

## SHRIMP EXPLORATIONS OFF THE WASHINGTON COAST, FALL 1955 AND SPRING 1956

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### SUMMARY

Shrimp explorations off the Washington coast were conducted by the Service's exploratory fishing vessel John N. Cobb during the fall (October 18 to November 9) of 1955 and spring (March 27 to April 19) of 1956. These explorations were carried out in cooperation with the State of Washington Department of Fisheries' shellfish division. Gear used during the fall exploration included a 20-foot beam trawl and a small West Coast box-type otter trawl. Gear used during the spring exploration included a 20-foot beam trawl, a small West Coast box-type otter trawl, and a 40-foot Gulf of Mexico shrimp trawl.

Fishing results during the fall exploration showed that pink shrimp (Pandalus jordani) were widely distributed at various depths over the entire area explored. The best drag with the beam trawl caught 150 pounds of heads on shrimp an hour and the best drag with the otter trawl caught 600 pounds of shrimp an hour.

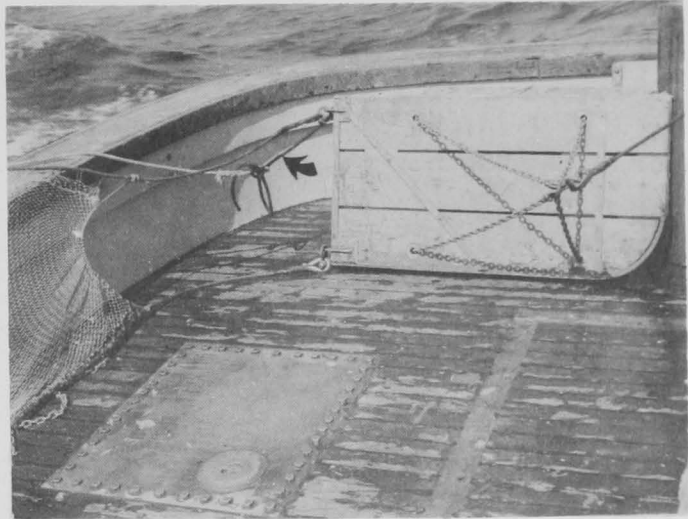


Fig. 1 - Method of attaching port door to wing of Gulf shrimp trawl. Starboard door was attached in same manner. Arrow indicates forward portion of "lazy line."

Fishing results during the spring exploration showed that of the three types of gear used, the Gulf shrimp trawl was the most efficient and practicable type of gear for catching shrimp on these grounds. Of the 51 drags made with this gear, 25 caught shrimp in amounts ranging from 300 to 2,200 pounds an hour. The two most promising localities which appeared to offer the best prospects for the development of a commercial shrimp fishery are between the mouth of the Moclips River and the mouth of Connor Creek, and between Grays Harbor and Cape Shoalwater.

### BACKGROUND

Explorations for shrimp off the Washington coast were undertaken by the U. S. Fish and Wildlife Service's exploratory fishing vessel John N. Cobb during the fall of 1955 and the spring of 1956. These explorations were carried out in cooperation with the State of Washington Department of Fisheries' shellfish division whose personnel participated in the collection of data aboard the vessel and examined samples of shrimp in the laboratory after the completion of each trip.

During the fall exploration (October 18 to November 9, 1955), 45 drags were made with a 20-foot beam trawl and 7 drags were made with a small West Coast

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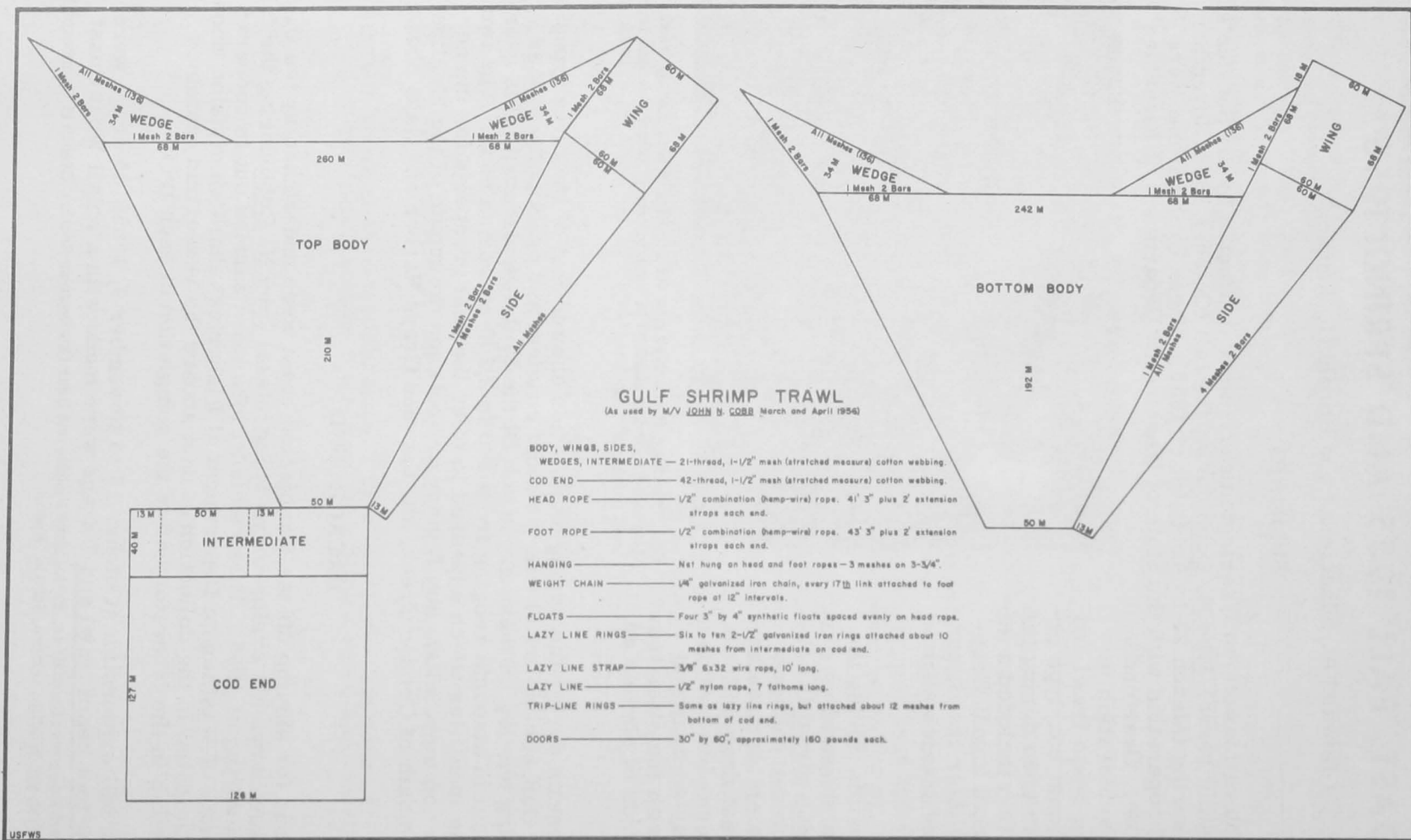


Fig. 2 - Gulf shrimp trawl used during the spring (March 27 to April 19, 1956) exploration by the exploratory fishing vessel John N. Cobb.

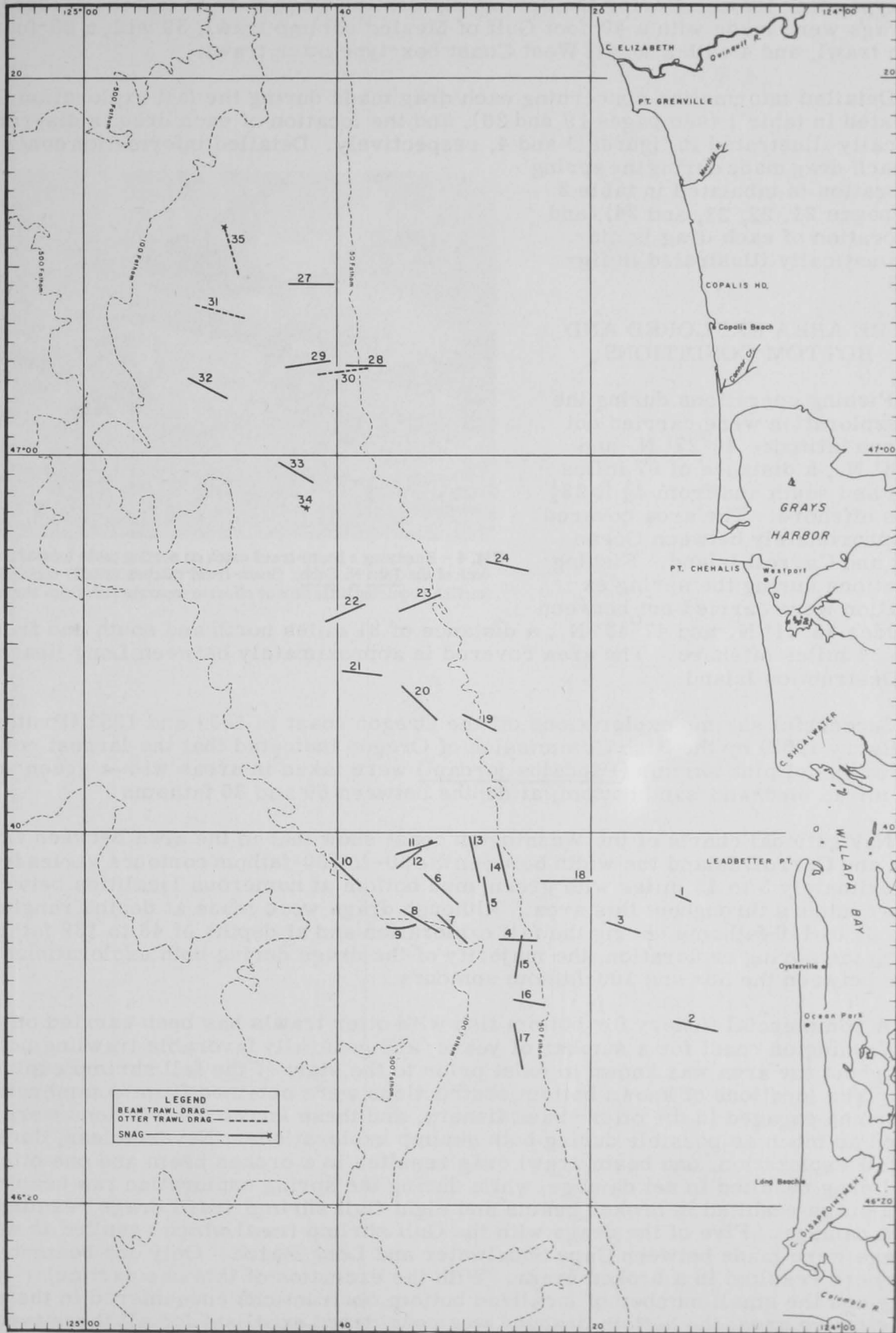


Fig. 3 - Location of beam-trawl drags and otter-trawl drags between Ocean Park and Cape Elizabeth, fall (October 18 to November 9, 1955) exploration.

box-type otter trawl. During the spring exploration (March 27 to April 19, 1956), 51 drags were made with a 40-foot Gulf of Mexico shrimp trawl, 39 with a 20-foot beam trawl, and 4 with a small West Coast box-type otter trawl.

Detailed information concerning each drag made during the fall exploration is tabulated in table 1 (see pages 19 and 20), and the location of each drag is diagrammatically illustrated in figures 3 and 4, respectively. Detailed information concerning each drag made during the spring exploration is tabulated in table 2 (see pages 21, 22, 23, and 24), and the location of each drag is diagrammatically illustrated in figure 8.

#### THE AREA EXPLORED AND BOTTOM CONDITIONS

Fishing operations during the fall exploration were carried out between latitudes  $46^{\circ}27'$  N. and  $48^{\circ}04'$  N., a distance of 97 miles north and south and from  $4\frac{1}{2}$  to  $28\frac{1}{2}$  miles offshore. The area covered is approximately between Ocean Park and Carroll Island. Fishing operations during the spring exploration were carried out between latitudes  $46^{\circ}21'$  N. and  $47^{\circ}42'$  N., a distance of 81 miles north and south and from 11 to 31 miles offshore. The area covered is approximately between Long Beach and Destruction Island.



Fig. 4 - Emptying a beam-trawl catch on sorting table located on the deck of the John N. Cobb. Beam-trawl catches usually contained few fish requiring little time or effort to separate fish from shrimp.

Successful shrimp explorations off the Oregon coast in 1951 and 1952 (Pruter and Harry 1952) by the Fish Commission of Oregon indicated that the largest concentrations of pink shrimp (*Pandalus jordani*) were taken in areas with a green-mud or a mixed mud-and-sand bottom, at depths between 60 and 80 fathoms.

Navigational charts of the Washington coast show that in the area between Ocean Park and Carroll Island the width between the 50- to 100-fathom contours varies from approximately 3 to 15 miles with green-mud bottom at numerous localities between these contours throughout this area. Although drags were made at depths ranging from 21 to 116 fathoms during the fall exploration and at depths of 48 to 139 fathoms during the spring exploration, the majority of the drags during both explorations were made between the 50- and 100-fathom contours.

A commercial fishery for bottom fish with otter trawls has been carried on off the Washington coast for a number of years, and generally favorable trawling bottom throughout the area was known to exist prior to the start of the fall shrimp exploration. The locations of known bottom obstructions were obtained from commercial fishermen engaged in the otter-trawl fishery, and these known obstructions were avoided as much as possible during both shrimp explorations. Nevertheless, during the fall exploration, one beam-trawl drag resulted in a broken beam and one otter-trawl drag resulted in net damage, while during the spring exploration two beam-trawl drags resulted in broken beams and eight Gulf shrimp-trawl drags resulted in net damage. Five of the drags with the Gulf shrimp trawl which resulted in net damage were made between Cape Shoalwater and Long Beach. Only one beam-trawl drag here resulted in a broken beam. With the exception of this one particular locality and the small number of localized bottom obstructions encountered in the rest of the entire area, the bottom dragged was considered excellent for all three types of gear.



Fig. 5 - Location of beam-trawl drags and otter-trawl drags between Cape Elizabeth and Carroll Island, fall (October 18 to November 9, 1955) exploration



## GEAR USED

**BEAM TRAWL:** The 20-foot beam trawl used was constructed to the same specifications as the beam trawl used during shellfish explorations in Alaskan waters by the John N. Cobb. (Details of the beam trawl are described by Ellson and Livingston 1952.) Nets of both 15-thread  $1\frac{1}{4}$ -inch, and 36-thread  $1\frac{1}{2}$ -inch mesh<sup>1/</sup> cotton webbing, 150 meshes deep, were used. The beam was a hemlock pole approximately 8 inches in diameter at the center and cut down to 6 inches at each end to allow for attachment of the "D" frames or runners, which were made of bar iron  $\frac{5}{8}$ -inch thick and 6 inches wide. As a precautionary measure against possible mudding, which later proved unnecessary, the width of the bottom part of each "D" frame was increased to 16 inches by welding on a  $\frac{5}{8}$ -inch iron plate. After the hemlock beam was broken, 6 x 6-inch milled spruce beams were used. The beam trawl was towed at an average speed of 2 knots with an average scope <sup>2/</sup> of 2.8 to 1.

**OTTER TRAWL:** The otter trawl used was a 600-mesh West Coast box-type trawl with a head rope 45 feet long and a foot rope 54 feet long. The wings, body, and intermediate of the trawl were  $1\frac{1}{2}$ -inch mesh cotton webbing and cod ends of both  $1\frac{1}{4}$ -inch mesh and  $1\frac{1}{2}$ -inch mesh cotton webbing were used. (Details of the otter trawl are described by Schaefers and Smith 1954.) "Dandy-line" gear 13 fathoms in length extended from the doors to the wings of the net. The net was set from the stern and brought aboard over the starboard side. The otter trawl was towed at an average speed of 2.7 knots with an average scope of 3 to 1.



Fig. 6 - Emptying the West Coast box-type otter trawl on the deck of the John N. Cobb. Many fish were present in catches with this gear, making separating of shrimp difficult.

(The Gulf of Mexico shrimp fishery.) The trawl was set from the stern of the vessel and towed from a single trawl cable. A bridle, 25 fathoms in length on each leg, led from the end of the trawl cable to the doors. The net was attached to the doors with a 2-foot extension of the head rope and foot rope. The catch was hauled aboard over the stern using a "lazy line" (fig. 2) which ran from one trawl door back to the cod end. The Gulf shrimp trawl was towed at an average speed of 2.6 knots with an average scope of 3 to 1.

**GULF SHRIMP TRAWL:** The Gulf shrimp trawl (fig. 1) used during the spring shellfish exploration of the John N. Cobb is referred to as a 40-foot flat trawl in the Gulf of Mexico shrimp fishery. (See Bullis 1951 for a description of various types of shrimp trawls used in

## FISHING RESULTS

**FALL EXPLORATION:** Fishing results with the beam trawl during the fall exploration showed that pink shrimp (Pandalus jordani)<sup>3/</sup> were widely distributed at various depths over the entire area explored. All drags<sup>4/</sup> with the beam trawl caught shrimp

1/ All mesh sizes in this report refer to stretched measure.

2/ Ratio of trawl cable out to depth of water.

3/ Any mention of shrimp in the discussion refers to this species. The small infrequent catches of side-stripe shrimp (Pandalopsis dispar) are tabulated in the fishing log. Other species of shrimp were frequently taken but only in insignificant quantities and are not included in the discussion or the fishing log. These were Crangon species and Spirontocaris species.

4/ Drags in which the gear did not reach bottom are not included.

in amounts ranging from a "trace"<sup>5/</sup> to 150 pounds per hour,<sup>6/</sup> with the majority of the drags producing over 40 pounds per hour. Although drags were made at depths of 21 to 116 fathoms, the best catches were made at depths of approximately 40 to 90 fathoms on bottom consisting of green mud or a mixture of green mud and sand. Of the 9 beam-trawl drags that caught over 100 pounds of shrimp an hour, 7 were made at depths of 51 to 71 fathoms, and 2 were made at depths of 78 to 88 fathoms. Localities which produced over 100 pounds of shrimp an hour are located off Willapa Bay, off Grays Harbor, off Cape Elizabeth, and off the Queets River. For the best beam-trawl catches see drags 5, 20-23, 27, 32, 41-43, and 45 in the fishing log. Shrimp from these drags ranged from 115 to 166 whole (heads-on) shrimp a pound.<sup>7/</sup>

Although only a limited number of drags were made with the small West Coast box-type otter trawl, results indicated that this gear was considerably more effective than the beam trawl in taking shrimp in the area explored off the Washington coast. This was probably due to the larger size of the otter trawl and the faster speed at which the otter trawl was normally towed resulting in more bottom being fished than when using the beam trawl for a similar period of time.

Off Copalis Head four beam-trawl drags at depths of 44 to 81 fathoms caught from 55 to 95 pounds of shrimp an hour and 3 otter-trawl drags at depths of 48 to 80 fathoms caught from 240 to 600 pounds of shrimp an hour. Off the Queets River, a beam-trawl drag at 61 to 65 fathoms that caught 120 pounds of shrimp an hour was approximately duplicated by an otter-trawl drag at 61 to 63 fathoms which caught 270 pounds of shrimp an hour. In this same locality in deeper water a beam-trawl drag at 77 to 88 fathoms caught 110 pounds of shrimp an hour while an approximate duplicate otter-trawl drag at 81 to 85 fathoms caught 50 pounds of pink shrimp an hour. This was the only drag in which the otter trawl failed to catch more shrimp per hour than the best beam-trawl drag of the entire fall exploration.

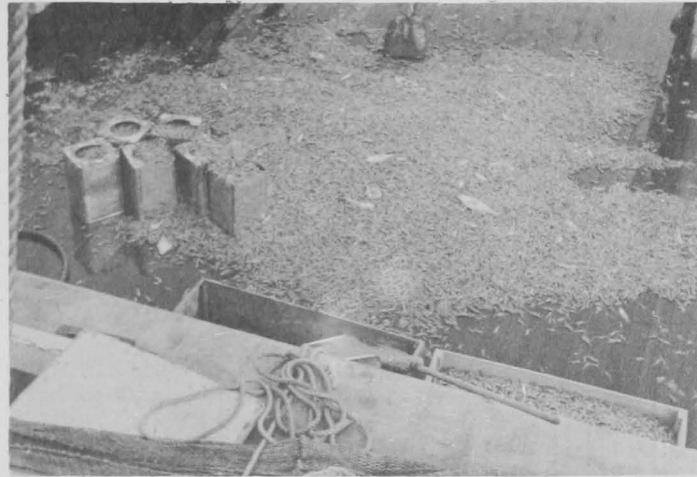


Fig. 7 - A clean catch of shrimp taken with the Gulf shrimp trawl.

Beam-trawl catches usually contained only small quantities of incidental fish, requiring little time or effort in separating the fish from the shrimp. Otter-trawl catches, however, usually contained larger quantities of fish<sup>8/</sup> in relation to the shrimp, making it impracticable to separate all the shrimp.

Shrimp taken in the otter trawl appeared to be smashed in varying degrees, probably due in part to the pressure of the fish against them while in the net. For these reasons it was decided that the use of the small otter trawl for catching shrimp would not be practicable in a commercial operation, and it was decided to experiment in the use of a Gulf shrimp trawl during future shrimp explorations off the Washington coast. It was believed that a 40-foot Gulf shrimp trawl would catch more shrimp than the beam trawl because of its increased spread and faster towing

<sup>5/</sup> "Trace" - less than one pound of shrimp.

<sup>6/</sup> During the fall exploration all drags in which the gear reached the bottom were of 1-hour duration with the exception of drags number 1 and 34 which were beam-trawl drags and drags number 48 and 49 which were otter-trawl drags. The catches for drags number 48 and 49 have been converted to an hourly basis in the discussion.

<sup>7/</sup> For details of number of whole shrimp per pound for various drags see tables 1 and 2.

<sup>8/</sup> Data concerning fish taken along with the shrimp have been turned over to the State of Washington Department of Fisheries shellfish division for processing.

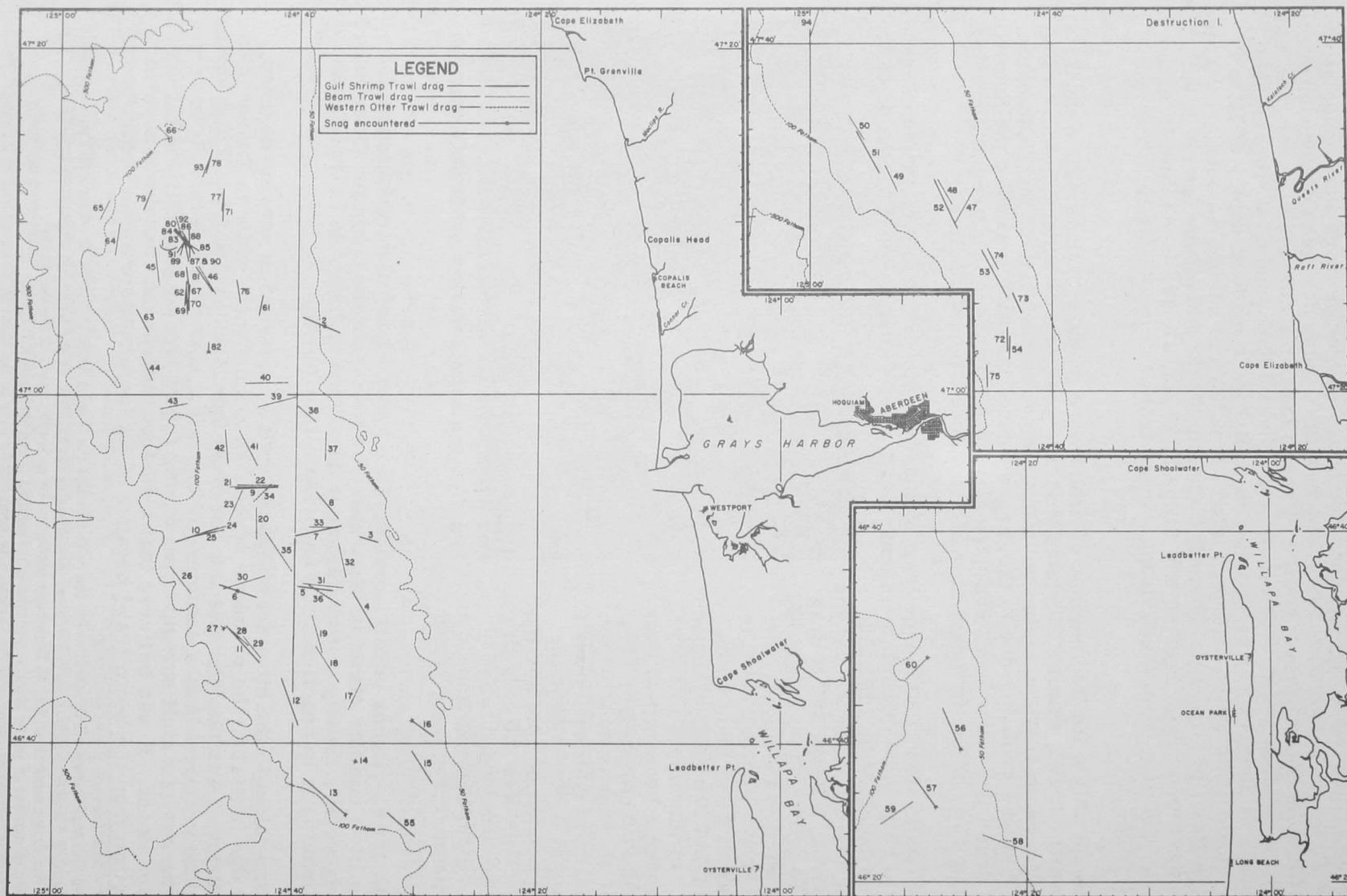


Fig. 8 - Location of beam-trawl drags, otter-trawl drags, and Gulf shrimp-trawl drags, spring exploration (March 27 to April 19, 1956).



speed resulting in more bottom being fished per hour. It was also believed that the 40-foot Gulf shrimp trawl would catch less fish than the West Coast box-type otter trawl because of its shorter wings, less overhang, and the method of attaching the doors almost directly to the net rather than having "dandy-line" gear leading from the doors to the net as in the case of the West Coast otter trawl. These beliefs proved to be true during the spring shrimp exploration.

SPRING EXPLORATION: The best shrimp catches during the spring exploration were made with the Gulf shrimp trawl. Of the 51 drags made with this gear, 25 caught shrimp in amounts ranging from 300 to 2,200 pounds an hour.<sup>9/</sup>

These 25 drags were made in the area between the mouth of Queets River and Oysterville at depths ranging from 61 to 87 fathoms. The two most promising localities which appeared to offer the best prospects for the development of a commercial shrimp fishery are between the mouth of the Moclips River and the mouth of Conner Creek, and between Grays Harbor and Cape Shoalwater.

Between the mouth of the Moclips River and the mouth of Connor Creek a total of 21 daytime and 4 nighttime drags were made with the Gulf shrimp trawl. Excellent shrimp catches were made during daytime hours in 15 of 16 drags at depths of 69 to 79 fathoms. With the exception of drag No. 1 which caught 175 pounds of shrimp, the other 15 drags at these depths caught from 980 to 2,200 pounds of shrimp an hour and averaged 1,407 pounds of shrimp an hour. Included in these 15 drags which were all made on green mud bottom were a series of 7 "production" drags (Nos. 85-91), each of 30-minutes duration made over a 6-hour period between 6:00 a.m. and 12 noon on April 18. These 7 drags, at depths of 74 to 79 fathoms, produced a total of 5,210 pounds of shrimp, with an average of 744 pounds of shrimp per 30-minute drag. The shrimp from these "production" drags averaged from 117 to 148 whole (heads on) shrimp a pound.

The remaining 5 daytime drags with the Gulf shrimp trawl in this locality at various depths from 48 to 66 fathoms and from 83 to 86 fathoms caught from a trace to 250 pounds of shrimp an hour.

Drags with the beam trawl in this locality at depths of 73 to 81 fathoms caught from 90 to 200 pounds of shrimp an hour and drags at over 90 fathoms caught insignificant quantities of shrimp.

The four nighttime drags, all made with the Gulf shrimp trawl, were approximate duplicates of daytime drags which had produced excellent catches of shrimp. The nighttime drags, however, produced only insignificant catches of shrimp ranging from 8 to 14 pounds of shrimp an hour. These drags, each of 30 minutes duration, were started from 1½ to 4 hours after sunset. Results of these nighttime drags suggest that shrimp trawling may not be productive during certain hours of darkness in this area during this season of the year.

Evidence that individuals of this species of shrimp do come off the bottom at night was subsequently obtained in early June 1956, off the northern end of Vancouver Island during a midwater trawl expedition for fish by the John N. Cobb. A drag with a midwater trawl at depths of 43½ to 50 fathoms over bottom depths of 109 to 121 fathoms caught 186 individual pink shrimp. This drag, of 1-hour duration was started 4¾ hours after sunset. With the exception of a small-mesh liner in the cod end, the mesh size of the rest of this midwater trawl was too large to effectively capture shrimp, and more shrimp would probably have been taken if the entire net were of a small-mesh size.

<sup>9/</sup> Catch results have been converted to a rate-per-hour basis as some variation occurred in the duration of a considerable number of individual drags during the spring exploration.

The one nighttime beam-trawl drag made during the fall exploration caught 65 pounds of shrimp an hour. This drag was started  $2\frac{1}{2}$  hours after sunset and was not a duplicate of a daytime drag.

Between the entrance of Grays Harbor and Cape Shoalwater a total of 28 drags were made at depths of 54 to 93 fathoms. Of these 28 drags, 16 were made with the beam trawl, 9 with the Gulf shrimp trawl, and 3 with the western otter trawl. Except for 1 drag at 54 to 56 fathoms which caught only 6 pounds of shrimp an hour and another which snagged, the other 7 drags with the Gulf shrimp trawl caught from 230 to 700 pounds of shrimp an hour. These 7 drags were made at depths of 57 to 87 fathoms. The best drag was made on a green mud bottom while the remaining drags were on a bottom composed of green mud and sand.

Of the 16 beam-trawl drags, 1 resulted in a broken beam, 8 caught from 120 to 275 pounds of shrimp an hour, and the remainder caught from 3 to 90 pounds of shrimp an hour. The majority of the beam-trawl drags which caught over 120 pounds of shrimp an hour were made in approximately the same locations as some of the better Gulf shrimp-trawl drags. The 3 otter-trawl drags caught from 150 to 600 pounds of shrimp an hour. The sizes here ranged from 109 to 182 whole (heads-on) shrimp a pound.

Commercial quantities of shrimp were also taken with the Gulf shrimp trawl between Cape Elizabeth and Kalaloch Creek at depths ranging from 57 to 83 fathoms. The majority of the drags with this gear in this locality caught from 420 to 720 pounds of shrimp an hour with only 1 drag <sup>10/</sup> producing less than 420 pounds of shrimp an hour. Drags with the beam trawl caught from 140 to 250 pounds of shrimp an hour.

While drags in this locality produced commercial quantities of shrimp, the shrimp were consistently small, averaging from 161 to 214 whole (heads-on) shrimp a pound. These small shrimp may be present only at certain seasons of the year, as shrimp taken from drags in this locality during the fall exploration showed a marked variation in size running from 100 to 166 whole (heads-on) shrimp a pound.

Between Cape Shoalwater and Long Beach 8 drags were made with the Gulf shrimp trawl at depths of 54 to 105 fathoms, with only 1 drag resulting in a catch of over 300 pounds an hour. This drag (No. 55), of 1-hour duration, was made at 75 to 80 fathoms and caught 315 pounds of shrimp. Five of these drags encountered snags which resulted in torn web. Beam-trawl drags in this area caught only small amounts of shrimp and 1 drag resulted in a broken beam.

#### SHRIMP ICING EXPERIMENTS

Shrimp were held on ice during the spring exploration for as long as 96 hours with little change noted in the texture of the shrimp meat before or after cooking. The cooked shrimp meat was equal in flavor and color to that of shrimp cooked soon after being landed. It was noted, however, that after 48 hours on ice the pink color of the whole shrimp appeared to have faded to a paler shade. After a day on ice, the shrimp were much easier to peel than when first caught.

#### WEATHER CONDITIONS

Fishing operations during the fall exploration were seriously curtailed by adverse weather conditions, with no trawling possible on 9 of the 23 days the vessel was in the area of fishing operations.

Weather conditions were generally favorable for fishing operations during the spring exploration with trawling possible on all but 5 of the 24 days the vessel was in the area of fishing operations.

<sup>10/</sup> Drag Nos. 53 and 54 are not included. These drags, made during adverse weather conditions, captured only trace amounts of shrimp and were approximately duplicated by drags No. 74 and 72, respectively, which caught 720 and 420 pounds of shrimp an hour.

Table 1 - Fishing Log--Shrimp Exploration Off The Washington Coast--Fall 1955--John N. Cobb

Drag number	1 (B.T.) <sup>1/</sup>	2 (B.T.)	3 (B.T.)	4 (B.T.)	5 (B.T.)	6 (B.T.)	7 (B.T.)	8 (B.T.)	9 (B.T.)	10 (B.T.)	11 (B.T.)	12 (B.T.)	13 (B.T.)
Date	10/18/55	10/19/55	10/19/55	10/19/55	10/19/55	10/19/55	10/20/55	10/20/55	10/20/55	10/20/55	10/20/55	10/20/55	10/21/55
Latitude N.	46°36.3'	46°29.5'	46°34.7'	46°34.2'	46°35.6'	46°37.8'	46°34.1'	46°34.7'	46°35.1'	46°37.2'	46°38.8'	46°39.6'	46°37.3'
Longitude W.	124°12.1'	124°10.0'	124°16.2'	124°24.2'	124°28.0'	124°33.2'	124°29.7'	124°32.0'	124°33.9'	124°38.2'	124°35.4'	124°32.5'	124°28.8'
Loran reading	2H4-3800	2H4-3715	2H4-3779	2H4-3770	2H4-3784	2H4-3806	2H4-3763	2H4-3769	2H4-3772	2H4-3792	2H4-3816	2H4-3827	2H4-3805
Loran reading	2H5-3489	2H5-3487	2H5-3479.5	2H5-3460	2H5-3451	2H5-3437	2H5-3445	2H5-3439	2H5-3433	2H5-3420	2H5-3430	2H5-3440	2H5-3450
Course, magnetic <sup>2/</sup>	272°	260°	266°	250°	329°	110°	291°	278°	245°	290°	051°	211°	325°
Sea	Smooth	Smooth	Smooth	Slight	Slight	Slight	Slight	Slight	Smooth	Slight	Slight	Slight	Calm
Depth range in fathoms	25-28	21-28	34-39	50-69	62-65	71-74	81-84	89-91	100-116	89-93	68-76	69-77	57-61
Type of bottom	gy. S.	gy. S.	gn. M. & S.	gn. M. & S.	gn. M. & S.	gn.-gy. M. & S.	gn. M. & S.	gn. M. & S.	gn. M. & S.	gn. M. & S.	-	gn. M. & S.	gn. M. & S.
Trawling bottom	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	-	Clear	Clear
Time on bottom in minutes	30	60	60	60	60	60	60	60	60	60	-	60	60
Shrimp catch in pounds: (whole shrimp per pound) <sup>3/</sup>													
Pink	Trace <sup>4/</sup>	Trace	14 (117)	35 (140)	130 (127)	18 (134)	75 (164)	80 (119)	40 (121)	30 (119)	-	45 (142)	75 (119)
Side-strips	-	-	-	-	-	-	1 (78)	2 (73)	2 (75)	-	-	-	-
Total shrimp catch in pounds	-	-	14	35	130	18	76	82	42	30	-	45	75
Remarks	-	-	-	-	-	-	-	-	-	-	Net not on bottom	-	-

Drag number	14 (B.T.) <sup>1/</sup>	15 (B.T.)	16 (B.T.)	17 (B.T.)	18 (B.T.)	19 (B.T.)	20 (B.T.)	21 (B.T.)	22 (B.T.)	23 (B.T.)	24 (B.T.)	25 (B.T.)	26 (B.T.)
Date	10/21/55	10/21/55	10/21/55	10/21/55	10/21/55	10/22/55	10/22/55	10/22/55	10/22/55	10/22/55	10/23/55	10/28/55	10/28/55
Latitude N.	46°39.4'	46°34.5'	46°30.8'	46°29.7'	46°37.4'	46°45.4'	46°46.0'	46°48.4'	46°51.2'	46°51.8'	46°53.9'	47°28.1'	47°26.7'
Longitude W.	124°27.4'	124°25.5'	124°23.6	124°26.0'	124°20.0'	124°27.5'	124°32.2'	124°36.5'	124°41.0	124°35.1'	124°24.9'	124°12.5'	124°11.2'
Loran reading	2H4-3831	2H4-3772	2H4-3728	2H4-3714	2H4-3812	2H4-3905	2H4-3907	2H4-3928	2H4-3952	2H4-3970	2H4-4011	2H4-4253	2H4-4253
Loran reading	2H5-3455	2H5-3457	2H5-3459	2H5-3452	2H5-3473	2H5-3459	2H5-3444	2H5-3429	2H5-3411	2H5-3435	2H5-3473	2H5-3286	2H5-3305
Course, magnetic <sup>2/</sup>	115°	167°	258°	148°	248°	273°	291°	254°	044°	047°	259°	254°	266°
Sea	Smooth	Smooth	Smooth	Smooth	Smooth	Slight	Slight	Slight	Slight	Slight	Slight	Slight	Slight
Depth range in fathoms	52-53	55-61	49-64	58-60	41-47	48-52	57-61	65-71	62-69	51-56	36-43	53-63	50-56
Type of bottom	br.-gn. M. & S.	gn. M. S. & Sh.	gn. M. & S.	gn. M. & S.	gn. M. & S.	gn. M. & S.	gn. M. & S.	gn. M. & S.	gn. M. & S.	gn. M. & S.	-	gn. S.	gn. M. & S.
Trawling bottom	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	-	Clear	Clear
Time on bottom in minutes	60	60	60	60	60	60	60	60	60	60	-	60	60
Shrimp catch in pounds: (whole shrimp per pound) <sup>3/</sup>													
Pink	40 (115)	65 (139)	45 (126)	30 (134)	70 (125)	75 (150)	110 (158)	140 (145)	130 (148)	140 (161)	-	40 (121)	70 (107)
Side-strips	-	-	-	-	-	-	-	-	-	-	-	-	-
Total shrimp catch in pounds	40	65	45	30	70	75	110	140	130	140	-	40	70
Remarks	-	-	-	-	-	-	-	-	-	-	Net not on bottom	-	-

Note: For explanation of footnotes and abbreviations, see p. 20.

Table 1 - Fishing Log--Shrimp Exploration Off The Washington Coast--Fall 1955--John N. Cobb (Contd.)

Drag number	27 (B.T.) <sup>1/</sup>	28 (B.T.)	29 (B.T.)	30 (O.T.)	31 (O.T.)	32 (B.T.)	33 <sup>2/</sup> (B.T.)	34 (B.T.)	35 (O.T.)	36 (B.T.)	37 (B.T.)	38 (B.T.)	39 (B.T.)
Date	10/31/55	11/1/55	11/1/55	11/1/55	11/1/55	11/1/55	11/1/55	11/5/55	11/5/55	11/6/55	11/6/55	11/6/55	11/6/55
Latitude N.	47°09.1'	47°04.8'	47°05.1'	47°04.7'	47°07.3'	47°03.1'	46°58.6'	46°57.3'	47°09.7'	47°47.8'	47°44.1'	47°41.0'	47°40.5'
Longitude W.	124°40.3'	124°36.2'	124°40.6'	124°37.6'	124°47.3'	124°48.7'	124°41.9'	124°42.9'	124°47.8'	124°56.8'	124°55.7'	125°00.6'	124°55.5'
Loran reading	2H4-4145	2H4-4115	2H4-4105	2H4-4110	2H4-4103	2H4-4058	2H4-4033	2H4-4017	2H4-4122	2H4-4253	2H4-4250	2H4-4229	2H4-4213
Loran reading	2H5-3400	2H5-3428	2H5-3405	2H5-3421	2H5-3362	2H5-3363	2H5-3404	2H5-3400	2H5-3353	2H5-3029	2H5-3070	2H5-3070	2H5-3104
Course, magnetic <sup>2/</sup>	247°	247°	239°	239°	261°	273°	277°	090°	321°	173°	241°	067°	044°
Sea	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Rough	Moderate	Moderate	Moderate	Slight	Slight	Slight
Depth range in fathoms	55-61	44-53	55-63	48-59	72-80	77-81	64-69	70-71	73-77	62-65	63-72	70-84	57-65
Type of bottom	gn. M.	gn. M. & S.	gn. M.	gn. M. & S.	gn. M.	gn. M.	-	S. & Blds.	gn. M.	gn. M.	gn. M. & S.	gn. M.	gn. M. & S.
Trawling bottom	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Snag	Snag	Clear	Clear	Clear	Clear
Time on bottom in minutes	60	60	60	60	60	60	60	7	60	60	60	60	60
Shrimp catch in pounds: (whole shrimp per pound) <sup>3/</sup>													
Pink	90 (151)	60 (123)	55 (119)	240 (-)	600 (118)	95 (115)	65 (104)	Trace <sup>4/</sup>	250 (148)	40 (124)	45 (123)	85 (120)	55 (125)
Side-stripe	-	-	-	-	-	-	-	-	-	-	-	-	-
Total shrimp catch in pounds	90	60	55	240	600	95	65	-	250	40	45	85	55
Remarks	-	-	-	-	-	-	-	Beam broke	Net torn	-	-	-	-
Drag number	40 (B.T.) <sup>1/</sup>	41 (B.T.)	42 (B.T.)	43 (B.T.)	44 (B.T.)	45 (B.T.)	46 (O.T.)	47 (O.T.)	48 (O.T.)	49 (O.T.)	50 (B.T.)	51 (B.T.)	52 (B.T.)
Date	11/6/55	11/7/55	11/7/55	11/7/55	11/7/55	11/7/55	11/8/55	11/8/55	11/8/55	11/8/55	11/8/55	11/9/55	11/9/55
Latitude N.	47°40.8'	47°35.8'	47°33.2'	47°32.7'	47°26.6'	47°23.6'	47°32.5'	47°32.5'	47°32.9'	47°34.7'	47°51.8'	48°00.3'	48°03.6'
Longitude W.	124°59.8'	124°56.2'	124°53.8'	124°47.5'	124°44.3'	124°43.5'	124°48.1'	124°48.3'	124°48.3'	124°56.5'	124°55.8'	124°56.7'	124°58.2'
Loran reading	2H4-4231	2H4-4230	2H4-4230	2H4-4219	2H4-4242	2H4-4232	2H4-4247	2H4-4246	2H4-4247	2H4-4225	2H4-4262	2H4-4270	2H4-4270
Loran reading	2H5-3077	2H5-3140	2H5-3177	2H5-3218	2H5-3207	2H5-3313	2H5-3216	2H5-3216	2H5-3212	2H5-3148	2H5-2995	2H5-2906	2H5-2866
Course, magnetic <sup>2/</sup>	333°	169°	132°	177°	130°	160°	161°	165°	170°	332°	337°	119°	165°
Sea	Slight	Moderate	Moderate	Moderate	Slight	Slight	Slight	Moderate	Slight	Smooth	Smooth	Moderate	Moderate
Depth range in fathoms	78-81	78-88	78-79	61-65	57-58	63-65	61-64	61-64	61-63	81-85	54-57	48-51	56-57
Type of bottom	gn. M. & Sh.	gn. M. S. & Sh.	gn. M. S. & Sh.	gn. M. & S.	gn. M. & S.	gn. M. & S.	-	-	gn. M. & S.	gn. M. & S.	gn. S. & Sh.	gn. S.	gn. S.
Trawling bottom	Clear	Clear	Clear	Clear	Clear	Clear	-	-	Clear	Clear	Clear	Clear	Clear
Time on bottom in minutes	60	60	60	60	60	60	-	-	30	30	60	60	60
Shrimp catch in pounds: (whole shrimp per pound) <sup>3/</sup>													
Pink	45 (120)	110 (163)	150 (166)	120 (135)	80 (124)	125 (139)	-	-	135 (100)	25 (100)	60 (130)	Trace <sup>4/</sup>	Trace
Side-stripe	-	-	-	-	-	-	-	-	-	-	-	-	-
Total shrimp catch in pounds	45	110	150	120	80	125	-	-	135	25	60	-	-
Remarks	-	-	-	-	-	-	Net not on bottom	Net not on bottom	-	-	-	-	-

<sup>1/</sup>Indicates type of gear; B.T. - beam trawl, O.T. - otter trawl.

<sup>2/</sup>Course given is between starting point and end point.

<sup>3/</sup>Figures in parentheses indicate number of whole shrimp per pound.

<sup>4/</sup>"Trace" - less than one pound of shrimp.

<sup>5/</sup>Night drag.

Symbols for Types of Bottom:

Blds. - boulders M. - mud  
br. - brown S. - sand  
gn. - green Sh. - shells  
gy. - gray



Table 2 - Fishing Log--Shrimp Exploration Off The Washington Coast--Spring 1956--John N. Cobb

Drag number	1 (G.S.T.) <sup>1/</sup>	2 (G.S.T.)	3 (G.S.T.)	4 (G.S.T.)	5 (G.S.T.)	6 (G.S.T.)	7 (G.S.T.)	8 (G.S.T.)	9 (G.S.T.)	10 (G.S.T.)	11 (G.S.T.)	12 (G.S.T.)
Date	3/27/56	3/27/56	3/27/56	3/31/56	3/31/56	3/31/56	3/31/56	3/31/56	3/31/56	3/31/56	4/1/56	4/1/56
Latitude N.	47°08.6'	47°04.4'	46°51.7'	46°46.5'	46°48.7'	46°48.3'	46°51.8'	46°52.7'	46°54.6'	46°52.3'	46°46.7'	46°43.7'
Longitude W.	124°51.6'	124°39.6'	124°34.7'	124°33.5'	124°36.8'	124°43.1'	124°40.0'	124°36.4'	124°41.5'	124°46.4'	124°45.6'	124°41.1'
Loran reading	2H4-4098	2H4-4101	2H4-3970	2H4-3911	2H4-3931	2H4-3915	2H4-3961	2H4-3979	2H4-3990	2H4-3952	2H4-3891	2H4-3865
Loran reading	2H5-3333	2H5-3411	2H5-3437	2H5-3440	2H5-3428	2H5-3402	2H5-3415	2H5-3430	2H5-3408	2H5-3386	2H5-3392	2H5-3411
Course, magnetic <sup>2/</sup>	073°	090°	084°	307°	254°	266°	055°	298°	246°	229°	116°	138°
Sea	Moderate	Rough	Rough	Slight	Slight	Slight	Slight	Slight	Slight	Slight	Slight	Slight
Depth range in fathoms	77-78	48-56	54-56	57-60	65-72	76-83	61-70	60-62	69-77	82-86	82-87	76-84
Type of bottom	gn. M.	gn. M. & S.	gn. M. & S.	gn. M. & S.	gn. M. & S.	gn. M. & S.	gn. M. & S.	gn. M. & S.	gn. M. & S.	gn. M. & S.	gn. M.	S. & hrd.
Trawling bottom	Clear	Snag	Clear	Clear	Clear	Snag	Clear	Clear	Clear	Clear	Clear	Clear
Time on bottom in minutes	60	60	30	60	60	60	60	60	60	60	60	60
Shrimp catch in pounds: (whole shrimp per pound) <sup>3/</sup>												
Pink	175 (167)	Trace <sup>4/</sup>	3	240 (134)	250 (131)	Trace	300 (131)	230 (120)	350 (120)	400 (182)	700 (142)	20 (151)
Side-stripe	-	-	-	-	-	-	-	-	-	-	-	-
Total shrimp catch in pounds	175	Trace	3	240	250	Trace	300	230	350	400	700	20
Total shrimp catch, hourly basis	175	Trace	6	240	250	Trace	300	230	350	400	700	20
Remarks	-	Net torn	-	-	-	Net torn	-	-	-	-	-	-

Drag number	13 (G.S.T.) <sup>1/</sup>	14 (G.S.T.)	15 (G.S.T.)	16 (G.S.T.)	17 (B.T.)	18 (B.T.)	19 (B.T.)	20 (B.T.)	21 (B.T.)	22 (B.T.)	23 (B.T.)	24 (B.T.)
Date	4/1/56	4/1/56	4/1/56	4/1/56	4/1/56	4/1/56	4/2/56	4/2/56	4/2/56	4/2/56	4/2/56	4/2/56
Latitude N.	46°38.0'	46°39.1'	46°37.6'	46°40.3'	46°41.9'	46°43.5'	46°45.1'	46°53.4'	46°54.7'	46°54.7'	46°54.6'	46°52.4'
Longitude W.	124°39.1'	124°34.8'	124°28.5'	124°28.3'	124°35.4'	124°36.3'	124°37.7'	124°43.3'	124°45.4'	124°41.4'	124°44.4'	124°45.8'
Loran reading	2H4-3801	2H4-3819	2H4-3809	2H4-3842	2H4-3852	2H4-3870	2H4-3888	2H4-3972	2H4-3980	2H4-3991	2H4-3982	2H4-3955
Loran reading	2H5-3417	2H5-3432	2H5-3451	2H5-3453	2H5-3431	2H5-3429	2H5-3424	2H5-3400	2H5-3389	2H5-3408	2H5-3394	2H5-3389
Course, magnetic <sup>2/</sup>	109°	145°	306°	285°	002°	304°	322°	157°	068°	248°	085°	231°
Sea	Slight	Moderate	Moderate	Moderate	Moderate	Moderate	Slight	Slight	Slight	Slight	Smooth	Smooth
Depth range in fathoms	90-105	73-74	60-62	54-60	68-72	72-74	69-74	73-75	69-78	68-77	76-82	82-86
Type of bottom	Cl. S. & Blds.	Blds. & hrd.	gn. M. & S.	gn. S. Blds. & G.	gn. M. & S.	gn. M. & S.	gn. S. Cl. & hrd.	gn. M. & S.	gn. M. & S.	gn. M. & S.	gn. M. & S.	gn. M. & S.
Trawling bottom	Snag	Snag	Clear	Snag	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear
Time on bottom in minutes	60	7	60	44	60	60	60	60	60	60	60	60
Shrimp catch in pounds: (whole shrimp per pound) <sup>3/</sup>												
Pink	5 (116)	-	150 (130)	30 (115)	30 (118)	25 (109)	3	225 (109)	120 (133)	175 (149)	200 (142)	65 (176)
Side-stripe	-	-	-	-	-	-	-	-	-	-	-	-
Total shrimp catch in pounds	5	-	150	30	30	25	3	225	120	175	200	65
Total shrimp catch, hourly basis	5	-	150	44	30	25	3	225	120	175	200	65
Remarks	Net torn	Net torn Hung up	-	Net torn	-	-	-	-	-	-	-	-

Note: For explanation of footnotes and abbreviations, see p. 24.

Table 2 - Fishing Log--Shrimp Exploration Off The Washington Coast--Spring 1956--John N. Cobb (Contd.)

Drag number	25 (B.T.) <sup>1/</sup>	26 (B.T.)	27 (B.T.)	28 (B.T.)	29 (B.T.)	30 (B.T.)	31 (B.T.)	32 (B.T.)	33 (B.T.)	34 (O.T.)	35 (O.T.)	36 (O.T.)
Date	4/2/56	4/3/56	4/3/56	4/3/56	4/3/56	4/3/56	4/3/56	4/3/56	4/3/56	4/4/56	4/4/56	4/4/56
Latitude N.	46°51.8'	46°50.1'	46°46.7'	46°46.6'	46°44.9'	46°48.8'	46°49.1'	46°49.5'	46°52.3'	46°54.9'	46°52.0'	46°49.0'
Longitude W.	124°48.9'	124°50.4'	124°46.1'	124°45.7'	124°42.8'	124°45.9'	124°39.3'	124°35.8'	124°36.5'	124°42.0'	124°42.5'	124°38.8'
Loran reading	2H4-3940	2H4-3918	2H4-3890	2H4-3890	2H4-3876	2H4-3914	2H4-3931	2H4-3942	2H4-3973	2H4-3990	2H4-3958	2H4-3931
Loran reading	2H5-3374	2H5-3369	2H5-3390	2H5-3393	2H5-3404	2H5-3390	2H5-3418	2H5-3432	2H5-3429	2H5-3405	2H5-3404	2H5-3420
Course, magnetic <sup>2/</sup>	055°	119°	111°	109°	298°	050°	074°	325°	245°	202°	124°	101°
Sea	Smooth	Smooth	Smooth	Smooth	Slight	Slight	Slight	Slight	Moderate	Rough	Moderate	Moderate
Depth range in fathoms	82-86	92-93	87-88	82-87	82-85	76-82	64-71	62-63	62-65	70-74	72-75	65-69
Type of bottom	gn. M. & S.	gn. S. & St.	gn. M. & gy. Cl.	gn. M.	gn. M.	gn. M.	gn. M. & St.	gn. M. & S.	gn. M. & S.	gn. M. & S.	gn. M. & S.	gn. M. & S.
Trawling bottom	Clear	Clear	Clay bank	Clear	Clear	Clear	Clear	Clear	Soft	Clear	Clear	Clear
Time on bottom in minutes	60	60	10	60	60	60	60	60	60	30	60	60
Shrimp catch in pounds: (whole shrimp per pound) <sup>3/</sup>												
Pink	90 (156)	40 (163)	-	150 (153)	275 (123)	40 (125)	120 (116)	90 (110)	120 (118)	300	150 (121)	325 (120)
Side-stripe	-	Trace <sup>4/</sup>	-	-	-	-	-	-	-	-	-	-
Total shrimp catch in pounds	90	40	-	150	275	40	120	90	120	300	150	325
Total shrimp catch, hourly basis	90	40	-	150	275	40	120	90	120	600	150	325
Remarks	-	-	Beam broke Hung up	-	-	-	-	-	-	-	-	-

Drag number	37 (B.T.) <sup>1/</sup>	38 (B.T.)	39 (B.T.)	40 (B.T.)	41 (B.T.)	42 (B.T.)	43 (B.T.)	44 (B.T.)	45 (B.T.)	46 (B.T.)	47 (B.T.)	48 (B.T.)
Date	4/7/56	4/7/56	4/7/56	4/7/56	4/8/56	4/8/56	4/8/56	4/8/56	4/8/56	4/8/56	4/9/56	4/9/56
Latitude N.	46°56.1'	46°58.4'	46°59.2'	47°00.6'	46°57.9'	46°56.0'	46°59.5'	47°00.8'	47°08.5'	47°07.4'	47°29.7'	47°30.7'
Longitude W.	124°37.6'	124°38.4'	124°43.2'	124°44.3'	124°44.8'	124°45.7'	124°49.2'	124°52.1'	124°52.0'	124°48.4'	124°48.0'	124°48.2'
Loran reading	2H4-4017	2H4-4040	2H4-4036	2H4-4047	2H4-4018	2H4-3995	2H4-4021	2H4-4025	2H4-4096	2H4-4100	2H4-4238	2H4-4241
Loran reading	2H5-3425	2H5-3422	2H5-3397	2H5-3390	2H5-3390	2H5-3387	2H5-3366	2H5-3348	2H5-3331	2H5-3356	2H5-3240	2H5-3230
Course, magnetic <sup>2/</sup>	338°	290°	053°	067°	130°	333°	236°	313°	150°	125°	007°	307°
Sea	Moderate	Moderate	Moderate	Moderate	Smooth	Smooth	Smooth	Smooth	Smooth	Smooth	Smooth	Slight
Depth range in fathoms	57-58	56-59	59-69	60-69	72-78	78-81	85-91	89-91	78-81	70-73	58-65	64-66
Type of bottom	gn. M.	gn. M. & S.	gn. M. & S.	gn. M. & S. & St.	gn. M. & S.	gn. M. & Cl.	gn. M. & S. & St.	gn. M. & S.	gn. M. & S.	gn. M.	gn. M. & S.	gn. M. & S.
Trawling bottom	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear
Time on bottom in minutes	60	60	60	60	60	60	60	60	60	60	60	60
Shrimp catch in pounds: (whole shrimp per pound) <sup>3/</sup>												
Pink	10 (102)	35 (103)	30 (119)	65 (104)	55 (125)	4	25 (156)	50	90 (157)	125	140	250 (163)
Side-stripe	-	-	-	-	-	-	Trace <sup>4/</sup>	Trace	-	-	-	-
Total shrimp catch in pounds	10	35	30	65	55	4	25	50	90	125	140	250
Total shrimp catch, hourly basis	10	35	30	65	55	4	25	50	90	125	140	250
Remarks	-	-	-	-	-	-	-	-	-	-	-	-

Note: For explanation of footnotes and abbreviations, see p. 24.

Table 2 - Fishing Log--Shrimp Exploration Off The Washington Coast--Spring 1956--John N. Cobb (Contd.)												
Drag number	49 (B.T.) <sup>1/</sup>	50 (B.T.)	51 (G.S.T.)	52 (G.S.T.)	53 (G.S.T.)	54 (G.S.T.)	55 (G.S.T.)	56 (G.S.T.)	57 (G.S.T.)	58 (B.T.)	59 (B.T.)	60 (B.T.)
Date	4/9/56	4/9/56	4/9/56	4/9/56	4/9/56	4/9/56	4/12/56	4/12/56	4/12/56	4/12/56	4/13/56	4/13/56
Latitude N.	47°31.5'	47°31.5'	47°31.9'	47°32.1'	47°28.1'	47°23.1'	46°36.0'	46°29.9'	46°26.0'	46°22.6'	46°23.2'	46°31.6'
Longitude W.	124°52.8'	124°55.5'	124°56.2'	124°49.7'	124°45.8'	124°43.5'	124°32.2'	124°26.9'	124°29.1'	124°23.6'	124°32.0'	124°29.9'
Loran reading	2H4-4228	2H4-4228	2H4-4227	2H4-4240	2H4-4241	2H4-4230	2H4-3785	2H4-3715	2H4-3665	2H4-3628	2H4-3630	2H4-3733
Loran reading	2H5-3197	2H5-3155	2H5-3118	2H5-3210	2H5-3266	2H5-3317	2H5-3439	2H5-3450	2H5-3441	2H5-3453	2H5-3432	2H5-3443
Course, magnetic <sup>2/</sup>	312°	306°	129°	133°	130°	159°	110°	135°	122°	089°	033°	023°
Sea	Slight	Moderate	Moderate	Moderate	Rough	Rough	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
Depth range in fathoms	79-81	82-84	82-83	64-66	58-60	62-65	75-80	62-71	69-80	48-60	76-77	85-103
Type of bottom	gn. M. & S.	gn. M. & S.	gn. M. & S.	gn. M. & S.	gn. M.	gn. M. & S.	M.	M. S. & St.	Cl. & M.	gy. M. S. & Cl.	M. & S.	Cl.
Trawling bottom	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Snag	Snag	Clear	Clear	Clay bank
Time on bottom in minutes	60	60	60	60	60	30	60	60	60	90	60	60
Shrimp catch in pounds: (whole shrimp per pound) <sup>3/</sup>												
Pink	240 (198)	180 (198)	590 (214)	720 (161)	Trace	Trace	315 (133)	100 (114)	Trace	Trace	10 (170)	Trace
Side-stripe	---	Trace <sup>1/</sup>	Trace	-	-	-	-	-	-	-	-	-
Total shrimp catch in pounds	240	180	590	720	Trace	Trace	315	100	Trace	Trace	10	Trace
Total shrimp catch, hourly basis	240	180	590	720	Trace	Trace	315	100	Trace	Trace	10	Trace
Remarks	-	-	-	-	-	-	-	Net torn	Net torn	-	-	Beam broke

Drag number	61 (G.S.T.) <sup>1/</sup>	62 (G.S.T.)	63 (G.S.T.)	64 (B.T.)	65 (B.T.)	66 (B.T.)	67 <sup>2/</sup> (G.S.T.)	68 <sup>2/</sup> (G.S.T.)	69 (G.S.T.)	70 (G.S.T.)	71 (G.S.T.)	72 (G.S.T.)
Date	4/15/56	4/15/56	4/15/56	4/15/56	4/15/56	4/15/56	4/15/56	4/15/56	4/16/56	4/16/56	4/16/56	4/16/56
Latitude N.	47°04.5'	47°06.5'	47°04.9'	47°08.0'	47°10.2'	47°14.8'	47°06.3'	47°06.0'	47°06.1'	47°04.8'	47°10.0'	47°22.2'
Longitude W.	124°43.3'	124°49.4'	124°53.5'	124°55.4'	124°56.6'	124°50.9'	124°49.1'	124°49.1'	124°49.4'	124°49.2'	124°46.5'	124°43.8'
Loran reading	2H4-4090	2H4-4088	2H4-4059	2H4-4080	2H4-4093	2H4-4150	2H4-4087	2H4-4084	2H4-4084	2H4-4073	2H4-4130	2H4-4225
Loran reading	2H5-3391	2H5-3352	2H5-3332	2H5-3312	2H5-3297	2H5-3315	2H5-3354	2H5-3355	2H5-3353	2H5-3357	2H5-3360	2H5-3321
Course, magnetic <sup>2/</sup>	348°	160°	128°	345°	004°	293°	160°	330°	154°	336°	339°	337°
Sea	Moderate	Moderate	Slight	Slight	Slight	Slight	Slight	Slight	Slight	Slight	Slight	Smooth
Depth range in fathoms	62-62	76-78	83-86	90-94	126-139	100-111	76-78	75-76	76-77	74-76	69-70	63-65
Type of bottom	gn. M.	gn. M.	gy. M.	M. & S.	gy. M. & S.	gn. M. & S.	gn. M.	gn. M.	gn. M.	gn. M.	gn. M.	gn. M.
Trawling bottom	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear
Time on bottom in minutes	30	30	30	60	30	45	30	30	30	30	30	30
Shrimp catch in pounds: (whole shrimp per pound) <sup>3/</sup>												
Pink	80 (139)	800 (131)	4	Trace <sup>1/</sup>	Trace	Trace	4 (135)	7 (121)	490	525 (164)	1100 (132)	210 (169)
Side-stripe	-	-	-	-	1 (48)	Trace	-	-	-	-	-	-
Total shrimp catch in pounds	80	800	4	Trace	1	Trace	4	7	490	525	1100	210
Total shrimp catch, hourly basis	160	1600	8	Trace	2	Trace	8	14	980	1050	2200	420
Remarks	-	-	-	-	-	-	-	-	-	-	-	-

Note: For explanation of footnotes and abbreviations, see p. 24.

Table 2 - Fishing Log--Shrimp Exploration Off The Washington Coast--Spring 1956--John N. Cobb (Contd.)

Drag number	73 (G.S.T.) <sup>1/</sup>	74 (G.S.T.)	75 (G.S.T.)	76 (G.S.T.)	77 (G.S.T.)	78 (G.S.T.)	79 (G.S.T.)	80 (G.S.T.)	81 (G.S.T.)	82 (G.S.T.)	83 <sup>2/</sup> (G.S.T.)
Date	4/16/56	4/16/56	4/16/56	4/17/56	4/17/56	4/17/56	4/17/56	4/17/56	4/17/56	4/17/56	4/17/56
Latitude N.	47°24.5'	47°26.9'	47°21.5'	47°05.2'	47°10.6'	47°14.2'	47°11.8'	47°09.6'	47°07.3'	47°03.0'	47°08.7'
Longitude W.	124°42.5'	124°44.5'	124°45.5'	124°44.9'	124°46.5'	124°47.4'	124°52.4'	124°50.5'	124°48.6'	124°47.4'	124°49.5'
Loran reading	-	2H4-4242	2H4-4214	2H4-4092	2H4-4135	2H4-4160	2H4-4123	2H4-4111	2H4-4099	2H4-4061	2H4-4107
Loran reading	-	2H5-3283	2H5-3315	2H5-3381	2H5-3358	2H5-3340	2H5-3318	2H5-3337	2H5-3354	2H5-3370	2H5-3345
Course, magnetic <sup>2/</sup>	314°	309°	356°	328°	342°	172°	178°	117°	122°	162°	295°
Sea	Smooth	Smooth	Smooth	Slight	Slight	Slight	Slight	Moderate	Moderate	Moderate	Moderate
Depth range in fathoms	57-58	58-60	77-82	65-66	69-70	76-78	86-86	76-79	70-74	75-77	77-80
Type of bottom	gn. M. & S.	gn. M.	gn. M.	gn. M.	gn. M.	gn. M.	gn. S.	gn. M.	gn. M.	hrd.	gn. M.
Trawling bottom	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Snag	Clear
Time on bottom in minutes	30	30	30	30	30	30	30	30	30	10	30
Shrimp catch in pounds: (whole shrimp per pound) <sup>3/</sup>											
Pink	185 (175)	360 (208)	125 (197)	125 (138)	610 (132)	490 (148)	2 1/2	900 (141)	430 (130)	10	5 (111)
Side-stripe	-	-	Trace <sup>4/</sup>	-	-	-	-	-	-	-	-
Total shrimp catch in pounds	185	360	125	125	610	490	2 1/2	900	430	10	5
Total shrimp catch, hourly basis	370	720	250	250	1220	980	5	1800	860	60	10
Remarks	-	-	-	-	-	-	-	-	-	Net torn Rung up	-

Drag number	84 <sup>5/</sup> (G.S.T.)	85 (G.S.T.)	86 (G.S.T.)	87 (G.S.T.)	88 (G.S.T.)	89 (G.S.T.)	90 (G.S.T.)	91 (G.S.T.)	92 (O.T.)	93 (B.T.)	94 (B.T.)
Date	4/17/56	4/18/56	4/18/56	4/18/56	4/18/56	4/18/56	4/18/56	4/18/56	4/19/56	4/19/56	4/19/56
Latitude N.	47°08.9'	47°08.3'	47°09.4'	47°08.2'	47°09.4'	47°08.0'	47°09.0'	47°08.1'	47°08.8'	47°12.6'	47°40.5'
Longitude W.	124°49.9'	124°48.4'	124°49.8'	124°49.4'	124°49.2'	124°49.9'	124°49.7'	124°50.2'	124°49.8'	124°48.2'	125°00.0'
Loran reading	2H4-4108	2H4-4108	2H4-4113	2H4-4103	2H4-4115	2H4-4100	2H4-4110	2H4-4100	2H4-4108	2H4-4115	2H4-4230
Loran reading	2H5-3343	2H5-3353	2H5-3342	2H5-3347	2H5-3345	2H5-3345	2H5-3343	2H5-3343	2H5-3343	2H5-3341	2H5-3078
Course, magnetic <sup>2/</sup>	138°	297°	128°	332°	155°	355°	144°	007°	324°	357°	355°
Sea	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Slight	Slight
Depth range in fathoms	76-78	75-79	74-78	76-78	74-77	76-77	74-77	75-77	78-81	75-77	77-83
Type of bottom	gn. M.	gn. M.	gn. M.	gn. M.	gn. M.	gn. M.	gn. M.	gn. M.	gn. M.	gn. M.	gn. M.
Trawling bottom	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear
Time on bottom in minutes	30	30	30	30	30	30	30	30	30	60	60
Shrimp catch in pounds: (whole shrimp per pound) <sup>3/</sup>											
Pink	5 (96)	1050 (128)	650 (125)	925 (142)	855 (124)	560 (117)	590 (141)	580 (148)	35	200	70
Side-stripe	-	-	-	-	-	-	-	-	-	-	-
Total shrimp catch in pounds	5	1050	650	925	855	560	590	580	35	200	70
Total shrimp catch, hourly basis	10	2100	1300	1850	1710	1120	1180	1160	70	200	70
Remarks	-	-	-	-	-	-	-	-	-	-	-

<sup>1/</sup>Indicates type of gear; B. T. - beam trawl; O. T. - otter trawl; G. S. T. - Gulf shrimp trawl.

<sup>2/</sup>Course given is between starting point and end point.

<sup>3/</sup>Figures in parentheses indicate number of whole shrimp per pound.

<sup>4/</sup>"Trace" - less than one pound of shrimp.

<sup>5/</sup>Night drag.

Symbols for Types of Bottom:

Blds. - boulders hrd. - hard  
Cl. - clay M. - mud  
G. - gravel S. - sand  
Gy. - gray St. - stones  
gn. - green



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## MULTIMILLION-DOLLAR MEAT PROMOTION PLAN

Programs conducted by competing protein producers, such as outlined below, emphasize the need for the commercial fishing industry to collaborate on national promotional programs to maintain and increase its markets. In today's competitive market, local, regional, and national fish-producing groups cannot overlook any opportunity to make the consumer want to buy fish in preference to other competing products.

If the attitudes of several hundred livestock producers are representative, the livestock industry may be ready to indorse a multimillion-dollar national livestock meat promotion plan. A recent survey revealed that nearly 99 percent of the persons polled by the Iowa Beef Producers Association indicated a further need for research, education, and promotion to increase the consumption of meat. The program would be financed by a uniform check-off on all livestock sold for slaughter. At the end of each calendar month, these funds would be forwarded to a national livestock promotion commission for distribution. A straight across-the-board five cents per 100-pound-weight assessment is being considered which will raise about \$28,000,000 yearly. Of the funds so derived, 40 percent would be slated for the National Livestock and Meat Board; another 40 percent will be distributed among the National Livestock Councils, e.g., the National Beef Council, and the National Lamb Feeders Association; and the remaining 20 percent of the funds would go to the State producer councils.