

MEMORANDUM

TO: Council, AP, and SSC Members

FROM: Clarence G. Pautzke  
Executive Director

DATE: December 3, 1992

SUBJECT: Gulf of Alaska Groundfish

**ACTION REQUIRED**

- (a) Review 1993 Final Stock Assessment and Fishery Evaluation (SAFE) document.
- (b) Set 1993 Acceptable Biological Catch (ABC) limits and Total Allowable Catches (TAC) limits for all groundfish.
- (c) Set 1993 Prohibited Species Catch (PSC) limits for halibut.

**BACKGROUND**

SAFE Document

In September, a draft SAFE document was provided which formed the basis for the preliminary groundfish specifications for the 1993 fishing year. The groundfish Plan Teams met in Seattle during the week of November 16-20, 1992 to prepare the final SAFE document provided at this meeting. The individual species or species complex stock assessments contained in the final SAFE may represent changes from the preliminary SAFE. These changes may be based on incorporation of updated stock survey information (such as the annual longline survey), updated catch information, inclusion of discard estimates, or refinement of stock modeling parameters.

This final SAFE for the Gulf of Alaska contains the Plan Team's estimates of biomass and ABCs for all groundfish species covered under the Gulf FMP and information concerning bycatch of halibut to provide guidance to the Council in establishing PSC apportionments. Table 1 shows Plan Team, SSC, and AP recommendations for ABCs, TACs and apportionments, and provides space for the Council's recommendations. Table 2 of the introductory SAFE chapter shows the recommended ABCs and the corresponding overfishing levels (in metric tons) for each of the species or species complexes. None of the Plan Team recommended ABCs exceeds the overfishing level.

Set Initial ABCs, TACs, and Apportionments for the 1993 Fisheries

During the week of this Council meeting, the SSC and AP recommendations will be added to Table 1 and supplemental handouts will be provided to the Council. In 1992, all TACs were apportioned to Domestic Annual Processing (DAP). Under Amendment 21, 25% of the initial specifications for groundfish (from September) will go forward as interim specifications for the 1993 fisheries until superseded by publication of the Council's recommended final specifications in the *Federal Register*, sometime in early 1993.

For GOA pollock, the 1993 ABC recommendation of 206,400 mt is well above the ABC set for 1992. All indications suggest that the 1988 year class is above average and larger than the 1984 and 1985 year classes. The recommended 1993 ABC was based on simulations that incorporated recent recruitment trends. Relative to the 1992 SAFE several new sources of information have become available: (1) the 1992 Shelikof Strait hydroacoustic biomass estimate, (2) length frequency data from the 1992 hydroacoustic survey, (3) length frequency data from the 1991 and 1st quarter 1992 fisheries, (4) estimates of catch-at-age from the 1991 fishery, (5) updated estimates of discards and catch, and (6) an evaluation of various fishing strategies.

The recommended 1993 ABC of 56,700 mt for Pacific cod is down somewhat from 1992 (63,500 mt) and down considerably from the 1991 ABC of 77,900. The stock reduction analysis (SRA) indicates that cod biomass may continue to decline in subsequent years.

For flatfish species, the only change since setting the preliminary ABCs comes as a result of re-editing of the 1990 trawl survey results. The 1993 ABCs differ from 1992 because estimates of exploitable biomass are now higher. The final 1993 ABC recommendations are as follows: deepwater flatfish - 45,530 mt; shallow water flatfish - 50,480 mt; Flathead sole - 49,450 mt; Arrowtooth flounder - 321,290 mt. These ABC recommendations are all at or above the 1992 ABCs for these species.

For sablefish, the results of the 1992 domestic longline survey and the 1992 cooperative longline survey have been incorporated in the stock assessment since the preliminary recommendations in September. The recommended ABC for 1993 is 20,900 mt. This value was obtained by adjusting the fishing rate downward in proportion to a threshold reference level. Apportionment of the catch across management areas was based on the 1988-1992 survey distributions, with emphasis placed on the 1992 distribution.

Exploitable biomass for Pacific Ocean Perch (POP) was estimated using a stock synthesis model that incorporated revised 1984 and 1987 survey biomass estimates and 1990 and 1991 fisheries length frequency data. Based on a fishing mortality that would maintain 35% of unfished spawning biomass per recruit, adjusted downward by the current biomass, the recommended 1993 ABC for POP is 5,560 mt. Because northern rockfish constitute a high percentage of the catch of 'other' slope rockfish, a separate ABC of 5,760 mt is recommended for this species. Fishing rates equal to natural mortality rates were applied to arrive at ABCs for the shorttraker/rougheye complex (1,960 mt) and the remaining 'other' slope rockfish (8,300 mt).

Biomass estimates for dusky rockfish the 1984, 1987, and 1990 trawl surveys were averaged to represent the current exploitable biomass for pelagic shelf rockfish. Applying a natural mortality rate to the biomass estimate results in a recommended ABC for 1993 of 6,740 mt. The Plan Team again recommends managing black rockfish separately from the pelagic shelf complex and recommends an ABC of 570 mt, which is the estimated catch for 1991. Because black rockfish are caught in very nearshore waters and are presently managed under the overall pelagic shelf quota, potential overharvest and localized depletions could occur. Recommended apportionment of the black rockfish ABC is as follows: Western Gulf - 50 mt; Central Gulf - 320 mt; Eastern Gulf - 200 mt.

New information collected from submersible surveys conducted by ADF&G was used to estimate the biomass of demersal shelf rockfish. Transect densities were extrapolated from the Central Southeast and East Yakutat management districts to obtain biomass estimates for the entire Southeast Outside District. An ABC was determined by applying an  $F=M$  fishing strategy to the lower 90% confidence interval of the biomass range. The recommended 1993 ABC for demersal shelf rockfish is 800 mt.

For thornyheads, the 1993 ABC recommendation of 1,180 mt is less than the preliminary recommendation (from September). This results from an updated natural mortality rate, lower than had been previously used, which reduces the optimal exploitation rate.

**Set Initial PSC Limits for Halibut**

Amendment 21 clarifies the halibut PSC framework to permit the Council to specify PSC limits by season and by gear type. In September, the Council recommended the following apportionments for public review:

<u>Trawl Gear</u>		<u>Hook and Line Gear</u>	
1st quarter	600 mt (30%)	1st trimester	150 mt (20%)
2nd quarter	600 mt (30%)	2nd trimester	550 mt (73.3%)
3rd quarter	400 mt (20%)	3rd trimester	50 mt (6.7%)
4th quarter	400 mt (20%)		
<hr/>		<hr/>	
TOTALS	2000 mt		750 mt

These were the same apportionments used in 1992.

Of the 750 mt PSC limit for fixed gear, 10 mt was apportioned specifically to the Demersal Shelf Rockfish fisheries in Southeast Alaska. Pot gear was exempted from PSC closures. In 1992, halibut bycatch declined in the sablefish fishery, but increased substantially in the Pacific cod fishery. The 750 mt fixed gear PSC cap was exceeded by 95 mt as of November 8, 1992.

Appendix I of the 1993 final SAFE report contains information on halibut bycatch in the 1992 groundfish fisheries in the Gulf of Alaska. The information in this section details the occurrence of halibut bycatch by time, area, and fishery.

In 1992, bottom trawling was prohibited on March 22, when the first quarter halibut PSC allowance of 1,200 mt was reached. The second quarter allowance lasted only five weeks, with the bottom trawl fisheries closing on May 4. The third quarter PSC limit was reached on August 5. Through November 8, total halibut bycatch mortality from trawl gear was 1,969 mt.

**TABLE 1. GULF OF ALASKA GROUND FISH**  
**1993 Plan Team, SSC, and AP recommendations and apportionments (metric tons)**

Species	Area	1992			Plan Team 1993 ABC	SSC 1993 ABC	Advisory Panel	
		ABC	TAC	Catch*			1993 TAC	DAP
Pollock	W (61) }		19,320	18,127	44,050			
	C (62) }	96,000	18,480	15,518	47,500			
	C (63) }		46,200	49,506	111,450			
	E	3,400	3,400	66	3,400			
	Total	99,400	87,400	83,217	206,400			
Pacific Cod	W	23,500	23,500	34,399	18,700			
	C	39,000	39,000	38,940	35,200			
	E	1,000	1,000	1,087	2,800			
	Total	63,500	63,500	74,426	56,700			
Flatfish, Deep	W	1,740	1,740	125	2,020			
	C	33,550	15,000	7,563	35,580			
	E	3,990	3,000	73	7,930			
	Total	39,280	19,740	7,761	45,530			
Flathead sole	W	12,580	2000	295	12,580			
	C	31,990	5,000	1,731	31,830			
	E	3,710	3,000	8	5,040			
	Total	48,280	10,000	2,034	49,450			
Flatfish, Shallow	W	27,480	3,000	1,644	27,480			
	C	21,260	7,000	5,518	21,260			
	E	1,740	1,740	2	1,740			
	Total	50,480	11,740	7,164	50,480			
Arrowtooth	W	38,880	5,000	943	38,880			
	C	253,320	15,000	13,057	253,330			
	E	11,680	5,000	967	29,080			
	Total	303,880	25,000	14,967	321,290			
Sablefish	W	2,500	2,500	2,110	2,030			
	C	9,570	9,570	9,580	9,610			
	W. Yakutat	3,740	3,740	4,122	3,830			
	E. Yak./SEO	4,990	4,990	4,707	5,430			
	Total	20,800	20,800	20,519	20,900			
Pacific Ocean	W	1,620	1,470	1,249	1,240			
Perch	C	1,720	1,561	2,470	1,560			
	E	2,390	2,169	2,261	2,760			
	Total	5,730	5,200	5,980	5,560			
	Shortraker / Rougheye	W	100	100	98	100		
Rockfish (Other Slope)	C	1,290	1,290	1,374	1,290			
	E	570	570	676	570			
	Total	1,960	1,960	2,148	1,960			
	W	1,390	1,390	1,167	330			
Northern Rockfish	C	6,510	6,510	7,185	1,640			
	E	6,160	6,160	783	6,330			
	Total	14,060	14,060	9,135	8,300			
	W		included in		1,000			
C		slope rockfish		4,720				
E				40				
Total				5,760				
Rockfish (Pelagic Shelf)	W	1,212	1,212	73	1,010			
	C	4,393	4,393	2,368	4,450			
	E	1,281	1,281	976	1,280			
	Total	6,886	6,886	3,417	6,740			
Black Rockfish	W		included in		50			
	C		pelagic rockfish		320			
	E				200			
	Total				570			
Rockfish (Demersal Shelf)	S.E. Out.	550	550	525	800			
Thornyhead	Gulfwide	1,798	1,798	1,659	1,180			
Other Species	Gulfwide	0	20,432	16,354	0			
<b>GULF OF ALASKA TOTAL</b>		<b>656,604</b>	<b>289,066</b>	<b>249,306</b>	<b>781,620</b>	<b>0</b>	<b>0</b>	<b>0</b>

\* Catch through November 8, 1992

Table 2. Exploitable biomasses, 1993 ABCs, and estimated trends and abundances of groundfish.

Species	Exploitable Biomass (mt)	ABC	----- 1993 -----		Abundance, Trend	
			Overfishing Level			
Pollock	1,062,000	{ W(61)	44,050	286,000	Low, stable	
		{ C(62)	47,500			
		{ C(63)	111,450			
		E	3,400			9,020
		<b>Total</b>	<b>206,400</b>			<b>295,020</b>
Pacific cod	324,000	W	18,700	78,100	Medium, declining	
		C	35,200			
		E	2,800			
		<b>Total</b>	<b>56,700</b>			
Flatfish (deep water)	227,656	W	2,020	59,650	High, stable	
		C	35,580			
		E	7,930			
		<b>Total</b>	<b>45,530</b>			
Flatfish (shallow water)	261,724	W	27,480	70,860	High, stable	
		C	21,260			
		E	1,740			
		<b>Total</b>	<b>50,480</b>			
Flathead sole	247,247	W	12,580	64,780	High, stable	
		C	31,830			
		E	5,040			
		<b>Total</b>	<b>49,450</b>			
Arrowtooth flounder	1,889,922	W	38,880	451,690	High, stable	
		C	253,330			
		E	29,080			
		<b>Total</b>	<b>321,290</b>			
Sablefish	190,400	W	2,030	25,010	Medium, decreasing slightly	
		C	9,610			
		WYK	3,830			
		SEO	5,430			
		<b>Total</b>	<b>20,900</b>			

(Continued on next page)

Table 2. (cont.) Exploitable biomasses, 1993 ABCs, overfishing levels, and estimated abundances and trends of groundfish.

Species	Exploitable Biomass (mt)		----- 1993 -----		
			ABC	Overfishing Level	Abundance, Trend
Slope rockfish (Other)	134,400	W	330		Low, unknown
		C	1,640		
		E	6,330		
		<b>Total</b>	<b>8,300</b>	<b>9,850</b>	
Northern Rockfish	96,070	W	1,000		Relative abundance unknown
		C	4,720		
		E	40		
		<b>Total</b>	<b>5,760</b>	<b>10,360</b>	
Pacific Ocean Perch	153,600	W	1,240		Low, stable
		C	1,560		
		E	2,760		
		<b>Total</b>	<b>5,560</b>	<b>7,137</b>	
Shortraker/ Rougheye	72,960	W	100		Low, unknown
		C	1,290		
		E	570		
		<b>Total</b>	<b>1,960</b>	<b>2,900</b>	
Pelagic shelf rockfish	74,900	W	1,010		Relative abundance unknown
		C	4,450		
		E	1,280		
		<b>Total</b>	<b>6,740</b>	<b>11,300</b>	
Black Rockfish	Unknown	W	50		Relative abundance unknown
		C	320		
		E	200		
		<b>Total</b>	<b>570</b>	<b>570</b>	
Demersal shelf rockfish (SE Outside district)	48,366	SEO	800	1,600	Low, stable
Thornyhead rockfish	26,207	Gulfwide	1,180	1,440	Low, decreasing
Other species	NA	W C E	NA		TAC = 5% of the sum of TACs

Note: DSR catch applies to the expanded SEO District for 1992.  
 1993 ABCs, and Overfishing are rounded to nearest 10.  
 Overfishing is defined Gulf-wide.  
 Northern Rockfish are separated from Slope Rockfish for 1993.  
 Black Rockfish are separated from Pelagic Shelf Rockfish for 1993.

DIRECTOR  
DONALD A. MCGAUGHRAN

# INTERNATIONAL PACIFIC HALIBUT COMMISSION

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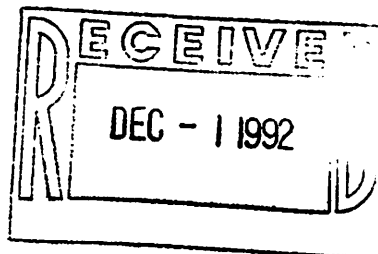
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ESTABLISHED BY A CONVENTION BETWEEN CANADA  
AND THE UNITED STATES OF AMERICA

December 1, 1992



Dr. Clarence Pautzke  
Executive Director  
NPFMC  
P.O. Box 103136  
Anchorage, AK 99510

Dear Clarence:

The International Pacific Halibut Commission has recommended a 10% per year reduction in United States halibut bycatch limits, based on an incentive program. As the current vessel incentive program will not effectively help further reduce bycatch, we recommend that the Council set 1993 Gulf of Alaska halibut bycatch mortality at status quo levels of 2,000 mt for trawl and 750 mt for hook and line. We continue to believe that halibut bycatch mortality can and should be reduced, and strongly oppose any efforts to increase bycatch mortality limits.

Sincerely,

Donald A. McCaughran  
Director

cc. Commissioners

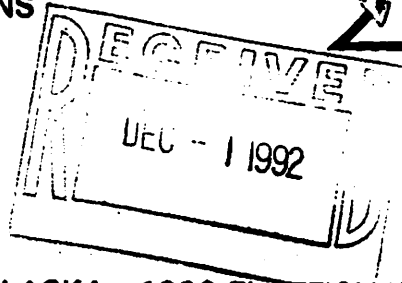
# Alaska Groundfish Data Bank

TO: CLARENCE PAUTZKE, EXECUTIVE DIRECTOR  
NORTH PACIFIC FISHERY MANAGEMENT COUNCIL

RE: GULF OF ALASKA SPECIFICATIONS

DATE: DECEMBER 1, 1992

SENT BY FAX: 1 PP



RE: CENTRAL GULF OF ALASKA - 1993 FLATFISH TAC'S

Historically Gulf of Alaska TAC's have been set at what it was felt what could be taken with out exceeding the halibut cap. With the advent of the observer program all TAC's except the flatfish TAC's have been set without regard to the limitations of the halibut cap.

Flatfish TAC's have been set at what the industry felt could be taken. The intent was and is to develop the flatfish fishery as the halibut cap permitted and avoid having flatfish compete for halibut with the Pacific cod and pollock fisheries.

After a review of the 1992 flatfish catch and TAC's we suggest the following changes:

**Arrowtooth Flounder:** Increase the TAC to 20,000 MT. 1992 catch was 13,507 MT and the TAC was 15,000 MT. An additional 5,000 MT may have been taken as unreported discard by the shorebased fleet, bringing the total 1992 catch up to 18,507 MT. ABC is 253,330 MT.

**Shallow Flatfish:** Increase the TAC to 10,000 MT. The 1992 catch was 5,518 MT and the TAC was 7,000 MT. During 1992 shallow flatfish became an important fishery. Halibut bycatch rates ranged 1.3% to 4.6%, much lower than the deep flatfish halibut bycatch rates of 3.0% to 8.8%. ABC is 21,260 MT.

Sincerely,

Chris Blackburn, Executive Director  
Alaska Groundfish Data Bank



**TABLE 1. GULF OF ALASKA GROUND FISH**  
**1993 Council Recommendations for ABC, TAC, and Apportionments**  
 (All Values in Metric Tons)

Species	Area	Council ABC	Council TAC	Council DAP
Pollock	W (61) }	34,068	24,087	24,087
	C (62) }	36,737	25,974	25,974
	C (63) }	86,195	60,939	60,939
	E	3,400	3,400	3,400
	Total	160,400	114,400	114,400
Pacific Cod	W	18,700	18,700	18,700
	C	35,200	35,200	35,200
	E	2,800	2,800	2,800
	Total	56,700	56,700	56,700
Flatfish, Deep	W	2,020	1,740	1,740
	C	35,580	15,000	15,000
	E	7,930	3,000	3,000
	Total	45,530	19,740	19,740
Flathead sole	W	12,580	2,000	2,000
	C	31,830	5,000	5,000
	E	5,040	3,000	3,000
	Total	49,450	10,000	10,000
Flatfish, Shallow	W	27,480	4,500	4,500
	C	21,260	10,000	10,000
	E	1,740	1,740	1,740
	Total	50,480	16,240	16,240
Arrowtooth	W	38,880	5,000	5,000
	C	253,330	20,000	20,000
	E	29,080	5,000	5,000
	Total	321,290	30,000	30,000
Sablefish	W	2,030	2,030	2,030
	C	9,610	9,610	9,610
	W. Yakutat	3,830	3,830	3,830
	E. Yak./SEO	5,430	5,430	5,430
	Total	20,900	20,900	20,900
Pacific Ocean	W	1,240	571	571
Perch	C	1,560	718	718
	E	2,760	1,271	1,271
	Total	5,560	2,560	2,560
Shortraker / Rougheye	W	100	90	90
	C	1,290	1,161	1,161
	E	570	513	513
	Total	1,960	1,764	1,764
Rockfish (Other Slope)	W	330	214	214
	C	1,640	1,064	1,064
	E	6,330	4,105	4,105
	Total	8,300	5,383	5,383
Northern Rockfish	W	1,000	1,000	1,000
	C	4,720	4,720	4,720
	E	40	40	40
	Total	5,760	5,760	5,760
Rockfish (Pelagic Shelf)	W	1,010	1,010	1,010
	C	4,450	4,450	4,450
	E	1,280	1,280	1,280
	Total	6,740	6,740	6,740
Rockfish (Demersal Shelf)	S.E. Out.	800	800	800
Thornyhead	Gulfwide	1,180	1,062	1,062
Other Species	W		3,065	3,065
	C		9,709	9,709
	E		1,828	1,828
	Total		14,602	14,602
<b>GULF OF ALASKA TOTAL</b>		<b>735,050</b>	<b>306,651</b>	<b>306,651</b>



AQUATIC RESOURCES CONSERVATION

G R O U P

December 7, 1992

**STATEMENT  
TO THE NORTH PACIFIC FISHERY MANAGEMENT COUNCIL  
ON THE NEED TO REBUILD THE POPULATION OF PACIFIC OCEAN PERCH  
IN THE GULF OF ALASKA**

Aquatic Resources Conservation Group is a non-profit, public-interest consultative group of professionals dedicated to the use of science, economics, law and policy to maintaining healthy, diverse ecosystems in the face of increasing pressure to exploit their resources.

As a central component of the Comprehensive Gulf of Alaska Rockfish Management Plan, we support the implementation of a rebuilding strategy for the depleted population of Pacific ocean perch. The purpose of this statement is to bring to the Council's attention information concerning the status of the stock and the population biology of Pacific ocean perch that justify the adoption of a decisive rebuilding schedule.

**1. Current stock status.**

The abundance of Pacific ocean perch (POP) as estimated by trawl surveys has been declining since 1984. Specially large declines occurred between the 1987 and 1990 surveys (Heifetz & Clausen, 1992).

Data from the 1987 survey shows that only 12% of the POP population is older than 15 years, compared with 40% in the less exploited population of the shorter lived Northern rockfish (Heifetz & Clausen, 1992).

Stock Synthesis Model (Methot, 1990) runs (Heifetz & Ianelli, 1992) revealed inconsistencies between survey biomass estimates and survey age and size composition and fishery CPUE data (Heifetz & Clausen, 1992). In an attempt to reconcile these inconsistencies, model configurations with varying emphasis on survey biomass estimates were explored (Heifetz & Ianelli, 1992). Model 2, where an emphasis of 1.5 was given to survey biomass data, was chosen as a compromise between the other two alternatives (emphasis 1 and 3) and because it provided the best overall fit to the data (Heifetz & Clausen, 1992). However, the total likelihood varied only slightly between the three models (Heifetz & Ianelli, 1992).

All three reconstructions indicate that the POP population in the Gulf of Alaska declined dramatically after 1963, reaching a minimum in the middle 1980s and showing little signs of recovery, if any, since then. Current biomass is estimated between 10-20% of the 1960s levels. Thus, regardless of the uncertainty and inconsistencies in the data, it is apparent that the POP population in the Gulf of Alaska remains severely depleted.

Currently, fisheries resources in many areas of the US Exclusive Economic Zone are depleted and it is a major responsibility for fishery managers to implement rebuilding programs according to the guidelines for the development of Fishery Management Plans (U.S. Dept. of Commerce, 1989b cited in Rosemberg & Brault, 1991). The guidelines specify that a stock rebuilding program must be established for stocks identified as overfished, and that the time frame for rebuilding is to be determined by the Council.

## **2. Stock rebuilding projections.**

Given that POP is a longlived and slow growing fish, rebuilding will evidently require a long time (Heifetz et al., 1992). The stock rebuilding projections presented to the Council (Heifetz et al., 1992) show that a substantial rebuilding period is necessary, and that the length of time required depends largely on the harvest level chosen. However, there are biological considerations that argue for the shortest time possible. Recruitment may fall below current levels due to reduced number of spawners, increasingly younger spawners, and ensuing reduced stock fecundity. As indicated, in 1987 only 12% of the POP population in the Gulf of Alaska was older than 15 years. Further exploitation can be expected to magnify this problem by harvesting fish at a time in their life when additions to the stock through growth exceed losses due to natural mortality. By rebuilding the stock in a way that older fish are more abundant, fecundity will increase, and the chances of good recruitment will improve.

In order to accomplish this objective, the proposed F35%-adjusted strategy seems inadequate in two counts. First, the probability of rebuilding the stock under this strategy hardly reaches 50% at the end of a 30 year-period. If this Council is to commit to a rebuilding strategy, it should chose one that offers good prospects of succeeding. Among those explored by Heifetz et al. (1992), the bycatch strategy is the only one that assures recovery of the population and predicts tangible changes in the shortest time period. Obviously, all of this holds true only if the model and its assumptions are realistic.

Secondly, the simulations do not adequately take into account the implications of a young POP population on its reproductive potential. To the extent that fecundity increases with age, the risks of the population declining below present levels, as well as the prospects for rebuilding, under any of the exploitation strategies, are not adequately evaluated.

Relative to pristine populations, heavily exploited stocks have more skewed age compositions because more individuals are concentrated in fewer age-classes (Rosemberg & Brault, 1991). These authors consider that, in addition to yield and spawning stock biomass, the compression of the age structure needs to be used to assess the appropriate time scale for reducing exploitation of overfished stocks. The

rationale being that with a wide range of adult age-groups in the population, the size of the adult stock is buffered against variations in the strength of individual year classes.

Also, because fecundity of older POP has been found to be greater than that of younger fish of the same weight (Leaman, 1991), the demographic structure of the population is an important determinant of its productivity. See also Appendix I.a.

A number of simulation studies on rebuilding trajectories for rockfish species (Mayo, 1986; Gunderson, 1978; Balsiger et al., 1985; Archibald et al., 1983; Hightower & Grossman, 1987) (see Appendix I.b.) indicate that attempts to restore a severely depleted stock to former levels will require extreme management measures over an extended time horizon. Examples of rebuilding trajectories for other groundfish (cod and haddock, Rosemberg & Brault, 1991) (Appendix I) evidence that rapid reductions in yield have a high cost in terms of short-term yield, while slow reductions have a high risk to the spawning stock and the rebuilding of age composition. Another obvious conclusion of these studies is that average rebuilding times increase as fishing mortality increases.

In the projections presented by Heifetz et al., (1992), no attempt is made to attain pristine biomass levels, but rather some level of the spawning stock with increased productivity and improved ability to take advantage of favorable environmental conditions. What this level should be remains to be defined. The stock assessment scientists are proposing B35% as a preliminary benchmark based on a study by Clark (1991) on appropriate exploitation rates for groundfish. However, B40%-B45% appear more suitable if stochastic recruitment variation is introduced. Because POP's life history parameters are very different from those of a typical groundfish, these benchmarks are probably inappropriate and a level higher than 35%-45% of the pristine spawning stock biomass may be necessary. If this were the case, even lower exploitation rates would be required to restore the stock at that higher level.

### **3. Summary and Recommendations**

The information presented here suggests that restoration of Gulf of Alaska POP stocks will be contingent upon attainment and maintenance of adequate levels and age structure of the spawning stock biomass. The proposed exploitation rate (F35%-adjusted), although presumably providing for some rebuilding, offers only a 50% probability of reaching the B35% spawning stock levels at the end of a 30 year-period. The adequacy of the B35% benchmark for POP is questionable and a higher level, and thus a lower exploitation rate, is likely to be appropriate. There is evidence that the fecundity of POP vary with the age. Since this factor is not taken into consideration in the simulations, the loss/increase of stock fecundity under the strategies examined is not evaluated.

The information presented here, suggests that to restore the POP population in the Gulf of Alaska, current fishing mortality patterns need to be modified to increase the total fecundity of the stock and improve its ability to produce recruitments that more than replace the removals from the fishery. The proposed exploitation level does not offer good chances of succeeding and the risks of further depletion have not been adequately evaluated.

Resource managers seek to balance the competing needs of stock conservation and economic viability of a fishing industry. As for the second, it should be remembered that commercial fisheries extinctions bring about economic disruption and loss of management options.

As for conservation, even though there is a possibility that the recovery of the POP is permanently blocked by the new environmental conditions brought about by fishing, it is a fundamental responsibility of managers to strive to achieve sustainability in marine living resources use for present and future participants, for both commercial and non-commercial users. This will not happen if sequential depletion of the stocks is allowed to occur and no action is taken to restore, to the extent possible, the impacted populations.

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Prepared by:

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## APPENDIX I.

### a. Notes on the effects of age on fecundity and reproductive value of POP.

Important life history characteristics of POP are that it grows slowly, has a low natural mortality and that it may reach and exceed 80 years (Archibald et al., 1981). POP are ovoviviparous (i.e., eggs are fertilized internally and the young are released in the spring as larvae) and therefore their populations lack the resilience of highly fecund, oviparous fish, such as the gadoids (Gunderson, 1976). Ovoviviparity enhances larval survival at a cost of greatly reduced individual fecundity (Mayo, 1986).

It has been commonly assumed that fecundity is linearly correlated with size or weight of the fish and, therefore, that stock biomass was a good index of stock fecundity (Gunderson, 1976; Ianelli & Ito, 1991). However, several studies of fecundity of POP show that it increases notably faster than their weight as the fish grows. In these studies, the exponent of the fecundity/length function ranges between 5.2 and 6.3 depending on the study and the area (Alverson & Westrheim, 1961; Paraketsov, 1963; and Lisovenko, 1965; cited in Quast, 1972). Leaman (1991) found that for lightly exploited stocks of POP, age, in addition to weight, was a determinant factor of fecundity.

According to these relationships, the contribution of large POP to the reproduction of the species is much more important than their size or weight indicates (Leaman, 1991). As a result, reduction in standing stock may have a depressant effect well beyond the proportionate change in biomass (Quast, 1972).

Under heavy exploitation, some degree of compensatory growth, and subsequent earlier sexual maturity, can be expected to result in an increase in the number of larvae released (Gunderson, 1976). The limits of this mechanism were explored by Leaman (1991). Resultant increases in fecundity at age due to compensatory growth (10-15%) were small compared with the major decreases in lifetime reproductive output, associated with the truncation of the average lifespan (14-16 years versus 25-35 years POP of British Columbia). Leaman (1991) found out that fish in heavily exploited stocks have significantly lower fecundity relative to fish of similar size in unexploited stocks, and that, though fecundity at age had changes with exploitation due to compensatory growth, these growth changes consume some energy that would otherwise have been allocated to the gonads.

According to this, a rapid drop in fecundity in populations of Pacific ocean perch subject to exploitation may explain the severe decline of the exploited populations and the limited resilience of the species. Reduced recruitment would be in part reflection of lowered fecundity of the spawning stock that is not compensated for by reduced age at maturity or increased survival of prerecruits (Quast, 1972).

As Leaman (1991) proposes, reproductive value (i.e., average number of young that a female of arbitrary age in a stable age distribution can expect to produce at that age and over the remainder of her life) should be an integral part of management and rebuilding programs of rockfish stocks.

**b. Notes on rebuilding projections of rockfish stocks and other fish species.**

A biological and economic assessment of possible rebuilding scenarios for POP in waters of Alaska was conducted by NMFS in 1985 (Balsiger et al., 1985). They found out that the rapidity of the stock rebuilding process was largely dependent on the assumed recruitment relationship, and that with a moderate stock-recruitment relationship, rebuilding is relatively slow even when there is no fishing. If recruitment is proportional to stock biomass, no rebuilding can occur. This study identifies 0.02 as the "maximum allowable value of fishing mortality (F) consistent with concern for these stocks". The authors recommended that even lower levels of F are desirable to allow for a more rapid rebuilding and providing a "cushion" for modeling and survey bias (Balsiger et al., 1985). These values were based on equilibrium conditions.

Simulations to assess stock behavior of POP from Queen-Charlotte Sound under various harvesting strategies (Archibald et al., 1983) indicated that without fishing the stock would grow to above B50% in 30 years and that fishing at  $F = 0.1$  kept the stock at current levels (1/8 of pristine levels) producing a small yield. The authors note that the percentage of older (>17 years) fish was about 32%, and that there are several stocks of POP where the percentage of such old fish are estimated to be more than 80%; for unexploited or lightly exploited stocks, the majority of fish may be older than 30 years (Archibald et al., 1983).

Gunderson (1978) estimated the time required to rebuild the POP stocks from the Vancouver and the Columbia areas to levels producing MSY between 11 and 24 years for initial exploitation rates ranging from 0 to 11%.

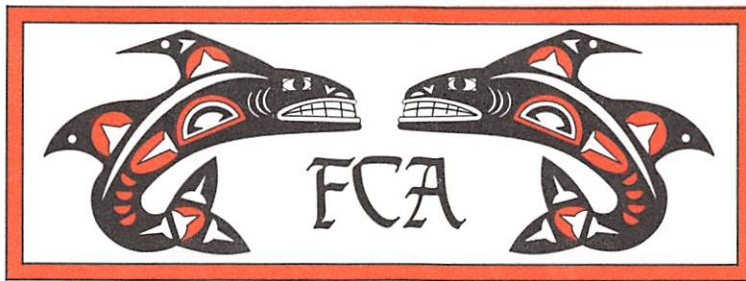
Hightower & Grossman (1987) found that the length of the rehabilitation period was affected by the demographic characteristics of the stock and the historical level of exploitation. For the POP stocks studied, deterministic simulations showed that the optimal policy was to close the fishery until spawning stock biomass exceeded the target level. This is because changes in stock size would be slow (compared with anchovy and Atlantic menhaden).

A series of deterministic simulations to evaluate the response of the rockfish *Sebastes fasciatus* in the Gulf of Maine were conducted by Mayo (1986). He found out that future stock rebuilding was dependent almost entirely on recruitment success and that one strong year class per decade combined with  $F = 0.07$  and  $M = 0.05$  would stabilize the stock only at minimal maintenance levels.

A study of Georges Bank haddock rebuilding projections showed that because the stock was very low, substantial improvements in yield can only occur after massive rebuilding has been accomplished (Rosemberg & Brault, 1991). The results of this study show that, although yield remained low under all strategies, rebuilding in stock biomass and age composition began when F was reduced by 50% (from current levels of  $F = 0.26$ ).

Another simulation of rebuilding projections for Georges Bank haddock showed that only low fishing mortalities would result in rebuilding, and that the average time required ranged from 11 years at  $F = 0$  to 19 years at  $F = 0.1$  (Overholtz et al., 1986).





December 9, 1992

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

**RE: 1993 Gulf of Alaska Rockfish TACs**

Dear Rick:

This letter is to formally transmit the Fishing Company of Alaska's concerns that the Council intends to arbitrarily reduce Pacific Ocean perch and other trawlable rockfish TACs as a means to indirectly eliminate the trawl rockfish fishery from the Gulf of Alaska. Following the Council's decision last September not to approve the proposed amendment to prohibit trawling in the southeast district, several Council members were quoted that they would use the tactic of reducing TACs as a means to subvert the Council's earlier decision.

The Magnuson Fishery Conservation and Management Act and the Council's own groundfish fishery management plans require that the setting of optimum yield (i.e., TACs) be based on economic and social considerations. We object to Council members prejudicing the Council process by making their decisions prior to the presentation of socioeconomic data.

The FCA is the largest privately-owned, 100% American-owned fishing company in Alaska. We pioneered the Gulf rockfish fishery and have established international markets for our product. The quotas for rockfish that the politicians wish to eliminate can only be harvested by trawl gear. An elimination of the trawl rockfish fishery will have significant social and economic impacts to the region and the nation as a whole. In this day and age where the United States is attempting to strengthen its economy, I can't believe the Secretary of Commerce would approve the elimination of the trawl rockfish fishery for purely political reasons.

**The Fishing Company of Alaska, Inc.**

P.O. BOX 1121 • SEWARD, ALASKA 99664  
PHONE (907) 224-8937 • FAX (907) 224-3709

Several issues have been suggested by the politicians as rationale for eliminating our fishery:

The issue of whether the Council is managing rockfish conservatively.

Over the last year, the Council, its SSC, and the plan team have been accused of mismanaging the rockfish resource and overfishing the stocks. The FCA supports the view of both the SSC and the plan team that we are managing these stocks conservatively. There is no argument that Gulf rockfish stocks were overfished in the 1960s by foreign fleets. Since implementation of the MFCMA, the Council has undertaken a conservative management strategy which allows for a limited directed fishery and resource rebuilding. The plan team has reviewed the scientific information available and have concluded that ABCs should remain at status quo levels for 1993. The Rockfish Industry Committee has also recommended an F 35% exploitation rate strategy which maintains trawl harvest levels at essentially the same level for 1993. These recommendations come to you following NMFS analysis which indicates that stocks are currently rebuilding and are very likely to continue to rebuild at these exploitation levels. Other information has been presented which indicates that scientists are underestimating rockfish biomass and the Alaska Fisheries Science Center has established a working group to develop better survey techniques. The FCA supports the efforts of this working group.

Economic Importance of Trawl Harvests of Rockfish in the GOA.

Even the publicly stated intent by some to eliminate our fishery, the FCA has prepared the attached report which summarizes several key facts about this fishery. The estimated wholesale value of Gulf rockfish trawl harvests was over \$22 million in 1992. This year, there were 9 catcher/processor trawlers who harvested about 75% of the total POP catch. These vessels employed over 400 people, with rockfish earnings providing about one-quarter of their annual income. In addition to these 9 vessels, another 16 trawl vessels and their crews participated in the GOA rockfish fishery.

It should be clear from this report, that given the limited volume of fish, this is one of the most valuable fisheries in Alaska. Species targeted by trawl vessels are different from those targeted by longline vessels. A reduction in rockfish TACs, especially POP and the other slope and pelagic species, will provide no tangible benefits to longline fishermen.

The rockfish trawl fishery has faced a series of regulatory impacts over the last 8 years which have made it increasingly difficult to stay in business. It is safe to say that the rockfish trawl industry is "at the edge" of its economic survival. The approval of additional regulatory constraints, especially when they cannot be justified for conservation purposes, serves no purpose but to penalize U.S. fishermen for the overfishing practices of the foreign fleets, and to financially ruin the trawl industry for the sake of appeasing longline interests.

The international markets that have been created by this and other U.S. companies over the last 10 years were a difficult undertaking. Maintaining the U.S. market share in this very competitive world has also been very difficult. Reduction of GOA TACs will have a dramatic impact on the U.S.'s ability to maintain a strong position in these markets. The Council must understand that the supplier has a responsibility to the market. Competition from Japanese-caught rockfish from the Russian-zone, and other waters of the North Pacific, make it imperative that the U.S. Government do what it can to

The need for a "buffer" between ABC and TAC.

It was again mentioned by some Council members in September that if TACs can't be lowered, than another way of reaching the same conclusion is to create a buffer between the ABC and TAC. The FCA is opposed to establishing such a buffer. First of all, a buffer to protect the resource has already been established in the setting of ABC. The plan team has already considered the biological status of the resource in its ABC determination. For POP, the recommended overfishing level is 12,360 mt. The plan team's ABC for POP is 5,535 mt, based on the F 35% exploitation rate. A buffer of 6,800 mt already exists if you adopt the team's overfishing and ABC recommendations. A further buffer is not necessary and will have significant economic impacts as described above. It has been suggested by the politicians that the argument for a TAC buffer is to guarantee that the trawl harvest doesn't exceed the TAC. My response is that similar TAC overruns have occurred in every fishery that the Council/NMFS has managed. The answer to this problem is to more closely monitor those fisheries where such overruns are possible. The NMFS has already taken steps (e.g., reducing retention rates, require more timely reporting) to reduce the chance of these problems reoccurring. The FCA supports these efforts by NMFS and is of the opinion that only with comprehensive rationalization will these TAC overruns be totally eliminated.

Reductions in Gulf of Alaska rockfish TACs will have a drastic effect on my company and the trawl rockfish industry. Such reductions cannot be justified given the analysis and recommendations of the SC and the plan team. The Council is managing the rockfish resource conservatively. Reductions in rockfish TACs cannot be supported for social and economic reasons. This is one of the most valuable fisheries in the United States. Our ability to maintain our markets and harvest other, less valuable groundfish species is dependent on maintaining rockfish harvests. For these reasons, we recommend that the Council, at a minimum, adopt 1993 rockfish TACs at 1992 levels.

Sincerely,



Mike Szymanski  
Government Affairs

enclosure

December 7, 1992  
NMFS/AKR/Juneau

Estimated Bycatch of Pacific Ocean Perch (POP) and  
Shortraker/Rougheye Rockfishes (SR/RE) in 1993 Gulf of Alaska  
(GOA) Trawl Fisheries

Introduction

The primary goal in inseason management of groundfishes is to achieve the maximum harvest within a fishing year, while not exceeding total allowable catch (TAC) and causing undesired discards. To accomplish this, the amount of harvest, and incidental bycatch rate of a species group in other fisheries must be known or estimable.

Establishment of a directed fishing allowance (DFA) allows curtailment of the directed fishery prior to attainment of TAC, so that unavoidable incidental bycatches of a species group can be retained later in the year. The appropriate DFA is a dynamic number, usually back calculated from estimates of expected groundfish harvests and on the bycatch rates of a species group in those fisheries. Both factors are in turn controlled by regulations, market demand, and prohibited species catch (PSC) constraints.

The TACs and PSC limitations are established early in each fishing year. Anticipated groundfish harvests can often be reasonably estimated inseason or from previous years. Bycatch rates (directed fishing standards, DFS), are established in regulations at levels intended to be low enough to discourage targeting while allowing unavoidable bycatch. With this information and the TAC, it is possible to calculate the appropriate DFA, or to determine that none is acceptable in consideration of current management regimes.

This current analysis estimates the incidental bycatch of Pacific Ocean perch (POP) and shortraker and rougheye rockfishes (SR/RE) in trawl fisheries of the Gulf of Alaska (GOA) under several groundfish harvesting scenarios. It is intended as a preseason indicator of whether sufficient TAC exists to provide a directed fishery of POP and SR/RE in GOA fisheries in 1993.

Methods

NMFS Weekly Production Reports (WPR) for 1992 were used to determine bycatch rates for POP and SR/RE, and estimate their accrual in GOA trawl fisheries. All calculations are in round metric tons (mt). Rate tables are presented in the Appendix.

Bycatch Rates

Bycatch rates for POP (or SR/RE) in other trawl fisheries were

determined for periods of time during which POP (or SR/RE) was not retainable. These rates are considered to be "neutral" in that there was presumably no incentive either for covert targeting ("topping off") or for avoidance of those rockfishes. The analysis included all WPR indicating trawl gear for the appropriate time period. Each WPR was assigned to a target fishery determined as the species of maximum retained tonnage. Data were pooled for the entire GOA to increase sample sizes. For each target, all retained and discarded catch was summed by species. The bycatch rate of POP (SR/RE) was calculated as a percent:  $(\text{POP or SR/RE catch}) / (\text{retained amount of target species}) * 100$ . This method conforms to calculations used to establish directed fishing in regulations, which compare amounts of a bycatch-only species against amounts of other fish retained on board a vessel. Bycatch rates calculated for POP and SR/RE constitute the overall fleet average for each target fishery; although both lower and higher rates were experienced. When a species group did not appear as a target, no bycatch rate could be calculated and current DFS was used as a default bycatch rate.

#### Bycatch Accrual

Bycatch accrual was estimated in several ways for the entire GOA and also for the Eastern, Central, and Western Regulatory Areas (EG, CG, WG, respectively). Retained trawl catch was summed by species for 1992, and multiplied by (1) current directed fishing standards (DFS), and (2) calculated neutral bycatch rates. The exercise was repeated after allowing for an increase in retained harvest of all flatfishes, other slope rockfishes, and pelagic shelf rockfishes by 50 percent, or up to the 1992 TAC, whichever is greater. This allowed significant expansion of those fisheries but assumed halibut would continue to be limiting to trawl fishing. All other fisheries are fully utilized or would be unlikely to expand significantly. A third set of tables assumes that retained trawl catch would equal all 1992 TACs, except for hook-and-line sablefish, which is inaccessible to trawlers.

Appendix tables present derived data. Although 1993 TACs for groundfishes are not yet established, 1992 TACs were used as proxy amounts. Incidental bycatch amounts of POP or SR/RE needed for each groundfish fishery are shown, but totals for POP and SR/RE exclude amounts shown for pollock, for 90 percent of the Pacific cod, and for all but 5,000 mt of Atka mackerel. Pollock was excluded because that species is infrequently retained by vessels that target rockfish and would not be available as a basis for retention of POP or SR/RE. All pollock and 90 percent of the 1993 Pacific cod allocation are allocated to the inshore component which has limited markets and generally does not exhibit "topping off" behavior for rockfishes. Atka mackerel catch was assumed to be limited to the WG, and to 5,000 mt. The

tonnage restriction reflects the lower potential catch of Atka mackerel if "other species" is allocated by regulatory area in 1993.

When the directed fishery for POP or SR/RE is closed, current DFS allow retention of amounts of either species group equal to 15 percent of the deep water flatfish, flathead sole, sablefish, and rockfishes open to directed fishing, PLUS 5 percent of the amount of other fish species retained on board at the same time during the same trip. Rockfish directed fishing is closed by regulation until July 1; prior to that date the allowed bycatch of, for example, POP in other rockfish fisheries is limited to 5 percent, although 15 percent was allowed in analyses to reflect the situation after July 1 and for conservatism.

Assumptions:

- a. all rockfishes other than POP (or SR/RE) are open to directed fishing.
- b. the same vessels retain both the POP (or SR/RE) and all other GOA trawl groundfish, except pollock.
- c. all catch of POP (or SR/RE) would be caught or topped-off at the bycatch rates indicated, except for pollock and Pacific cod inshore fisheries.
- d. total catch of POP (or SR/RE) would be constrained by the total allowable catch (TAC).
- e. bycatch rates as high as regulatory (or calculated) bycatch rates occur in all GOA areas where groundfish were retained by trawlers. This is actually dependent on the distribution of POP (or SR/RE), behavior of the fleet and markets for vessels fishing in each area.
- f. for projection to 1993, the amount of catch and distribution of groundfish catch among species remain the same as in 1992.

Results and Discussion

Some catch of POP and SR/RE is unavoidable in trawl groundfish fisheries in the GOA. The minimum expected catch with no directed fishery for POP or SR/RE has a lower bound derived from the neutral bycatch rates and an upper bound derived from DFS allowed under current regulations, or by the TAC of POP or SR/RE (Tables 1,2). Amounts calculated for neutral bycatch rates represent the unavoidable bycatch of POP or SR/RE in trawl fisheries. Amounts derived using DFS reflect the allowable amounts under current regulations, and provide an upper bound on bycatch.

POP

In the EG, the entire 1992 TAC of POP is not required as bycatch under any likely scenario. Other than rockfishes, only small amounts of groundfish are harvested by trawlers in the EG because of the small amount of biomass available there. Even if trawl catch expanded significantly for flatfishes and rockfishes and all POP bycatch were "topped off" to the maximum extent allowable, only 450 mt (21 percent of the 1992 TAC) would be required. In the CG nearly all the POP (1,203 mt, 77 percent of 1992 TAC) is required as bycatch even under the most conservative estimate, using neutral rates and 1992 retained groundfish catch levels. The WG is similar to the EG in that less than half (40 percent) of the TAC is needed as bycatch, except that the total 1992 TAC for POP, 1,470 mt, is much lower.

These amounts of POP calculated can be considered an overestimate of the amounts actually needed as incidental trawl catch because some of the assumptions oversimplify the fisheries:

- topping off is limited by the frequent start of new fishing trips (weekly, if not sooner).
- rockfish fisheries would not be open to directed fishing until July 1, so that the allowable bycatch rate of POP or SR/RE prior to July would be 5 percent of the amount of remaining rockfishes, and not 15 percent.
- expansion of groundfish fisheries is likely overstated because halibut bycatch is anticipated to be limiting at current levels, and the Council anticipates reductions in halibut PSC in the future. Offshore trawlers displaced from Pacific cod might engage in flatfish fisheries as an alternate early year target and experience relatively high halibut bycatch rates.
- the fleet of trawl vessels delivering to shoreside processors is less likely to catch rockfishes or intentionally top off because shoreside markets for rockfishes are less developed and because of the manner in which catcher vessels handle fish on board. In this analysis, adjustments were only made for Pacific cod.

#### SR/RE

Data indicate that small amounts of SR/RE are actually needed as unavoidable trawl bycatch anywhere in the GOA (47, 191, and 26 mt for the EG, CG, and WG, respectively), but that any significant targeting or topping off could easily lead to exceeding the TACs. Additionally, there is a fundamental difference between the bycatch of POP and SR/RE. While POP is almost exclusively a trawl target and bycatch, information from the domestic observer program and the longline surveys indicates that substantial unreported mortality of SR/RE may be occurring in the hook-and-line fishery for sablefish in the GOA. The Alaska Department of

Fish and Game and NMFS estimate that in the entire GOA, that source may account for 575 mt additional SR/RE mortality in 1992. This additional mortality may be causing TACs, ABCs, and even overfishing levels to be exceeded. This unreported SR/RE discard can be indexed simply to sablefish catches, and should be accounted for in management regimes.

Current regulations delay directed trawl fisheries for rockfishes until July 1. In consideration of the relative value of POP and SR/RE, some topping off might be expected earlier in the year. However, as in recent years, the offshore trawl fleet will likely participate in BSAI fisheries in the first quarter. The amount of groundfish, and POP and SR/RE taken prior to July 1 will be less than that presented for the whole year. Any targeting that occurs would undermine the season delay to minimize halibut and salmon bycatch in those fisheries. The amount actually taken prior to July 1, 1993 is not estimable at this time, and will depend on availability and relative value of other groundfish fisheries to the trawl fleet, on the nature of the GOA trawl fleet, and on halibut bycatch restrictions. Alterations to the DFS would require a regulatory amendment, or Emergency Interim Rule. NMFS anticipates examining the status of fisheries close to July 1 to determine if directed fisheries for POP and SR/RE are warranted. Additionally, it is imperative that all possible actions be taken to insure full and accurate accounting of all fishery removals, and to minimize discards.



Table 1. Trawl bycatch needs of Pacific Ocean perch (POP) in regulatory areas of the GOA under different trawl harvest and retention scenarios: (1) using 1992 TACs, (2) using 1992 TACs plus a 50% increase in flatfishes, slope (other) rockfish, and Pelagic shelf rockfish, and (3) assuming trawl gear retained the entire 1992 TAC (except for hook-and-line sablefish). The 1992 TAC is shown for comparison.

BYCATCH SPECIES, AREA AND SCENARIO	1992 TAC of POP	MT POP BYCATCH WITH DFS	% OF 1992 TAC	MT POP BYCATCH WITH NEUTRAL RATES	% OF 1992 TAC
POP, EGOA					
1	2,169	361	17%	252	12%
2	2,169	450	21%	350	16%
3	2,169	2,775	130%	1,098	51%
POP, CGOA					
1	1,561	3,234	207%	1,203	77%
2	1,561	4,195	269%	1,629	104%
3	1,561	6,925	444%	2,716	174%
POP, WGOA					
1	1,470	524	36%	43	3%
2	1,470	587	40%	64	4%
3	1,470	1,803	123%	630	43%

Table 2. Trawl bycatch needs of Shortraker and Rougheye rockfishes (SR/RE) in regulatory areas of the GOA under different trawl harvest and retention scenarios: (1) using 1992 TACs, (2) using 1992 TACs plus a 50% increase in flatfishes, slope (other) rockfish, and Pelagic shelf rockfish, and (3) assuming trawl gear retained the entire 1992 TAC (except for hook-and-line sablefish). The 1992 TAC is shown for comparison.

BYCATCH SPECIES, AREA AND SCENARIO	1992 TAC of SR/RE	MT SR/RE BYCATCH WITH DFS	% OF 1992 TAC	MT SR/RE BYCATCH WITH NEUTRAL RATES	% OF 1992 TAC
SR/RE, EGOA					
1	570	636	112%	40	7%
2	570	725	127%	47	8%
3	570	3,014	529%	583	102%
SR/RE, CGOA					
1	1,290	3,283	254%	169	13%
2	1,290	4,244	329%	197	15%
3	1,290	6,966	540%	1,333	103%
SR/RE, WGOA					
1	100	657	657%	21	21%
2	100	720	720%	26	25%
3	100	2009	2009%	451	451%

## ESTIMATED BYCATCH OF POP IN 1993 EASTERN GOA TRAWL FISHERIES (TAC = 2,169)

## I. Based on 1992 retained trawl catch for the EASTERN GOA

Species Group	1992 Retained mt	Directed Fishing Standard %	POP Bycatch mt	Neutral Bycatch Rate %	POP Bycatch mt
Atka mackerel	0	5	0	0.00	0
Arrowtooth flound.	86	5	4	0.00	0
Demersal rock *	25	15	4	15.00	4
Deep water flats	4	15	1	5.06	0
Flathead sole	8	15	1	0.11	0
Other species *	0	5	0	5.00	0
Pacific cod	30	5	1	0.31	0
Pelagic shelf rock	916	15	137	22.84	209
Pollock	7	5	0	0.00	0
POP	2113				
Sablefish	309	15	46	0.00	0
Shallow water flat	0	5	0	0.08	0
Slope (other) rock	416	15	62	7.45	31
Shortraker/Roughey	282	15	42	2.63	7
Thornyhead rockf	417	15	63	0.00	0
Total (see notes):	2500		361		252

## Notes:

Data in round metric tons (mt), from weekly reports through 11/29/92.

\*\* indicates there is no calculated rate; current standard used.

Fishing standard assumes "topping off" for all retained groundfish, and that all rockfish are open to directed fishing (15% bycatch).

Total retained catch excludes POP.

Total POP bycatch excludes pollock, 90% of Pcod, all but 5,000 mt of

WGOA Atka mackerel (assumes "other" apportioned by area in 1993).

Other species includes sharks, skates, sculpins, eulachon, capelin, smelt, octopus, squid; Atka mackerel is treated separately.

Calculated bycatch rates from NMFS Weekly Processor Reports,

during period when POP was not retainable.

Sablefish TAC is trawl only.

Thornyhead assigned equally to regulatory areas.

## ESTIMATED BYCATCH OF POP IN 1993 EASTERN GOA TRAWL FISHERIES (TAC = 2,169)

II. Based on retained 1992 EGOA trawl catch PLUS a 50 % increase in Deep, shallow flats, Flathead sole, Arrowtooth, Pelagic and Slope rockfish

Species Group	1992 Adjusted Retained mt	Directed Fishing Standard %	POP Bycatch mt	Neutral Bycatch Rate %	POP Bycatch mt
Atka mackerel	0	5	0	0.00	0
Arrowtooth flound.	129	5	6	0.00	0
Demersal rock *	25	15	4	15.00	4
Deep water flats	6	15	1	5.06	0
Flathead sole	12	15	2	0.11	0
Other species *	0	5	0	5.00	0
Pacific cod	30	5	1	0.31	0
Pelagic shelf rock	1281	15	192	22.84	293
Pollock	7	5	0	0.00	0
POP	2113				
Sablefish	309	15	46	0.00	0
Shallow water flat	0	5	0	0.08	0
Slope (other) rock	624	15	94	7.45	46
Shorthead/Roughey	282	15	42	2.63	7
Thornyhead rockf	417	15	63	0.00	0
Total (see notes):	3122		450		350

## Notes:

Data in round metric tons (mt), from weekly reports through 11/29/92.  
 \*\*\* indicates there is no calculated rate; current standard used.  
 Fishing standard assumes "topping off" for all retained groundfish,  
 and that all rockfish are open to directed fishing (15% bycatch).  
 Total retained catch excludes POP.  
 Total POP bycatch excludes pollock, 90% of Pcod, all but 5,000 mt of  
 WGOA Atka mackerel (assumes "other" apportioned by area in 1993).  
 Calculated bycatch rates from NMFS Weekly Processor Reports,  
 during period when POP was not retainable.  
 Sablefish TAC is trawl only.  
 Thornyhead assigned equally to regulatory areas.

## ESTIMATED BYCATCH OF POP IN 1993 EASTERN GOA TRAWL FISHERIES (TAC = 2,169)

## III. Based on total 1992 EASTERN GOA TACs

Species Group	1992 Total TAC mt	Directed Fishing Standard %	POP Bycatch mt	Neutral Bycatch Rate %	POP Bycatch mt
Atka mackerel	0	5	0	0.00	0
Arrowtooth flound.	5000	5	250	0.00	0
Demersal rock *	550	15	83	15.00	83
Deep water flats	3000	15	450	5.06	152
Flathead sole	3000	15	450	0.11	3
Other species *	1860	5	93	5.00	93
Pacific cod	1000	5	50	0.31	3
Pelagic shelf rock	1281	15	192	22.84	293
Pollock	3400	5	170	0.00	0
POP	2169				
Sablefish	437	15	66	0.00	0
Shallow water flat	1740	5	87	0.08	1
Slope (other) rock	6160	15	924	7.45	459
Shortraker/Roughey	570	15	86	2.63	15
Thornyhead rockf	599	15	90	0.00	0
Total (see notes):	28597		2775		1098

## Notes:

Data in round metric tons (mt), from weekly reports through 11/29/92.  
 \*\*\* indicates there is no calculated rate; current standard used.  
 Fishing standard assumes "topping off" for all retained groundfish,  
 and that all rockfish are open to directed fishing (15% bycatch).  
 Total retained catch excludes POP.  
 Total POP bycatch excludes pollock, 90% of Pcod, all but 5,000 mt of  
 WGOA Atka mackerel (assumes "other" apportioned by area in 1993).  
 Calculated bycatch rates from NMFS Weekly Processor Reports,  
 during period when POP was not retainable.  
 \*Other species\* includes Atka mackerel, and equals 5 % of TACs.  
 Sablefish TAC is trawl only.  
 Thornyhead assigned equally to regulatory areas.

## ESTIMATED BYCATCH OF POP IN 1993 CENTRAL GOA TRAWL FISHERIES (TAC = 1,561)

## I. Based on 1992 retained trawl catch for the CENTRAL GOA

Species Group	1992 Retained mt	Directed Fishing Standard %	POP Bycatch mt	Neutral Bycatch Rate %	POP Bycatch mt
Atka mackerel	46	5	2	0.00	0
Arrowtooth flound.	404	5	20	0.00	0
Demersal rock *	45	15	7	15.00	7
Deep water flats	6290	15	943	5.06	318
Flathead sole	1530	15	230	0.11	2
Other species *	16	5	1	5.00	1
Pacific cod	22031	5	1102	0.31	67
Pelagic shelf rock	1801	15	270	22.84	411
Pollock	58717	5	2936	0.00	0
POP	1625				
Sablefish	1793	15	269	0.00	0
Shallow water flat	4728	5	236	0.08	4
Slope (other) rock	5721	15	858	7.45	426
Shortraker/Roughey	1300	15	195	2.63	34
Thornyhead rockf	613	15	92	0.00	0
Total (see notes):	105035		3234		1203

## Notes:

Data in round metric tons (mt), from weekly reports through 11/29/92.

\*\*\* indicates there is no calculated rate; current standard used.

Fishing standard assumes "topping off" for all retained groundfish,  
and that all rockfish are open to directed fishing (15% bycatch).

Total retained catch excludes POP.

Total POP bycatch excludes pollock, 90% of Pcod, all but 5,000 mt of

WGOA Atka mackerel (assumes "other" apportioned by area in 1993).

Other species includes sharks, skates, sculpins, eulachon,  
capelin, smelt, octopus, squid; Atka mackerel is treated separately.

Calculated bycatch rates from NMFS Weekly Processor Reports,

during period when POP was not retainable.

Sablefish TAC is trawl only.

Thornyhead assigned equally to regulatory areas.

## ESTIMATED BYCATCH OF POP IN 1993 CENTRAL GOA TRAWL FISHERIES (TAC = 1,561)

II. Based on retained 1992 CGOA trawl catch PLUS a 50 % increase in Deep, shallow flats, Flathead sole, Arrowtooth, Pelagic and Slope rockfish

Species Group	1992 Adjusted Retained mt	Directed Fishing Standard %	POP Bycatch mt	Neutral Bycatch Rate %	POP Bycatch mt
Atka mackerel	46	5	2	0.00	0
Arrowtooth flound.	605	5	30	0.00	0
Demersal rock *	45	15	7	15.00	7
Deep water flats	9435	15	1415	5.06	477
Flathead sole	2296	15	344	0.11	3
Other species *	16	5	1	5.00	1
Pacific cod	22031	5	1102	0.31	67
Pelagic shelf rock	2702	15	405	22.84	617
Pollock	58717	5	2936	0.00	0
POP	1625				
Sablefish	1793	15	269	0.00	0
Shallow water flat	7000	5	350	0.08	6
Slope (other) rock	6510	15	977	7.45	485
Shortraker/Roughy	1300	15	195	2.63	34
Thornyhead rockf	613	15	92	0.00	0
Total (see notes):	113109		4195		1629

## Notes:

Data in round metric tons (mt), from weekly reports through 11/29/92.  
 \*\*\* indicates there is no calculated rate; current standard used.  
 Fishing standard assumes "topping off" for all retained groundfish,  
 and that all rockfish are open to directed fishing (15% bycatch).  
 Total retained catch excludes POP.  
 Total POP bycatch excludes pollock, 90% of Pcod, all but 5,000 mt of  
 WGOA Atka mackerel (assumes "other" apportioned by area in 1993).  
 Calculated bycatch rates from NMFS Weekly Processor Reports,  
 during period when POP was not retainable.  
 Sablefish TAC is trawl only.  
 Thornyhead assigned equally to regulatory areas.

## ESTIMATED BYCATCH OF POP IN 1993 CENTRAL GOA TRAWL FISHERIES (TAC = 1,561)

## III. Based on total 1992 CENTRAL GOA TACs

Species Group	1992 Total TAC mt	Directed Fishing Standard %	POP Bycatch mt	Neutral Bycatch Rate %	POP Bycatch mt
Atka mackerel	0	5	0	0.00	0
Arrowtooth flound.	15000	5	750	0.00	0
Demersal rock *	0	15	0	15.00	0
Deep water flats	15000	15	2250	5.06	759
Flathead sole	5000	15	750	0.11	6
Other species *	8480	5	424	5.00	424
Pacific cod	39000	5	1950	0.31	119
Pelagic shelf rock	4393	15	659	22.84	1003
Pollock	64680	5	3234	0.00	0
POP	1561				
Sablefish	1914	15	287	0.00	0
Shallow water flat	7000	5	350	0.08	6
Slope (other) rock	6510	15	977	7.45	485
Shorthead/Roughy	1290	15	194	2.63	34
Thornyhead rockf	599	15	90	0.00	0
<b>Total (see notes):</b>	<b>168866</b>		<b>6925</b>		<b>2716</b>

## Notes:

Data in round metric tons (mt), from weekly reports through 11/29/92.  
 \*\*\* indicates there is no calculated rate; current standard used.  
 Fishing standard assumes "topping off" for all retained groundfish,  
 and that all rockfish are open to directed fishing (15% bycatch).  
 Total retained catch excludes POP.  
 Total POP bycatch excludes pollock, 90% of Pcod, all but 5,000 mt of  
 WGOA Atka mackerel (assumes "other" apportioned by area in 1993).  
 Calculated bycatch rates from NMFS Weekly Processor Reports,  
 during period when POP was not retainable.  
 \*Other species\* includes Atka mackerel, and equals 5 % of TACs.  
 Sablefish TAC is trawl only.  
 Thornyhead assigned equally to regulatory areas.



## ESTIMATED BYCATCH OF POP IN 1993 WESTERN GOA TRAWL FISHERIES (TAC = 1,470)

## I. Based on 1992 retained trawl catch for the WESTERN GOA

Species Group	1992 Retained mt	Directed Fishing Standard %	POP Bycatch mt	Neutral Bycatch Rate %	POP Bycatch mt
Atka mackerel	13252	5	663	0.00	0
Arrowtooth flound.	39	5	2	0.00	0
Demersal rock *	0	15	0	15.00	0
Deep water flats	31	15	5	5.06	2
Flathead sole	103	15	15	0.11	0
Other species *	5	5	0	5.00	0
Pacific cod	26420	5	1321	0.31	81
Pelagic shelf rock	63	15	9	22.84	14
Pollock	15639	5	782	0.00	0
POP	948				
Sablefish	10	15	2	0.00	0
Shallow water flat	904	5	45	0.08	1
Slope (other) rock	332	15	50	7.45	25
Shortraker/Roughey	57	15	9	2.63	1
Thornyhead rockf	32	15	5	0.00	0
Total (see notes):	56887		524		43

## Notes:

Data in round metric tons (mt), from weekly reports through 11/29/92.

\*\*\* indicates there is no calculated rate; current standard used.

Fishing standard assumes "topping off" for all retained groundfish, and that all rockfish are open to directed fishing (15% bycatch).

Total retained catch excludes POP.

Total POP bycatch excludes pollock, 90% of Pcod, all but 5,000 mt of

WGOA Atka mackerel (assumes "other" apportioned by area in 1993).

Other species includes sharks, skates, sculpins, eulachon, capelin, smelt, octopus, squid; Atka mackerel is treated separately.

Calculated bycatch rates from NMFS Weekly Processor Reports,

during period when POP was not retainable.

Sablefish TAC is trawl only.

Thornyhead assigned equally to regulatory areas.

## ESTIMATED BYCATCH OF POP IN 1993 WESTERN GOA TRAWL FISHERIES (TAC = 1,470)

II. Based on retained 1992 WGOA trawl catch PLUS a 50 % increase in Deep, shallow flats, Flathead sole, Arrowtooth, Pelagic and Slope rockfish

Species Group	1992 Adjusted Retained mt	Directed Fishing Standard %	POP Bycatch mt	Neutral Bycatch Rate %	POP Bycatch mt
Atka mackerel	13252	5	663	0.00	0
Arrowtooth flound.	58	5	3	0.00	0
Demersal rock *	0	15	0	15.00	0
Deep water flats	46	15	7	5.06	2
Flathead sole	154	15	23	0.11	0
Other species *	5	5	0	5.00	0
Pacific cod	26420	5	1321	0.31	81
Pelagic shelf rock	94	15	14	22.84	21
Pollock	15639	5	782	0.00	0
POP	948				
Sablefish	10	15	2	0.00	0
Shallow water flat	1357	5	68	0.08	1
Slope (other) rock	497	15	75	7.45	37
Shortraker/Roughey	57	15	9	2.63	1
Thornyhead rockf	32	15	5	0.00	0
Total (see notes):	57622		587		64

## Notes:

Data in round metric tons (mt), from weekly reports through 11/29/92.  
 \*\*\* indicates there is no calculated rate; current standard used.  
 Fishing standard assumes 'topping off' for all retained groundfish,  
 and that all rockfish are open to directed fishing (15% bycatch).  
 Total retained catch excludes POP.  
 Total POP bycatch excludes pollock, 90% of Pcod, all but 5,000 mt of  
 WGOA Atka mackerel (assumes 'other' apportioned by area in 1993).  
 Calculated bycatch rates from NMFS Weekly Processor Reports,  
 during period when POP was not retainable.  
 Sablefish TAC is trawl only.  
 Thornyhead assigned equally to regulatory areas.

## ESTIMATED BYCATCH OF POP IN 1993 WESTERN GOA TRAWL FISHERIES (TAC = 1,470)

## III. Based on total 1992 WESTERN GOA TACs

Species Group	1992 Total TAC mt	Directed Fishing Standard %	POP Bycatch mt	Neutral Bycatch Rate %	POP Bycatch mt
Atka mackerel	0	5	0	0.00	0
Arrowtooth flound.	5000	5	250	0.00	0
Demersal rock *	0	15	0	15.00	0
Deep water flats	1740	15	261	5.06	88
Flathead sole	2000	15	300	0.11	2
Other species *	3092	5	155	5.00	155
Pacific cod	23500	5	1175	0.31	72
Pelagic shelf rock	1212	15	182	22.84	277
Pollock	19320	5	966	0.00	0
POP	1470				
Sablefish	500	15	75	0.00	0
Shallow water flat	3000	5	150	0.08	2
Slope (other) rock	1390	15	209	7.45	104
Shortraker/Roughey	100	15	15	2.63	3
Thornyhead rockf	599	15	90	0.00	0
Total (see notes):	61453		1803		630

## Notes:

Data in round metric tons (mt), from weekly reports through 11/29/92.  
 \*\*\* indicates there is no calculated rate; current standard used.  
 Fishing standard assumes "topping off" for all retained groundfish,  
 and that all rockfish are open to directed fishing (15% bycatch).  
 Total retained catch excludes POP.  
 Total POP bycatch excludes pollock, 90% of Pcod, all but 5,000 mt of  
 WGOA Atka mackerel (assumes "other" apportioned by area in 1993).  
 Calculated bycatch rates from NMFS Weekly Processor Reports,  
 during period when POP was not retainable.  
 \*Other species\* includes Atka mackerel, and equals 5 % of TACs.  
 Sablefish TAC is trawl only.  
 Thornyhead assigned equally to regulatory areas.

## ESTIMATED BYCATCH OF POP IN 1993 GOA TRAWL FISHERIES (TAC = 5,200)

## I. Based on 1992 retained trawl catch for the GOA

Species Group	1992 Retained mt	Directed Fishing Standard %	POP Bycatch mt	Neutral Bycatch Rate %	POP Bycatch mt
Atka mackerel	13298	5	665	0.00	0
Arrowtooth flound.	529	5	26	0.00	0
Demersal rock *	70	15	10	15.00	10
Deep water flats	6325	15	949	5.06	320
Flathead sole	1642	15	246	0.11	2
Other species *	40	5	2	5.00	2
Pacific cod	48481	5	2424	0.31	148
Pelagic shelf rock	2780	15	417	22.84	635
Pollock	74364	5	3718	0.00	0
POP	4686				
Sablefish	2112	15	317	0.00	0
Shallow water flat	5632	5	282	0.08	4
Slope (other) rock	6469	15	970	7.45	482
Shortraker/Roughey	1638	15	246	2.63	43
Thornyhead rockf	1062	15	159	0.00	0
Total (see notes):	164442		4117		1498

## Notes:

Data in round metric tons (mt), from weekly reports through 11/29/92.  
 \*\*\* indicates there is no calculated rate; current standard used.  
 Fishing standard assumes "topping off" for all retained groundfish,  
 and that all rockfish are open to directed fishing (15% bycatch).  
 Total retained catch excludes POP.  
 Total POP bycatch excludes pollock, 90% of Pcod, all but 5,000 mt of  
 WGOA Atka mackerel (assumes "other" apportioned by area in 1993).  
 Other species includes sharks, skates, sculpins, eulachon,  
 capelin, smelt, octopus, squid; Atka mackerel is treated separately.  
 Calculated bycatch rates from NMFS Weekly Processor Reports,  
 during period when POP was not retainable.

## ESTIMATED BYCATCH OF POP IN 1993 GOA TRAWL FISHERIES (TAC = 5,200)

II. Based on retained 1992 trawl catch PLUS a 50 % increase in Deep, shallow flats, Flathead sole, Arrowtooth, Pelagic and Slope rockfish

Species Group	1992 Adjusted Retained mt	Directed Fishing Standard %	POP Bycatch mt	Neutral Bycatch Rate %	POP Bycatch mt
Atka mackerel	13298	5	665	0.00	0
Arrowtooth flound.	793	5	40	0.00	0
Demersal rock *	70	15	10	15.00	10
Deep water flats	9487	15	1423	5.06	480
Flathead sole	2463	15	369	0.11	3
Other species *	40	5	2	5.00	2
Pacific cod	48481	5	2424	0.31	148
Pelagic shelf rock	4170	15	626	22.84	952
Pollock	74364	5	3718	0.00	0
POP	4686				
Sablefish	2112	15	317	0.00	0
Shallow water flat	8448	5	422	0.08	7
Slope (other) rock	9703	15	1455	7.45	723
Shortraker/Roughey	1638	15	246	2.63	43
Thornyhead rockf	1062	15	159	0.00	0
Total (see notes):	176129		5562		2220

## Notes:

Data in round metric tons (mt), from weekly reports through 11/29/92.  
 \*\*\* indicates there is no calculated rate; current standard used.  
 Fishing standard assumes "topping off" for all retained groundfish,  
 and that all rockfish are open to directed fishing (15% bycatch).  
 Total retained catch excludes POP.  
 Total POP bycatch excludes pollock, 90% of Pcod, all but 5,000 mt of  
 WGOA Atka mackerel (assumes "other" apportioned by area in 1993).  
 Calculated bycatch rates from NMFS Weekly Processor Reports,  
 during period when POP was not retainable.

## ESTIMATED BYCATCH OF POP IN 1993 GOA TRAWL FISHERIES (TAC = 5,200)

## III. Based on total 1992 TACs

Species Group	1992 Total TAC mt	Directed Fishing Standard %	POP Bycatch mt	Neutral Bycatch Rate %	POP Bycatch mt
Atka mackerel	0	5	0	0.00	0
Arrowtooth flound.	25000	5	1250	0.00	0
Demersal rock *	550	15	83	15.00	83
Deep water flats	19740	15	2961	5.06	998
Flathead sole	10000	15	1500	0.11	11
Other species *	20432	5	1022	5.00	1022
Pacific cod	63500	5	3175	0.31	194
Pelagic shelf rock	6886	15	1033	22.84	1572
Pollock	87400	5	4370	0.00	0
POP	5200				
Sablefish	2851	15	428	0.00	0
Shallow water flat	11740	5	587	0.08	9
Slope (other) rock	14060	15	2109	7.45	1047
Shortraker/Roughey	1960	15	294	2.63	51
Thornyhead rockf	1798	15	270	0.00	0
Total (see notes):	265917		12103		4794

## Notes:

Data in round metric tons (mt), from weekly reports through 11/29/92.  
 \*\* indicates there is no calculated rate; current standard used.  
 Fishing standard assumes "topping off" for all retained groundfish,  
 and that all rockfish are open to directed fishing (15% bycatch).  
 Total retained catch excludes POP.  
 Total POP bycatch excludes pollock, 90% of Pcod, all but 5,000 mt of  
 WGOA Atka mackerel (assumes "other" apportioned by area in 1993).  
 Calculated bycatch rates from NMFS Weekly Processor Reports,  
 during period when POP was not retainable.  
 Atka mackerel includes TAC for "other species".  
 Sablefish TAC is trawl only.  
 "Other species" includes Atka mackerel, and was increased from 5 % of TACs.

## ESTIMATED BYCATCH OF SR/RE IN 1993 EASTERN GOA TRAWL FISHERIES (TAC = 570)

## I. Based on 1992 retained trawl catch for the EASTERN GOA

Species Group	1992 Retained mt	Calculated Bycatch Rate %	SR/RE Bycatch mt	Neutral Bycatch Rate %	SR/RE Bycatch mt
Atka mackerel	0	5	0	0.03	0
Arrowtooth fl *	86	5	4	5.00	4
Demersal rock *	25	15	4	15.00	4
Deep water flats	4	15	1	0.00	0
Flathead sole	8	15	1	0.02	0
Other species *	0	5	0	5.00	0
Pacific cod	30	5	1	0.02	0
Pelagic shelf rock	916	15	137	0.00	0
Pollock	7	5	0	0.01	0
POP	2113	15	317	1.10	23
Sablefish	309	15	46	0.00	0
Shallow water flat	0	5	0	0.00	0
Slope (other) rock	416	15	62	2.16	9
Shortraker/Roughey	282				
Thornyhead rockf	417	15	63	0.00	0
Total (see notes):	4332		636		40

## Notes:

Data in round metric tons (mt), from weekly reports through 11/29/92.  
 \*\* indicates there is no calculated rate; current standard used.  
 Fishing standard assumes "topping off" for all retained groundfish,  
 and that all rockfish are open to directed fishing (15% bycatch).  
 Total retained catch excludes SR/RE.  
 Total SR/RE bycatch excludes pollock, 90% of Pcod, all but 5,000 mt of  
 WGOA Atka mackerel (assumes "other" apportioned by area in 1993).  
 Other species includes sharks, skates, sculpins, eulachon,  
 capelin, smelt, octopus, squid; Atka mackerel is treated separately.  
 Calculated bycatch rates from NMFS Weekly Processor Reports,  
 during period when SR/RE was not retainable.  
 Sablefish TAC is trawl only.  
 Thornyhead assigned equally to regulatory areas.

## ESTIMATED BYCATCH OF SR/RE IN 1993 EASTERN GOA TRAWL FISHERIES (TAC = 570)

II. Based on retained 1992 EGOA trawl catch PLUS a 50 % increase in Deep, shallow flats, Flathead sole, Arrowtooth, Pelagic and Slope rockfish

Species Group	1992 Adjusted Retained mt	Directed Fishing Standard %	SR/RE Bycatch mt	Neutral Bycatch Rate %	SR/RE Bycatch mt
Atka mackerel	0	5	0	0.03	0
Arrowtooth fl *	129	5	6	5.00	6
Demersal rock *	25	15	4	15.00	4
Deep water flats	6	15	1	0.00	0
Flathead sole	12	15	2	0.02	0
Other species *	0	5	0	5.00	0
Pacific cod	30	5	1	0.02	0
Pelagic shelf rock	1281	15	192	0.00	0
Pollock	7	5	0	0.01	0
POP	2113	15	317	1.10	23
Sablefish	309	15	46	0.00	0
Shallow water flat	0	5	0	0.00	0
Slope (other) rock	624	15	94	2.16	13
Shortraker/Roughey	282				
Thornyhead rockf	417	15	63	0.00	0
Total (see notes):	4954		725		47

## Notes:

Data in round metric tons (mt), from weekly reports through 11/29/92.  
 \*\*\* indicates there is no calculated rate; current standard used.  
 Fishing standard assumes "topping off" for all retained groundfish,  
 and that all rockfish are open to directed fishing (15% bycatch).  
 Total retained catch excludes SR/RE.  
 Total SR/RE bycatch excludes pollock, 90% of Pcod, all but 5,000 mt of  
 WGOA Atka mackerel (assumes "other" apportioned by area in 1993).  
 Calculated bycatch rates from NMFS Weekly Processor Reports,  
 during period when SR/RE was not retainable.  
 Sablefish TAC is trawl only.  
 Thornyhead assigned equally to regulatory areas.



## ESTIMATED BYCATCH OF SR/RE IN 1993 EASTERN GOA TRAWL FISHERIES (TAC = 570)

## III. Based on total 1992 EASTERN GOA TACs

Species Group	1992 Total TAC mt	Directed Fishing Standard %	SR/RE Bycatch mt	Neutral Bycatch Rate %	SR/RE Bycatch mt
Atka mackerel	0	5	0	0.03	0
Arrowtooth fl *	5000	5	250	5.00	250
Demersal rock *	550	15	83	15.00	83
Deep water flats	3000	15	450	0.00	0
Flathead sole	3000	15	450	0.02	1
Other species *	1860	5	93	5.00	93
Pacific cod	1000	5	50	0.02	0
Pelagic shelf rock	1281	15	192	0.00	0
Pollock	3400	5	170	0.01	0
POP	2169	15	325	1.10	24
Sablefish	437	15	66	0.00	0
Shallow water flat	1740	5	87	0.00	0
Slope (other) rock	6160	15	924	2.16	133
Shortraker/Roughey	570				
Thornyhead rockf	599	15	90	0.00	0
Total (see notes):	30196		3014		583

## Notes:

Data in round metric tons (mt), from weekly reports through 11/29/92.

\*\*\* indicates there is no calculated rate; current standard used.

Fishing standard assumes "topping off" for all retained groundfish, and that all rockfish are open to directed fishing (15% bycatch).

Total retained catch excludes SR/RE.

Total SR/RE bycatch excludes pollock, 90% of Pcod, all but 5,000 mt of

WGOA Atka mackerel (assumes "other" apportioned by area in 1993).

Calculated bycatch rates from NMFS Weekly Processor Reports, during period when SR/RE was not retainable.

"Other species" includes Atka mackerel, and equals 5 % of TACs.

Sablefish TAC is trawl only.

Thornyhead assigned equally to regulatory areas.

## ESTIMATED BYCATCH OF SR/RE IN 1993 CENTRAL GOA TRAWL FISHERIES (TAC = 1,2

## I. Based on 1992 retained trawl catch for the CENTRAL GOA

Species Group	1992 Retained mt	Calculated Bycatch Rate %	SR/RE Bycatch mt	Neutral Bycatch Rate %	SR/RE Bycatch mt
Atka mackerel	46	5	2	0.03	0
Arrowtooth fl *	404	5	20	5.00	20
Demersal rock *	45	15	7	15.00	7
Deep water flats	6290	15	943	0.00	0
Flathead sole	1530	15	230	0.02	0
Other species *	16	5	1	5.00	1
Pacific cod	22031	5	1102	0.02	3
Pelagic shelf rock	1801	15	270	0.00	0
Pollock	58717	5	2936	0.01	3
POP	1625	15	244	1.10	18
Sablefish	1793	15	269	0.00	0
Shallow water flat	4728	5	236	0.00	0
Slope (other) rock	5721	15	858	2.16	124
Shortraker/Roughley	1300				
Thornyhead rockf	613	15	92	0.00	0
Total (see notes):	105360		3283		169

## Notes:

Data in round metric tons (mt), from weekly reports through 11/29/92.

\*\*\* indicates there is no calculated rate; current standard used.

Fishing standard assumes "topping off" for all retained groundfish, and that all rockfish are open to directed fishing (15% bycatch).

Total retained catch excludes SR/RE.

Total SR/RE bycatch excludes pollock, 90% of Pcod, all but 5,000 mt of

WGOA Atka mackerel (assumes "other" apportioned by area in 1993).

Other species includes sharks, skates, sculpins, eulachon, capelin, smelt, octopus, squid; Atka mackerel is treated separately.

Calculated bycatch rates from NMFS Weekly Processor Reports,

during period when SR/RE was not retainable.

Sablefish TAC is trawl only.

Thornyhead assigned equally to regulatory areas.

## ESTIMATED BYCATCH OF SR/RE IN 1993 CENTRAL GOA TRAWL FISHERIES (TAC = 1,2

II. Based on retained 1992 CGOA trawl catch PLUS a 50 % increase in Deep, shallow flats, Flathead sole, Arrowtooth, Pelagic and Slope rockfish

Species Group	1992 Adjusted Retained mt	Directed Fishing Standard %	SR/RE Bycatch mt	Neutral Bycatch Rate %	SR/RE Bycatch mt
Atka mackerel	46	5	2	0.03	0
Arrowtooth fl *	605	5	30	5.00	30
Demersal rock *	45	15	7	15.00	7
Deep water flats	9435	15	1415	0.00	0
Flathead sole	2296	15	344	0.02	0
Other species *	16	5	1	5.00	1
Pacific cod	22031	5	1102	0.02	3
Pelagic shelf rock	2702	15	405	0.00	0
Pollock	58717	5	2936	0.01	3
POP	1625	15	244	1.10	18
Sablefish	1793	15	269	0.00	0
Shallow water flat	7000	5	350	0.00	0
Slope (other) rock	6510	15	977	2.16	141
Shortraker/Roughey	1300				
Thornyhead rockf	613	15	92	0.00	0
Total (see notes):	113434		4244		197

## Notes:

Data in round metric tons (mt), from weekly reports through 11/29/92.  
 \*\*\* indicates there is no calculated rate; current standard used.  
 Fishing standard assumes "topping off" for all retained groundfish,  
 and that all rockfish are open to directed fishing (15% bycatch).  
 Total retained catch excludes SR/RE.  
 Total SR/RE bycatch excludes pollock, 90% of Pcod, all but 5,000 mt of  
 WGOA Atka mackerel (assumes "other" apportioned by area in 1993).  
 Calculated bycatch rates from NMFS Weekly Processor Reports,  
 during period when SR/RE was not retainable.  
 Sablefish TAC is trawl only.  
 Thornyhead assigned equally to regulatory areas.

## ESTIMATED BYCATCH OF SR/RE IN 1993 CENTRAL GOA TRAWL FISHERIES (TAC = 1,2

## III. Based on total 1992 CENTRAL GOA TACs

Species Group	1992 Total TAC mt	Directed Fishing Standard %	SR/RE Bycatch mt	Neutral Bycatch Rate %	SR/RE Bycatch mt
Atka mackerel	0	5	0	0.03	0
Arrowtooth fl *	15000	5	750	5.00	750
Demersal rock *	0	15	0	15.00	0
Deep water flats	15000	15	2250	0.00	0
Flathead sole	5000	15	750	0.02	1
Other species *	8480	5	424	5.00	424
Pacific cod	39000	5	1950	0.02	6
Pelagic shelf rock	4393	15	659	0.00	0
Pollock	64680	5	3234	0.01	3
POP	1561	15	234	1.10	17
Sablefish	1914	15	287	0.00	0
Shallow water flat	7000	5	350	0.00	0
Slope (other) rock	6510	15	977	2.16	141
Shorthead/Roughy	1290				
Thornyhead rockf	599	15	90	0.00	0
Total (see notes):	169137		6966		1333

## Notes:

Data in round metric tons (mt), from weekly reports through 11/29/92.  
 \*\*\* indicates there is no calculated rate; current standard used.  
 Fishing standard assumes "topping off" for all retained groundfish,  
 and that all rockfish are open to directed fishing (15% bycatch).  
 Total retained catch excludes SR/RE.  
 Total SR/RE bycatch excludes pollock, 90% of Pcod, all but 5,000 mt of  
 WGOA Atka mackerel (assumes "other" apportioned by area in 1993).  
 Calculated bycatch rates from NMFS Weekly Processor Reports,  
 during period when SR/RE was not retainable.  
 "Other species" includes Atka mackerel, and equals 5 % of TACs.  
 Sablefish TAC is trawl only.  
 Thornyhead assigned equally to regulatory areas.

ESTIMATED BYCATCH OF SR/RE IN 1993 WESTERN GOA TRAWL FISHERIES (TAC =100)

I. Based on 1992 retained trawl catch for the WESTERN GOA

Species Group	1992 Retained mt	Calculated Bycatch Rate %	SR/RE Bycatch mt	Neutral Bycatch Rate %	SR/RE Bycatch mt
Atka mackerel	13252	5	663	0.03	3
Arrowtooth fl *	39	5	2	5.00	2
Demersal rock *	0	15	0	15.00	0
Deep water flats	31	15	5	0.00	0
Flathead sole	103	15	15	0.02	0
Other species	5	5	0	5.00	0
Pacific cod	26420	5	1321	0.02	4
Pelagic shelf rock	63	15	9	0.00	0
Pollock	15639	5	782	0.01	1
POP	948	15	142	1.10	10
Sablefish	10	15	2	0.00	0
Shallow water flat	904	5	45	0.00	0
Slope (other) rock	332	15	50	2.16	7
Shortraker/Roughey	57				
Thornyhead rockf	32	15	5	0.00	0
Total (see notes):	57778		657		21

Notes:

Data in round metric tons (mt), from weekly reports through 11/29/92.  
 \*\* indicates there is no calculated rate; current standard used.  
 Fishing standard assumes "topping off" for all retained groundfish, and that all rockfish are open to directed fishing (15% bycatch).  
 Total retained catch excludes SR/RE.  
 Total SR/RE bycatch excludes pollock, 90% of Pcod, all but 5,000 mt of WGOA Atka mackerel (assumes "other" apportioned by area in 1993).  
 Other species includes sharks, skates, sculpins, eulachon, capelin, smelt, octopus, squid; Atka mackerel is treated separately.  
 Calculated bycatch rates from NMFS Weekly Processor Reports, during period when SR/RE was not retainable.  
 Sablefish TAC is trawl only.  
 Thornyhead assigned equally to regulatory areas.

## ESTIMATED BYCATCH OF SR/RE IN 1993 WESTERN GOA TRAWL FISHERIES (TAC =100)

II. Based on retained 1992 WGOA trawl catch PLUS a 50 % increase in Deep, shallow flats, Flathead sole, Arrowtooth, Pelagic and Slope rockfish

Species Group	1992 Adjusted Retained mt	Directed Fishing Standard %	SR/RE Bycatch mt	Neutral Bycatch Rate %	SR/RE Bycatch mt
Atka mackerel	13252	5	663	0.03	3
Arrowtooth fl *	58	5	3	5.00	3
Demersal rock *	0	15	0	15.00	0
Deep water flats	46	15	7	0.00	0
Flathead sole	154	15	23	0.02	0
Other species	5	5	0	5.00	0
Pacific cod	26420	5	1321	0.02	4
Pelagic shelf rock	94	15	14	0.00	0
Pollock	15639	5	782	0.01	1
POP	948	15	142	1.10	10
Sablefish	10	15	2	0.00	0
Shallow water flat	1357	5	68	0.00	0
Slope (other) rock	497	15	75	2.16	11
Shortraker/Roughey	57				
Thornyhead rockf	32	15	5	0.00	0
Total (see notes):	58513		720		26

## Notes:

Data in round metric tons (mt), from weekly reports through 11/29/92.  
 \*\*\* indicates there is no calculated rate; current standard used.  
 Fishing standard assumes "topping off" for all retained groundfish,  
 and that all rockfish are open to directed fishing (15% bycatch).  
 Total retained catch excludes SR/RE.  
 Total SR/RE bycatch excludes pollock, 90% of Pcod, all but 5,000 mt of  
 WGOA Atka mackerel (assumes "other" apportioned by area in 1993).  
 Calculated bycatch rates from NMFS Weekly Processor Reports,  
 during period when SR/RE was not retainable.  
 Sablefish TAC is trawl only.  
 Thornyhead assigned equally to regulatory areas.

## ESTIMATED BYCATCH OF SR/RE IN 1993 WESTERN GOA TRAWL FISHERIES (TAC =100)

## III. Based on total 1992 WESTERN GOA TACs

Species Group	1992 Total TAC mt	Directed Fishing Standard %	SR/RE Bycatch mt	Neutral Bycatch Rate %	SR/RE Bycatch mt
Atka mackerel	0	5	0	0.03	0
Arrowtooth fl *	5000	5	250	5.00	250
Demersal rock *	0	15	0	15.00	0
Deep water flats	1740	15	261	0.00	0
Flathead sole	2000	15	300	0.02	0
Other species	3092	5	155	5.00	155
Pacific cod	23500	5	1175	0.02	4
Pelagic shelf rock	1212	15	182	0.00	0
Pollock	19320	5	966	0.01	1
POP	1470	15	221	1.10	16
Sablefish	500	15	75	0.00	0
Shallow water flat	3000	5	150	0.00	0
Slope (other) rock	1390	15	209	2.16	30
Shortraker/Roughey	100				
Thornyhead rockf	599	15	90	0.00	0
Total (see notes):	62823		2009		451

## Notes:

Data in round metric tons (mt), from weekly reports through 11/29/92.  
 \*\*\* indicates there is no calculated rate; current standard used.  
 Fishing standard assumes "topping off" for all retained groundfish,  
 and that all rockfish are open to directed fishing (15% bycatch).  
 Total retained catch excludes SR/RE.  
 Total SR/RE bycatch excludes pollock, 90% of Pcod, all but 5,000 mt of  
 WGOA Atka mackerel (assumes "other" apportioned by area in 1993).  
 Calculated bycatch rates from NMFS Weekly Processor Reports,  
 during period when SR/RE was not retainable.  
 \*Other species\* includes Atka mackerel, and equals 5 % of TACs.  
 Sablefish TAC is trawl only.  
 Thornyhead assigned equally to regulatory areas.

## ESTIMATED BYCATCH OF SR/RE IN 1993 GOA TRAWL FISHERIES (TAC = 1,960

## I. Based on 1992 retained trawl catch for the GOA

Species Group	1992 Retained mt	Directed Fishing Standard %	SR/RE Bycatch mt	Neutral Bycatch Rate %	SR/RE Bycatch mt
Atka mackerel	13298	5	665	0.03	3
Arrowtooth fl *	529	5	26	5.00	26
Demersal rock *	70	15	10	15.00	10
Deep water flats	6325	15	949	0.00	0
Flathead sole	1642	15	246	0.02	0
Other species *	40	5	2	5.00	2
Pacific cod	48481	5	2424	0.02	7
Pelagic shelf rock	2780	15	417	0.00	0
Pollock	74364	5	3718	0.01	4
POP	4686	15	703	1.10	51
Sablefish	2112	15	317	0.00	0
Shallow water flat	5632	5	282	0.00	0
Slope (other) rock	6469	15	970	2.16	140
Shortraker/Roughey	1638				
Thornyhead rockf	1062	15	159	0.00	0
Total (see notes):	167489		4574		232

## Notes:

Data in round metric tons (mt), from weekly reports through 11/29/92.  
 \*\*\* indicates there is no calculated rate; current standard used.  
 Fishing standard assumes "topping off" for all retained groundfish,  
 and that all rockfish are open to directed fishing (15% bycatch).  
 Total retained catch excludes SR/RE.  
 Total SR/RE bycatch excludes pollock, 90% of Pcod, all but 5,000 mt of  
 WGOA Atka mackerel (assumes "other" apportioned by area in 1993).  
 Other species includes sharks, skates, sculpins, eulachon,  
 capelin, smelt, octopus, squid; Atka mackerel is treated separately.  
 Calculated bycatch rates from NMFS Weekly Processor Reports,  
 during period when SR/RE was not retainable.



## ESTIMATED BYCATCH OF SR/RE IN 1993 GOA TRAWL FISHERIES (TAC = 1,960

II. Based on retained 1992 trawl catch PLUS a 50 % increase in Deep, shallow flats, Flathead sole, Arrowtooth, Pelagic and Slope rockfish

Species Group	1992 Adjusted Retained mt	Directed Fishing Standard %	SR/RE Bycatch mt	Neutral Bycatch Rate %	SR/RE Bycatch mt
Atka mackerel	13298	5	665	0.03	3
Arrowtooth fl *	793	5	40	5.00	40
Demersal rock *	70	15	10	15.00	10
Deep water flats	9487	15	1423	0.00	0
Flathead sole	2463	15	369	0.02	1
Other species *	40	5	2	5.00	2
Pacific cod	48481	5	2424	0.02	7
Pelagic shelf rock	4170	15	626	0.00	0
Pollock	74364	5	3718	0.01	4
POP	4686	15	703	1.10	51
Sablefish	2112	15	317	0.00	0
Shallow water flat	8448	5	422	0.00	0
Slope (other) rock	9703	15	1455	2.16	210
Shortraker/Roughy	1638				
Thornyhead rockf	1062	15	159	0.00	0
Total (see notes):	179177		6019		315

## Notes:

Data in round metric tons (mt), from weekly reports through 11/29/92.  
 \*\*\* indicates there is no calculated rate; current standard used.  
 Fishing standard assumes "topping off" for all retained groundfish,  
 and that all rockfish are open to directed fishing (15% bycatch).  
 Total retained catch excludes SR/RE.  
 Total SR/RE bycatch excludes pollock, 90% of Pcod, all but 5,000 mt of  
 WGOA Atka mackerel (assumes "other" apportioned by area in 1993).  
 Calculated bycatch rates from NMFS Weekly Processor Reports,  
 during period when SR/RE was not retainable.

## ESTIMATED BYCATCH OF SR/RE IN 1993 GOA TRAWL FISHERIES (TAC = 1,960)

## III. Based on total 1992 TACs

Species Group	1992 Total TAC mt	Directed Fishing Standard %	SR/RE Bycatch mt	Neutral Bycatch Rate %	SR/RE Bycatch mt
Atka mackerel	0	5	0	0.03	0
Arrowtooth fl *	25000	5	1250	5.00	1250
Demersal rock *	550	15	83	15.00	83
Deep water flats	19740	15	2961	0.00	0
Flathead sole	10000	15	1500	0.02	2
Other species *	20432	5	1022	5.00	1022
Pacific cod	63500	5	3175	0.02	10
Pelagic shelf rock	6886	15	1033	0.00	0
Pollock	87400	5	4370	0.01	4
POP	5200	15	780	1.10	57
Sablefish	2851	15	428	0.00	0
Shallow water flat	11740	5	587	0.00	0
Slope (other) rock	14060	15	2109	2.16	304
Shorthead/Roughy	1960				
Thornyhead rockf	1798	15	270	0.00	0
<b>Total (see notes):</b>	<b>269157</b>		<b>12589</b>		<b>2718</b>

## Notes:

Data in round metric tons (mt), from weekly reports through 11/29/92.  
 \*\*\* indicates there is no calculated rate; current standard used.  
 Fishing standard assumes "topping off" for all retained groundfish,  
 and that all rockfish are open to directed fishing (15% bycatch).  
 Total retained catch excludes SR/RE.  
 Total SR/RE bycatch excludes pollock, 90% of Pcod, all but 5,000 mt of  
 WGOA Atka mackerel (assumes "other" apportioned by area in 1993).  
 Calculated bycatch rates from NMFS Weekly Processor Reports,  
 during period when SR/RE was not retainable.  
 Atka mackerel includes TAC for "other species".  
 Sablefish TAC is trawl only.  
 "Other species" includes Atka mackerel, and equals 5 % of TACs.



SUMMARY OF 1990, 1991, 1992 ROCKFISH FISHERIES IN THE GULF OF ALASKA (GOA)  
 DATA FROM WEEKLY PRODUCTION REPORTS THROUGH: NOVEMBER 29, 1992  
 DATA IN ROUND METRIC TONS

ROCKFISH SPECIES GROUP				CATCH AS % OF					
SPECIES GROUP	TAC	ABC	TAC	CATCH		REMAINDER	CATCH AS % OF		TAC
				ABC	TAC		ABC	TAC	
PACIFIC OCEAN PERCH	1992	1,720	1,561	2,470	(909)	221	77	85	
		1,620	1,470	1,249	221		77		
		2,390	2,169	2,261	(92)	95	104		*
	1991	1,624	1,624	1,401	223	86	86		*
		1,798	1,798	2,765	(967)	154	154		*
	1990	2,378	2,378	1,971	407	83	83		
SHORTRAKER/ROUGHEYE	1992	1,290	1,290	1,374	(84)	2	98		
		100	100	98	2		98		
	1991	570	570	676	(106)	119	119		*
		100	100	73	27	73	73		*
	1990	4,300	4,300	9,973	(2,273)	130	130		*
		5,700	5,700	5,938	(238)	104	104		*
OTHER (SLOPE)	1992	6,510	6,510	7,185	(675)	110	84		
		1,399	1,390	1,167	223	83	84		
	1991	1,212	1,212	847	365	70	70		*
		5,454	5,454	5,127	327	94	94		*
	1990	4,300	4,300	9,973	(2,273)	130	130		*
		5,700	5,700	5,938	(238)	104	104		*
PELAGIC SHELF	1992	4,393	4,393	2,368	2,025	54	54		
		1,212	1,212	73	1,139	6	6		
	1991	1,281	1,281	976	305	76	76		
		800	800	215	585	27	27		
	1990	1,400	1,400	1,65	1,235	12	12		*
		900	900	936	(36)	104	104		*
UNSPECIFIED	1992	5,800	5,800	955	4,845	16	16		
		1,000	1,000	527	473	53	53		
	1991	3,100	3,100	1,191	1,909	38	38		
		800	800	215	585	27	27		
	1990	1,400	1,400	1,65	1,235	12	12		*
		900	900	936	(36)	104	104		*

0 1

1 4

2 2

3 1

NOTES

EXCEEDED ABC TAC

ABC TAC

ABC TAC

ABC TAC

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ABC TAC

DEMERSAL SHELF										(2), (3)
1992	SEO	550	550	525	25	95	95			
1991	SEO	445	425	395	30	89	93			
1990	SEO	UNKNOWN	470	358	112		76			
								0	0	
THORNYHEAD										(1)
1992	GULF-WIDE	1,798	1,798	1,659	139	92	92			
1991	GULF-WIDE	1,798	1,398	1,085	313	60	78			
1990	GULF-WIDE	3,800	3,800	1,575	2,225	41	41			
								0	0	

ABBREVIATIONS:

ABC = Acceptable Biological Catch  
TAC = Total Allowable Catch  
O.F. = Overfishing  
WG = Western Regulatory Area  
CG = Central Regulatory Area  
EG = Eastern Regulatory Area  
SEO = Southeast Outside District  
GOA = Gulf of Alaska

NOTES:

- (1) UNREPORTED discard of SHORTRAKER, ROUGHEYE, THORNYHEADS in H&L SABLEFISH fishery is excluded.
- (2) DSR ABC is based on catch history. Significant UNREPORTED discard of DSR in H&L HALIBUT fishery is excluded from ABC, TAC, catch.
- (3) ADFG data indicate amount designated as DSR TAC was exceeded in 1992.
- (4) OTHER ROCKFISH includes PACIFIC OCEAN PERCH, SHORTRAKER, ROUGHEYE IN 1990.

05-Dec-92 04:13 PM

NMFS ALASKA REGION, JUNEAU

HISTORY OF 1992 ROCKFISH FISHERIES IN THE GULF OF ALASKA (GOA)  
 DATA FROM WEEKLY PRODUCTION REPORTS THROUGH: NOVEMBER 29, 1992  
 DATA IN ROUND METRIC TONS

ROCKFISH SPECIES GROUP	TAC	OVER- FISHING	CATCH AS % OF			EXCEEDED			NOTES		
			ABC	TAC	CATCH	REMAINDER	O.F.	ABC		TAC	
PACIFIC OCEAN PERCH	WG		1,620	1,470	1,249	221	77	85			
	CG		1,720	1,561	2,470	(909)	144	158	*	*	
	EG		2,390	2,169	2,261	(92)	95	104	*	*	
	TOTAL:	5,730	5,730	5,200	5,980	(780)	104	104	115	*	
SHORTRAKER/ ROUGHEYE	WG		100	100	98	2	98	98			
	CG		1,290	1,290	1,374	(84)	107	107	*	*	
	EG		570	570	676	(106)	119	119	*	*	
	TOTAL:	2,900	1,960	1,960	2,148	(188)	74	110	110		(1)
OTHER SLOPE	WG		1,399	1,390	1,167	223	83	84			
	CG		6,510	6,510	7,201	(691)	111	111	*	*	
	EG		6,160	6,160	784	5,376	13	13			
	TOTAL:	20,710	14,069	14,060	9,152	4,908	44	65	65		
PELAGIC SHELF	WG		1,212	1,212	73	1,139	6	6			
	CG		4,393	4,393	2,384	2,009	54	54			
	EG		1,281	1,281	976	305	76	76			
	TOTAL:	11,360	6,886	6,886	3,433	3,453	30	50	50		
DEMERSAL SHELF	SEO	732	550	550	532	18	73	97	97		(2), (3)
THORNYHEAD	GULF-WIDE	2,440	1,798	1,798	1,660	138	68	92	92		(4)
<hr/>											
1992											
AREA SUMMARY:	WG		4,331	4,172	2,587	1,585	60	62			
	CG		13,913	13,754	13,429	325	97	98			
	EG		10,951	10,730	5,229	5,501	48	49			
GRAND SUMMARY:	GOA		30,993	30,454	22,905	7,549	74	75	1	4	5

## ABBREVIATIONS:

ABC = Acceptable Biological Catch  
 TAC = Total Allowable Catch  
 O.F. = Overfishing  
 WG = Western Regulatory Area  
 CG = Central Regulatory Area  
 EG = Eastern Regulatory Area  
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## NOTES:

- (1) UNREPORTED discard of SHORTRAKER, ROUGHEYE, THORNYHEADS in H&L SABLEFISH fishery is excluded.
- (2) DSR ABC is based on catch history. Significant UNREPORTED discard of DSR in H&L HALIBUT fishery is excluded from ABC, TAC, catch.
- (3) ADFG data indicate amount designated as DSR TAC was exceeded in 1992.
- (4) AREA SUMMARY excludes THORNYHEAD ROCKFISH
- (5) SEO area expanded to include East Yakutat District.

HISTORY OF 1991 ROCKFISH FISHERIES IN THE GULF OF ALASKA (GOA)  
 DATA FROM WEEKLY PRODUCTION REPORTS THROUGH: NOVEMBER 29, 1992  
 DATA IN ROUND METRIC TONS

ROCKFISH SPECIES GROUP	TAC	OVER- FISHING	ABC	TAC	CATCH	REMAINDER	CATCH AS % OF			EXCEEDED			NOTES
							O.F.	ABC	TAC	O.F.	ABC	TAC	
PACIFIC OCEAN PERCH	WG		1,624	1,624	1,401	223		86	86				
	CG		1,798	1,798	2,765	(967)		154	154			*	
	EG		2,378	2,378	1,971	407		83	83				
	TOTAL:	NA	5,800	5,800	6,137	(337)	ERR	106	106				
SHORTRAKER/ ROUGHEYE	WG		100	100	73	27		73	73				(1)
	CG		1,320	1,320	868	452		66	66				
	EG		580	580	410	170		71	71				
	TOTAL:	NA	2,000	2,000	1,351	649	ERR	68	68				
OTHER SLOPE	WG		1,212	1,212	847	365		70	70				
	CG		5,454	5,454	5,127	327		94	94				
	EG		3,434	3,434	532	2,902		15	15				
	TOTAL:	NA	10,100	10,100	6,506	3,594	ERR	64	64				
PELAGIC SHELF	WG		800	800	215	585		27	27				
	CG		3,100	3,100	1,191	1,909		38	38				
	EG		900	900	936	(36)		104	104			*	
	TOTAL:	NA	4,800	4,800	2,342	2,458	ERR	49	49				
DEMERSAL SHELF	SEO	NA	445	425	395	30	ERR	89	93				(2), (3)
THORNYHEAD	GULF-WIDE	NA	1,798	1,398	1,085	313	ERR	60	78				(4)
1991													
AREA SUMMARY:	WG		3,736	3,736	2,536	1,200		68	68				
	CG		11,672	11,672	9,951	1,721		85	85				
	EG		7,737	7,717	4,244	3,473		55	55				
GRAND SUMMARY:	GOA		24,943	24,523	17,816	6,707		71	73	0	0	2	

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 TAC = Total Allowable Catch  
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NMFS ALASKA REGION, JUNEAU

HISTORY OF 1990 ROCKFISH FISHERIES IN THE GULF OF ALASKA (GOA)  
 DATA FROM WEEKLY PRODUCTION REPORTS THROUGH: NOVEMBER 29, 1992  
 DATA IN ROUND METRIC TONS

ROCKFISH SPECIES GROUP	TAC	OVER- FISHING	ABC	TAC	CATCH	REMAINDER	CATCH AS % OF			EXCEEDED			NOTES
							O.F.	ABC	TAC	O.F.	ABC	TAC	
OTHER ROCKFISH	WG		4,300	4,300	5,203	(903)		121	121			*	
	CG		7,700	7,700	9,973	(2,273)		130	130			*	
	EG		5,700	5,700	5,938	(238)		104	104			*	
	TOTAL:	NA	17,700	17,700	21,114	(3,414)		119	119				
PELAGIC SHELF	WG		1,400	1,400	165	1,235		12	12				
	CG		5,800	5,800	955	4,845		16	16				
	EG		1,000	1,000	527	473		53	53				
	TOTAL:	NA	8,200	8,200	1,647	6,553		20	20				
DEMERSAL SHELF	SEO	NA	UNKNOWN	470	358	112			76				(2), (3)
THORNYHEAD	GULF-WIDE	NA	3,800	3,800	1,575	2,225		41	41				(4)
1990													
AREA SUMMARY:	WG		5,700	5,700	5,368	332		94	94				
	CG		13,500	13,500	10,928	2,572		81	81				
	EG		6,700	7,170	6,823	347		102	95				
GRAND SUMMARY:	GOA		29,700	30,170	24,694	5,476		83	82	0	0	3	

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- (3) ADFG data indicate amount designated as DSR TAC was exceeded in 1992.
- (4) AREA SUMMARY excludes THORNYHEAD ROCKFISH
- (5) OTHER ROCKFISH includes PACIFIC OCEAN PERCH, SHORTRAKER, ROUGHEYE.