

DEEP-WATER TRAWLING SURVEY OFF THE OREGON AND WASHINGTON COASTS

(AUGUST 25-OCTOBER 3, 1952)

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SUMMARY

A deep-trawling investigation off the Oregon and the Washington coasts was conducted by the Service's exploratory fishing vessel John N. Cobb from August 25 to October 3, 1952. The work was carried on in deep water adjacent to the present commercial fishing grounds of the local otter-trawl fleet.

Exploratory fishing was confined between Cape Foulweather and Cape Lookout, Oregon, and between Cape Elizabeth and Destruction Island, Washington. A total of 48 otter-trawl drags were made at depths ranging from 100 to 400 fathoms.

The continental slope off the Oregon coast was found to be rather gentle, having a number of terraces, ridges, and hills. The bottom in this region is mostly free of obstructions and suitable for trawl fishing. Off the Washington coast the continental slope is quite steep, and a number of snags were encountered.

Three commercially-utilized species of fish (Dover sole, sablefish, and Pacific ocean perch) dominated the catches. Dover sole and Pacific ocean perch were taken from depths between 100 and 240 fathoms. These two species were mixed in catches made off Cascade Head, Oregon. Sablefish were taken over the complete depth range fished; however, those in deep water were small and in poor shape.

Other fish taken included varieties of red rockfish, arrowtoothed flounder, rex sole, slender sole, hake, and several types of skates. Trash fish such as hake and skates were taken in most drags, but they represented only a small portion of the total catch.

OBJECTIVES OF EXPLORATION

In a continuation of the program initiated in the summer of 1951, the U. S. Fish and Wildlife Service's exploratory fishing vessel John N. Cobb made a six-week deep-water trawl exploration off the coasts of Oregon and Washington during late summer and early fall of 1952. The objectives of this investigation were: (1) to ascertain the availability and the abundance of marine bottom fishes in the deep waters adjacent to the present commercial fishing grounds of the local otter-trawl fleet; (2) to determine the commercial varieties of fishes inhabiting these deeper waters; (3) to gain information regarding technical problems involved in handling fishing gear in deep-water trawl work; and (4) to obtain catch information which would be of value in analyzing the practicability of commercial exploitation of these regions.

AREA EXPLORED

Exploratory fishing was conducted off the coast of Oregon between latitudes 44°47' N. and 45°21' N. and off the coast of Washington between latitudes 47°22' N. and 47°41' N. These areas roughly correspond to the waters between Cape Foulweather and Cape Lookout, Oregon, and between Cape Elizabeth and Destruction Island, Washington. The vessel left Seattle on August 25, and spent the first

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four weeks working off the Oregon coast. The remainder of the trip was devoted to investigating waters off the Washington coast. During the cruise a total of 48 otter-trawl drags were made at depths ranging from 100 to 400 fathoms.

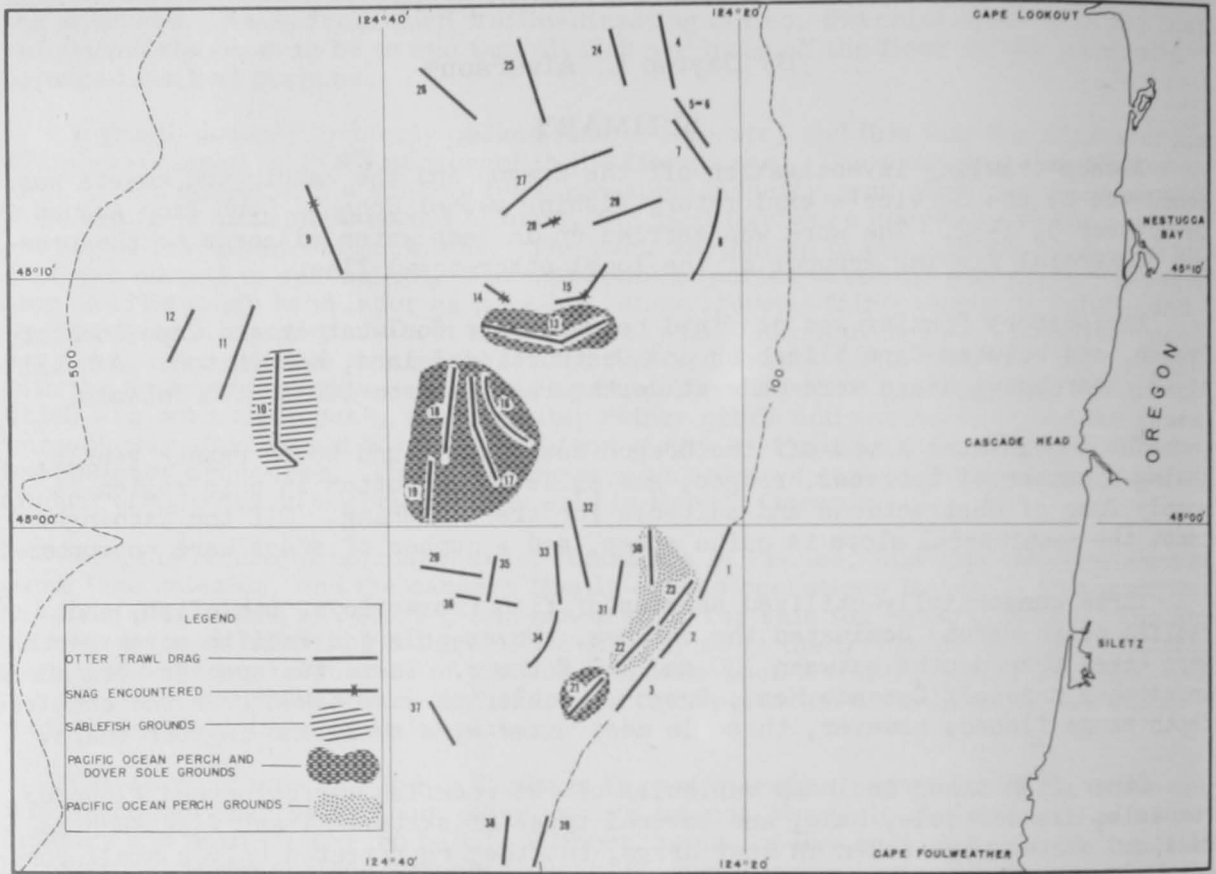


FIG. 1 - EXPLORATORY DRAGS, AREAS OF SPECIAL FISHING INTEREST, AND BOTTOM CONTOURS--OREGON COAST.

The geographical areas explored and the general bottom topography are shown in figures 1 and 2.

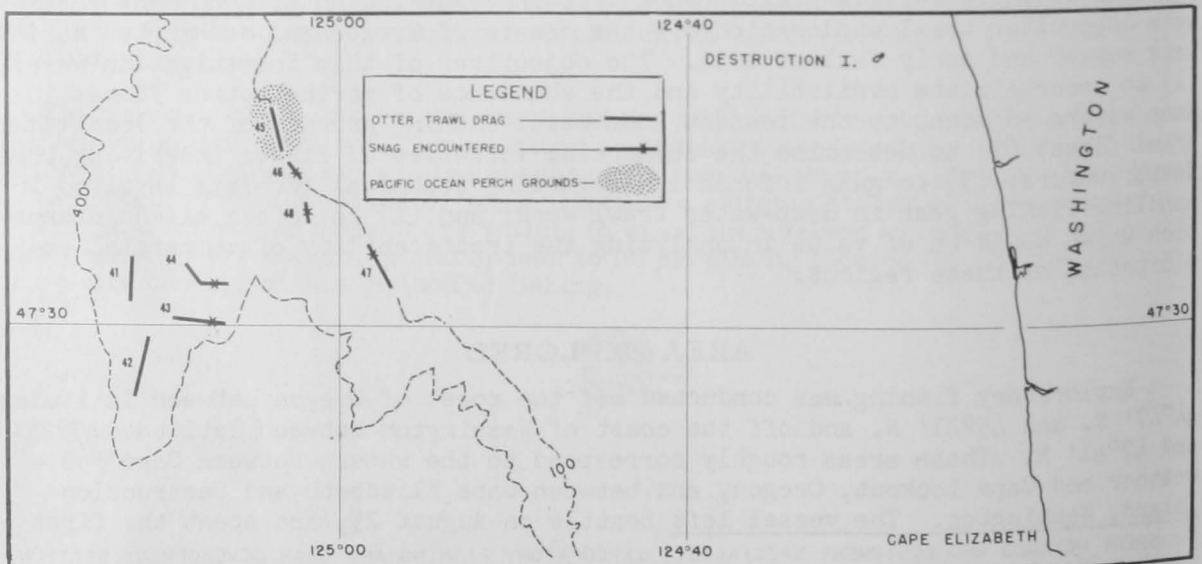


FIG. 2 - EXPLORATORY DRAGS, AREAS OF SPECIAL FISHING INTEREST, AND BOTTOM CONTOURS--WASHINGTON COAST.

The area explored off the Oregon coast measured 34 miles north and south and extended nearly 40 miles offshore. The continental slope^{1/} in this region is relatively gentle, having an average gradient of about 2 percent (Shepard 1948). The width of the slope between the 100- and the 500-fathom contour lines varies between 20 and 30 miles, and a number of terraces, ridges, and hills exist along the gentle slope. Bottom samples from this region were predominantly mud; however, gravel and rock were found in a few localized areas. The bottom dragged was mostly free of obstructions and suitable for trawl work.

The area explored off the Washington coast measured 19 miles north and south and extended 35 miles seaward. The slope characteristic in this region was somewhat steeper, with the average width between the 100- and the 400-fathom contour lines being only 10 miles. Trawling bottom between 100 and 300 fathoms was poor and a number of snags were encountered. Below 300 fathoms a small terraced region was located which was free of obstructions. Bottom samples showed mud with some stones or boulders. Several days were spent in an effort to locate favorable bottom on the offshore seamount discovered by the John N. Cobb in 1950 (Powell, Alverson, and Livingstone 1952); however, the fathograms showed only abrupt, steep slopes unsuitable for trawling.

METHODS USED

Commercial fishermen familiar with the trawl-fishing grounds along the Oregon and the Washington coasts assisted in laying out the desirable areas to be investigated. This procedure minimized the overlapping of areas to be explored with those already under exploitation by the otter-trawl fleet.

The method of locating suitable trawling bottom was identical to that used in the John N. Cobb's 1951 trawl exploration (Alverson 1951). Navigation charts showing soundings were studied to learn the characteristics of the bottom topography. Regions which appeared to be satisfactory for dragging operations were sounded with a constant recording-type echo sounder, and if the resultant fathogram was relatively uniform a drag was made.

Trawling methods used were similar to those commonly employed by the Pacific Northwest otter-trawl fleet. The net was set from the stern of the vessel and picked up on the starboard side. Catches were placed into deck bins of known cubic volume and the total weight of the fish was estimated from the occupied volume. Various conversion factors (volumes to weight) used for the several dominant species were obtained from data supplied by Seattle fish dealers.

Drags were made for a period of one or two hours, depending on the depth and type of bottom. Generally the deeper drags were towed for two hours. Positions were determined from loran readings which were taken after the net had been set and again at the time hauling of the gear began.

TYPE OF GEAR

All exploratory drags were made with a standard 400-mesh Western trawl^{2/} similar to the commercial trawl nets in use in the Pacific Northwest. Ten 8-inch-diameter spherical aluminum floats were attached to the head rope of the trawl, 3 on each wing of the net, and 4 across the throat of the net. The 4 floats across the throat of the net were the "plane-type" with a lifting collar around

^{1/}THE SLOPE LEADING FROM THE EDGE OF THE CONTINENTAL SHELF (APPROXIMATELY 100 FATHOMS) TO THE GREATER DEPTHS OF THE OCEAN.

^{2/}FOR DETAIL SPECIFICATIONS OF NET USED SEE COMMERCIAL FISHERIES REVIEW, VOL. 13, NO. 11 (NOVEMBER 1951), PP. 4-5.

the lower portion of the sphere. Recent tests by British investigators (Anonymous 1952) have shown this type of float to be greatly superior in its lifting ability as compared to other trawl floats of equal static buoyancy.

RESULTS

Detailed results of all exploratory drags have been tabulated and are presented in table 1. These drags are diagrammatically illustrated in figures 1 and 2, 3/ which also include areas of special fishing interest, snags, and bottom contour lines. The positions given in the fishing log are the starting point of each drag, and the courses are the resultant direction between the starting point and the end of each drag. For best results in plotting drags given in the fishing log, readers are referred to U. S. Coast and Geodetic Survey Chart No. 6002, Columbia River to Destruction Island, and No. 5902, Yaquina Head to Columbia River.

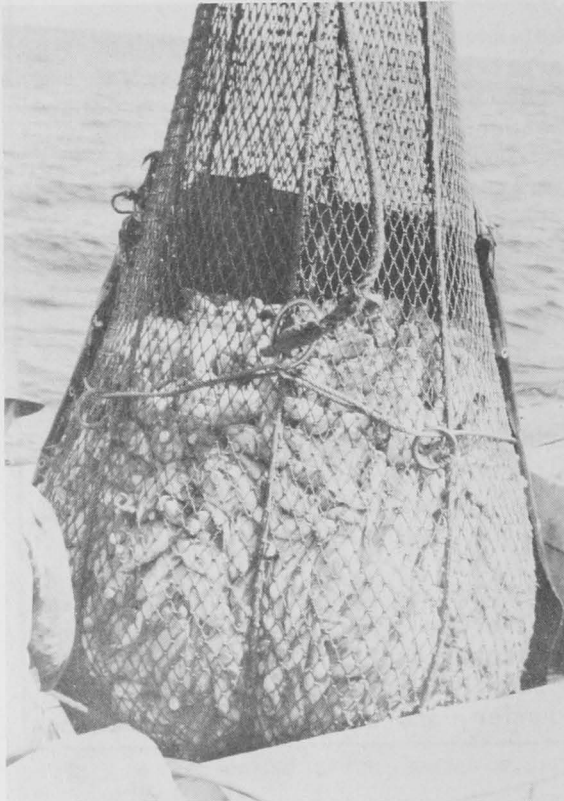


FIG. 3 - A CATCH OF BOTTOM FISH ABOUT TO BE RELEASED INTO THE DECK BIN.

catches of Pacific ocean perch. The best catches of Dover sole were taken west of Cascade Head, Oregon, at depths from 200 to 242 fathoms. The bottom in this area was clear of obstructions and composed of gray mud. Fair catches were also made west of Siletz Bay, Oregon, in 120 to 122 fathoms. Samples of Dover sole taken from the area west of Cascade Head averaged 15 inches in length, with the sex ratio of males to females being approximately equal. For best Dover-sole catches see drags 13, 16-19, and 21 in the fishing log.

SABLEFISH: These fish were taken in small quantities over the entire depth range fished; however, sablefish from depths below 250 fathoms were usually small and had a soft-flesh texture. Drag No. 10 in 300 to 304 fathoms, west of Cascade Head, Oregon, produced 1,000 pounds of sablefish, but only 65 percent of the fish were of marketable size. Fish taken from depths between 100 and 200 fathoms appeared in good shape and averaged from 7 to 9 pounds in weight.

PACIFIC OCEAN PERCH: This species was found to be the most abundant fish taken during the 1952 deep-water trawl investigation. The best catches of Pacific ocean perch were made between 120 and 230 fathoms. Below 250 fathoms the fish was seldom taken. Good catches were made off the Oregon coast from Nestucca Bay
 3/ DRAG NUMBER 40, MADE ON THE OFFSHORE SEAMOUNT, IS NOT SHOWN ON THE CHARTS.

Three commercially-utilized species of fish--Dover sole (Microstomus pacificus), sablefish (Anoplopoma fimbria), and Pacific ocean perch (Sebastes alutus)--dominated the catches. Dover sole and Pacific ocean perch were taken in fair quantities between 100 and 225 fathoms, while sablefish were taken somewhat deeper. The shaded areas shown on figures 1 and 2 indicate regions in which catches of the different species of 500 pounds per hour or greater were taken.

DOVER SOLE: This species was taken off the Oregon coast generally mixed with

south to Cape Foulweather. Drag No. 39 (not shaded on the chart) produced a good show of Pacific ocean perch, but the bag tie-line broke and the catch was lost. A fair catch of this fish was also made southwest of Destruction Island, Washington, in 100 fathoms.



FIG. 4 - A DECK BIN FULL OF DOVER SOLE AND PACIFIC OCEAN PERCH.



FIG. 5 - A "FLOATER" (FULL COD END) OF PACIFIC OCEAN PERCH BEING BROUGHT ALONG-SIDE THE VESSEL.

Practically all of the Pacific ocean perch taken off the Oregon and the Washington coasts were of commercially acceptable size (of several hundred fish examined, no immature specimen was noted). For best Pacific ocean perch catches see drags 13, 16-19, 21-23, 30 and 45.

OTHER ROCKFISH: A number of other species of rockfish were found commonly associated with catches of Pacific ocean perch. These included the black-mouthed rockfish (Sebastes crameri), the pop-eyed rockfish (Sebastes saxicola), the black-throated rockfish (Sebastes introniger), the rosy rockfish (Sebastes rosaceus), the split-nosed rockfish (Sebastes diplopros), and the round-finned rockfish (Sebastes alascanus). Of these species, the pop-eyed rockfish is the most difficult to distinguish and separate from the Pacific ocean perch.



FIG. 6 - TWO LARGE ROCKFISH TAKEN IN 240 FATHOMS OF WATER.

OTHER FISH TAKEN: Rex sole (Glyptocephalus zachirus), arrow-toothed flounder (Atheresthes stomias), slender sole (Lyopsetta exilis), hake (Merluccius productus), and many species of red rockfish were common in deep-water hauls. English sole (Parophrys vetulus), petrale sole (Eopsetta jordani), lingcod (Ophiodon elongatus), and the varieties of black rockfish taken by trawlers fishing the continental shelf were almost entirely absent from catches made below 100 fathoms. Trash fish, such as hake and several varieties of skates, were

taken in the majority of the drags; however, they generally represented only a small percentage of the total catch.

Table 1 - Fishing Log of Deep-Water Trawling Exploration off the Coasts of Oregon and Washington, 1952

DRAG NUMBER	1	2	3	4	5	6	7	8	9	10
Date	8/27/52	8/27/52	8/27/52	8/28/52	8/28/52	8/28/52	8/29/52	8/29/52	8/29/52	8/30/52
Latitude N.	45° 00.0'	44° 56.8'	44° 52.6'	45° 17.6'	45° 15.1'	45° 15.1'	45° 56.6'	45° 13.4'	45° 10.2'	45° 02.5'
Longitude W.	124° 20.7'	124° 22.7'	124° 27.1'	124° 23.9'	124° 21.9'	124° 21.9'	124° 23.2'	124° 21.2'	124° 40.6'	124° 45.6'
Loran Reading 2H4	2612	2573	2521	2827	2791	2794	2810	2776	2730	2657
Loran Reading 2H5	3415	3410	3400	3415	3417	3417	3417	3416	3371	3366
Sea	Mod. swell	Mod. swell	Mod. swell	Mod. swell	Lt. swell	Lt. swell	Calm	Calm	Calm	Mod. swell
Course, Magnetic	183°	218°	015°	335°	302°	302°	127°	175°	316°	330°
Depth Range in Fathoms	100	100	100	200	200-202	200	200	200-202	298-303	300-304
Type of Bottom	Mud	Gn. W.	Gn. W.	Gn. W.	-	-	Gn. W.	Gn. W.	Rocky	Mud
Trawling Bottom	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Snag	Clear
Elapsed Time on Bottom	1 hr.	1 hr.	1 hr.	1 hr.	1 hr.	1 hr.	1 hr.	2 hrs.	2 hrs.	2 hrs.
Estimated Total Catch in Pounds	1400	600	1600	400	Crossed doors	Crossed doors	800	2100	300	1900
Splits	None	None	None	None	None	None	None	None	None	None
<u>Catch in Pounds (% Marketable):</u>										
<u>Flat Fish:</u>										
Dover	Few (50%)	40 (80%)	450 (75%)	100 (80%)			150 (85%)	800 (90%)	Few (100%)	100 (70%)
Petrale	Few (100%)	10 (100%)	10 (100%)							
Rex			50 (75%)	*(1) (100%)			*(1) (100%)	Few (00%)		
Arrow-toothed Flounder (Turbot)	200 (75%)	50 (90%)	500 (80%)	Few (100%)			Few (100%)	100 (70%)		
<u>Round Fish:</u>										
Hake	Few (100%)	Few (100%)	Few (100%)	Few (100%)			Few (100%)	Few (100%)	Few (100%)	Few (100%)
Lingcod	20 (100%)									
Pollock		*(1) (100%)								
Sablefish	200 (95%)	100 (100%)	50 (100%)	50 (75%)			300 (95%)	450 (90%)	100 (50%)	1000 (65%)
Shark										
True Cod										
<u>Rockfish:</u>										
Black	200 (100%)	180 (100%)	10 (100%)	25 (100%)						
Pacific Ocean Perch	200 (50%)	20 (100%)	100 (100%)	100 (75%)			Few (100%)	50 (100%)		100 (80%)
Red	450 (75%)	180 (100%)	90 (50%)	75 (100%)			320 (75%)	550 (80%)	100 (50%)	500 (55%)

NOTE: FOR EXPLANATION OF FOOTNOTE, SEE PAGE 14.

Table 1 - Fishing Log of Deep-Water Trawling Exploration off the Coasts of Oregon and Washington, 1952 (Contd.)

DRAG NUMBER	11	12	13	14	15	16	17	18	19	20
Date	8/30/52	8/30/52	8/31/52	8/31/52	9/1/52	9/1/52	9/1/52	9/2/52	9/2/52	9/2/52
Latitude N.	45° 05.2'	45° 06.8'	45° 08.0'	45° 09.7'	45° 10.3'	45° 03.5'	45° 01.8'	45° 02.7'	45° 00.5'	44° 58.1'
Longitude W.	124° 49.8'	124° 53.0'	124° 35.0'	124° 34.3'	124° 27.8'	124° 32.1'	124° 34.0'	124° 37.0'	124° 38.0'	124° 35.0'
Loran Reading 2H4	2664	2661	2703	2722	2732	2646	2631	2639	2611	2582
Loran Reading 2H5	3360	3354	3392	3393	3406	3396	3390	3385	3361	3386
Sea	Mod. swell	Mod. swell	Mod. swell	Mod. swell	Mod. swell	Mod. swell	Mod. swell	Calm	Calm	Calm
Course, Magnetic	358°	001°	061°	103°	216°	303°	325°	342°	343°	257°
Depth Range in Fathoms	350-360	390-404	180-200	180	190-200	200	218-224	238-242	228-232	240
Type of Bottom	Mud & Rock	-	Mud	Rocky	Rocky	Mud	Mud	Mud	Mud	Gn. Mud
Trawling Bottom	Clear	Clear	Clear	Snag	Snag	Clear	Clear	Clear	Clear	Clear
Elapsed Time on Bottom	2 hrs.	1 hr.	2 hrs.	26 min.	1 hr.	2 hrs.	2 hrs.	2 hrs.	1 hr.	1 hr.
Estimated Total Catch in Pounds	1000	500	4000	200	500	4200	3000	3200	3200	400
Splits	None	None	None	None	None	One	None	None	None	None
Catch in Pounds (% Marketable):										
Flat Fish:										
Dover	Few (100%)	Few (100%)	1000 (70%)	100 (90%)	50 (80%)	1500 (85%)	1000(85%)	1300 (80%)	1000 (80%)	Few (80%)
Petrals			* (1) (100%)	* (1) (100%)						
Rez			50 (65%)	Few (100%)	Few (50%)	100 (50%)	50 (25%)	100 (50%)	100 (50%)	
Arrow-toothed Flounder (Turbot)			50 (70%)		Few (100%)	100 (70%)	80 (80%)			
Round Fish:										
Hake	Few (100%)		100 (100%)	Few (100%)	100 (100%)	Few (100%)	Few (100%)	100 (100%)	100 (100%)	Few (100%)
Lingcod										
Pollock										
Sablefish	600 (80%)	300 (80%)	100 (70%)	20 (50%)	50 (80%)	50 (90%)	200 (70%)	400 (65%)	300 (65%)	85 (80%)
Shark										
True Cod										
Rockfish:										
Black										
Pacific ocean perch			1000 (80%)		200 (95%)	2000 (95%)	1000 (95%)	900 (100%)	1000 (95%)	
Red	200 (25%)	150 (40%)	1300 (80%)	50 (100%)	50 (50%)	400 (100%)	600 (80%)	100 (75%)	300 (90%)	200 (100%)

NOTE: FOR EXPLANATION OF FOOTNOTE, SEE PAGE 14.

Table 1 - Fishing Log of Deep-Water Trawling Exploration off the Coasts of Oregon and Washington, 1952 (Contd.)

DRAG NUMBER	21	22	23	24	25	26	27	28	29	30
Date	9/3/52	9/3/52	9/3/52	9/4/52	9/4/52	9/4/52	9/9/52	9/9/52	9/9/52	9/10/52
Latitude N.	44° 52.5'	44° 54.3'	44° 56.0'	45° 17.6'	45° 16.2'	45° 16.2'	45° 12.2'	45° 12.2'	45° 12.0'	44° 57.8'
Longitude W.	124° 30.0'	124° 27.3'	124° 24.8'	124° 26.7'	124° 31.1'	124° 35.0'	124° 23.5'	124° 31.2'	124° 28.6'	124° 25.5'
Loran Reading 2H4	2515	2538	2560	2824	2801	2804	2755	2753	2754	2582
Loran Reading 2H5	3394	3400	3405	3411	3401	3393	3396	3400	3405	3407
Sea	Hvy. swell	Hvy. swell	Hvy. swell	Mod. swell	Mod. swell	Hvy. swell	Choppy	Mod. swell	Mod. swell	Mod. swell
Course, Magnetic	022°	022°	015°	326°	320°	291°	034°	045°	050°	339°
Depth Range in Fathoms	120-122	120	118-120	212	220-230	255	225-230	230	218	138-110
Type of Bottom	Mud	Mud	Mud	Mud	Mud	-	Mud	-	Mud	Mud
Trawling Bottom	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Snag	Clear	Clear
Elapsed Time on Bottom	1 hr.	1 hr.	1 hr.	1 hr.	2 hrs.	1 hr.	2 hrs.	10 min.	1 hr.	1 hr.
Estimated Total Catch in Pounds	2500	3100	3500	1000	1800	400	1000	100	800	3400
Splits	None	None	None	None	None	None	None	None	None	None
Catch in Pounds (% Marketable):										
<u>Flat Fish:</u>										
Dover	800 (80%)	100 (80%)	400 (80%)	100 (85%)	100 (80%)	50 (85%)	Few (80%)	Few (90%)	150 (80%)	400 (85%)
Petrale	•(1) (100%)	•(1) (100%)								
Rox		50 (25%)		Few (20%)	55 (25%)		Few (50%)		Few (00%)	Few (25%)
Arrow-toothed Flounder (Turbot)	300 (100%)	160 (80%)	200 (80%)		50 (80%)	50 (80%)				
<u>Round Fish:</u>										
Hake	Few (100%)	100 (100%)	50 (100%)	Few (100%)	Few (100%)	Few (100%)	Few (100%)	Few (100%)	Few (100%)	50 (100%)
Lingcod										
Pollock										
Sablefish	Few (50%)	100 (65%)	100 (80%)	100 (90%)	200 (90%)	100 (90%)	100 (75%)	Few (50%)	50 (80%)	100 (70%)
True Cod										
<u>Rockfish:</u>										
Black										
Pacific Ocean Perch	800 (95%)	2000 (95%)	2000 (95%)	350 (95%)	100 (95%)	Few (100%)	100 (95%)	25 (100%)	100 (95%)	2000 (95%)
Red	300 (85%)	300 (80%)	500 (85%)	250 (85%)	600 (75%)	40 (75%)	500 (55%)	25 (40%)	350 (75%)	500 (80%)

NOTE: FOR EXPLANATION OF FOOTNOTE, SEE PAGE 14.

Table 1 - Fishing Log of Deep-Water Trawling Exploration off the Coasts of Oregon and Washington, 1952 (Contd.)

DRAG NUMBER	31	32	33	34	35	36	37	38	39	40
Date	9/10/52	9/10/52	9/11/52	9/11/52	9/11/52	9/11/52	9/12/52	9/17/52	9/17/52	9/24/52
Latitude N.	44° 56.5'	44° 57.7'	44° 59.5'	44° 56.8'	44° 58.8'	44° 57.0'	44° 51.2'	44° 46.3'	44° 46.0'	46° 45.0'
Longitude W.	124° 27.5'	124° 28.9'	124° 30.7'	124° 30.6'	124° 34.0'	124° 33.2'	124° 36.6'	124° 34.0'	124° 31.5'	130° 48.0'
Loran Reading 2H4	2564	2583	2602	2564	2594	2568	2495	2440	2435	3186
Loran Reading 2H5	3401	3388	3396	3395	3387	3389	3382	3384	3388	2050
Sea	Mod. swell	Mod. swell	Lt. swell	Lt. swell	Lt. swell	Calm	Mod. swell	Hvy. swell	Hvy. swell	Mod. swell
Course, Magnetic	348°	327°	159°	184°	172°	260°	310°	347°	345°	203°
Depth Range in Fathoms	170	200	220	220	240	240	198-202	120	102	110-112
Type of Bottom	Mud	Mud	Mud	Mud	Mud	Mud	Rocky	Mud	Mud	Rocky
Trawling Bottom	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Snag
Elapsed Time on Bottom	1 hr.	2 hrs.	1 hr.	1 hr.	1 hr.	1 hr.	1 hr.	1 hr.	1 hr.	3 min.
Estimated Total Catch in Pounds	1800	2600	400	600	600	400	400	1200	3000	None
Splits	None	None	None	None	None	None	None	None	None	None
<u>Catch in Pounds (% Marketable):</u>										
<u>Flat Fish:</u>										
Dover	300 (90%)	400 (80%)	100 (75%)	100 (80%)	85 (80%)	100 (80%)	75 (100%)	75 (95%)		P
Petrale										U
Hex		150 (40%)	Few (10%)	Few (25%)	50 (25%)	Few (20%)	Few (20%)	Few (15%)		R
Arrow-toothed Flounder (Turbot)	125 (50%)	100 (80%)	Few (85%)	50 (100%)	40 (85%)	Few (75%)	Few (95%)	150 (95%)		S
<u>Round Fish:</u>										
Hake		Few (100%)	Few (100%)	Few (100%)	Few (100%)	20 (100%)	Few (100%)	Few (100%)		T
Lingcod										R
Pollock										A
Sablefish	200 (85%)	100 (75%)	75 (45%)	150 (75%)	100 (85%)	125 (90%)	50 (80%)	100 (85%)		P
Shark										B
True Cod										R
<u>Rockfish:</u>										
Black										O
Pacific Ocean Perch	400 (95%)	500 (95%)	50 (95%)	150 (90%)						K
Red	500 (90%)	1000 (85%)	150 (70%)	100 (80%)	200 (60%)	100 (75%)	200 (75%)	500 (75%)		E

NOTE: FOR EXPLANATION OF FOOTNOTE, SEE PAGE 14.

Table 1 - Fishing Log of Deep-Water Trawling Exploration off the Coasts of Oregon and Washington, 1952 (Contd.)

DRAW NUMBER	41	42	43	44	45	46	47	48
Date	9/25/52	9/25/52	9/26/52	9/26/52	9/26/52	9/26/52	9/27/52	9/27/52
Latitude N.	47° 32.6'	47° 29.4'	47° 30.2'	47° 32.2'	47° 38.1'	47° 36.1'	47° 31.2'	47° 34.2'
Longitude W.	125° 12.0'	125° 11.0'	125° 09.5'	125° 08.9'	125° 03.7'	125° 02.5'	124° 57.4'	125° 02.0'
Loran Reading 2H4	4163	4156	4162	4177	4210	4209	4213	4203
Loran Reading 2H5	3070	3099	3102	3086	3070	3101	3164	3110
Sea	Mod. swell	Mod. swell	Slight chop	Mod. chop	Mod. swell	Mod. swell	Lt. swell	Mod. swell
Course, Magnetic	158°	170°	074°	087°	136°	122°	307°	302°
Depth Range in Fathoms	306-308	304-308	302-310	284	100	100	100	120
Type of Bottom	Mud	Mud	Coral-Mud	Rocky	Sand-Gravel	Rocky	Rocky	Rocky
Trawling Bottom	Clear	Clear	Snag	Snag	Clear	Snag	Snag	Snag
Elapsed Time on Bottom	1 hr.	1 hr.	1 hr.	1 hr.	1 hr.	5 min.	1 hr.	10 min.
Estimated Total Catch in Pounds	400	500	400	None	2500	325	500	None
Splits	None	None	None	None	None	None	None	None
<u>Catch in Pounds (% Marketable):</u>								
<u>Flat Fish:</u>								
Dover		Few (100%)	Few (85%)		300 (60%)		Few (70%)	
Petrale								
Rex					Few (10%)			
Arrow-toothed Flounder (Turbot)	20 (100%)	Few (100%)	Few (100%)		125 (70%)	* (2) (100%)	Few (100%)	
<u>Round Fish:</u>								
Hake					Few (100%)		20 (100%)	
Lingcod								
Pollock					* (1) (100%)			
Sablefish	200 (10%)	250 (55%)	150 (45%)		50 (75%)	Few (70%)		
Shark	* (1) (100%)		* (1) (100%)					
True Cod					* (2) (100%)			
<u>Rockfish:</u>								
Black								
Pacific Ocean Perch					1000 (95%)	200 (95%)	300 (95%)	
Red	150 (20%)	180 (25%)	200 (20%)		200 (65%)	100 (35%)	100 (45%)	

* BRACKETED FIGURES INDICATE NUMBER OF FISH INSTEAD OF POUNDS.

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CONSUMERS' CANNED FISH PREFERENCES

Canned salmon, for many years the number one choice of consumers of canned fish in the United States, still held the lead in consumer preference as recently as 1951. This was found in a national consumer survey (Fish and Shellfish Preferences of Household Consumers) conducted during that year by the U. S. Fish and Wildlife Service. Nearly 63 percent of those contacted in the survey mentioned salmon when asked what kind of canned fish they served. Tuna, nearly as popular, was named by 56 percent. Sardines (13 percent) and mackerel (2 percent) fell far behind the two leading varieties.



The regional pattern of preferences for canned fish was surprisingly varied. The people in areas with a high proportion of rural families had a definite preference for salmon, whereas areas with higher urban populations preferred canned tuna. An example of this was found in comparing the survey findings in the South with those in the Northeast. In the South, which is considered basically rural, salmon was preferred over tuna by a ratio of 2 to 1 (73 percent used salmon, while 36 percent used tuna). In the Northeast, an area with a large urban population, 76 percent of the consumers used tuna, compared to 55 percent who said they served salmon. Use of sardines appeared to follow somewhat the same area pattern as salmon, with the largest percentage of sardine users found in the South, and the smallest percentage found in the Northeast.

In the West, which accounts for most of the production of salmon, tuna, and sardines, it was noted that tuna took first place in consumers' preference by a wide margin. Almost 70 percent of the consumers in this area used tuna, but only 46 percent reported buying salmon. In the Midwest area, the situation was reversed, since almost 70 percent used salmon but only 50 percent used tuna.

Part I--National Summary (FL-407) and Part II--Regional Summary (FL-408) of the series Fish and Shellfish Preferences of Household Consumers--1951 are available free upon request from the Division of Information, U. S. Fish and Wildlife Service, Washington 25, D. C.