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DOCUMENT
Ser. No. <u>2465</u>
Rev. No. <u>1</u>

INFORMATION ON ROCKFISH FROM NMFS GROUND FISH SURVEY  
IN THE ALEUTIAN ISLANDS -- SUMMER 1980

by

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September 1981

(Revised November 1981)

This paper may be cited in the following manner:

Ronholt, Lael. Information on Rockfish from NMFS Groundfish Survey in the Aleutian Islands--Summer 1980. (Document submitted to the annual meeting of the International North Pacific Fisheries Commission, Vancouver, Canada, Oct. 1981.) Northwest and Alaska Fisheries Center, Nat'l. Mar. Fish. Serv., NOAA, 2725 Montlake Blvd. E., Sseattle, WA 98112.

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During the summer-fall of 1980 the NMFS, Northwest and Alaska Fisheries Center, in cooperation with the Japanese Fishery Agency, conducted a groundfish survey of the Aleutian Islands from Unimak Pass to Attu Island. The U.S. charter vessels HALF MOON BAY, conducted otter trawl sampling from Agattu Island to Sequam Pass from June 30 to August 20, the OCEAN HARVESTER, from Sequam Pass to Unimak Pass, July 29-August 22, while the Japanese stern trawler HATSUE MARU No. 62 worked throughout the Aleutian chain from July 16-November 14. The results discussed in this report include only the data collected by the U.S. vessels and scientists. The report provides information on the abundance, distribution, and size composition of rockfish from the survey.

The 1980 summer survey was the first NMFS resource assessment groundfish survey conducted in the Aleutian Islands. Therefore, no previous data bases are available to measure changes in the status of the groundfish stocks in the survey area. As the same trawls were used in this survey as in the 1978 and 1979 rockfish survey in the eastern and western Gulf of Alaska, comparisons can be made between the 3 surveys. The Aleutian Islands were divided into sampling units 30 minutes of longitude wide both north and south of the Aleutian chain. Each sampling unit was subdivided into 5 depth intervals giving higher sampling density to the shallower water:

1-100 m	1-54 fms
101-200 m	55-108 fms
201-300 m	109-164 fms
301-500 m	165-273 fms
501-700 m	274-382 fms

One otter trawl station was scheduled for each depth interval in each sampling unit.

Indices of abundance, CPUE's, were computed for all rockfish species by depth intervals and areas by first standardizing all catches to one hour of fishing effort and then summing the individual catches and dividing by the sum of the fishing effort:

$$\text{CPUE}_{ijk} = \frac{W_{ijk} (60 \text{ min})}{T_{ijk}}$$

where CPUE refers to the catch per unit effort in kg/hr for species k for the jth station in the ith area-depth interval. W<sub>ijk</sub> equals the catch and T<sub>ijk</sub> the time trawled (minutes).

Area CPUE's were calculated by weighting each depth interval by the square nautical miles of continental shelf and/or slope it represents:

$$\overline{\text{CPUE}}_{tk} = \frac{\sum_i (\overline{\text{CPUE}}_{ik} \cdot A_i)}{A_t}$$

where A<sub>i</sub> equals the area in the ith depth interval and A<sub>t</sub> equals the area of all depth intervals being combined.

Biomass estimates were calculated by depth intervals within areas following the method described by Alverson and Pereyra (1969):

$$\hat{B}_{ik} = \overline{\text{CPUE}}_{ik} / q_k$$

where B<sub>ik</sub> is the standing stock of available biomass of the kth species in the ith area-depth interval and q<sub>k</sub> is a coefficient of catchability where:

$$q_k = C_k \frac{\bar{a}}{A_i}$$

and C<sub>k</sub> is the coefficient of vulnerability of species k for fish of sufficient size to be retained by the trawl which are within the area "swept" by the trawl. The coefficient of vulnerability consists of two components: (1) C<sub>k</sub>, the vulnerability of those fish that actually come within the influence of the trawl; and (2) C<sub>u</sub>, the proportion of the total fish in the volume of water

above the seabed area swept by the trawl which would come within the trawl's influence. Rockfish specific coefficients of vulnerability are not known for the Gulf of Alaska but have been assumed to be constant and equal to 1.0.

Length frequency data by sex were collected for most rockfish species encountered in abundance. For catches less than 200 individuals, all specimens were measured, while for large catches, a random sample of approximately 200 individuals was measured. Subsamples were then weighted by the total number of that species in the catch and combined with other subsamples or samples to provide a measure of the size-sex composition of a depth interval or area. Age structures were taken for selected rockfish species; however, these data are not ready for presentation at this time.

The survey data has been analyzed by INPFC statistical areas; Aleutian and Shumagin. Because of the extreme geographic length of the Aleutian Islands and differences in species distribution and abundance, the Aleutian INPFC area was divided into western Aleutian, (170° E to 180° longitude) and eastern Aleutian (180° to 170° W longitude)(Figure 1). Only the western portion of the Shumagin area was surveyed.

#### Pacific ocean perch (*Sebastes alutus*)

Pacific ocean perch was the dominant rockfish species in the western Shumagin and Aleutian INPFC statistical areas (Figure 1). Pacific ocean perch were captured in the 101-200 m (55-108 fms), 201-300 m (109-164 fms), and 301-500 m (165-273 fms) depth intervals; however, they were most abundant in the 101-200 and 201-300 m depth intervals (Table 1). Highest abundance occurred in the western Shumagin area, south of the Aleutian chain, where the CPUE averaged 697 kg/hr overall depth intervals sampled. High abundance was also found both north and south of the chain in the eastern Aleutian area. Highest average catch rates in depth intervals of maximum abundance

occurred in the western Shumagin south of the chain in 101-200 m, 1831 kg/hr, north of the chain in the same area in 201-300 m, 618 kg/hr and north and south of the Aleutian Islands in the eastern Aleutian area, in 201-300 m, 645 and 676 kg/hr, respectively.

The estimated available biomass of Pacific ocean perch in the area surveyed totaled 196,324 mt with the largest portion, 55.2% (108,251 mt) being located in the western Shumagin area south of the Aleutian chain (Table 2). The eastern Aleutian area was the only other area containing substantial amounts of the available biomass, 43,547 mt (22.2%) south of the chain and 34,352 mt (17.5%) north.

The size composition of Pacific ocean perch in the Aleutian and western Shumagin areas varied considerably (Tables 3 and 4). In the western Aleutian area north of the chain, all specimens sampled were greater than 35 cm while south of the chain nearly 80% of the specimens were in the 31-35 cm size range (Table 5). Pacific ocean perch in the eastern Aleutian area covered a wider size range than in the western area and north of the chain 66% of the female and 32% of males were greater than 35 cm while south of the chain 84% of the females and 57% of the males were larger than 35 cm. In the western Shumagin area the Pacific ocean perch covered a similar size range, as in the eastern Aleutian area, and north of the chain 42% of the females and 12% of the males were over 35 cm while south of the chain 19% of the females and 17% of the males were over 35 cm.

#### Other rockfish species

Nine species of rockfish other than Pacific ocean perch were captured during the 1980 Aleutian Island survey; however, only four--northern rockfish (Sebastes polyspinus), rougheye rockfish (Sebastes aleutianus), shorttraker rockfish (Sebastes borealis), and thornyhead rockfish (Sebastolobus alascanus)

occurred in any numbers (Tables 6 and 7). Northern rockfish were most abundant in the 101-200 fm depth interval and occurred in highest abundance south of the Aleutian Islands in the eastern (196 kg/hr) and western (95 kg/hr) Aleutian areas and north of the Aleutians in the western Shumagin area (79 kg/hr). Rougheye rockfish occurred in highest abundance in the 301-500 m depth intervals in the western Shumagin (195 kg/hr) and eastern Aleutian (92 kg/hr) areas south of the Aleutians. Shortraker rockfish were also most abundant in the 301-500 m depth interval and occurred in highest abundance in the western Aleutian area averaging 69 kg/hr north and 47 kg/hr south of the Aleutian chain. Thornyhead rockfish was found in highest abundance in the western Shumagin area, south of the chain where the CPUE averaged 108, 163, and 71 kg/hr in the 201-300, 301-500, and 501-700 m depth intervals, respectively.

The available biomass of northern rockfish was estimated at 24,915 mt with the greatest proportion of this biomass being found south of the Aleutian Islands in the eastern Aleutian area (58%) and western Aleutian area (27%). Rougheye rockfish biomass was estimated at 9,446 mt and was primarily found (59%) in the eastern Aleutian area south of the islands. Shortraker rockfish and shortspine thornyheads had estimated biomasses of 6,987 and 6,783 mt, respectively. The largest portion of the shortspine thornyhead biomass (75%) was found in the western Shumagin area south of the island while the biomass of shortraker rockfish were more equally distributed in the eastern and western Aleutian area both north and south of the islands.

Length frequency data for northern, shortraker, and rougheye rockfish are presented in Tables 9-11.

#### DISCUSSION

The 1978-1980 rockfish surveys have provided data on Pacific ocean perch and other rockfish species inhabiting the Gulf of Alaska and Aleutian Islands

and allows comparisons of the relative stock abundance and size composition throughout these areas.

Pacific ocean perch are presently found in highest abundance in the western Shumagin INPFC Statistical area south of the Aleutian Islands where the overall catch rate averaged 688 kg/hr (Table 12). In the depth interval of the principal concentration, 101-200 m, the catch rate averaged 1,831 kg/hr. Pacific ocean perch in this area ranged in size from 17-41 cm with 18% of the stock being over 35 cm (Tables 13-14). The eastern Aleutian and western Shumagin north of the Aleutian Islands had the second highest abundance. Catch rates in the depth interval of highest abundance, 201-300 m, averaged 676 kg/hr south and 646 kg/hr in the eastern Aleutians area and 618 kg/hr in the western Shumagin-north area of the Aleutian Islands. Fifty-three percent of the stock north and 75% of the stock south in the eastern Aleutians area were greater than 35 cm while only 18% were larger on the south side in the western Shumagin area.

Abundance of Pacific ocean perch in the eastern Shumagin, Kodiak, and Chirikof areas were similar, averaging about 100 kg/hr for all depths surveyed; however, in the depth of maximum abundance, 201-300 m, the average catch rates ranged from 210 kg/hr in the eastern Shumagin to 184 kg/hr in the Kodiak, and 145 kg/hr in the Chirikof area. Size composition of the Pacific ocean perch stocks in the eastern Shumagin, Chirikof, and Kodiak areas were quite similar with from 10-15% of the stocks being greater than 35 cm and the majority of the fish 63-77% being 30-35 cm. Pacific ocean perch abundance in the southeastern area was slightly lower averaging 78 kg/hr overall with the catch rate in the depth interval of the principal concentration, 201-300 m, averaging 123 kg/hr. In southeastern, an area where the Pacific ocean perch are of a larger average size than most of the remaining Gulf of Alaska, 30% of the stock was greater than 35 cm.

Lowest abundance was found in the western Aleutian area, both north, 31 kg/hr, and south, 7 kg/hr, of the chain and in the Yakutat area, 4 kg/hr. Catch rates in the depth of maximum abundance were also low, averaging 69 kg/hr, 301-400 m north and 25 kg/hr, 201-300 m south of the chain and 8 kg/hr, 301-400 m, in the Yakutat area. In the western Aleutian area, north of the chain, all individuals measured were greater than 35 cm, while south of the chain only 7% were greater than 35 cm with 78% being from 31-35 cm. In the Yakutat area, nearly 21% of the stock was greater than 35 cm.

Large percentages of smaller fish, less than 25 cm were found in only 2 areas -- the western Shumagin area north of the Aleutians where nearly 29% of the Pacific ocean perch were in the 20-25 cm range and the southeastern area where nearly 34% of the fish were less than 20 cm.

Table 1.--Average catch rate (kg/hr) of Pacific ocean perch by areas and depth intervals in the Aleutian Islands during the 1980 groundfish survey.

Depth (m)	Areas					
	Western Aleutians		Eastern Aleutians		Western Shumagin	
	North	South	North	South	North	South
1-100	0	0	0	0	0	0
101-200	0.1	0.8	13.4	7.0	41.1	1831.3
201-300	23.6	25.4	645.8	676.1	618.2	8.8
301-500	58.9	1.4	187.1	3.1	7.5	0
501-700	<u>2/</u>	<u>2/</u>	0	0	0	0
1-700 <sup>1/</sup>	21.7	7.5	144.0	145.3	72.9	696.7

<sup>1/</sup> Average catch rates for area have been weighted by the square miles of continental shelf or slope they represent.

<sup>2/</sup> No sampling.

Table 2.--Estimated available biomass (mt) and 90% confidence intervals for Pacific ocean perch by depth intervals and areas during the 1980 groundfish survey.

Depth (m)	Areas						Total
	Western Aleutians		Eastern Aleutians		Western Shumagin		
	North	South	North	South	North	South	
1-100	0	0	0	0	0	0	0
101-200	2	57	794	516	885	108,251	110,505
201-300	141	1,580	24,989	42,845	6,290	186	76,031
301-500	872	50	8,569	186	111	0	9,788
501-700	0	0	0	0	0	0	0
1-700	1,015	1,687	34,352	43,547	7,286	108,437	196,324
Upper	3,000	4,061	58,581	117,506	25,489	191,535	305,248
Lower	0	0	10,123	0	0	25,342	87,398

Table 3.--Weighted percentage length frequencies by sex for Pacific ocean perch captured north of the Aleutian chain during the 1980 groundfish survey.

Length(m)	Areas					
	Western Aleutians		Eastern Aleutians		Western Shumagin	
	Male	Female	Male	Female	Male	Female
17			0.1	*		
18				*		
19				*		
20					1.3	0.4
21			0.1		6.3	1.5
22			0.3	0.1	10.8	5.3
23			0.5	0.2	4.4	9.8
24			0.8	0.4	6.1	4.0
25			0.9	0.4	6.8	3.4
26			0.4	0.4	2.3	1.9
27			1.4	0.7	1.9	0.4
28			1.4	1.2	2.6	0.3
29			3.1	0.7	2.2	2.3
30			5.0	1.0	5.7	2.3
31			5.7	2.2	4.8	3.6
32			12.1	4.6	8.7	2.9
33			15.1	6.2	10.5	6.2
34			13.0	5.2	10.0	5.2
35			8.8	10.7	3.1	8.8
36			13.6	14.7	6.1	9.6
37			9.4	15.2	2.8	10.9
38	33.3	5.5	4.7	15.2	2.2	10.9
39	33.3	11.0	2.4	10.3	0.4	6.5
40	16.7	26.6	0.9	6.9	0.4	2.9
41		24.8	0.3	2.7	0.4	0.8
42	16.7	24.8	0.4	0.6		0.3
43		7.3		0.3		
44				0.1		
45				0.2		
TOTAL	100.0	100.0	100.4	100.2	99.8	100.2

\* less than 0.1%

Table 4.--Weighted percentage length frequencies for Pacific ocean perch captured south of the Aleutian chain during the 1980 groundfish survey.

Length (cm)	Areas					
	Western Aleutians		Eastern Aleutians		Western Shumagin	
	Male	Female	Male	Female	Male	Female
17			0.1			0.2
18			0.1	0.1		
19			0.3			
20			0.4	0.1		*
21			1.3	0.8	0.4	0.1
22			1.9	0.5	1.1	1.0
23			1.6	1.2	2.5	1.3
24	2.8		1.2	1.6	3.7	1.5
25	2.8		1.6	3.0	1.9	0.8
26	4.2	2.0	4.0	1.7	0.9	0.3
27	1.4		2.6	2.2	0.3	0.2
28	1.4		8.9	0.1	1.7	0.2
29	1.4		4.0	1.3	1.6	1.5
30	1.4	14.3	6.5	0.6	3.3	1.6
31	13.9	6.1	2.4	0.5	8.3	5.6
32	16.7	18.4	0.7	0.1	10.4	13.1
33	25.0	16.3	2.1	0.4	15.2	14.0
34	18.1	22.5	0.1	0.1	15.6	19.1
35	5.6	12.2	3.6	1.7	15.3	21.4
36	5.6	4.1	8.2	3.3	9.5	12.4
37		2.0	27.3	8.7	6.1	5.0
38		2.0	9.8	22.9	1.4	0.8
39			4.9	22.9	0.2	0.4
40			3.2	20.5		*
41			3.2	4.8	0.2	
42				0.8		
TOTAL	100.3	99.9	100.0	99.9	99.8	100.3

\* less than 0.1%

Table 5.--Size composition (%) by size groups for Pacific ocean perch captured during the 1980 groundfish survey.

	North						South					
	Western Aleutian		Eastern Aleutian		Western Shumagin		Western Aleutian		Eastern Aleutian		Western Shumagin	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
> 35	100.0	100.0	31.7	66.2	12.3	41.9	5.6	8.1	56.6	83.9	17.4	18.6
31-35			54.7	28.9	37.1	26.7	79.3	75.5	8.9	2.8	64.8	73.2
26-30			11.3	4.0	14.7	7.2	9.8	16.3	26.0	5.9	7.8	3.8
≤ 25			2.6	1.1	35.7	24.4	5.6		8.5	7.3	9.8	4.7
TOTAL			100.3	100.2	99.8	100.2	100.3	99.9	100.0	99.9	99.8	100.3

Table 6.--Average CPUE in kg/hr of rockfish species other than Pacific ocean perch by areas and depth intervals during the 1980 Aleutian Island groundfish survey.

Species	INPFC AREAS (NORTH)																	
	Western Aleutian						Eastern Aleutian						Western Shumagin					
	Depth (m)						Depth (m)						Depth (m)					
1- 100	101- 200	201- 300	301- 500	501- 700	1- 700	1- 100	101- 200	201- 300	301- 500	501- 700	1- 700	1- 100	101- 200	201- 300	301- 500	501- 700	1- 700	
<u>Sebastes</u> <u>alascanus</u>	0	0	0	1.3	<u>1/</u>	0.4	1.3	0.1	0.4	3.8	0	1.1	0	0	2.4	0.9	38.6	5.7
<u>Sebastes</u> <u>aleutianus</u>	0	0	29.1	8.3	<u>1/</u>	6.4	0	0	2.8	6.9	0	1.8	0	0	0.6	0.3	0	0.1
<u>Sebastes</u> <u>borealis</u>	0	0	12.8	69.4	<u>1/</u>	23.6	0	1.0	3.9	35.2	0	7.6	1.3	0	0	0	0	0.5
<u>Sebastes</u> <u>polyspinus</u>	0	0	0	0	<u>1/</u>	0	0.2	0.9	9.7	0	0	1.8	0	79.1	0.6	0	0	17.1
<u>Sebastes</u> <u>ciliatus</u>	0	0	0	0	<u>1/</u>	0	0	0.2	0.2	0	0	0.1	0	3.0	0	0	0	0.7
<u>Sebastes</u> <u>zacentrus</u>	0	0	0	0	<u>1/</u>	0	0	<u>2/</u>	0	0	0	<u>2/</u>	0	0	0	0	0	0

1/ no sampling2/ less than 0.1 kg/hr

2:4.12.7

Table 7.--Average CPUE in kg/hr of rockfish species other than Pacific ocean perch by areas and depth intervals during the 1980 Aleutian Island groundfish survey.

Species	INPFC AREAS (SOUTH)																	
	Western Aleutian						Eastern Aleutian						Western Shumagin					
	1-100		101-200		Depth (m) 201-300 301-500 501-700		1-100		101-200		Depth (m) 201-300 301-500 501-700		1-100		101-200		Depth (m) 201-300 301-500 501-700	
<u>Sebastes alascanus</u>	0	0	3.9	12.7	<u>1/</u>	3.2	0	0	0.5	2.4	0	0.6	0	0.1	107.6	162.6	70.5	29.1
<u>Sebastes aleutianus</u>	0	0.3	0.8	18.2	<u>1/</u>	3.3	0	0	2.2	92.2	0	18.7	0	0	17.5	195.1	0	15.3
<u>Sebastes borealis</u>	0	0.7	0	47.1	<u>1/</u>	7.8	0	0	3.8	29.5	0	6.6	0	0	0	0	7.3	0.4
<u>Sebastes polyspinus</u>	0	94.6	0.1	0.1	<u>1/</u>	30.6	0	195.5	0.6	0	0	48.3	0.1	24.5	0	0	0	9.4
<u>Sebastes cramerii</u>	0	0	0	0	<u>1/</u>	0	0	0.1	0	0	0	<u>2/</u>	0	0	0	0	0	0
<u>Sebastes altivelis</u>	0	0	0	0	<u>1/</u>	0	0	0	0	<u>2/</u>	0	<u>2/</u>	0	0	0	0	0	0
<u>Sebastes ciliatus</u>	0	0	0	0	<u>1/</u>	0	0	0	0	<u>2/</u>	0	0	0.2	8.9	0	0	0	3.5
<u>Sebastes ruberrimus</u>	0	0	0	0	<u>1/</u>	0	0	0	0	0	0	0	0	4.3	0	0	0	0.7

1/ no sampling2/ less than 0.1 kg/hr

Table 8.--Estimated available biomass (mt) of rockfish species other than Pacific ocean perch by depth intervals and areas during the 1980 groundfish survey.

Depth (m)	Species	Areas						Total
		Western Aleutians		Eastern Aleutians		Western Shumagin		
		North	South	North	South	North	South	
1-100	Rougheye	0	0	0	0	0	0	0
	Shortraker	0	0	0	0	52	0	52
	Northern	0	0	10	0	0	6	16
	Shortspine thornyhead	0	22	62	0	0	0	84
101-200	Rougheye	0	18	0	0	0	0	18
	Shortraker	0	48	60	0	0	0	108
	Northern	0	6,824	50	14,432	1,706	1,451	24,463
	Shortspine thornyhead	0	0	3	0	0	5	8
201-300	Rougheye	174	50	108	143	6	370	851
	Shortraker	77	0	151	244	0	0	472
	Northern	0	8	376	40	6	0	430
	Shortspine thornyhead	0	243	15	30	24	2,456	2,768
301-500	Rougheye	122	660	317	5,464	4	2,010	8,577
	Shortraker	1,027	1,702	1,613	1,750	0	0	6,092
	Northern	0	4	0	2	0	0	6
	Shortspine thornyhead	42	460	177	140	13	2,158	2,990
501-700	Rougheye	0	0	0	0	0	0	0
	Shortraker	0	0	0	0	0	59	59
	Northern	0	0	0	0	0	0	0
	Shortspine thornyhead	0	0	0	0	536	601	1,137
1-700	Rougheye	296	728	425	5,607	10	2,380	9,446
	Shortraker	1,104	1,750	1,824	1,994	52	59	6,783
	Northern	0	6,836	436	14,474	1,712	1,457	24,915
	Shortspine thornyhead	42	725	257	170	573	5,220	6,987

Table 9.--Weighted length frequencies by sex (%) for northern rockfish captured in the Aleutian Islands during the 1980 groundfish survey.

Length (cm)	AREAS									
	Western Aleutian South		Eastern Aleutian North		Eastern Aleutian South		Western Shumagin North		Western Shumagin South	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
21							5.0	1.3		
22							7.5	2.5		
23							5.0	1.3		
24							12.5	3.8	3.8	1.6
25							5.0	3.8	1.3	3.3
26							7.5	6.3	6.5	1.6
27	3.2	1.5				0.9	10.0	11.3	6.7	8.7
28	5.3	6.2					10.0	11.3	11.5	6.0
29	12.8	9.4				0.9	15.0	17.5	11.9	11.9
30	22.3	10.2			6.5	1.7	7.5	16.3	8.3	3.3
31	24.4	14.4			5.6	10.3	12.5	10.0	9.6	12.4
32	21.2	16.5	16.7		12.0	6.9		8.8	11.1	10.8
33	6.6	8.3		3.1	13.9	6.0	2.5	1.3	9.6	9.5
34	0.5	13.1	16.7	12.5	13.9	11.2		5.0	7.3	1.6
35	1.3	13.3	16.7	15.6	9.3	10.3			1.3	1.6
36		3.5	50.0	12.5	13.9	10.3			2.5	7.9
37		1.7	9.4	15.6	11.1	13.8			5.3	8.5
38		1.1		15.6	8.3	9.5				3.3
39	0.2			9.4	4.6	8.6				5.2
40		0.8		6.3	0.9	5.2				
41						4.3				
42				6.3					1.3	
43				3.1					2.1	2.7
TOTAL	99.9	100.0	100.1	100.0	100.0	99.9	100.0	100.5	100.1	99.9

Table 10.--Weighted length frequencies by sex (%) for rougeye rockfish captured in the Aleutian Islands during the 1980 groundfish survey.

Length (cm)	AREAS			
	Eastern Aleutian South		Western Shumagin South	
	Male	Female	Male	Female
23		0.8		
24				
25				
26				
27		0.8		
28				
29				
30				
31	0.7	0.8		
32		1.5		
33				
34	4.4	1.5		2.1
35	1.5	0.8		2.1
36	0.7	3.0	0.8	
37	1.5	1.5		
38	0.7	4.5	4.9	2.1
39	5.8	6.0	4.3	3.0
40	5.1	7.5	3.0	1.5
41	10.2	6.7	1.5	6.1
42	9.5	14.2	3.8	4.6
43	13.9	10.5	7.4	4.6
44	11.0	7.5	6.8	6.9
45	5.8	6.7	8.3	9.1
46	9.5	6.7	6.1	8.9
47	3.7	1.5	6.8	7.6
48	3.7	6.0	8.3	9.1
49	3.7	4.5	7.6	10.5
50	2.9	3.7	3.0	1.5
51	2.2	0.8	2.3	6.1
52	0.7	1.5	5.1	3.8
53			3.8	1.5
54			3.8	2.3
55	2.2		2.3	2.3
56		0.8	1.5	0.8
57			3.6	0.8
58			2.1	
59	0.7		2.1	
60				
61		0.8		0.8
62				
63				2.1
64				
65				
66				
67				
68				
69				
70			0.8	
TOTAL	100.1	100.6	100.0	100.2

Table 11.--Weighted length frequencies by sex (%) for shorttraker rockfish captured in the Aleutian Islands during the 1980 groundfish survey.

Length (cm)	AREAS							
	Western Aleutian North		Western Aleutian South		Eastern Aleutian North		Eastern Aleutian South	
	Male	Female	Male	Female	Male	Female	Male	Female
33								6.3
34								
35			5.9					
36				2.9			11.1	
37			17.6	2.9			11.1	3.1
38				2.9			5.6	6.3
39			5.9	11.8				9.4
40							5.6	3.1
41			11.8	5.9		12.5	22.2	6.3
42				8.8				9.4
43			11.8	14.7			5.6	9.4
44								12.5
45		5.0	11.8	2.9		12.5	5.6	3.1
46					11.1		11.1	6.3
47	4.8		5.9	5.9				
48	9.5	5.0		5.9		12.5	11.1	3.1
49	4.8		5.9			12.5		
50	9.5			5.9			5.6	6.3
51	9.5	10.0		2.9	11.1	12.5		
52	9.5	5.0		2.9		12.5		
53	4.8	20.0	5.9	5.9	11.1			6.3
54	9.5							
55		10.0			11.1			
56		5.0			11.1		5.6	
57	14.3	5.0	5.9	2.9	11.1			
58	9.5			5.9	33.3	12.5		6.3
59	9.5	5.0						
60		10.0						
61		5.0	5.9					
62	4.8					12.5		
63				2.9				
64		5.0		2.9				
65			5.9					3.1
66								
67		5.0						
68								
69								
70				2.9				
71		5.0						
TOTAL	100.0	100.0	100.2	99.7	99.9	100.0	100.2	100.3

Table 12.--Average CPUE (kg/hr) for Pacific ocean perch by INPFC areas from the 1978-1980 Gulf of Alaska and Aleutian Island surveys.

Depth (m)	Western Aleutian North	Western Aleutian South	Eastern Aleutian North	Eastern Aleutian South	Western Shumagin North	Western Shumagin South	Eastern Shumagin	Chirikof	Kodiak	Yakutat	South-eastern
1-100	0	0	0	0	0	0	0	<u>1/</u>	<u>1/</u>	0	0
101-200	<u>2/</u>	1	13	7	41	1,831	42	40	18	4	42
201-300	24	25	646	676	618	9	210	145	184	2	123
301-400	69	2	262	6	11	0	<u>1/</u>	2	2	8	60
401-500	21	1	0	0	0	0	<u>1/</u>	<u>1/</u>	0	0	2
1-500 <sup>3/</sup>	31	7	228	195	105	688	131	98	115	4	78

1/ no sampling

2/ less than 1 kg/hr

3/ area CPUE's have not been weighted

Table 13.--Weighted percentage length frequencies (sexes combined) for Pacific ocean perch captured during the 1978-1980 rockfish surveys in the Gulf of Alaska and Aleutian Islands.

Length (cm)	Western Aleutian North	Western Aleutian South	Eastern Aleutian North	Eastern Aleutian South	Western Shumagin North	Western Shumagin South	Eastern Shumagin	Chirikof	Kodiak	Yakutat	South- eastern
14											0.61
15										0.42	4.40
16										0.42	10.82
17			0.06	0.02		0.11		0.02		0.42	12.10
18			0.02	0.07				0.06			5.01
19			0.02	0.11				0.30			0.43
20				0.18	0.71	0.02		0.80	0.06		0.18
21			0.05	0.95	3.31	0.21		0.56	0.01	0.42	
22			0.12	0.92	7.32	1.05	0.05	0.51		0.42	0.61
23			0.28	1.34	7.79	1.87	0.12	0.69	0.04	0.84	0.18
24		1.65	0.53	1.45	4.81	2.54	0.43	0.86	0.18	2.09	0.03
25		1.65	0.56	2.57	4.65	1.34	1.11	1.54	0.40	0.84	
26		3.31	0.42	2.47	2.05	0.56	1.29	1.83	0.73	1.67	0.06
27		0.83	0.92	2.31	0.96	0.24	1.24	1.33	0.55	1.67	0.52
28		0.83	1.23	3.29	1.14	0.86	1.23	1.59	2.67	1.67	0.49
29		0.83	1.58	2.22	2.28	1.54	1.14	1.95	3.20	1.67	1.71
30		6.61	2.49	2.53	3.58	2.41	1.98	4.65	4.60	3.77	2.41
31		10.74	3.50	1.11	4.07	6.85	5.67	8.66	10.71	8.37	2.93
32		17.36	7.40	0.32	5.04	11.82	13.43	16.48	19.33	12.13	4.89
33		21.49	9.53	0.97	7.81	14.54	24.51	20.14	19.52	17.57	5.93
34		19.84	8.10	0.11	7.00	17.48	23.06	14.35	17.44	16.74	9.17
35		8.26	10.02	2.28	6.67	18.53	12.03	9.33	10.69	8.37	7.34
36		4.96	14.27	4.87	8.30	11.01	4.74	4.65	4.33	5.86	6.78
37		0.83	13.01	14.83	7.88	5.50	2.26	2.56	2.11	4.60	5.29
38	6.96	0.83	11.29	18.57	7.65	1.04	1.88	2.52	1.55	2.51	3.85
39	12.17		7.33	16.99	4.23	0.32	1.50	2.38	0.92	2.51	3.70
40	26.09		4.65	14.78	1.95	0.02	1.27	1.15	0.67	2.51	3.03
41	23.48		1.79	4.25	0.65	0.11	0.59	0.85	0.25	1.26	2.51
42	24.35		0.51	0.53	0.16		0.26	0.23	0.01	0.84	2.05
43	6.96		0.16				0.11		0.01	0.42	0.92
44			0.07				0.11				0.64
45			0.11								0.52
46											0.34
47											0.15
48											0.24
49											0.06
50											0.06
51											0.03
TOTAL	100.01	100.02	100.02	100.04	100.0	99.97	100.01	99.99	99.98	100.01	99.99

Table 14.--Size composition (%) by size groups for Pacific ocean perch, sexes combined, in the Aleutian Islands and Gulf of Alaska.

	Western Aleutian North	Western Aleutian South	Eastern Aleutian North	Eastern Aleutian South	Western Shumagin North	Western Shumagin South	Eastern Shumagin	Chirikof	Kodiak	Yakutat	South- eastern
> 35	100.00	6.62	53.19	74.82	30.82	18.00	12.72	14.34	9.85	20.51	30.17
31-35		77.69	38.55	4.79	30.59	69.22	78.70	68.96	77.69	63.18	30.26
26-30		12.41	6.64	12.82	10.01	5.61	6.88	11.35	11.75	10.45	5.19
< 25		<u>3.30</u>	<u>1.64</u>	<u>7.61</u>	<u>28.59</u>	<u>7.14</u>	<u>1.71</u>	<u>5.34</u>	<u>0.69</u>	<u>5.87</u>	<u>34.37</u>
TOTAL	100.00	100.02	100.02	99.97	100.00	99.97	100.01	99.99	99.98	100.01	99.99