain with a problem will be able to fix it.

We feel certain that these efforts will bring our mortality rate within the 12.5% assumed rate during 1995 - and we respectfully request that the Council leave it at that level.

Freezer-Longliner/IPHC Meeting

Today we hosted a well-attended seminar for freezer-longliners at EXPO, to discuss bycatch. The purpose was to make sure everyone understands the bycatch issues, and to plan for next year. Greg Williams of the IPHC was kind enough to attend and to share some impressions he has gained in reviewing observer reports on the handful of vessels which may have experienced high halibut mortality rates. Apparently inexperienced rollermen overwhelmed by occasional high volumes of fish was the main problem - which can be fixed. Occasionally there was a rollerman whose English was poor, and who apparently did not understand the careful release program adequately - also fixable. The final (rare) cause was bad attitudes - rollermen who professed not to care. The solution here is quite simple - a citation, followed by a NOVA, and a visit with the administrative law judge.

The fishermen recounted some of their difficulties with inexperienced observers - those who insisted that the average weight of bycaught halibut was 300 pounds (such fish cannot be caught with autobaiter hooks, which straighten out); spent whole days in bed; insisted that gangion-cutting is the only permissible means of careful release.

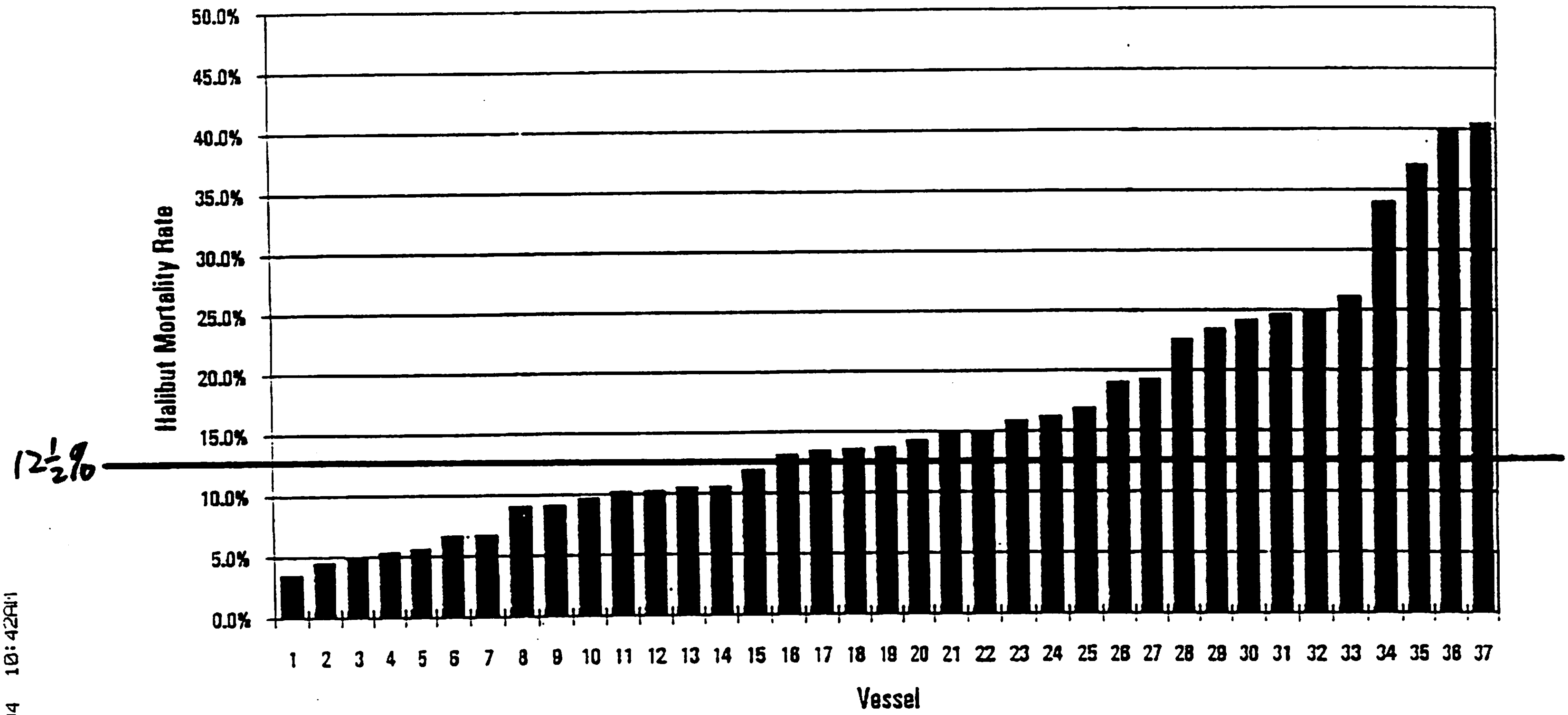
We are confident that these difficulties can be overcome through the exchange of real-time data which will take place next year - and that careful release will prove quite effective.

Sincerely,

Thorn

Thorn Smith

1994 BSA Pacific cod H&L Halibut Mortality Rates



T. Smith

Fixed Gear Proposal for 1995 Pacific Cod Specifications

Plan Team ABC: 328,000 mt

Pacific Cod TAC Request:

Trawl:	54.00%	140,400 mt
Fixed Gear:	44.00%	114,400 mt
Jig:	2.00%	5,200 mt
	======	========
	100.00%	260,000 mt

Fixed Gear Apportionment by Trimester:

	Allocation of ITAC:
First Trimester:	68,000 mt
Second Trimester:	16,500 mt
Third Trimester:	12,740 mt
Reserve:	17,160 mt
	=========
Total:	114,400 mt

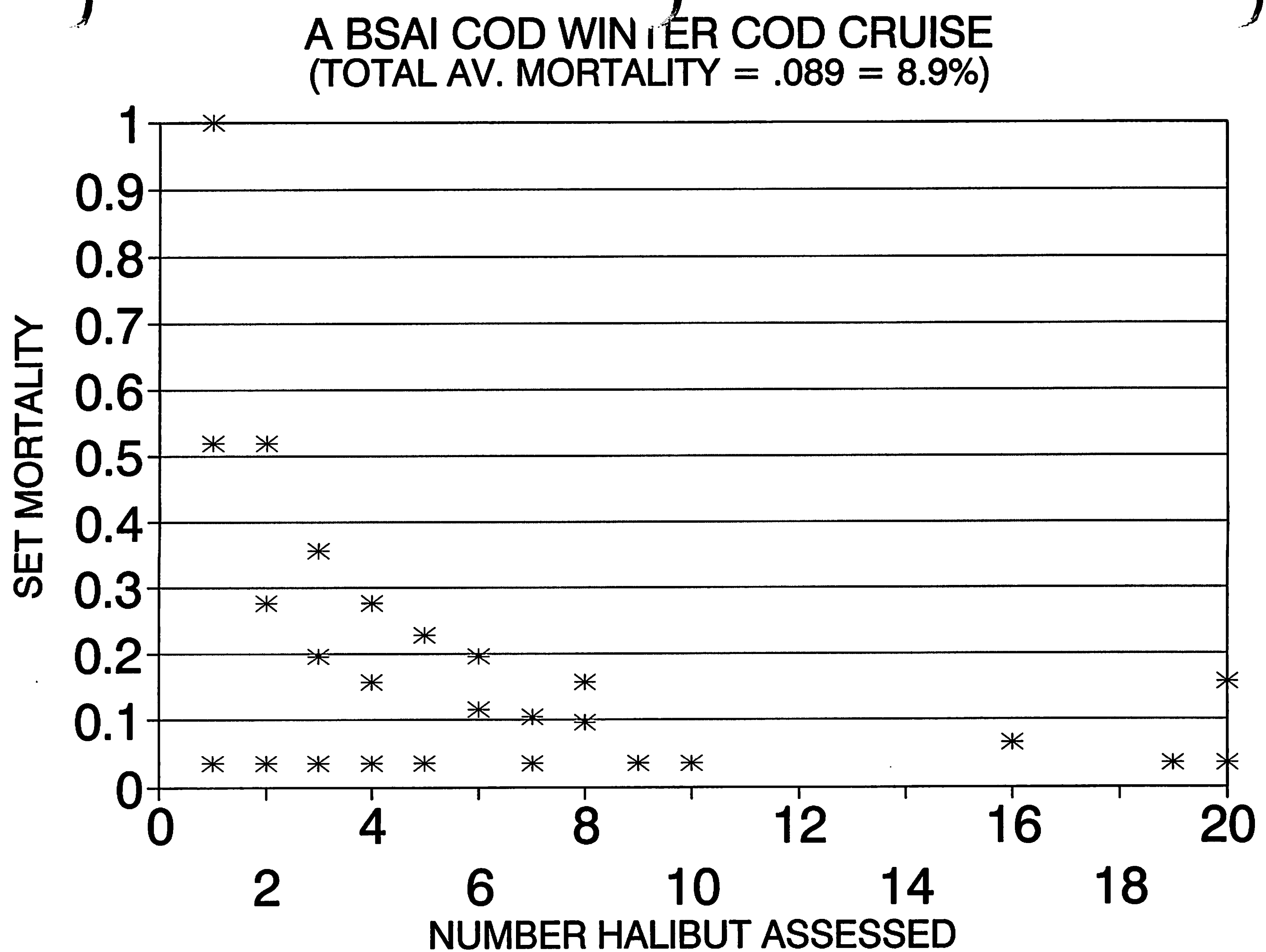
Support APrec, instead

1995 Halibut PSC Proposal:

Halibut Cap: 725 mt

	Cap:	
First Trimester:	475 mt	
Second Trimester:	0 mt	
Third Trimester:	250 mt	plus other species halibut if IFQ exemption from cap is passed
	=====	
Total:	725 mt	

Start fishery Sept 1 – no change

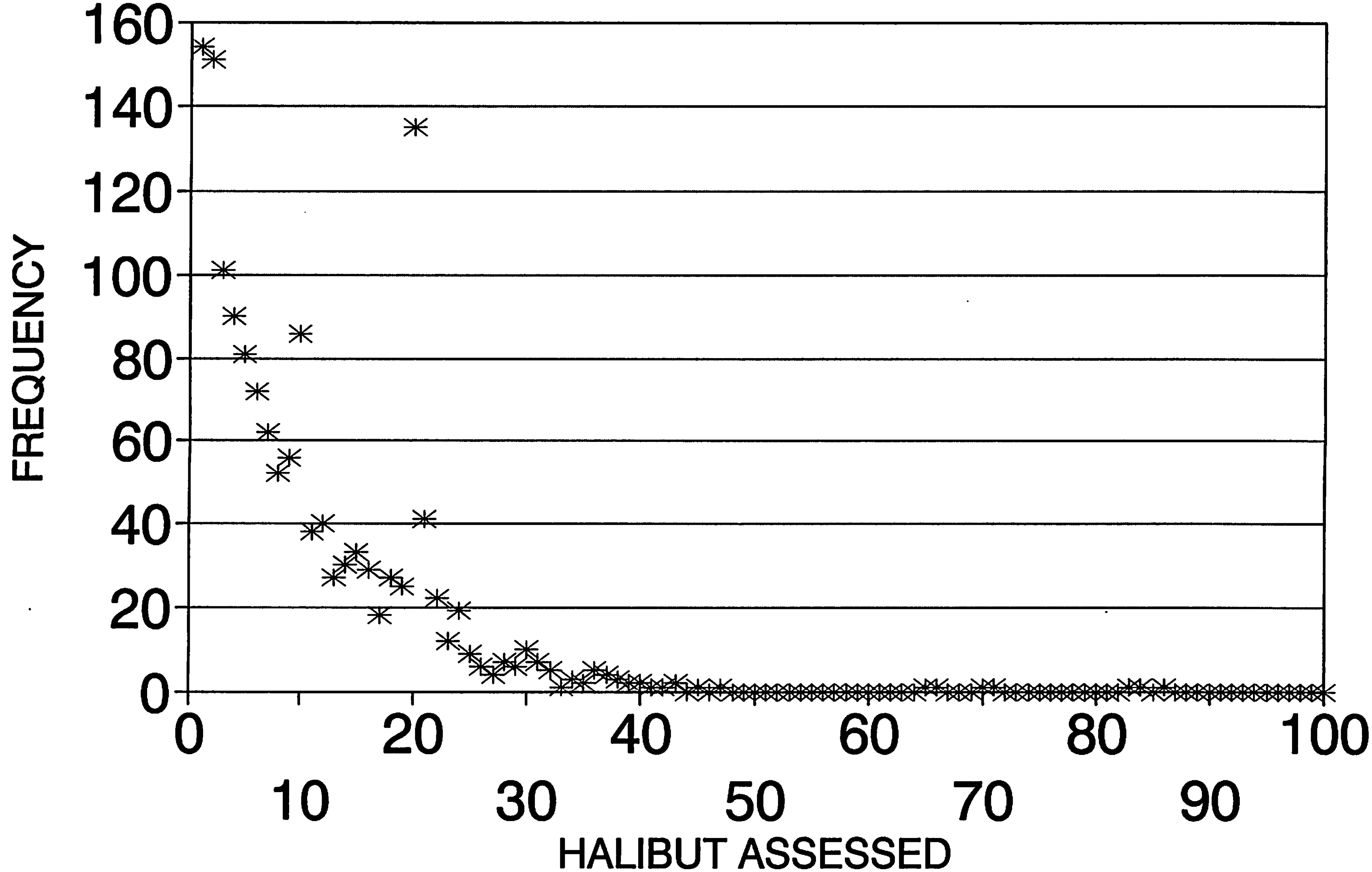


WINTHER | SMOKER

FIS 12/94

1993 NORPAC BSAI COD SETS

TOTAL 1494 SETS



FIS 12/94 RESULTS OF CHANGING "EXCELLENT" MORT.

1993 NORPAC	0.775	0.155	0.070	28599	
SCENARIO	EXC	POOR	DEAD	TOTAL	MORT
A	22164	4433	2002	28599	0.178
B	22164	4433	2002	28599	0.165
C	22164	4433	2002	28599	0.156
D	22164	4433	2002	28599	0.152
E	22164	4433	2002	28599	0.152

	A	B	C	D	E
EXC	0.035	0.02	0.01	0.005	0
POOR	0.52	0.51	0.51	0.50	0.5
DEAD	1	1	1	1	1

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GREENPEACE

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December 9, 1994

Richard Lauber, Chairman
North Pacific Fishery Management Council
P.O. Box 103136
Anchorage, AK
99510

Mr. Chairman and Members of the Council:

On behalf of Greenpeace and its 1.8 million supporters here in the United States, I would like to comment on the Bering Sea/Aleutian Islands and Gulf of Alaska groundfish specifications. The focus of this testimony will be on recommendations to the ecosystem considerations chapter of the stock assessment and fishery evaluation (SAFE) documents.

We remain concerned with the health of North Pacific ecosystems and the fisheries that are supported by them. We believe that decisions made by this Council should reflect commitment to sustainably conserve and manage these resources. We are encouraged by the continual development of an approach to address ecosystem considerations in fisheries management. We commend the Plan Team's efforts to collect information about North Pacific ecosystem dynamics and we believe that this work is a necessary component of any analysis of fisheries practices and of any proactive management regime.

The intent of this testimony is to highlight our concerns in the Bering Sea and the Gulf of Alaska as it relates to our interpretation of fishery management schemes based on knowledge of ecosystem dynamics.

Ecosystem considerations

There has been increasing interest in recent years for developing new fisheries management schemes based on ecosystem dynamics instead of individual fish stocks or groups of exploited fish stocks. Unfortunately, the reason is because in some exploited marine systems, commercial stocks are depleted or have collapsed despite the use of conventional management practices. Fisheries management has been focused on maximizing yields in weight and value, yet the condition of the North Pacific ecosystem warrants a broad based approach that serves to incorporate the biological needs of this dynamic marine system when determining fishery yields. Because of the amount of uncertainty in fisheries science, more emphasis should be placed on risk-averse management decisions.

Over the past 30 years, significant changes have occurred in the North Pacific. Populations of fish stocks have fluctuated as a result of overexploitation. As one stock has declined another stock has been targeted. This has been the modus operandi of fisheries management in the region--to target under-utilized species as another becomes fully-utilized. Consequently, significant declines in key predator species, such as marine mammals and seabirds have been noted yet ignored. Commercial fish stocks are utilized to fulfill the concept of optimum yield and have continued irrespective of effects on other species in the ecosystem. As a result of single-species management, non-commercial ecosystem components, such as macro-invertebrates, non-targeted fish, birds and marine mammals have undergone significant yet largely unexplained changes in abundance.

Rational sustainable ecosystem based management of the Northeastern Pacific groundfish fisheries faces five major obstacles that need to be overcome:

1. The consequences of past overexploitation (e.g. depleted stocks, irreversible ecosystem changes).

2. The current and future pressure to overfish due to overcapitalization of the fleet. Of particular importance are the large highly mobile vessels for which sequential overexploitation of fish stocks is the rationale modus operandi.

3. Single species management and research, which ignores the needs of other consumers in the ecosystem and the interactions among its members.

4. Indiscriminate fishing practices that lead to significant levels of unintended mortality with detrimental effects on both the species directly impacted and the ecosystem as a whole.

5. Uncertainty (due to both lack of knowledge and/or understanding and to natural variability) concerning the reliability and significance of fishery data; the assumptions and parameters used in stock assessment; and the structure and dynamics of ecosystems in which the target species live.

In the management of Alaska's living marine resources, these obstacles may be overcome through a combination of management measures and research initiatives.

Recommendations on quota setting procedures

Greenpeace has consistently advocated that the Council set the total allowable catch(TAC) below the acceptable biological catch (ABC). The reason for this is to separate the biology, the ABC from economics, the TAC. We believe that because overages of the TAC for numerous species does occur, that a buffer between the two quotas is necessary. As an example, we will recommend TACs for Gulf of Alaska pollock and Bering Sea pollock.

Gulf of Alaska

We are encouraged by the amount of information that the stock assessment scientist and the Plan Team has included in the pollock chapter in the SAFE document. It is recognized that the stock biomass is at historic low levels and is declining, and understanding the need to consider maintaining the pollock population above threshold levels, a conservative exploitation strategy was chosen. Additionally, concerns were raised about recent trends in poor recruitment of pollock and ecosystem considerations such as limiting forage fish removals important to marine mammals and sea birds.

In order that there is an adequate buffer between this ABC and the amount of pollock which is allowed to be caught, we recommend that the TAC in the Gulf of Alaska (Western and Central areas) be set 10% lower than the ABC.

Bering Sea/Aleutian Islands

In the Bering Sea, we question the absence of conservative exploitation strategies that have been applied to Bering Sea pollock. Specifically, the concerns about the status of the pollock stocks in the Bering Sea and how the declining biomass trend may impact other species in the ecosystem is largely absent from this chapter in the SAFE document. We contend that although a lower exploitation rate was used, ecosystem considerations were not included in the calculation of the ABC. We are also concerned that uncertainties about the strength of the 1989 year class should have been weighed equally, that is, a high and a low estimate of its strength should have been used in the model runs to calculate a range of yields for the fishery.

Since 1990, our organization has raised concerns about the high level of fishery removals in the North Pacific and how this may be impacting other components of the ecosystem. We have consistently stated our belief that the exploitation rates of pollock in the Eastern Bering Sea are too high. It is recognized that walleye pollock migrate throughout the Bering Sea and that the stocks are highly interdependent. Pollock fishing in the EBS and AI began in the mid-1960s, after yellowfin sole and Pacific Ocean perch had been depleted. The biomass of EBS pollock declined during the

1970s due to overharvesting. Good year classes in 1978, 1982 and 1984 contributed to a biomass increase during the late 1980s. Recently, however, the stock has declined markedly. The estimated biomass from the 1991 surveys was 6.5 million metric tons down from 12.2 million metric tons in 1988.

Each year we urge the Council to lower the TACs in the EBS, the Aleutian Islands and the Bogoslof subarea. Our arguments for this are based on the increases in TACs which continue irrespective of the declining trend of the biomass. Further, as with fisheries in the Gulf of Alaska, we believe that the TACs should be lower than the ABCs. Recently, the Council has moved away from this approach and instead set the TAC equal to the ABC. We urge you to incorporate a buffer between the two, recognizing that they are separate allotments.

For 1995, we recommend the TAC for EBS pollock be set at 1 million metric tons, the AI set at 51,600 mt and the Bogoslof subarea be set at 1000 mt. The reasons for these TACs is the unimproved status of the pollock stocks in the Bering Sea and the need to keep the removals at or below the levels set in 1991. In short, the EBS TAC has increased in recent years from 1.1 million mt to 1.33 million mt. Added to this concern is the fact that the area known as the EBS has actually decreased in size since 1991 because of the separation of the Bogoslof subarea. Since the 1992, more pollock has been removed from a smaller area.

Our comments about the roe and non-roe apportionment also relate to recent increases in this apportionment irrespective of the decreased amount of area in which the roe fisheries are prosecuted. We question the practice of targeting on spawning aggregations and request that a more risk-averse approach be applied to this type of fishery management. In our view, targeting on spawning populations may pose threats to the pollock populations. Because in several fish species, the oldest individuals return earlier and remain longer on the spawning grounds than younger fish, in those fisheries targeting on spawning aggregations the older and more genetically diverse individuals would suffer higher mortality than younger, less diverse individuals. This impoverishment of the genetic make-up of the stock may lead to a reduction in its ability to withstand fluctuations.

Biological interactions

Parallel to the intense fishing in the North Pacific during the last 3 decades, several populations of marine birds and mammals that feed on exploited groundfish have undergone dramatic declines. For instance, since the late 1970s, Steller sea lions have declined over 80% throughout their core range. The production of Northern fur seal pups on the Pribilof Islands declined by more than 60% between 1955 and 1980. The harbor seal rookery in Tugidak Island in the western Gulf of Alaska once the largest in Alaska, has shrunk to about 15% of its size in the mid-1970s. EBS populations of common murres, thick-billed murres, red-legged kittiwakes and black legged kittiwakes are also declining rapidly (from 50% to 90% over the past 20 years). Pollock are an important prey item in all of these species' diets.

Although a direct link between increased commercial fishing pressure and the decline of these populations cannot be established at this time, there are indications that birds and marine mammals are being outcompeted by the commercial fishery in their search for food. There are indications that significant changes in the North Pacific ecosystem are occurring. Biomass replacements in which the dominant species is driven to low levels and is substituted by another species can cause what is termed 'cascading effects' on other components of the ecosystem. There are indications that cascading effects are propagating through the GOA and the EBS ecosystems: several exploited groundfish species have been depleted while others, such as flatfish (e.g. arrowtooth flounder, rock sole) and scavenger species (e.g. skates) have markedly increased while several populations of marine mammals and seabirds have declined concomitantly.

Conclusion

In closing we urge the Council and the National Marine Fisheries Service to work closely in developing guidelines and procedures for dealing with uncertainty concerning the status of stocks and the numerical and functional relationships among fish stocks and other components of the ecosystem of which they are a part. Improving the information about North Pacific fisheries and the ecosystems which support them will serve to maintain viable fisheries for future generations.

Management procedures must explicitly take into consideration all the various types of uncertainty inherent in fisheries management and calculate the risks of failure from various management options. We recommend the continued development of research and monitoring programs needed to fill critical gaps in knowledge of the structure and dynamics of marine ecosystems, to verify the predicted effects and to detect the possible unforeseen effects of fishery management programs.

Thank you for your time.

Sincerely,

Penny Pagels
Fisheries Campaigner

References used:

Borisov, V.M. 1978. The selective effect of fishing on the population structure of species with a long life cycle. J. Ichthyol., 18: 896-904

Daan, N. 1980. A review of replacement of depleted stocks by other species and the mechanisms underlying such replacement. Rapp. P. v.Reun. Cons. Int. Explor. Mer, 177: 405-421

North Pacific Fishery Management Council (NPFMC) 1994. Stock Assessment and Fishery Evaluation Document for the groundfish resources in the Bering Sea and Aleutian Islands for 1995. North Pacific Fishery Management Council. NPFMC, Anchorage, AK. November 1994

North Pacific Fishery Management Council (NPFMC) 1994. Stock Assessment and Fishery Evaluation Document for the groundfish resources in the Gulf of Alaska for 1995. North Pacific Fishery Management Council. NPFMC, Anchorage, AK. November 1994

Pitcher, K.W. 1990. Major declines in number of harbor seals (Phoca vitulina) on Tugidak Island, Gulf of Alaska. Mar. Mammal Sci., 6(2): 121-134.

Sherman, K. 1989. Biomass flips in large marine ecosystems. pp. 327-333. In: K. Sherman and L.M. Alexander (eds.). Biomass yields and geography of large marine ecosystems. AAAS Selected Symposium, 111, Westview Press Inc., Boulder, CO.

Smith, P.J., R.I.C. Francis and McVeagh. 1991. Loss of genetic diversity due to fishing pressure. Fish. Res., 10:309-316.

Springer, A.M. 1992. A review: Walleye pollock in the North Pacific: How much difference do they really make? Fish. Oceanography: 1(1).