NORTHWEST & ALASKA FISHERIES CENTER PROCESSED REPORT

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TRAWL SURVEYS OF GROUNDFISH RESOURCES IN THE EASTERN GULF OF ALASKA AND SOUTHEASTERN ALASKAN WATERS 1976-77

by
Norman B. Parks and Harold Zenger

JUNE 1978

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Northwest and Alaska Fisheries Center
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INTRODUCTION

The National Marine Fisheries Service (NMFS) in Seattle has conducted a series of eight cruises in the Gulf of Alaska and southeastern Alaska waters since 1972 to determine the distribution, abundance, and biological condition of groundfish resources in these areas. Results of surveys conducted in 1972-75 in western and central Gulf of Alaska waters have been reported by Hughes and Alton (1974); Hughes and Parks (1975); Ronholt et al. (1976); and Hughes and Hirschhorn (1978).

This report is based upon data generated by trawl surveys conducted in 1976 and 1977 in the eastern Gulf and southeastern Alaskan waters. The principal objectives were: (1) to document the distribution, abundance, and size composition of demersal resources, and (2) to provide current information on resource availability for the fishing industry.

BACKGROUND

Resources other than groundfish which recently supported or presently are supporting small domestic fisheries in the eastern Gulf and southeastern Alaska areas include red king crab, golden king crab, Tanner (snow) crab, Dungeness crab, scallops, Pacific halibut, Pacific herring, and shrimps. Groundfish species presently harvested by U.S. nationals include sablefish, rockfish, various flounders, and walleye pollock.

During 1976, the domestic harvest of these groundfish species from the eastern Gulf and southeastern Alaskan waters totaled 2.94 million pounds and was valued at $806,000. Over 98 percent of this volume and value was harvested from southeastern Alaska waters, where sablefish (blackcod) dominated the fisheries.

Foreign groundfish catches in these areas in recent years have been substantial. For example, in 1976 the Japanese groundfish catch in the southeastern Alaska-International North Pacific Fisheries Commission (INPFC) statistical area was reported to be 20,432 mt, or more than 15 times the U.S. domestic harvest of 1,312 mt in the area (including inside waters). In the five-year period from 1967-71, the average Japanese and Soviet groundfish catches in the Yakutat-INPFC statistical area were about 22,875 and 4,370 mt, respectively. During this same time period, in the INPFC statistical area that encompasses southeastern Alaskan waters, their average catches were about 18,870 and 5,687 mt respectively. Pacific ocean perch and sablefish were the primary species taken by the Japanese, while "rockfish" and Pacific ocean perch dominated Soviet catches.

During the most recent five-year period (1972-76), the Japanese and Soviet groundfish catches averaged about 27,453 and 3,240 mt respectively in the Yakutat area. In the southeastern area the Japanese average catch during 1972-76 was about 25,267 mt. The Soviets reported no catches in the southeastern area during 1972-76. Sablefish, Pacific ocean perch, and rockfish comprised most of the Japanese catches, while the Soviet catches in the Yakutat area were reported as primarily Pacific ocean perch, pollock, and rockfish. In 1973, the South Koreans began fishing in the Yakutat and southeastern Alaskan areas with catches estimated at 17 and 23 mt, respectively, primarily of Pacific ocean perch, pollock, and sablefish. In 1974, the South Koreans began targeting on sablefish, when catches of about 104 mt in the Yakutat area and 1,488 mt in the

southeastern area were reported. They continued fishing for sablefish in 1975 and 1976.

This report is aimed at providing the fishing industry and management agencies with groundfish resource information in southeastern Alaskan waters. As such, it provides information to assist in fishery development discussions by industry while providing a data base for regulatory and ecological aspects.

Common names of species taken are used in the text. A list of both common and scientific names is shown in the Appendix.

METHODS

The NOAA research vessel John N. Cobb was used to conduct 1976 and 1977 surveys. The John N. Cobb is 93 feet (ft) in overall length, and has a basic hull design of a west coast purse seiner.

All trawling was conducted with 400-mesh Eastern bottom trawls with 1¼-inch mesh codend liners to retain small fish. The trawl doors used were 5 x 7 ft steel V-type, with 20-fathom (fm) ½-inch bridles to the net. Diver observations indicate that the 400-mesh trawls generally obtain a horizontal spread of 38 ft and height of 6-8 ft.

SAMPLING PROCEDURES

The trawl surveys were conducted during daylight hours over a bottom depth range of 10-250 fm along outside waters from Yakutat to Cross Sound, and from 50 to 250 fm along outside waters from Cross Sound to Dixon Entrance. The survey area was divided into 50-fm depth intervals (10-50, 51-100, 101-150, and 151-250 fm) called strata. Each depth stratum was then divided into 25 square-mile blocks which were numbered consecutively.

Blocks known to be untrawlable were eliminated, and those to be sampled were chosen using a table of random numbers. Depth strata were not used in the inside waters of southeastern Alaska because of the very steep drop-offs in most areas. These inside waters were divided into 12 areas, and then each of them into 25 square-mile blocks regardless of depth.

Trawling duration at each station was usually 30 minutes. Only valid hauls, those in which the net did not become torn or hung-up, were counted in the survey results. An XBT (expendable bathythermograph) cast, to determine water temperature with depth, was made during each survey tow.

For all hauls, the catches were sorted by species as described by Hughes (1976) and weighed to determine the species composition and their catch rates for each stratum or area. In most cases, fish were measured to determine the percentage of species in each area that were of a marketable size (11½ inches for flatfishes and 12 inches for roundfishes).

DATA ANALYSIS

Catch rates were calculated and species composition was determined by area for the inside waters of southeastern Alaska and by depth stratum for the outside waters (Yakutat to Dixon Entrance). Catch rates are averages for each sampling stratum or area, and as such will not represent those that could be expected from given areas of high abundance which would be exploited during commercial fishing.

Approximations of exploitable biomass were calculated using the area-swept technique. Biomass estimates are regarded as conservative because it was assumed that the trawls were 100 percent efficient. For the eastern Gulf of Alaska (Yakutat to Cross Sound), biomass estimates were

calculated using average catch per-unit-effort (CPUEs) for each of the 10 predominant species in each of four depth intervals. In the outside waters of southeastern Alaska (Cross Sound to Dixon Entrance), the same criteria were followed using 12 predominant species and three depth intervals. The inside waters of southeastern Alaska involved biomass estimates for 12 species and 12 geographic areas.

RESULTS

Eastern Gulf of Alaska (Yakutat to Cross Sound)

The area surveyed in the eastern Gulf of Alaska during the spring of 1976 is shown in Figure 1. As indicated, 12 strata, numbered 69-80, were established in this area. Bottom conditions throughout this entire area were generally found to be rough and hard. Strata numbers 72 in 151-250 fm, 73 in less than 50 fm, and 76 in 101-150 fm were found to be untrawlable. Figures 2-6 summarize catch information of the predominant species captured in each of the remaining nine strata. Table 1 summarizes catch data for the Eastern Gulf survey area by depth intervals, and also shows the exploitable biomass estimates of the predominant species.

Throughout this area, porifera (sponges) were the most abundant organisms taken. They were taken primarily in strata 71 and 75 with catch rates of 1,334 and 300 lbs/hr respectively.

Flatfishes

Turbot.--In this area, turbot (arrowtooth flounder) had the highest average catch rates with an average of 159 lbs/hr. Turbot were the most abundant in strata 71, 77, 78, and 79, with CPUEs of 334, 547, 302, and

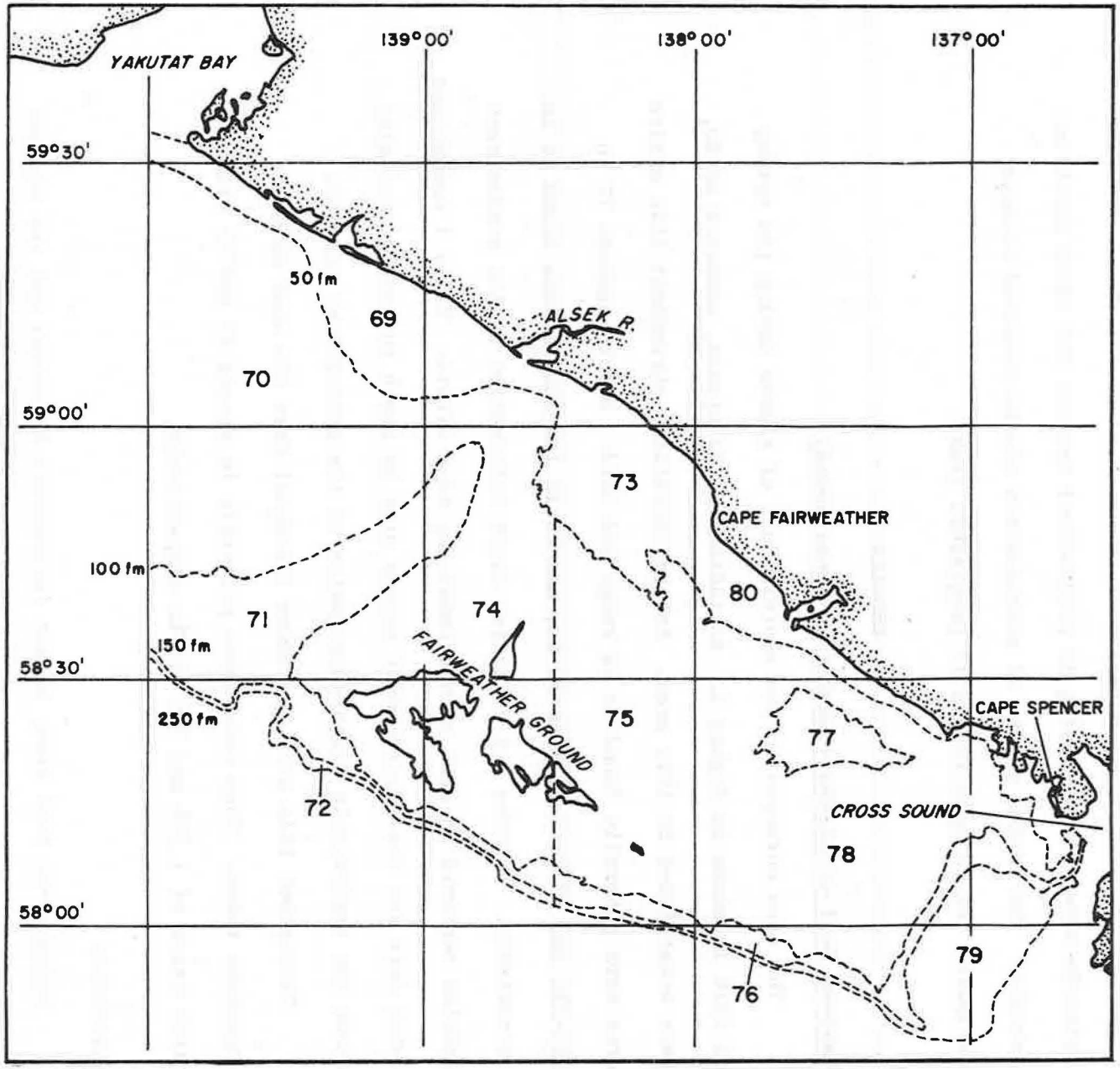

Figure 1.--Region of groundfish survey in waters of the eastern Gulf of Alaska, during John N. Cobb cruise, April-May 1976.

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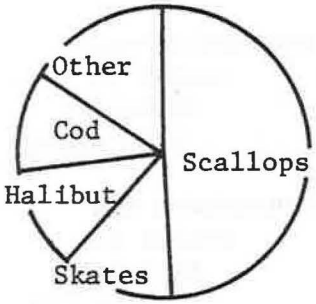


SCALLOPS
208 lbs/hr

SKATES
50 lbs/hr

HALIBUT
50 lbs/hr

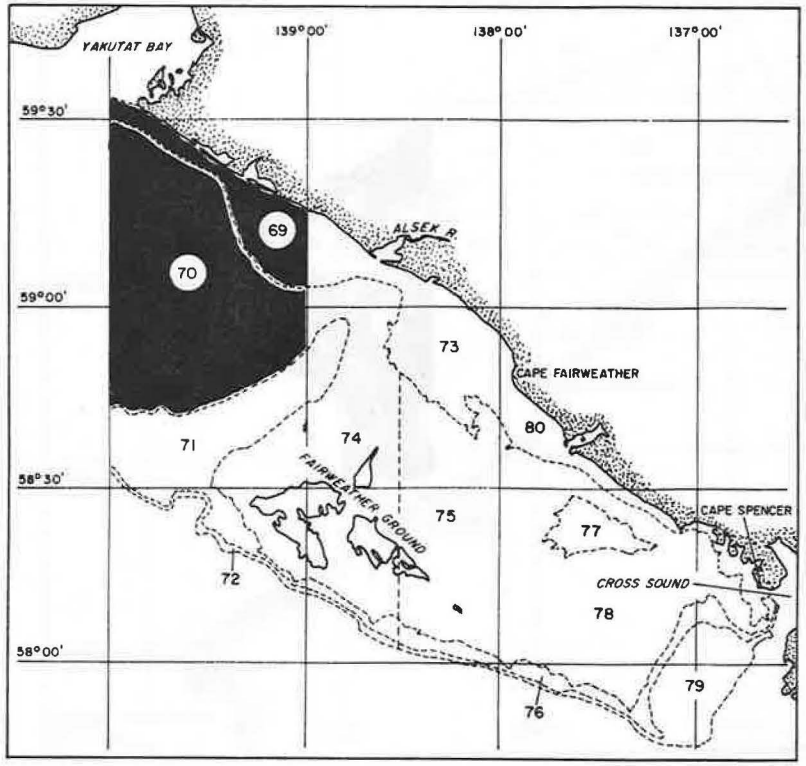
COD
46 lbs/hr
100% marketable

TURBOT
25 lbs/hr
18 inches
100% marketable

OTHER FLATFISH
30 lbs/hr

Stratum 69
1-50 fms
210 square miles

Stratum 70
51-100 fms
1000 square miles



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TURBOT
82 lbs/hr
13 inches
83% marketable

FLATHEAD SOLE
66 lbs/hr
12 inches
67% marketable

SKATES
54 lbs/hr

EULACHON
48 lbs/hr

COD
36 lbs/hr
100% marketable

HALIBUT
24 lbs/hr

Figure 2.--Groundfish species composition and pounds of fish and shellfish caught per hour trawled during the spring of 1976 in the shaded portions of the eastern Gulf of Alaska. The average length of the fish in inches, and the percentage of marketable-sized fish by number are shown.

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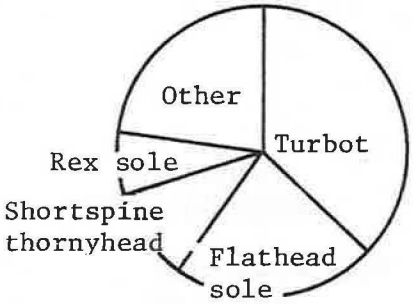


Stratum 71
101-150 fms
501 square miles

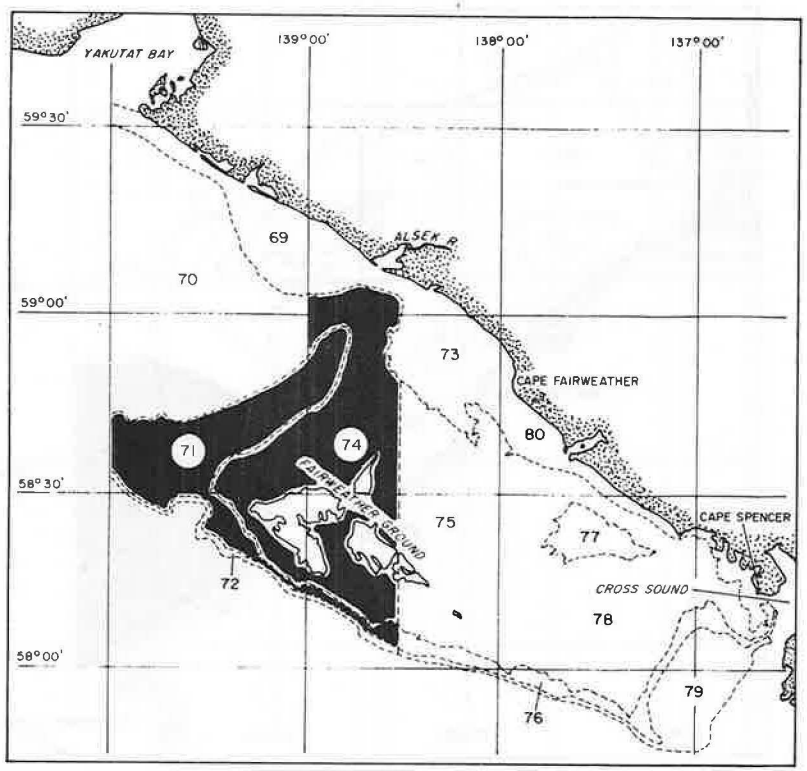
TURBOT
334 lbs/hr
16 inches
97% marketable

FLATHEAD SOLE
210 lbs/hr
15 inches
98% marketable

SHORTSPINE THORNYHEAD
93 lbs/hr
10 inches
30% marketable

REX SOLE
63 lbs/hr
13 inches
86% marketable

DOVER SOLE
47 lbs/hr
14 inches
96% marketable



Stratum 74
51-100 fms
846 square miles

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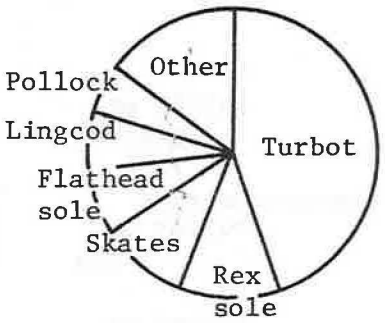

TURBOT
160 lbs/hr
12 inches
59% marketable

REX SOLE
37 lbs/hr
12 inches
78% marketable

SKATES
33 lbs/hr

FLATHEAD SOLE
24 lbs/hr
13 inches
89% marketable

LINGCOD
21 lbs/hr
100% marketable

POLLOCK
18 lbs/hr
18 inches
95% marketable

Figure 3.--Groundfish species composition and pounds of fish caught per hour trawled during the spring of 1976 in the shaded portions of the eastern Gulf of Alaska. The average length of the fish in inches and the percentage of marketable-sized fish by number are shown.

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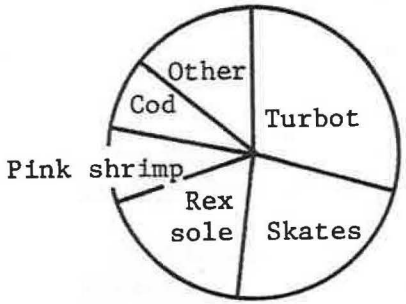


TURBOT
99 lbs/hr
10 inches
43% marketable

SKATES
77 lbs/hr

REX SOLE
59 lbs/hr
13 inches
85% marketable

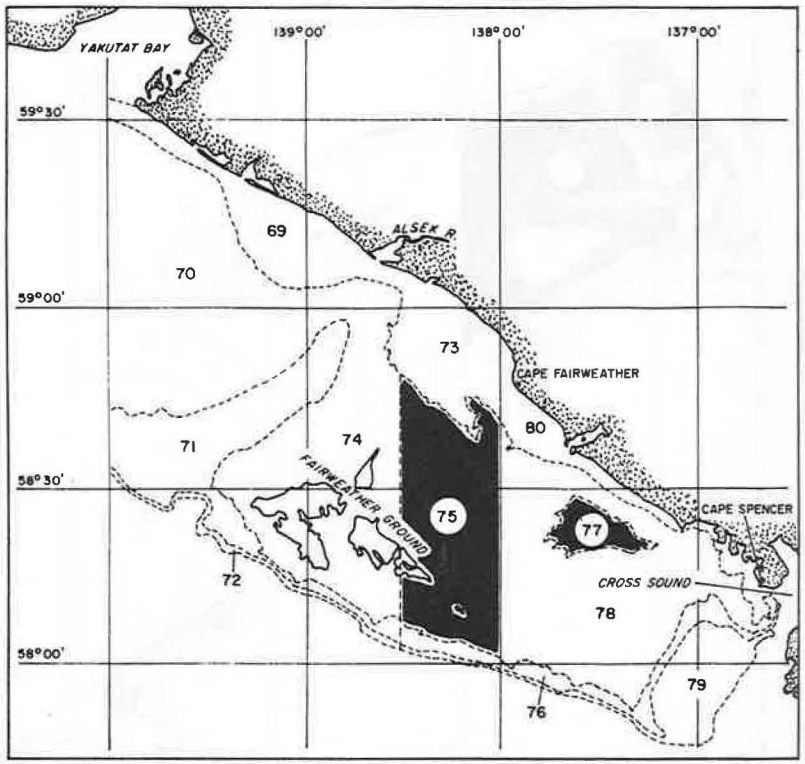
PINK SHRIMP
29 lbs/hr

COD
26 lbs/hr
No data

HALIBUT
14 lbs/hr

Stratum 75
51-100 fms
597 square miles

Stratum 77
101-150 fms
95 square miles



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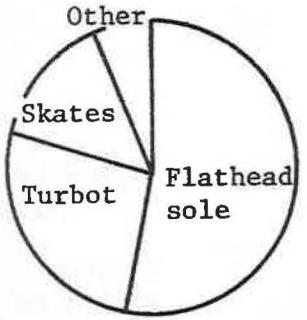

FLATHEAD SOLE
1124 lbs/hr
14 inches
97% marketable

TURBOT
547 lbs/hr
14 inches
91% marketable

SKATES
305 lbs/hr

SHORTSPINE THORNYHEAD
78 lbs/hr
No data

SIDE-STRIPE SHRIMP
42 lbs/hr

Figure 4.--Groundfish species composition and pounds of fish and shrimp caught per hour trawled during the spring of 1976 in the shaded portions of the eastern Gulf of Alaska. The average length of the fish in inches and the percentage of marketable-sized fish by number are shown.

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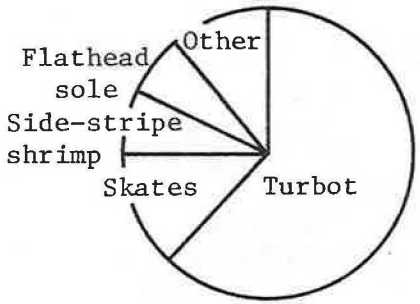


TURBOT
302 lbs/hr
13 inches
75% marketable

SKATES
63 lbs/hr

SIDE-STRIPE SHRIMP
33 lbs/hr

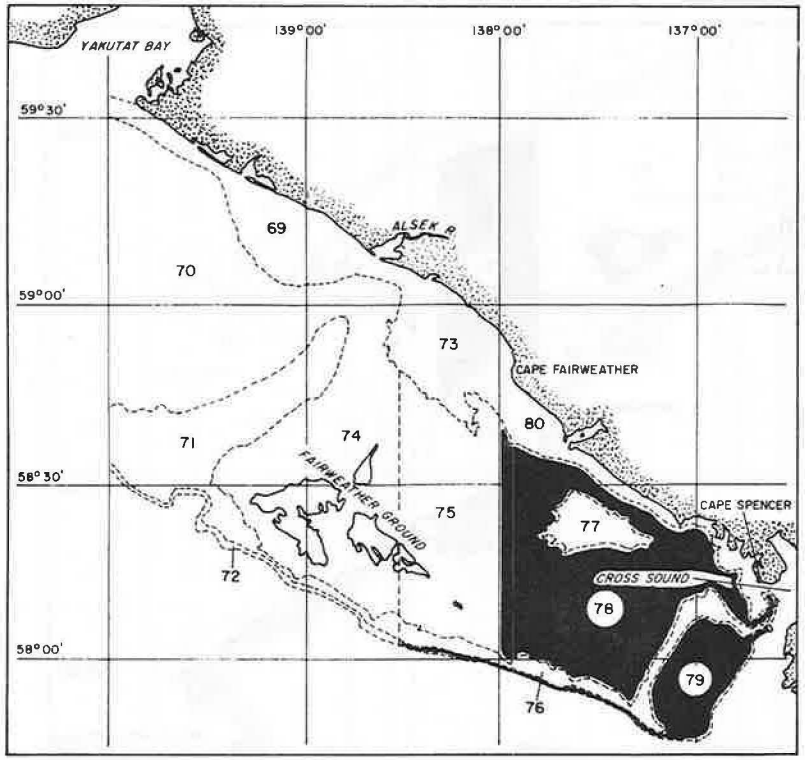
FLATHEAD SOLE
31 lbs/hr
12 inches
61% marketable

EULACHON
26 lbs/hr

TANNER CRAB
20 lbs/hr

Stratum 78
51-100 fms
944 square miles

Stratum 79
151-250 fms
274 square miles



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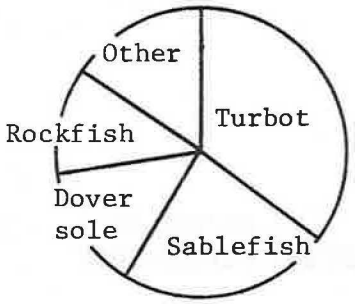

TURBOT
290 lbs/hr
23 inches
100% marketable

SABLEFISH
194 lbs/hr
25 inches
100% marketable

DOVER SOLE
115 lbs/hr
17 inches
100% marketable

ROCKFISH
99 lbs/hr
No data

SKATES
93 lbs/hr

Figure 5.--Groundfish species composition and pounds of fish, shrimp, and crab caught per hour trawled during the spring of 1976 in the shaded portions of the eastern Gulf of Alaska. The average length of the fish in inches and the percentage of marketable-sized fish by number are shown.

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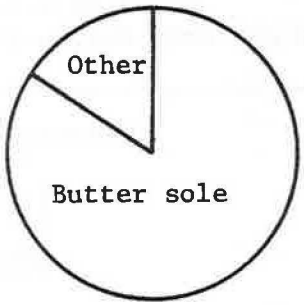

Stratum 80
1-50 fms
139 square miles

BUTTER SOLE
1084 lbs/hr
10 inches
28% marketable

TOM COD
60 lbs/hr

HALIBUT
40 lbs/hr

COD
35 lbs/hr
No data

SCALLOPS
32 lbs/hr

TURBOT
12 lbs/hr

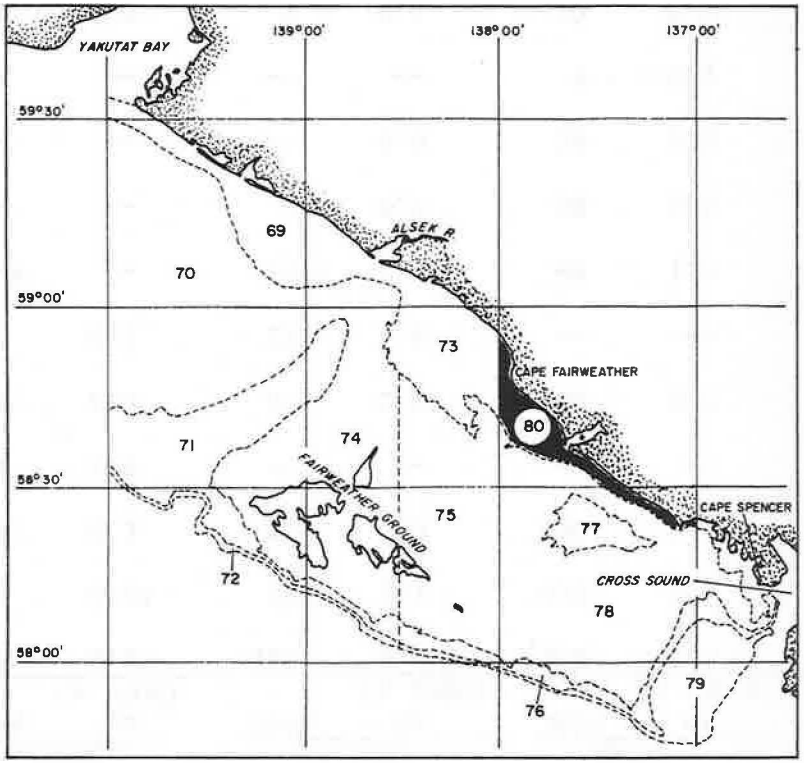

Figure 6.--Groundfish species composition and pounds of fish and shellfish caught per hour trawled during the spring of 1976 in the shaded portion of the eastern Gulf of Alaska. The average length of the fish in inches and the percentage of marketable-sized fish by number are shown.

Table 1.--Mean catch in pounds per hour trawled and estimates of exploitable biomass (metric tons x 1,000), by depth interval, for predominant species in the eastern Gulf of Alaska (Yakutat to Cross Sound), April-May 1976.

Species	Depth intervals (in fathoms) and area (in square nautical miles)									
	1-50 (349)		51-100 (3,387)		101-150 (596)		151-250 (274)		1-250 (4,606)	
	lb/h	mt (x 1000)	lb/h	mt (x 1000)	lb/h	mt (x 1000)	lb/h	mt (x 1000)	lb/h	mt (x 1000)
Turbot	20	0.2	120	9.0	388	5.1	290	1.7	159	15.9
Flathead sole	2	0.0*	38	2.7	438	5.6	3	0.0	98	8.4
Skates	36	0.3	55	4.3	100	1.4	93	0.6	62	6.5
Butter sole	364	2.9	--	--	--	--	--	--	45	2.9
Rex sole	6	0.0	27	2.1	480	0.7	2	0.0	27	2.8
Pacific cod	43	0.3	23	1.6	--	--	--	--	20	1.9
Shortspine thornyhead	--*	--	(0)*	0.0	89	1.2	--	--	15	1.2
Other rockfish[1/]	--	--	2	0.2	38	0.5	99	0.6	12	1.3
Dover sole	--	--	--	0.0	35	0.5	115	0.7	11	1.2
Sablefish	--	--	--	--	3	0.0	194	1.1	9	1.2
Walleye pollock	1	0.0	8	0.6	20	0.3	10	0.0	9	0.9
Other flatfish[2/]	14	0.1	4	0.3	4	0.0	--	--	5	0.5

* 0.0 = less than 100 metric tons (mt)
-- = no catch
(0) = CPUE less than 1 lbs/hr

1/ Rougheye rockfish; Pacific ocean perch; rosethorn rockfish; redbanded rockfish; and silvergray rockfish.

2/ English sole; slender sole; rock sole; and petrale sole.

290 lbs/hr respectively. By depth interval the catch rates of turbot were highest in the 101-150 and 151-250 fm ranges with 388 and 290 lbs/hr, respectively. Percentage of marketable-sized turbot increased with depth, ranging from 43-83 percent at 51-100 fm, and 91-97 percent at 101-150 fm, to 100 percent marketable size at 151-250 fm.

Flathead sole.--In terms of pounds per hour trawled, flathead sole ranked second in abundance over this area with an average catch rate of 98 lbs/hr. They were most abundant in strata 71 and 77 with CPUEs of 210 and 1,124 lbs/hr, respectively. They were abundant only in the 101-150 fm depth interval with an average catch rate of 438 lbs/hr. The percentage of marketable-sized flathead sole in this depth interval was 97-98 percent.

Butter sole.--Stratum 80 (1-50 fm) was the only area where butter sole were found in any significant concentration, although in this area, average catch rates of 1,084 lbs/hr were high enough to rank them the third highest flatfish and the fourth highest species in overall abundance. These fish were small, however, and only 28 percent were of marketable size.

Rex sole.--Average catch rate of rex sole ranked fourth highest among flatfish at 27 lbs/hr. The highest CPUEs occurred in strata 71, 74, and 75, with 63, 37, and 59 lbs/hr, respectively. By depth interval the best catches were made in 101-150 fm (480 lbs/hr), and the percentage of marketable-sized rex sole ranged from 78 to 86 percent.

Dover sole.--The average catch rate for Dover sole was only 11 lbs/hr for this area. The CPUE was highest in stratum 79 (151-250 fm) with 115

lbs/hr. Dover sole from this stratum averaged 17 inches (100 percent of marketable size).

Other flatfish.--English sole, slender sole, rock sole, and petrale sole combined, had their highest catch rates in strata 69 and 80 (both 1-50 fm) with 30 and 12 lbs/hr, respectively.

Elasmobranchs

Skates.--The three species of skates combined had the third highest catch rates in this area with an average of 62 lbs/hr. Their average catches were made up of 37 percent big skates, 33 percent black skates, and 30 percent longnose skates. Catch rates of skates were highest in strata 75, 77, and 79, with CPUEs of 77, 305, and 93 lbs/hr, respectively. They were taken at all depth intervals with the highest catches at 101-150 fm (100 lbs/hr) and 151-250 fm (93 lbs/hr).

Roundfish and Rockfish

Pacific cod.--Average catch rates for Pacific cod for this area were only 30 lbs/hr. Highest catch rates occurred in strata 69, 70, 75, and 80, with CPUEs of 46, 36, 26, and 35 lbs/hr, respectively. By depth interval, Pacific cod were taken only in the 1-50 and 51-100 fm depth intervals, where average catch rates were 43 and 23 lbs/hr, respectively, and all were of marketable size.

Sablefish.--Average catch rates for sablefish were highest in stratum 79 where 194 lbs/hr were taken. The depth interval in this stratum was 151-250 fm. These sablefish averaged 25 inches in length.

Walleye pollock.--Average catch rates for pollock in this area were extremely low. Highest average CPUEs occurred in strata 71 and 74, where 27 and 18 lbs/hr, respectively, were taken.

Shortspine thornyhead.--The highest average catch rates of this rockfish occurred in strata 71 and 77 (both in 101-150 fm), where 93 and 78 lbs/hr were taken. Only 30 percent of these fish were of marketable size in stratum 71.

Other rockfish.--Catches of other rockfish combined, consisting primarily of rougheye rockfish, Pacific ocean perch, rosethorn rockfish, redbanded rockfish, and silvergrey rockfish were highest in strata 71 and 79 where average CPUEs were 47 and 99 lbs/hr, respectively.

Other Species

Scallops.--Scallops were the most abundant species in stratum 69 with an average catch rate of 208 lbs/hr. They were also taken in stratum 80 with an average CPUE of 32 lbs/hr. Both of these strata were in the 1-50 fm depth interval. Small catches of eulachon, Pacific halibut, lingcod, Pacific tomcod, pink shrimp, sidestripe shrimp, and Tanner crab were taken in various strata. Although of no commercial value, sponges, as previously stated, were the most abundant organisms taken in strata 71 and 75.

Inside Waters of Southeastern Alaska

The inside waters of southeastern Alaska were separated into 12 areas (Figure 7). A total of 51 valid trawl hauls was made in this region, and seabed conditions were found to be extremely rough and hard in

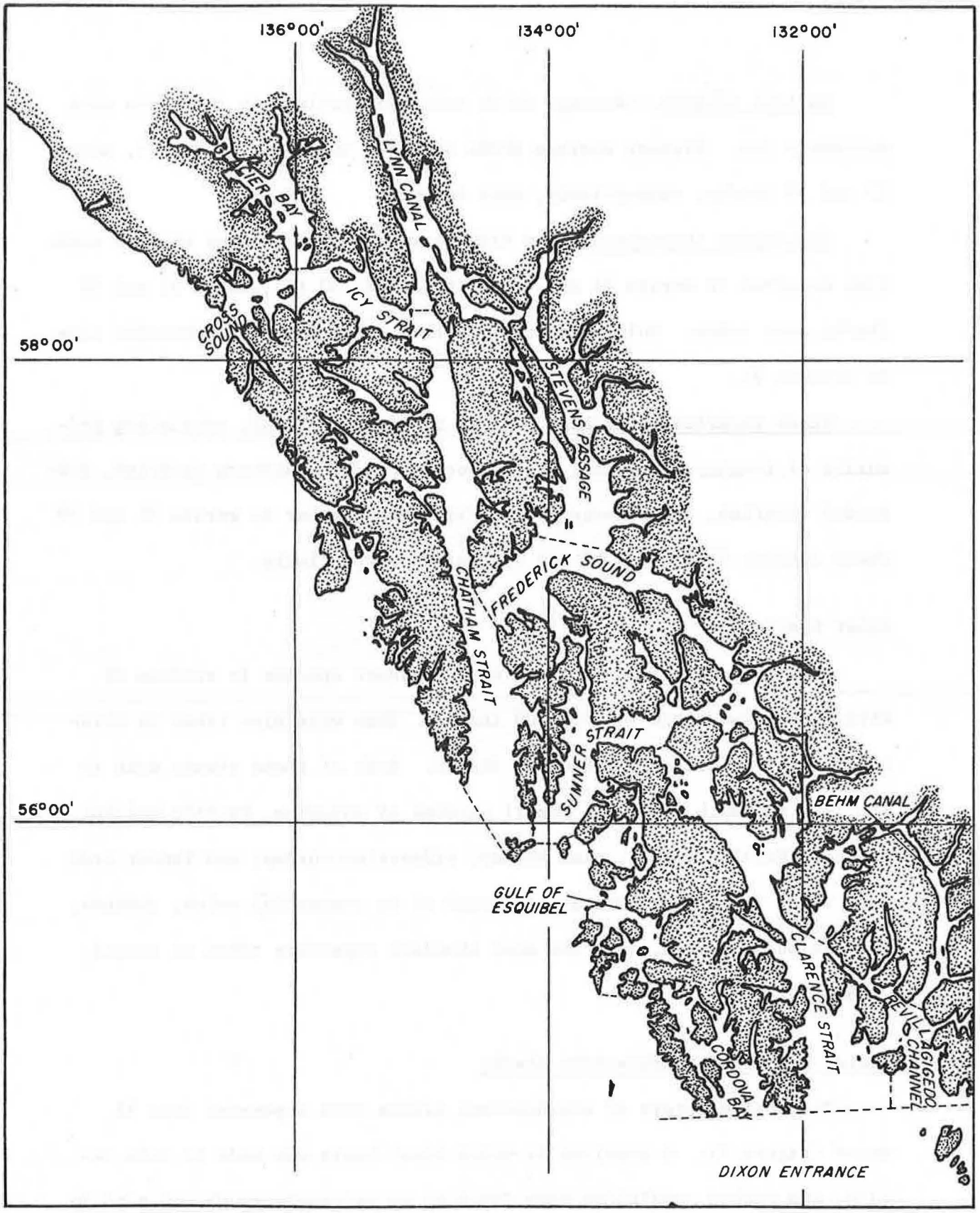

Figure 7.--Region of groundfish survey in the inside waters of southeastern Alaska on John N. Cobb cruise, April-May 1976.

many localities. Among the more untrawlable areas encountered were Glacier Bay, Icy Strait, much of Chatham Strait, Clarence Strait, Sumner Strait, and central Frederick Sound.

Figures 8-13 summarize the catch rates, average sizes, and percentages of marketable individuals for the predominant species taken in each of the areas. Table 2 summarizes catch per hour data for the predominant species by area, and Table 3 shows the exploitable biomass estimates of species in these same areas.

Throughout the inside waters, the predominant fish species in order of abundance were ratfish, skates, turbot, pollock, and flathead sole. Heart urchins were extremely abundant in Peril Strait, in the Chatham Strait area, and in portions of Stephens Passage and Behm Canal. The larger catches of heart urchins in these areas ranged from about 300 to 6,000 lbs per 30-minute haul.

Flatfish

Turbot.--Turbot were the most abundant flatfish in the inside waters with an average CPUE of 175 lbs/hr. Average catch rates of turbot were highest in Stephens Passage, Frederick Sound, Sumner Strait, Gulf of Esquibel, Cordova Bay, and Revillagigedo Channel, where 230, 507, 171, 349, 160, and 306 lbs/hr, respectively, were taken. Average size in these areas ranged from 16 to 20 inches (68 to 99 percent marketable).

Flathead sole.--The second most abundant flatfish was the flathead sole with an average CPUE of 82 lbs/hr. Catch rates were highest in Lynn Canal (136 lbs/hr), Frederick Sound (256 lbs/hr), Sumner Strait (125 lbs/hr), and Gulf of Esquibel (257 lbs/hr). Average size ranged from 11 inches in Lynn Canal to 13 inches in Frederick Sound, while the portions

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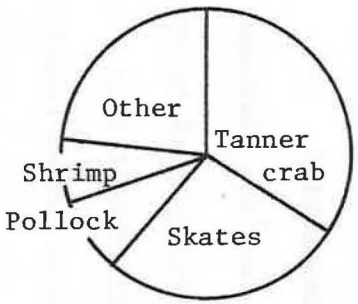


TANNER CRAB
99 lbs/hr

SKATES
78 lbs/hr

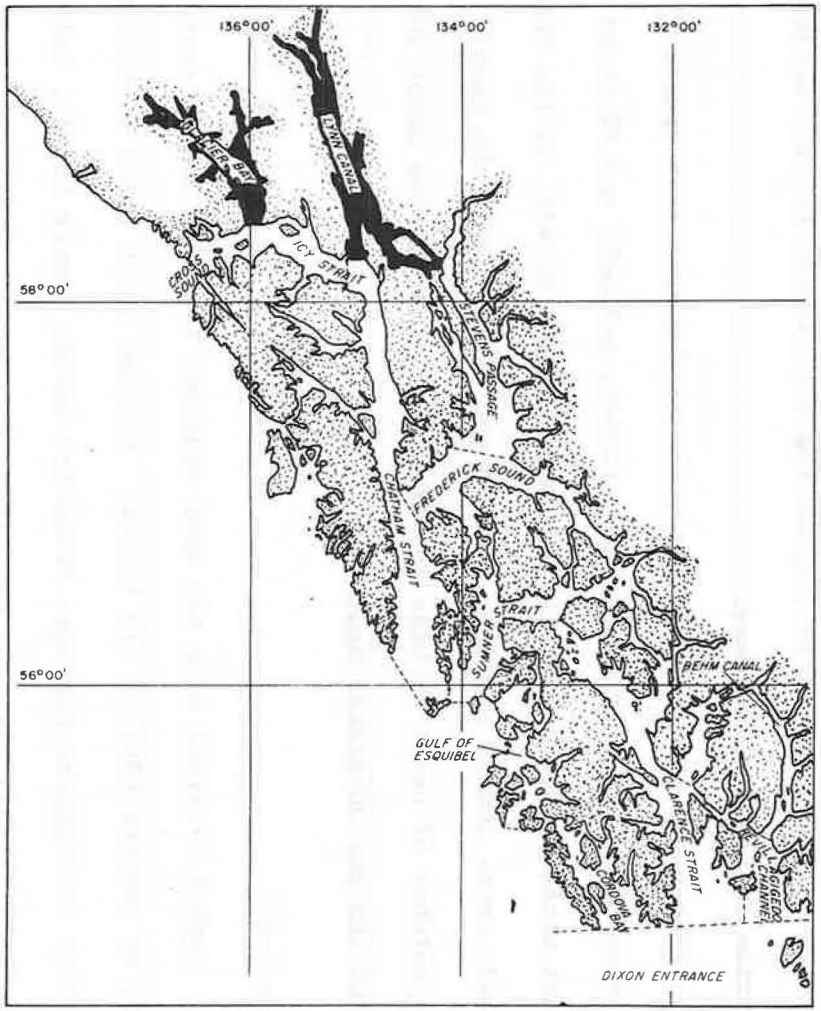
POLLOCK
26 lbs/hr
2% marketable

SHRIMP
21 lbs/hr

KING CRAB
19 lbs/hr

Glacier Bay
325 square miles

Lynn Canal
500 square miles



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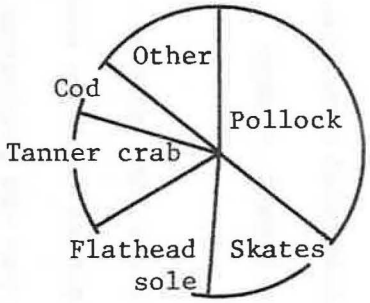

POLLOCK
326 lbs/hr
16 inches
98% marketable

SKATES
137 lbs/hr

FLATHEAD SOLE
136 lbs/hr
11 inches
42% marketable

TANNER CRAB
116 lbs/hr

COD
57 lbs/hr
100% marketable

TURBOT
42 lbs/hr
16 inches
98% marketable

Figure 8.--Groundfish species composition and pounds of fish and crab caught per hour trawled during the spring of 1976 in the Glacier Bay and Lynn Canal areas of S.E. Alaska. The average length of the fish in inches and the percentage of marketable-sized fish by number are shown.

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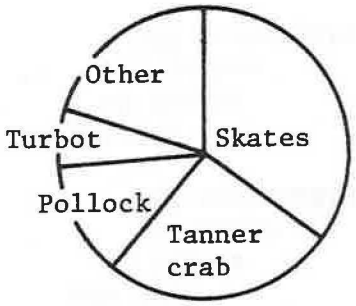


SKATES
248 lbs/hr

TANNER CRAB
191 lbs/hr

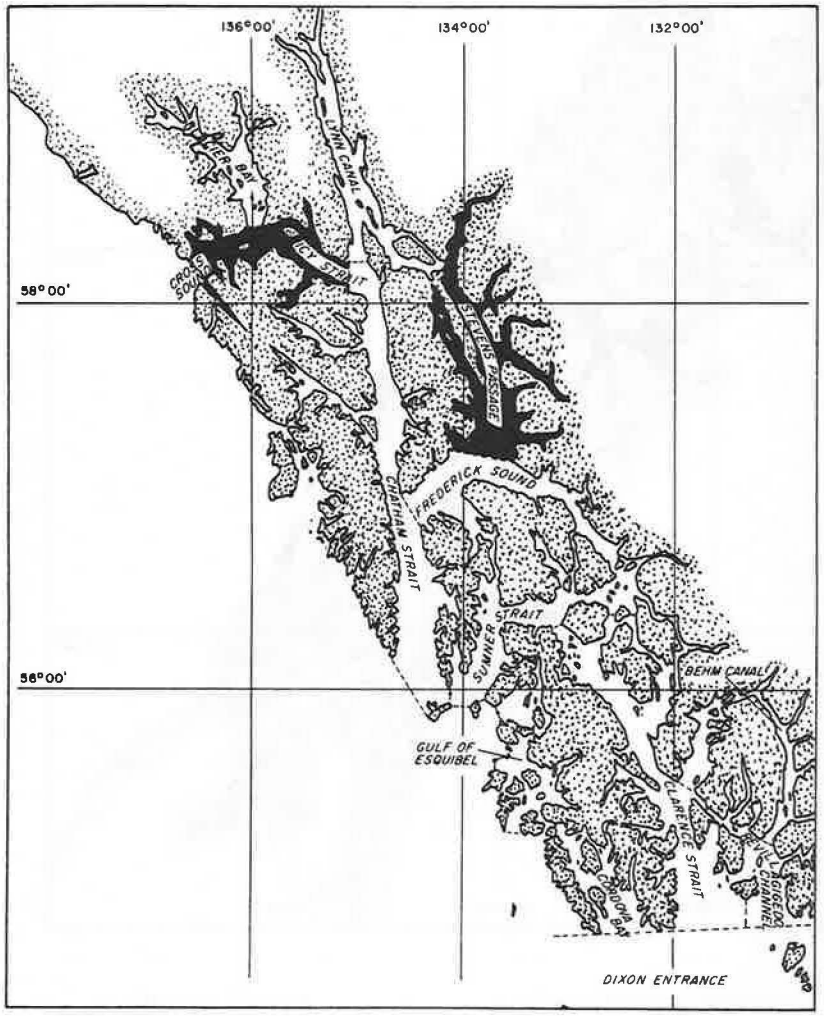
POLLOCK
93 lbs/hr
16 inches
78% marketable

FLATHEAD SOLE
46 lbs/hr
11 inches
56% marketable

TURBOT
28 lbs/hr
13 inches
79% marketable

Icy Strait
500 square miles

Stephens Passage
750 square miles



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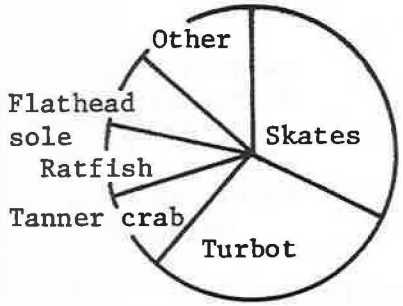

SKATES
260 lbs/hr

TURBOT
230 lbs/hr
19 inches
98% marketable

TANNER CRAB
72 lbs/hr

RATFISH
63 lbs/hr

FLATHEAD SOLE
63 lbs/hr
14 inches
83% marketable

REX SOLE
32 lbs/hr
12 inches
66% marketable

Figure 9.--Groundfish species composition and pounds of fish and crab caught per hour trawled during the spring of 1976 in the Icy Strait and Stephens Passage areas of S.E. Alaska. The average length of the fish in inches and the percentage of marketable-sized fish by number are shown.

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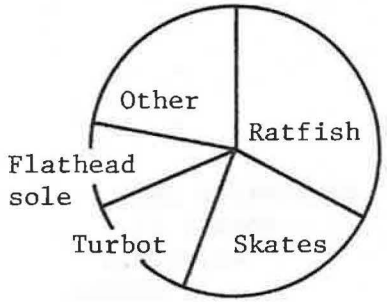


RATFISH
424 lbs/hr

SKATES
296 lbs/hr

TURBOT
171 lbs/hr
16 inches
68% marketable

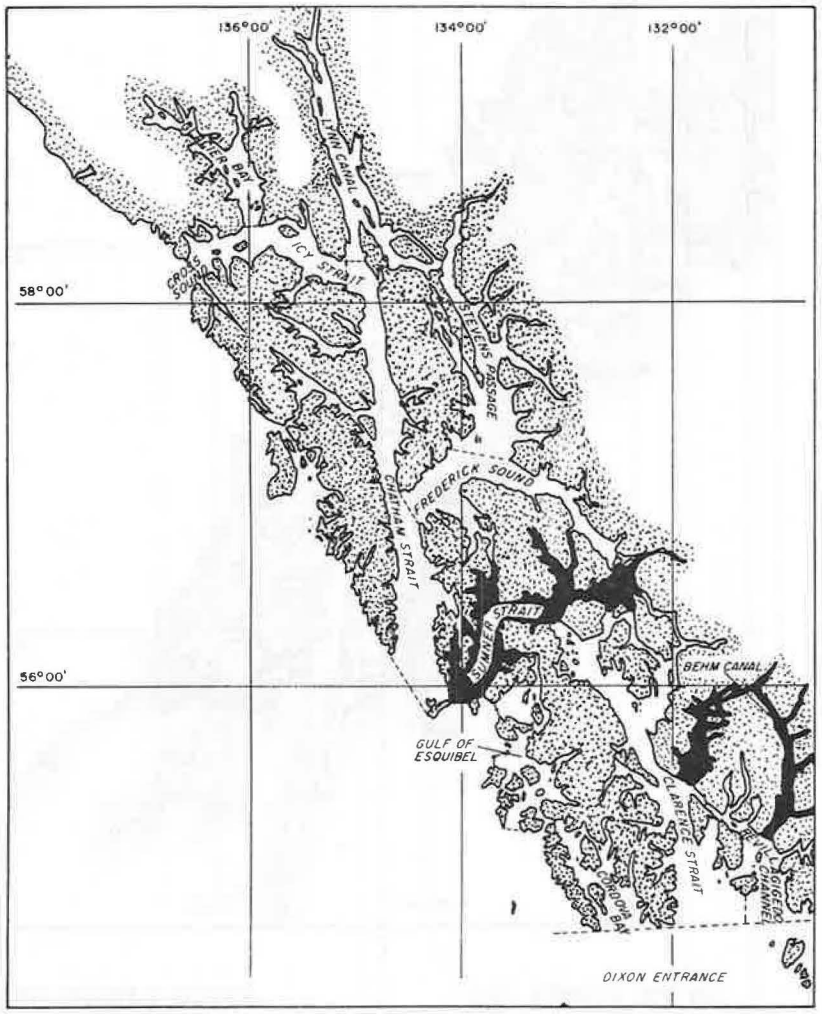
FLATHEAD SOLE
125 lbs/hr
12 inches
65% marketable

REX SOLE
55 lbs/hr
10 inches
38% marketable

POLLOCK
49 lbs/hr
9 inches
30% marketable

Sumner Strait
850 square miles

Behm Canal
375 square miles



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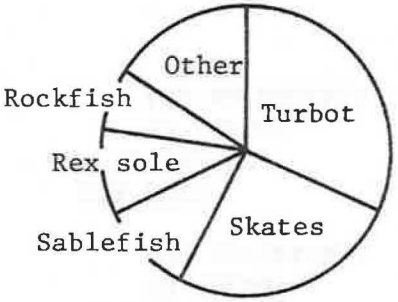

TURBOT
117 lbs/hr
20 inches
100% marketable

SKATES
94 lbs/hr

SABLEFISH
37 lbs/hr
22 inches
100% marketable

REX SOLE
33 lbs/hr
12 inches
56% marketable

RATFISH
26 lbs/hr

ROCKFISH
19 lbs/hr
No data

Figure 10--Groundfish species composition and pounds of fish caught per hour trawled during the spring of 1976 in the Sumner Strait and Behm Canal areas of S.E. Alaska. The average length of the fish in inches and the percentage of marketable-sized fish by number are shown.

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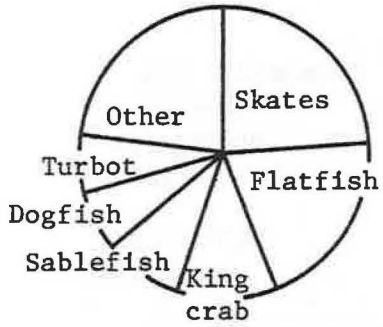


SKATES
81 lbs/hr

FLATFISH
67 lbs/hr

KING CRAB
36 lbs/hr

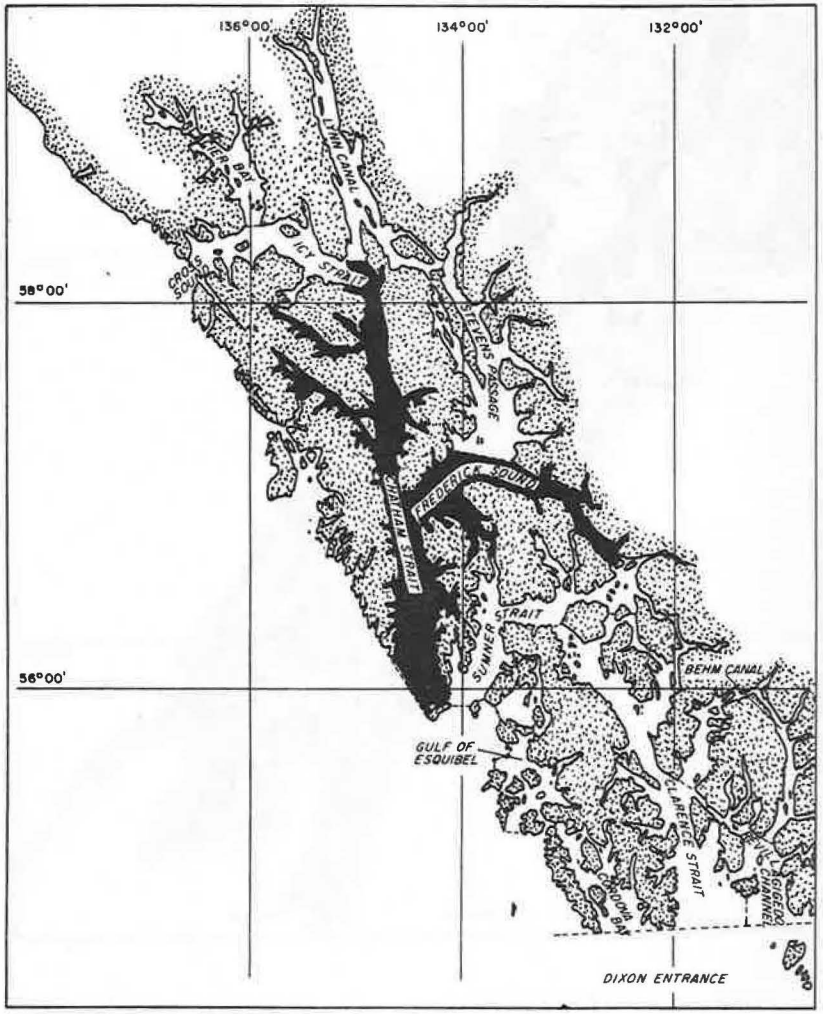
SABLEFISH
29 lbs/hr
25 inches
100% marketable

DOGFISH
22 lbs/hr

TURBOT
21 lbs/hr
17 inches
98% marketable

Chatham Strait
1525 square miles

Frederick Sound
775 square miles



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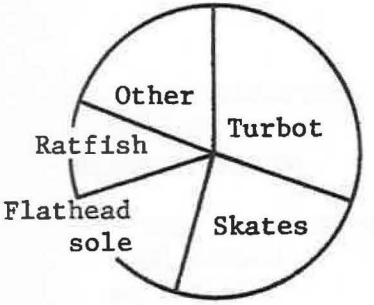

TURBOT
507 lbs/hr
17 inches
98% marketable

SKATES
392 lbs/hr

FLATHEAD SOLE
256 lbs/hr
13 inches
90% marketable

RATFISH
171 lbs/hr

KING CRAB
116 lbs/hr

REX SOLE
57 lbs/hr
11 inches
42% marketable

Figure 11--Groundfish species composition and pounds of fish and crab caught per hour trawled during the spring of 1976 in the Chatham Strait and Frederick Sound areas of S.E. Alaska. The average length of the fish in inches and the percentage of marketable-sized fish by number are shown.

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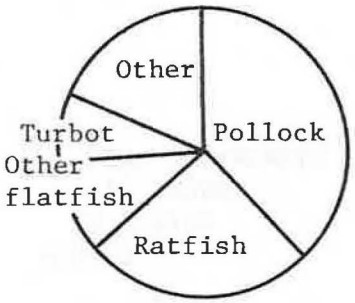

POLLOCK
1675 lbs/hr
19 inches
100% marketable

RATFISH
1122 lbs/hr

OTHER FLATFISH
451 lbs/hr
59% marketable

TURBOT
349 lbs/hr
17 inches
92% marketable

SKATES
273 lbs/hr

FLATHEAD SOLE
257 lbs/hr
12 inches
61% marketable

Gulf of Esquibel
450 square miles

Clarence Strait
1525 square miles

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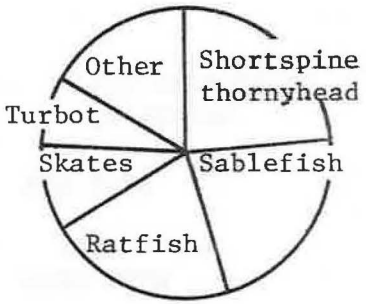

SHORTSPINE THORNYHEAD
124 lbs/hr
91% marketable

SABLEFISH
112 lbs/hr
25 inches
100% marketable

RATFISH
106 lbs/hr

SKATES
49 lbs/hr

TURBOT
40 lbs/hr
20 inches
100% marketable

OTHER FLATFISH
26 lbs/hr
79% marketable

Figure 12.--Groundfish species composition and pounds of fish caught per hour trawled during the spring of 1976 in the Gulf of Esquibel and Clarence Strait areas of S.E. Alaska. The average length of the fish in inches and the percentage of marketable-sized fish by number are shown.

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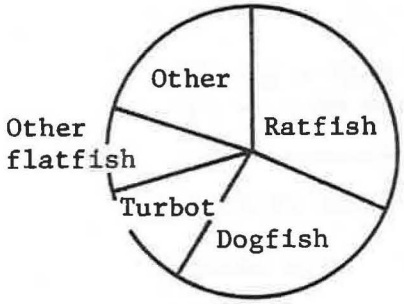


RATFISH
414 lbs/hr

DOGFISH
354 lbs/hr

TURBOT
160 lbs/hr
20 inches
99% marketable

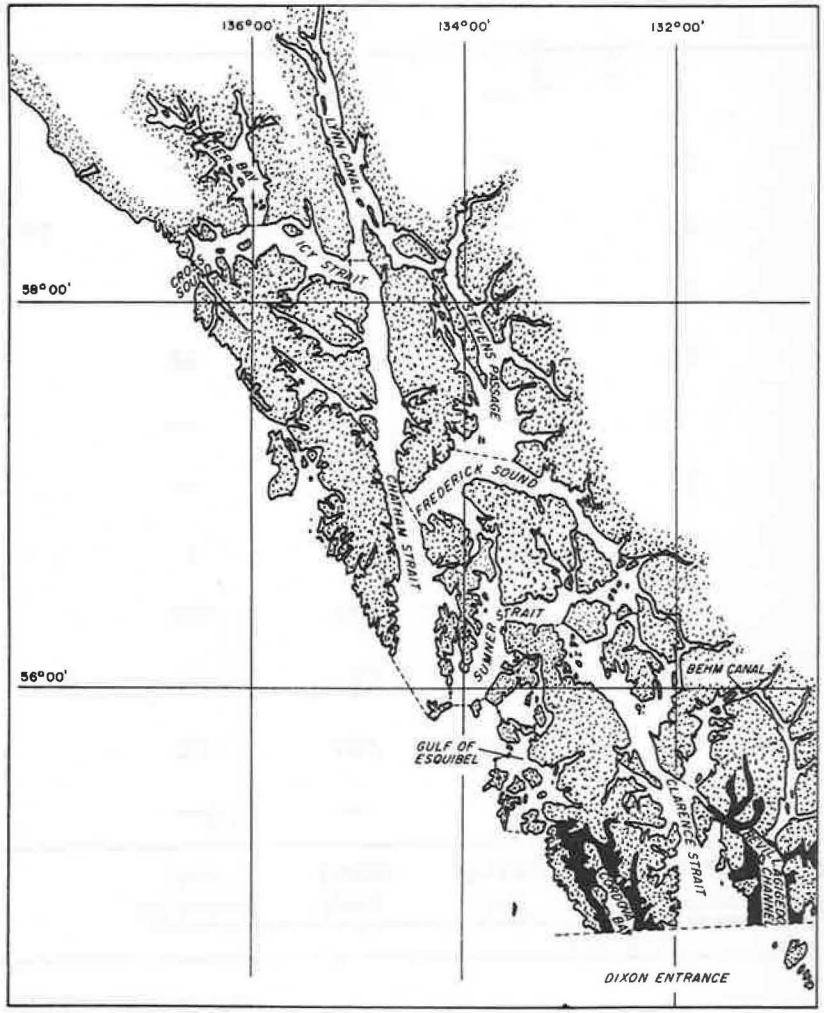
OTHER FLATFISH
131 lbs/hr
44% marketable

DOVER SOLE
87 lbs/hr
16 inches
98% marketable

SABLEFISH
77 lb/hr
26 inches
100% marketable

Cordova Bay
375 square miles

Revillagigedo Channel
500 square miles



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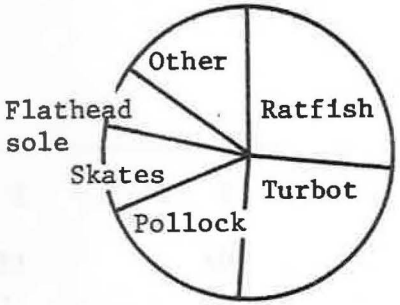


RATFISH
348 lbs/hr

TURBOT
306 lbs/hr
16 inches
89% marketable

POLLOCK
227 lbs/hr
11 inches
14% marketable

SKATES
130 lbs/hr

FLATHEAD SOLE
83 lbs/hr
11 inches
56% marketable

REX SOLE
58 lbs/hr
10 inches
70% marketable

Figure 13.--Groundfish species composition and pounds of fish caught per hour trawled during the spring of 1976 in the Cordova Bay and Revillagigedo Channel areas of S.E. Alaska. The average length of the fish in inches and the percentage of marketable-sized fish by number are shown.

Table 2.--Catch per unit of effort (lbs/hr), by area, for predominant species in the inside waters of southeastern Alaska, Lynn Canal to Dixon Entrance, John N. Cobb cruise, April-May 1976.

Species	AREA					
	Glacier Bay	Lynn Canal	Icy Strait	Stephens Passage	Chatham Strait	Frederick Sound
Ratfish	--[1]	--	--	63	--	171
Skates	78	137	248	260	81	392
Turbot	--	42	28	230	21	507
Pollock	26	326	93	22	8	42
Flathead sole	6	136	46	63	10	256
Sablefish	--	--	--	2	29	--
Dogfish	--	--	--	--	22	--
Tanner crab	99	116	191	73	11	28
Rex sole	1	12	2	32	(0)[2]	57
Shortspine thornyhead	2	--	--	18	16	1
Dover sole	--	--	--	12	19	(0)
Pacific cod	--	57	--	2	2	4

1/ -- = no catch
2/ (0) = CPUE less than 1 lbs/hr

Table 2.--(cont.)

Species	AREA						
	Sumner Strait	Behm Canal	Gulf of Esquibel	Clarence Strait	Cordova Bay	Revillagigedo Channel	Total
Ratfish	424	26	1,122	106	414	348	201
Skates	296	94	273	49	60	130	176
Turbot	171	117	349	40	160	306	175
Pollock	49	--[1]	1,675	1	40	227	148
Flathead sole	125	--	257	8	4	83	82
Sablefish	(0)	37	10	112	77	3	35
Dogfish	6	11	35	33	354	12	33
Tanner crab	40	8	23	2	(0)[2]	2	33
Rex sole	55	33	74	10	34	58	32
Shortspine thornyhead	--	11	--	124	12	43	29
Dover sole	2	4	14	17	86	4	15
Pacific cod	23	--	20	--	4	3	8

1/ -- = no catch
2/ (0) = CPUE less than 1 lbs/hr

Table 3.--Estimates of available biomass (metric tons), by area, for predominant species in the inside waters of southeastern Alaska, Lynn Canal to Dixon Entrance, John N. Cobb cruise, April-May, 1976.

Species	Area (and number of square nautical miles)					
	Glacier Bay (325)	Lynn Canal (500)	Icy Strait (500)	Stephens Passage (750)	Chatham Strait (1,525)	Frederick Sound (775)
Ratfish	--1/	--	--	1,097	--	3,132
Skates	582	1,577	2,847	4,471	2,850	6,964
Turbot	--	472	299	4,503	860	8,969
Pollock	194	3,696	922	403	284	728
Flathead sole	46	1,542	491	1,088	368	4,638
Sablefish	--	--	--	37	1,277	--
Dogfish	--	--	--	--	956	--
Shortspine thornyhead	16	--	--	344	650	18
Rex sole	4	132	21	632	13	1,030
Dover sole	--	--	--	264	842	5
Pacific cod	--	642	--	31	53	71

1/ -- = no catch

Table 3.--(cont.)

Species	Area (and number of square nautical miles)						
	Sumner Strait (850)	Behm Canal (375)	Gulf of Esquibel (450)	Clarence Strait (1,525)	Cordova Bay (375)	Revillagigedo Channel (500)	Total (8,450)
Ratfish	8,141	218	11,447	3,492	3,934	3,706	35,167
Skates	5,774	806	2,826	1,723	520	1,495	32,435
Turbot	3,361	995	3,566	1,325	1,410	3,255	29,015
Pollock	1,005	--	17,094	43	352	2,422	27,213
Flathead sole	2,574	--	2,715	291	31	888	14,672
Sablefish	5	317	108	3,738	743	34	6,259
Dogfish	126	96	367	1,062	3,107	120	5,834
Shortspine thornyhead	--	96	--	4,056	120	438	5,738
Rex sole	1,117	283	760	310	321	613	5,236
Dover sole	40	34	143	570	818	42	2,758
Pacific cod	460	--	206	--	41	34	1,538

marketable were 42 to 90 percent, respectively.

Rex sole.--The overall average CPUE for rex sole, the third most abundant flatfish, was 32 lbs/hr. The highest catch rates occurred in Frederick Sound, Sumner Strait, Gulf of Esquibel, and Revillagigedo Channel, where CPUEs were 57, 55, 74, and 58 lbs/hr, respectively. Rex sole in these areas were relatively small, with the average size being 10 and 11 inches, and the percentage marketable ranging from 38 to 70 percent.

Dover sole.--Dover sole was the fourth ranking flatfish in abundance, with an average CPUE of 15 lbs/hr. Cordova Bay had the highest catch rate (86 lbs/hr).

Roundfish and Rockfish

Walleye pollock.--In the inside waters, pollock was the most abundant roundfish species encountered, The average catch rate was 148 lbs/hr, with the highest catches being from Lynn Canal (326 lbs/hr), Gulf of Esquibel (1,675 lbs/hr), and Revillagigedo Channel (227 lbs/hr). In these three areas the average sizes of pollock and percentage marketable were 16 inches and 98 percent, 19 inches and 100 percent, and 11 inches and 14 percent, respectively.

Sablefish.--With an average CPUE of 35 lbs/hr, sablefish was the second most abundant roundfish taken. Catch rates were highest in Behm Canal (37 lbs/hr), Clarence Strait (112 lbs/hr), and Cordova Bay (77 lbs/hr). Average sizes of sablefish in these areas were 22, 25, and 26 inches, respectively.

Shortspine thornyhead.--The overall average catch rate of this rockfish in the inside waters was 29 lbs/hr. They were most abundant in Clarence Strait (125 lbs/hr), and Revillagigedo Channel (43 lbs/hr). In Clarence Strait, it was the most abundant species taken, and the average size was 14 inches, with 91 percent at marketable size.

Pacific cod.--Catches of Pacific cod in these waters were disappointingly low, with an average CPUE of only 8 lbs/hr. Lynn Canal had the highest catch rate with 57 lbs/hr, followed by Sumner Strait, and Gulf of Esquibel with 23 and 20 lbs/hr, respectively.

Elasmobranchs

Spiny dogfish.--The average CPUE for spiny dogfish in the inside waters was 33 lbs/hr. The highest catch rates occurred in Cordova Bay where 354 lbs/hr were taken. The abundance of spiny dogfish in the inside waters of southeastern Alaska increased to the south.

Skates.--Skates combined were the second most abundant species taken with an overall average catch rate of 176 lbs/hr. They were found in all areas, with the highest catch rates in Icy Strait, Stephens Passage, Frederick Sound, Sumner Strait, and Gulf of Esquibel where averages of 248, 260, 392, 296, and 273 lbs/hr, respectively, were taken. The overall average composition of the skate catches by species was the longnose skate, 43 percent; the black skate, 34 percent; and the big skate, 23 percent.

Chimaeras

Ratfish.--Ratfish were the most abundant species encountered in the inside waters, and they were found primarily in the areas south of

Frederick Sound. The highest average CPUE occurred in the Gulf of Esquibel (1,122 lbs/hr). Other areas of high ratfish abundance included Sumner Strait, Cordova Bay, and Revillagigedo Channel, with catch rates of 424, 414, and 348 lbs/hr, respectively.

Crabs

Tanner crab.--The average CPUE for Tanner crab was 33 lbs/hr with the higher catch rates in the northern areas. In Glacier Bay, Lynn Canal, Icy Strait, and Stephens Passage average CPUEs were 99, 116, 191, and 73 lbs/hr, respectively.

Red king crab.--Only in Glacier Bay, Chatham Strait, and Frederick Sound were king crab taken in significant numbers. Average catch rates in these areas were 19, 36, and 116 lbs/hr, respectively.

Other species.--Sidestripe shrimp and pink shrimp were caught in small quantitites in Glacier Bay, where average catches of sidestripe and pink shrimp were 16 and 5 lbs/hr, respectively.

Outside Waters of Southeastern Alaska (Cross Sound to Dixon Entrance)

The southeastern Alaska groundfish survey area of outside waters is shown in Figure 14. Eleven depth strata were assigned to this area, and 22 valid hauls were completed in the nine trawlable strata. No trawlable bottom could be located in strata 86 or 91, and bottom conditions throughout most of the survey area again were generally rough and hard.

Figures 15-19 summarize the average catch rates of predominant species, and for selected species, the average size and percentage of marketable individuals taken in each strata. Catch rates in general were much higher than those from both the outside waters from Yakutat to Cross Sound,

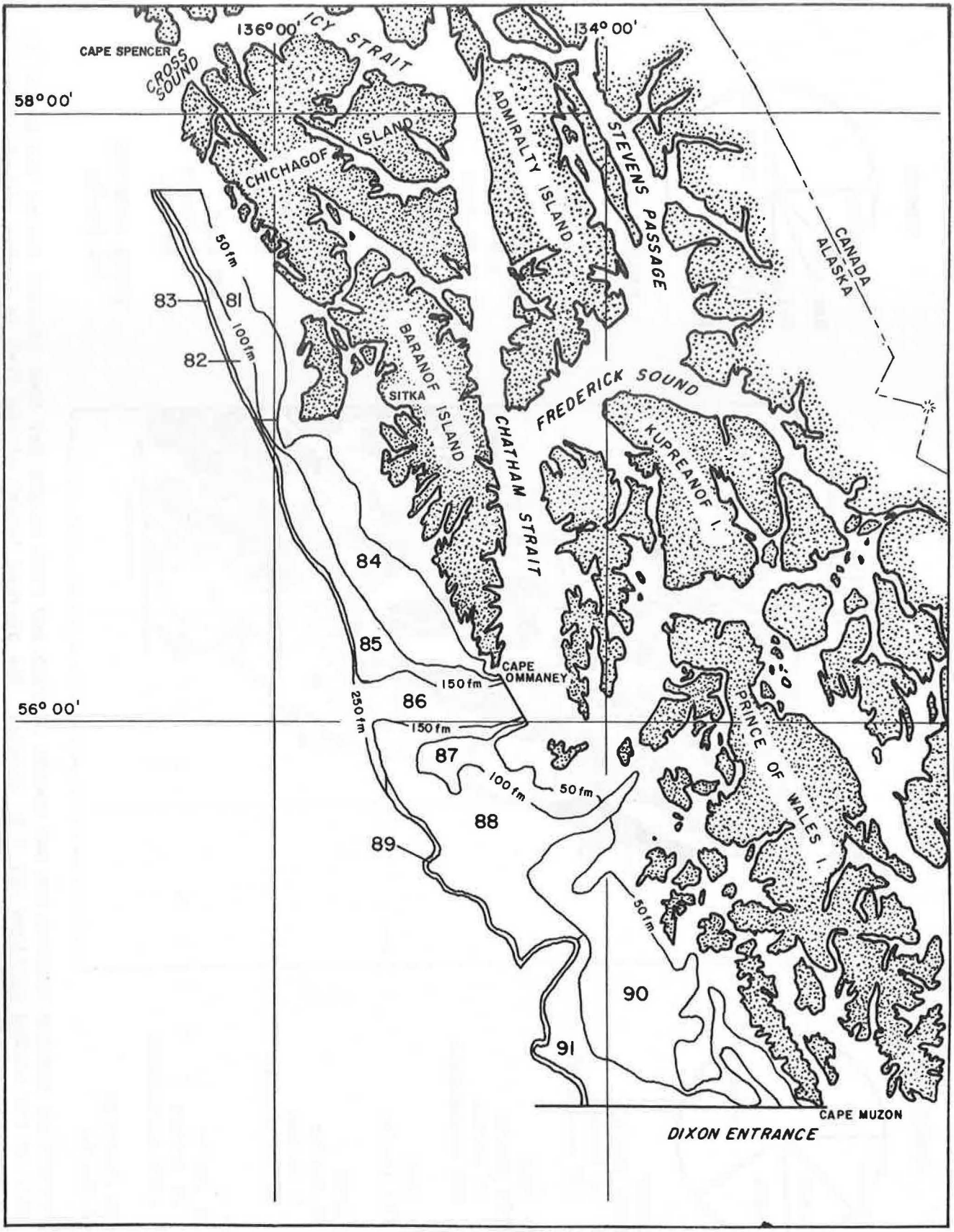
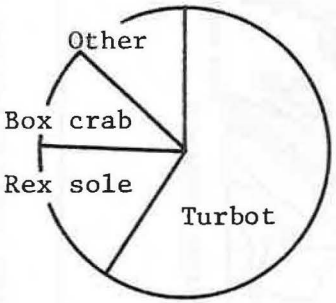


Figure 14.--Area covered in the groundfish survey of the outside waters of southeastern Alaska, John N. Cobb cruise, July-August 1977.

SUMMER



TURBOT
978 lbs/hr
10 inches
22% marketable

REX SOLE
275 lbs/hr
13 inches
88% marketable

BOX CRAB
192 lbs/hr

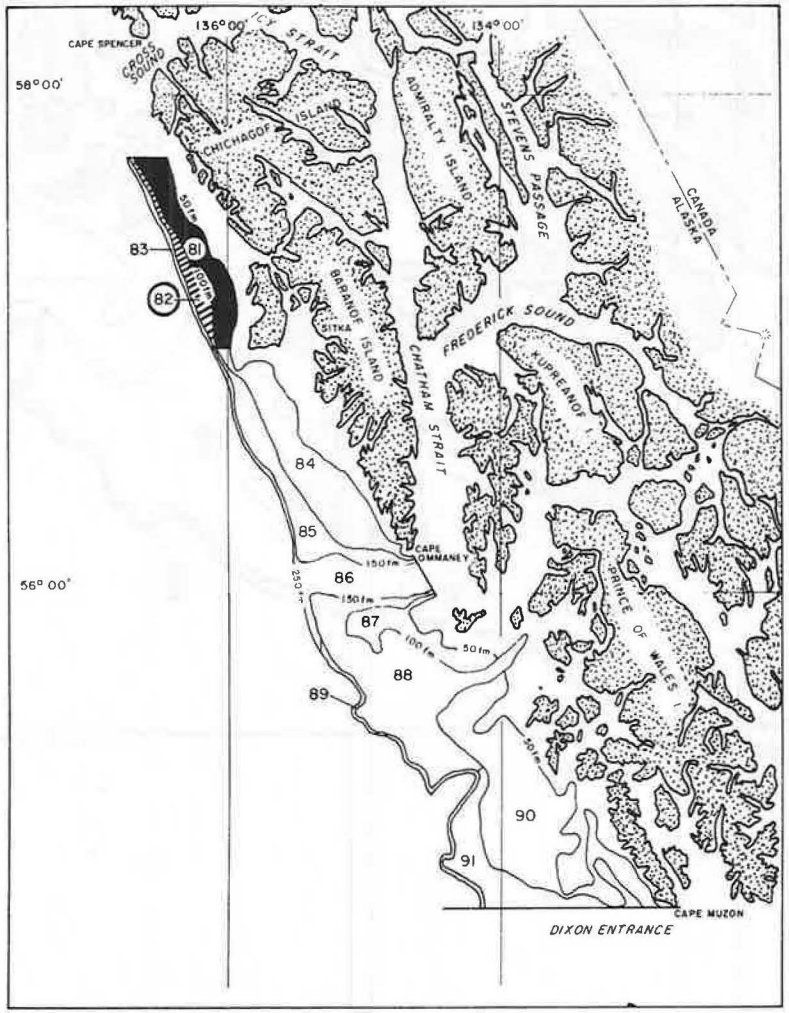
POLLOCK
65 lbs/hr
8 inches
0% marketable

COD
63 lbs/hr
21 inches
100% marketable

OTHER FLATFISH
60 lbs/hr

Stratum 81
51-100 fms
294 square miles

Stratum 82
101-150 fms
75 square miles



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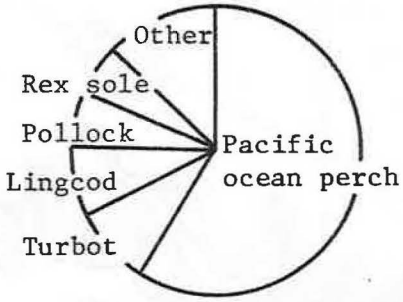


PACIFIC OCEAN PERCH
2818 lbs/hr
12 inches
97% marketable

TURBOT
429 lbs/hr
No data

LINGCOD
391 lbs/hr
100% marketable

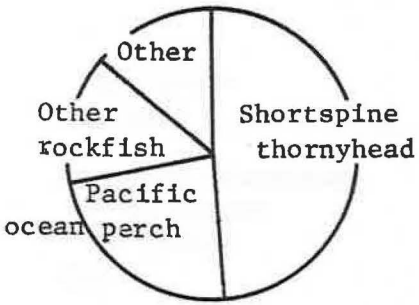
POLLOCK
272 lbs/hr
16 inches
100% marketable

REX SOLE
265 lbs/hr
No data

OTHER ROCKFISH
195 lbs/hr

Figure 15.--Groundfish species composition and pounds of fish and crab caught per hour trawled during the summer of 1977 in the shaded portions off S.E. Alaska. The average length of the fish in inches and the percentage of marketable-sized fish by number are shown.

SUMMER



SHORTSPINE THORNYHEAD
654 lbs/hr
No data

PACIFIC OCEAN PERCH
312 lbs/hr
12 inches
83% marketable

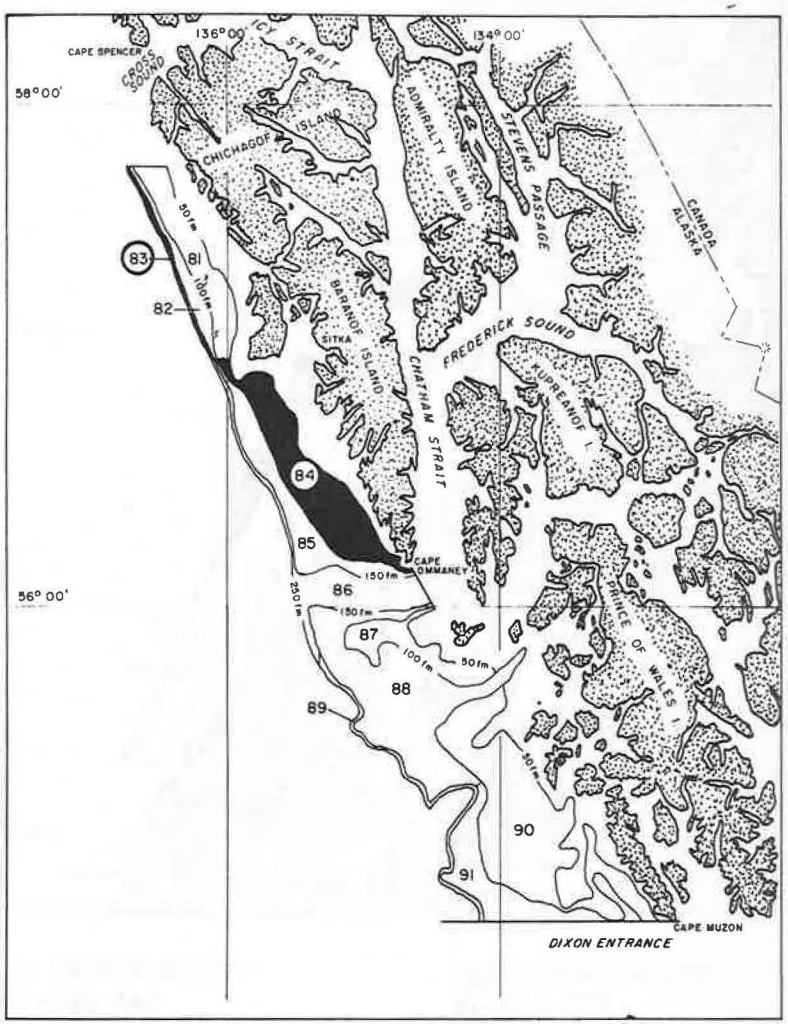
OTHER ROCKFISH
191 lbs/hr
No data

DOVER SOLE
131 lbs/hr
No data

TURBOT
40 lbs/hr
No data

Stratum 83
151-250 fms
42 square miles

Stratum 84
51-100 fms
604 square miles



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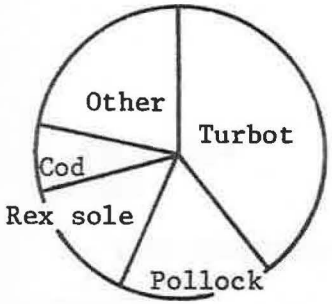


TURBOT
988 lbs/hr
No data

POLLOCK
439 lbs/hr
15 inches
92% marketable

REX SOLE
356 lbs/hr
No data

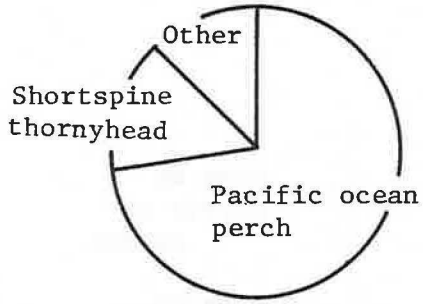
COD
182 lbs/hr
20 inches
97% marketable

OTHER FLATFISH
140 lbs/hr
100% marketable

FLATHEAD SOLE
126 lbs/hr
No data

Figure 16.--Groundfish species composition and pounds of fish caught per hour trawled during the summer of 1977 in the shaded portions off S.E. Alaska. The average length of the fish in inches and the percentage of marketable-sized fish by number are shown.

SUMMER



PACIFIC OCEAN PERCH
1167 lbs/hr
12 inches
69% marketable

SHORTSPINE THORNYHEAD
244 lbs/hr
No data

TURBOT
69 lbs/hr
No data

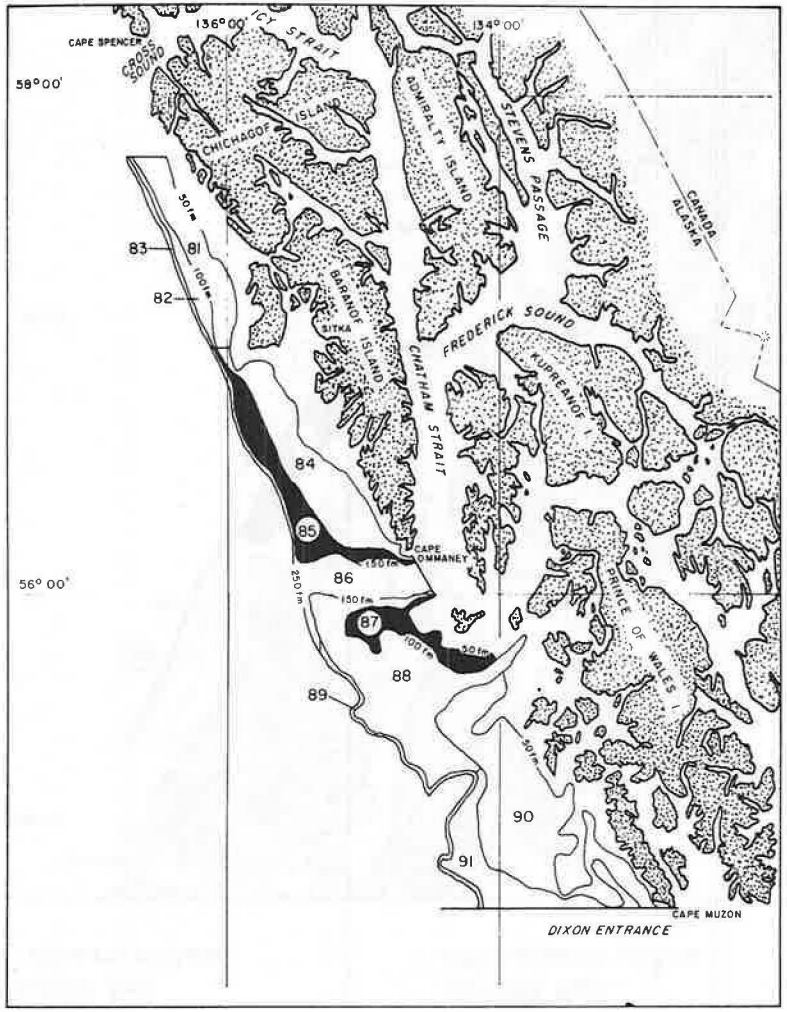
DOVER SOLE
48 lbs/hr
No data

COD
39 lbs/hr
21 inches
100% marketable

REX SOLE
23 lbs/hr

Stratum 85
101-150 fms
311 square miles

Stratum 87
51-100 fms
202 square miles



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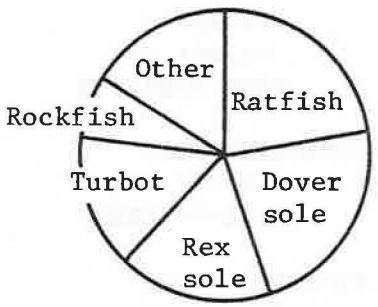


RATFISH
391 lbs/hr

DOVER SOLE
366 lbs/hr
No data

REX SOLE
301 lbs/hr
No data

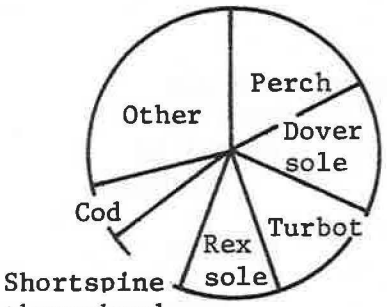
TURBOT
259 lbs/hr
No data

ROCKFISH
114 lbs/hr
100% marketable

SKATES
101 lbs/hr

Figure 17.--Groundfish species composition and pounds of fish caught per hour trawled during the summer of 1977 in the shaded portions off S.E. Alaska. The average length of the fish in inches and the percentage of marketable-sized fish by number are shown.

SUMMER



PACIFIC OCEAN PERCH
173 lbs/hr
12 inches
55% marketable

DOVER SOLE
149 lbs/hr
No data

TURBOT
129 lbs/hr
No data

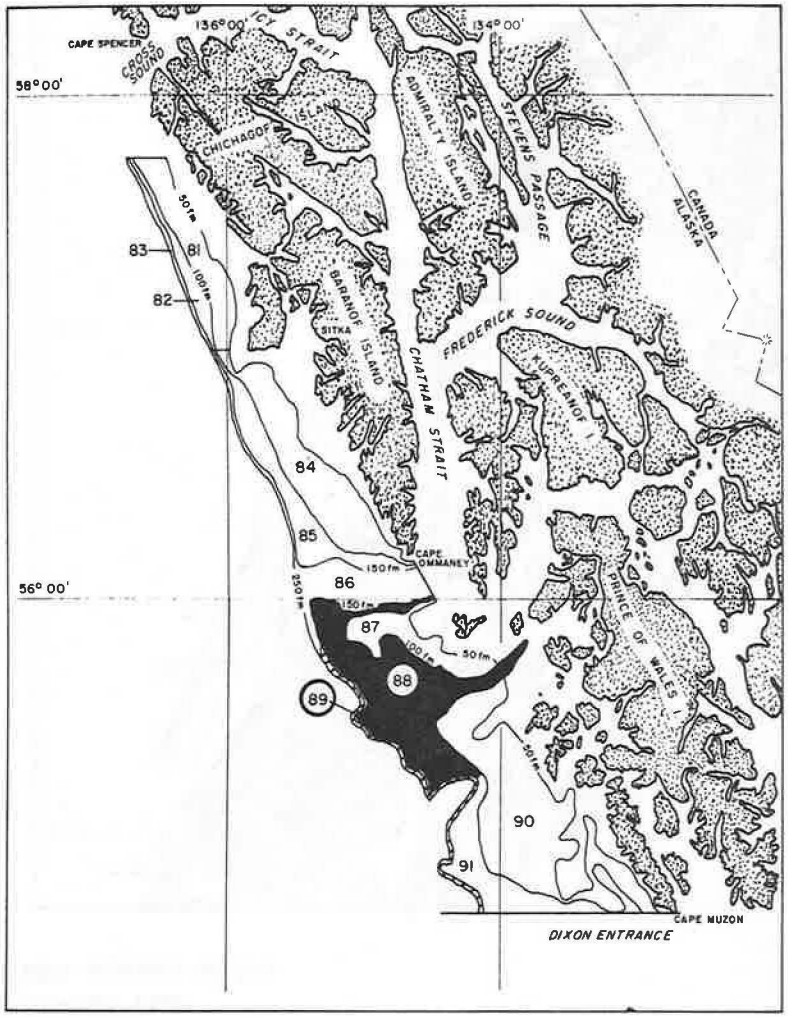
REX SOLE
112 lbs/hr
No data

SHORTSPINE THORNYHEAD
89 lbs/hr
No data

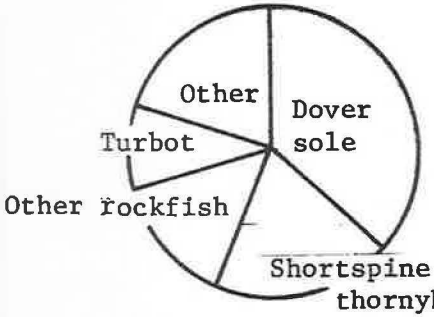
COD
59 lbs/hr
20 inches
98% marketable

Stratum 88
101-150 fms
912 square miles

Stratum 89
151-250 fms
70 square miles



SUMMER



DOVER SOLE
382 lbs/hr
No data

SHORTSPINE THORNYHEAD
210 lbs/hr
No data

OTHER ROCKFISH
151 lbs/hr
No data

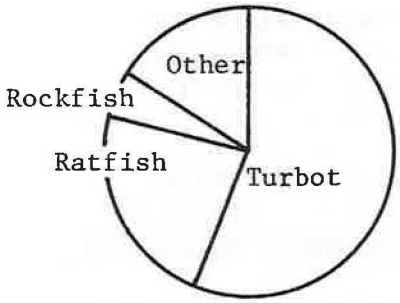
TURBOT
103 lbs/hr
No data

REX SOLE
89 lbs/hr
No data

SABLEFISH
48 lbs/hr
100% marketable

Figure 18.--Groundfish species composition and pounds of fish caught per hour trawled during the summer of 1977 in the shaded portions off S.E. Alaska. The average length of the fish in inches, and the percentage of marketable-sized fish by number are shown.

SPRING



Stratum 90
51-100 fms
986 square miles

TURBOT
1810 lbs/hr
No data

RATFISH
747 lbs/hr

ROCKFISH
161 lbs/hr
No data

HALIBUT
134 lbs/hr
29 inches

REX SOLE
88 lbs/hr
No data

POLLOCK
56 lbs/hr
13 inches
62% marketable

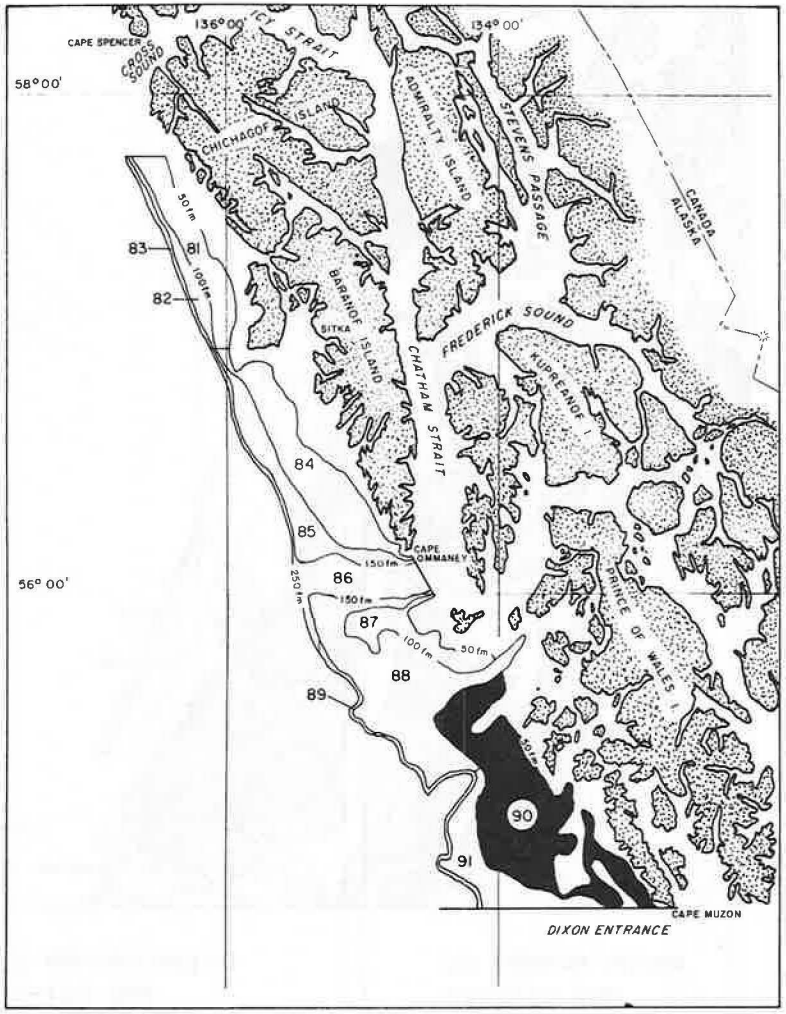


Figure 19.--Groundfish species composition and pounds of fish caught per hour trawled during the summer of 1977 in the shaded portion off S.E. Alaska. The average length of the fish in inches and the percentage of marketable-sized fish by number are shown.

and the inside waters of southeastern Alaska. Table 4 shows the average catch rates of predominant species by depth intervals, and also the estimates of exploitable biomass.

Flatfish

Turbot.--Turbot was by far the most abundant species taken in the outside waters of southeastern Alaska with an average CPUE of 752 lbs/hr. Stratum 90 had the highest catch rate (1,810 lbs/hr), followed by strata 81, 82, 84, and 87 with catch rates of 978, 429, 988, and 259 lbs/hr, respectively. By depth turbot were most abundant in the 51-100 fm interval (1,368 lbs/hr), followed by 150 lbs/hr in the 101-150 fm depth interval.

Rex sole.--Average catch rates of 143 lbs/hr for rex sole made it the second most abundant flatfish in this area. Catch rates were highest in strata 81, 82, 84, and 87 where 275, 265, 356, and 301 lbs/hr, respectively, were taken. By depth the highest catch rates occurred in 51-100 fm (190 lbs/hr), followed by 101-150 fm (109 lbs/hr).

Dover sole.-- Dover sole was the third most abundant flatfish, with an overall average CPUE of 104 lbs/hr. Catch rates were highest in strata 83, 87, 88, and 89 with average catch rates of 131, 366, 149, and 382 lbs/hr, respectively. Catch rates increased by depth from 65 lbs/hr at 51-100 fm, to 120 lbs/hr at 101-150 fm, and 256 lbs/hr at 151-250 fm.

Roundfish and Rockfish

Pacific ocean perch.--In this area Pacific ocean perch were the most abundant species in the roundfish-rockfish group, and was second in total abundance only to turbot. The average CPUE was 300 lbs/hr, and in strata

Table 4.--Mean catch per unit of effort (lbs/hr) and estimates of exploitable biomass (metric tons x 1,000), by depth interval, for predominant species in the outside waters of southeastern Alaska (Cross Sound to Dixon Entrance), John N. Cobb cruise, July-August 1977.

	Depth intervals (in fathoms) and (area in square nautical miles)							
	51-100 (2,086)		101-150 (1,298)		151-250 (112)		51-250 (3,496)	
Species	lb/h	mt (x 1000)	lb/h	mt (x 1000)	lb/h	mt (x 1000)	lb/h	mt (x 1000)
Turbot	1,368	65.1	150	4.6	71	0.2	752	69.9
Pacific ocean perch	7	0.3	688	24.1	170	0.5	300	24.9
Ratfish	463	21.0	29	0.8	--[1]	--	242	21.8
Rex sole	190	9.1	109	3.2	44	0.1	143	12.4
Dover sole	65	3.1	120	3.6	256	0.7	104	7.7
Pollock	128	5.8	66	1.8	1	0.0[2]	91	7.5
Other rockfishes[3]	96	4.6	70	2.1	157	0.4	91	7.1
Shortspine thornyhead	--	--	114	4.3	432	1.3	86	5.6
Pacific cod	78	3.7	55	1.6	--	--	62	5.4
Skates	26	1.2	29	0.9	22	0.0	27	2.2

1/ -- = no catch
2/ 0.0 = biomass less than 100 (metric tons) mt
3/ Bocaccio; yelloweye rockfish; redbanded rockfish; rougheye rockfish; silvergray rockfish; darkblotched rockfish; and redstripe rockfish.

82 and 85 the catch rates were 2,818 and 1,167 lbs/hr, respectively. Both of these highest catches were in the 101-150 fm depth interval. The next highest catches occurred in the 151-250 fm interval (170 lbs/hr).

Walleye pollock.--With an overall average catch rate of 91 lbs/hr, pollock was the second most abundant of the roundfish-rockfish species. Highest catch rates occurred in stratum 82 (272 lbs/hr), and stratum 84 (439 lbs/hr). Pollock catch rates decreased with depth from an average catch rate of 128 lbs/hr at 51-100 fm, to 66 lbs/hr at 101-150 fm, to only 1 lbs/hr at 151-250 fm. Average size ranged from 8 and 15 inches in 51-100 fm, to 13 and 16 inches in the 101-150 fm depth interval.

Other rockfish.--Other rockfishes combined had an average catch rate of 91 lbs/hr (the same as pollock). They included, in order of abundance, boccacio, yelloweye rockfish, redbanded rockfish, rougheye rockfish, silvergray rockfish, dark-blotched rockfish, and the redstripe rockfish. The highest catch rates of these rockfishes occurred in strata 82, 83, 87, 89, and 90 with average catch rates of 195, 191, 114, 124, and 151 lbs/hr, respectively. They were most abundant in the 151-250 fm depth interval where the catch rate was 157 lbs/hr.

Shortspine thornyhead.--Catch rates of this rockfish averaged 86 lbs/hr, just less than those of pollock and other rockfish. Highest catch rates were in stratum 83 (654 lbs/hr), followed by strata 85 and 89 with 244 and 210 lbs/hr, respectively, but they were not found in the 51-100 fm depth interval. Average catch rates increased with depth from 114 lbs/hr at 101-150 fm, to 432 lbs/hr at 151-250 fm.

Pacific cod.--The average catch rate of Pacific cod in this area was 62 lbs/hr, with the highest catch rates occurring in strata 81, 82, 84, 88, and 90 at 63, 59, 182, 59, and 54 lbs/hr respectively. Catch rates of Pacific cod decreased with depth from 78 lbs/hr at 51-100 fm, to 55 lbs/hr at 101-150 fm, with no cod taken in the 151-250 fm depth interval.

Elasmobranchs

Skates.--The average catch rate for all species of skates combined in these outside waters was 27 lbs/hr. The highest catch rate occurred in stratum 87 (101 lbs/hr). By depth interval their CPUEs were relatively equal (26, 29, and 22 lbs/hr) at 51-100, 101-150, and 151-250 fm, respectively. In this area the composition of skates by species was the big skate, 60 percent; the longnose skate, 39 percent; and the black skate, 1 percent.

Chimaeras

Ratfish.--Ratfish were the third most abundant species in these outside waters, having a total average catch rate of 242 lbs/hr. The largest catch rates came from the 51-100 fm depth interval (463 lbs/hr) and then dropped sharply to 29 lbs/hr in 101-150 fm, with no ratfish being taken in the 151-250 fm depth interval. Catch rates were greatest in strata 87 and 90 where 391 and 747 lbs/hr averages were taken.

Other Species

Only three other species made up a significant portion of the catch in any of the strata in this area. Box crabs were taken in stratum 81 (192 lbs/hr). In stratum 82, lingcod catch rates averaged 391 lbs/hr.

Pacific halibut averaging 19 inches in length were caught in stratum 90 (134 lbs/hr).

OTHER RECENT EXPLORATORY FISHING EFFORTS WITHIN THE EASTERN GULF AND SOUTHEASTERN ALASKAN WATERS

Large catches of pollock were made in certain areas during a joint NMFS-industry exploratory fishing cruise performed by the fishing vessel Ocean Leader from June 18 to July 1, 1976. This survey, using bottom and midwater trawls, ranged from Icy Bay to Cape Ommaney in the outside waters and the waters of Chatham Strait, Frederick Sound, and Seymour Canal. Depths fished ranged from 14 to 153 fm (Figure 20).

Table 5 summarizes the results of 36 trawl hauls performed during that cruise.

Between Icy Bay and Yakutat along the 62-fm curve, 10,000 lb of pollock were taken in a 1-hour tow (haul 16), and south of Cape Fairweather in 41 fm, 5,000 lb of pollock were captured in 1.3 hr (haul 26). Both of these catches were taken with 107 ft high-opening Norwegian bottom trawls (Table 5).

Inside, Stephens Passage yielded 2,500 lbs/hr of pollock (haul 30) which averaged 17 inches in length. Seymour Canal was by far the most productive area with pollock catch rates ranging from 1,750-28,000 lbs/hr (hauls 31-36). A total of 172,000 lb of pollock were taken in six tows. The average catch rate for two tows (hauls 31 and 32) made with the "Bas" Norwegian midwater net was 4,900 lbs/hr, and four tows (hauls 33-36) with a modified Norwegian midwater capelin net yielded 17,500 lbs/hr of pollock (Table 5).

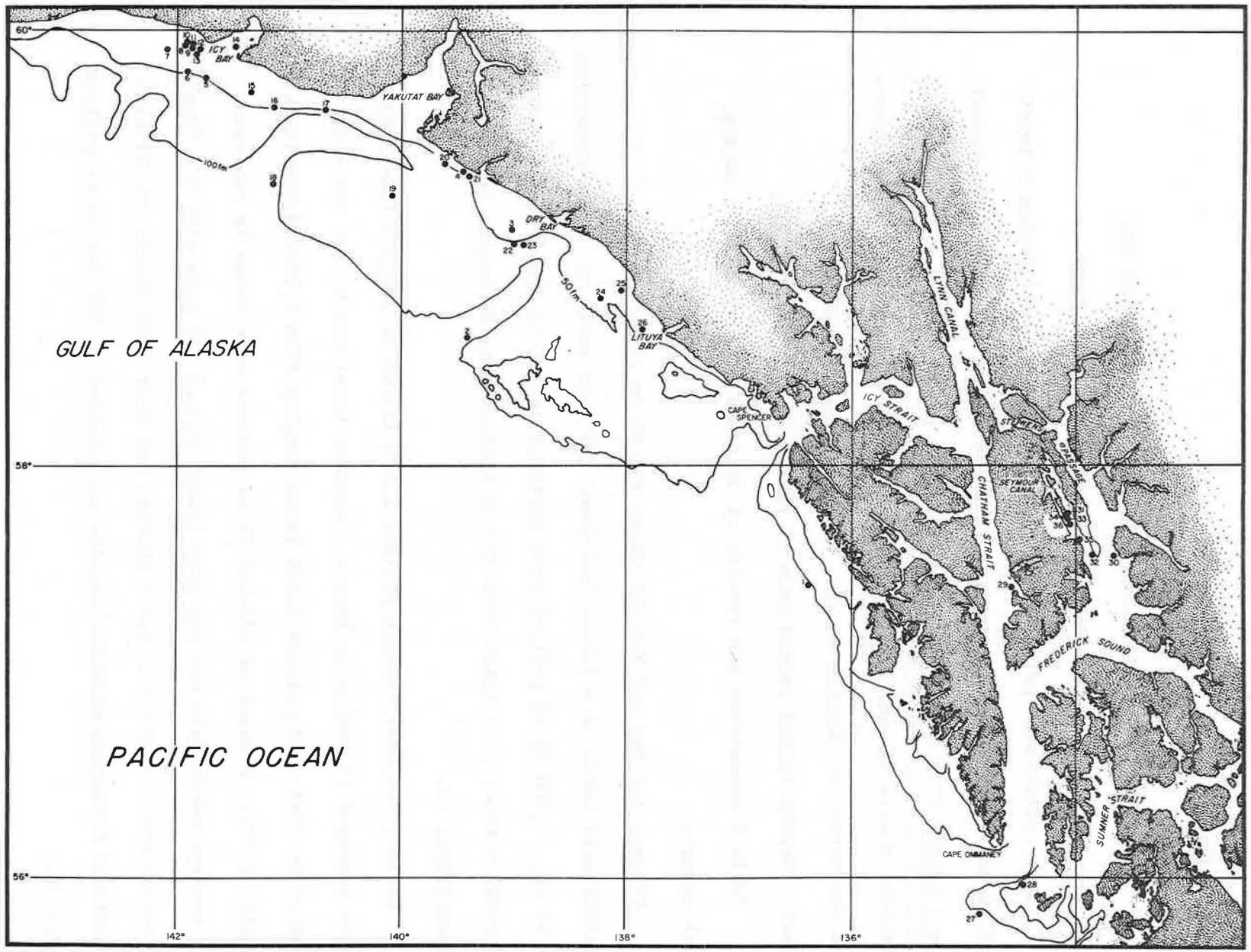


Figure 20.--Locations of bottom and midwater tows made in Alaskan waters during the Ocean Leader cruise, June-July 1976.

Table 5.--Summary of catches and mean lengths of fish taken during explorations by the F/V Ocean Leader in southeastern Alaska during June 1976.

Haul no.	Lat. N Long. W	Gear depth (fm.)	Time towed (hr.)	Gear type*	Catch (lb) and mean length (inches)					
					Pollock	Pacific cod	Ocean perch	Starry flounder	Turbot	Others
1	57°26' 136°24'	95	1.8	1	150	--	50	--	--	--
2	58°35' 139°24'	135	0.8	2	10	25	--	--	100	Redstripe rockfish-20
3	59°06' 139°01'	28	1.5	2	--	800	--	--	200	Butter sole-400 English sole-150
4	59°22' 139°27'	26	0.8	2	--	--	NET TORN	--	--	Halibut-30 King salmon-25
5	59°46' 141°44'	20	0.5	2	50	50	--	50 (16 in)	--	Butter sole-75
6	59°48' 141°51'	25	0.5	2	1,200	--	--	--	--	--
7	59°54' 142°06'	16	0.6	2	--	--	--	--	--	Halibut-100 Tanner crab-70
8	59°56' 141°56'	14	0.8	2	--	--	--	1,500	--	--
9	59°55' 141°52'	16	0.8	2	--	--	--	3,700 (18 in)	--	--
10	59°58' 141°54'	15	0.3	3	--	--	--	150	--	--
11	59°56' 141°51'	15	0.5	3	--	--	--	50	--	--
12	59°54' 141°48'	14	0.2	3	--	--	--	100	--	--
13	59°53' 141°50'	16	0.7	3	--	--	--	50	--	--
14	59°55' 141°29'	37	0.5	4	--	No catch - Hauled early			--	--
15	59°43' 141°21'	35	1.0	4	--	500 (22 in)	--	--	--	Halibut-300
16	59°39' 141°08'	62	1.0	4	10,000	--	--	--	--	Flathead sole 2,000-(13 in)
17	59°38' 140°41'	41	1.1	2	1,200	300	--	--	--	Halibut-150

Table 5.--(continued)

Haul no.	Lat. N Long. W	Gear depth (fm.)	Time towed (hr.)	Gear type*	Catch (lb) and mean length (inches)					
					Pollock	Pacific cod	Ocean perch	Starry flounder	Turbot	Others
18	59°18' 141°10'	153	1.0	2a	--	--	300 (14 in)	--	--	Rex sole-300
19	59°15' 140°05'	70	0.7	2a	--	--	--	100	--	Halibut-40
20	59°23' 139°38'	31	1.0	2a	2,500	200	--	--	50	Halibut-200
21	59°20' 139°24'	14	1.7	4a	--	150	--	--	300 (16 in)	Tanner crab-800 Dungeness-600
22	59°02' 139°01'	47	0.8	3	--	--	--	--	--	Flathead sole-75 Scallops-800
23	59°01' 138°53'	48	1.9	3	--	--	--	--	--	Scallops-300
24	58°46' 138°14'	48	0.2	3	--	No catch - hung up			--	--
25	58°49' 138°03'	20	0.5	4	--	No catch - hung up			--	--
26	58°38' 137°51'	41	1.3	4	5,000 18	500 (22 in)	--	--	--	Scallops-300
27	55°49' 134°52'	103	1.4	4a	--	No catch - hung up			--	--
28	55°55.5' 134°28'	45	5.0	1	1,000 (17 in)	--	--	80 (14 in)	--	--
29	57°25.5' 134°34.5'	50	1.0	1	550 (17 in)	--	--	15	--	--
30	57°34.5' 133°39.5	55	1.6	1	4,000 (17 in)	--	--	45	--	--
31	57°46' 134°04'	50	2.5	1	25,000 (17 in)	--	--	10	--	--
32	57°34.5' 133°51'	55	4.0	1	7,000 (17 in)	--	Hung up	--	--	--
33	57°43' 133°03'	40	2.5	5	70,000 (17 in)	--	--	--	--	--
34	57°45.5' 134°05'	42	1.5	5	30,000 (17 in)	--	--	--	--	--

Table 5.--(continued)

Haul no.	Lat. N Long. W	Gear depth (fm.)	Time towed (hr.)	Gear type*	Catch (lb) and mean length (inches)					
					Pollock	Pacific cod	Ocean perch	Starry flounder	Turbot	Others
35	57°38.5' 133°58'	46	2.0	5	25,000 (17 in)	200 (14 in)	--	--	--	--
36	57°45.5' 134°05'	40	2.0	5	15,000 (17 in)	--	--	--	--	--

*Gear type: 1) "Bas" Norwegian midwater net - Karm doors
2) Norwegian (107-ft footrope) bottom trawl - Karm doors 2a) Added 102-ft tickler chain
3) Beam trawl
4) Norwegian (107-ft footrope) bottom trawl - 6 x 9 ft V-doors 4a) Added 102-ft tickler chain
5) Modified Norwegian midwater capelin net - Karm doors

In August 1977, the John N. Cobb made a 20-day exploratory trawl survey of groundfish resources of inside waters of southeastern Alaska, covering scattered locations from the Gulf of Esquibel to Zimovia Strait and northward in Tenakee Inlet (Figure 21). Fishing was limited mostly to small bays and channels where trawlable bottom was located.

Nets employed were 400-mesh Eastern otter trawls, one with a 1¼-inch codend liner, and one modified Eastern trawl without a liner.

This cruise was highlighted by a number of catches that indicated the possible presence of commercially-significant quantities of fish. Table 6 summarizes the largest catches consisting of pollock and flatfish.

Promising catches of pollock were made in Sea Otter Sound, Davidson Inlet, and Pybus Bay. Catches of flatfish were best in El Capitan Passage, Shipley Bay, Shakan Strait, and Pybus and Hood Bays.

DISCUSSION AND SUMMARY

The results of John N. Cobb cruises in 1976-77 indicate that the abundance of commercially-important bottomfish species was low in the eastern Gulf of Alaska and both the inside and outside waters of southeastern Alaska during the spring and summer, relative to western Gulf of Alaska areas previously surveyed.

In the eastern Gulf of Alaska from Yakutat to Cross Sound, catch rates were extremely low. The John N. Cobb's survey indicated turbot was the predominant species in this area (159 lbs/hr), followed by flathead sole (98 lbs/hr), and skates (62 lbs/hr).

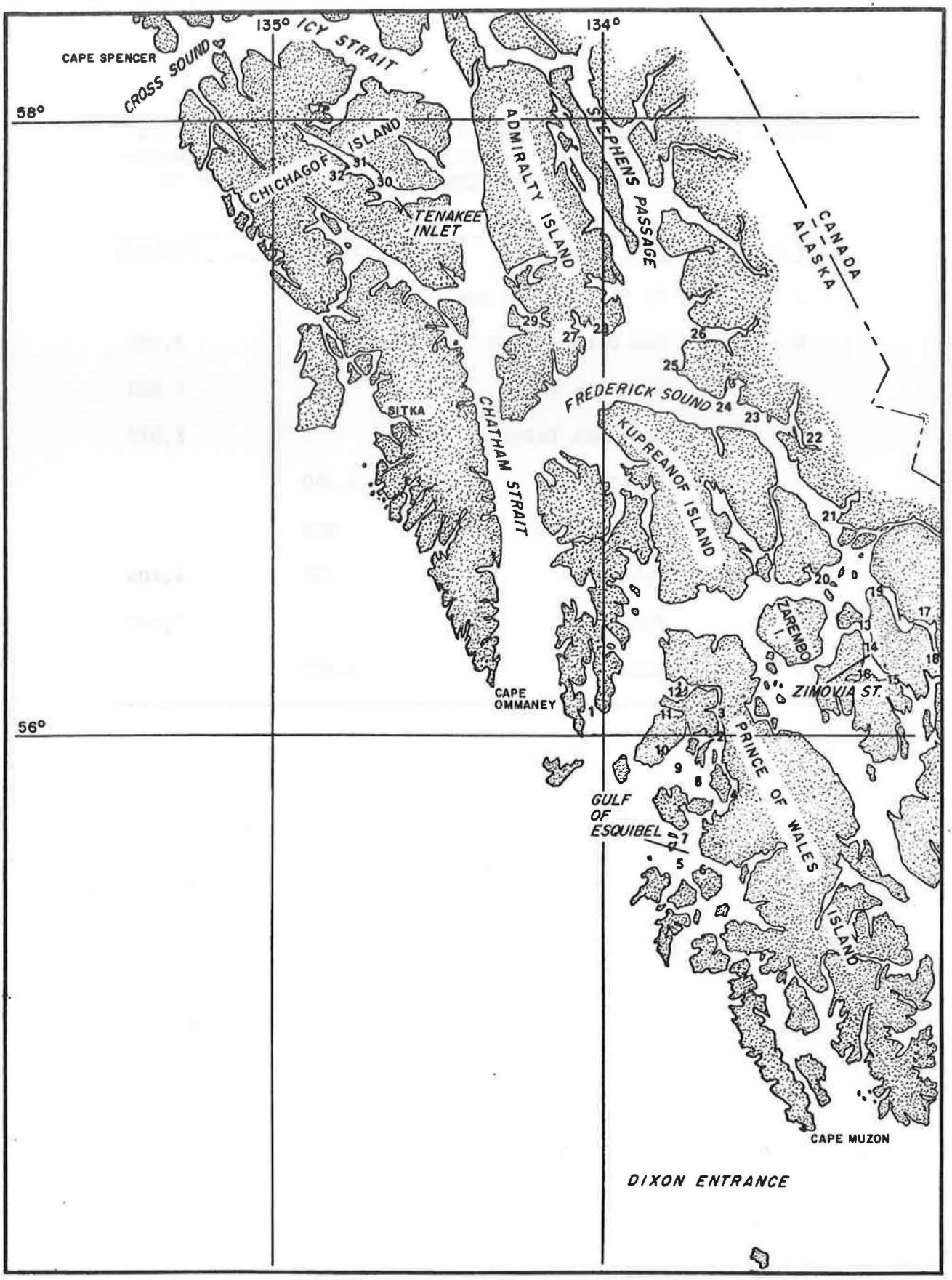


Figure 21.--Distribution of bottom tows made in southeastern Alaska waters by the John N. Cobb in August 1977. Drag numbers indicate individual tows, and those with the highest catches are shown in Table 6.

Table 6.--Location and catch per unit effort (lbs/hr) of the most important catches of groundfish made in southeast Alaska by the John N. Cobb in the summer of 1977.

Haul no.	Location	Flatfish	Pollock
2	El Capitan Passage	1,779	
8	Sea Otter Sound		3,294
9	Davidson Inlet		4,808
10	Davidson Inlet		8,372
11	Shipley Bay	3,390	
12	Shakan Strait	948	
27	Pybus Bay	900	1,706
28	Pybus Bay		3,440
29	Hood Bay	3,800	

The demersal trawl survey of southeastern Alaska showed ratfish to be the predominant species with an average catch rate of 201 lbs/hr, followed by skates (176 lbs/hr), turbot (175 lbs/hr), pollock (148 lbs/hr), and flathead sole (82 lbs/hr). Best catches occurred in the Gulf of Esquibel area, followed by Frederick Sound and Revillagigedo Channel.

The outside waters of southeastern Alaska appear to have greater resources than the eastern Gulf area (Yakutat to Cross Sound) or the inside waters of southeastern Alaska.

Turbot was the predominant species in outside waters of southeastern Alaska with an overall average catch rate of 752 lbs/hr, followed by Pacific ocean perch (300 lbs/hr), ratfish (242 lbs/hr), rex sole (143 lbs/hr), and Dover sole (104 lbs/hr).

In the summer of 1976, the commercial fishing vessel, Ocean Leader, found no substantial fish concentrations in the coastal waters of the survey area. In the inside waters, a large concentration of pollock was found in Seymour Canal. These fish were in midwater and schooled at 30-60 fm depths where bottom depth was 65-100 fms.

CONCLUSIONS

Groundfish abundance in the eastern Gulf and southeastern Alaskan areas was very low, and in many sampling areas catches were dominated by ratfish, turbot, skates, and other species of little or no commercial value. Many areas would probably support profitable small vessel trawl fisheries or longline fisheries targeting on flatfish, rockfish, cod, and sablefish. The potential for operating profitable large vessel trawl

fisheries in these waters appears poor with the exception of seasonal fisheries for pollock in the inside waters and possibly perch in the outside waters of southeastern Alaska. In either case midwater trawling capability is desirable due to off-bottom schooling characteristics of both species during portions of the year and the fact that much of the area is not suitable for bottom trawling. Although not adequate to properly assess sablefish stocks, the few deep tows completed, coupled with foreign catch information, indicate sablefish may continue to be of major importance in developing and expanding groundfish fisheries in the eastern Gulf and southeastern Alaskan waters.

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APPENDIX

List of common and scientific names of significant species taken in the eastern Gulf of Alaska and in southeastern Alaska by the John N. Cobb in 1976 and 1977.

Ratfish	*Hydrolagus colliei*
Spiny dogfish	*Squalus acanthias*
Big skate	*Raja binoculata*
Black skate	*Raja kincaidi*
Longnose skate	*Raja rhina*
Turbot (arrowtooth flounder)	*Atheresthes stomias*
Petrale sole	*Eopsetta jordani*
Rex sole	*Glyptocephalus zachirus*
Flathead sole	*Hippoglossoides elassodon*
Pacific halibut	*Hippoglossus stenolepis*
Butter sole	*Isopsetta isolepis*
Rock sole	*Lepidopsetta bilineata*
Slender sole	*Lyopsetta exilis*
Dover sole	*Microstomus pacificus*
English sole	*Parophrys vetulus*
Sablefish (blackcod)	*Anoplopoma fimbria*
Pacific herring	*Clupea harengus pallasi*
Lingcod	*Ophiodon elongatus*
Pacific tomcod	*Microgadus proximus*
Pacific cod	*Gadus macrocephalus*

Walleye pollock	*Theragra chalcogramma*
Eulachon	*Thaleichthys pacificus*
Rougheye rockfish	*Sebastes aleutianus*
Pacific ocean perch	*Sebastes alutus*
Redbanded rockfish	*Sebastes babcocki*
Silvergray rockfish	*Sebastes brevispinis*
Darkblotched rockfish	*Sebastes crameri*
Rosethorn rockfish	*Sebastes helvomaculatus*
Redstripe rockfish	*Sebastes proriger*
Yelloweye rockfish	*Sebastes ruberrimus*
Pink shrimp	*Pandalus borealis*
Side stripe shrimp	*Pandalopsis dispar*
Dungeness crab	*Cancer magister*
Tanner crab	*Chionoecetes bairdi*
Box crab	*Lopholithoides foraminatus*
Golden king crab	*Lithodes aequispina*
Red king crab	*Paralithodes camtschatica*
Scallop	*Pecten caurinus*