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SHRIMP EXPLORATIONS OFF VANCOUVER ISLAND (BRITISH COLUMBIA) BY M/V JOHN N. COBB, OCTOBER-NOVEMBER 1962

By Lael L. Ronholt*

ABSTRACT

Sixty trawl drags were made in 30 to 105 fathoms between Cape Beale and Cape Cook. Three species of commercially important pandalid shrimp were found: the pink shrimp (Pandalus jordani), side-stripe shrimp (Pandalopsis dispar), and spot shrimp (Pandalus platyceros).

The best catches were made off Barkley Sound where 150 pounds of pink shrimp were taken in a one-half hour drag. Of the remaining 59 drags, 3 produced 50 pounds of pink shrimp, 6 yielded from 25 to 50 pounds, and 48 caught less than 25 pounds. Two drags failed, owing to gear damage.

For all drags the number of pink shrimp, heads-on, ranged from 95 to 182 per pound.

INTRODUCTION

From October 15 to November 16, 1962, the U. S. Bureau of Commercial Fisheries con-ted a five-week exploratory shrimp cruise aboard the research vessel John N. Cobb. Ex-rations extended along the southwest coast of Vancouver Island, from Cape Beale north-rd to Cape Cook in 30 to 100 fathoms. The primary purpose of the cruise was to locate d delineate commercial concentrations of shrimp and trawlable ground previously unknown the commercial fishing fleet. Secondary objectives were to collect data on the life history d size of the shrimp inhabiting these waters.

BACKGROUND

Although commercial shrimp fishing has not been conducted off the west coast of Van-ver Island, commercial fisheries for the pink shrimp (Pandalus jordani) have developed Washington and Oregon. During the first two years of the fisheries, Washington shrimp ndings rose rapidly to 6,729,000 pounds, but from 1958 to 1960 the yearly catch decreased 1,805,000 pounds (table 1). The Oregon fishery was also characterized by a rapid rise in ndings during the first two years. In 1959, 2,425,000 pounds of shrimp were landed, but in 60 the catch decreased to 1,136,000 pounds. e decline in the Washington-Oregon shrimp ndings, although not fully documented, is parently the result of changes in the com-itive economic status of the fishery com-ned with a reduction in catch per unit of ort and fishing intensity during the most cent years.

Table 1 - Shrimp Landings off Oregon and Washington, 1955-60 1/

	1960	1959	1958	1957	1956	1955
	(1,000 Lbs.)					
Oregon	1,136	2,425	1,523	495	6	-
Washington	1,805	2,998	6,729	2,458	76	8

1/Source: Pacific Marine Fisheries Commission, mimeographed report, December 1, 1961.

Results of shrimp explorations conducted off Oregon and Washington by the Oregon Fish mmission and the U. S. Bureau of Commercial Fisheries have been published elsewhere

shery Biologist, Exploratory Fishing and Gear Research Base, U. S. Bureau of Commercial Fisheries, Seattle, Wash.

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(Alverson, McNeely, and Johnson 1960; Pruter and Harry 1952; Ronholt and Magill 1961; Schaefers and Johnson 1957).

Prior work off Vancouver Island by the Bureau consisted of 8 Gulf shrimp trawl drags made off Barkley Sound and Pachena Point in 60 to 118 fathoms. Two drags, in 60 to 69 fa- oms, produced from 300 to 400 pounds of pink shrimp per hour fished. The eight drags pr- duced an average catch of 92 pounds of pink shrimp and 11 pounds of the side-stripe shrimp per hour (Alverson, McNeely, and Johnson 1960).

Explorations were conducted off the west coast of Vancouver Island by the Fisheries Re- search Board of Canada in 1955 (Butler and Dubokovic 1955). The area explored extended fro off the Strait of Juan de Fuca to Cape Scott in 48 to 100 fathoms. Sixty-two drags were ma with a small-mesh shrimp otter trawl. Results indicated that shrimp were not available i sufficient quantities to support a commercial fishery. Although the catch rates in some ar were comparable to established, inshore, small-boat fisheries, the availability did not app great enough to support operations with larger vessels required to fish the offshore groun Greatest availability was found off Nootka Sound where one drag resulted in a catch rate o 324 pounds per hour. The shrimp taken during those explorations were quite small, avera ing about 200 heads-on-shrimp to the pound.

During 1959, the Fisheries Research Board of Canada conducted further expolorations Nootka Sound (Butler, 1959). Five drags were made with a small-mesh shrimp trawl in 6 75 fathoms. Four drags produced 795, 348, 216, and 120 pounds of pink shrimp per hour. availability of shrimp was higher than in 1954, and the number of heads-on-shrimp per po ranged from 178 to 286. The shrimp taken at the southern end of the Nootka grounds were larger than those taken at the northern end.

REGION EXPLORED

The offshore region of Vancouver Island was selected for shrimp explorations becaus (1) no commercial shrimp fishing was being conducted in that area, (2) prior explorations indicated the possibility of shrimp concentrations, and (3) the area lies adjacent to the kn shrimp grounds off the Washington coast.

The Continental Shelf is relatively narrow, measuring approximately 40 miles in wid off Cape Beale at the southern end, and 5 miles off Cape Cook at the northern end. The s strate is predominantly green mud, with some green sand or a mixture of green sand and Trawlable grounds were intermingled with rough, rocky regions.

GEAR AND METHODS

FISHING GEAR: A Gulf-of-Mexico flat shrimp trawl measuring 43 feet along the foo rope (Schaefers and Johnson, 1957) was used at all stations. The net was constructed of 1 inch mesh throughout.

The trawl doors were $2\frac{1}{2}$ by 5 feet, and weighed about 160 pounds each. Dandyline gea was not used, as the net was fastened directly behind the doors. Twenty-fathom bridles c nected the doors to a single warp.

METHODS: The sampling procedure was designed to cover the 50- to 100-fathom de interval. Two series of drags were alternated throughout the region as fishing conditions mitted. One series was made from 50 to 100 fathoms at 10-fathom intervals, the second 55 to 95 fathoms at 10-fathom intervals.

Before fishing the net, a sounding transect was made of the area. During the soundi transect the depth recorder marks a permanent "trace," which shows the bottom configu tion and indicates whether the bottom is soft or hard. When the recording revealed that t bottom was trawlable, the net was fished. All drags, with one exception, were 30 minutes long. Time was calculated from the time the net reached the bottom until retrievals were started. An attempt was made to maintain a constant depth during each drag.

The shrimp catch in each drag was analyzed by species. Representative samples of the mercially important species were frozen for examination ashore.

The associated fish catch was analyzed by species for: (1) number of individuals, (2) to- eight, and (3) minimum and maximum length. Length frequencies were taken for some mercially important species.

RESULTS

In 60 drags, made between Cape Beale and Cape Cook in 30 to 105 fathoms, no concentra- of shrimp were found that, at this time, could be considered commercially exploitable.

Table 2 - Catch-Depth Relationship for the Pink Shrimp (Pandalus jordani) Taken from Cape Beale to Cape Cook

pth Range n Fathoms	Number of Half-Hour Drags	Number of Half-Hour Drags Containing Shrimp	Total Shrimp Catch (in Pounds)	Average Catch (in Pounds) Per Half-Hour Drag
30-39	1	0	0	0
40-49	1	0	0	0
50-59	3	2	t	t
60-69	15	15	148	10
70-79	16	16	198	18
80-89	16.47	15.47	332	15
90-99	5	5	34	9
100-109	1	1	9	9
Total	58.47	54.57	721	12

- ("trace") equals less than one pound.

pink shrimp (Pandalus jordani) was the inant species, and the largest catch was pounds of pink shrimp from a half hour in the area off Barkley Sound. The ber of pink shrimp (heads-on per pound) ed from 95 to 182, and the average catch half-hour by depth ranged from 0 to 18 ds (table 2). Other commercially uti- species found were side-stripe mp and spot shrimp. For ease of dis- ion the region explored has been di- into the three following areas: Bark- ound, Amphitrite Point to Esteban Point, Esteban Point to Cape Cook.

BARKLEY SOUND: Ten drags were off Barkley Sound in depths from 60 fathoms (fig. 1). Four drags produced shrimp at a higher rate than 25 pounds half hour. The highest catch (drag num- 1) was 150 pounds per half hour. Drag ber 4 took 50 pounds; and drags number nd 60 produced 46 and 42 pounds, re- tively. Pink shrimp were in highest bers in the 80- to 89-fathom depth in- al. Four drags in that depth range pro- d an average of 56 pounds per half (table 3).

Side-stripe and spot shrimp were also n off Barkley Sound. Side-stripe shrimp taken in 9 drags at rates from 1 to 7 ds per half hour, with drag number 59

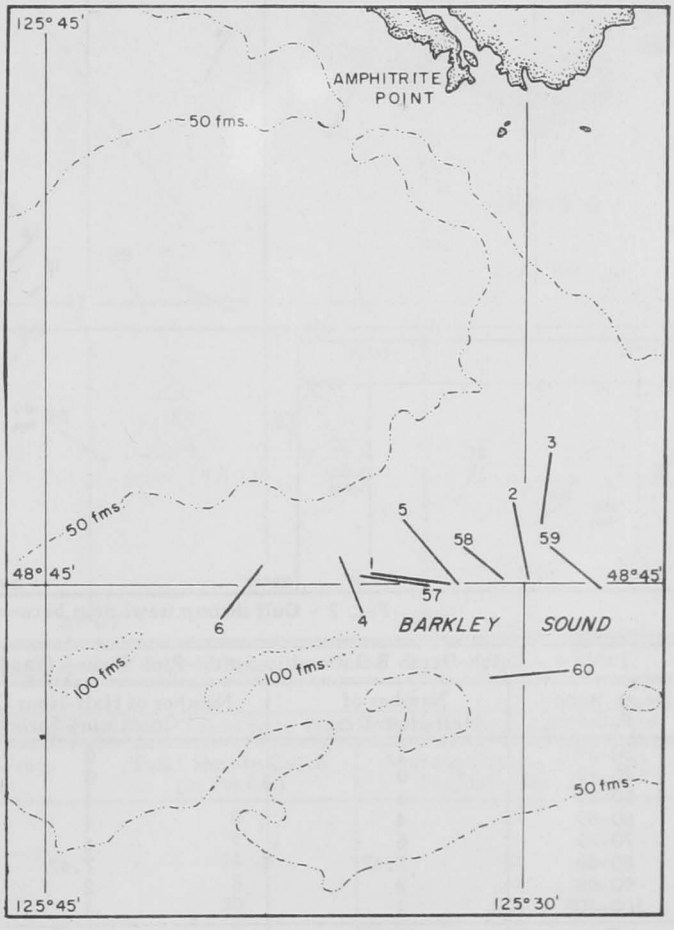

Fig. 1 - Gulf shrimp trawl drags off Barkley Sound.

Table 3 - Catch-Depth Relationship for the Pink Shrimp (Pandalus jordani) Taken off Barkley Sound

Depth Range in Fathoms	Number of Half-Hour Drags	Number of Half-Hour Drags Containing Shrimp	Total Shrimp Catch (in Pounds)	Average Catch (in Pounds) Per Half-Hour Drag
60-69	3	3	48	16
70-79	3	3	71	24
80-89	4	4	224	56
Total	10	10	343	34

producing the largest catch. Three specimens of spot shrimp were taken in drags nur 59 and 60.

AMPHITRITE POINT TO ESTEBAN POINT: Twenty-four drags were made between A phitrite Point and Esteban Point in depths from 30 to 109 fathoms (fig. 2). Only 4 drags pr

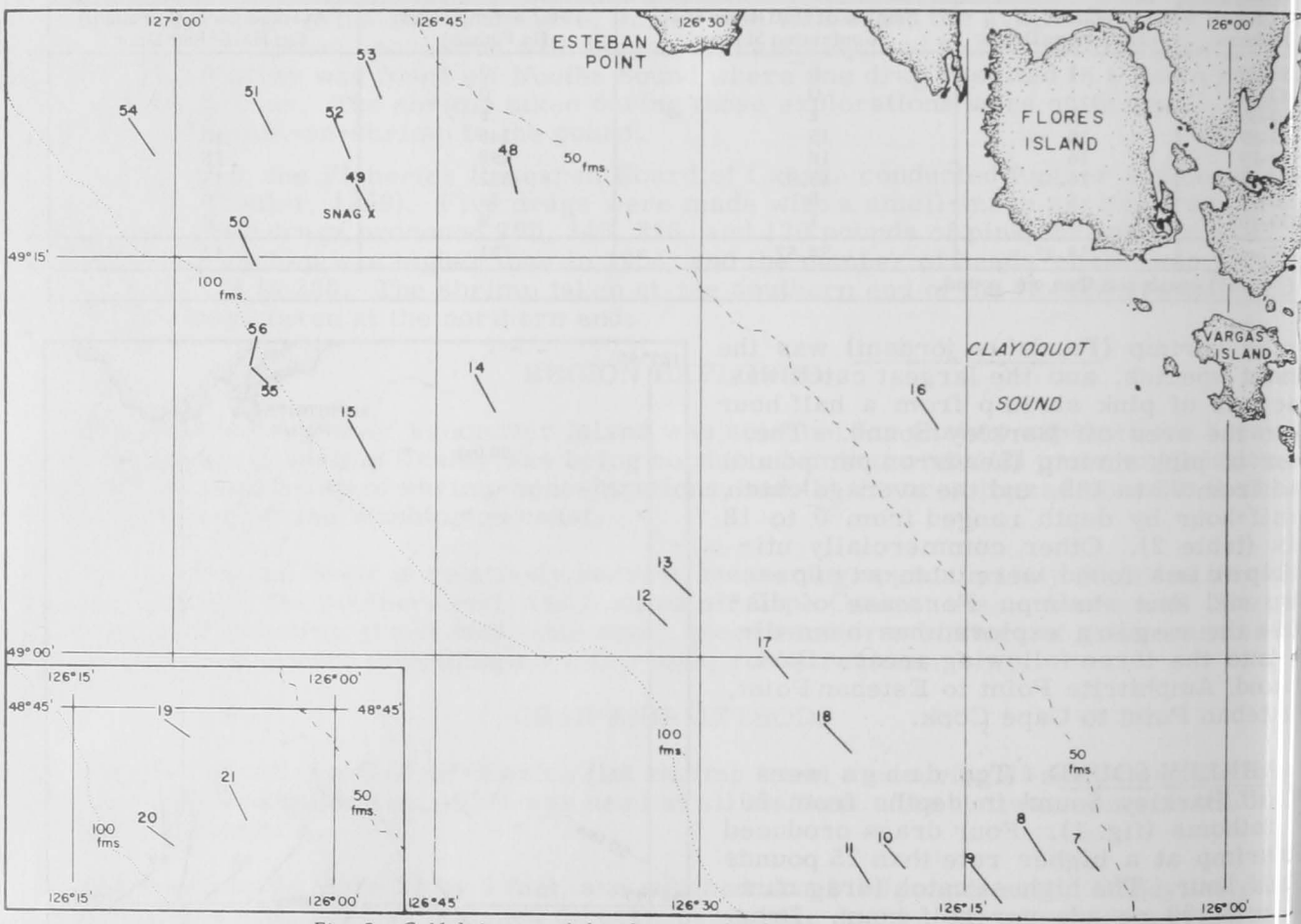

Fig. 2 - Gulf shrimp trawl drag between Amphitrite Point and Esteban Point.

Table 4 - Catch-Depth Relationship for the Pink Shrimp (Pandalus jordani) Taken from Amphitrite Point to Esteban Point

Depth Range in Fathoms	Number of Half-Hour Drags	Number of Half-Hour Drags Containing Shrimp	Total Shrimp Catch (in Pounds)	Average Catch (in Pounds) Per Half-Hour Drag
30-39	1	0	0	0
40-49	0	0	0	0
50-59	1	1	t	t
60-69	4	4	6	2
70-79	6	6	95	16
80-89	7.47	7.47	108	15
90-99	2	2	29	15
100-105	1	1	9	9
Total	22.47	21.47	247	11

t - ("trace") equals less than one pound.

ed pink shrimp at a rate of 25 pounds or more per half hour. Drags number 10 and 52 pro-ed 50 pounds per half hour and drags number 11 and 13 yielded 25 pounds per half hour. shrimp were most available in the 70- to 79-fathom depth interval, where six drags pro-ed an average catch of 16 pounds per half hour (table 4). Two drags were not successful ause of gear damage.

Side-stripe shrimp were not found in that area, but six specimens of spot shrimp were n in drag number 12.

ESTEBAN POINT TO CAPE COOK: Twenty-six drags were made between Esteban Point Cape Cook in 40 to 99 fathoms (fig. 3). Two drags, numbers 46 and 47, produced 30 and ounds, respectively. The remaining 24 drags produced less than 25 pounds per half hour. highest catches occurred in the 60- to 69-fathom depth range where eight drags produced verage catch of 12 pounds per half hour (table 5).

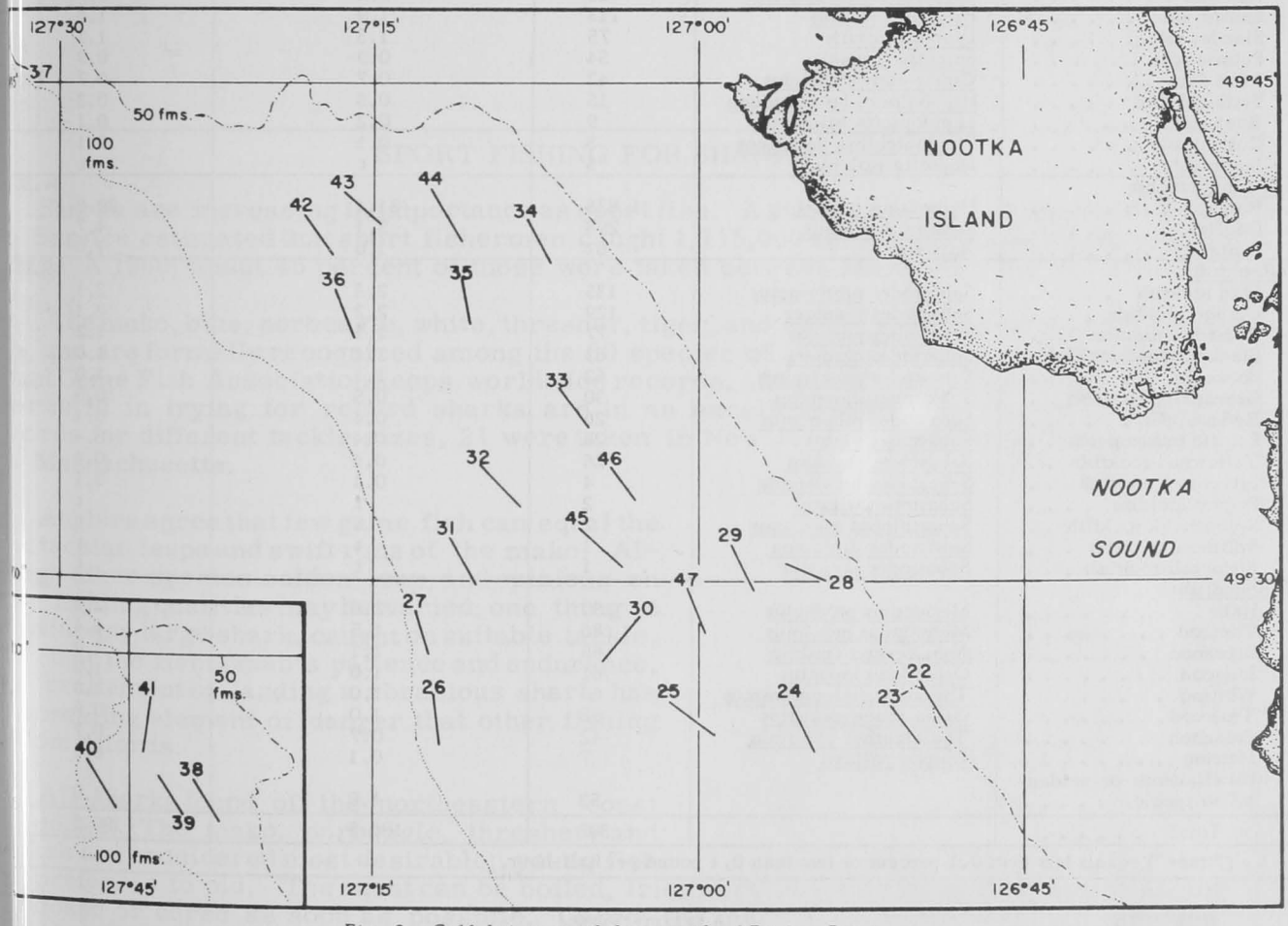

Fig. 3 - Gulf shrimp trawl drags north of Esteban Point.

Table 5 - Catch-Depth Relationship for the Pink Shrimp (Pandalus jordani) Taken from Esteban Point to Cape Cook

epth Range n Fathoms	Number of Half-Hour Drags	Number of Half-Hour Drags Containing Shrimp	Total Shrimp Catch (in Pounds)	Average Catch (in Pounds) Per Half-Hour Drag
40-49	1	0	0	0
50-59	2	1	t	t
60-69	8	8	94	12
70-79	7	7	5	1
80-89	5	4	30	6
90-99	3	3	6	2
Total	26	23	135	5

- ("trace") equals less than one pound.

Side-stripe shrimp were not found in that region; however, 1½ pounds of spot shrimp w caught during drags number 40 and 41.

FISH CATCH: Fish catches, which ranged from 1 to 412 pounds, were dominated by fl fish and elasmobranchs, which accounted for 46.6 and 34.9 percent, respectively, of the tot fish catch (table 6). Ratfish and turbot were the two dominant species, constituting 29.6 an 26.6 percent of the total fish catch.

Table 6 - Species of Fish Encountered Showing Total Pounds Caught, Average Catch Per Half-Hour, and Percent of Total Fish Catch Based on 58.5 (30-Minute) Drags

Common Name	Scientific Name	Total Pounds	Average Catch (in Pounds) Per Half-Hour Drag	Percentage of Total Fish Catch
Flatfish:				46.6
Turbot	Atheresthes stomias	1,678	28.7	26.6
Dover sole	Microstomus pacificus	522	8.9	8.3
Rex sole	Glyptocephalus zachirus	420	7.2	6.7
English sole	Parophrys vetulus	113	1.9	1.8
Slender sole	Lyopsetta exilis	75	1.3	1.2
Petrale sole	Eopsetta jordani	54	0.9	0.9
Sand dab	Citharichthys sordidus	42	0.7	0.7
Flathead sole	Hippoglossoides elassodon	15	0.3	0.2
Rock sole	Lepidopsetta bilineata	9	0.2	0.1
Curlfin sole	Pleuronichthys decurrens	8	0.1	0.1
Butter sole	Isopsetta isolepis	3	t	t
Elasmobranchs:				34.9
Ratfish	Hydrolagus colliei	1,838	31.4	29.2
Dogfish	Squalus acanthius	298	5.1	4.7
Skate	Raja sp.	61	1.0	1.0
Rockfish:				9.2
Flag rockfish	Sebastodes rubrivinctus	135	2.3	2.1
Orange rockfish	Sebastodes pinniger	129	2.2	2.1
Redstripe rockfish	Sebastodes proriger	77	1.3	1.2
Blackblotched rockfish	Sebastodes crameri	63	1.1	1.0
Bocaccio	Sebastodes paucispinis	62	1.1	1.0
Greenstripe rockfish	Sebastodes elongatus	30	0.5	0.5
Red snapper	Sebastodes ruberrimus	26	0.4	0.4
Pacific ocean perch	Sebastodes alutus	26	0.4	0.4
Yellowtail rockfish	Sebastodes flavidus	26	0.4	0.4
Silvergray rockfish	Sebastodes brevispinis	4	0.1	0.1
Pygmy rockfish	Sebastodes wilsoni	2	t	t
Spingcheek rockfish	Sebastolobus alascanus	2	t	t
Splitnose rockfish	Sebastodes diploproa	1	t	t
Stripetail rockfish	Sebastodes saxicola	1	t	t
Roundfish:				8.5
Hake	Merluccius productus	150	2.6	2.4
Tomcod	Microgadus proximus	86	1.5	1.4
Blackcod	Anoplopoma fimbria	65	1.1	1.0
Lingcod	Ophiodon elongatus	61	1.0	1.0
Whiting	Theragra chalcogrammus	60	1.0	1.0
True cod	Gadus macrocephalus	58	1.0	0.9
Eulachon	Thaleichthys pacificus	42	0.7	0.7
Herring	Clupea pallasii	7	0.1	0.1
Miscellaneous or unidentified species		53	1.0	1.0
Total		6,302	106.5	100.2

t - ("trace") equals less than 0.1 percent or less than 0.1 pound per half-hour.

APPENDIX

A detailed fishing log showing the fishing positions, time on bottom, catch particulars, and other pertinent data for each drag is available as an appendix to the reprint of this arti Write for Separate No. 704 which contains "Table 7 - Cruise 56 Fishing Log: Shrimp Exp ations off Vancouver Island, British Columbia, October-November 1962."

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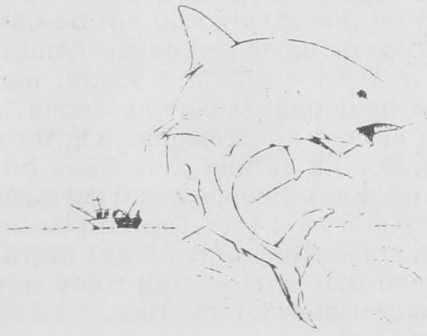
SPORT FISHING FOR SHARKS

Sharks are increasing in importance as sport fish. A survey by the U. S. Fish and Wild- Service estimated that sport fishermen caught 1,715,000 sharks in United States coastal ers in 1960; about 45 percent of those were taken between Maine and North Carolina.

The mako, blue, porbeagle, white, thresher, tiger, and sawfish sharks rank as big-game h, and are formally recognized among the 50 species of game fish on which the Internaal Game Fish Association keeps worldwide records. Anglers in the Northeast who are erested in trying for record sharks are in an excellent area. Of the current world ords for different tackle sizes, 21 were taken in New Jersey, New York, Rhode Island, Massachusetts.



Anglers agree that few game fish can equal the tacular leaps and swift runs of the mako. Algh other species seldom leap, and opinions on r fighting qualities may be varied, one thing is ain: any large shark, caught on suitable tackle, test the fisherman's patience and endurance. excitement of landing a voracious shark has ppealing element of danger that other fishing om affords.

All sharks found off the northeastern coast edible. The mako, porbeagle, thresher, and fish are considered most desirable; young fish preferred to old. The meat can be boiled, fried, broiled, or chowdered, but it should ooked or cured as soon as possible. Cured, the meat is excellent whether smoked, ted, or kippered.

Fresh mako, hammerhead, small dusky, and dogfish are good eating, particularly n cooked in sauces or with vegetables and other meats. These sharks have a distinc- flavor, milder than some of the more common food fishes. Elaborate preparations not necessary, but culinary imagination is a helpful ingredient. (Anglers' Guide to rks of the Northeastern United States: Maine to Chesapeake Bay, Bureau of Sport Fishes & Wildlife Circular No. 179, Washington, D. C.)