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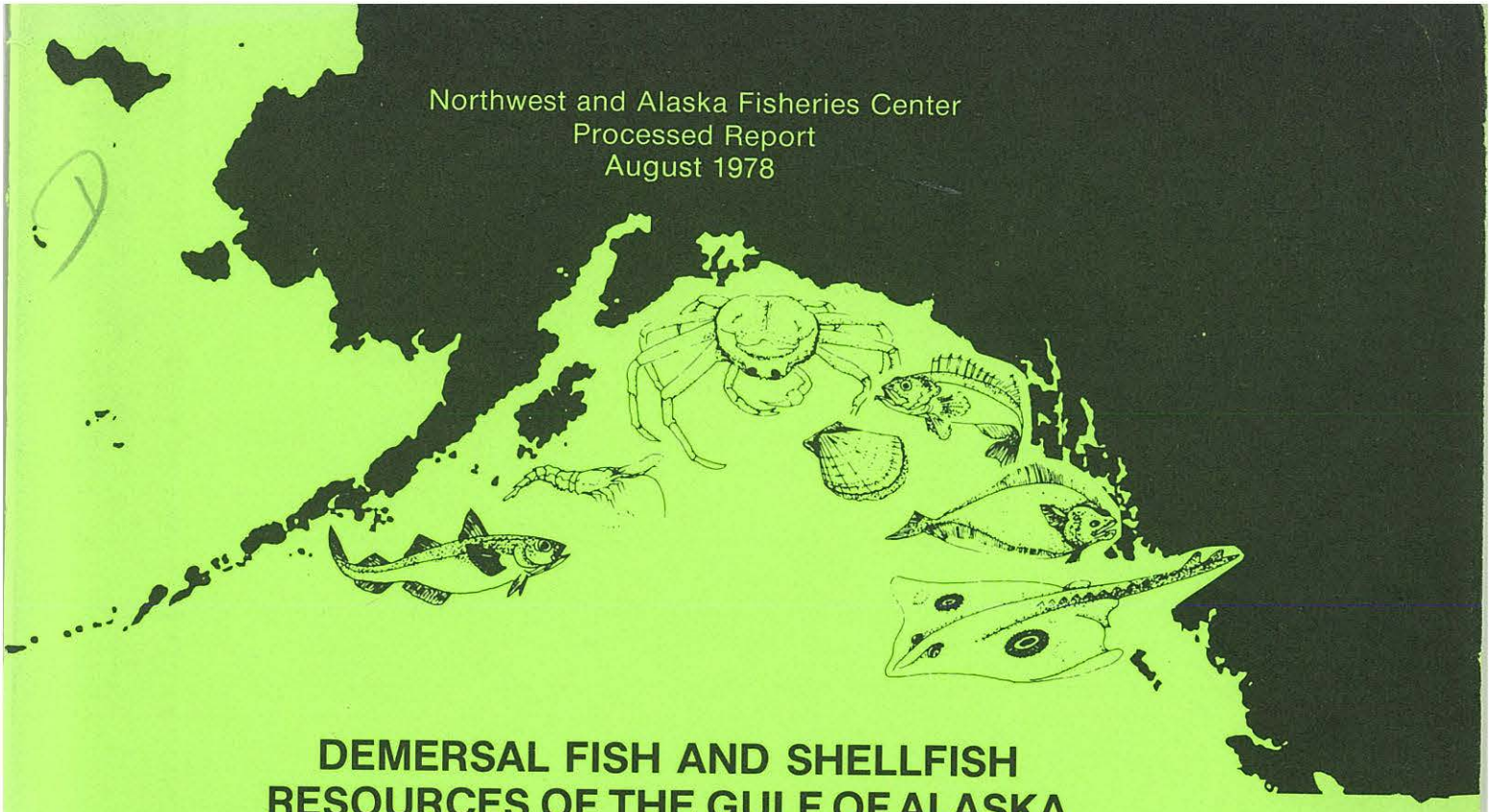

DEMERSAL FISH AND SHELLFISH RESOURCES OF THE GULF OF ALASKA FROM CAPE SPENCER TO UNIMAK PASS 1948 — 1976

(A Historical Review)

by
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Cruise 628, Chartered Fishing Vessels, Arthur H., St. Michael and Western Flyer (June-August 1962)

During the 1962 resource assessment survey 232 stations were successfully sampled in the eastern Gulf of Alaska (Table XI-53). Sampling densities were generally high throughout the survey area ranging from one station per 256 km^2 in the Prince William region to one station per 628 km^2 in the Fairweather region. Highest densities by depth zones occurred in the outer shelf and upper slope and averaged one station per 391 km^2 over the entire survey area. Station numbers and positions for all successful tows are presented in Figures XI-301-302. Fish and commercially important invertebrate species taken during the survey are listed in Table V-3-4. Random length frequencies were taken for several fish species in the Kenai outer shelf and upper slope but data were insufficient to construct population size-sex composition over the entire survey area.

TOTAL BIOMASS

The total apparent biomass between June and August of the survey period has been estimated at 607 thousand mt, of which 52% occurred in the outer shelf, 25% in the inner shelf and 23% in the upper slope (Table XI-54 and Figure XI-303). The combined Fairweather and Kenai regions accounted for 63% of the total biomass, while Prince William (21%) and Yakutat (16%) accounted for the remainder.

The Fairweather region had the highest biomass density (11.6 mt/km^2) with values in the remaining regions ranging from 4.9 to 6.5 mt/km^2. By depth zones, the highest biomass density occurred in the upper slope followed by the inner and outer shelf and averaged 6.7 mt/km^2 over the entire survey area. The total catch encountered at each successful sampling station is plotted in Figure XI-304.

RELATIVE IMPORTANCE OF SPECIES GROUPS

The proportion the combined fishes contributed to the total biomass was highest in the upper slope depth zone (94%), lowest in the inner shelf (82%), and averaged 89% over all depths. By species groups, the flatfishes represented the greatest portion of the total biomass (61%) followed in rank order by the roundfishes (12%), invertebrates and rockfish (11%) and elasmobranchs (5%) (Table XI-55).

Of the total estimated flatfish biomass of 368 thousand mt, the outer shelf depth zone contained the largest portion (49%) followed by the inner shelf (27%) and upper slope (24%) (Table XI-56). Sixty-seven percent of the flatfish biomass was concentrated in the Fairweather and Kenai regions with Prince William and Yakutat accounting for the remainder. The mean CPUE for the flatfish group over the entire survey area was 242 kg/hr. By depth zones the highest mean catch rate occurred in the upper slope followed by the inner and outer shelf. The Fairweather region had the

Table XI-53.--Number of stations successfully trawled and sampling densities[1/] by regions and depth zones in the Gulf of Alaska during June-August 1962 (Cruise 628).

Region	DEPTH ZONES (M) 0 - 100			101 - 200			201 - 400			0 - 400		
	No. of stations	Area (km^2)	Sampling density	No. of stations	Area (km^2)	Sampling density	No. of stations	Area (km^2)	Sampling density	No. of stations	Area (km^2)	Sampling density
Fairweather	2	2,566	1,283	21	11,617	553	3	2,144	715	26	16,327	628
Yakutat	5	4,418	884	24	10,430	435	6	4,894	816	35	19,742	564
Prince William	15	7,885	526	48	8,990	187	13	2,600	200	76	19,475	256
Kenai	3	6,239	2,080	61	20,829	341	31	8,139	263	95	35,207	371
Total	25	21,108	844	154	51,866	337	53	17,777	335	232	90,751	391

[1/] Sampling density = $\frac{\text{No. of } km^2}{\text{No. of stations}}$

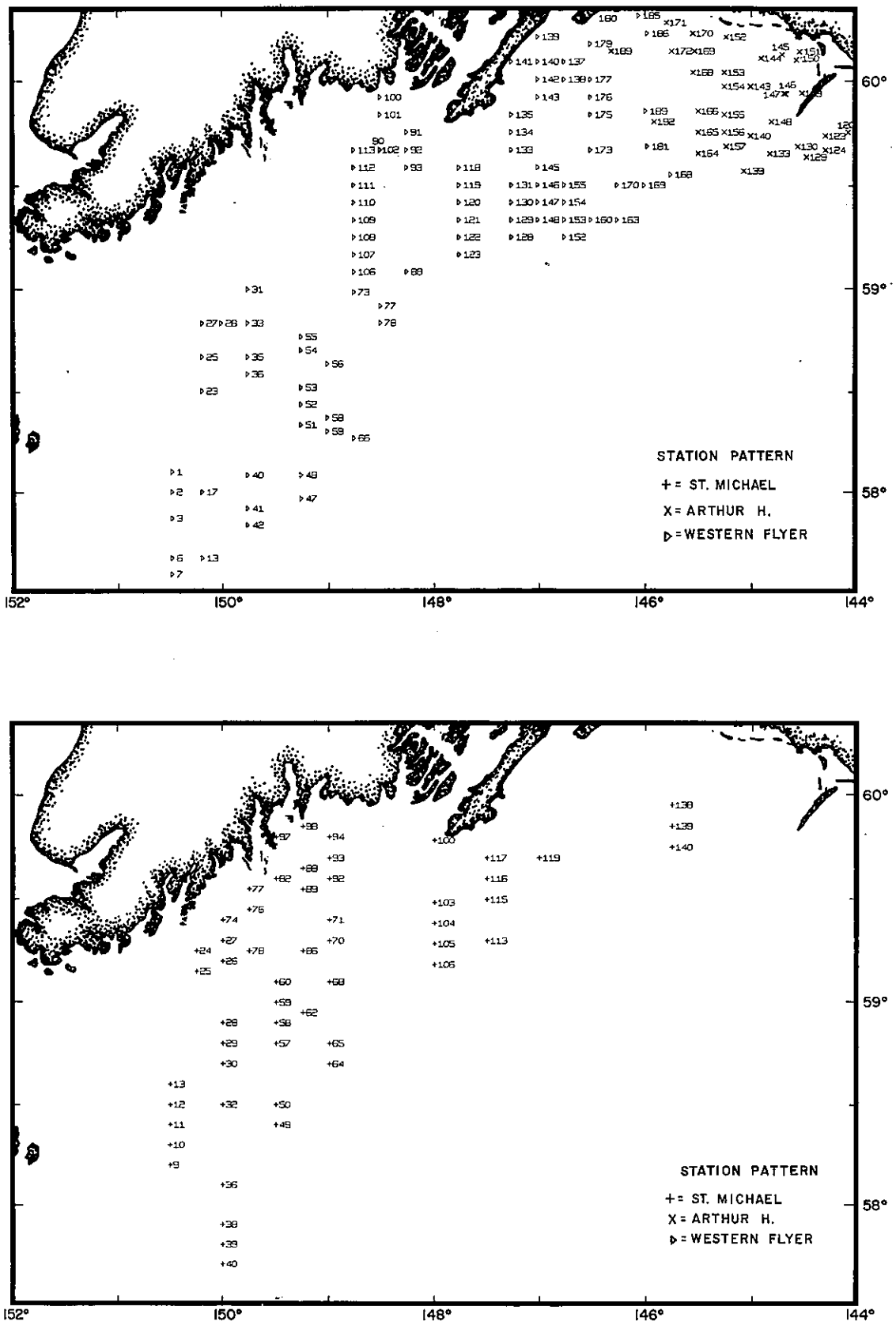


Figure XI-301.--Stations successfully trawled (otter trawl) during Cruise 628, June-Aug. 1962.

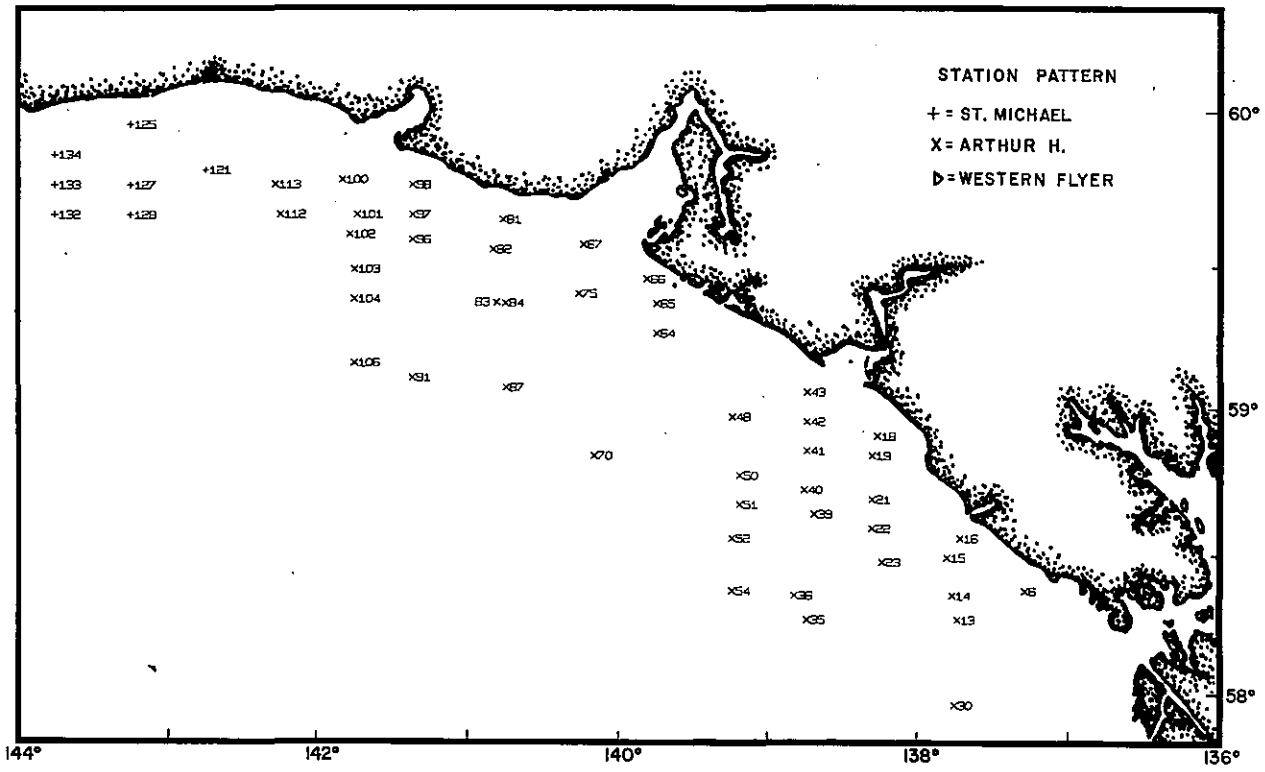


Figure XI-302.--Stations successfully trawled (otter trawl) during Cruise 628, June-Aug. 1962.

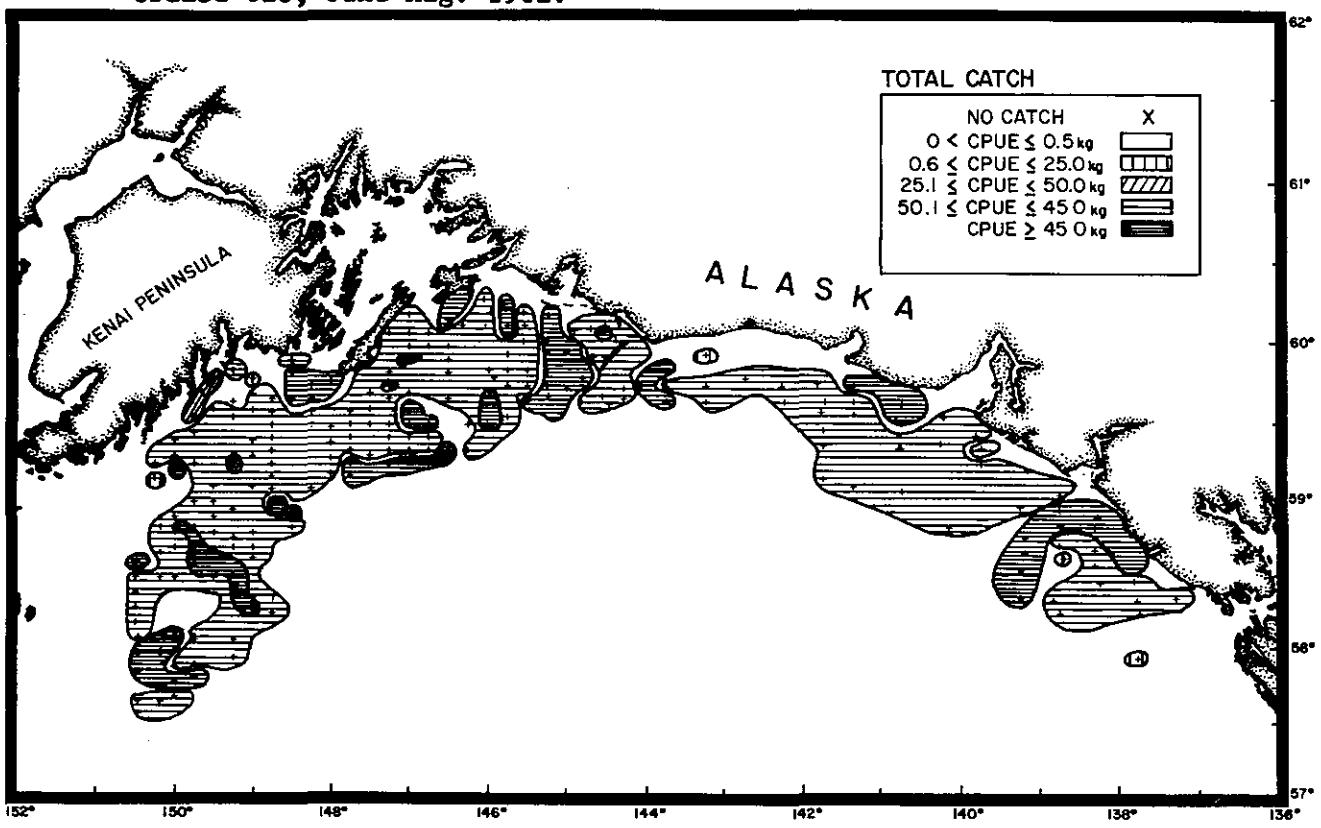
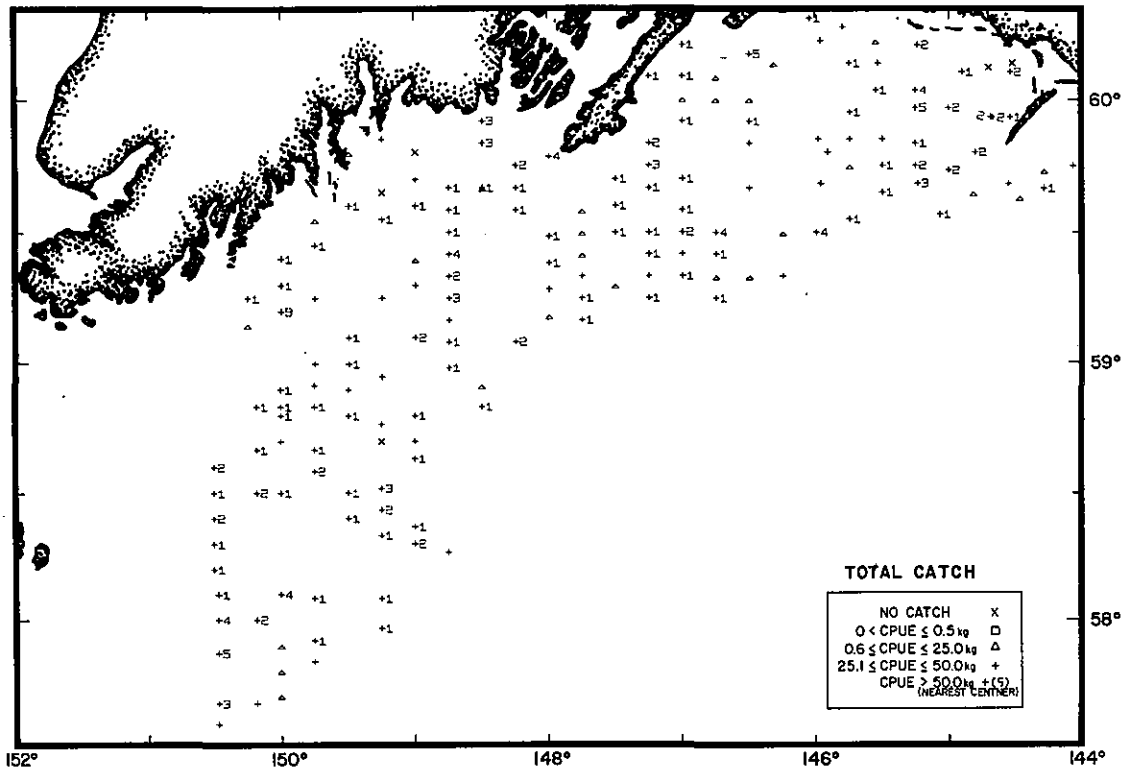
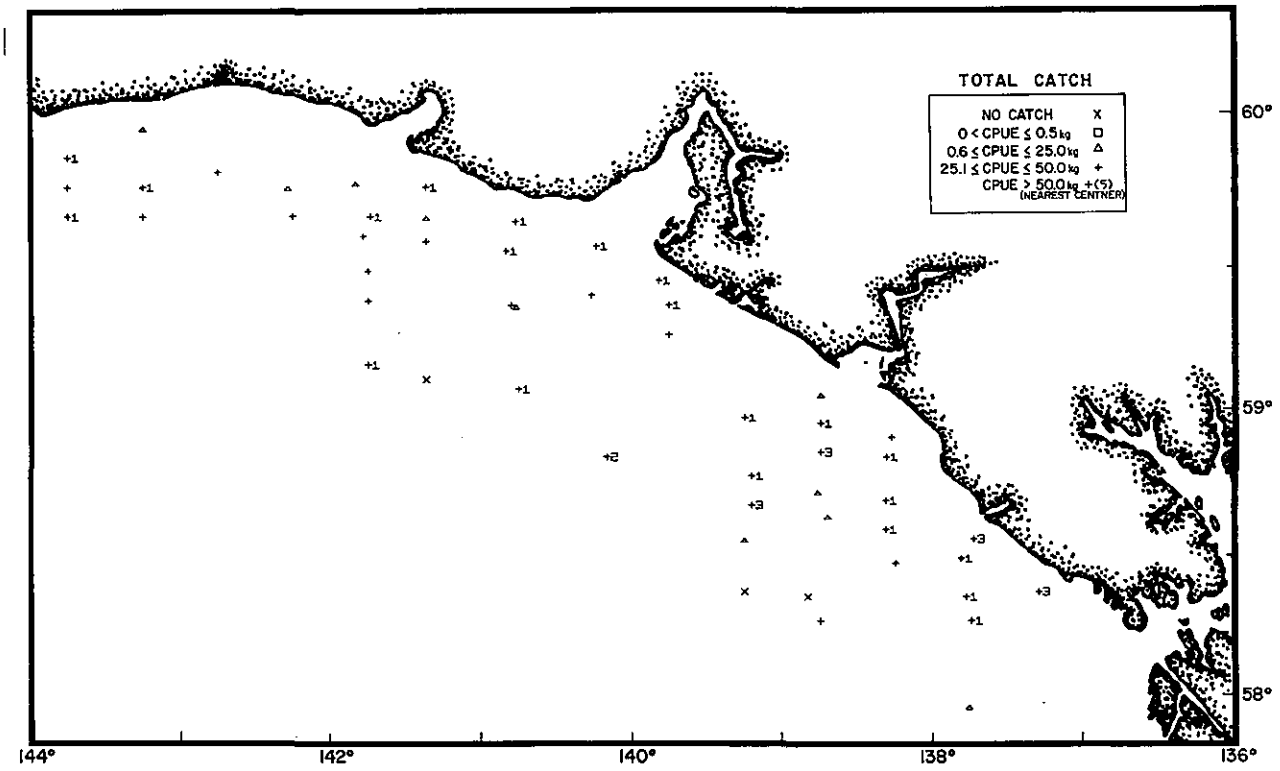


Figure XI-303.--Distribution of apparent relative abundance of all species combined in the eastern Gulf of Alaska, June-Aug. 1962 (Cruise 628).

Table XI-54.--Estimated biomass in metric tons for all species combined during the June-August 1962 resource assessment survey in the Gulf of Alaska (Cruise 628).

Regions	DEPTH ZONES (M) 0-100	101-200	201-400	0-400
Fairweather				
mt x 10^3	66.6	66.8	55.8	189.2
mt/km^2	25.9	5.7	26.0	11.6
% biomass in depth zone	44.8	21.0	39.8	31.2
% regional biomass	35.2	35.3	29.5	100.0
Yakutat				
mt x 10^3	19.7	55.2	22.5	97.4
mt/km^2	4.5	5.3	4.6	4.9
% biomass in depth zone	13.3	17.3	16.1	16.0
% regional biomass	20.2	56.7	23.1	100.0
Prince William				
mt x 10^3	35.5	74.6	16.9	127.0
mt/km^2	4.5	8.3	6.5	6.5
% biomass in depth zone	23.9	23.4	12.1	20.9
% regional biomass	28.0	58.7	13.3	100.0
Kenai				
mt x 10^3	26.8	121.6	44.8	193.2
mt/km^2	4.8	5.8	5.5	5.5
% biomass in depth zone	18.0	38.2	32.0	31.9
% regional biomass	13.9	62.9	23.2	100.0
Total				
mt x 10^3	148.6	318.2	140.0	606.8
mt / km^2	7.0	6.1	7.9	6.7
% biomass in depth zone	100.0	99.9	100.0	100.0
% total biomass	24.5	52.4	23.1	100.0





Figures XI-304.--Distribution of standardized catch rates in kg/hr of all species combined in the eastern Gulf of Alaska, June-Aug. 1962 (Cruise 628).

Table XI-55.--Relative importance of species groups based on the rank order of their total biomass (Cruise 628).

Species Groups	DEPTH ZONES (M) 0-100	101-200	201-400	0-400
Flatfish				
mt x 10^3	101.1	178.9	87.7	367.7
mt/km^2	4.8	3.4	4.9	4.1
% biomass in depth zone	68.0	56.3	62.6	60.6
% flatfish biomass	27.5	48.7	23.8	100.0
Roundfish				
mt x 10^3	15.9	46.3	11.9	74.1
mt/km^2	0.8	0.9	0.7	0.8
% biomass in depth zone	10.7	14.6	8.5	12.2
% roundfish biomass	21.5	62.5	16.0	100.0
Invertebrates				
mt x 10^3	27.2	33.8	8.1	69.1
mt/km^2	1.3	0.7	0.5	0.8
% biomass in depth zone	18.3	10.6	5.8	11.4
% invertebrate biomass	39.4	48.9	11.7	100.0
Rockfish				
mt x 10^3	0.2	41.7	25.0	66.9
mt/km^2	1/	0.8	1.4	0.7
% biomass in depth zone	0.1	13.1	17.8	11.0
% rockfish biomass	0.3	62.3	37.4	100.0
Elasmobranchs				
mt x 10^3	4.3	17.3	7.4	29.0
mt/km^2	0.2	0.3	0.4	0.3
% biomass in depth zone	2.9	5.4	5.3	4.8
% elasmobranch biomass	14.8	59.7	25.5	100.0
Total				
mt x 10^3	148.7	318.0	140.1	606.8
mt/km^2	7.1	6.1	7.9	6.7
% biomass in depth zone	100.0	100.0	100.0	100.0
% total biomass	24.5	52.4	23.1	100.0

1/ Less than 0.1 mt/km^2.

Table XI-56.--Estimated biomass and population size of flatfishes in the Gulf of Alaska during June-August 1962.

Region	Depth zone (m)	CPUE[1] (kg/hr)	Estimated biomass (mt)	Proportion of total estimated biomass	Estimated population (X 10^6)	Proportion of total estimated population	Mean size per individual[2] Weight (kg)	Length (cm)
Fairweather	1-100	1254.8	53,828.2	36.7	81.0	33.3	0.66	--
	101-200	259.1	50,329.4	34.4	94.7	39.0	0.53	--
	201-400	1183.2	42,409.8	28.9	67.4	27.7	0.63	--
	All zones	537.0	146,567.4	39.9	243.1	28.9	0.60	--
Yakutat	1-100	157.2	11,611.0	23.3	29.7	24.7	0.40	--
	101-200	153.3	26,737.5	53.7	68.9	57.2	0.39	--
	201-400	139.8	11,442.6	23.0	21.8	18.1	0.52	--
	All zones	150.8	49,791.1	13.5	120.4	14.3	0.41	--
Prince William	1-100	147.4	19,433,3	27.4	45.9	28.8	0.42	--
	101-200	284.9	42,824.8	60.4	96.7	60.7	0.44	--
	201-400	198.7	8,639.5	12.2	16.7	10.5	0.52	--
	All zones	217.7	70,897.6	19.3	159.3	19.0	0.45	--
Kenai	1-100	155.3	16,201.4	16.1	63.0	19.9	0.46	--
	101-200	169.5	59,024.0	58.8	201.5	63.5	0.30	--
	201-400	184.9	25,169.8	25.1	52.5	16.6	0.48	--
	All zones	170.5	100,395.2	27.3	317.0	37.8	0.32	--
Total	1-100	286.5	101,073.9	27.5	219.6	26.2	0.46	--
	101-200	206.3	178,915.7	48.7	461.8	55.0	0.39	--
	201-400	294.9	87,661.7	23.8	158.4	18.8	0.55	--
	All zones	242.3	367,651.3	100.0	839.8	100.0	0.44	--

1/ Mean catch per unit effort, in kilograms per hour trawled.
2/ Where data are available.
3/ Less than 0.1 kg/hr.
4/ Less than 0.1 X 10^6 individuals.
5/ Less than 0.1 percent.

highest apparent relative abundance with particularly high mean CPUE's occurring in the inner shelf and upper slope depth zones of this region (Figure XI-305). Mean CPUE's decreased to slightly below the survey average in the Prince William region and declined further in Kenai and Yakutat. The distribution of the standardized catch rates for the flatfish group is plotted in Figure XI-306 for all stations successfully sampled.

The roundfish group had the second highest estimated biomass of 74 thousand mt. Sixty-four percent of this biomass was concentrated in the Kenai region while contributions generally declined to the east with Yakutat accounting for the smallest portion (8%) (Table XI-57). The outer shelf depth zone contained nearly 63% of the roundfish biomass while the inner shelf and upper slope contained 21% and 16% respectively. Mean catch rates for the roundfish group did not vary significantly with depth. The outer shelf depth zone was highest followed by the inner shelf and upper slope. The Kenai region had the highest relative apparent abundance where particulary high CPUE's occurred in the inner and outer shelf (Figure XI-307). The remaining regions had mean catch rates which fell below the survey average. The distribution of the standardized catch rates for this group is plotted for all successful stations in Figure XI-308.

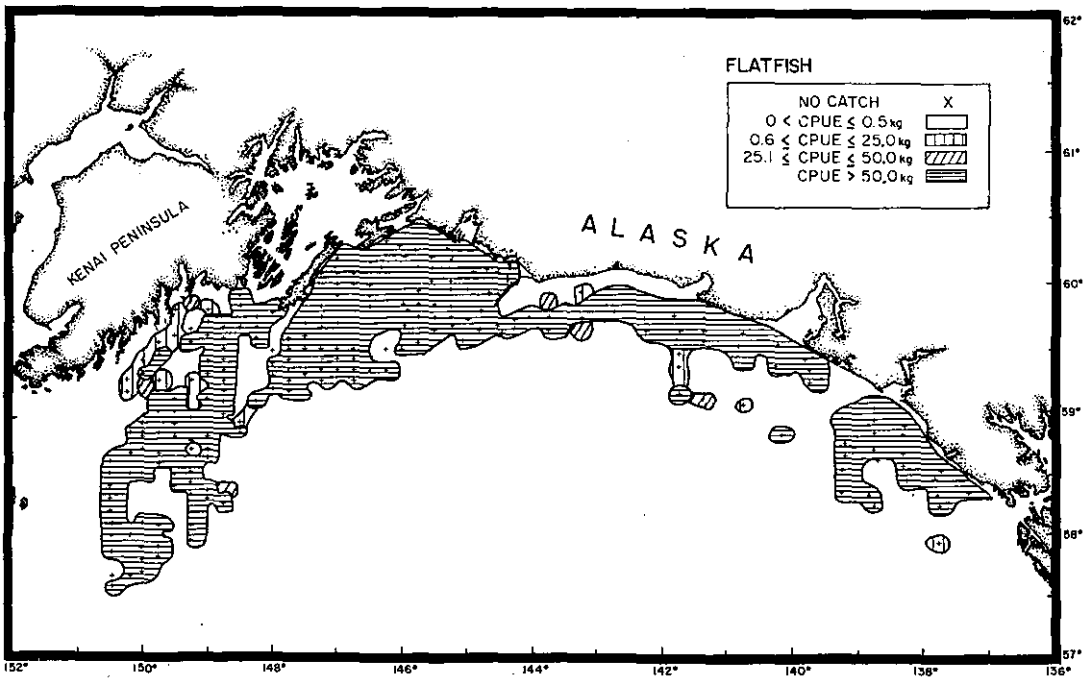


Figure XI-305.--Distribution of apparent relative abundance of flatfish in the eastern Gulf of Alaska, June-Aug. 1962 (Cruise 628).

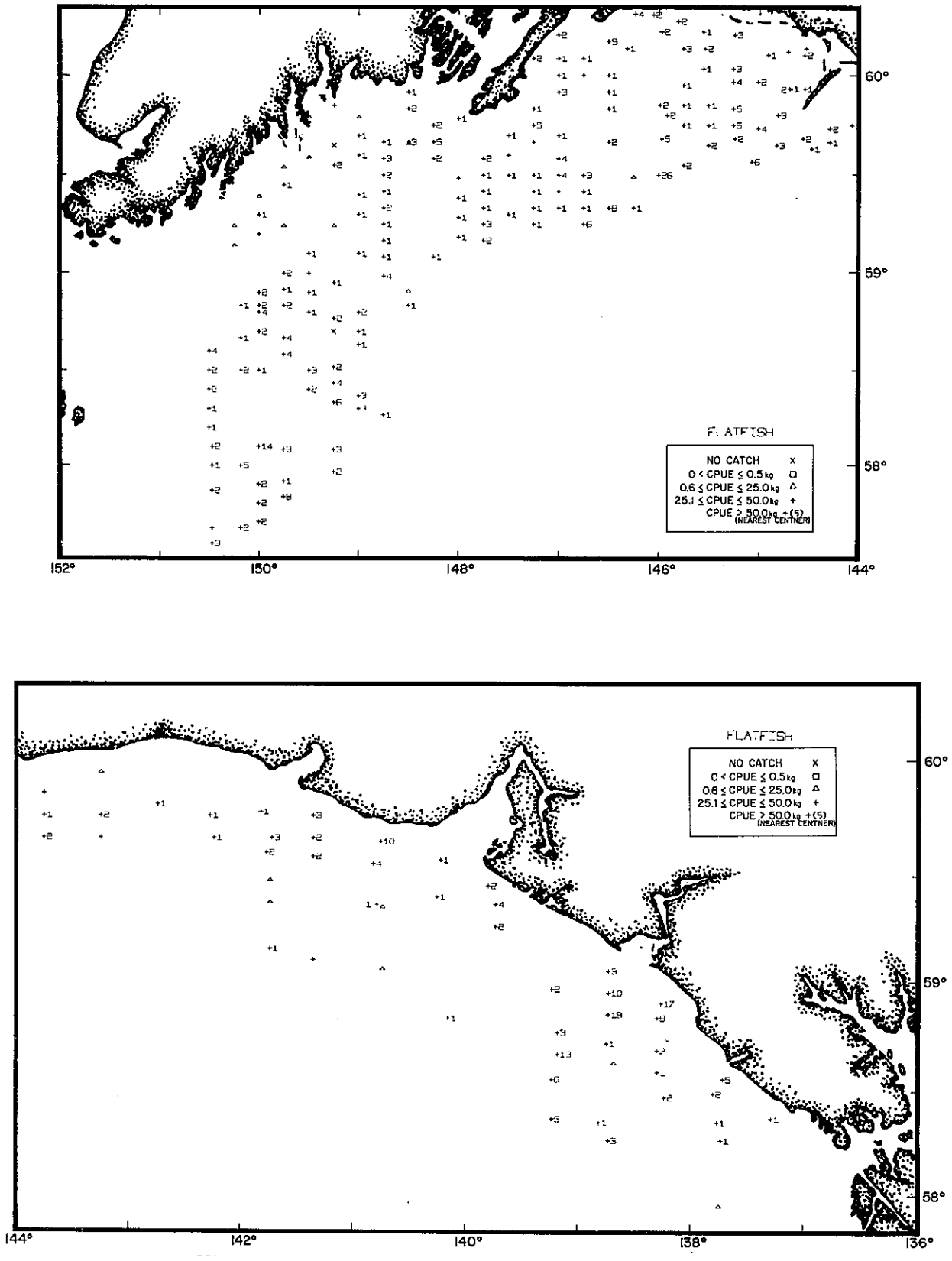


Figure XI-306.--Distribution of standardized catch rates in kg/hr of flatfish in the eastern Gulf of Alaska, June-Aug. 1962 (Cruise 628).

Table XI-57.--Estimated biomass and population size of roundfishes in the Gulf of Alaska during June-August 1962.

Region	Depth zone (m)	CPUE[1/] (kg/hr)	Estimated biomass (mt)	Proportion of total estimated biomass	Estimated population (X 10^6)	Proportion of total estimated population	Mean size per individual[2/] Weight (kg)	Length (cm)
Fairweather	1-100	65.4	2,806.8	37.8	1.5	16.7	1.82	--
	101-200	11.0	2,121.5	28.6	5.2	57.8	0.41	--
	201-400	69.6	2,496.2	33.6	2.3	25.5	1.09	--
	All zones	27.2	7,424.5	10.0	9.0	4.7	0.82	--
Yakutat	1-100	19.4	1,435.4	24.8	3.0	25.4	0.47	--
	101-200	12.3	2,151.9	37.2	4.3	36.5	0.50	--
	201-400	26.8	2,195.7	38.0	4.5	38.1	0.49	--
	All zones	17.5	5,783.0	7.8	11.8	6.3	0.49	--
Prince William	1-100	12.0	1,576.7	11.7	6.1	25.2	0.26	--
	101-200	67.7	10,176.3	75.4	16.5	68.2	0.62	--
	201-400	40.3	1,750.7	12.9	1.6	6.6	1.10	--
	All zones	41.5	13,503.7	18.2	24.2	12.8	0.56	--
Kenai	1-100	96.7	10,089.4	21.3	26.2	18.2	0.39	--
	101-200	91.5	31,858.7	67.3	111.0	77.2	0.29	--
	201-400	39.8	5,412.8	11.4	6.6	4.6	0.82	--
	All zones	80.5	47,360.9	64.0	143.8	76.2	0.33	--
Total	1-100	45.1	15,908.3	21.5	36.8	19.5	0.43	--
	101-200	53.4	46,308.4	62.5	137.0	72.6	0.34	--
	201-400	39.9	11,855.4	16.0	15.0	7.9	0.79	--
	All zones	48.8	74,072.1	100.0	188.8	100.0	0.39	--

1/ Mean catch per unit effort, in kilograms per hour trawled.
2/ Where data are available.
3/ Less than 0.1 kg/hr.
4/ Less than 0.1 X 10^6 individuals.
5/ Less than 0.1 percent.

The invertebrates had the third highest estimated biomass of 69 thousand mt of which 49% occurred in the outer shelf, 39% in the inner shelf and 12% in the upper slope (Table XI-58). The invertebrate biomass was evenly divided between the four regions with the largest estimate occurring in the Prince William region (27%) and the lowest in the Yakutat region (22%). The relative apparent abundance of the invertebrate group decreased with increasing depth with values ranging from 77 kg/hr in the inner shelf to 27 kg/hr in the upper slope (Figure XI-309). Mean CPUE's were generally highest in the easternmost regions with the highest density occurring in the Fairweather region; a result of relatively high concentrations on the inner shelf. Other regions where the relative apparent abundance was higher than the survey average included Prince William and Yakutat. The distribution of the standardized catch rates is plotted in Figure XI-310.

The fourth most important species group contributing to the total biomass were the rockfishes. This group was primarily restricted to the outer shelf and upper slope depth zones which together contained over 99% of the estimated biomass (67 thousand mt) (Table XI-59 and Figure XI-311). By depth zones, the highest mean catch rate occurred in the upper slope followed by the outer shelf and regional mean CPUE's were lowest in the Fairweather region and highest in the Yakutat region. The distribution of the standardized catch rates is plotted in Figure XI-312.

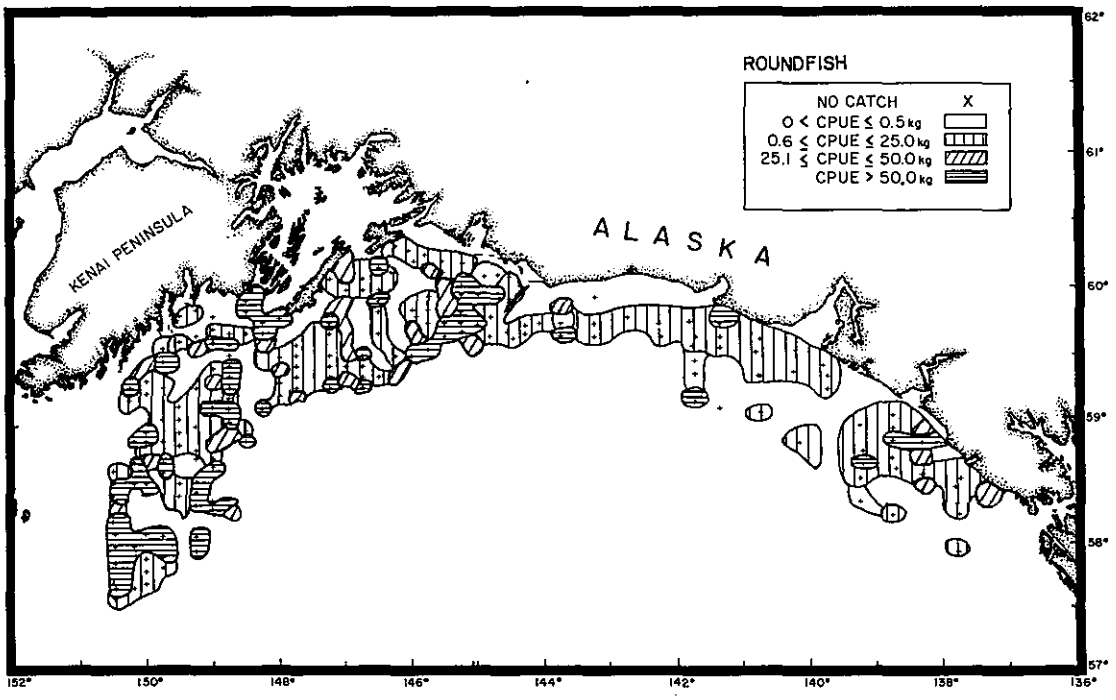


Figure XI-307.--Distribution of apparent relative abundance of roundfish in the eastern Gulf of Alaska, June-Aug. 1962 (Cruise 628).

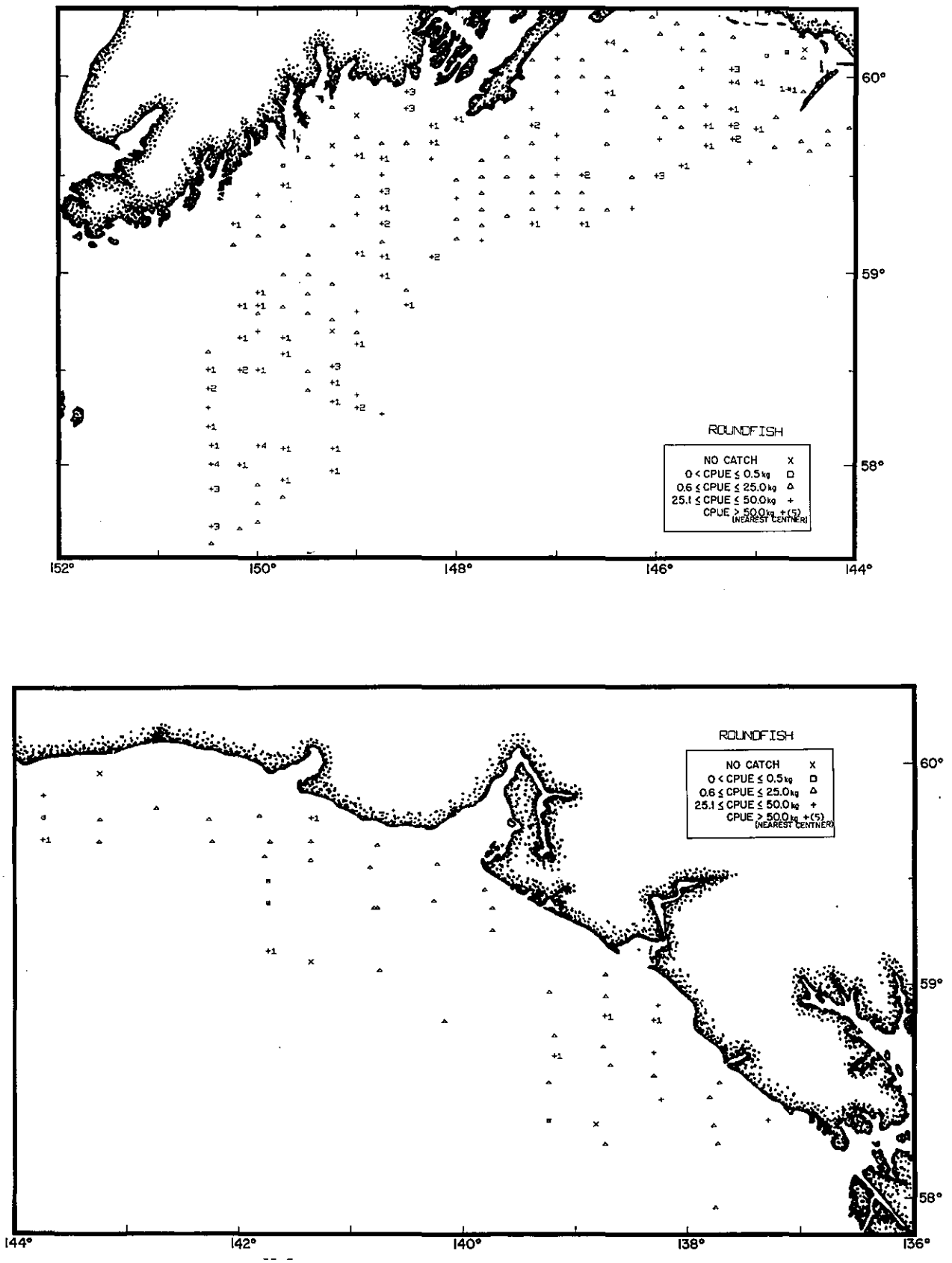


Figure XI-308.--Distribution of standardized catch rates in kg/hr of roundfish in the eastern Gulf of Alaska, June-Aug. 1962 (Cruise 628).

Table XI-58.--Estimated biomass of invertebrates in the Gulf of Alaska during June-August 1962.

Region	Depth zone (m)	CPUE[1] (kg/hr)	Estimated biomass (mt)	Proportion of total estimated biomass	Estimated population (X 10^6)	Proportion of total estimated population	Mean size per individual[2] Weight (kg)	Length (cm)
Fairweather	1-100	227.0	9,379.8	57.4	--	--	--	--
	101-200	26.9	5,218.9	30.7	--	--	--	--
	201-400	56.2	2,016.1	11.9	--	--	--	--
	All zones	62.2	16,974.8	24.6	--	--	--	--
Yakutat	1-100	82.4	6,083.1	39.3	--	--	--	--
	101-200	43.4	7,561.4	48.8	--	--	--	--
	201-400	22.5	1,838.1	11.9	--	--	--	--
	All zones	46.9	15,482.6	22.4	--	--	--	--
Prince William	1-100	82.9	10,925.6	57.7	--	--	--	--
	101-200	39.2	5,892.0	31.1	--	--	--	--
	201-400	48.7	2,116.7	11.2	--	--	--	--
	All zones	58.2	18,934.3	27.4	--	--	--	--
Kenai	1-100	4.0	420.6	2.4	--	--	--	--
	101-200	43.5	15,163.9	85.5	--	--	--	--
	201-400	15.7	2,141.7	12.1	--	--	--	--
	All zones	30.1	17,726.2	25.6	--	--	--	--
Total	1-100	77.0	27,169.1	39.3	--	--	--	--
	101-200	39.0	33,836.2	49.0	--	--	--	--
	201-400	27.3	8,112.6	11.7	--	--	--	--
	All zones	45.6	69,117.9	100.0	--	--	--	--

1/ Mean catch per unit effort, in kilograms per hour trawled.
2/ Where data are available.
3/ Less than 0.1 kg/hr.
4/ Less than 0.1 X 10^6 individuals.
5/ Less than 0.1 percent.

The elasmobranchs made the smallest contribution to the total biomass (5%) with an estimated 29 thousand mt. Mean CPUE's increased with depth, varying from 12 kg/hr in the inner shelf to 25 kg/hr in the upper slope (Table XI-60 and Figure XI-313). Nearly 60% of the estimated biomass was contained in the outer shelf with lower values in the upper slope (26%) and inner shelf (15%). The Fairweather region contained 40% of the elasmobranch biomass and had the highest regional mean catch, a result of relatively high concentrations in the upper slope and outer shelf. The distribution of the standardized catch rates is plotted in Figure XI-314.

DISTRIBUTION, RELATIVE ABUNDANCE, BIOMASS AND SIZE COMPOSITION FEATURES OF PRINCIPAL SPECIES OF FISH AND INVERTEBRATES

TURBOT

Distribution and abundance.--Turbot were taken in each region-depth zone sampled and had the highest relative apparent abundance (127 kg/hr) of any species encountered in the survey area. Mean CPUE's increased with depth, ranging from 84 kg/hr in the inner shelf to 188 kg/hr in the upper slope (Table XI-61 and Figure XI-315). The Fairweather region had the highest apparent relative abundance, a result of high catch rates in all 3 depth zones (Figure XI-316). Mean CPUE's in the remaining regions were all below the survey average for this species.

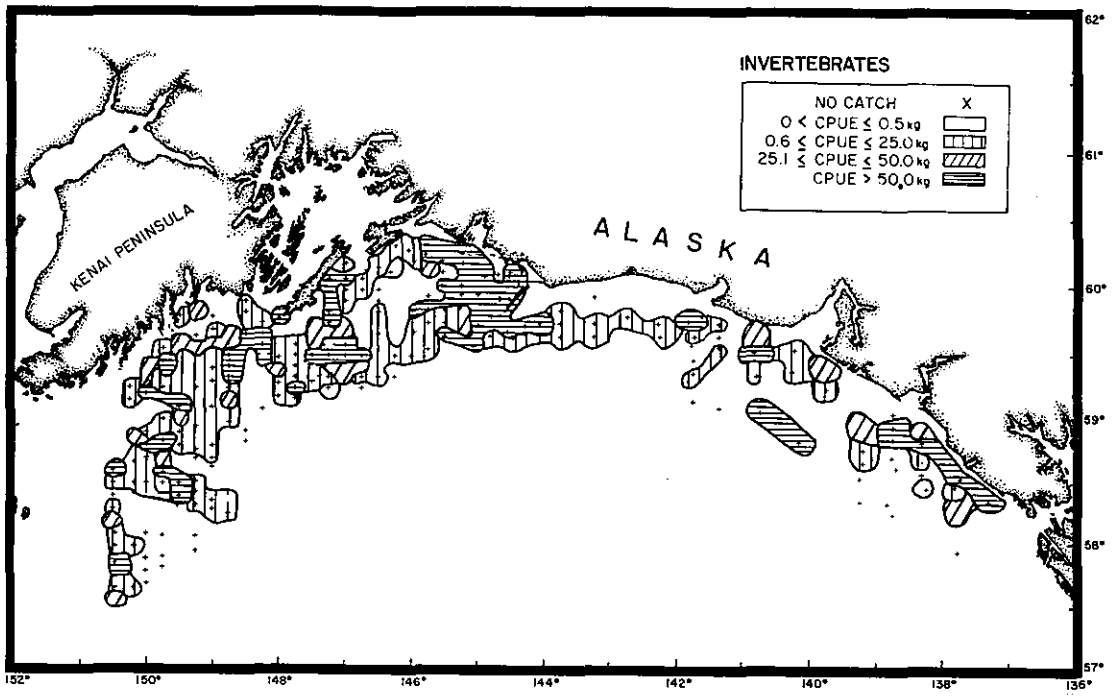
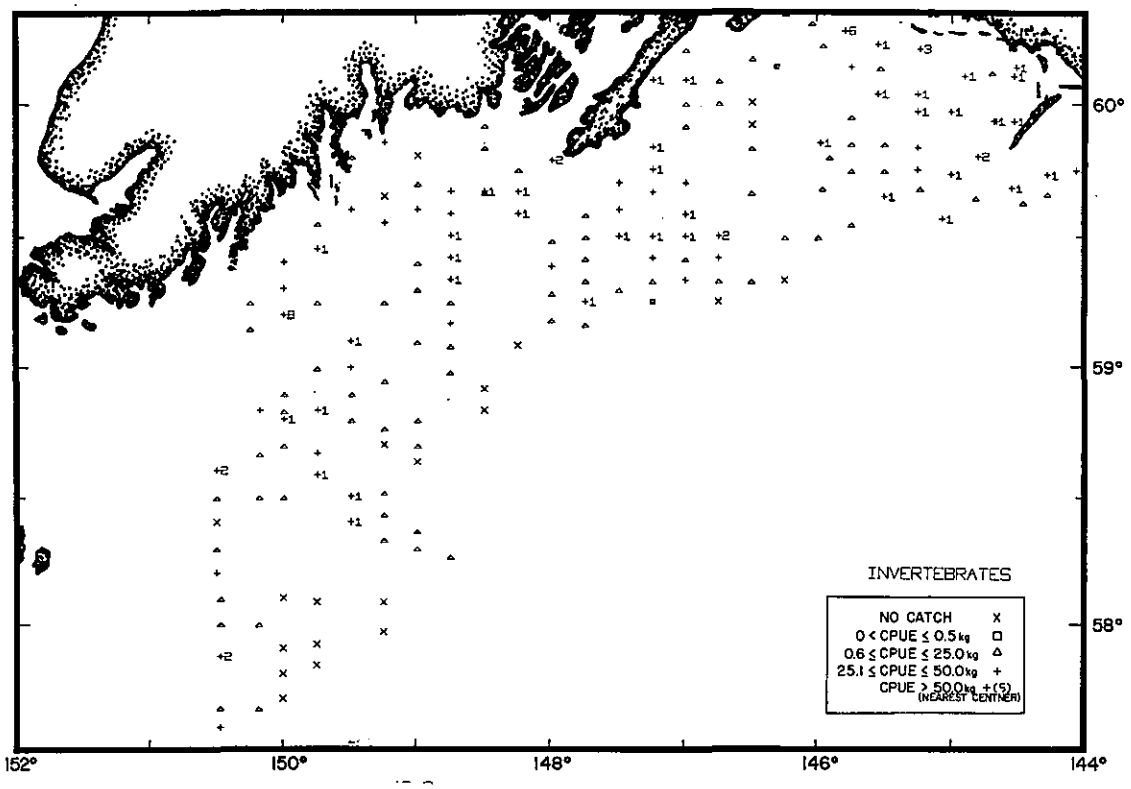


Figure XI-309.--Distribution of apparent relative abundance of invertebrates in the eastern Gulf of Alaska, June-Aug. 1962 (Cruise 628).



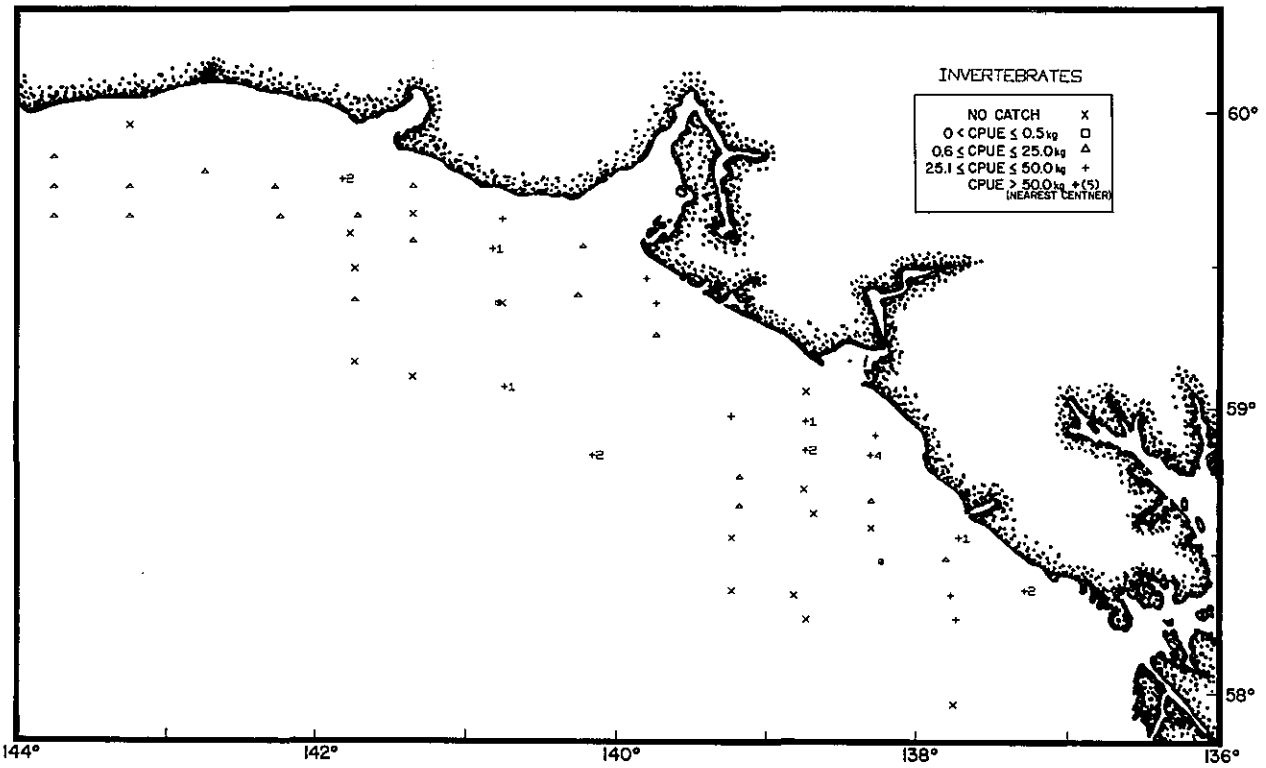


Figure XI-310.--Distribution of standardized catch rates in kg/hr of invertebrates in the eastern Gulf of Alaska, June-Aug. 1962 (Cruise 628).

Table XI-59.--Estimated biomass and population size of rockfishes in the Gulf of Alaska during June-August, 1962.

Region	Depth zone (m)	CPUE[1] (kg/hr)	Estimated biomass (mt)	Proportion of total estimated biomass	Estimated population (X 10^6)	Proportion of total estimated population	Mean size per individual[2] Weight (kg)	Length (cm)
Fairweather	1-100	0	0	0	0	0	--	--
	101-200	7.9	1,521.1	23.5	3.6	25.3	0.43	--
	201-400	138.6	4,969.2	76.5	10.6	74.7	0.47	--
	All zones	23.8	6,494.3	9.7	14.2	10.2	0.46	--
Yakutat	1-100	0	0	0	0	0	--	--
	101-200	87.7	15,287.0	72.0	30.5	64.1	0.50	--
	201-400	72.6	5,940.0	28.0	17.1	35.9	0.35	--
	All zones	64.3	21,227.0	31.8	47.6	34.2	0.45	--
Prince William	1-100	0.4	48.4	0.3	0.1	0.3	0.79	--
	101-200	86.1	12,938.5	77.9	24.3	77.4	0.53	--
	201-400	83.5	3,630.1	21.8	7.0	22.3	0.52	--
	All zones	51.1	16,617.0	24.8	31.4	22.6	0.53	--
Kenai	1-100	1.0	105.2	0.5	0.2	0.4	0.45	--
	101-200	34.4	11,997.5	53.2	24.2	52.7	0.50	--
	201-400	76.6	10,422.7	46.3	21.5	46.9	0.48	--
	All zones	38.2	22,525.4	33.7	45.9	33.0	0.49	--
Total	1-100	0.4	153.6	0.2	0.3	0.2	0.51	--
	101-200	48.1	41,748.1	62.5	82.6	59.4	0.51	--
	201-400	84.0	24,962.0	37.3	56.2	40.4	0.44	--
	All zones	44.1	66,863.7	100.0	139.1	100.0	0.48	--

1/ Mean catch per unit effort, in kilograms per hour trawled.
2/ Where data are available.
3/ Less than 0.1 kg/hr.
4/ Less than 0.1 X 10^6 individuals.
5/ Less than 0.1 percent.

Biomass.--The apparent biomass of turbot was estimated at 242 thousand mt, of which 60% occurred in the outer shelf, 28% in the upper slope and 12% in the inner shelf. The highest contribution came from the Fairweather region (57%) where large portions occurred in the outer shelf and upper slope. Proportions contributed from the remaining regions ranged from 12% in Yakutat to 17% in Kenai.

Size composition.--Random length frequencies for turbot are available from the Kenai region. On the outer shelf turbot, sexes combined, ranged in size from 21-56 cm and averaged 33 cm while on the upper slope turbot ranged from 28-68 cm and averaged 39 cm (Figure XI-317).

FLATHEAD SOLE

Distribution and abundance.--Flathead sole occurred throughout all regions and depth zones averaging 40 kg/hr over the entire survey area (Table XI-62). Mean CPUE's were highest in the outer shelf and upper slope depth zones while the inner shelf had the lowest apparent density distribution (Figures XI-318-319). The Prince William region accumulated the highest regional CPUE's while mean catch rates from the remaining regions were below the survey average. Particularly high mean CPUE's in excess of 100 kg/hr occurred in the Prince William outer shelf and the Fairweather upper slope.

Biomass.--Of the estimated 61 thousand mt of apparent biomass, 72% occurred on the outer shelf, 21% on the upper slope and 7% on the inner shelf. The Prince William and Kenai regions contributed 32% and 36% respectively to the total biomass while the Fairweather and Yakutat regions each contributed 16%. Particularly high biomass estimates occurred in the Prince William and Kenai outer shelf depth zones.

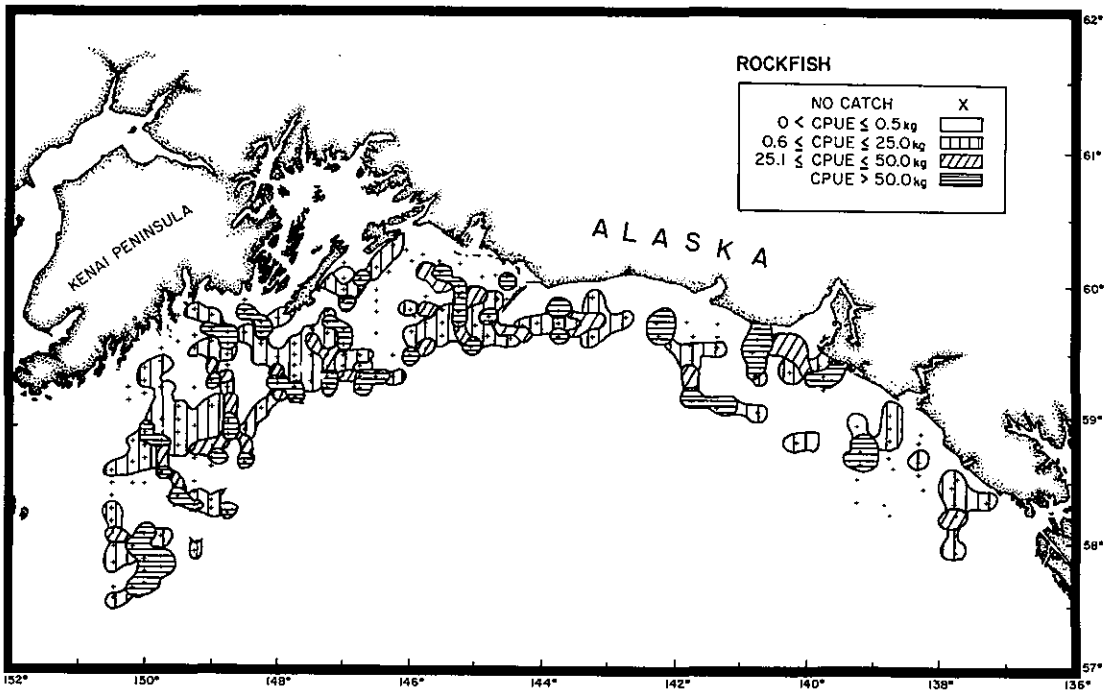


Figure XI-311.--Distribution of apparent relative abundance of rockfish in the eastern Gulf of Alaska, June-Aug. 1962 (Cruise 628).

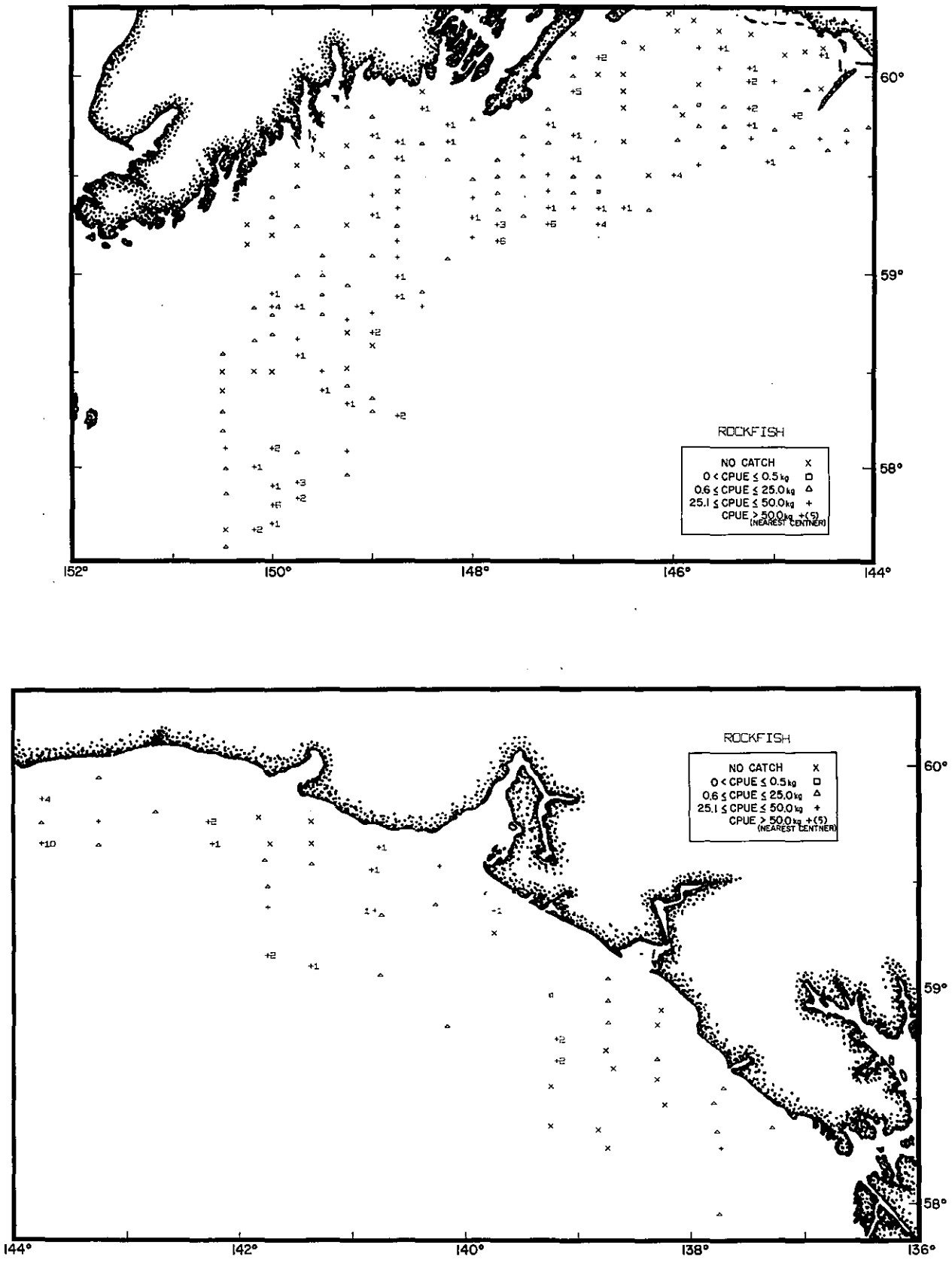


Figure XI-312.--Distribution of standardized catch rates in kg/hr of rockfish in the eastern Gulf of Alaska, June-Aug. 1962 (Cruise 628).

Size composition.--Random length frequencies were taken in the Kenai upper slope where flathead sole, sexes combined, ranged in size from 22-39 cm averaging 28.6 cm (Figure XI-320).

PACIFIC OCEAN PERCH

Distribution and abundance.--Pacific ocean perch were widely distributed throughout the survey area but were primarily concentrated on the outer shelf and upper slope (Table XI-63). Relative apparent abundance increased with depth with the upper slope accumulating the largest mean CPUE followed by the outer and inner shelf (Figure XI-321-322). The Yakutat and Prince William regions had similar mean CPUE's which exceeded the survey average of 39 kg/hr and were followed in order by Kenai and Fairweather. Highest CPUE's occurred in the Fairweather upper slope and the Yakutat and Prince William outer shelf.

Biomass.--The total biomass for Pacific ocean perch was estimated at 59 thousand mt, of which 68% occurred in the outer shelf and 32% in the upper slope. Relatively equal contributions from the Yakutat, Prince William and Kenai outer shelf accounted for 66% of the total biomass with the remainder being divided between the upper slope depth zones of all regions. The biomass estimate for this species should be considered low, as this species is known to be abundant in hard-rocky areas, which can not be adequately sampled with the trawls used during these surveys.

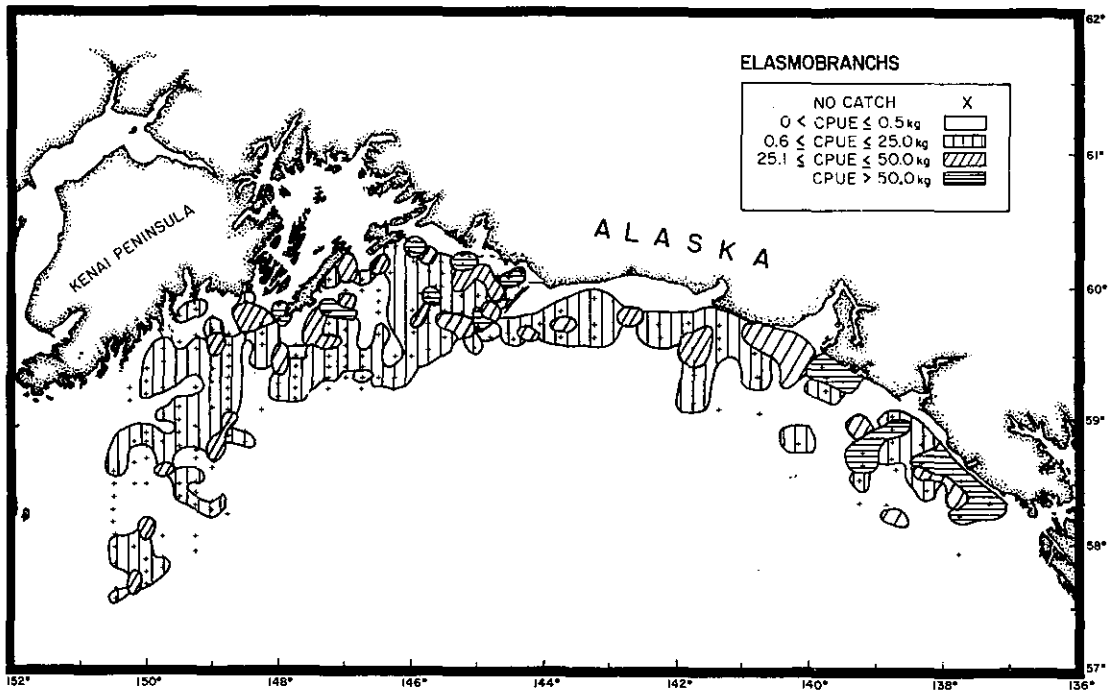
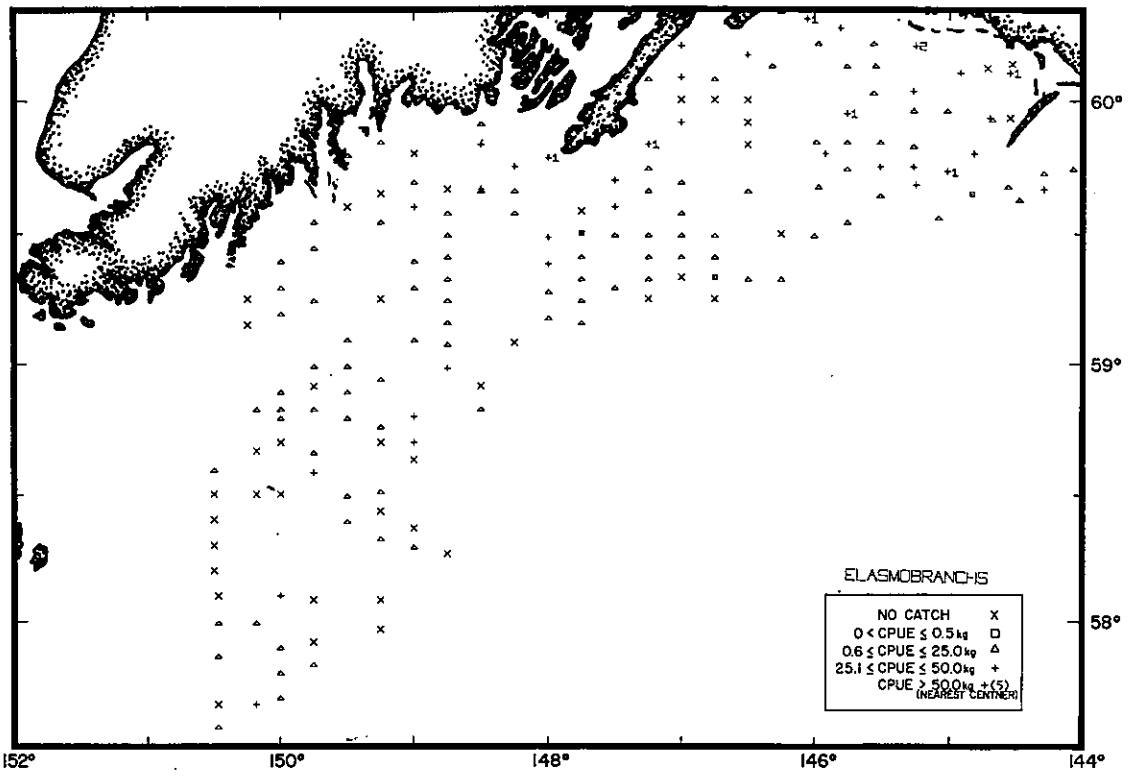


Figure XI-313.--Distribution of apparent relative abundance of elasmobranchs in the eastern Gulf of Alaska, June-Aug. 1962 (Cruise 628).

Table XI-60.--Estimated biomass and population size of elasmobranchs in the Gulf of Alaska during June-August 1962.

Region	Depth zone (m)	CPUE[1/] (kg/hr)	Estimated biomass (mt)	Proportion of total estimated biomass	Estimated population (X 10^6)	Proportion of total estimated population	Mean size per individual[2/] Weight (kg)	Length (cm)
Fairweather	1-100	4.1	177.1	1.5	0.1	1.6	2.06	--
	101-200	39.0	7,560.2	65.1	4.0	65.6	1.93	--
	201-400	108.4	3,884.7	33.4	2.0	32.8	1.94	--
	All zones	42.6	11,622.0	40.1	6.1	40.9	1.93	--
Yakutat	1-100	7.9	583.7	11.5	0.3	10.7	1.98	--
	101-200	19.6	3,424.1	67.6	1.7	60.7	1.97	--
	201-400	12.9	1,059.2	20.9	0.8	28.6	1.39	--
	All zones	15.3	5,067.0	17.5	2.8	18.8	1.81	--
Prince William	1-100	26.8	3,532.9	50.2	0.8	32.0	4.28	--
	101-200	18.2	2,731.1	38.8	1.2	48.0	2.29	--
	201-400	17.8	771.7	11.0	0.5	20.0	1.71	--
	All zones	21.6	7,035.7	24.3	2.5	16.8	2.81	--
Kenai	1-100	0	0	0	0	0	--	--
	101-200	10.2	3,551.4	67.9	2.6	74.3	1.35	--
	201-400	12.4	1,681.7	32.1	0.9	25.7	1.93	--
	All zones	8.9	5,233.1	18.1	3.5	23.5	1.50	--
Total	1-100	12.2	4,293.7	14.8	1.2	8.0	3.58	--
	101-200	19.9	17,266.8	59.6	9.5	63.8	1.82	--
	201-400	24.9	7,397.3	25.6	4.2	28.2	1.76	--
	All zones	19.1	28,957.8	100.0	14.9	100.0	1.94	--

1/ Mean catch per unit effort, in kilograms per hour trawled.
2/ Where data are available.
3/ Less than 0.1 kg/hr.
4/ Less than 0.1 X 10^6 individuals.
5/ Less than 0.1 percent.



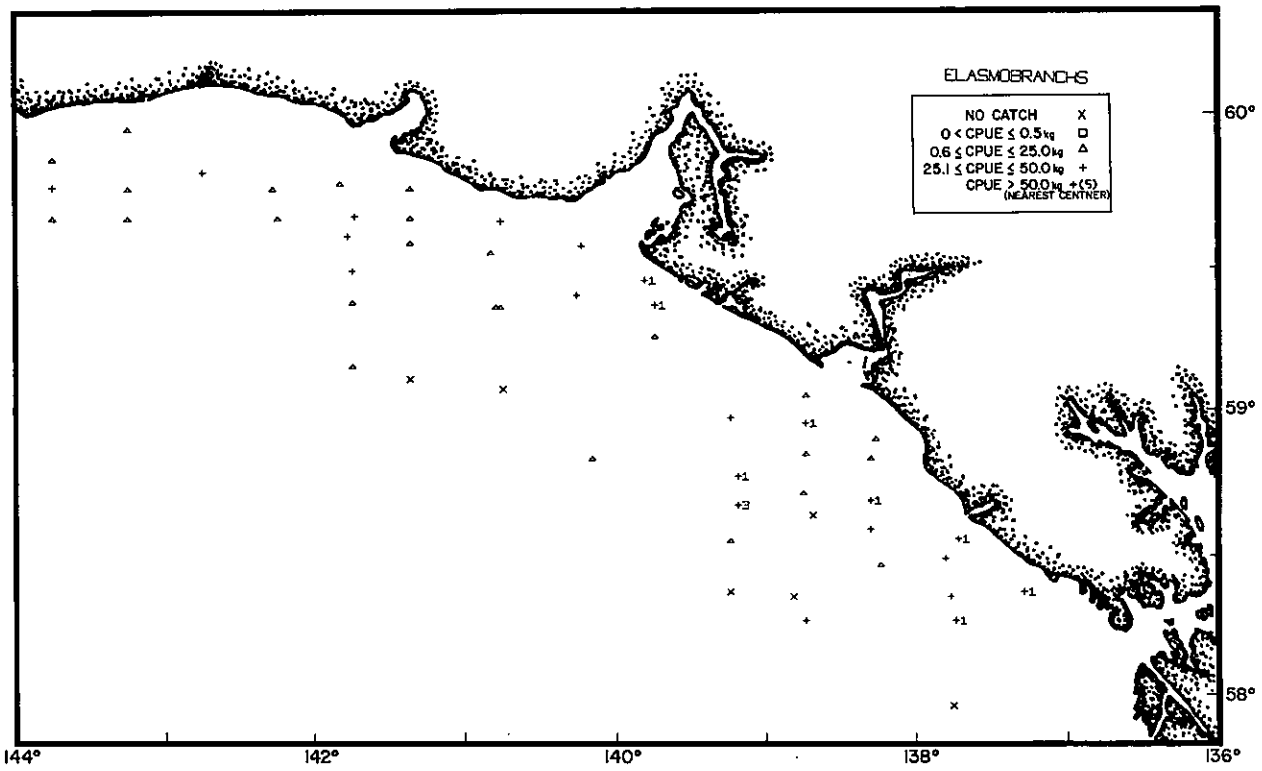


Figure XI-314.--Distribution of standardized catch rates in kg/hr of elasmobranchs in the eastern Gulf of Alaska, June-Aug. 1962 (Cruise 628).

Table XI-61.--Estimated biomass and population size of turbot (Atheresthes stomias) in the Gulf of Alaska during June-August 1962.

Region	Depth zone (m)	CPUE[1] (kg/hr)	Estimated biomass (mt)	Proportion of total estimated biomass	Estimated population (X 10^6)	Proportion of total estimated population	Mean size per individual[2] Weight (kg)	Mean size per individual[2] Length (cm)
Fairweather	1-100	338.5	13,619.8	9.8	13.6	9.8	1.07	--
	101-200	229.7	82,527.2	59.3	82.5	59.3	0.54	--
	201-400	860.9	42,952.2	30.9	43.0	30.9	0.72	--
	All zones	329.7	139,099.2	57.4	139.1	39.4	0.65	--
Yakutat	1-100	71.2	5,262.2	18.5	11.9	19.4	0.44	--
	101-200	99.5	17,347.2	61.1	42.4	69.2	0.41	--
	201-400	70.7	5,786.6	20.4	7.0	11.4	0.83	--
	All zones	86.0	28,396.0	11.7	61.3	17.4	0.46	--
Prince William	1-100	48.7	6,414.5	18.5	12.5	20.5	0.51	--
	101-200	150.1	22,563.0	65.3	40.8	66.8	0.55	--
	201-400	128.5	5,585.4	16.2	7.8	12.7	0.71	--
	All zones	106.2	34,562.9	14.3	61.1	17.3	0.57	--
Kenai	1-100	31.7	3,307.1	8.2	12.5	13.7	0.27	--
	101-200	67.1	23,373.4	58.2	64.9	70.9	0.36	32.9
	201-400	99.2	13,501.1	33.6	14.1	15.4	0.96	39.1
	All zones	68.2	40,181.6	16.6	91.5	25.9	0.44	--
Total	1-100	83.6	28,603.6	11.8	50.5	14.3	0.57	--
	101-200	124.4	145,810.8	60.2	230.6	65.3	0.63	--
	201-400	187.5	67,825.3	28.0	71.9	20.4	0.94	--
	All zones	127.3	242,239.7	100.0	353.0	100.0	0.69	--

1/ Mean catch per unit effort, in kilograms per hour trawled.
2/ Where data are available.
3/ Less than 0.1 kg/hr.
4/ Less than 0.1 X 10^6 individuals.
5/ Less than 0.1 percent.

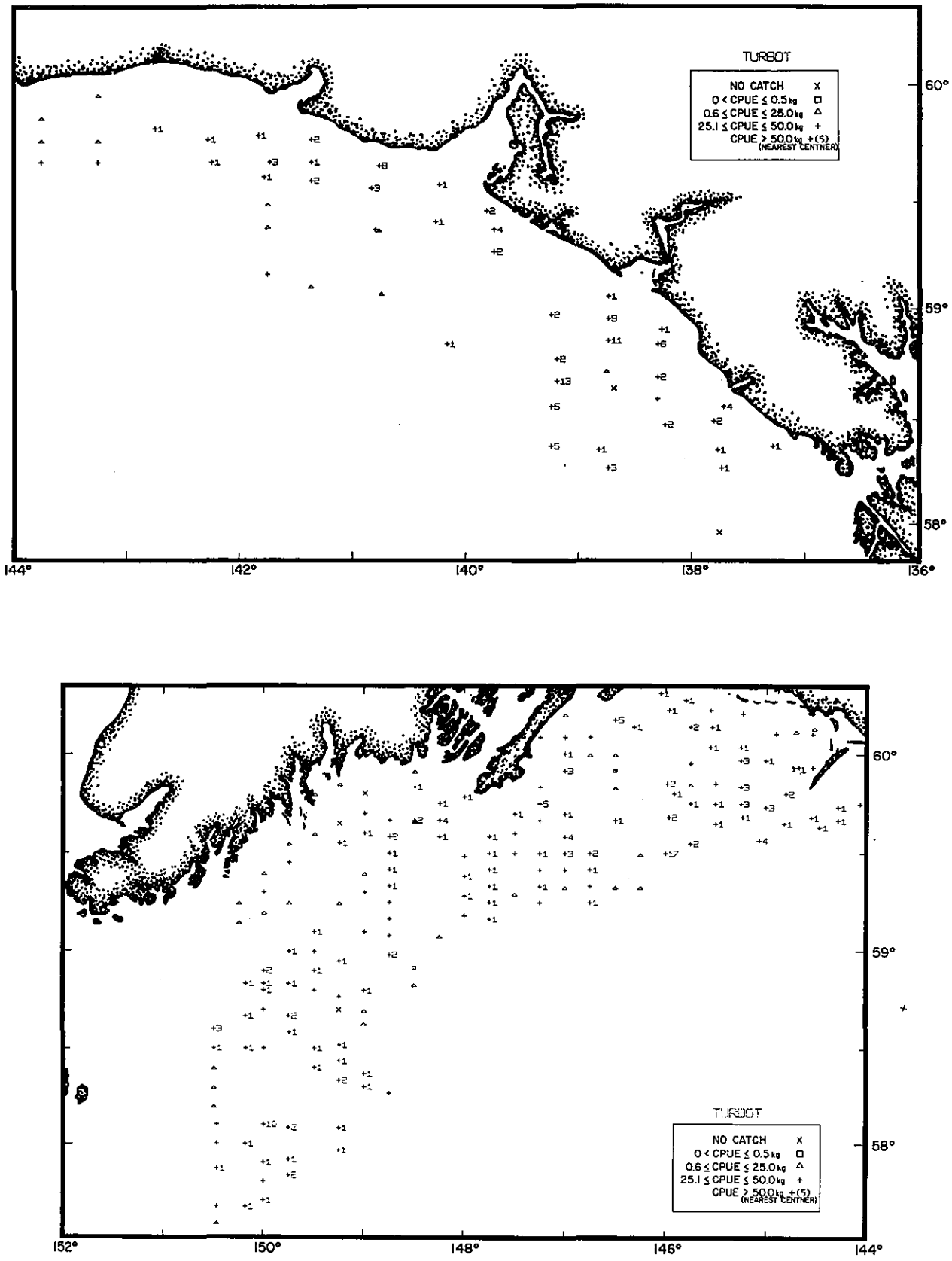


Figure XI-315.--Distribution of standardized catch rates in kg/hr of turbot in the eastern Gulf of Alaska, June-Aug. 1962 (Cruise 628).

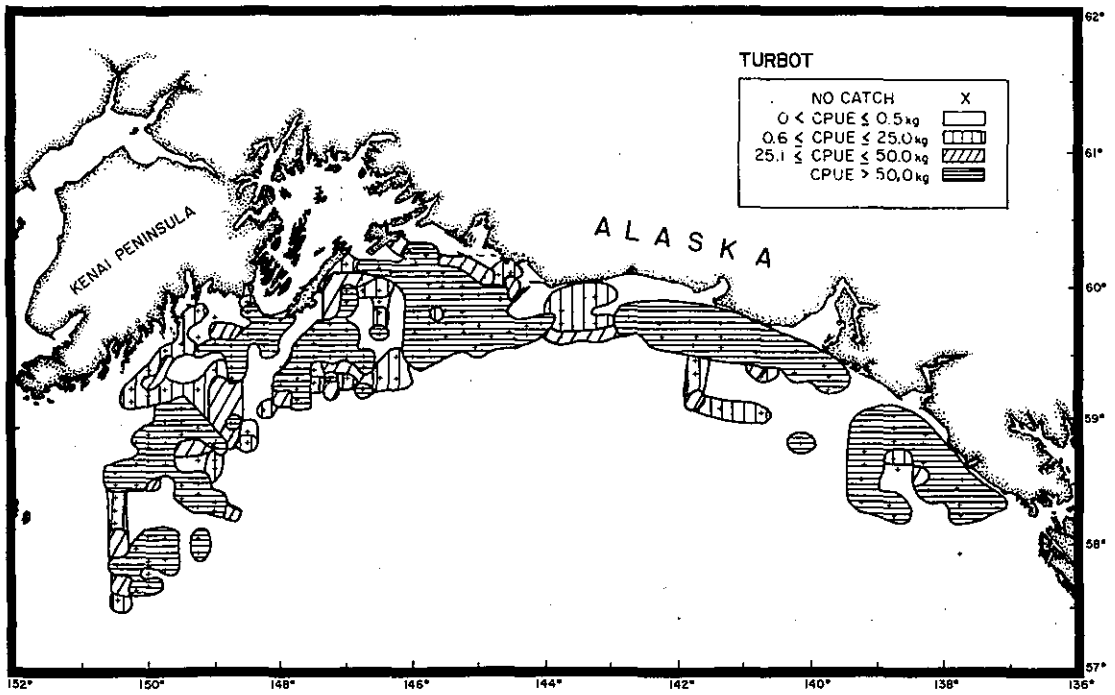


Figure XI-316.--Distribution of apparent relative abundance of turbot in the eastern Gulf of Alaska, June-Aug. 1962 (Cruise 628).

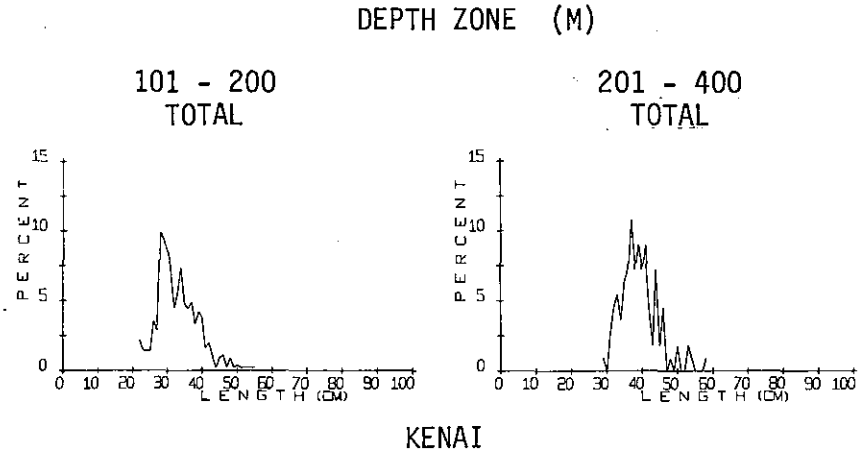
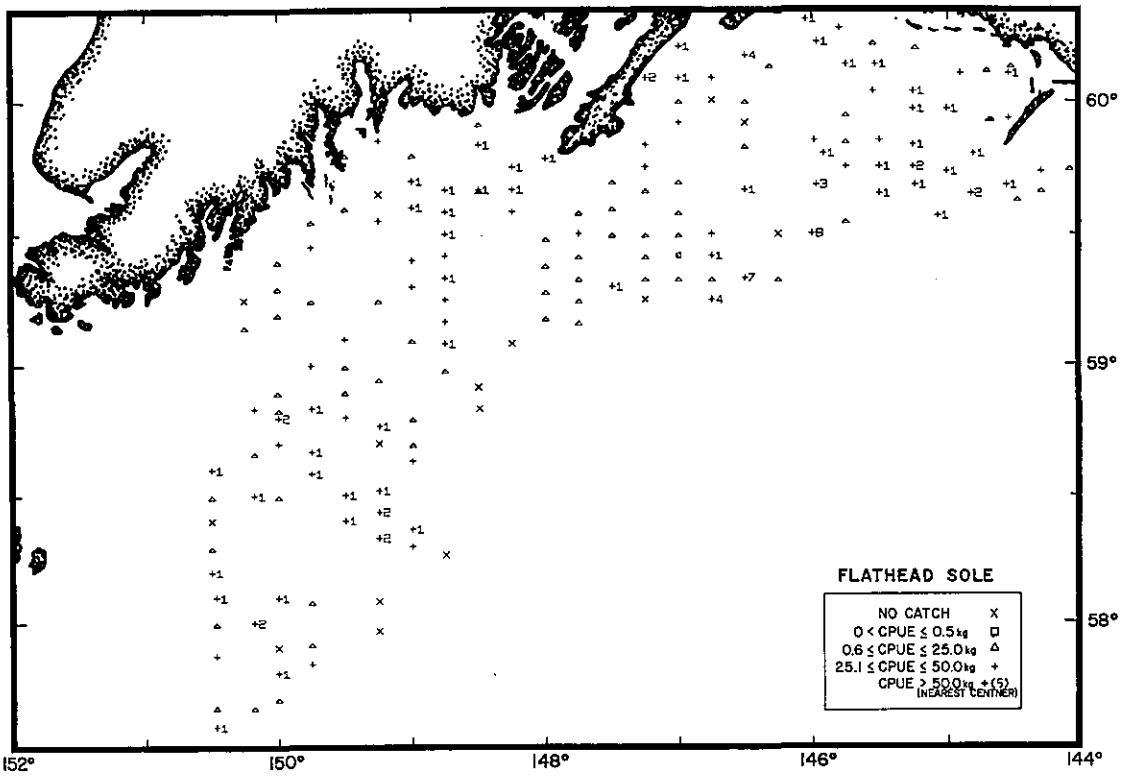


Figure XI-317.--Percentage length frequencies of turbot from the Gulf of Alaska (Cruise 628).

Table XI-62.--Estimated biomass and population size of flathead sole (Hippoglossoides elassodon) in the Gulf of Alaska during June-August 1962.

Region	Depth zone (m)	CPUE[1] (kg/hr)	Estimated biomass (mt)	Proportion of total estimated biomass	Estimated population ($\times 10^6$)	Proportion of total estimated population	Mean size per individual[2] Weight (kg)	Mean size per individual[2] Length (cm)
Fairweather	1-100	3.0	126.5	1.4	0.4	2.1	0.29	--
	101-200	14.1	2,747.1	29.0	5.8	30.2	0.47	--
	201-400	183.9	6,591.2	69.6	13.0	67.7	0.51	--
	All zones	34.6	9,464.8	15.6	19.2	9.6	0.49	--
Yakutat	1-100	16.7	1,233.0	12.5	4.5	15.9	0.27	--
	101-200	38.1	6,633.3	67.1	20.0	70.7	0.33	--
	201-400	24.7	2,021.9	20.4	3.8	13.4	0.53	--
	All zones	30.0	9,888.2	16.3	28.3	14.2	0.35	--
Prince William	1-100	19.6	2,578.5	13.1	9.5	17.4	0.27	--
	101-200	104.3	15,671.6	79.6	42.2	77.3	0.37	--
	201-400	33.0	1,435.0	7.3	2.9	5.3	0.49	--
	All zones	60.5	19,685.1	32.4	54.6	27.4	0.36	--
Kenai	1-100	4.3	447.0	2.1	2.4	2.5	0.18	--
	101-200	53.4	18,599.6	85.6	83.6	85.7	0.22	--
	201-400	19.6	2,672.3	12.3	11.5	11.8	0.23	28.6
	All zones	36.9	21,718.9	35.7	97.5	48.8	0.22	--
Total	1-100	12.5	4,385.0	7.2	16.8	8.4	0.26	--
	101-200	50.3	43,651.6	71.9	151.6	76.0	0.29	--
	201-400	42.8	12,720.4	20.9	31.2	15.6	0.41	--
	All zones	40.1	60,757.0	100.0	199.6	100.0	0.30	--

1/ Mean catch per unit effort, in kilograms per hour trawled.
2/ Where data are available.
3/ Less than 0.1 kg/hr.
4/ Less than 0.1 X 10^6 individuals.
5/ Less than 0.1 percent.



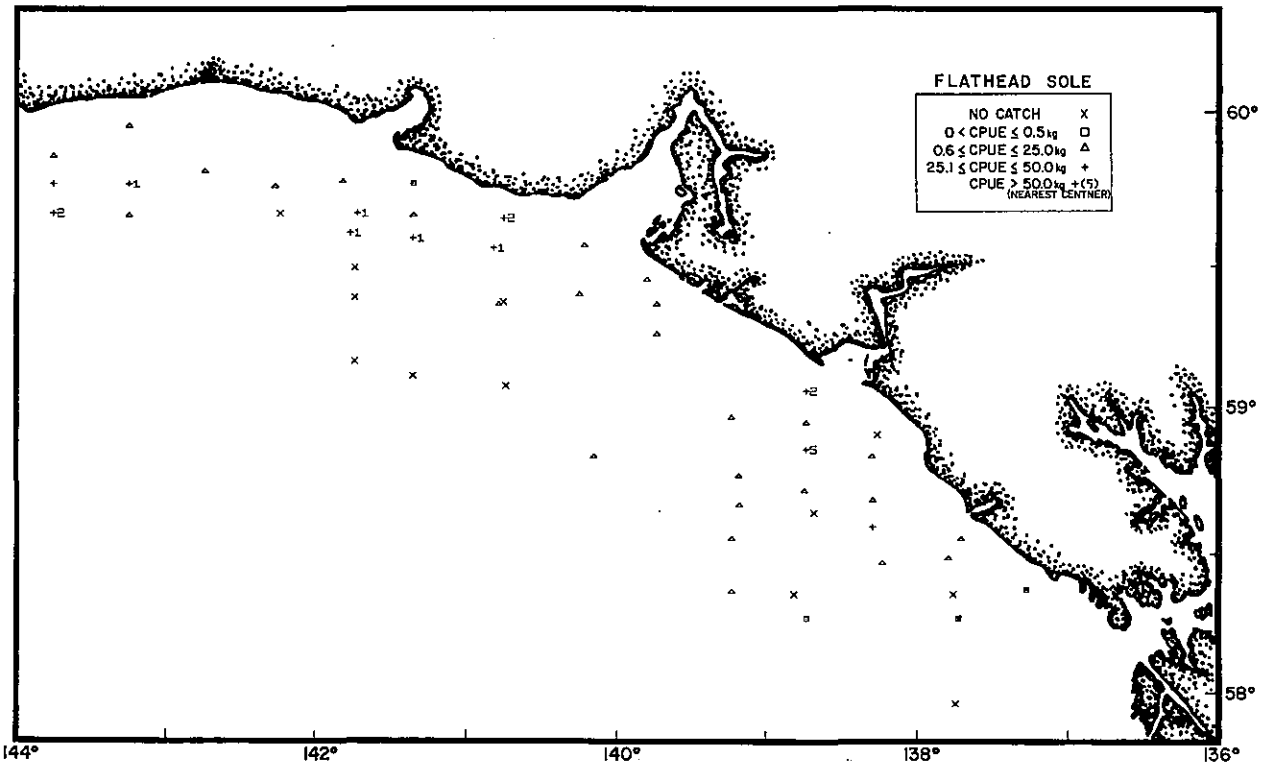


Figure XI-318.--Distribution of standardized catch rates in kg/hr of flathead sole in the eastern Gulf of Alaska, June-Aug. 1962 (Cruise 628).

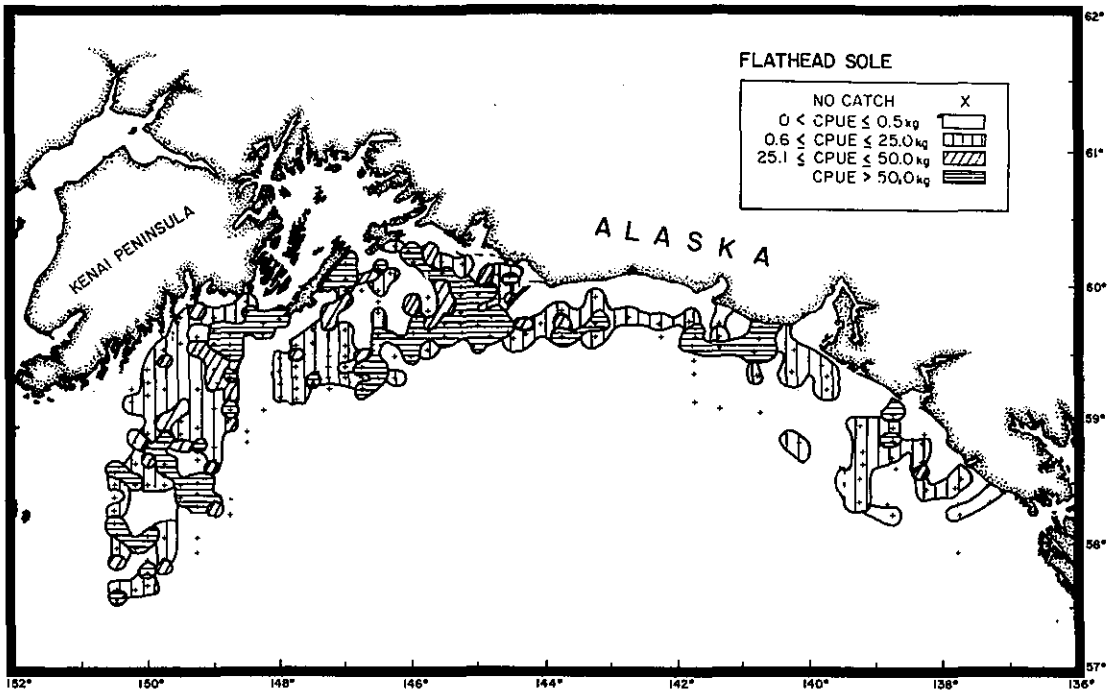
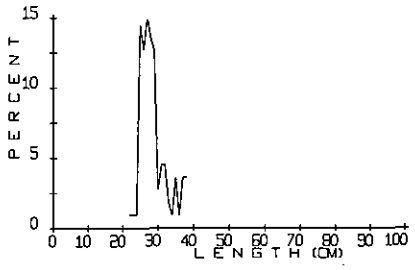


Figure XI-319.--Distribution of apparent relative abundance of flathead sole in the eastern Gulf of Alaska, June-Aug. 1962 (Cruise 628).

DEPTH ZONE (M)

201 - 400



KENAI

Figure XI-320.--Percentage length frequencies of flathead sole from the Gulf of Alaska (Cruise 628).

Table XI-63.--Estimated biomass and population size of Pacific ocean perch (Sebastes alutus) in the Gulf of Alaska during June-August, 1962.

Region	Depth zone (m)	CPUE[1/] (kg/hr)	Estimated biomass (mt)	% of Total	Estimated population NO. 10^6	% of Total	Mean size per individual Weight (kg)	Mean size per individual Length (cm)
Fairweather	1-100	0	0	0	0	0	--	--
	101-200	6.7	1,303.6	24.9	2.7	24.3	0.48	--
	201-400	109.6	3,929.1	75.1	8.4	75.7	0.47	--
	All zones	19.2	5,232.7	8.9	11.1	9.7	0.47	--
Yakutat	1-100	0	0	0	0	0	--	--
	101-200	85.5	14,913.8	83.3	29.5	79.7	0.51	--
	201-400	36.5	2,985.8	16.7	7.5	20.3	0.40	--
	All zones	54.2	17,899.6	30.6	37.0	32.4	0.49	--
Prince William	1-100	0.4	47.2	0.3	0.1	0.4	0.90	--
	101-200	81.7	12,283.7	81.9	22.3	83.2	0.55	--
	201-400	61.4	2,670.0	17.8	4.4	16.4	0.61	--
	All zones	46.1	15,000.9	25.7	26.8	23.5	0.56	--
Kenai	1-100	1.0	105.2	0.5	0.2	0.5	0.45	--
	101-200	32.0	11,132.8	54.6	21.4	54.6	0.52	--
	201-400	67.3	9,152.3	44.9	17.6	44.9	0.52	--
	All zones	34.7	20,390.3	34.8	39.2	34.4	0.52	--
Total	1-100	0.4	152.4	0.3	0.3	0.3	0.60	--
	101-200	45.7	39,633.9	67.7	75.9	66.5	0.68	--
	201-400	63.1	18,737.2	32.0	37.9	33.2	0.60	--
	All zones	38.6	58,523.5	100.0	114.1	100.0	0.65	--

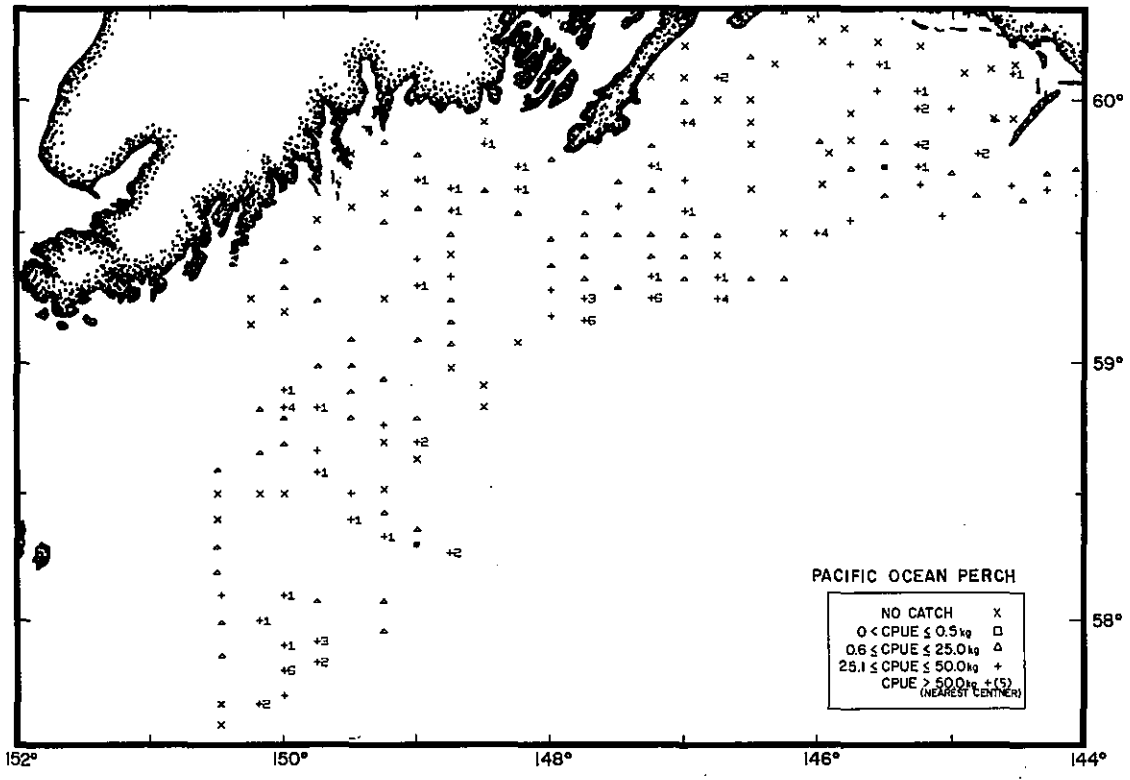
[1/] Mean catch per unit effort, in kilograms per hour trawled.

[2/] Where data are available.

[3/] Less than 0.1 kg/hr

[4/] Less than 0.1 X 10^6 individuals

[5/] Less than 0.1 percent



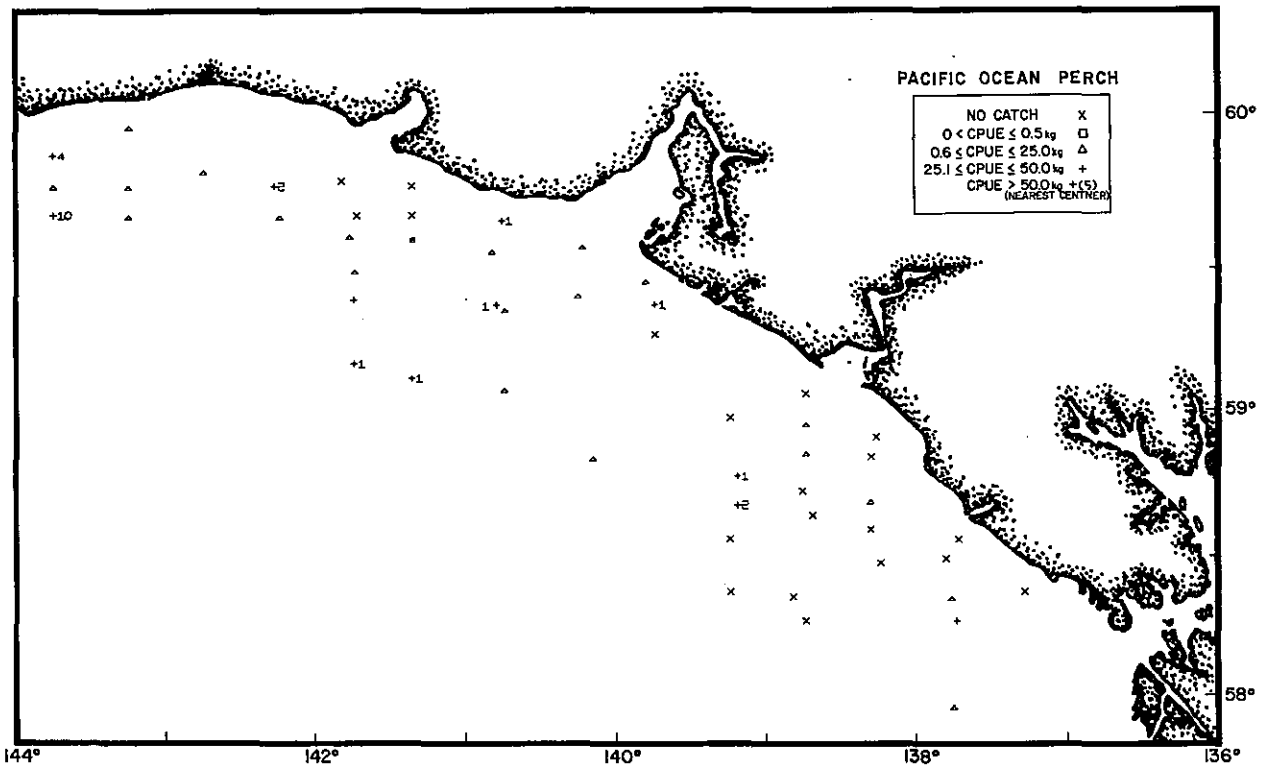


Figure XI-321.--Distribution of standardized catch rates in kg/hr of Pacific ocean perch in the eastern Gulf of Alaska, June-Aug. 1962 (Cruise 628).

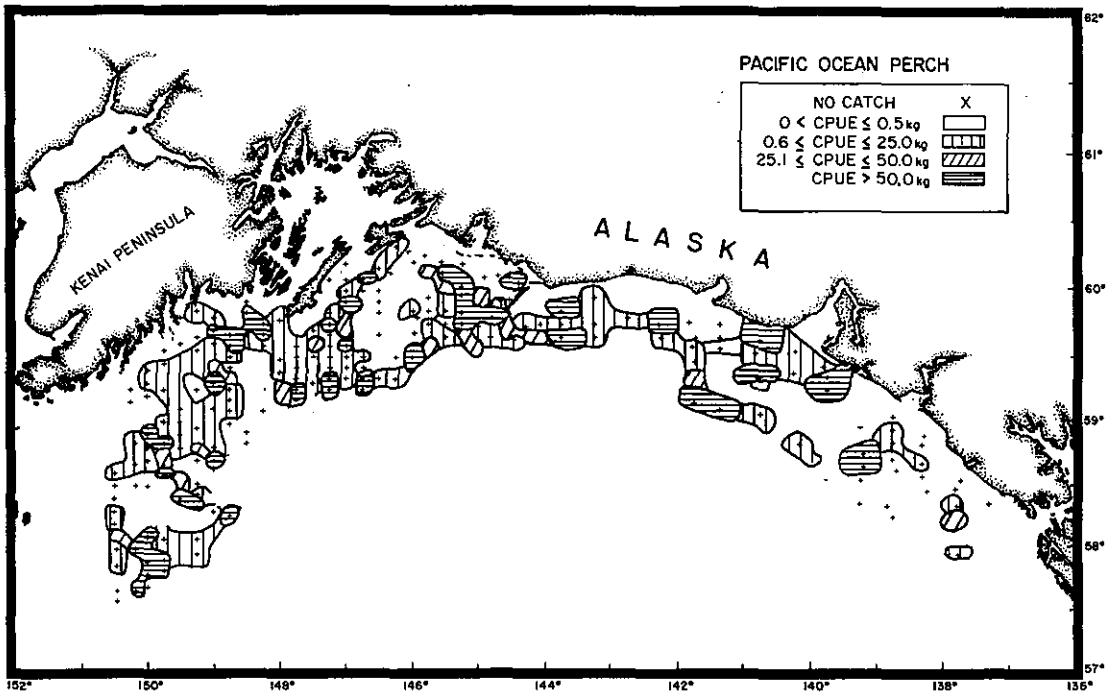


Figure XI-322.--Distribution of apparent relative abundance of Pacific ocean perch in the eastern Gulf of Alaska, June-Aug. 1962 (Cruise 628).

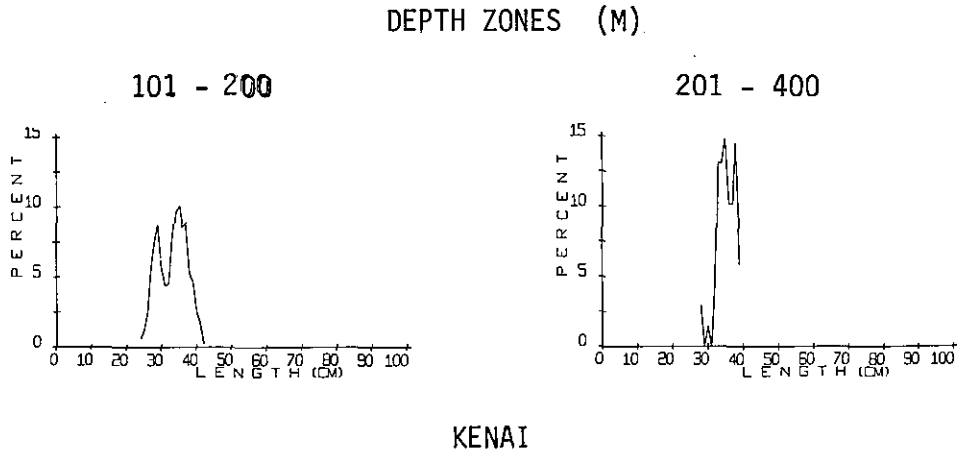


Figure XI-323.--Percentage length frequencies of Pacific ocean perch from the Gulf of Alaska (Cruise 628).

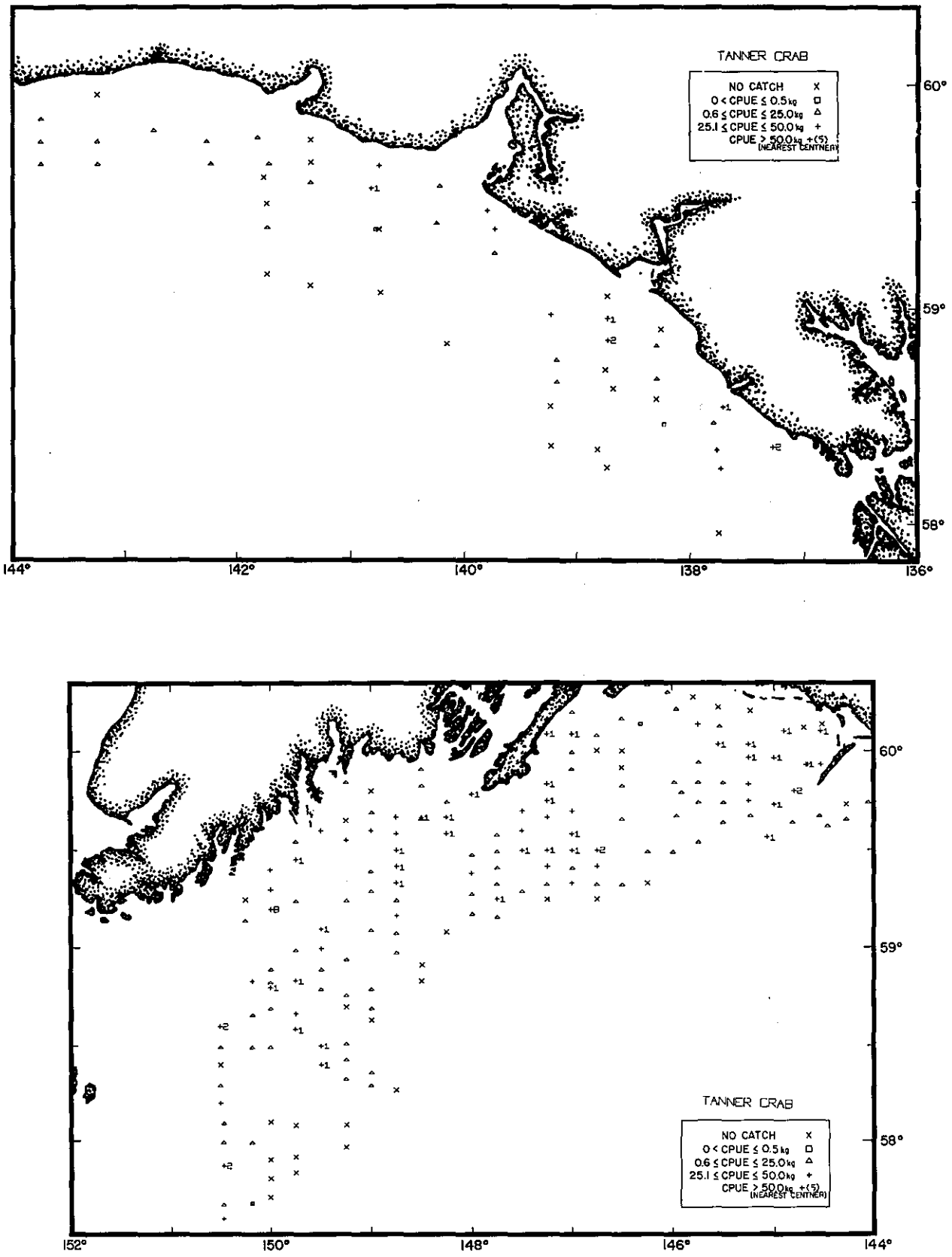


Figure XI-324.--Distribution of standardized catch rates in kg/hr of Tanner crab in the eastern Gulf of Alaska, June-Aug. 1962 (Cruise 628).

Size composition.--Random length frequencies taken in the Kenai outer shelf indicated a range of 23-42 cm with an average of 33.0 cm while in the upper slope the specimens ranged from 28-39 cm and averaged 35.1 cm (Figure XI-323).

TANNER CRAB

Distribution and abundance.--Tanner crab were taken from all regions-depth zones sampled and averaged 25 kg/hr over the entire survey area (Table XI-64). Mean CPUE's were highest in the outer shelf and upper slope but declined considerably in the inner shelf (Figures XI-324-325). The Prince William, Fairweather and Kenai regions had similar mean CPUE's which ranged from 26-30 kg/hr while the Yakutat region was considerably below the survey average for this species.

Biomass.--The apparent biomass of Tanner crab has been estimated at 37 thousand mt, of which 73% occurred in the outer shelf, 22% in the upper slope, and 5% in the inner shelf. The Kenai region accounted for 47% of the biomass with most of this estimate coming from the outer shelf. Contributions from the remaining regions ranged from 11-23% of the total biomass of this species. Tanner crab biomass estimates should be considered minimal as otter trawls fished at the towing speeds used during these surveys do not adequately sample the larger male crabs.

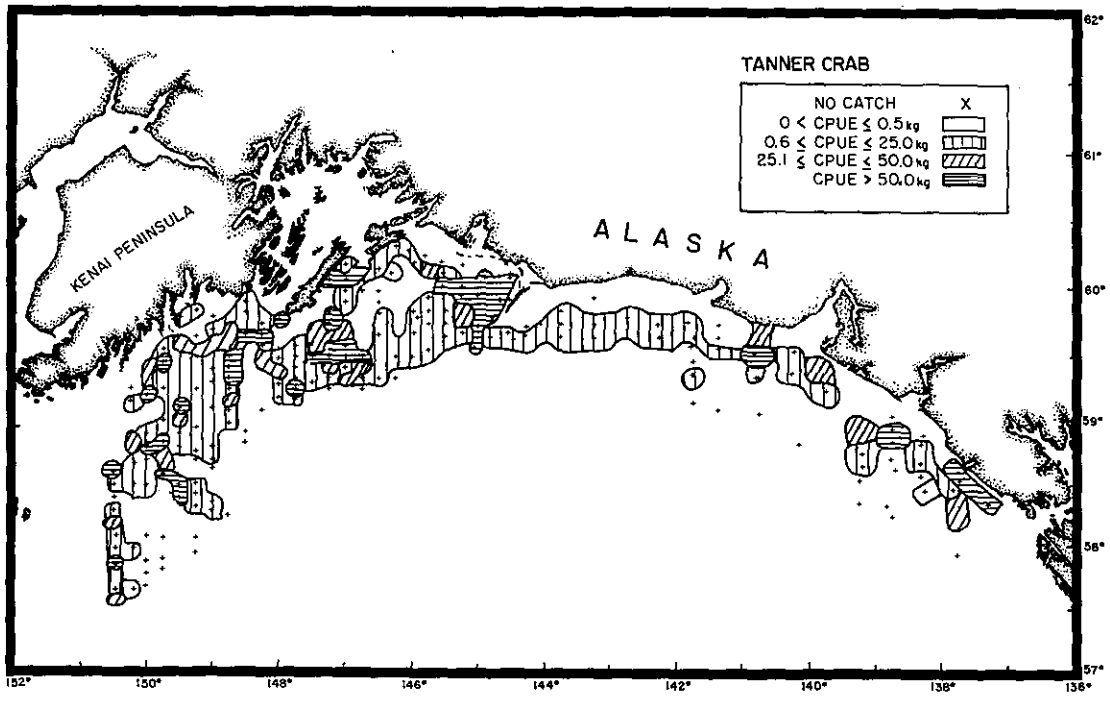


Figure XI-325.--Distribution of apparent relative abundance of Tanner crab in the eastern Gulf of Alaska, June-Aug. 1962 (Cruise 628).

Table XI-64.--Estimated biomass and population size of Tanner crab (Chionoecetes sp.) in the Gulf of Alaska during June-August. 1962.

Region	Depth zone (m)	CPUE[1] (kg/hr)	Estimated biomass (mt)	Proportion of total estimated biomass	Estimated population (X 10^6)	Proportion of total estimated population	Mean size per individual[2] Weight (kg)	Length (cm)
Fairweather	1-100	0.6	24.3	0.3	0.1	0.5	0.38	--
	101-200	26.6	5,161.8	71.7	17.8	86.0	0.29	--
	201-400	56.2	2,016.1	28.0	2.8	13.5	0.73	--
	All zones	26.4	7,202.2	19.4	20.7	23.8	0.35	--
Yakutat	1-100	7.1	526.7	13.3	1.3	22.0	0.41	--
	101-200	9.2	1,608.5	40.5	2.5	42.4	0.64	--
	201-400	22.5	1,838.1	46.2	2.1	35.6	0.86	--
	All zones	12.0	3,973.3	10.7	5.9	6.8	0.67	--
Prince William	1-100	7.3	956.1	11.4	1.4	6.7	0.69	--
	101-200	35.6	5,351.8	63.5	15.4	73.7	0.35	--
	201-400	48.6	211.2	25.1	73.7	19.6	0.51	--
	All zones	25.9	8,420.0	22.7	20.9	24.1	0.40	--
Kenai	1-100	4.0	420.6	2.4	1.3	3.3	0.33	--
	101-200	43.1	14,999.7	85.6	32.7	83.0	0.46	--
	201-400	15.4	2,092.1	12.0	5.4	13.7	0.39	--
	All zones	29.8	17,512.4	47.2	39.4	45.3	0.44	--
Total	1-100	5.5	1,927.7	5.2	4.1	4.7	0.47	--
	101-200	31.3	27,121.8	73.1	68.4	78.7	0.40	--
	201-400	27.1	8,058.4	21.7	14.4	16.6	0.56	--
	All zones	24.5	37,107.9	100.0	86.9	100.0	0.43	--

1/ Mean catch per unit effort, in kilograms per hour trawled.
2/ Where data are available.
3/ Less than 0.1 kg/hr.
4/ Less than 0.1 X 10^6 individuals.
5/ Less than 0.1 percent.

PACIFIC HALIBUT

Distribution and abundance.--Pacific halibut occurred in all regions-depth zones surveyed and had a relative apparent abundance of 16 kg/hr. (Table XI-65). Mean CPUE's increased with decreasing bottom depth with the highest mean catch rate occurring on the inner shelf followed by the outer shelf and upper slope (Figure XI-326). The Fairweather, Prince William, and Kenai regions exceeded the survey average with a particularly high catch rate (91 kg/hr) occurring in the Fairweather inner shelf.

Biomass.--The biomass of Pacific halibut has been estimated at 25 thousand mt, of which 58% occurred on the inner shelf, 40% on the outer shelf, and 2% on the upper slope. The total biomass was relatively evenly divided among the four regions with Kenai making the largest contribution (39%) and Yakutat the smallest (14%). Because of the relatively low speeds utilized during trawling operations, the larger, more powerful halibut probably escape the sampling gear resulting in a low biomass estimate.

Size composition.--No length frequency data are available for this species.

REX SOLE

Distribution and abundance.--Rex sole were taken throughout all regions and depth zones, with an apparent relative abundance of nearly 15 kg/hr (Table XI-66). Mean CPUE's increased significantly with depth; the highest density distribution occurring in the upper slope followed by the outer and inner shelf (Figure XI-327). In the Kenai region, the mean catch rate exceeded the survey average but declined to below average in the remaining regions. Highest mean CPUE's occurred in the Fairweather upper slope and the Kenai outer shelf and upper slope.

Biomass.--The biomass of rex sole has been estimated at 22 thousand mt, of which 53% occurred in the outer shelf, 39% in the upper slope and only 8% in the inner shelf. The Kenai region made the largest contribution (60%) while the remaining regions made relatively equal contributions which ranged from 12-15%.

Size composition.--Length frequency distributions are available from the Kenai upper slope where rex sole, sexes combined, ranged in size from 25-47 cm and averaged 36 cm (Figure XI-328).

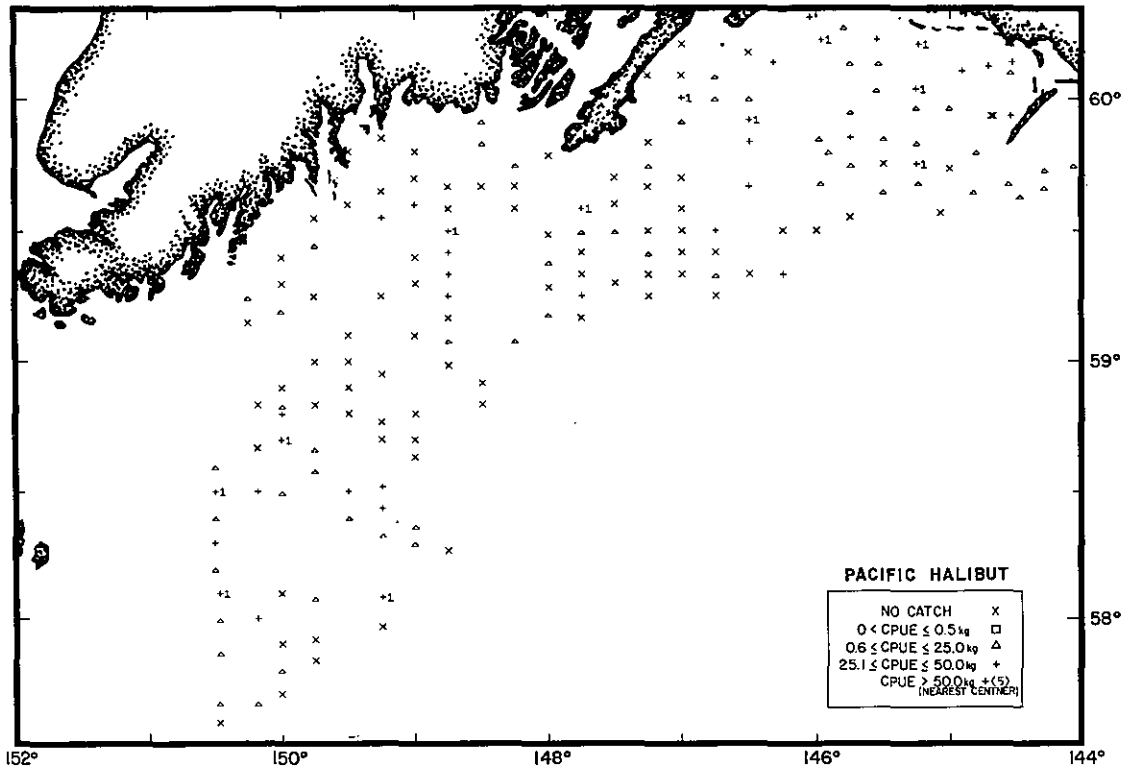
WALLEYE POLLOCK

Distribution and abundance.--Walleye pollock were not taken from the Kenai inner shelf but appeared in the remaining regions-depth zones averaging 14 kg/hr over the entire survey area (Table XI-67). The highest relative apparent abundance occurred in the outer shelf depth zone followed by the upper slope and inner shelf (Figure XI-329). The largest concentrations of pollock were found in the Prince William region (26 kg/hr) where mean CPUE's were highest in the outer shelf and upper slope (Figure XI-330). Mean catch rates in the remaining regions varied from 3-16 kg/hr.

Table XI-65.--Estimated biomass and population size of halibut (Hippoglossus stenolepis) in the Gulf of Alaska During June-August 1962.

Region	Depth zone (m)	CPUE[1/] (kg/hr)	Estimated biomass (mt)	Proportion of total estimated biomass	Estimated population (X 10^6)	Proportion of total estimated population	Mean size per individual[2/] Weight (kg)	Mean size per individual[2/] Length (cm)
Fairweather	1-100	90.9	3,898.5	72.7	2.3	85.2	1.67	--
	101-200	7.0	1,366.9	25.5	0.4	14.8	3.21	--
	201-400	2.6	93.8	1.8	4/	5/	3.92	--
	All zones	19.6	5,359.2	21.4	2.7	23.1	1.98	--
Yakutat	1-100	26.7	1,970.6	55.9	1.5	75.0	1.29	--
	101-200	8.7	1,519.2	43.1	0.5	25.0	3.21	--
	201-400	0.4	33.4	1.0	4/	5/	2.45	--
	All zones	10.7	3,523.2	14.1	2.0	17.1	1.76	--
Prince William	1-100	33.1	4,370.1	68.7	2.4	85.7	1.82	--
	101-200	13.2	1,978.2	31.1	0.4	14.3	5.53	--
	201-400	0.3	15.0	0.2	4/	5/	4.49	--
	All zones	19.5	6,363.3	25.5	2.8	23.9	2.27	--
Kenai	1-100	40.4	4,211.4	43.2	3.2	76.2	1.30	--
	101-200	14.7	5,133.1	52.6	1.0	23.8	5.08	--
	201-400	3.0	414.4	4.2	4/	5/	12.87	--
	All zones	16.5	9,785.9	39.0	4.2	35.9	2.32	--
Total	1-100	41.0	14,450.6	57.8	9.4	80.3	1.54	--
	101-200	11.5	9,997.4	40.0	2.3	19.7	4.35	--
	201-400	1.8	556.6	2.2	4/	5/	7.61	--
	All zones	16.4	25,004.6	100.0	11.7	100.0	2.14	--

1/ Mean catch per unit effort, in kilograms per hour trawled.
2/ Where data are available.
3/ Less than 0.1 kg/hr.
4/ Less than 0.1 X 10^6 individuals.
5/ Less than 0.1 percent.



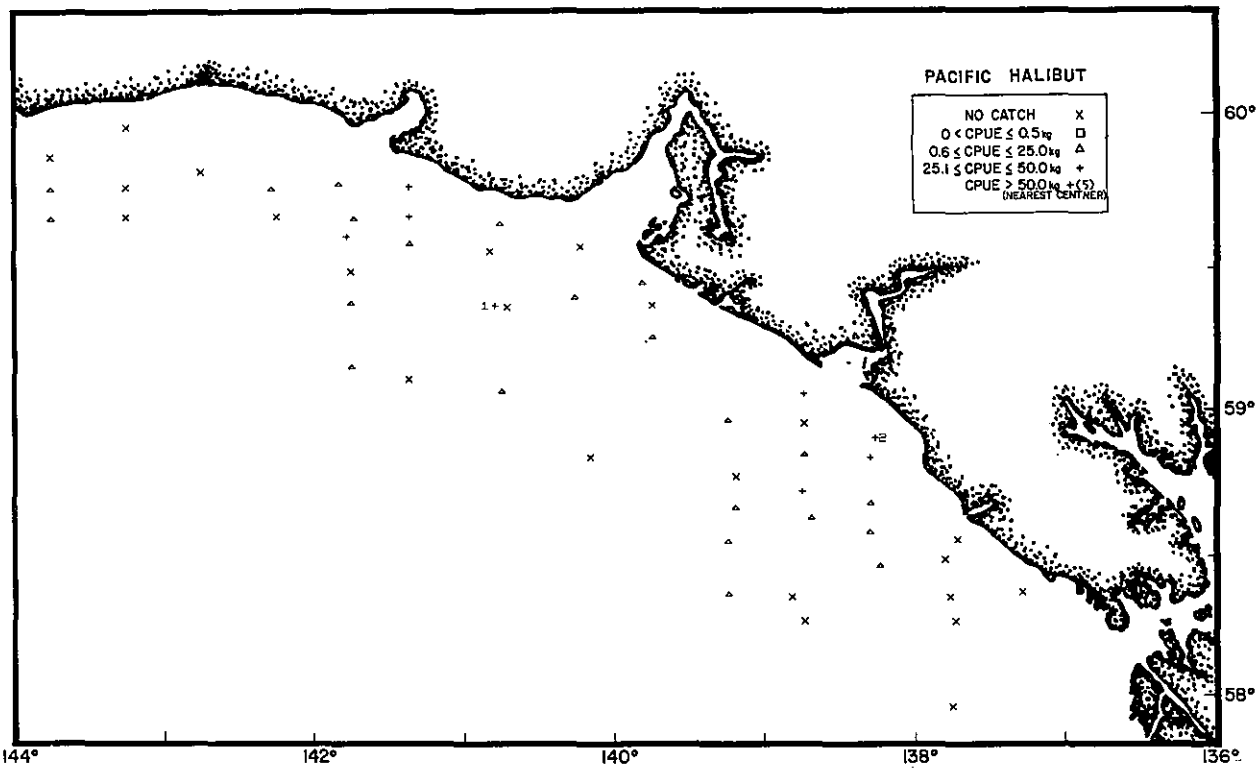
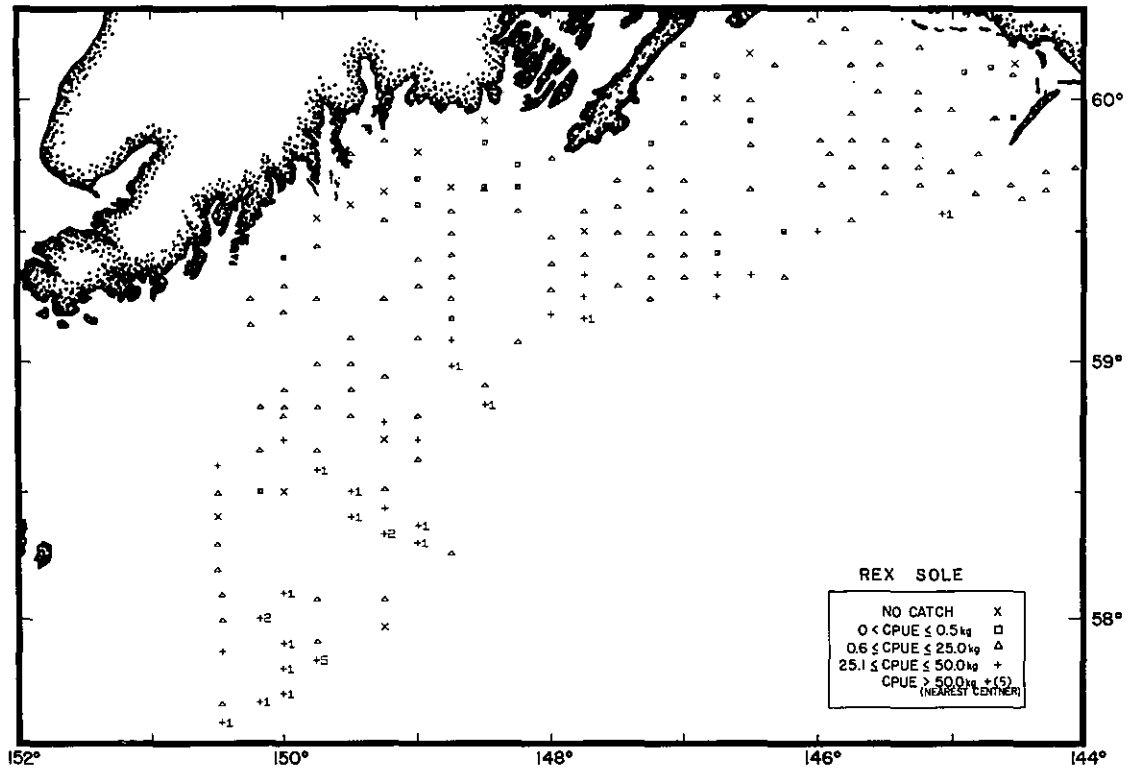


Figure XI-326.--Distribution of standardized catch rates in kg/hr of Pacific halibut in the eastern Gulf of Alaska, June-Aug. 1962 (Cruise 628).

Table XI-66.--Estimated biomass and population size of rex sole (Glyptocephalus zachirus) in the Gulf of Alaska during June-August 1962.

Region	Depth zone (m)	CPUE[1/] (kg/hr)	Estimated biomass (mt)	Proportion of total estimated biomass	Estimated population (X 10^6)	Proportion of total estimated population	Mean size per individual[2/] Weight (kg)	Length (cm)
Fairweather	1-100	5.7	243.2	7.4	0.8	6.2	0.30	--
	101-200	6.4	1,249.2	37.9	5.3	41.1	0.24	--
	201-400	50.3	1,802.5	54.7	6.8	52.7	0.27	--
	All zones	12.1	3,294.9	14.9	12.9	11.6	0.26	--
Yakutat	1-100	4.7	348.5	12.7	2.9	19.5	0.12	--
	101-200	4.8	839.7	30.6	4.8	32.2	0.18	--
	201-400	19.0	1,554.2	56.7	7.2	48.3	0.22	--
	All zones	8.3	2,742.4	12.4	14.9	13.3	0.18	--
Prince William	1-100	6.2	812.0	28.1	10.9	46.0	0.07	--
	101-200	9.4	1,407.8	48.8	9.3	39.2	0.15	--
	201-400	15.3	666.8	23.1	3.5	14.8	0.19	--
	All zones	8.9	2,886.6	13.0	23.7	21.3	0.12	--
Kenai	1-100	3.8	394.3	3.0	2.3	3.8	0.17	--
	101-200	23.6	8,208.7	62.0	39.5	65.8	0.21	--
	201-400	34.1	4,642.6	35.0	18.2	30.4	0.26	36.1
	All zones	22.5	13,245.6	59.7	60.0	53.8	0.22	--
Total	1-100	5.1	1,798.0	8.1	16.9	15.2	0.11	--
	101-200	13.5	11,705.4	52.8	58.9	52.8	0.20	--
	201-400	29.1	8,666.1	39.1	35.7	32.0	0.24	--
	All zones	14.6	22,169.5	100.0	111.5	100.0	0.20	--

1/ Mean catch per unit effort, in kilograms per hour trawled.
2/ Where data are available.
3/ Less than 0.1 kg/hr.
4/ Less than 0.1 X 10^6 individuals.
5/ Less than 0.1 percent.



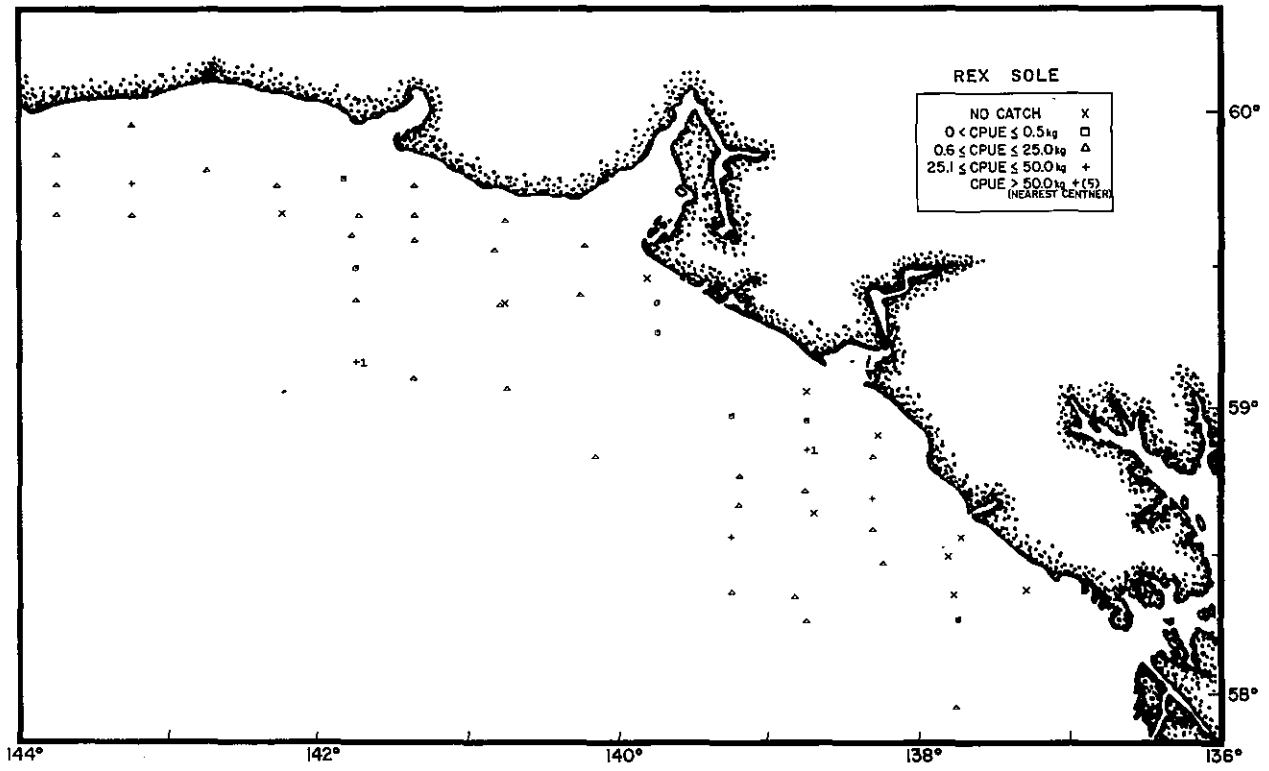
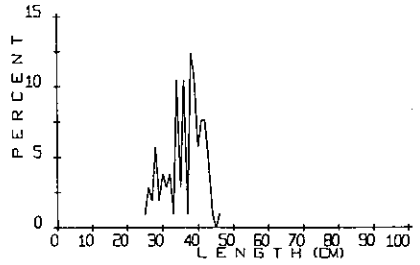


Figure XI-327.--Distribution of standardized catch rates in kg/hr of rex sole in the eastern Gulf of Alaska, June-Aug. 1962 (Cruise 628).

DEPTH ZONE (M)

201 - 400



KENAI

Figure XI-328.--Percentage length frequencies of rex sole from the Gulf of Alaska (Cruise 628).

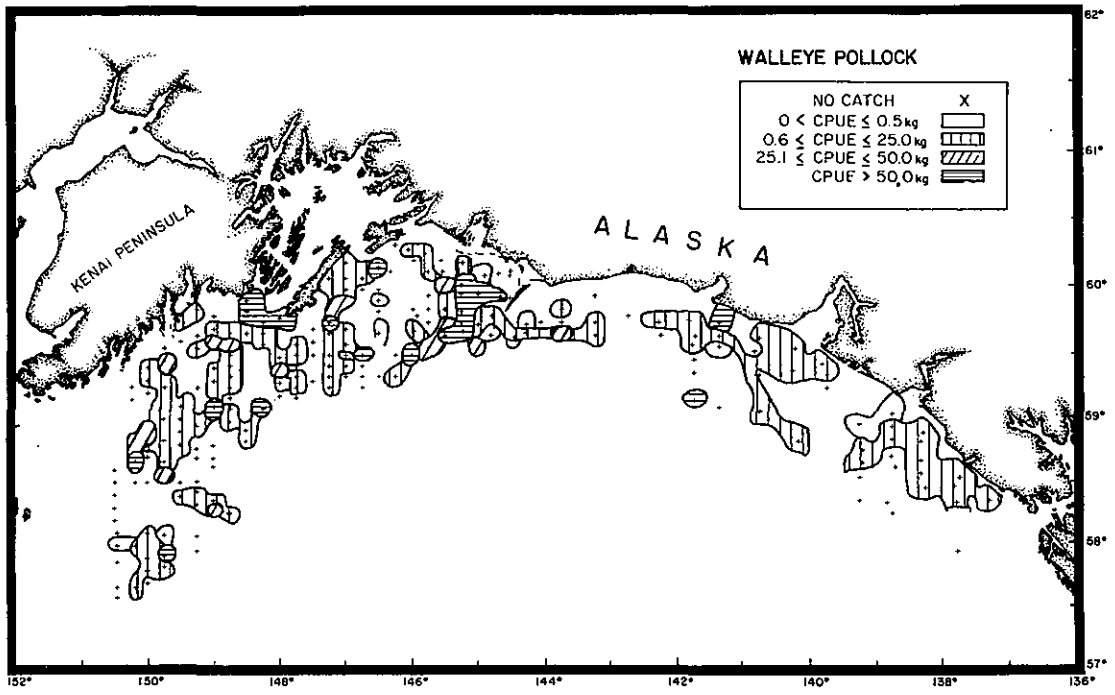
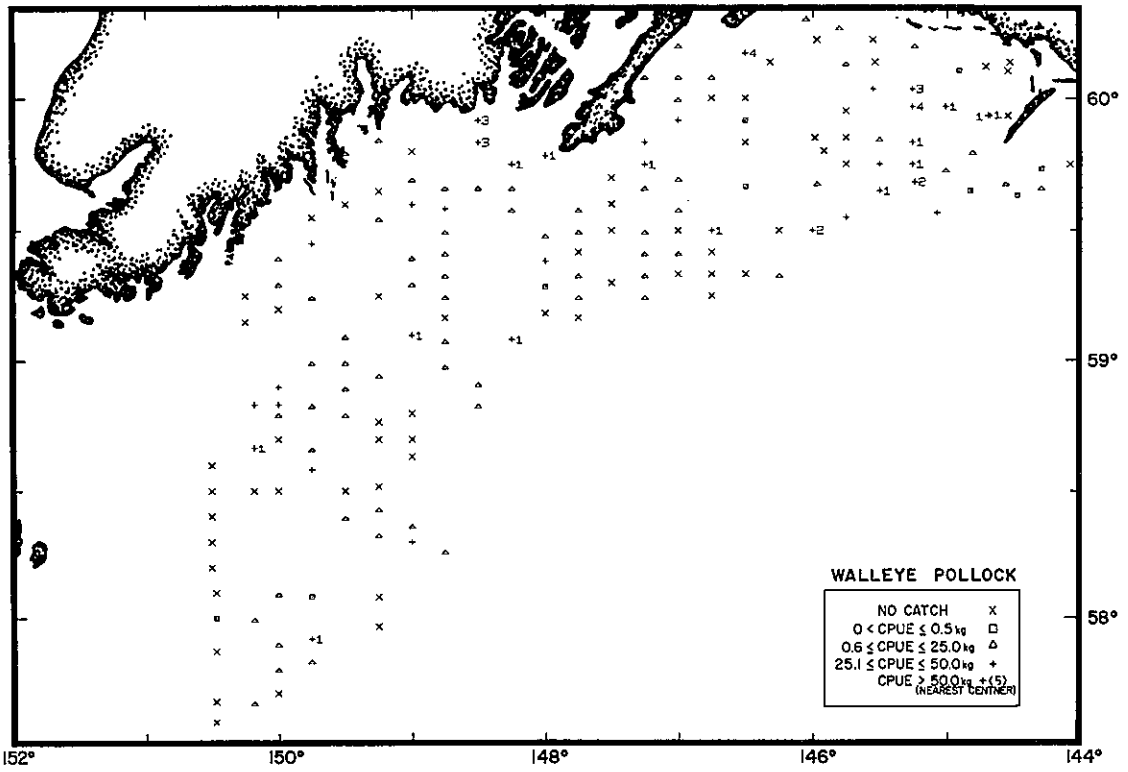


Figure XI-329.--Distribution of apparent relative abundance of walleye pollock in the eastern Gulf of Alaska, June-Aug. 1962 (Cruise 628).

Table XI-67.--Estimated biomass and population size of pollock (Theragra chalcogramma) in the Gulf of Alaska during June-August 1962.

Region	Depth zone (m)	CPUE[1] (kg/hr)	Estimated biomass (mt)	Proportion of total estimated biomass	Estimated population (X 10^6)	Proportion of total estimated population	Mean size per individual[2] Weight (kg)	Mean size per individual[2] Length (cm)
Fairweather	1-100	3.4	146.0	15.7	0.6	28.6	0.25	--
	101-200	2.6	504.7	54.1	1.1	52.4	0.48	--
	201-400	7.9	281.8	30.2	0.4	19.0	0.64	--
	All zones	3.4	932.5	4.3	2.1	4.5	0.44	--
Yakutat	1-100	12.7	938.8	29.3	2.3	33.3	0.40	--
	101-200	5.7	995.0	31.1	2.1	30.5	0.47	--
	201-400	15.5	2,167.7	39.6	2.5	36.2	0.50	--
	All zones	9.7	3,201.5	14.8	6.9	15.0	0.46	--
Prince William	1-100	0.9	129.8	1.6	0.3	2.4	0.38	--
	101-200	49.1	7,376.8	87.8	11.2	89.6	0.66	--
	201-400	20.5	893.2	10.6	1.0	8.0	0.87	--
	All zones	25.8	8,399.8	38.8	12.5	27.1	0.67	--
Kenai	1-100	0	0	0	0	0	--	--
	101-200	22.0	7,655.4	84.1	21.6	87.8	0.35	--
	201-400	10.7	1,451.5	15.9	3.0	12.2	0.48	--
	All zones	15.5	9,106.9	42.1	24.6	53.4	0.37	--
Total	1-100	3.4	1,214.6	5.6	3.2	6.9	0.38	--
	101-200	19.1	16,531.9	76.4	36.0	78.1	0.46	--
	201-400	13.1	3,894.2	18.0	6.9	15.0	0.56	--
	All zones	14.3	21,640.7	100.0	46.1	100.0	0.47	--

1/ Mean catch per unit effort, in kilograms per hour trawled.
2/ Where data are available.
3/ Less than 0.1 kg/hr.
4/ Less than 0.1 X 10^6 individuals.
5/ Less than 0.1 percent.



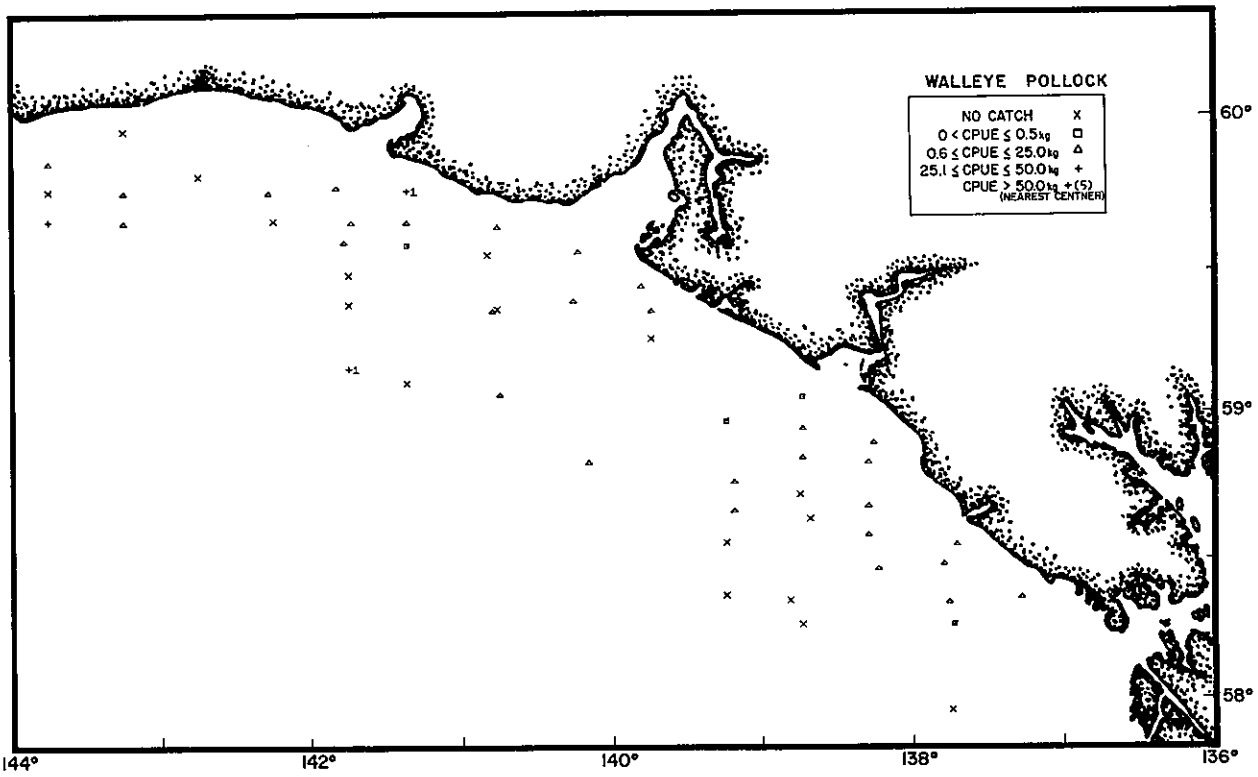


Figure XI-330.--Distribution of standardized catch rates in kg/hr of walleye pollock in the eastern Gulf of Alaska, June-Aug. 1962 (Cruise 628).

Biomass.--Of the nearly 22 thousand mt of estimated apparent pollock biomass, 76% occurred in the outer shelf, 18% in the upper slope and 6% in the inner shelf. The Prince William and Kenai regions contributed 39% and 42% respectively, while the Yakutat and Fairweather regions accounted for 15% and 4%. The combined estimate from the Prince William and Kenai outer shelf depth zones represents nearly 70% of the total biomass. The pollock biomass should be considered a minimum estimate since this is a semi-pelagic species and some unknown portion of the population may have occupied the water column above the sampling gear.

Size composition.--Pollock length frequencies were not taken during this survey.

SKATES

Distribution and abundance.--During these surveys, skates were not identified to individual species. Skates were not taken on the inner shelf of the Fairweather and Kenai regions but appeared in significant concentrations within the remaining regions-depth zones (Table XI-68). Apparent relative abundance increased slightly with increasing depth, and averaged 13 kg/hr over the entire survey (Figure XI-331). The Fairweather region had the highest mean CPUE, a result of large catches in the upper slope (73 kg/hr).

Biomass.--The total apparent skate biomass has been estimated at nearly 25 thousand mt of which 61% occurred in the outer shelf, 24% in the upper slope and 15% in the inner shelf. The Fairweather region made the largest contribution to the biomass (35%) followed by Prince William (27%), Kenai (20%) and Yakutat (17%).

PACIFIC COD

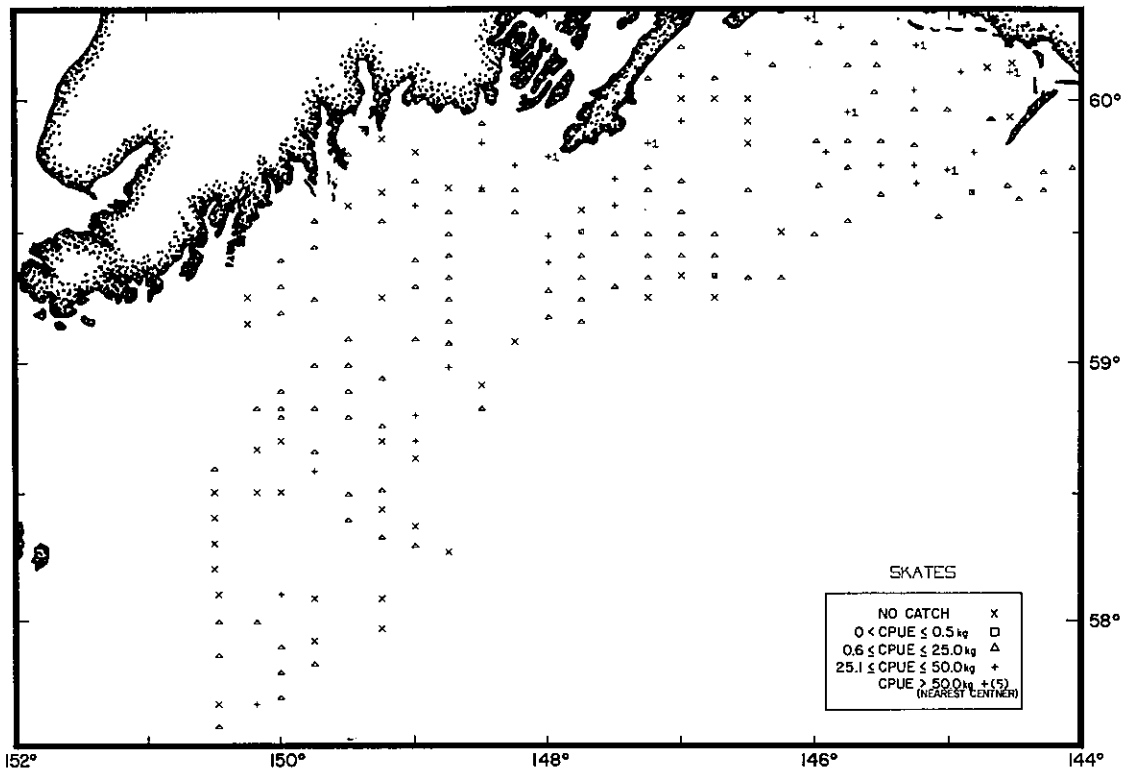
Distribution and abundance.--The highest concentrations of Pacific cod occurred in the Fairweather inner shelf and the Kenai inner and outer shelves (Table XI-69). Apparent relative abundance in the remaining region-depth zones was below the survey average (12 kg/hr) (Figure XI-332). Mean CPUE's were inversely related to bottom depth with values ranging from 3-21 kg/hr in the upper slope and inner shelf, respectively.

Biomass.--Of the estimated 18 thousand mt of apparent biomass, over 95% was concentrated on the continental shelf with the inner shelf accounting for 42% and the outer shelf 53%. The Kenai region contributed nearly 70% to the total biomass with the outer and inner shelves of this region accounting for 24 and 45% respectively. The Fairweather region made the remaining substantial contribution (17%) where 14% of the total Pacific cod biomass occurred in the inner shelf. Although Pacific cod are mainly demersal, unknown portions of the population may have occupied the water column above the sampling gear resulting in a low biomass estimate.

Table XI-68.--Estimated biomass and population size of skates (Rajidae) in the Gulf of Alaska during June-August 1962.

Region	Depth zone (m)	CPUE[1/] (kg/hr)	Estimated biomass (mt)	Proportion of total estimated biomass	Estimated population (X 10^6)	Proportion of total estimated population	Mean size per individual [2/] Weight (kg)	Length (cm)
Fairweather	1-100	0	0	0	0	0	--	--
	101-200	31.4	6,095.2	70.1	3.2	68.1	1.89	--
	201-400	72.7	2,605.2	29.9	1.5	31.9	1.73	--
	All zones	31.9	8,700.4	35.3	4.7	37.3	1.85	--
Yakutat	1-100	3.8	281.4	6.7	0.1	4.3	1.91	--
	101-200	16.6	2,891.7	68.7	1.4	60.9	2.01	--
	201-400	12.7	1,039.4	24.6	0.8	34.8	1.39	--
	All zones	12.8	4,212.5	17.1	2.3	18.2	1.83	--
Prince William	1-100	25.2	3,321.6	49.6	0.7	31.8	4.78	--
	101-200	17.7	2,665.4	39.8	1.1	50.0	2.32	--
	201-400	16.4	713.7	10.6	0.4	18.2	1.71	--
	All zones	20.6	6,700.7	27.2	2.2	17.5	3.05	--
Kenai	1-100	0	0	0	0	0	--	--
	101-200	9.6	3,355.9	67.0	2.5	73.5	1.32	--
	201-400	12.2	1,654.8	33.0	0.9	26.5	1.91	--
	All zones	8.5	5,010.7	20.4	3.4	27.0	1.47	--
Total	1-100	10.2	3,603.0	14.6	0.8	6.3	4.50	--
	101-200	13.4	15,008.2	61.0	8.2	65.1	1.83	--
	201-400	14.7	6,013.1	24.4	3.6	28.6	1.67	--
	All zones	12.9	24,624.3	100.0	12.6	100.0	1.95	--

1/ Mean catch per unit effort, in kilograms per hour trawled.
2/ Where data are available.
3/ Less than 0.1 kg/hr.
4/ Less than 0.1 X 10^6 individuals.
5/ Less than 0.1 percent.



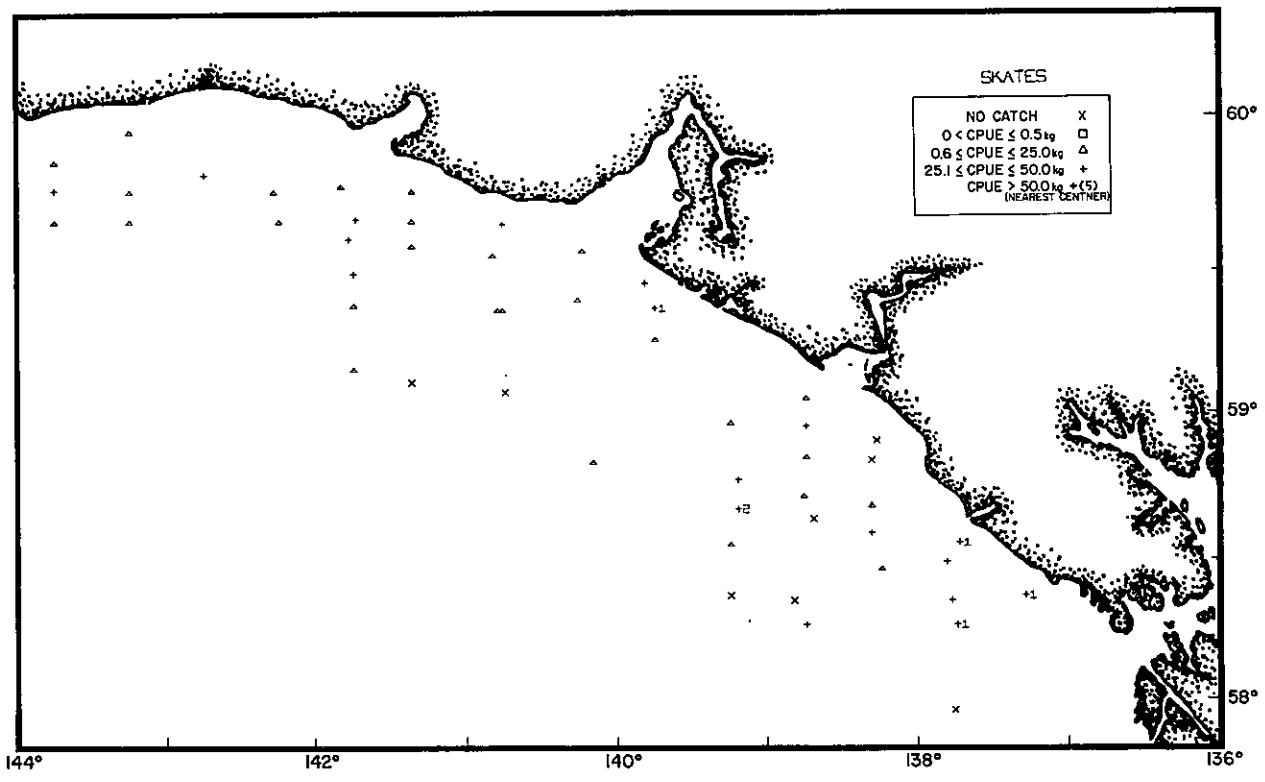


Figure XI-331.--Distribution of standardized catch rates in kg/hr of skates in the eastern Gulf of Alaska, June-Aug. 1962 (Cruise 628).

Table XI-69.--Estimated biomass and population size of Pacific cod (Gadus macrocephalus) in the Gulf of Alaska during June-August 1962.

Region	Depth zone (m)	CPUE[1/] (kg/hr)	Estimated biomass (mt)	Proportion of total estimated biomass	Estimated population (X 10^6)	Proportion of total estimated population	Mean size per individual[2/] Weight (kg)	Length (cm)
Fairweather	1-100	59.3	2,544.2	85.2	0.6	75.0	4.24	--
	101-200	0.9	176.2	5.9	0.1	12.5	2.38	--
	201-400	7.4	265.6	8.9	0.1	12.5	2.78	--
	All zones	10.9	2,986.0	16.7	0.8	4.7	3.73	--
Yakutat	1-100	5.9	437.6	40.6	0.4	36.4	1.14	--
	101-200	2.7	468.1	43.4	0.4	36.4	1.13	--
	201-400	2.1	172.6	16.0	0.3	27.2	0.60	--
	All zones	3.3	1,078.3	6.1	1.1	6.5	0.98	--
Prince William	1-100	2.3	305.0	23.1	0.2	25.0	1.39	--
	101-200	5.4	804.6	61.0	0.5	62.5	1.62	--
	201-400	4.8	209.7	15.9	0.1	12.5	2.73	--
	All zones	4.1	1,319.3	7.4	0.8	4.8	1.65	--
Kenai	1-100	40.7	4,248.2	34.2	4.9	34.5	0.86	--
	101-200	22.9	7,971.3	64.1	9.2	64.8	0.87	42.5
	201-400	1.6	216.5	1.7	0.1	0.7	2.14	--
	All zones	21.1	12,436.0	69.8	14.2	84.0	0.88	--
Total	1-100	21.3	7,535.0	42.3	6.1	36.1	1.24	--
	101-200	10.9	9,420.2	52.9	10.2	60.4	0.92	--
	201-400	2.9	864.4	4.8	0.6	3.5	1.44	--
	All zones	11.7	17,819.6	100.0	16.9	100.0	1.05	--

1/ Mean catch per unit effort, in kilograms per hour trawled.
2/ Where data are available.
3/ Less than 0.1 kg/hr.
4/ Less than 0.1 X 10^6 individuals.
5/ Less than 0.1 percent.

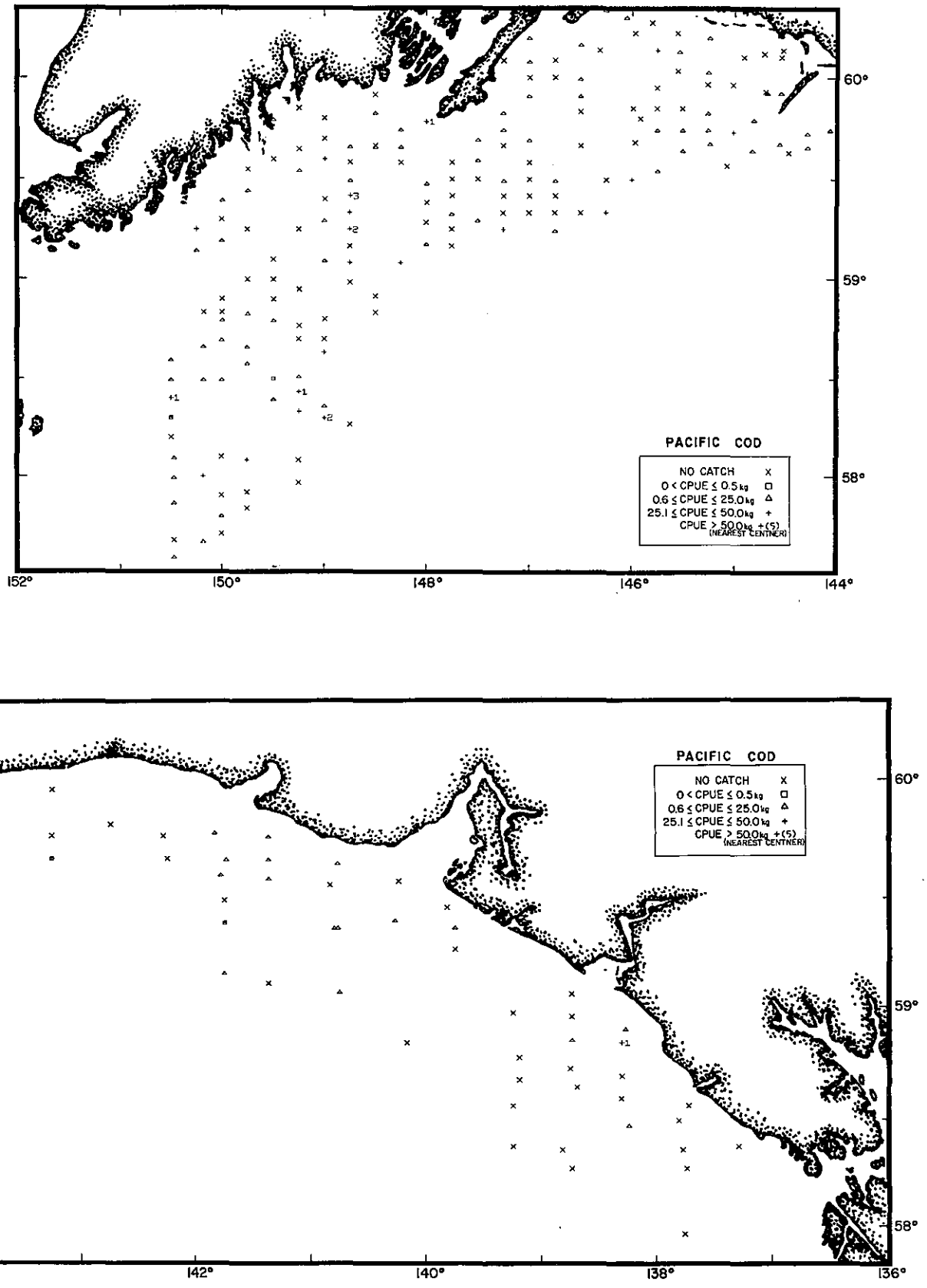


Figure XI-332.--Distribution of standardized catch rates in kg/hr of Pacific cod in the eastern Gulf of Alaska, June-Aug. 1962 (Cruise 628).

Size composition.--Random length frequencies were taken in the Kenai outer shelf where Pacific cod ranged from 33-83 cm and averaged 42.5 cm (Figure XI-333).

SCALLOPS

Distribution and abundance.--Scallops had a relatively restricted geographic and bathymetric distribution with most concentrations occurring in shallow waters of the eastern Gulf regions (Table XI-70). Highest catch rates were in the Fairweather-inner shelf (205 kg/hr) and Yakutat-inner and outer shelf (47 and 22 kg/hr) (Figure XI-334). Scallops were not taken from the Kenai region, the Fairweather-outer shelf, and the upper slope depth zone of all regions.

Biomass.--Of the nearly 16 thousand mt of estimated apparent biomass, 74% occurred in the inner shelf and 26% in the outer shelf. Fifty-three percent of the biomass was contained in the Fairweather-inner shelf while the combined Yakutat-inner and outer shelf accounted for 44%. The biomass estimate for scallops should be considered minimal as the otter trawl is an inefficient gear for harvesting scallops.

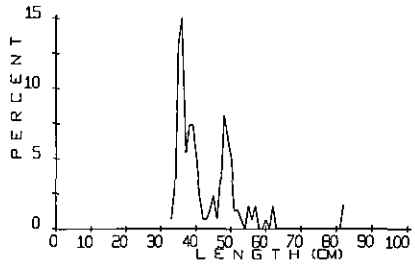
Size composition.--No length frequency data were collected for this species group.

COTTIDS

Distribution and abundance.--During the early Gulf of Alaska surveys, cottids were not identified to species but rather placed in the family grouping Cottidae. The density distribution of cottids was greatest on

DEPTH ZONE (M)

101 - 200



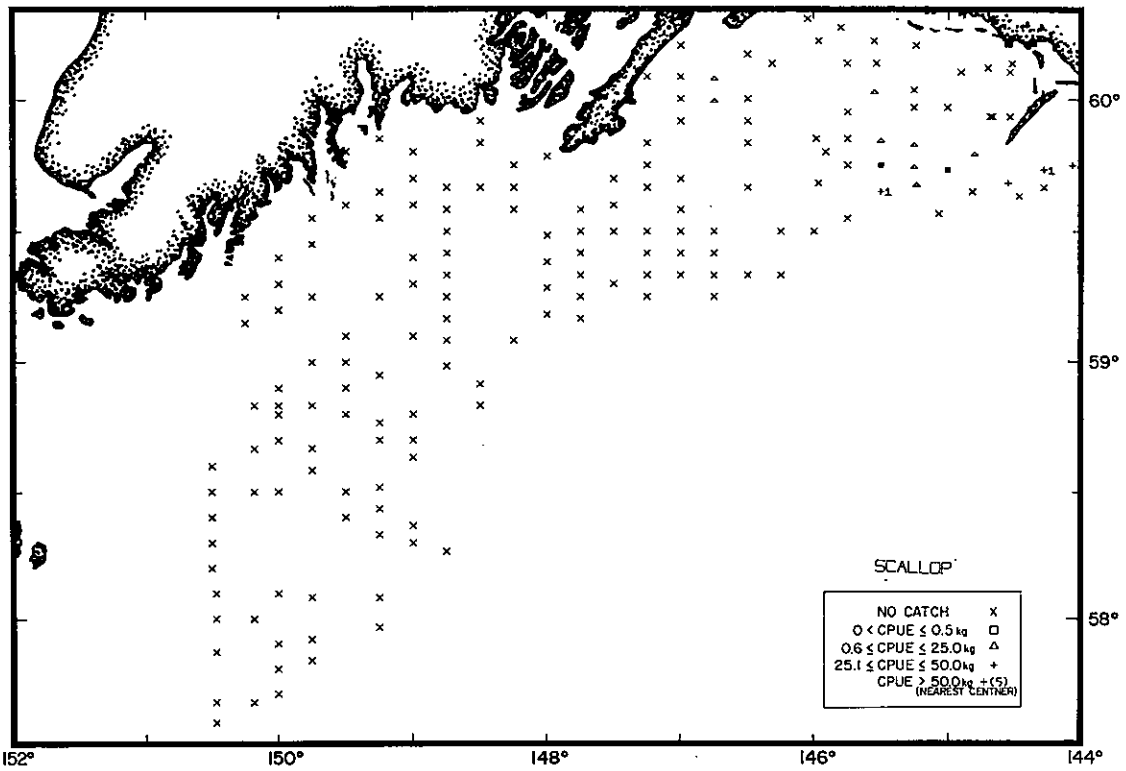
KENAI

Figure XI-333.--Percentage length frequencies of Pacific cod from the Gulf of Alaska (Cruise 628).

Table XI-70.--Estimated biomass and population size of scallops (Pectinidae) in the Gulf of Alaska during June-August 1962.

Region	Depth zone (m)	CPUE[1/] (kg/hr)	Estimated biomass (mt)	Proportion of total estimated biomass	Estimated population (X 10^6)	Proportion of total estimated population	Mean size per individual[2/] Weight (kg)	Mean size per individual[2/] Length (cm)
Fairweather	1-100	204.8	8,787.3	100.0	33.5	100.0	0.26	--
	101-200	0	0	0	0	0	--	--
	201-400	0	0	0	0	0	--	--
	All zones	32.2	8,787.3	52.7	33.5	56.0	0.26	--
Yakutat	1-100	47.4	3,501.3	47.3	12.6	51.4	0.28	--
	101-200	22.4	47.3	52.7	11.9	48.6	0.33	--
	201-400	0	0	0	0	0	--	--
	All zones	22.4	7,400.6	44.4	24.5	41.0	0.30	--
Prince William	1-100	0.1	9.9	2.1	0.1	5.6	0.11	--
	101-200	3.2	473.9	97.9	1.7	94.4	0.28	--
	201-400	0	0	0	0	0	--	--
	All zones	1.5	483.8	2.9	1.8	3.0	0.27	--
Kenai	1-100	0	0	0	0	0	--	--
	101-200	0	0	0	0	0	--	--
	201-400	0	0	0	0	0	--	--
	All zones	0	0	0	0	0	--	--
Total	1-100	34.9	12,298.5	73.8	46.2	77.3	0.27	--
	101-200	5.1	4,373.2	26.2	13.6	22.7	0.32	--
	201-400	0	0	0	0	0	--	--
	All zones	11.2	16,671.7	100.0	59.8	100.0	0.28	--

1/ Mean catch per unit effort, in kilograms per hour trawled.
2/ Where data are available.
3/ Less than 0.1 kg/hr.
4/ Less than 0.1 X 10^6 individuals.
5/ Less than 0.1 percent.



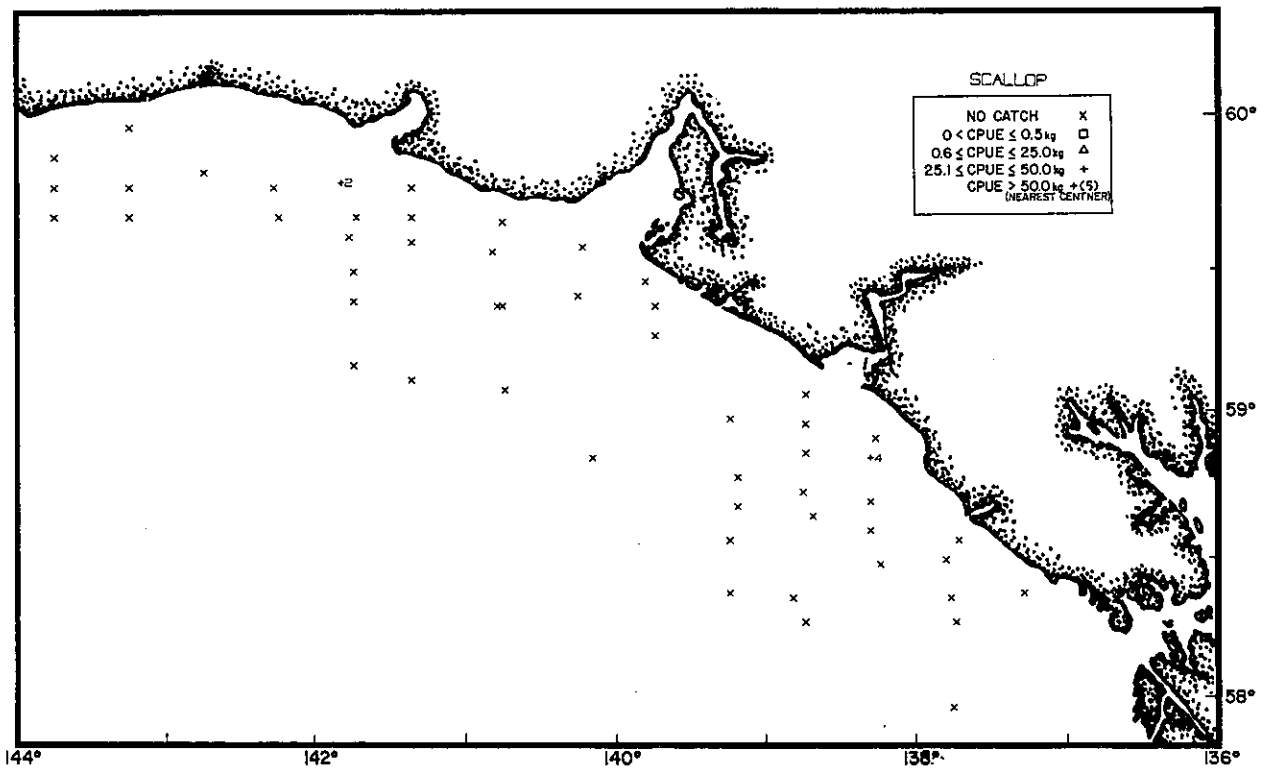


Figure XI-334.--Distribution of standardized catch rates in kg/hr of scallop in the eastern Gulf of Alaska, Sept.-Nov. 1962 (Cruise 629).

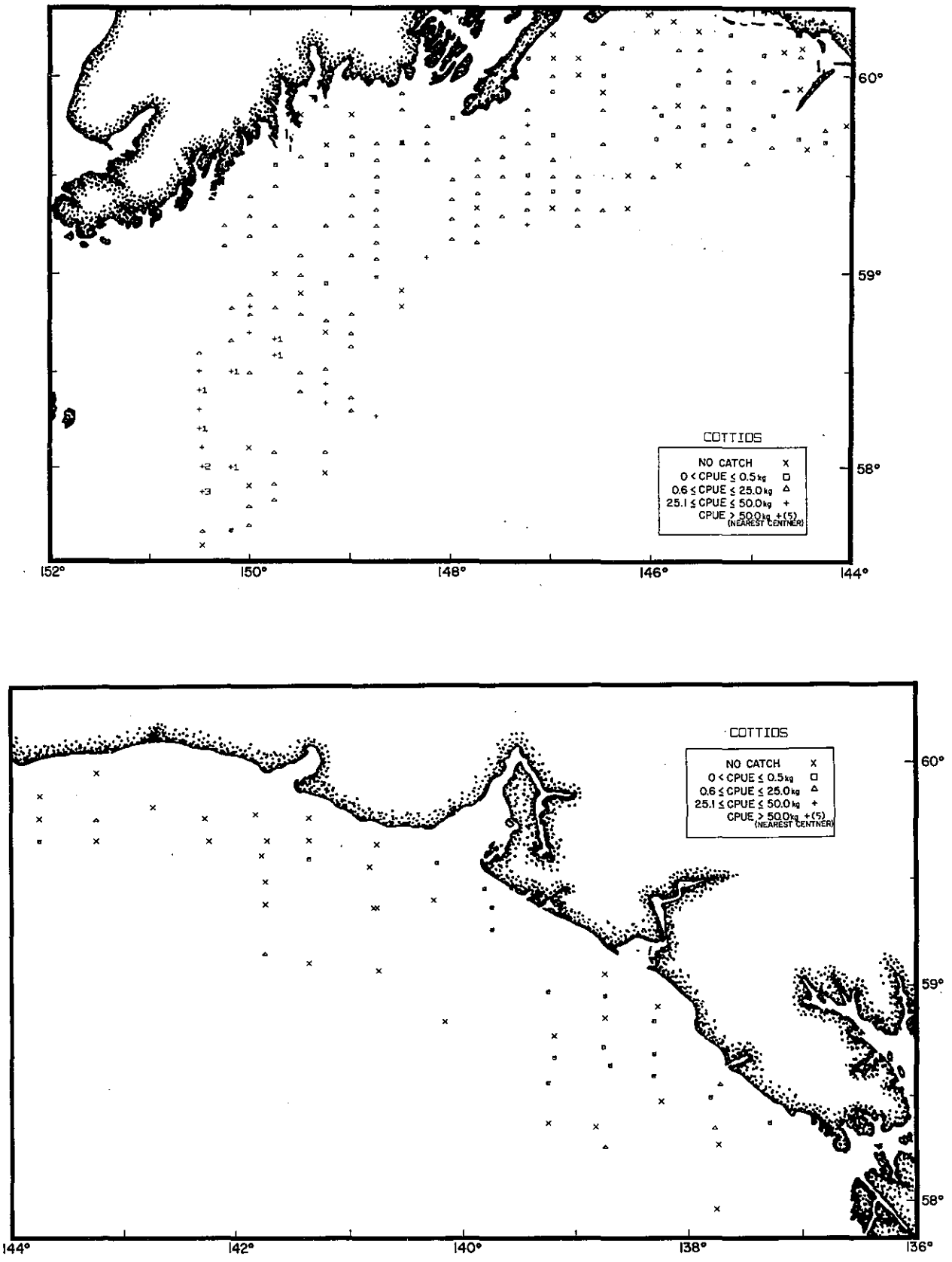
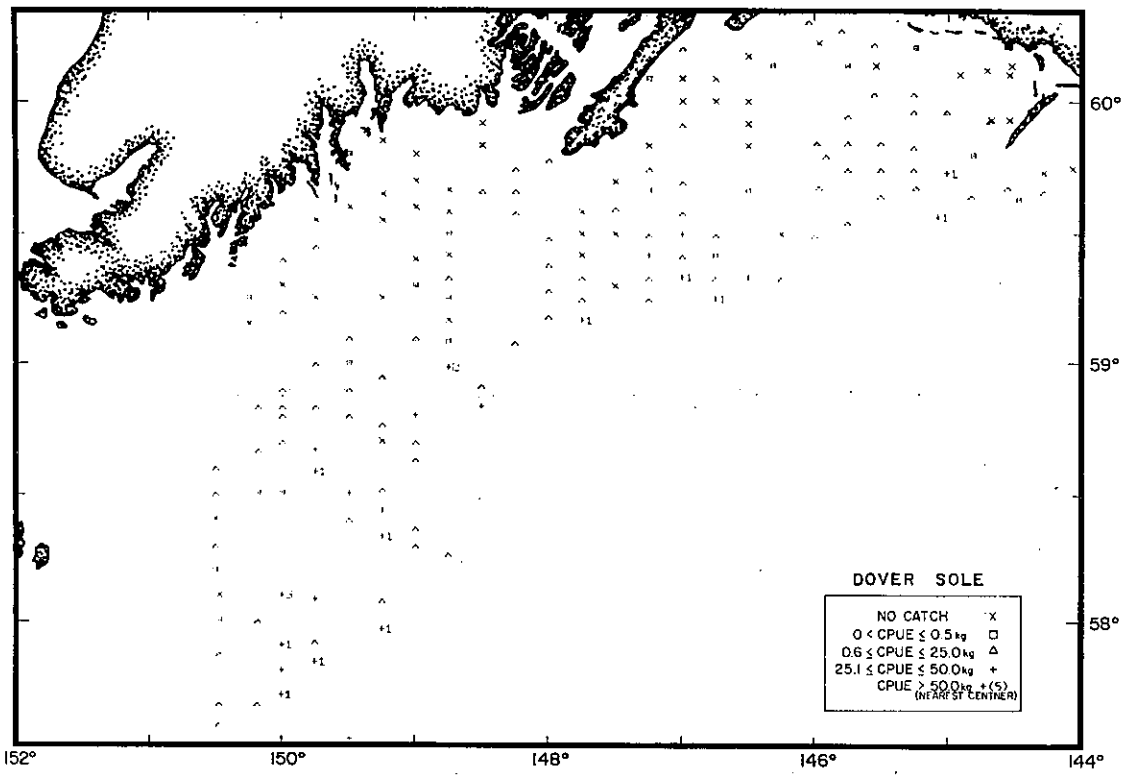


Figure XI-335.--Distribution of standardized catch rates in kg/hr of cottids in the eastern Gulf of Alaska, June-Aug. 1962 (Cruise 628).



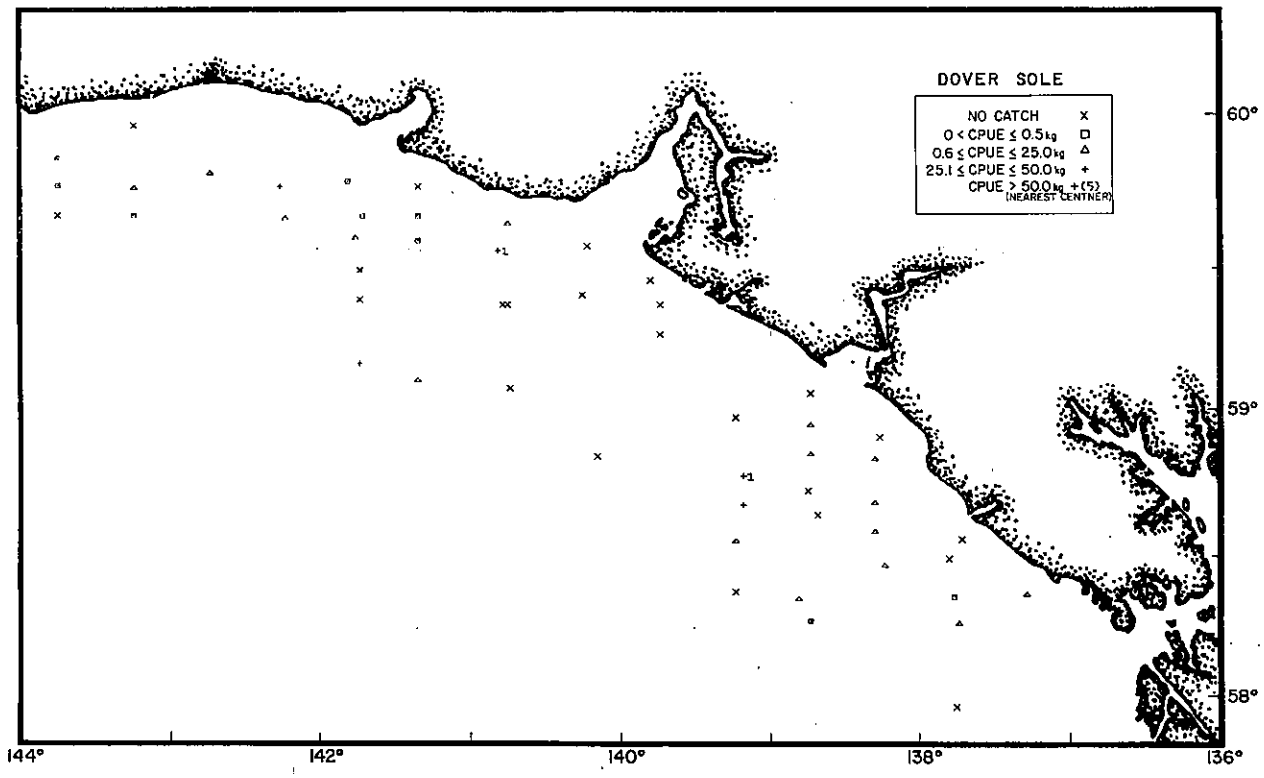


Figure XI-336.--Distribution of standardized catch rates in kg/hr of Dover sole in the eastern Gulf of Alaska, June-Aug. 1962 (Cruise 628).

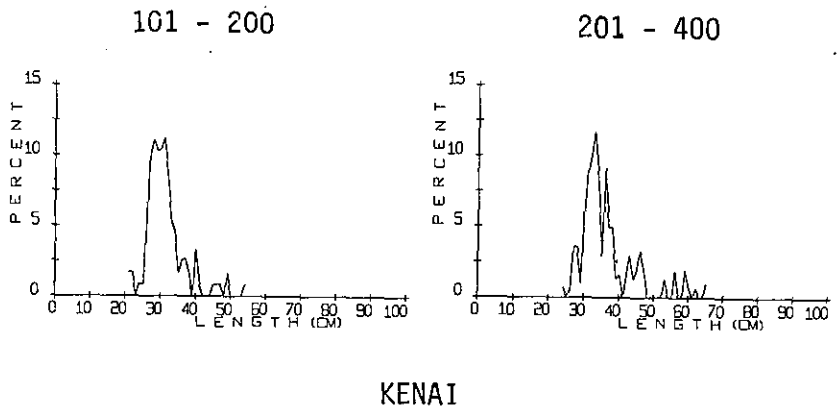


Figure XI-337.--Percentage length frequencies of Dover sole from the Gulf of Alaska (Cruise 628).

the continental shelf of the westernmost regions covered during the survey (Table XI-71 and Figure XI-335). The Kenai region accumulated the highest mean catch rate, a result of relatively high concentrations in the inner and outer shelf. While apparent abundance was below the survey average of 10 kg/hr in the remaining regions.

Biomass.--Of the estimated 14 thousand mt of cottids, almost 96% were concentrated on the continental shelf. Sixty percent of the apparent biomass came from the outer shelf, 36% from the inner shelf, and only 5% from the upper slope. The Kenai region contained 93% of the estimated biomass with estimates declining rapidly to the east.

Size composition.--No length frequency data were collected for this species group.

DOVER SOLE

Distribution and abundance.--Dover sole appeared in all regions sampled with mean catch rates increasing with bottom depth (Table XI-72). Catch rates increased from 1 kg/hr in the inner shelf to 28 kg/hr in the upper slope and averaged 9 kg/hr over the survey area (Figure XI-336). Mean CPUE's did not vary greatly between regions with Fairweather having the lowest apparent relative abundance and Kenai the highest.

Table XI-71.--Estimated biomass and population size of cottids (Cottidae) in the Gulf of Alaska during June-August 1962.

Region	Depth zone (m)	CPUE[1/] (kg/hr)	Estimated biomass (mt)	Proportion of total estimated biomass	Estimated population (X 10^6)	Proportion of total estimated population	Mean size per individual[2/] Weight (kg)	Length (cm)
Fairweather	1-100	0.2	9.7	12.6	4/	5/	0.23	--
	101-200	0.3	64.8	83.9	0.7	100.0	0.09	--
	201-400	0.1	2.7	3.5	4/	5/	0.06	--
	All zones	0.3	77.2	0.5	0.7	1.1	0.11	--
Yakutat	1-100	0	0	0	0	0	--	--
	101-200	0.3	53.4	34.1	0.4	50.0	0.13	--
	201-400	1.3	103.3	65.9	0.4	50.0	0.24	--
	All zones	0.5	156.7	1.1	0.8	1.3	0.20	--
Prince William	1-100	0.2	29.0	3.5	0.3	9.1	0.10	--
	101-200	4.7	709.0	84.7	2.8	84.9	0.25	--
	201-400	2.3	99.2	11.8	0.2	6.0	0.80	--
	All zones	2.6	837.2	5.8	3.3	5.3	0.25	--
Kenai	1-100	48.9	5,099.9	38.1	18.0	31.5	0.28	--
	101-200	22.5	7,826.2	58.5	38.0	66.4	0.21	--
	201-400	3.3	447.5	3.4	1.2	2.1	0.39	--
	All zones	22.7	13,373.6	92.6	57.2	92.3	0.23	--
Total	1-100	14.6	5,138.6	35.6	18.3	29.5	0.28	--
	101-200	10.0	8,653.4	59.9	41.9	67.6	0.21	--
	201-400	2.2	652.7	4.5	1.8	2.9	0.36	--
	All zones	9.5	14,444.7	100.0	62.0	100.0	0.23	--

1/ Mean catch per unit effort, in kilograms per hour trawled.
2/ Where data are available.
3/ Less than 0.1 kg/hr.
4/ Less than 0.1 X 10^6 individuals.
5/ Less than 0.1 percent.

Table XI-72.--Estimated biomass and population size of Dover sole (Microstomus pacificus) in the Gulf of Alaska during June-August 1962.

Region	Depth zone (m)	CPUE[1/] (kg/hr)	Estimated biomass (mt)	Proportion of total estimated biomass	Estimated population (X 10^6)	Proportion of total estimated population	Mean size per individual[2/] Weight (kg)	Mean size per individual[2/] Length (cm)
Fairweather	1-100	5.7	243.2	13.6	1.5	36.6	0.17	--
	101-200	0.7	139.7	7.8	0.4	9.8	0.37	--
	201-400	39.4	1,411.2	78.6	2.2	53.6	0.64	--
	All zones	6.6	1,794.1	13.3	4.1	11.6	0.44	--
Yakutat	1-100	0.1	6.0	0.2	4/	5/	0.14	--
	101-200	2.2	390.8	16.1	1.2	24.0	0.32	--
	201-400	24.8	2,032.4	83.7	3.8	76.0	0.54	--
	All zones	7.3	2,429.2	18.1	5.0	14.2	0.49	--
Prince William	1-100	0.8	106.7	4.7	0.6	8.6	0.17	--
	101-200	7.9	1,185.0	53.2	4.0	57.1	0.29	--
	201-400	21.6	937.2	42.1	2.4	34.3	0.38	--
	All zones	6.9	2,228.9	16.6	7.0	19.9	0.32	--
Kenai	1-100	0.8	86.8	1.2	0.5	2.6	0.19	--
	101-200	8.5	2,952.0	42.3	9.9	51.8	0.30	31.3
	201-400	29.0	3,939.3	56.5	8.7	45.6	0.45	36.4
	All zones	11.9	6,978.1	52.0	19.1	54.3	0.37	--
Total	1-100	1.2	442.7	3.3	2.6	7.4	0.17	--
	101-200	5.4	4,667.5	34.8	15.5	44.0	0.30	--
	201-400	28.0	8,320.1	61.9	17.1	48.6	0.49	--
	All zones	8.9	13,430.3	100.0	35.2	100.0	0.38	--

1/ Mean catch per unit effort, in kilograms per hour trawled.
2/ Where data are available.
3/ Less than 0.1 kg/hr.
4/ Less than 0.1 X 10^6 individuals.
5/ Less than 0.1 percent.

Biomass.--The apparent biomass of Dover sole was estimated at 13 thousand mt of which 62% occurred in the upper slope and 35% in the outer shelf. The Kenai region made the largest contribution to the biomass (52%) with the remaining being relatively evenly distributed between the Fairweather (13%), Yakutat (18%) and Prince William (17%) regions. The biomass estimate for Dover sole may be low as the bathymetric range or this species was not adequately sampled due to the limtations of the sampling gear and the rugged topography associated with the upper slope.

Size composition.--Length frequency data are available for the Kenai region. In the outer shelf, Dover sole, sexes combined, averaged 31.3 cm which increased to 36.4 cm in the upper slope (Figure XI-337).

DUNGENESS CRAB

Distribution and abundance.--Dungeness crab appeared within a very restricted distribution (Table XI-73). Highest relative apparent abundance occurred in the inner shelf of the Prince William (69 kg/hr), Yakutat (19 kg/hr) and Fairweather regions (22 kg/hr). (Figure XI-338). Over the survey area, Dungeness crab had mean CPUE of 33 kg/hr in the inner shelf and averaged 8 kg/hr over all depths. No catches containing this species occurred in the Kenai region.

Biomass.--Of the 11 thousand mt of Dungeness crab, nearly 100% came from the inner shelf depth zone. Nearly 80% of this apparent biomass was contained in the Prince William region followed by Yakutat (12%) and Fairweather (8%). The biomass estimate of Dungeness crab should be considered minimal as this species occurs in highest abundance where sampling was not adequately conducted during this survey.

Size composition.--No length frequency data were collected for this species.

SABLEFISH

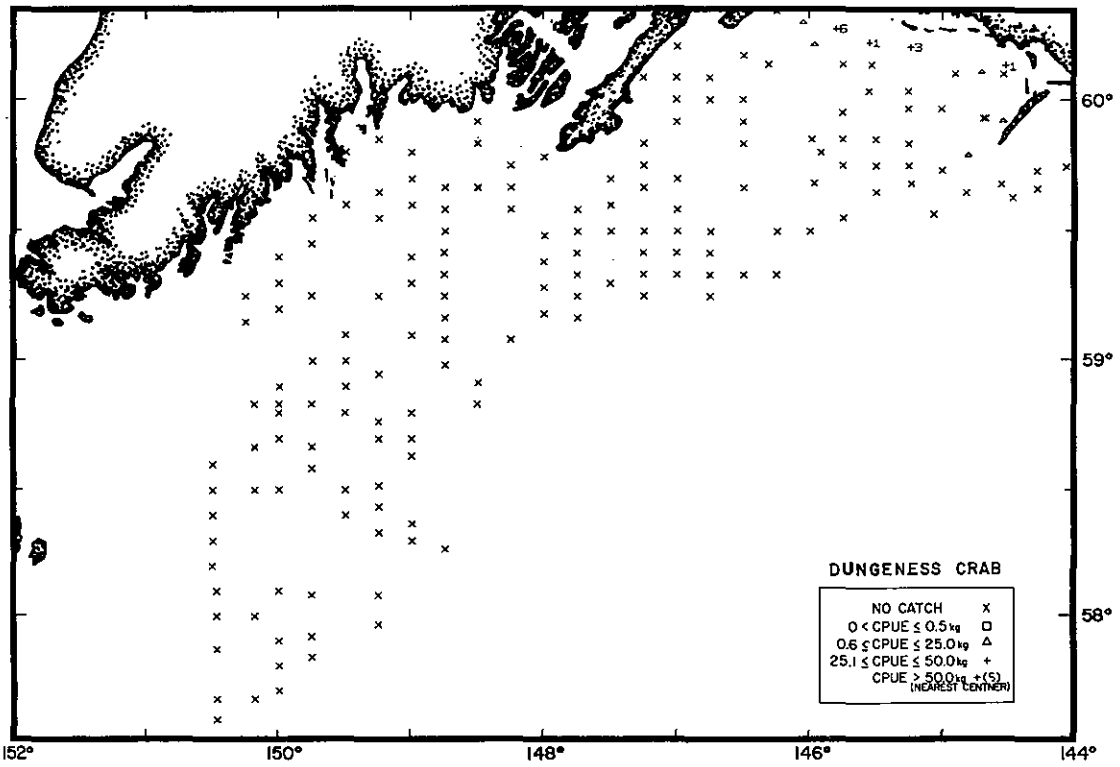
Distribution and abundance.--Except for the Kenai inner shelf, sablefish were taken throughout the survey area (Table XI-74). Relative apparent abundance averaged 7 kg/hr over the survey area and increased with increasing water depth from 1 kg/hr in the inner shelf to 21 kg/hr in the upper slope. (Figure XI-339). Mean CPUE's were above the survey average in the Fairweather, 10 kg/hr, and Kenai, 7 kg/hr, regions.

Biomass.--Nearly 97% of the estimated 10 thousand mt of sablefish apparent biomass was contained in the outer shelf (34%) and upper slope (63%) depth zones. The Kenai region contained the largest portion of the estimate (40%) followed by Fairweather (28%), Prince William (19%) and Yakutat (13%). The biomass estimate for sablefish should be considered low for the bathymetric range of this species extends beyond the depths covered during the survey.

Table XI-73.--Estimated biomass and population size of Dungeness crab (Cancer magister) in the Gulf of Alaska during June-August 1962.

Region	Depth zone (m)	CPUE[1/] (kg/hr)	Estimated biomass (mt)	Proportion of total estimated biomass	Estimated population (X 10^6)	Proportion of total estimated population	Mean size per individual[2/] Weight (kg)	Length (cm)
Fairweather	1-100	21.6	928.2	100.0	1.1	100.0	0.82	--
	101-200	0	0	0	0	0	--	--
	201-400	0	0	0	0	0	--	--
	All zones	3.4	928.2	8.1	1.1	7.2	0.82	--
Yakutat	1-100	18.7	1,384.9	100.0	1.8	100.0	0.76	--
	101-200	0	0	0	0	0	--	--
	201-400	0	0	0	0	0	--	--
	All zones	4.2	1,384.9	12.2	1.8	11.9	0.76	--
Prince William	1-100	69.4	9,153.4	99.9	12.3	100.0	0.74	--
	101-200	3/	6.5	0.1	4/	5/	0.52	--
	201-400	0	0	0	0	0	--	--
	All zones	28.1	9,159.9	79.8	12.3	80.9	0.74	--
Kenai	1-100	0	0	0	0	0	--	--
	101-200	0	0	0	0	0	--	--
	201-400	0	0	0	0	0	--	--
	All zones	0	0	0	0	0	--	--
Total	1-100	32.5	11,466.5	99.9	15.2	100.0	0.75	--
	101-200	3/	6.5	0.1	4/	5/	0.52	--
	201-400	0	0	0	0	0	--	--
	All zones	7.6	11,473.0	100.0	15.2	100.0	0.75	--

1/ Mean catch per unit effort, in kilograms per hour trawled.
2/ Where data are available.
3/ Less than 0.1 kg/hr
4/ Less than 0.1 X 10^6 individuals.
5/ Less than 0.1 percent.



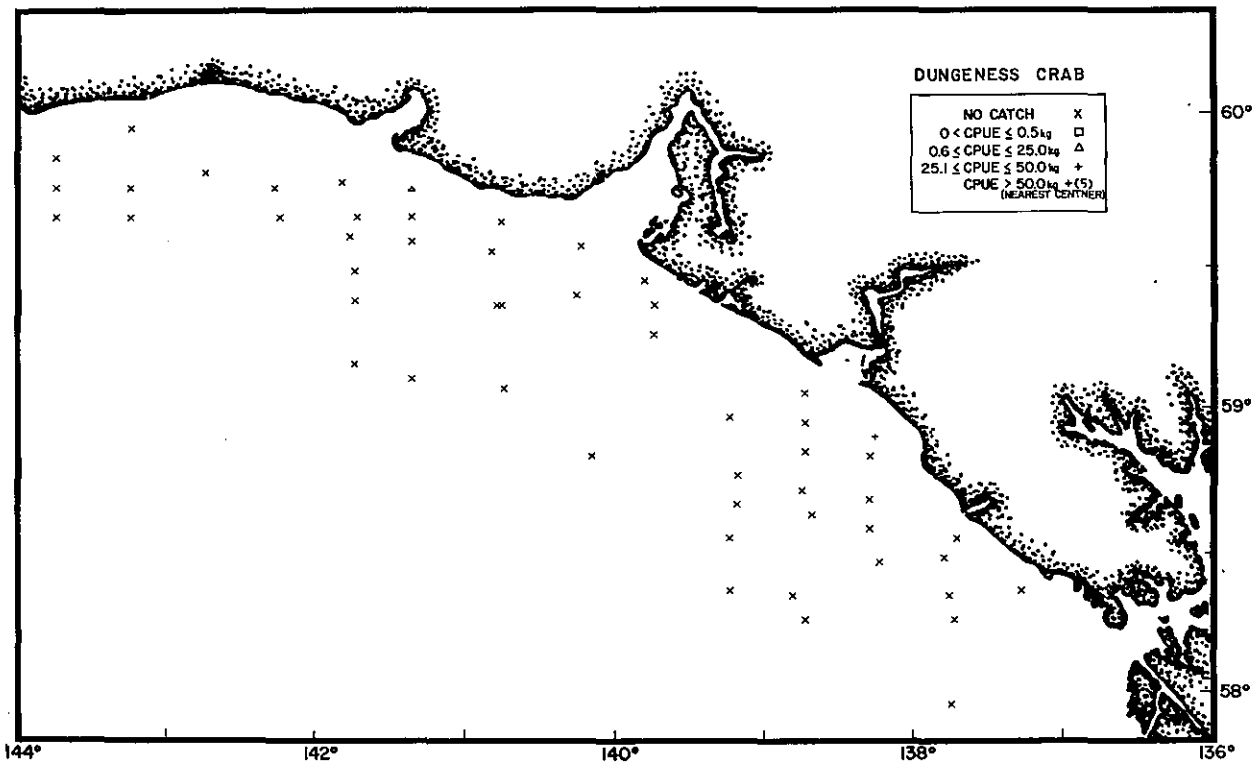


Figure XI-338.--Distribution of standardized catch rates in kg/hr of Dungeness crab in the eastern Gulf of Alaska, June-Aug. 1962 (Cruise 628).

Table XI-74.--Estimated biomass and population size of sablefish (Anoplopoma fimbria) in the Gulf of Alaska during June-August 1962.

Region	Depth zone (m)	CPUE[1/] (kg/hr)	Estimated biomass (mt)	Proportion of total estimated biomass	Estimated population (X 10^6)	Proportion of total estimated population	Mean size per individual[2/] Weight (kg)	Length (cm)
Fairweather	1-100	0.7	29.2	1.1	0.1	4.4	0.34	--
	101-200	4.5	872.7	31.7	0.7	30.4	1.33	--
	201-400	51.6	1,850.2	67.2	1.5	65.2	1.25	--
	All zones	10.1	2,752.1	28.0	2.3	23.5	1.20	--
Yakutat	1-100	0.7	53.6	4.4	0.2	14.3	0.33	--
	101-200	3.3	574.0	46.7	0.7	50.0	0.75	--
	201-400	7.3	600.1	48.9	0.5	35.7	1.30	--
	All zones	3.7	1,227.7	12.5	1.4	14.3	0.88	--
Prince William	1-100	1.8	241.6	12.8	0.9	37.5	0.27	--
	101-200	7.5	1,130.2	59.7	1.2	50.0	0.97	--
	201-400	12.0	520.3	27.5	0.3	12.5	1.83	--
	All zones	5.8	1,892.1	19.3	2.4	24.5	0.79	--
Kenai	1-100	0	0	0	0	0	--	--
	101-200	2.1	743.7	18.8	1.5	40.5	0.51	45.3
	201-400	23.6	3,206.1	81.2	2.2	59.5	1.44	56.7
	All zones	6.7	3,949.8	40.2	3.7	37.7	1.07	--
Total	1-100	0.9	324.4	3.3	1.2	12.3	0.27	--
	101-200	3.8	3,320.6	33.8	4.1	41.8	0.81	--
	201-400	20.8	6,176.6	62.9	4.5	45.9	1.37	--
	All zones	6.5	9,821.7	100.0	9.8	100.0	1.00	--

1/ Mean catch per unit effort, in kilograms per hour trawled.
2/ Where data are available.
3/ Less than 0.1 kg/hr.
4/ Less than 0.1 X 10^6 individuals.
5/ Less than 0.1 percent.

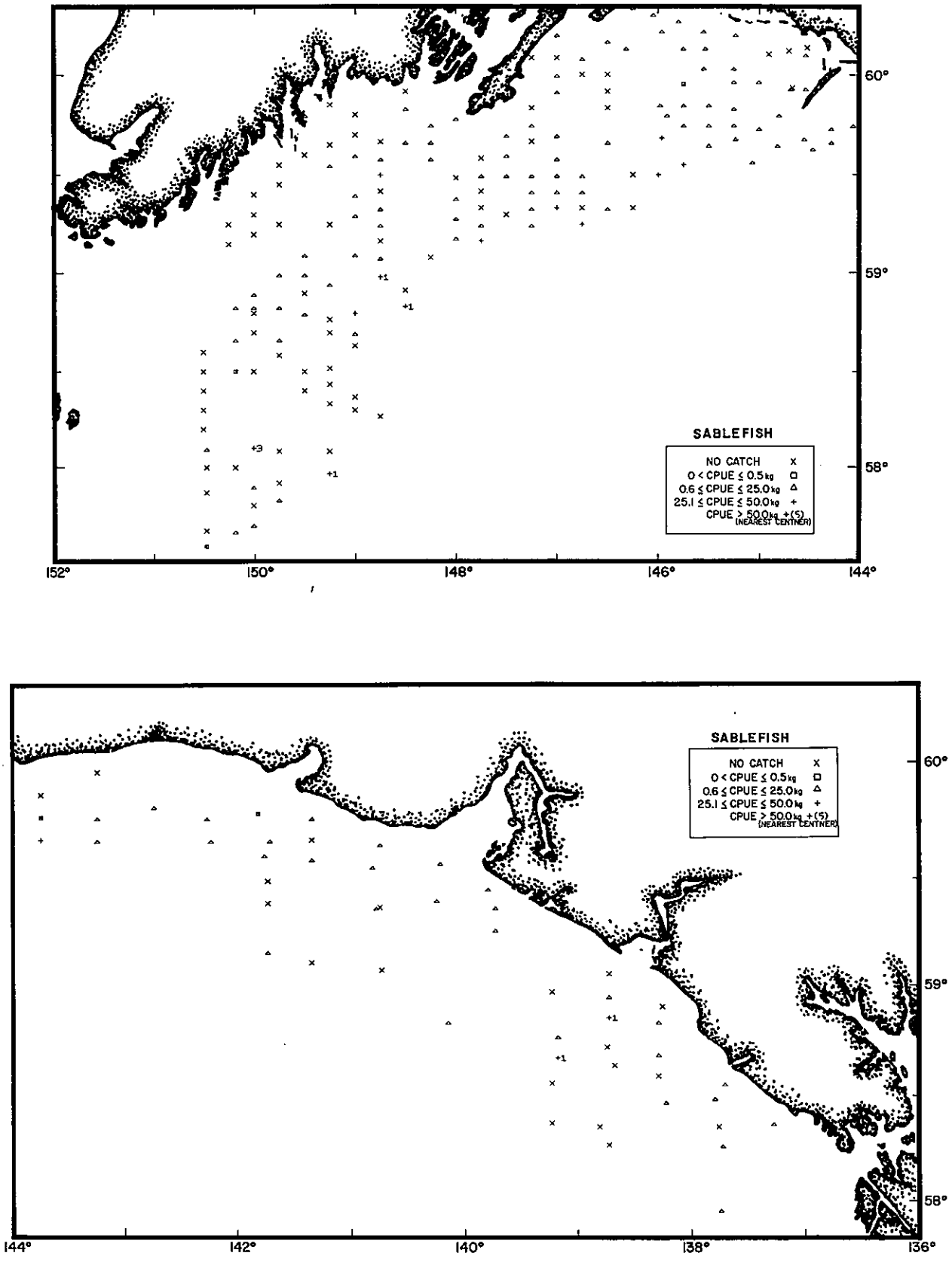


Figure XI-339.--Distribution of standardized catch rates in kg/hr of sablefish in the eastern Gulf of Alaska, June-Aug. 1962 (Cruise 628).

Size composition.—Length frequency data are available from the Kenai region where sablefish, sexes combined, averaged 45.3 cm on the outer shelf and 56.7 cm on the upper slope (Figure XI-340).

ROCK SOLE

Distribution and abundance.—High concentrations of rock sole were associated with shallow waters of the westernmost regions of the survey area (Table XI-75 and Figure XI-341). The Kenai inner shelf had the highest mean CPUE (76 kg/hr) but values fell to below the survey average (6 kg/hr) in the remaining regions (Figure XI-342).

Biomass.--Of the 9 thousand mt of estimated apparent biomass, nearly 90% occurred in the inner shelf depth zone with the greates contribution occuring in the Kenai inner shelf (84%). The biomass estimate for rock sole should be considered minimal as this species is most abundant during summer months in shallow untrawlable areas.

Size composition.--Length frequency data are available from the Kenai outer shelf where rock sole ranged in size from 19-37 cm and averaged 27.5 cm (Figure XI-343).

SHORTSPINE THORNYHEAD

Distribution and abundance.--Shortspine thornyheads were not taken in the inner shelf depth zone, appeared in small concentrations in the outer shelf and were most abundant in the upper slope (Table XI-76 and Figures XI-344-345). This species appeared in all regions with Yakutat having the highest apparent relative abundance followed by Prince William, Fairweather and Kenai. The mean CPUE over the entire survey area was 4 kg/hr.

Biomass.--Nearly 85% of the estimated 6 thousand mt of apparent biomass came from the upper slope depth zone while the contribution from the outer shelf was 15%. Yakutat made the largest regional contribution (44%) followed by Prince William (23%), Kenai (21%), and Fairweather (12%). Biomass estimate of this species should be considered minimal as the survey covered only a portion of its bathymetric range which includes the steep, rugged bottom of the continental slope.

Size composition.--Length frequencies were not taken for this species.

OTHER SPECIES

Over the survey area, several species were captured at mean CPUE's of less than 1 kg/hr yet had relatively high mean catch rates within restricted distributions (Table XI-77). Examples from the Fairweather inner shelf were the starry flounder (471 kg/hr), butter sole (251 kg/hr) and English sole (83 kg/hr), while in the Fairweather upper slope, English sole (83 kg/hr) and spiny dogfish (36 kg/hr) were relatively abundant. Other species were butter sole from the Yakutat inner shelf (18 kg/hr), starry flounder from the Prince William inner shelf (20 kg/hr) and ronquils from the Kenai outer shelf (22 kg/hr).

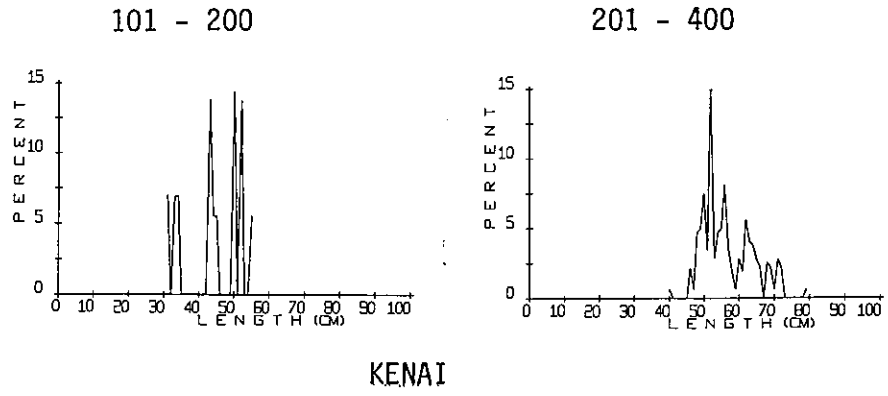


Figure XI-340.--Percentage length frequencies of sablefish from the Gulf of Alaska (Cruise 628).

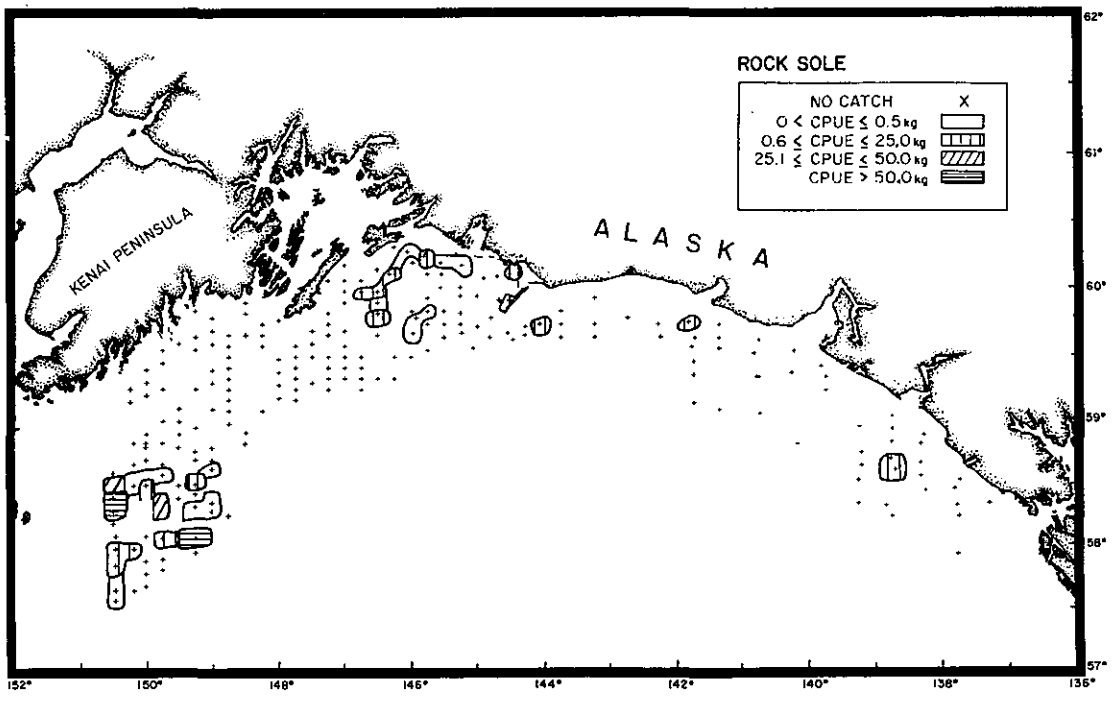
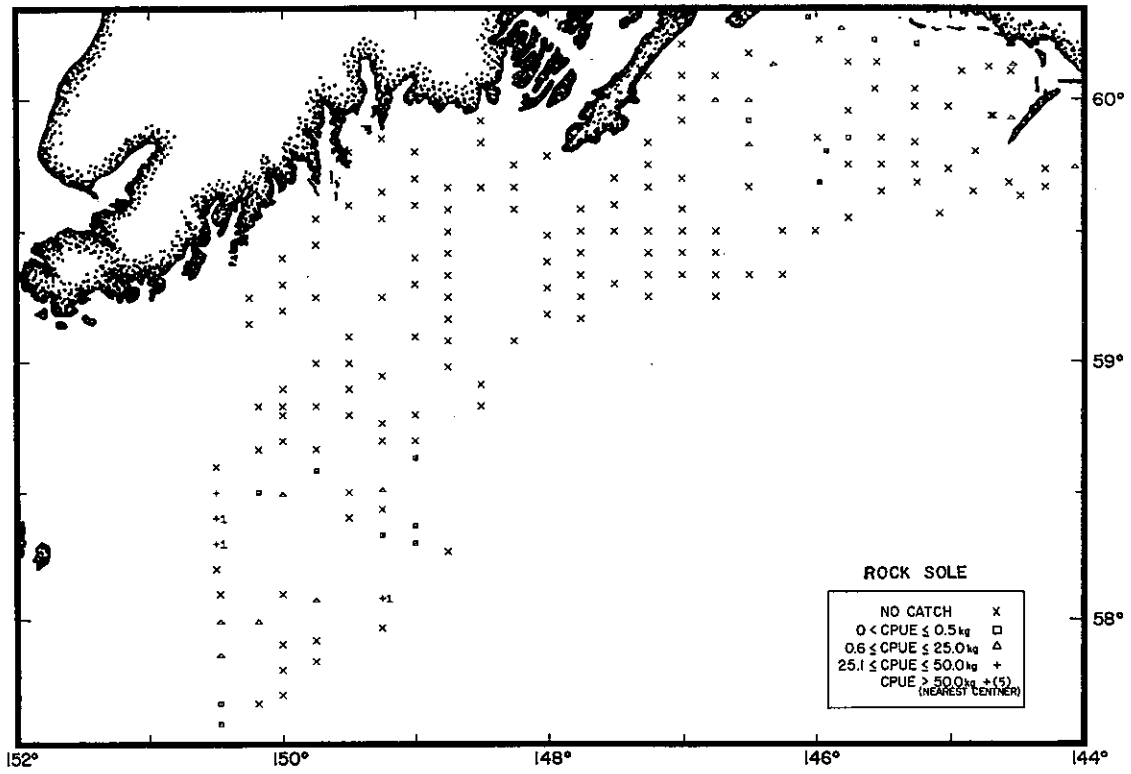


Figure XI-341.--Distribution of apparent relative abundance of rock sole in the eastern Gulf of Alaska, June-Aug. 1962 (Cruise 628).

Table XI-75.--Estimated biomass and population size of rock sole (Lepidopsetta bilineata) in the Gulf of Alaska during June-August 1962.

Region	Depth zone (m)	CPUE[1] (kg/hr)	Estimated biomass (mt)	Proportion of total estimated biomass	Estimated population ($\times 10^6$)	Proportion of total estimated population	Mean size per individual[2] Weight (kg)	Mean size per individual[2] Length (cm)
Fairweather	1-100	0	0	0	0	0	--	--
	101-200	1.0	186.3	100.0	0.2	100.0	0.88	--
	201-400	0	0	0	0	0	--	--
	All zones	0.7	186.3	2.0	0.2	0.4	0.88	--
Yakutat	1-100	0.9	63.9	89.8	0.2	100.0	0.42	--
	101-200	3/	7.3	10.2	4/	5/	0.50	--
	201-400	0	0	0	0	0	--	--
	All zones	0.3	71.2	0.8	0.2	0.5	0.43	--
Prince William	1-100	3.3	433.0	99.7	1.3	100.0	0.34	--
	101-200	3/	1.3	0.3	4/	5/	0.20	--
	201-400	0	0	0	0	0	--	--
	All zones	1.4	434.3	4.7	1.3	2.8	0.33	--
Kenai	1-100	74.3	7,755.0	91.2	42.1	94.4	0.18	--
	101-200	2.2	749.3	8.8	2.5	5.6	0.30	27.5
	201-400	0	0	0	0	0	--	--
	All zones	14.5	8,504.3	92.5	44.6	96.3	0.19	--
Total	1-100	23.4	8,251.9	89.7	43.6	94.2	0.19	--
	101-200	1.1	944.2	10.3	2.7	5.8	0.35	--
	201-400	0	0	0	0	0	--	--
	All zones	6.1	9,196.1	100.0	46.3	100.0	0.20	--

1/ Mean catch per unit effort, in kilograms per hour trawled.
2/ Where data are available.
3/ Less than 0.1 kg/hr.
4/ Less than 0.1 X 10^6 individuals.
5/ Less than 0.1 percent.



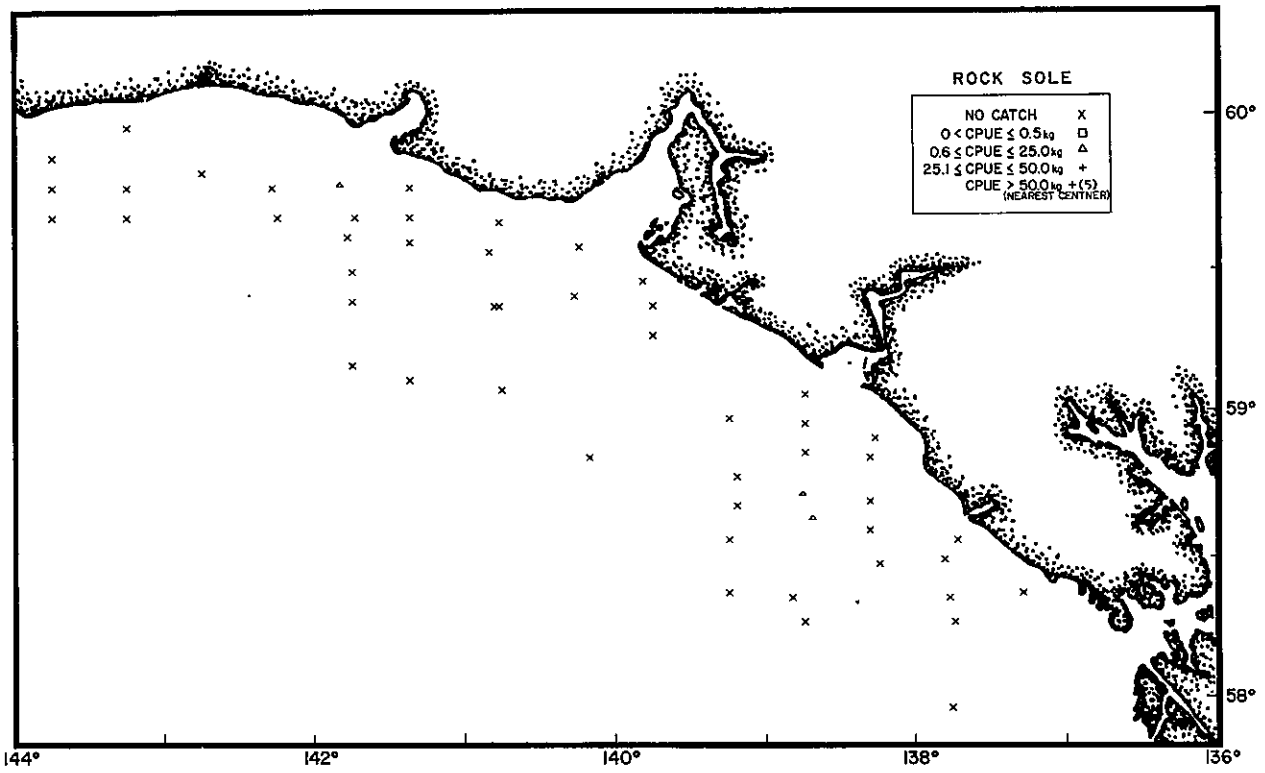


Figure XI-342.--Distribution of standardized catch rates in kg/hr of rock sole in the eastern Gulf of Alaska, June-Aug. 1962 (Cruise 628).

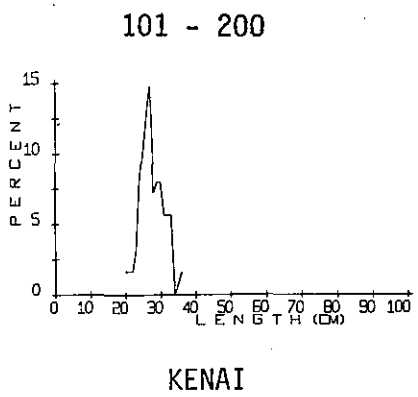


Figure XI-343.--Percentage length frequencies of rock sole from the Gulf of Alaska (Cruise 628).

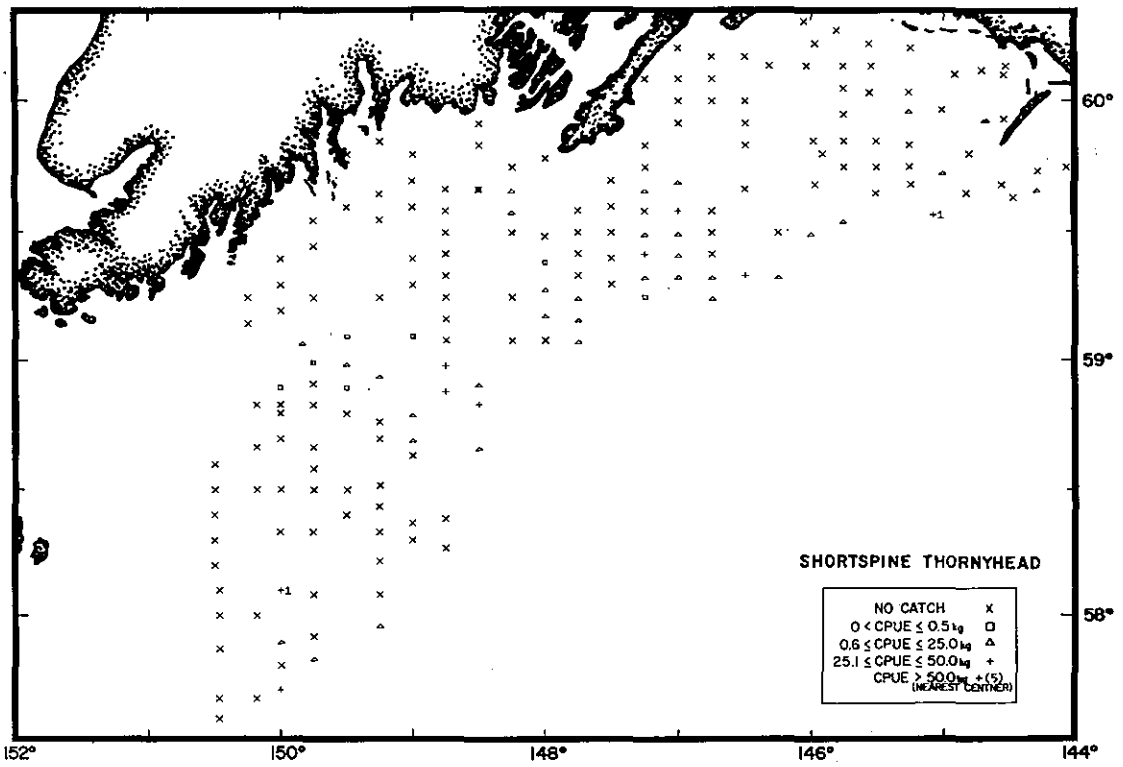


Figure XI-344.--Distribution of standardized catch rates in kg/hr of shortspine thornyhead in the eastern Gulf of Alaska, June-Aug. 1962 (Cruise 628).

Table XI-76.--Estimated biomass and population size of shortspine thornyhead (Sebastolobus alascanus) in the Gulf of Alaska during June-August 1962.

Region	Depth zone (m)	CPUE[1/] (kg/hr)	Estimated biomass (mt)	Proportion of total estimated biomass	Estimated population (X 10^6)	Proportion of total estimated population	Mean size per individual[2/] Weight (kg)	Length (cm)
Fairweather	1-100	0	0	0	0	0	--	--
	101-200	0.2	46.2	6.2	0.3	13.6	0.18	--
	201-400	19.5	698.6	93.8	1.9	86.4	0.36	--
	All zones	2.7	744.8	11.9	2.2	11.2	0.34	--
Yakutat	1-100	0	0	0	0	0	--	--
	101-200	0.9	148.3	5.3	0.5	5.3	0.29	--
	201-400	32.1	2,628.2	94.7	8.9	94.7	0.29	--
	All zones	8.4	2,776.5	44.4	9.4	48.0	0.30	--
Prince William	1-100	0	0	0	0	0	--	--
	101-200	3.5	529.1	37.6	1.5	38.5	0.34	--
	201-400	20.2	877.3	62.4	2.4	61.5	0.36	--
	All zones	4.3	1,406.4	22.5	3.9	19.9	0.35	--
Kenai	1-100	0	0	0	0	0	--	--
	101-200	0.5	186.0	14.1	0.5	12.2	0.36	37.4
	201-400	8.4	1,136.8	85.9	3.6	87.8	0.31	--
	All zones	2.2	1,322.8	21.2	4.1	20.9	0.32	--
Total	1-100	0	0	0	0	0	--	--
	101-200	1.0	909.6	14.6	2.8	14.3	0.32	--
	201-400	18.0	5,340.9	85.4	16.8	85.7	0.32	--
	All zones	4.1	6,250.5	100.0	19.6	100.0	0.32	--

1/ Mean catch per unit effort, in kilograms per hour trawled.
2/ Where data are available.
3/ Less than 0.1 kg/hr.
4/ Less than 0.1 X 10^6 individuals.
5/ Less than 0.1 percent.

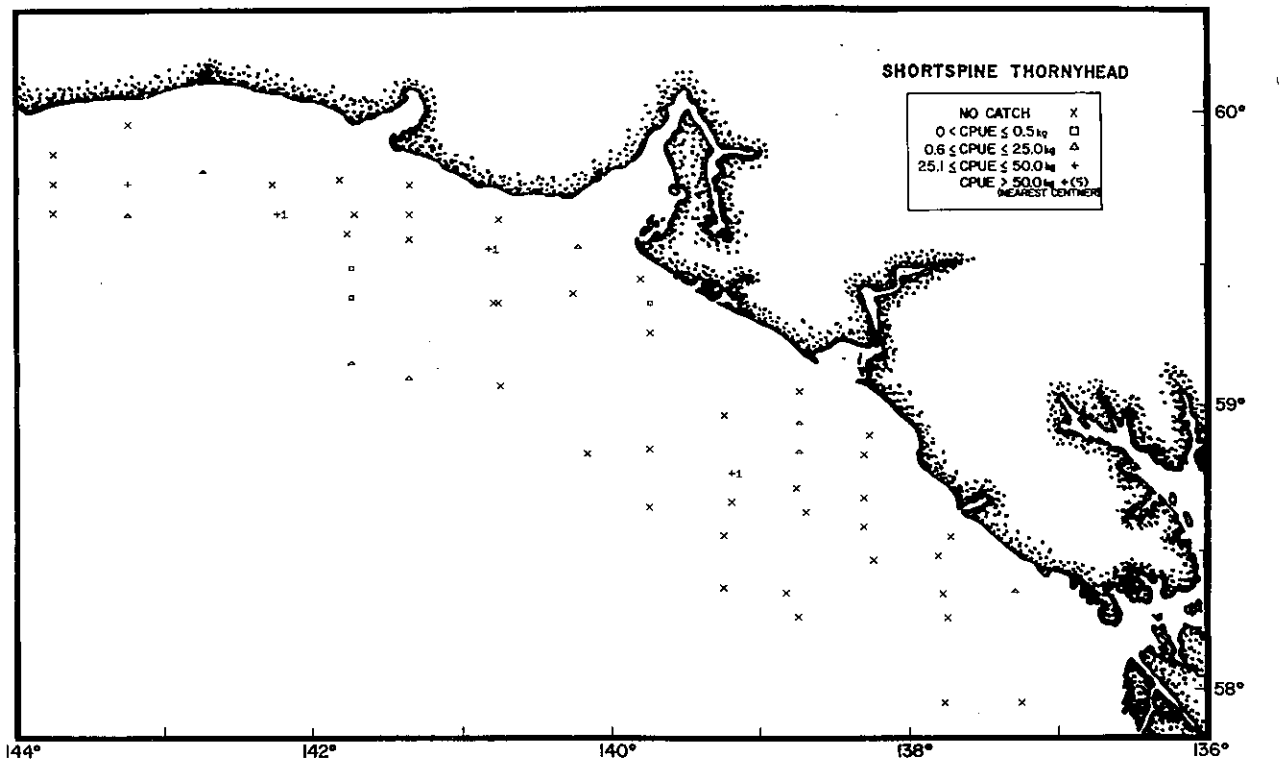


Figure XI-345.--Distribution of standardized catch rates in kg/hr of shortspine thornyhead in the eastern Gulf of Alaska, June-Aug. 1962 (Cruise 628).

Table XI-77.--Species of fish which occurred at mean CPUE's greater than 10 kg/hr in restricted distribution (Cruise 628).

Region	Species	DEPTH ZONES (M) 0 - 100	101 - 200	201 - 400
Fairweather	Starry flounder	471	--	--
	Butter sole	251	--	--
	English sole	83	--	46
	Spiny dogfish	--	--	36
Yakutat	Butter sole	18	--	--
Prince William	Starry flounder	20	--	--
Kenai	Ronquils	--	22	--

Cruise 629, Chartered Fishing vessels Arthur H., St. Michael and Western Flyer (September-November 1962).

During the 1962 resource assessment survey 114 stations were successfully sampled (Table XI-78). Sampling densities ranged from one station per 475 km^2 in the Prince William region, to one station per 1,316 km^2 in the Yakutat region, and averaged one station per 741 km^2 over all regions. By depth zones, the highest densities occurred in the upper slope and outer shelf, with one station per 711 and 730 km^2 respectively, while the inner shelf had a density of one station per 1,173 km^2. Sampling did not occur on the Kenai-inner shelf. Station numbers and positions for all successful tows are presented in Figure XI-346. Fish and commercially important invertebrate species taken during the survey are listed in Table V-3-4.

TOTAL BIOMASS

The total apparent biomass during the survey period has been estimated at 356 thousand mt, of which 16% occurred in the inner shelf, 58% in the outer shelf, and 26% in the upper slope (Table XI-79). The combined Fairweather and Kenai regions accounted for 71% of the total biomass. The Fairweather region contributed 39% the Kenai region 32% while the Prince William and Yakutat regions followed with 18 and 12% respectively. The mean biomass density over the four regions comprising the survey area was 4.2 mt/km^2. The Fairweather region had the highest density (8.4 mt/km^2), followed by Kenai, Prince William and Yakutat, (Figure XI-347). Biomass densities exceeded the average in all three depth zones of the Fairweather region as well as the Kenai and Prince William upper slope. Over all regions, densities increased with depth and ranged from 3.7 mt/km^2 on the inner shelf to 5.3 mt/km^2 in the upper slope. The total catch encountered at each successful sampling station is plotted in Figure XI-348.

RELATIVE IMPORTANCE OF SPECIES GROUPS

The proportion which the combined fish species contributed to the total apparent biomass increased with depth and averaged 88% over all regions. By species groups, the flatfishes represented the greatest portion of the total biomass (53%), followed by roundfishes (14%), invertebrates (12%), rockfishes (11%) and elasmobranchs (10%) (Table XI-80).

The combined flatfish species had an estimated total apparent biomass of 190 thousand mt, with 61% occurring on the outer shelf, 23% on the upper slope, and 16% on the inner shelf (Table XI-81). The Fairweather region contained the largest percentage of the total flatfish biomass (49%), followed by Kenai (27%), Prince William (16%) and Yakutat (9%).

Mean CPUE's for the flatfish group increased with depth, ranging from 87 kg/hr on the inner shelf to 148 kg/hr on the upper slope and averaging 125 kg/hr over the entire survey area (Figure XI-349). The Fairweather region had the highest mean CPUE of 337 kg/hr, with catch rates exceeding the survey average in each depth zone. Mean CPUE's fell below the survey average in the Prince William and Kenai regions and were lowest in Yakutat. The distribution of the standardized mean flatfish catch rates are plotted in Figure XI-350 for all stations successfully sampled.

Table XI-78.--Number of stations successfully trawled and sampling densities[1/] by regions and depth zones in the Gulf of Alaska during September-November 1962 (Cruise 629).

Regions	DEPTH ZONES (M) 0-100			101-200			201-400			0-400		
	No. of stations	Area (km^2)	Sampling density	No. of stations	Area (km^2)	Sampling density	No. of stations	Area (km^2)	Sampling density	No. of stations	Area (km^2)	Sampling density
Fairweather	5	2,566	513	20	11,617	581	2	2,144	1,072	27	16,327	605
Yakutat	3	4,418	1,473	8	10,430	1,304	4	4,894	1,224	15	19,742	1,316
Prince William	10	7,885	789	24	8,990	375	7	2,600	371	41	19,475	475
Kenai	0	--	--	19	20,829	1,096	12	8,139	678	31	28,968	934
Total	18	14,869	826	71	51,866	731	25	17,777	711	114	84,512	741

1/ Sampling density = $\frac{\text{No. of } km^2}{\text{No. of stations}}$

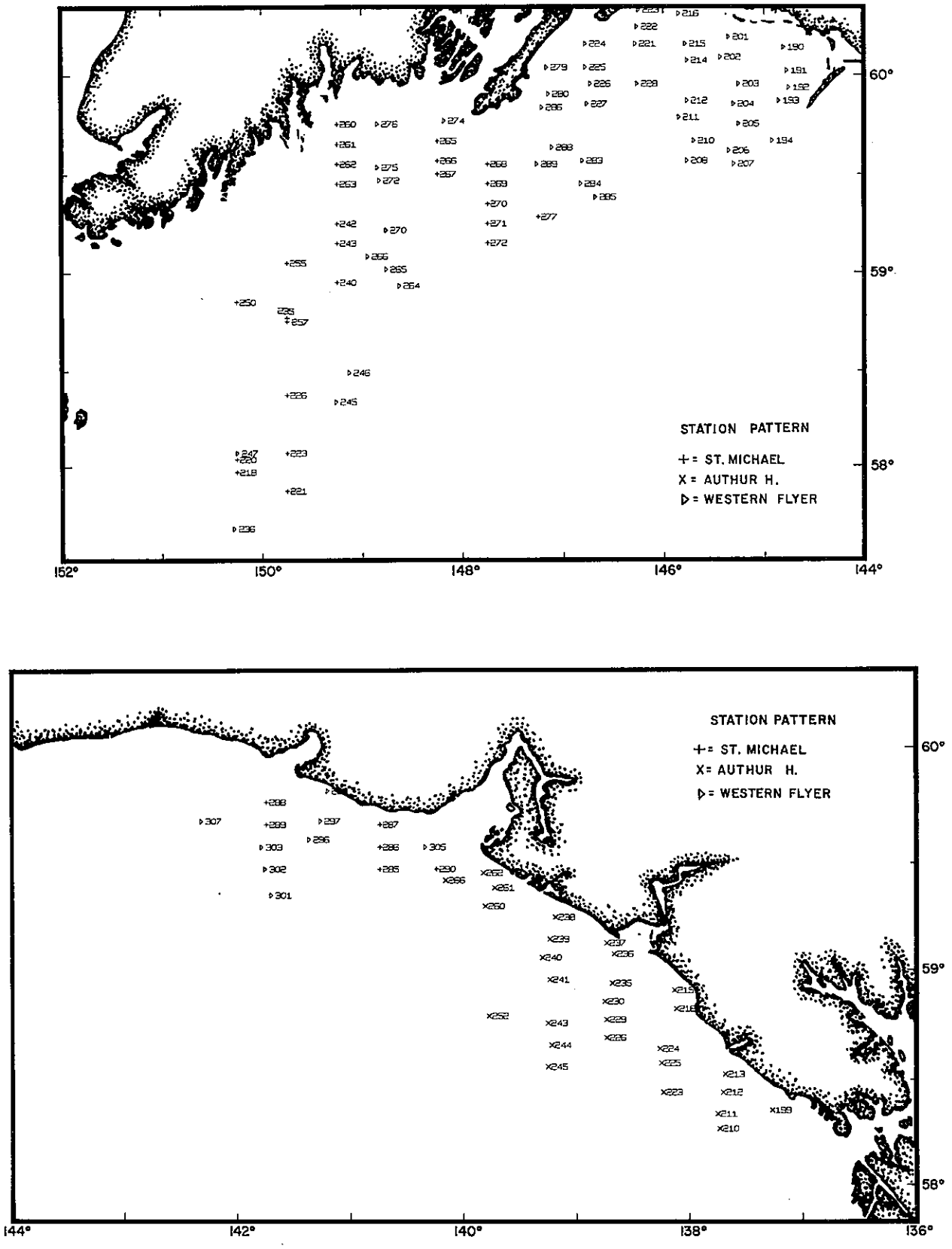


Figure XI-346.--Stations successfully trawled (otter trawl) during Cruise 629, Sept.-Nov. 1962.

Table XI-79.--Estimated biomass in metric tons of all species combined during the September-November 1962 resource assessment survey in the Gulf of Alaska (Cruise 629).

Regions	DEPTH ZONES (M) 0-100	101-200	201-400	0-400
Fairweather				
mt x 10^3	21.9	88.5	26.9	137.3
mt/km^2	8.5	7.6	12.6	8.4
% biomass in depth zone	39.4	42.8	28.8	38.6
% regional biomass	15.9	64.4	19.6	99.9
Yakutat				
mt x 10^3	5.4	25.3	10.7	41.4
mt/km^2	1.2	2.4	2.2	2.1
% biomass in depth zone	9.7	12.2	11.5	11.6
% of regional biomass	13.0	61.0	25.9	99.9
Prince William				
mt x 10^3	28.3	25.1	11.7	65.1
mt/km^2	3.6	2.8	4.5	3.3
% biomass in depth zone	50.9	12.1	12.6	18.3
% regional biomass	43.5	38.5	18.0	100.0
Kenai				
mt x 10^3	--	68.1	44.1	112.2
mt/km^2	--	3.3	5.4	3.9
% biomass in depth zone	--	32.9	47.2	31.5
% regional biomass	--	60.7	39.3	100.0
Total				
mt x 10^3	55.6	207.0	93.4	356.0
mt/km^2	3.7	4.0	5.3	4.2
% biomass in depth zone	100.0	100.0	100.1	100.0
% total biomass	15.6	58.1	26.3	100.0

The roundfish group had the second highest apparent biomass of 48 thousand mt. As with the flatfish group, the outer shelf contained the greatest proportion of the estimated biomass (63%). The upper slope followed with 35% while the inner shelf contained 2% (Table XI-82). The roundfishes contribution to the total biomass increased with depth and ranged from 2% in the inner shelf to 18% in the upper slope. The Kenai region contained 50% of the total roundfish biomass, even though no sampling occurred on the inner shelf. Contributions by the other regions were significantly lower and ranged from 26% in the Fairweather region to 10% in the Yakutat region. Mean CPUE's for the roundfish group increased with depth, ranging from 3 kg/hr on the inner shelf to 56 kg/hr on the upper slope and averaging 34 kg/hr over the entire survey area (Figure XI-351). Highest apparent relative abundance occurred in the Fairweather region (45 kg/hr) followed closely by Kenai (41 kg/hr) with Prince William and Yakutat having significantly lower values. The distribution of the standardized catch rates are plotted for each successful station in Figure XI-352.

The invertebrates had the third highest estimated apparent biomass of 43 thousand mt, of which 59% occurred in the outer shelf, 26% in the inner shelf and 15% on the upper slope (Table XI-83). Invertebrates represented nearly 21% of the total biomass in the inner shelf, and 12% in the outer shelf, but only 7% in the upper slope. The total invertebrate biomass was relatively evenly divided between Fairweather (32%), Prince William (33%) and Kenai (26%) while the Yakutat region represented only 8%. The mean CPUE for the invertebrate group was 29 kg/hr, with catch rates decreasing

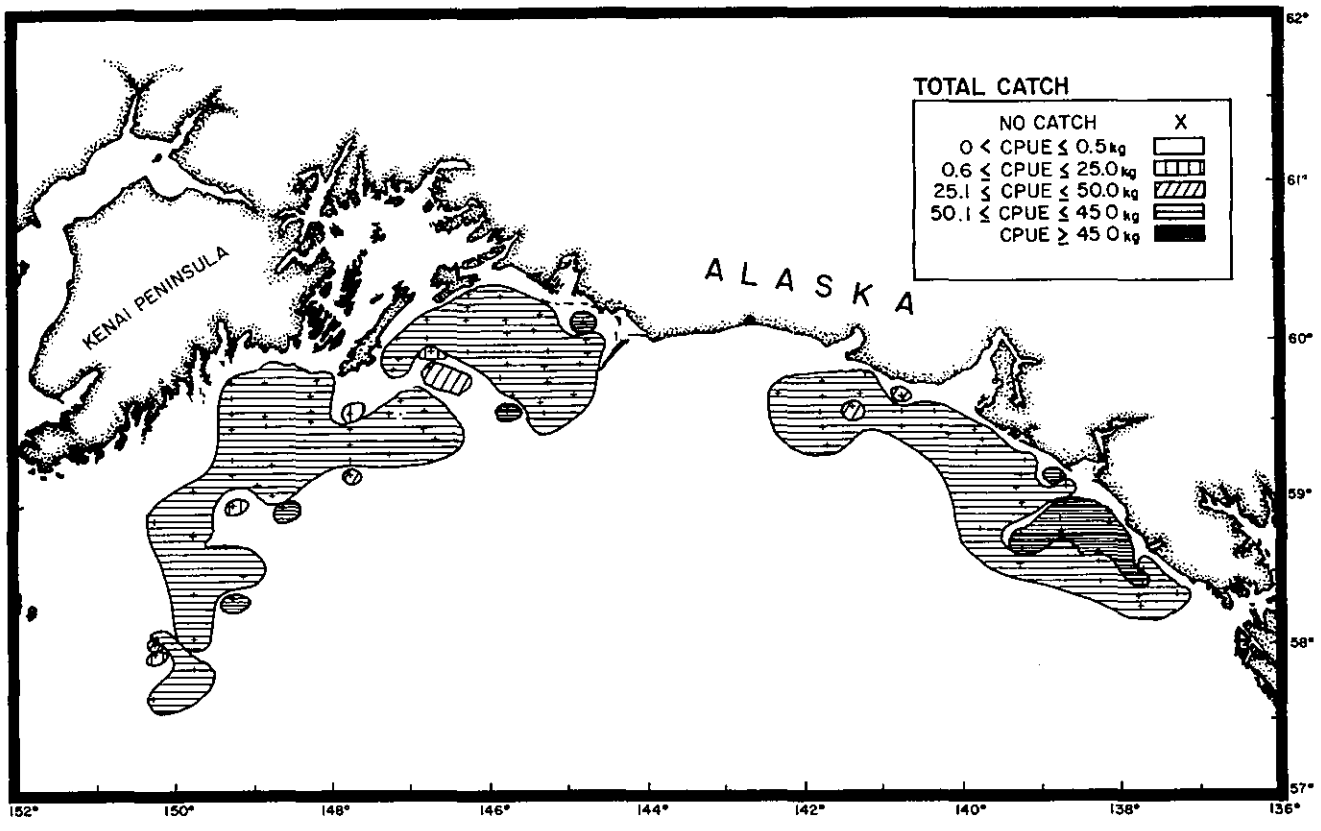


Figure XI-347.--Distribution of apparent relative abundance of all species combined in the eastern Gulf of Alaska, Sept.-Nov. 1962 (Cruise 629).

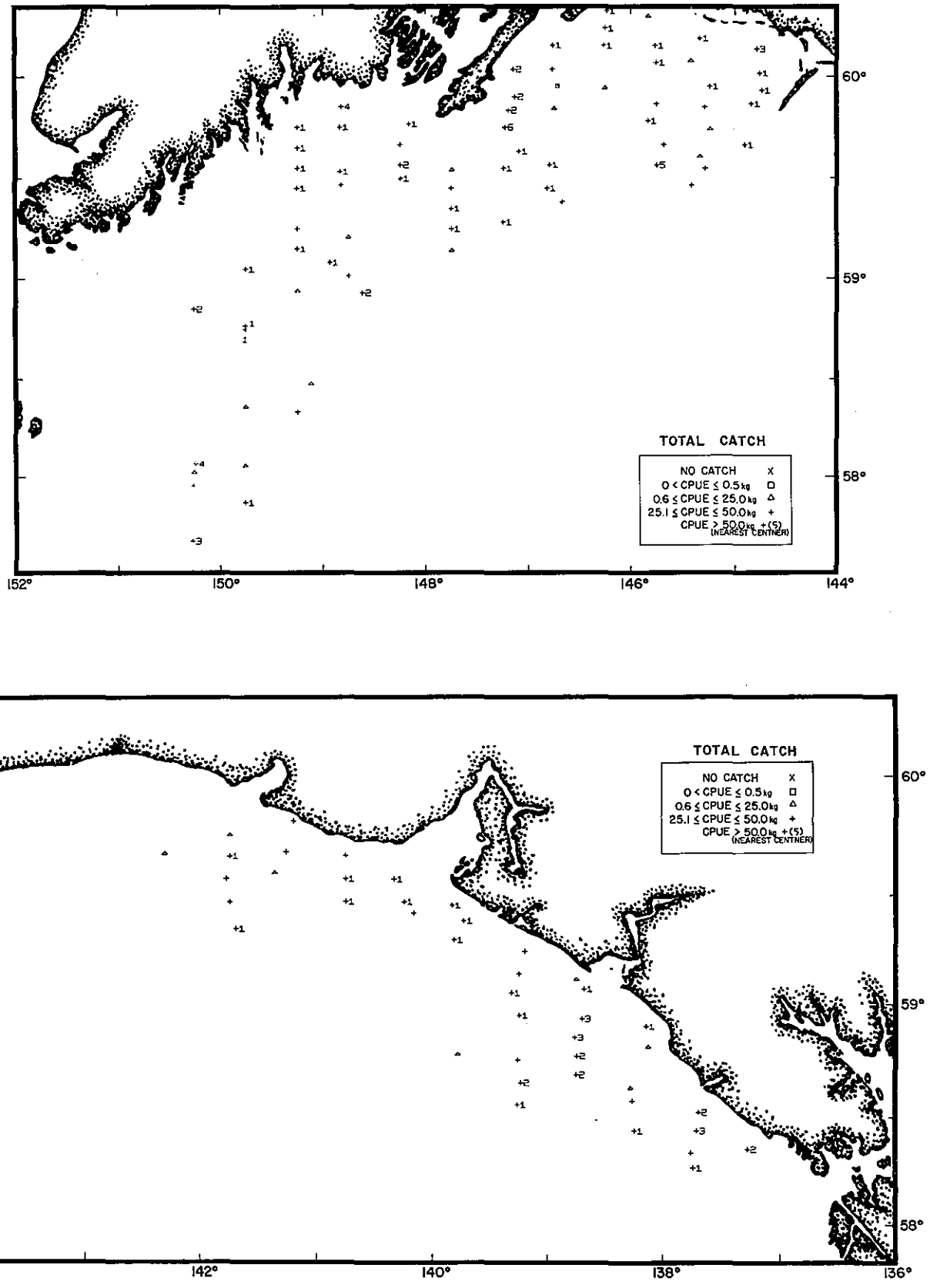


Figure XI-348.--Distribution of standardized catch rates in kg/hr of all species combined in the eastern Gulf of Alaska, Sept.-Nov. 1962 (Cruise 629).

Table XI-80.--Relative importance of species groups based on the rank order of their total biomass (Cruise 629).

Species Group	DEPTH ZONES (M) 0-100	101-200	201-400	0-400
Flatfish				
mt x 10^3	30.8	114.7	44.0	189.5
mt/km^2	2.1	2.2	2.5	2.2
% biomass in depth zone	55.5	55.4	47.0	53.2
% flatfish biomass	16.3	60.5	23.0	100.0
Roundfish				
mt x 10^3	1.0	30.2	16.8	48.0
mt/km^2	0.1	0.6	1.0	0.6
% biomass in depth zone	1.8	14.6	18.0	13.5
% roundfish biomass	2.1	62.9	35.0	100.0
Invertebrates				
mt x 10^3	11.4	25.5	6.4	43.3
mt/km^2	0.8	0.5	0.4	0.5
% biomass in depth zone	20.5	12.3	6.8	12.2
% invertebrate biomass	26.3	58.9	14.8	100.0
Rockfishes				
mt x 10^3	0.1	19.6	20.2	39.9
mt/km^2	1/	0.4	1.1	0.5
% biomass in depth zone	0.2	9.5	21.6	11.2
% rockfish biomass	0.3	49.1	50.6	100.0
Elasmobranchs				
mt x 10^3	12.2	16.9	6.2	35.3
mt/km^2	0.8	0.3	0.4	0.4
% biomass in depth zone	22.0	8.2	6.6	9.9
% rockfish biomass	34.6	47.9	17.6	100.1
Total				
mt x 10^3	55.5	206.9	93.6	356.0
mt/km^2	3.7	4.0	5.3	4.2
% biomass in depth zone	100.0	100.0	100.0	100.0
% total biomass	15.6	58.1	26.3	100.0

1/ Less than 0.1 mt/km^2.

Table XI-81.--Estimated biomass and population size of flatfishes in the Gulf of Alaska during September-November 1962.

Region	Depth zone (m)	CPUE 1/ (kg/hr)	Estimated biomass (mt)	Proportion of total estimated biomass	Estimated population (X 10^6)	Proportion of total estimated population	Mean size per individual 2/ Weight (kg)	Mean size per individual 2/ Length (cm)
Fairweather	1-100	397.8	17062.5	18.5	39.7	22.9	0.43	--
	101-200	301.9	58637.2	63.7	105.6	60.9	0.56	--
	201-400	455.2	16314.6	17.7	28.1	16.2	0.58	--
	All zones	337.1	92014.3	48.6	173.4	42.3	0.53	--
Yakutat	1-100	33.3	2461.9	14.6	6.0	21.4	0.41	--
	101-200	64.7	11290.6	67.1	16.4	58.6	0.69	--
	201-400	37.7	3084.3	18.3	5.6	20.0	0.55	--
	All zones	51.0	16836.8	8.9	28.0	6.8	0.60	--
Prince William	1-100	85.3	11240.0	37.6	23.0	35.0	0.49	--
	101-200	91.8	13794.8	46.1	32.8	49.9	0.42	--
	201-400	112.2	4879.1	16.3	10.0	15.2	0.49	--
	All zones	91.9	29913.9	15.8	65.8	16.1	0.45	--
Kenai	1-100	--	--	--	--	--	--	--
	101-200	89.1	31036.0	61.2	81.3	57.1	0.38	--
	201-400	144.7	19686.2	38.8	61.1	42.9	0.32	--
	All zones	86.2	50722.2	26.8	142.4	34.8	0.36	--
Total	1-100	87.2	30764.4	16.2	68.7	16.8	0.45	--
	101-200	132.3	114758.6	60.6	236.1	57.6	0.49	--
	201-400	147.9	43964.2	23.2	104.8	25.6	0.42	--
	All zones	124.9	189487.2	100.0	409.6	100.0	0.46	--

1/ Mean catch per unit effort, in kilograms per hour trawled.
2/ Where data are available.
3/ Less than 0.1 kg/hr.
4/ Less than 0.1 X 10^6 individuals.
5/ Less than 0.1 percent.

with increasing depth (Figure XI-353). Regions where the relative apparent abundance was higher than the survey average included Fairweather and Prince William. The distribution of the standardized catch rates are plotted in Figure XI-354.

The fourth most important species group contributing to the total apparent biomass were the rockfishes. This group was primarily restricted to the outer shelf and upper slope depth zones which together contained over 99% of the total rockfish biomass (40 thousand mt) (Table XI-84). The highest mean CPUE (68 kg/hr) occurred in the upper slope depth zone with values rapidly decreasing in the outer and inner shelf (Figure XI-355). Within regions, particularly high mean CPUE's occurred in the Fairweather and Kenai upper slope depth zones. The distribution of the standardized catch rates for the successful stations are plotted in figure XI-356.

The elasmobranchs made the smallest contribution to the total biomass (10%), but appeared in each region-depth zone sampled (Table XI-85). This group had a total apparent biomass of 35 thousand mt of which 48% occurred on the outer shelf, 35% on the inner shelf, and 20% on the upper slope. Elasmobranchs were most abundant in the three easternmost regions which contained over 90% of the estimated biomass (Figure XI-357) Standardized catch rates for all successfully sampled stations are plotted for this group in Figure XI-358.

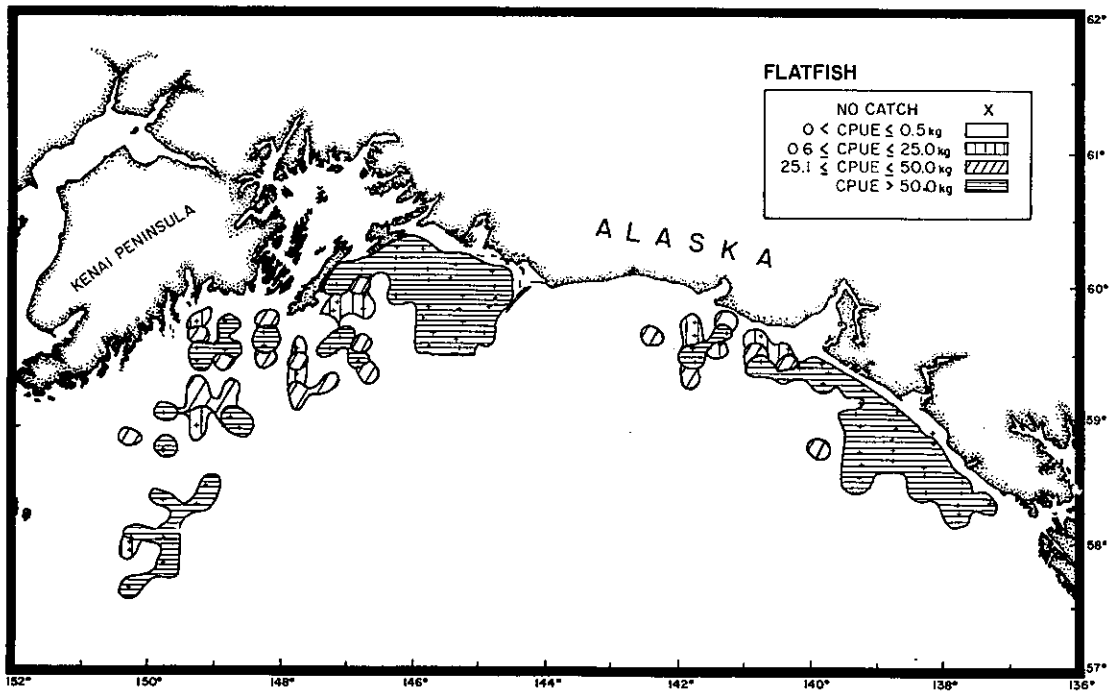


Figure XI-349.--Distribution of apparent relative abundance of flatfish in the eastern Gulf of Alaska, Sept.-Nov. 1962 (Cruise 629).

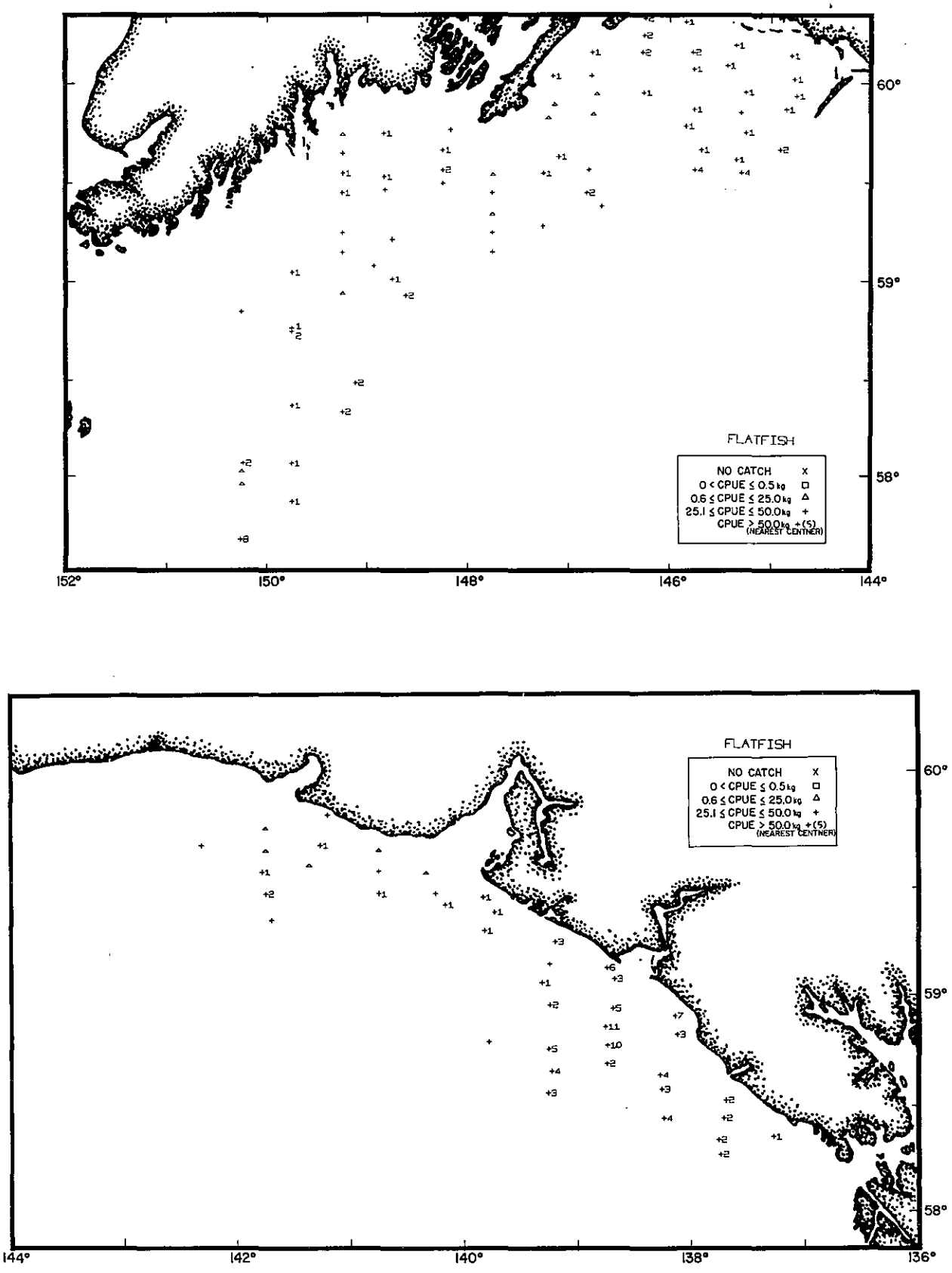


Figure XI-350.--Distribution of standardized catch rates in kg/hr of flatfish in the eastern Gulf of Alaska, Sept.-Nov. 1962 (Cruise 629).

Table XI-82.--Estimated biomass and population size of roundfishes in the Gulf of Alaska during September-November 1962.

Region	Depth zone (m)	CPUE 1/ (kg/hr)	Estimated biomass (mt)	Proportion of total estimated biomass	Estimated population (X 10^6)	Proportion of total estimated population	Mean size per individual 2/ Weight (kg)	Mean size per individual 2/ Length (cm)
Fairweather	1-100	6.3	271.2	2.2	0.4	2.5	0.77	--
	101-200	47.8	9289.0	74.9	13.4	83.2	0.70	--
	201-400	79.4	2845.2	22.9	2.3	14.3	1.21	--
	All zones	45.4	12405.4	25.8	16.1	16.7	0.77	--
Yakutat	1-100	2.6	190.8	4.1	1.1	17.7	0.17	--
	101-200	18.2	3179.1	68.2	3.6	58.1	0.87	--
	201-400	15.8	1292.8	27.7	1.5	24.2	0.86	--
	All zones	14.1	4662.7	9.7	6.2	6.4	0.74	--
Prince William	1-100	4.4	574.7	8.4	2.8	25.7	0.20	--
	101-200	16.5	2486.0	36.5	5.1	46.8	0.49	--
	201-400	86.2	3747.2	55.0	3.0	27.5	1.23	--
	All zones	20.9	6807.9	14.2	10.9	11.3	0.62	--
Kenai	1-100	--	--	--	--	--	--	--
	101-200	43.9	15283.6	63.3	49.3	78.0	0.31	--
	201-400	65.3	8882.0	36.8	13.9	22.0	0.64	--
	All zones	41.1	24165.6	50.3	63.2	65.6	0.38	--
Total	1-100	3.0	1036.7	2.2	4.3	4.5	0.23	--
	101-200	34.9	30237.7	62.9	71.4	74.1	0.42	--
	201-400	56.4	16767.2	34.9	20.7	21.5	0.81	--
	All zones	33.8	48041.6	100.0	96.4	100.0	0.50	--

1/ Mean catch per unit effort, in kilograms per hour trawled.
2/ Where data are available.
3/ Less than 0.1 kg/hr.
4/ Less than 0.1 X 10^6 individuals.
5/ Less than 0.1 percent.

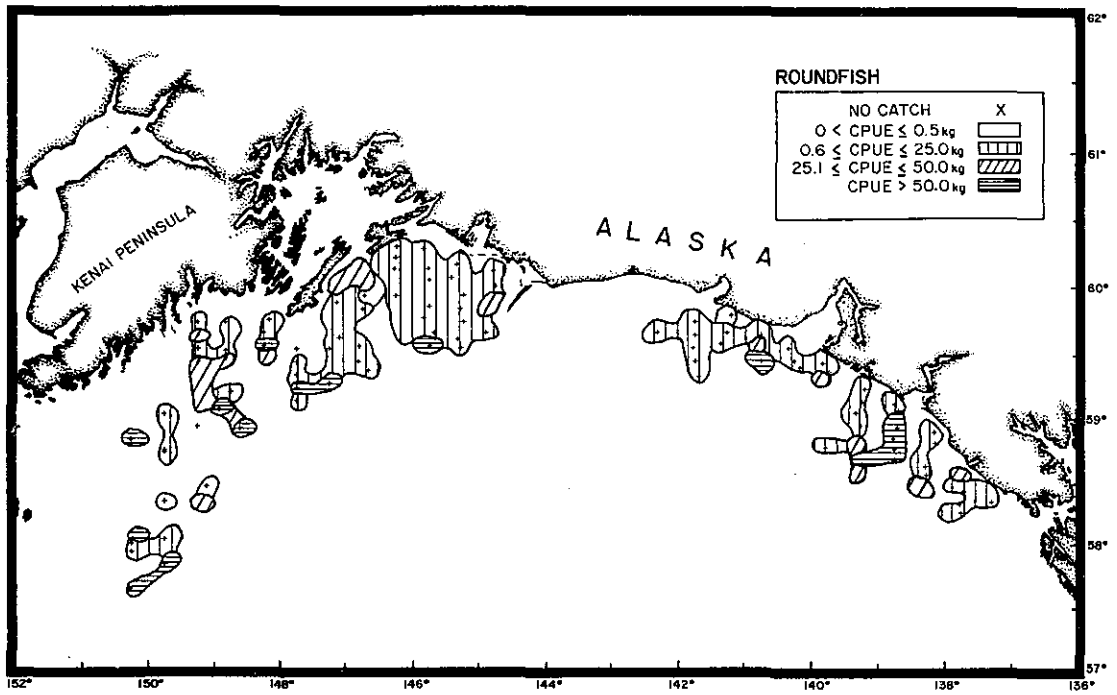


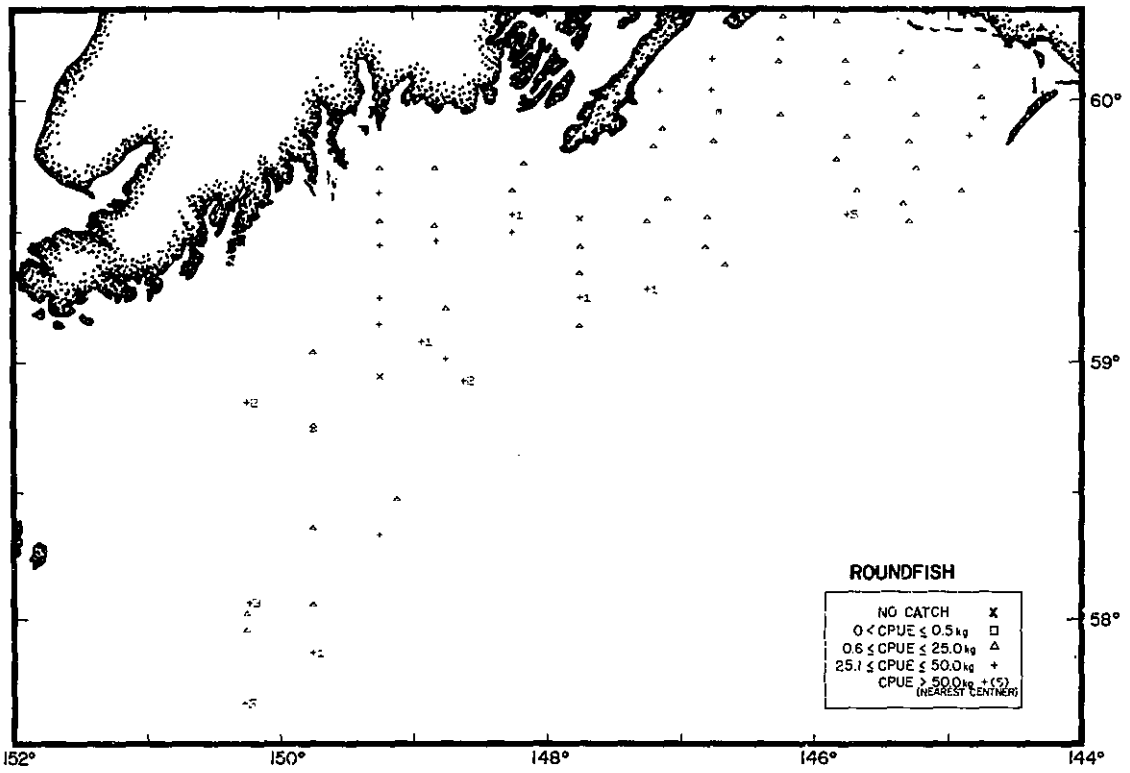
Figure XI-351.--Distribution of apparent relative abundance of roundfish in the eastern Gulf of Alaska, Sept.-Nov. 1962 (Cruise 629).

DISTRIBUTION, RELATIVE APPARENT ABUNDANCE, BIOMASS ESTIMATES, AND SIZE COMPOSITION FEATURES OF PRINCIPAL SPECIES OF FISH AND INVERTEBRATES

TURBOT

Distribution and Abundance--Turbot occured in each region-depth zone sampled and had the highest apparent relative abundance (66 kg/hr) of any species encountered in the survey area. Mean CPUE's increased with depth from 14 kg/hr on the inner shelf, to 88 kg/hr on the upper slope (Table XI-86). The Fairweather region had the highest relative apparent abundance (218 kg/hr), while the three remaining regions were below the survey average (Figure XI-359). Within the Fairweather region, particularly high mean catch rates occurred on the upper slope (349 kg/hr) and outer shelf (234 kg/hr) which contributed significantly to the total apparent abundance of this species (Figure XI-360).

Biomass--The apparent biomass of turbot was estimated at 100 thousand mt, of which 69% occurred on the outer shelf, 26% on the upper slope, and only 5% on the inner shelf. The Fairweather region accounted for nearly 60% of the turbot biomass, with the outer shelf and upper slope depth zones making the largest contribution to the regional total (98%) and the survey total (58%).



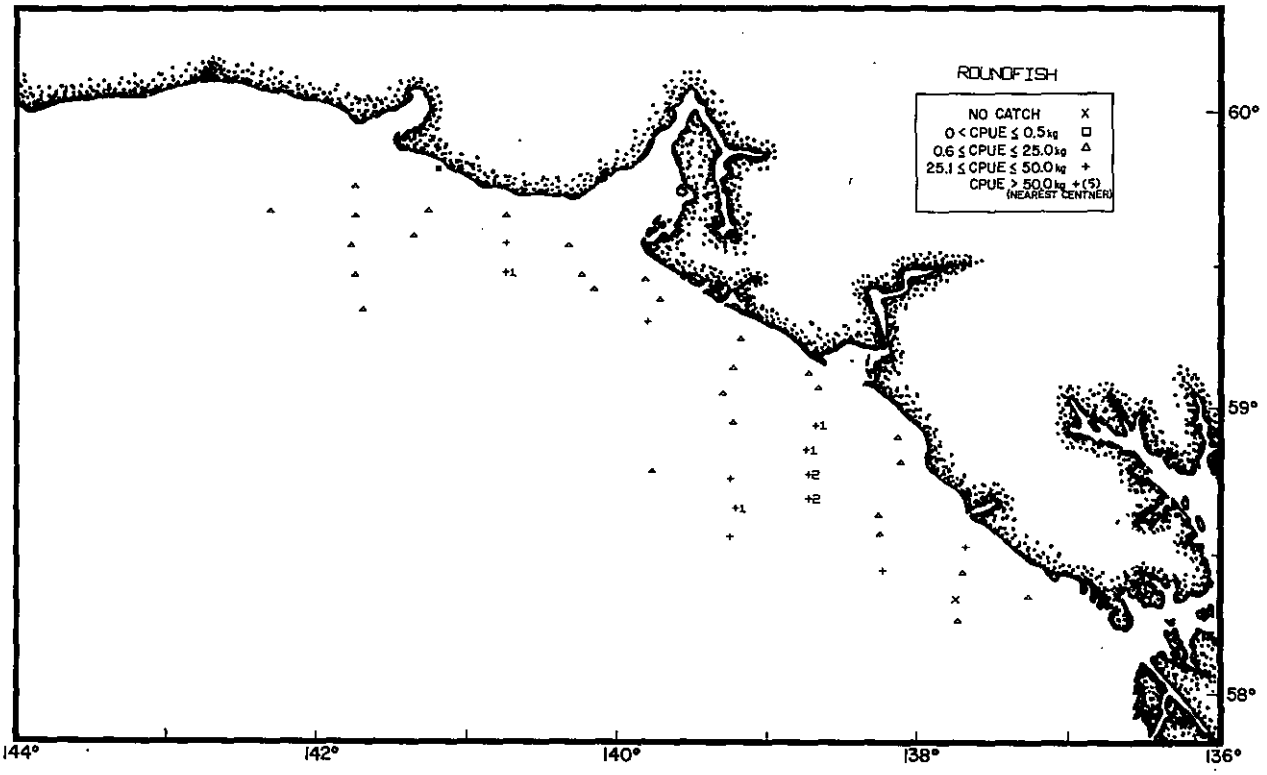


Figure XI-352.--Distribution of standardized catch rates in kg/hr of roundfish in the eastern Gulf of Alaska, Sept.-Nov. 1962 (Cruise 629).

Table XI-83.--Estimated biomass of invertebrates in the Gulf of Alaska during September-November 1962.

Region	Depth zone (m)	CPUE 1/ (kg/hr)	Estimated biomass (mt)	Proportion of total estimated biomass	Estimated population (X 10^6)	Proportion of total estimated population	Mean size per individual 2/ Weight (kg)	Mean size per individual 2/ Length (cm)
Fairweather	1-100	66.0	2828.1	20.6				
	101-200	53.7	10427.0	76.1				
	201-400	12.7	454.4	3.3				
	All zones	50.3	13709.5	31.5				
Yakutat	1-100	7.0	519.0	13.3				
	101-200	13.0	2259.5	58.0				
	201-400	13.6	1116.6	28.7				
	All zones	11.8	3895.1	9.0				
Prince William	1-100	61.5	8106.0	56.2				
	101-200	31.6	4748.6	33.9				
	201-400	35.9	1560.0	10.8				
	All zones	44.3	14414.6	33.3				
Kenai	1-100	--	--	--				
	101-200	23.2	8074.8	71.3				
	201-400	23.8	3245.1	28.7				
	All zones	19.2	11319.9	26.1				
Total	1-100	32.5	11453.1	26.4				
	101-200	29.4	25509.9	58.9				
	201-400	21.4	6376.1	14.7				
	All zones	28.6	43339.1	100.0				

1/ Mean catch per unit effort, in kilograms per hour trawled.
2/ Where data are available.
3/ Less than 0.1 kg/hr.
4/ Less than 0.1 X 10^6 individuals.
5/ Less than 0.1 percent.

Size composition--Random length frequencies were taken in the Kenai region. In the outer shelf, turbot sexes combined, ranged from 22-62 cm, and averaged 33.0 cm., while in the upper slope they ranged from 19-49 cm, and averaged 34.5 cm (Figure XI-361).

TANNER CRAB

Distribution and Abundance--Tanner crab were taken in each region-depth zone sampled during the survey. Mean CPUE's were highest on the outer shelf and upper slope and averaged 21 kg/hr over all depth zones (Figure XI-362) The Fairweather region had the highest apparent relative abundance (36 kg/hr), followed by Prince William, Kenai, and Yakutat (Table XI-87, Figure XI-363).

Biomass--Of the total estimated biomass of 32 thousand mt, 33% was contained in the Kenai region, 31% in Fairweather, 29% in Prince William and 8% in Yakutat. By depth zones, 70% came from the outer shelf, 20% from the upper slope and 10% from the inner shelf. The Tanner crab biomass estimate should be considered minimal due to the inability of the otter trawl to capture larger male crabs when towed at speeds utilized during this survey.

Size composition--Size composition data were not taken for this species.

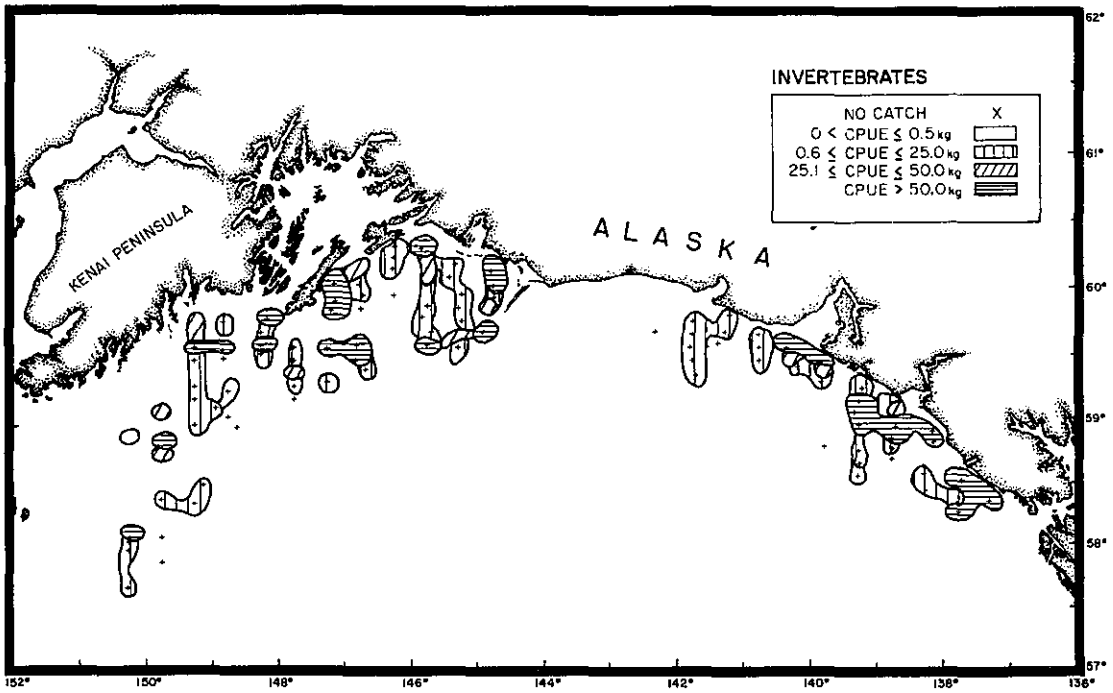


Figure XI-353.--Distribution of apparent relative abundance of invertebrates in the eastern Gulf of Alaska, Sept.-Nov. 1962 (Cruise 629).

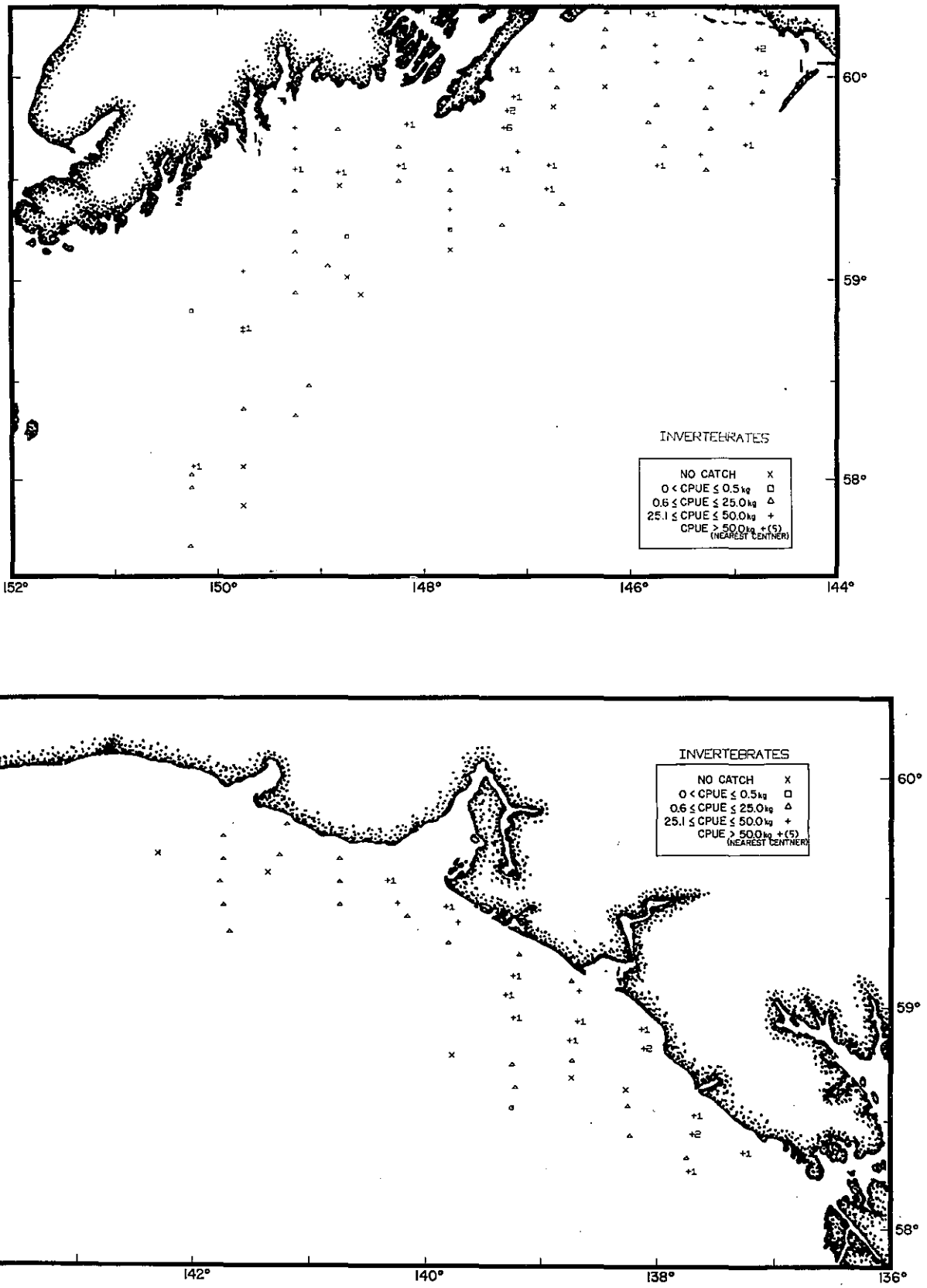


Figure XI-354.--Distribution of standardized catch rates in kg/hr of invertebrates in the eastern Gulf of Alaska, Sept.-Nov. 1962 (Cruise 629).

Table XI-84.--Estimated biomass and population size of rockfishes in the Gulf of Alaska during September-November 1962.

Region	Depth zone (m)	CPUE 1/ (kg/hr)	Estimated biomass (mt)	Proportion of total estimated biomass	Estimated population (X 10^6)	Proportion of total estimated population	Mean size per individual 2/ Weight (kg)	Length (cm)
Fairweather	1-100	0	0	0	0	0	--	--
	101-200	11.8	2292.1	28.2	4.8	24.6	0.48	--
	201-400	162.8	5836.0	71.8	14.7	75.4	0.40	--
	All zones	29.8	8128.1	20.4	19.5	24.8	0.42	--
Yakutat	1-100	0.4	29.0	0.4	0.1	0.6	0.39	--
	101-200	26.9	4690.0	62.1	10.3	62.1	0.46	--
	201-400	34.7	2835.7	37.5	6.2	37.4	0.46	--
	All zones	22.9	7554.7	18.9	16.6	21.1	0.46	--
Prince William	1-100	0.6	85.4	4.8	0.1	2.0	0.73	--
	101-200	7.2	1083.0	61.1	3.8	77.6	0.28	--
	201-400	14.0	605.5	34.1	1.0	20.4	0.58	--
	All zones	5.4	1773.9	4.4	4.9	6.2	0.36	--
Kenai	1-100	--	--	--	--	--	--	--
	101-200	32.9	11488.0	51.2	17.6	46.8	0.65	--
	201-400	80.6	10966.1	48.8	20.0	53.2	0.55	--
	All zones	38.1	22454.1	56.3	37.6	47.9	0.60	--
Total	1-100	0.3	114.4	0.3	0.2	0.3	0.57	--
	101-200	22.5	19553.1	49.0	36.5	46.4	0.54	--
	201-400	68.1	20243.3	50.7	41.9	53.3	0.48	--
	All zones	26.3	39910.8	100.0	78.6	100.0	0.51	--

1/ Mean catch per unit effort, in kilograms per hour trawled.
2/ Where data are available.
3/ Less than 0.1 kg/hr.
4/ Less than 0.1 X 10^6 individuals.
5/ Less than 0.1 percent.

FLATHEAD SOLE

Distribution and Abundance--Flathead sole were taken from each region-depth zone sampled in the survey area. Apparent relative abundance increased with depth and averaged 20 kg/hr over the survey area (Table XI-88). Mean catch rates varied from 4 kg/hr on the inner shelf to 34 kg/hr on the upper slope. The Fairweather and Kenai regions had the highest abundance (32 and 25 kg/hr), with mean catches falling below the survey average in the remaining regions (Figure XI-364). Within regions, particularly high CPUE's occurred in the Fairweather (78 kg/hr) and Kenai (43 kg/hr) upper slope depth zones, (Figure XI-365).

Biomass--Nearly all of the estimated flathead sole apparent biomass of 30 thousand mt was divided between the upper slope (34%) and outer shelf (62%) depth zones. The Kenai region contained the greatest percentage of the biomass (49%), followed by Fairweather (28%), Prince William (20%), and Yakutat (4%).

Size composition--Random length frequencies were taken in the Kenai - outer shelf where flathead sole, sexes combined, ranged in size from 21 - 38 cm and averaged 26.7 cm. (Figure XI-366).

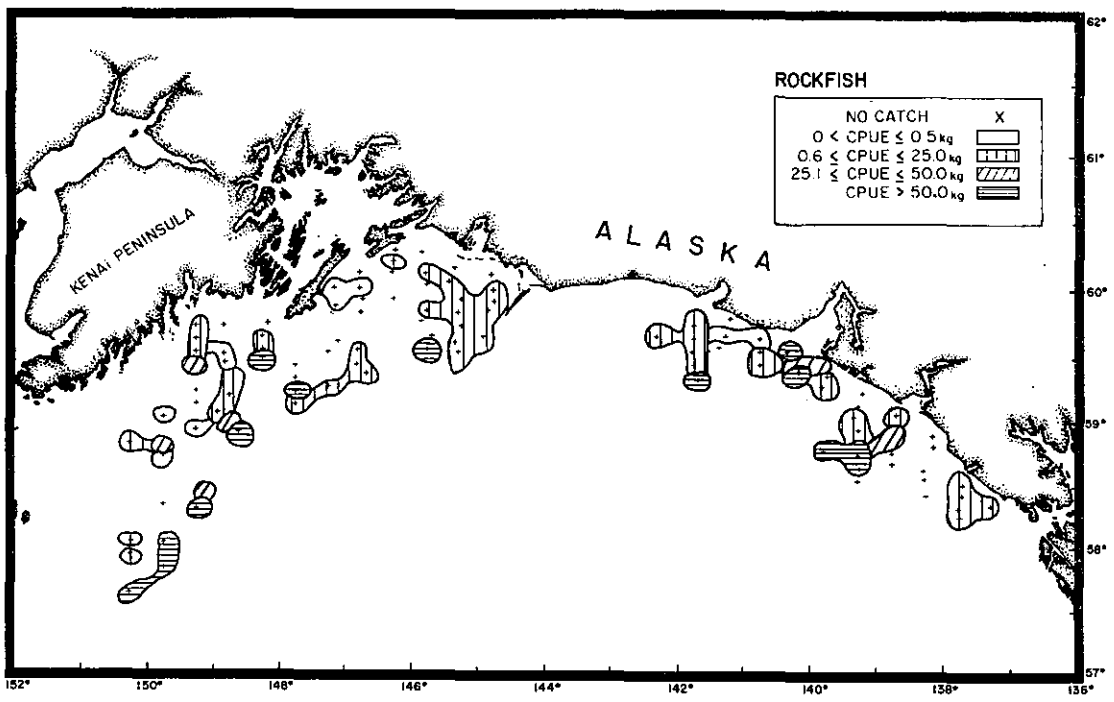
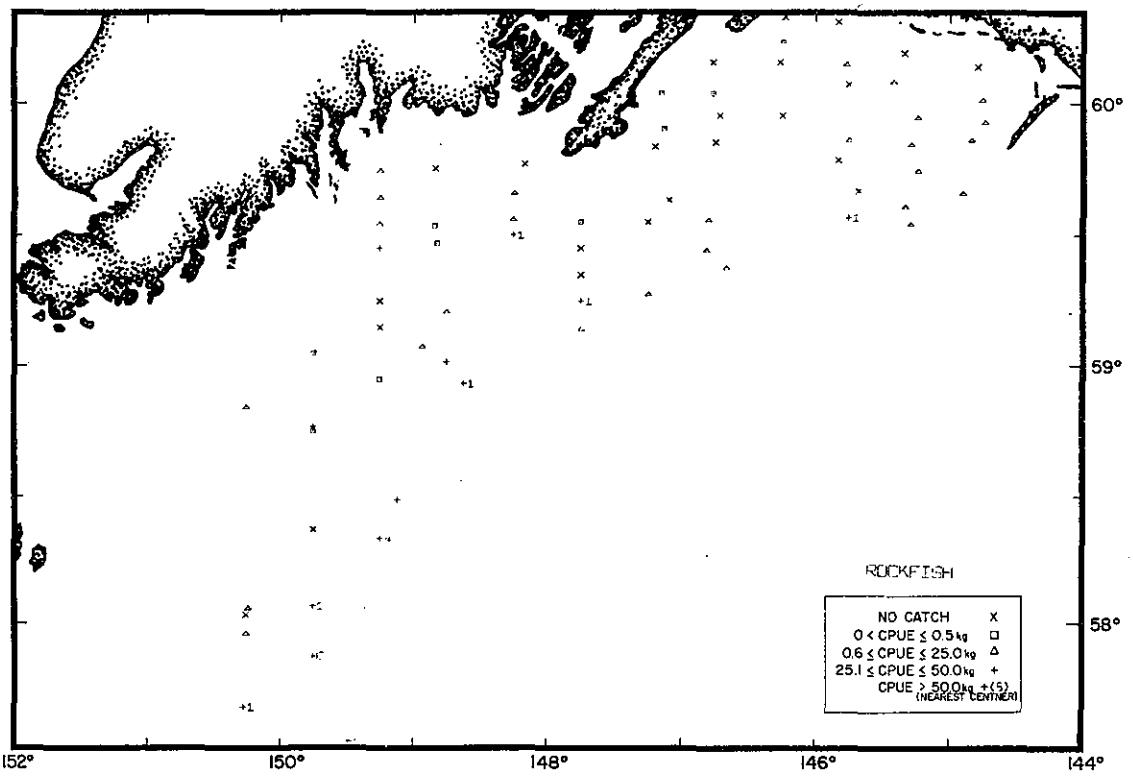


Figure XI-355.--Distribution of apparent relative abundance of rockfish in the eastern Gulf of Alaska, Sept.-Nov. 1962 (Cruise 629).



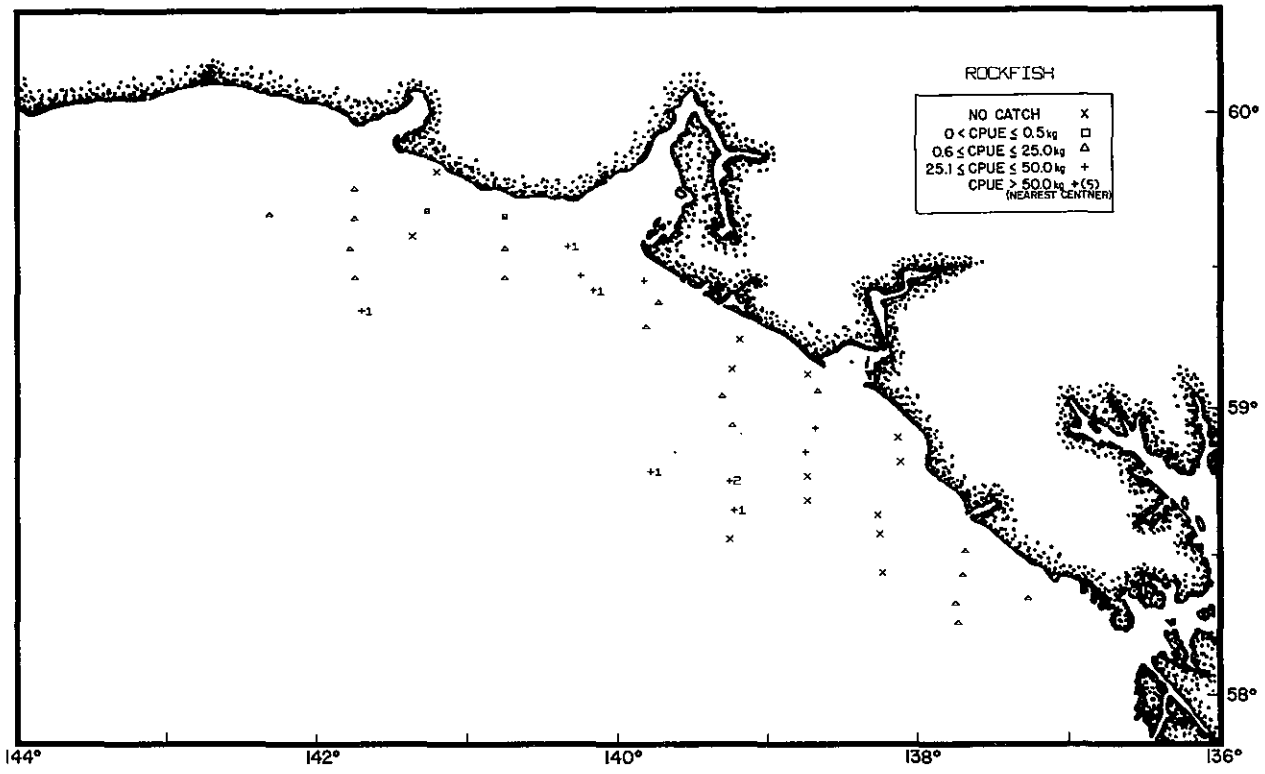


Figure XI-356.--Distribution of standardized catch rates in kg/hr of rockfish in the eastern Gulf of Alaska, Sept.-Nov. 1962 (Cruise 629).

Table XI-85.--Estimated biomass and population size of elasmobranchs in the Gulf of Alaska during September-November 1962.

Region	Depth zone (m)	CPUE 1/ (kg/hr)	Estimated biomass (mt)	Proportion of total estimated biomass	Estimated population (X 10^6)	Proportion of total estimated population	Mean size per individual 2/ Weight (kg)	Mean size per individual 2/ Length (cm)
Fairweather	1-100	40.1	1719.3	15.5	0.8	11.8	2.15	--
	101-200	40.4	7852.6	70.9	4.8	70.6	1.63	--
	201-400	42.1	1509.2	13.6	1.2	17.7	1.25	--
	All zones	40.6	11081.1	31.4	6.8	41.2	1.63	--
Yakutat	1-100	29.8	2202.6	25.9	0.6	17.1	3.50	--
	101-200	22.2	3871.3	45.6	1.7	48.6	2.31	--
	201-400	29.5	2417.5	28.5	1.2	34.3	2.01	--
	All zones	25.7	8491.4	24.1	3.5	21.2	2.42	--
Prince William	1-100	62.9	8296.2	67.9	1.7	48.6	4.81	--
	101-200	19.8	2973.5	24.3	1.3	37.1	2.36	--
	201-400	21.8	947.8	7.8	0.5	14.3	1.82	--
	All zones	37.5	12217.5	34.6	3.5	21.2	3.49	--
Kenai	1-100	--	--	--	--	--	--	--
	101-200	6.2	2170.7	61.7	1.6	59.3	1.40	--
	201-400	9.9	1345.6	38.3	1.1	40.7	1.20	--
	All zones	6.0	3516.3	10.0	2.7	16.4	1.30	--
Total	1-100	34.6	12218.1	34.6	3.1	18.8	3.94	--
	101-200	19.4	16868.1	47.8	9.4	57.0	1.79	--
	201-400	20.9	6220.1	17.6	4.0	24.2	1.56	--
	All zones	23.3	35306.3	100.0	16.5	100.0	2.14	--

1/ Mean catch per unit effort, in kilograms per hour trawled.
2/ Where data are available.
3/ Less than 0.1 kg/hr.
4/ Less than 0.1 X 10^6 individuals.
5/ Less than 0.1 percent.

PACIFIC OCEAN PERCH

Distribution and Abundance--Pacific ocean perch were widely distributed throughout the survey area, but were primarily taken in the outer shelf and upper slope depth zones (Table XI-89). The upper slope had the highest apparent abundance (53 kg/hr), followed by the outer and inner shelf (Figure XI-367). Mean CPUE's by regions ranged from 4 kg/hr in Prince William, to 37 kg/hr in Kenai and averaged 19 kg/hr over the entire survey area (Figure XI-368).

Biomass--The estimated apparent biomass of 29 thousand mt was relatively evenly divided between the outer shelf (46%) and upper slope (53%) depth zones. The Kenai region contained the largest percentage of the biomass (74%), while the next highest contribution came from the Fairweather region (17%). The biomass estimate for this species should be considered low, as this species is semi-pelagic and an unknown portion of the total population are distributed among hard-rocky areas, inaccessable to standard bottom trawls used during these surveys.

Size composition--Length frequency data are available from the Kenai-outer shelf where Pacific ocean perch ranged in size from 31-41 cm and averaged 37.1 cm (Figure XI-369).

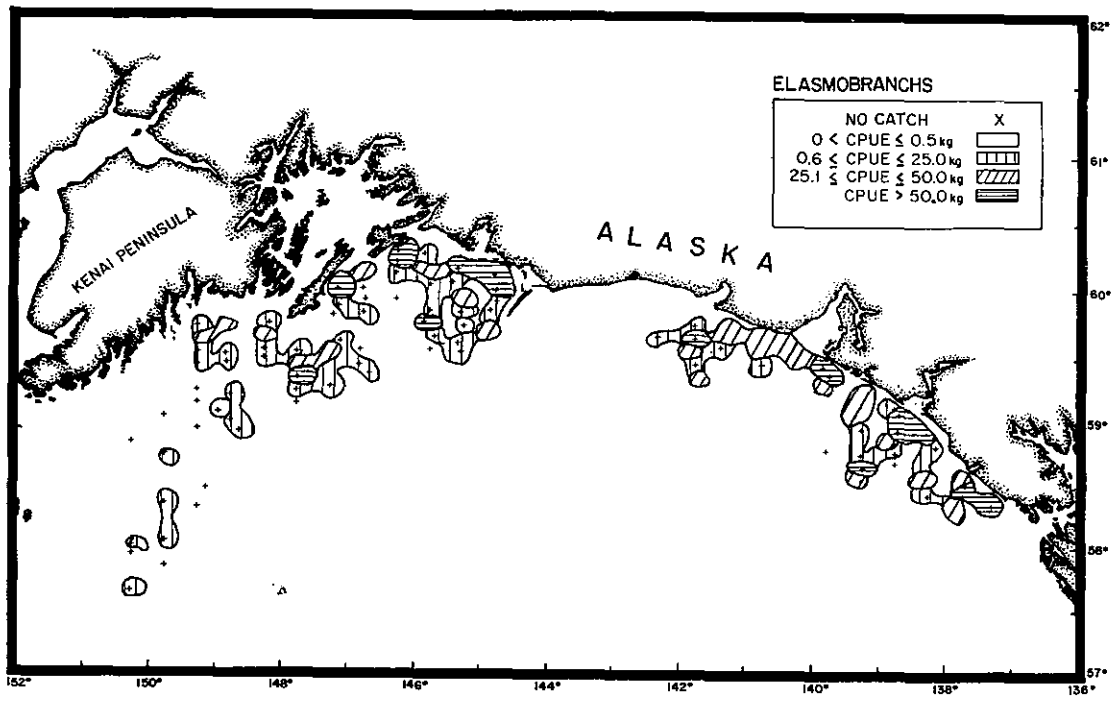


Figure XI-357.--Distribution of apparent relative abundance of elasmobranchs in the eastern Gulf of Alaska, Sept.-Nov. 1962 (Cruise 629).

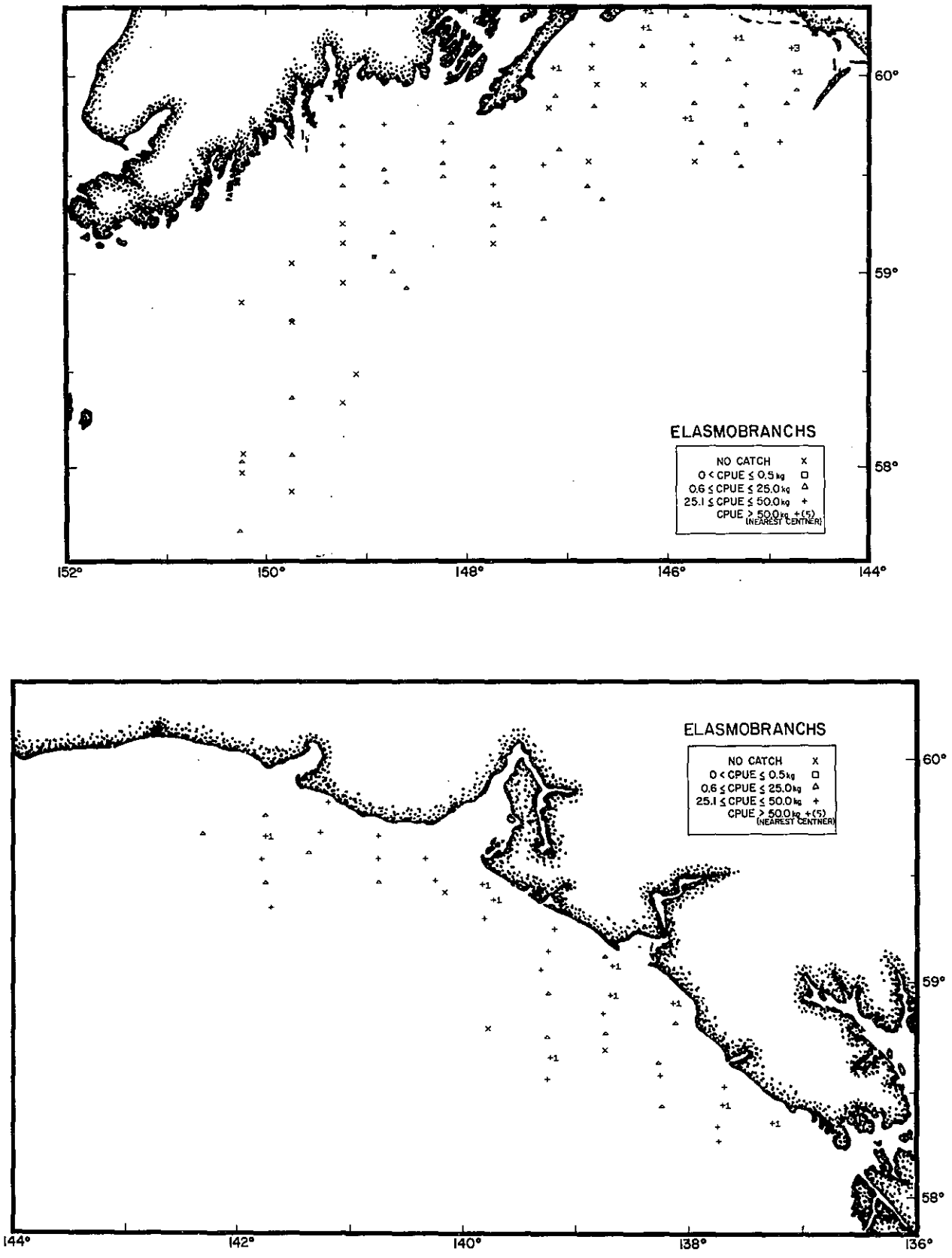


Figure XI-358.--Distribution of standardized catch rates in kg/hr of elasmobranchs in the eastern Gulf of Alaska, Sept.-Nov. 1962 (Cruise 629).

Table XI-86.--Estimated biomass and population size of turbot (Atheresthes stomias) in the Gulf of Alaska during September-November 1962.

Region	Depth zone (m)	CPUE 1/ (kg/hr)	Estimated biomass (mt)	Proportion of total estimated biomass	Estimated population (X 10^6)	Proportion of total estimated population	Mean size per individual 2/ Weight (kg)	Mean size per individual 2/ Length (cm)
Fairweather	1-100	33.5	1436.0	2.4	2.4	2.5	0.60	--
	101-200	234.3	45506.9	76.5	77.4	79.1	0.59	--
	201-400	349.4	12523.1	21.1	18.0	18.4	0.70	--
	All zones	217.8	59466.0	59.6	97.8	53.3	0.61	--
Yakutat	1-100	2.7	201.0	2.8	0.5	3.5	0.41	--
	101-200	31.5	5491.1	77.6	11.4	79.7	0.48	--
	201-400	16.9	1383.4	19.6	2.4	16.8	0.58	--
	All zones	21.4	7075.5	7.1	14.3	7.8	0.50	--
Prince William	1-100	26.1	3437.5	23.4	7.4	25.8	0.46	--
	101-200	56.8	8539.5	58.1	17.7	61.7	0.48	--
	201-400	62.7	2726.8	18.5	3.6	12.5	0.75	--
	All zones	45.2	14703.8	14.7	28.7	15.6	0.51	--
Kenai	1-100	--	--	--	--	--	--	--
	101-200	26.5	9226.5	49.7	24.2	56.7	0.38	33.0
	201-400	68.5	9328.4	50.3	18.5	43.3	0.50	34.5
	All zones	31.5	18554.9	18.6	42.7	23.3	0.43	33.7
Total	1-100	14.4	5074.5	5.1	10.3	5.6	0.49	--
	101-200	79.3	68764.0	68.9	130.7	71.2	0.53	--
	201-400	87.7	25961.7	26.0	42.5	23.2	0.61	--
	All zones	65.8	99800.2	100.0	183.5	100.0	0.54	--

1/ Mean catch per unit effort, in kilograms per hour trawled.
2/ Where data are available.
3/ Less than 0.1 kg/hr.
4/ Less than 0.1 X 10^6 individuals.
5/ Less than 0.1 percent.

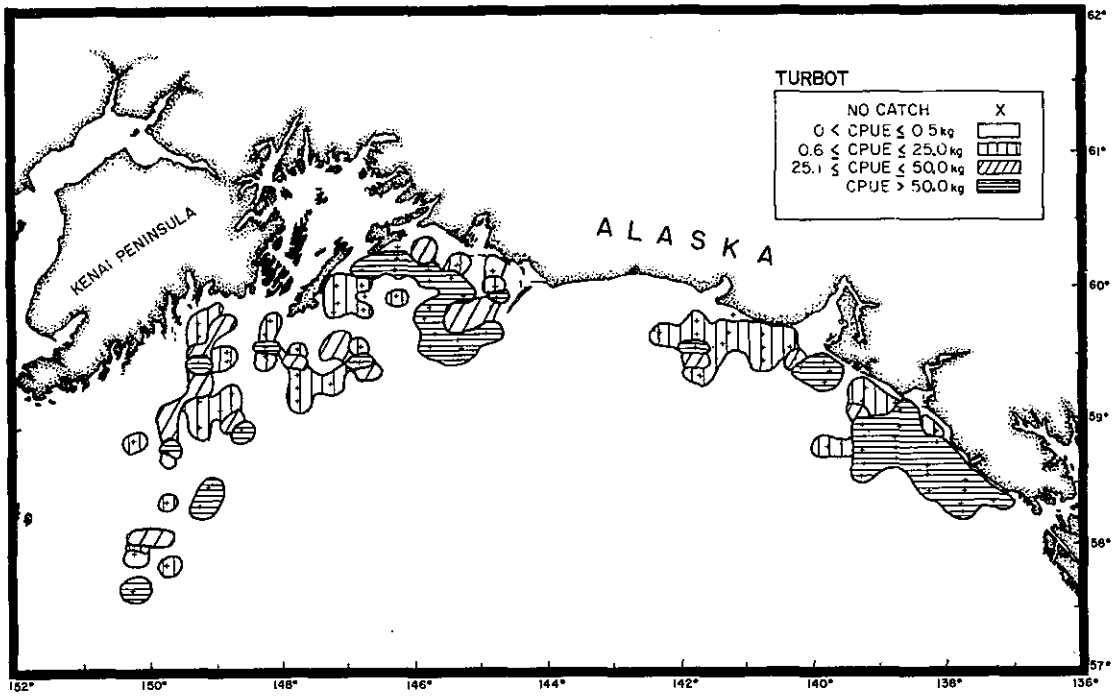


Figure XI-359.--Distribution of apparent relative abundance of turbot in the eastern Gulf of Alaska, Sept.-Nov. 1962 (Cruise 629).

SKATES

Distribution and Abundance--During the 1962 survey, skates were not identified to species but were combined into a general classification. Skates were taken in each region-depth zone sampled, and averaged 18 kg/hr over the survey area (Table XI-90). Highest apparent abundance occurred in the inner shelf depth zone (28 kg/hr), decreasing in the upper slope and outer shelf. With the exception of the Kenai area, (5 kg/hr) mean CPUE's varied little between (18-32 kg/hr) regions (Figure XI-370).

Biomass--The skate apparent biomass for the survey area has been estimated at 27 thousand mt, of which 46% occurred in the outer shelf, 36% in the inner shelf, and 18% in the upper slope. With the exception of the Kenai region which made the smallest contribution, the biomass was divided relatively evenly between Prince William (38%), Yakutat (26%) and Fairweather (25%).

Size Composition--Size composition data were not taken for this group.

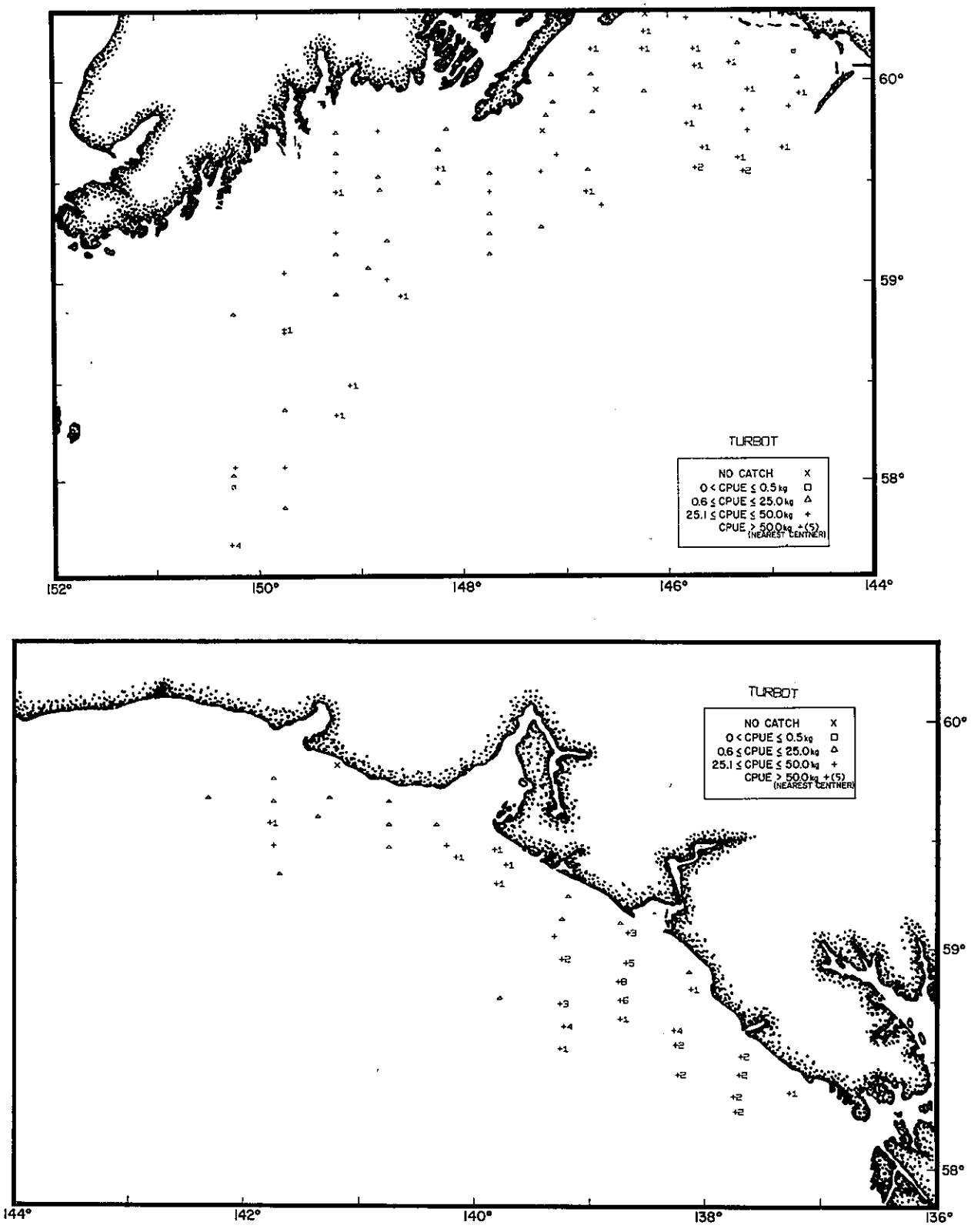


Figure XI-360.--Distribution of standardized catch rates in kg/hr of turbot in the eastern Gulf of Alaska, Sept.-Nov. 1962 (Cruise 629).

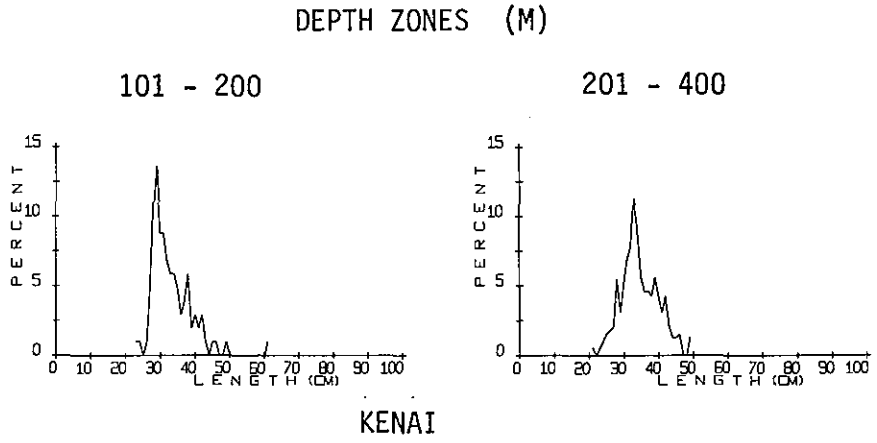


Figure XI-361.--Percentage length frequencies of turbot from the Gulf of Alaska (Cruise 629).

PACIFIC HALIBUT

Distribution and Abundance--With the exception of the Fairweather-upper slope, Pacific halibut were taken throughout the survey area. Apparent relative abundance varied little between regions with Yakutat having the largest concentrations (20 kg/hr), and Prince William the lowest (10 kg/hr)(Table XI-91). Mean CPUE's were highest on the outer shelf depth zone (20 kg/hr), while lower values occurred on the inner shelf and the upper slope (Figure XI-371).

Biomass--The apparent biomass of Pacific halibut has been estimated at 23 thousand mt, of which 75% occurred on the outer shelf, 17% on the inner shelf, and 8% on the upper slope. The Kenai region made the largest contribution to the total biomass with 41%, while proportions in the remaining regions ranged from 15% (Fairweather) to 29% (Yakutat). The biomass estimate for Pacific halibut should be considered low as the larger specimens of this species are apparently able to escape an otter trawl when towed at the speeds used during these surveys.

Size composition--Size composition data are available through the International Pacific Halibut Commission.

WALLEYE POLLOCK

Distribution and Abundance--With the exception of the Yakutat-inner shelf, pollock were encountered in each region-depth zone sampled (Table XI-92). Relative apparent abundance increased with depth with the highest mean CPUE occurring on the upper slope (32 kg/hr), followed by the outer and inner shelf and averaged 14 kg/hr over the entire survey area (Figure XI-372). The Fairweather, Kenai, and Prince William regions had relatively similar CPUE's which ranged from 12-19 kg/hr while the Yakutat region was lowest with 4 kg/hr. (Figure XI-373).

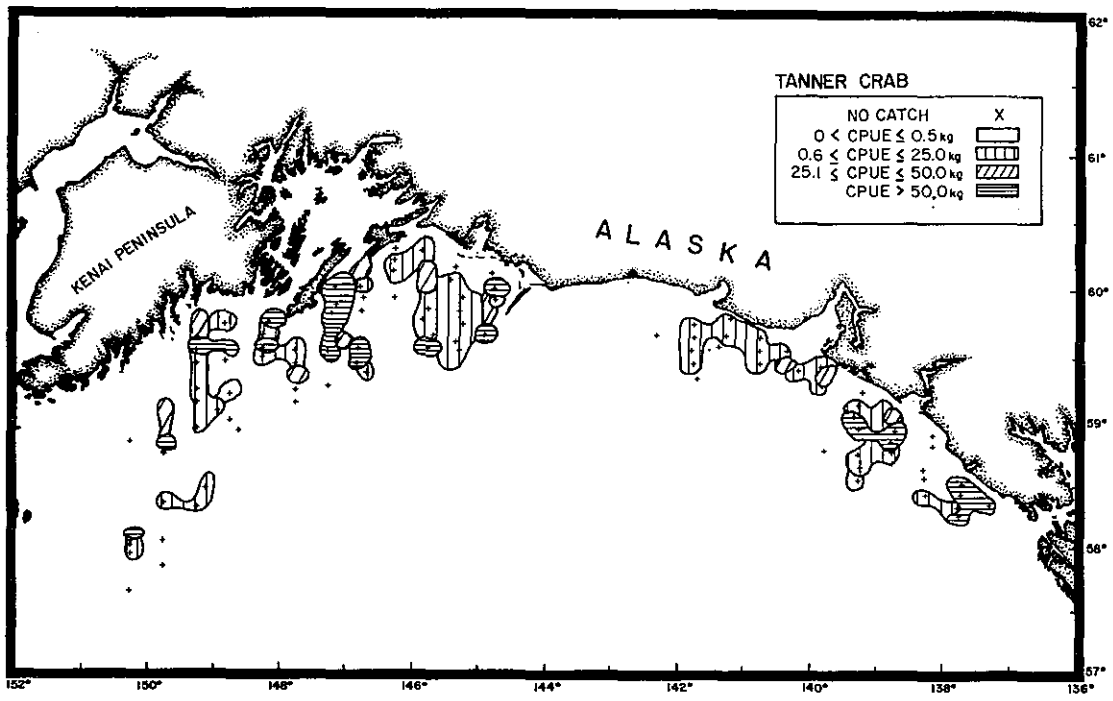


Figure XI-362.--Distribution of apparent relative abundance of Tanner crab in the eastern Gulf of Alaska, Sept.-Nov. 1962 (Cruise 629).

Biomass--The apparent pollock biomass of 20 thousand mt was fairly evenly divided between the outer shelf (54%), and upper slope (46%) depth zones. The Kenai region accounted for the major portion of the biomass (49%), while the remainder was divided between Fairweather (26%), Prince William (19%), and Yakutat (7%). The estimated pollock biomass should be considered a minimum since this is a semi-pelagic species and some unknown portion of the population may have occupied the water column above the sampling gear.

Size composition--Size composition data are not available for the species.

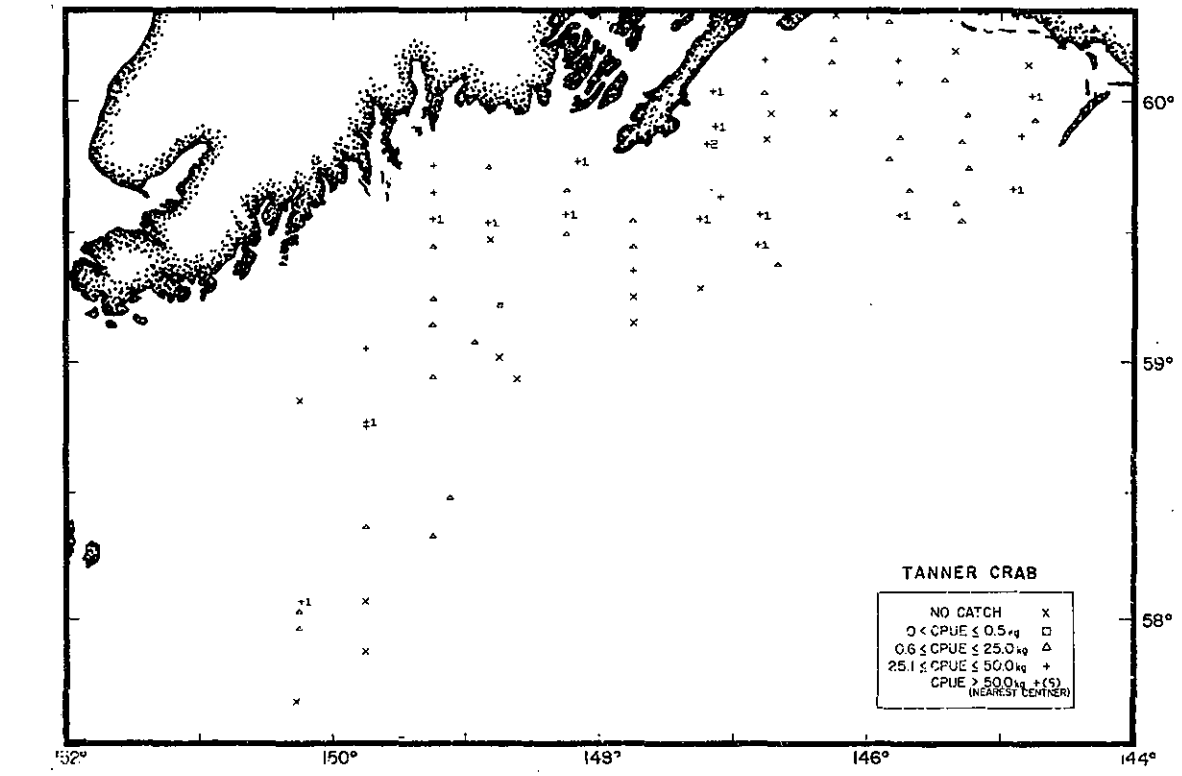
REX SOLE

Distribution and Abundance--Rex sole had a relatively wide distribution throughout the survey area, but were not highly abundant in any region or depth zone (Table XI-93). Mean CPUEs increased with depth, the highest abundance occurring on the upper slope and decreasing in the outer and inner shelf depth zones respectively. The Fairweather region had the highest apparent relative abundance followed by Kenai, Prince William and Yakutat (Figure XI-374).

Table XI-87.--Estimated biomass and population size of Tanner crab (Chionoecetes sp.) in the Gulf of Alaska during September-November 1962.

Region	Depth zone (m)	CPUE 1/ (kg/hr)	Estimated biomass (mt)	Proportion of total estimated biomass	Estimated population (X 10^6)	Proportion of total estimated population	Mean size per individual 2/ Weight (kg)	Mean size per individual 2/ Length (cm)
Fairweather	1-100	0.7	31.1	0.3	0.1	0.4	0.60	--
	101-200	47.4	9215.0	95.0	22.6	93.0	0.41	--
	201-400	12.7	454.4	4.7	1.6	6.6	0.30	--
	All zones	35.5	9700.5	30.7	24.3	29.9	0.40	--
Yakutat	1-100	2.0	144.1	6.1	0.3	2.0	0.56	--
	101-200	6.8	1179.7	49.8	10.2	69.4	0.12	--
	201-400	12.8	1044.0	44.1	4.2	28.6	0.25	--
	All zones	7.2	2367.8	7.5	14.7	18.1	0.16	--
Prince William	1-100	23.1	3041.5	33.7	6.2	28.7	0.49	--
	101-200	29.4	4419.9	49.1	12.7	58.8	0.35	--
	201-400	35.6	1547.7	17.2	2.7	12.5	0.57	--
	All zones	27.7	9009.1	28.5	21.6	26.5	0.42	--
Kenai	1-100	--	--	--	--	--	--	--
	101-200	21.0	7327.5	69.4	14.4	69.2	0.51	--
	201-400	23.7	3230.0	30.6	6.4	30.8	0.50	--
	All zones	17.9	10557.5	33.4	20.8	25.6	0.51	--
Total	1-100	9.1	3216.7	10.2	6.6	8.1	0.49	--
	101-200	25.5	22142.1	70.0	59.9	73.6	0.37	--
	201-400	21.1	6276.1	19.8	14.9	18.3	0.42	--
	All zones	20.8	31634.9	100.0	81.4	100.0	0.39	--

1/ Mean catch per unit effort, in kilograms per hour trawled.
2/ Where data are available.
3/ Less than 0.1 kg/hr.
4/ Less than 0.1 X 10^6 individuals.
5/ Less than 0.1 percent.



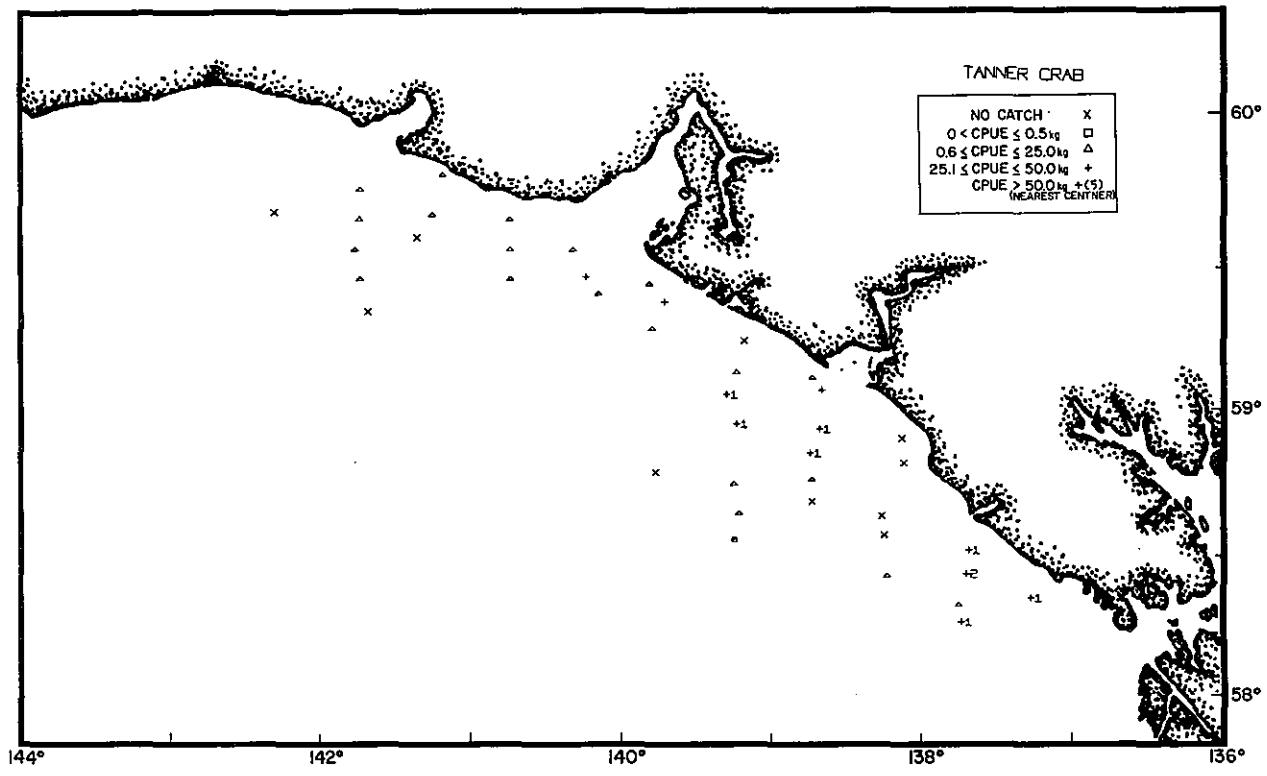


Figure XI-363.--Distribution of standardized catch rates in kg/hr of Tanner crab in the eastern Gulf of Alaska, Sept.-Nov. 1962 (Cruise 629).

Table XI-88.--Estimated biomass and population size of flathead sole (Hippoglossoides elassodon) in the Gulf of Alaska during September-November 1962.

Region	Depth zone (m)	CPUE 1/ (kg/hr)	Estimated biomass (mt)	Proportion of total estimated biomass	Estimated population (X 10^6)	Proportion of total estimated population	Mean size per individual 2/ Weight (kg)	Mean size per individual 2/ Length (cm)
Fairweather	1-100	4.6	195.4	2.3	0.9	4.0	0.23	--
	101-200	28.9	5608.6	65.3	14.6	64.9	0.38	--
	201-400	77.6	2780.2	32.4	7.0	31.1	0.40	--
	All zones	31.5	8584.2	28.2	22.5	22.0	0.38	--
Yakutat	1-100	0.1	8.9	0.8	4/	5/	0.18	--
	101-200	3.6	620.0	56.1	1.9	54.3	0.32	--
	201-400	5.8	475.9	43.1	1.6	45.7	0.30	--
	All zones	3.4	1104.8	3.6	3.5	3.4	0.31	--
Prince William	1-100	8.1	1065.4	17.9	3.9	21.7	0.27	--
	101-200	25.1	3768.2	63.3	11.2	62.2	0.34	--
	201-400	25.7	1117.4	18.8	2.9	16.1	0.39	--
	All zones	18.3	5951.0	19.6	18.0	17.6	0.33	--
Kenai	1-100	--	--	--	--	--	--	--
	101-200	25.6	8928.7	60.5	32.5	55.6	0.27	26.7
	201-400	42.9	5834.8	39.5	26.0	44.4	0.23	--
	All zones	25.1	14763.5	48.6	58.5	57.1	0.25	--
Total	1-100	3.6	1269.7	4.2	4.8	4.7	0.26	--
	101-200	21.8	18925.5	62.3	60.2	58.7	0.31	--
	201-400	34.4	10208.3	33.6	37.5	36.6	0.27	--
	All zones	20.1	30403.5	100.0	102.5	100.0	0.30	--

1/ Mean catch per unit effort, in kilograms per hour trawled.
2/ Where data are available.
3/ Less than 0.1 kg/hr.
4/ Less than 0.1 X 10^6 individuals.
5/ Less than 0.1 percent.

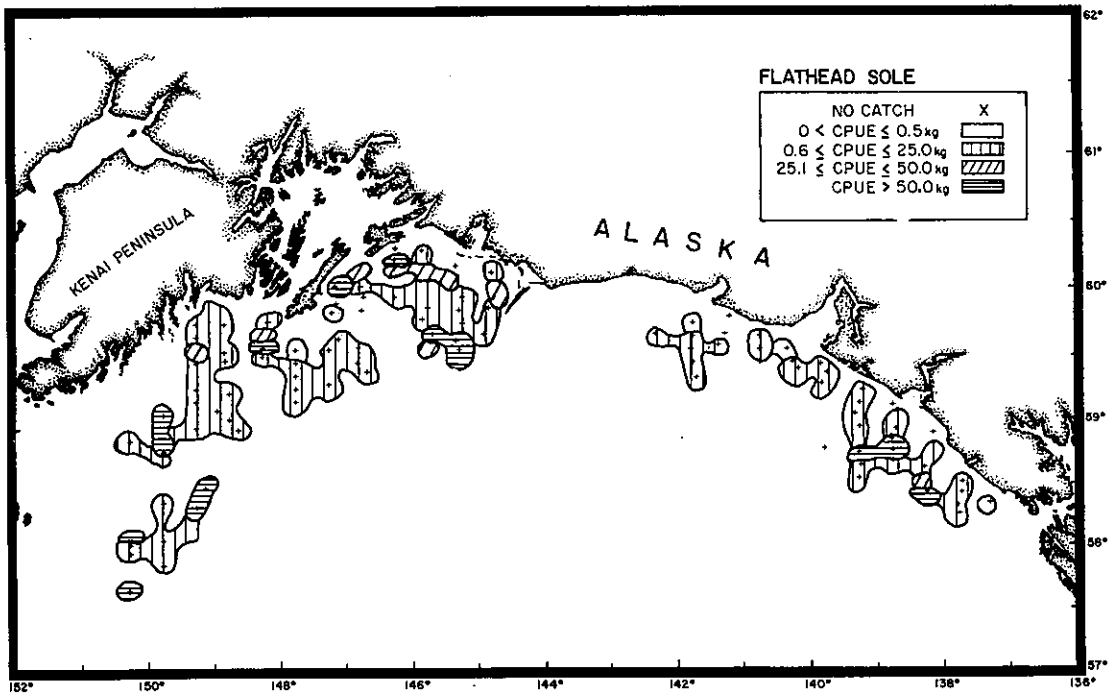


Figure XI-364.--Distribution of apparent relative abundance of flathead sole in the eastern Gulf of Alaska, Sept.-Nov. 1962 (Cruise 629).

Biomass--Rex sole had an estimated apparent biomass of 12 thousand mt, of which 58% occurred in the outer slope, 28% in the upper slope, and 14% in the inner shelf. Together the Kenai and Fairweather regions accounted for 84% of the biomass with 67% of the Fairweather contribution coming from the outer shelf. The biomass in the Kenai region was divided relatively evenly between the outer shelf (57%) and upper slope (43%).

Size composition--Random length frequency data are available from the Kenai upper slope where rex sole, sexes combined, ranged in size from 20-42 cm averaging 30.7 cm (Figure XI-375).

PACIFIC COD

Distribution and Abundance--Pacific cod appeared regularly throughout the survey area, but in relatively low concentration (Table XI-94). By depths, the highest relative apparent abundance was in the upper slope depth zone (12 kg/hr), followed by the outer shelf and the inner shelf and averaged 6 kg/hr over the survey area. Mean CPUE's ranged from 3 to 9 kg/hr being highest in the Kenai and Yakutat regions. The distribution of the standardized catch rates are presented in figure XI-376.

Biomass--The estimated apparent biomass of Pacific cod in the survey area was 10 thousand mt of which the largest contributors, Kenai (50%) and Yakutat (30%), together accounted for 80% of the total biomass. By depth zones, 59% of the biomass came from the outer shelf, 37% from the upper slope and 4% from the inner shelf. Although Pacific cod are mainly demersal, unknown portions of the population may have occupied the water column above the sampling gear thus resulting in a low biomass estimate.

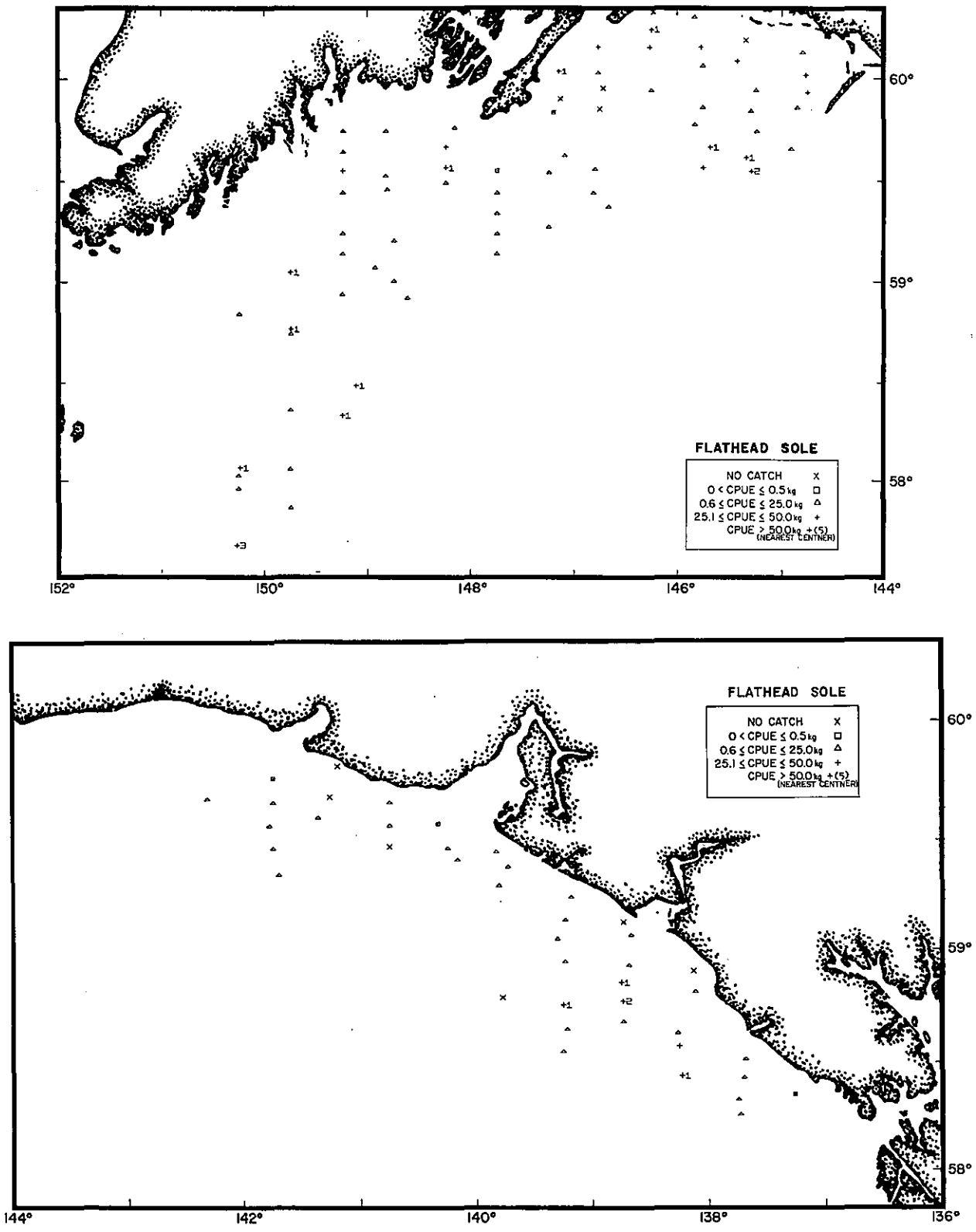


Figure XI-365.--Distribution of standardized catch rates in kg/hr of flathead sole in the eastern Gulf of Alaska, Sept.-Nov. 1962 (Cruise 629).

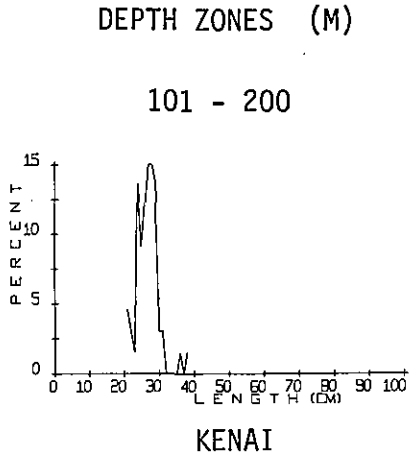


Figure XI-366.--Percentage length frequency of flathead sole from the Gulf of Alaska (Cruise 629).

Size composition--Size composition data are not available for this species.

SABLEFISH

Distribution and Abundance--The distribution of sablefish catch rates shows that highest concentrations occurred at the deeper stations (Table XI-95). The upper slope depth zone had the largest mean CPUE (11 kg/hr), with lower values occurring in the outer and inner shelf. The Fairweather region had the highest sablefish catch rate (22 kg/hr), while values in the three remaining areas ranged from 0.2 kg/hr (Yakutat) to 3 kg/hr (Kenai and Prince William) (Figures XI-377-378).

Biomass--Of the estimated 8 thousand mt of sablefish, 60% occurred in the outer shelf depth zone. The upper slope contained 37% of the estimated standing stock, while the inner shelf accounted for only 3%. Together, the Fairweather (69%) and Kenai (19%) region accounted for nearly 90% of the total biomass. The biomass estimate of sablefish should be considered minimal as this species occurs at greater depths than those sampled during this survey.

Size Composition--Size composition data are not available for this species.

Table XI-89.--Estimated biomass and population size of Pacific ocean perch (Sebastes alutus) in the Gulf of Alaska during September-November 1962.

Region	Depth zone (m)	CPUE 1/ (kg/hr)	Estimated biomass (mt)	Proportion of total estimated biomass	Estimated population (X 10^6)	Proportion of total estimated population	Mean size per individual 2/ Weight (kg)	Mean size per individual 2/ Length (cm)
Fairweather	1-100	0	0	0	0	0	--	--
	101-200	4.3	829.5	20.4	1.6	17.6	0.51	--
	201-400	90.5	3244.4	79.6	7.5	82.4	0.43	--
	All zones	14.9	4073.9	16.9	9.1	17.2	0.45	--
Yakutat	1-100	0.2	14.5	0.7	4/	5/	0.59	--
	101-200	2.5	436.1	20.7	1.1	26.8	0.41	--
	201-400	20.2	1654.6	78.6	3.0	73.2	0.55	--
	All zones	6.4	2105.2	7.2	4.1	7.8	0.51	--
Prince William	1-100	0.6	85.4	5.8	0.1	2.3	0.73	--
	101-200	6.6	994.0	68.3	3.6	83.7	0.28	--
	201-400	8.6	375.2	25.8	0.6	14.0	0.58	--
	All zones	4.4	1454.6	5.0	4.3	8.1	0.33	--
Kenai	1-100	--	--	--	--	--	--	--
	101-200	32.6	11343.8	52.2	17.2	48.7	0.66	37.1
	201-400	76.5	10410.0	47.8	18.1	51.3	0.57	--
	All zones	37.0	21753.8	74.0	35.3	66.9	0.62	--
Total	1-100	0.3	99.9	0.3	0.1	0.2	--	--
	101-200	15.7	13603.4	46.3	23.5	44.5	0.58	--
	201-400	52.8	15684.2	53.4	29.2	55.3	0.54	--
	All zones	19.4	29387.5	100.0	52.8	100.0	0.57	--

1/ Mean catch per unit effort, in kilograms per hour trawled.
2/ Where data are available.
3/ Less than 0.1 kg/hr.
4/ Less than 0.1 X 10^6 individuals.
5/ Less than 0.1 percent.

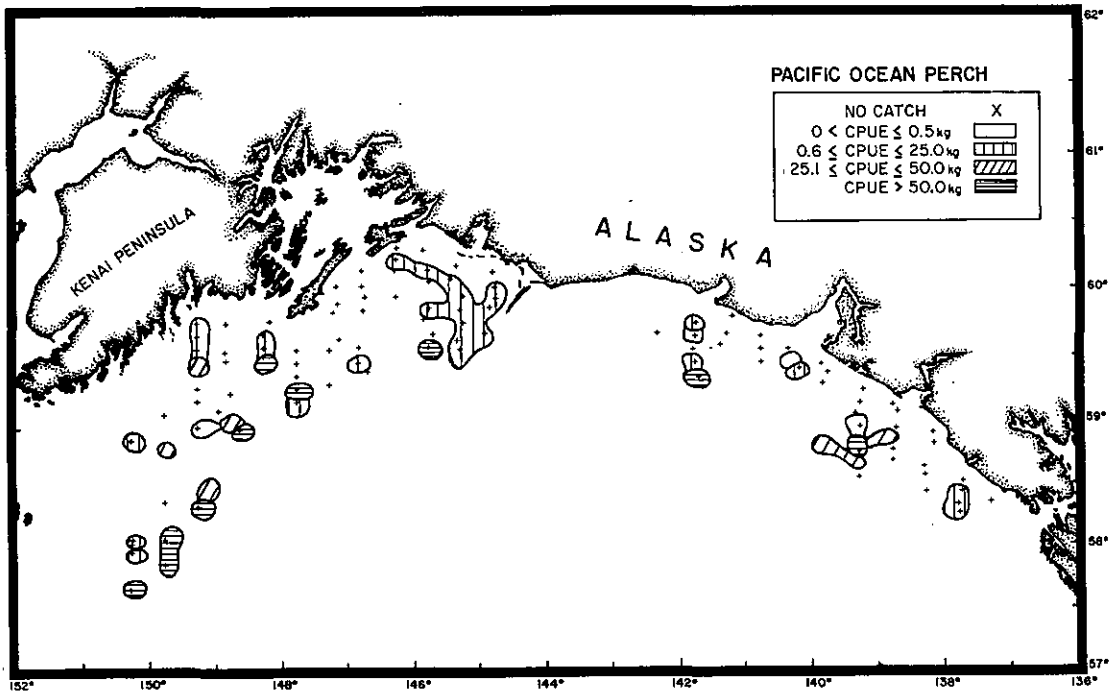


Figure XI-367.--Distribution of apparent relative abundance of Pacific ocean perch in the eastern Gulf of Alaska, Sept.-Nov. 1962 (Cruise 629).

SHORTSPINE THORNYHEAD

Distribution and Abundance--The CPUE of the shortspine thornyhead over the survey area averaged 5 kg/hr with apparent relative abundance increasing with depth (Table XI-96). Only trace amounts were encountered on the inner shelf, however, catch rates increased in the outer shelf (4 kg/hr), and upper slope (13 kg/hr). By geographic regions, mean CPUE's generally increased from west to east. Kenai and Prince William had the lowest apparent abundance while Yakutat and Fairweather had significantly higher values (Figure XI-379).

Biomass--The standing stock estimate of the shortspine thornyhead (7 thousand mt) was fairly evenly divided between the outer shelf (48%) and upper slope (52%) depth zones. The two easternmost regions, Fairweather and Yakutat, accounted for 88% of the total estimated standing stock. Biomass estimates for this species should be considered minimal as the survey covered only a portion of its bathymetric range which includes the steep, rugged bottom of the continental slope.

Size composition--Size composition data are not available for this species.

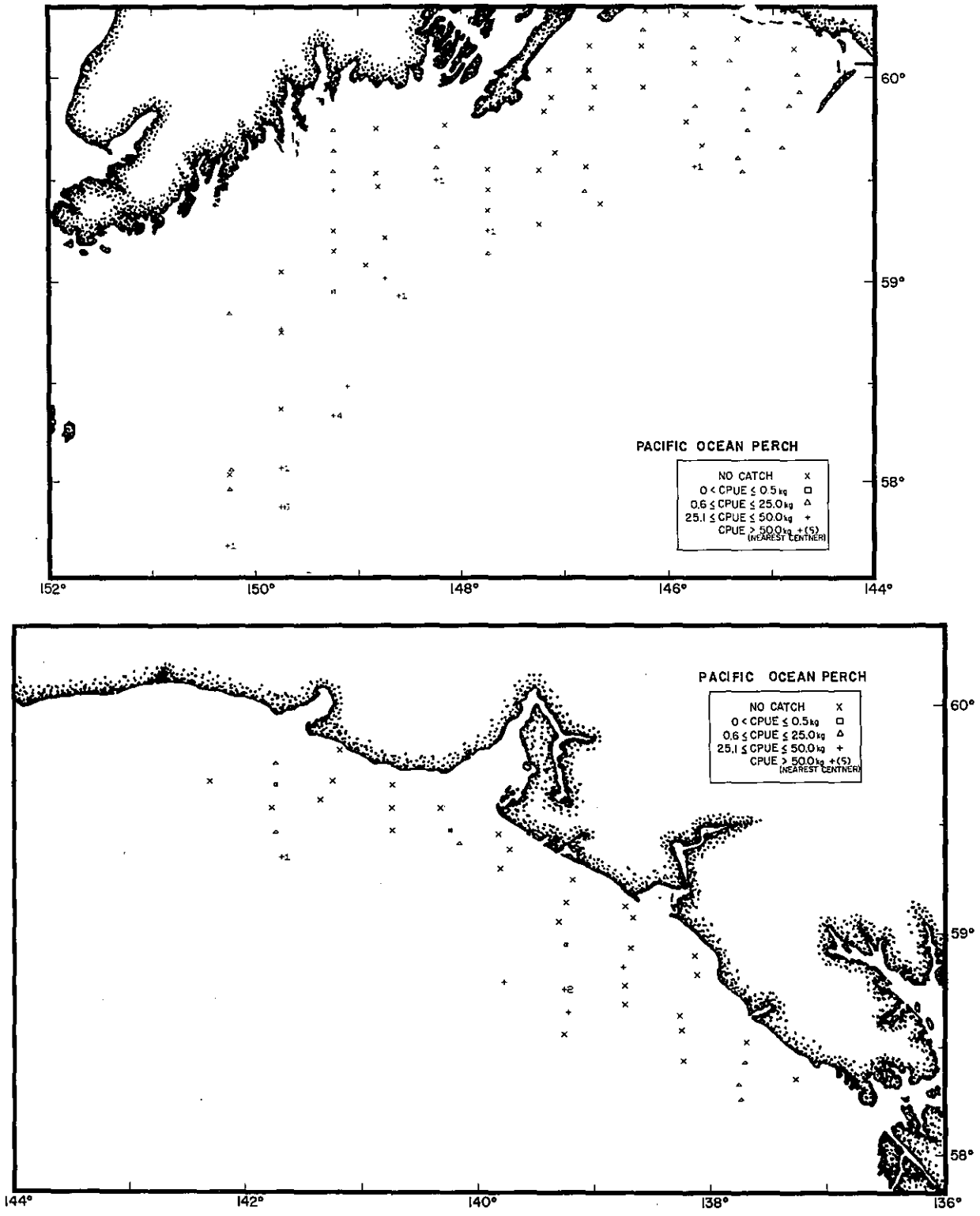


Figure XI-368.--Distribution of standardized catch rates in kg/hr of Pacific ocean perch in the eastern Gulf of Alaska, Sept.-Nov. 1962 (Cruise 629).

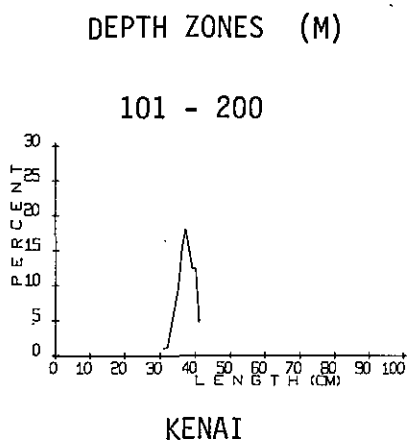


Figure XI-369.--Percentage length frequencies of Pacific ocean perch from the Gulf of Alaska (Cruise 629).

COTTIDS

Distribution and Abundance--The cottid group had an apparent relative abundance of 5 kg/hr (Table XI-97). Catch rates were highest in the outer shelf depth zone but decreased in the upper slope and inner shelf. By geographic regions, concentrations of cottids increased from east to west, ranging from 0.4 kg/hr in the Fairweather region to 10 kg/hr in the Kenai region (Figure XI-380).

Biomass--Of the estimated apparent biomass of cottids, 7 thousand mt, nearly 95% was contained in the outer shelf depth zone and 88% in the Kenai region.

Size composition--Size composition data are not available for this species.

DUNGENESS CRAB

Distribution and Abundance--Dungeness crab appeared in three of the four regions comprising the survey area, but had a low overall apparent relative abundance (4 kg/hr) (Table XI-98). This species was not taken in the upper slope depth zone, only trace amounts appeared in the outer shelf and highest abundance occurred in the inner shelf depth zone (16 kg/hr), particularly in the Fairweather and Prince William regions (Figure XI-381).

Table XI-90.--Estimated biomass and population size of skates (Rajidae) in the Gulf of Alaska during September-November 1962.

Region	Depth zone (m)	CPUE 1/ (kg/hr)	Estimated biomass (mt)	Proportion of total estimated biomass	Estimated population (X 10^6)	Proportion of total estimated population	Mean size per individual 2/ Weight (kg)	Mean size per individual 2/ Length (cm)
Fairweather	1-100	14.3	612.5	8.8	0.3	6.5	2.10	--
	101-200	27.9	5414.4	78.1	3.5	76.1	1.54	--
	201-400	25.3	906.8	13.1	0.8	17.4	1.08	--
	All zones	25.4	6933.7	25.2	4.6	37.4	1.49	--
Yakutat	1-100	25.3	1866.7	25.9	0.5	17.2	3.76	--
	101-200	18.5	3233.5	44.9	1.4	48.3	2.35	--
	201-400	25.6	2097.4	29.1	1.0	34.5	2.10	--
	All zones	21.8	7197.6	26.2	2.9	23.6	2.51	--
Prince William	1-100	55.4	7303.4	69.7	1.0	41.7	7.28	--
	101-200	16.1	2413.2	23.0	1.0	41.7	2.50	--
	201-400	17.5	763.0	7.3	0.4	16.7	1.82	--
	All zones	32.2	10479.6	38.1	2.4	19.5	4.37	--
Kenai	1-100	--	--	--	--	--	--	--
	101-200	4.7	1634.4	56.9	1.3	54.2	1.22	--
	201-400	9.1	1240.1	43.1	1.1	45.8	1.14	--
	All zones	4.9	2874.5	10.5	2.4	19.5	1.18	--
Total	1-100	27.7	9782.6	35.6	1.8	14.6	5.43	--
	101-200	14.6	12695.5	46.2	7.2	58.5	1.76	--
	201-400	16.8	5007.3	18.2	3.3	26.8	1.52	--
	All zones	18.1	27485.4	100.0	12.3	99.9	2.23	--

1/ Mean catch per unit effort, in kilograms per hour trawled.
2/ Where data are available.
3/ Less than 0.1 kg/hr.
4/ Less than 0.1 X 10^6 individuals.
5/ Less than 0.1 percent.

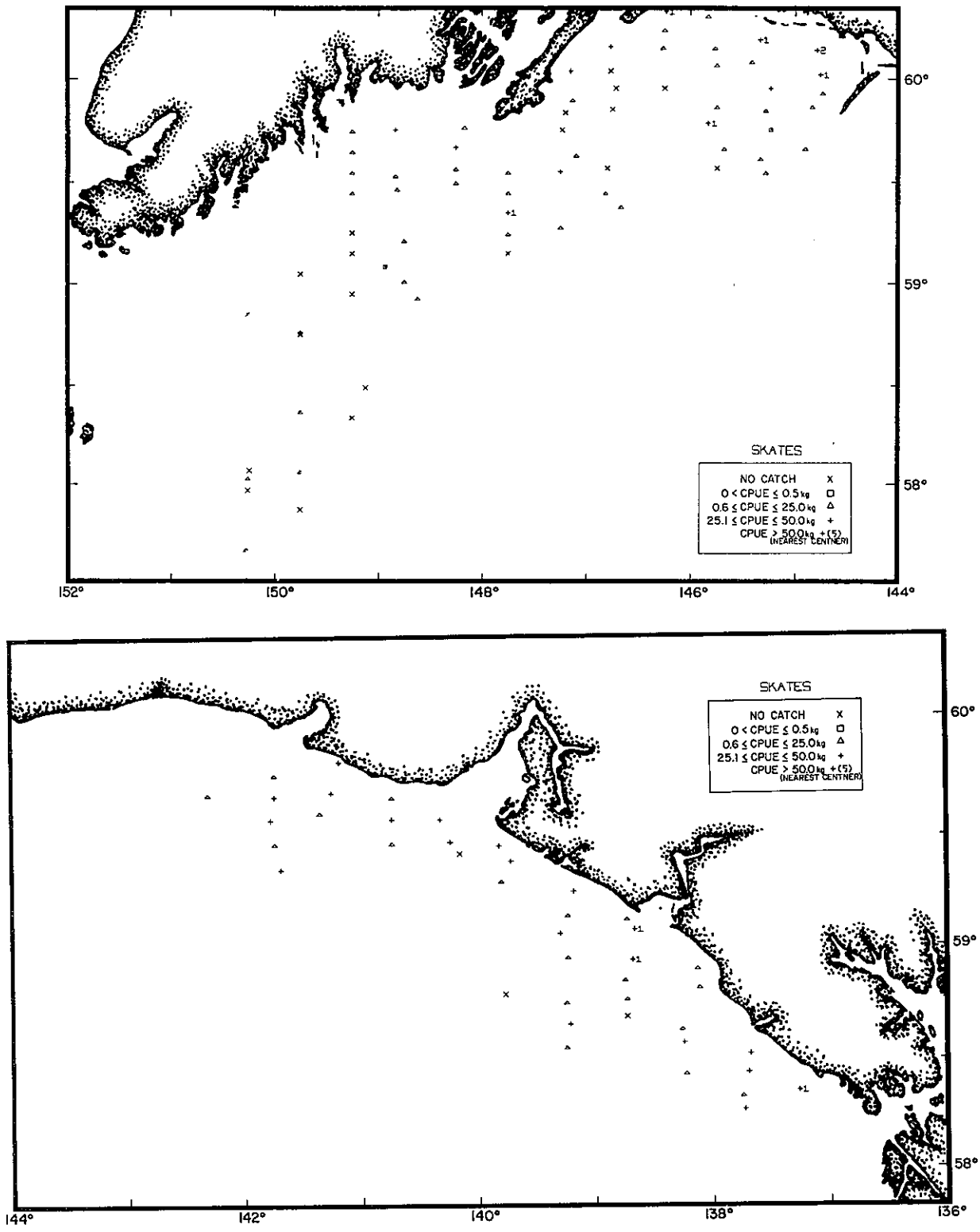


Figure XI-370.--Distribution of standardized catch rates in kg/hr of skates in the eastern Gulf of Alaska, Sept.-Nov. 1962 (Cruise 629).

Table XI-91.--Estimated biomass and population size of Pacific halibut (Hippoglossus stenolepsis) in the Gulf of Alaska during September-November, 1962.

Region	Depth zone (m)	CPUE 1/ (kg/hr)	Estimated biomass (mt)	Proportion of total estimated biomass	Estimated population (X 10^6)	Proportion of total estimated population	Mean size per individual 2/ Weight (kg)	Length (cm)
Fairweather	1-100	16.4	702.4	20.3	0.3	21.4	2.73	--
	101-200	14.2	2761.6	79.7	1.1	78.6	2.61	--
	201-400	0	0	0	0	0	--	--
	All zones	12.7	3464.0	15.3	1.4	18.0	2.63	--
Yakutat	1-100	10.7	793.0	12.1	0.4	19.1	1.89	--
	101-200	27.5	4795.0	73.1	1.4	66.7	3.55	--
	201-400	11.9	975.8	14.9	0.3	14.3	3.75	--
	All zones	19.9	6563.8	28.9	2.1	26.9	3.23	--
Prince William	1-100	17.9	2357.3	69.6	1.7	81.0	1.41	--
	101-200	6.0	907.0	26.8	0.4	19.1	2.43	--
	201-400	2.9	124.8	3.7	4/	5/	5.02	--
	All zones	10.4	3389.1	14.9	2.1	26.9	1.61	--
Kenai	1-100	--	--	--	--	--	--	--
	101-200	24.3	8467.8	91.0	2.1	95.5	4.05	--
	201-400	6.1	834.4	9.0	0.1	4.6	7.88	--
	All zones	15.8	9302.2	40.9	2.2	28.2	4.23	--
Total	1-100	10.9	3852.7	17.0	2.4	30.8	1.61	--
	101-200	19.5	16931.4	74.5	5.0	64.1	3.39	--
	201-400	6.5	1935.0	8.5	0.4	5.1	4.84	--
	All zones	15.0	22719.1	100.0	7.8	100.0	2.91	--

1/ Mean catch per unit effort, in kilograms per hour trawled.
2/ Where data are available.
3/ Less than 0.1 kg/hr.
4/ Less than 0.1 X 10^6 individuals.
5/ Less than 0.1 percent.

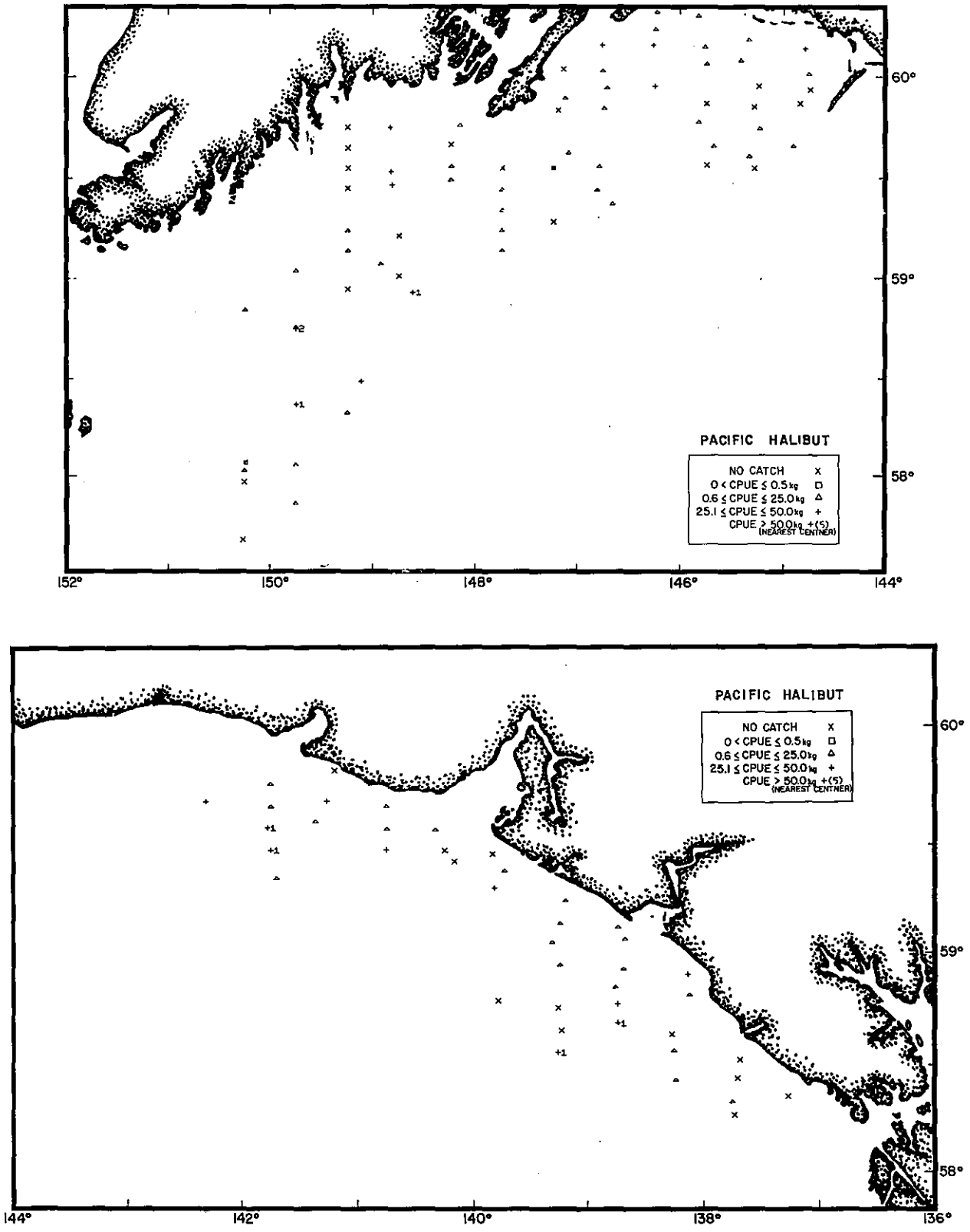


Figure XI-371.--Distribution of standardized catch rates in kg/hr of Pacific halibut in the eastern Gulf of Alaska, Sept.-Nov. 1962 (Cruise 629).

Table XI-92.--Estimated biomass and population size of pollock (Theragra chalcogramma) in the Gulf of Alaska during September-November 1962.

Region	Depth zone (m)	CPUE 1/ (kg/hr)	Estimated biomass (mt)	Proportion of total estimated biomass	Estimated population (X 10^6)	Proportion of total estimated population	Mean size per individual 2/ Weight (kg)	Mean size per individual 2/ Length (cm)
Fairweather	1-100	0.6	24.9	0.5	4/	5/	0.58	--
	101-200	22.4	4347.4	82.8	7.0	81.4	0.62	--
	201-400	24.4	875.5	16.7	1.6	18.6	0.56	--
	All zones	19.2	5247.8	25.6	8.6	20.8	0.61	--
Yakutat	1-100	0	0	0	0	0	--	--
	101-200	3.7	650.7	47.1	1.0	58.8	0.66	--
	201-400	8.9	730.6	52.9	0.7	41.2	0.98	--
	All zones	4.2	1381.3	6.8	1.7	4.1	0.80	--
Prince William	1-100	0.3	36.9	0.9	0.2	4.6	0.24	--
	101-200	5.9	889.0	22.7	1.8	40.9	0.49	--
	201-400	68.7	2985.0	76.3	2.4	54.6	1.25	--
	All zones	12.0	3910.9	19.1	4.4	10.6	0.89	--
Kenai	1-100	--	--	--	--	--	--	--
	101-200	14.7	5103.6	51.4	15.9	59.6	0.32	--
	201-400	35.5	4830.1	48.6	10.8	40.5	0.45	--
	All zones	16.9	9933.7	48.5	26.7	64.5	0.37	--
Total	1-100	0.2	61.8	0.3	0.2	0.5	0.31	--
	101-200	12.7	10990.7	53.7	25.7	62.1	0.43	--
	201-400	31.7	9421.2	46.0	15.5	37.4	0.61	--
	All zones	13.5	20473.7	100.0	41.4	100.0	0.49	--

1/ Mean catch per unit effort, in kilograms per hour trawled.
2/ Where data are available.
3/ Less than 0.1 kg/hr.
4/ Less than 0.1 X 10^6 individuals.
5/ Less than 0.1 percent.

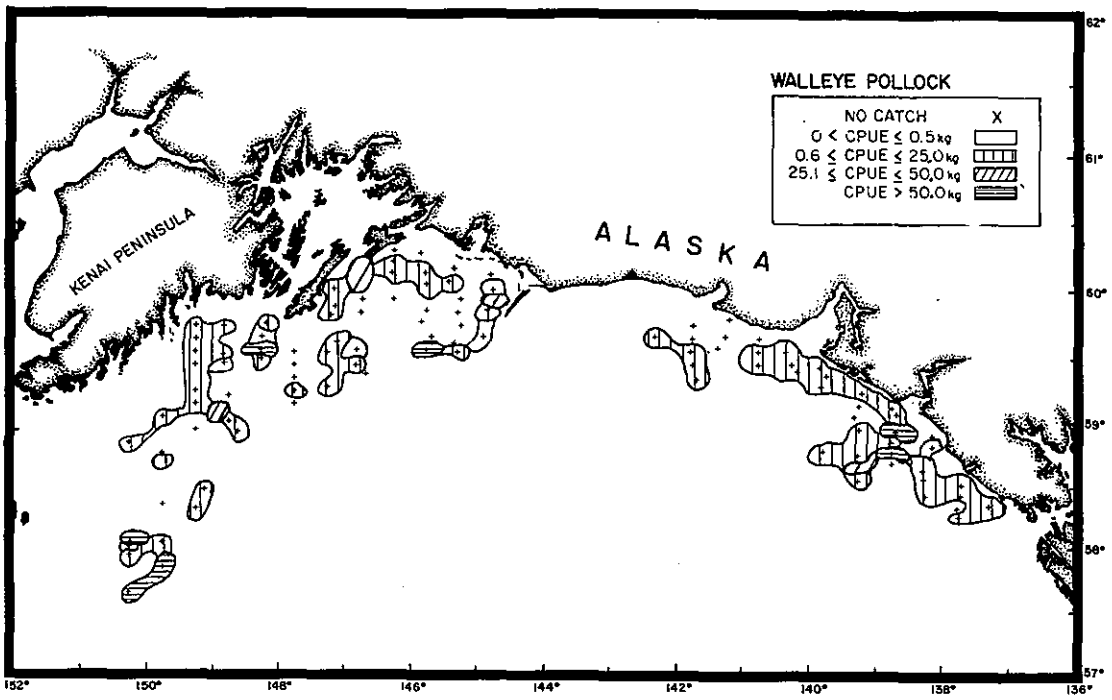


Figure XI-372.--Distribution of apparent relative abundance of walleye pollock in the eastern Gulf of Alaska, Sept.-Nov. 1962 (Cruise 629).

Biomass--Of the nearly 6 thousand mt of standing stock, 99% occurred in the inner shelf depth zone while, the Prince William (79%) and Fairweather (18%) regions together accounted for 98% of the total biomass. The biomass estimate for Dungeness crab should be considered minimal as most of the population occurs in water depths shallower than were adequately sampled during this survey.

Size composition--Size composition data were not taken for this species.

DOVER SOLE

Distribution and Abundance--The CPUE for Dover sole over the survey area averaged 3 kg/hr with the apparent relative abundance increasing with depth from less than 1 kg/hr in the inner shelf to 8 kg/hr in the upper slope (Table XI-99). Highest mean CPUE's occurred in the Fairweather and Kenai regions (Figure XI-382).

Biomass--Of the nearly 5 thousand mt of apparent biomass, 50% occurred in the outer shelf and 48% in the upper slope. Eighty-six percent of the total biomass occurred in the combined Fairweather (47%) and Kenai regions (39%), while Prince William (14%) and Yakutat (1%) contributed considerably lesser portions. The biomass estimate for Dover sole should be considered low as the bathymetric range of this species, which extends to approximately 600 fathoms, was not adequately sampled during this survey.

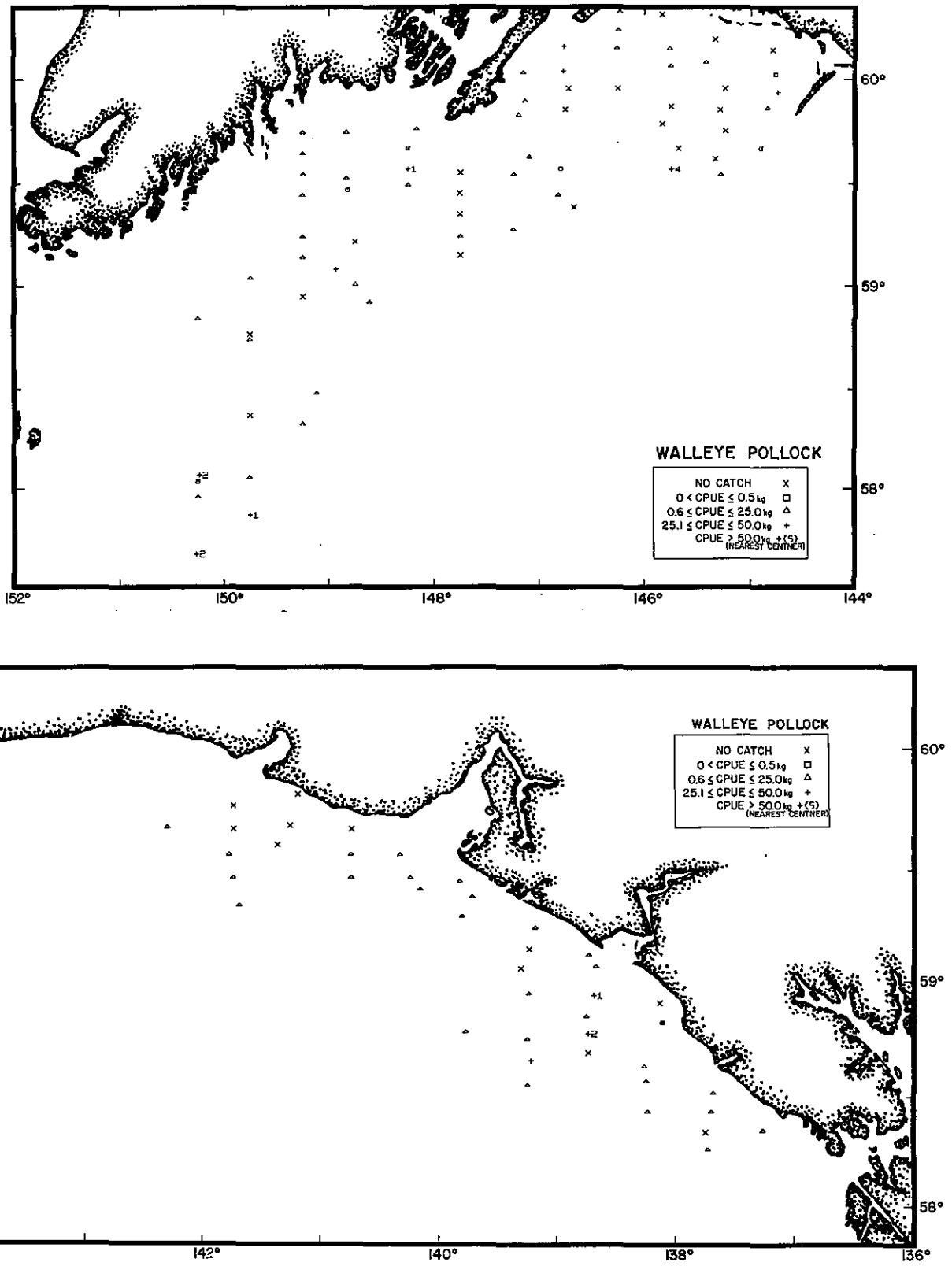


Figure XI-373.--Distribuiton of standardized catch rates in kg/hr of walleye pollock in the eastern Gulf of Alaska, Sept.-Nov. 1962 (Cruise 629).

Table XI-93.--Estimated biomass and population size of rex sole (Glyptocephalus zachirus) in the Gulf of Alaska during September-November 1962.

Region	Depth zone (m)	CPUE 1/ (kg/hr)	Estimated biomass (mt)	Proportion of total estimated biomass	Estimated population (X 10^6)	Proportion of total estimated population	Mean size per individual 2/ Weight (kg)	Mean size per individual 2/ Length (cm)
Fairweather	1-100	25.6	1097.4	25.5	5.5	33.5	0.20	--
	101-200	14.9	2898.4	67.3	9.4	57.3	0.31	--
	201-400	8.7	313.0	7.3	1.5	9.2	0.21	--
	All zones	15.8	4308.8	35.6	16.4	27.3	0.26	--
Yakutat	1-100	1.2	89.3	14.0	0.7	19.4	0.12	--
	101-200	1.8	315.4	49.6	1.6	44.4	0.20	--
	201-400	2.8	231.2	36.4	1.3	36.1	0.17	--
	All zones	1.9	635.9	5.3	3.6	6.0	0.17	--
Prince William	1-100	3.7	484.5	36.5	2.8	35.4	0.17	--
	101-200	3.0	448.1	33.7	3.0	38.0	0.15	--
	201-400	9.1	396.0	29.8	2.1	26.6	0.19	--
	All zones	4.1	1328.6	11.0	7.9	13.1	0.17	--
Kenai	1-100	--	--	--	--	--	--	--
	101-200	9.6	3326.3	56.9	19.0	59.0	0.18	--
	201-400	18.5	2520.3	43.1	13.2	51.0	0.19	30.7
	All zones	10.0	5846.6	48.2	32.2	53.6	0.18	--
Total	1-100	4.7	1671.2	13.8	9.0	15.0	0.19	--
	101-200	8.1	6988.2	57.7	33.0	54.9	0.21	--
	201-400	11.6	3460.5	28.6	18.1	30.1	0.19	--
	All zones	8.0	12119.9	100.0	60.1	100.0	0.20	--

1/ Mean catch per unit effort, in kilograms per hour trawled.
2/ Where data are available.
3/ Less than 0.1 kg/hr.
4/ Less than 0.1 X 10^6 individuals.
5/ Less than 0.1 percent.

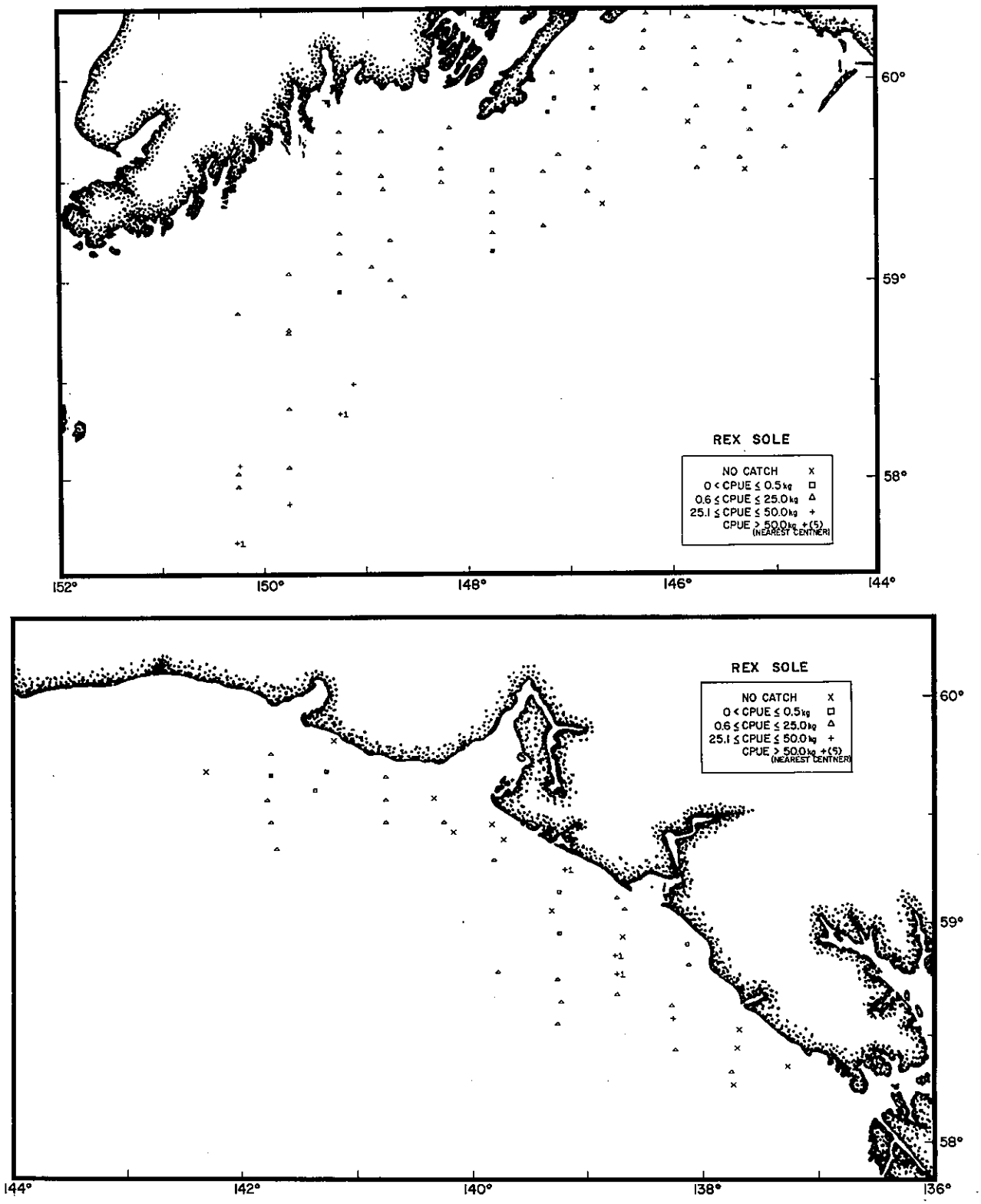


Figure XI-374.--Distribution of standardized catch rates in kg/hr of rex sole in the eastern Gulf of Alaska, Sept.-Nov. 1962 (Cruise 629).

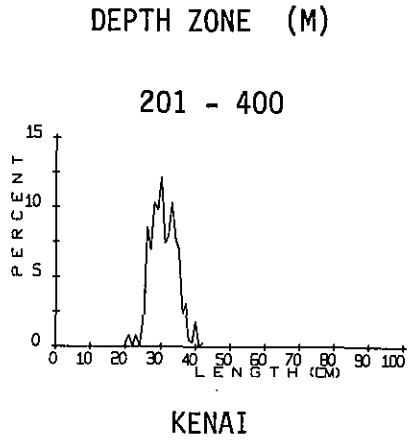


Figure XI-375.--Percentage length frequencies of rex sole from the Gulf of Alaska (Cruise 629).

Size composition--On the Kenai upper slope where random length frequency data are available, Dover sole, sexes combined, ranged in size from 27-41 cm and averaged 30.4 cm (Figure XI-383).

SCALLOPS

Distribution and Abundance--Scallops had a relatively limited distribution, appearing mainly in the inner shelf depth zone of the eastern regions which resulted in an overall mean CPUE of only 2 kg/hr (Table XI-100). The highest mean CPUE occurred in the Fairweather region (10 kg/hr) (Figure XI-384).

Biomass--Of the 3,600 mt of apparent biomass of scallops, 58% occurred in the inner shelf, 41% in the outer shelf and only 1% in the upper slope. The Fairweather region accounted for 80% of the total biomass, and the Yakutat region 12%. The biomass estimate for scallops should be considered minimal as the otter trawls used in these surveys are not an efficient gear for harvesting scallops.

Table XI-94.--Estimated biomass and population size of Pacific cod (Gadus macrocephalus) in the Gulf of Alaska during September-November 1962.

Region	Depth zone (m)	CPUE 1/ (kg/hr)	Estimated biomass (mt)	Proportion of total estimated biomass	Estimated population (X 10^6)	Proportion of total estimated population	Mean size per individual 2/ Weight (kg)	Mean size per individual 2/ Length (cm)
Fairweather	1-100	2.6	112.9	16.3	0.1	33.3	1.88	--
	101-200	3.0	579.1	83.7	0.2	66.7	2.45	--
	201-400	0	0	0	0	0	--	--
	All zones	2.5	692.0	7.2	0.3	2.9	2.31	--
Yakutat	1-100	1.8	134.0	4.6	0.2	6.5	0.60	--
	101-200	12.6	2205.1	76.3	2.2	71.0	1.00	--
	201-400	6.8	552.8	19.1	0.7	22.6	0.82	--
	All zones	8.7	2891.9	29.9	3.1	30.1	0.93	--
Prince William	1-100	1.1	138.7	11.0	0.8	34.8	0.18	--
	101-200	6.3	948.5	75.1	1.4	60.9	0.68	--
	201-400	4.0	175.6	13.9	0.1	4.4	1.28	--
	All zones	3.9	1262.8	13.1	2.3	22.3	0.55	--
Kenai	1-100	--	--	--	--	--	--	--
	101-200	5.7	1993.3	41.3	2.6	56.5	0.78	--
	201-400	20.8	2833.4	58.7	2.0	43.5	1.41	--
	All zones	8.2	4826.7	49.9	4.6	44.7	1.05	--
Total	1-100	1.1	385.6	4.0	1.1	10.7	0.35	--
	101-200	6.6	5726.0	59.2	6.4	62.1	0.89	--
	201-400	12.0	3561.8	36.8	2.8	27.2	1.27	--
	All zones	6.4	9673.4	100.0	10.3	100.0	0.94	--

1/ Mean catch per unit effort, in kilograms per hour trawled.
2/ Where data are available.
3/ Less than 0.1 kg/hr.
4/ Less than 0.1 X 10^6 individuals.
5/ Less than 0.1 percent.

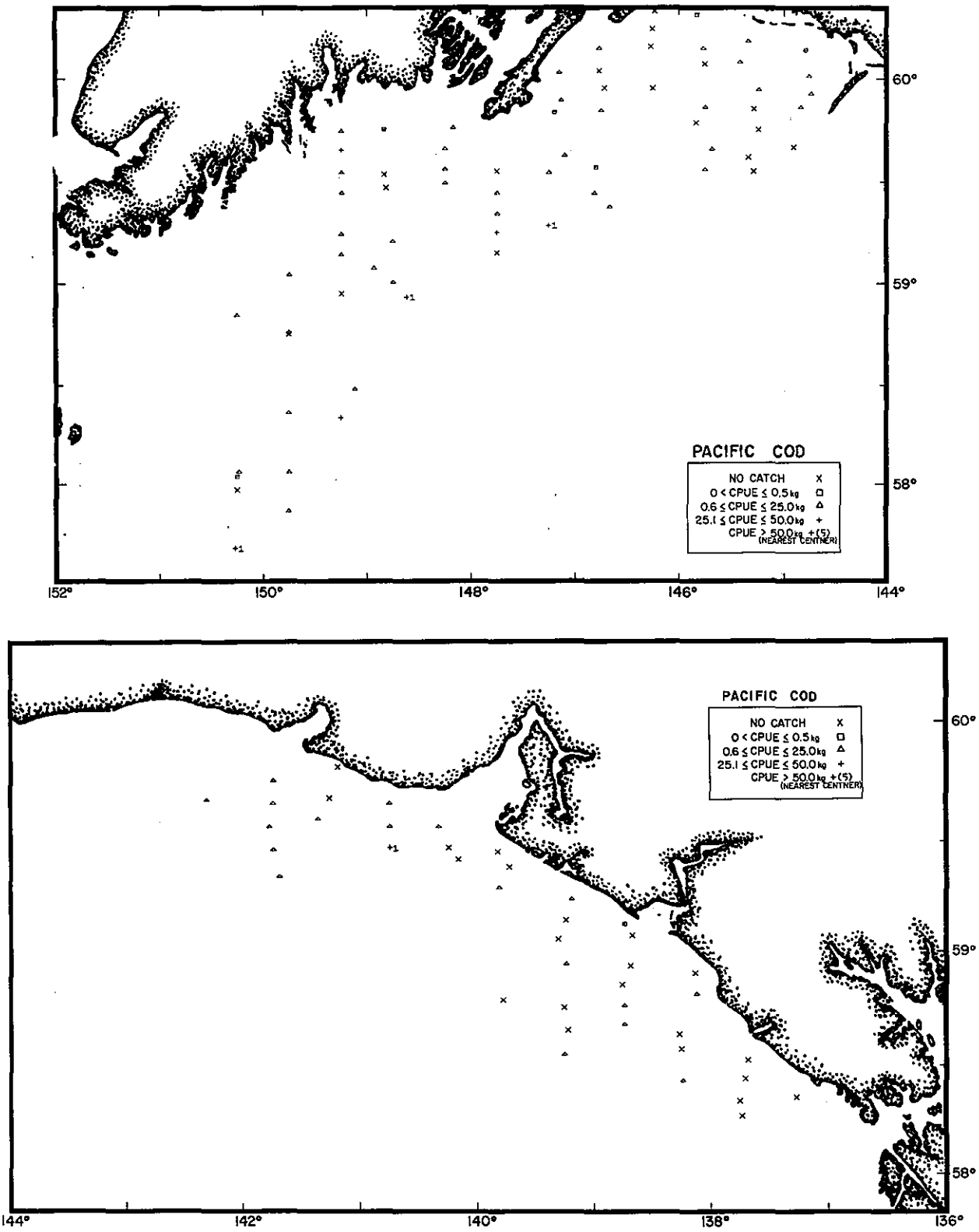


Figure XI-376.--Distribution of standardized catch rates in kg/hr of Pacific cod in the eastern Gulf of Alaska, Sept.-Nov. 1962 (Cruise 629).

Table XI-95.--Estimated biomass and population size of sablefish (Anoplopoma fimbria) in the Gulf of Alaska during September-November 1962.

Region	Depth zone (m)	CPUE 1/ (kg/hr)	Estimated biomass (mt)	Proportion of total estimated biomass	Estimated population (X 10^6)	Proportion of total estimated population	Mean size per individual 2/ Weight (kg)	Mean size per individual 2/ Length (cm)
Fairweather	1-100	0.6	25.3	0.4	0.1	1.7	0.42	--
	101-200	21.4	4156.3	70.8	4.9	84.5	0.85	--
	201-400	47.0	1685.2	28.7	0.8	13.8	2.24	--
	All zones	21.5	5866.8	69.4	5.8	67.4	1.01	--
Yakutat	1-100	0	0	0	0	0	--	--
	101-200	0.3	58.3	100.0	0.1	100.0	0.45	--
	201-400	0	0	0	0	0	--	--
	All zones	0.2	58.3	0.7	0.1	1.2	0.45	--
Prince William	1-100	1.8	234.0	25.4	0.6	56.2	0.36	--
	101-200	1.8	264.6	28.7	0.4	30.8	0.61	--
	201-400	9.8	424.0	46.0	0.3	23.1	1.42	--
	All zones	2.9	922.6	10.9	1.3	15.1	0.71	--
Kenai	1-100	--	--	--	--	--	--	--
	101-200	1.7	585.8	36.5	0.8	57.1	0.71	48.2
	201-400	7.5	1017.9	63.5	0.6	42.9	1.59	--
	All zones	2.7	1603.7	19.0	1.4	16.3	1.15	--
Total	1-100	0.7	259.3	3.1	0.7	8.1	0.37	--
	101-200	5.8	5065.0	59.9	6.2	72.1	0.82	--
	201-400	10.5	3127.1	37.0	1.7	19.8	0.16	--
	All zones	5.6	8451.4	100.0	8.6	100.0	0.98	--

1/ Mean catch per unit effort, in kilograms per hour trawled.
2/ Where data are available.
3/ Less than 0.1 kg/hr.
4/ Less than 0.1 X 10^6 individuals.
5/ Less than 0.1 percent.

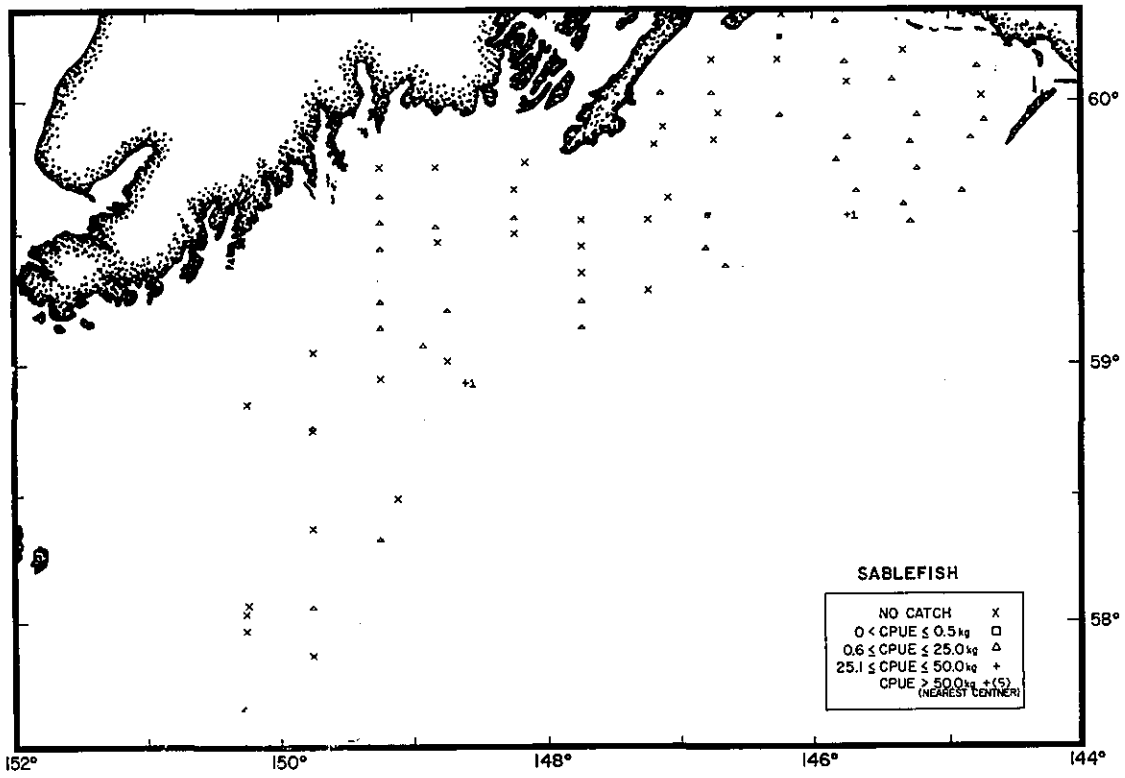


Figure XI-377.--Distribution of standardized catch rates in kg/hr of sablefish in the eastern Gulf of Alaska, Sept.-Nov. 1962 (Cruise 629).

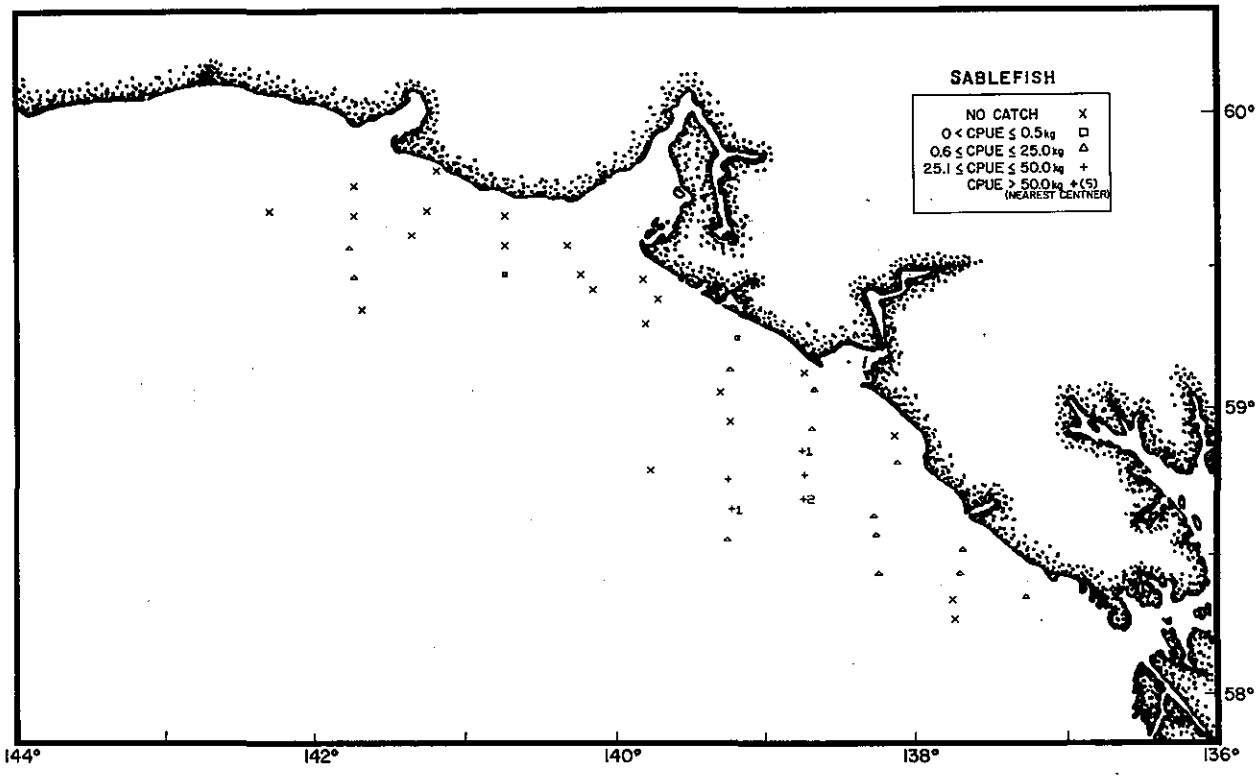


Figure XI-378.--Distribution of standardized catch rates in kg/hr of sablefish in the eastern Gulf of Alaska, Sept.-Nov. 1962 (Cruise 629).

Table XI-96.--Estimated biomass and population size of shortspine thornyhead (Sebastolobus alascanus) in the Gulf of Alaska during September-November 1962.

Region	Depth zone (m)	CPUE 1/ (kg/hr)	Estimated biomass (mt)	Proportion of total estimated biomass	Estimated population (X 10^6)	Proportion of total estimated population	Mean size per individual 2/ Weight (kg)	Mean size per individual 2/ Length (cm)
Fairweather	1-100	0	0	0	0	0	--	--
	101-200	6.2	1209.1	36.4	2.5	27.5	0.48	--
	201-400	58.9	2112.8	63.6	6.6	72.5	0.32	--
	All zones	12.1	3321.9	46.5	9.1	43.3	0.37	--
Yakutat	1-100	0.1	7.8	0.2	4/	5/	0.32	--
	101-200	11.7	2032.1	68.4	6.8	70.8	0.29	--
	201-400	11.4	932.0	31.4	2.8	29.2	0.34	--
	All zones	9.0	2971.9	41.6	9.6	45.7	0.31	--
Prince William	1-100	0	0	0	0	0	--	--
	101-200	0.3	52.6	22.4	0.1	25.0	0.42	--
	201-400	4.2	182.3	77.6	0.3	75.0	0.60	--
	All zones	0.7	234.9	3.3	0.4	1.9	0.59	--
Kenai	1-100	--	--	--	--	--	--	--
	101-200	0.3	118.6	19.4	0.2	10.5	0.76	--
	201-400	3.6	492.4	80.6	1.7	89.5	0.29	--
	All zones	1.0	611.0	8.6	1.9	9.1	0.32	--
Total	1-100	3/	7.8	0.1	4/	5/	--	--
	101-200	3.9	3412.4	47.8	9.6	45.7	0.36	--
	201-400	12.5	3719.5	52.1	11.4	54.3	0.33	--
	All zones	4.7	7139.7	100.0	21.0	100.0	0.34	--

1/ Mean catch per unit effort, in kilograms per hour trawled.
2/ Where data are available.
3/ Less than 0.1 kg/hr.
4/ Less than 0.1 X 10^6 individuals.
5/ Less than 0.1 percent.

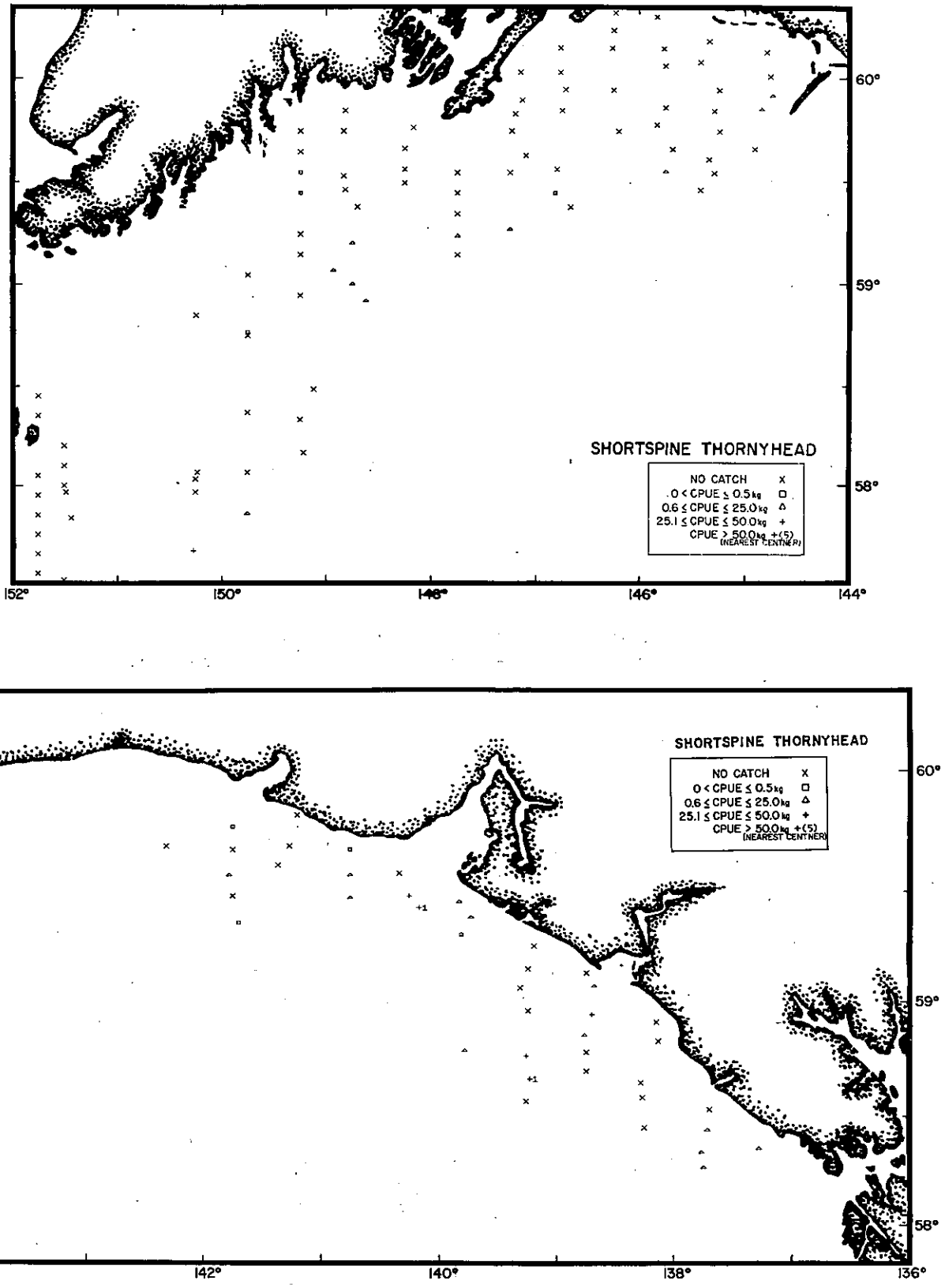


Figure XI-379.--Distribution of standardized catch rates in kg/hr of shortspine thornyhead in the eastern Gulf of Alaska, Sept.-Nov. 1962 (Cruise 629).

Table XI-97.--Estimated biomass and population size of cottids (Cottidae) in the Gulf of Alaska during September-November 1962.

Region	Depth zone (m)	CPUE 1/ (kg/hr)	Estimated biomass (mt)	Proportion of total estimated biomass	Estimated population (X 10^6)	Proportion of total estimated population	Mean size per individual 2/ Weight (kg)	Mean size per individual 2/ Length (cm)
Fairweather	1-100	0.1	2.7	2.8	4/	5/	0.16	--
	101-200	0.5	94.0	97.2	0.7	100	0.13	--
	201-400	0	0	0	0	0	--	--
	All zones	0.4	96.7	1.4	0.7	3.2	0.14	--
Yakutat	1-100	0.1	5.6	2.2	4/	5/	0.11	--
	101-200	1.4	249.2	97.8	0.1	100	1.91	--
	201-400	0	0	0	0	0	--	--
	All zones	0.8	254.8	3.8	0.1	0.5	1.42	--
Prince William	1-100	0.4	46.4	10.5	0.4	25.5	0.13	--
	101-200	1.8	277.5	62.8	1.1	64.7	0.25	--
	201-400	2.7	117.7	26.7	0.2	11.8	0.56	--
	All zones	1.4	441.6	6.6	1.7	7.8	0.26	--
Kenai	1-100	--	--	--	--	--	--	--
	101-200	16.5	5756.7	96.7	18.9	97.9	0.30	--
	201-400	1.4	193.8	3.3	0.4	2.1	0.51	--
	All zones	10.1	5950.5	88.2	19.3	88.5	0.31	--
Total	1-100	0.2	54.7	0.8	0.4	1.8	0.14	--
	101-200	7.3	6377.4	94.6	20.8	95.4	0.31	--
	201-400	1.0	311.5	4.6	0.6	2.75	0.52	--
	All zones	4.5	6743.6	100.0	21.8	100.0	0.31	--

1/ Mean catch per unit effort, in kilograms per hour trawled.
2/ Where data are available.
3/ Less than 0.1 kg/hr.
4/ Less than 0.1 X 10^6 individuals.
5/ Less than 0.1 percent.

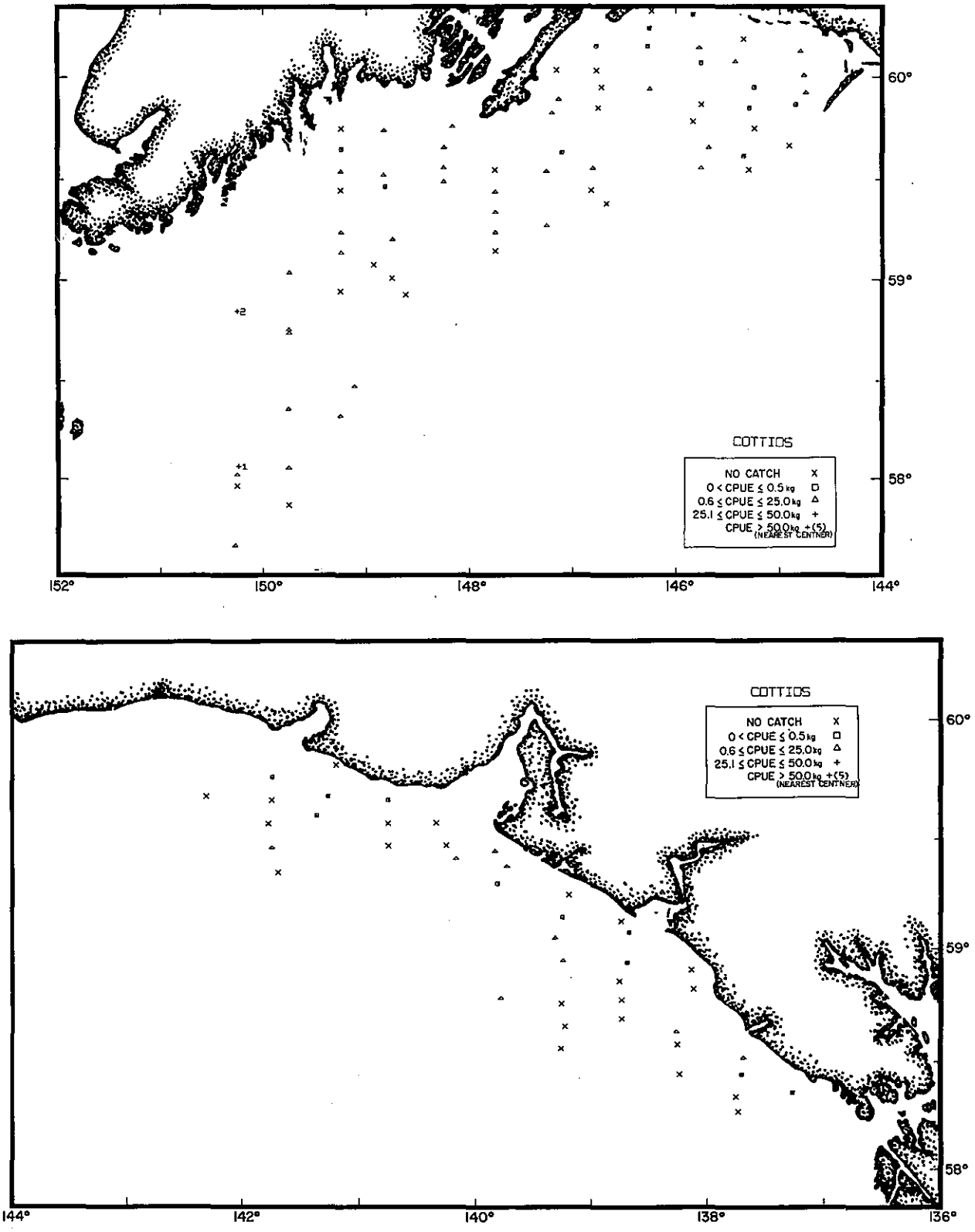


Figure XI-380.--Distribution of standardized catch rates in kg/hr of cottids in the eastern Gulf of Alaska, Sept.-Nov. 1962 (Cruise 629).

Table XI-98.--Estimated biomass and population size of Dungeness crab (Cancer magister) in the Gulf of Alaska during September-November 1962.

Region	Depth zone (m)	CPUE 1/ (kg/hr)	Estimated biomass (mt)	Proportion of total estimated biomass	Estimated population (X 10^6)	Proportion of total estimated population	Mean size per individual 2/ Weight (kg)	Mean size per individual 2/ Length (cm)
Fairweather	1-100	23.9	1023.9	94.7	0.6	85.7	1.68	--
	101-200	0.3	57.3	5.3	0.1	14.3	0.98	--
	201-400	0	0	0	0	0	--	--
	All zones	4.0	1081.2	19.0	0.7	8.8	1.54	--
Yakutat	1-100	1.3	95.7	100	0.1	100	0.91	--
	101-200	0	0	0	0	0	--	--
	201-400	0	0	0	0	0	--	--
	All zones	0.3	95.7	1.7	0.1	1.3	0.91	--
Prince William	1-100	34.3	4520.6	100	7.2	100	0.63	--
	101-200	0	0	0	0	0	--	--
	201-400	0	0	0	0	0	--	--
	All zones	13.9	4520.6	79.3	7.2	90.0	0.63	--
Kenai	1-100	--	--	--	--	--	--	--
	101-200	0	0	0	0	0	--	--
	201-400	0	0	0	0	0	--	--
	All zones	0	0	0	0	0	--	--
Total	1-100	15.6	5640.2	99.0	7.9	98.8	0.71	--
	101-200	0.1	57.3	1.0	0.1	1.3	0.57	--
	201-400	0	0	0	0	0	--	--
	All zones	3.8	5697.5	100.0	8.0	100	0.71	--

1/ Mean catch per unit effort, in kilograms per hour trawled.
2/ Where data are available.
3/ Less than 0.1 kg/hr.
4/ Less than 0.1 X 10^6 individuals.
5/ Less than 0.1 percent.

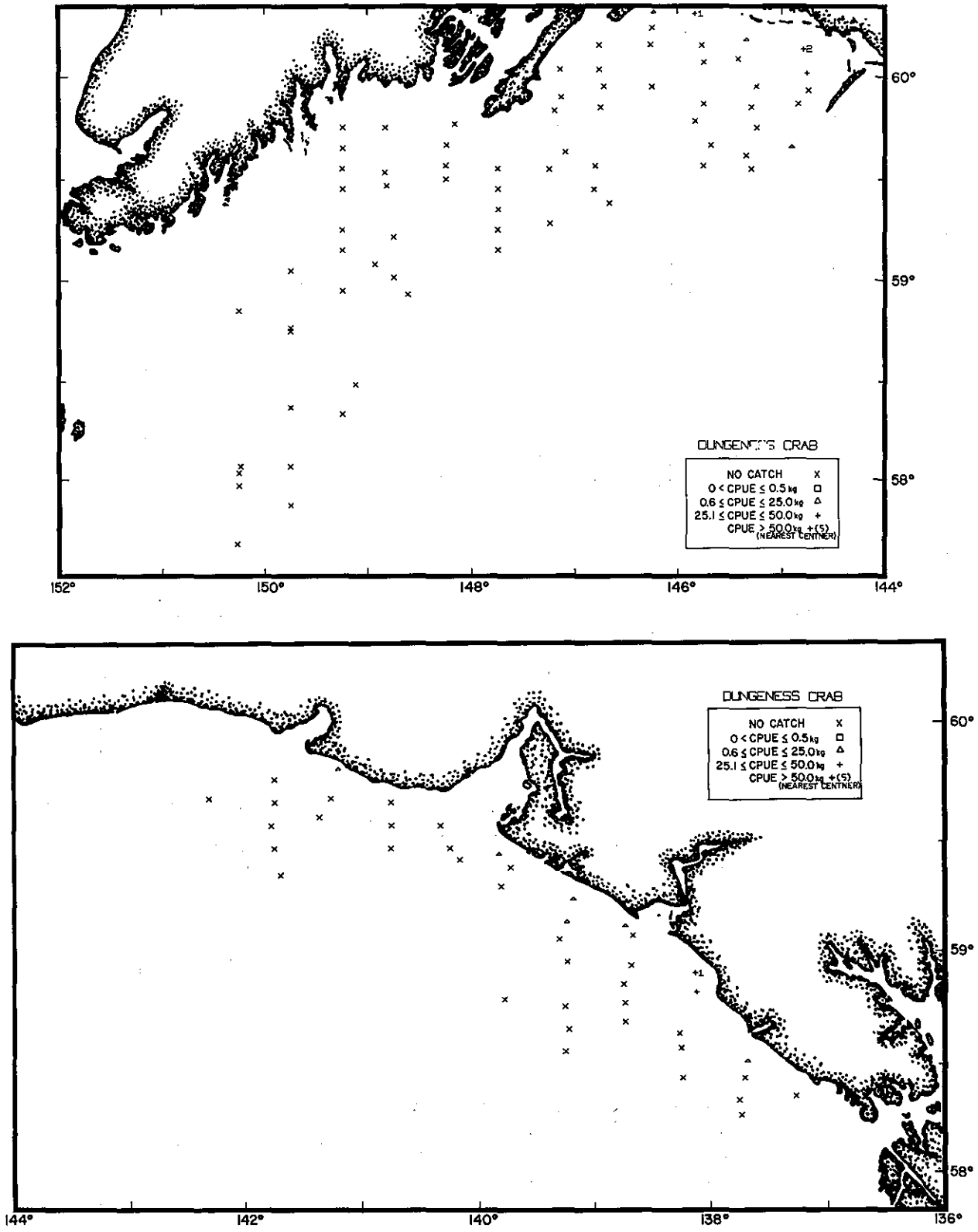


Figure XI-381.--Distribution of standardized catch rates in kg/hr of Dungeness crab in the eastern Gulf of Alaska, Sept.-Nov. 1962 (Cruise 629).

Table XI-99.--Estimated biomass and population size of Dover sole (Microstomus pacificus) in the Gulf of Alaska during September-November 1962.

Region	Depth zone (m)	CPUE 1/ (kg/hr)	Estimated biomass (mt)	Proportion of total estimated biomass	Estimated population (X 10^6)	Proportion of total estimated population	Mean size per individual 2/ Weight (kg)	Mean size per individual 2/ Length (cm)
Fairweather	1-100	1.7	71.2	3.1	0.3	6.8	0.22	--
	101-200	7.9	1524.8	66.9	2.6	59.1	0.60	--
	201-400	19.1	684.5	30.0	1.5	34.1	0.45	--
	All zones	8.4	2280.5	47.1	4.4	36.1	0.52	--
Yakutat	1-100	0	0	0	0	0	--	--
	101-200	0	0	0	0	0	--	--
	201-400	0.2	17.9	100	4/	100.0	0.36	--
	All zones	3/	17.9	0.4	4/	5/	0.36	--
Prince William	1-100	0.2	24.7	3.8	0.2	9.5	0.15	--
	101-200	0.7	112.5	17.3	0.5	23.8	0.21	--
	201-400	11.8	514.3	78.9	1.4	66.7	0.37	--
	All zones	2.0	651.5	13.5	2.1	17.2	0.31	--
Kenai	1-100	--	--	--	--	--	--	--
	101-200	2.2	766.9	40.5	2.5	43.9	0.30	--
	201-400	8.3	1127.2	59.5	3.2	56.1	0.35	30.4
	All zones	3.2	1894.1	39.1	5.7	46.7	0.33	--
Total	1-100	0.3	95.9	2.0	0.5	4.1	0.19	--
	101-200	2.8	2404.2	49.6	5.6	45.9	0.43	--
	201-400	7.9	2343.9	48.4	6.1	50.0	0.38	--
	All zones	3.2	4844.0	100.0	12.2	100.0	0.40	--

1/ Mean catch per unit effort, in kilograms per hour trawled.
2/ Where data are available.
3/ Less than 0.1 kg/hr.
4/ Less than 0.1 X 10^6 individuals.
5/ Less than 0.1 percent.

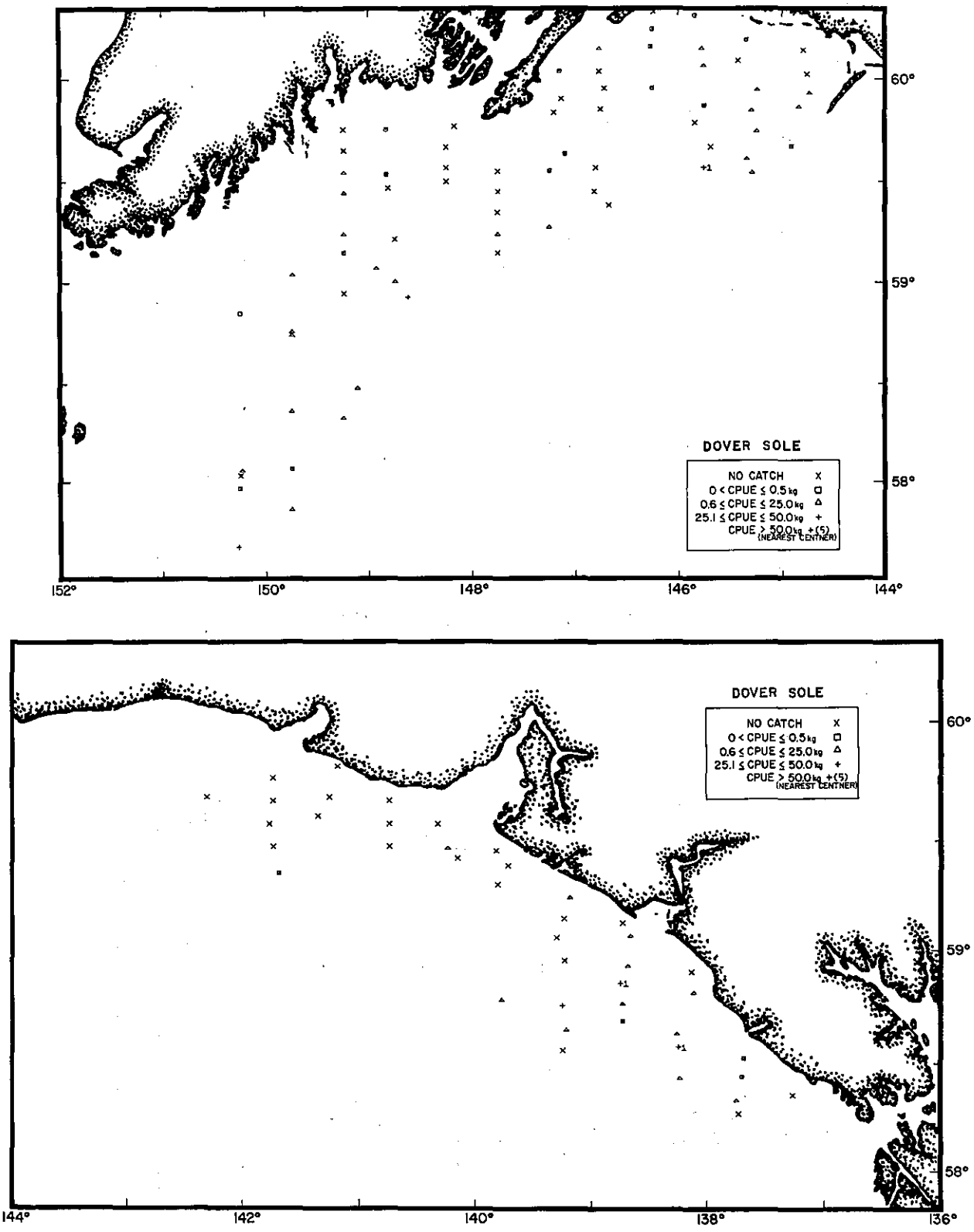


Figure XI-382.--Distribution of standardized catch rates in kg/hr of Dover sole in the eastern Gulf of Alaska, Sept.-Nov. 1962 (Cruise 629).

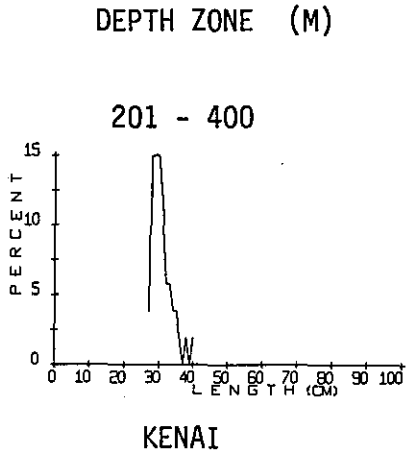


Figure XI-383.--Percentage length frequencies of Dover sole from the Gulf of Alaska (Cruise 629).

Size composition--No size composition data were taken for this species.

OTHER SPECIES

Several species which had low overall mean catch rates, produced relatively high levels of abundance within restricted distributions (Table XI-101). In the Fairweather region butter sole, starry flounder and English sole averaged over 10 kg/hr in the inner shelf and spiny dogfish in all three depth zones. The mean CPUE for starry flounder, also exceeded the 10 kg/hr catch rate in the Prince William region.

Table XI-100.--Estimated biomass and population size of scallops (Pectinidae) in the Gulf of Alaska during September-November 1962.

Region	Depth zone (m)	CPUE 1/ (kg/hr)	Estimated biomass (mt)	Proportion of total estimated biomass	Estimated population (X 10^6)	Proportion of total estimated population	Mean size per individual 2/ Weight (kg)	Mean size per individual 2/ Length (cm)
Fairweather	1-100	41.3	1773.0	62.0	6.8	66.7	0.26	--
	101-200	5.6	1088.1	38.0	3.4	33.3	0.32	--
	201-400	0	0	0	0	0	--	--
	All zones	10.5	2861.1	79.7	10.2	75.6	0.28	--
Yakutat	1-100	3.8	279.2	67.2	1.2	66.7	0.23	--
	101-200	0.6	98.9	23.8	0.4	22.2	0.23	--
	201-400	0.4	37.1	8.9	0.2	11.1	0.23	--
	All zones	1.3	415.2	11.6	1.8	13.3	0.23	--
Prince William	1-100	0.2	32.0	10.2	0.3	20.0	0.11	--
	101-200	1.9	282.7	89.8	1.2	80.0	0.23	--
	201-400	0	0	0	0	0	--	--
	All zones	1.0	314.7	5/	1.5	11.1	0.21	--
Kenai	1-100	--	--	--	--	--	--	--
	101-200	0	0	0	0	0	--	--
	201-400	0	0	0	0	0	--	--
	All zones	0	0	0	0	0	--	--
Total	1-100	5.9	2084.2	58.0	8.3	61.5	0.25	--
	101-200	1.7	1469.7	40.9	5.0	37.0	0.29	--
	201-400	0.1	37.1	1.0	0.2	1.5	0.19	--
	All zones	2.4	3591.0	99.9	13.5	100	0.27	--

1/ Mean catch per unit effort, in kilograms per hour trawled.
2/ Where data are available.
3/ Less than 0.1 kg/hr.
4/ Less than 0.1 X 10^6 individuals.
5/ Less than 0.1 percent.

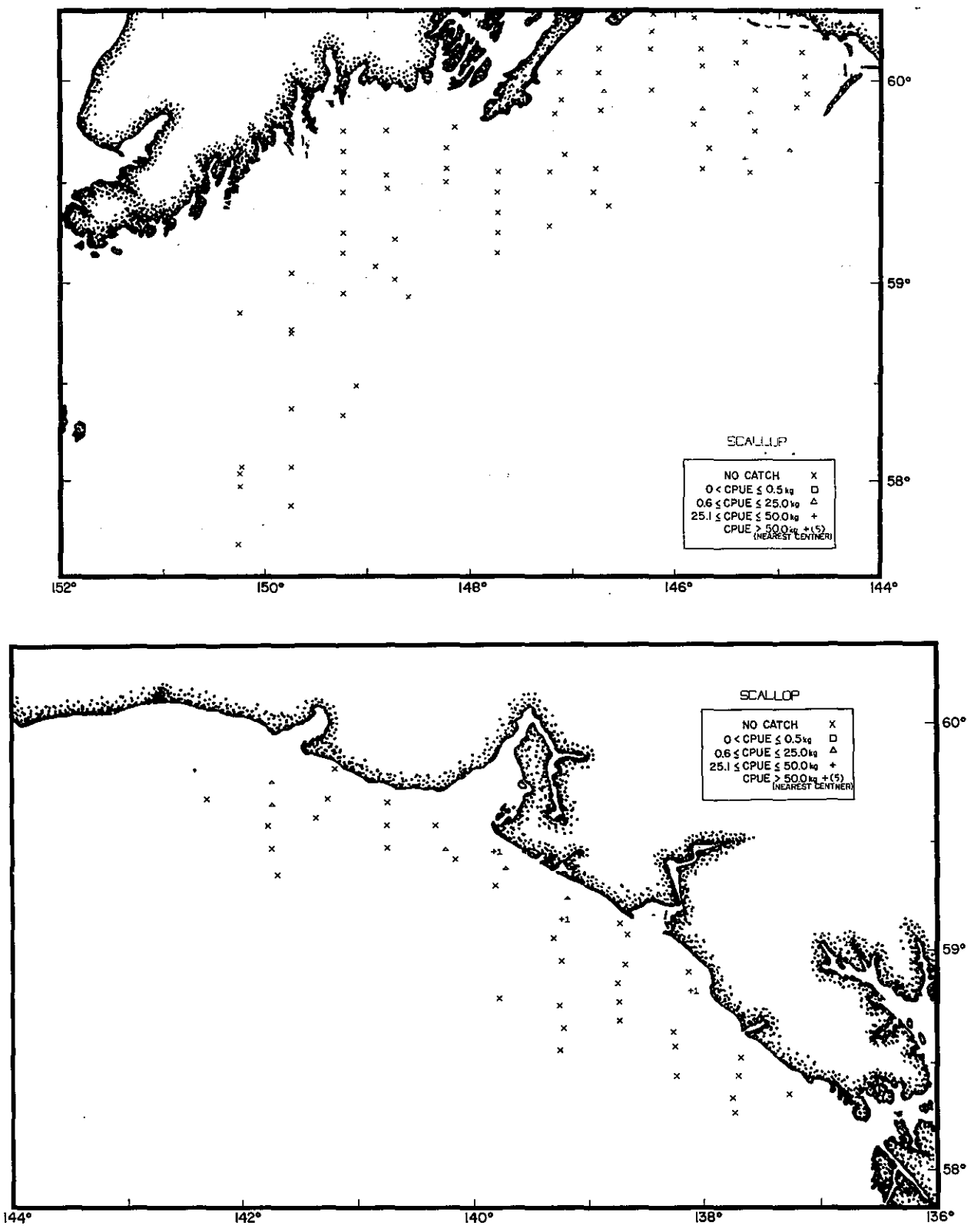


Figure XI-384.--Distribution of standardized catch rates in kg/hr of scallop in the eastern Gulf of Alaska, Sept.-Nov. 1962 (Cruise 629).

Table XI-101.--Species of fish and invertebrates which occurred at mean CPUE's greater than 10 kg/hr in restricted distributions (Cruise 629).

Region	Species	DEPTH ZONES (M) 0 - 100	101 - 200	201 - 400
Fairweather	Butter sole	165	--	--
	Starry flounder	123	--	--
	English sole	26	--	--
	Spiny dogfish	26	13	17
Prince William	Starry flounder	15	--	--

Cruises 733, 734, 744, 751, 753 and 762, R/V John N. Cobb
Chartered Fishing Vessel North Pacific (April-October 1973-76)

During the Gulf of Alaska surveys completed between 1973-1976, 310 stations were successfully sampled (Table XI-102). Sampling densities ranged from one station per 270 km^2 in the Prince William region to one station per 902 km^2 in the Sanak region, and averaged one station per 663 km^2 over all regions. Sampling did not occur in the Shumagin region and the Kenai-inner shelf. By depth zones, the highest sampling density occurred in the outer shelf, with one station per 559 km^2, Lower densities of one station per 623 km^2, and one station per 1006 km^2 occurred in the upper slope and inner shelf. Station numbers and positions of the successful tows are presented for each cruise in Figures XI-385-389. Fish and important invertebrate species encountered during these surveys are listed in Tables V-3 and V-4.

TOTAL BIOMASS

The total apparent biomass available between April and October of the 1973-76 survey period has been estimated at 1,922 thousand metric tons, of which 24% was located on the inner shelf, 57% on the outer shelf and 19% on the upper slope (Table XI-103 and Figures XI-390-391). Three western regions accounted for 64% of the total apparent biomass in the Gulf of Alaska. Sanak and Kodiak each contributed 24% while the Chirikof region accounted for 16%.

The biomass density over the Gulf of Alaska averaged 10.9 mt/km^2, and ranged from 5.4 and 5.7 mt/km^2 in the Fairweather and Shelikof regions to 18.4 and 18.6 mt/km^2 in the Sanak and Kodiak regions. Within regions, Sanak and Kodiak exceeded 20 mt/km^2 in the outer shelf and upper slope depth zones, while the highest density of 28.3 mt/km^2 occurred in the Prince William upper slope. Over the entire Gulf of Alaska, the outer shelf depth zone had the greatest biomass density (12.6 mt/km) followed by the inner shelf and upper slope. The standardized total catch rate encountered at each successful station is plotted by individual cruises in Figures XI-392-396.

RELATIVE IMPORTANCE OF SPECIES GROUPS

The combined fish species accounted for 86% of the total biomass in the Gulf of Alaska. This contribution was greatest in the outer shelf and upper slope depth zones, where the total fish accounted for 88 and 86% of the total biomass, while the inner shelf contribution was a lower 80%. By species groups, the roundfishes represented the greatest portion of the total biomass (49%), followed by flatfishes (33%), and invertebrates (15%) while the rockfishes and elasmobranchs each contributed less than 2% (Table XI-104).

Table XI-102.--Number of stations successfully trawled and sampling densities[1/] of regions and depth zones in the Gulf of Alaska during April-October 1973-76 (Cruises 733, 734, 744, 751, 753, and 762).

	DEPTH ZONES (M)											
	0-100			101-200			201-400			0-400		
Region	No. of stations	Area (km^2)	Sampling density	No. of stations	Area (km^2)	Sampling density	No. of stations	Area (km^2)	Sampling density	No. of stations	Area (km^2)	Sampling density
Fairweather	4	2,566	642	16	11,617	726	2	2,144	1,072	22	16,327	742
Yakutat	16	4,418	276	31	10,430	336	12	4,894	408	59	19,742	335
Prince William	17	7,885	464	50	8,990	180	5	2,600	520	72	19,475	270
Kenai	0	--	--	25	19,183	767	8	7,927	991	33	27,110	822
Kodiak	6	10,924	1,821	15	9,415	628	10	4,253	425	31	24,592	793
Shelikof	3	497	166	9	3,132	348	7	7,999	1,143	19	11,628	612
Chirikof	8	9,439	1,180	19	12,749	671	19	10,585	557	46	32,773	712
Shumagin	0	--	--	0	--	--	0	--	--	0	--	--
Sanak	8	12,773	1,597	14	11,607	829	6	888	148	28	25,268	902
Total	62	48,502	782	179	87,123	487	69	41,290	598	310	176,915	571

1/ Sampling density = $\frac{\text{No. of } km^2}{\text{No. of stations}}$

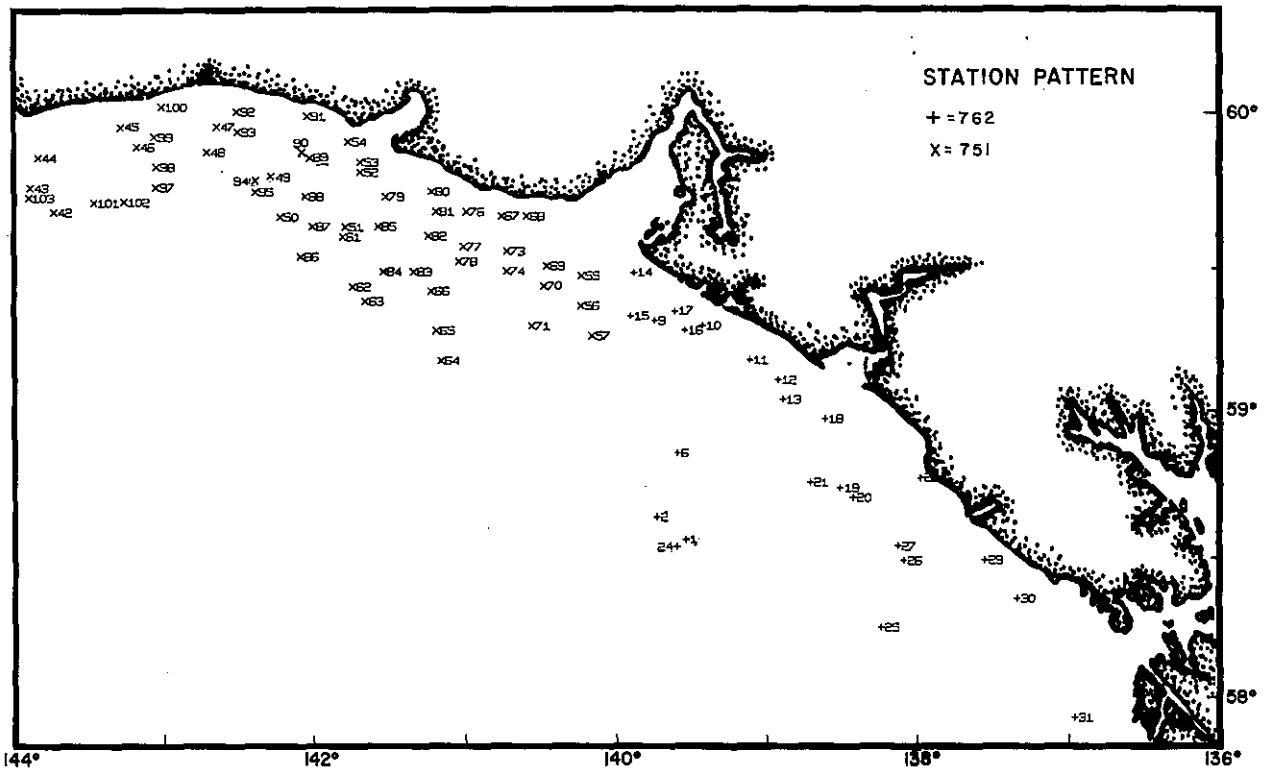


Figure XI-385.--Stations successfully trawled (otter trawl) during Cruises 751 and 762, May-Aug. 1975 and Apr. 1976.

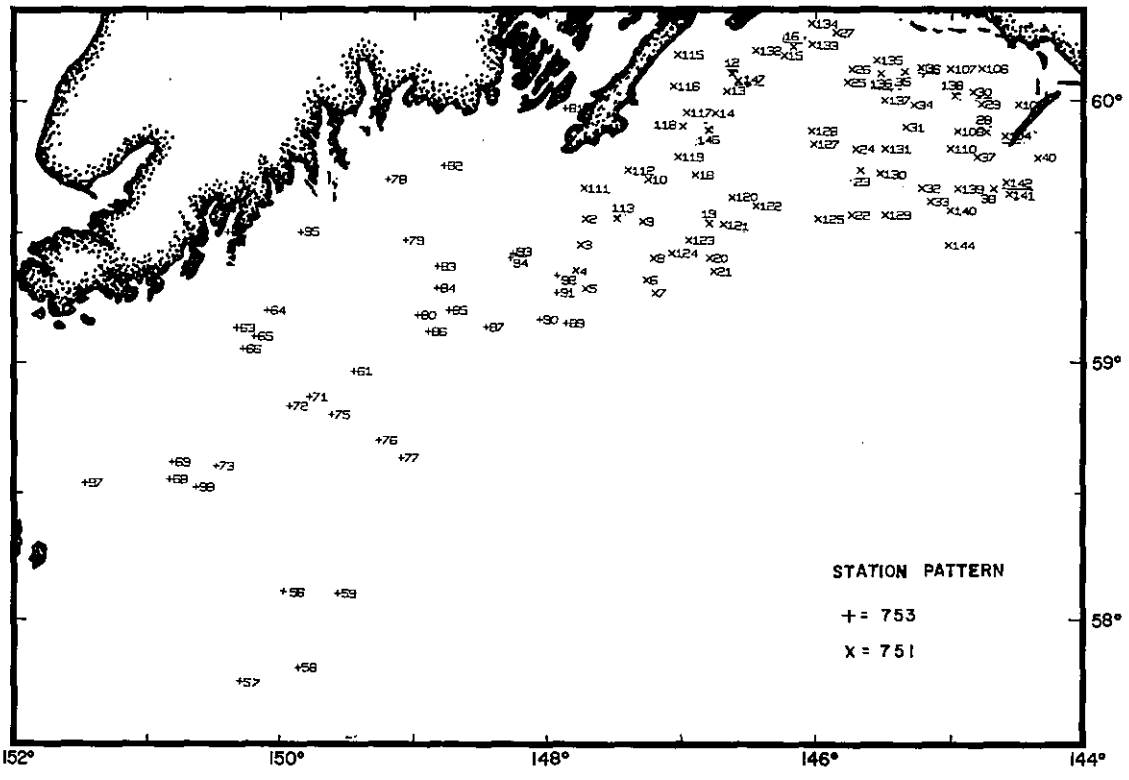


Figure XI-386.--Stations successfully trawled (otter trawl) during Cruises 751 and 753, May-Aug. 1975.

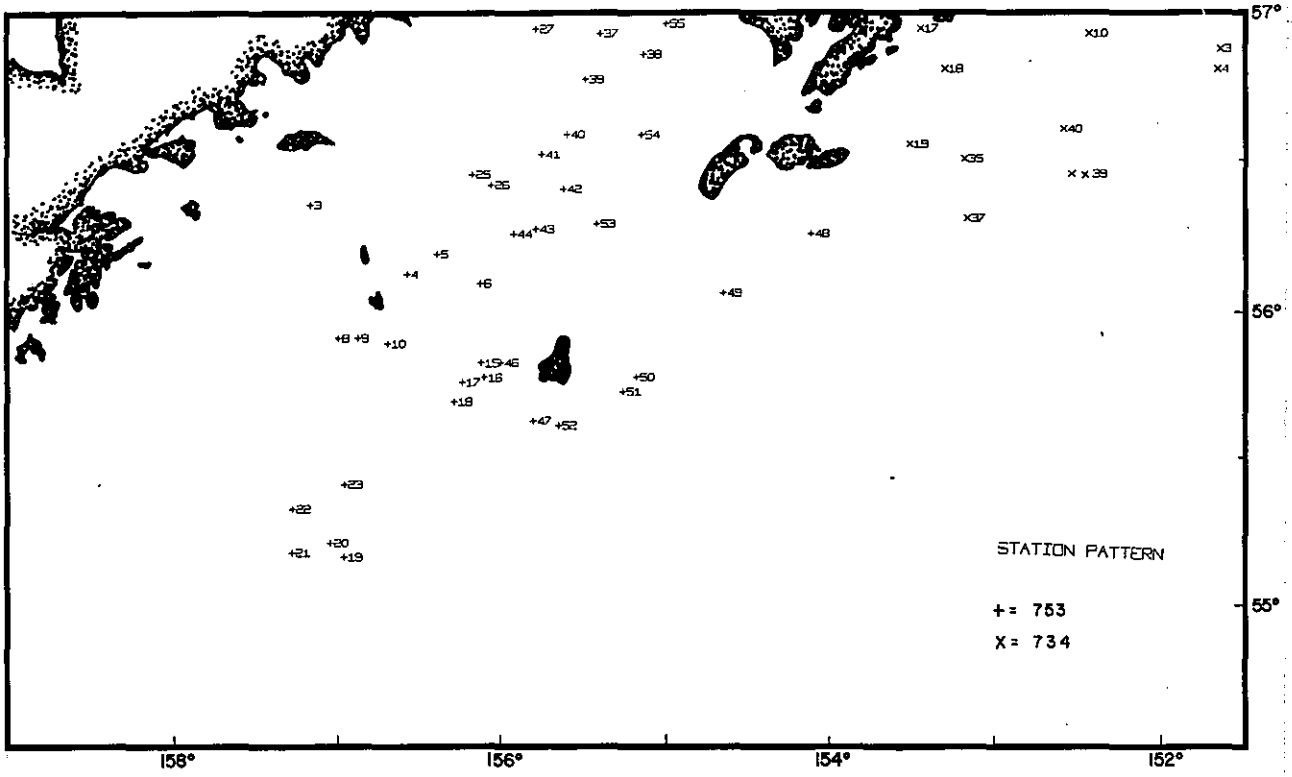


Figure XI-387.--Stations successfully trawled (otter trawl) during Cruises 734 and 753, Aug.-Oct. 1973 and Jun.-Aug. 1975.

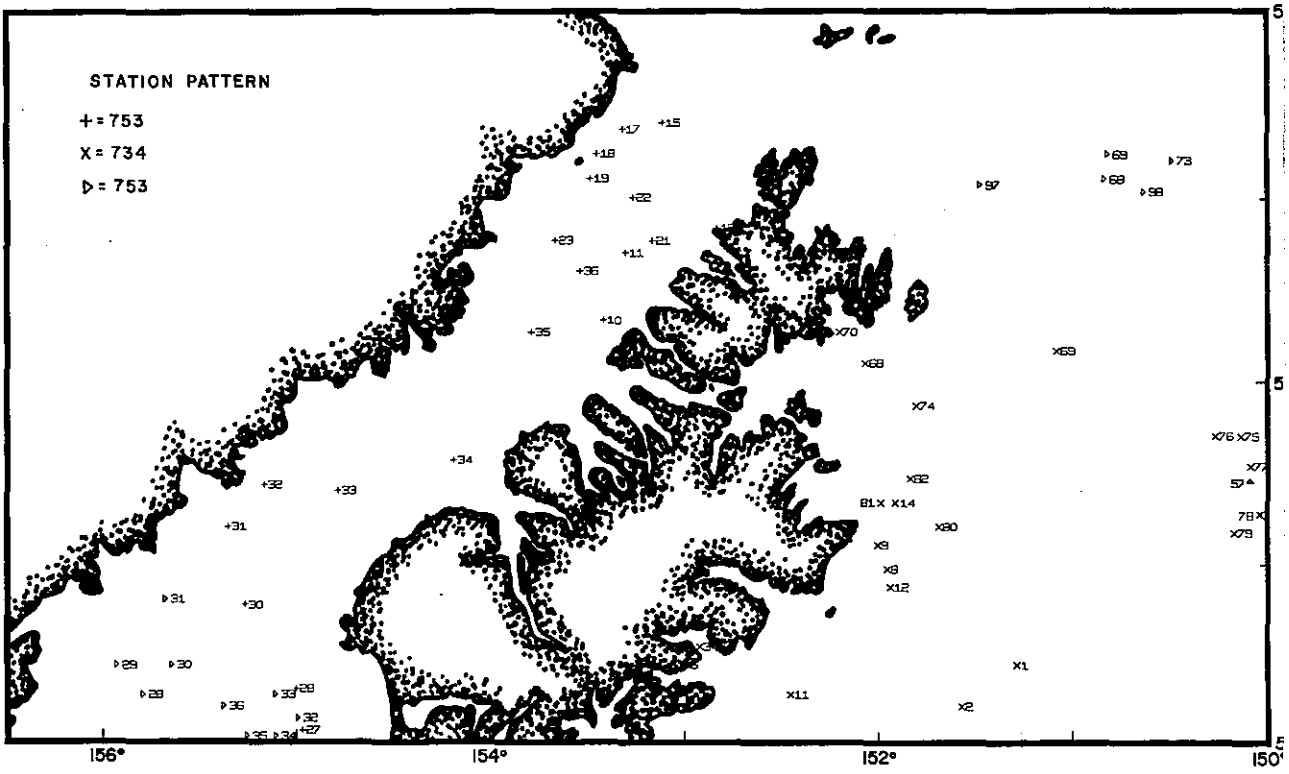


Figure XI-388.--Stations successfully trawled (otter trawl) during Cruises 733, 734, and 753, May-June 1973, Aug.-Oct. 1973, and Jun.-Aug. 1975.

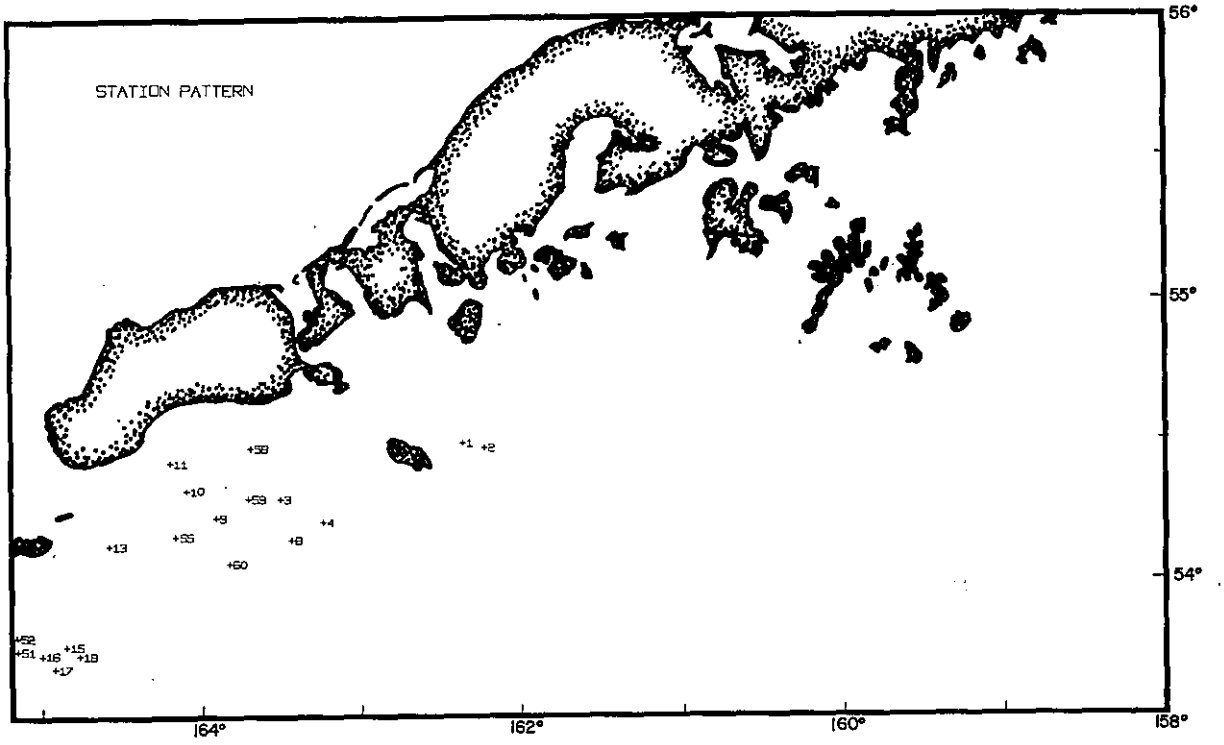


Figure XI-389.--Stations successfully trawled (otter trawl) during Cruise 744, Jul.-Aug. 1974.

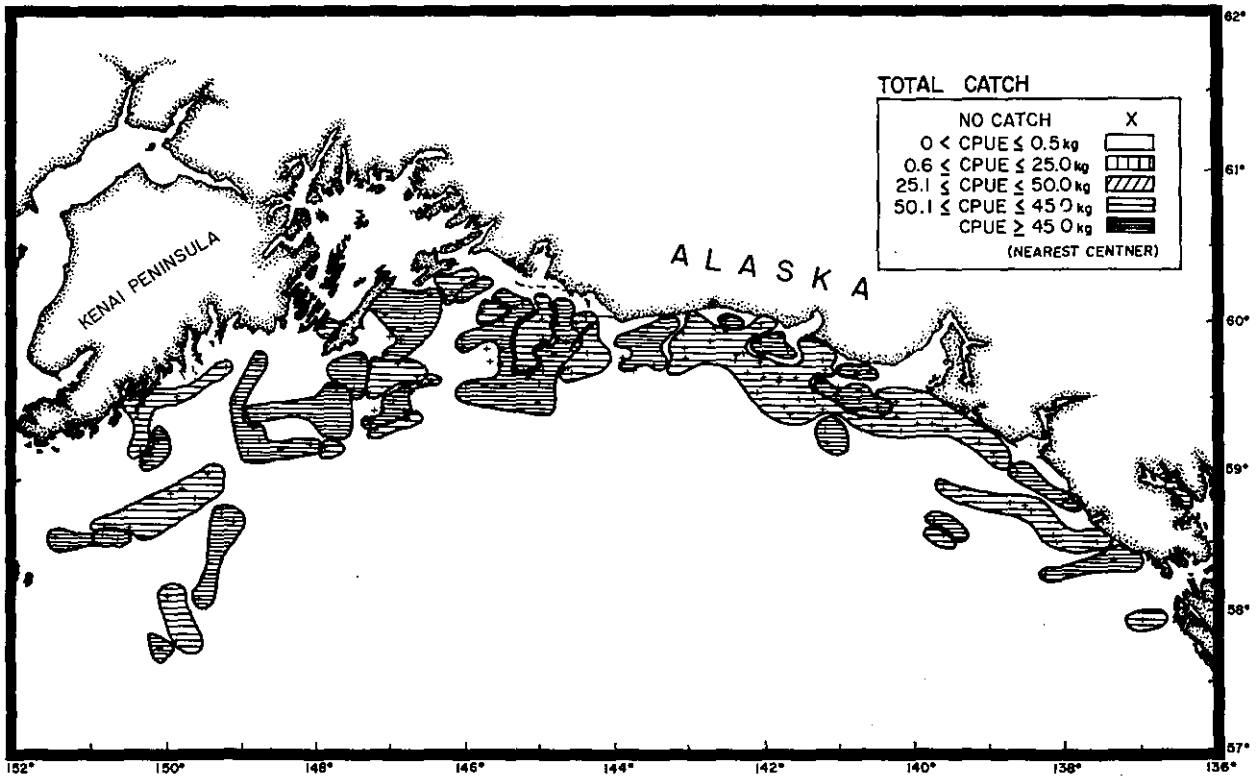


Figure XI-390.--Distribution of apparent relative abundance of all species combined in the eastern Gulf of Alaska, May-Aug. 1975, Jun.-Aug. 1975, Apr. 1976 (Cruises 751-753 and 762).

Table XI-103.--Estimated biomass in metric tons of all species combined during April-October 1973-76 resource assessment surveys in the Gulf of Alaska (Cruises 733, 734, 744, 751, 753, and 762).

Region	DEPTH ZONES (M) 0-100	101-200	201-400	0-400
Fairweather				
mt x 10^3	9.5	61.9	16.8	88.2
mt/km^2	3.7	5.3	7.8	5.4
% biomass in depth zone	2.0	5.6	4.7	4.6
% regional biomass	10.8	70.2	19.0	100.0
Yakutat				
mt x 10^3	53.6	51.7	42.1	147.4
mt/km^2	12.1	4.9	8.8	7.5
% biomass in depth zone	11.5	4.7	11.7	7.7
% regional biomass	36.4	35.1	28.6	100.1
Prince William				
mt x 10^3	59.5	70.6	73.5	203.6
mt/km^2	7.6	7.9	28.3	10.5
% biomass in depth zone	12.8	6.4	20.6	10.6
% regional biomass	29.2	34.7	36.1	100.0
Kenai				
mt x 10^3	--	157.5	24.1	181.6
mt/km^2	--	8.2	3.0	6.7
% biomass in depth zone	--	14.3	6.7	9.5
% regional biomass	--	86.7	13.3	100.0
Kodiak				
mt x 10^3	164.0	206.6	87.2	457.8
mt/km^2	15.0	21.9	20.5	18.6
% biomass in depth zone	35.3	18.8	24.3	23.8
% regional biomass	35.8	45.1	19.1	100.0
Shelikof				
mt x 10^3	3.2	24.6	37.9	65.7
mt/km^2	6.4	7.9	4.7	5.7
% biomass in depth zone	0.7	2.2	10.6	3.4
% regional biomass	4.8	37.5	57.7	100.0
Chirikof				
mt x 10^3	27.9	232.9	51.2	312.0
mt/km^2	3.0	18.3	4.8	9.5
% biomass in depth zone	6.0	21.2	14.3	16.2
% regional biomass	8.9	74.6	16.4	99.9
Shumagin				
mt x 10^3	--	--	--	--
mt/km^2	--	--	--	--
% biomass in depth zone	--	--	--	--
% regional biomass	--	--	--	--
Sanak				
mt x 10^3	146.9	293.8	25.4	466.1
mt/km^2	11.5	25.3	28.6	18.4
% biomass in depth zone	31.6	26.7	7.1	24.3
% regional biomass	31.5	63.0	5.5	100.0
Total				
mt x 10^3	464.6	1,099.6	358.2	1,922.4
mt/km^2	9.6	12.6	8.7	10.9
% biomass in depth zone	100.0	99.9	100.0	100.1
% regional biomass	24.2	57.2	18.7	100.1

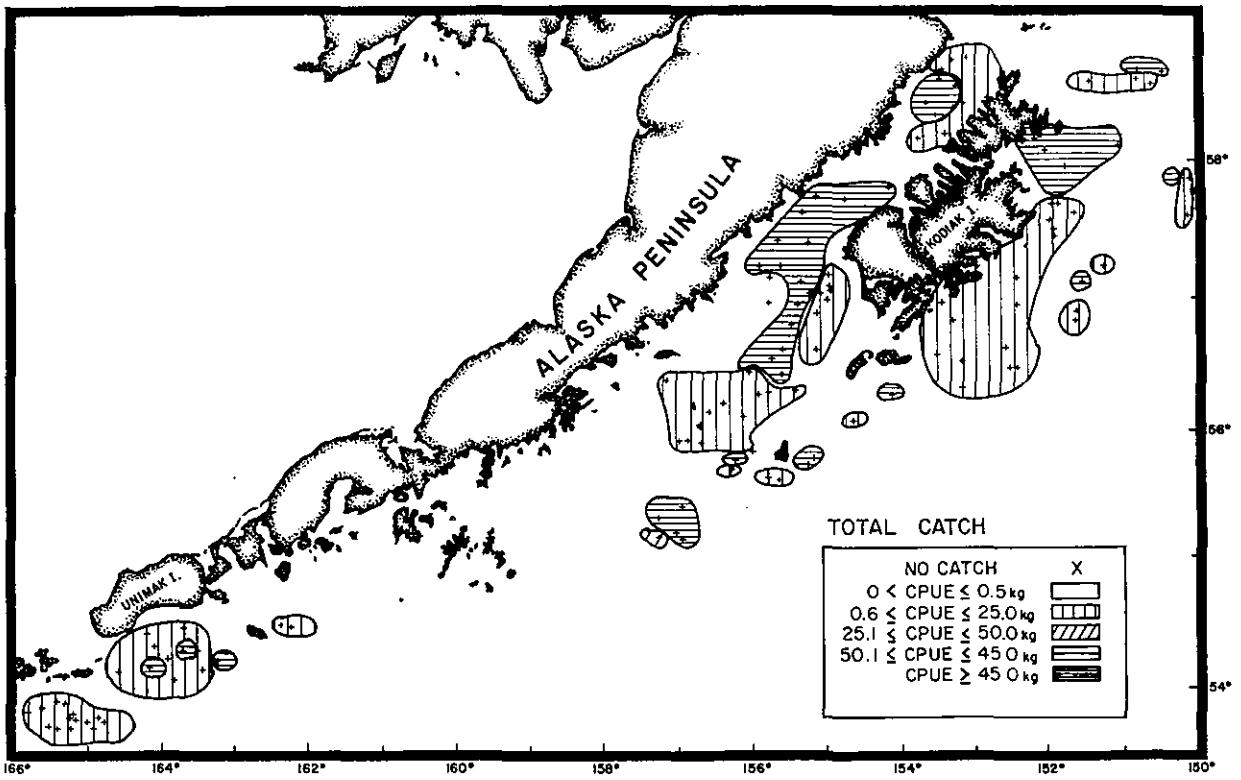


Figure XI-391.--Distribution of apparent relative abundance of all species combined in the western Gulf of Alaska, May-Jul. 1973, Aug.-Oct. 1973, Jul.-Aug. 1974, and Jun.-Aug. 1975 (Cruises 733, 734, 744, and 753).

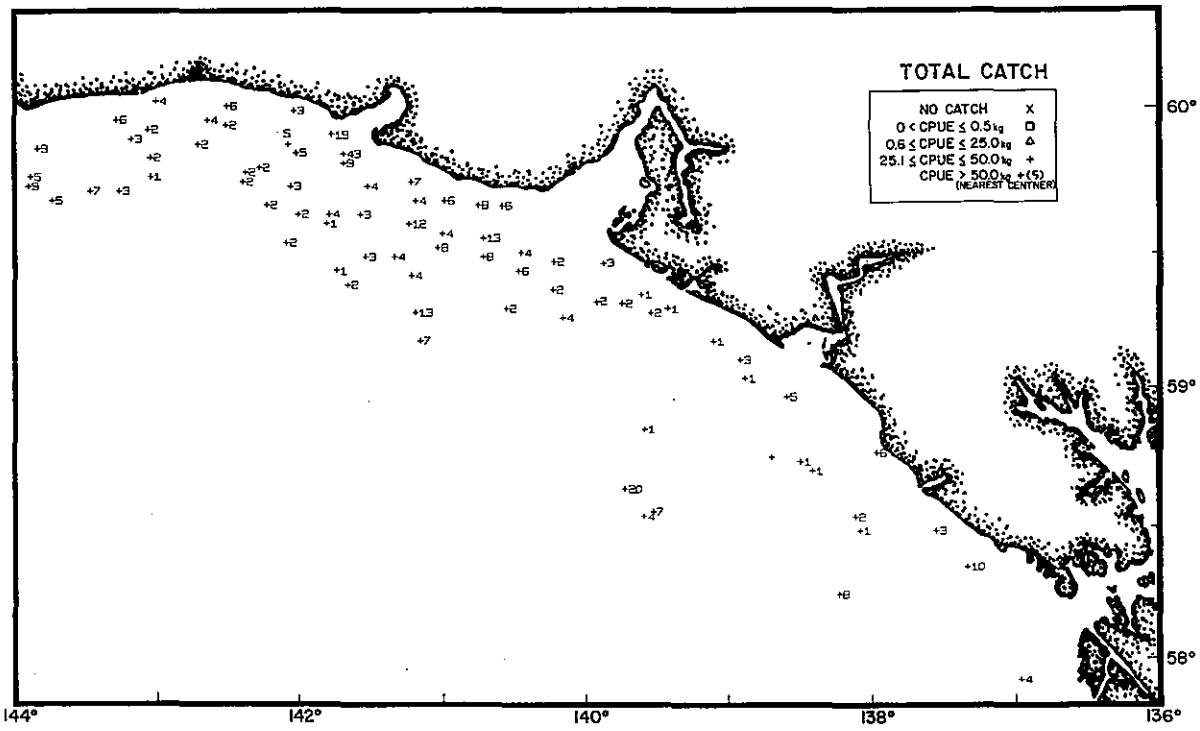


Figure XI-392.--Distribution of standardized catch rates in kilograms/hour of all species combined in the eastern Gulf of Alaska, May-Aug. 1975 (Cruises 751 and 762).

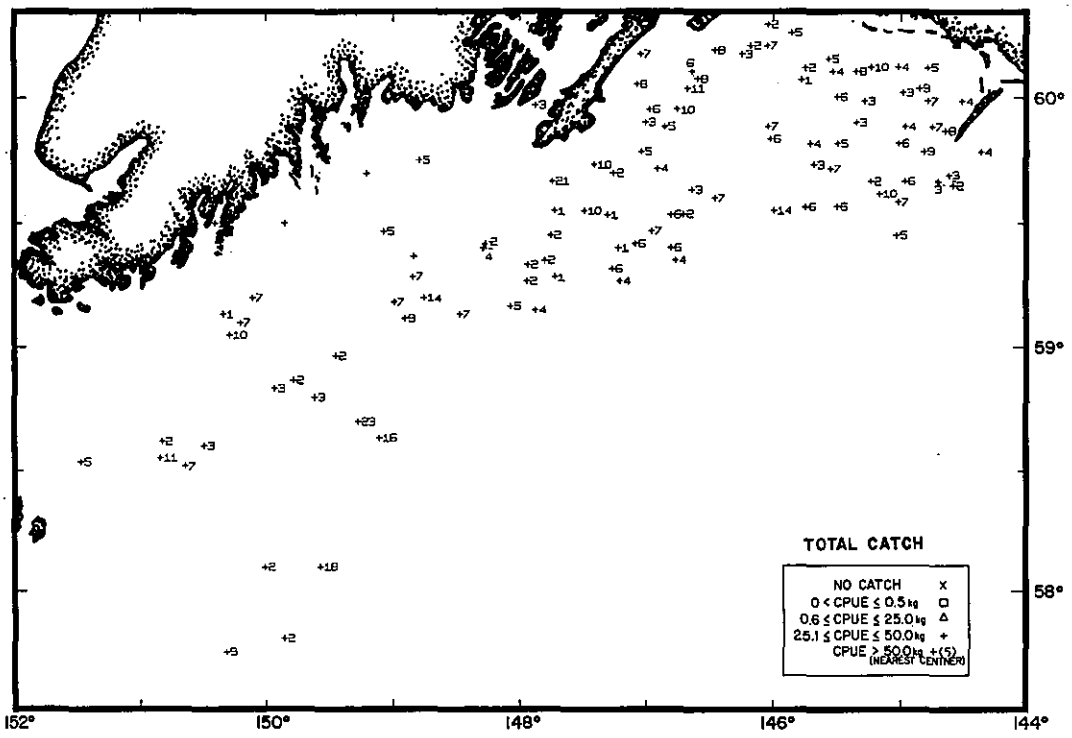


Figure XI-393.--Distribution of standardized catch rates in kilograms/ hour of all species combined in the eastern Gulf of Alaska, Aug.-Oct. 1973 and Jun.-Aug. 1975 (Cruises 751 and 753).

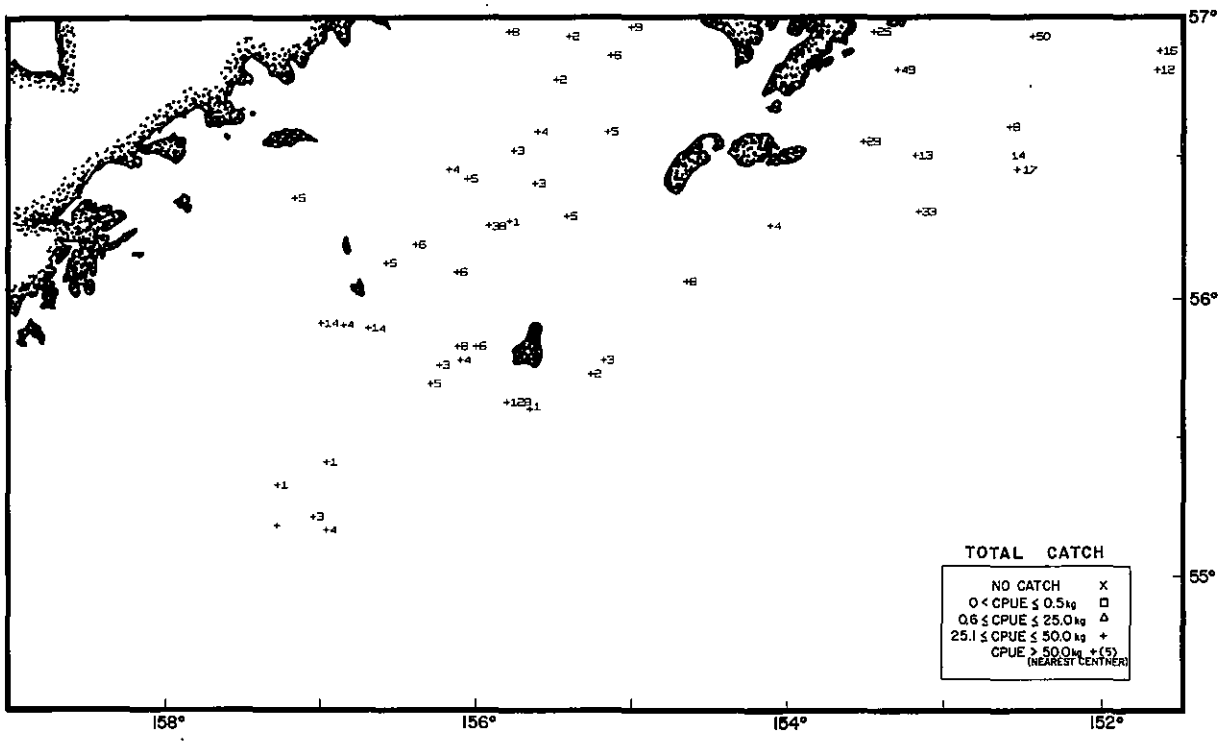


Figure XI-394.--Distribution of standardized catch rates in kilograms/ hour of all species combined in the western Gulf of Alaska, Aug.-Oct. 1973 and Jun.-Aug. 1975 (Cruises 734 and 753).

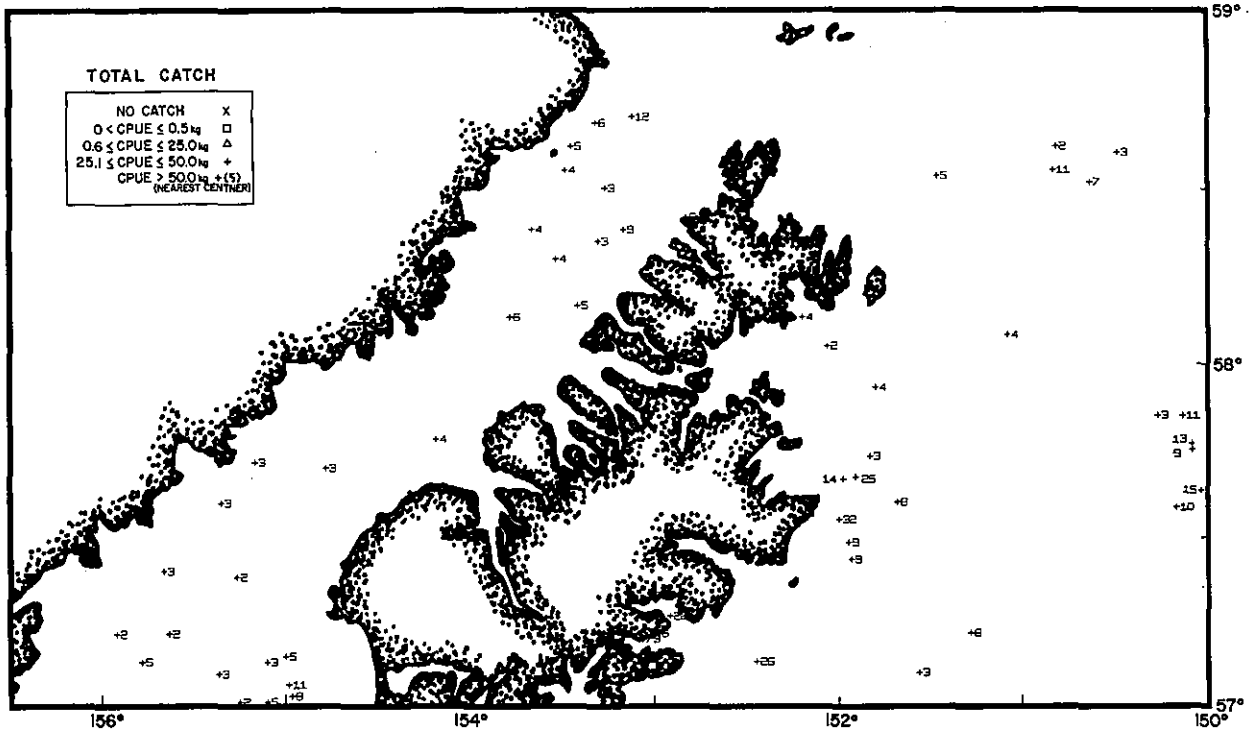


Figure XI-395.—Distribution of standardized catch rates in kilograms/hour of all species combined in the western Gulf of Alaska, May–Jun. 1973, Aug.–Oct. 1973, and Jun.–Aug. 1975 (Cruises 733, 734, and 753).

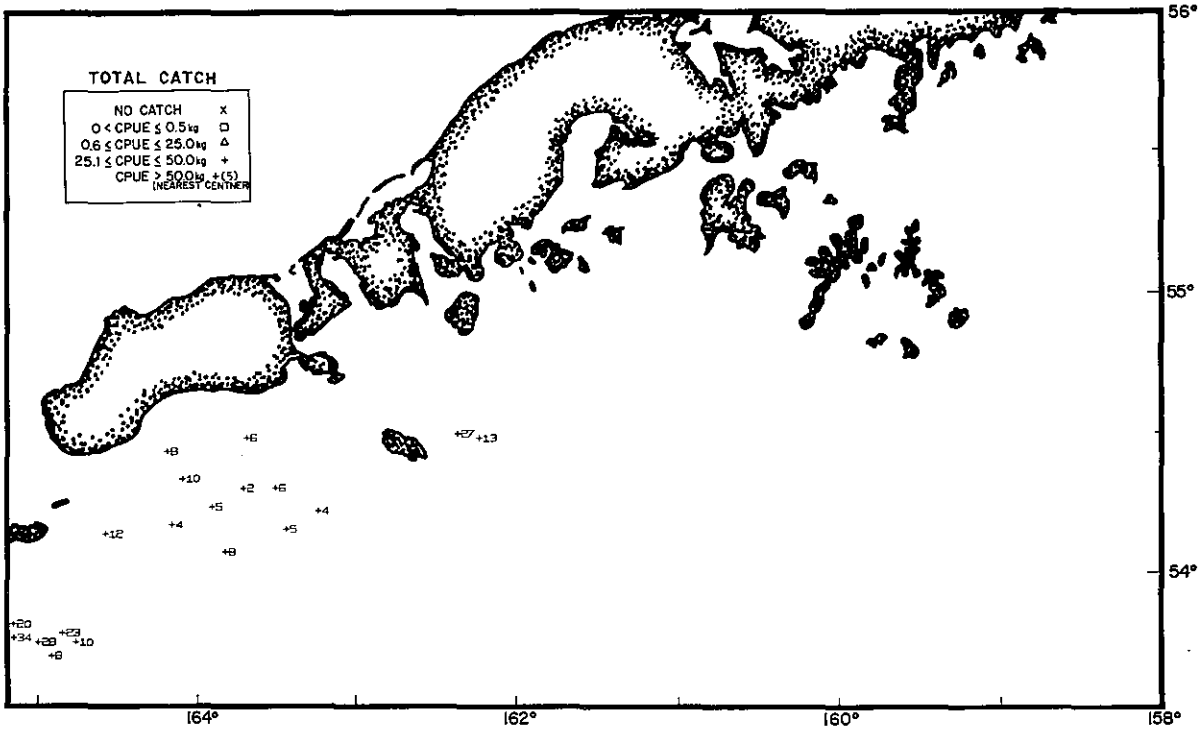


Figure XI-396.—Distribution of standardized catch rates in kilograms/hour of all species combined in the western Gulf of Alaska, Jul.–Aug. 1974 (Cruise 744).

Of the total estimated relative apparent roundfish biomass of 946 thousand mt nearly 73% occurred in the outer shelf depth zone, while the inner shelf contained 18%, and the upper slope 9% (Table XI-105). The roundfish group was the greatest contributor to the total biomass of all species in the outer shelf depth zone (63%) and was second to the flatfish group in the inner shelf and upper slope with 37 and 23%.Mean CPUE's for the roundfish group ranged from 150 kg/hr in the upper slope to 599 kg/hr in the outer shelf, and averaged 408 kg/hr over the entire Gulf of Alaska. Apparent relative abundance increased from east to west, with the exception of the Shelikof region (Figures XI-397-398). The Sanak region had the highest mean CPUE of 845 kg/hr with the largest values occurring in the outer shelf and upper slope. Other regions with above average levels of abundance were Kodiak and Chirikof. Standardized roundfish catch rates are plotted in Figures XI-399-403 for all stations successfully sampled.

The flatfish group had the second highest apparent biomass of 641 thousand mt, 38% occurring in the outer shelf, 32% in the upper slope and 30% in the inner shelf (Table XI-106). The flatfish were the greatest contributors to the total biomass in the upper slope (57%) and inner shelf (42%), and were second to the roundfish group in the outer shelf (22%).Mean CPUE's for the flatfish group ranged from 207 kg/hr in the outer shelf depth zone to 293 kg/hr in the inner shelf, and averaged 246 kg/hr over the entire Gulf. Regions with above average levels of relative apparent abundance were Kodiak, Sanak and Yakutat (Figures XI-404-405). Particularly high flatfish mean CPUE's occurred in the Kodiak and Sanak upper slope depth zones (757 and 722 kg/hr), and the Yakutat and Kodiak inner shelves (497 and 483 kg/hr). Standardized flatfish catch rates for all successful stations for this group are plotted in Figures XI-406-410.

Invertebrates the third most important species group, had an estimated apparent biomass of 278 thousand mt, of which 50% occurred in the outer shelf, 33% in the inner shelf and 18% in the upper slope (Table XI-107). Invertebrates contributed 20% to the total biomass in the inner shelf, 14% in the upper slope and 13% in the outer shelf. The mean CPUE for invertebrates in the Gulf of Alaska was 117 kg/hr with values ranging from 89 kg/hr in the upper slope to 138 kg/hr in the inner shelf. The Kodiak region had the highest apparent relative abundance (216 kg/hr) with above average mean catch rates in the Prince William, Fairweather and Shelikof regions (Figures XI-411-412). Invertebrates had relatively high mean CPUE's in the Shelikof-inner shelf (327 kg/hr), Prince William-inner shelf and upper slope (244 and 279 kg/hr), Kodiak-inner and outer shelves (213 and 285 kg/hr) and the Sanak-upper slope (282 kg/hr). Standardized catch rates are plotted for this group in Figures XI-413-417.

Table XI-104.--Relative importance of species groups based on the rank order of their total biomass (Cruises 733, 734, 744, 751, 753, 762).

Species	DEPTH ZONES (M) 0-100	101-200	201-400	0-400
Roundfish				
mt x 10^3	172.5	692.2	81.6	946.3
mt/km^2	3.6	7.9	2.0	5.3
% biomass in depth zone	37.1	62.9	22.8	49.2
% roundfish biomass	18.2	73.2	8.6	100.0
Flatfish				
mt x 10^3	193.6	241.4	205.7	640.7
mt/km^2	4.0	2.8	5.0	3.6
% biomass in depth zone	41.7	22.0	57.5	33.3
% flatfish biomass	30.2	37.7	32.1	100.0
Invertebrates				
mt x 10^3	90.9	137.5	49.4	277.8
mt/km^2	1.9	1.6	1.2	1.6
% biomass in depth zone	19.6	12.5	13.8	14.5
% invertebrate biomass	32.7	49.5	17.8	100.0
Rockfish				
mt x 10^3	0.4	13.9	14.6	28.9
mt/km^2	1/	0.2	0.4	0.2
% biomass in depth zone	0.1	1.3	4.1	1.5
% rockfish biomass	1.4	48.1	50.5	100.0
Elasmobranchs				
mt x 10^3	7.2	14.8	6.3	28.3
mt/km^2	0.1	0.2	0.2	0.2
% biomass in depth zone	1.6	1.3	1.8	1.5
% elasmobranch biomass	25.4	52.3	22.3	100.0
Total				
mt x 10^3	464.6	1099.8	357.6	1922.0
mt/km^2	9.6	12.7	8.8	10.9
% biomass in depth zone	100.1	100.0	100.0	100.1
% total biomass	24.2	57.2	18.6	100.0

1/ Less than 0.1 mt/km^2.

Table XI-105.--Estimated biomass and population size of roundfishes in the Gulf of Alaska during April-October 1973-76.

Region	Depth zone (m)	CPUE[1] (kg/hr)	Estimated biomass (mt)	Proportion of total estimated biomass	Estimated population (X 10^6)	Proportion of total estimated population	Mean size per individual [2] Weight (kg)	Length (cm)
Fairweather	1-100	25.1	902.4	16.2	9.6	26.0	0.09	--
	101-200	23.4	3,814.5	68.6	26.0	70.3	0.15	--
	201-400	28.2	846.7	15.2	1.4	3.8	0.63	--
	All zones	24.3	5,563.6	0.6	37.0	--	0.15	--
Yakutat	1-100	249.6	15,459.5	57.1	154.0	87.1	0.10	--
	101-200	52.5	7,677.4	28.4	20.3	11.5	0.38	--
	201-400	57.2	3,928.6	14.5	2.5	1.4	1.59	--
	All zones	97.8	27,065.5	2.7	176.8	--	0.15	--
Prince William	1-100	132.4	14,638.5	29.5	74.0	42.6	0.20	--
	101-200	247.1	31,152.0	62.8	85.3	49.1	0.37	--
	201-400	104.5	3,811.2	7.7	14.4	8.3	0.26	--
	All zones	181.6	49,601.7	5.2	173.7	--	0.29	--
Kenai	1-100	--	--	--	--	--	--	--
	101-200	313.7	76,182.1	90.9	145.7	98.8	.52	--
	201-400	76.3	7,656.1	9.1	1.8	1.2	4.27	--
	All zones	244.3	83,838.2	8.9	147.5	--	0.57	--
Kodiak	1-100	450.0	64,448.0	27.6	--	--	--	--
	101-200	1,088.2	134,313.0	57.5	--	--	--	--
	201-400	624.5	34,820.5	14.9	--	--	--	--
	All zones	724.4	233,581.5	24.7	--	--	--	--
Shelikof	1-100	75.9	491.8	2.5	--	--	--	--
	101-200	261.7	10,679.8	54.9	--	--	--	--
	201-400	79.4	8,275.7	42.6	--	--	--	--
	All zones	128.3	19,447.3	2.1	--	--	--	--
Chirikof	1-100	83.5	9,981.6	4.4	17.3	6.9	0.58	--
	101-200	1,270.2	205,001.0	90.3	218.6	87.5	0.94	--
	201-400	89.7	12,019.4	5.3	13.9	5.6	0.86	--
	All zones	580.8	227,002.0	24.0	249.8	--	0.91	--
Shumagin	1-100	--	--	--	--	--	--	--
	101-200	--	--	--	--	--	--	--
	201-400	--	--	--	--	--	--	--
	All zones	--	--	--	--	--	--	--
Sanak	1-100	370.5	66,559.2	22.2	--	--	--	--
	101-200	1,368.0	223,347.0	74.4	--	--	--	--
	201-400	821.1	10,260.5	3.4	--	--	--	--
	All zones	844.6	300,166.7	31.7	--	--	--	--
Total	1-100	261.5	172,481.0	18.2	--	--	--	--
	101-200	599.3	692,166.8	73.2	--	--	--	--
	201-400	149.8	81,618.7	8.6	--	--	--	--
	All zones	408.0	946,266.5	100.0	--	--	--	--

1/ Mean catch per unit effort, in kilograms per hour trawled.
2/ Where data are available.
3/ Less than 0.1 kg/hr.
4/ Less than 0.1 X 10^6 individuals.
5/ Less than 0.1 percent.

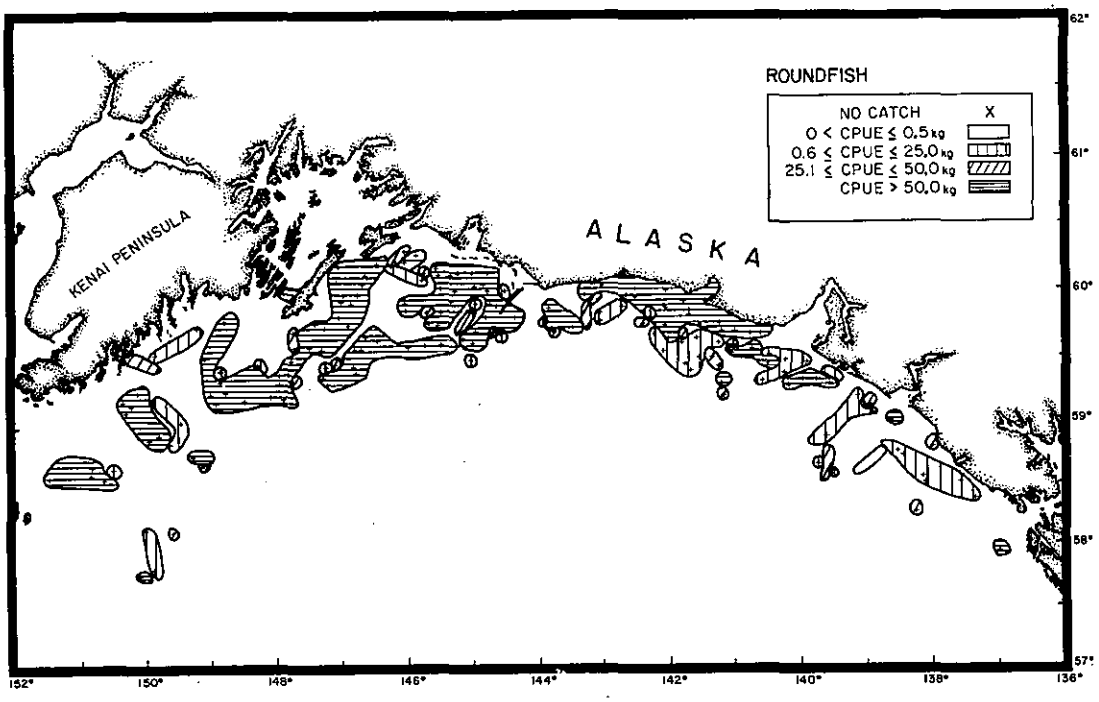


Figure XI-397.—Distribution of apparent relative abundance of roundfish in the eastern Gulf of Alaska, May-Aug. 1975, Jun.-Aug. 1975, and Apr. 1976 (Cruises 751, 753, and 762).

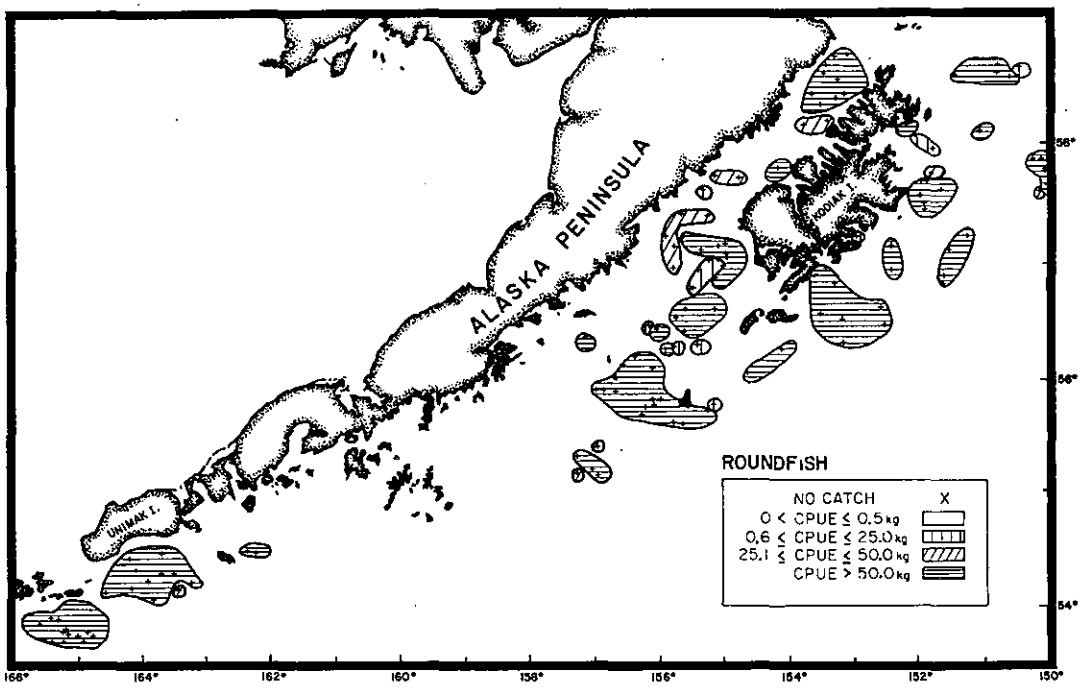


Figure XI-398.—Distribution of apparent relative abundance of roundfish in the western Gulf of Alaska, May-Jul. 1973, Aug.-Oct. 1973, Jul.-Aug. 1974, and Jun.-Aug. 1975 (Cruises 733, 734, 744, and 753).

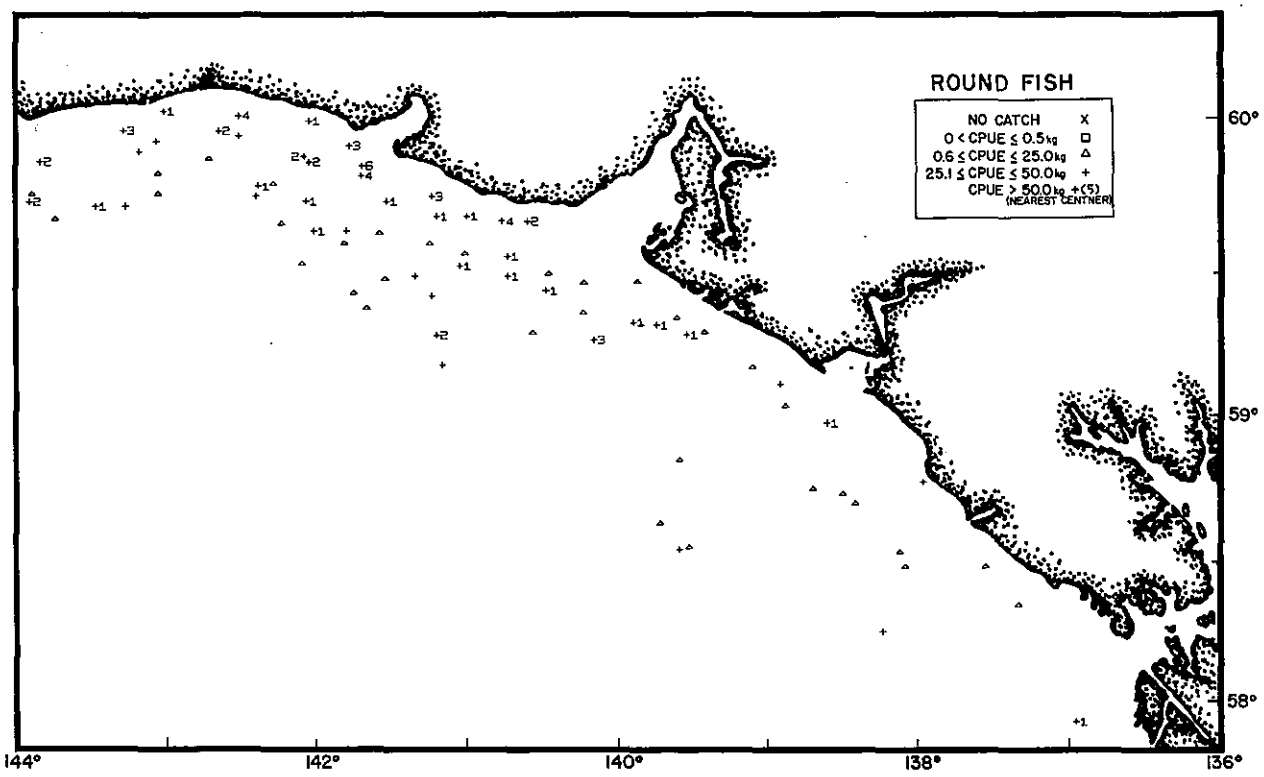


Figure XI-399.--Distribution of standardized catch rates in kilograms/ hour of roundfish in the eastern Gulf of Alaska, May-Aug. 1975, and Apr. 1976 (Cruises 751 and 762).

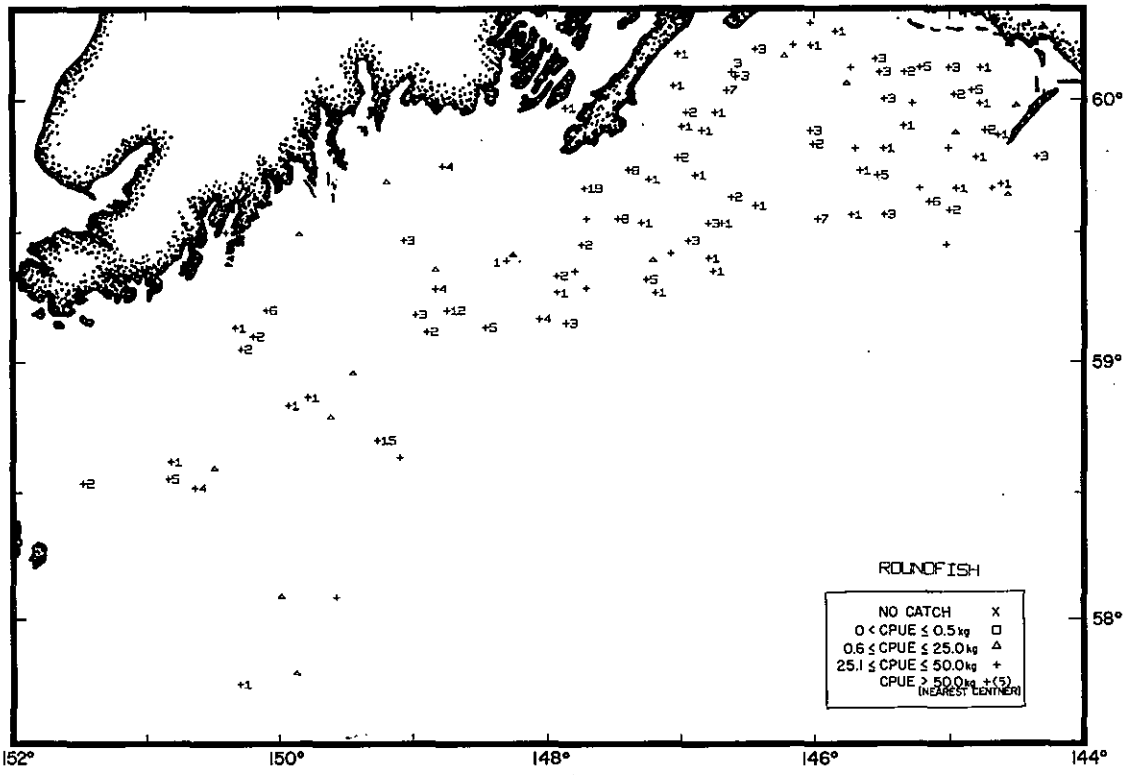


Figure XI-400.--Distribution of standardized catch rates in kilograms/ hour of roundfish in the eastern Gulf of Alaska, May-Aug. 1975 (Cruises 751 and 753).

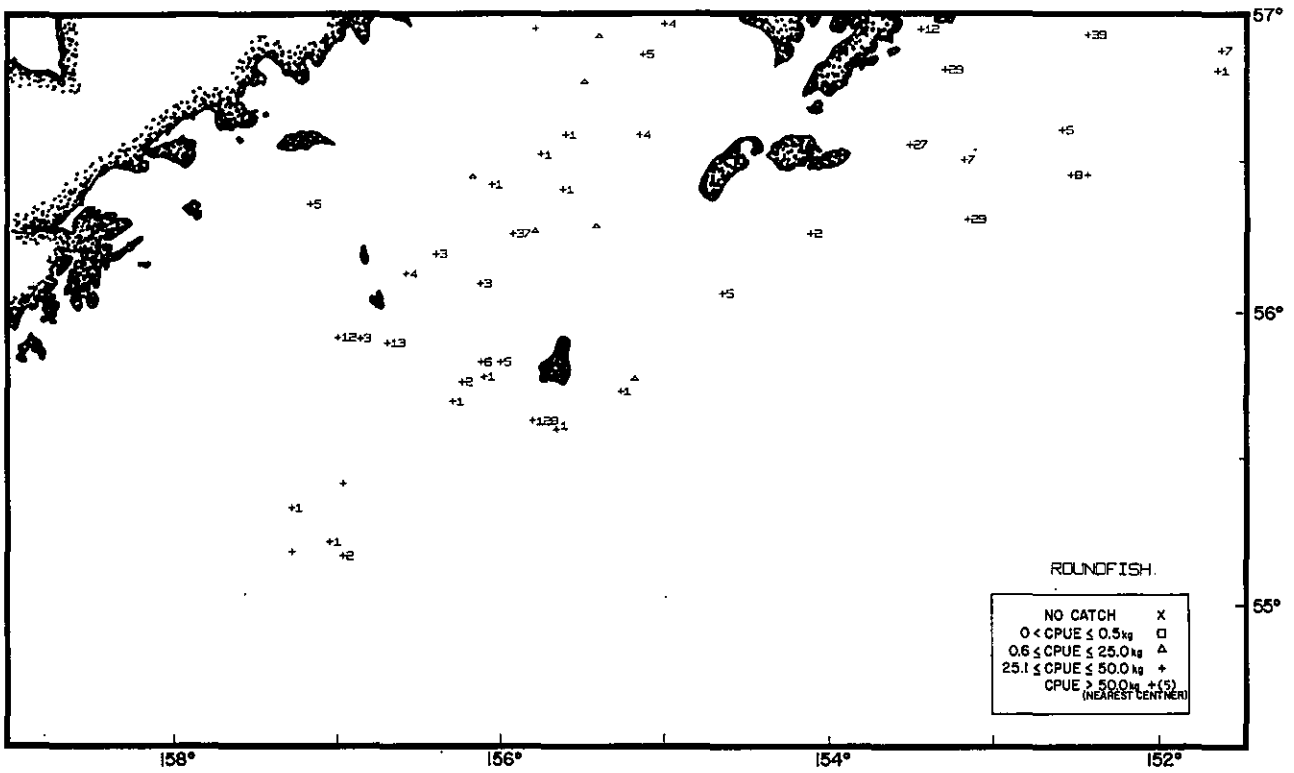


Figure XI-401.--Distribution of standardized catch rates in kilograms/ hour of roundfish in the western Gulf of Alaska, Aug.-Oct. 1973 and Jun.-Aug. 1975, Cruises 734 and 753).

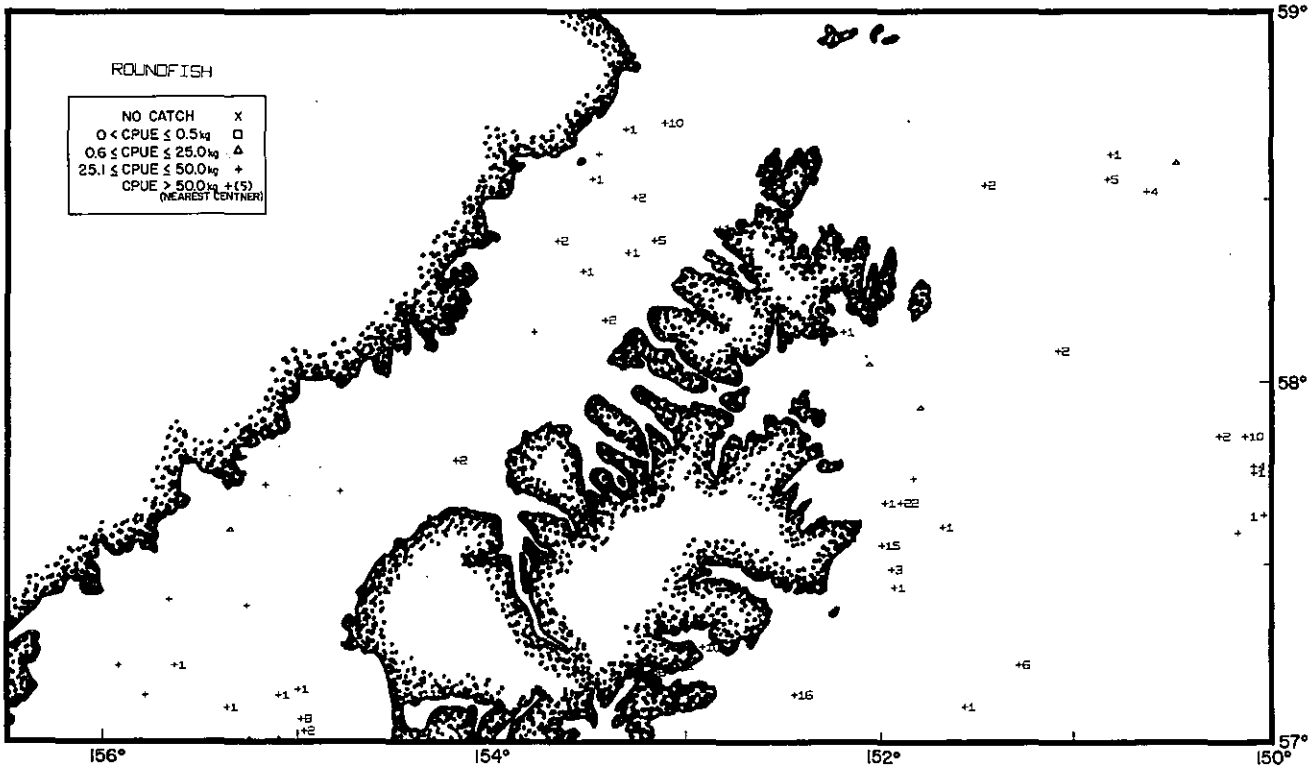


Figure XI-402.--Distribution of standardized catch rates in kilograms/ hour of roundfish in the western Gulf of Alaska, May-Jun. 1973, Aug.-Oct. 1973, and Jun.-Aug. 1975 (Cruises 733, 734, and 753).

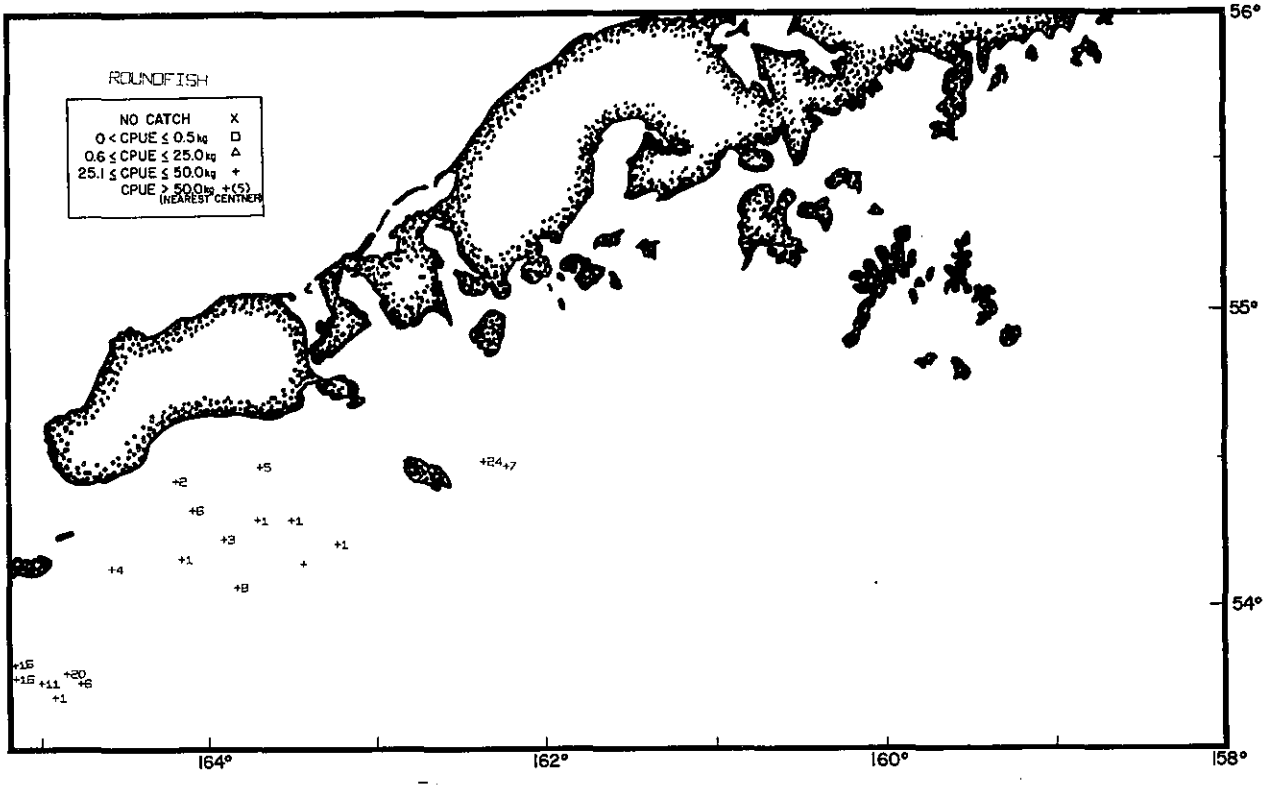


Figure XI-403.--Distribution of standardized catch rates in kilograms/hour of roundfish in the western Gulf of Alaska, Jul.-Aug. 1974 (Cruise 744).

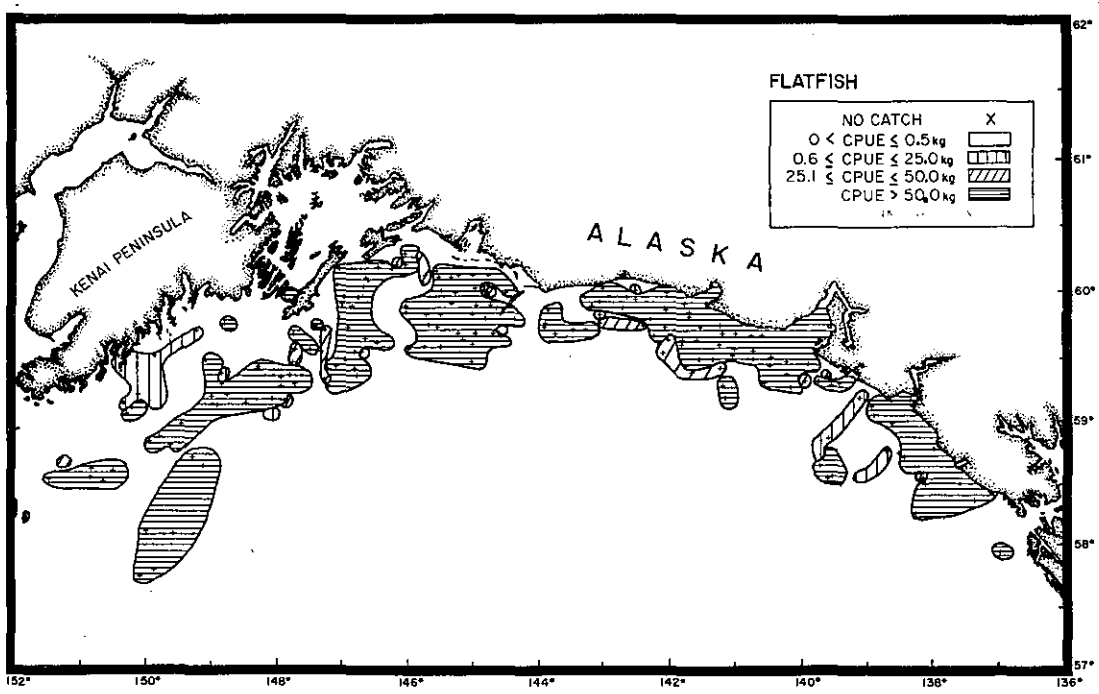


Figure XI-404.--Distribution of apparent relative abundance of flatfish in the eastern Gulf of Alaska, May-Aug. 1975, Jun.-Aug. 1975, and Apr. 1976 (Cruises 751, 753, and 762).

Table XI-106.--Estimated biomass and population size of flatfishes in the Gulf of Alaska during April-October 1973-76.

Region	Depth zone (m)	CPUE 1/ (kg/hr)	Estimated biomass (mt)	Proportion of total estimated biomass	Estimated population ($\times 10^6$)	Proportion of total estimated population	Mean size per individual 2/ Weight (kg)	Length (cm)
Fairweather	1-100	164.0	5,898.9	14.8	27.3	25.0	0.22	--
	101-200	127.9	20,826.3	52.2	61.0	55.8	0.34	--
	201-400	438.5	13,180.5	33.0	21.0	19.2	0.63	--
	All zones	174.4	39,905.7	6.2	109.3	--	0.36	--
Yakutat	1-100	497.0	30,787.4	36.7	64.0	34.4	0.48	--
	101-200	209.2	30,589.8	36.4	80.6	43.3	0.38	--
	201-400	329.4	22,608.9	26.9	41.4	22.3	0.55	--
	All zones	303.4	83,986.1	13.1	186.0	--	0.45	--
Prince William	1-100	123.8	13,685.6	15.4	76.2	51.5	0.18	--
	101-200	140.6	17,725.0	19.9	54.5	36.8	0.33	--
	201-400	158.1	57,637.7	65.7	17.3	11.7	0.33	--
	All zones	136.1	89,048.3	13.9	148.0	--	0.25	--
Kenai	1-100	--	--	--	--	--	--	--
	101-200	249.2	60,516.5	82.2	71.2	82.4	0.85	--
	201-400	130.7	13,111.3	17.8	15.2	17.6	0.86	--
	All zones	214.6	73,627.8	11.5	86.4	--	0.85	--
Kodiak	1-100	482.6	69,107.7	46.7	--	--	--	--
	101-200	297.2	36,682.9	24.8	--	--	--	--
	201-400	757.3	42,220.4	28.5	--	--	--	--
	All zones	459.1	148,011.0	23.0	--	--	--	--
Shelikof	1-100	85.1	551.3	2.3	--	--	--	--
	101-200	221.2	9,028.2	38.0	--	--	--	--
	201-400	135.9	14,167.0	59.7	--	--	--	--
	All zones	156.7	23,746.5	3.7	--	--	--	--
Chirikof	1-100	73.4	8,774.2	15.2	34.4	21.6	0.26	--
	101-200	93.5	15,090.5	26.2	64.5	40.5	0.23	--
	201-400	251.8	33,741.6	58.6	60.4	37.9	0.56	--
	All zones	130.6	57,606.3	9.0	159.3	--	0.36	--
Shumagin	1-100	--	--	--	--	--	--	--
	101-200	--	--	--	--	--	--	--
	201-400	--	--	--	--	--	--	--
	All zones	--	--	--	--	--	--	--
Sanak	1-100	360.5	64,770.4	51.9	--	--	--	--
	101-200	312.1	50,955.5	40.9	--	--	--	--
	201-400	721.8	9,019.8	7.2	--	--	--	--
	All zones	350.9	124,745.7	19.4	--	--	--	--
Total	1-100	292.9	193,575.5	30.2	--	--	--	--
	101-200	206.9	241,414.7	37.7	--	--	--	--
	201-400	281.3	205,687.2	32.1	--	--	--	--
	All zones	246.2	640,677.4	100.0	--	--	--	--

1/ Mean catch per unit effort, in kilograms per hour trawled.
2/ Where data are available.
3/ Less than 0.1 kg/hr.
4/ Less than 0.1 $\times 10^6$ individuals.
5/ Less than 0.1 percent.

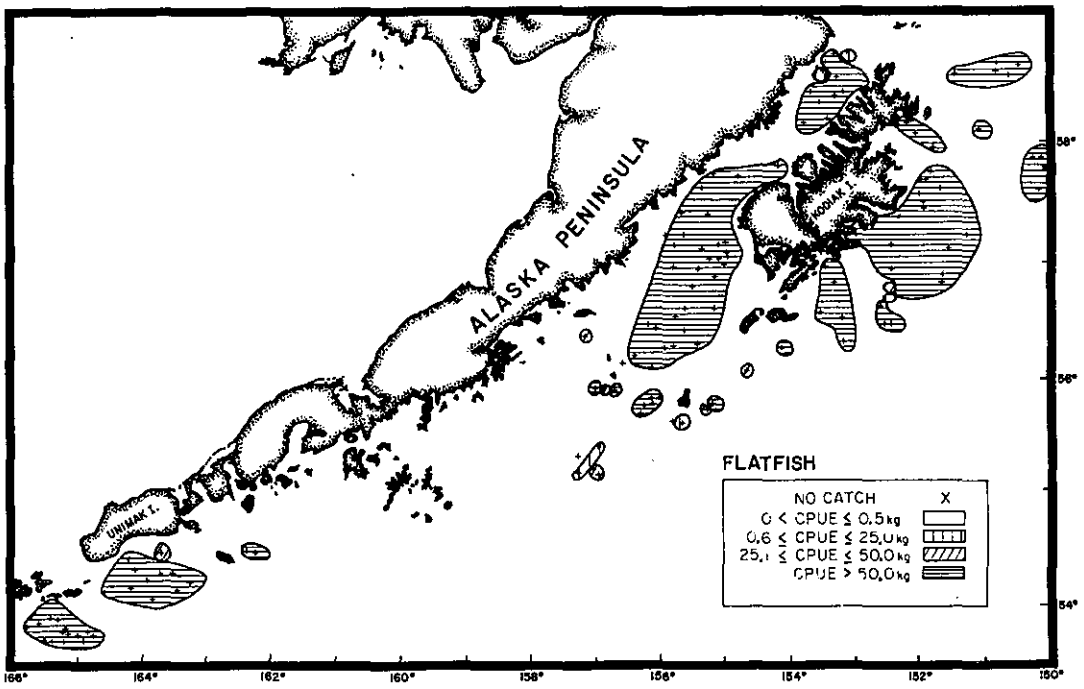


Figure XI-405.--Distribution of apparent relative abundance of flatfish in the western Gulf of Alaska, May-Jul. 1973, Aug.-Oct. 1973, Jul.-Aug. 1974, and Jun.-Aug. 1975 (Cruises 733, 734, 744, and 753).

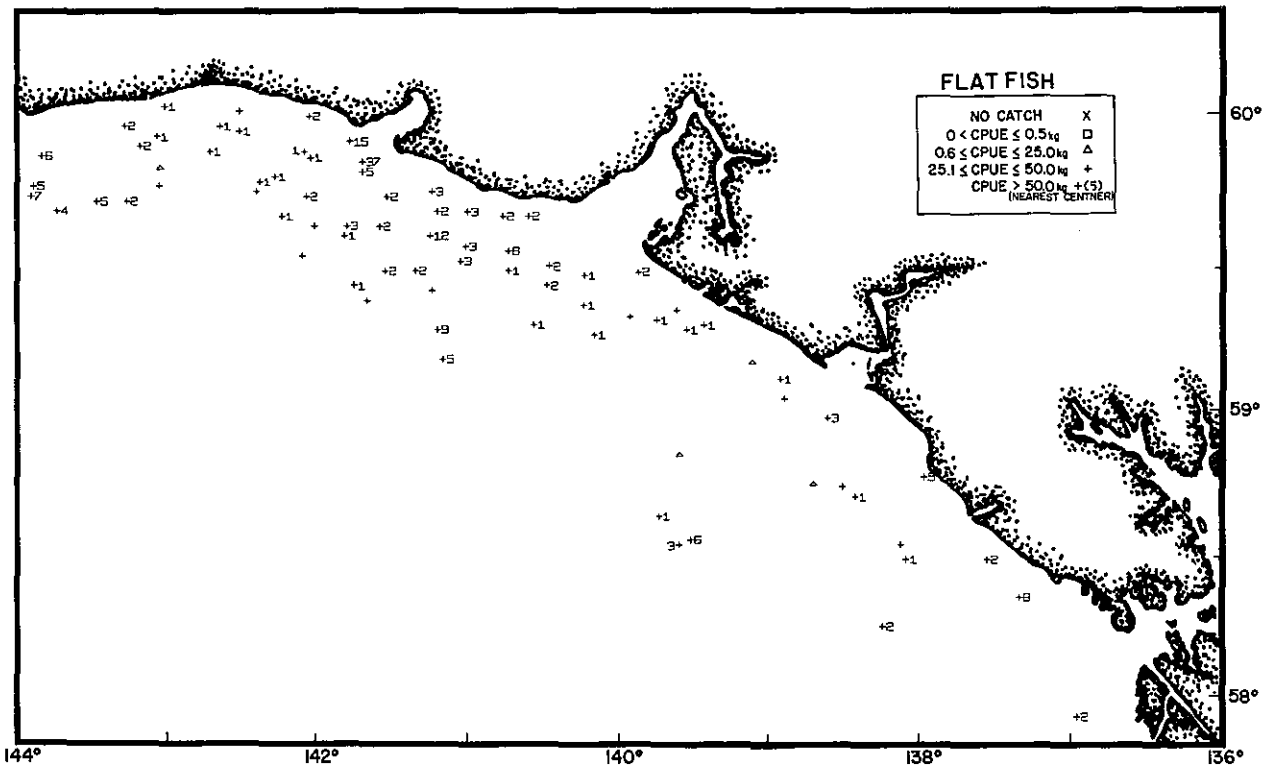


Figure XI-406.--Distribution of standardized catch rates in kilograms/hour of flatfish in the eastern Gulf of Alaska, May-Aug. 1975 and Apr. 1976 (Cruises 751 and 762).

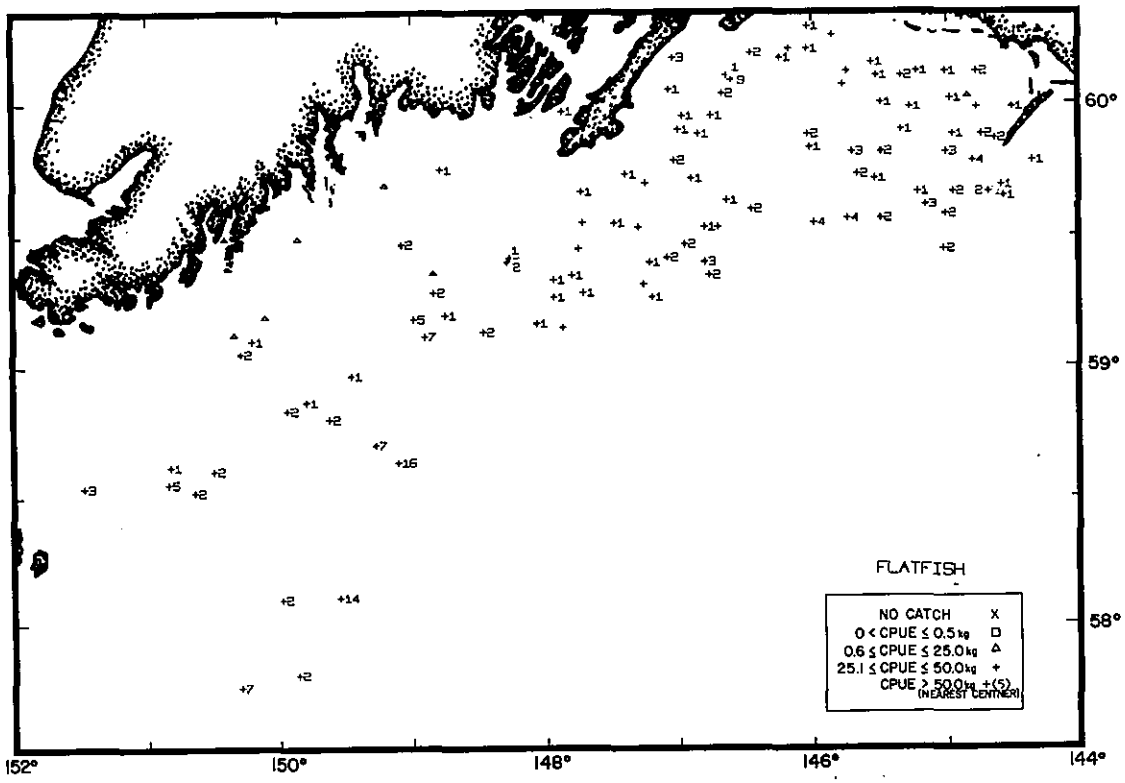


Figure XI-407.--Distribution of standardized catch rates in kilograms/ hour of flatfish in the eastern Gulf of Alaska, May-Aug. 1975 (Cruises 751 and 753).

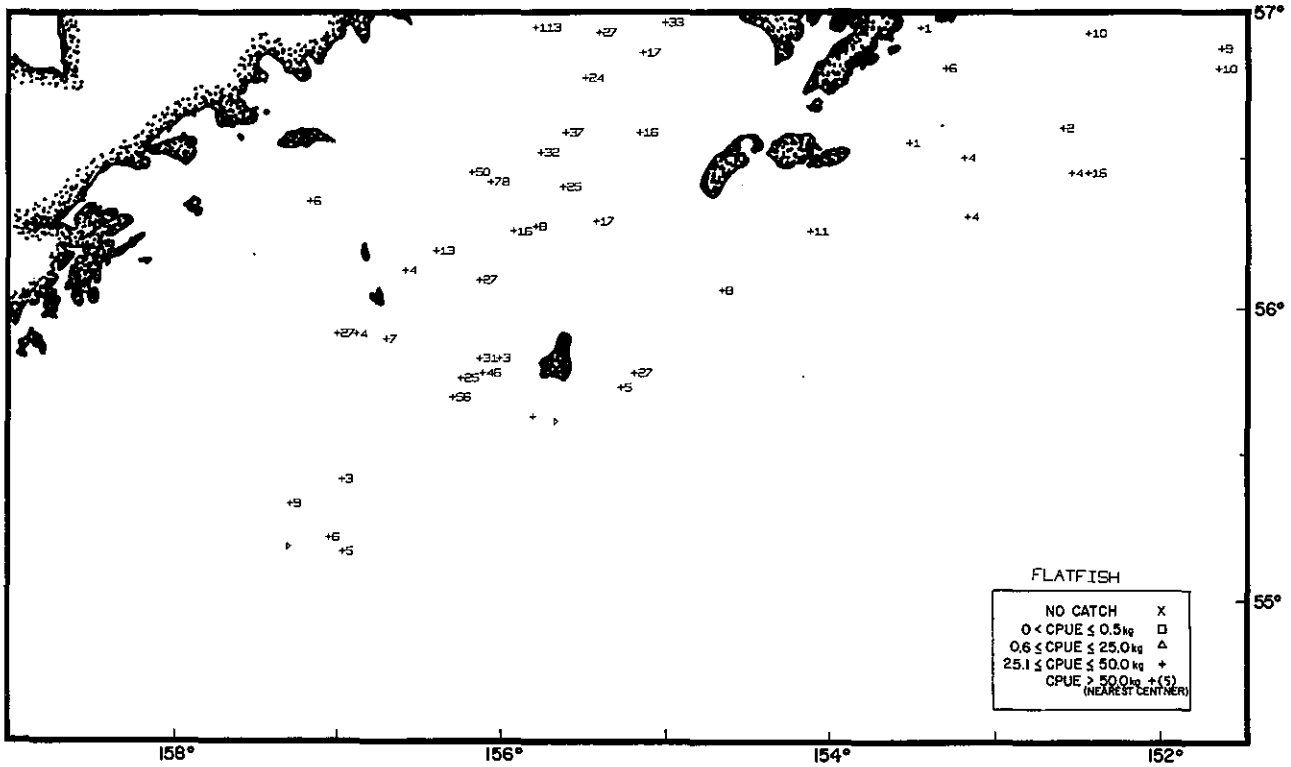


Figure XI-408.--Distribution of standardized catch rates in kilograms/ hour of flatfish in the western Gulf of Alaska, Aug.-Oct. 1973 and Jun.-Aug. 1975 (Cruises 734 and 753).

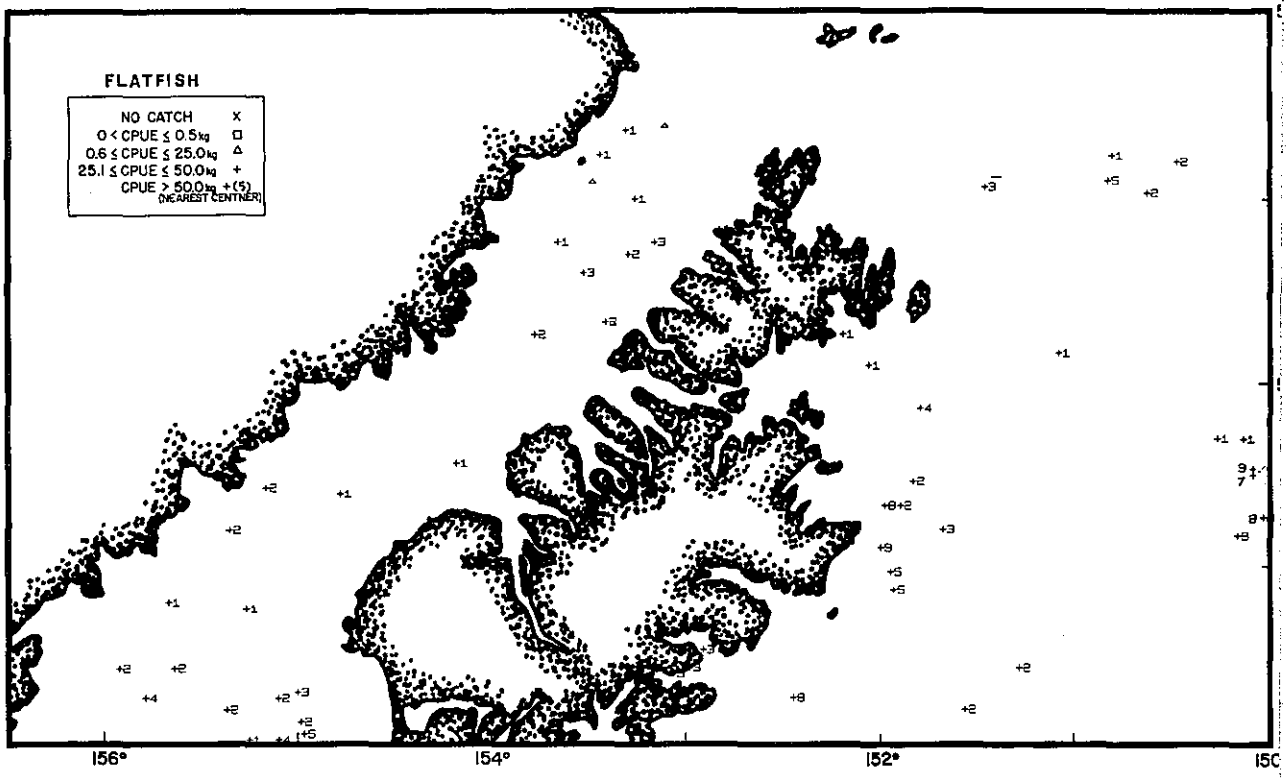


Figure XI-409.--Distribution of standardized catch rates in kilograms/ hour of flatfish in the western Gulf of Alaska, May-Jun. 1973, Aug.-Oct. 1973, and Jun.-Aug. 1975 (Cruise 733, 734, and 753).

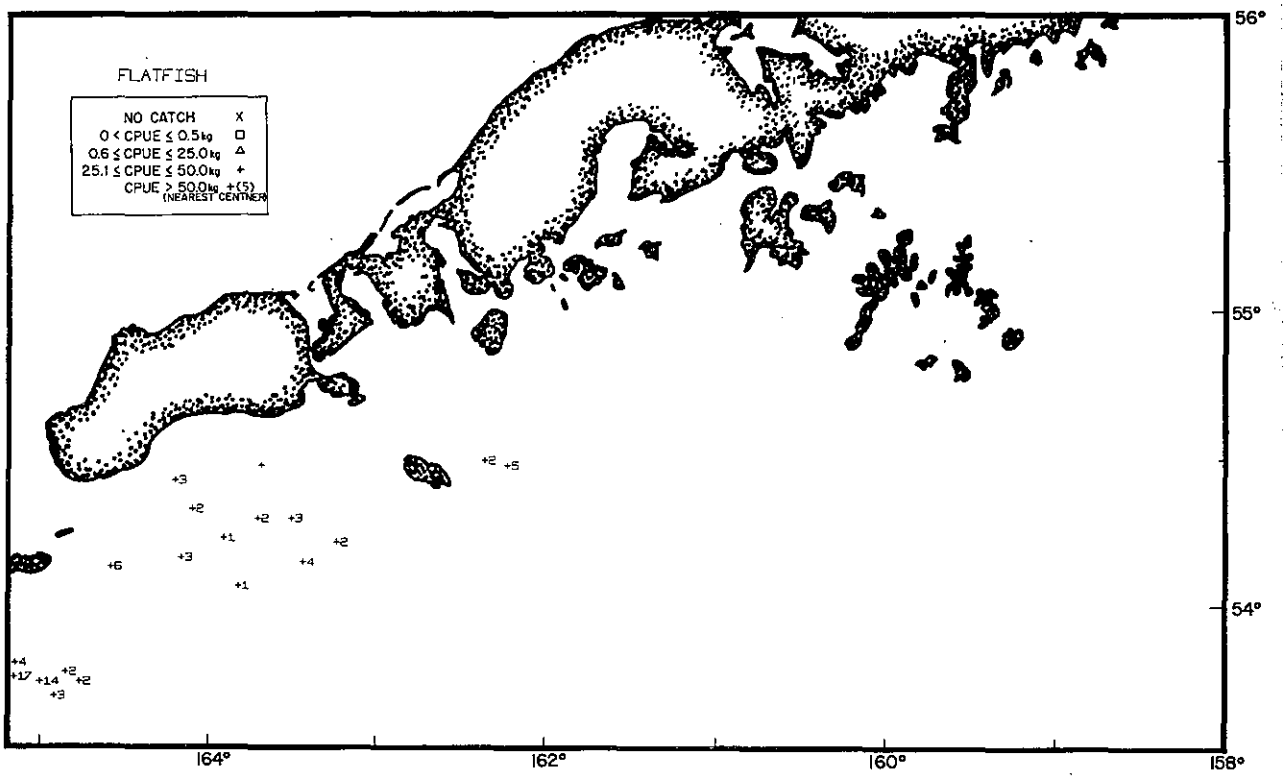


Figure XI-410.--Distribution of standardized catch rates in kilograms/ hour of flatfish in the western Gulf of Alaska, Jul.-Aug. 1974 (Cruise 744).

Table XI-107.--Estimated biomass and population size of invertebrates in the Gulf of Alaska during April-October 1973-76.

Region	Depth zone (m)	CPUE[1] (kg/hr)	Estimated biomass (mt)	Proportion of total estimated biomass	Estimated population (X 10^6)	Proportion of total estimated population	Mean size per individual [2] Weight (kg)	Mean size per individual [2] Length (cm)
Fairweather	1-100	62.0	2,231.5	6.7				
	101-200	189.4	30,848.3	92.5				
	201-400	9.5	284.9	0.9				
	All zones	145.8	33,364.7	12.0				
Yakutat	1-100	73.5	4,552.6	21.5				
	101-200	45.8	6,702.0	31.6				
	201-400	145.1	9,957.0	46.9				
	All zones	76.6	21,211.6	7.6				
Prince William	1-100	243.8	26,958.0	49.4				
	101-200	138.2	17,416.0	31.9				
	201-400	278.9	10,167.6	18.6				
	All zones	199.7	54,541.6	19.6				
Kenai	1-100	--	--	--				
	101-200	72.7	17,663.4	86.8				
	201-400	26.8	2,690.1	13.2				
	All zones	59.3	20,353.5	7.3				
Kodiak	1-100	212.5	30,435.4	43.7				
	101-200	284.8	35,146.7	50.4				
	201-400	73.5	4,097.5	5.9				
	All zones	216.1	69,679.6	25.1				
Shelikof	1-100	326.9	2,118.7	9.8				
	101-200	117.1	4,778.0	22.1				
	201-400	140.9	14,684.4	68.0				
	All zones	142.4	21,581.1	7.8				
Chirikof	1-100	76.1	9,099.4	41.8				
	101-200	53.7	8,665.0	39.8				
	201-400	30.0	4,025.7	18.5				
	All zones	54.1	21,790.1	7.8				
Shumagin	1-100	--	--	--				
	101-200	--	--	--				
	201-400	--	--	--				
	All zones	--	--	--				
Sanak	1-100	86.5	15,545.7	44.0				
	101-200	99.6	16,255.5	46.0				
	201-400	281.5	3,518.2	10.0				
	All zones	99.4	35,319.4	12.7				
Total	1-100	138.4	90,941.3	32.7				
	101-200	117.2	137,474.9	49.5				
	201-400	89.1	49,425.4	17.8				
	All zones	116.7	277,841.6	100.0				

1/ Mean catch per unit effort, in kilograms per hour trawled.
2/ Where data are available.
3/ Less than 0.1 kg/hr.
4/ Less than 0.1 X 10^6 individuals.
5/ Less than 0.1 percent.

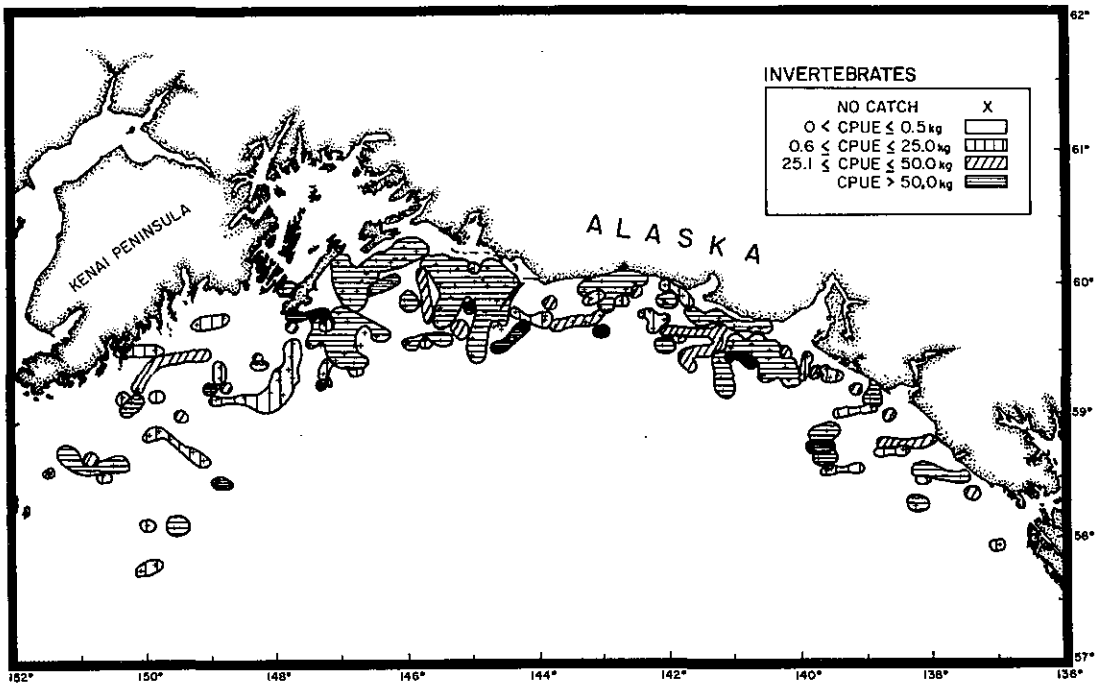


Figure XI-411.--Distribution of apparent relative abundance of invertebrates in the eastern Gulf of Alaska, May-Aug. 1975, Jun.-Aug. 1975, and Apr. 1976 (Cruise 751, 753, and 762).

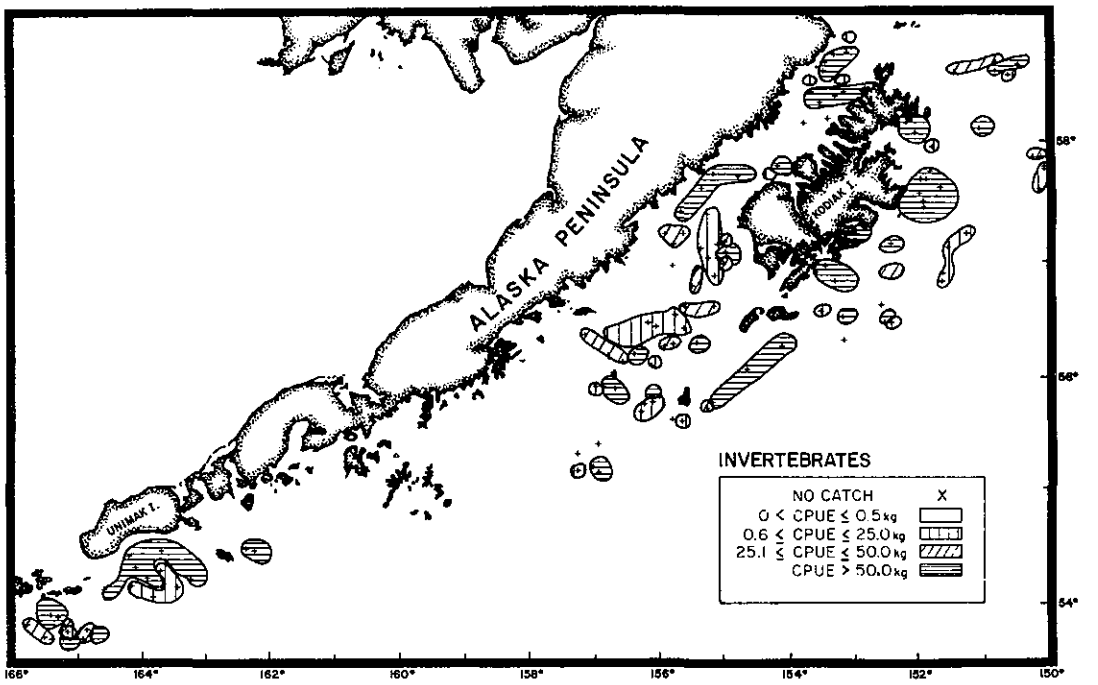


Figure XI-412.--Distribution of apparent relative abundance of invertebrates in the western Gulf of Alaska, May-Jul. 1973, Aug.-Oct. 1973, Jul.-Aug. 1974, and Jun.-Aug. 1975 (Cruises 733, 734, 744, and 753).

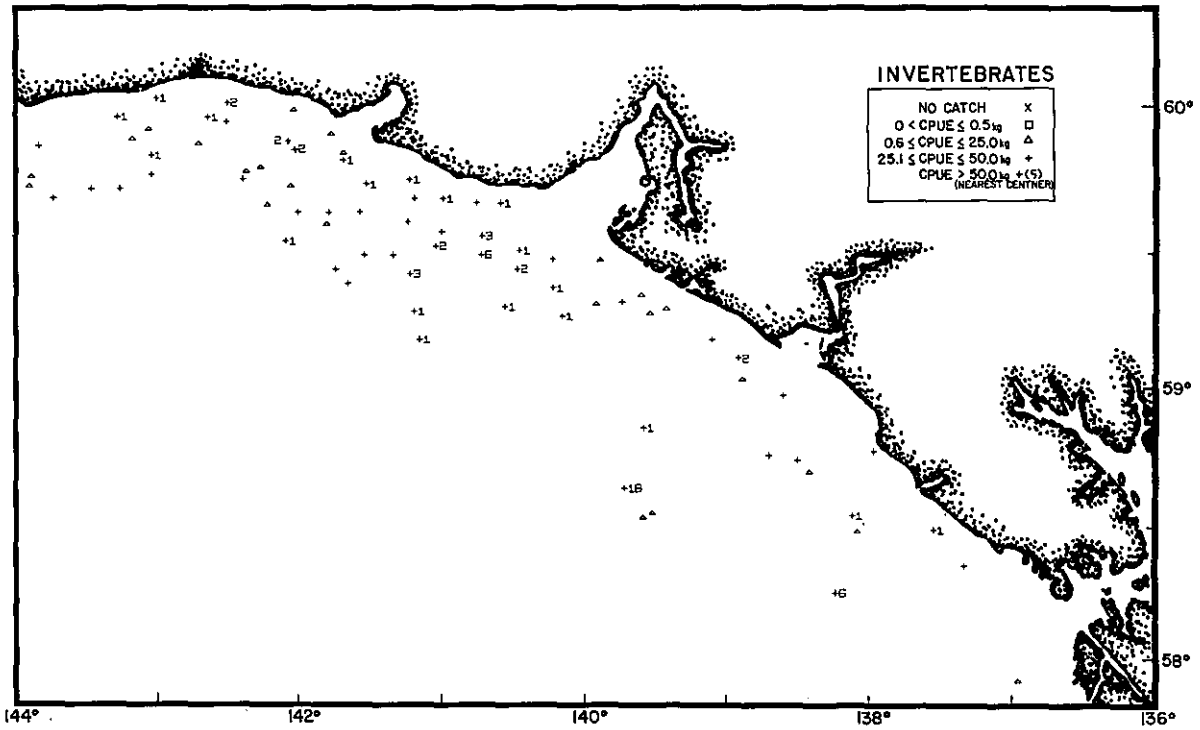


Figure XI-413.--Distribution of standardized catch rates in kilograms/ hour of invertebrates in the eastern Gulf of Alaska, May-Aug. 1975 and Apr. 1976 (Cruises 751 and 762).

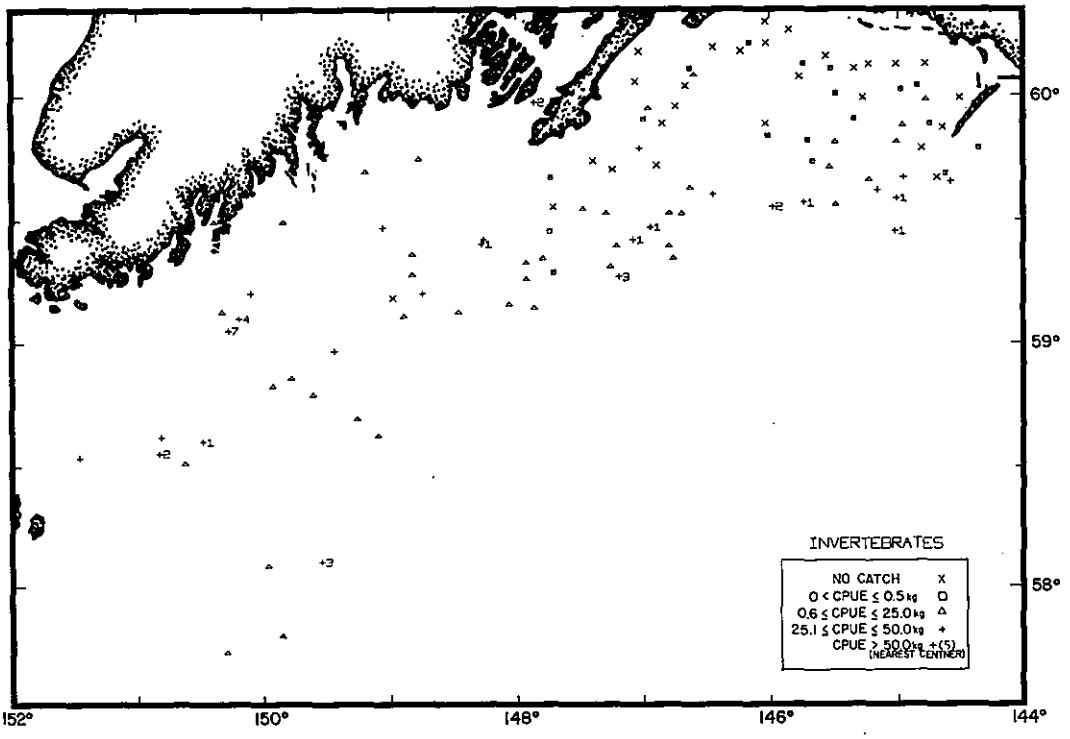


Figure XI-414.--Distribution of standardized catch rates in kilograms/ hour of invertebrates in the eastern Gulf of Alaska, May-Aug. 1975 (Cruises 751 and 753).

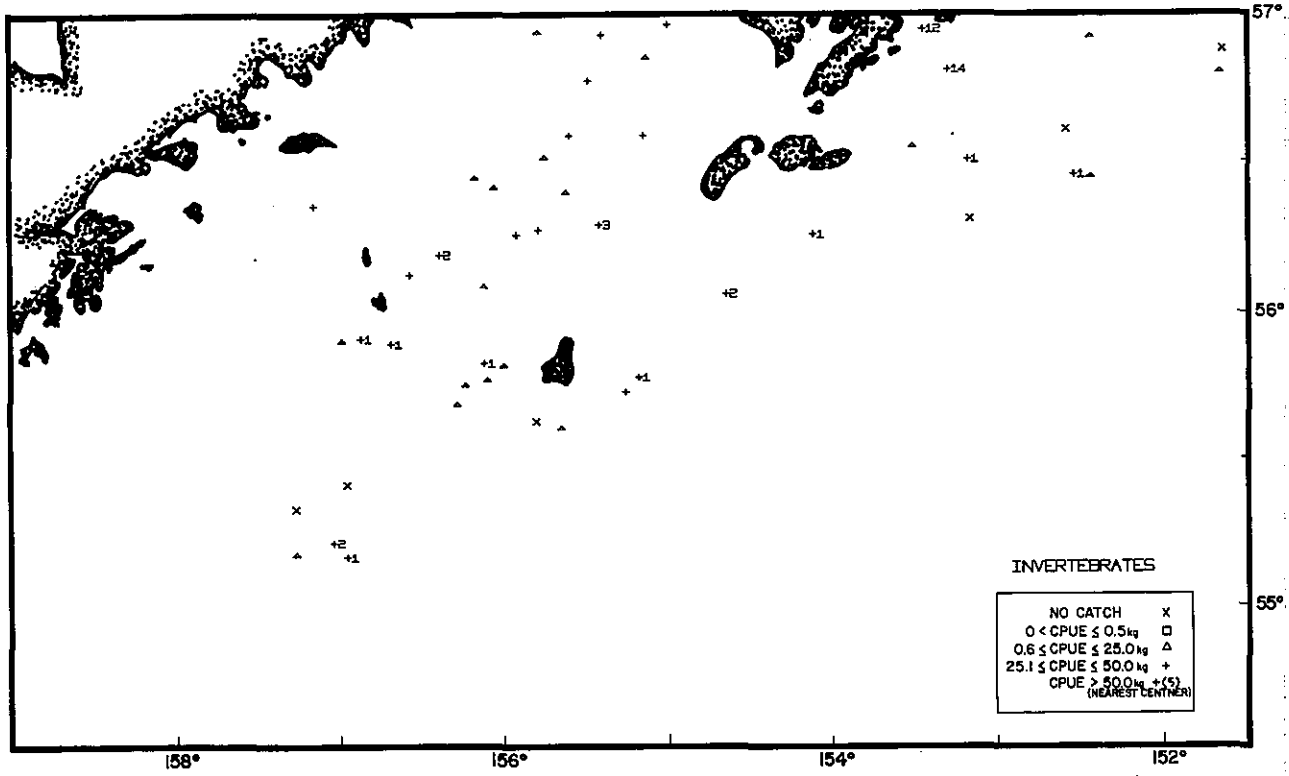


Figure XI-415.--Distribution of standardized catch rates in kilograms/ hour of invertebrates in the western Gulf of Alaska, Aug.-Oct. 1973, and Jun.-Aug. 1975 (Cruises 734 and 753).

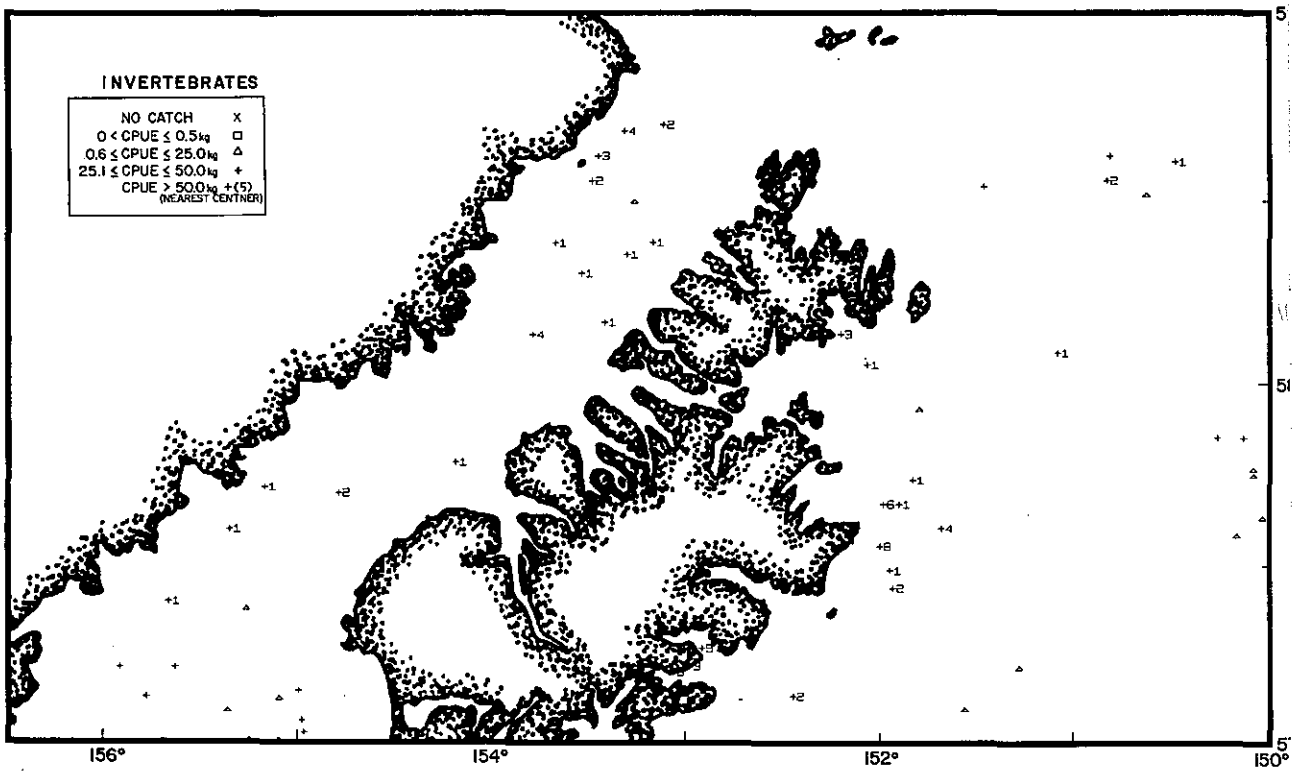


Figure XI-416.--Distribution of standardized catch rates in kilograms/ hour of invertebrates in the western Gulf of Alaska, May-Jun. 1973, Aug.-Oct. 1973, and Jun.-Aug. 1975 (Cruises 733, 734, and 753).

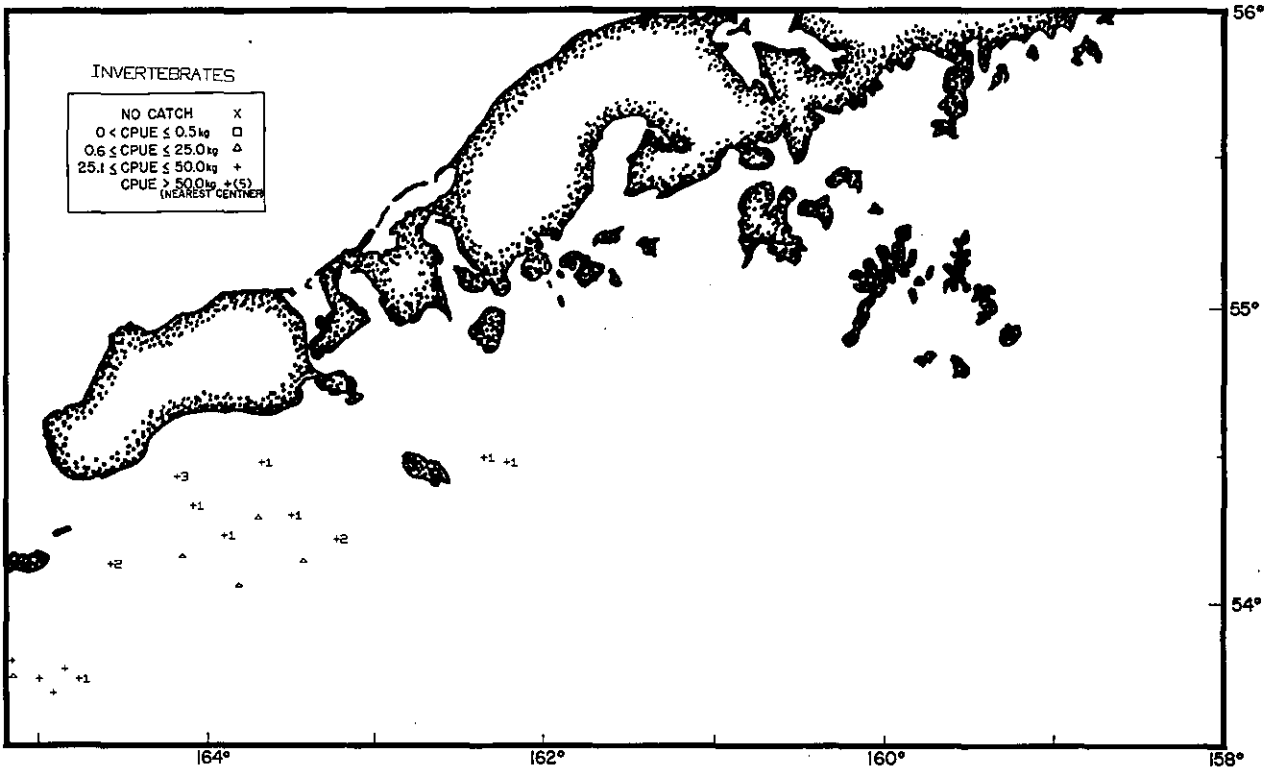


Figure XI-417.--Distribution of standardized catch rates in kilograms/hour of invertebrates in the western Gulf of Alaska, Jul.-Aug. 1974 (Cruise 744).

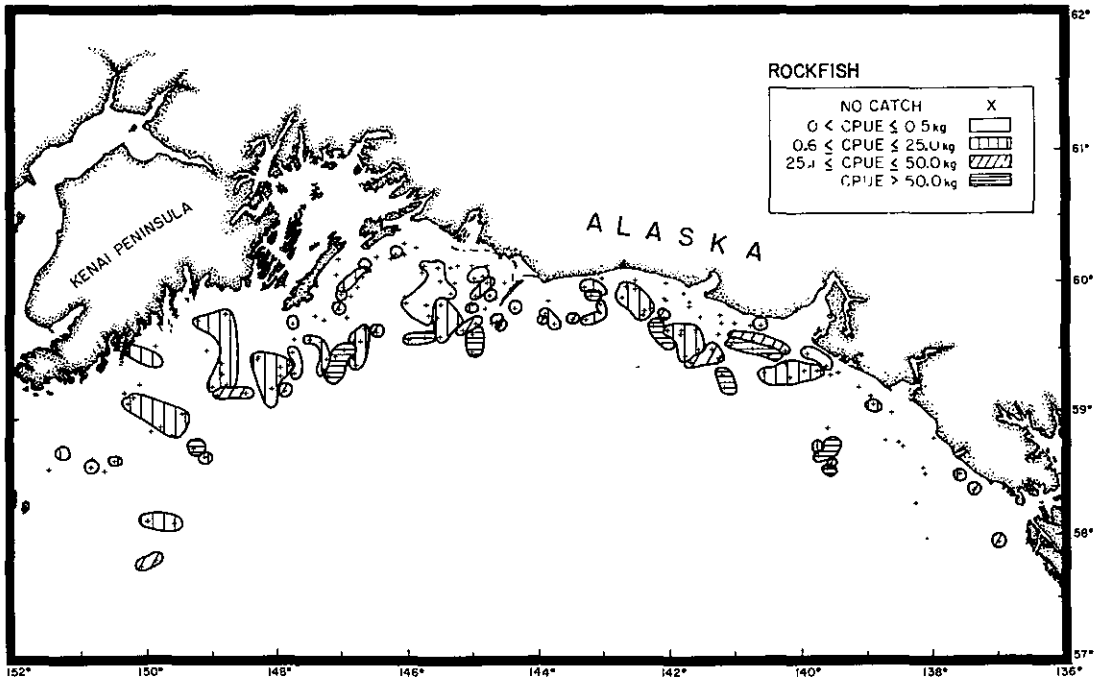


Figure XI-418.--Distribution of apparent relative abundance of rockfish in the eastern Gulf of Alaska, May-Aug. 1975, Jun.-Aug. 1975, and Apr. 1976.

The rockfish group had an estimated apparent biomass of 29 thousand mt, which represents less than 2% of the total biomass in the Gulf of Alaska (Table XI-108). Nearly 100% of the rockfish biomass occurred at depths greater than 100 meters. The upper slope contained 51%, the outer shelf 48%, while the inner shelf estimate was approximately 1%.Mean CPUE's for the rockfish group ranged from 0.6 kg/hr in the inner shelf depth zone to 29 kg/hr in the upper slope and averaged 13 kg/hr over the entire Gulf. Yakutat had the highest relative apparent abundance (24 kg/hr) which resulted from relatively high mean catch rates in the outer shelf and upper slope (Figures XI-418-419). Particularly high CPUE's also occurred in the Sanak and Kodiak upper slope depth zones. Standardized catch rates for all successful stations for this group are plotted in Figures XI-420-424.

The elasmobranch group had an estimated biomass of 28 thousand mt which represents less than 2% of the total estimated biomass in the Gulf of Alaska (Table XI-109). The greatest percentage of the elasmobranch biomass (52%) occurred in the outer shelf while the remainder was evenly divided between the inner shelf (25%) and upper slope (22%). Mean CPUE's were almost identical (11-12 kg/hr) in all depth zones. Apparent relative abundance was highest in the three easternmost regions with the highest CPUE of 33 kg/hr occurring in the Yakutat area (Figures XI-425-426). Standardized catch rates for all successful stations for this group are plotted in Figures XI-427-431.

DISTRIBUTION, RELATIVE APPARENT ABUNDANCE, BIOMASS ESTIMATES, AND SIZE COMPOSITION FEATURES OF PRINCIPAL SPECIES OF FISH AND INVERTEBRATES

WALLEYE POLLOCK

Distribution and abundance--Walleye pollock were taken in each region and depth zone sampled and averaged 321 kg/hr, the highest relative apparent abundance of any species encountered in the Gulf of Alaska (Figures XI-432-433). By depth zones, the highest mean CPUE of 529 kg/hr occurred in the outer shelf followed by the inner shelf and the upper slope. Mean CPUE's were significantly above average in three western Gulf regions with Sanak having the highest mean CPUE followed by Chirikof and Kodiak. The lowest relative apparent abundance occurred in the Fairweather region. The distribution of the standardized catch rates for the successful stations is shown in Figures XI-434-438.

Biomass--The total biomass of walleye pollock has been estimated at 739 thousand mt of which 83% was located in the outer shelf depth zone (Table XI-110). The remaining biomass was relatively evenly divided between the inner shelf and upper slope. The western Gulf regions contained 84% of the apparent pollock biomass with Sanak making the largest contribution (33%) followed by Chirikof (28%) and Kodiak (21%). The combined Kodiak and Sanak outer shelf depth zones accounted for 42% of the estimated biomass for this species. The pollock biomass estimate should be considered minimal since this is a semi-pelagic species and some unknown portion of the population may have occupied the water column above the sampling gear, thus being unavailable to the trawl.

Table XI-108.--Estimated biomass and population size of rockfishes in the Gulf of Alaska during April-October 1973-76.

Region	Depth zone (m)	CPUE[1] (kg/hr)	Estimated biomass (mt)	Proportion of total estimated biomass	Estimated population (X 10^6)	Proportion of total estimated population	Mean size per individual[2] Weight (kg)	Length (cm)
Fairweather	1-100	0.3	12.2	0.4	[4]	[5]	0.34	--
	101-200	7.4	1,200.7	38.6	0.5	6.4	2.36	--
	201-400	63.1	1,895.2	61.0	7.3	93.6	0.26	--
	All zones	13.6	3,108.1	10.8	7.8	--	0.40	--
Yakutat	1-100	0.1	7.7	0.1	[4]	[5]	0.31	--
	101-200	18.9	3,292.5	59.0	7.0	35.9	0.39	--
	201-400	57.7	2,281.6	40.9	12.5	64.1	0.32	--
	All zones	24.3	5,581.8	19.3	19.5	--	0.34	--
Prince William	1-100	3.1	340.5	9.1	1.7	13.1	0.20	--
	101-200	17.3	2,185.6	58.4	7.3	56.2	0.30	--
	201-400	33.4	1,217.0	32.5	4.0	30.8	0.30	--
	All zones	13.7	3,743.1	13.0	13.0	--	0.29	--
Kenai	1-100	--	--	--	--	--	--	--
	101-200	11.8	2,862.4	90.2	2.1	63.6	1.35	--
	201-400	3.1	312.9	9.9	1.2	36.4	0.26	--
	All zones	9.3	3,175.3	11.0	3.3	--	0.96	--
Kodiak	1-100	0.2	21.7	0.3	--	--	--	--
	101-200	2.6	320.2	5.0	--	--	--	--
	201-400	108.8	6,066.1	94.7	--	--	--	--
	All zones	19.9	6,408.0	22.2	--	--	--	--
Shelikof	1-100	0	0	0	0	0	--	--
	101-200	2.5	102.8	48.7	--	--	--	--
	201-400	1.0	108.1	51.3	--	--	--	--
	All zones	1.4	210.9	0.7	0.3	--	--	--
Chirikof	1-100	[3]	4.1	0.1	[4]	[5]	0.14	--
	101-200	24.1	3,897.1	91.8	9.2	95.6	0.42	--
	201-400	2.6	345.5	8.1	0.3	4.4	1.03	--
	All zones	10.8	4,246.7	14.7	9.6	--	0.44	--
Shumagin	1-100	--	--	--	--	--	--	--
	101-200	--	--	--	--	--	--	--
	201-400	--	--	--	--	--	--	--
	All zones	--	--	--	--	--	--	--
Sanak	1-100	0	0	0	0	0	--	--
	101-200	0	0	0	0	0	--	--
	201-400	193.2	2,414.6	100.0	--	--	--	--
	All zones	6.8	2,414.6	8.4	--	--	--	--
Total	1-100	0.6	386.2	1.3	--	--	--	--
	101-200	11.5	13,861.3	48.0	--	--	--	--
	201-400	29.0	14,641.0	50.7	--	--	--	--
	All zones	12.7	28,888.5	100.1	--	--	--	--

1/ Mean catch per unit effort, in kilograms per hour trawled.
2/ Where data are available.
3/ Less than 0.1 kg/hr.
4/ Less than 0.1 X 10^6 individuals.
5/ Less than 0.1 percent.

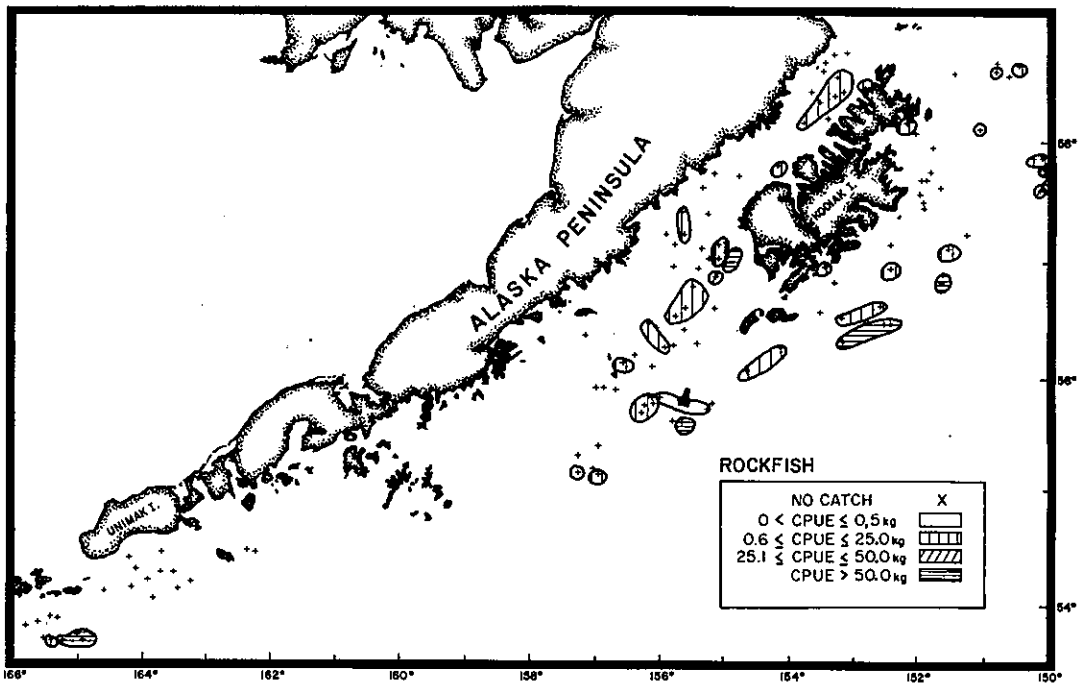


Figure XI-419.--Distribution of apparent relative abundance of rockfish in the western Gulf of Alaska, May-Jul. 1973, Aug.-Oct. 1973, Jul.-Aug. 1974, and Jun.-Aug. 1975 (Cruises 733, 734, 744, and 753).

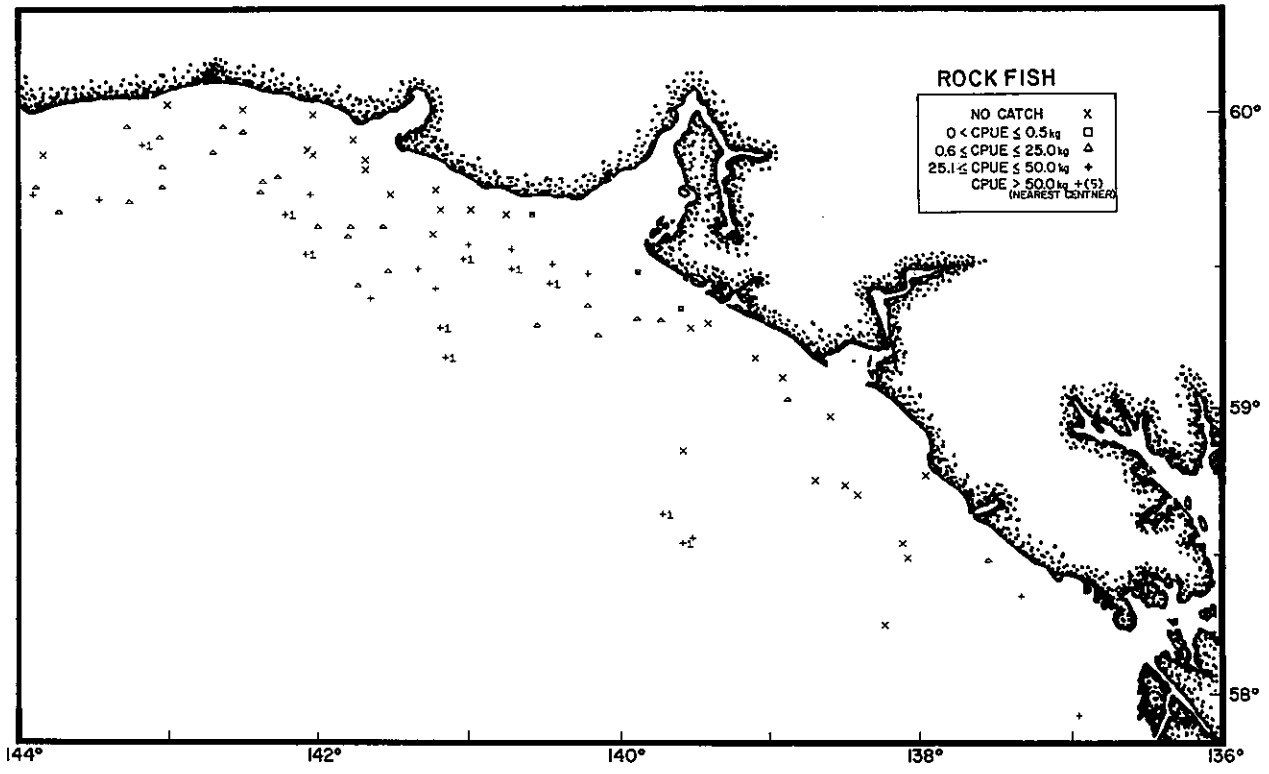


Figure XI-420.--Distribution of standardized catch rates in kilograms/hour of rockfish in the eastern Gulf of Alaska, May-Aug. 1975 and Apr. 1976 (Cruises 751 and 762).

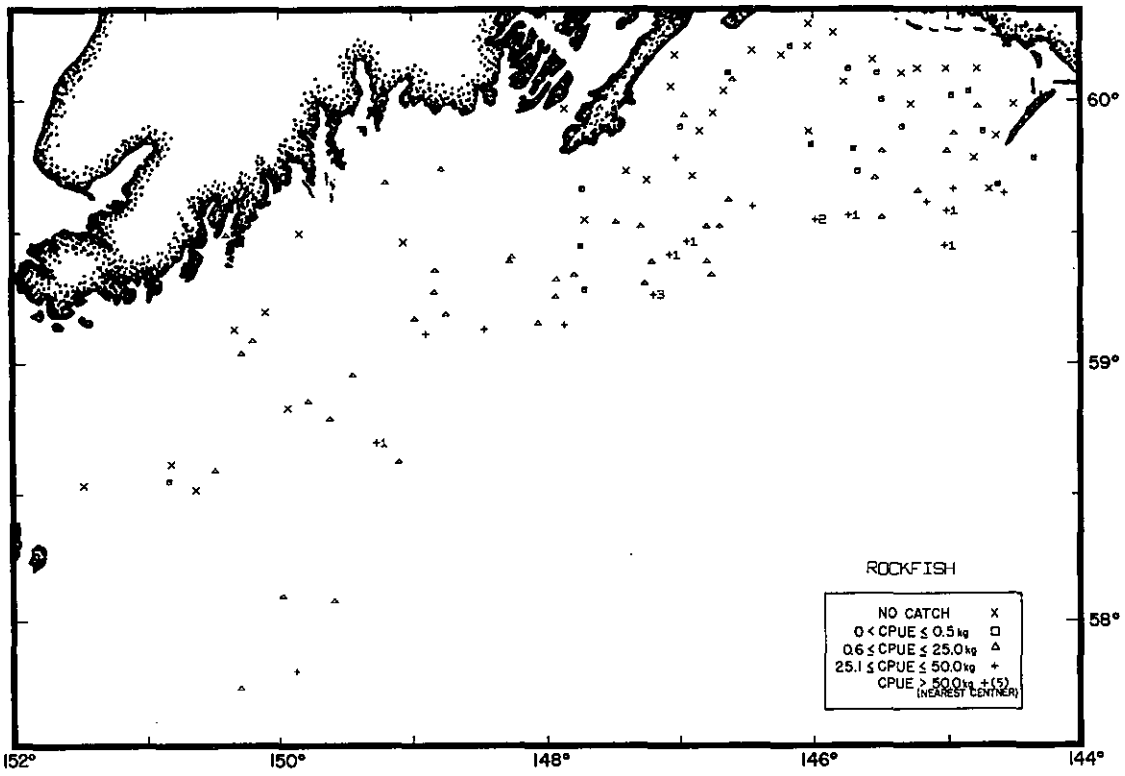


Figure XI-421.--Distribution of standardized catch rates in kilograms/ hour of rockfish in the eastern Gulf of Alaska, May-Aug. 1975 (Cruises 751 and 753).

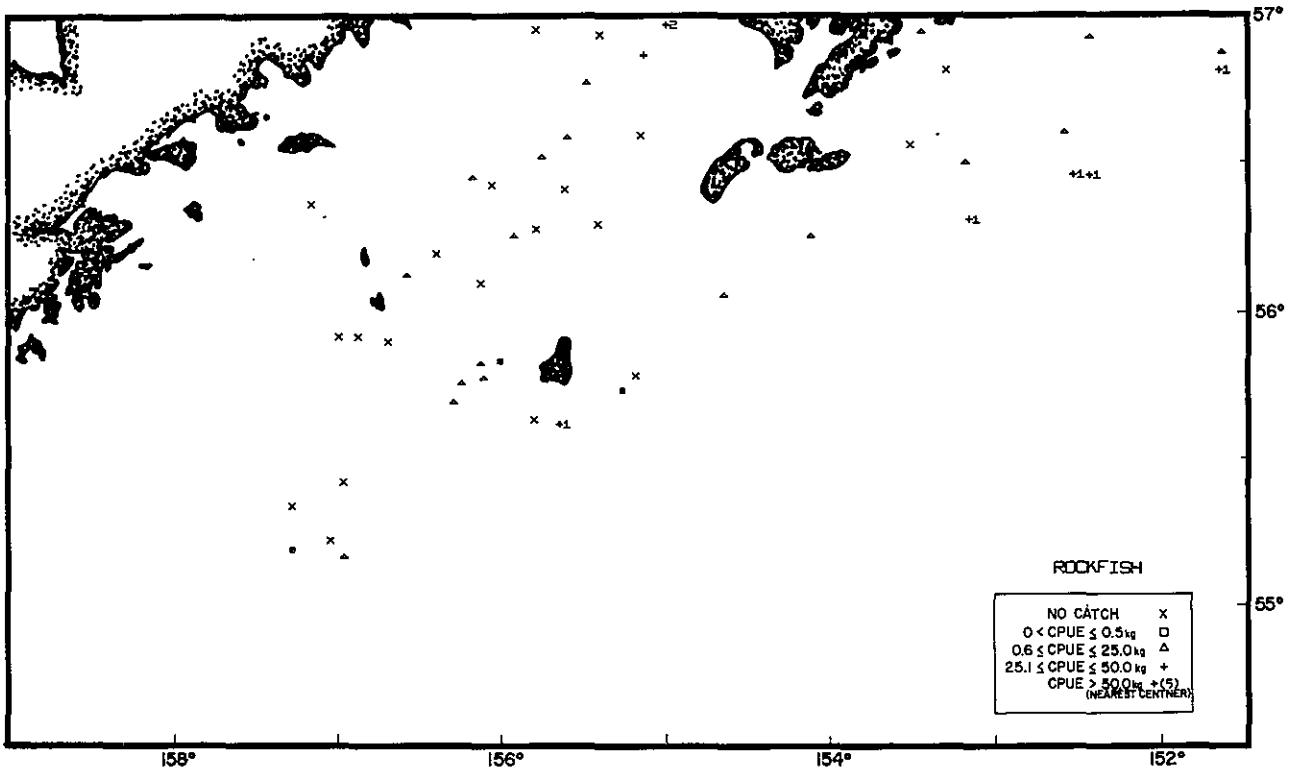


Figure XI-422.--Distribution of standardized catch rates in kilograms/ hour of rockfish in the western Gulf of Alaska, Aug.-Oct. 1973 and Jun.-Aug. 1975 (Cruises 734 and 753).

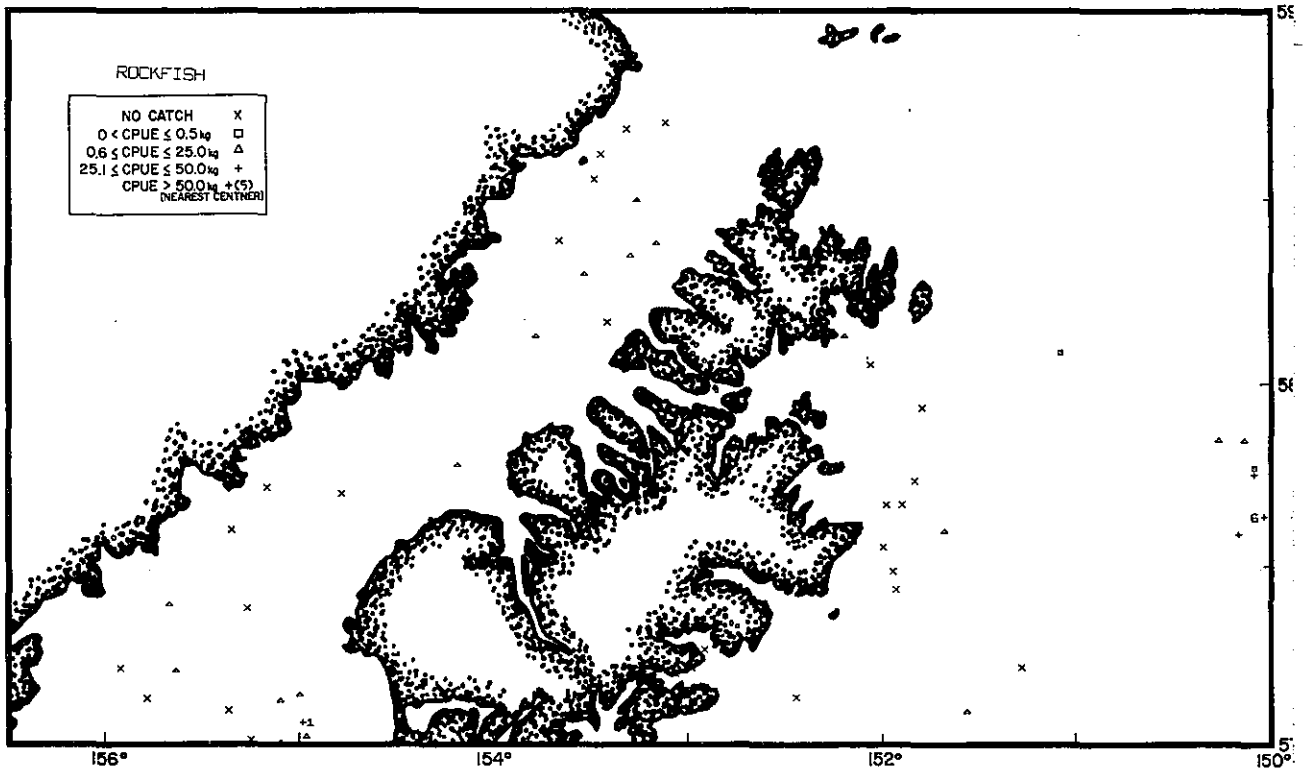


Figure XI-423.--Distribution of standardized catch rates in kilograms/ hour of rockfish in the western Gulf of Alaska, May-Jun. 1973, Aug.-Oct. 1973, and Jun.-Aug. 1975 (Cruises 733, 734, and 753).

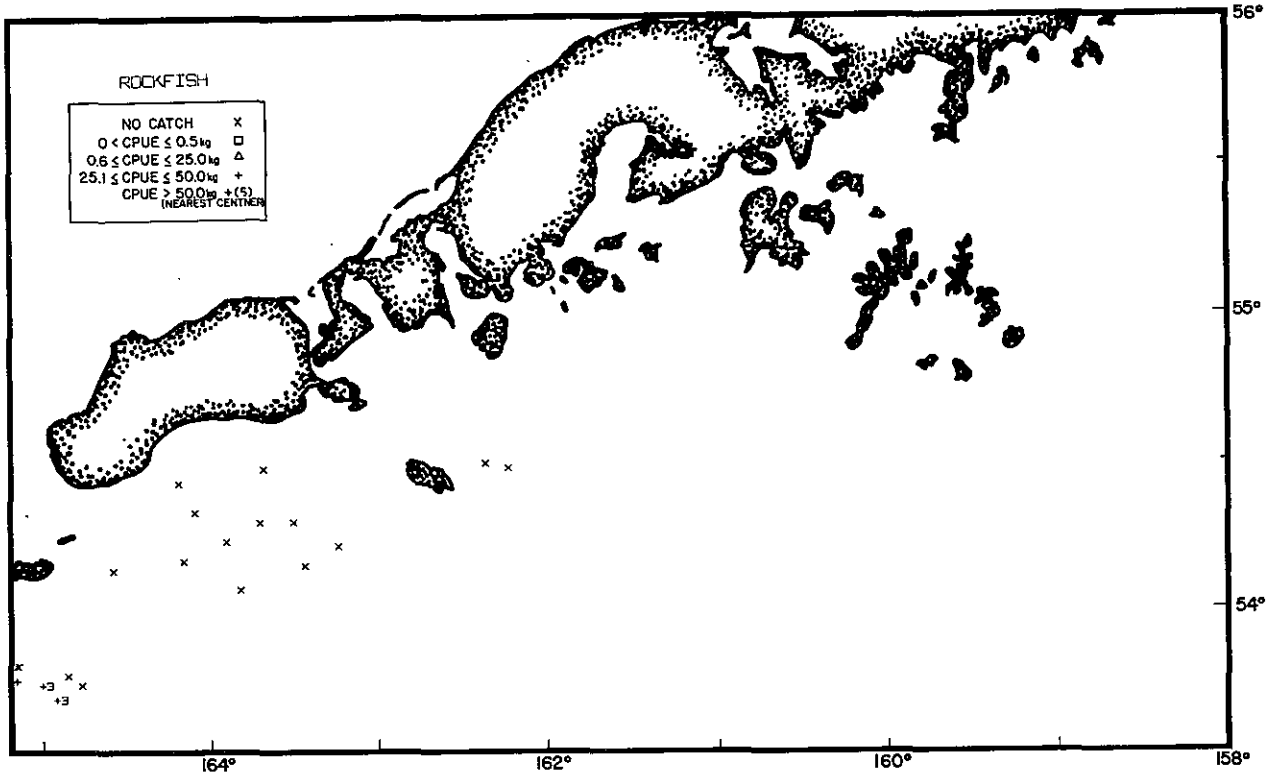


Figure XI-424.--Distribution of standardized catch rates in kilograms/ hour of rockfish in the western Gulf of Alaska, Jul.-Aug. 1974 (Cruise 744).

Table XI-109.--Estimated biomass and population size of Elasmobranchs in the Gulf of Alaska during April-October 1973-76.

Region	Depth zone (m)	CPUE[1] (kg/hr)	Estimated biomass (mt)	Proportion of total estimated biomass	Estimated population (X 10^6)	Proportion of total estimated population	Mean size per individual[2] Weight (kg)	Length (cm)
Fairweather	1-100	12.7	456.9	7.3	0.3	8.8	1.81	--
	101-200	32.3	5,255.3	83.5	2.5	73.5	2.13	--
	201-400	19.3	579.5	9.2	0.6	17.7	1.01	--
	All zones	27.5	6,291.7	22.2	3.4	--	1.91	--
Yakutat	1-100	45.4	2,813.3	31.1	1.4	28.0	1.94	--
	101-200	23.7	3,459.7	38.2	2.2	44.0	1.55	--
	201-400	40.7	2,795.2	30.8	1.4	28.0	1.99	--
	All zones	32.8	9,068.2	31.9	5.0	--	1.79	--
Prince William	1-100	35.4	3,911.5	58.7	0.7	41.2	5.87	--
	101-200	16.6	2,098.3	31.5	0.7	41.2	2.89	--
	201-400	17.8	649.9	9.8	0.3	17.7	2.35	--
	All zones	24.4	6,659.7	23.4	1.7	--	3.99	--
Kenai	1-100	--	--	--	--	--	--	--
	101-200	1.2	290.8	47.3	0.3	42.9	1.00	--
	201-400	3.2	324.3	52.7	0.4	57.1	0.92	--
	All zones	1.8	615.1	2.2	0.7	--	0.96	--
Kodiak	1-100	0	0	0	0	0	--	--
	101-200	1.5	179.2	95.4	--	--	--	--
	201-400	0.2	8.6	4.6	--	--	--	--
	All zones	0.6	187.8	0.7	--	--	--	--
Shelikof	1-100	1.2	7.8	1.1	--	--	--	--
	101-200	0.5	20.6	2.8	--	--	--	--
	201-400	6.7	702.5	96.1	--	--	--	--
	All zones	4.8	730.9	2.6	--	--	--	--
Chirikof	1-100	0	0	0	0	0	--	--
	101-200	1.7	269.7	20.4	4/	5/	15.88	--
	201-400	7.8	1,049.3	79.6	0.2	100.0	5.31	--
	All zones	3.2	1,319.0	4.7	0.2	--	6.15	--
Shumagin	1-100	--	--	--	--	--	--	--
	101-200	--	--	--	--	--	--	--
	201-400	--	--	--	--	--	--	--
	All zones	--	--	--	--	--	--	--
Sanak	1-100	0	0	0	0	0	--	--
	101-200	19.9	3,247.9	94.2	1.9	95.0	1.74	--
	201-400	15.9	198.4	5.8	0.1	5.0	2.76	--
	All zones	9.7	3,446.3	12.1	2.0	--	1.78	--
Total	1-100	10.5	7,189.5	25.4	--	--	--	--
	101-200	12.2	14,821.5	52.3	--	--	--	--
	201-400	11.2	307.7	22.3	--	--	--	--
	All zones	11.5	28,318.7	100.0	--	--	--	--

1/ Mean catch per unit effort, in kilograms per hour trawled.
2/ Where data are available.
3/ Less than 0.1 kg/hr.
4/ Less than 0.1 X 10^6 individuals.
5/ Less than 0.1 percent

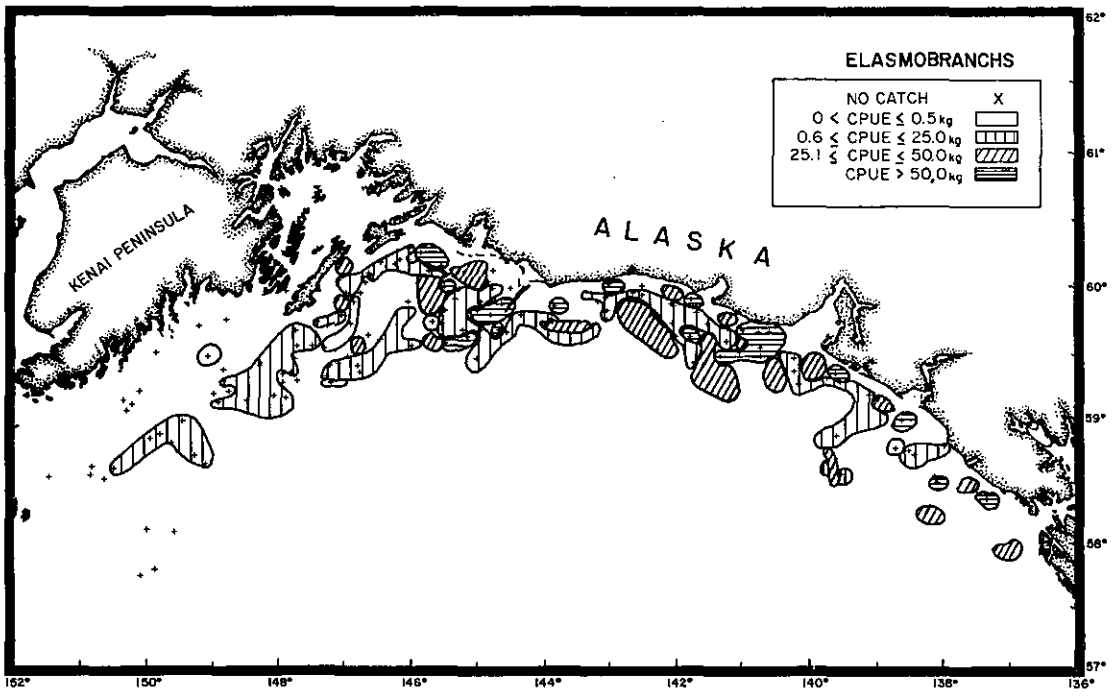


Figure XI-425.--Distribution of apparent relative abundance of elasmobranchs in the eastern Gulf of Alaska, May-Aug. 1975, Jun.-Aug. 1975, and Apr. 1976 (Cruises 751, 753, and 762).

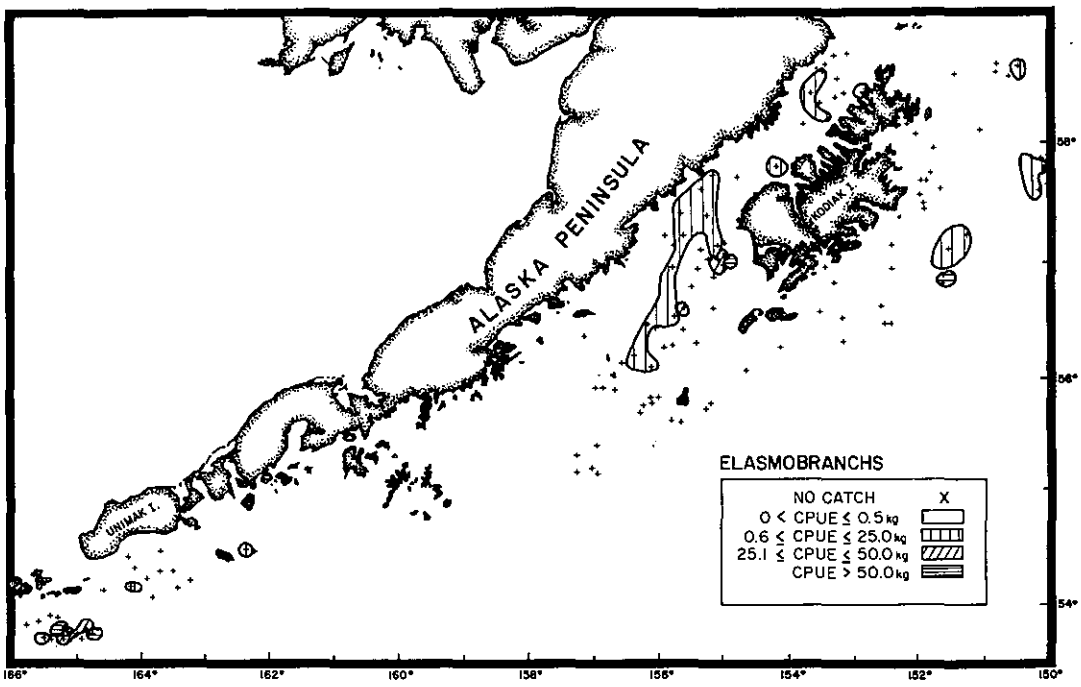


Figure XI-426.--Distribution of apparent relative abundance of elasmobranchs in the western Gulf of Alaska, May-Jul. 1973, Aug.-Oct. 1973, Jul.-Aug. 1974, and Jun.-Aug. 1975 (Cruises 733, 734, 744, and 753).

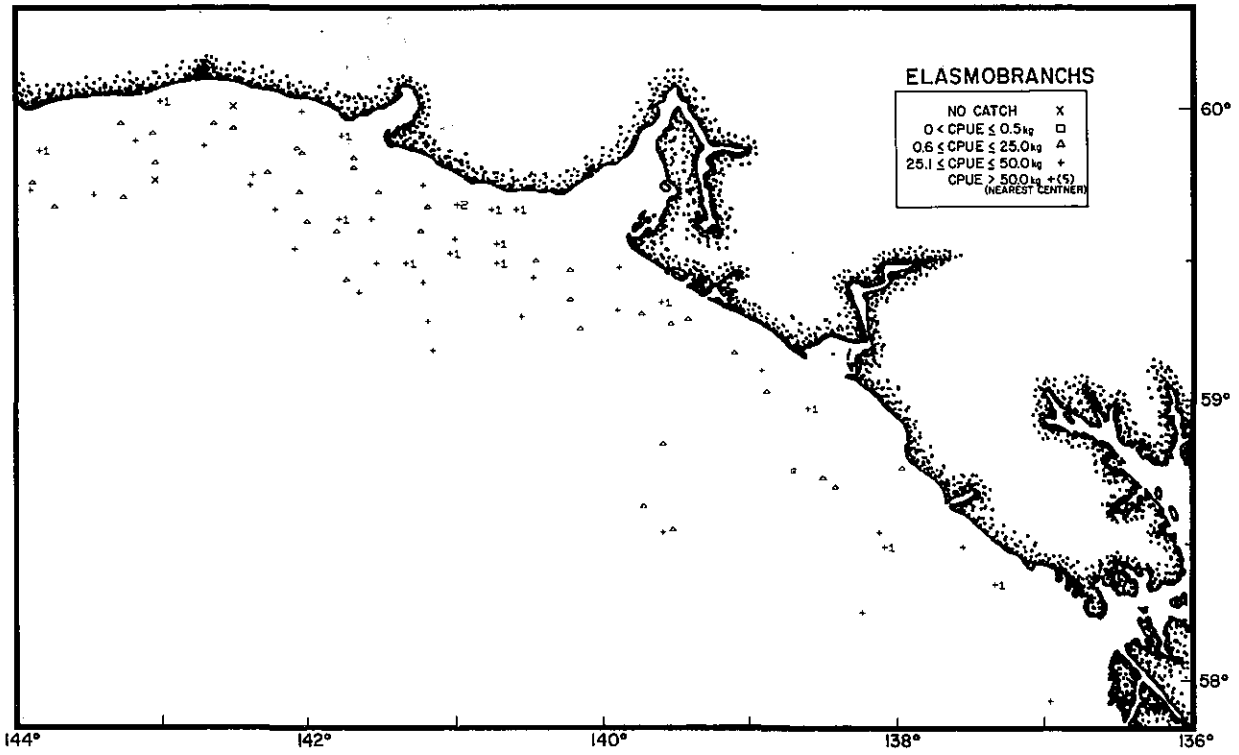


Figure XI-427.--Distribution of standardized catch rates in kilograms/ hour of elasmobranchs in the eastern Gulf of Alaska, May-Aug. 1975 and Apr. 1976 (Cruises 751 and 762).

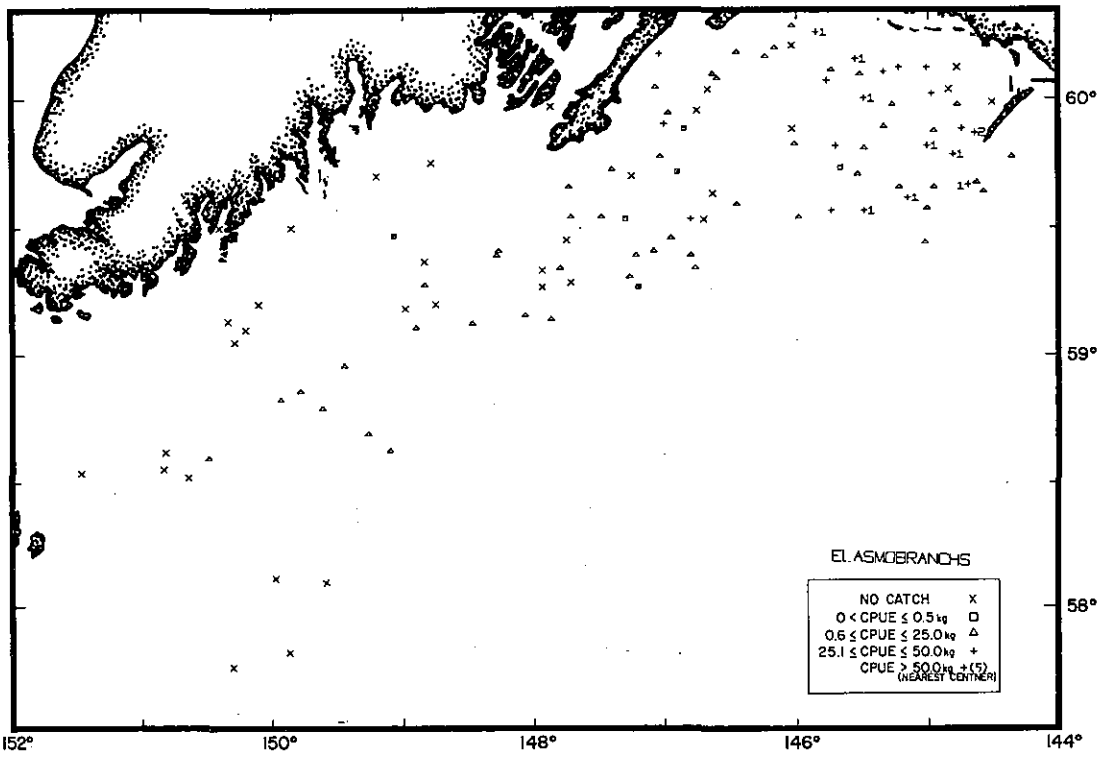


Figure XI-428.--Distribution of standardized catch rates in kilograms/ hour of elasmobranchs in the eastern Gulf of Alaska, May-Aug. 1975 (Cruises 751 and 753).

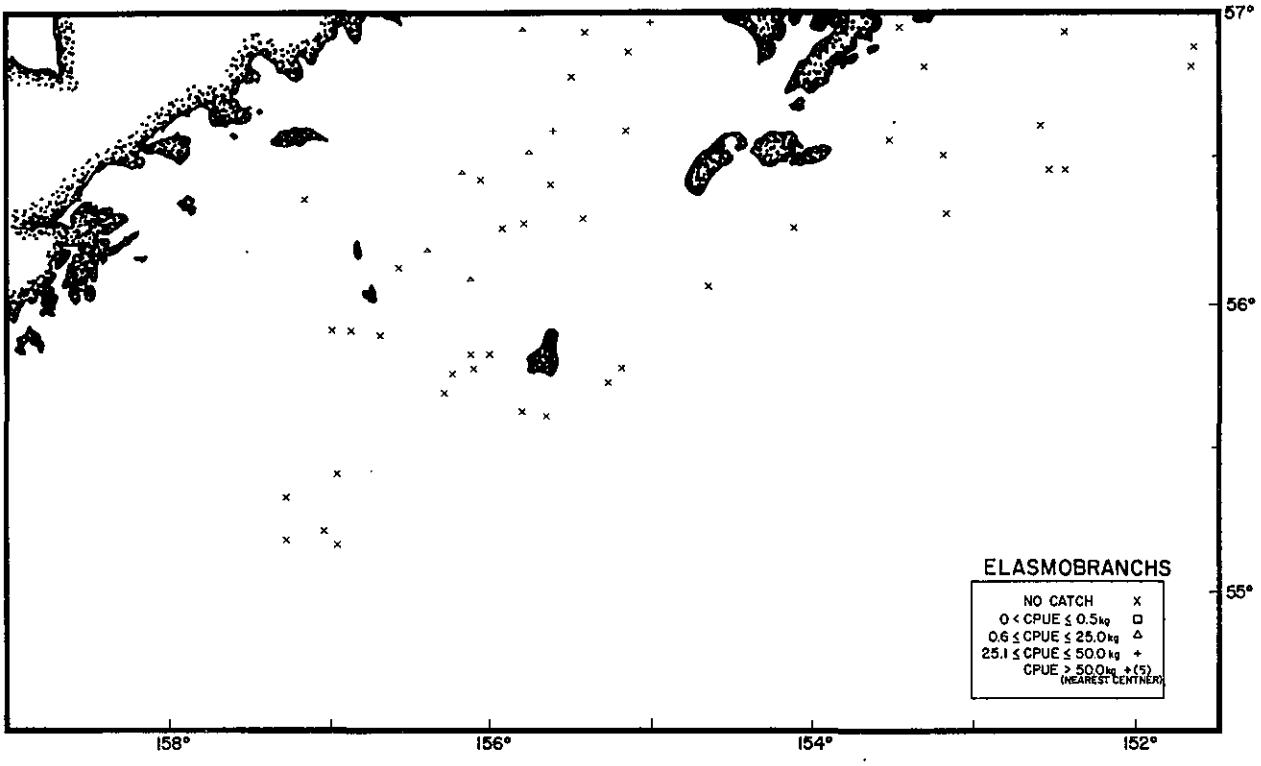


Figure XI-429.--Distribution of standardized catch rates in kilograms/ hour of elasmobranchs in the western Gulf of Alaska, Aug.-Oct. 1973, and Jun.-Aug. 1975 (Cruises 734 and 753).

Figure XI-430.--Distribution of standardized catch rates in kilograms/ hour of elasmobranchs in the western Gulf of Alaska, May-Jun. 1973, Aug.-Oct. 1973, and Jun.-Aug. 1975 (Cruises 733, 734, and 753).

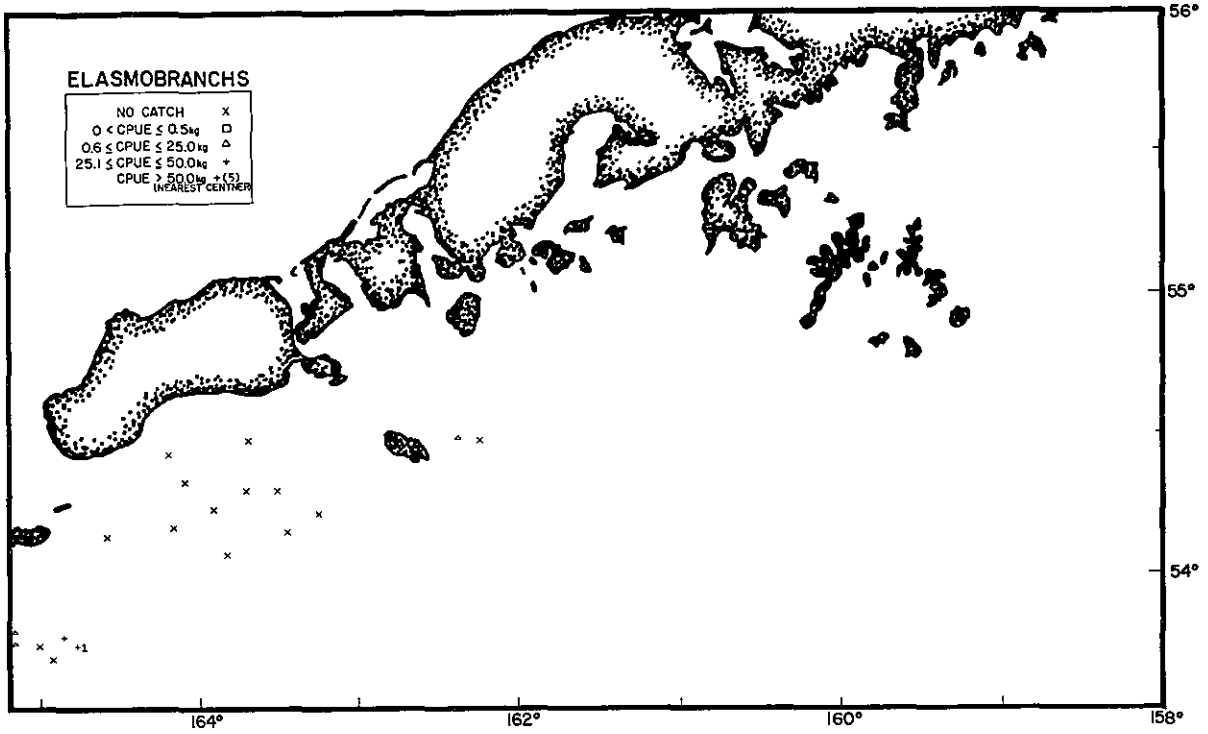


Figure XI-431.--Distribution of standardized catch rates in kilograms/hour of elasmobranchs in the western Gulf of Alaska, Jul.-Aug. 1974 (Cruise 744).

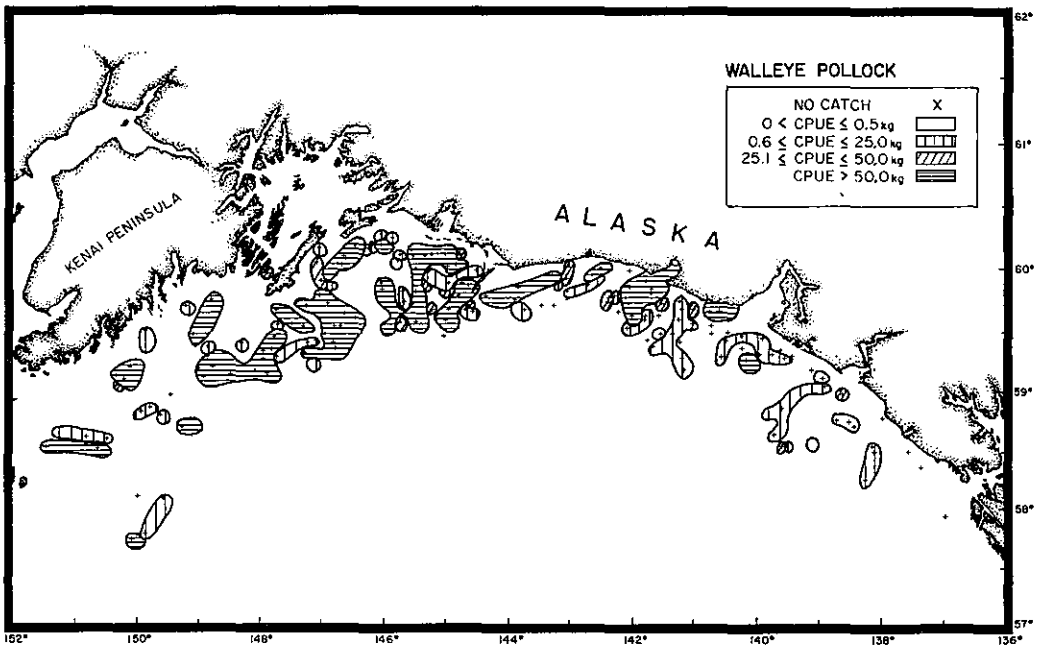


Figure XI-432.--Distribution of apparent relative abundance of walleye pollock in the eastern Gulf of Alaska, May-Aug. 1975, Jun.-Aug. 1975, and Apr. 1976 (Cruises 751, 753, and 762).

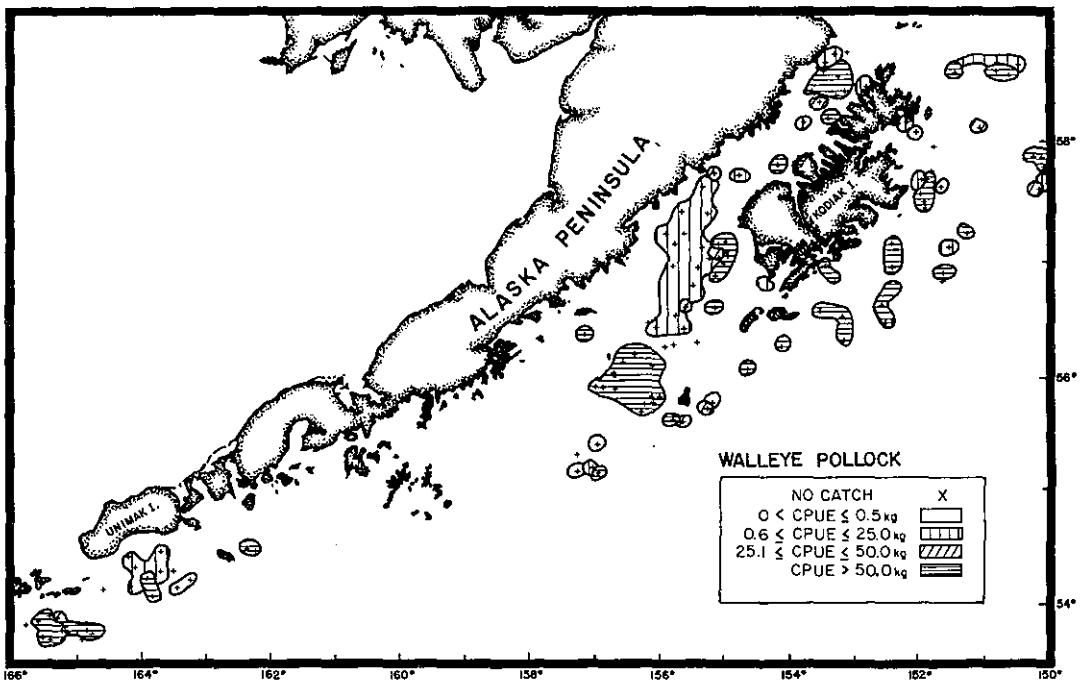


Figure XI-433.--Distribution of apparent relative abundance of walleye pollock in the western Gulf of Alaska, May-Jul. 1973, Aug.-Oct. 1973, Jul.-Aug. 1974, and Jun.-Aug. 1975 (Cruises 733, 734, 744, and 753).

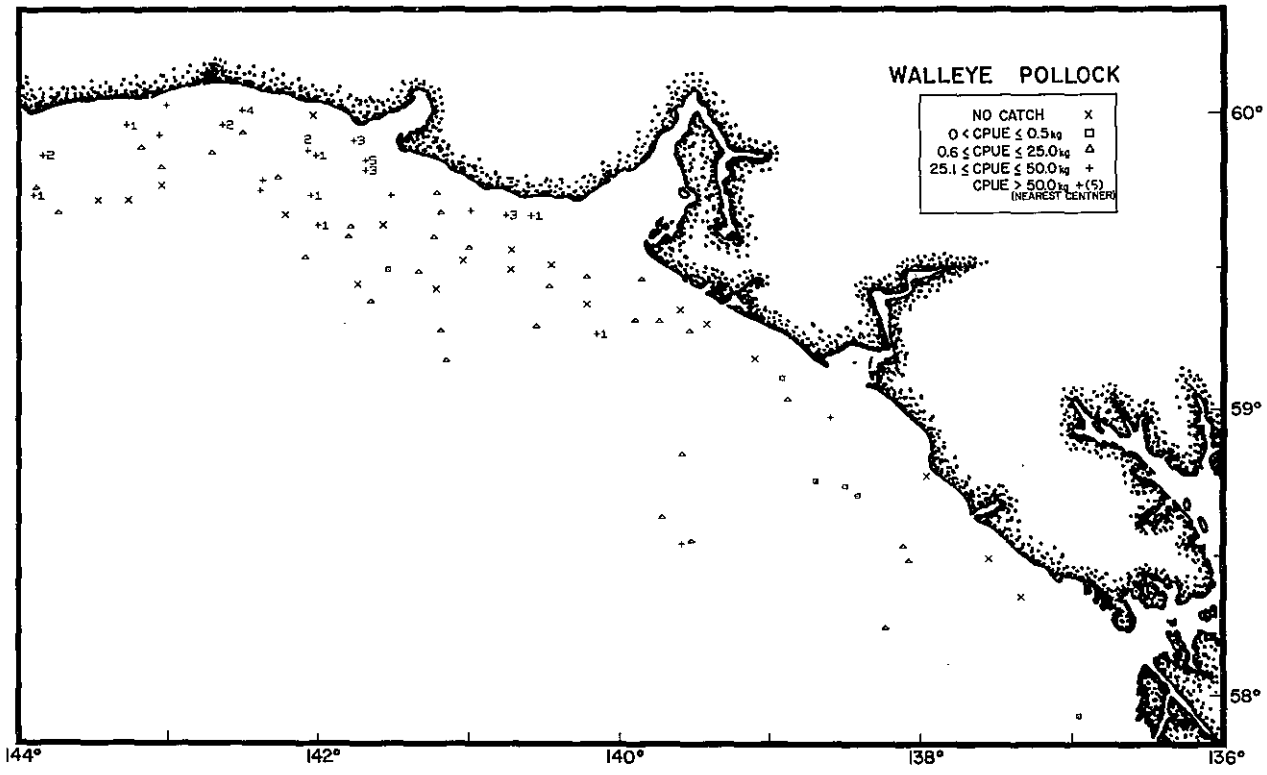


Figure XI-434.--Distribution of standardized catch rates in kilograms/hour of walleye pollock in the eastern Gulf of Alaska, May-Aug. 1975, Apr. 1976 (Cruises 751 and 762).

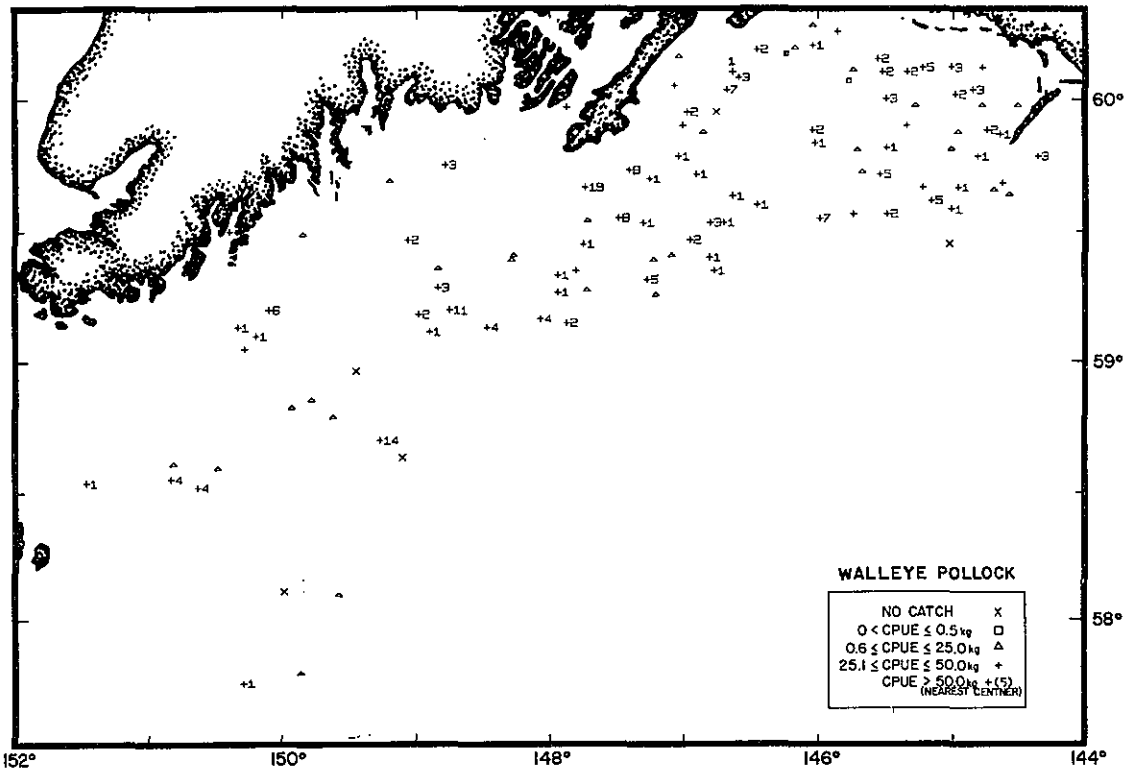


Figure XI-435.--Distribution of standardized catch rates in kilograms/ hour of walleye pollock in the eastern Gulf of Alaska, May-Aug. 1975 (Cruises 751 and 753).

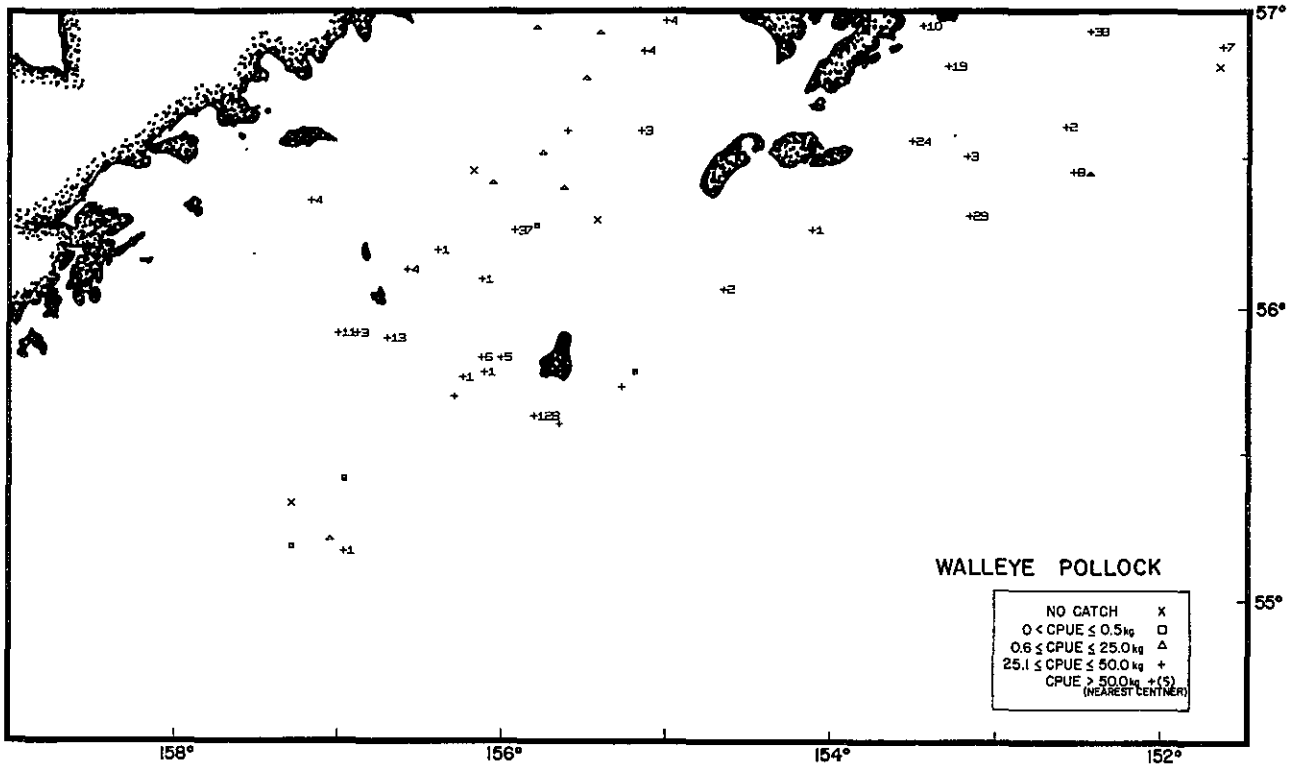


Figure XI-436.--Distribution of standardized catch rates in kilograms/ hour of walleye pollock in the western Gulf of Alaska, Aug.-Oct. 1973 and Jun.-Aug. 1975 (Cruises 734 and 753).

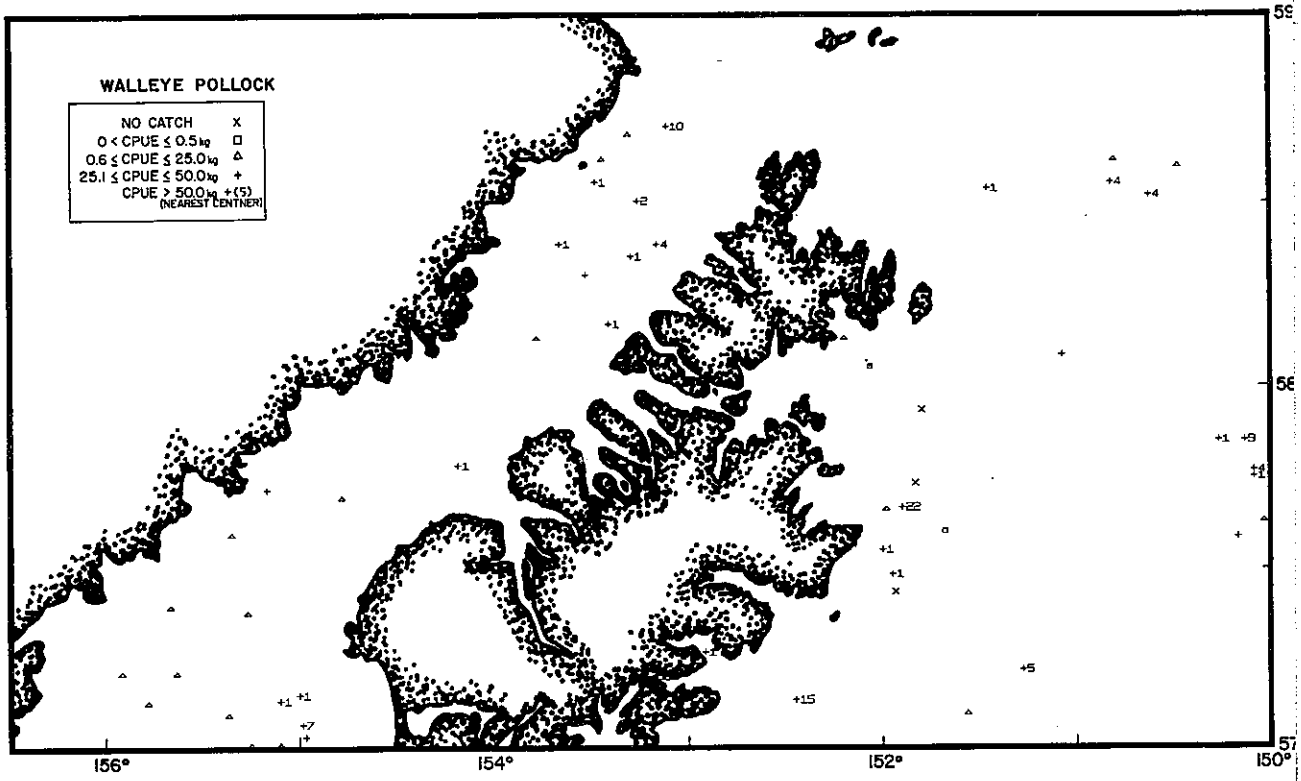


Figure XI-437.--Distribution of standardized catch rates in kilograms/ hour of walleye pollock in the western Gulf of Alaska, May–Jun., 1973, Aug.-Oct. 1973, and Jun.–Aug. 1975 (Cruises 733, 734, and 753).

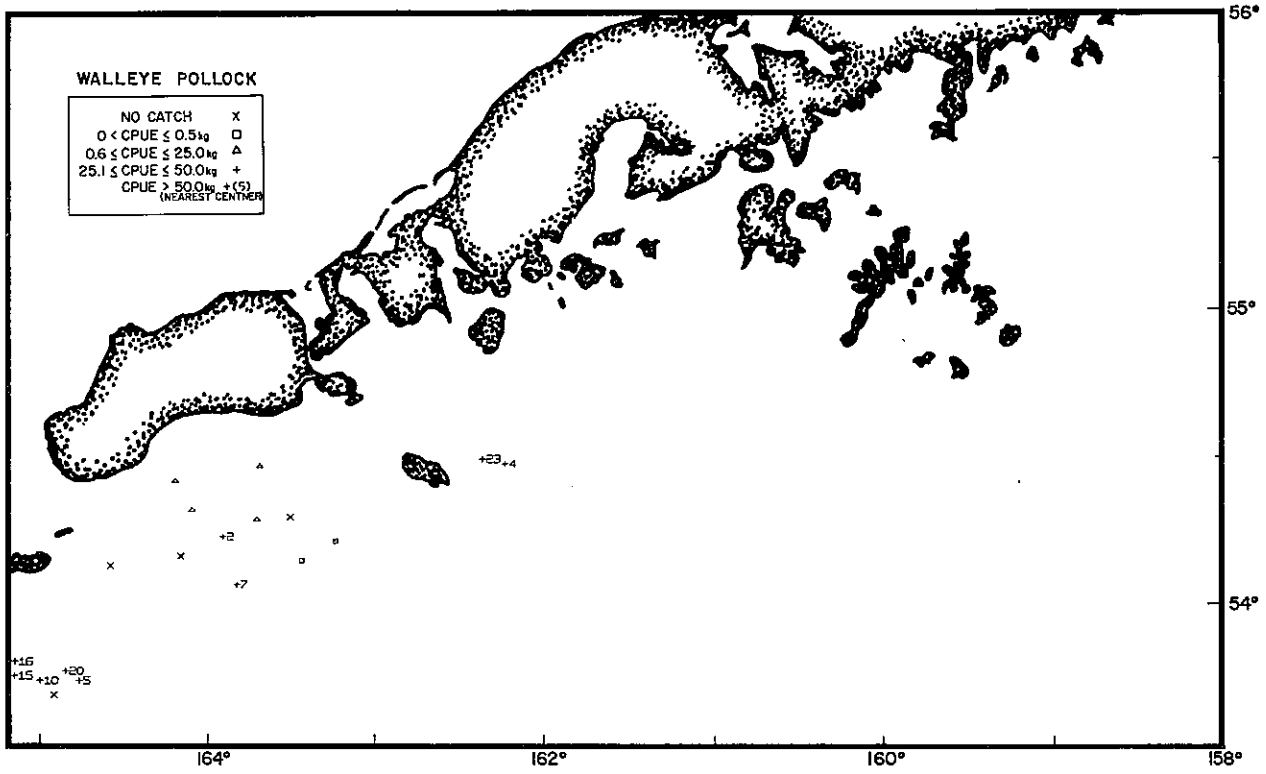


Figure XI-438.--Distribution of standardized catch rates in kilograms/ hour of walleye pollock in the western Gulf of Alaska, Jul.-Aug. 1974 (Cruise 744).

Table XI-110.--Estimated biomass and population size of walleye pollock (Theragra chalcogramma) in the Gulf of Alaska during April-October 1973-76.

Region	Depth zone (m)	CPUE[1] (kg/hr)	Estimated biomass (mt)	Proportion of total estimated biomass	Estimated population (X 10^6)	Proportion of total estimated population	Mean size per individual[2] Weight (kg)	Length (cm)
Fairweather	1-100	0.6	21.2	1.7	1.4	5.2	0.02	--
	101-200	4.1	665.0	53.9	24.4	90.0	0.03	12.0
	201-400	18.2	546.7	44.3	1.3	4.8	0.43	40.4
	All zones	5.4	1,232.9	0.2	27.1	--	0.05	--
Yakutat	1-100	169.1	10,474.4	70.9	137.3	92.2	0.08	16.3
	101-200	28.9	4,234.0	28.7	11.6	7.8	0.36	34.4
	201-400	0.9	62.3	0.4	0.1	0.1	0.49	--
	All zones	53.3	14,770.7	2.0	149.0	--	0.10	--
Prince William	1-100	93.3	10,314.0	26.5	46.9	36.7	0.22	35.5
	101-200	211.4	26,652.4	68.6	76.3	59.8	0.35	32.6
	201-400	52.3	1,904.9	4.9	4.5	3.5	0.42	36.0
	All zones	142.3	38,871.3	5.3	127.7	--	0.30	--
Kenai	1-100	--	--	--	--	--	--	--
	101-200	255.1	61,945.0	93.5	174.1	72.2	0.36	35.8
	201-400	42.8	4,290.0	6.5	14.7	7.8	0.29	33.1
	All zones	193.0	66,235.0	9.0	188.8	--	0.35	--
Kodiak	1-100	85.4	12,233.9	7.8	49.3	11.9	0.25	31.5
	101-200	913.4	112,732.0	71.9	306.7	74.2	0.37	35.9
	201-400	571.2	31,847.9	20.3	57.2	13.8	0.56	42.2
	All zones	486.3	156,813.8	21.2	413.2	--	0.38	--
Shelikof	1-100	40.5	262.6	1.9	3.7	5.4	0.07	14.9
	101-200	210.2	8,577.0	61.7	44.8	65.8	0.19	27.9
	201-400	48.5	5,052.4	36.4	19.6	28.8	0.26	30.2
	All zones	91.7	13,892.0	1.9	68.1	--	0.20	--
Chirikof	1-100	39.9	4,775.3	2.3	9.8	1.1	0.49	35.6
	101-200	1,212.1	195,625.0	95.9	856.5	98.1	0.23	30.3
	201-400	26.8	3,595.7	1.8	6.4	0.8	0.56	41.7
	All zones	525.8	203,996.0	27.6	872.7	--	0.23	--
Shumagin	1-100	--	--	--	--	--	--	--
	101-200	--	--	--	--	--	--	--
	201-400	--	--	--	--	--	--	--
	All zones	--	--	--	--	--	--	--
Sanak	1-100	193.3	34,722.1	14.3	--	--	--	--
	101-200	1,222.6	199,615.0	82.0	706.2	--	0.30	31.5
	201-400	731.8	9,144.5	3.8	--	--	--	--
	All zones	685.1	243,481.6	32.9	--	--	--	--
Total	1-100	108.9	72,803.5	9.9	--	--	--	--
	101-200	528.7	610,045.4	82.5	2,200.6	--	0.26	--
	201-400	103.4	56,444.4	7.6	--	--	--	--
	All zones	320.5	739,293.3	100.0	--	--	--	--

1/ Mean catch per unit effort, in kilograms per hour trawled.
2/ Where data are available.
3/ Less than 0.1 kg/hr.
4/ Less than 0.1 X 10^6 individuals.
5/ Less than 0.1 percent.

Size composition--Length-frequency distributions for pollock may include juvenile fish for which sex was not always determined. The inclusion of these unsexed fish in the calculation of mean size for sexes combined caused, in several cases, the mean lengths to be considerably less than those for individual sexes. (Table XI-111).

Female pollock were generally larger than males throughout the Gulf of Alaska. The range of mean lengths for females was 29.2-47.8 cm, while males varied from 28.3-48.2 cm with the largest fish generally occupying the upper slope waters of the western Gulf. Length-frequency distributions are available for all regions sampled and are presented in Figure XI-439. Unless otherwise noted as random length-frequencies, all distribution plots for this species are representative of the population occupying the respective region-depth zone.

Length-weight relationship--The coefficients which set the regression lines derived from 881 length weight observations in the Yakutat and Prince William regions are summarized in Table XI-112 by sexes and depth zones. Data points representing all length-weight observations are presented graphically by region-depth zones in Figure XI-440.

Table XI-111.--Mean lengths (cm) of walleye pollock by regions and depth zones (Cruises 733, 734, 744, 751, 759 and 762).

	0-100 m			101-200 m			201-400 m		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Fairweather	--	--	--	--	--	12.0	--	--	--
Yakutat	34.1	37.5	16.3[1/]	32.2	36.1	34.4	--	--	--
Prince William	37.7	44.7	33.5[1/]	32.5	33.1	32.6	35.7	36.5	36.0
Kenai	--	--	--	34.9	36.5	35.8	33.1	33.9	33.4
Kodiak	30.6	32.3	31.5	35.5	36.7	35.9	41.7	42.7	42.2
Shelikof	--	--	14.9[1/]	28.3	29.2	27.9[1/]	33.3	33.7	30.2[1]
Chirikof	29.8	39.5	35.6	30.1	30.6	30.3	39.4	42.8	41.7
Shumagin	--	--	--	--	--	--	--	--	--
Sanak	--	--	--	34.5	23.7	31.5	--	--	--

1/ Size composition of this species was often determined using unsexed samples with the sex of smaller specimens rarely being determined.

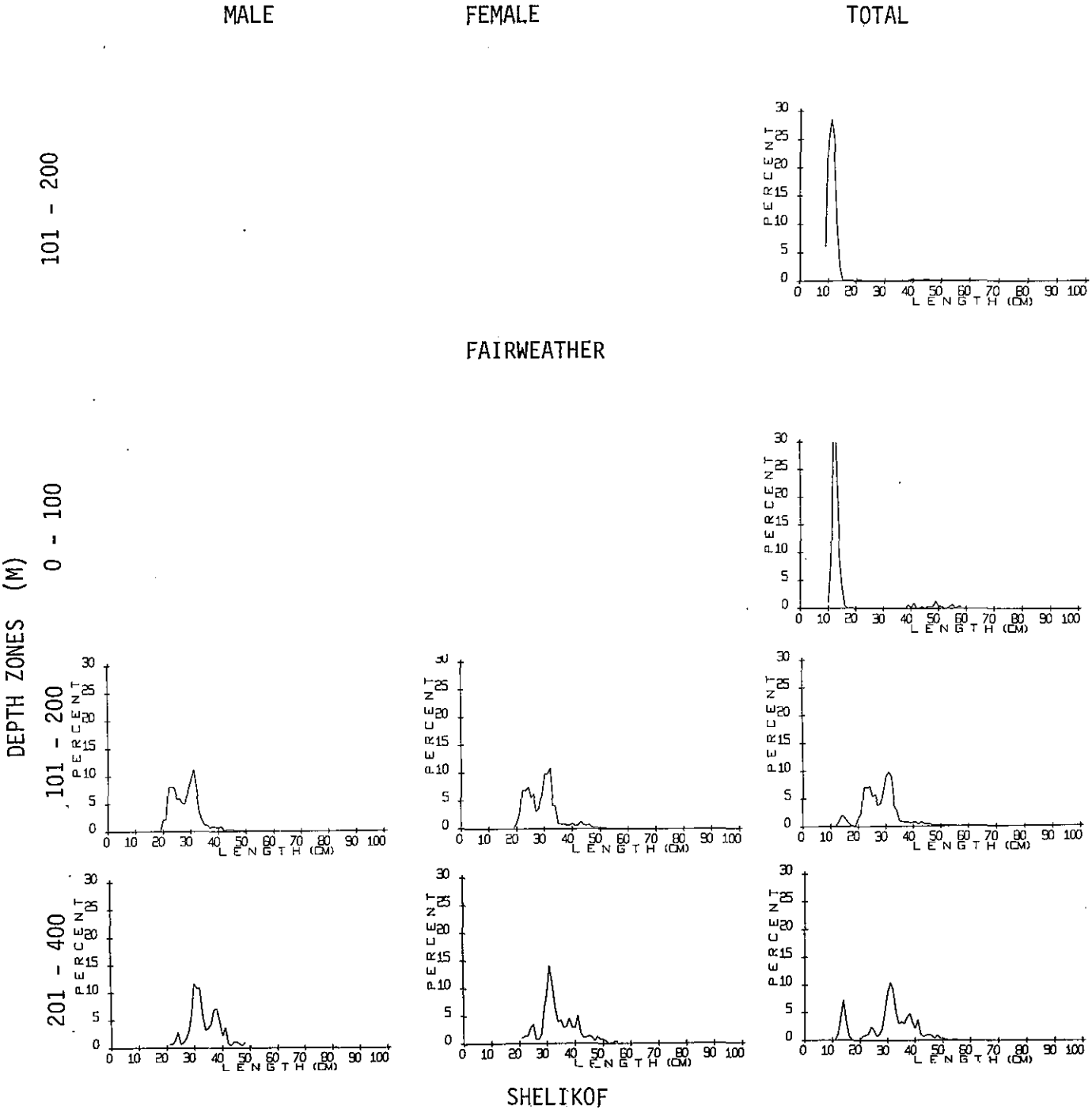


Figure XI-439.--Length frequency distributions of walleye pollock in the Gulf of Alaska by region-depth zones, 1973-1976.

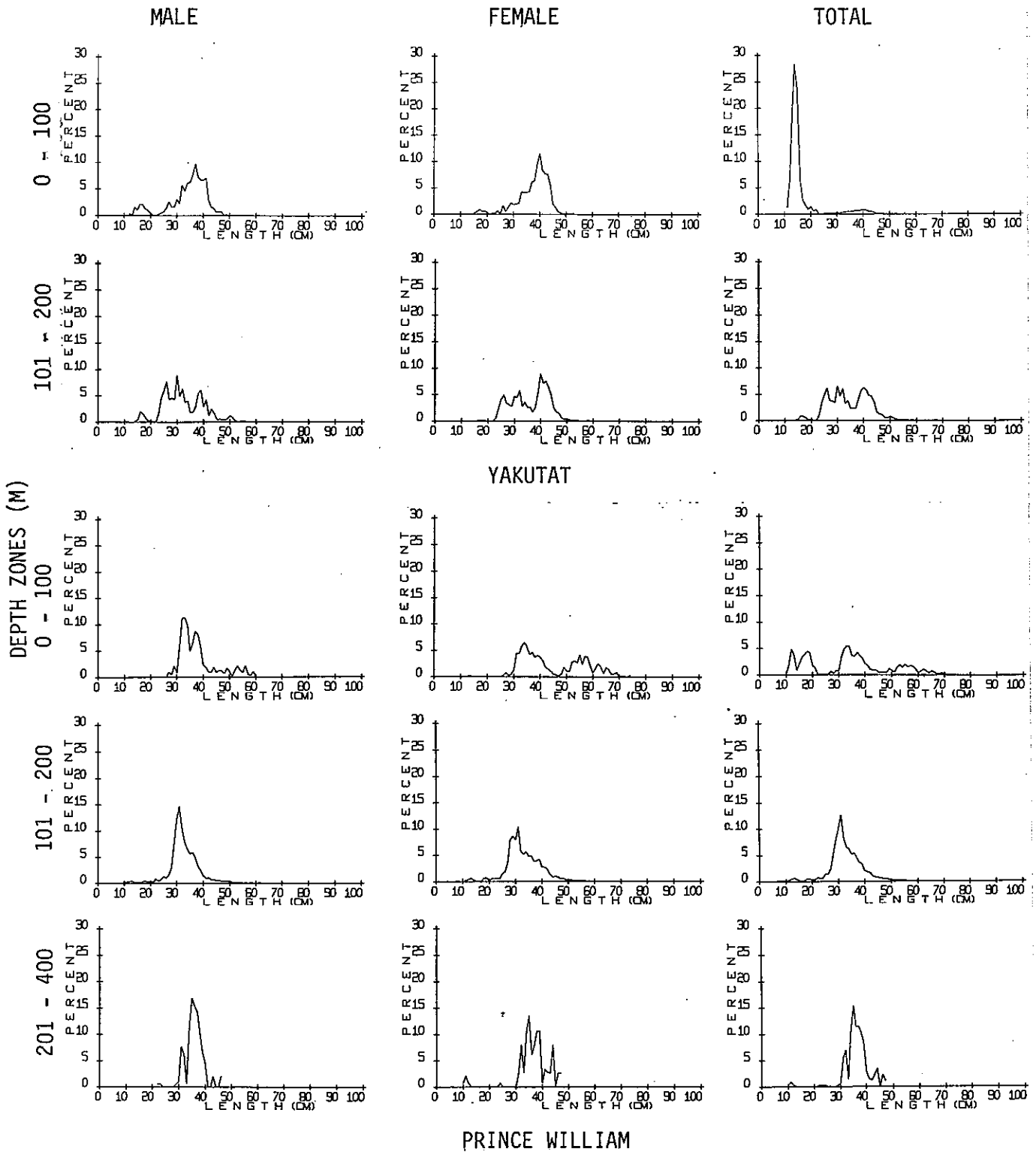


Figure XI-439 (continued).--Length frequency distributions of walleye pollock in the Gulf of Alaska by region-depth zones, 1973-1976.

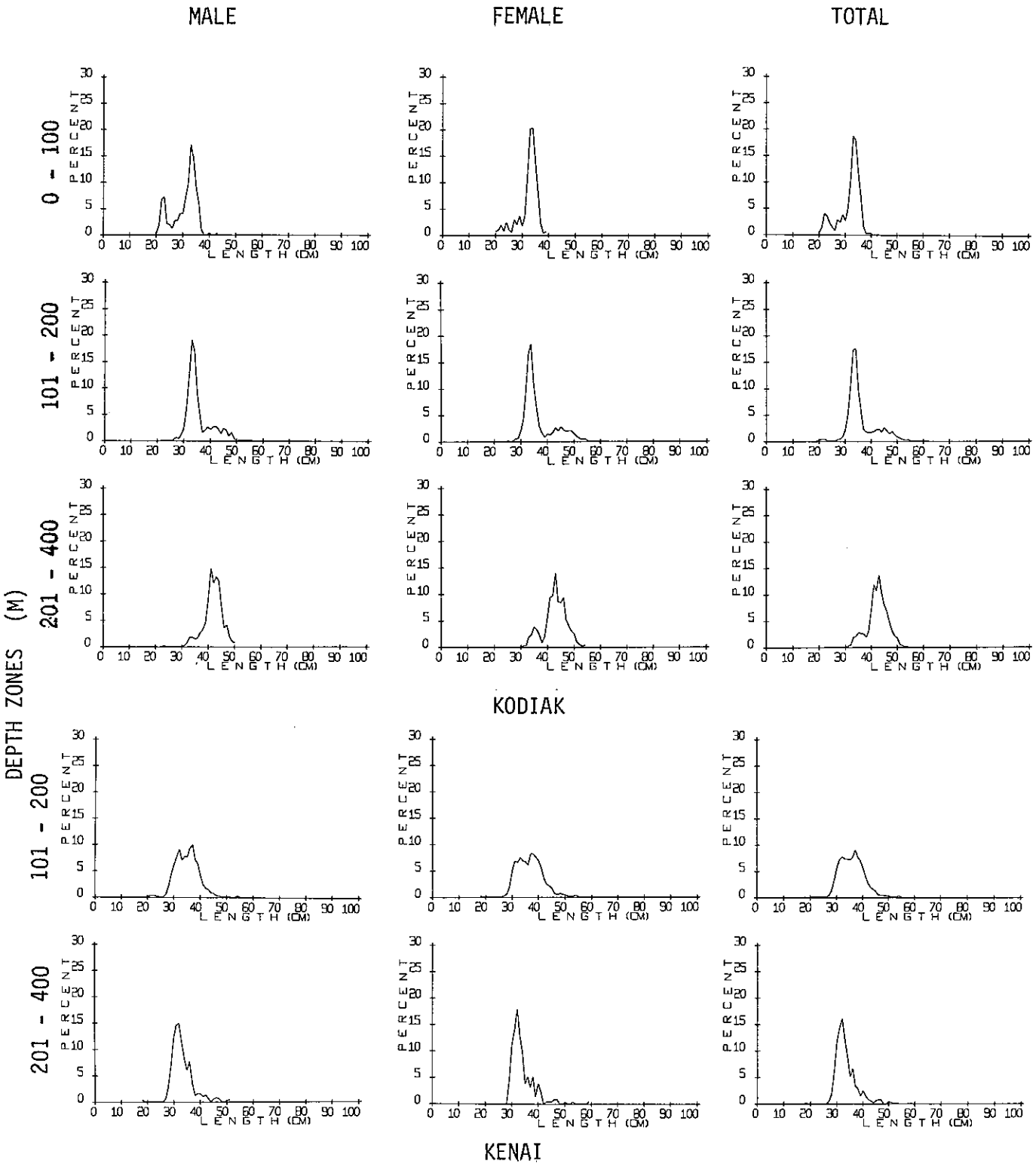


Figure XI-439 (continued).--Length frequency distributions of walleye pollock in the Gulf of Alaska by region-depth zones, 1973-1976.

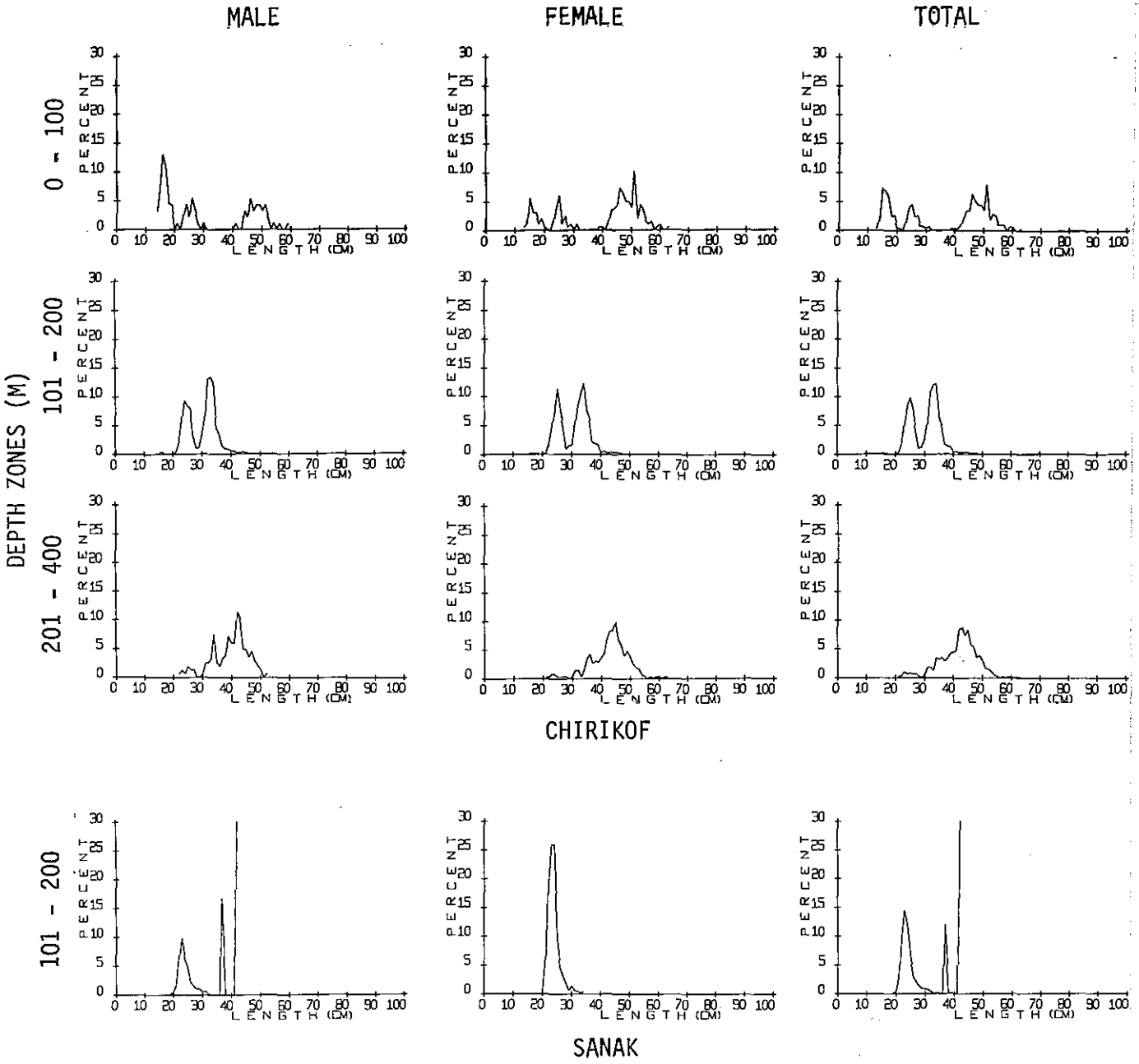


Figure XI-439 (continued).--Length frequency distributions of walleye pollock in the Gulf of Alaska by region-depth zones, 1973-1976.

Table XI-112.--Parameters for the length-weight relationship (weight (g) = a · length^{b}) for walleye pollock (Cruise 751).

		YAKUTAT				PRINCE WILLIAM			
	Depth	Sample Size	Range in Length (cm)	Parameters (a)	(b)	Sample Size	Range in Length (cm)	Parameters (a)	(b)
Males	0-100	61	28-41	0.016136	2.756664	38	38-60	0.008751	2.955079
	101-200	163	23-50	0.011378	2.887332	130	21-58	0.007360	2.976247
	201-400	--	--	--	--	32	22-41	0.032566	2.584934
Females	0-100	69	24-48	0.006271	3.032323	110	44-74	0.003107	3.214590
	101-200	181	23-68	0.015560	2.803517	85	26-60	0.003700	3.146924
	201-400	--	--	--	--	12	10-41	0.100003	2.304855

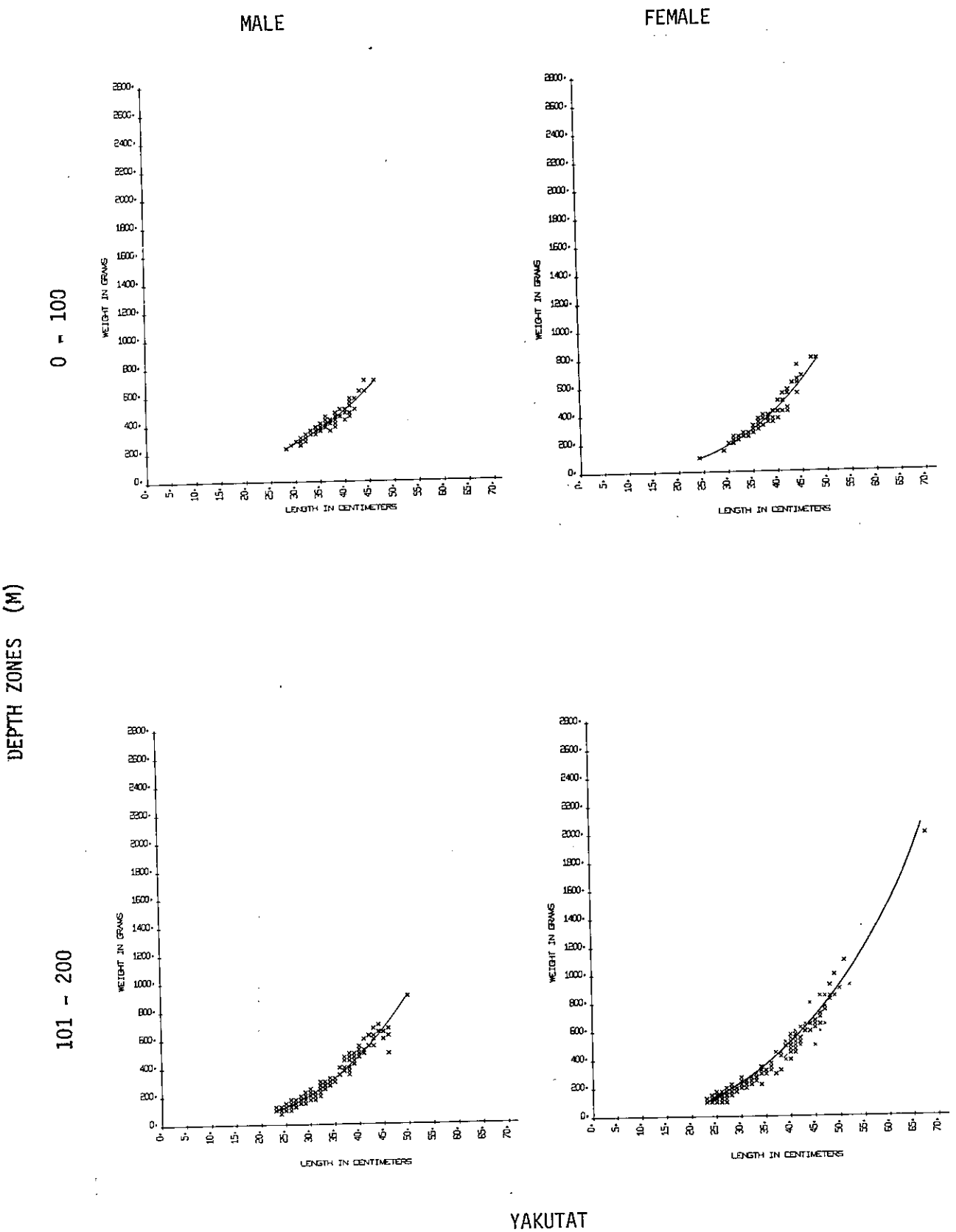


Figure XI-440.--Weight at length observations for walleye pollock in the Gulf of Alaska by regions and depth zones, May-Aug. 1975 (Cruise 751).

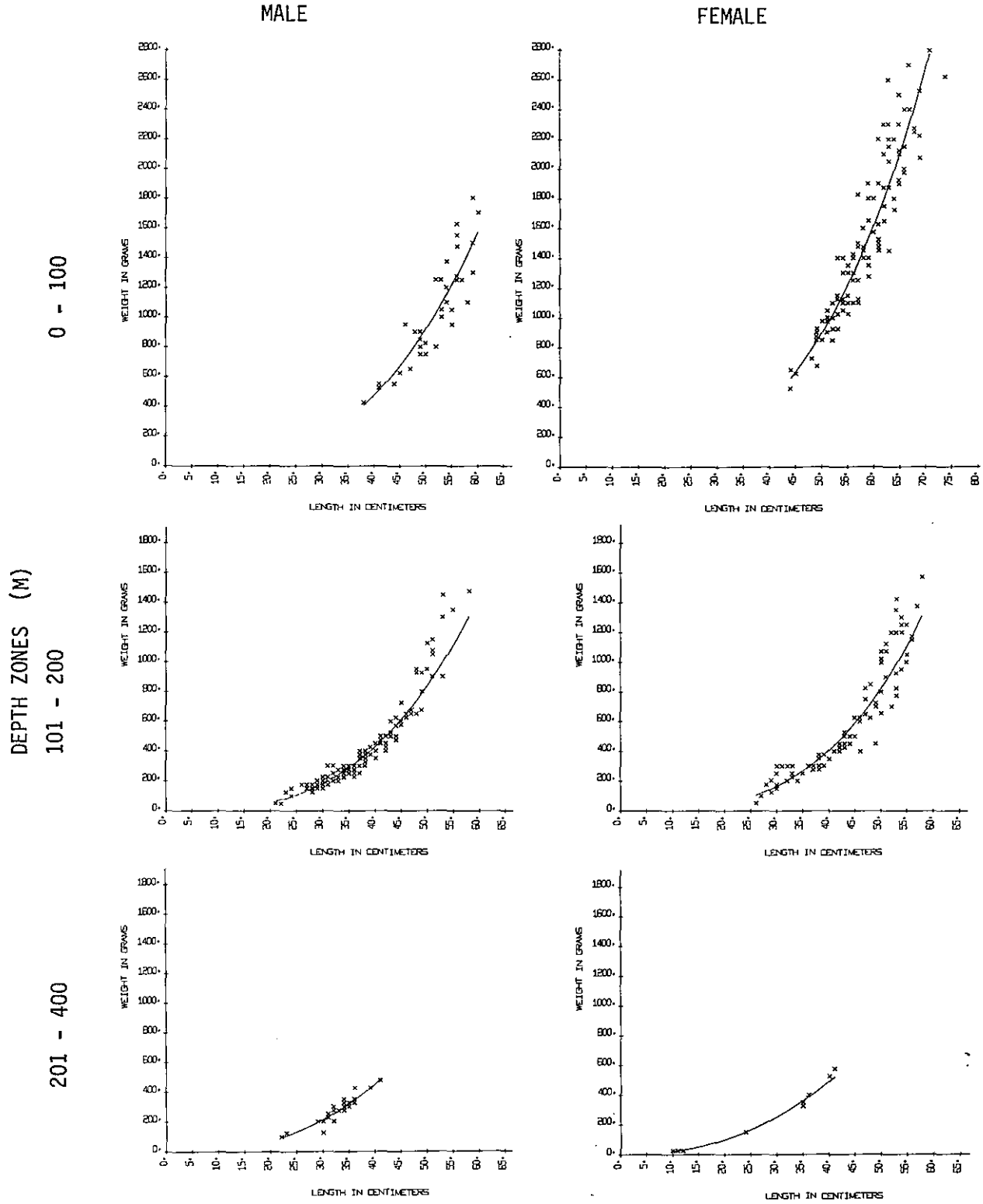


Figure XI-440 (continued).--Weight at length observations for walleye pollock in the Gulf of Alaska by regions and depth zones, May-Aug. 1975 (Cruise 751).

Age-length relationship--Age and length data collected from the Yakutat and Prince William regions are presented in Table XI-113. These data are summarized in Figure XI-441 by plots of mean lengths-at-age by sexes and regions. In general, for each sex, differences in the mean values by depths and regions were relatively small up to approximately five years in males and six years for females.

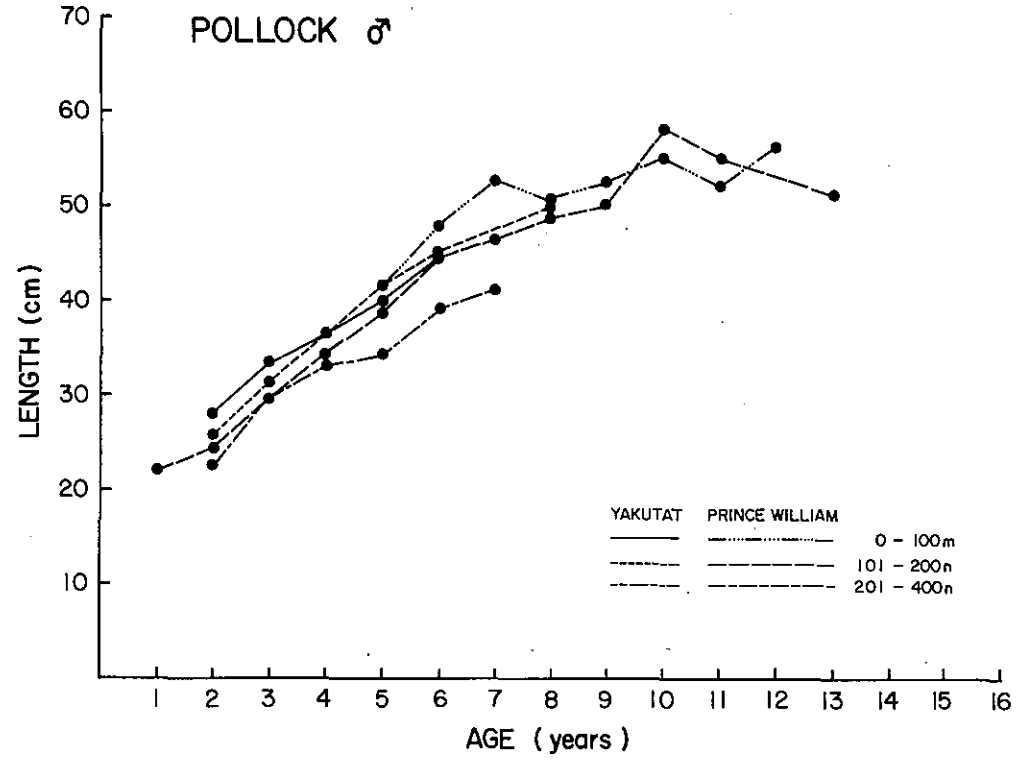
TURBOT

Distribution and abundance--Turbot were taken in each region-depth zone sampled and averaged 83 kg/hr over the entire Gulf of Alaska. Mean CPUE's increased with bottom depth, ranging from 43 kg/hr in the inner shelf to 119 kg/hr in the upper slope. The relative apparent abundance of turbot was greatest in the Yakutat region and was above average in the Kenai and Sanak regions (Figures XI-442-443). The distribution of the standardized catch rates for the successful stations is shown in Figures XI-444-448.

Biomass--The total biomass of turbot has been estimated at 191 thousand mt of which 52% was located in the outer shelf, 34% in the upper slope and 14% in the inner shelf (Table XI-114). Regions which accounted for relatively high portions of the total biomass were Kenai (20%), Sanak (19%), Yakutat (18%) and Chirikof (16%). The total turbot biomass was relatively evenly divided between the eastern (56%) and western (44%) Gulf regions.

Table XI-113.--Summary of age-length data collected for walleye pollock (Cruise 751).

	REGIONS					
	Yakutat			Prince William		
Sex	DEPTH ZONES (M)					
Males	0-100	101-200	201-400	0-100	101-200	201-4
Number of readable otoliths	95	161	--	33	133	30
Range in age (years)	2-6	2-8	--	5-12	1-13	2-7
Range in length (cm)	26-47	23-50	--	38-59	21-59	22-4
Females						
Number of readable otoliths	141	162	--	92	153	7
Range in age (years)	2-6	2-12	--	5-13	2-13	2-5
Range in length (cm)	24-53	23-68	--	44-69	26-71	24-4



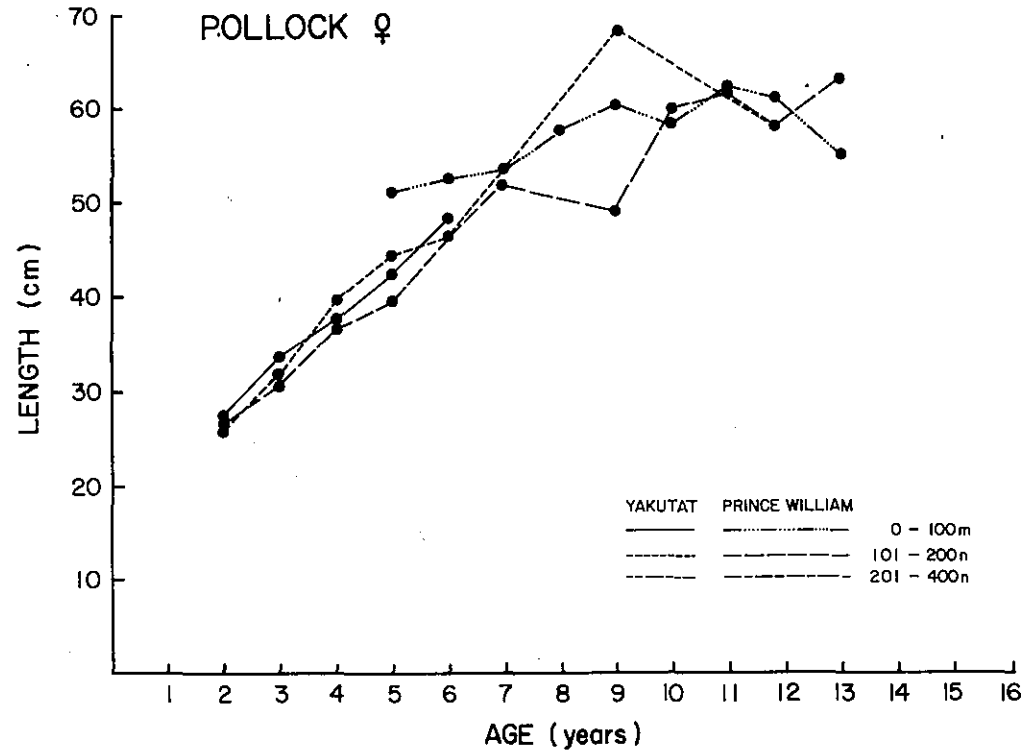


Figure XI-441.--Mean lengths at age for walleye pollock by sex and region-depth zones in the Gulf of Alaska, May-Aug. 1975 (Cruise 751).

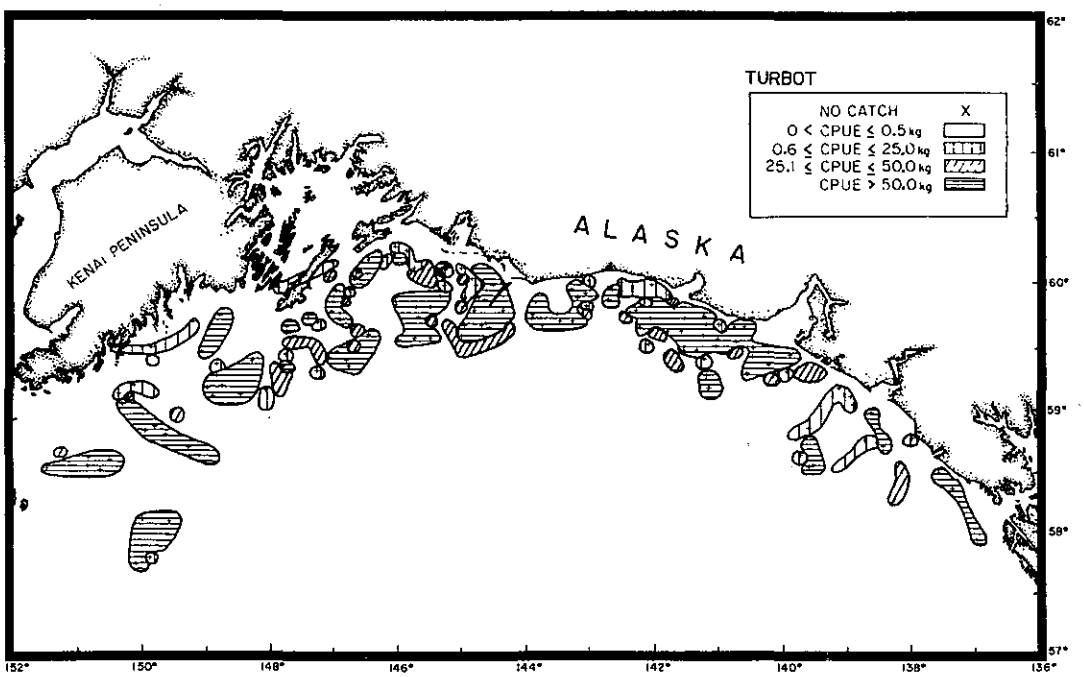


Figure XI-442.--Distribution of apparent relative abundance of turbot in the eastern Gulf of Alaska, May-Aug. 1975, Jun.-Aug. 1975, and Apr. 1976 (Cruises 751, 753, and 762).

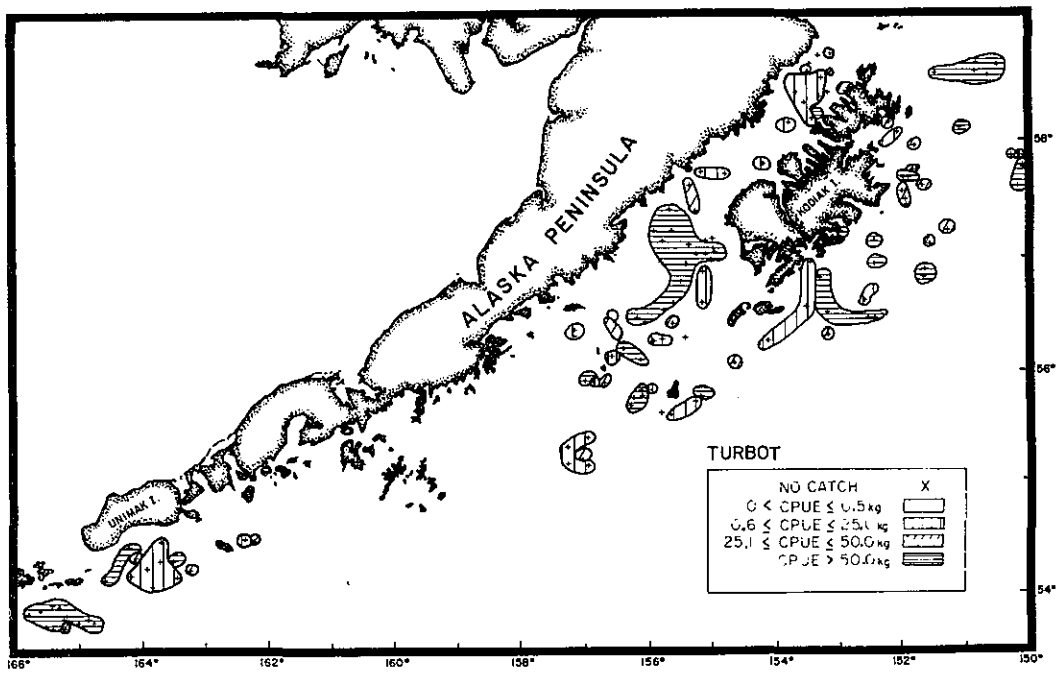


Figure XI-443.--Distribution of apparent relative abundance of turbot in the western Gulf of Alaska, May-Jul. 1973, Aug.-Oct. 1973, Jul.-Aug. 1974, and Jun.-Aug. 1975 (Cruises 733, 734, 744, and 753).

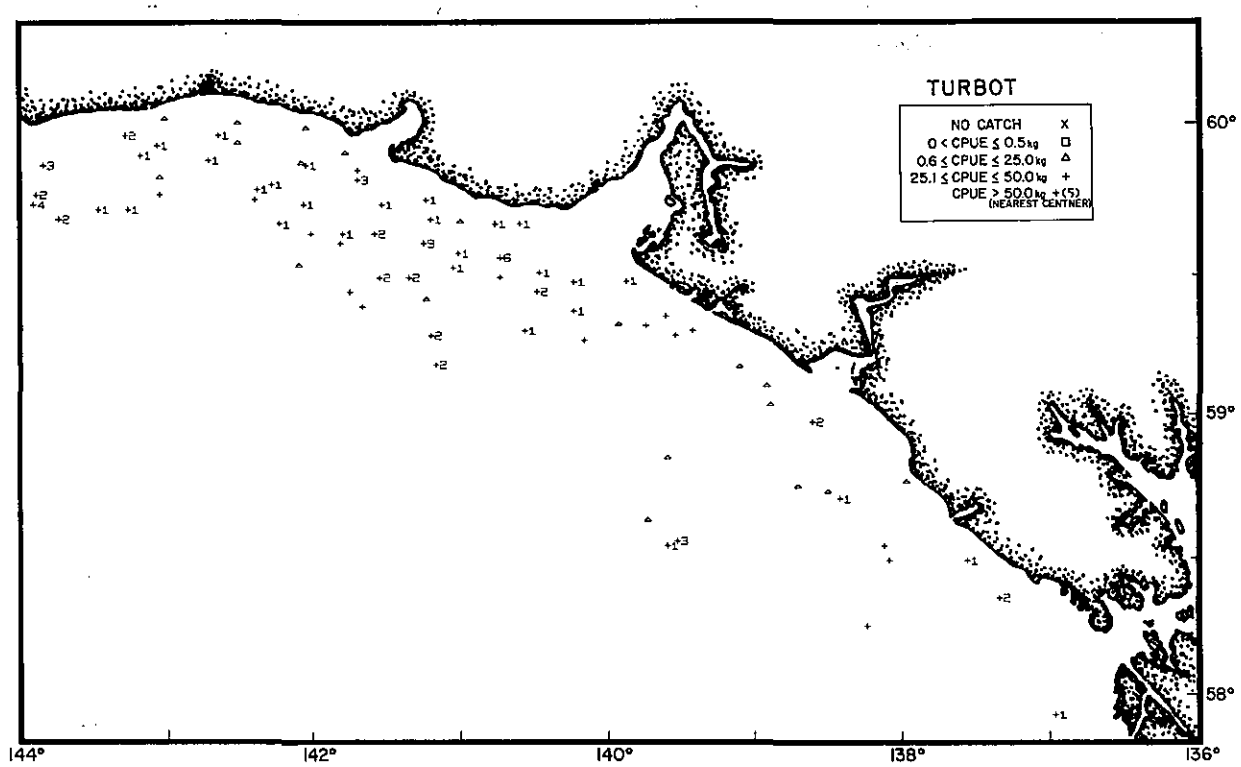


Figure XI-444.--Distribution of standardized catch rates in kilograms/hour of turbot in the eastern Gulf of Alaska, May-Aug. 1975, and Apr. 1976 (Cruises 751 and 762).

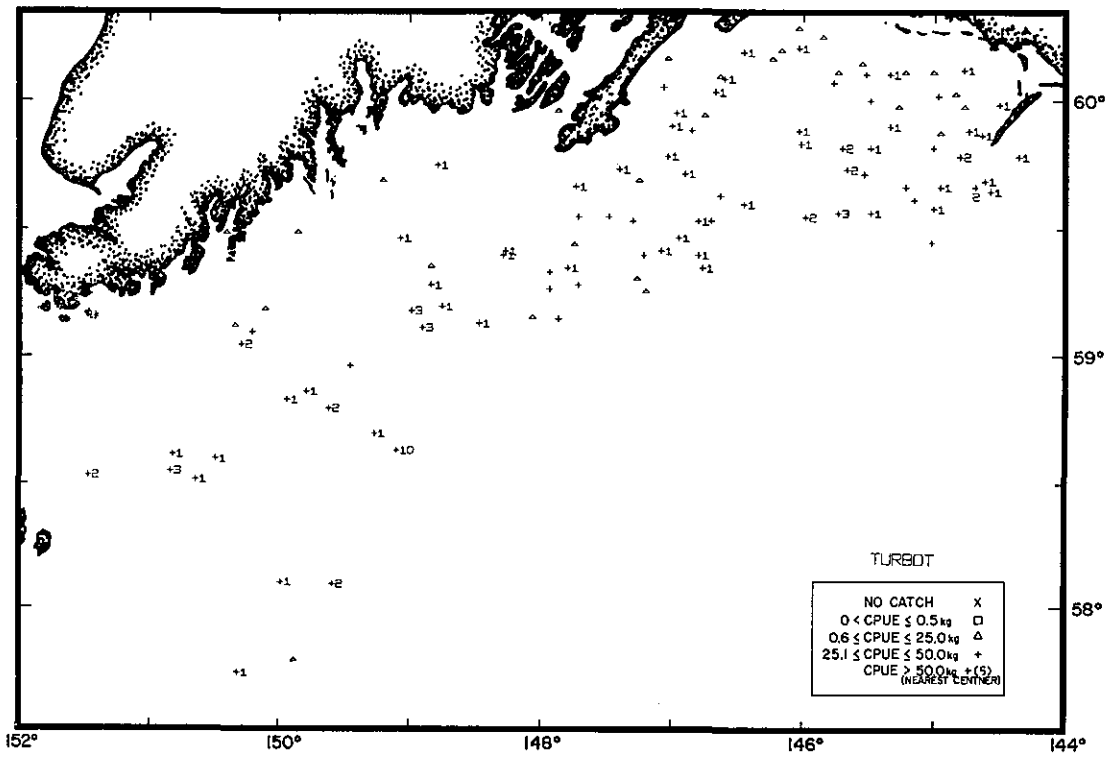


Figure XI-445.--Distribution of standardized catch rates in kilograms/hour of turbot in the eastern Gulf of Alaska, May-Aug. 1975 (Cruises 751 and 753).

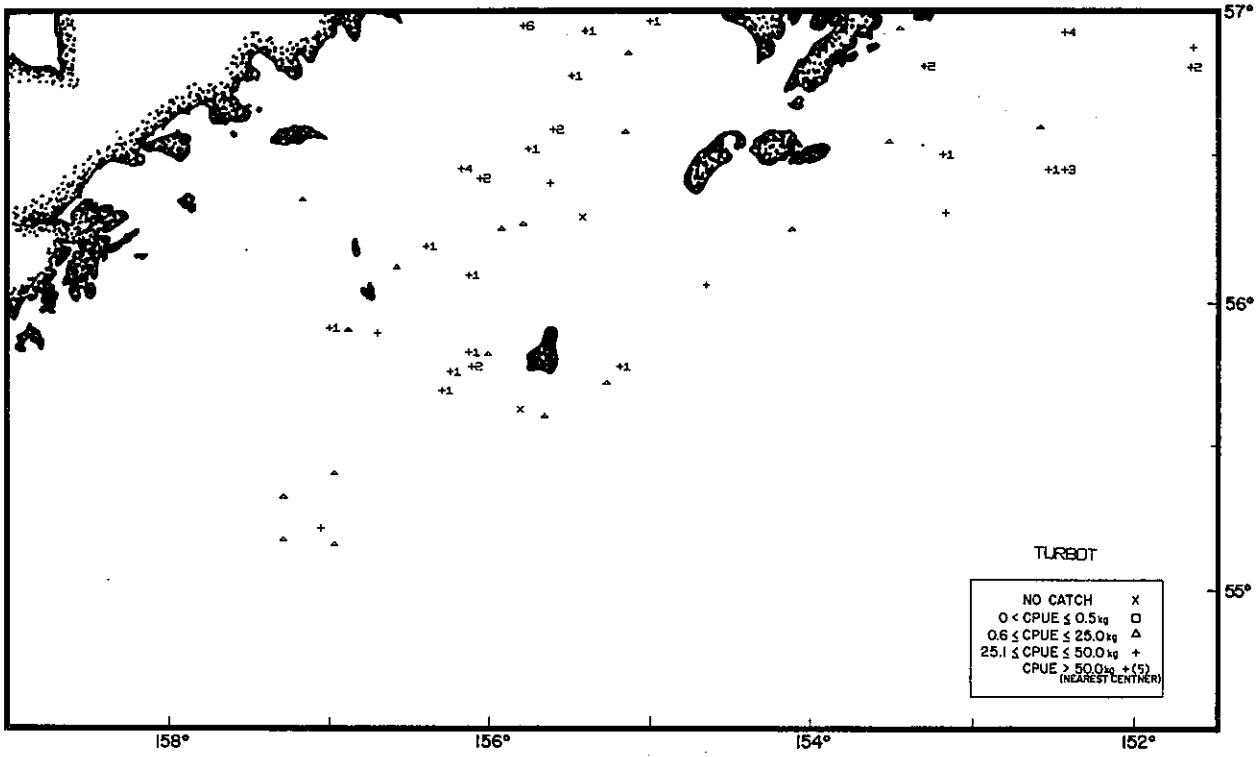


Figure XI-446.--Distribution of standardized catch rates in kilograms/ hour of turbot in the western Gulf of Alaska, Aug.-Oct. 1973 and Jun.-Aug. 1975 (Cruises 734 and 753).

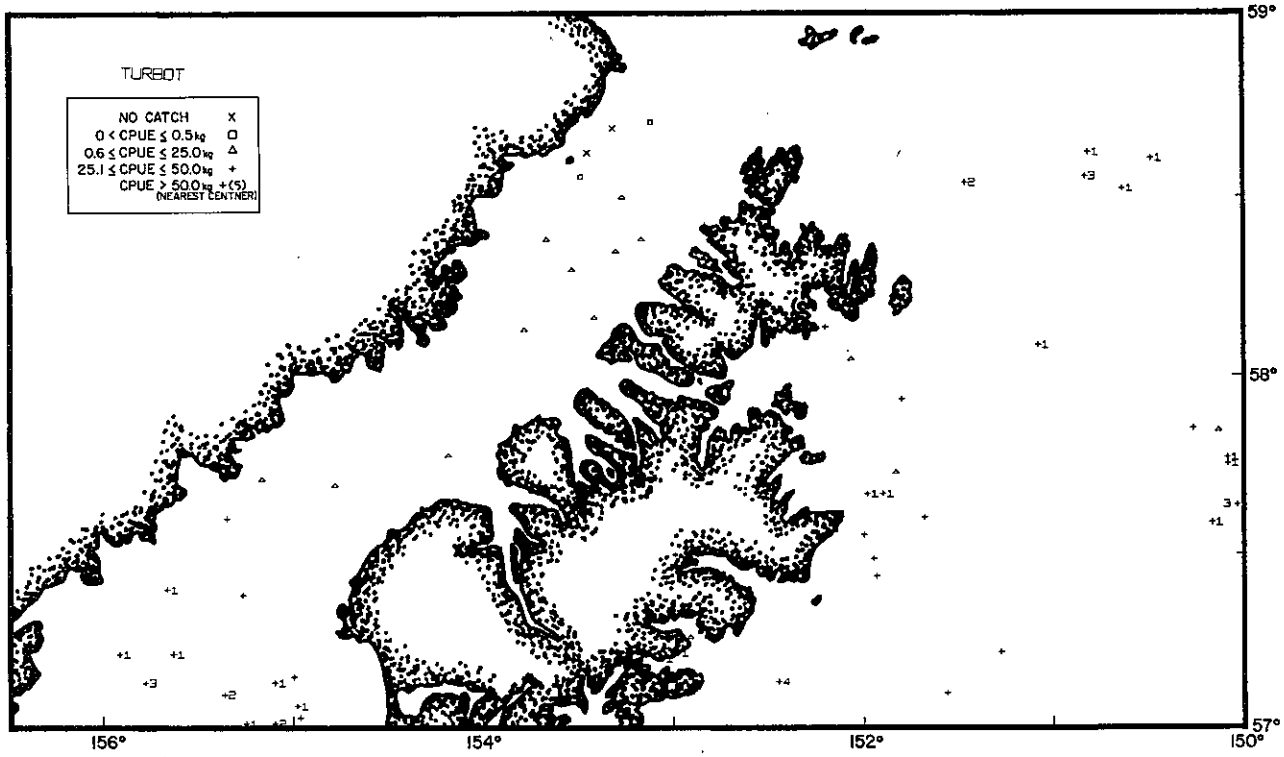


Figure XI-447.--Distribution of standardized catch rates in kilograms/ hour of turbot in the western Gulf of Alaska, May-Jun. 1973, Aug-Oct. 1973, and Jun.-Aug. 1975 (Cruises 733, 734, and 753).

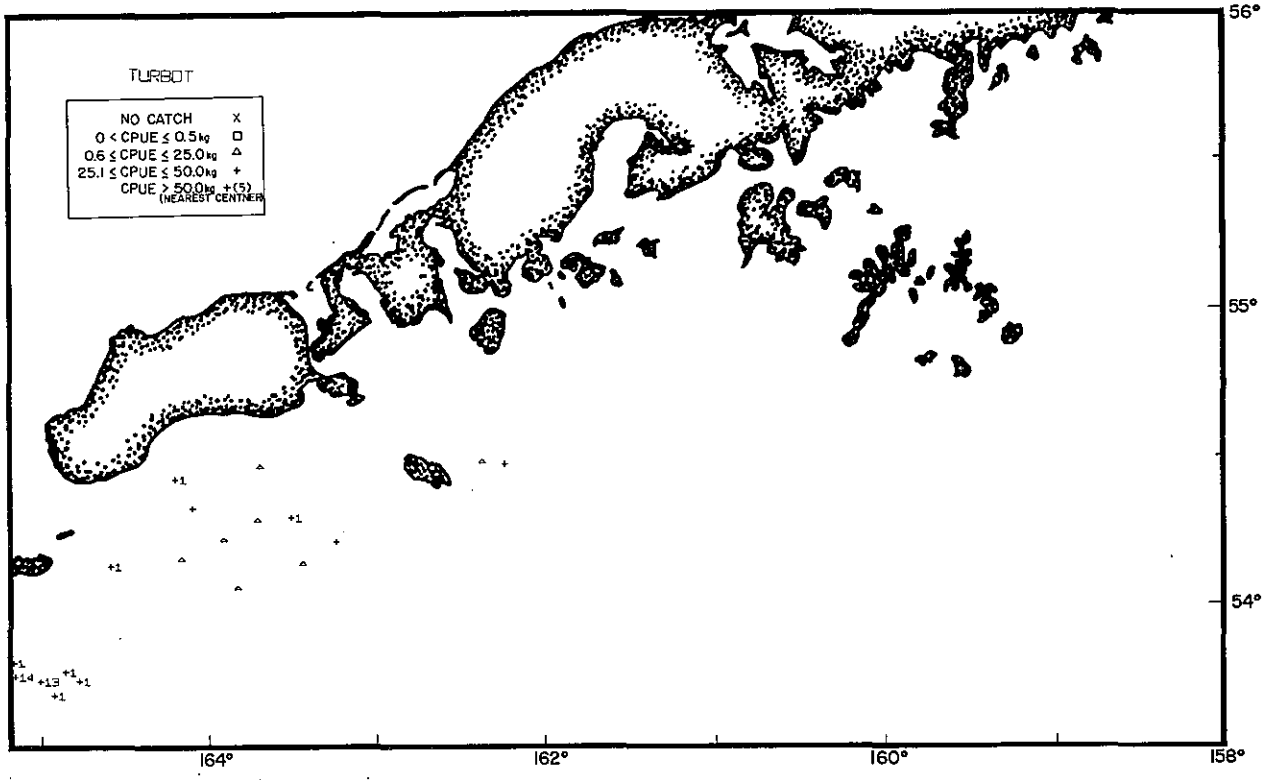


Figure XI-448.--Distribution of standardized catch rates in kilograms/hour of turbot in the western Gulf of Alaska, Jul.-Aug. 1974 (Cruise 744).

Size composition--Mean sizes of arrowtooth flounder are presented in Table XI-115. Sexed data are available from the Fairweather, Yakutat, Prince William and Chirikof regions while unsexed observations were used to calculate mean lengths in the Kenai, Kodiak, Shelikof and Sanak regions. Female turbot were generally larger than males with both sexes increasing in length with increasing depth. Mean lengths, sexes combined, ranged from 14.6 cm in the Kodiak-inner shelf to 50.9 cm in the Yakutat-upper slope. (Figure XI-449).

Length-weight relationship--The coefficients of regression derived from 1,442 length-weight observations in the Yakutat and Prince William regions are presented in Table XI-116 by sexes and depth zones. Data points representing each observation and the resulting regression line are presented in Figure XI-450.

Age-length relationship--Age and length data collected for turbot from the Yakutat and Prince William regions (Cruise 751) are presented in Table XI-117.

These data are summarized in Figure XI-451 by plots of mean lengths-at-age by sexes and regions. In general, differences in the mean values by depths and regions were negligable for males throughout their age range while relatively large deviations in the mean values for females occurred only after eight years of age.

Table XI-114.--Estimated biomass and population size of turbot (Atheresthes stomias) in the Gulf of Alaska during April-October 1973-76.

Region	Depth zone (m)	CPUE 1/ (kg/hr)	Estimated biomass (mt)	Proportion of total estimated biomass	Estimated population (X 10^6)	Proportion of total estimated population	Mean size per individual 2/ Weight (kg)	Mean size per individual 2/ Length (cm)
Fairweather	1-100	12.9	465.1	2.65	1.5	3.4	0.30	28.9
	101-200	63.2	10,298.1	58.7	33.4	76.4	0.31	31.2
	201-400	226.1	6,796.8	38.7	8.8	20.1	0.77	39.2
	All zones	76.7	17,560.0	9.2	43.7	--	0.40	--
Yakutat	1-100	55.8	3,456.9	9.9	11.6	15.0	0.30	30.2
	101-200	144.1	21,082.2	60.2	57.3	74.1	0.37	32.6
	201-400	152.7	10,476.6	29.9	8.4	10.9	1.25	50.9
	All zones	126.5	35,015.7	18.3	77.3	--	0.45	--
Prince William	1-100	55.7	6,154.6	37.4	39.6	58.9	0.16	26.3
	101-200	72.6	9,149.9	55.5	26.5	39.2	0.35	31.0
	201-400	32.1	1,169.1	7.1	1.5	2.2	0.77	41.5
	All zones	60.4	16,473.6	8.6	67.6	--	0.24	--
Kenai	1-100	--	--	--	--	--	--	--
	101-200	127.3	30,924.0	80.8	58.5	87.8	0.53	36.8
	201-400	73.1	7,339.7	19.2	8.2	12.3	0.90	45.5
	All zones	111.5	38,263.7	20.0	66.7	--	0.57	--
Kodiak	1-100	34.9	2,182.9	14.6	--	--	--	--
	101-200	93.2	5,493.8	36.8	26.6	--	0.21	24.2
	201-400	129.8	7,238.1	48.5	10.2	--	0.71	39.6
	All zones	73.6	14,914.8	7.8	--	--	--	--
Shelikof	1-100	0.1	0.6	5/	--	--	--	--
	101-200	10.1	411.4	12.4	--	--	--	--
	201-400	28.0	2,917.9	87.6	6.2	--	0.47	35.8
	All zones	22.0	3,329.9	1.7	--	--	--	--
Chirikof	1-100	13.3	1,585.5	5.2	16.1	21.0	0.09	21.7
	101-200	39.2	6,326.9	20.8	26.2	34.2	0.24	26.0
	201-400	168.0	22,514.9	74.0	34.4	44.9	0.66	39.5
	All zones	66.4	30,427.3	15.9	76.7	--	0.33	--
Shumagin	1-100	--	--	--	--	--	--	--
	101-200	--	--	--	--	--	--	--
	201-400	--	--	--	--	--	--	--
	All zones	--	--	--	--	--	--	--
Sanak	1-100	68.8	12,367.3	34.9	67.1	55.4	0.18	26.5
	101-200	100.9	16,472.4	46.5	46.2	38.2	0.36	33.1
	201-400	530.0	6,622.2	18.7	7.8	6.4	0.84	45.1
	All zones	99.7	35,461.9	18.5	121.1	--	0.29	--
Total	1-100	43.4	26,212.9	13.7	--	--	--	--
	101-200	90.9	100,158.7	52.3	--	--	--	--
	201-400	119.1	65,075.3	34.0	85.5	--	0.76	--
	All zones	82.8	191,446.9	100.0	--	--	--	--

1/ Mean catch per unit effort, in kilograms per hour trawled.
2/ Where data are available.
3/ Less than 0.1 kg/hr.
4/ Less than 0.1 X 10^6 individuals.
5/ Less than 0.1 percent.

Table XI-115.--Mean lengths (cm) of turbot by regions and depth zones (Cruises 733, 734, 744, 751, 753, and 762).

	0-100 m			101-200 m			201-400 m		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Fairweather	25.0	32.5	28.9	28.9	32.9	31.2	36.3	41.1	39.2
Yakutat	26.5	33.9	30.2	31.7	33.3	32.6	40.2	53.8	50.9
Prince William	25.8	27.5	26.3	29.2	32.2	31.0	32.0	44.6	41.5
Kenai	--	--	--	--	--	36.8	--	--	45.5
Kodiak	--	--	14.6[1/]	--	--	24.2	--	--	39.6
Shelikof	--	--	--	--	--	--	--	--	35.8
Chirikof	22.3	21.4	21.7	23.9	26.4	26.0	36.6	41.2	39.5
Shumagin	--	--	--	--	--	--	--	--	--
Sanak	--	--	26.5	--	--	33.1	--	--	45.1

[1/] The limited number of length-frequency samples taken from this region-depth zone probably do not represent the size composition adequately.

PACIFIC COD

Distribution and abundance--Pacific cod were widely distributed throughout the Gulf of Alaska. With the exception of the Fairweather-upper slope, this species was taken in each region-depth zone sampled and averaged 48 kg/hr over the entire survey area. By depth zones, the highest apparent relative abundance occurred in the inner shelf followed by the outer shelf and the upper slope. Particularly high mean CPUE's were recorded in the Sanak - inner shelf (102 kg/hr) and the Kodiak inner and outer shelf (197 and 96 kg/hr). The distribution of the standardized catch rates for the successful stations is shown in Figures XI-452-456.

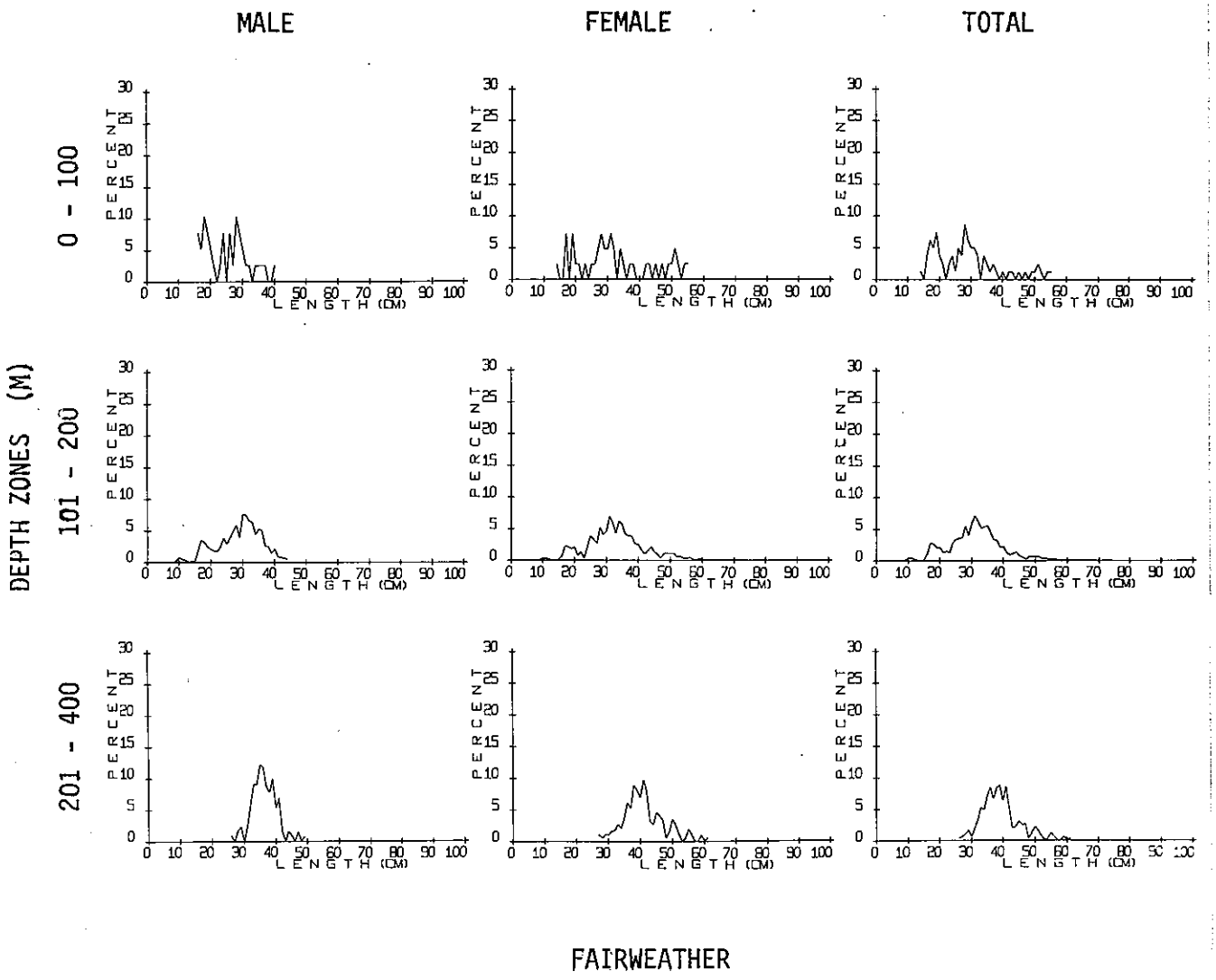


Figure XI-449.--Length frequency distributions of turbot in the Gulf of Alaska by region-depth zones, 1973-1976.

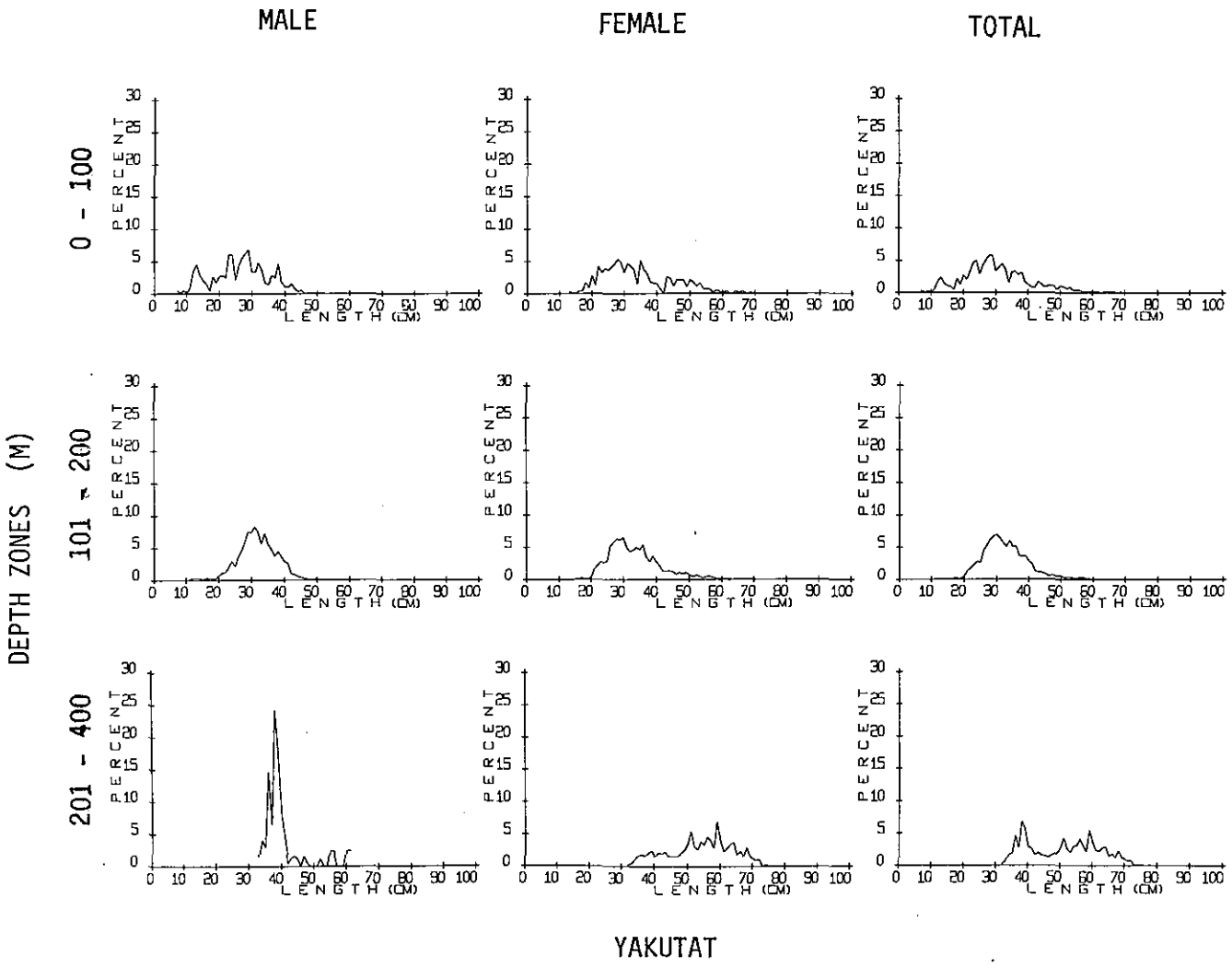


Figure XI-449 (continued).--Length frequency distributions of turbot in the Gulf of Alaska by region-depth zones, 1973-1976.

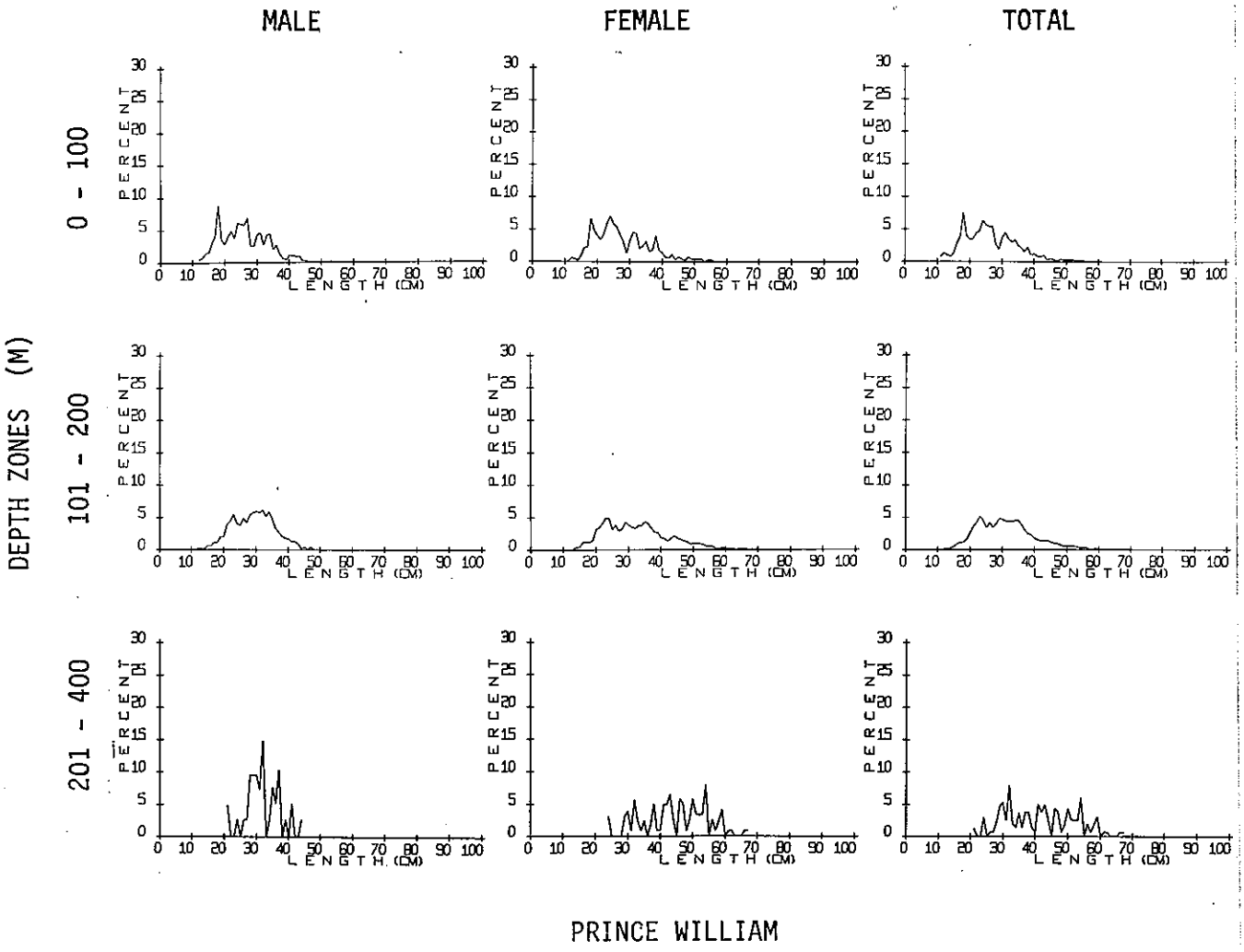


Figure XI-449 (continued).--Length frequency distributions of turbot in the Gulf of Alaska by region-depth zones, 1973-1976.

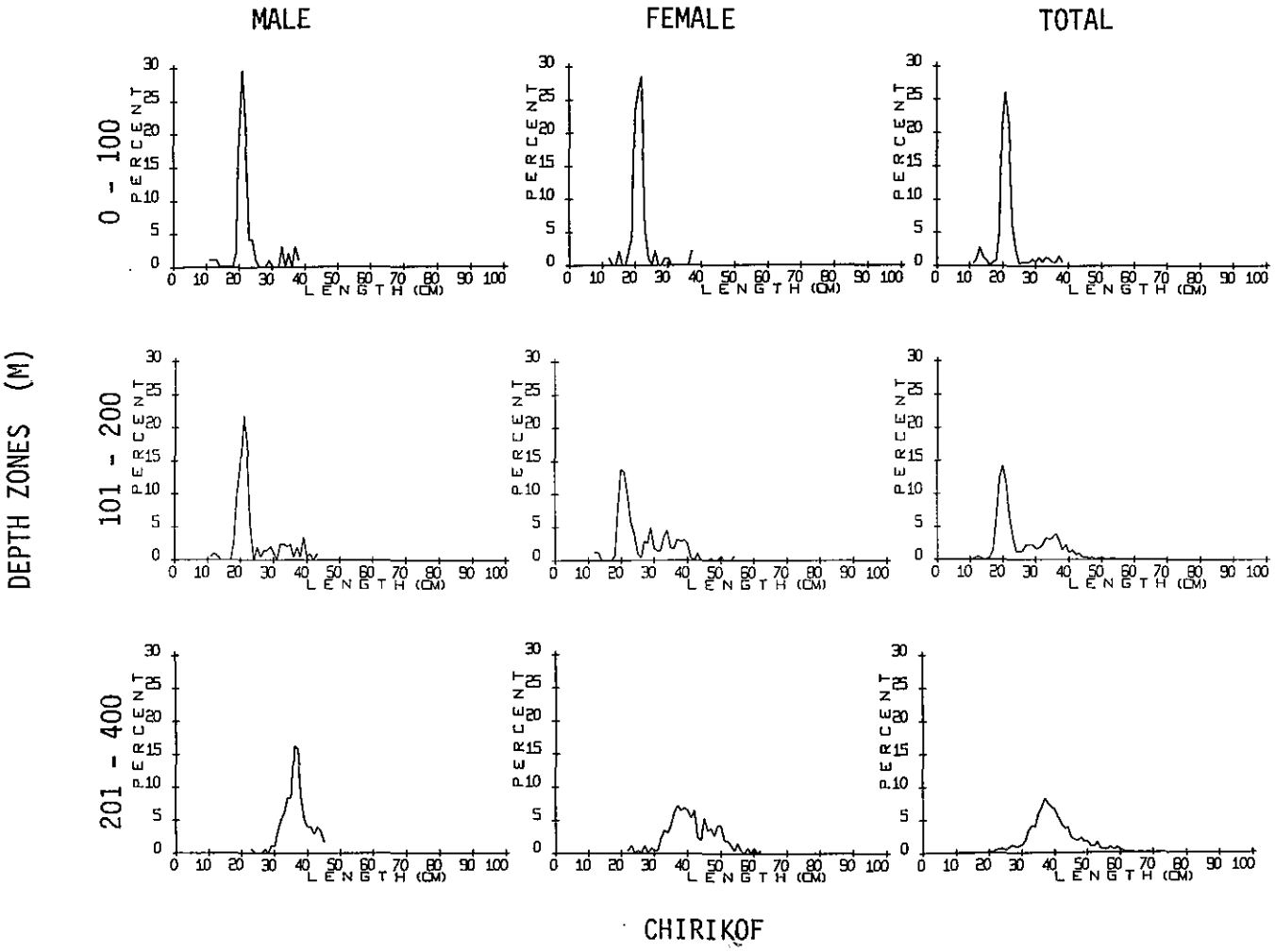


Figure XI-449 (continued).--Length frequency distributions of turbot in the Gulf of Alaska by region-depth zones, 1973-1976.

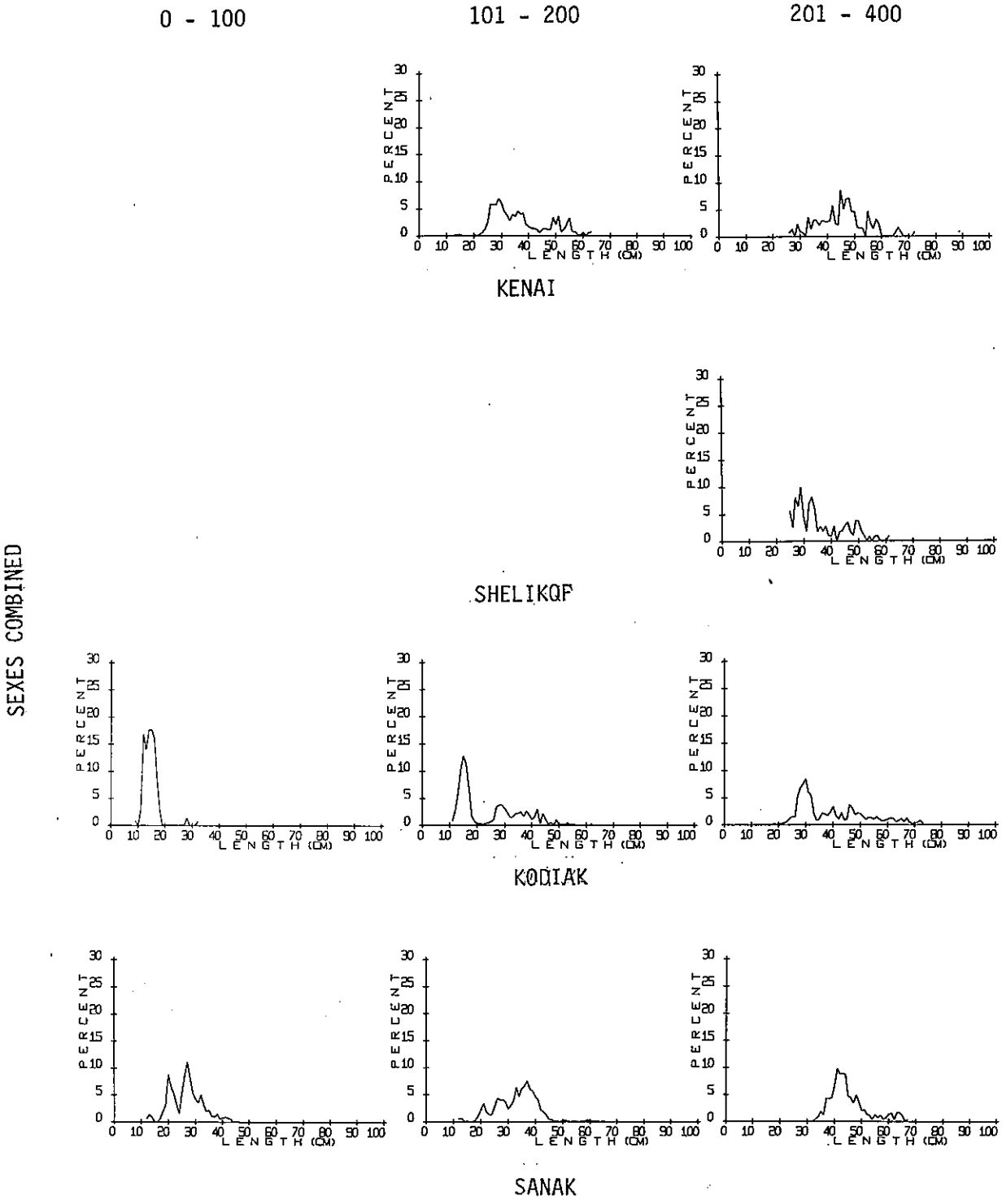


Figure XI-449 (continued).--Length frequency distributions of turbot in the Gulf of Alaska by region-depth zones, 1973-1976.

Table XI-116.--Parameters for the length-weight relationship (weight (g) = a · length^{b}) for turbot (Cruise 751).

		YAKUTAT				PRINCE WILLIAM			
	Depth	Sample Size	Range in Length (cm)	Parameters (a)	(b)	Sample Size	Range in Length (cm)	Parameters (a)	(b)
Males	0-100	183	18-57	0.004981	3.143462	49	13-38	0.201772	2.138611
	101-200	201	19-45	0.005512	3.101883	131	16-48	0.019233	2.755996
	201-400	25	33-47	0.014643	2.820948	23	21-42	0.002901	3.294699
Females	0-100	94	18-58	0.002955	3.289175	42	13-43	0.277278	2.026585
	101-200	340	17-68	0.004144	3.192835	202	16-64	0.009735	2.970779
	201-400	120	30-77	0.001988	3.382702	32	24-67	0.001622	3.451475

Table XI-117.--Summary of age-length data collected for turbot (Cruise 751).

Sex	REGIONS					
	Yakutat			Prince William		
	DEPTH ZONES (M)					
Males	0-100	101-200	201-400	0-100	101-200	201-400
Number of readable otoliths	63	206	72	43	115	31
Range in age (years)	3-6	3-9	4-9	2-6	2-11	3-7
Range in length (cm)	20-36	20-45	25-48	20-38	20-50	21-41
Females						
Number of readable otoliths	88	293	142	32	190	48
Range in age (years)	3-9	3-16	3-19	2-5	3-14	4-14
Range in length (cm)	20-58	20-69	24-78	21-39	20-64	24-67

Biomass--The total biomass of Pacific cod was estimated at 113 thousand mt (Table XI-118). Although Pacific cod are mainly demersal, portions of the population probably occupied the water column above the sampling gear and the biomass estimate should be considered a minimum for the survey area. Over the Gulf of Alaska, the major portion of the biomass was located on the continental shelf with the inner shelf containing 47% and the outer shelf 42%. Thirty-six percent of the total biomass was located in the Kodiak region while Sanak accounted for 29%. The western Gulf regions accounted for 77% of the total estimated biomass.

Size composition--Over all regions and depth zones where sexes were determined, females were always larger than males. The mean lengths of Pacific cod, sexes combined, did not appear to be related with bathymetric or geographic variations. Mean lengths ranged from 34.4 cm in the Kodiak-inner shelf to 64.7 cm in the Fairweather-inner shelf (Table XI-119 and Figure XI-457).

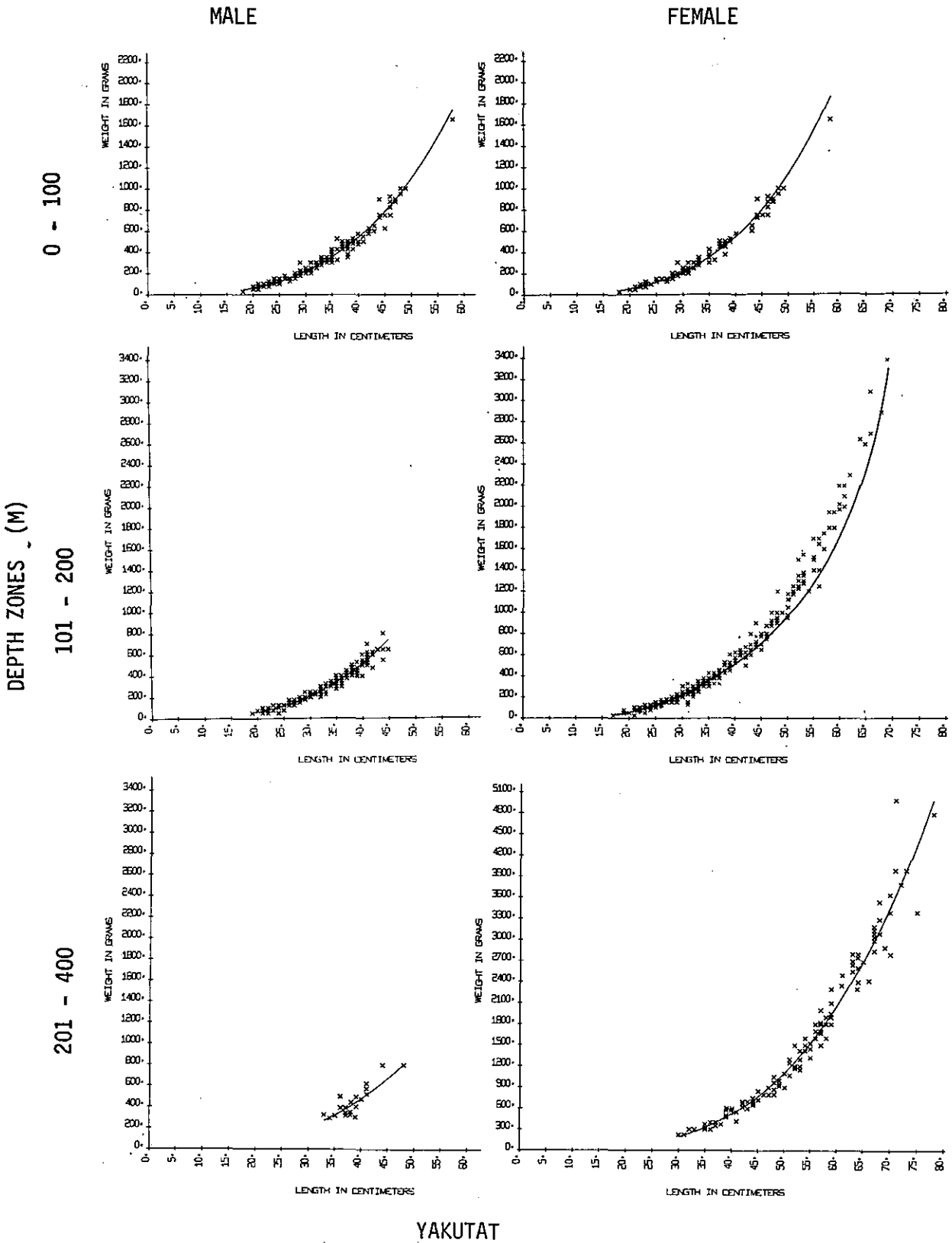


Figure XI-450.--Weight at length observations for turbot in the Gulf of Alaska by regions and depth zones, May-Aug. 1975 (Cruise 751).

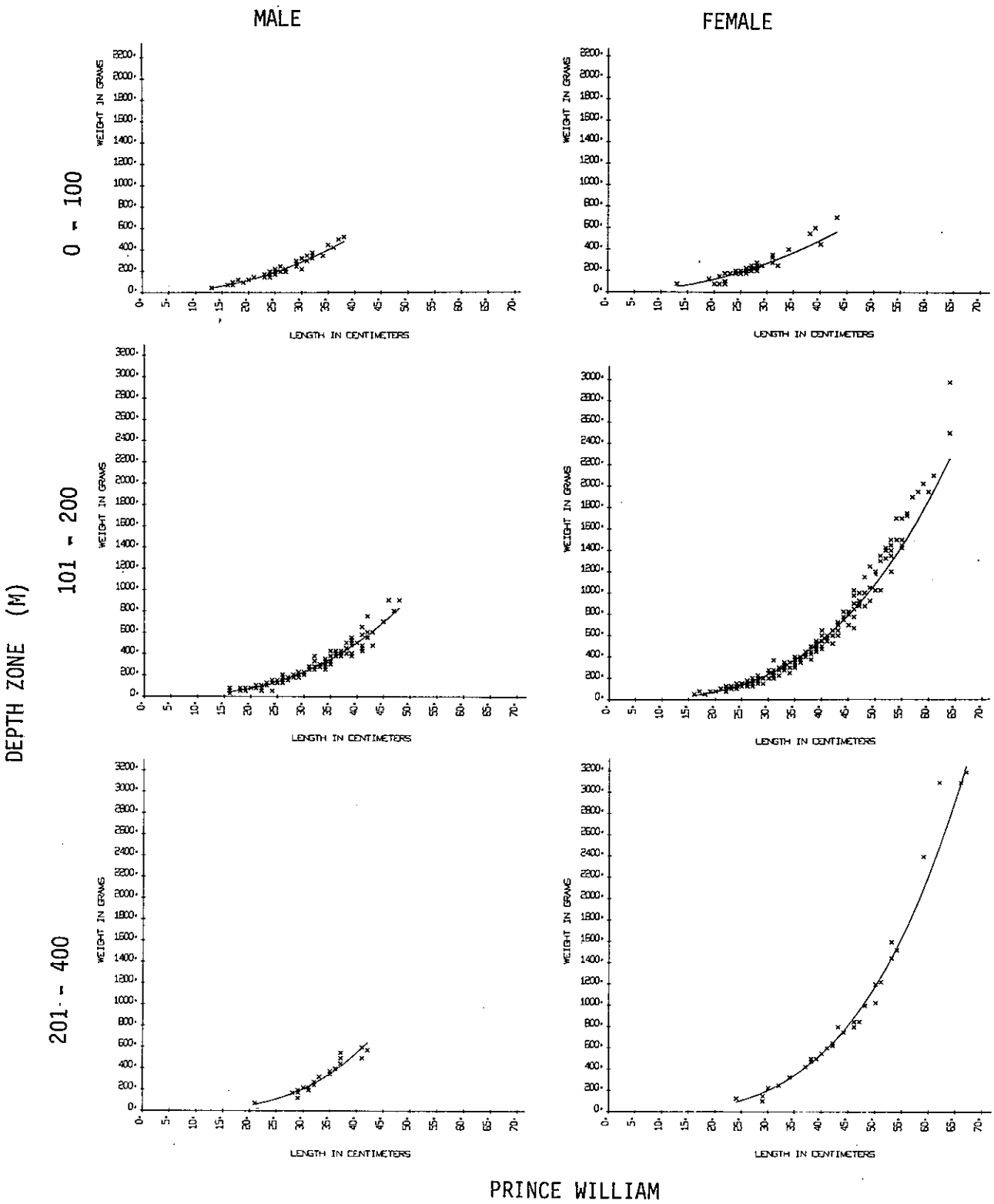
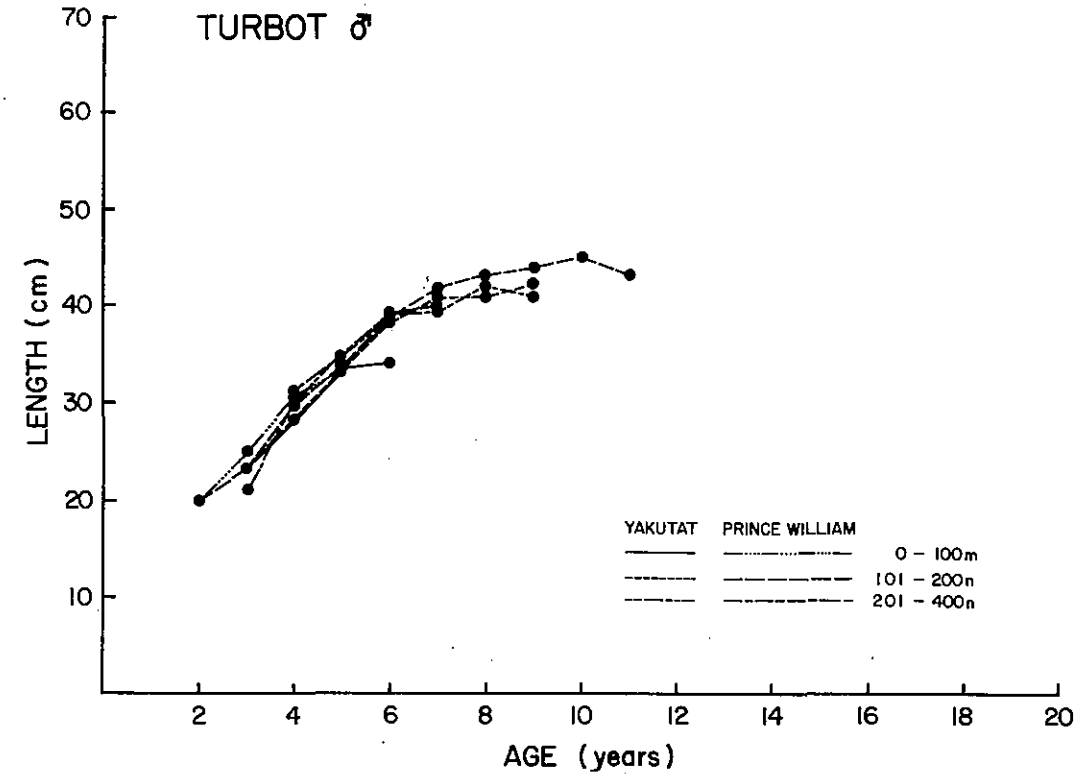


Figure XI-450 (continued).--Weight at length observations for turbot in the Gulf of Alaska by region-depth zones, 1973-1976.



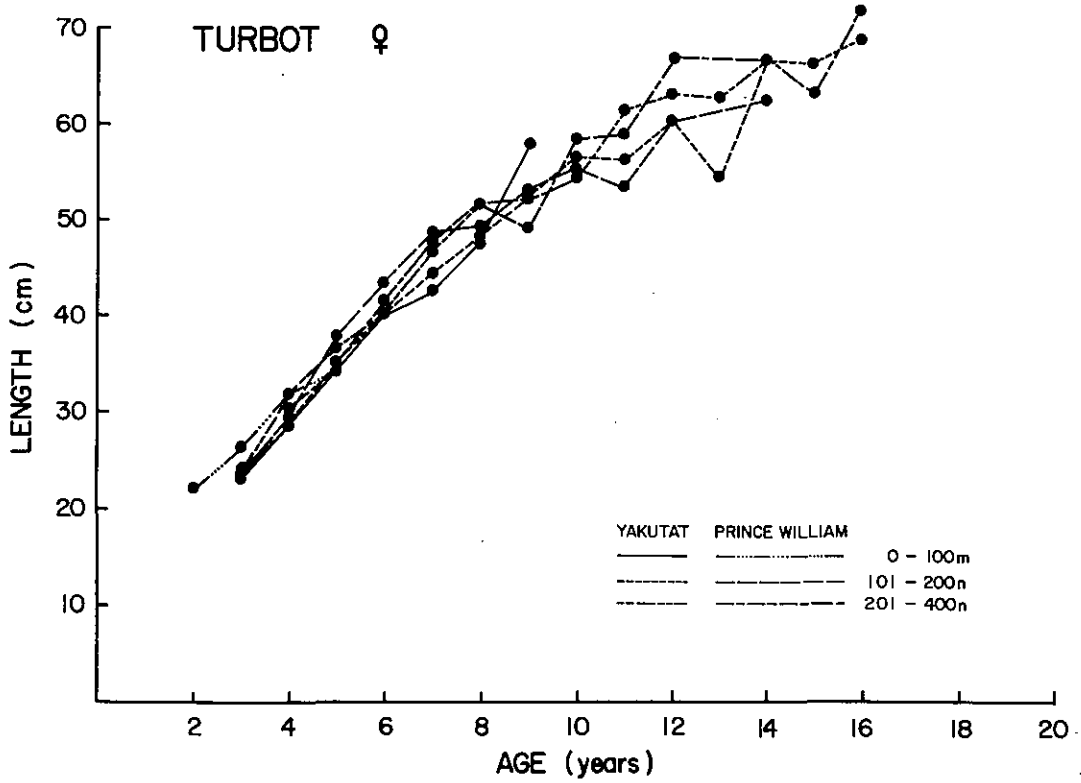


Figure XI-45i.--Mean lengths at age for turbot by sex and region-depth zones in the Gulf of Alaska, May-Aug. 1975 (Cruise 751).

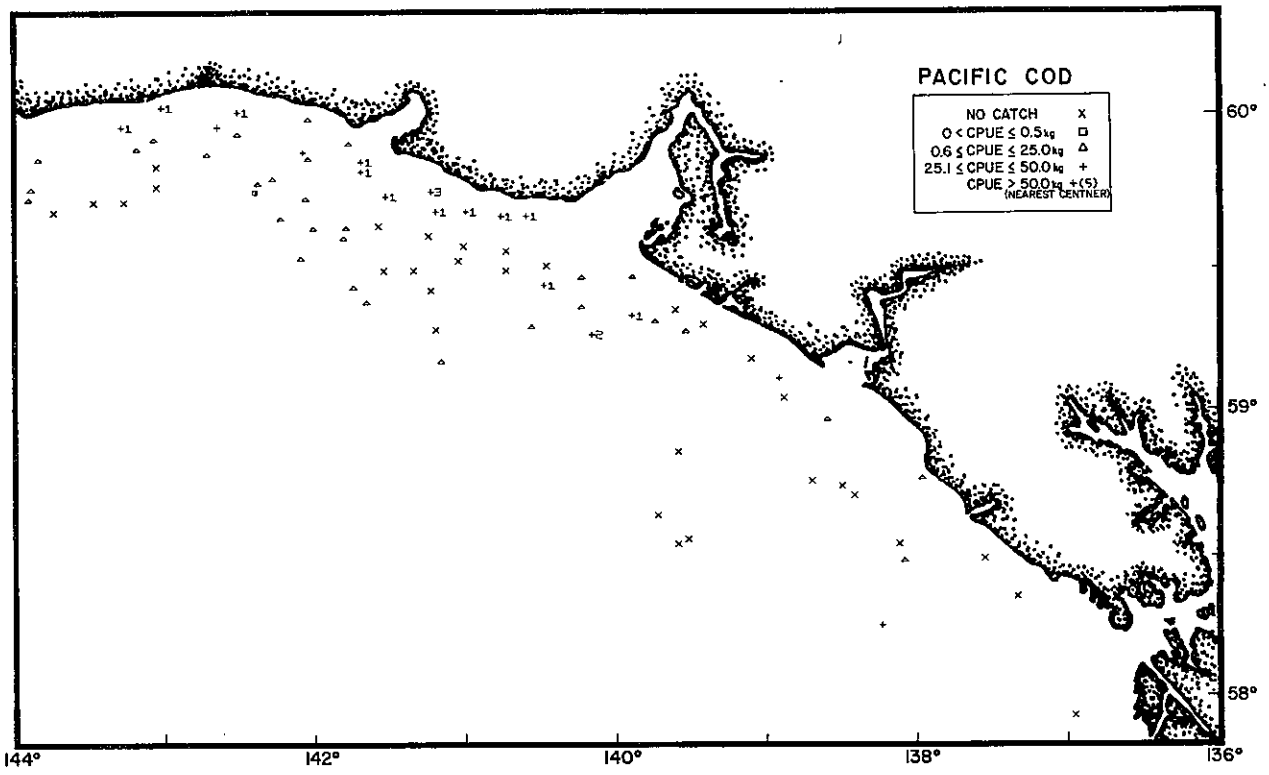


Figure XI-452.--Distribution of standardized catch rates in kilograms/ hour of Pacific cod in the eastern Gulf of Alaska, May-Aug. 1975 and Apr. 1976 (Cruises 751 and 762).

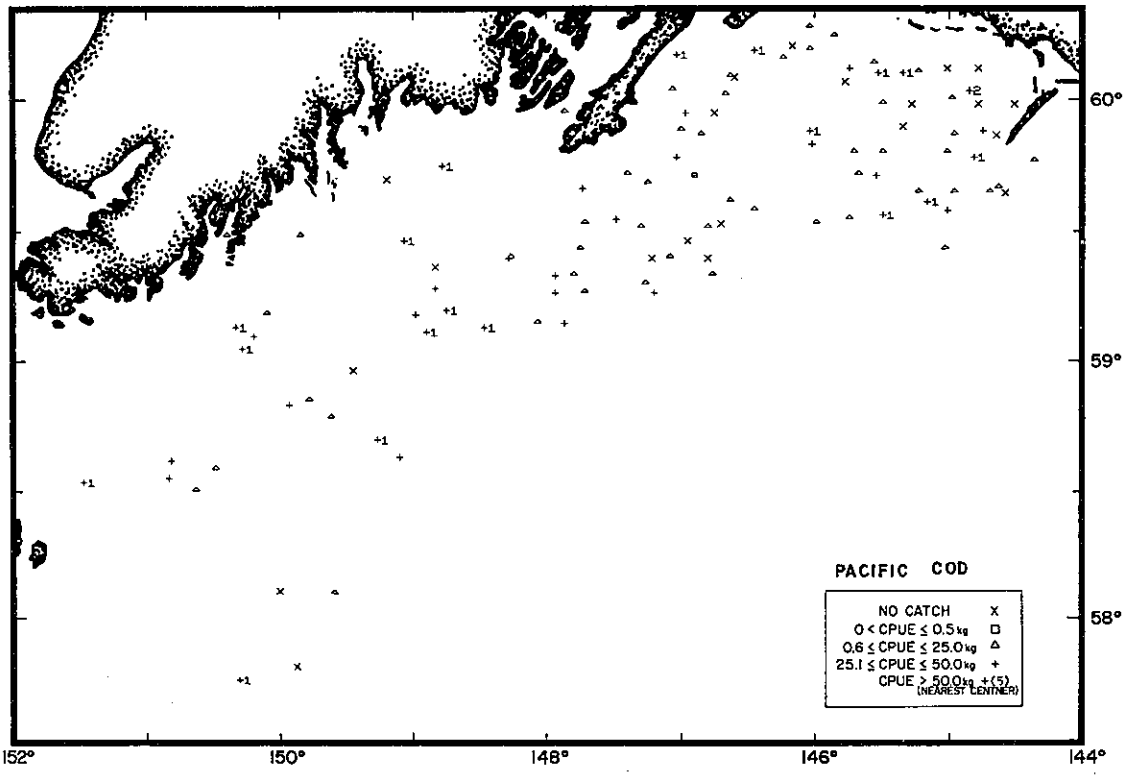


Figure XI-453.--Distribution of standardized catch rates in kilograms/ hour of Pacific cod in the eastern Gulf of Alaska, May-Aug. 1975 (Cruises 751 and 753).

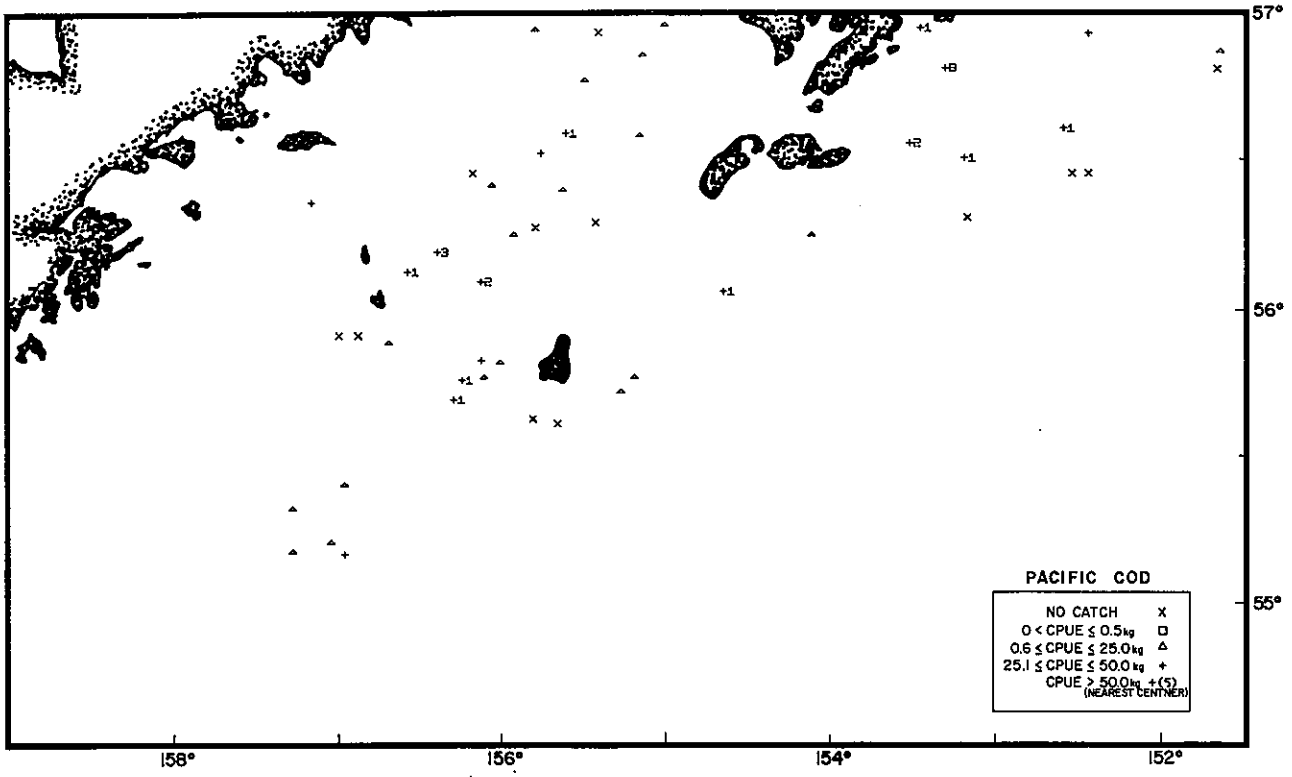


Figure XI-454.--Distribution of standardized catch rates in kilograms/ hour of Pacific cod in the western Gulf of Alaska, Aug.-Oct. 1973 and Jun.-Aug. 1975 (Cruises 734 and 753).

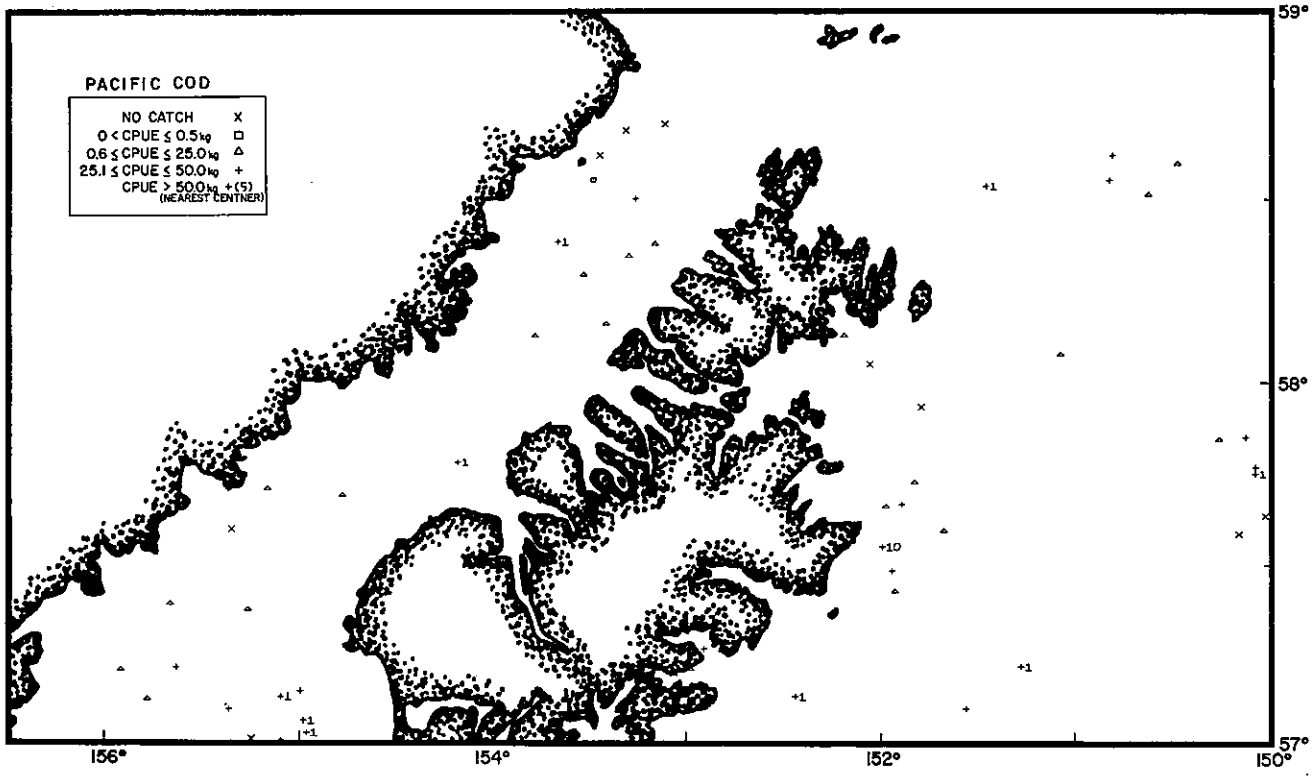


Figure XI-455.--Distribution of standardized catch rates in kilograms/ hour of Pacific cod in the western Gulf of Alaska, May-Jun. 1973, Aug.-Oct. 1973, and Jun.-Aug. 1975 (Cruises 733, 734, and 753).

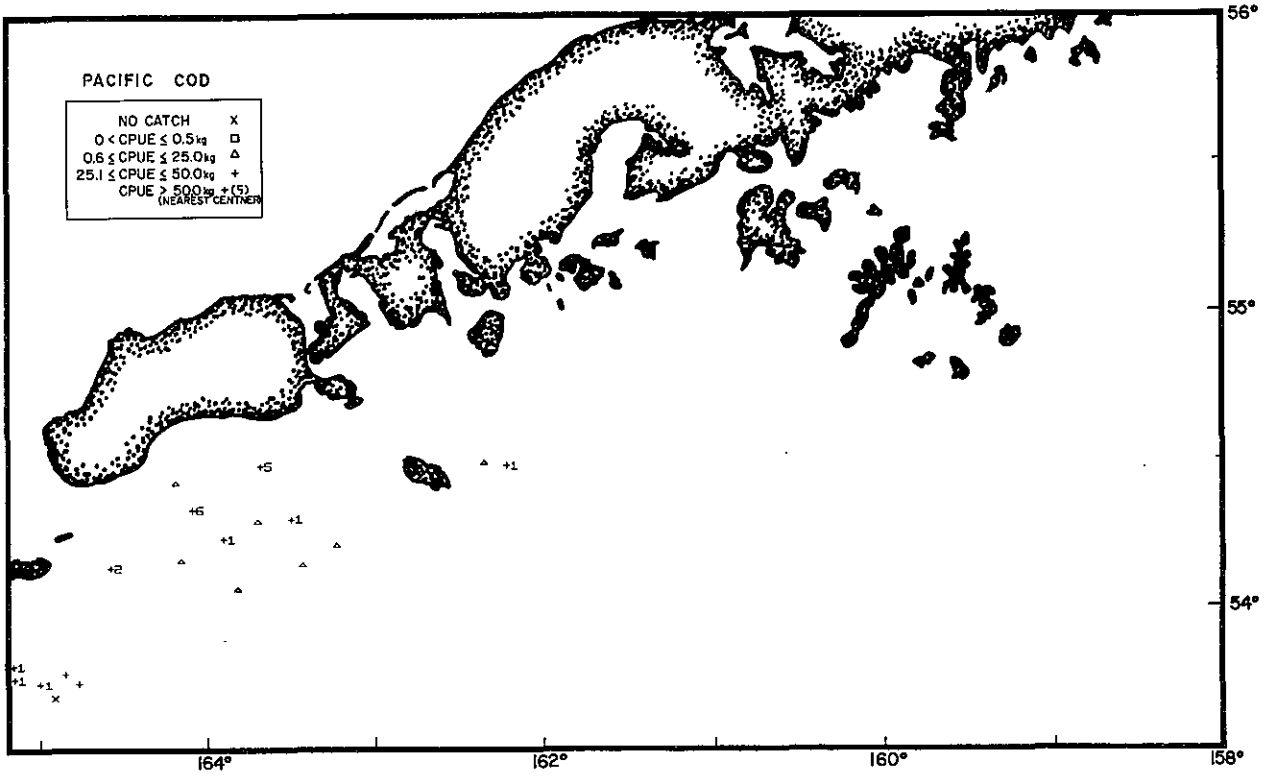


Figure XI-456.--Distribution of standardized catch rates in kilograms/ hour of Pacific cod in the western Gulf of Alaska, Jul.-Aug. 1974 (Cruise 744).

Length-weight relationship--Four hundred and ninety length-weight observations are available from the Yakutat and Prince William inner and outer shelf depth zones. The coefficients of regression are presented by sex and depth zones in Table XI-120 with the individual observations and resulting regression lines shown graphically in Figure XI-458.

Age-length relationship--Age and length data collected from the Yakutat and Prince William regions for Pacific cod are presented in Table XI-121.

The relatively narrow range of observed ages along with small sample sizes has resulted in little plottable data. Males ranged in age from 1-5 years while females varied from 2-4 years.

ROCK SOLE

Distribution and abundance--Rock sole appeared in all regions sampled but were primarily concentrated on the continental shelf in the western Gulf of Alaska. The relative apparent abundance of this species was inversely related to water depth with the highest mean CPUE, 147 kg/hr, occurring in the inner shelf depth zone (Figures XI-459-460). Lesser values, well below the 47 kg/hr survey average, were recorded in the outer shelf and upper slope. In the Kodiak and Sanak regions mean CPUE's were well above the Gulf of Alaska average with 173 and 147 kg/hr respectively. The distribution of the standardized catch rates for the successful stations is presented in Figures XI-461-465.

Table XI-118.--Estimated biomass and population size of Pacific cod (Gadus macrocephalus) in the Gulf of Alaska during April-October 1973-76.

Region	Depth zone (m)	CPUE[1] (kg/hr)	Estimated biomass (mt)	Proportion of total estimated biomass	Estimated population (X 10^6)	Proportion of total estimated population	Mean size per individual[2] Weight (kg)	Length (cm)
Fairweather	1-100	14.5	522.2	42.7	0.3	50.0	2.23	64.7
	101-200	4.3	701.9	57.3	0.3	50.0	2.03	--
	201-400	0	0	0	0	0	--	--
	All zones	5.3	1,224.1	1.1	0.6	0.5	2.11	--
Yakutat	1-100	70.6	4,370.3	63.7	3.2	60.4	1.39	48.6
	101-200	16.6	2,427.8	35.4	2.1	39.6	1.17	46.1
	201-400	0.9	58.4	0.9	[4]	[5]	2.55	--
	All zones	24.8	6,856.5	6.1	5.3	4.0	1.31	--
Prince William	1-100	13.2	1,455.3	28.6	1.1	37.9	1.36	48.7
	101-200	25.2	3,173.9	62.4	1.6	55.2	2.01	53.1
	201-400	12.5	456.4	9.0	0.2	6.9	2.61	60.5
	All zones	18.6	5,085.6	4.5	2.9	2.2	1.80	--
Kenai	1-100	--	--	--	--	--	--	--
	101-200	45.2	10,971.9	84.7	8.9	89.9	1.24	47.2
	201-400	19.7	1,980.0	15.3	1.0	10.1	1.98	55.5
	All zones	37.7	12,951.9	11.4	9.9	1.7	1.31	--
Kodiak	1-100	196.9	28,192.2	69.5	60.9	87.8	0.47	34.4
	101-200	96.3	11,891.2	29.3	8.0	11.5	1.48	49.2
	201-400	8.8	490.6	1.2	0.5	0.7	1.02	44.9
	All zones	125.8	40,574.0	35.8	69.4	52.8	0.59	--
Shelikof	1-100	0.2	1.0	[5]	[4]	[5]	--	--
	101-200	31.9	1,299.9	46.9	2.0	66.7	0.63	38.0
	201-400	14.1	1,472.5	53.1	1.0	33.3	1.53	49.8
	All zones	18.3	2,773.4	2.5	3.0	2.3	--	--
Chirikof	1-100	5.3	636.9	5.6	0.6	8.8	1.12	53.5
	101-200	24.4	3,930.2	34.4	2.6	38.2	1.49	47.4
	201-400	51.1	6,852.4	60.0	3.6	52.9	1.88	52.3
	All zones	25.8	11,419.5	10.1	6.8	5.2	1.67	--
Shumagin	1-100	--	--	--	--	--	--	--
	101-200	--	--	--	--	--	--	--
	201-400	--	--	--	--	--	--	--
	All zones	--	--	--	--	--	--	--
Sanak	1-100	102.3	18,377.7	56.6	16.3	48.7	1.10	45.9
	101-200	82.7	13,499.5	41.6	16.9	50.5	0.80	41.7
	201-400	46.4	580.0	1.8	0.3	0.9	2.00	54.5
	All zones	91.3	32,457.2	28.6	33.5	25.5	1.00	--
Total	1-100	81.7	53,555.6	47.3	82.4	62.7	--	--
	101-200	41.2	47,896.3	42.3	42.4	32.3	1.48	--
	201-400	22.4	11,890.3	10.5	6.6	5.0	1.80	--
	All zones	47.6	113,342.2	100.0	131.4	100.0	--	--

1/ Mean catch per unit effort, in kilograms per hour trawled.
2/ Where data are available.
3/ Less than 0.1 kg/hr.
4/ Less than 0.1 X 10^6 individuals.
5/ Less than 0.1 percent.

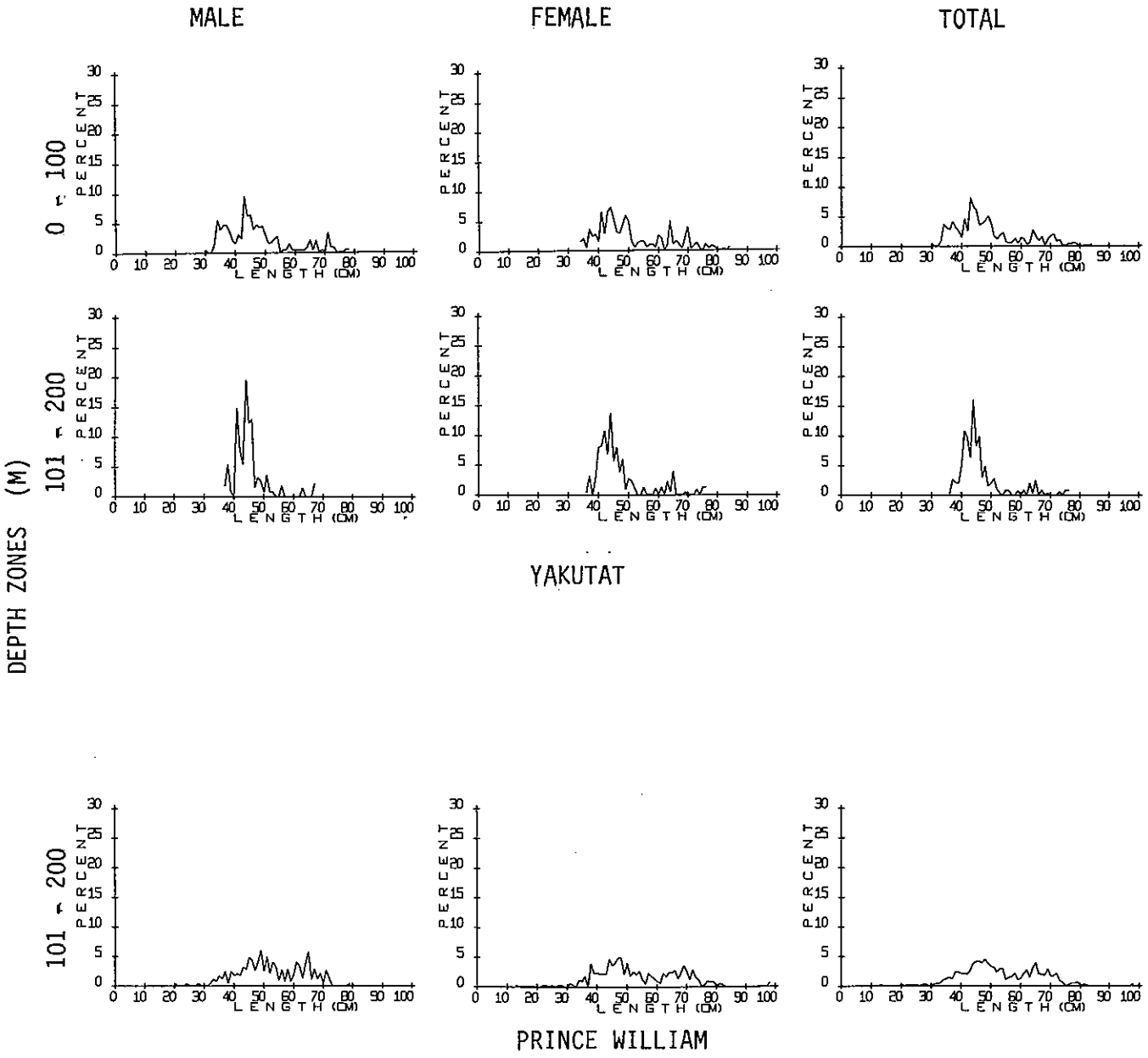


Figure XI-457.--Length frequency distributions of Pacific cod in the Gulf of Alaska by region-depth zones, 1973-1976.

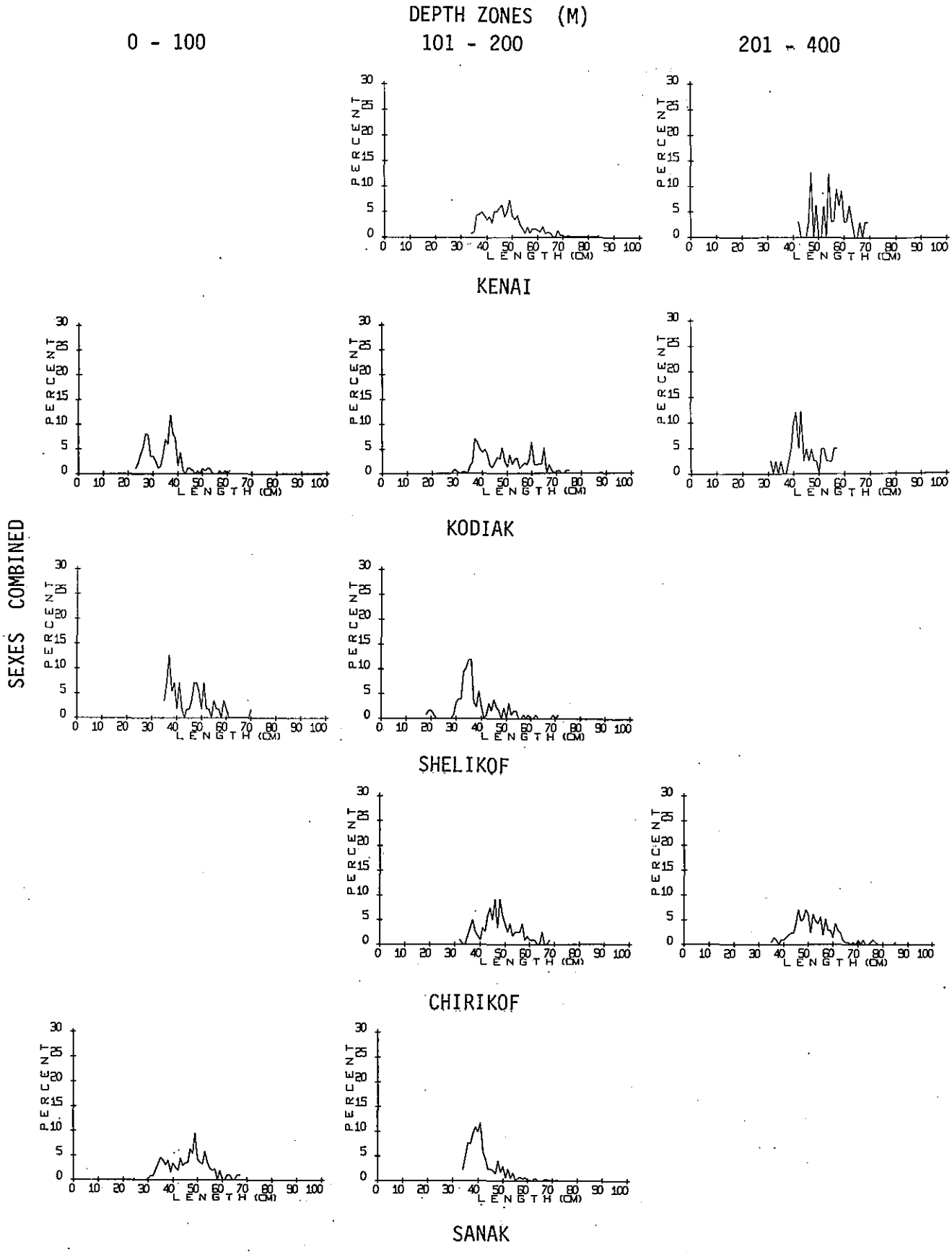


Figure XI-457 (continued).--Length frequency distributions of Pacific cod in the Gulf of Alaska by region-depth zones, 1973-1976.

Table XI-119.--Mean lengths (cm) of Pacific cod by regions and depth zones (Cruises 733, 734, 744, 751, 753 and 762).

	0-100 m			101-200 m			201-400 m		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Fairweather	--	--	--	--	--	--	--	--	--
Yakutat	46.7	50.9	48.6	44.9	46.9	46.1	--	--	--
Prince William	--	--	--	52.5	53.7	53.1	--	--	--
Kenai	--	--	--	--	--	47.2	--	--	55.5
Kodiak	--	--	34.4	--	--	49.2	--	--	44.9
Shelikof	--	--	45.1	--	--	38.0	--	--	--
Chirikof	--	--	--	--	--	47.4	--	--	52.3
Shumagin	--	--	--	--	--	--	--	--	--
Sanak	--	--	45.9	--	--	41.7	--	--	--

Biomass--The total apparent biomass of rock sole in the Gulf of Alaska has been estimated at 112 thousand mt with 86% of the total occurring in the inner shelf, 11% in the outer shelf and only 3% in the upper slope (Table XI-122). Two western Gulf regions, Kodiak and Sanak, accounted for over 96% of the total. Within these regions 44% of the total rock sole biomass occurred in the Kodiak-inner shelf while 40% was associated with the Sanak-inner shelf. The biomass estimate for rock sole is probably low as this species is abundant during summer months in shallow, untrawlable areas.

Size composition--Unsexed length frequency data are available from the Kodiak, Chirikof and Sanak regions. Mean lengths generally increased with depth but varied little between regions (Table XI-123 and Figure XI-466).

FLATHEAD SOLE

Distribution and abundance--Flathead sole were found in all areas and depth zones sampled in the Gulf of Alaska. By depth zones, apparent relative abundance was highest in the outer shelf and upper slope and averaged 44 kg/hr over the entire Gulf (Figures XI-467-468). Regions with above average mean CPUE's included Shelikof, Kodiak, Fairweather, Sanak and Kenai. Within regions, particularly high CPUE's occurred in the outer shelf depth zone of Shelikof and Kodiak and the Fairweather-upper slope. The distribution of the standardized catch rates for the successful stations is presented in Figures XI-469-473.

Table XI-120.--Parameters for the length-weight relationship (weight (g) = a · length^b) for Pacific cod (Cruise 751).

		YAKUTAT				PRINCE WILLIAM			
	Depth	Sample Size	Range in Length (cm)	Parameters (a)	(b)	Sample Size	Range in Length (cm)	Parameters (a)	(b)
Males	0-100	61	34-77	0.004640	3.212017	17	34-73	0.022392	2.803923
	101-200	38	37-56	0.003940	3.213627	100	33-72	0.003312	3.303537
	201-400	--	--	--	--	--	--	--	--
Females	0-100	68	34-81	0.002646	3.350940	40	35-78	0.005628	3.170108
	101-200	52	37-59	0.004918	3.169297	114	31-78	0.009251	3.046864
	201-400	--	--	--	--	--	--	--	--

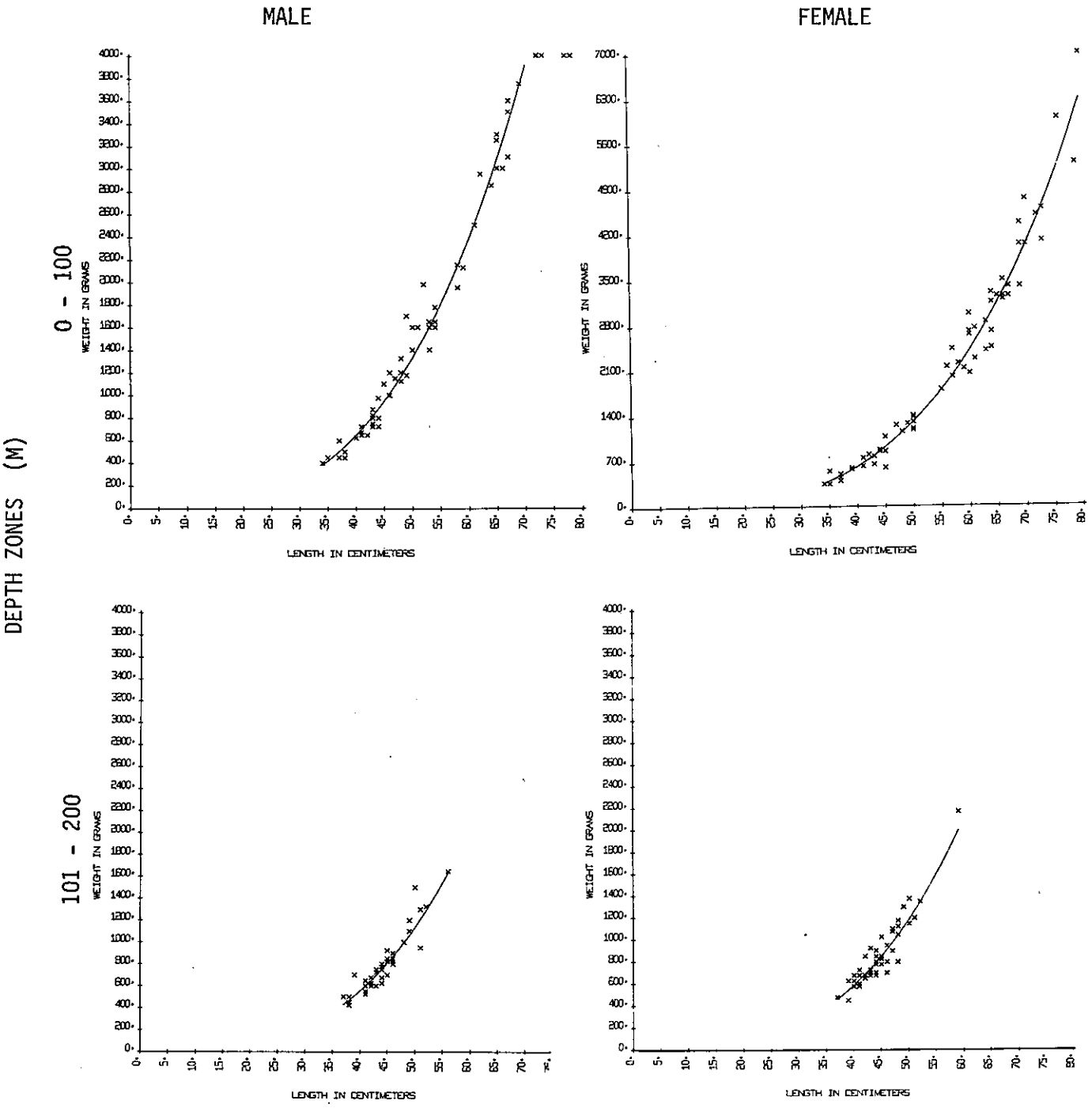


Figure XI-458.--Weight at length observations for Pacific cod in the Gulf of Alaska by regions and depth zones, May-Aug. 1975 (Cruise 751).

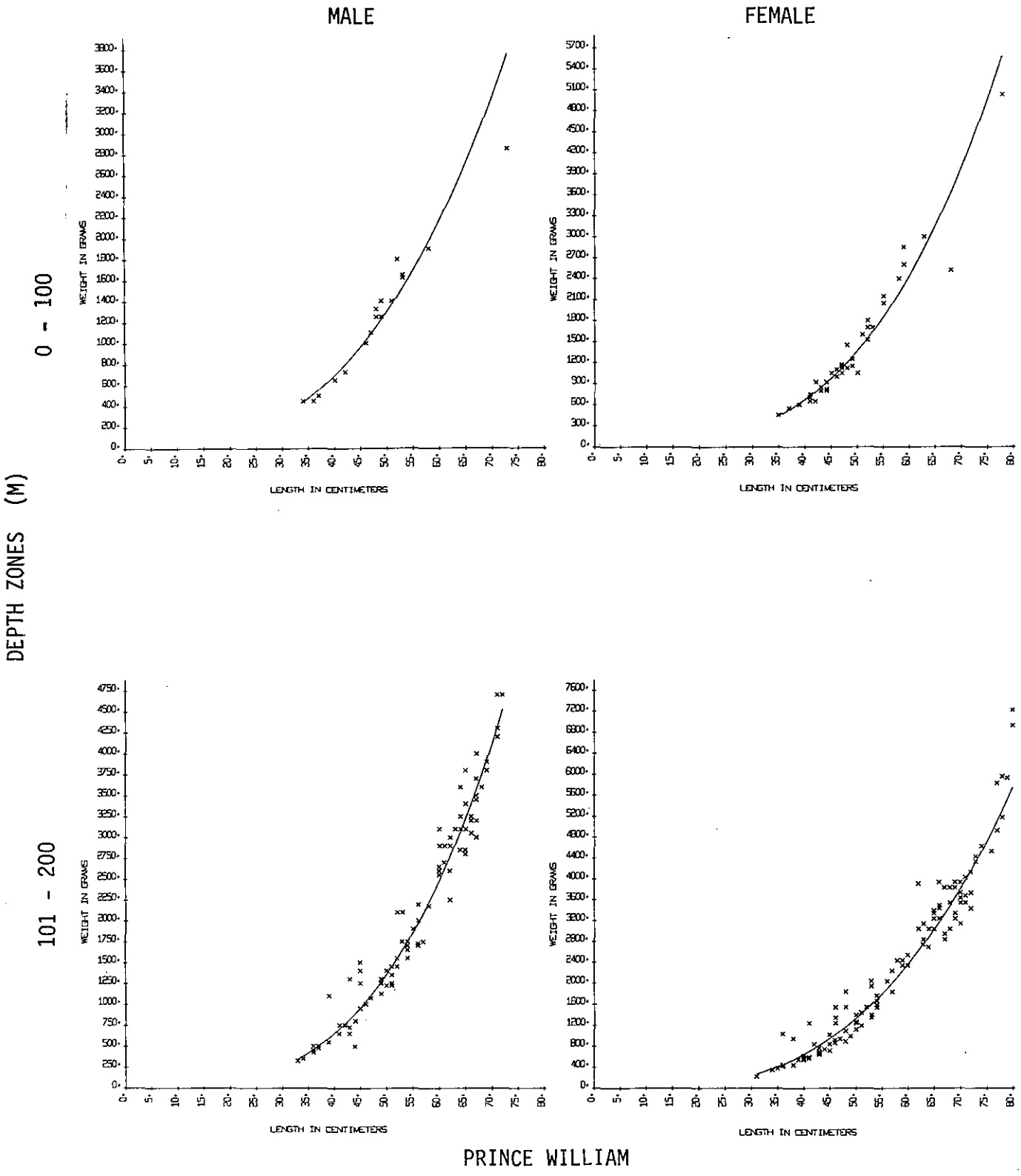


Figure XI-458 (continued).--Weight at length observations for Pacific cod in the Gulf of Alaska by regions and depth zones, May-Aug. 1975 (Cruise 751).

Table XI-121.--Summary of age-length data collected for Pacific cod (Cruise 751).

Sex	REGIONS					
	Yakutat			Prince William		
	DEPTH ZONES (M)					
Males	0-100	101-200	201-400	0-100	101-200	201-400
Number of readable otoliths	38	10	--	--	8	--
Range in age (years)	1-5	2	--	--	2-4	--
Range in length (cm)	37-77	38-54	--	--	37-69	--
Females						
Number of readable otoliths	30	28	--	--	25	--
Range in age (years)	2-4	2-3	--	--	1-4	--
Range in length (cm)	36-84	39-50	--	--	28-78	--

Biomass--The biomass of flathead sole in the Gulf of Alaska has been estimated at 104 thousand mt of which 69% was located in the outer shelf, 21% in the upper slope and 10% in the inner shelf (Table XI-124). Regions which contained the greatest portion of the biomass were Kodiak (18%), Sanak (16%), Kenai (15%) and Fairweather (11%). The eastern Gulf regions contributed 43% to the total flathead sole biomass while the western regions accounted for 57%.

Size composition--Length frequency data by sexes are available from the three easternmost Gulf regions while unsexed data are available from the remaining regions. Females were always larger than males with both sexes increasing in length with increasing depth (Figure XI-474). Largest mean lengths, sexes combined, generally occurred in the eastern Gulf regions with values ranging from 9.8 cm in the Kodiak-inner shelf to 37.9 cm in the Prince William-upper slope (Table XI-125).

Length-weight relationship--The coefficients of regression derived from 518 length weight observations obtained in the Yakutat and Prince William regions are presented in Table XI-126 by sexes and depth zones. Data points representing each observation and the resulting regression curves are presented in Figure XI-475.

Age-length relationship--Age and length data collected in the Yakutat and Prince William regions for flathead sole are presented in Table XI-127.

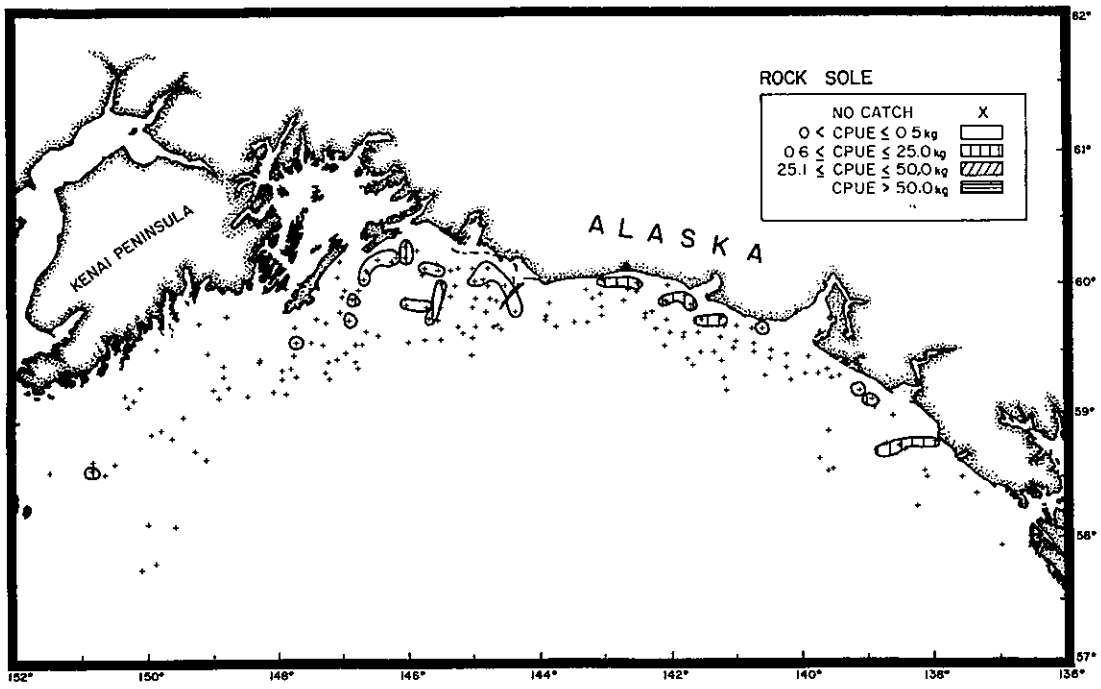


Figure XI-459.--Distribution of apparent relative abundance of rock sole in the eastern Gulf of Alaska, May-Aug. 1975, Jun.-Aug. 1975, and Apr. 1976 (Cruises 751, 753, and 762).

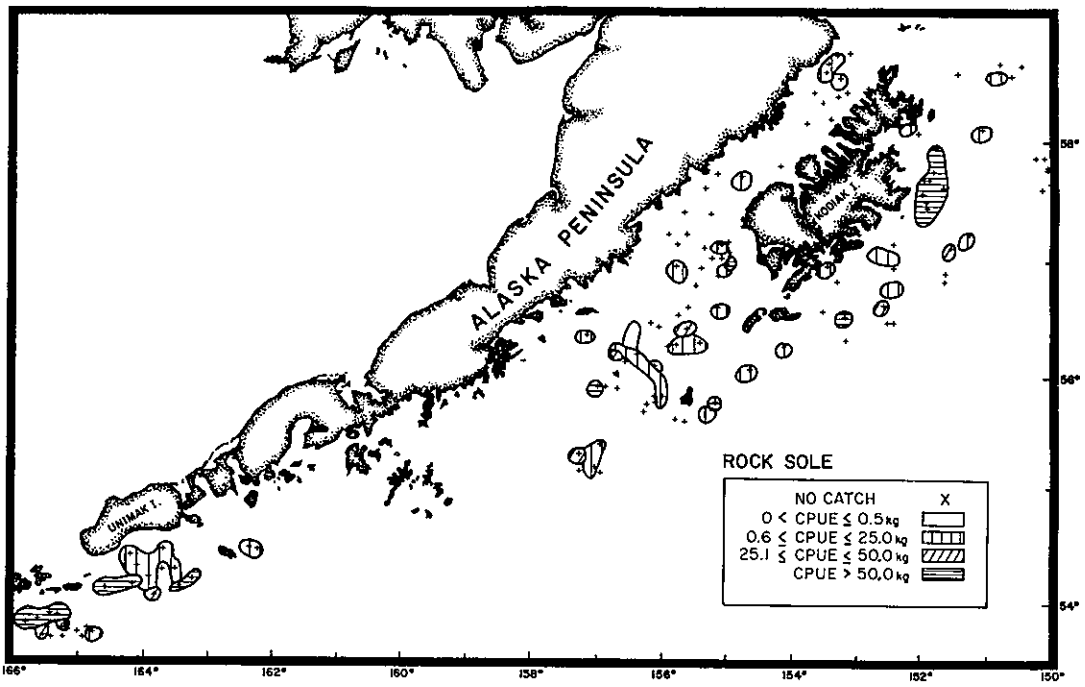


Figure XI-460.--Distribution of apparent relative abundance of rock sole in the western Gulf of Alaska, May-July 1973, Aug.-Oct. 1973, Jul.-Aug. 1974, and Jun.-Aug. 1975 (Cruises 733, 734, 744, and 753).

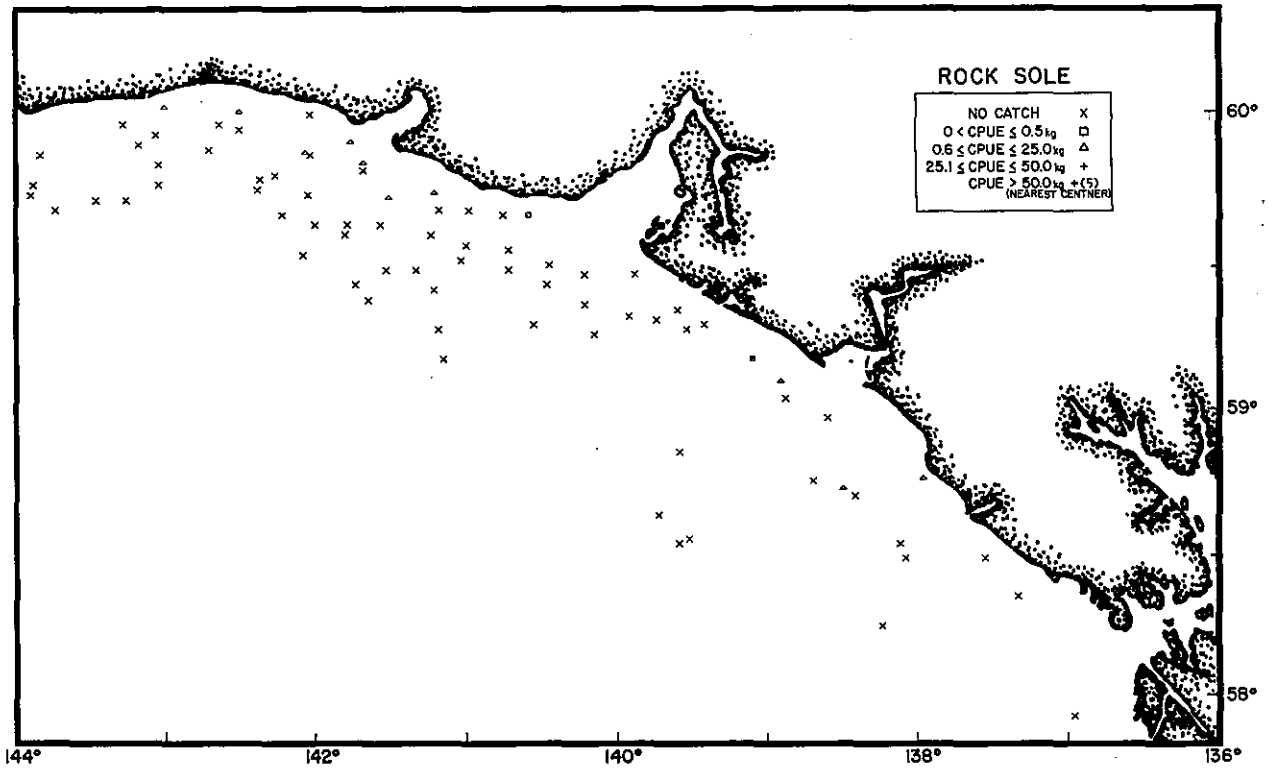


Figure XI-461.--Distribution of standardized catch rates in kilograms/ hour of rock sole in the eastern Gulf of Alaska, May-Aug. 1975 and Apr. 1976 (Cruises 751 and 762).

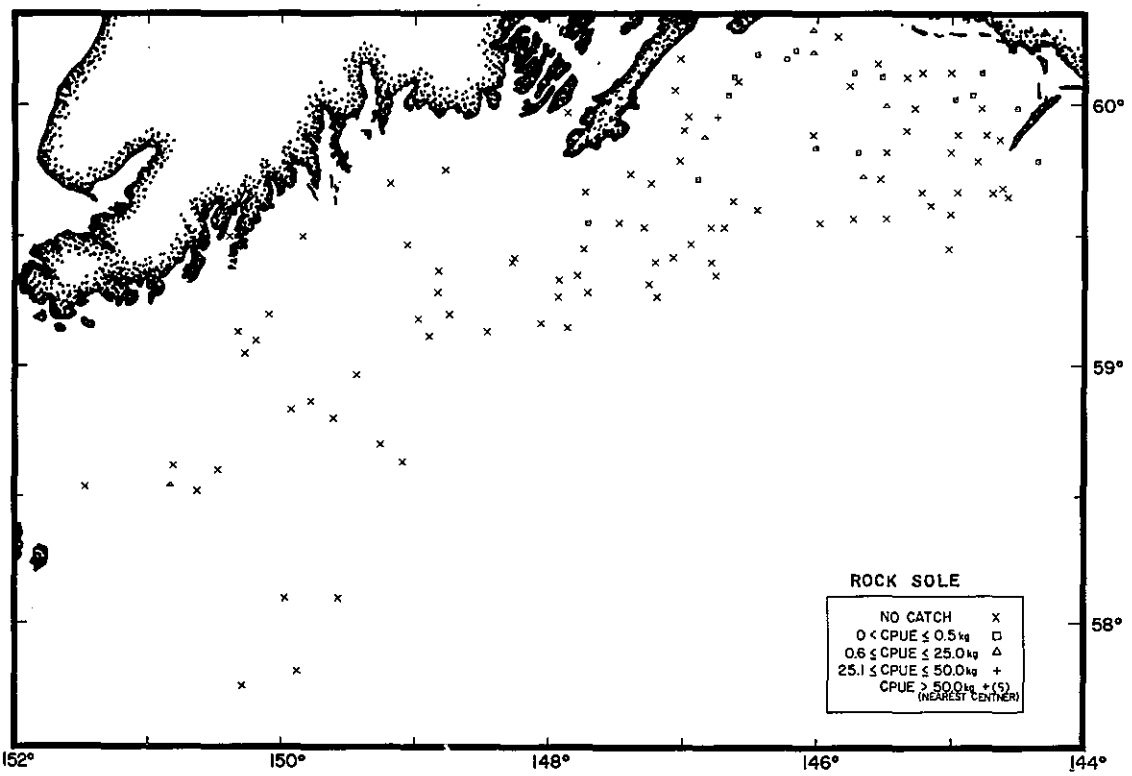


Figure XI-462.--Distribution of standardized catch rates in kilograms/ hour of rock sole in the eastern Gulf of Alaska, May-Aug. 1975 (Cruises 751 and 753).

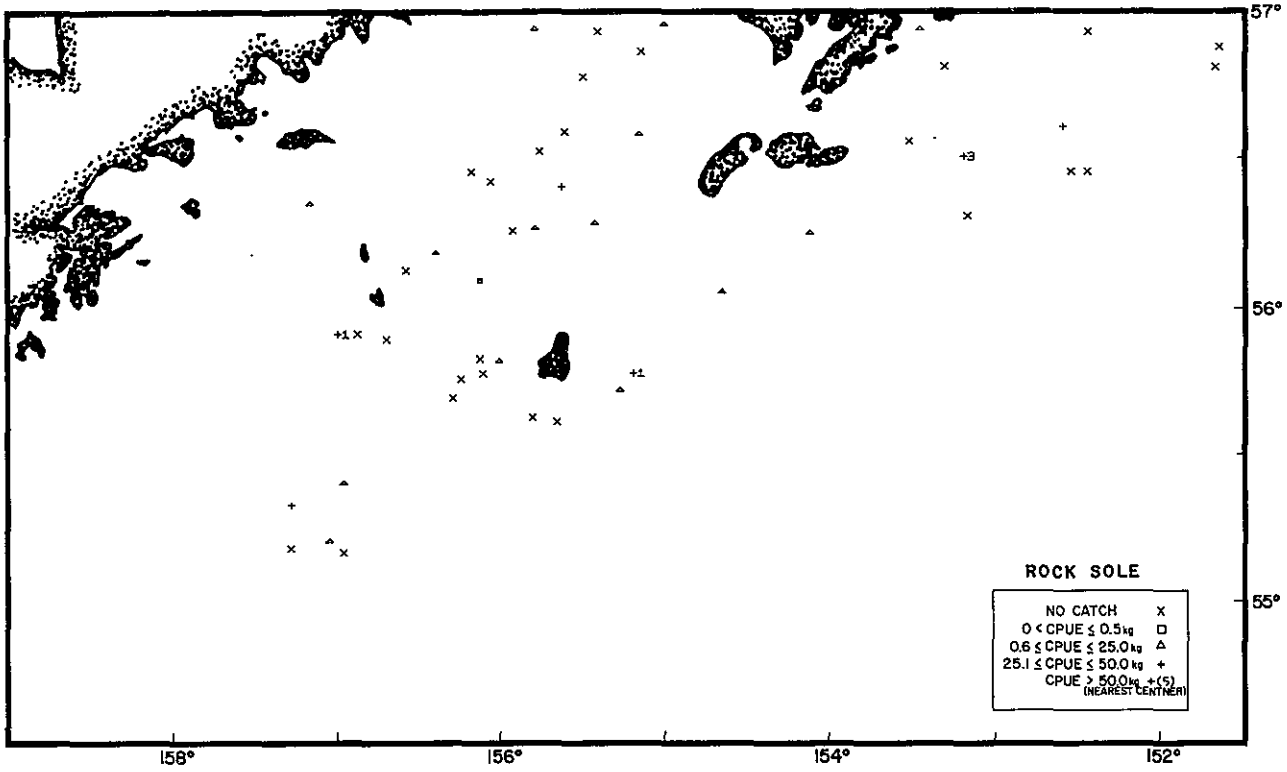
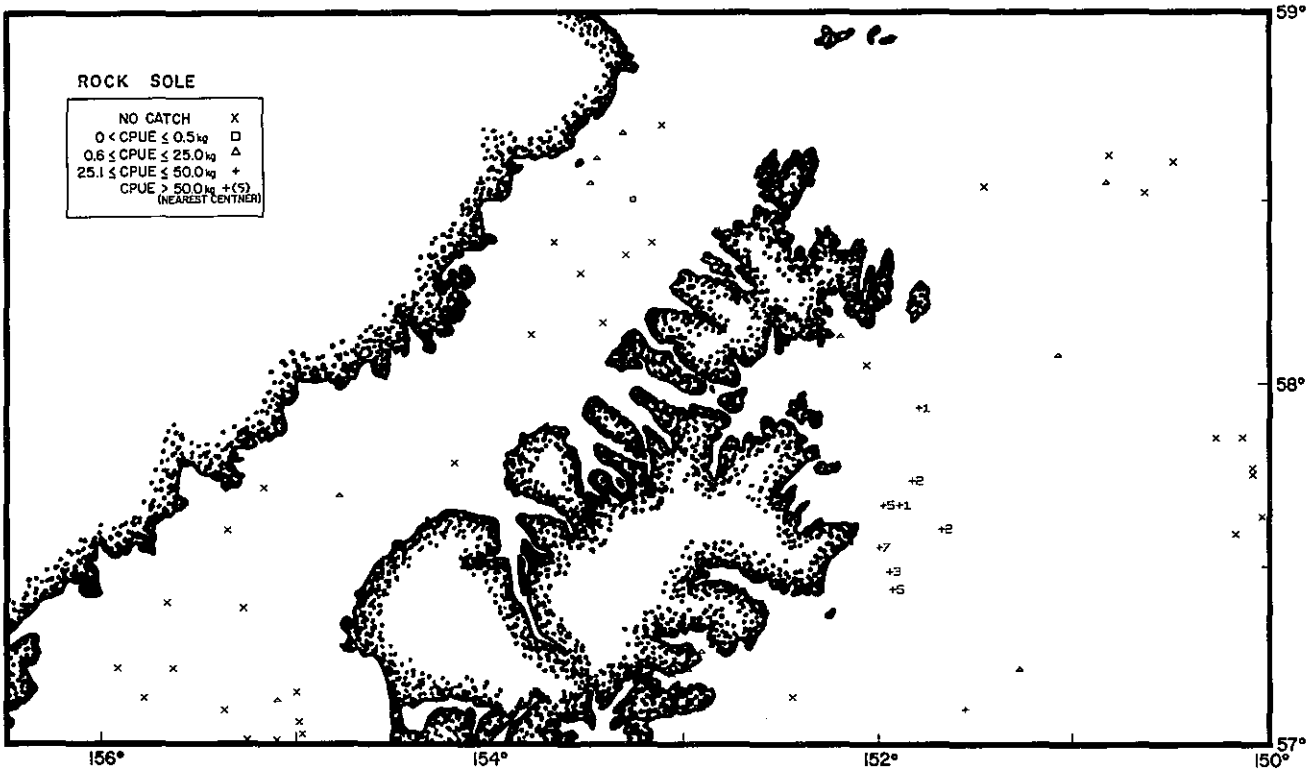


Figure XI-463.--Distribution of standardized catch rates in kilograms/ hour of rock sole in the western Gulf of Alaska, Aug.-Oct. 1973 and Jun.-Aug. 1975 (Cruises 734 and 753).



Figures XI-464.--Distribution of standardized catch rates in kilograms/ hour of rock sole in the western Gulf of Alaska, May-Jun. 1973, Aug.-Oct. 1973, and Jun.-Aug. 1975 (Cruises 733, 734, and 753).

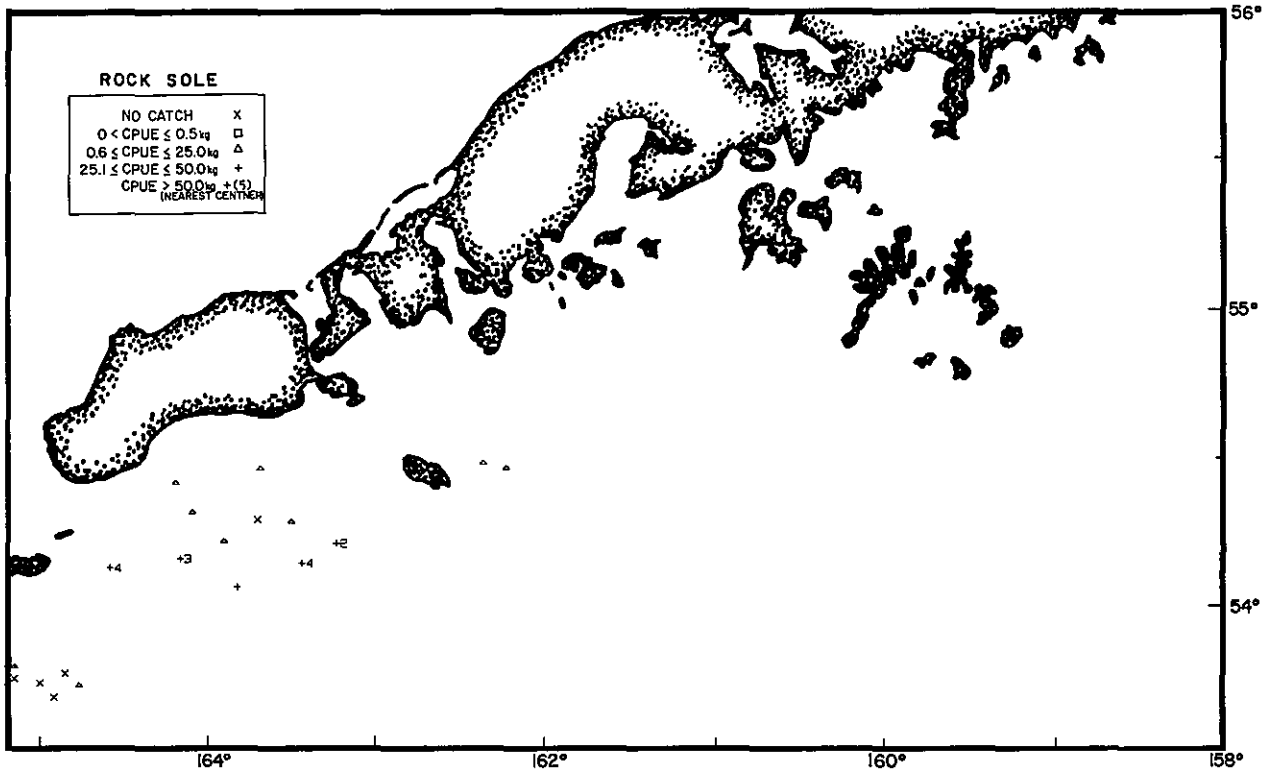


Figure XI-465.--Distribution of standardized catch rates in kilograms/ hour of rock sole in the western Gulf of Alaska, Jul.-Aug. 1974 (Cruise 744).

These data are summarized in Figure XI-476 by plots of mean lengths-at-age by sexes and regions. In general, mean length-at-age values were highest for females in all depth zones of both regions. Females ranged in age from 4-19 years while males varied from 4-22 years. In general, for each sex, differences in the mean values between regions and depths were relatively small.

TANNER CRAB

Distribution and abundance--Tanner crab occurred in all region - depth zones, and with the exception of the Fairweather and Sanak-upper slope averaged 37 kg/hr over the entire Gulf of Alaska. The relative apparent abundance of this species varied little between the three depth zones (Figures XI-477-478). The Prince William region had the highest mean CPUE (127 kg/hr) with catch rates exceeding 100 kg/hr in each depth zone (Figures XI-479-483). Other regions which exceeded the Gulf of Alaska average were Shelikof and Kodiak. The lowest regional CPUE's occurred in the Fairweather, Kenai and Yakutat areas.

Biomass--The biomass of Tanner crab has been estimated at 88 thousand mt of which 48% was located in the outer shelf, 27% in the upper slope and 30% in the inner shelf (Table XI-128). The Prince William region contained 39% of the estimated biomass with Kodiak and Shelikof making significant contributions of 21 and 16%. The western Gulf regions accounted for 55% of the estimated biomass while the combined eastern regions followed with 45%. Biomass estimates for Tanner crab should be considered minimal as otter trawls fished at the towing speeds used during these surveys do not adequately sample the larger male crabs.

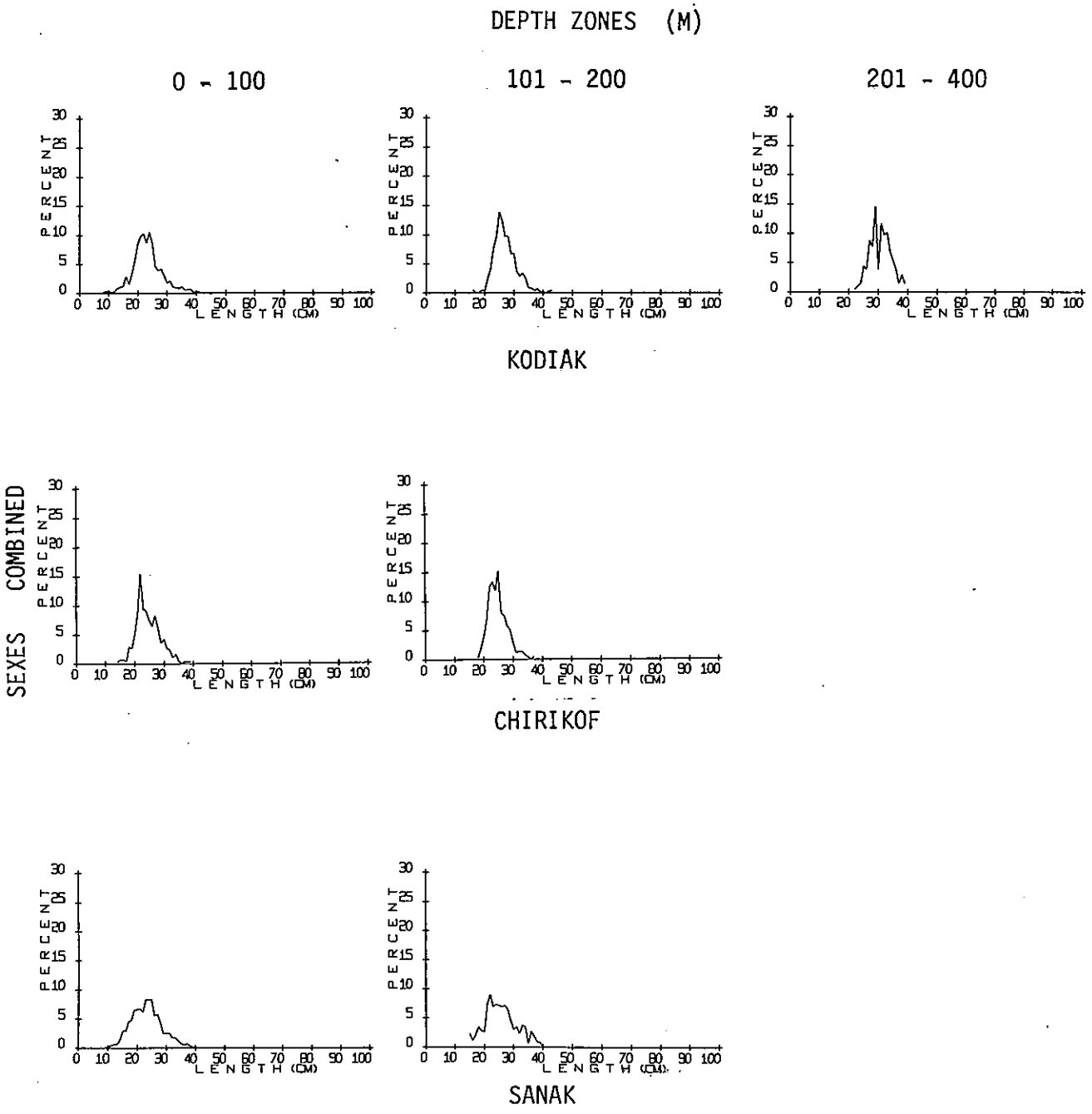


Figure XI-466.--Length frequency distributions of rock sole in the Gulf of Alaska by region-depth zones, 1973-1976.

Table XI-122.--Estimated biomass and population size of rock sole (Lepidopsetta bilineata) in the Gulf of Alaska during April-October 1973-76.

Region	Depth zone (m)	CPUE[1/] (kg/hr)	Estimated biomass (mt)	Proportion of total estimated biomass	Estimated population (X 10^6)	Proportion of total estimated population	Mean size per individual 2/ Weight (kg)	Mean size per individual 2/ Length (cm)
Fairweather	1-100	1.4	48.9	60.2	0.2	100.0	0.30	--
	101-200	0.2	32.3	39.8	4/	5/	1.59	--
	201-400	0	0	0	0	0	--	--
	All zones	0.4	81.2	0.1	0.2	--	0.45	--
Yakutat	1-100	3.3	201.6	100.0	592.3	100.0	0.34	--
	101-200	0	0	0	0	0	--	--
	201-400	0	0	0	0	0	--	--
	All zones	0.7	201.6	0.2	592.3	--	0.34	--
Prince William	1-100	2.7	300.8	95.6	1.2	92.3	0.25	--
	101-200	0.1	13.9	4.4	0.1	7.7	0.27	--
	201-400	0	0	0	0	0	--	--
	All zones	1.1	314.7	0.3	1.3	--	0.25	--
Kenai	1-100	--	--	--	--	--	--	--
	101-200	0.1	17.6	100.0	4/	100.0	0.45	--
	201-400	0	0	0	0	0	--	--
	All zones	0.1	17.6	5/	4/	--	--	--
Kodiak	1-100	245.3	49,455.5	88.7	279.5	93.0	0.18	23.3
	101-200	29.2	3,598.0	6.5	14.0	4.7	0.26	26.9
	201-400	48.4	2,701.0	4.8	7.2	2.4	0.38	30.7
	All zones	172.9	55,754.5	49.7	300.7	--	0.19	--
Shelikof	1-100	2.4	15.7	33.1	4/	--	0.53	--
	101-200	0.1	2.1	4.4	--	--	--	--
	201-400	0.3	29.7	62.5	0.3	--	0.09	--
	All zones	0.3	47.5	5/	--	--	--	--
Chirikof	1-100	15.6	1,870.0	52.3	9.6	53.9	0.20	24.5
	101-200	10.4	1,677.7	46.9	8.1	45.5	0.21	24.7
	201-400	0.2	28.2	0.8	0.1	0.6	0.40	--
	All zones	9.2	3,575.9	3.2	17.8	--	0.20	--
Shumagin	1-100	--	--	--	--	--	--	--
	101-200	--	--	--	--	--	--	--
	201-400	--	--	--	--	--	--	--
	All zones	--	--	--	--	--	--	--
Sanak	1-100	248.6	44,660.8	85.7	251.6	88.9	0.18	23.2
	101-200	45.6	7,448.0	14.3	31.3	11.1	0.24	25.7
	201-400	0.2	4/	0	4/	5/	--	--
	All zones	146.6	52,108.8	46.5	282.9	--	--	--
Total	1-100	147.2	96,553.3	86.1	--	--	--	--
	101-200	10.8	12,789.6	11.4	--	--	--	--
	201-400	5.1	2,758.9	2.5	--	--	--	--
	All zones	46.9	112,101.8	100.0	--	--	--	--

1/ Mean catch per unit effort, in kilograms per hour trawled.
2/ Where data are available.
3/ Less than 0.1 kg/hr.
4/ Less than 0.1 X 10^6 individuals.
5/ Less than 0.1 percent.

able XI-123.--Mean lengths (cm) of rock sole by regions and depth zones (Cruises 734, 753 and 744).

	0-100 m			101-200 m			201-400 m		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
airweather	--	--	--	--	--	--	--	--	--
akutat	--	--	--	--	--	--	--	--	--
rince William	--	--	--	--	--	--	--	--	--
enai	--	--	--	--	--	--	--	--	--
odiak	--	--	23.3	--	--	26.9	--	--	30.7
helikof	--	--	--	--	--	--	--	--	--
hirikof	--	--	24.5	--	--	24.7	--	--	--
humagin	--	--	--	--	--	--	--	--	--
anak	--	--	23.2	--	--	25.7	--	--	--

Size composition—Length-frequency data are available from the Yakutat and Prince William regions. Males were generally larger than females, however, mean lengths never exceeded 100 mm for either sex (Table XI-129 and Figure XI-484).

COTTIDS

Distribution and abundance--In many Gulf of Alaska trawl surveys, sculpins were placed in a common "cottid" group and not identified to individual species. Representing approximately 25 species encountered during the survey, (Table V-3), the cottids were found in all regions and depth zones with the exception of the Fairweather inner shelf. Apparent relative abundance was inversely proportional to bottom depth with the inner shelf having the highest mean CPUE (49 kg/hr) followed by the outer shelf (14 kg/hr) and upper slope (5 kg/hr). The overall mean CPUE for cottids in the Gulf of Alaska averaged 22 kg/hr with the highest average catch rates occurring in the western Gulf. Kodiak and Sanak had the highest mean catch rates with 70 and 51 kg/hr, while the highest CPUE in an eastern region was 4 kg/hr which occurred in Prince William and Kenai. The distribution of the standardized catch rates for the successful stations is presented in Figures XI-485-489.

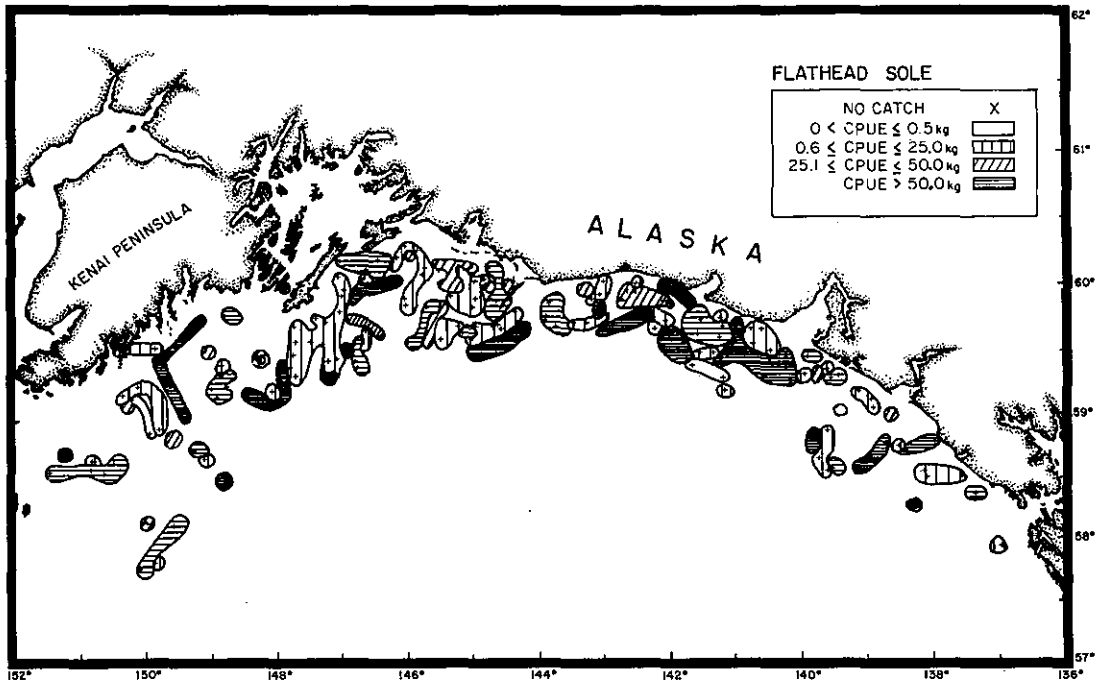


Figure XI-467.--Distribution of apparent relative abundance of flathead sole in the eastern Gulf of Alaska, May-Aug. 1975, Jun.-Aug. 1975, and Apr. 1976 (Cruises 751, 753, and 762).

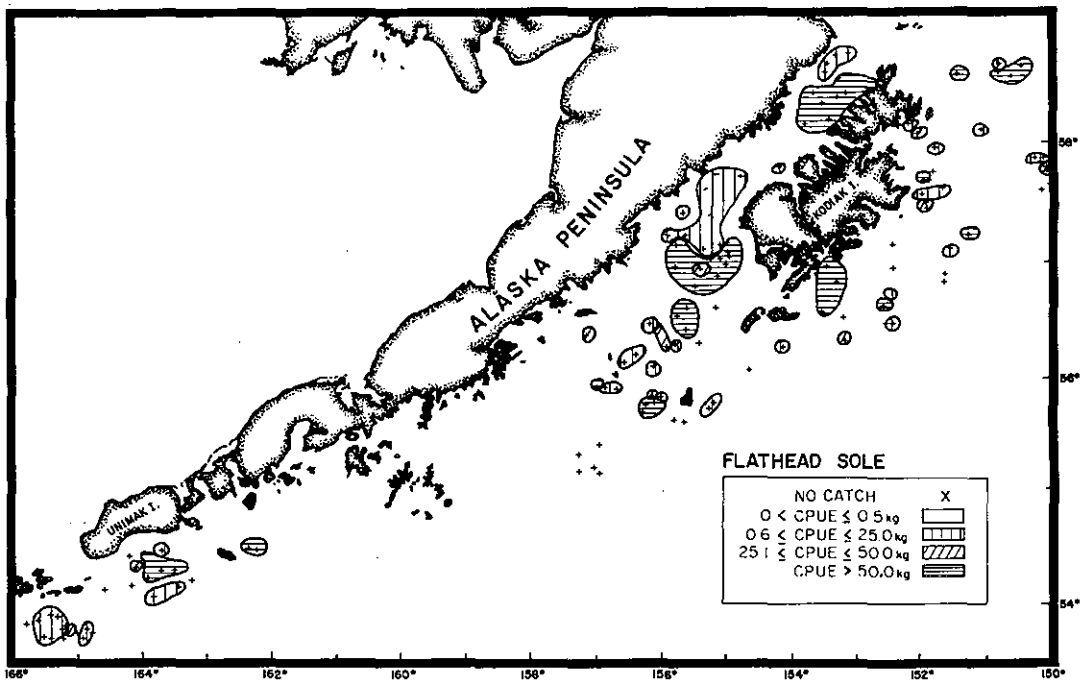


Figure XI-468.--Distribution of apparent relative abundance of flathead sole in the western Gulf of Alaska, May-Jul. 1973, Aug.-Oct. 1973, Jul.-Aug. 1974, and Jun.-Aug. 1975 (Cruises 733, 734, 744, and 753).

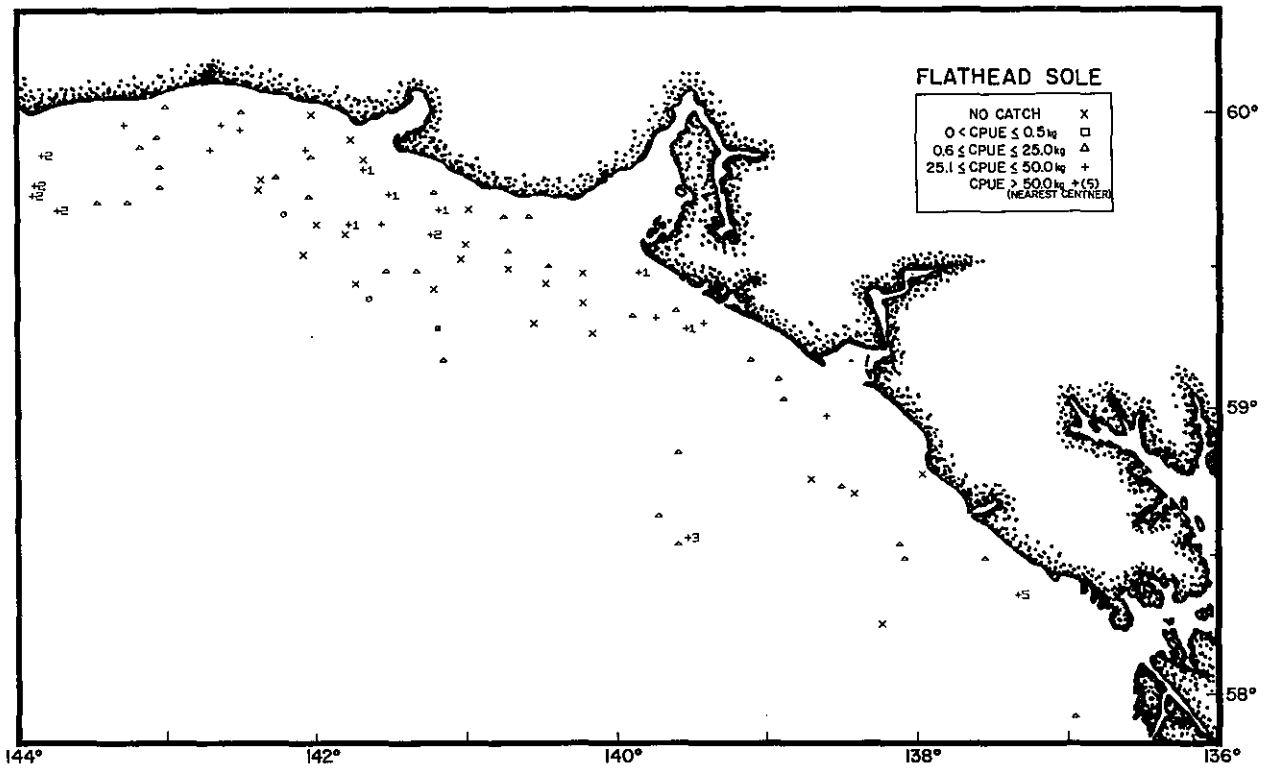


Figure XI-469.--Distribution of standardized catch rates in kilograms/ hour of flathead sole in the eastern Gulf of Alaska, May-Aug. 1975 and Apr. 1976 (Cruises 751 and 762).

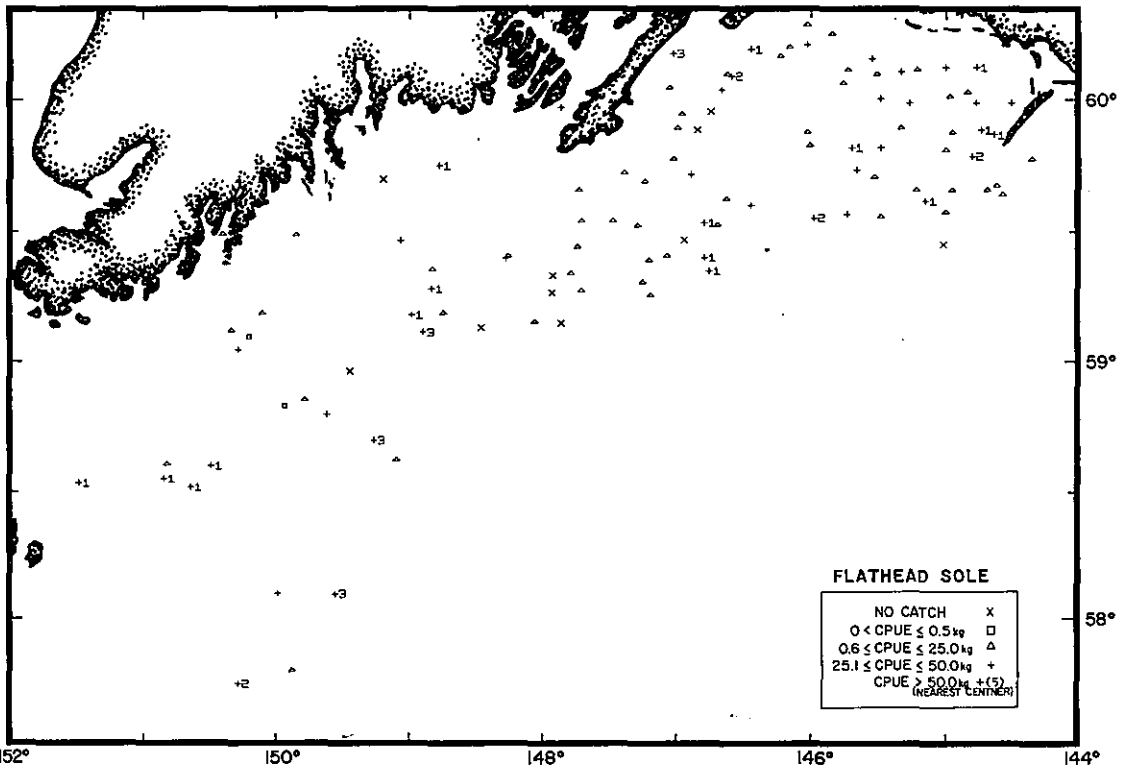


Figure XI-470.--Distribution of standardized catch rates in kilograms/ hour of flathead sole in the eastern Gulf of Alaska, May-Aug. 1975 (Cruises 751 and 753).

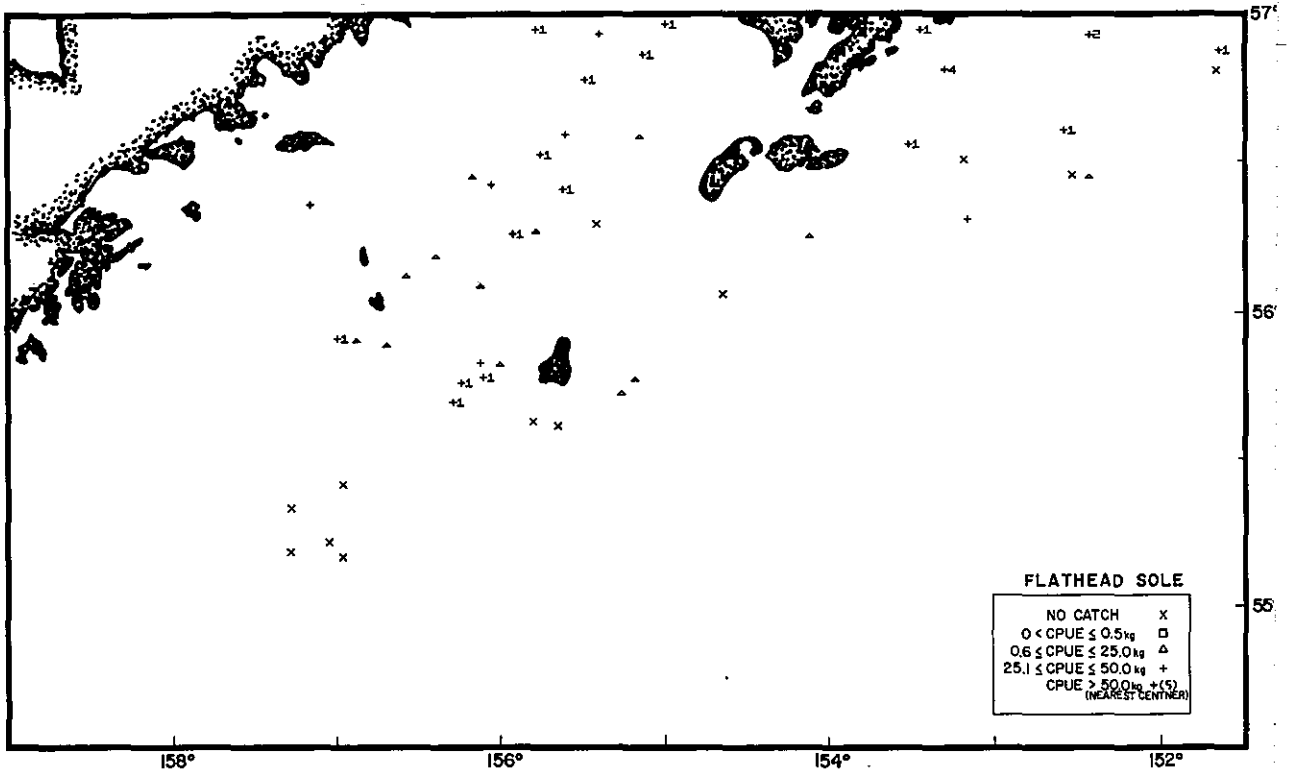


Figure XI-471.--Distribution of standardized catch rates in kilograms/ hour of flathead sole in the western Gulf of Alaska, Aug-Oct. 1973 and Jun.-Aug. 1975 (Cruises 734 and 753).

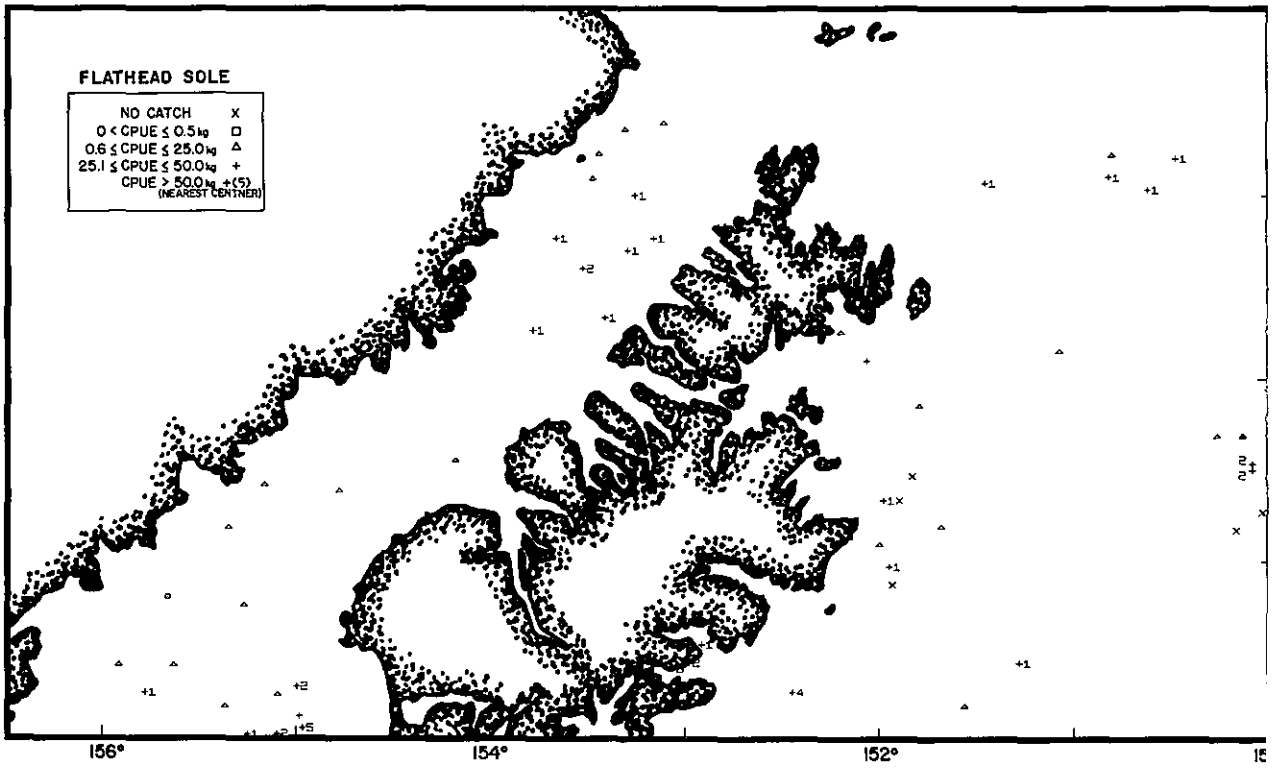


Figure XI-472.--Distribution of standardized catch rates in kilograms/ hour of flathead sole in the western Gulf of Alaska, May-Jun. 1973, Aug.-Oct. 1973, and Jun.-Aug. 1975 (Cruises 733, 734, and 753).

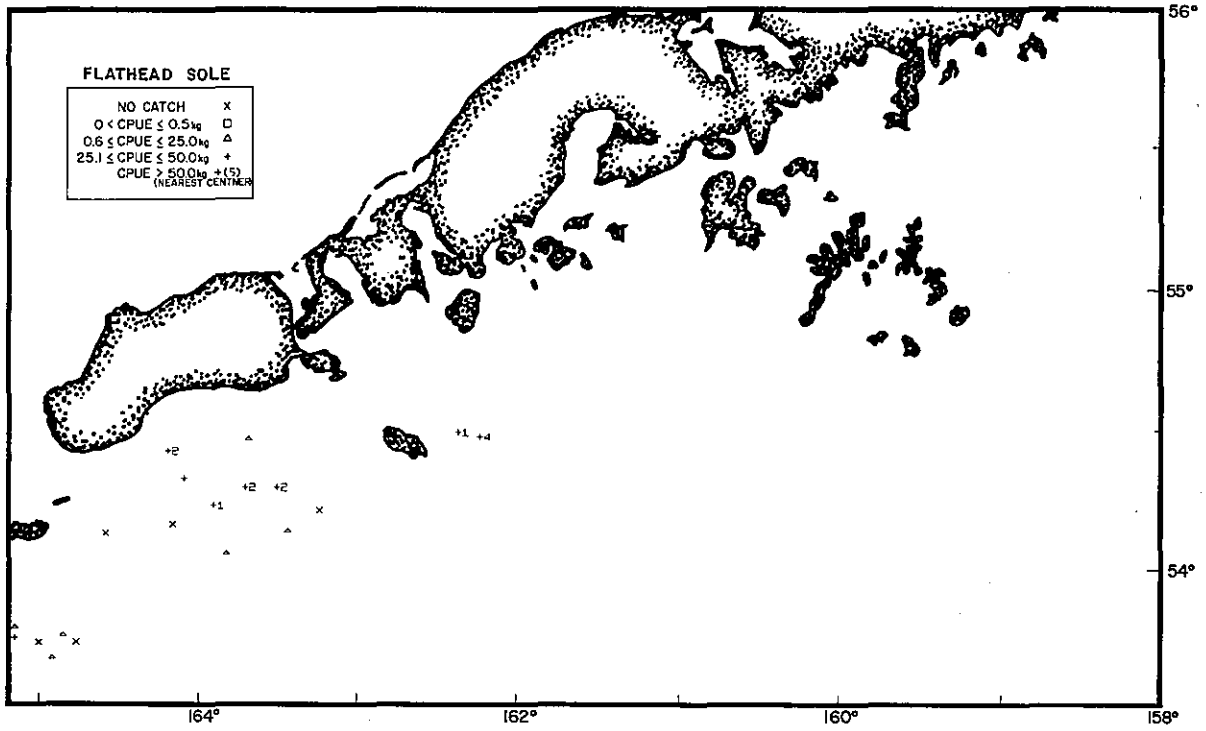


Figure XI-473.--Distribution of standardized catch rates in kilograms/ hour of flathead sole in the western Gulf of Alaska, Jul.-Aug. 1974 (Cruise 744).

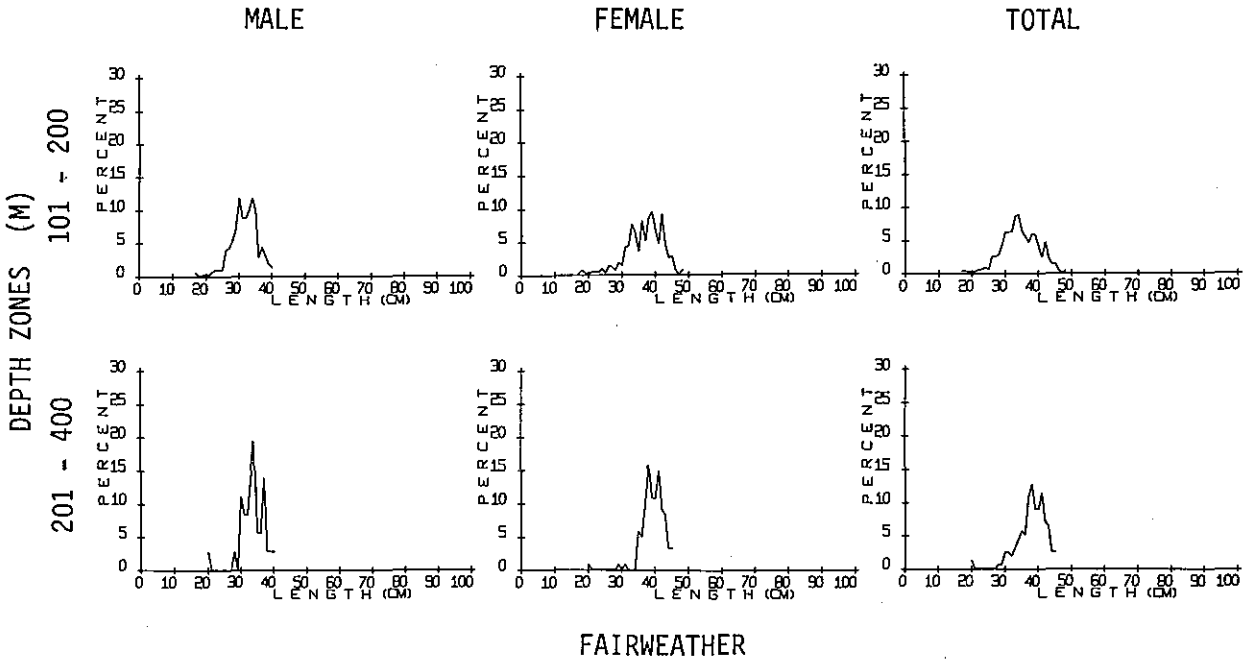


Figure XI-474.--Length frequency distributions of flathead sole in the Gulf of Alaska by region-depth zones, 1973-1976.

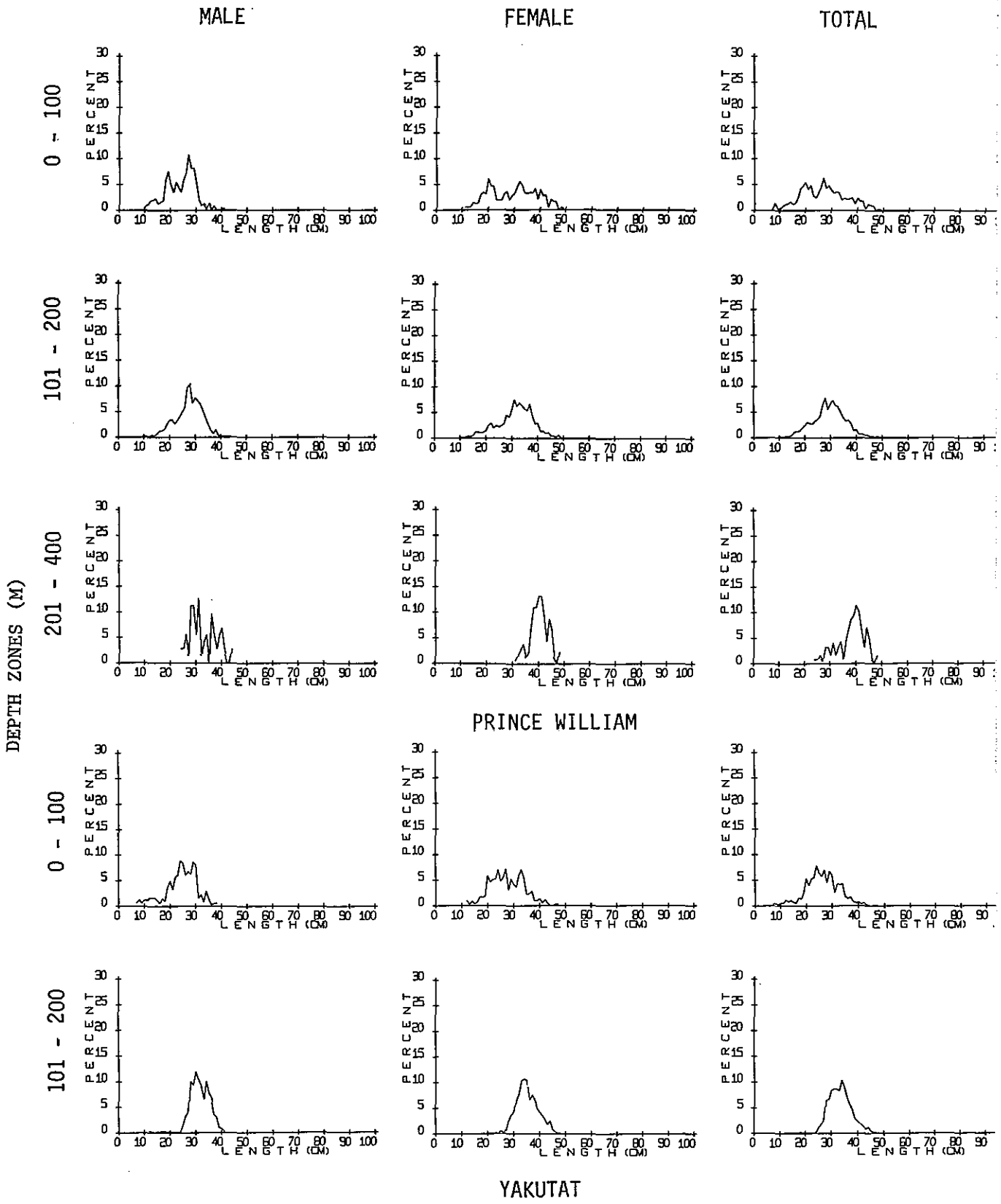


Figure XI-474 (continued).--Length frequency distributions of flathead sole in the Gulf of Alaska by region-depth zones, 1973-1976.

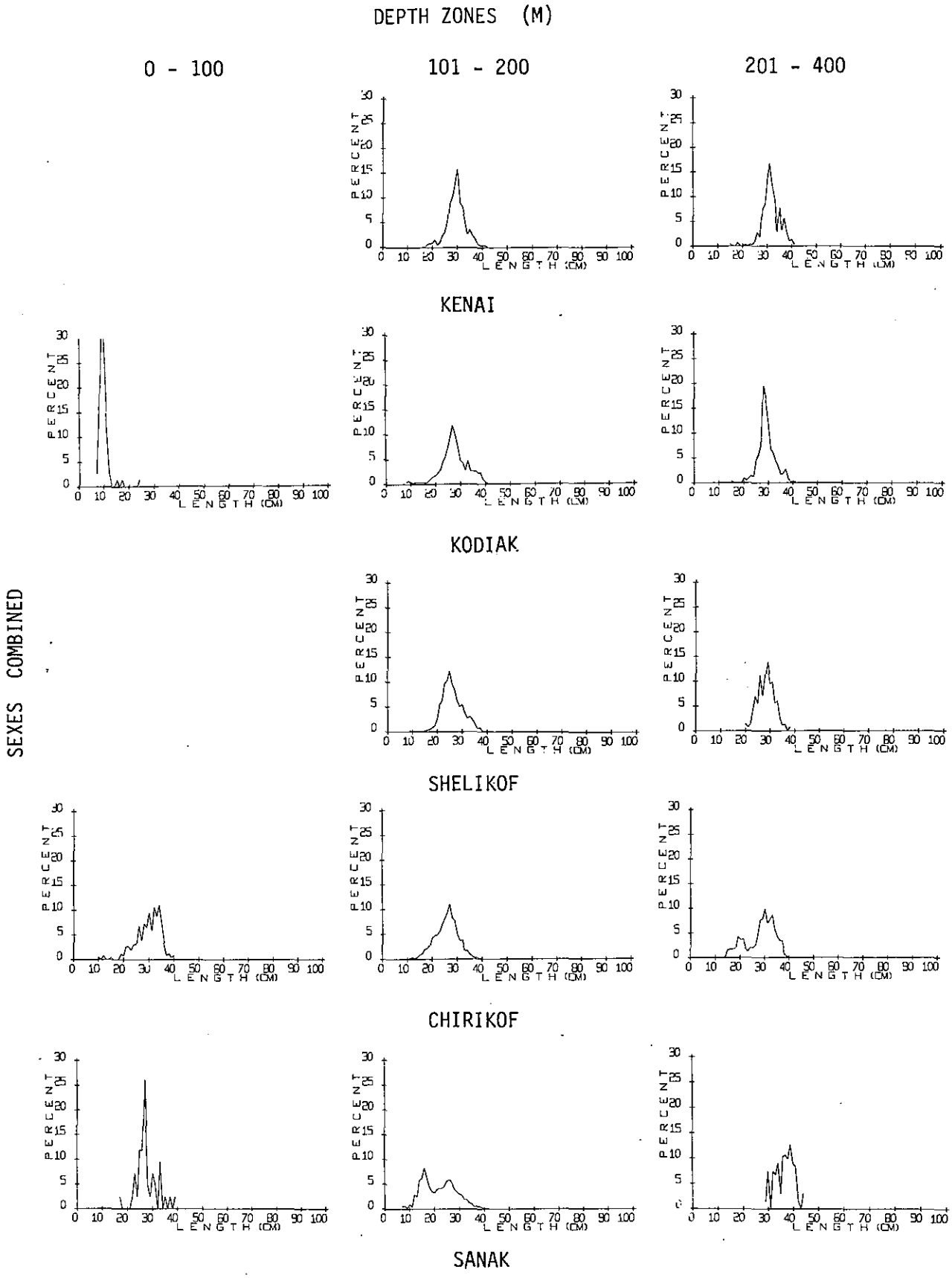


Figure XI-474 (continued).--Length frequency distributions of flathead sole in the Gulf of Alaska by region-depth zones, 1973-1976.

Table XI-124.--Estimated biomass and population size of flathead sole (Hippoglossoides elassodon) in the Gulf of Alaska during April-October 1973-76.

Region	Depth zone (m)	CPUE[1] (kg/hr)	Estimated biomass (mt)	Proportion of total estimated biomass	Estimated population (X 10^6)	Proportion of total estimated population	Mean size per individual[2] Weight (kg)	Mean size per individual[2] Length (cm)
Fairweather	1-100	1.1	40.8	0.4	0.2	0.9	0.19	--
	101-200	44.6	7,264.1	62.9	17.3	77.9	0.42	34.2
	201-400	141.1	4,240.3	36.7	4.7	21.2	0.89	37.9
	All zones	50.4	11,545.2	11.1	22.2	--	0.52	--
Yakutat	1-100	25.8	1,597.2	19.5	7.8	32.4	0.21	26.1
	101-200	44.6	6,524.4	79.8	16.2	67.2	0.40	33.1
	201-400	0.8	51.9	0.6	0.1	0.4	0.35	--
	All zones	29.5	8,173.5	7.9	24.1	--	0.34	--
Prince William	1-100	28.7	3,170.1	34.3	18.5	52.3	0.17	26.8
	101-200	31.4	3,953.6	42.8	13.5	38.1	0.29	29.2
	201-400	57.8	2,106.7	22.8	3.4	9.6	0.63	37.9
	All zones	33.8	9,230.4	8.9	35.4	--	0.26	--
Kenai	1-100	--	--	--	--	--	--	--
	101-200	54.8	13,300.2	86.1	54.2	88.6	0.25	29.4
	201-400	21.3	2,141.6	13.9	7.0	11.4	0.30	31.6
	All zones	45.0	15,441.8	14.9	61.2	--	0.25	--
Kodiak	1-100	14.1	2,013.7	10.6	--	--	--	--
	101-200	114.2	14,093.3	74.5	67.6	--	0.21	27.5
	201-400	50.4	2,812.3	14.9	12.0	--	0.23	29.2
	All zones	58.7	18,919.3	18.3	--	--	--	--
Shelikof	1-100	5.1	33.3	0.3	4/	5/	--	--
	101-200	149.9	6,117.0	60.6	36.3	66.1	0.17	26.1
	201-400	37.8	3,944.7	39.1	18.6	33.9	0.21	28.3
	All zones	66.6	10,095.0	9.7	54.9	--	--	--
Chirikof	1-100	15.8	1,883.5	13.5	7.8	12.7	0.24	29.7
	101-200	34.4	5,548.6	39.7	31.0	50.4	0.18	25.6
	201-400	48.8	6,535.7	46.8	22.7	36.9	0.29	28.4
	All zones	32.6	13,967.8	13.5	61.5	--	0.23	--
Shumagin	1-100	--	--	--	--	--	--	--
	101-200	--	--	--	--	--	--	--
	201-400	--	--	--	--	--	--	--
	All zones	--	--	--	--	--	--	--
Sanak	1-100	7.9	1,426.2	8.8	--	--	--	--
	101-200	89.3	14,578.6	89.5	126.2	--	0.12	21.8
	201-400	22.2	277.7	1.7	0.6	--	0.48	36.5
	All zones	45.8	16,282.5	15.7	--	--	--	--
Total	1-100	15.4	10,164.8	9.8	--	--	--	--
	101-200	61.2	71,379.8	68.9	362.3	--	0.20	--
	201-400	40.7	22,110.9	21.3	69.1	--	0.32	--
	All zones	43.7	103,655.5	100.0	--	--	--	--

1/ Mean catch per unit effort, in kilograms per hour trawled.
2/ Where data are available.
3/ Less than 0.1 kg/hr.
4/ Less than 0.1 X 10^6 individuals.
5/ Less than 0.1 percent.

Table XI-125.--Mean lengths (cm) of flathead sole by regions and depth zones (Cruises 733, 734, 744, 751, 753 and 762).

	0-100 m			101-200 m			201-400 m		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Fairweather	--	--	--	31.6	36.6	34.2	33.4	39.3	27.9[1/]
Yakutat	24.4	27.6	26.1	31.5	35.1	33.1	--	--	--
Prince William	23.8	29.5	26.8	27.4	31.4	29.2	32.6	40.0	37.9
Kenai	--	--	--	--	--	29.4	--	--	31.6
Kodiak	--	--	9.8[1/]	--	--	27.5	--	--	29.2
Shelikof	--	--	--	--	--	26.1	--	--	28.3
Chirikof	--	--	29.7	--	--	25.6	--	--	28.4
Shumagin	--	--	--	--	--	--	--	--	--
Sanak	--	--	27.7[1/]	--	--	21.8	--	--	36.5

[1/] The limited number of length-frequency samples taken from this region-depth zone probably do not represent the size composition adequately.

Biomass--The biomass of cottids in the Gulf of Alaska has been estimated at 51 thousand mt of which 63% occurred in the inner shelf, 32% in the outer shelf and 5% in the upper slope (Table XI-130). The two western Gulf regions of Kodiak and Sanak accounted for 79% of the total biomass while the combined eastern regions represented only 7%.

Size composition--No length-frequency data are available for this group.

REX SOLE

Distribution and abundance--With the exception of the Shelikof-inner shelf, rex sole was taken throughout all regions and depth zones sampled. By depths, the apparent relative abundance of this species was highest in the upper slope (40 kg/hr) but decreased to below the survey average in the outer and inner shelf. Regional CPUE's ranged from 13 to 24 kg/hr in the eastern Gulf, 0.1 to 46 kg/hr in the western Gulf and averaged 20 kg/hr over all regions. The distribution of the standardized catch rates for the successful stations are presented in Figures XI-490-494.

Table XI-126.--Parameters for the length-weight relationship (weight (g) = a · length^b) for flathead sole (Cruise 751).

		YAKUTAT				PRINCE WILLIAM			
	Depth	Sample Size	Range in Length (cm)	Parameters (a)	(b)	Sample Size	Range in Length (cm)	Parameters (a)	(b)
Males	0-100	--	--	--	--	--	--	--	--
	101-200	148	12-40	0.003786	3.265029	68	15-40	0.003439	3.276732
	201-400	--	--	--	--	55	24-39	0.006236	3.094872
Females	0-100	--	--	--	--	--	--	--	--
	101-200	139	22-47	0.006949	3.089048	98	15-48	0.002442	3.366945
	201-400	--	--	--	--	10	30-42	0.066091	2.433716

Table XI-127.--Summary of age-length data collected for flathead sole (Cruise 751).

Sex	REGIONS					
	Yakutat			Prince William		
	DEPTH ZONES (M)					
Males	0-100	101-200	201-400	0-100	101-200	201-400
Number of readable otoliths	51	119	--	--	84	52
Range in age (years)	4-18	5-22	--	--	4-19	5-20
Range in length (cm)	20-38	24-40	--	--	20-41	23-40
Females						
Number of readable otoliths	53	135	--	--	99	17
Range in age (years)	4-16	4-18	--	--	4-19	6-14
Range in length (cm)	20-42	21-47	--	--	20-48	29-42

Biomass--The total estimated biomass for rex sole in the Gulf of Alaska has been estimated at 47 thousand mt of which 47% occurred in the upper slope and outer shelf depth zones (Table XI-131). Kodiak and Sanak accounted for nearly 57% of the total biomass with 83% of the Kodiak contribution occurring in the upper slope and 84% of the Sanak contribution coming from the outer shelf. The eastern Gulf regions contributed 39% to the total biomass while the western regions accounted for 61%. The mean CPUE for rex sole averaged 20 kg/hr for the entire Gulf of Alaska and was highest in the Kodiak (46 kg/hr), Sanak (34 kg/hr) and Yakutat regions (24 kg/hr).

Size composition--Length frequency data by sexes are available from the three easternmost regions; while unsexed data are available from the Kenai, Kodiak, Chirikof and Sanak regions (Figure XI-495). Females were always larger than males with both sexes generally increasing in length with increasing depth (Table XI-132). Largest mean lengths occurred in the easternmost and westernmost regions of the survey area. In the eastern Gulf rex sole, sexes combined, ranged from 22.4-32.0 cm while mean lengths varied from 19.6-37.2 cm in the western regions.

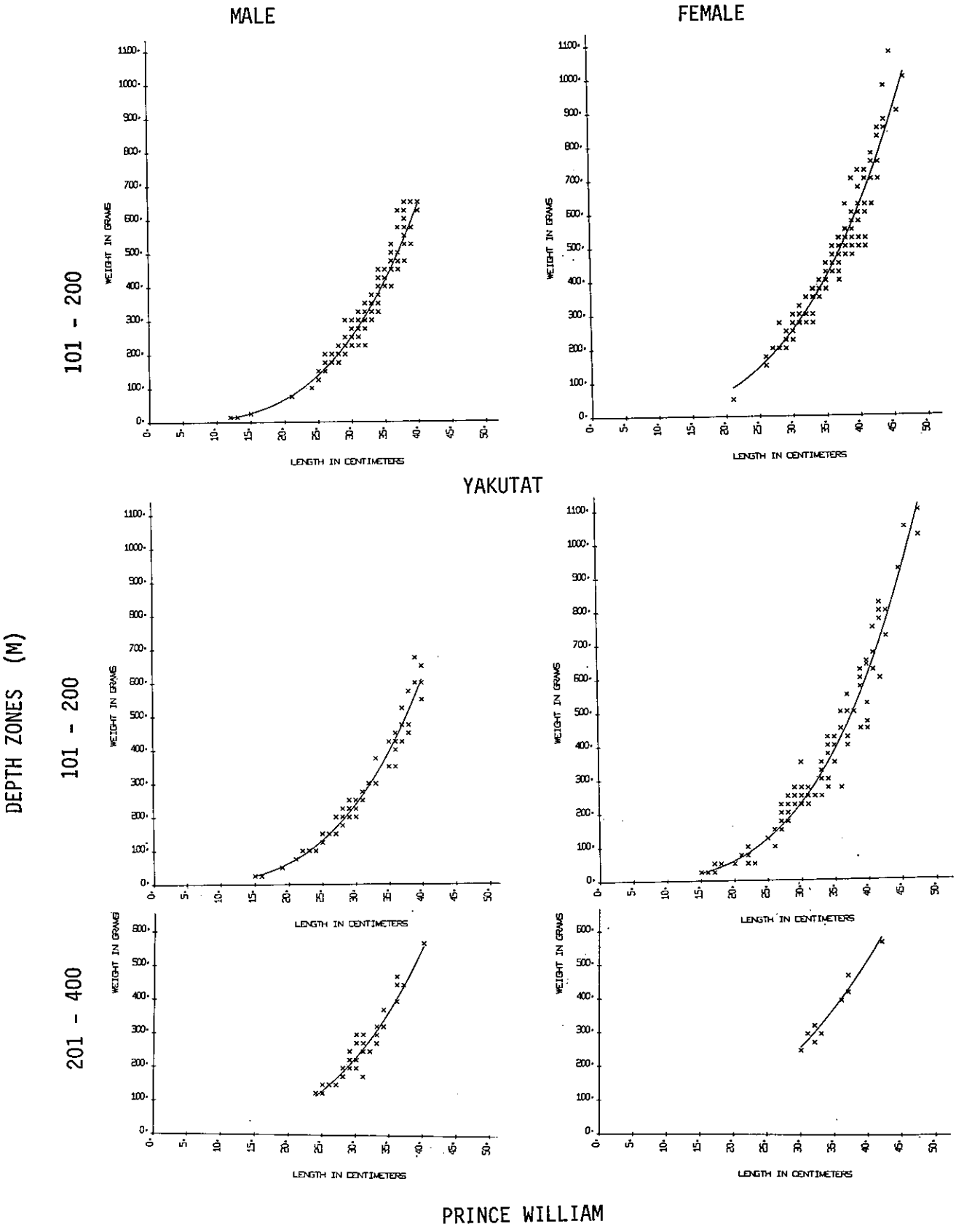
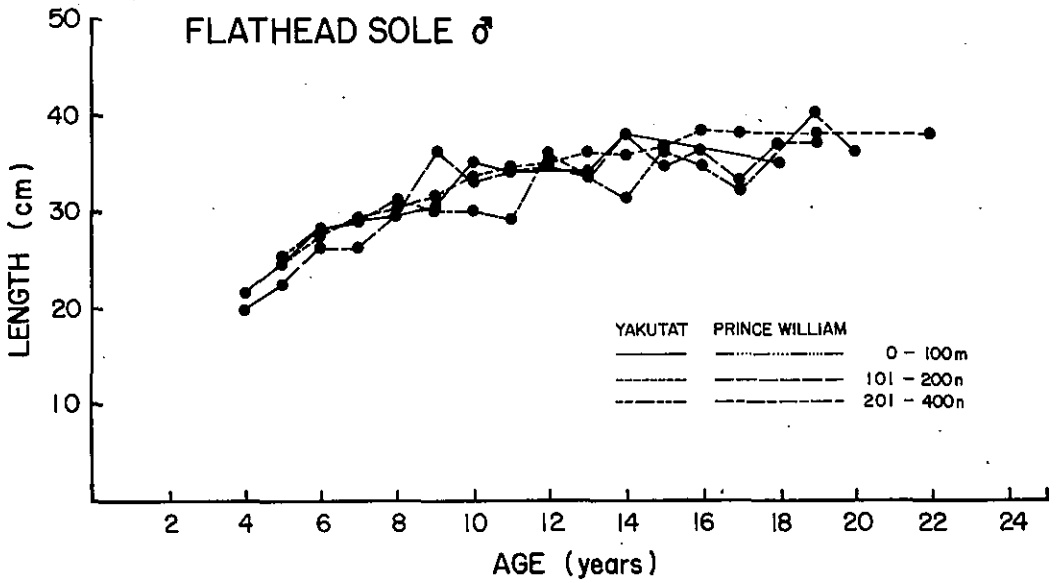


Figure XI-475.—Weight at length observations for flathead sole in the Gulf of Alaska by regions and depth zones, May-Aug. 1975 (Cruise 751).



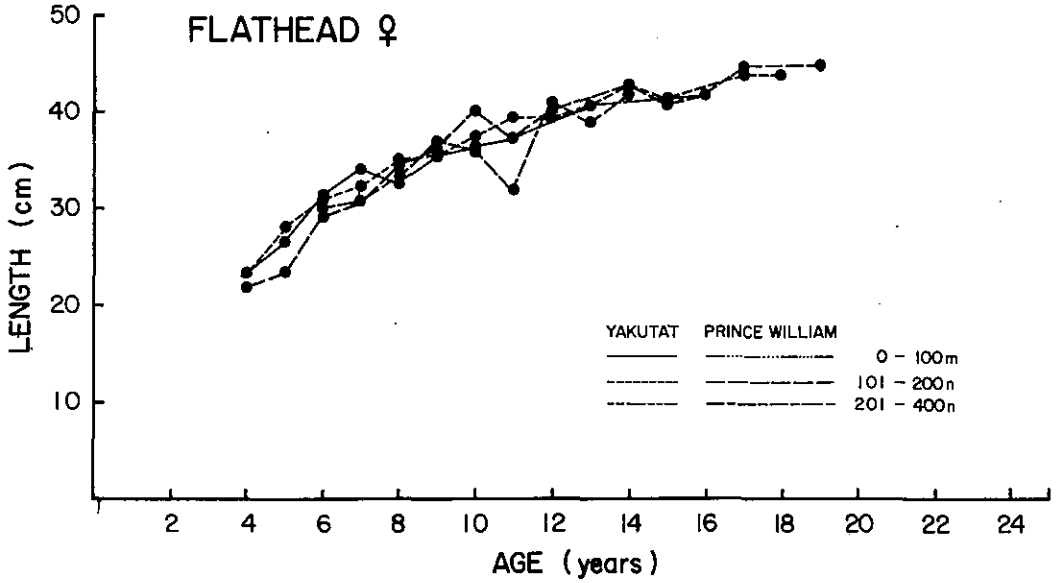


Figure XI-476.--Mean lengths at age for flathead sole by sex and region-depth zones in the Gulf of Alaska, May-Aug. 1975 (Cruise 751.)

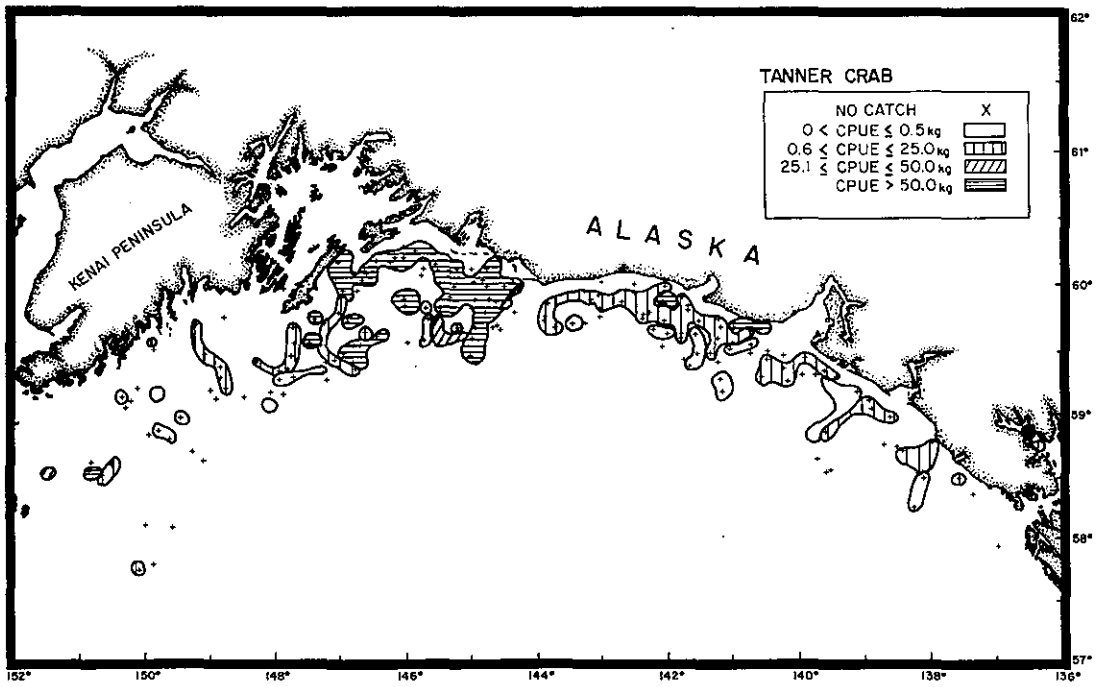


Figure XI-477.--Distribution of apparent relative abundance of Tanner crab in the eastern Gulf of Alaska, May-Aug. 1975, Jun.-Aug. 1975, and Apr. 1976 (Cruises 751, 753, and 762).

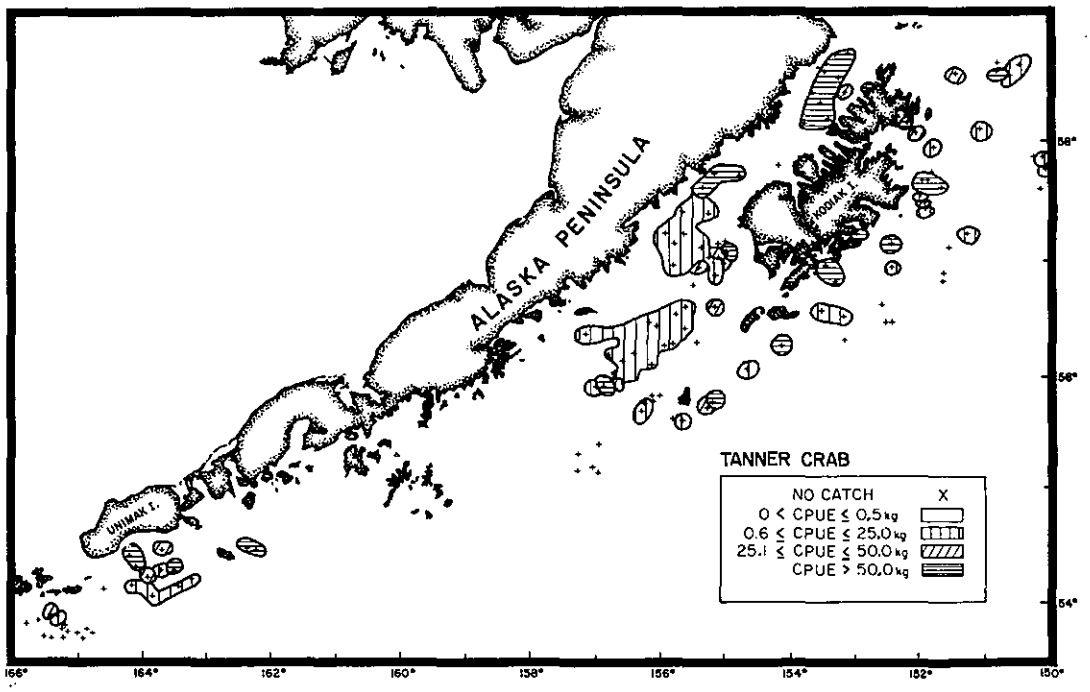


Figure XI-478.--Distribution of apparent relative abundance of Tanner crab in the western Gulf of Alaska, May-Jul. 1973, Aug-Oct. 1973, Jul.-Aug. 1974, and Jun.-Aug. 1975 (Cruises 733, 734, 744, and 753).

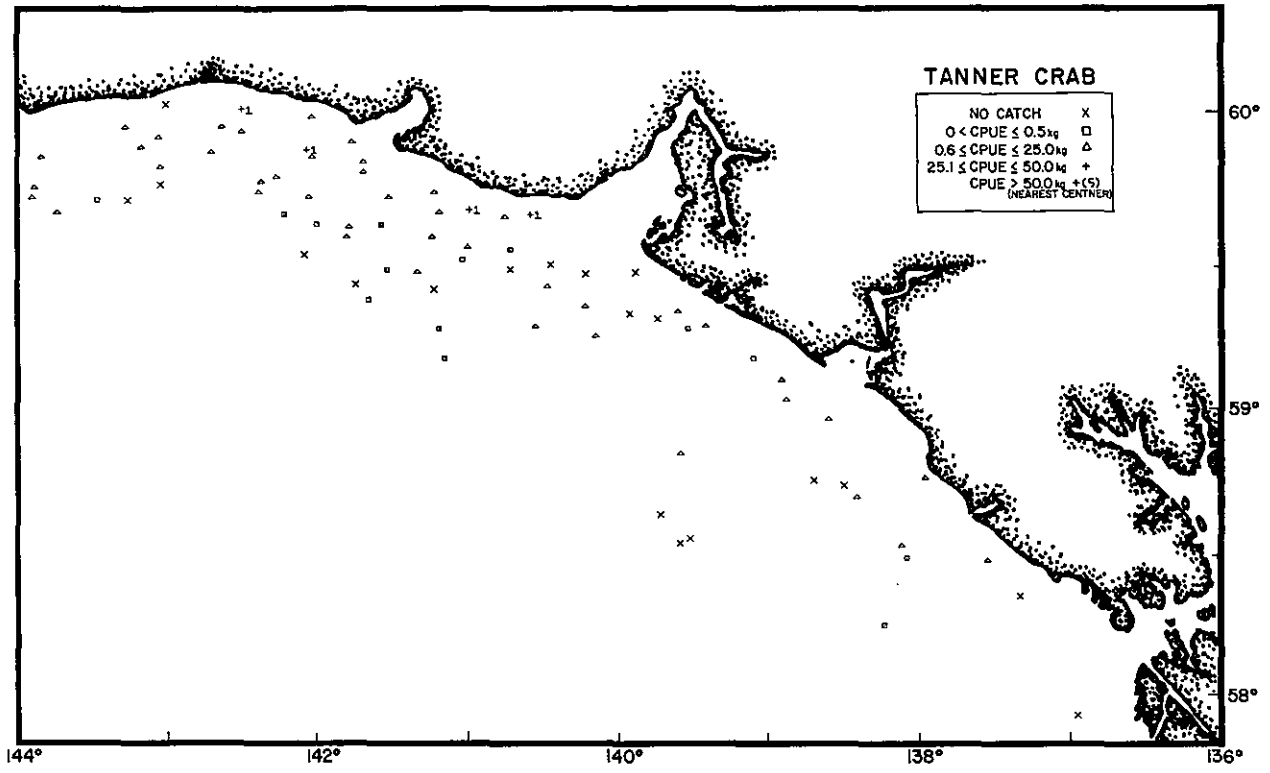


Figure XI-479.--Distribution of standardized catch rates in kilograms/ hour of Tanner crab in the eastern Gulf of Alaska, May-Aug. 1975 and Apr. 1976 (Cruises 751 and 762).

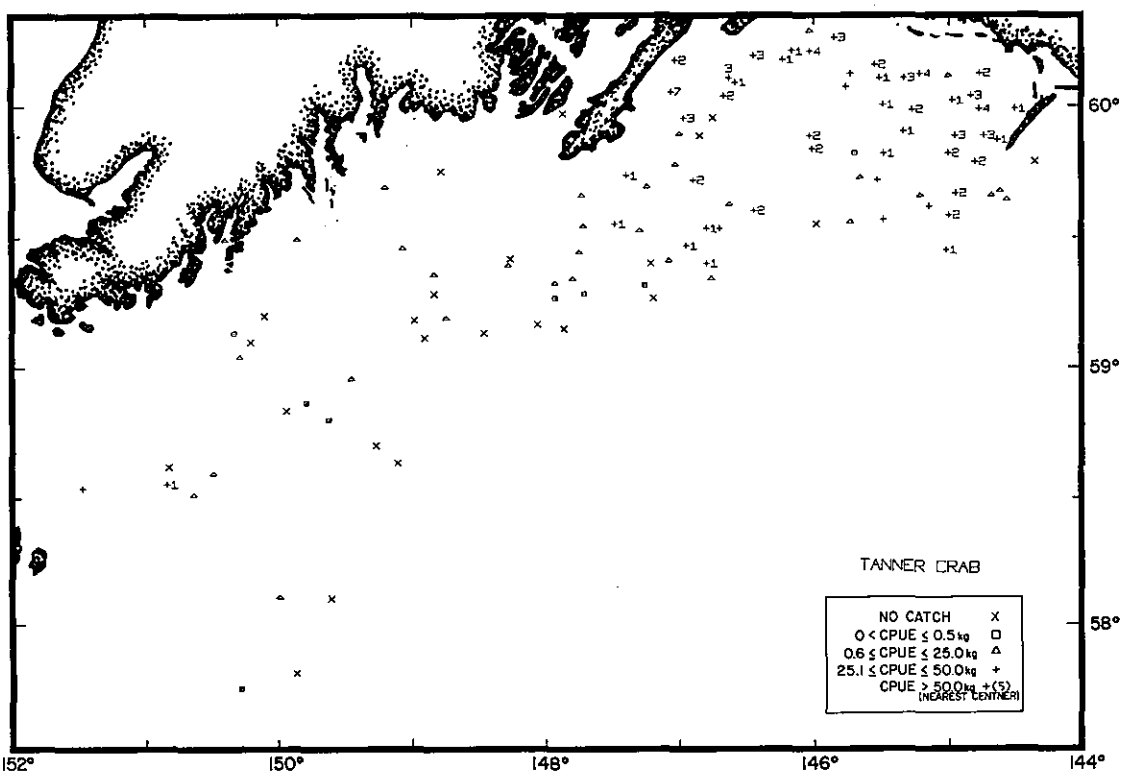


Figure XI-480.--Distribution of standardized catch rates in kilograms/ hour of Tanner crab in the eastern Gulf of Alaska, May-Aug. 1975 (Cruises 751 and 753).

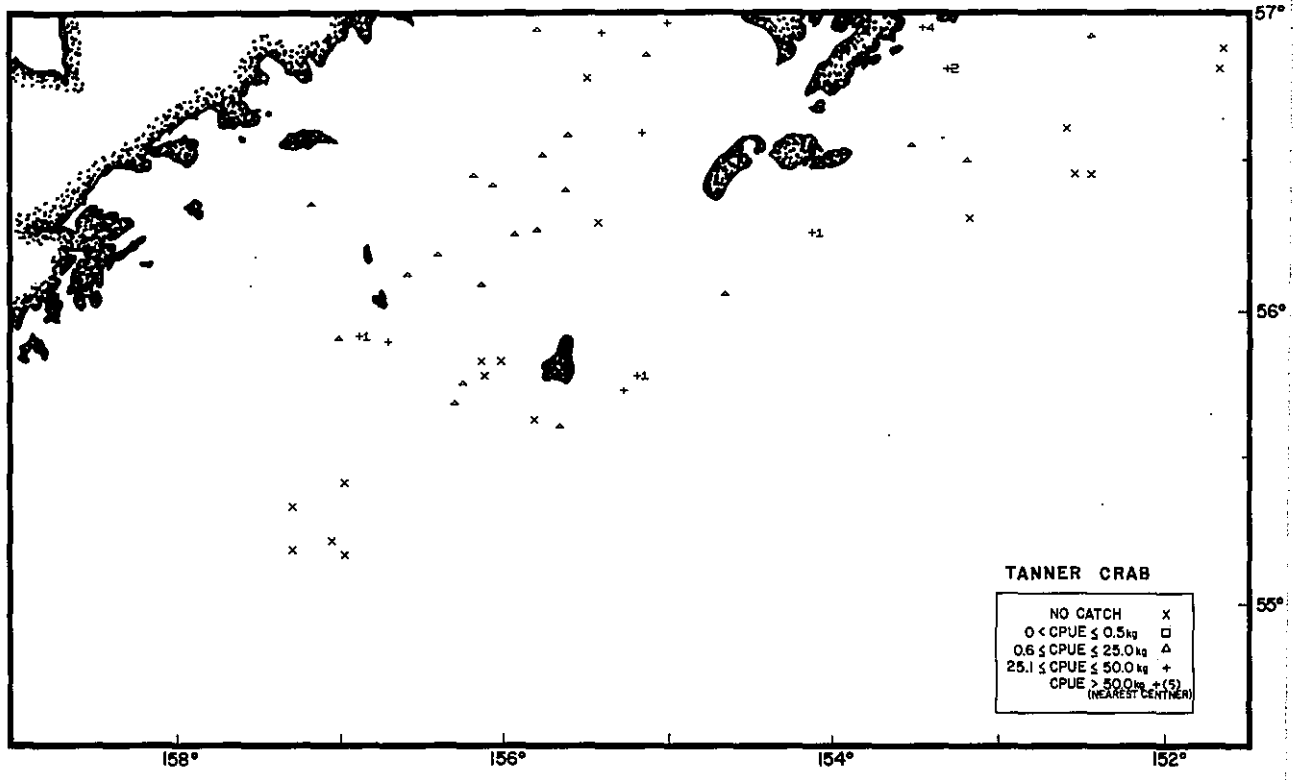


Figure XI-481.--Distribution of standardized catch rates in kilograms/ hour of Tanner crab in the western Gulf of Alaska, Aug.-Oct. 1973 and Jun.-Aug. 1975 (Cruises 734 and 753).

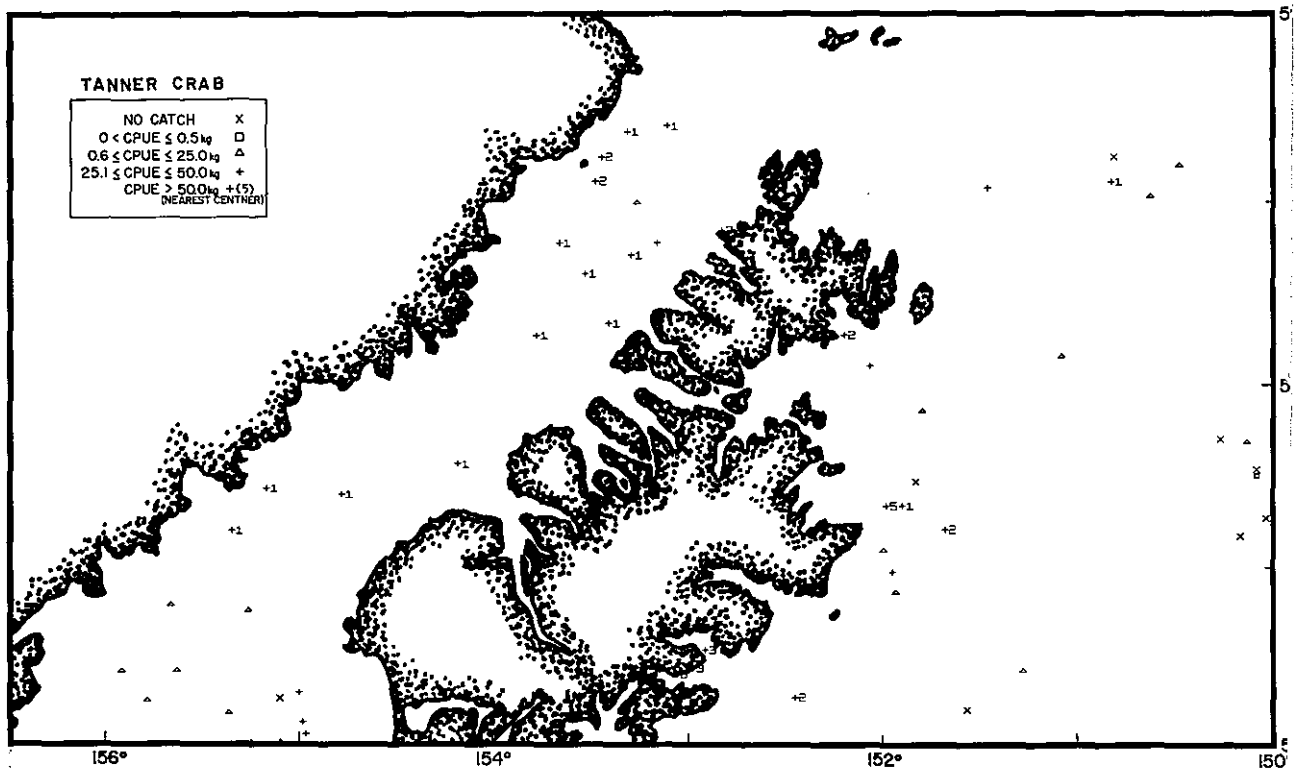


Figure XI-482.--Distribution of standardized catch rates in kilograms/ hour of Tanner crab in the western Gulf of Alaska, May-Jun. 1973, Aug.-Oct. 1973, and Jun.-Aug. 1975 (Cruises 733, 734, and 753).

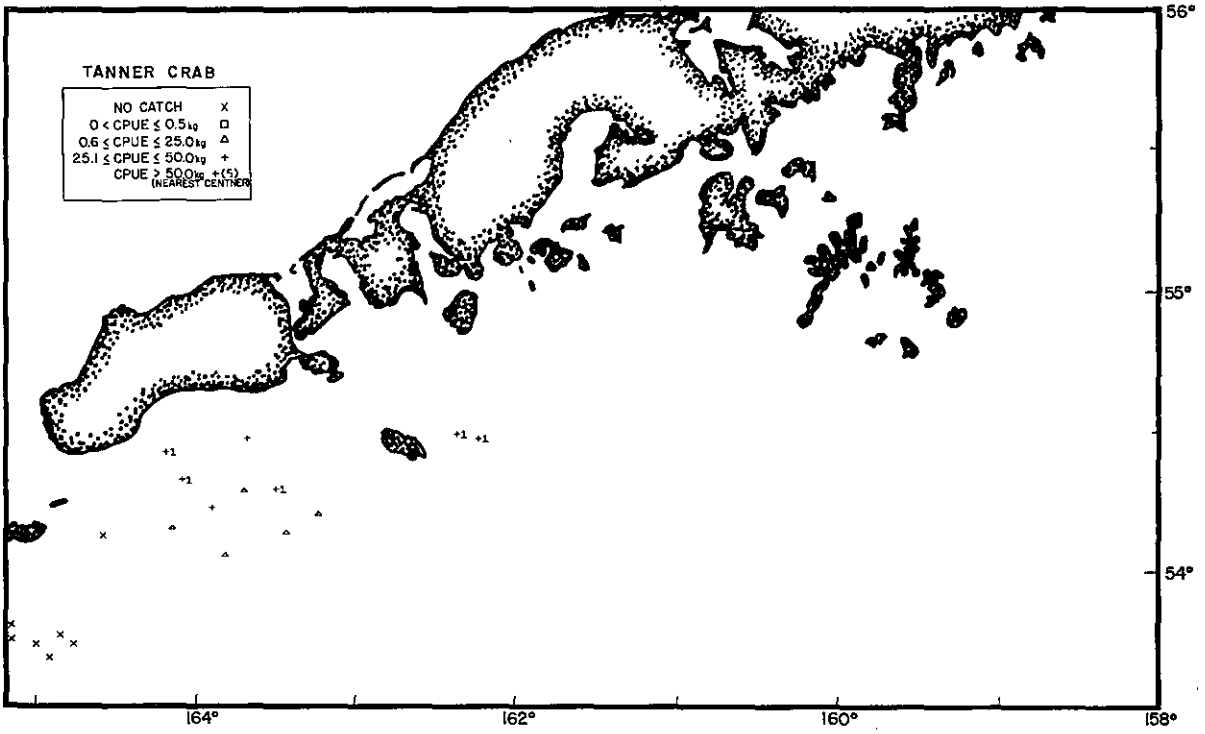


Figure XI-483.--Distribution of standardized catch rates in kilograms/ hour or Tanner crab in the western Gulf of Alaska, Jul.-Aug. 1974 (Cruise 744).

Length-weight relationship--Six hundred and sixty length-weight observations are available from the Yakutat and Prince William-outer shelf and upper slope depth zones. The coefficients of regression are presented by sexes and depth zones in Table XI-133 while the individual observations and resulting regression lines are shown graphically in Figure XI-496.

Age-length relationship--Age and length data collected from the Yakutat and Prince William regions are presented in Table XI-134.

These data are summarized in Figure XI-497 by plots of mean lengths-at-age by sexes and regions. In general, both sexes had similar mean length-at-age values through approximately eleven years with relatively small variations occurring between regions and depths for each sex.

DOVER SOLE

Distribution and abundance--The apparent relative abundance of Dover sole increased with depth in all regions except Kenai where the highest mean CPUE occurred in the outer shelf. Over all regions, the upper slope averaged 52 kg/hr, the outer shelf 14 kg/hr and the inner shelf had a mean catch rate of less than 1 kg/hr. The Kodiak region had the highest mean CPUE (64 kg/hr) due mainly to a 302 kg/hr contribution from the upper slope. Other regions with an apparent abundance greater than the Gulf of Alaska average (19 kg/hr) were Kenai and Yakutat. The distribution of the standardized catch rates for the successful stations is presented in Figures XI-498-502.

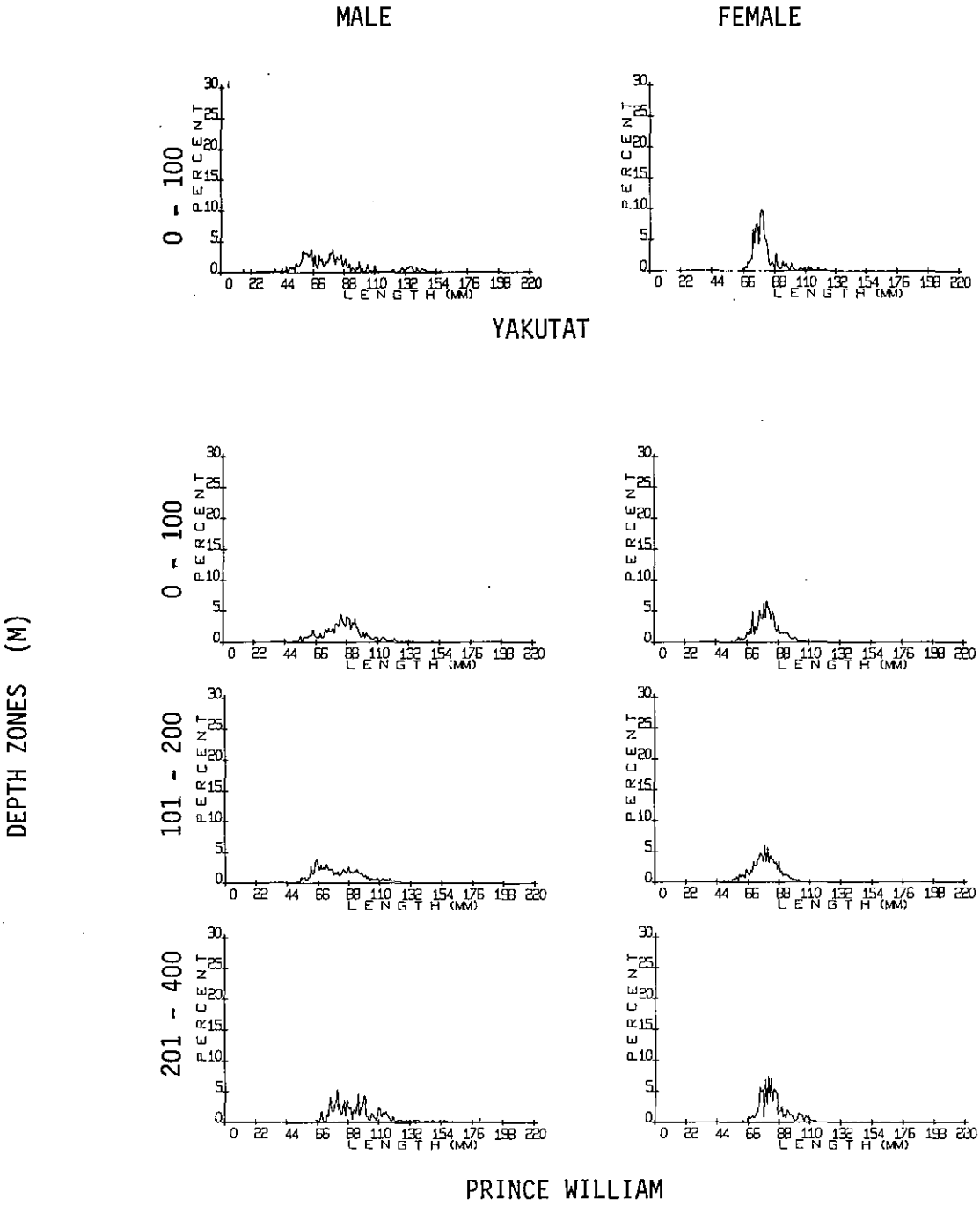


Figure XI-484.--Length frequency distributions of Tanner crab in the Gulf of Alaska by region-depth zones, 1973-1976.

Table XI-128.--Estimated biomass and population size of Tanner crab (Chionoecetes bairdi) in the Gulf of Alaska during April-October 1973-76.

Region	Depth zone (m)	CPUE 1/ (kg/hr)	Estimated biomass (mt)	Proportion of total estimated biomass	Estimated population (X 10^6)	Proportion of total estimated population	Mean size per individual 2/ Weight (kg)	Mean size per individual 2/ Length (mm)
Fairweather	1-100	2.0	73.4	7.3	0.2	8.0	0.36	--
	101-200	5.7	934.7	92.7	2.3	72.0	0.40	--
	201-400	0	0	0	0	0	--	--
	All zones	4.4	1,008.1	1.1	2.5	0.7	0.40	--
Yakutat	1-100	24.0	1,487.6	73.8	8.8	74.0	0.17	--
	101-200	5.2	756.3	32.4	2.5	21.0	0.30	--
	201-400	1.3	87.9	3.8	0.6	5.0	0.16	--
	All zones	8.4	2,331.9	2.7	11.9	3.2	0.20	--
Prince William	1-100	121.3	13,415.2	38.6	83.2	42.3	0.16	--
	101-200	106.4	13,414.7	38.7	78.7	40.0	0.17	--
	201-400	215.1	7,839.7	22.6	34.9	17.7	0.22	--
	All zones	126.9	34,669.6	39.4	196.8	52.1	0.18	--
Kenai	1-100	--	--	--	--	--	--	--
	101-200	5.8	1,397.7	73.8	4.7	82.5	0.30	--
	201-400	4.9	496.1	26.2	1.0	17.5	0.52	--
	All zones	5.5	1,893.8	2.2	5.7	1.5	0.35	--
Kodiak	1-100	15.0	2,143.6	11.4	6.7	14.5	0.32	--
	101-200	110.9	13,682.7	73.0	37.1	80.1	0.37	--
	201-400	52.3	2,918.5	15.6	2.5	5.4	1.15	--
	All zones	58.2	18,744.8	21.3	46.3	12.3	0.41	--
Shelikof	1-100	150.9	978.0	6.9	2.4	2.9	0.41	--
	101-200	57.2	2,334.5	16.5	10.2	12.3	0.23	--
	201-400	103.7	10,807.3	76.5	70.3	84.8	0.15	--
	All zones	93.2	14,119.8	16.0	82.9	21.9	0.17	--
Chirikof	1-100	9.1	1,084.1	16.6	0.6	5.6	1.81	--
	101-200	26.0	4,192.2	64.3	7.8	72.2	0.54	--
	201-400	9.3	1,247.6	19.1	2.4	22.2	0.51	--
	All zones	16.2	6,523.9	7.4	10.8	2.9	0.60	--
Shumagin	1-100	--	--	--	--	--	--	--
	101-200	--	--	--	--	--	--	--
	201-400	--	--	--	--	--	--	--
	All zones	--	--	--	--	--	--	--
Sanak	1-100	20.4	3,667.4	41.9	11.7	55.7	0.31	--
	101-200	31.2	5,088.8	58.1	9.3	44.3	0.55	--
	201-400	0	0	0	0	0	--	--
	All zones	24.6	8,756.2	9.9	21.0	5.6	0.42	--
Total	1-100	34.1	22,849.3	30.0	113.6	30.1	0.20	--
	101-200	35.6	41,801.6	47.5	152.7	40.4	0.27	--
	201-400	42.4	23,397.1	26.6	111.7	29.6	0.21	--
	All zones	36.9	88,048.0	100.0	377.9	100.1	0.23	--

1/ Mean catch per unit effort, in kilograms per hour trawled.
2/ Where data are available.
3/ Less than 0.1 kg/hr.
4/ Less than 0.1 X 10^6 individuals.
5/ Less than 0.1 percent.

Table XI-129.--Mean lengths (mm) of Tanner crab by regions and depth zones (Cruise 7

	0 - 100			101 - 200			201 - 400		
	Male	Female	Total	Male	Female	Total	Male	Female	Tot
Fairweather	--	--	--	--	--	--	--	--	--
Yakutat	78.9	80.4	--	--	--	--	--	--	--
Prince William	85.6	79.7	--	81.9	77.8	--	95.9	83.7	--
Kenai	--	--	--	--	--	--	--	--	--
Kodiak	--	--	--	--	--	--	--	--	--
Shelikof	--	--	--	--	--	--	--	--	--
Chirikof	--	--	--	--	--	--	--	--	--
Shumagin	--	--	--	--	--	--	--	--	--
Sanak	--	--	--	--	--	--	--	--	--

Biomass--Sixty-four percent of the estimated 45 thousand mt of Dover sole occurred in the upper slope depth zone (Table XI-135). The outer shelf contributed 36% while the inner shelf represented less than 1%. Forty-five percent of the estimated biomass was contained in the Kodiak region, while Kenai and Yakutat contributed 24 and 17% respectively. The biomass estimate for Dover sole is most probably low as the bathymetric range of this species, which extends to approximately 600 fathoms, was not adequately sampled during these surveys.

Size composition--In the three easternmost regions where sexed length measurements were taken, females were generally larger than males with both sexes increasing in length with depth (Table XI-136). Mean lengths, sexes combined, ranged from 30.0 cm in the Prince William-inner shelf to 41.1 cm in the Sanak-upper slope (Figure XI-503).

Length-weight relationship--The coefficients which fit the regression lines derived from 325 length-weight observations in the Yakutat and Prince William regions are summarized in Table XI-137 by sexes and depth zones. Data points representing all length weight observations are presented graphically by region-depth zones in Figure XI-504.

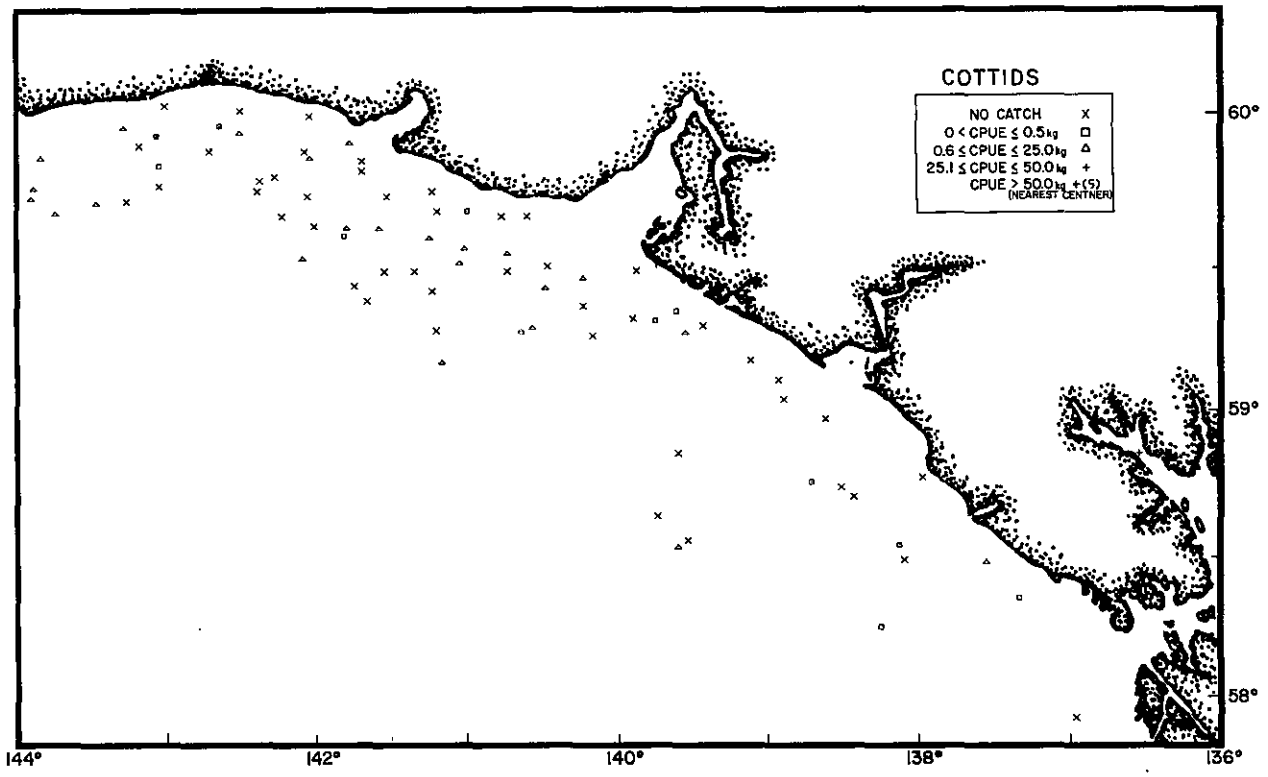


Figure XI-485.--Distribution of standardized catch rates in kilograms/ hour of cottids in the eastern Gulf of Alaska, May-Aug. 1975 and Apr. 1976 (Cruises 751 and 762).

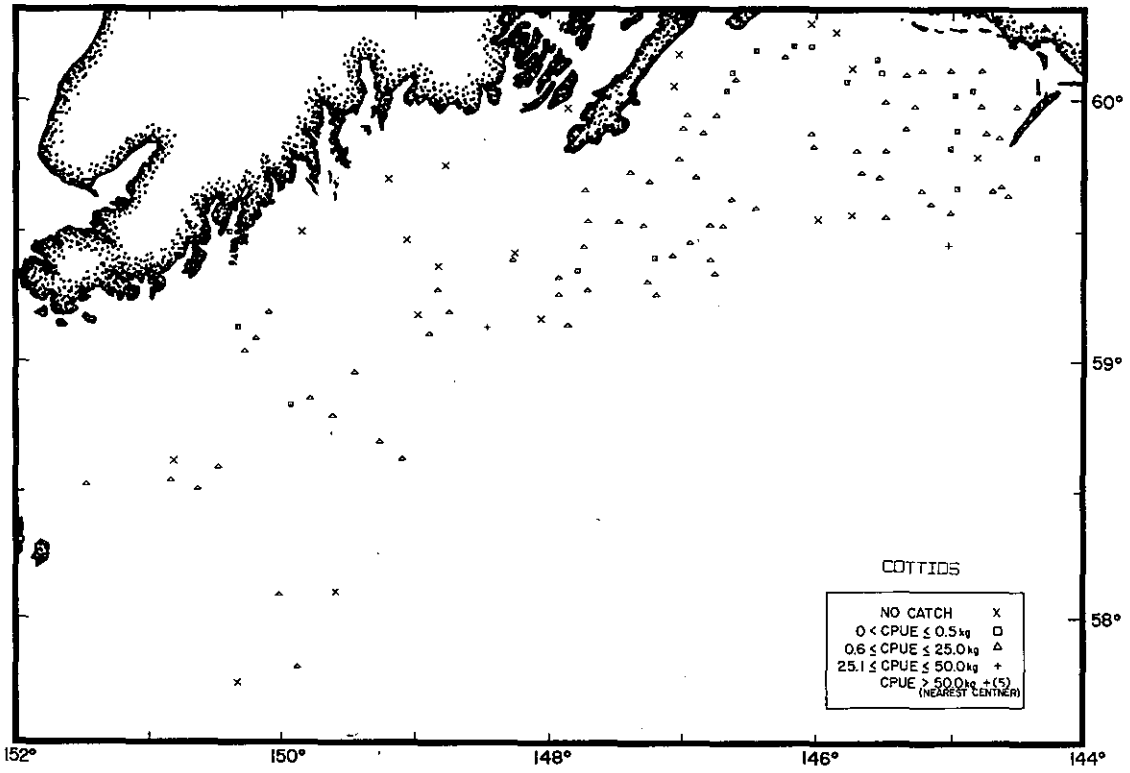


Figure XI-486.--Distribution of standardized catch rates in kilograms/ hour of cottids in the eastern Gulf of Alaska, May-Aug. 1975 (Cruises 751 and 753).

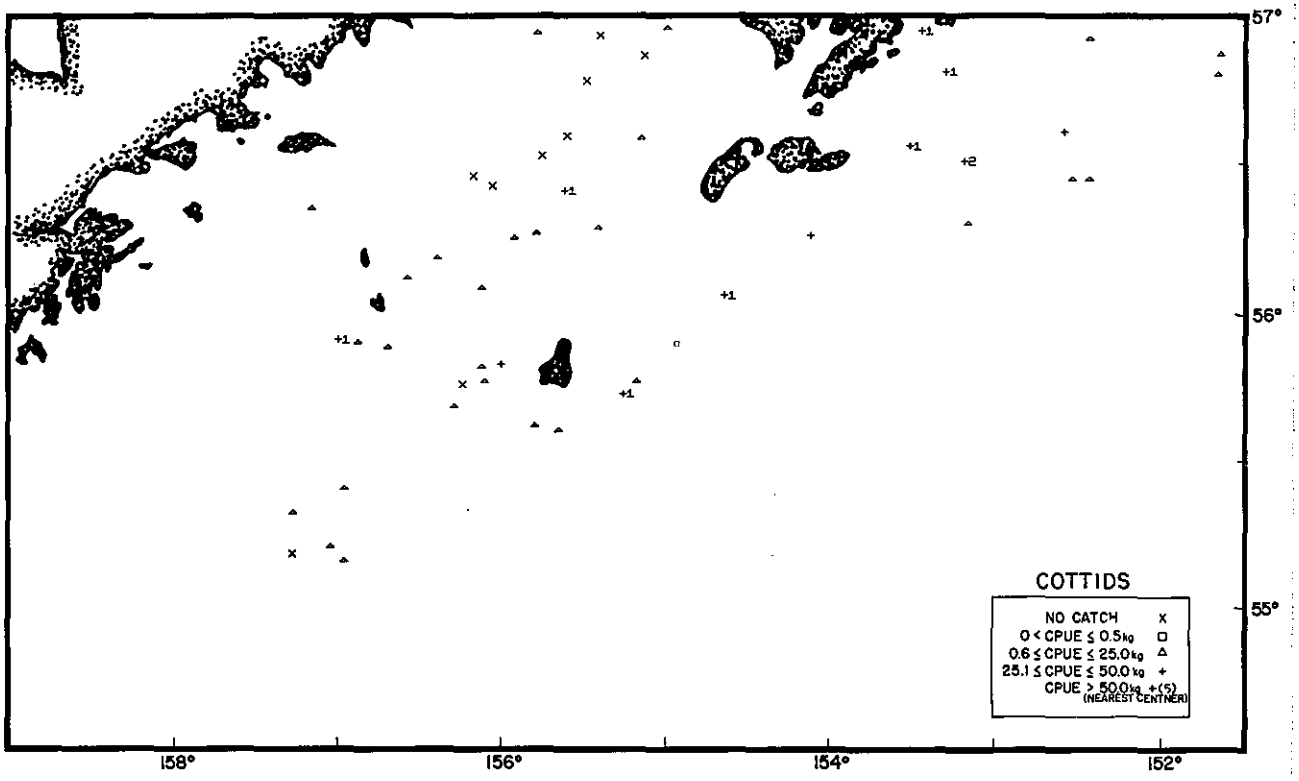


Figure XI-487.--Distribution of standardized catch rates in kilograms/ hour of cottids in the western Gulf of Alaska, Aug.-Oct. 1973 and Jun.-Aug. 1975 (Cruises 734 and 753).

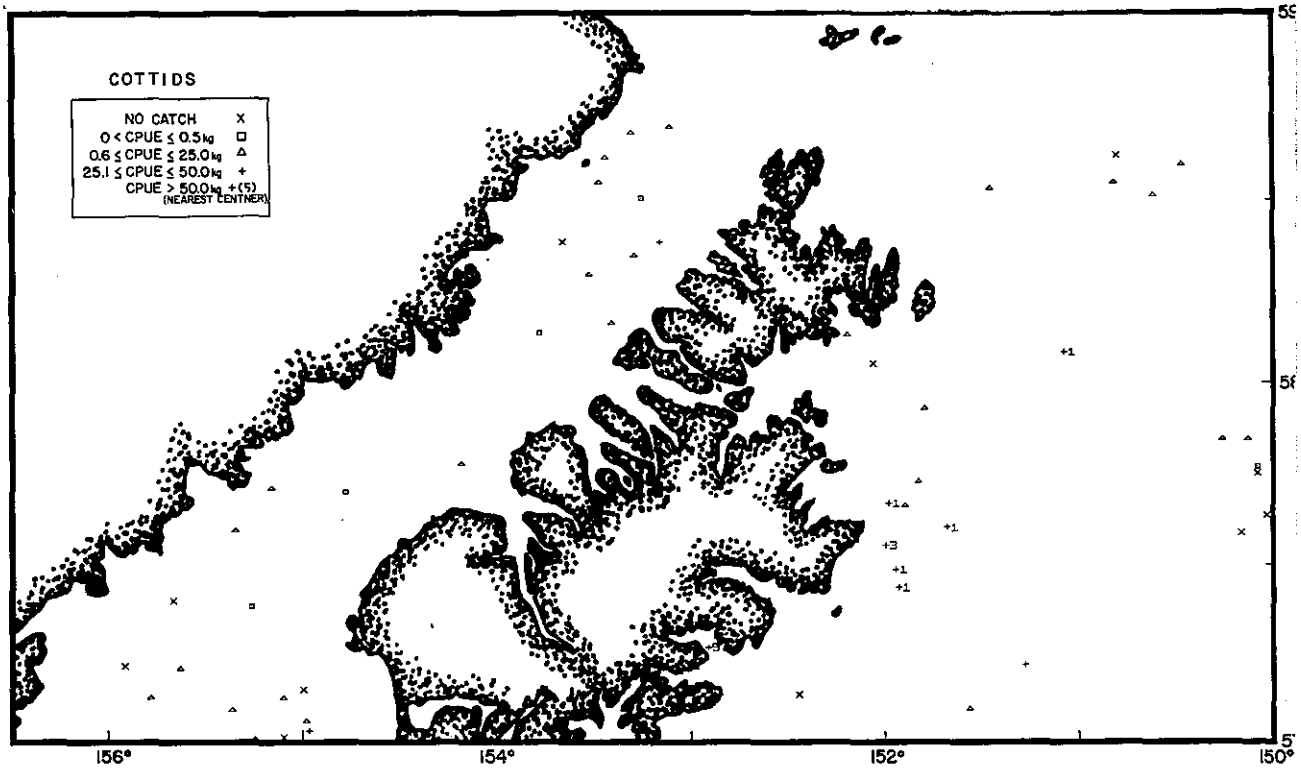


Figure XI-488.--Distribution of standardized catch rates in kilograms/ hour of cottids in the western Gulf of Alaska, May-Jun. 1973 and Jun.-Aug. 1975 (Cruises 733, 734, and 753).

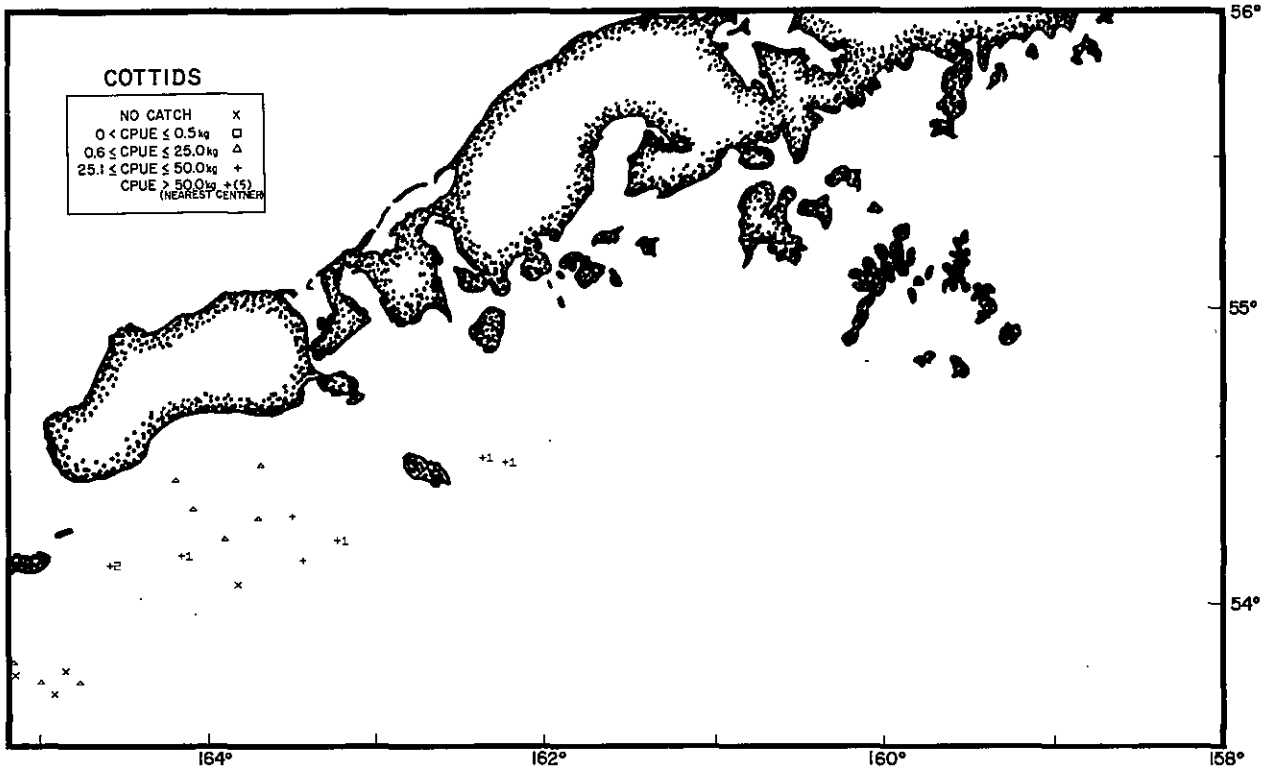


Figure XI-489.--Distribution of standardized catch rates in kilograms/ hour of cottids in the western Gulf of Alaska, Jul.-Aug. 1974 (Cruise 744).

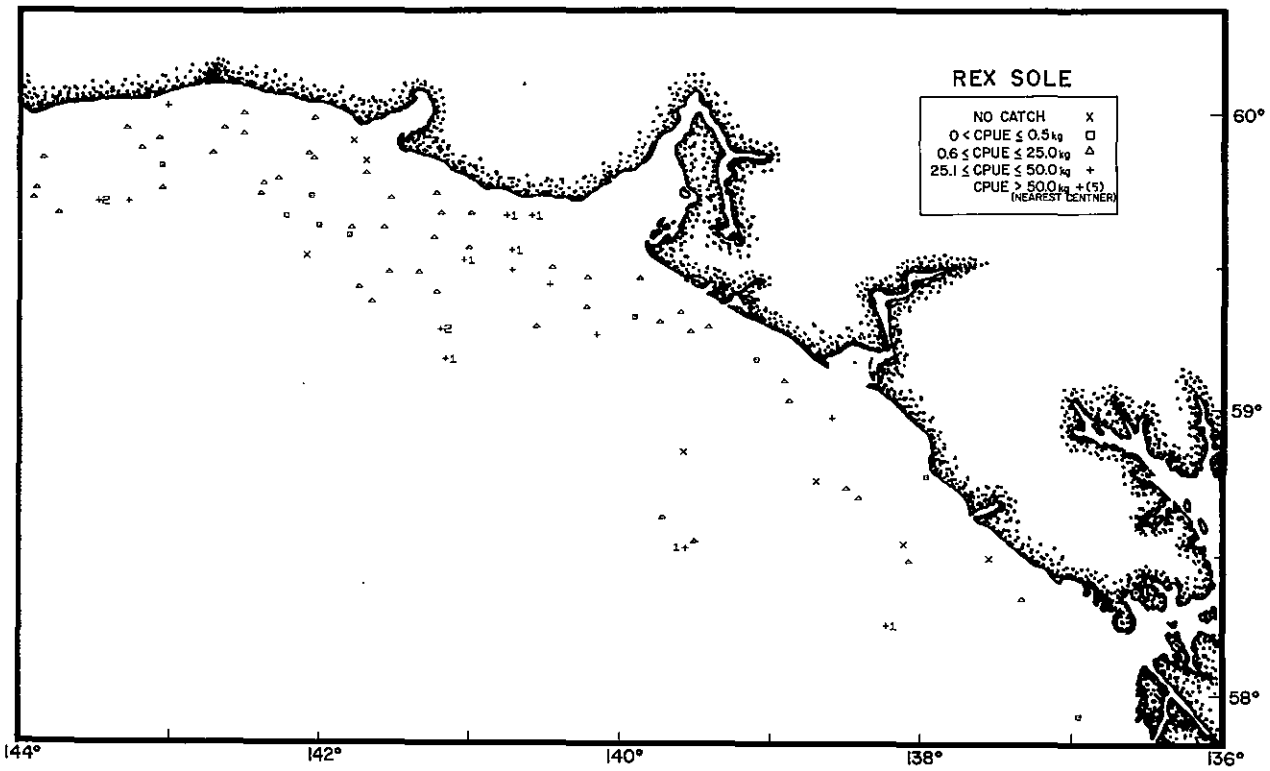


Figure XI-490.--Distribution of standardized catch rates in kilograms/ hour of rex sole in the eastern Gulf of Alaska, May-Aug. 1975 and Apr. 1976 (Cruises 751 and 762).

Table XI-130.--Estimated biomass and population size of Cottids in the Gulf of Alaska during April-October, 1973-76.

Region	Depth zone (m)	CPUE 1/ (kg/hr)	Estimated biomass (mt)	Proportion of total estimated biomass	Estimated population ($\times 10^6$)	Proportion of total estimated population	Mean size per individual 2/ Weight (kg)	Mean size per individual 2/ Length (cm)
Fairweather	1-100	0	0	0	0	0	--	--
	101-200	0.6	102.5	34.1	1.8	94.7	--	--
	201-400	6.6	197.7	65.9	0.1	5.3	--	--
	All zones	1.3	300.2	0.6	1.9	--	--	--
Yakutat	1-100	0.3	17.8	3.7	4/	5/	0.31	--
	101-200	1.5	212.8	44.5	0.2	66.7	1.22	--
	201-400	3.6	247.5	51.8	0.1	33.3	1.80	--
	All zones	1.7	478.1	0.9	0.3	--	1.30	--
Prince William	1-100	4.3	475.1	39.1	3.4	68.0	0.14	--
	101-200	3.2	407.2	33.5	1.3	26.0	0.31	--
	201-400	9.1	332.0	27.3	0.3	6.0	1.11	--
	All zones	4.4	1,214.3	2.4	5.0	--	0.24	--
Kenai	1-100	--	--	--	--	--	--	--
	101-200	5.6	1,366.0	91.2	2.2	81.5	0.62	--
	201-400	1.3	132.0	8.8	0.5	18.5	0.27	--
	All zones	4.3	1,498.0	3.0	2.7	--	0.56	--
Kodiak	1-100	115.3	16,512.5	73.6	--	--	--	--
	101-200	42.2	5,206.6	23.2	--	--	--	--
	201-400	13.0	724.8	3.2	--	--	--	--
	All zones	69.6	22,443.9	44.1	--	--	--	--
Shelikof	1-100	5.1	33.3	3.0	--	--	--	--
	101-200	10.5	429.5	38.8	--	--	--	--
	201-400	6.2	644.4	58.2	--	--	--	--
	All zones	7.3	1,107.2	2.2	--	--	--	--
Chirikof	1-100	16.2	1,937.8	32.8	1.2	28.6	1.66	--
	101-200	22.2	3,583.4	60.6	2.5	59.5	1.43	--
	201-400	2.9	393.5	6.6	0.5	11.9	0.73	--
	All zones	15.1	5,914.7	11.6	4.2	--	1.40	--
Shumagin	1-100	--	--	--	--	--	--	--
	101-200	--	--	--	--	--	--	--
	201-400	--	--	--	--	--	--	--
	All zones	--	--	--	--	--	--	--
Sanak	1-100	72.7	13,060.0	72.6	0.7	38.9	--	--
	101-200	30.1	4,908.9	27.3	1.0	55.6	--	--
	201-400	0.9	11.3	0.1	0.1	5.6	--	--
	All zones	50.6	17,980.2	35.3	1.8	--	--	--
Total	1-100	49.0	32,036.5	62.9	--	--	--	--
	101-200	14.0	16,216.9	31.8	--	--	--	--
	201-400	4.9	2,683.2	5.3	--	--	--	--
	All zones	21.6	50,936.6	100.1	--	--	--	--

1/ Mean catch per unit effort, in kilograms per hour trawled.
2/ Where data are available.
3/ Less than 0.1 kg/hr.
4/ Less than 0.1 X 10^6 individuals.
5/ Less than 0.1 percent.

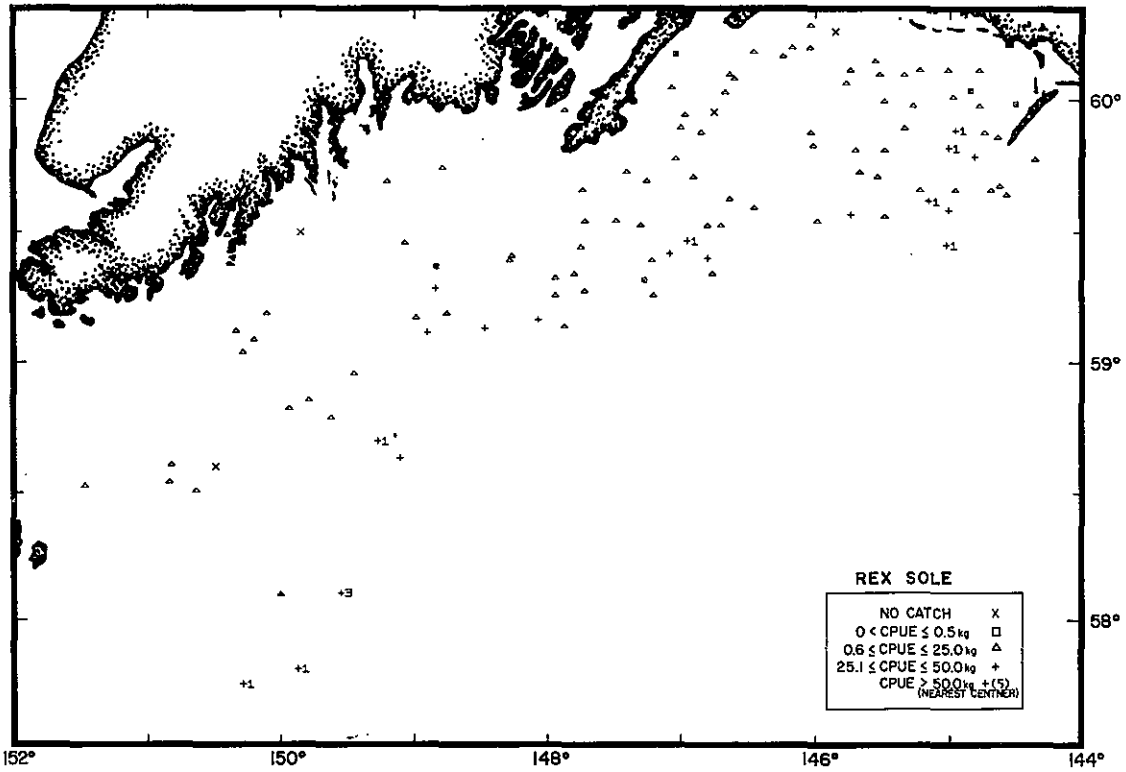


Figure XI-491.--Distribution of standardized catch rates in kilograms/ hour of rex sole in the eastern Gulf of Alaska, May-Aug. 1975 (Cruises 751 and 753).

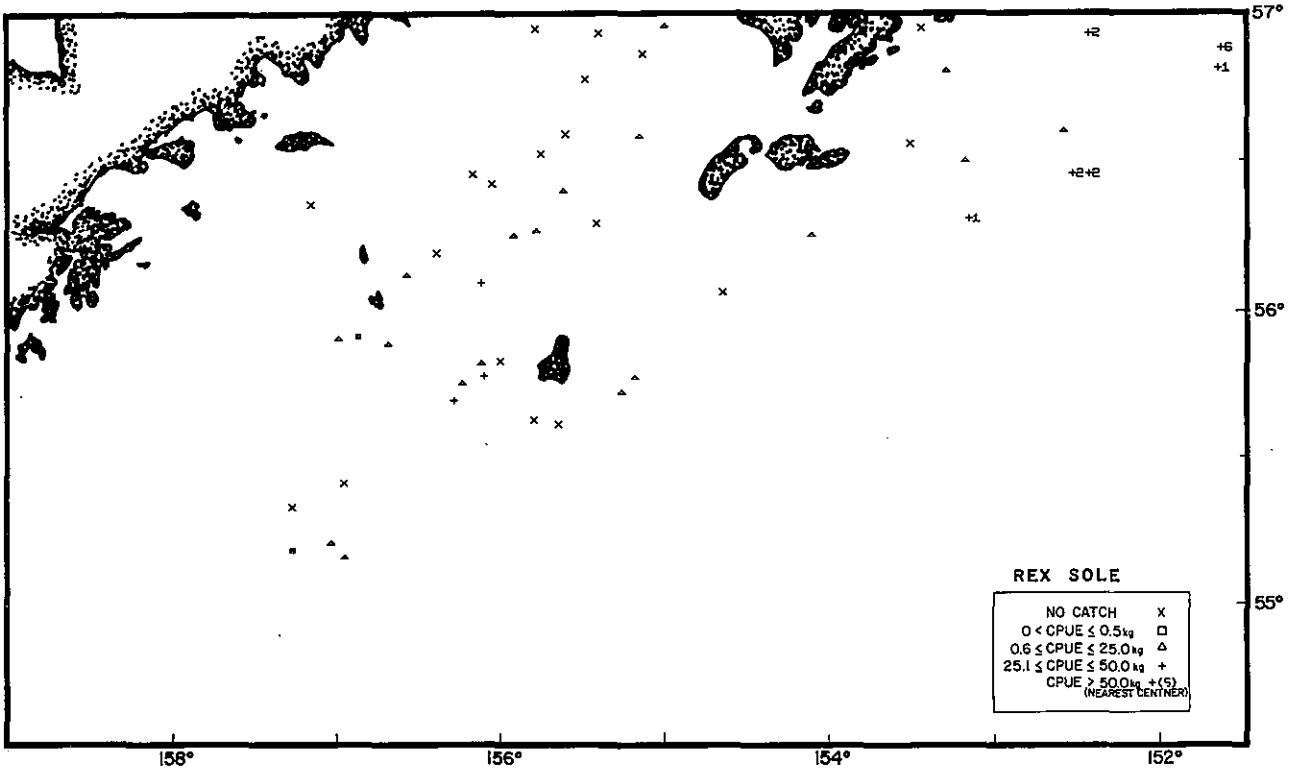


Figure XI-492.--Distribution of standardized catch rates in kilograms/ hour of rex sole in the western Gulf of Alaska, Aug-Oct. 1973 and Jun.-Aug. 1975 (Cruises 734 and 753).

Figure XI-493.--Distribution of standardized catch rates in kilograms/ hour of rex sole in the western Gulf of Alaska, May-Jun. 1973, Aug.-Oct. 1973, and Jun.-Aug. 1975 (Cruises 733, 734, and 753).

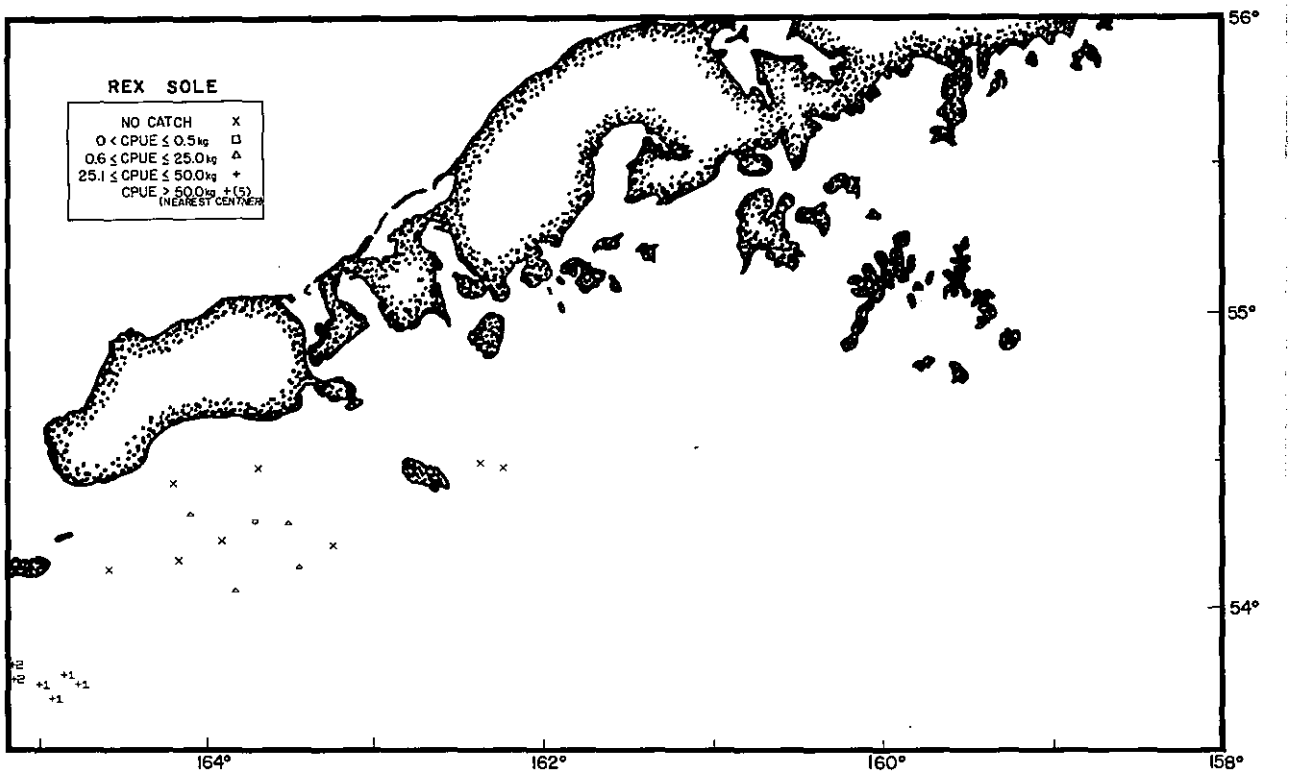


Figure XI-494.--Distribution of standardized catch rates in kilograms/ hour of rex sole in the western Gulf of Alaska, Jul.-Aug. 1974 (Cruise 744).

Table XI-131.--Estimated biomass and population size of rex sole (Glyptocephalus zachirus) in the Gulf of Alaska during April-October 1973-76.

Region	Depth zone (m)	CPUE[1] (kg/hr)	Estimated biomass (mt)	Proportion of total estimated biomass	Estimated population (X 10^6)	Proportion of total estimated population	Mean size per individual[2] Weight (kg)	Length (cm)
Fairweather	1-100	2.8	99.5	3.0	0.8	5.2	0.13	28.0
	101-200	12.9	2,096.6	63.8	10.0	64.5	0.21	31.2
	201-400	36.3	1,091.0	33.2	4.7	30.3	0.23	32.0
	All zones	14.4	3,287.1	7.0	15.5	--	0.21	--
Yakutat	1-100	16.8	1,043.1	15.5	6.5	19.6	0.16	28.1
	101-200	7.1	1,032.4	15.3	5.5	16.6	0.19	28.3
	201-400	68.0	4,664.4	69.2	21.1	63.8	0.22	31.6
	All zones	24.4	6,739.9	14.3	33.1	--	0.20	--
Prince William	1-100	5.9	648.2	18.4	12.5	37.7	0.05	22.4
	101-200	12.2	1,531.9	43.4	11.1	33.4	0.14	28.0
	201-400	37.0	1,350.3	38.3	9.6	28.9	0.14	27.4
	All zones	13.0	3,530.4	7.5	33.2	--	0.11	--
Kenai	1-100	--	--	--	--	--	--	--
	101-200	17.2	4,169.3	83.4	25.8	--	0.16	29.6
	201-400	8.3	830.7	16.6	--	--	--	--
	All zones	14.6	5,000.0	10.6	--	--	--	--
Kodiak	1-100	2.7	389.8	2.7	--	--	--	--
	101-200	16.8	2,068.5	14.1	--	--	--	--
	201-400	218.9	12,206.0	83.2	60.1	--	0.20	31.8
	All zones	45.5	14,664.3	31.1	--	--	--	--
Shelikof	1-100	0	0	0	0	0	--	--
	101-200	0.3	11.1	62.0	--	--	--	--
	201-400	0.1	6.8	38.0	--	--	--	--
	All zones	0.1	17.9	5/	--	--	--	--
Chirikof	1-100	1.6	196.5	10.3	--	--	--	--
	101-200	6.9	1,126.7	59.0	5.0	--	0.23	31.8
	201-400	4.4	585.4	30.7	1.4	--	0.41	33.2
	All zones	4.6	1,908.6	4.1	--	--	--	--
Shumagin	1-100	--	--	--	--	--	--	--
	101-200	--	--	--	--	--	--	--
	201-400	--	--	--	--	--	--	--
	All zones	--	--	--	--	--	--	--
Sanak	1-100	1.6	285.2	2.4	--	--	--	--
	101-200	61.7	10,065.4	84.3	30.1	--	0.33	37.2
	201-400	127.6	1,594.6	13.4	5.5	--	0.29	35.6
	All zones	33.6	11,945.2	25.4	--	--	--	--
Total	1-100	4.0	2,662.3	5.7	--	--	--	--
	101-200	18.7	22,101.9	46.9	--	--	--	--
	201-400	40.3	22,329.2	47.4	--	--	--	--
	All zones	19.7	47,093.4	100.0	--	--	--	--

1/ Mean catch per unit effort, in kilograms per hour trawled.
2/ Where data are available.
3/ Less than 0.1 kg/hr.
4/ Less than 0.1 X 10^6 individuals.
5/ Less than 0.1 percent.

Table XI-132.--Mean lengths (cm) of rex sole by regions and depth zones (Cruises 734, 744, 751, 753 and 762).

	0-100 m			101-200 m			201-400 m		
	Male	Female	Total	Male	Female	Total	Male	Female	Tota
Fairweather	--	--	--	29.9	32.7	31.2	31.2	35.6	32.0
Yakutat	25.9	29.8	28.1	26.5	29.6	28.3	30.7	32.7	31.6
Prince William	23.9	24.6	22.4	25.1	27.1	26.0	26.5	29.0	27.3
Kenai	--	--	--	--	--	29.6	--	--	31.6
Kodiak	--	--	19.6[1/]	--	--	28.6[1/]	--	--	31.8
Shelikof	--	--	--	--	--	--	--	--	--
Chirikof	--	--	--	--	--	31.8	--	--	33.2
Shumagin	--	--	--	--	--	--	--	--	--
Sanak	--	--	--	--	--	37.2	--	--	35.

[1/] The limited number of length-frequency samples taken from this region-depth zone probably do not represent the size composition adequately.

Age-length relationship--Age and length data collected from the Yakutat and Prince William regions are presented in Table XI-138.

These data are summarized in Figure XI-505 by plots of mean lengths-at-age by sexes and regions. Mean length-at-age values were similar for both sexes up to approximately six years. Females continued to show gradual growth through fourteen years while no male specimens had an estimated age greater than 10 years.

KING CRAB

Distribution and abundance--King crab had an apparent relative abundance of 19 kg/hr but were primarily taken in the western Gulf of Alaska (Figures XI-506-507). The Kodiak region had the highest mean CPUE (68 kg/hr), followed by Sanak, Chirikof, Kenai and Shelikof. The Fairweather region had an abundance of less than 1 kg/hr while no specimens were taken in the Yakutat and Prince William regions. Mean CPUE's were highest in the outer and inner shelves, respectively, but decreased rapidly in the upper slope. The distribution of the standardized catch rates for the successful stations is presented in Figures XI-508-512.

Table XI-133.--Parameters for the length-weight relationship (weight (g) = a · length^b) for rex sole (Cruise 751).

		YAKUTAT				PRINCE WILLIAM			
	Depth	Sample Size	Range in Length (cm)	Parameters (a)	(b)	Sample Size	Range in Length (cm)	Parameters (a)	(b)
Males	0-100	--	--	--	--	--	--	--	--
	101-200	91	11-34	0.112836	2.073052	158	11-37	0.010487	2.825047
	201-400	24	20-38	0.001200	3.514319	58	8-38	0.008558	2.898465
Females	0-100	--	--	--	--	--	--	--	--
	101-200	68	18-38	0.003186	3.194584	67	14-43	0.005966	3.014629
	201-400	35	26-41	0.000079	4.252458	159	12-44	0.000399	3.790268

Table XI-134.--Summary of age-length data collected for rex sole (Cruise 751).

Sex	REGIONS					
	Yakutat			Prince William		
	DEPTH ZONES (M)					
Males	0-100	101-200	201-400	0-100	101-200	201-400
Number of readable otoliths	--	63	68	--	71	71
Range in age (years)	--	3-9	4-11	--	3-11	3-15
Range in length (cm)	--	20-34	21-38	--	20-37	20-39
Females						
Number of readable otoliths	--	67	64	--	90	86
Range in age (years)	--	4-15	5-17	--	3-15	3-14
Range in length (cm)	--	20-38	21-41	--	20-45	20-42

Biomass--The biomass of king crab was estimated at 44 thousand mt of which 93% occurred in the western Gulf of Alaska (Table XI-139). The Kodiak region contributed nearly 50% to the total while Sanak accounted for 28% and Chirikof 14%. Sixty-two percent of the total biomass occurred in the outer shelf, 34% in the inner shelf and 4% came from the upper slope depth zone. Biomass estimates for king crab should be considered minimal due to the inability of the otter trawl to adequately sample the larger male crabs when towed at speeds utilized during this survey.

Size composition--No length-frequency data are available for this species.

PACIFIC HALIBUT

Distribution and abundance--Pacific halibut were widely distributed throughout the Gulf of Alaska, appearing in all regions-depth zones with the exception of the Fairweather and Prince William upper slopes. Relative apparent abundance was highest in the Shelikof and Kodiak regions respectively, with mean CPUE's in the remaining regions falling below the 18 kg/hr survey average. Pacific halibut demonstrated a bimodal density distribution by depth zones. The inner shelf and upper slope had mean CPUE's of 29 and 23 kg/hr while the outer shelf followed with 10 kg/hr. The distribution of the standardized catch rates for the successful stations is presented in Figures XI-513-517.

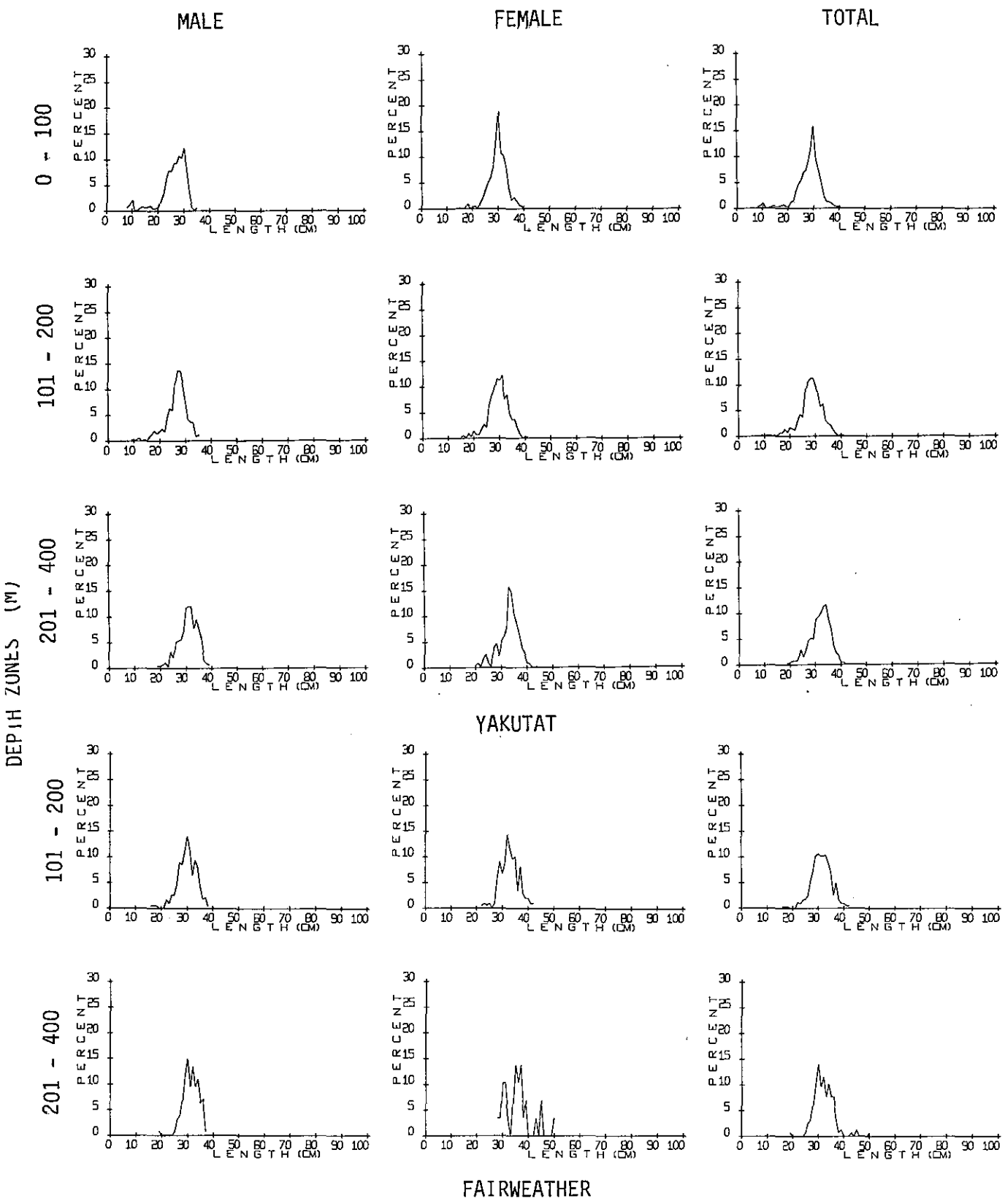


Figure XI-495.--Length frequency distributions of rex sole in the Gulf of Alaska by region-depth zones, 1973-1976.

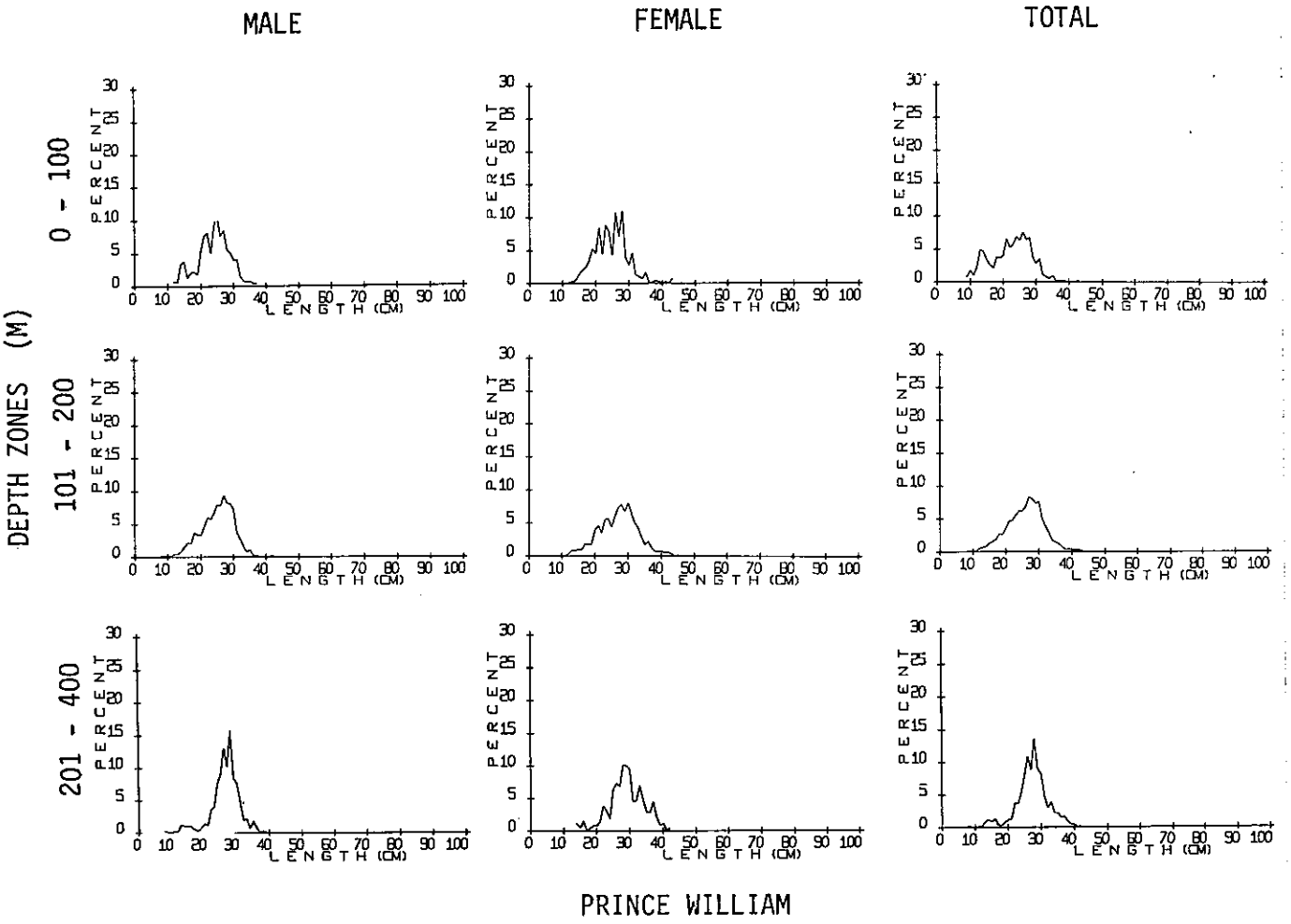


Figure XI-495 (continued).--Length frequency distributions of rex sole in the Gulf of Alaska by region-depth zones, 1973-1976.

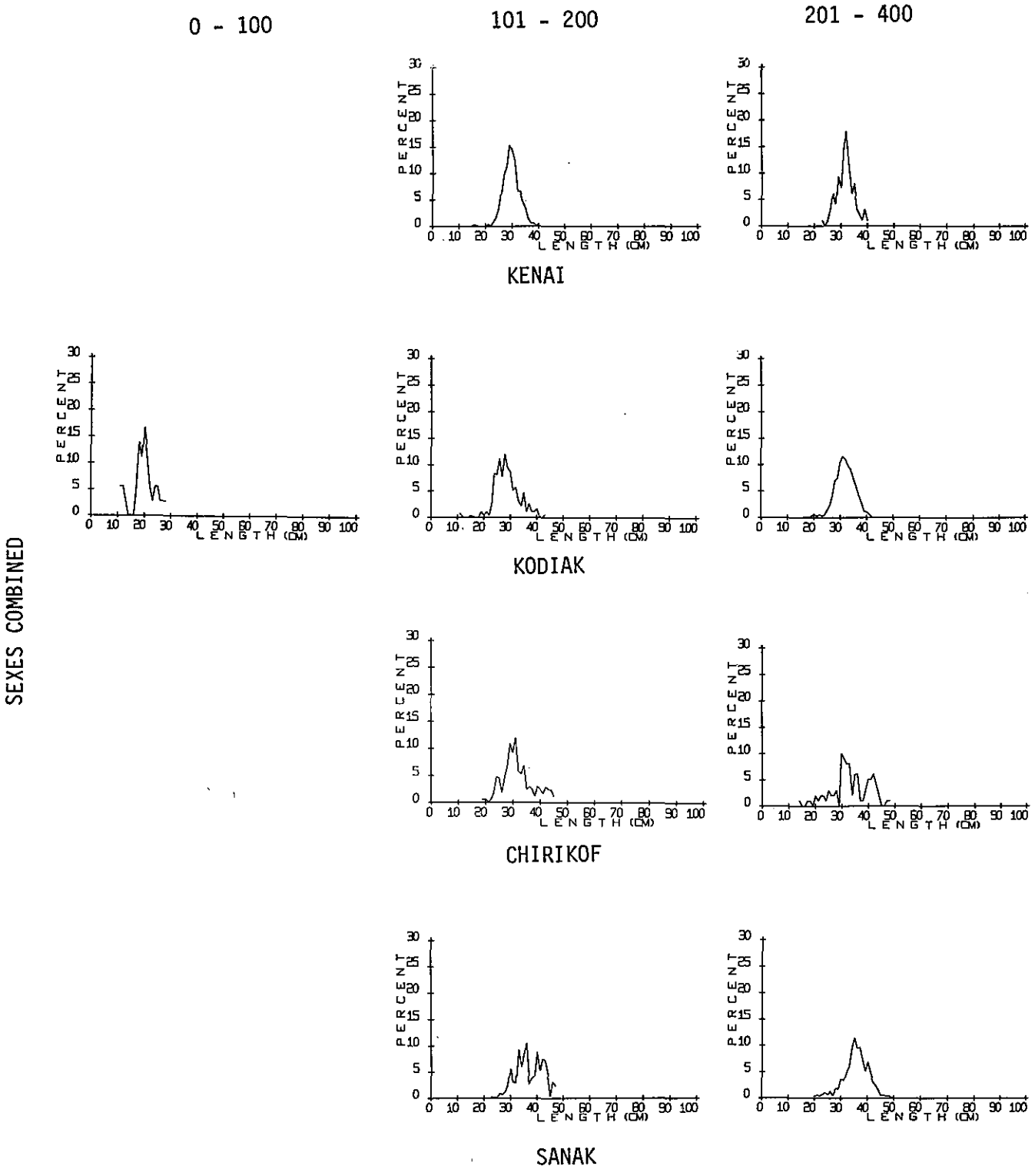


Figure XI-495 (continued).--Length frequency distributions of rex sole in the Gulf of Alaska by region-depth zones, 1973-1976.

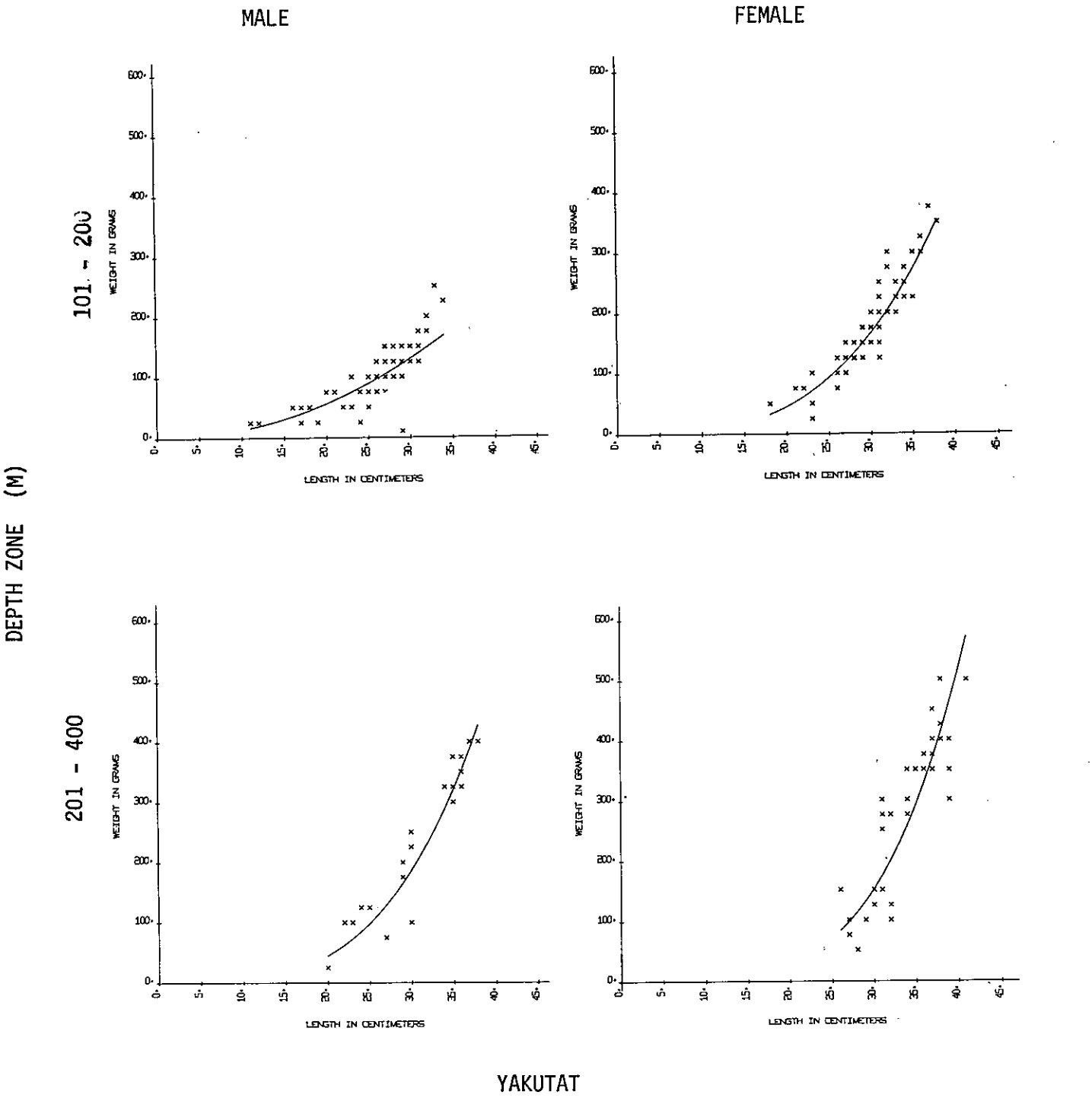


Figure XI-496.--Weight at length observations for rex sole in the Gulf of Alaska by regions and depth zones, May-Aug. 1975 (Cruise 751).

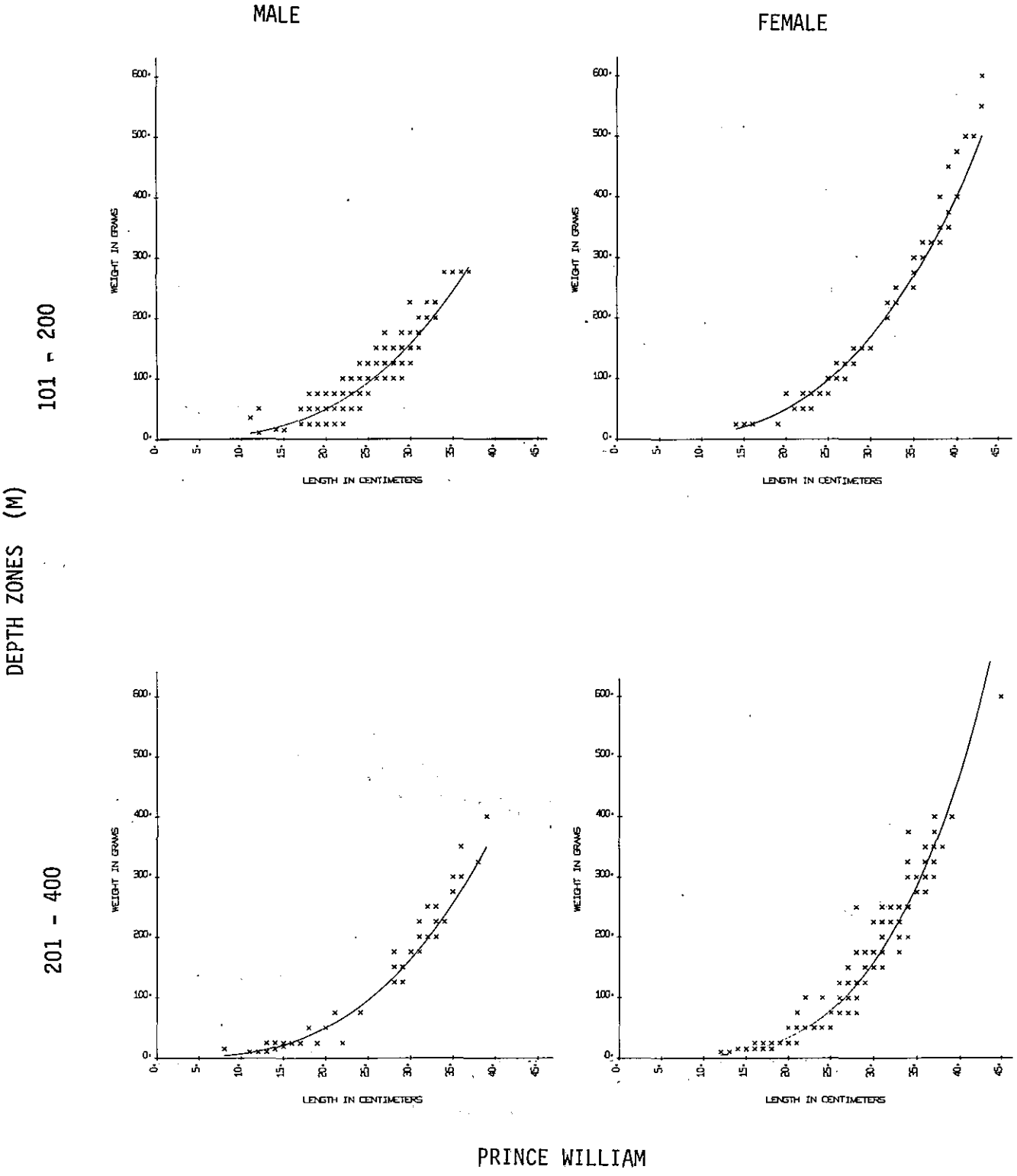
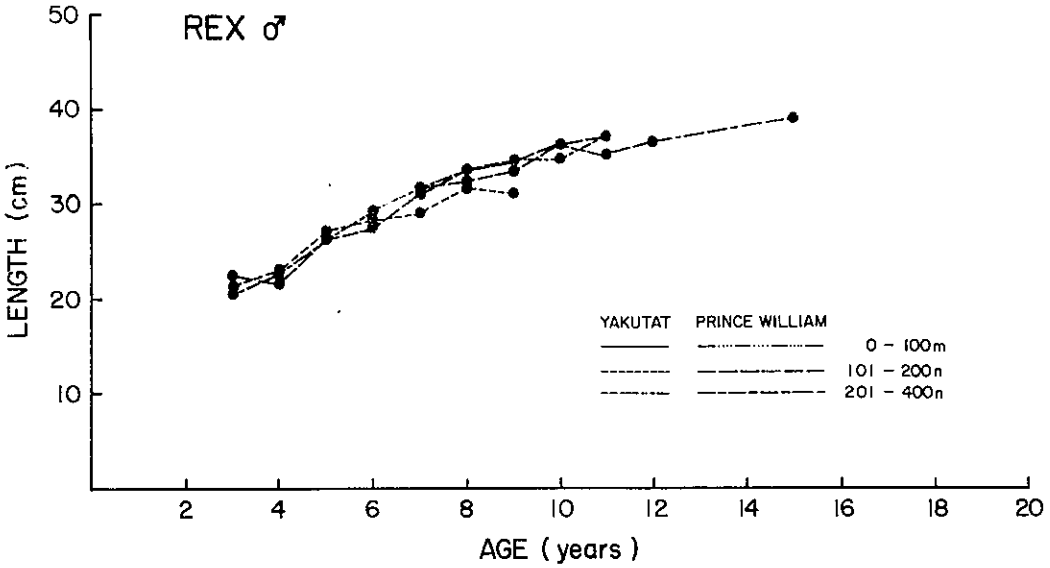


Figure XI-496 (continued).--Weight at length observations for rex sole in the Gulf of Alaska by regions and depth zones, May-Aug. 1975 (Cruise 751).



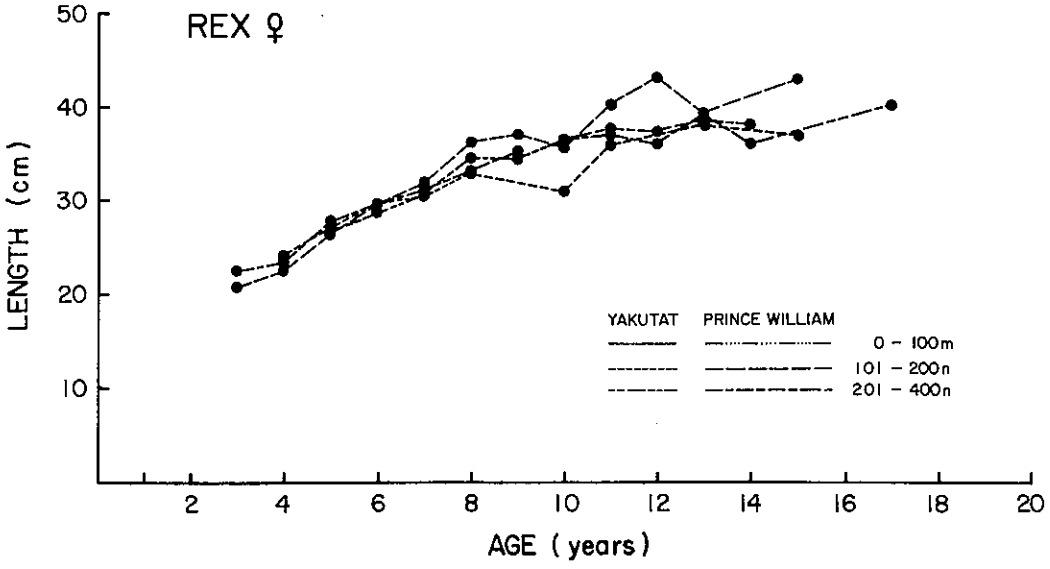


Figure XI-497.--Mean lengths at age for rex sole by sex and region-depth zones in the Gulf of Alaska, May-Aug. 1975 (Cruise 751).

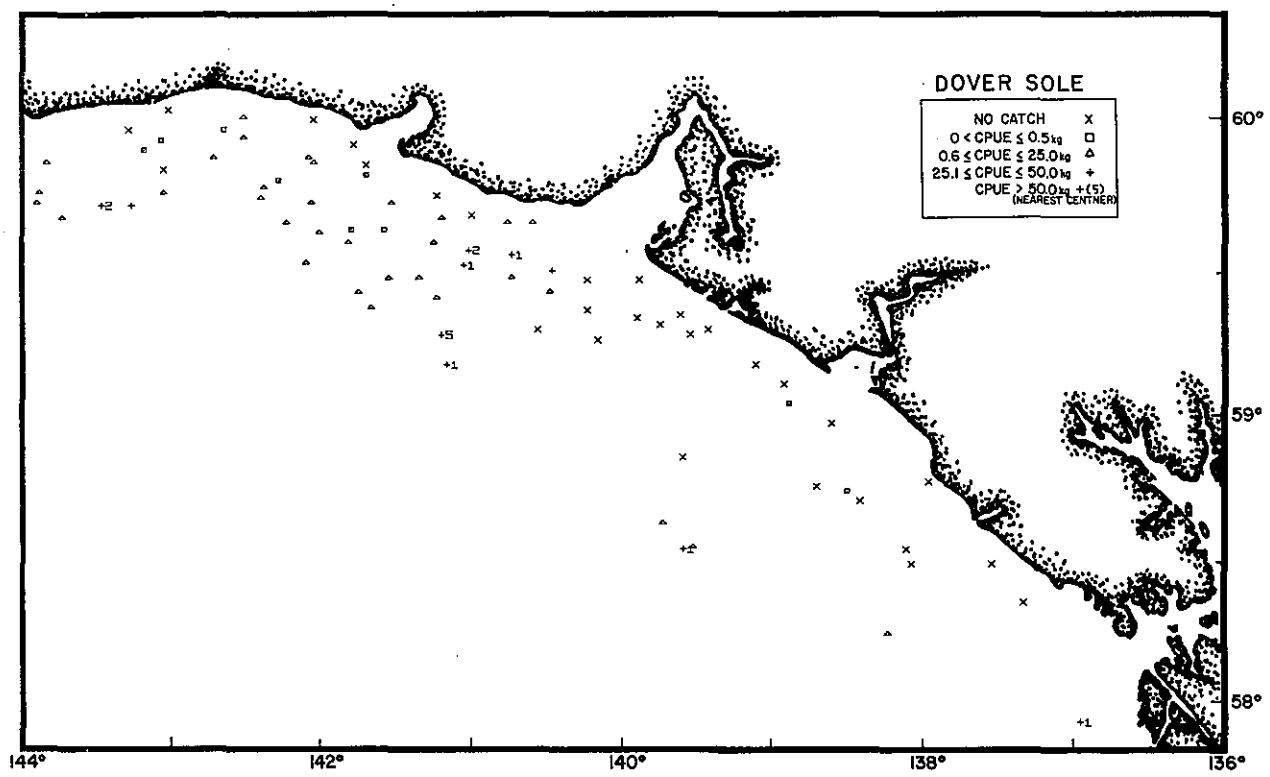


Figure XI-498.--Distribution of standardized catch rates in kilograms/ hour of Dover sole in the eastern Gulf of Alaska, May-Aug. 1975 and Apr. 1976 (Cruises 751 and 762).

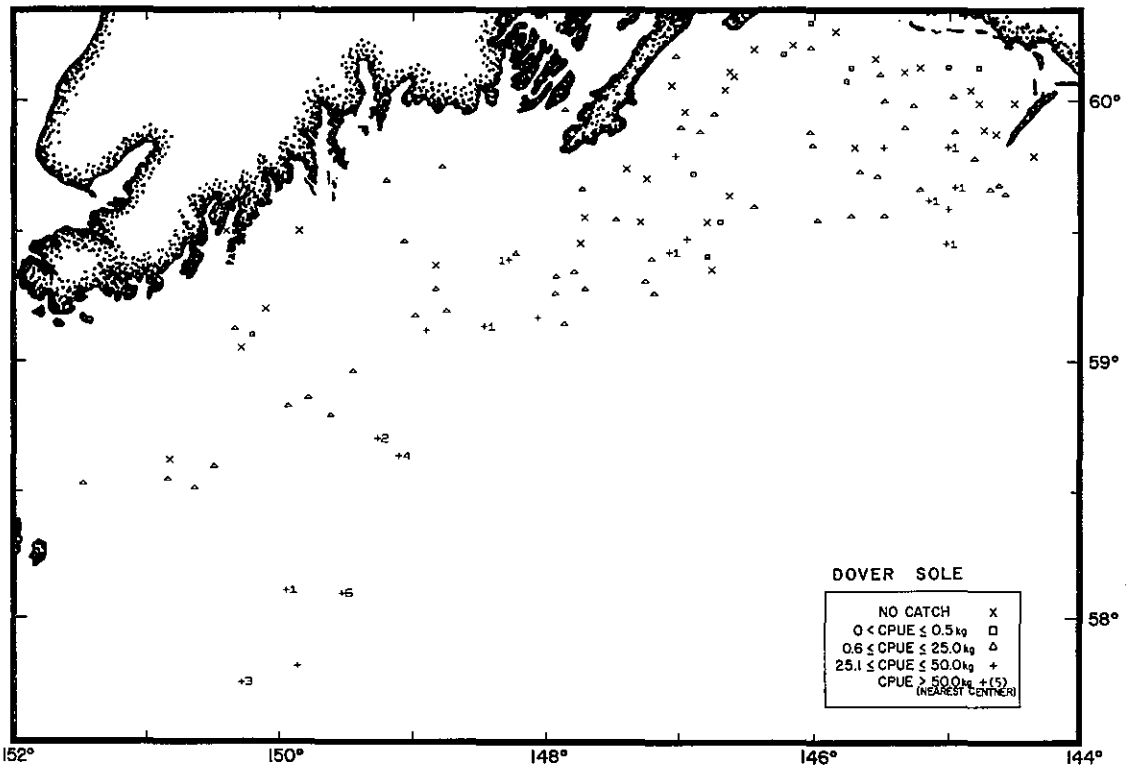


Figure XI-499.--Distribution of standardized catch rates in kilograms/ hour of Dover sole in the eastern Gulf of Alaska, May-Aug. 1975 (Cruises 751 and 753).

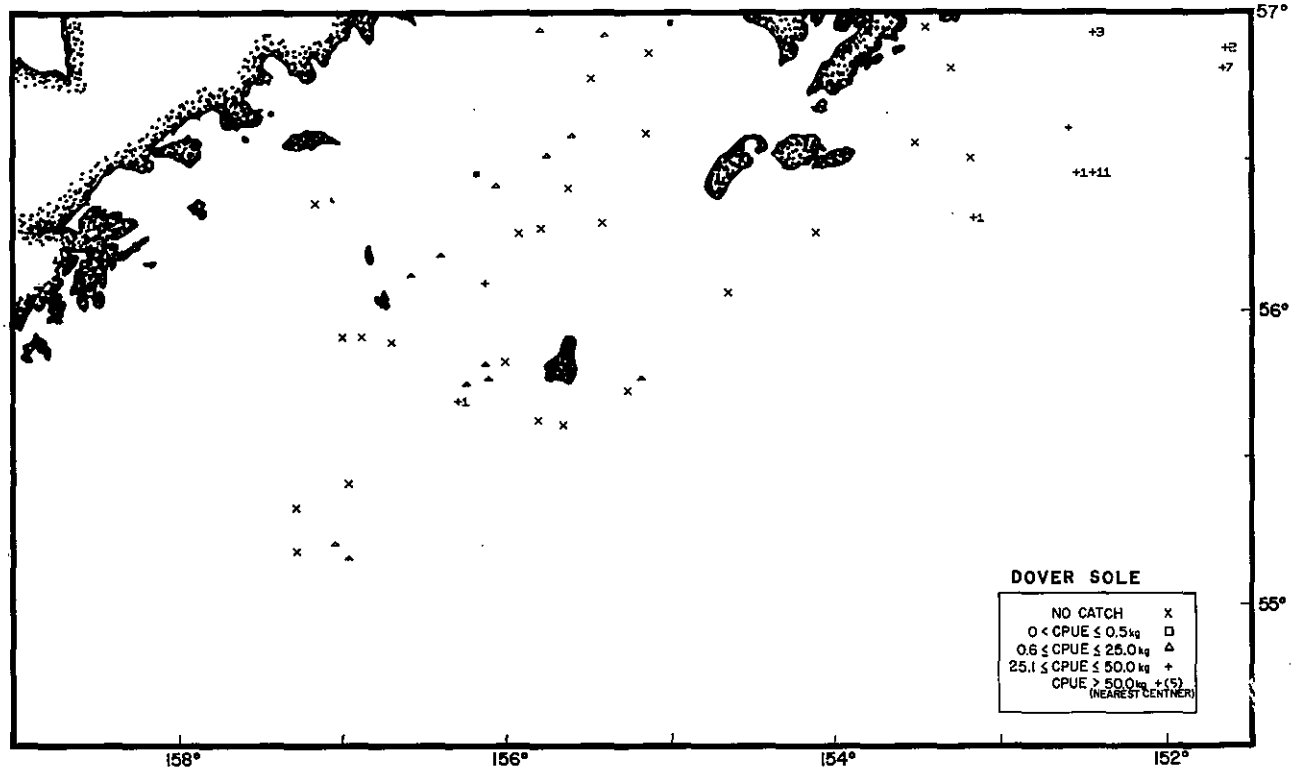


Figure XI-500.--Distribution of standardized catch rates in kilograms/ hour of Dover sole in the western Gulf of Alaska, May-Jun. 1973, Aug.-Oct. 1973, and Jul.-Aug. 1975 (Cruises 733, 734, and 753).

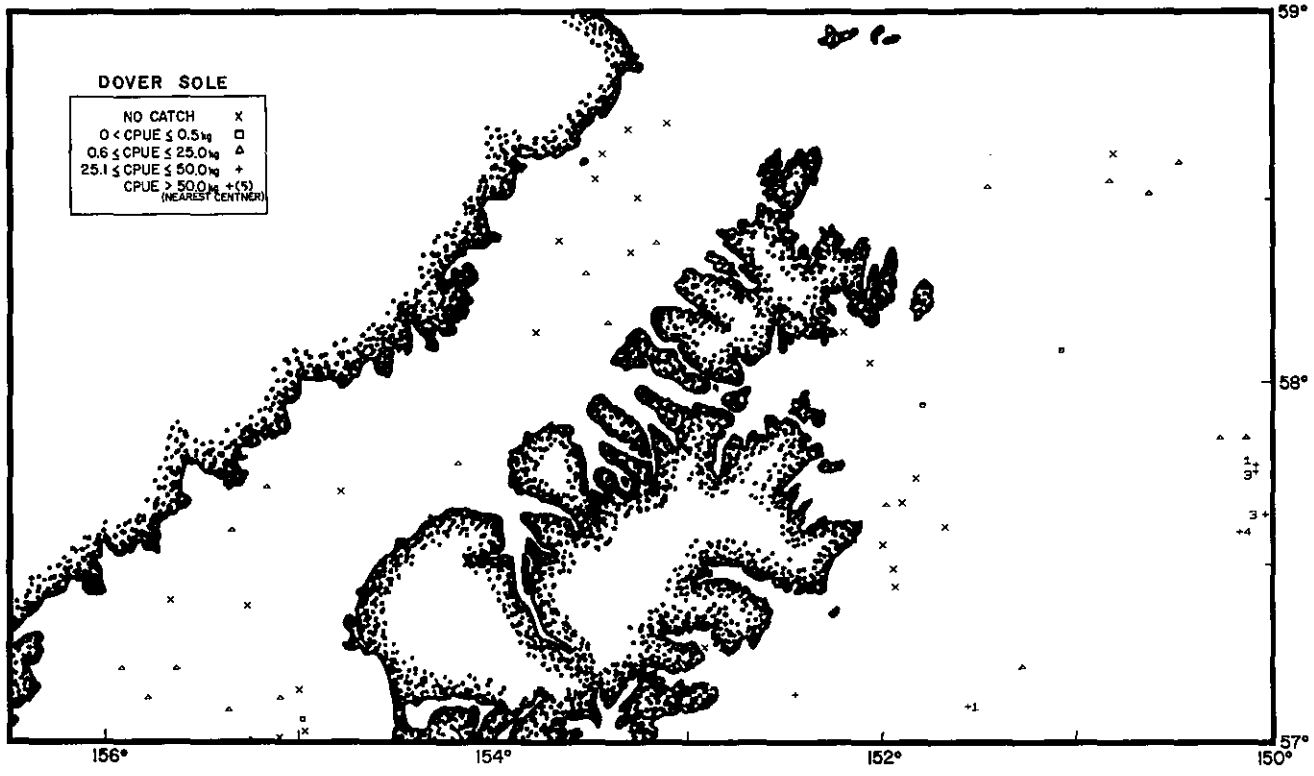


Figure XI-501.--Distribution of standardized catch rates in kilograms/ hour of Dover sole in the western Gulf of Alaska, May-Jun. 1973, Aug.-Oct. 1973, and Jul.-Aug. 1975 (Cruises 733, 734, and 753).

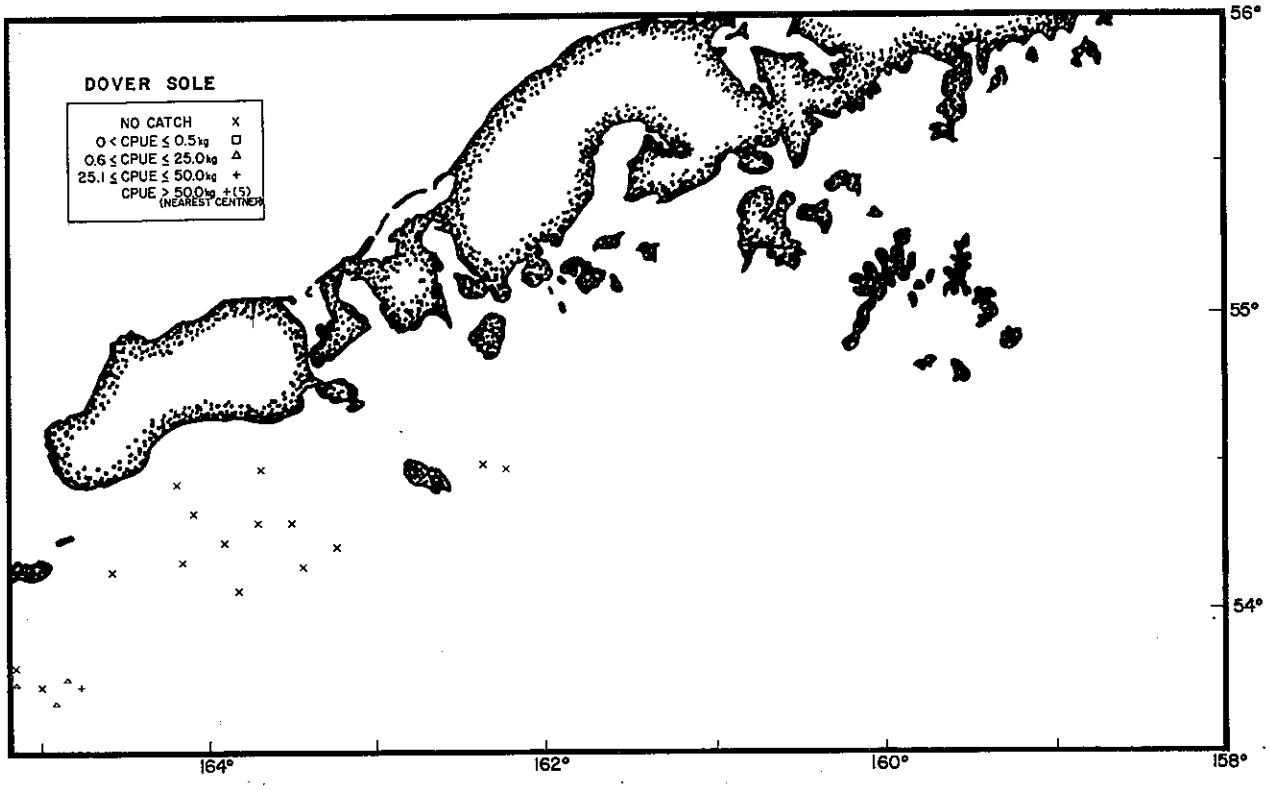


Figure XI-502.--Distribution of standardized catch rates in kilograms/ hour of Dover sole in the western Gulf of Alaska, Jul.-Aug. 1974 (Cruise 744).

Biomass--The biomass of Pacific halibut has been estimated at 43 thousand mt of which 44 percent occurred in the inner shelf, 29% in the upper slope and 27% in the outer shelf (Table XI-140). The combined Kodiak and Shelikof regions contained 44% of the biomass while the proportion contributed by the remaining regions ranged from 4 to 13%. Biomass estimates for Pacific halibut should be considered minimal as large halibut appear to be able to escape the trawl gear when towed at speeds utilized during the survey.

The combined eastern Gulf regions contained 33% of the estimated biomass while the western regions accounted for 67%.

Size composition--Length-frequency information collected for this species is limited due to efforts to return to the sea any halibut caught as quickly as possible. The Fairweather, Yakutat and Prince William were the only regions where the samples were adequate to construct length-frequency distributions (Figure XI-517). Pacific halibut, sexes combined, ranged in length from 44.1 cm in the Fairweather upper slope to 72.6 cm in the Yakutat outer shelf (Table XI-141)

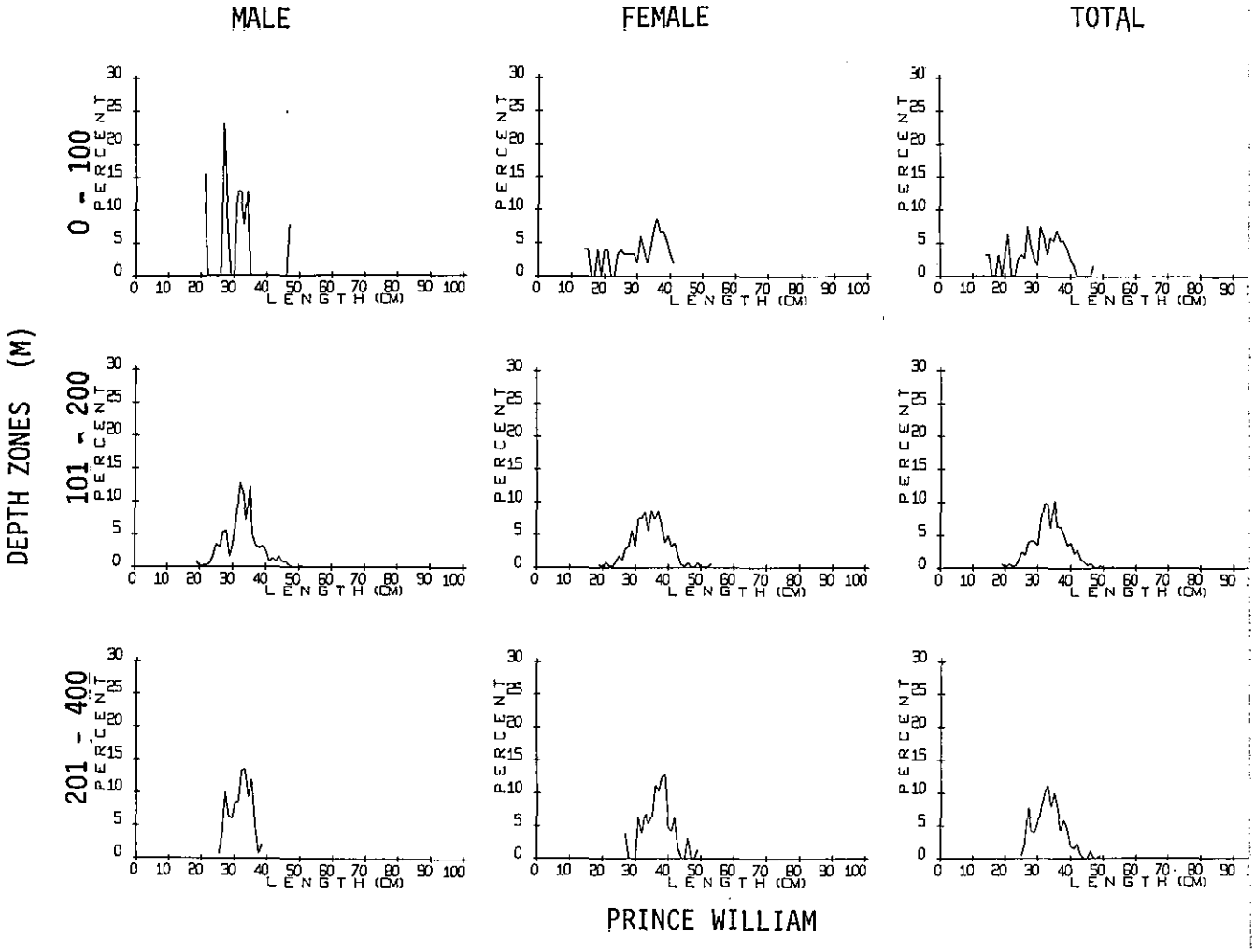


Figure XI-503.--Length frequency distributions of Dover sole from the Gulf of Alaska by region-depth zones, 1973-1976.

SEXES COMBINED

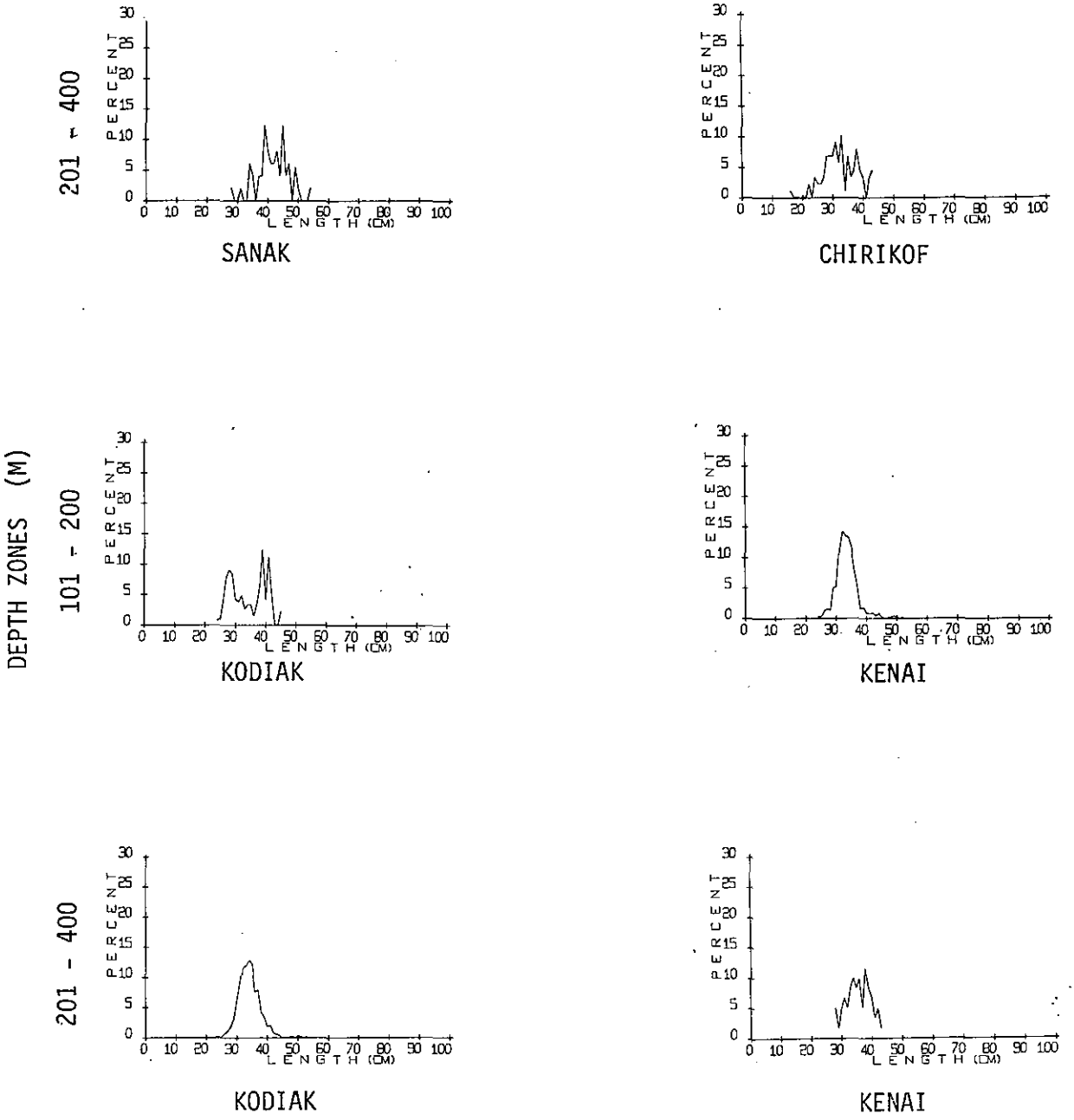


Figure XI-503 (continued).--Length frequency distributions of Dover sole from the Gulf of Alaska by region-depth zones, 1973-1976.

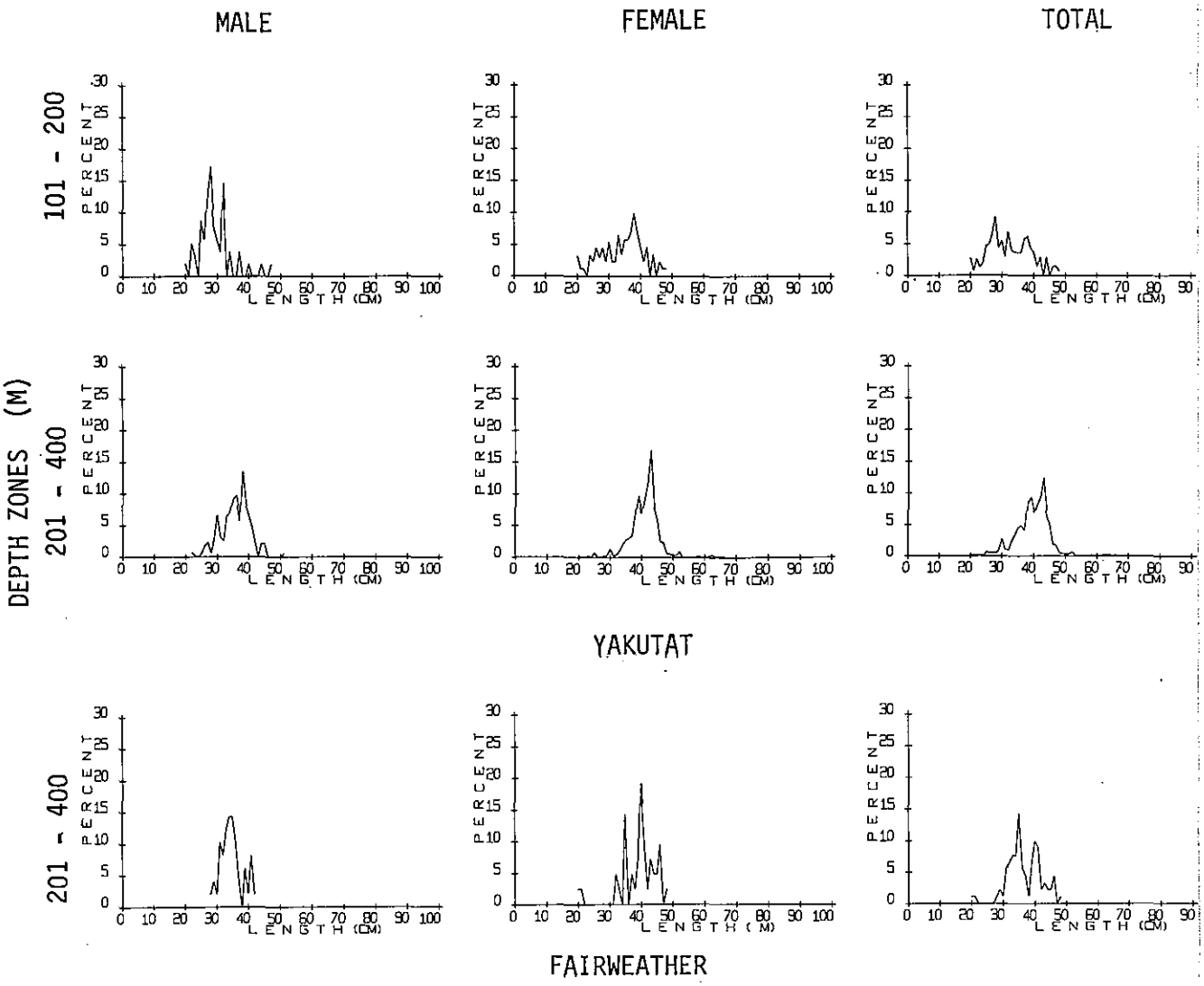


Figure XI-503 (continued).--Length frequency distributions of Dover sole from the Gulf of Alaska by region-depth zones, 1973-1976.

Table XI-135.--Estimated biomass and population size of Dover sole (Microstomus pacificus) in the Gulf of Alaska during April-October 1973-76.

Region	Depth zone (m)	CPUE[1] (kg/hr)	Estimated biomass (mt)	Proportion of total estimated biomass	Estimated population ($X 10^6$)	Proportion of total estimated population	Mean size per individual[2] Weight (kg)	Length (cm)
Fairweather	1-100	0.1	2.4	0.2	4/	5/	0.14	--
	101-200	0.3	41.6	4.1	0.1	3.6	0.40	--
	201-400	31.8	954.4	95.6	2.7	96.4	0.35	36.6
	All zones	4.4	998.4	2.2	2.8	--	0.35	--
Yakutat	1-100	1.5	95.2	1.2	0.3	2.4	0.30	--
	101-200	2.7	398.1	5.1	1.1	8.8	0.37	32.3
	201-400	106.7	7,320.8	93.7	11.1	88.8	0.66	39.6
	All zones	28.2	7,814.1	17.3	12.5	--	0.63	--
Prince William	1-100	1.9	209.9	8.1	0.9	13.9	0.22	30.0
	101-200	9.8	1,229.9	47.7	2.8	43.1	0.44	33.8
	201-400	31.2	1,137.7	44.1	2.8	43.1	0.41	33.5
	All zones	9.5	2,577.5	5.7	6.5	--	0.40	--
Kenai	1-100	--	--	--	--	--	--	--
	101-200	41.0	9,951.4	91.3	28.3	92.8	0.35	33.5
	201-400	9.4	944.5	8.7	2.2	7.3	0.43	35.4
	All zones	31.8	10,895.9	24.1	30.5	--	0.36	--
Kodiak	1-100	3/	2.2	5/	4/	5/	--	--
	101-200	29.3	3,613.7	17.7	8.9	16.5	0.40	34.2
	201-400	301.9	16,833.1	82.3	45.2	83.6	0.37	34.0
	All zones	63.5	20,449.0	45.3	54.1	--	--	--
Shelikof	1-100	0	0	0	0	0	--	--
	101-200	0.2	8.2	3.5	4/	5/	--	--
	201-400	2.2	229.7	96.6	0.8	100.0	0.28	--
	All zones	1.6	237.9	0.5	0.8	--	--	--
Chirikof	1-100	0.2	27.1	2.2	0.1	4.0	0.23	--
	101-200	1.4	229.6	18.6	0.6	24.0	0.40	--
	201-400	7.3	980.8	79.3	1.8	72.0	0.54	32.9
	All zones	2.6	1,237.5	2.7	2.5	--	0.49	--
Shumagin	1-100	--	--	--	--	--	--	--
	101-200	--	--	--	--	--	--	--
	201-400	--	--	--	--	--	--	--
	All zones	--	--	--	--	--	--	--
Sanak	1-100	0	0	0	0	0	--	--
	101-200	3.4	550.1	57.8	--	--	--	--
	201-400	32.2	402.4	42.3	0.6	--	0.72	41.1
	All zones	2.7	952.5	2.1	--	--	--	--
Total	1-100	0.5	336.8	0.8	1.3	--	0.31	--
	101-200	14.2	16,022.6	35.5	--	--	--	--
	201-400	52.1	28,803.4	63.8	67.2	--	0.43	--
	All zones	19.3	45,162.7	100.1	--	--	--	--

1/ Mean catch per unit effort, in kilograms per hour trawled.
2/ Where data are available.
3/ Less than 0.1 kg/hr.
4/ Less than 0.1 X 10^6 individuals.
5/ Less than 0.1 percent.

Table XI-136.--Mean lengths (cm) of Dover sole by regions and depth zones (Cruise 734 744, 751, 753 and 762).

	0-100 m			101-200 m			201-400 m		
	Male	Female	Total	Male	Female	Total	Male	Female	Tota
Fairweather	--	--	--	--	--	--	34.6	39.0	36.6
Yakutat	--	--	--	29.2	34.2	32.3	35.8	41.0	39.6
Prince William	30.2	30.0	30.0	32.9	34.4	33.8	31.5	36.9	33.5
Kenai	--	--	--	--	--	33.5	--	--	35.4
Kodiak	--	--	--	--	--	34.2	--	--	34.0
Shelikof	--	--	--	--	--	--	--	--	--
Chirikof	--	--	--	--	--	--	--	--	32.7
Shumagin	--	--	--	--	--	--	--	--	--
Sanak	--	--	--	--	--	--	--	--	41.5

SKATES

Distribution and abundance--Due to problems associated with identification of the skate species encountered in the Gulf of Alaska (Table V-3), these species have been combined into a general classification. Skates were found throughout the Gulf of Alaska with the exception of the Kodiak, Shelikof, Chirikof, and Sanak-inner shelf depth zones. Apparent relative abundance was highest in the eastern Gulf regions and averaged 11 kg/hr over all regions. The Yakutat region had the highest density distribution followed by Fairweather and Prince William. Mean CPUE's in the remaining regions were below the survey average in this group. Relative apparent abundance was evenly distributed between the three depth zones ranging from 11 kg/hr in the inner shelf to 12 kg/hr in the upper slope and outer shelf. The distribution of the standardized catch rates for the successful stations are presented in Figures XI-518-523.

Biomass--The skate biomass in the Gulf of Alaska has been estimated at 27 thousand mt of which 52% occurred in the outer shelf, 25% in the inner shelf and 23% in the upper slope (Table XI-142). The Yakutat region made the largest contribution to the total biomass (31%), followed by Prince William (24%) and Fairweather (22%). When combined these three easternmost Gulf regions accounted for 77% of the total skate biomass.

Table XI-137.--Parameters for the length-weight relationship (weight (g) = a · length^b) for Dover sole (Cruise 751).

		YAKUTAT				PRINCE WILLIAM			
	Depth	Sample Size	Range in Length (cm)	Parameters (a)	(b)	Sample Size	Range in Length (cm)	Parameters (a)	(b)
Males	0-100	--	--	--	--	3	32-34	0.041083	2.581121
	101-200	32	18-37	0.000796	3.694699	69	24-37	0.000575	3.786216
	201-400	--	--	--	--	--	--	--	--
Females	0-100	--	--	--	--	15	24-40	0.015220	2.887672
	101-200	71	22-47	0.001305	3.544710	135	26-52	0.003337	3.277051
	201-400	--	--	--	--	--	--	--	--

Table XI-138.--Summary of age-length data collected for Dover sole (Cruise 751).

Sex	REGIONS					
	Yakutat			Prince William		
	DEPTH ZONES (M)					
Males	0-100	101-200	201-400	0-100	101-200	201-40
Number of readable otoliths	--	26	55	3	21	45
Range in age (years)	--	3-8	3-10	6	4-10	4-1C
Range in length (cm)	--	25-37	25-44	31-34	27-37	23-37
Females						
Number of readable otoliths	--	43	68	12	60	68
Range in age (years)	--	3-14	3-13	3-10	4-14	4-14
Range in length (cm)	--	24-42	25-52	24-40	26-51	23-53

SHORTSPINE THORNYHEAD

Distribution and abundance--Occurrence of the shortspine thornyhead was generally confined to the upper slope depth zones where catch rates averaged 18 kg/hr. Highest relative apparent abundance occurred in the upper slope of the Sanak (77 kg/hr), Fairweather (62 kg/hr), Yakutat (48 kg/hr) and Prince William (30 kg/hr) regions with substantially lower rates occurring in the remaining areas. The distribution of the standardized catch rates for the successful stations is presented in Figures XI-524-528.

Biomass--Of the nearly 11 thousand mt of apparent biomass, 80% occurred in the upper slope, 18% in the outer shelf and 3% in the inner shelf (Table XI-143). The Yakutat region made the largest contribution to the total biomass (42%) followed by Fairweather (19%) and Prince William (18%). The remaining regions accounted for only 21% of the total biomass. The biomass estimate for this species should be considered minimal because the survey covered only a portion of its bathymetric range which includes the steep, rugged bottom of the lower slope.

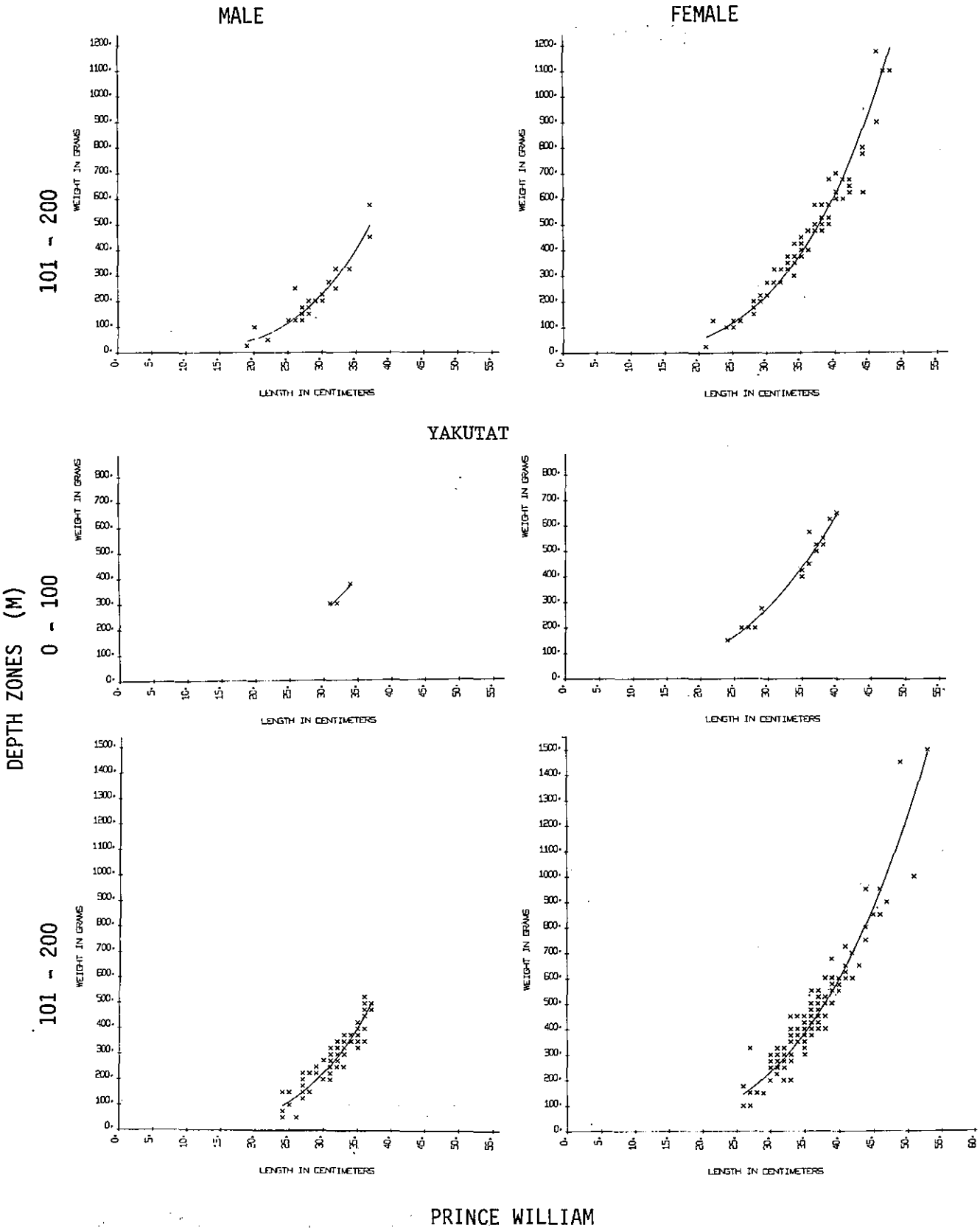
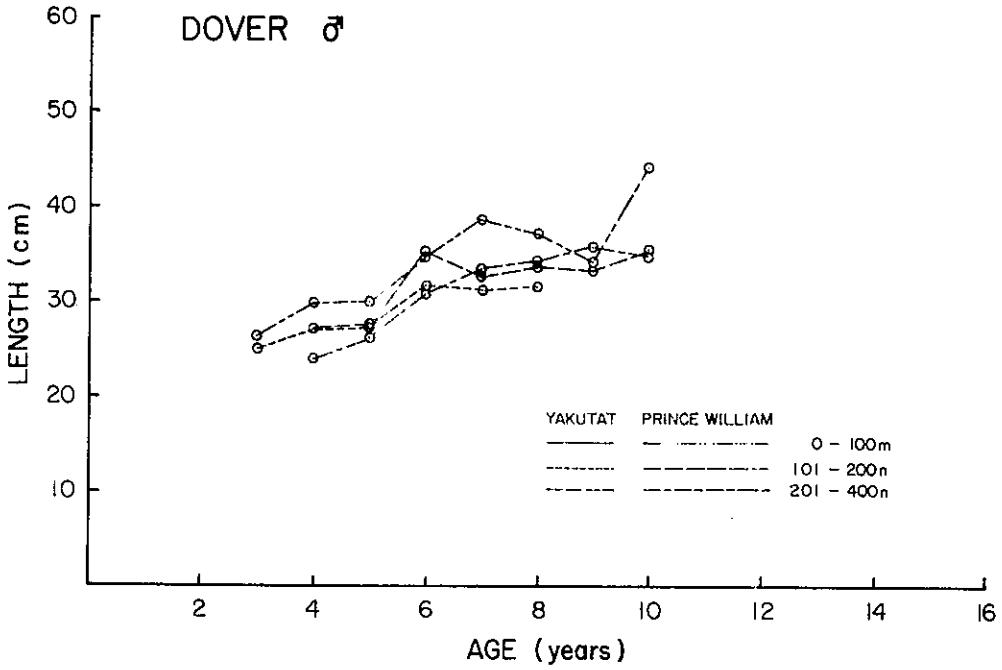


Figure XI-504.--Weight at length observations for Dover sole in the Gulf of Alaska by regions and depth zones, May-Aug. 1975 (Cruise 751).



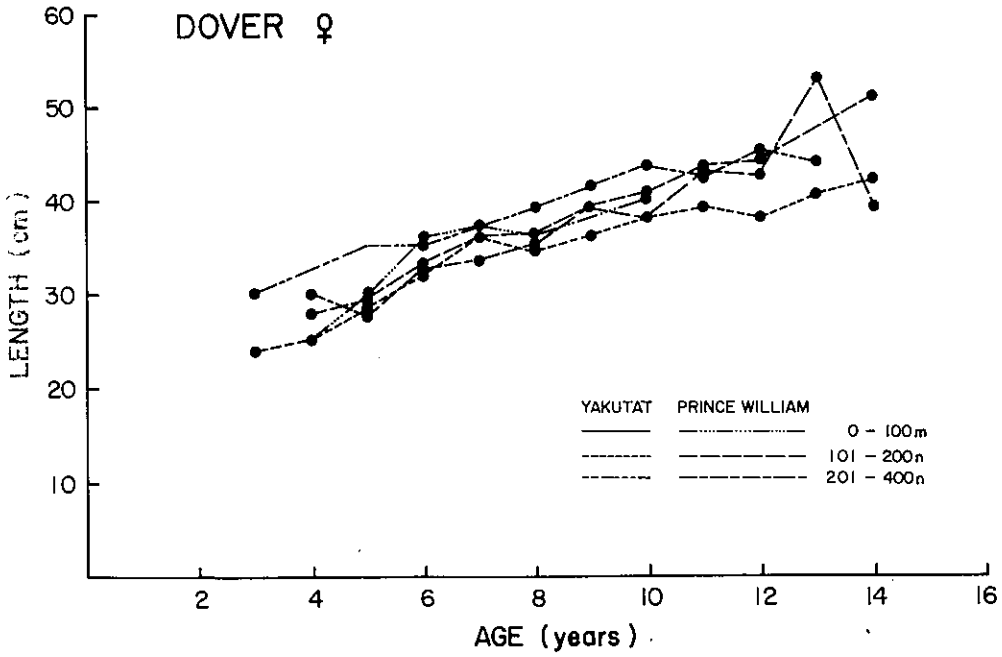


Figure XI-505.--Mean lengths at age for Dover sole by sex and region-depth zones in the Gulf of Alaska, May-Aug. 1975 (Cruise 751).

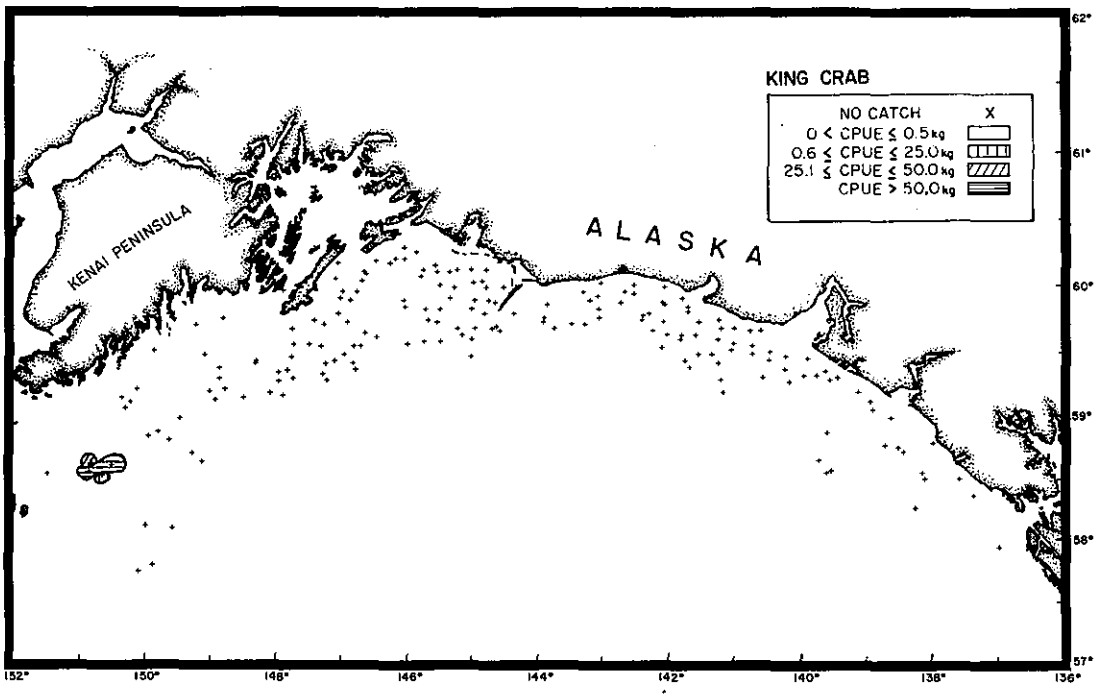


Figure XI-506.--Distribution of apparent relative abundance of king crab in the eastern Gulf of Alaska, May-Aug. 1975, Jun.-Aug. 1975, and Apr. 1976 (Cruises 751, 753, and 762).

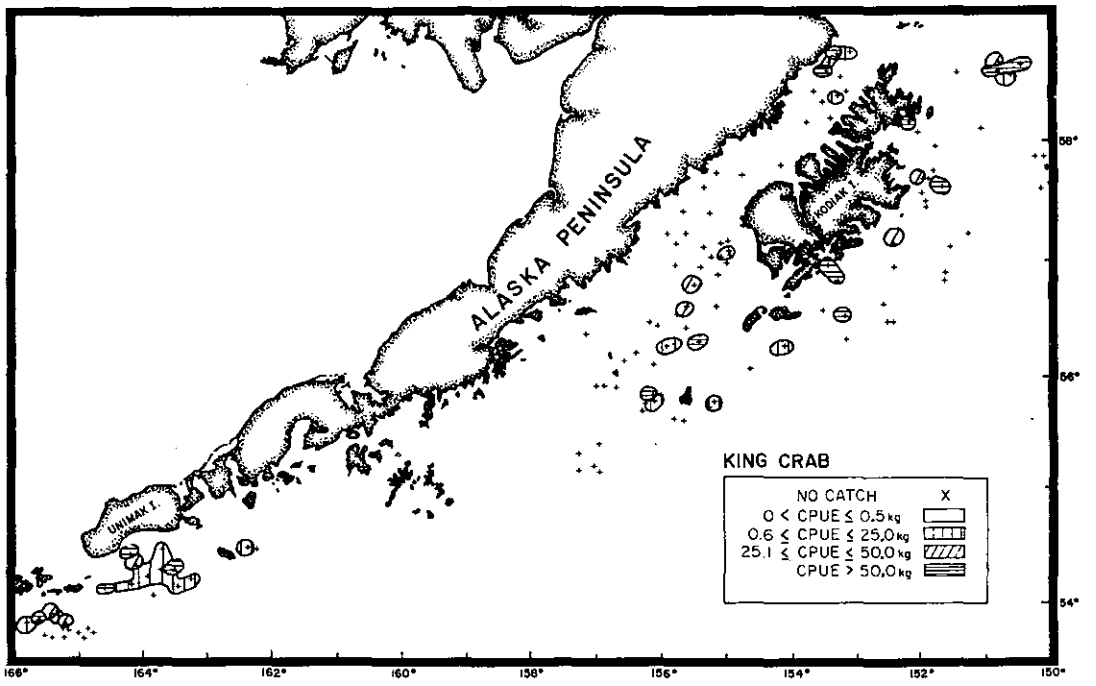


Figure XI-507.--Distribution of apparent relative abundance of king crab in the western Gulf of Alaska, May-Jul. 1973, Aug.-Oct. 1973, Jul.-Aug. 1974, and Jun.-Aug. 1975 (Cruises 733, 734, 753, and 744)

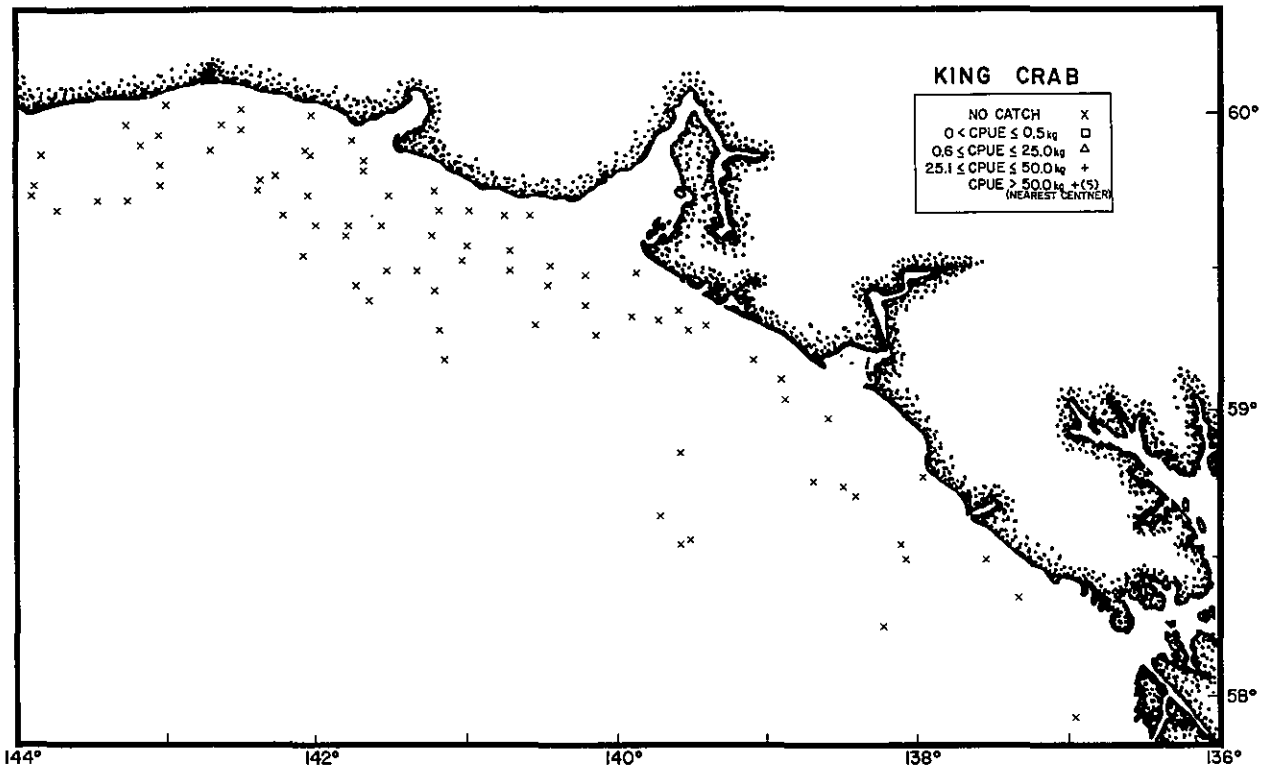


Figure XI-508.--Distribution of standardized catch rates in kilograms/ hour of king crab in the eastern Gulf of Alaska, May-Aug. 1975 and Apr. 1976 (Cruises 751 and 762).

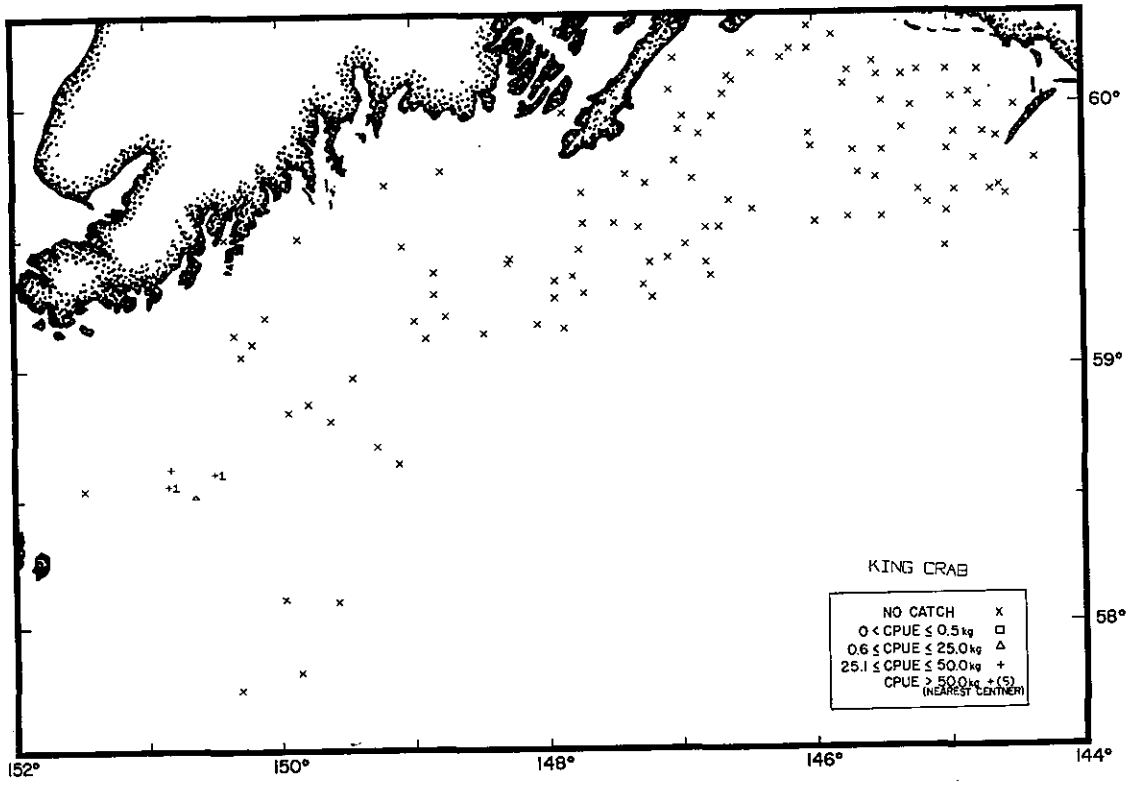


Figure XI-509.--Distribution of standardized catch rates in kilograms/ hour of king crab in the eastern Gulf of Alaska, May-Aug. 1975 (Cruises 751 and 753).

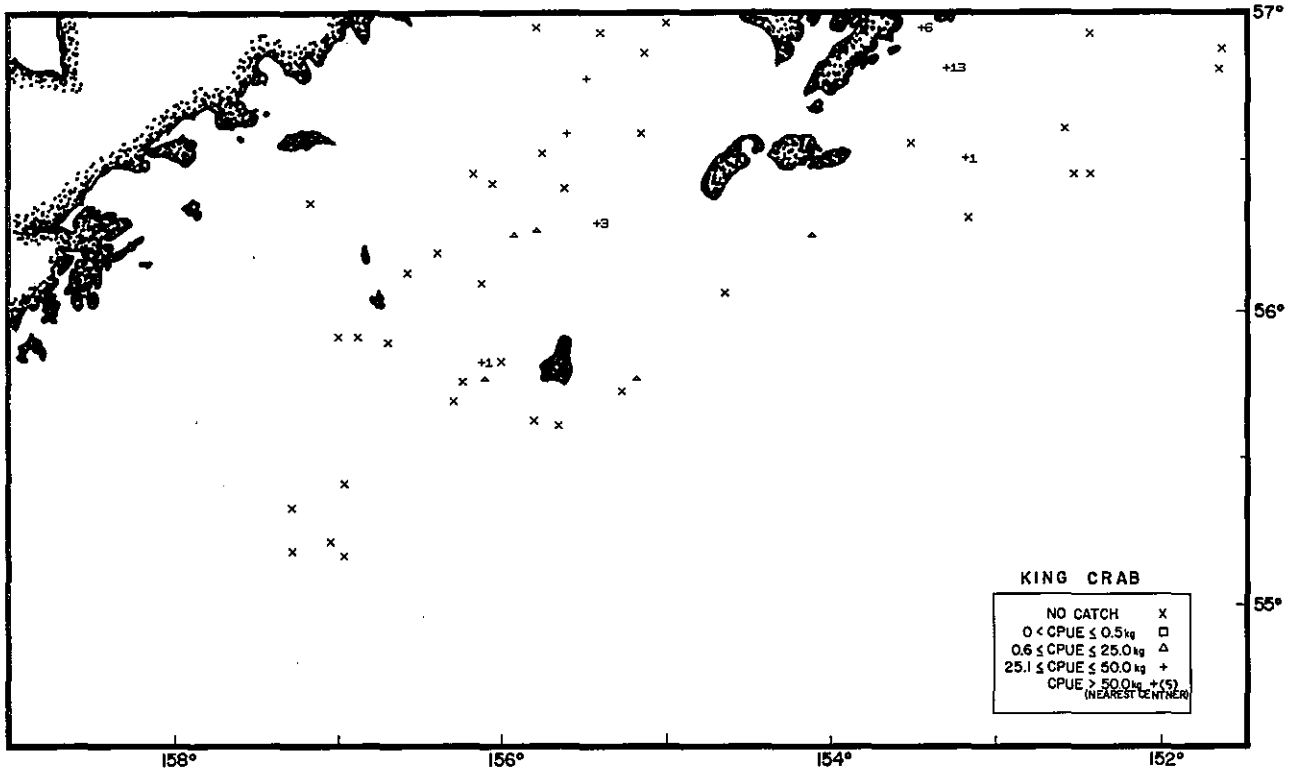


Figure XI-510.--Distribution of standardized catch rates in kilograms/ hour of king crab in the western Gulf of Alaska, Aug.-Oct. 1973 and Jun.-Aug. 1975 (Cruises 734 and 753).

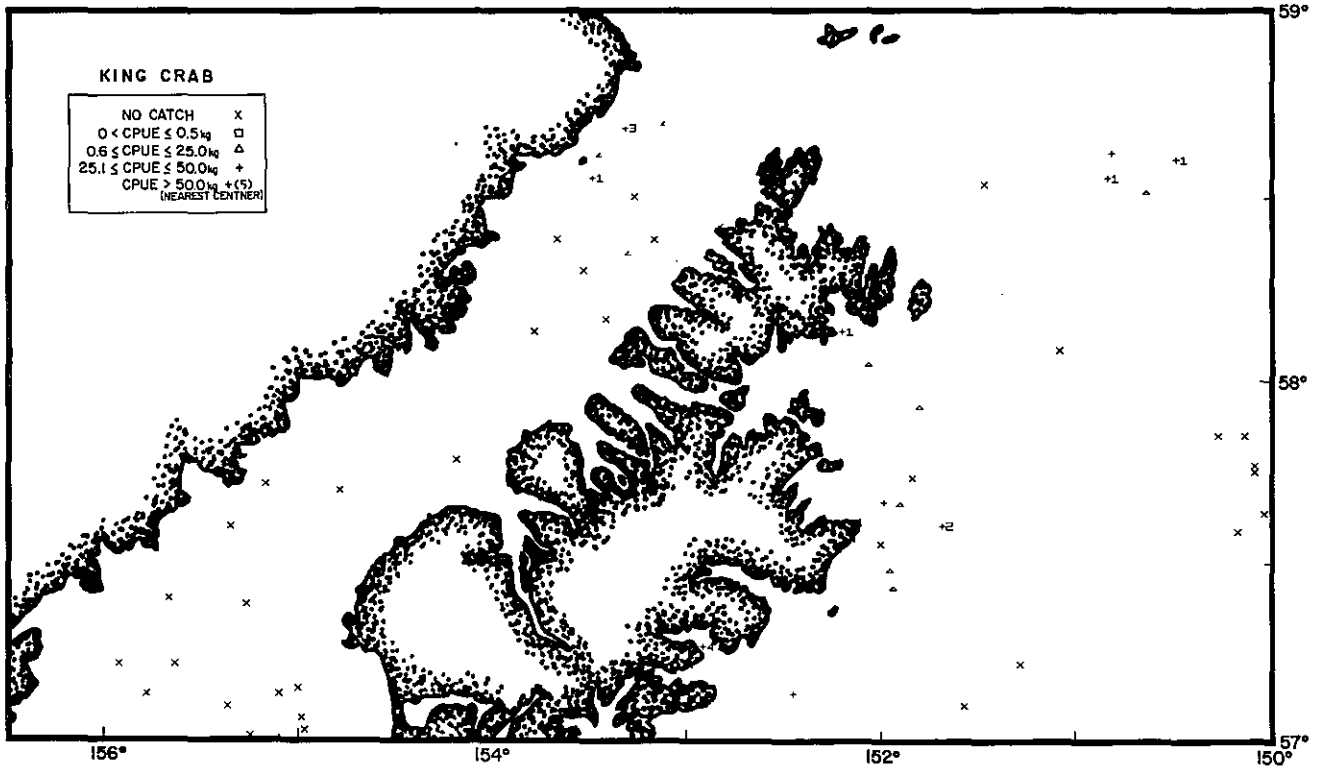


Figure XI-511.--Distribution of standardized catch rates in kilograms/ hour of king crab in the western Gulf of Alaska, May-Jun. 1973, Aug.-Oct. 1973, and Jun.-Aug. 1975 (Cruises 733, 734, and 753).

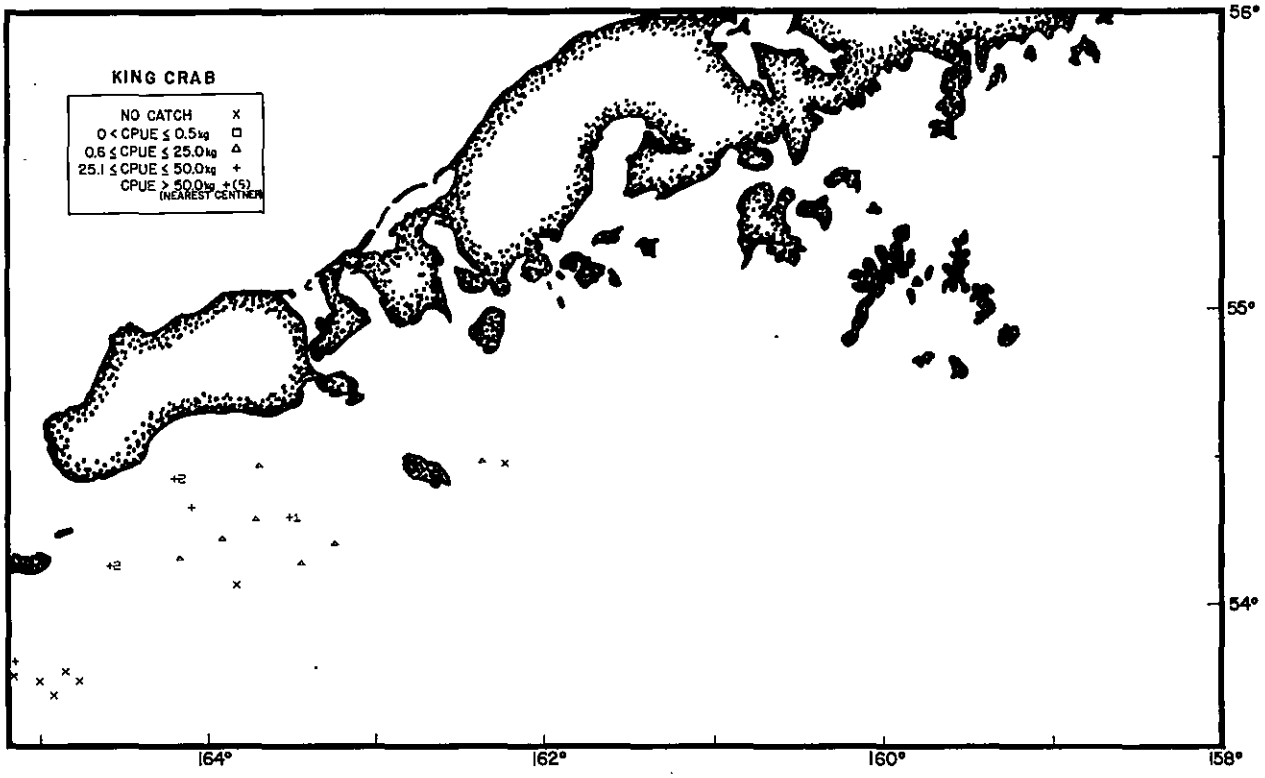


Figure XI-512.--Distribution of standardized catch rates in kilograms/ hour of king crab in the western Gulf of Alaska, Jul.-Aug. 1974 (Cruise 744).

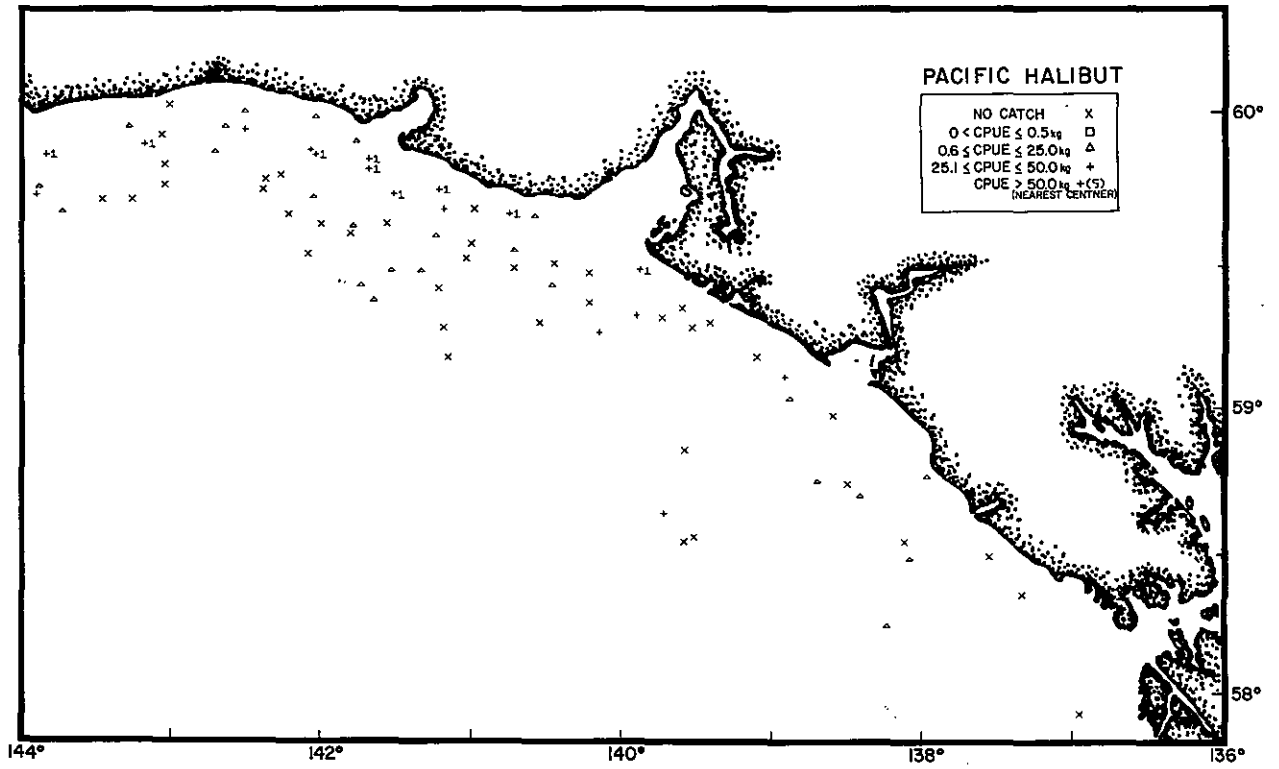


Figure XI-513.--Distribution of standardized catch rates in kilograms/ hour of Pacific halibut in the eastern Gulf of Alaska, May-Aug. 1975 and Apr. 1976 (Cruises 751 and 762).

Table XI-139.--Estimated biomass and population size of king crab (Paralithodes camtschatica) in the Gulf of Alaska during April-October 1973-76.

Region	Depth zone (m)	CPUE[1/] (kg/hr)	Estimated biomass (mt)	Proportion of total estimated biomass	Estimated population (X 10^6)	Proportion of total estimated population	Mean size per individual 2/ Weight (kg)	Length (cm)
Fairweather	1-100	0	0	0	0	0	--	--
	101-200	1.1	175.5	100.0	0.1	100.0	1.44	--
	201-400	0	0	0	0	0	--	--
	All zones	0.8	175.5	0.4	0.4	0.1	1.44	--
Yakutat	1-100	0	0	0	0	0	--	--
	101-200	0	0	0	0	0	--	--
	201-400	0	0	0	0	0	--	--
	All zones	0	0	0	0	0	--	--
Prince William	1-100	0	0	0	0	0	--	--
	101-200	0	0	0	0	0	--	--
	201-400	0	0	0	0	0	--	--
	All zones	0	0	0	0	0	--	--
Kenai	1-100	--	--	--	--	--	--	--
	101-200	7.1	1,727.3	59.6	0.4	57.1	3.87	--
	201-400	11.7	1,172.1	40.4	0.3	42.9	4.67	--
	All zones	8.5	2,899.4	6.6	0.7	3.5	4.16	--
Kodiak	1-100	25.9	3,702.7	16.8	1.2	11.4	2.98	--
	101-200	146.4	18,064.5	82.0	9.2	87.6	1.97	--
	201-400	4.6	258.0	1.2	0.1	1.0	3.30	--
	All zones	68.3	22,025.2	49.8	10.5	52.2	2.10	--
Shelikof	1-100	107.4	695.8	86.2	0.3	100.0	2.04	--
	101-200	2.7	111.1	13.8	4/	5/	3.06	--
	201-400	0	0	0	0	0	--	--
	All zones	5.3	806.9	1.8	0.3	1.5	2.14	--
Chirikof	1-100	38.0	4,539.5	75.0	1.6	69.6	2.81	--
	101-200	6.5	1,055.8	17.4	0.5	21.7	1.96	--
	201-400	3.4	460.7	7.6	0.2	8.7	2.04	--
	All zones	15.4	6,056.0	13.7	2.3	11.4	2.55	--
Shumagin	1-100	--	--	--	--	--	--	--
	101-200	--	--	--	--	--	--	--
	201-400	--	--	--	--	--	--	--
	All zones	--	--	--	--	--	--	--
Sanak	1-100	33.9	6,092.0	49.8	3.3	53.2	1.83	--
	101-200	37.6	6,141.7	50.2	2.9	46.7	2.15	--
	201-400	0	0	0	0	0	--	--
	All zones	34.4	12,238.7	27.7	6.2	30.9	1.98	--
Total	1-100	23.3	15,030.0	34.0	6.4	31.8	2.35	--
	101-200	23.6	27,280.9	61.7	13.1	65.2	2.08	--
	201-400	3.6	1,890.8	4.3	0.6	3.0	3.15	--
	All zones	18.9	44,201.7	100.0	20.1	100.0	2.20	--

1/ Mean catch per unit effort, in kilograms per hour trawled.
2/ Where data are available.
3/ Less than 0.1 kg/hr.
4/ Less than 0.1 X 10^6 individuals.
5/ Less than 0.1 percent.

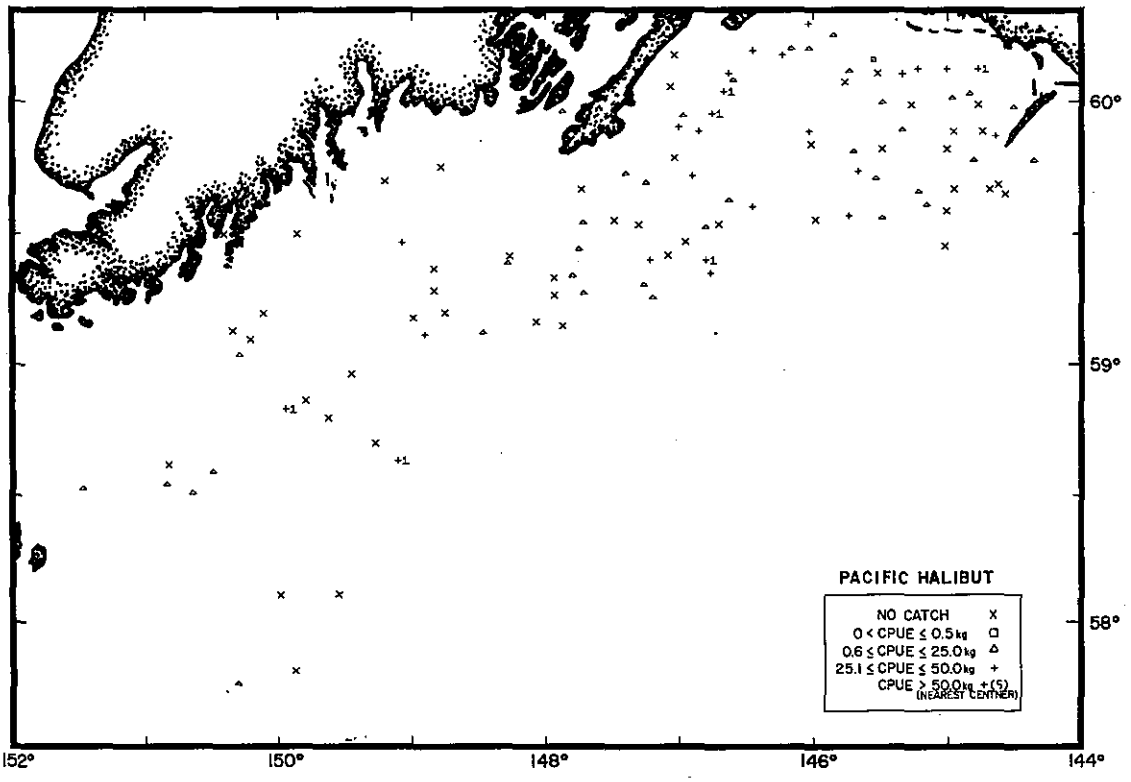


Figure XI-514.--Distribution of standardized catch rates in kilograms/ hour of Pacific halibut in the eastern Gulf of Alaska, May-Aug. 1975 (Cruises 751 and 753).

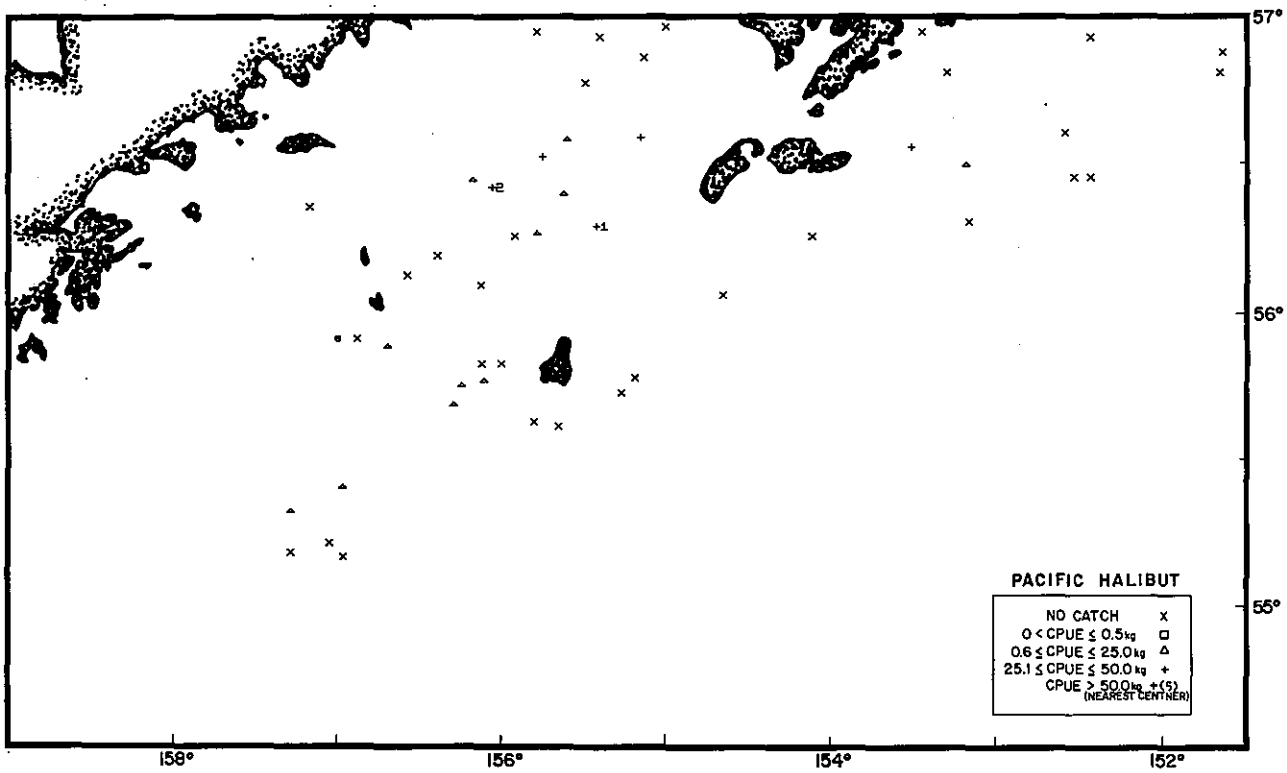


Figure XI-515.--Distribution of standardized catch rates in kilograms/ hour of Pacific halibut in the western Gulf of Alaska, Aug.-Oct. 1973 and Jun.-Aug. 1975 (Cruises 734 and 753).

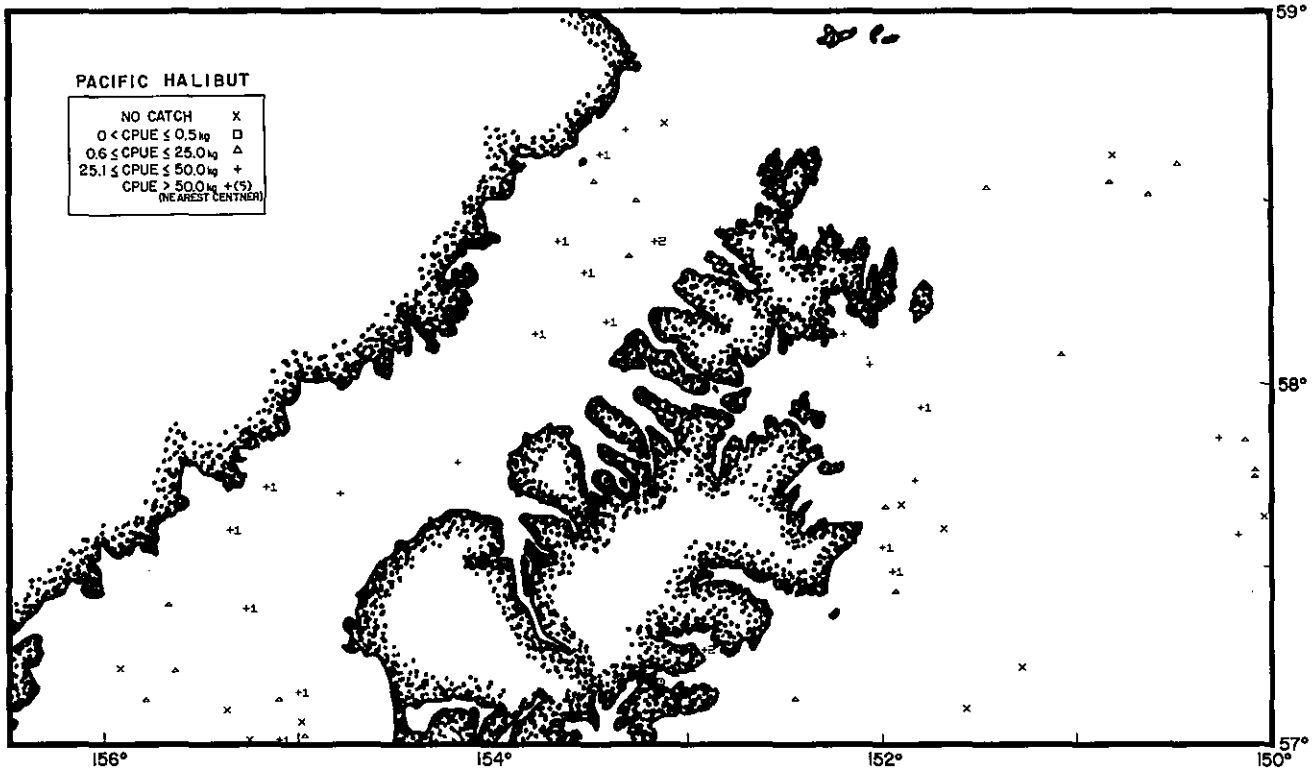


Figure XI-516.--Distribution of standardized catch rates in kilograms/ hour of Pacific halibut in the western Gulf of Alaska, May-Jun. 1973, Aug.-Oct. 1973, and Jun.-Aug. 1975 (Cruises 733, 734, and 753).

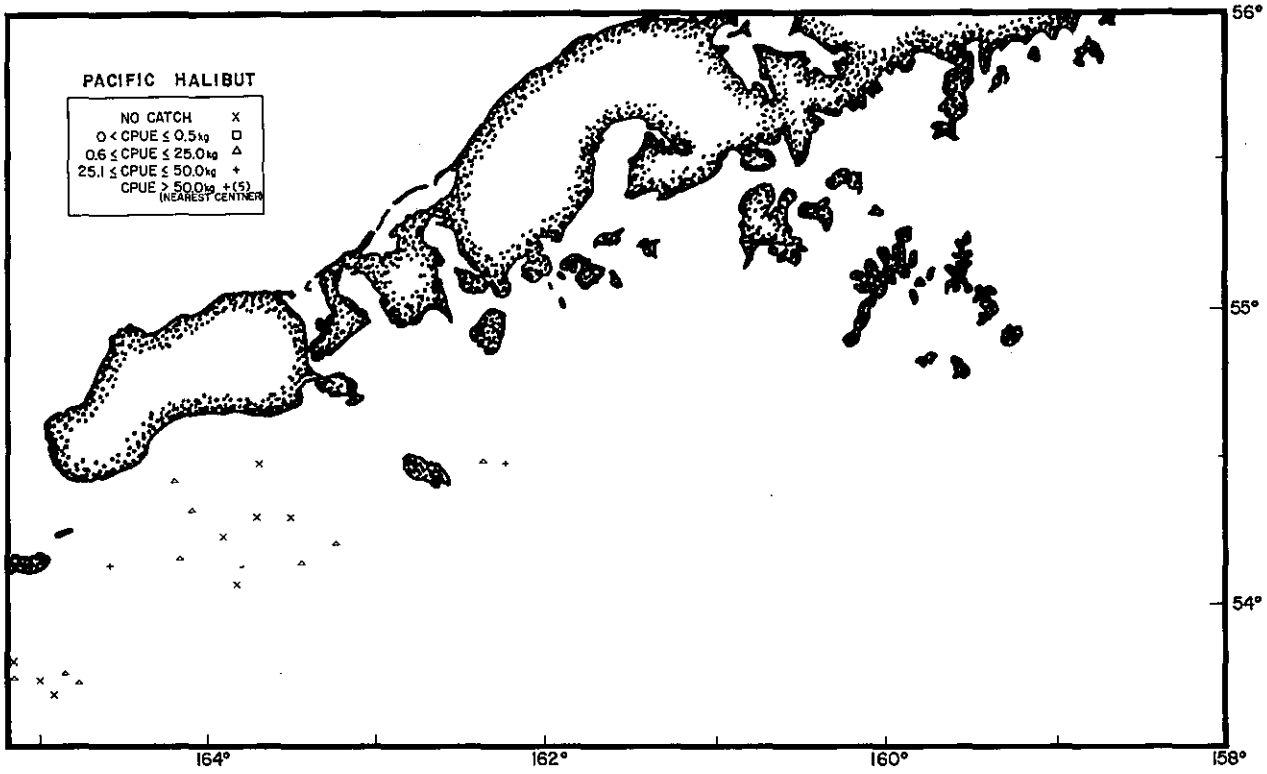


Figure XI-517.--Distribution of standardized catch rates in kilograms/ hour of Pacific halibut in the western Gulf of Alaska, Jul.-Aug. 1974 (Cruise 744).

Table XI-140.--Estimated biomass and population size of Pacific halibut (Hippoglossus stenolepis) in the Gulf of Alaska during April-October 1973-76.

Region	Depth zone (m)	CPUE 1/ (kg/hr)	Estimated biomass (mt)	Proportion of total estimated biomass	Estimated population ($\times 10^6$)	Proportion of total estimated population	Mean size per individual 2/ Weight (kg)	Mean size per individual 2/ Length (cm)
Fairweather	1-100	18.6	669.0	44.5	0.4	66.7	1.86	44.1
	101-200	5.1	835.9	55.6	0.2	33.3	4.56	65.4
	201-400	0	0	0	0	0	--	--
	All zones	6.6	1,504.9	3.5	0.6	3.3	2.77	--
Yakutat	1-100	37.5	2,321.2	59.8	0.9	75.0	2.61	54.5
	101-200	10.6	1,543.2	39.8	0.3	25.0	5.39	72.6
	201-400	0.2	14.3	0.4	4/	5/	2.49	--
	All zones	14.0	3,878.7	9.1	1.2	6.5	3.28	--
Prince William	1-100	25.8	2,854.5	60.8	2.0	80.0	1.44	47.1
	101-200	14.6	1,837.8	39.2	0.5	20.0	3.75	59.2
	201-400	0	0	0	0	0	--	--
	All zones	17.2	4,692.3	11.0	2.5	13.6	1.90	--
Kenai	1-100	--	--	--	--	--	--	--
	101-200	8.7	2,123.9	53.4	0.3	75.0	6.52	--
	201-400	18.5	1,854.8	46.6	0.1	25.0	18.48	--
	All zones	11.6	3,978.7	9.4	0.4	2.2	9.34	--
Kodiak	1-100	52.6	7,535.3	82.8	1.5	60.0	5.17	--
	101-200	9.7	1,194.3	13.1	0.7	28.0	1.67	--
	201-400	6.7	374.3	4.1	0.3	12.0	1.34	--
	All zones	28.2	9,103.9	21.4	2.5	13.6	3.71	--
Shelikof	1-100	45.7	296.0	3.1	0.1	3.5	4.28	--
	101-200	59.2	2,414.7	25.0	0.5	17.2	5.22	--
	201-400	66.7	6,957.2	72.0	2.3	79.3	2.99	--
	All zones	63.8	9,667.9	22.7	2.9	15.8	4.16	--
Chirikof	1-100	19.8	2,371.4	42.7	1.4	82.4	1.68	--
	101-200	0.5	88.6	1.6	0.1	5.9	1.74	--
	201-400	23.1	3,096.7	55.7	0.2	11.8	13.72	--
	All zones	12.6	5,556.7	13.1	1.7	9.2	3.29	--
Shumagin	1-100	--	--	--	--	--	--	--
	101-200	--	--	--	--	--	--	--
	201-400	--	--	--	--	--	--	--
	All zones	--	--	--	--	--	--	--
Sanak	1-100	14.5	2,607.9	63.0	5.5	83.3	0.48	--
	101-200	9.3	1,512.9	36.5	1.1	16.7	1.42	--
	201-400	1.5	18.9	0.5	4/	5/	4.54	--
	All zones	11.7	4,139.7	9.7	6.6	35.9	0.48	--
Total	1-100	28.6	18,655.3	43.9	11.8	64.1	1.58	--
	101-200	9.9	11,551.3	27.2	3.7	20.1	3.12	--
	201-400	23.1	12,316.2	29.0	2.9	15.8	4.25	--
	All zones	18.0	42,522.8	100.1	18.4	100.0	2.31	--

1/ Mean catch per unit effort, in kilograms per hour trawled.
2/ Where data are available.
3/ Less than 0.1 kg/hr.
4/ Less than 0.1 X 10^6 individuals.
5/ Less than 0.1 percent.

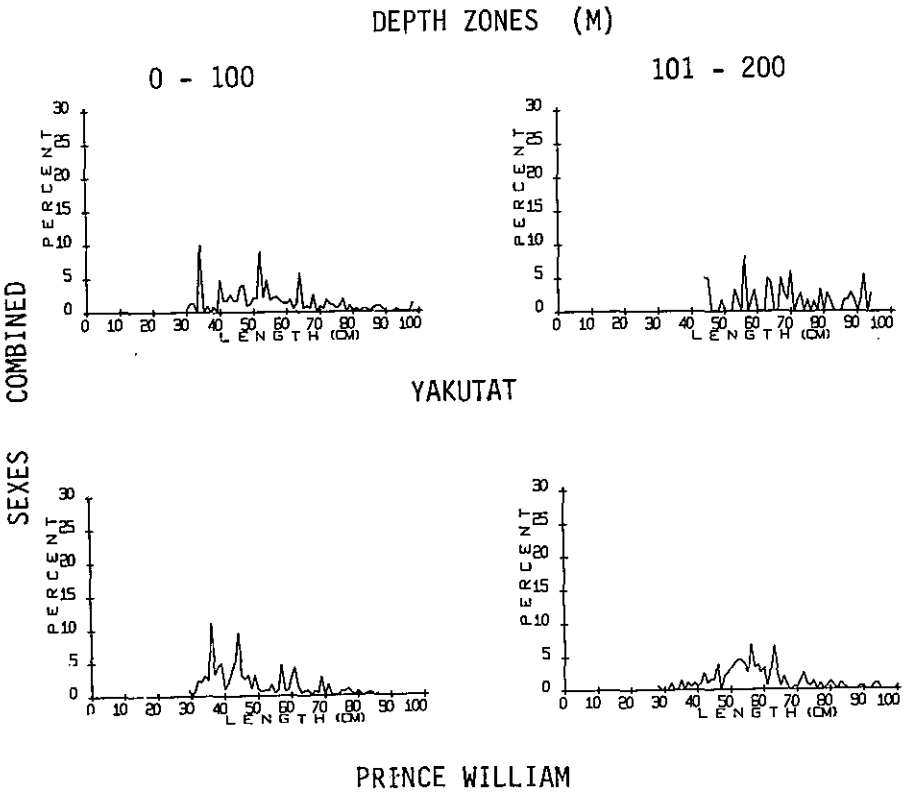


Figure XI-518.--Length frequency distributions of Pacific halibut in the Gulf of Alaska by region-depth zones, 1973-1976.

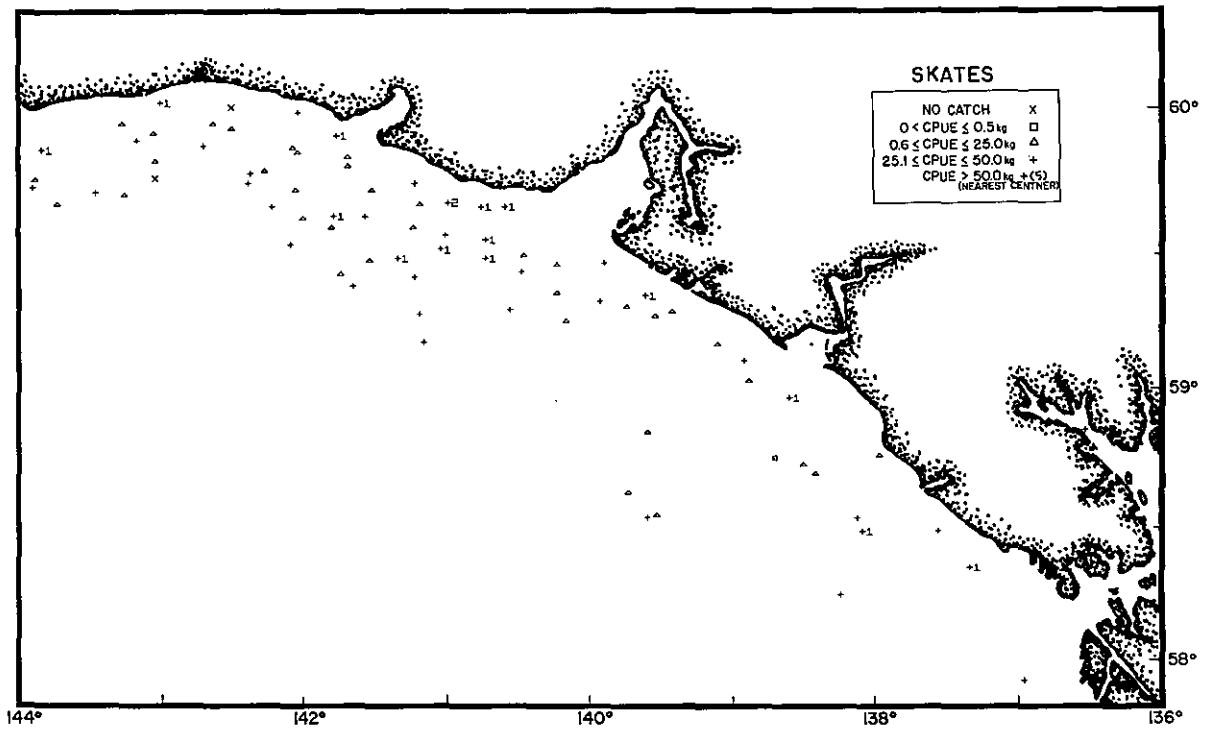


Figure XI-519.--Distribution of standardized catch rates in kilograms/hour of skates in the eastern Gulf of Alaska, May-Aug. 1975 and Apr. 1976 (Cruises 751 and 762).

Table XI-141.--Mean lengths (cm) of Pacific halibut by regions and depth zones (Cruises 751 and 762).

	0-100 m			101-200 m			201-400 m		
	Male	Female	Total	Male	Female	Total	Male	Female	Tota
Fairweather	--	--	--	--	--	--	--	--	--
Yakutat	--	--	54.5	--	--	72.6	--	--	--
Prince William	--	--	47.1	--	--	59.2	--	--	--
Kenai	--	--	--	--	--	--	--	--	--
Kodiak	--	--	--	--	--	--	--	--	--
Shelikof	--	--	--	--	--	--	--	--	--
Chirikof	--	--	--	--	--	--	--	--	--
Shumagin	--	--	--	--	--	--	--	--	--
Sanak	--	--	--	--	--	--	--	--	--

Size composition--Length frequency data are available only from the Yakutat upper slope and Prince William-outer shelf where mean lengths, sexes combined, were 26.1 and 34.0 cm respectively (Table XI-144 and Figure XI-528).

SABLEFISH

Distribution and abundance--While sablefish were taken at most depths throughout the survey area (Shelikof region excepted), highest concentrations occurred in the upper slope area of the eastern Gulf. The Yakutat-upper slope had the highest mean catch rate (51 kg/hr) followed by the upper slope of the Kodiak (19 kg/hr), Prince William (13 kg/hr) and Kenai (12 kg/hr) regions. The distribution of the standardized catch rates for the successful stations is presented in Figures XI-530-534.

Biomass--The apparent biomass of sablefish has been estimated at 10 thousand mt, of which 74% was contained in the upper slope, 24% in the outer shelf and 2% in the inner shelf (Table XI-145). The Yakutat region accounted for 37% of the sablefish biomass followed by Kenai (22%) and Kodiak (17%). Because the bathymetric range of this species, which extends to the lower slope, was not adequatly sampled, the biomass estimates should be considered minimal.

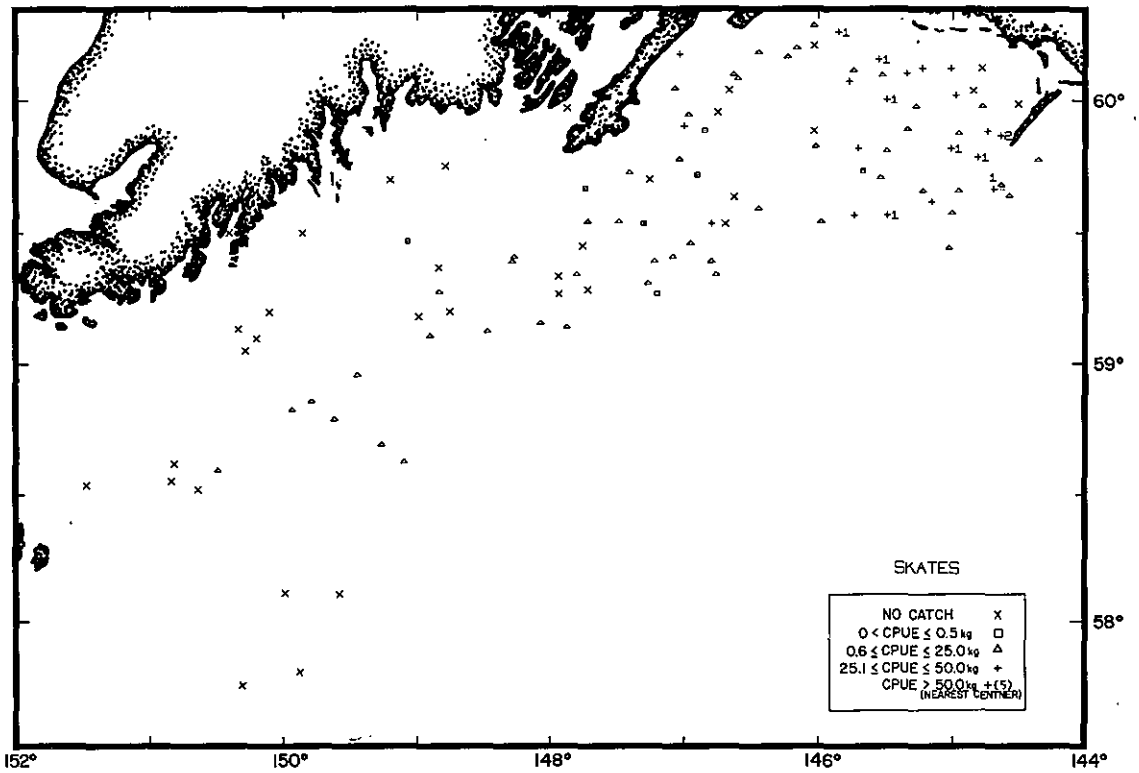


Figure XI-520.--Distribution of standardized catch rates in kilograms/ hour of skates in the eastern Gulf of Alaska, May-Aug. 1975 (Cruises 751 and 753).

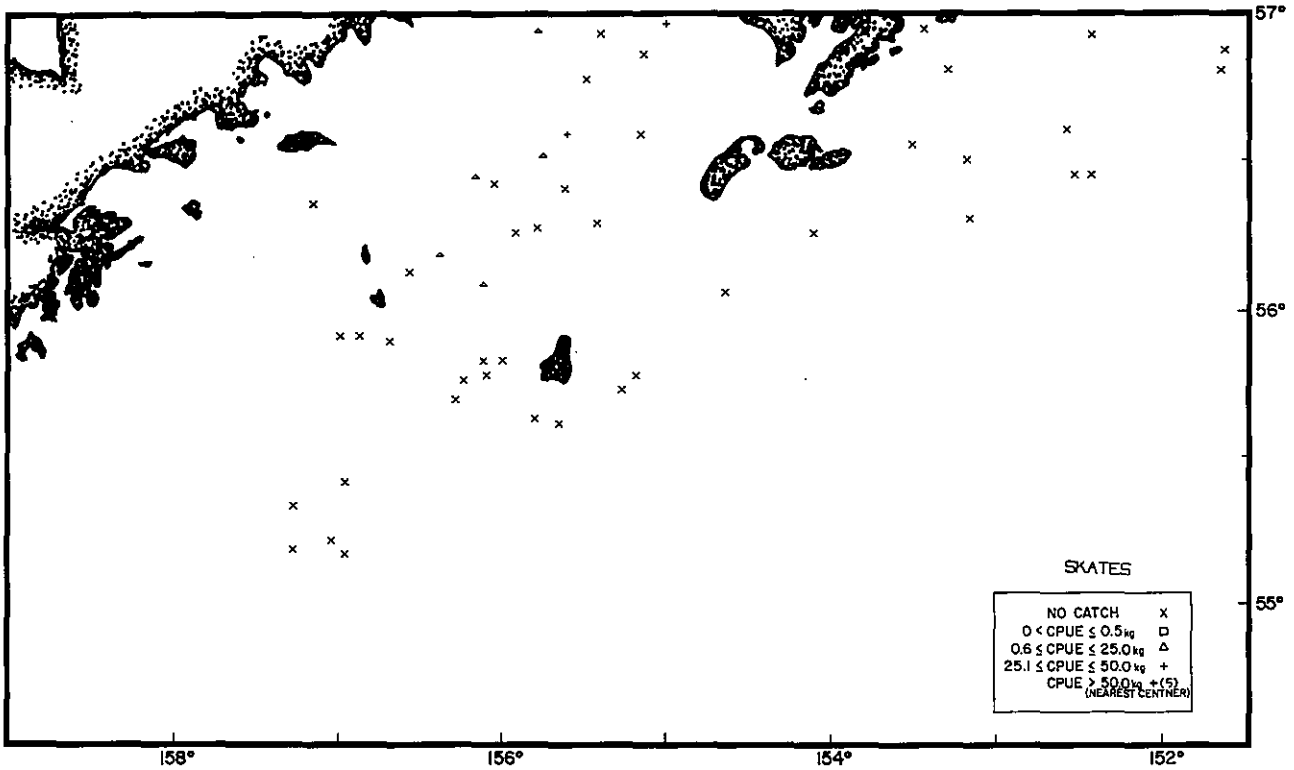


Figure XI-521.--Distribution of standardized catch rates in kilograms/ hour of skates in the western Gulf of Alaska, Aug.-Oct. 1973 and Jun.-Aug. 1975 (Cruises 734 and 753).

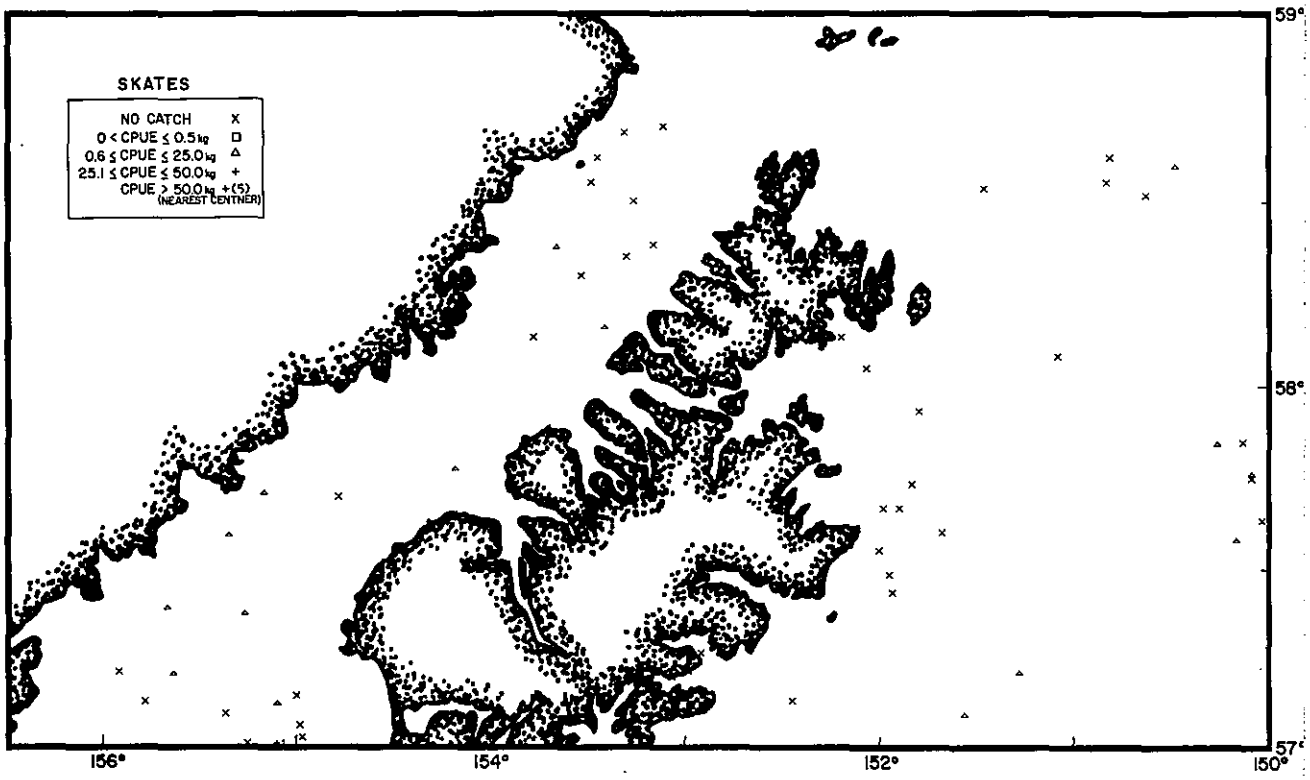


Figure XI-522.--Distribution of standradized catch rates in kilograms/ hour of skates in the western Gulf of Alaska, May-Jun. 1973, Aug.-Oct. 1973, and Jun.-Aug. 1975 (Cruises 733, 734, and 753).

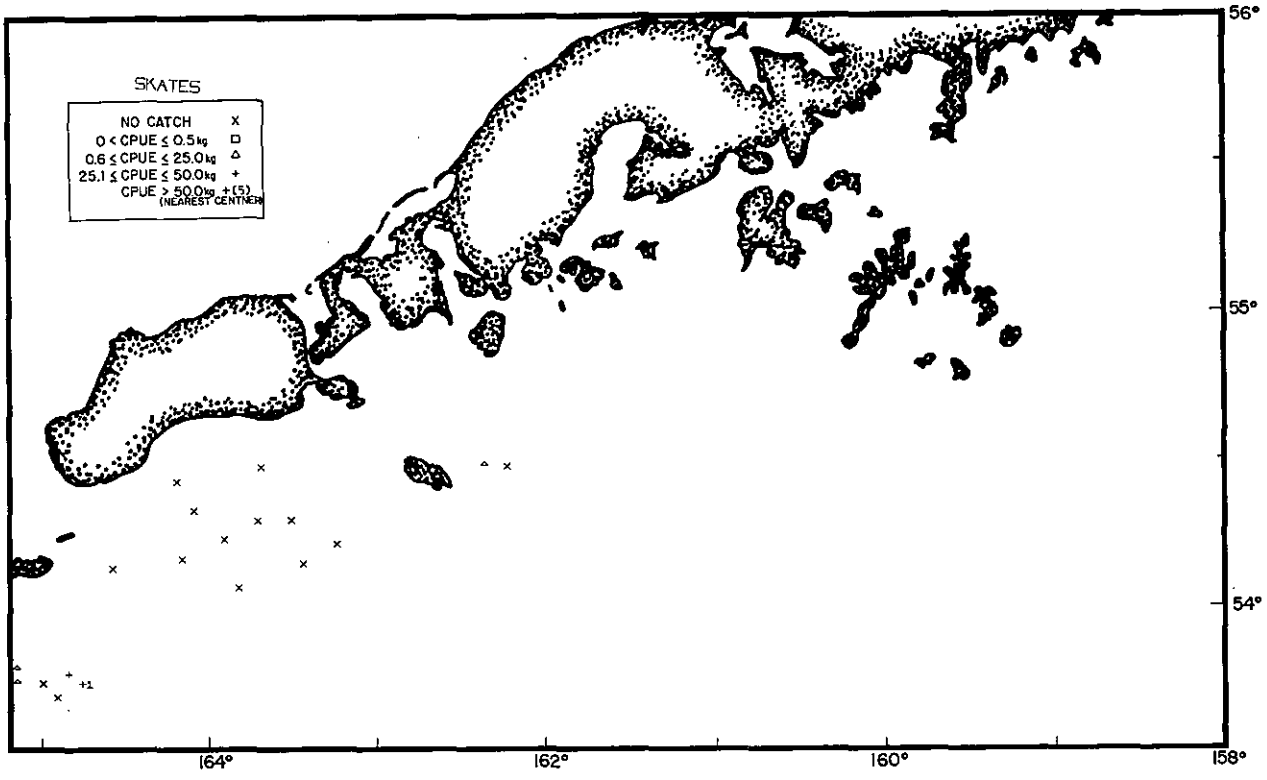


Figure XI-523.--Distribution of standardized catch rates in kilograms/ hour of skates in the western Gulf of Alaska, Jul.-Aug. 1974 (Cruise 744).

Table XI-142.--Estimated biomass and population size of skates in the Gulf of Alaska during April-October 1973-76.

Region	Depth zone (m)	CPUE 1/ (kg/hr)	Estimated biomass (mt)	Proportion of total estimated biomass	Estimated population ($\times 10^6$)	Proportion of total estimated population	Mean size per individual 2/ Weight (kg)	Length (cm)
Fairweather	1-100	12.7	456.9	7.6	0.3	9.4	1.81	--
	101-200	30.5	4,969.0	82.7	2.3	71.9	2.16	--
	201-400	19.3	579.5	9.7	0.6	18.8	1.01	--
	All zones	26.2	6,005.4	21.9	3.2	--	1.92	--
Yakutat	1-100	42.6	2,642.1	30.61	1.4	29.2	1.94	--
	101-200	22.5	3,286.9	38.1	2.1	43.8	1.53	--
	201-400	39.4	2,701.9	31.3	1.3	27.1	2.00	--
	All zones	31.2	8,630.9	31.4	4.8	--	1.78	--
Prince William	1-100	35.4	3,872.3	59.3	0.7	41.2	5.92	--
	101-200	16.6	2,033.6	31.11	0.7	41.2	2.93	--
	201-400	17.8	630.0	9.6	0.3	17.7	2.40	--
	All zones	24.4	6,535.9	23.8	1.7	--	4.06	--
Kenai	1-100	--	--	--	--	--	--	--
	101-200	1.2	290.8	47.3	0.3	42.9	1.00	--
	201-400	3.2	324.3	52.7	0.4	57.1	0.92	--
	All zones	1.8	615.1	2.2	0.7	--	0.96	--
Kodiak	1-100	0	0	0	0	0	--	--
	101-200	1.5	179.2	95.4	--	--	--	--
	201-400	0.2	8.6	4.6	--	--	--	--
	All zones	0.6	187.8	0.7	--	--	--	--
Shelikof	1-100	0	0	0	0	0	--	--
	101-200	0.5	20.6	2.9	4/	5/	2.27	--
	201-400	6.7	702.5	97.2	0.5	100.0	1.47	--
	All zones	4.7	723.1	2.6	0.5	--	1.49	--
Chirikof	1-100	0	0	0	0	0	--	--
	101-200	1.7	269.7	20.4	4/	5/	15.88	--
	201-400	7.8	1,049.3	79.6	0.2	100.0	5.31	--
	All zones	1.2	1,319.0	4.8	0.2	--	6.15	--
Shumagin	1-100	--	--	--	--	--	--	--
	101-200	--	--	--	--	--	--	--
	201-400	--	--	--	--	--	--	--
	All zones	--	--	--	--	--	--	--
Sanak	1-100	0	0	0	0	0	--	--
	101-200	19.9	3,247.9	94.2	1.9	95.0	1.71	--
	201-400	15.9	198.4	5.8	0.1	5.0	1.98	--
	All zones	9.7	3,446.3	12.6	2.0	--	1.72	--
Total	1-100	10.5	6,971.3	25.4	--	--	--	--
	101-200	12.3	14,297.7	52.1	--	--	--	--
	201-400	11.5	6,194.5	22.5	--	--	--	--
	All zones	11.2	27,463.5	100.0	--	--	--	--

1/ Mean catch per unit effort, in kilograms per hour trawled.
2/ Where data are available.
3/ Less than 0.1 kg/hr.
4/ Less than 0.1 X 10^6 individuals.
5/ Less than 0.1 percent.

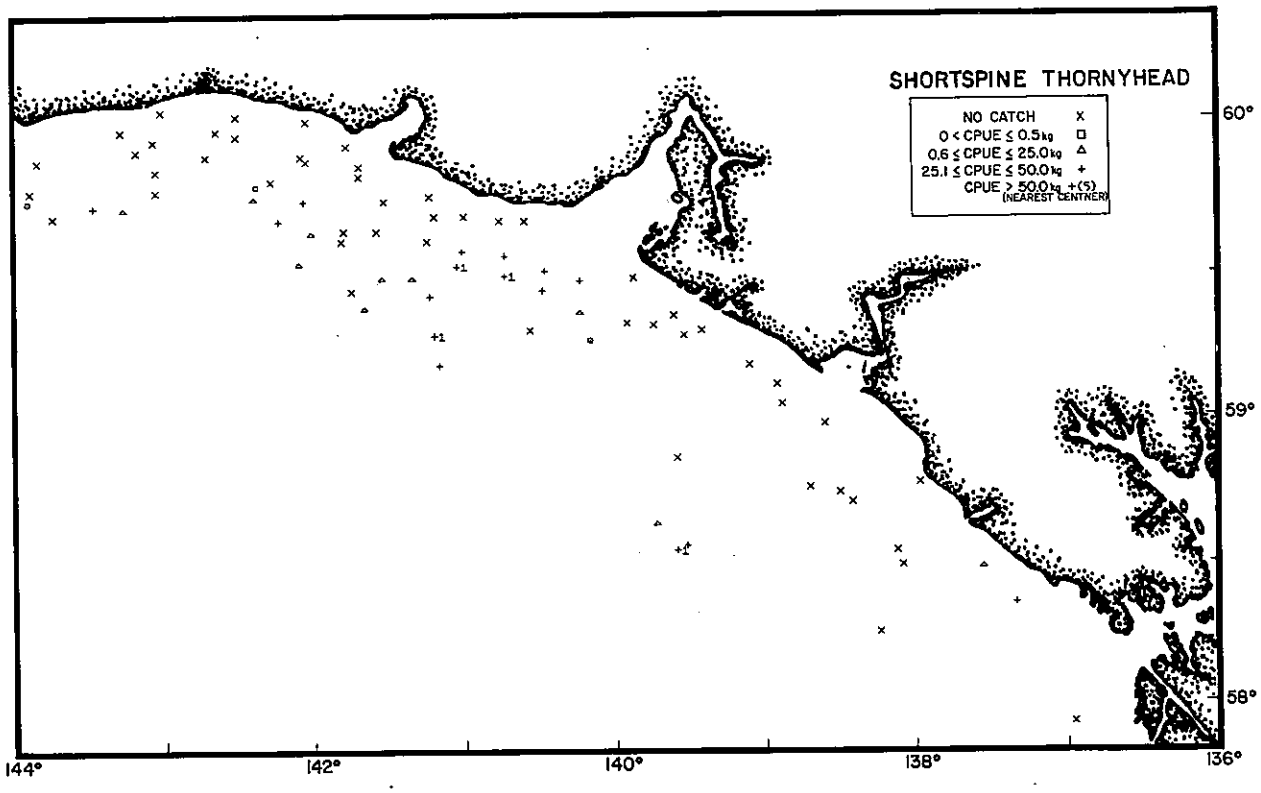


Figure XI-524.--Distribution of standardized catch rates in kilograms/ hour of shortspine thornyhead in the eastern Gulf of Alaska, May-Aug. 1975 and Apr. 1976 (Cruises 751 and 762).

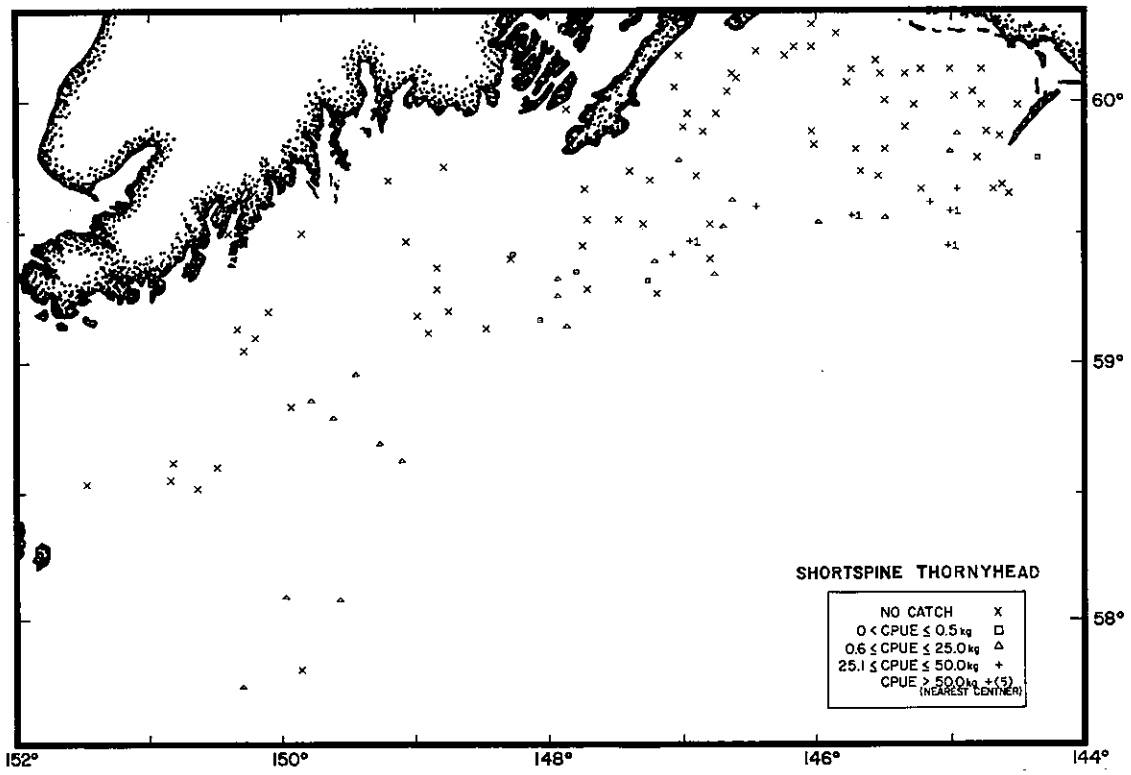


Figure XI-525.--Distribution of standardized catch rates in kilograms/ hour of shortspine thornyhead in the eastern Gulf of Alaska, May-Aug. 1975 (Cruises 751 and 753).

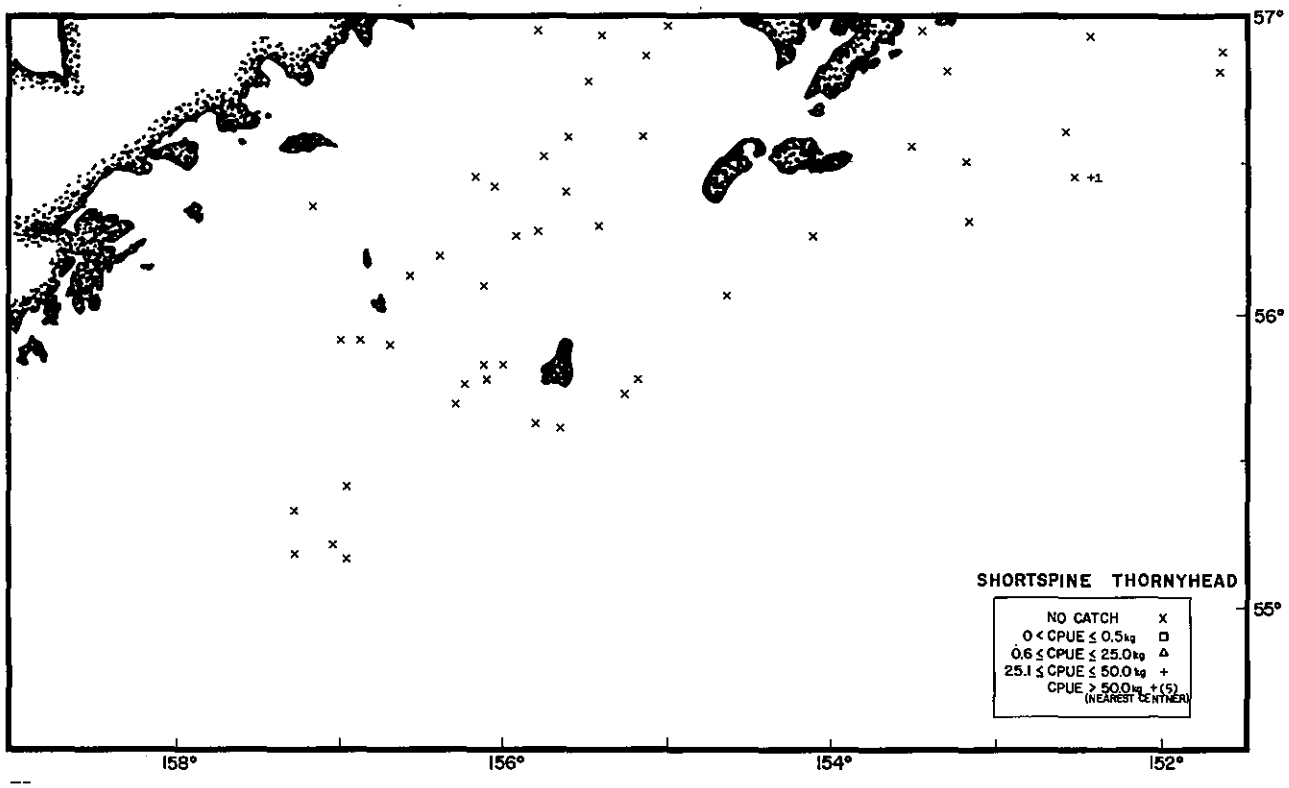


Figure XI-526.--Distribution of standardized catch rates in kilograms/ hour of shortspine thornyhead in the western Gulf of Alaska, Aug.-Oct. 1973 and Jun.-Aug. 1975 (Cruises 734 and 753).

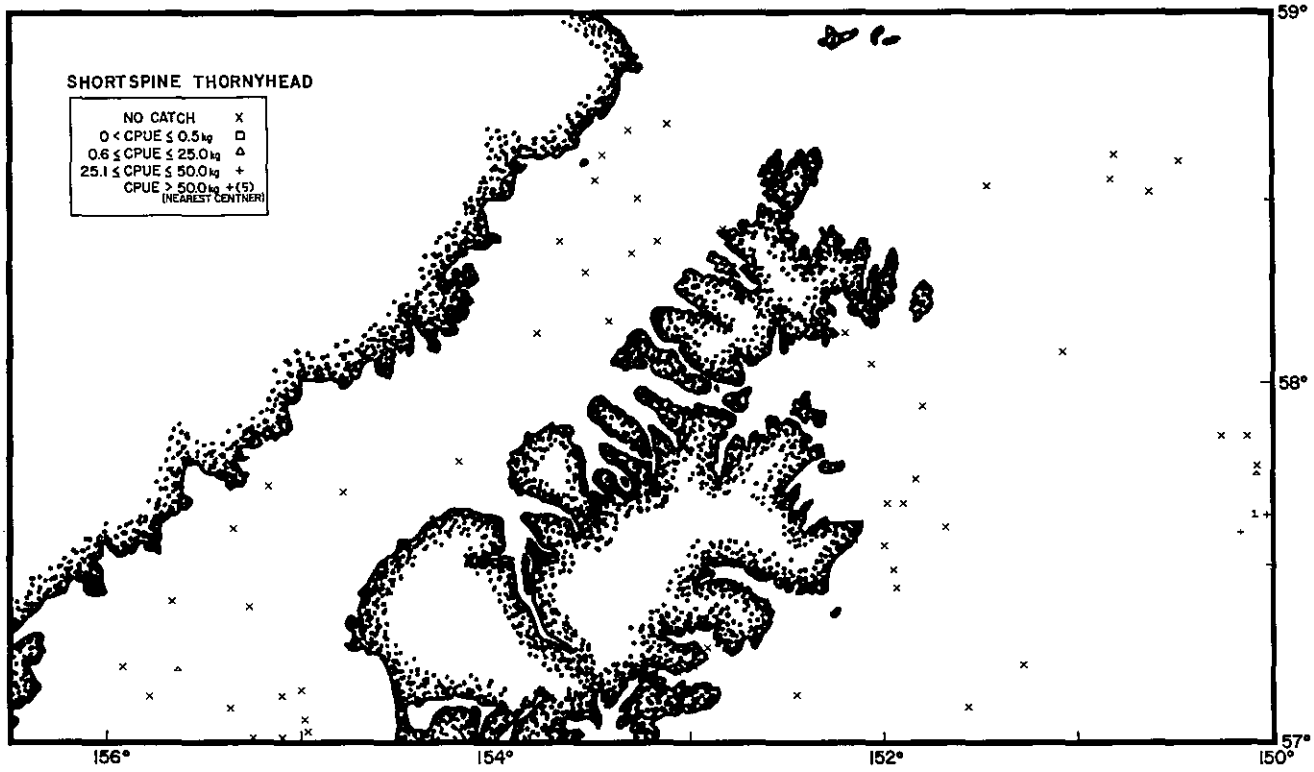


Figure XI-527.--Distribution of standardized catch rates in kilograms/ hour of shortspine thornyhead in the western Gulf of Alaska, May-Jun. 1973, Aug.-Oct. 1973, and Jun.-Aug. 1975 (Cruises 733, 734, and 753).

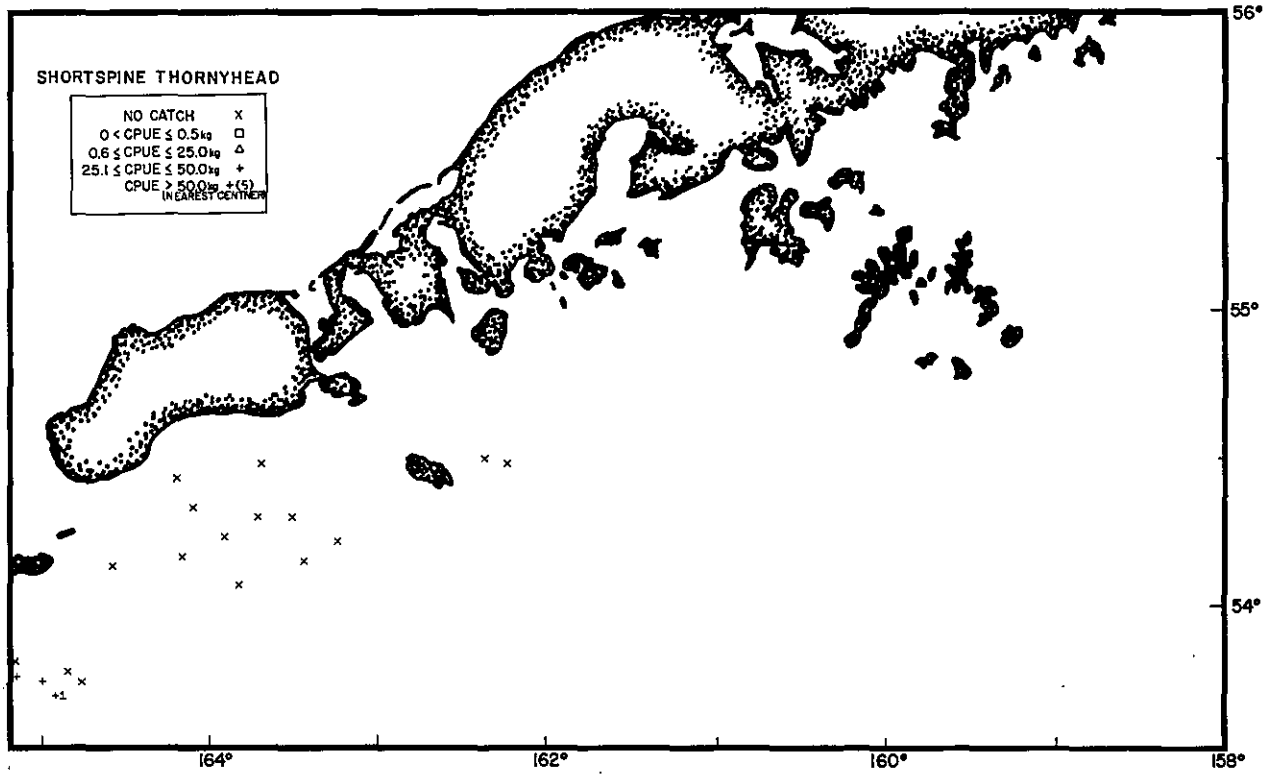


Figure XI-528.--Distribution of standardized catch rates in kilograms/ hour of shortspine thornyhead in the western Gulf of Alaska, Jul.-Aug. 1974 (Cruise 744).

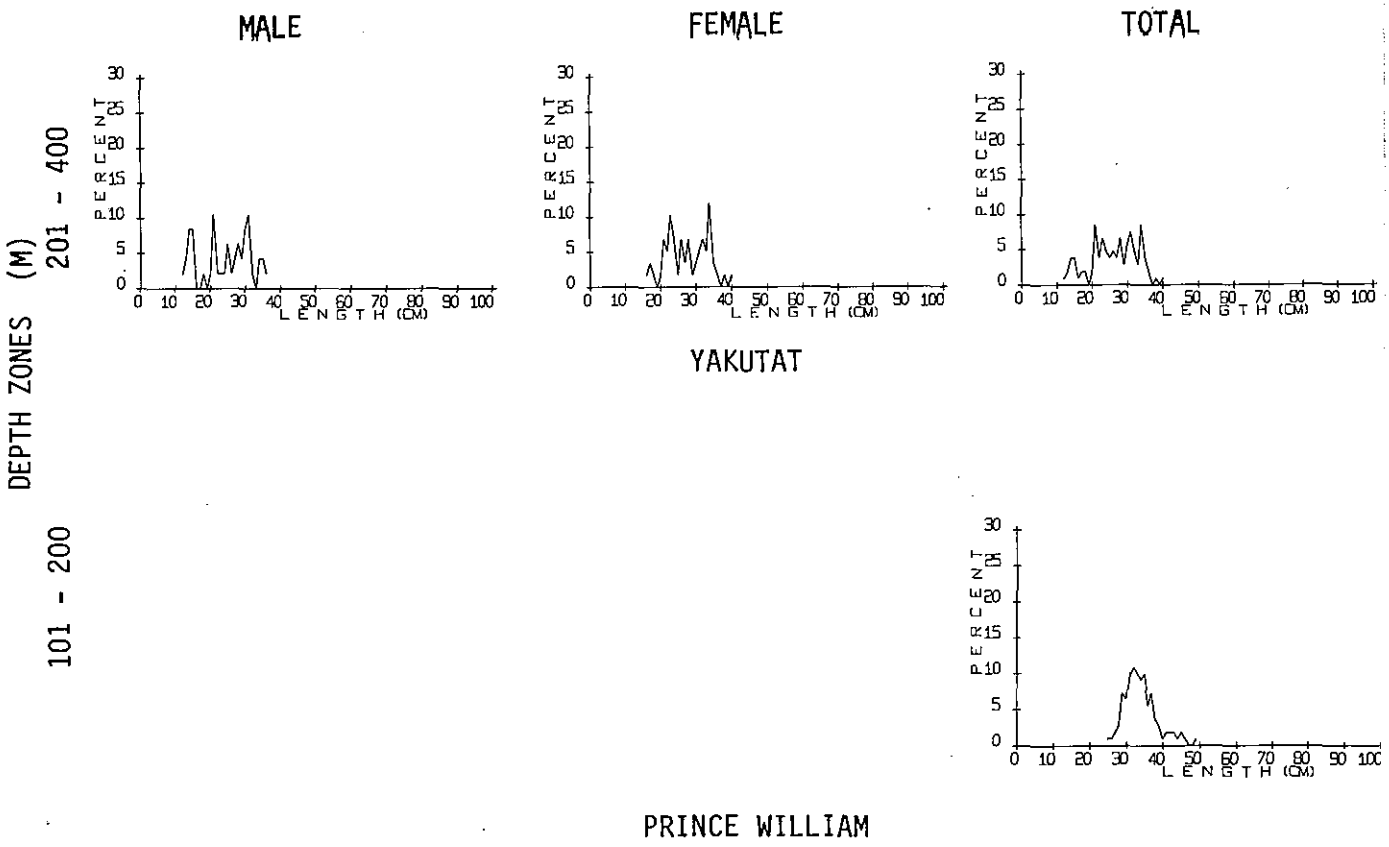


Figure XI-529.--Length frequency distributions of shortspine thornyhead in the Gulf of Alaska by region-depth zones, 1973-1976.

Table XI-143.--Estimated biomass and population size of shortspine thornyhead (Sebastolobus alascanus) in the Gulf of Alaska during April-October 1973-76.

Region	Depth zone (m)	CPUE 1/ (kg/hr)	Estimated biomass (mt)	Proportion of total estimated biomass	Estimated population ($\times 10^6$)	Proportion of total estimated population	Mean size per individual 2/ Weight (kg)	Mean size per individual 2/ Length (cm)
Fairweather	1-100	0	0	0	0	0	--	--
	101-200	2.4	397.1	17.5	0.4	5.2	0.91	--
	201-400	62.1	1,867.9	82.5	7.3	94.8	0.26	--
	All zones	9.9	2,265.0	19.0	7.7	--	0.29	--
Yakutat	1-100	3/	1.2	5/	4/	5/	0.16	--
	101-200	3.6	528.6	13.9	2.1	15.6	0.25	--
	201-400	47.6	3,268.7	86.1	11.4	84.4	0.29	26.1
	All zones	13.7	3,798.5	41.6	13.5	--	0.28	--
Prince William	1-100	2.9	324.5	15.4	1.6	22.5	0.20	--
	101-200	5.4	677.1	32.1	1.6	22.5	0.42	34.0
	201-400	30.4	1,107.9	52.5	3.9	54.9	0.29	--
	All zones	7.7	2,190.5	17.7	7.1	--	0.30	--
Kenai	1-100	--	--	--	--	--	--	--
	101-200	1.1	275.8	53.6	1.0	41.7	0.28	--
	201-400	2.4	239.0	46.4	1.4	58.3	0.16	--
	All zones	1.5	514.8	4.3	2.4	--	0.21	--
Kodiak	1-100	0	0	0	0	0	--	--
	101-200	0	0	0	0	0	--	--
	201-400	19.4	1,082.4	100.0	--	--	--	--
	All zones	3.4	1,082.4	9.1	--	--	--	--
Shelikof	1-100	0	0	0	0	0	--	--
	101-200	0	0	0	0	0	--	--
	201-400	0	0	0	0	0	--	--
	All zones	0	0	0	0	0	--	--
Chirikof	1-100	0	0	0	0	0	--	--
	101-200	0	0	0	0	0	--	--
	201-400	3/	6.4	100.0	--	--	0.45	--
	All zones	3/	6.4	0.1	--	--	0.45	--
Shumagin	1-100	--	--	--	--	--	--	--
	101-200	--	--	--	--	--	--	--
	201-400	--	--	--	--	--	--	--
	All zones	--	--	--	--	--	--	--
Sanak	1-100	0	0	0	0	0	--	--
	101-200	0	0	0	0	0	--	--
	201-400	77.4	967.4	100.0	--	--	--	--
	All zones	2.7	967.4	8.1	--	--	--	--
Total	1-100	0.5	325.7	3.0	--	--	--	--
	101-200	1.1	1,878.6	17.5	--	--	--	--
	201-400	17.8	8,539.7	79.5	--	--	--	--
	All zones	4.9	10,744.0	100.0	--	--	--	--

1/ Mean catch per unit effort, in kilograms per hour trawled.
2/ Where data are available.
3/ Less than 0.1 kg/hr.
4/ Less than 0.1 $\times 10^6$ individuals.
5/ Less than 0.1 percent.

Table XI-144.--Mean lengths (cm) of shortspine thornyhead by regions and depth zones (Cruise 751)

	0-100 m			101-200 m			201-400 m		
	Male	Female	Total	Male	Female	Total	Male	Female	Tota
Fairweather	--	--	--	--	--	--	--	--	--
Yakutat	--	--	--	--	--	--	24.3	27.5	26.1
Prince William	--	--	--	--	--	34.0	--	--	--
Kenai	--	--	--	--	--	--	--	--	--
Kodiak	--	--	--	--	--	--	--	--	--
Shelikof	--	--	--	--	--	--	--	--	--
Chirikof	--	--	--	--	--	--	--	--	--
Shumagin	--	--	--	--	--	--	--	--	--
Sanak	--	--	--	--	--	--	--	--	--

Size composition--Sablefish were often measured, tagged, and released alive so that the portion measured by sex groups was relatively small. Length data are available from the Yakutat and Prince William regions where sablefish ranged from 48.5-60.1 cm (Table XI-146 and Figure XI-535).

PACIFIC OCEAN PERCH

Distribution and abundance--Pacific ocean perch appeared in each region where sampling occurred but were generally restricted to the outer shelf and upper slope depth zones. Mean catch rates varied little between regions (2-8 kg/hr) with highest relative abundance occurring in Chirikof and Shelikof and lowest in the Fairweather and Sanak regions. By depth zones, apparent relative abundance was highest in the outer shelf (6 kg/hr) followed by the upper slope and inner shelf (Figures XI-536-537). The distribution of the standardized catch rates for the successful stations is presented in Figures XI-538-542.

Biomass--The apparent biomass of Pacific ocean perch has been estimated at 9 thousand mt, of which 78% was contained on the outer shelf and 22% on the upper slope (Table XI-147). The Chirikof region made the largest contribution to the total biomass (34%) while the remaining regions accounted for 2-16% of the balance. The biomass estimates should be considered minimal as this species is semi-pelagic and is known to be abundant in hard-rocky areas which could not be adequately sampled with the trawl gear utilized in these surveys.

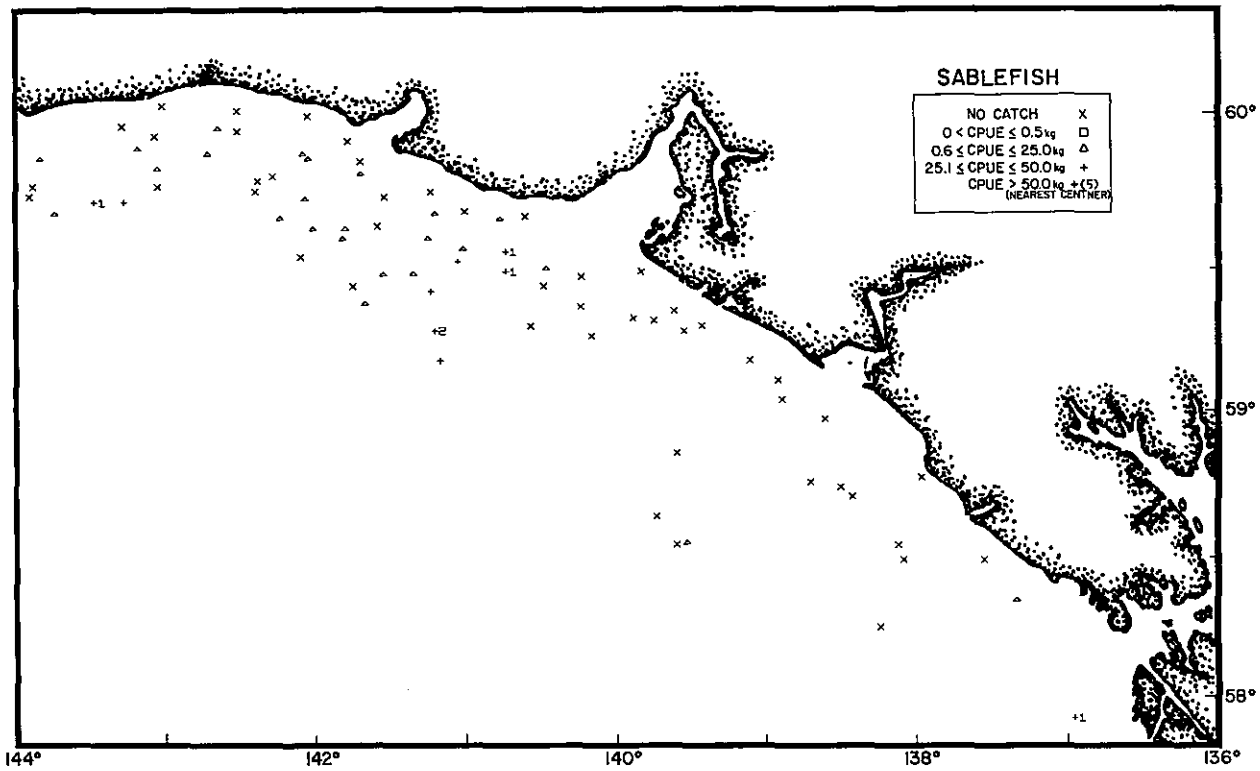


Figure XI-530.--Distribution of standardized catch rates in kilograms/ hour of sablefish in the eastern Gulf of Alaska, May-Aug. 1975 and Apr. 1976 (Cruises 751 and 762).

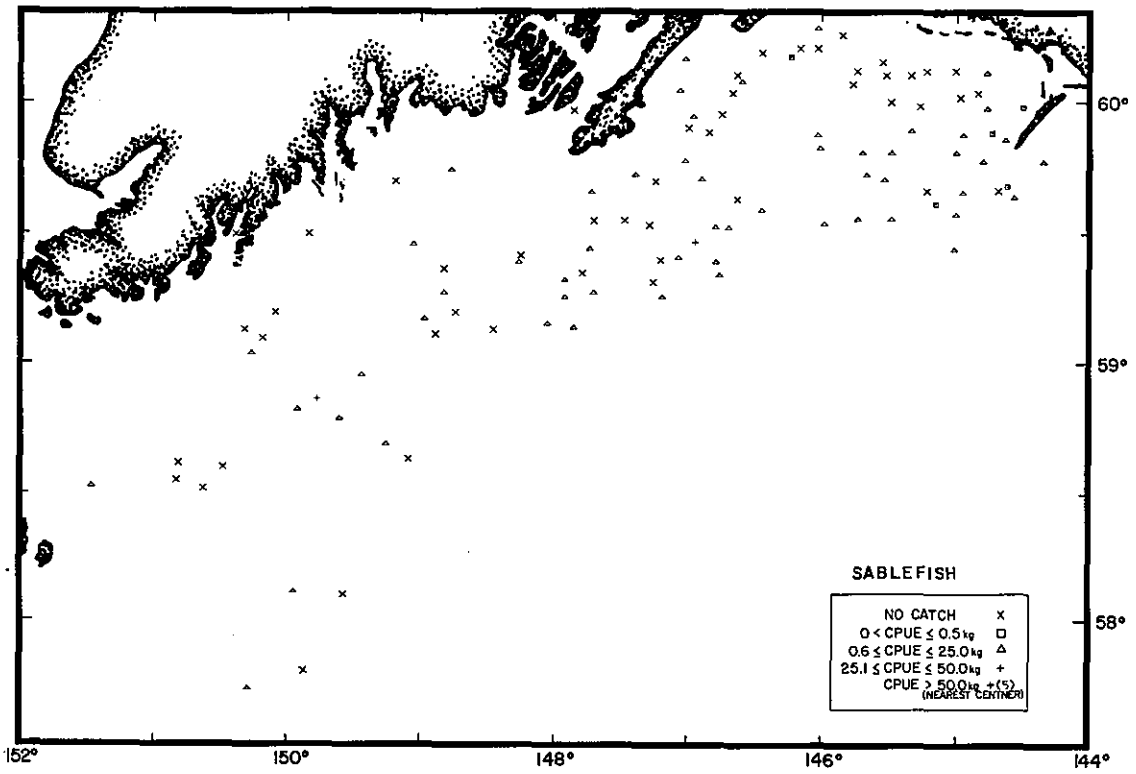


Figure XI-531.--Distribution of standardized catch rates in kilograms/ hour of sablefish in the eastern Gulf of Alaska, May-Aug. 1975 (Cruises 751 and 753).

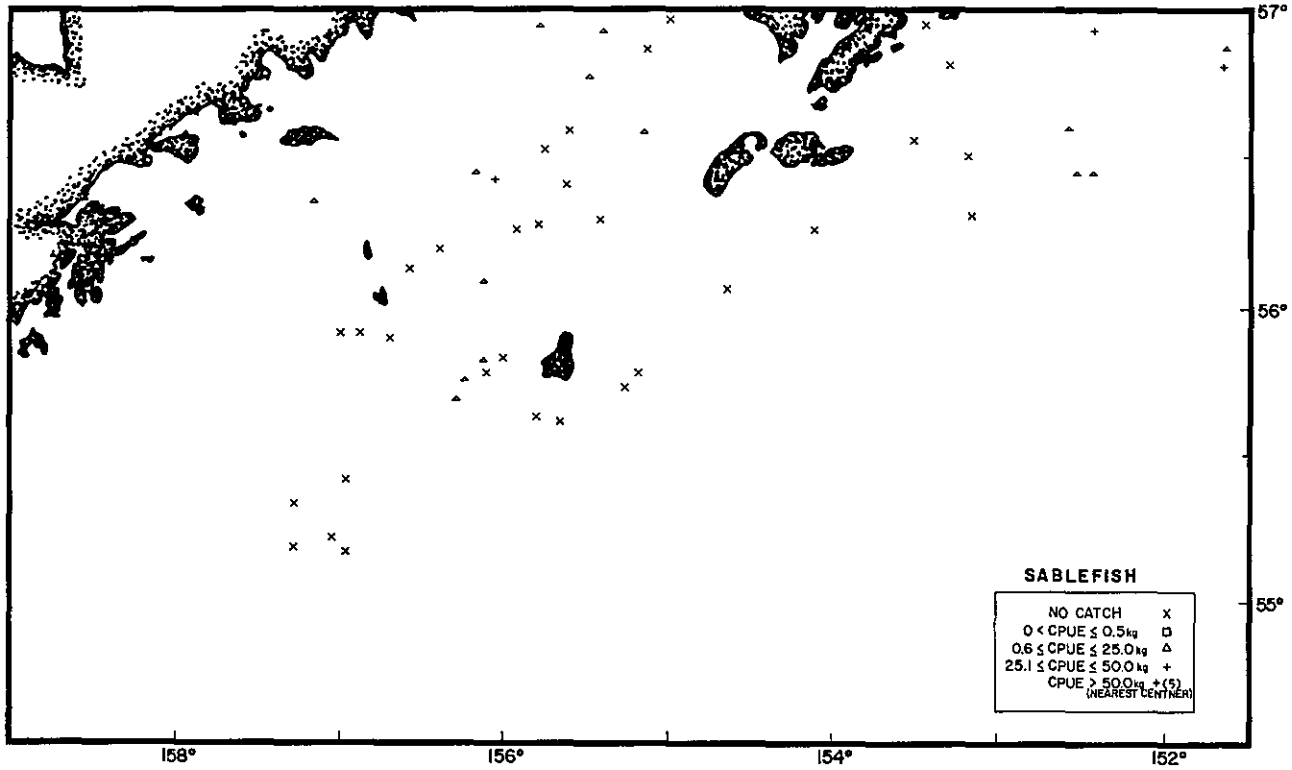


Figure XI-532.--Distribution of standardized catch rates in kilograms/ hour of sablefish in the western Gulf of Alaska, Aug.-Oct. 1973 and Jun.-Aug. 1975 (Cruises 734 and 753).

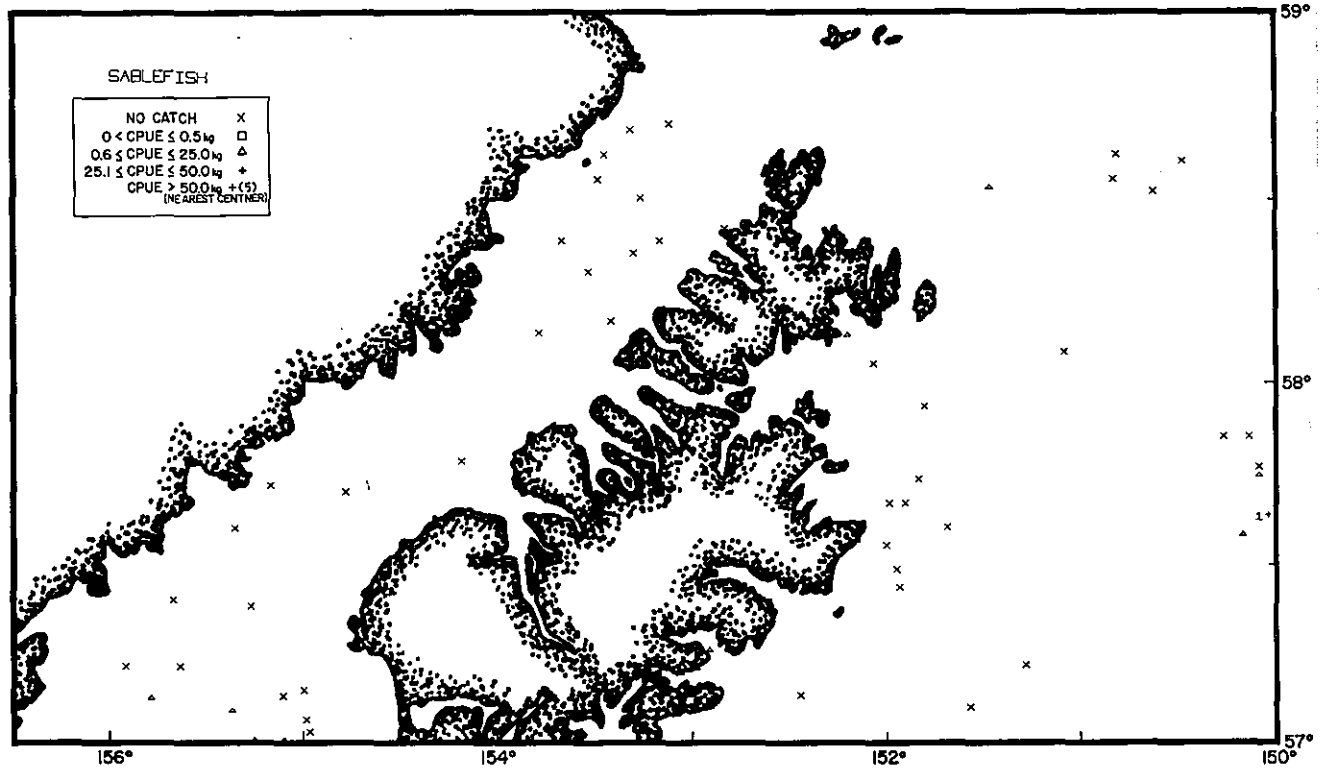


Figure XI-533.--Distribution of standardized catch rates in kilograms/ hour of sablefish in the western Gulf of Alaska. May-Jun. 1973, Aug.-Oct. 1973, and Jun.-Aug 1975 (Cruises 733, 734, and 753).

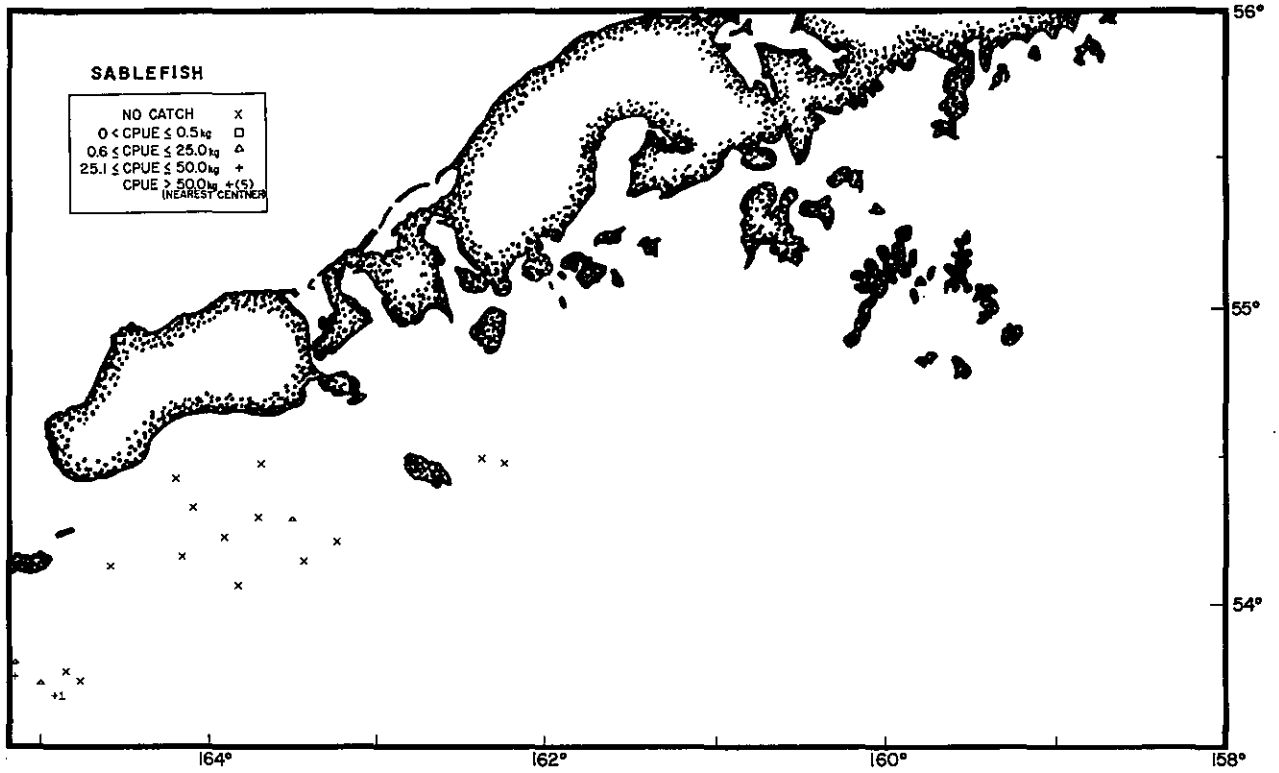


Figure XI-534.--Distribution of standardized catch rates in kilograms/ hour of sablefish in the western Gulf of Alaska, Jul.-Aug. 1974 (Cruise 744).

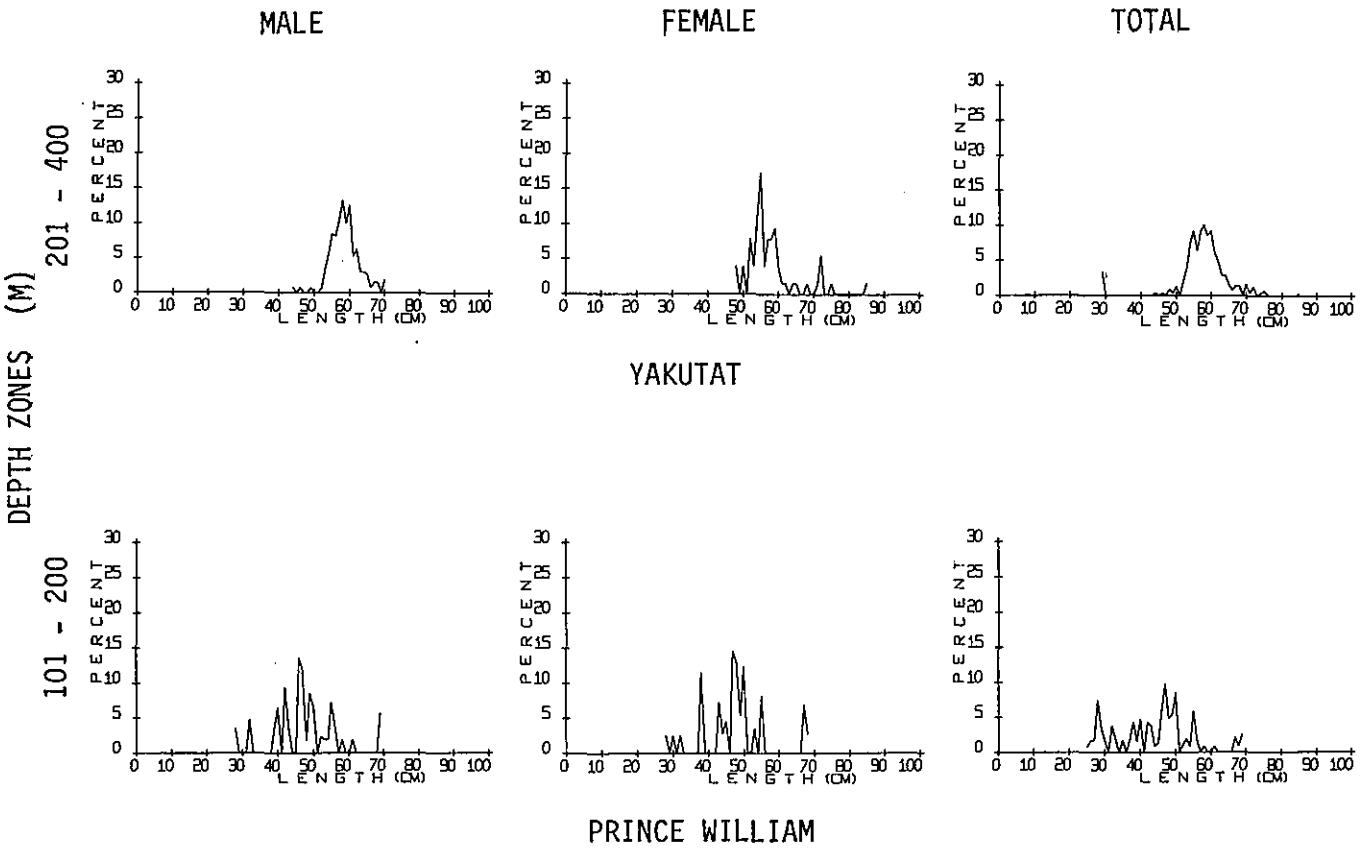


Figure XI-535.--Length frequency distributions of sablefish in the Gulf of Alaska by region-depth zones, 1973-1976.

Table XI-145.—Estimated biomass and population size of sablefish (Anoplopoma fimbria) in the Gulf of Alaska during April-October 1973-76.

Region	Depth zone (m)	CPUE[1] (kg/hr)	Estimated biomass (mt)	Proportion of total estimated biomass	Estimated population (X 10^9)	Proportion of total estimated population	Mean size per individual[2] Weight (kg)	Mean size per individual[2] Length (cm)
Fairweather	1-100	0	0	0	0	0	--	--
	101-200	0.2	32.3	54.2	--	--	--	--
	201-400	0.9	27.3	45.8	4/	100.0	0.91	--
	All zones	0.3	59.6	0.6	4/	--	--	--
Yakutat	1-100	0.8	48.6	1.3	0.1	5.0	0.40	--
	101-200	1.5	212.8	5.7	0.2	10.0	1.05	48.5
	201-400	50.8	3,484.0	93.0	1.7	85.0	2.05	57.6
	All zones	13.5	3,745.4	37.0	2.0	--	1.85	--
Prince William	1-100	1.5	170.2	18.2	0.4	36.4	0.39	51.5
	101-200	2.4	305.3	32.7	0.4	36.4	0.82	--
	201-400	12.6	458.0	49.1	0.3	27.3	1.37	60.1
	All zones	3.4	933.5	9.3	1.1	--	0.82	--
Kenai	1-100	--	--	--	--	--	--	--
	101-200	4.5	1,101.6	48.9	0.8	57.1	1.32	--
	201-400	11.5	1,149.3	51.1	0.6	42.9	1.79	--
	All zones	6.6	2,250.9	22.3	1.4	--	1.53	--
Kodiak	1-100	0	0	0	0	0	--	--
	101-200	5.0	612.1	36.2	--	--	--	--
	201-400	19.3	1,077.4	63.8	--	--	--	--
	All zones	5.3	1,689.5	16.7	--	--	--	--
Shelikof	1-100	0	0	0	0	0	--	--
	101-200	0	0	0	0	0	--	--
	201-400	0	0	0	0	0	--	--
	All zones	0	0	0	0	0	--	--
Chirikof	1-100	0.2	27.1	3.1	0.1	14.3	0.23	--
	101-200	0.2	30.8	3.6	0.1	14.3	0.60	--
	201-400	6.0	806.2	93.3	0.5	71.4	1.54	--
	All zones	1.8	864.1	8.5	0.7	--	1.25	--
Shumagin	1-100	--	--	--	--	--	--	--
	101-200	--	--	--	--	--	--	--
	201-400	--	--	--	--	--	--	--
	All zones	--	--	--	--	--	--	--
Sanak	1-100	0	0	0	--	--	--	--
	101-200	0.6	95.2	16.6	--	--	--	--
	201-400	38.3	478.0	83.4	--	--	--	--
	All zones	1.6	573.2	5.7	--	--	--	--
Total	1-100	0.4	245.9	2.4	--	--	--	--
	101-200	2.1	2,390.1	23.6	--	--	--	--
	201-400	13.4	7,480.2	73.9	--	--	--	--
	All zones	4.2	10,116.2	100.0	--	--	--	--

1/ Mean catch per unit effort, in kilograms per hour trawled.
2/ Where data are available.
3/ Less than 0.1 kg/hr.
4/ Less than 0.1 X 10^6 individuals.
5/ Less than 0.1 percent.

Table XI-146.--Mean lengths (cm) of sablefish by regions and depth zones (Cruise 751)

	0-100 m			101-200 m			201-400 m		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Fairweather	--	--	--	--	--	--	--	--	--
Yakutat	--	--	--	--	--	--	58.6	57.8	57.6
Prince William	--	--	--	47.5	47.6	43.9	--	--	--
Kenai	--	--	--	--	--	--	--	--	--
Kodiak	--	--	--	--	--	--	--	--	--
Shelikof	--	--	--	--	--	--	--	--	--
Chirikof	--	--	--	--	--	--	--	--	--
Shumagin	--	--	--	--	--	--	--	--	--
Sanak	--	--	--	--	--	--	--	--	--

Size composition--Length frequency data for Pacific ocean perch are available from the Yakutat and Prince William outer shelf and upper slope depth zones and the Chirikof-outer shelf. Males were generally larger than females with the largest mean lengths, sexes combined, occurring in the Yakutat - outer shelf (38.4 cm), Prince William-upper slope (32.8 cm) and Chirikof-outer shelf (36.6 cm) (Table XI-148 and Figure XI-543).

Length-weight relationship--Table XI-149 summarizes length-weight observations taken for Pacific ocean perch in the Yakutat and Prince William regions and gives coefficients for the regression lines which fit these data. Graphical representations of the individual observations are presented by area-depth intervals in Figure XI-544.

WEATHERVANE SCALLOP

Distribution and abundance--While weathervane scallop were taken in 6 of the 8 regions surveyed, mean catch rates greater than 10 kg/hr occurred only in the inner shelf depth zone of the Fairweather (52 kg/hr), Yakutat (14 kg/hr) and Kodiak (12 kg/hr) regions. Apparent relative abundance within the remaining regions ranged from less than 0.1 kg/hr in the Chirokof-inner shelf and Yakutat-upper slope to 3 kg/hr in the Yakutat -outer shelf. The distribution of the standardized catch rates for the successful stations is presented in Figures XI-545-549.

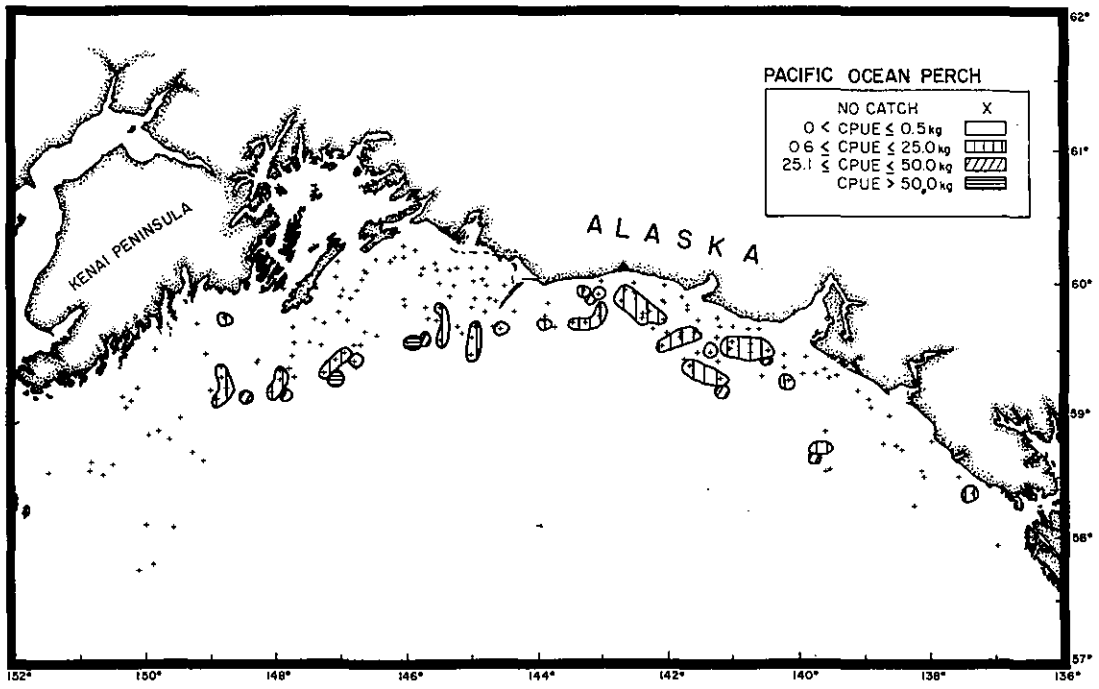


Figure XI-536.--Distribution of apparent relative abundance of Pacific ocean perch in the eastern Gulf of Alaska, May-Aug. 1975, Jun.-Aug. 1975, and Apr. 1976 (Cruises 751, 753, and 762).

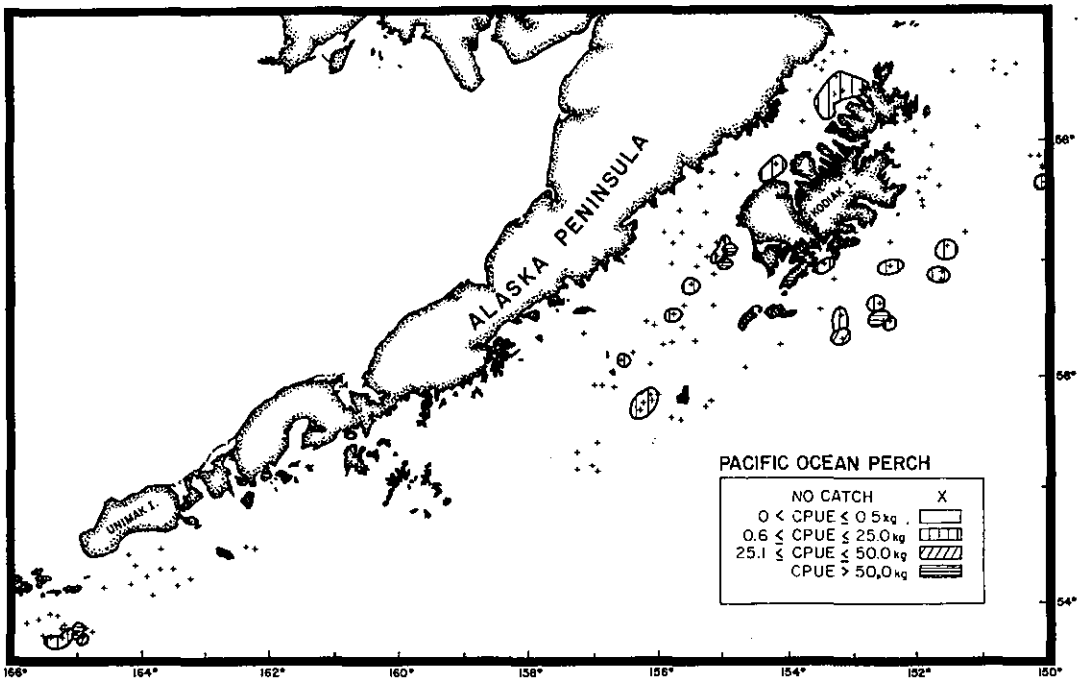


Figure XI-537.--Distribution of apparent relative abundance of Pacific ocean perch in the western Gulf of Alaska, May-Jul. 1973, Aug.-Oct. 1973, Jul.-Aug. 1974, and Jun.-Aug. 1975 (Cruises 733, 734, 744, and 753).

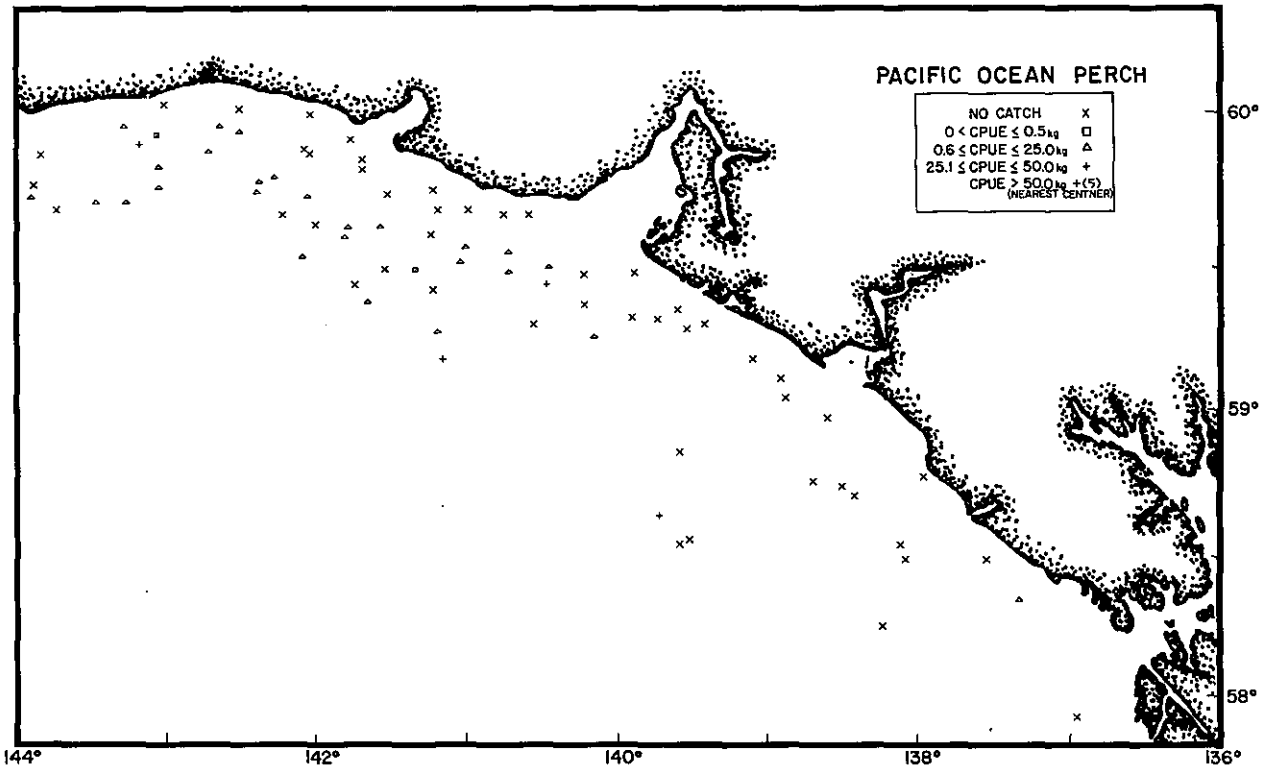


Figure XI-538.--Distribution of standardized catch rates in kilograms/ hour of Pacific ocean perch in the eastern Gulf of Alaska, May-Aug. 1975 and Apr. 1976 (Cruises 751 and 762).

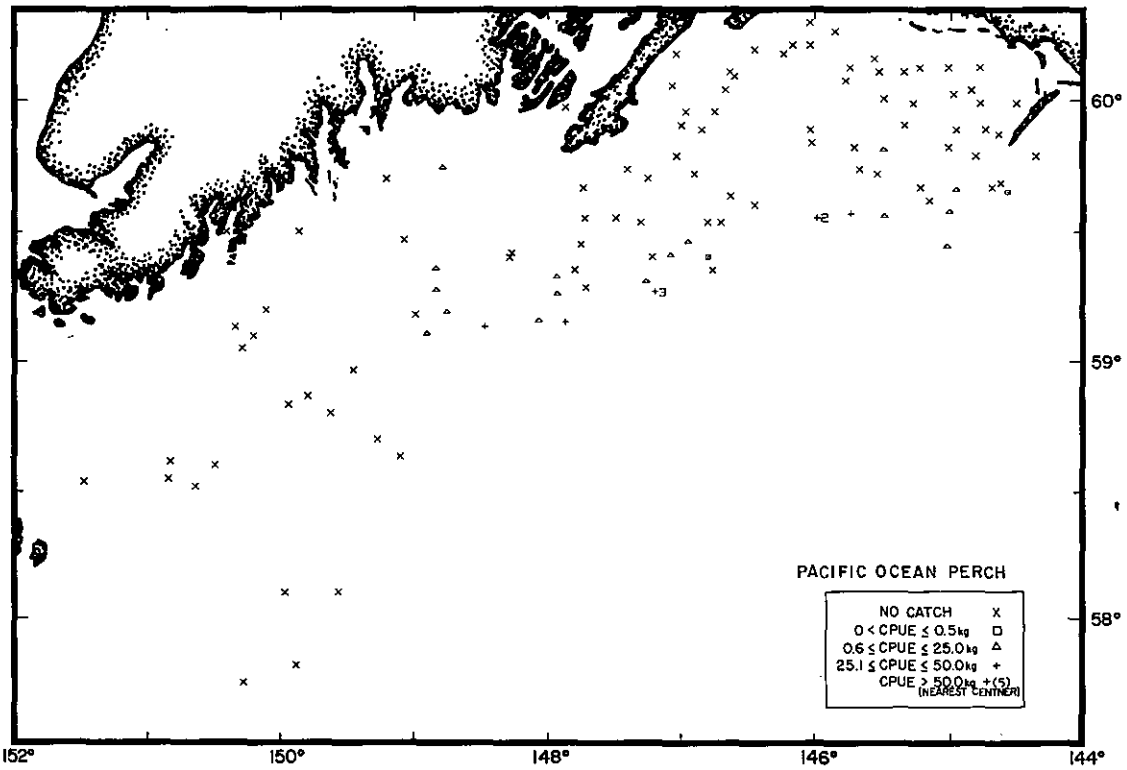


Figure XI-539.--Distribution of standardized catch rates in kilograms/ hour of Pacific ocean perch in the eastern Gulf of Alaska, May-Aug. 1975 (Cruises 751 and 753).

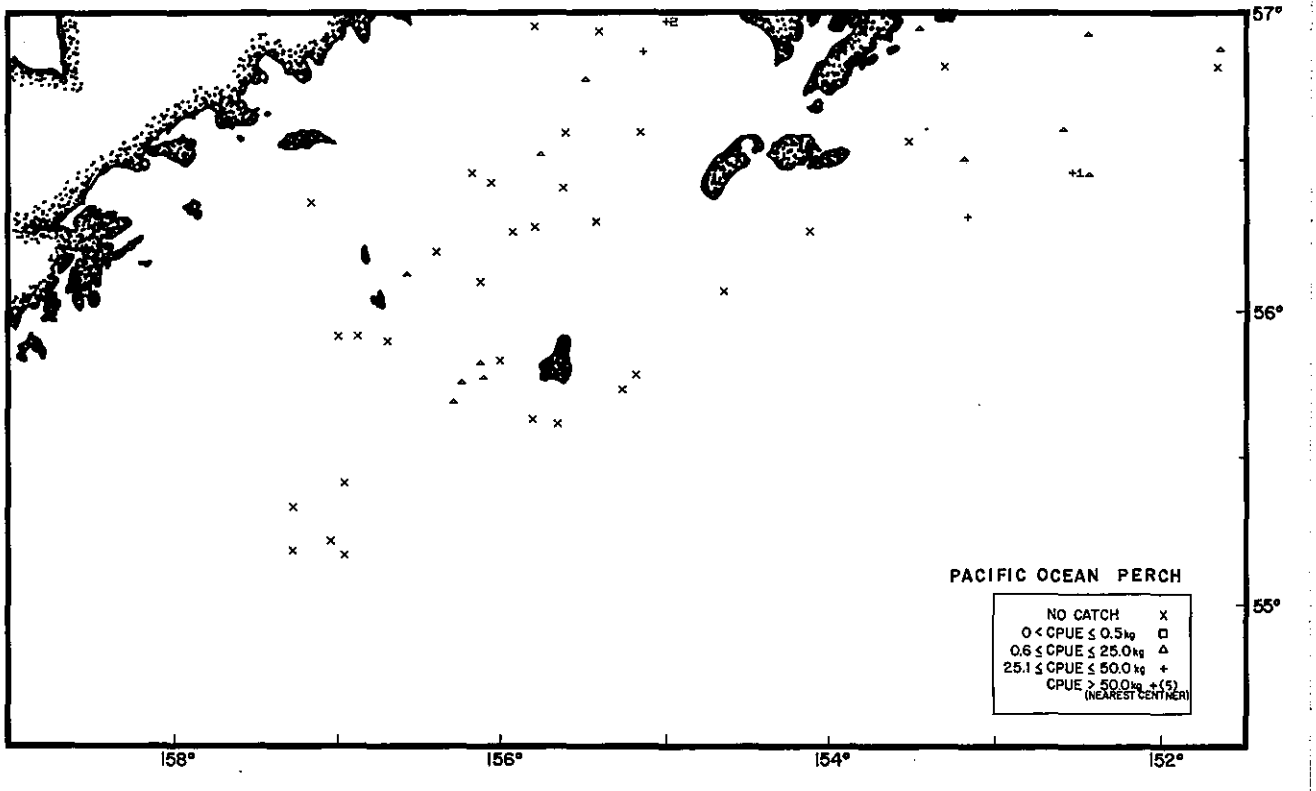


Figure XI-540.--Distribution of standardized catch rates in kilograms/ hour of Pacific ocean perch in the western Gulf of Alaska, Aug.-Oct. 1973 and Jun.-Aug. 1975 (Cruises 734 and 753).

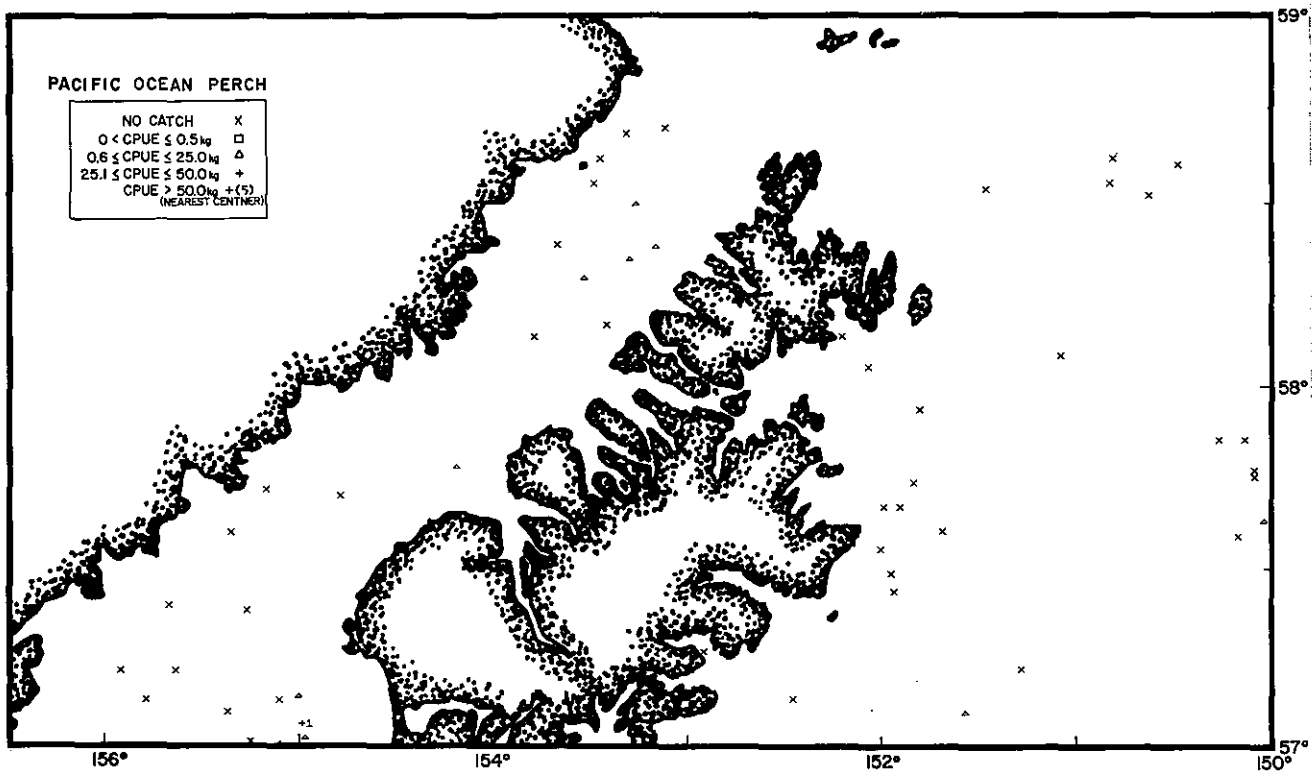


Figure XI-541.--Distribution of standardized catch rates in kilograms/ hour of Pacific ocean perch in the western Gulf of Alaska, May-Jun. 1973, Aug.-Oct. 1973, and Jun.-Aug. 1975 (Cruises 733, 734, and 753).

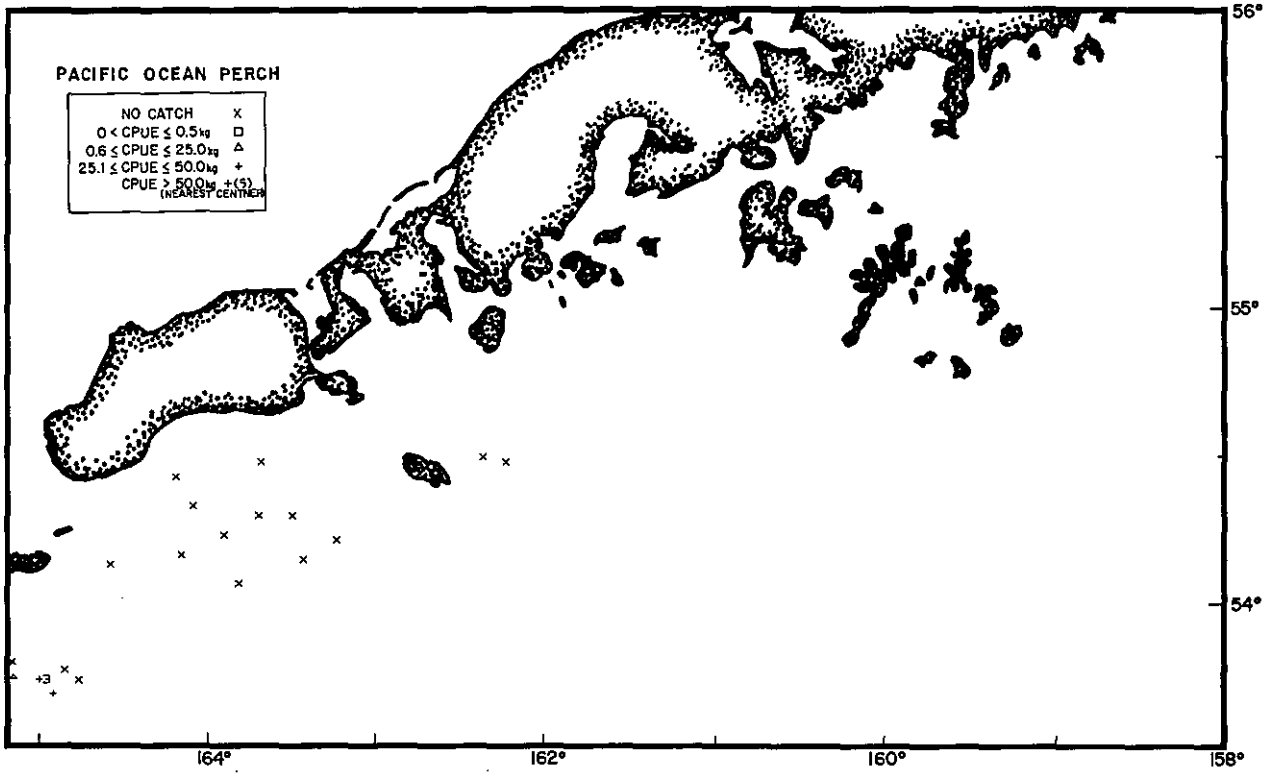


Figure XI-542.--Distribution of standardized catch rates in kilograms/ hour of Pacific ocean perch in the western Gulf of Alaska, Jul.-Aug. 1974 (Cruise 744).

Biomass--Of the estimated 5 thousand mt of biomass, nearly 89% occurred on the inner shelf, 11% on the outer shelf and only 0.2% in the upper slope (Table XI-150). Regions making the largest contribution to the biomass were Fairweather (35%), Kodiak (33%) and Yakutat (23%). The biomass estimate for scallops should be considered extremely minimal as otter trawls, as rigged for these surveys, are not an effective harvesting gear for this species.

Size composition--Length-frequency data are not available for this species.

SMELTS

Distribution and abundance--Specimens representing the smelt group, which consists predominately of eulachon and to a lesser extent, capelin and other similar species, were taken throughout the survey area. The wide bathymetric distribution of this group is illustrated by the three highest mean catch rates which occurred in the Shelikof-inner shelf (27 kg/hr), the Prince William upper slope (15 kg/hr) and the Fairweather-outer shelf (12 kg/hr). The distribution of the standardized catch rates for the successful stations is presented in Figures XI-550-554.

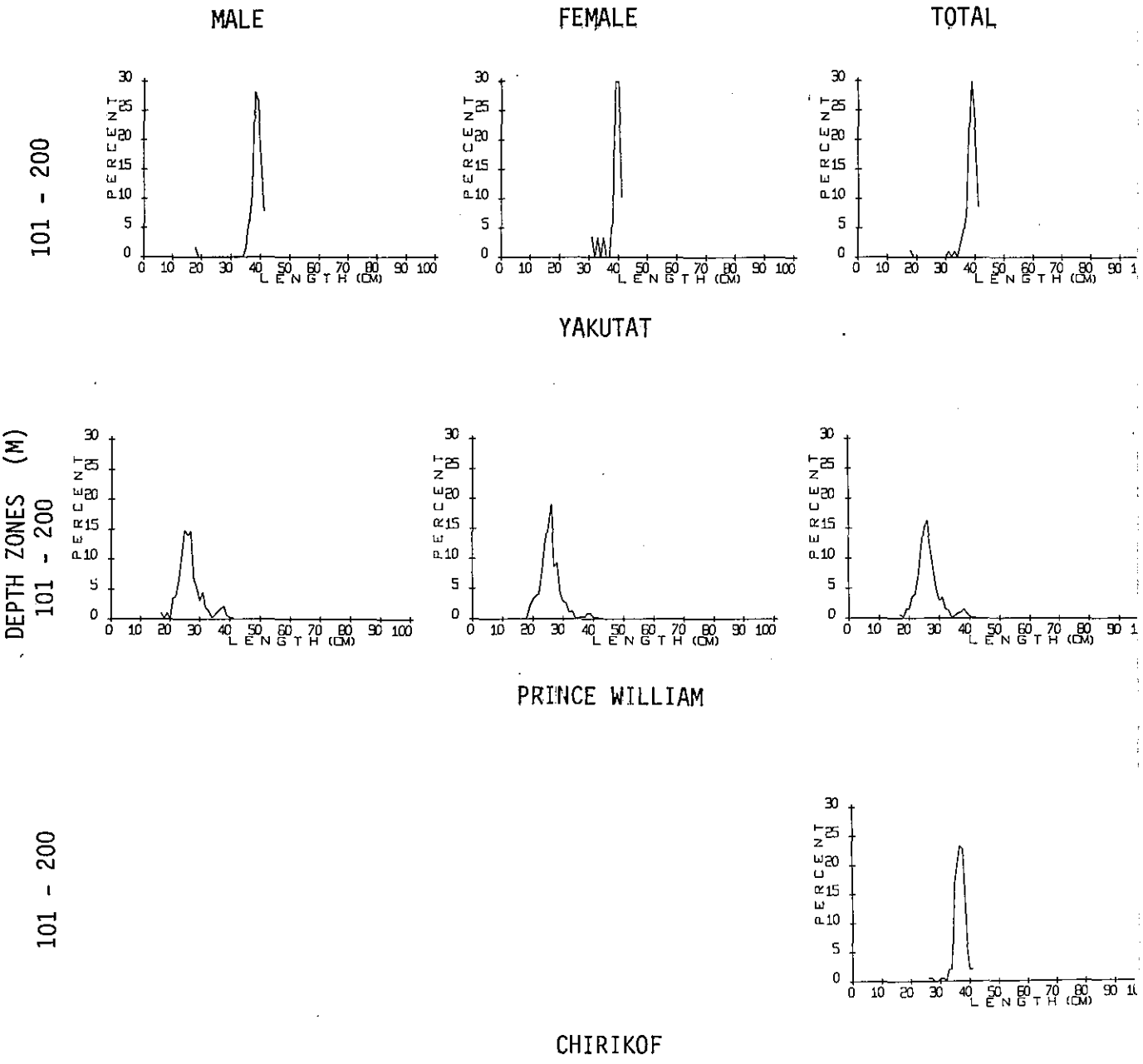


Figure XI-543.--Length frequency distributions of Pacific ocean perch in the Gulf of Alaska by region-depth zones, 1973-1976.

Table XI-147.--Estimated biomass and population size of Pacific ocean perch (Sebastes alutus) in the Gulf of Alaska during April-October 1973-76.

Region	Depth zone (m)	CPUE 1/ (kg/hr)	Estimated biomass (mt)	Proportion of total estimated biomass	Estimated population (X 10^6)	Proportion of total estimated population	Mean size per individual 2/ Weight (kg)	Mean size per individual 2/ Length (cm)
Fairweather	1-100	0	0	0	0	0	--	--
	101-200	2.9	457.7	100.0	0.7	100.0	0.66	--
	201-400	0	0	0	0	0	--	--
	All zones	2.1	475.7	5.3	0.7	--	--	--
Yakutat	1-100	0.1	4.4	0.4	4/	5/	0.45	--
	101-200	4.6	675.2	61.2	1.1	61.1	0.60	38.4
	201-400	6.2	424.2	38.4	0.7	38.9	0.63	36.8
	All zones	4.0	1,103.8	12.3	1.8	--	0.61	--
Prince William	1-100	0	0	0	0	0	--	--
	101-200	10.9	1,377.6	96.1	5.3	98.2	0.26	26.2
	201-400	1.5	56.2	3.9	0.1	1.9	0.59	32.8
	All zones	5.2	1,433.8	16.0	5.4	--	0.27	--
Kenai	1-100	--	--	--	--	--	--	--
	101-200	4.7	1,136.9	100.0	1.6	100.0	0.71	--
	201-400	0	0	0	0	0	--	--
	All zones	3.3	1,136.9	12.7	1.6	--	0.71	--
Kodiak	1-100	0.2	21.7	2.2	--	--	--	--
	101-200	2.4	298.6	30.7	--	--	--	--
	201-400	11.7	652.5	67.1	--	--	--	--
	All zones	3.0	972.8	10.9	--	--	--	--
Shelikof	1-100	0	0	0	0	0	--	--
	101-200	18.3	57.6	34.8	0.1	50.0	0.58	--
	201-400	0.4	108.1	65.2	0.1	50.0	0.91	--
	All zones	7.8	165.7	1.9	0.2	--	0.76	--
Chirikof	1-100	0	0	0	0	0	--	--
	101-200	18.3	2,951.5	98.3	4.6	97.9	0.64	36.6
	201-400	0.4	51.2	1.7	0.1	2.1	0.60	--
	All zones	7.8	3,002.7	33.5	4.7	--	0.64	--
Shumagin	1-100	--	--	--	--	--	--	--
	101-200	--	--	--	--	--	--	--
	201-400	--	--	--	--	--	--	--
	All zones	--	--	--	--	--	--	--
Sanak	1-100	0	0	0	0	0	--	--
	101-200	0	0	0	0	0	--	--
	201-400	53.5	668.8	100.0	--	--	--	--
	All zones	1.9	668.8	7.5	--	--	--	--
Total	1-100	3/	26.1	0.3	--	--	--	--
	101-200	6.1	6,973.1	77.8	--	--	--	--
	201-400	3.4	1,961.1	21.9	--	--	--	--
	All zones	3.9	8,960.2	100.0	--	--	--	--

1/ Mean catch per unit effort, in kilograms per hour trawled.
2/ Where data are available.
3/ Less than 0.1 kg/hr.
4/ Less than 0.1 X 10^6 individuals.
5/ Less than 0.1 percent.

Table XI-148.--Mean lengths (cm) of Pacific ocean perch by regions and depth zones (Cruises 751 and 753).

	0-100 m			101-200 m			201-400 m		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Fairweather	--	--	--	--	--	--	--	--	--
Yakutat	--	--	--	38.2	38.8	38.4	--	--	--
Prince William	--	--	--	26.7	25.7	26.2	--	--	--
Kenai	--	--	--	--	--	--	--	--	--
Kodiak	--	--	--	--	--	--	--	--	--
Shelikof	--	--	--	--	--	--	--	--	--
Chirikof	--	--	--	--	--	36.6	--	--	--
Shumagin	--	--	--	--	--	--	--	--	--
Sanak	--	--	--	--	--	--	--	--	--

Biomass--Of the nearly 5 thousand mt of estimated biomass, 72% occurred in the outer shelf, 18% on the upper slope, and 11% on the inner shelf (Table XI-151). The eastern Gulf regions contained the greatest portion of the biomass (79%). The Fairweather region made the largest contribution (42%) followed by Prince William (20%), Sanak (13%) and Kenai (9%). The biomass estimate for this species group should be considered extremely low as these are pelagic fishes which school throughout the water column, thus being available to the bottom trawl only occassionally.

Size composition--No length-frequency data are available for this species group.

OTHER SPECIES

During the survey period several species which had a relatively low total density distribution (1 kg/hr) occurred at significant levels of relative apparent abundance in restricted distributions (Table XI-152). Examples in the eastern Gulf of Alaska include the starry flounder (313 kg/hr) and butter sole (41 kg/hr) from the Yakutat-inner shelf and pink shrimp (25 kg/hr) in the Prince William-inner shelf. In the western Gulf, pink shrimp occurred at significant levels (67 kg/hr) in the Kodiak-inner shelf as did rougheye rockfish (62 kg/hr).

Table XI-149.-- Parameters for the length-weight relationship (weight (g) = a · length^{b}) for Pacific ocean perch (Cruise 751).

		YAKUTAT				PRINCE WILLIAM			
	Depth	Sample Size	Range in Length (cm)	Parameters (a)	(b)	Sample Size	Range in Length (cm)	Parameters (a)	(b)
Males	0-100	--	--	--	--	--	--	--	--
	101-200	45	35-41	0.412758	2.043899	102	21-41		
	201-400	25	32-38	0.017933	2.917656	--	--	--	--
Females	0-100	--	--	--	--	--	--	--	--
	101-200	25	31-41	0.007955	3.123415	59	18-39	--	--
	201-400	8	32-37	0.006143	3.214232	--	--	--	--

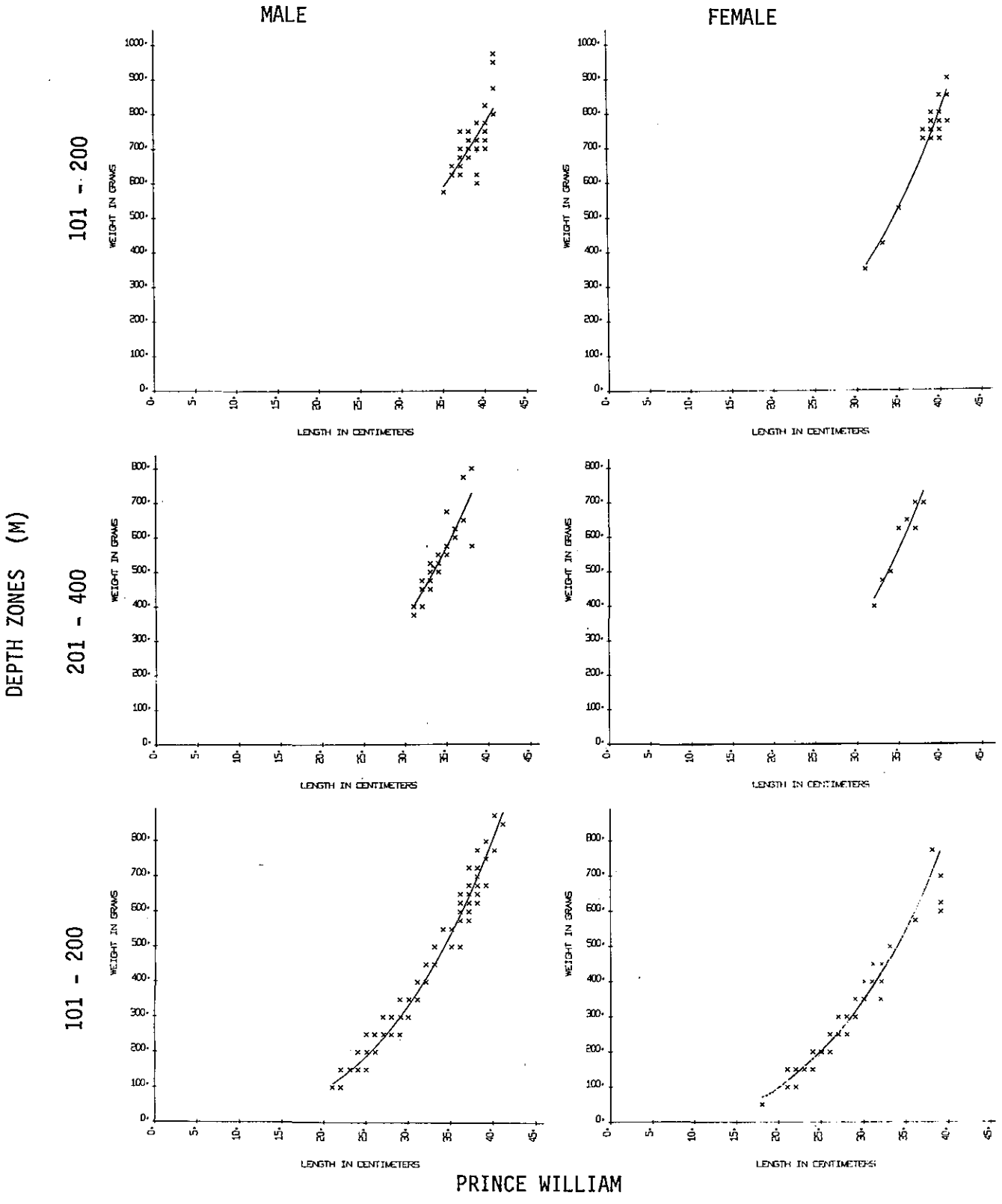


Figure XI-544.--Weight at length observations for Pacific ocean perch in the Gulf of Alaska by regions and depth zones, May-Aug. 1975 (Cruise 751).

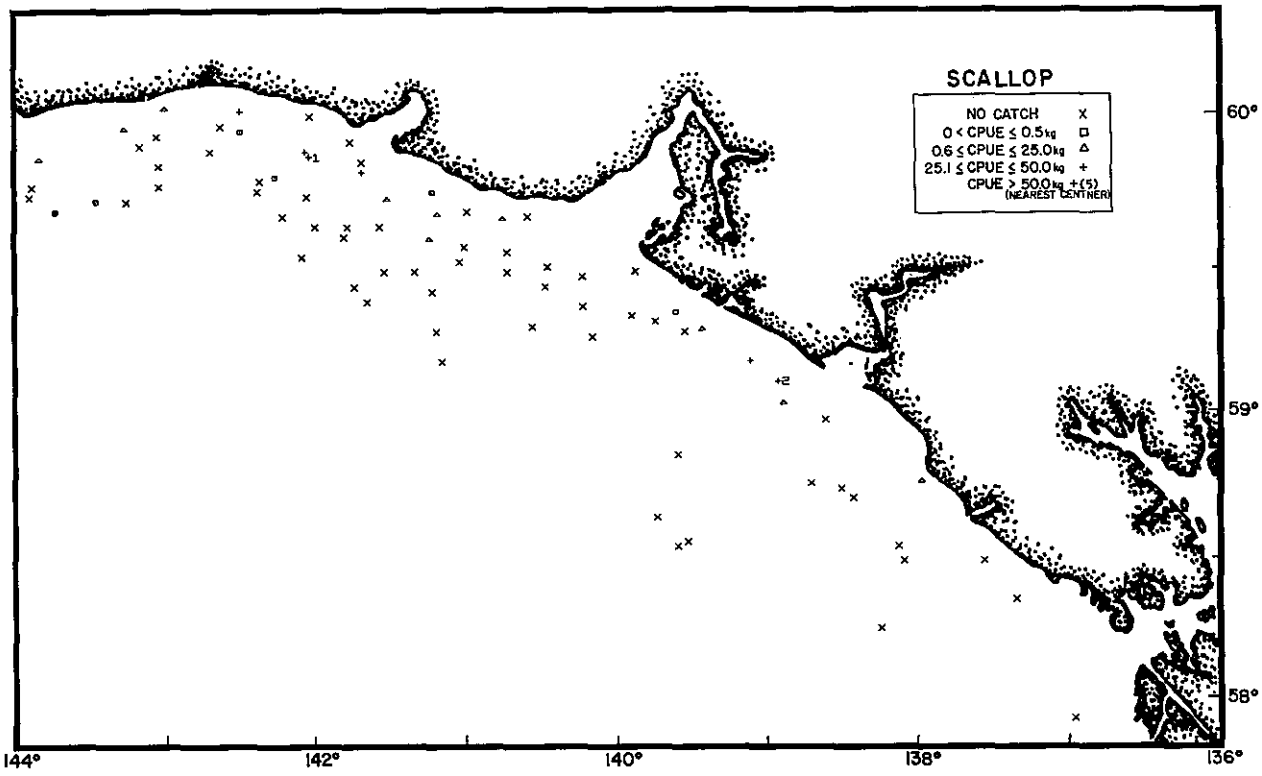


Figure XI-545.--Distribution of standardized catch rates in kilograms/ hour of weathervane scallop in the eastern Gulf of Alaska, May-Aug. 1975 and Apr. 1976 (Cruises 751 and 762).

Length frequency distributions for butter sole and starry flounder in the inner shelf depth zone of the Yakutat region are presented in Figures XI-555-556. Male butter sole ranged from 13-26 cm and females from 13-37 cm while male starry flounder ranged from 32-48 cm and females from 31-62 cm.

Twenty-five length-weight observations for starry flounder females are available from the Yakutat-inner shelf. The coefficients of regression are a=.012688 and b=3.004012 and the resulting regression line is presented in Figure XI-557.

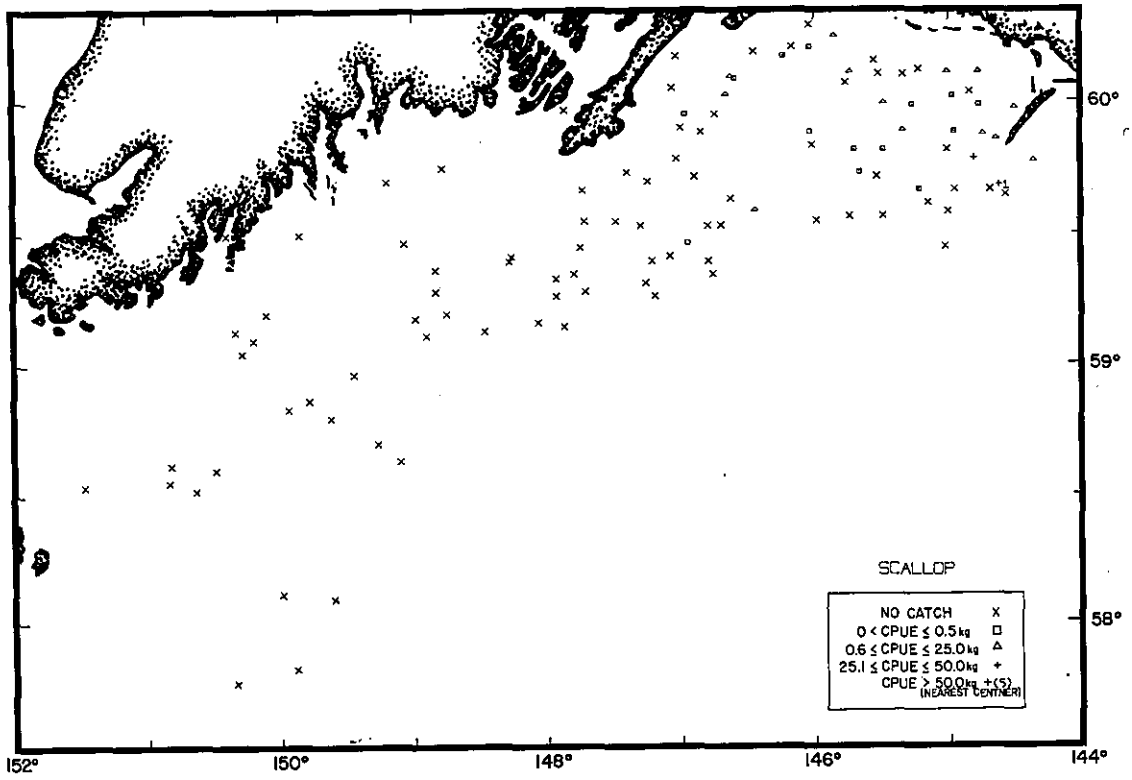


Figure XI-546.--Distribution of standardized catch rates in kilograms/ hour of weathervane scallop in the eastern Gulf of Alaska, May-Aug. 1975 (Cruises 751 and 753).

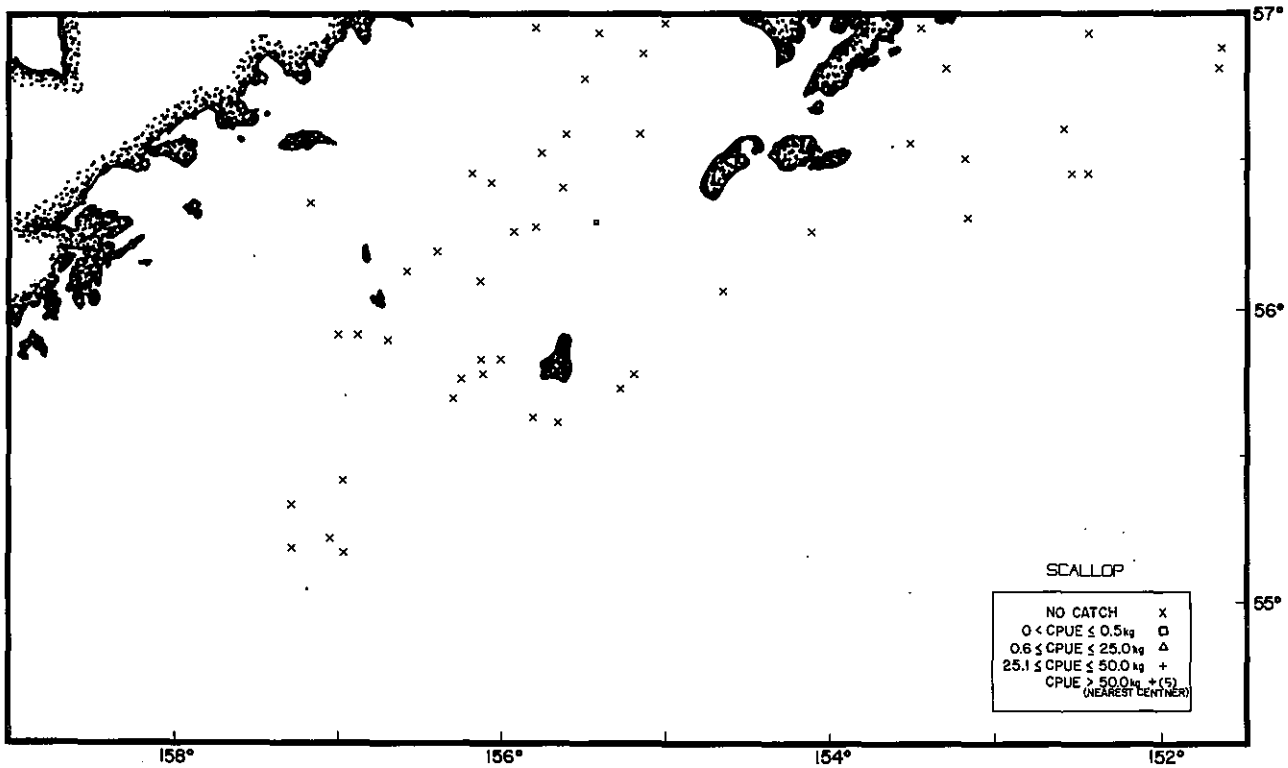


Figure XI-547.--Distribution of standardized catch rates in kilograms/ hour of weathervane scallop in the western Gulf of Alaska, Aug.-Oct. 1973 and Jun.-Aug. 1975 (Cruises 734 and 753).

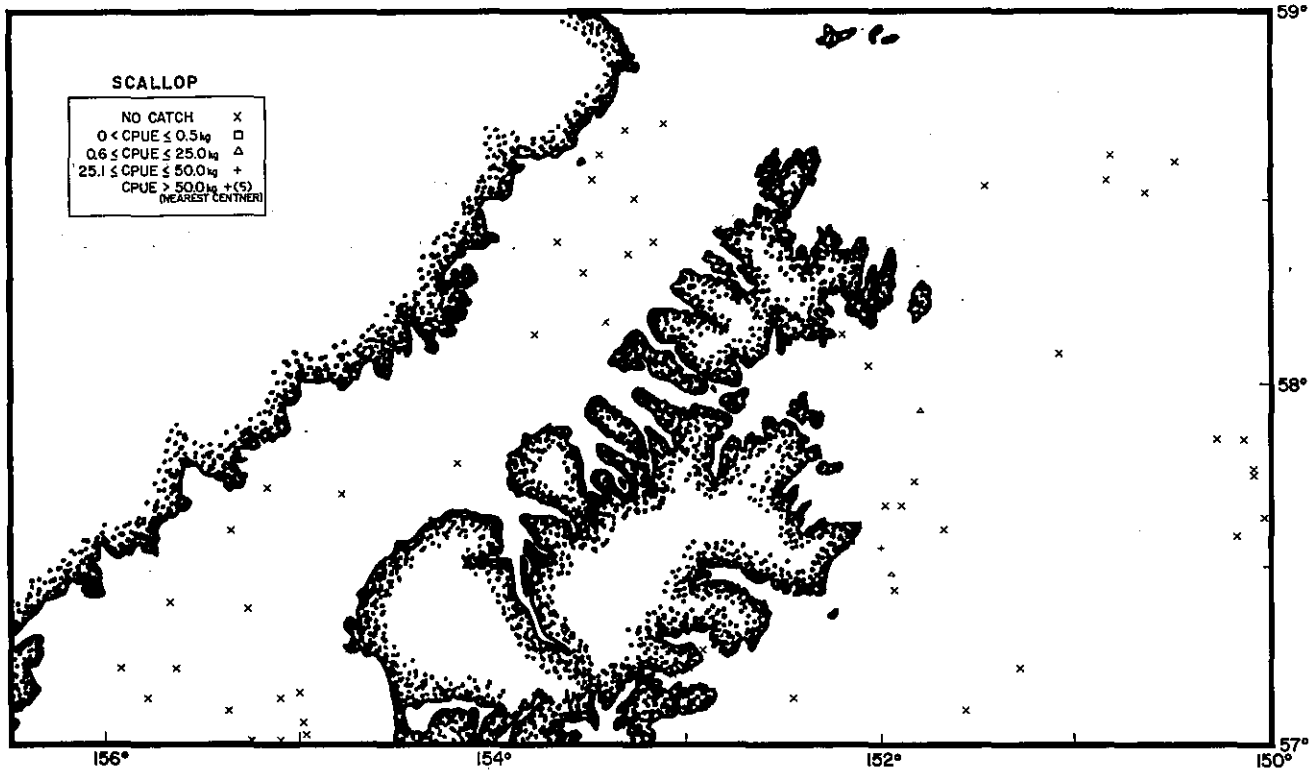


Figure XI-548.--Distribution of standardized catch rates in kilograms/ hour of weathervane scallop in the western Gulf of Alaska, May-Jun. 1973, Aug.-Oct. 1973, and Jun.-Aug. 1975 (Cruises 733, 734, and 753).

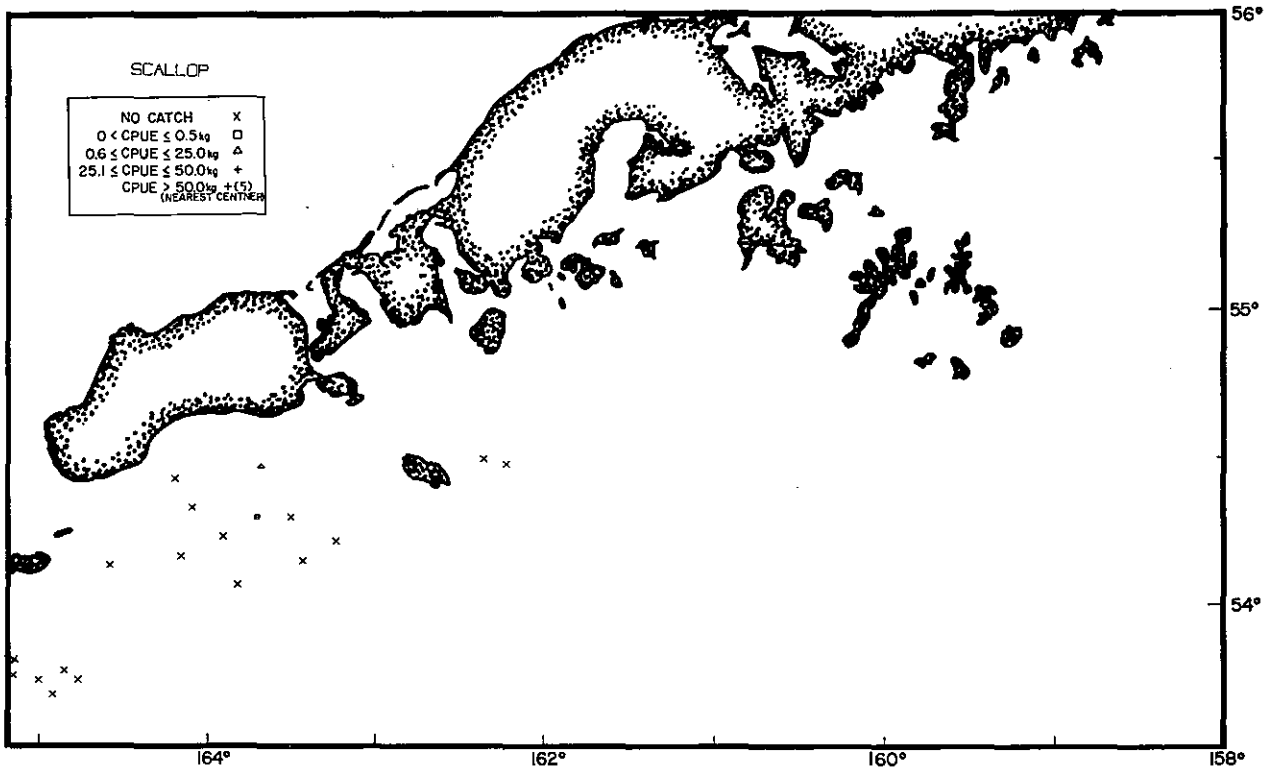


Figure XI-549.--Distribution of standardized catch rates in kilograms/ hour of weathervane scallop in the western Gulf of Alaska, Jul.-Aug. 1974 (Cruise 744).

Table XI-150.--Estimated biomass and population size of weathervane scallop (Pecten caurinus) in the Gulf of Alaska during April-October, 1973-76.

Region	Depth zone (m)	CPUE 1/ (kg/hr)	Estimated biomass (mt)	Proportion of total estimated biomass	Estimated population ($X 10^6$)	Proportion of total estimated population	Mean size per individual 2/ Weight (kg)	Mean size per individual 2/ Length (cm)
Fairweather	1-100	51.7	1,860.2	98.9	--	--	--	--
	101-200	0.1	20.3	1.1	--	--	--	--
	201-400	0	0	0	--	--	--	--
	All zones	8.2	1,880.5	35.4	--	--	--	--
Yakutat	1-100	13.7	849.1	68.1	2.3	71.9	0.37	--
	101-200	2.6	383.6	31.1	0.9	28.1	0.41	--
	201-400	3/	1.3	0.1	4/	5/	0.23	--
	All zones	4.5	1,234.0	23.2	3.2	--	0.38	--
Prince William	1-100	2.3	258.4	84.1	1.0	76.9	0.26	--
	101-200	0.3	39.0	12.7	0.2	15.4	0.24	--
	201-400	0.3	9.9	3.2	0.1	7.7	0.19	--
	All zones	1.1	307.3	5.8	1.3	--	0.25	--
Kenai	1-100	--	--	--	--	--	--	--
	101-200	0	0	0	0	0	--	--
	201-400	0	0	0	0	0	--	--
	All zones	0	0	0	0	0	--	--
Kodiak	1-100	12.2	1,745.2	100.0	--	--	--	--
	101-200	0	0	0	--	--	--	--
	201-400	0	0	0	--	--	--	--
	All zones	5.4	1,745.2	32.8	--	--	--	--
Shelikof	1-100	0	0	0	0	0	--	--
	101-200	0	0	0	0	0	--	--
	201-400	0	0	0	0	0	--	--
	All zones	0	0	0	0	0	--	--
Chirikof	1-100	3/	6.8	100.0	4/	100.0	0.23	--
	101-200	0	0	0	0	0	--	--
	201-400	0	0	0	0	0	--	--
	All zones	3/	6.8	0.1	4/	--	0.23	--
Shumagin	1-100	--	--	--	--	--	--	--
	101-200	--	--	--	--	--	--	--
	201-400	--	--	--	--	--	--	--
	All zones	--	--	--	--	--	--	--
Sanak	1-100	0	0	0	0	0	--	--
	101-200	0.9	142.8	100.0	0.5	100.0	0.29	--
	201-400	0	0	0	0	0	--	--
	All zones	0.4	142.8	2.7	0.5	--	--	--
Total	1-100	7.1	4,719.7	88.8	--	--	--	--
	101-200	0.5	585.7	11.0	--	--	--	--
	201-400	3/	11.2	0.2	--	--	--	--
	All zones	2.2	5,316.6	100.0	--	--	--	--

1/ Mean catch per unit effort, in kilograms per hour trawled.
2/ Where data are available.
3/ Less than 0.1 kg/hr.
4/ Less than 0.1 X 10^6 individuals.
5/ Less than 0.1 percent.

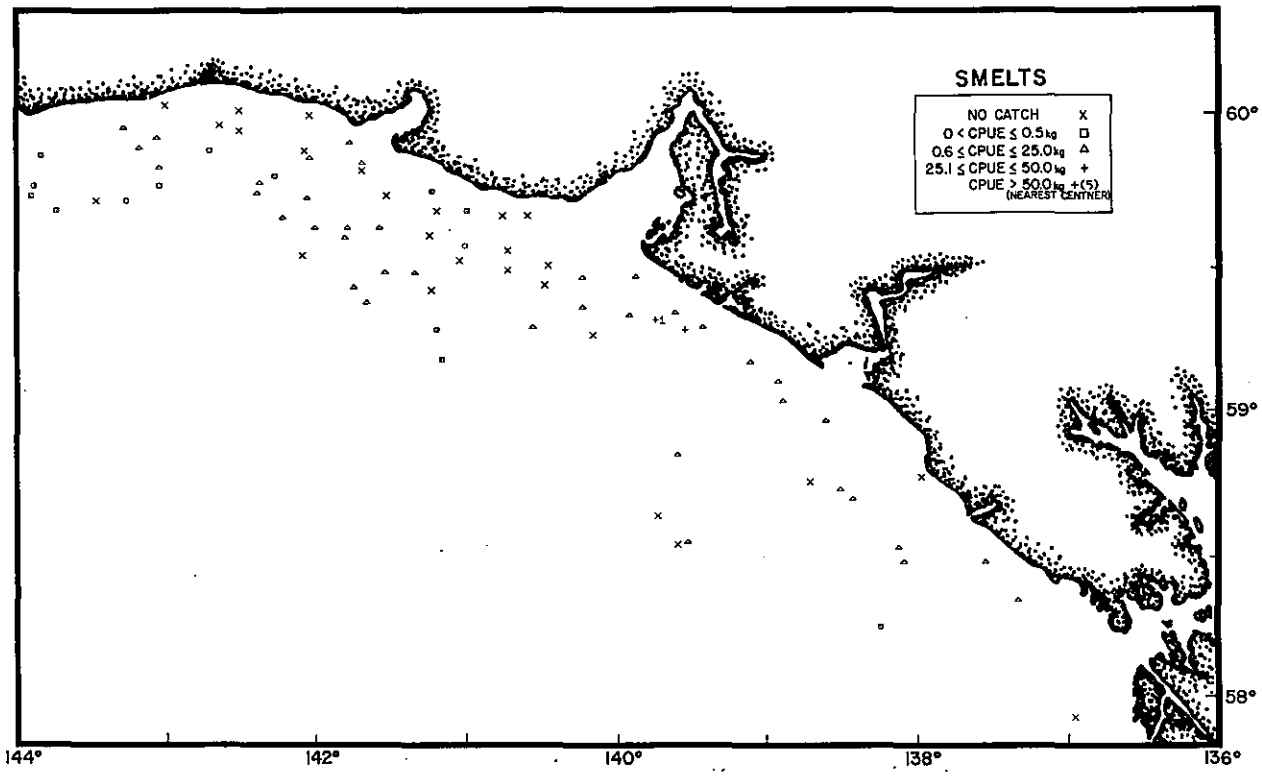


Figure XI-550.--Distribution of standardized catch rates in kilograms/ hour of smelts in the eastern Gulf of Alaska, May-Aug. 1975 and Apr. 1976 (Cruises 751 and 762).

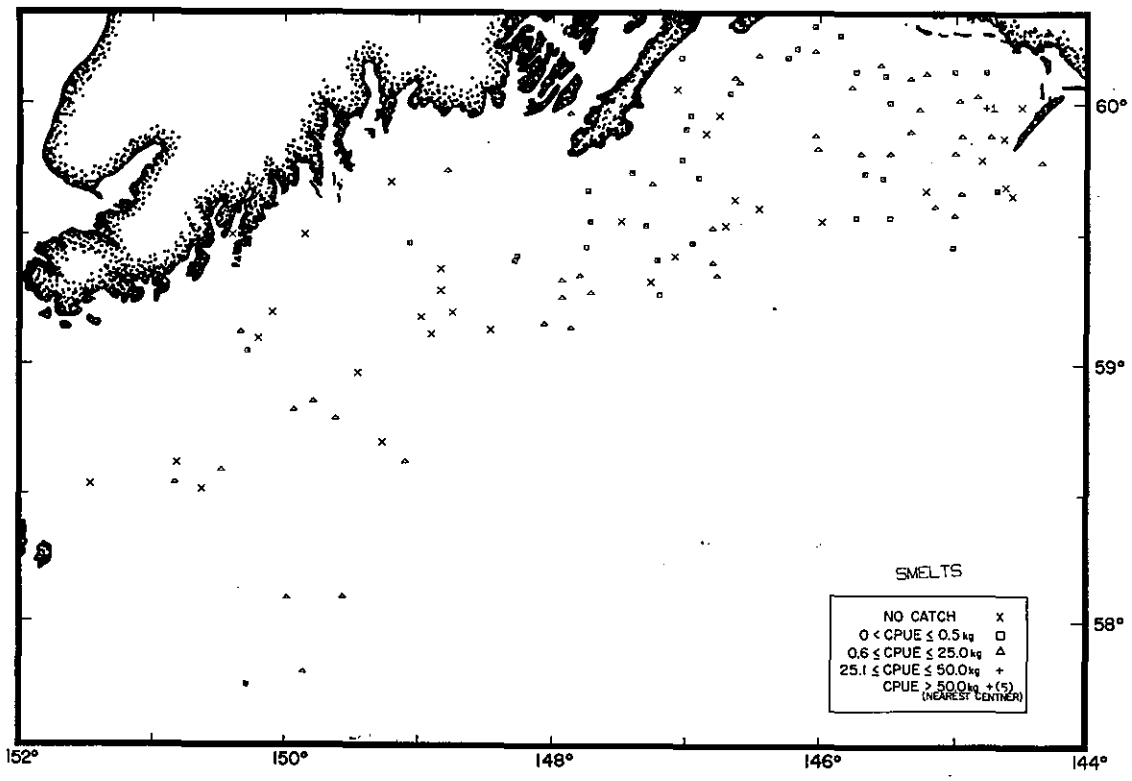


Figure XI-551.--Distribution of standardized catch rates in kilograms/ hour of smelts in the eastern Gulf of Alaska, May-Aug. 1975. (Cruises 751 and 753).

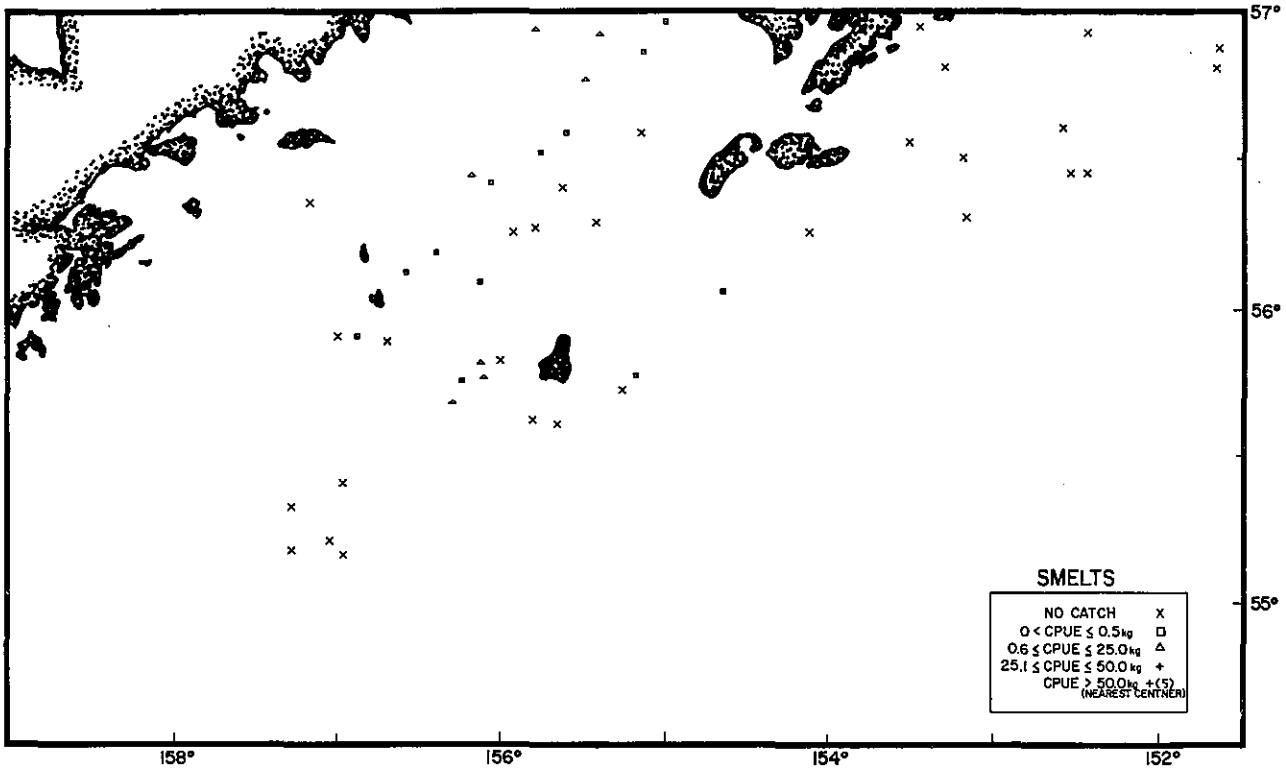


Figure XI-552.--Distribution of standardized catch rates in kilograms/ hour of smelts in the western Gulf of Alaska, Aug.-Oct. 1973 and Jun.-Aug. 1975 (Cruises 734 and 753).

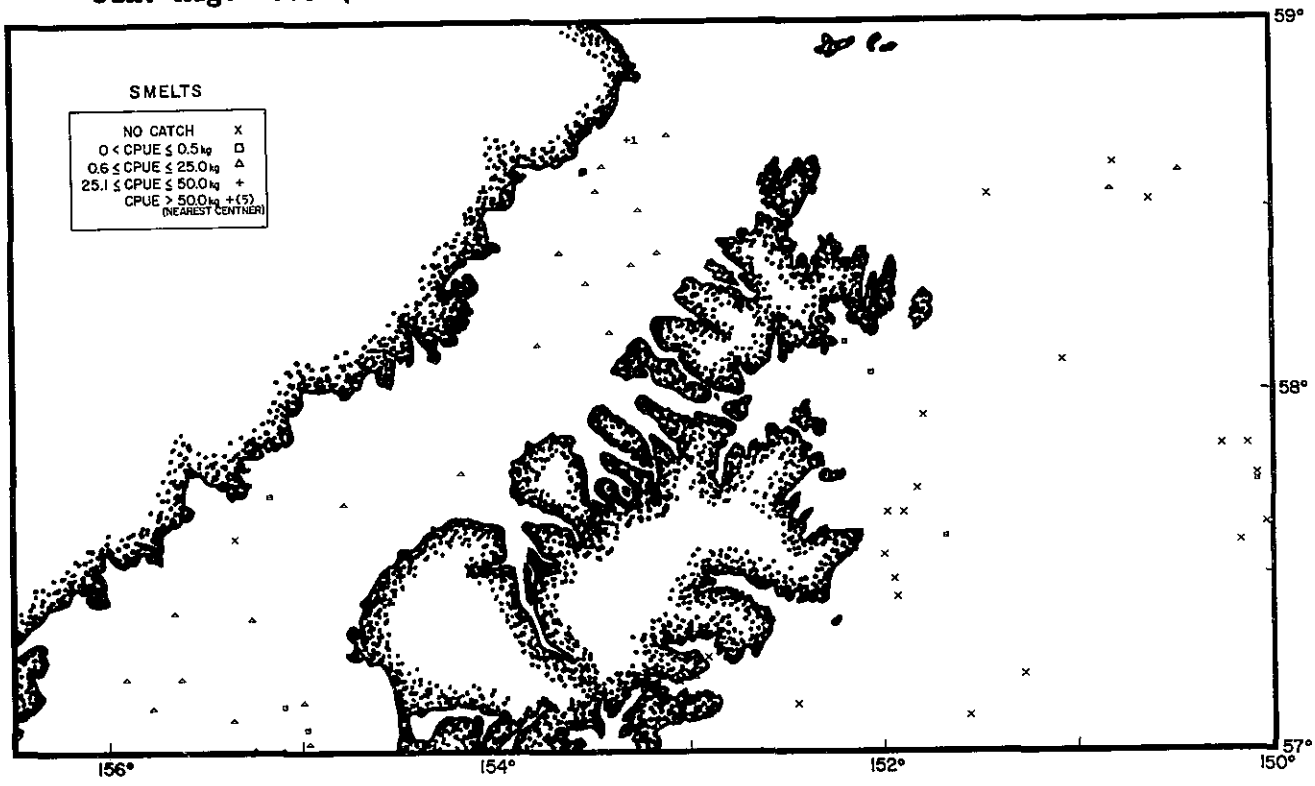


Figure XI-553.--Distribution of standardized catch rates in kilograms/ hour of smelts in the western Gulf of Alaska, May-Jun. 1973, Aug.-Oct. 1973, and Jun.-Aug. 1975 (Cruises 733, 734, and 753).

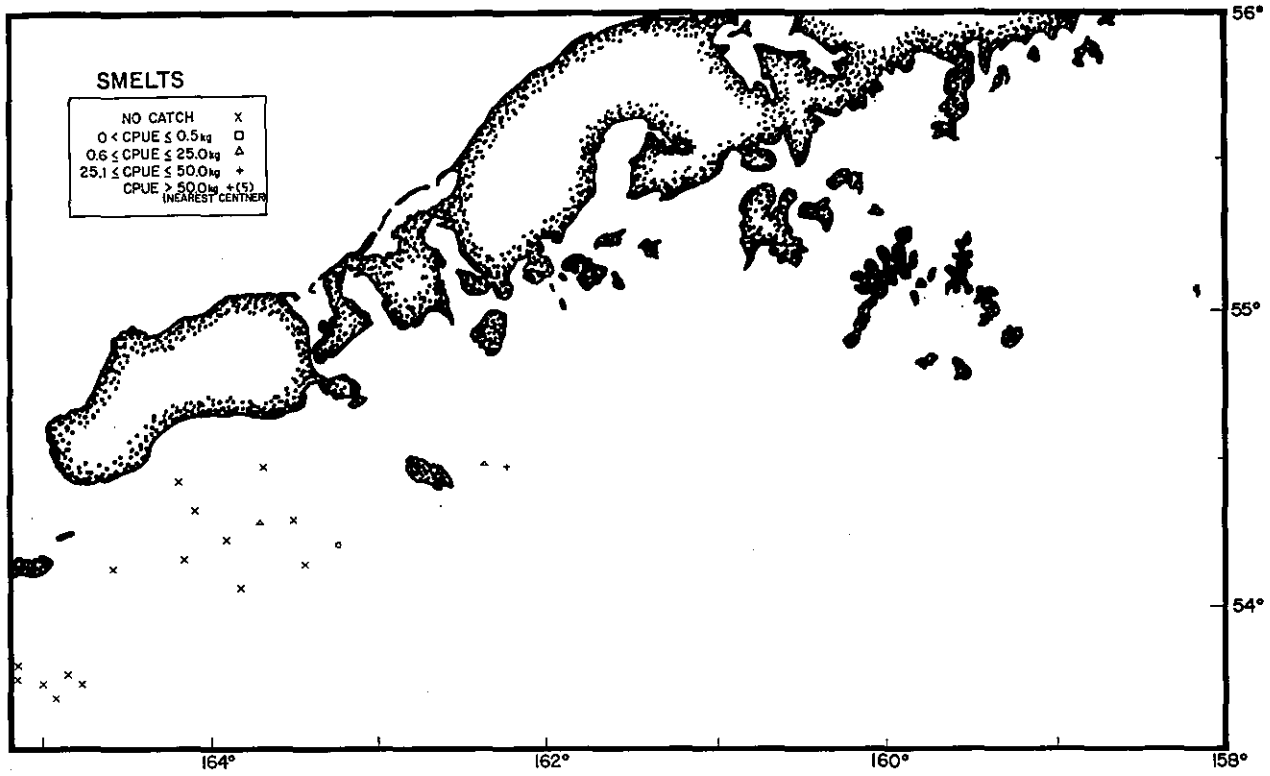


Figure XI-554.--Distribution of standardized catch rates in kilograms/ hour of smelts in the western Gulf of Alaska, Jul.-Aug. 1974.

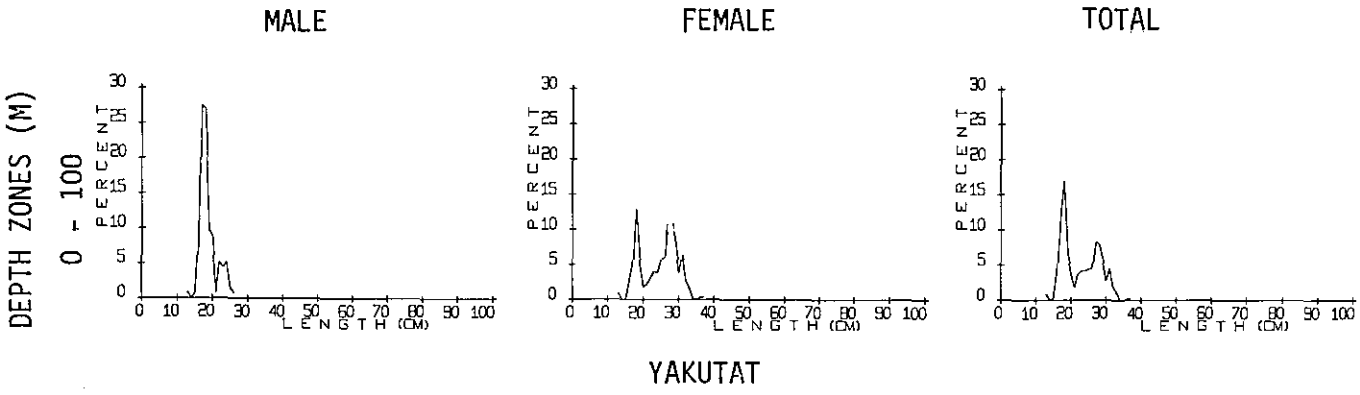


Figure XI-555.--Percentage length frequency of butter sole in the Yakutat region, 1975.

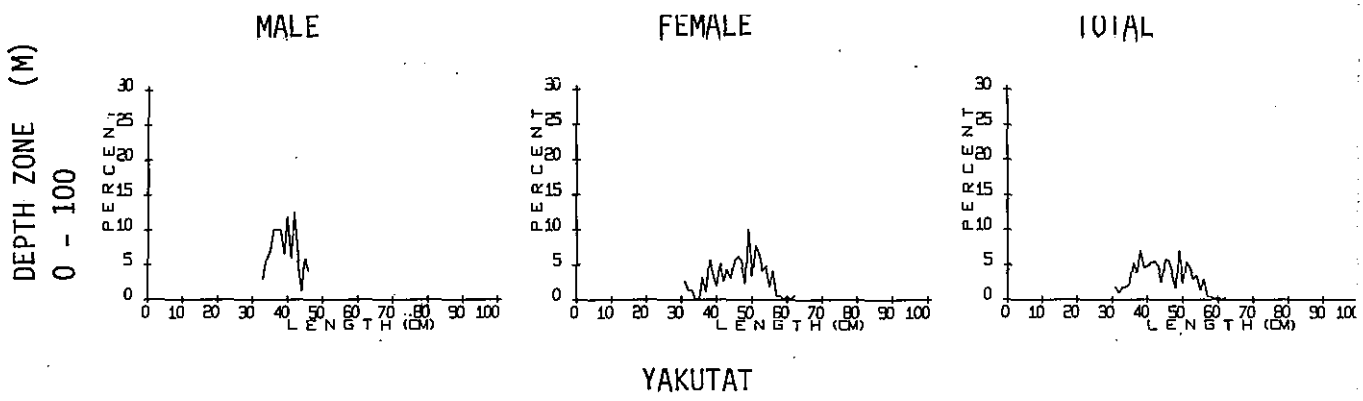


Figure XI-556.--Percentage length frequency of starry flounder in the Yakutat region, 1975.

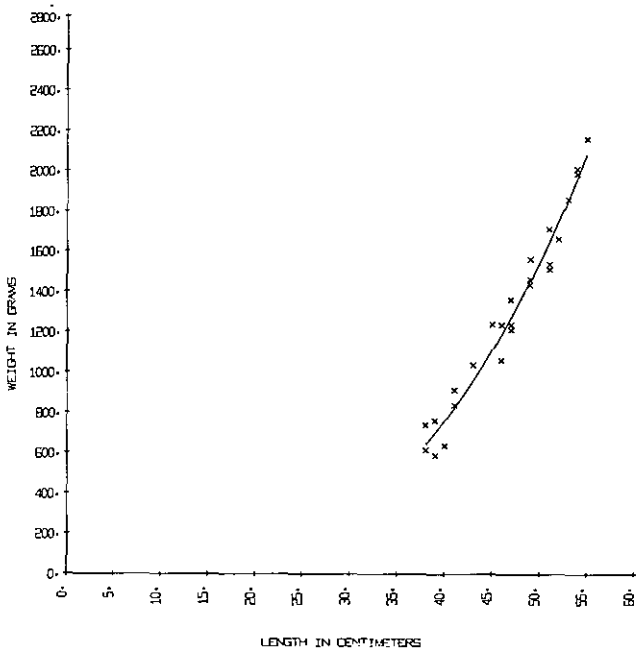


Figure XI-557.--Weight at length observations for starry flounder females in the 0-100 M. depth zone of the Yakutat region, May-Aug. 1975 (Cruise 751).

Table XI-151.--Estimated biomass and population size of smelts in the Gulf of Alaska during April-October 1973-76.

Region	Depth zone (m)	CPUE 1/ (kg/hr)	Estimated biomass (mt)	Proportion of total estimated biomass	Estimated population ($\times 10^6$)	Proportion of total estimated population	Mean size per individual 2/ Weight (kg)	Mean size per individual 2/ Length (cm)
Fairweather	1-100	1.2	44.9	2.2	1.2	--	0.04	--
	101-200	11.7	1,898.9	94.1	--	--	--	--
	201-400	2.5	75.0	3.7	--	--	--	--
	All zones	8.8	2,018.8	42.1	--	--	--	--
Yakutat	1-100	0.6	35.3	9.0	0.8	5.8	0.04	--
	101-200	2.2	324.0	82.6	12.2	89.1	0.03	--
	201-400	0.5	33.2	8.46	0.7	5.1	0.05	--
	All zones	1.4	392.5	8.2	13.7	--	0.03	--
Prince William	1-100	2.4	270.7	28.2	2.4	16.7	0.11	--
	101-200	1.1	138.9	14.5	2.9	20.1	0.05	--
	201-400	15.1	550.3	57.3	9.1	63.2	0.06	--
	All zones	3.5	959.9	20.0	14.4	--	0.07	--
Kenai	1-100	--	--	--	--	--	--	--
	101-200	1.5	366.6	86.3	7.1	89.9	0.05	--
	201-400	0.6	58.0	13.7	0.8	10.1	0.07	--
	All zones	1.2	424.6	8.8	7.9	--	0.05	--
Kodiak	1-100	0	0	0	0	0	--	--
	101-200	0.1	11.9	100.0	--	--	--	--
	201-400	0	0	0	0	0	--	--
	All zones	3/	11.9	0.3	--	--	--	--
Shelikof	1-100	26.7	172.9	44.0	--	--	--	--
	101-200	2.4	96.3	24.5	--	--	--	--
	201-400	1.2	123.9	31.5	--	--	--	--
	All zones	2.6	393.1	8.2	--	--	--	--
Chirikof	1-100	0	0	0	0	0	--	--
	101-200	0.2	4/	0	0.9	16.4	0.03	--
	201-400	1.1	0.1	100.0	4.6	83.6	0.03	--
	All zones	0.4	0.2	5/	5.5	--	0.03	--
Shumagin	1-100	--	--	--	--	--	--	--
	101-200	--	--	--	--	--	--	--
	201-400	--	--	--	--	--	--	--
	All zones	--	--	--	--	--	--	--
Sanak	1-100	0.1	2.0	0.3	--	--	--	--
	101-200	3.7	597.7	99.7	--	--	--	--
	201-400	0	0	0	0	0	--	--
	All zones	1.8	599.7	12.5	--	--	--	--
Total	1-100	0.8	525.8	11.0	--	--	--	--
	101-200	2.9	3,434.3	71.5	--	--	--	--
	201-400	1.8	840.5	17.5	--	--	--	--
	All zones	2.1	4,800.6	100.0	--	--	--	--

1/ Mean catch per unit effort, in kilograms per hour trawled.
2/ Where data are available.
3/ Less than 0.1 kg/hr.
4/ Less than 0.1 X 10^6 individuals.
5/ Less than 0.1 percent.

Table XI-152.--Species of fish and invertebrates which occurred at mean CPUE's greater than 10 kg/hr in restricted distributions (Cruises 733, 734, 744, 751, 753, 762).

Region	Species	DEPTH ZONES (M) 0-100	101-200	201-400
Fairweather	Sponge	--	152	--
Yakutat	Starry flounder	313	--	--
	Butter sole	41	--	--
	Sunflower star	22	--	--
	Sea urchins	--	--	121
Prince William	Tunicates	25	--	--
	Pink shrimp	25	--	--
	Sea urchins	20	--	--
	Basket star	13	--	--
	Leather star	--	10	29
Kenai	Sponge	--	19	--
	Stony coral	--	13	--
Kodiak	Snails	120	--	--
	Anemone	38	--	--
	Butter sole	32	--	--
	Searcher	28	--	--
	Atka mackerel	14	--	--
	Pink shrimp	--	19	--
Shelikof	Pink shrimp	67	18	--
	Yellowfin sole	16	--	--
	Basket star	--	30	12
	Lithodid crab	--	--	10
Chirikof	Sea urchins	21	--	--
	Sponge	--	11	--
Sanak	Butter sole	18	--	--
	Anemone	17	--	--
	Eelpouts	--	21	--
	Sea urchins	--	--	239
	Rougheye rockfish	--	--	62
	Basket stars	--	--	19