

Charleston
A

Fish Commission of Oregon
Trawl Investigations
Report of Cruise 70-4, Shrimp

Vessel: M/V Sunrise, chartered trawler.

Dates: March 18-20, 1970.

- Objectives:
1. To collect samples of pink shrimp (Pandalus jordani) by sex and age for benthic distribution studies.
 2. To locate age I shrimp (1969 year class) in the study area.
 3. To tow for shrimp in the area 4 to 10 feet above the ocean floor.
 4. To collect associated oceanographic data.
 5. To tag incidentally caught lingcod (Ophiodon elongatus) and yellowtail rockfish (Sebastes flavidus).
 6. To collect anchovies for Pelagic Fisheries Investigations.
 7. To obtain fish specimens requested by the University of Idaho.

Methods: The study area for cruise 70-4 included 18 stations in the area off Tillamook Head (Figure 1). All stations except 1-3 are 4 nautical miles apart.

We used a 41-foot headrope Gulf semiballoon trawl. The trawl's body and intermediate is made of 1-1/8-inch stretch mesh netting and its cod-end consists of 1-1/2-inch mesh.

To determine the distribution of pink shrimp from 4 to 10 feet off the bottom during daytime towing, we attached a vertical distribution sampler (VDS) to the trawl (Figure 2). This sampler is similar to a device developed by personnel of the Bureau of Commercial Fisheries Exploratory Fishing and Gear Research Base in Seattle, Washington.

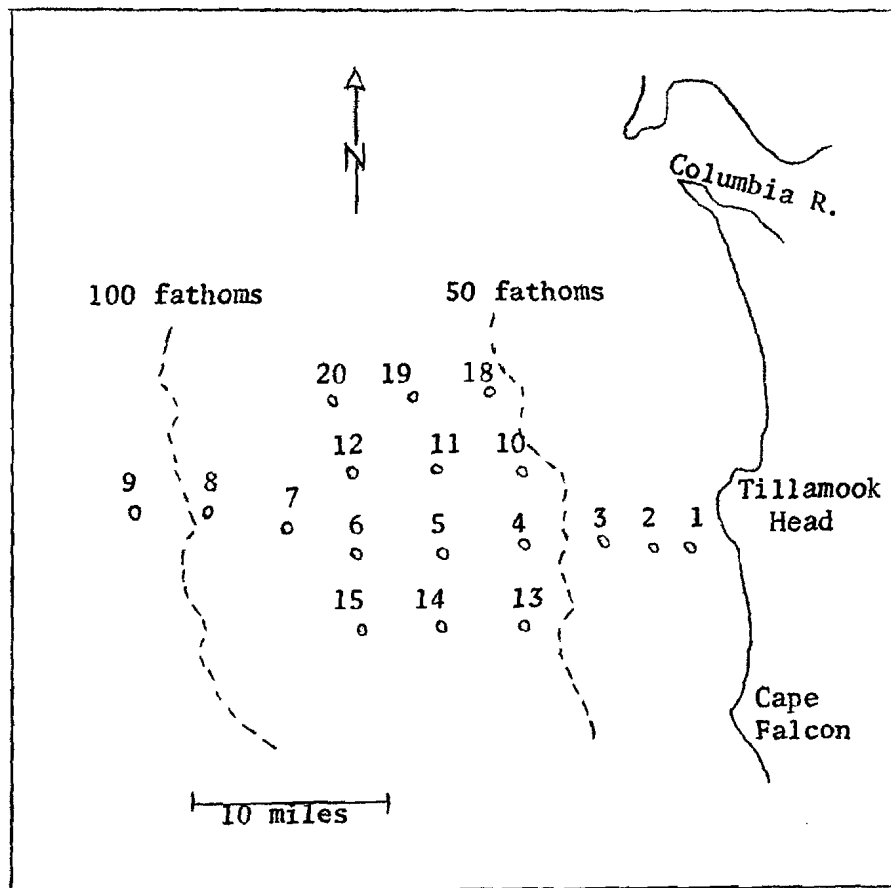


Figure 1. Location of trawl stations, Cruise 70-4

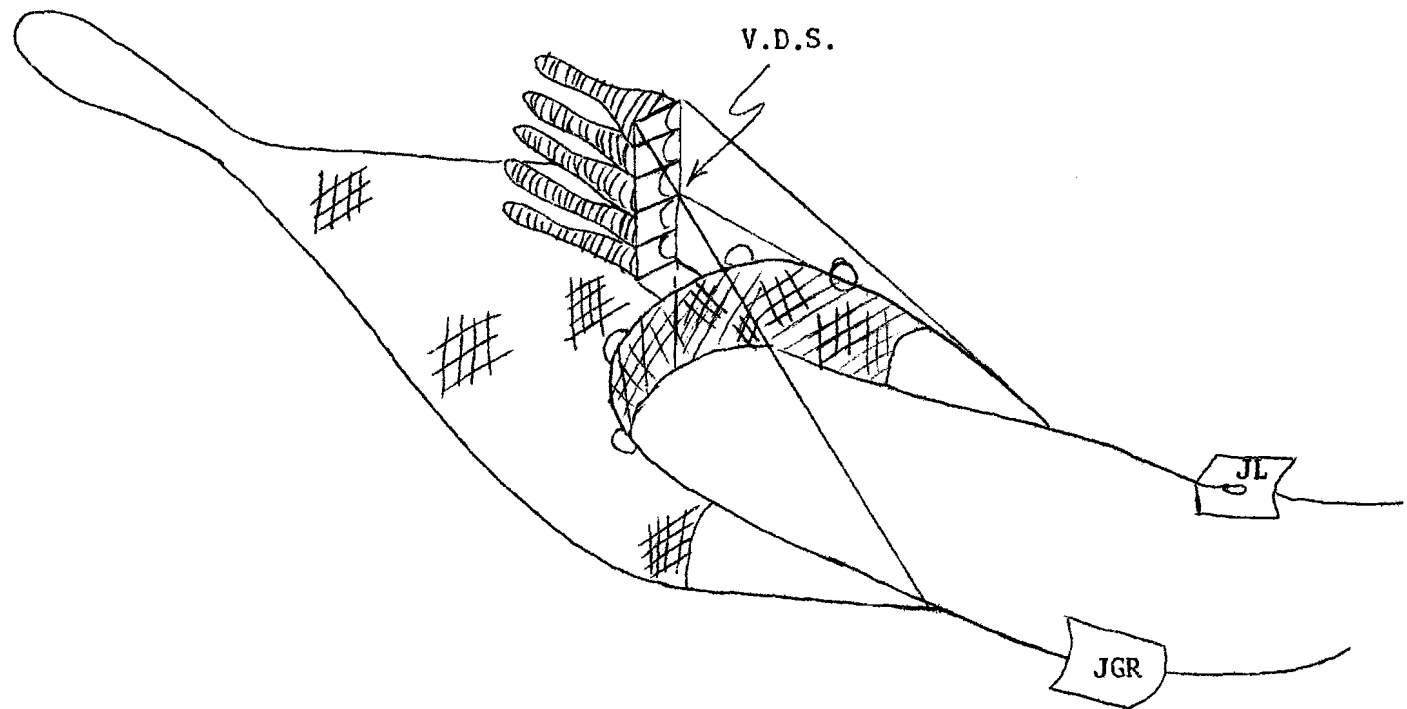


Figure 2. Placement of vertical distribution sampler in semiballoon trawl

The VDS has a frame of 2-1/2-inch aluminum tubing and is 2 feet wide and 10 feet high. There are five openings in the upper 6 feet, each measuring 1 foot vertically by 2 feet horizontally. Crosspieces separating the openings consist of 2-1/2-inch aluminum tubing. Knotless nylon, 1/2-inch mesh bags, 7 feet in length, are attached to each opening.

One 1/2-mile tow was made at each station. Approximately 400 shrimp were randomly sampled from the catch of each tow.

Results:

Table 1 summarizes the results obtained from shrimp catches collected at 15 stations in the study area. The average catch for stations having catches of one or more pounds was 60.0 pounds/tow. No shrimp were caught at station 3. Therefore, no tows were attempted at stations 1 and 2.

No distinct pattern was found in the shrimp distribution either by sex or age (Table 1). However, there was a general trend of a higher percentage (28.7-95.3) of females at six stations, (4-6, 10, 13 and 14) in the central and inshore portion of the study area. The same tendency at these stations was applicable for age III+ shrimp whose percentage ranged from 20.0 to 59.8. Other stations had a maximum of 18.5% females and 10.1% III+ age shrimp.

One-year old, immature males (1969 year class) were found in samples from 13 of the 15 stations towed. There was a higher percentage (31.9-96.9) of this year class at the offshore and northern stations. This was particularly apparent at stations 7 and 8 where the proportion of age I shrimp was over 94.0%.

Table 1 Summary of sex and age composition in percent of shrimp catches, cruise 70-4.

Station no.	Depth (fms)	Catch (lbs)	No. per pound ^{1/}	Sample size (no)	Sex composition				Age composition		
					Immature males	Males	Transitionals	Females	I	II	III+ ^{3/}
18	61	0.6	234	138 ^{2/}	72.4	2.2	10.9	14.5	72.5	23.9	3.6
19	72	71.0	283	396	84.1	3.3	3.5	9.1	84.1	8.6	7.3
20	78	7.0	169	398	31.9	22.6	35.2	10.3	31.9	63.1	5.0
10	62-63	2.0	77	150 ^{2/}	4.0	1.3	8.0	86.7	4.0	37.3	58.7
11	72-74	23.0	228	396	67.9	5.3	8.3	18.5	67.9	22.0	10.1
12	80	140.0	269	401	69.8	12.0	12.7	5.5	69.8	28.2	2.0
3	52-53	0.0	-	-	-	-	-	-	-	-	-
4	67	1.7	76	127 ^{2/}	0.0	0.0	4.7	95.3	0.0	40.2	59.8
5	78	42.0	138	401	25.7	15.7	26.4	32.2	25.7	53.9	20.4
6	81	101.0	155	401	44.6	11.2	15.5	28.7	44.7	32.4	22.9
7	83	0.7	427	286 ^{2/}	96.9	0.0	1.4	1.7	96.9	1.7	1.4
8	100-101	47.0	383	398	94.0	1.8	1.2	3.0	94.0	3.8	2.2
9	159	41.0	-	3 ^{2/}	0.0	33.3	66.7	0.0	0.0	100.0	0.0
13	73	8.0	136	400	28.3	14.5	25.2	32.0	28.2	51.8	20.0
14	80-81	122.0	126	397	20.4	28.2	16.6	34.8	20.4	53.1	26.5
15	83-84	156.0	224	398	56.8	18.8	16.1	8.3	56.8	38.2	5.0

^{1/} Includes 1969 year class shrimp (immature males).

^{2/} Total catch.

^{3/} Age III and IV+ shrimp are combined, unlike previous cruises, because of the increasing difficulty in separating them accurately.

The results of the VDS catches are summarized in Table 2. Nine pink shrimp were caught in the sampler. These were obtained at the three stations (12, 14 and 15) with the largest shrimp catches (122.0+ pounds). The VDS catches of other species may not be representative of their actual distribution near the ocean floor. Some may have been caught in the upper part of the water column while the sampler was being retrieved.

XBT casts were made at 10 stations. There was a gradual decrease in bottom temperature from inshore to offshore in the study area. Station 4, the closest inshore with XBT data, had a bottom temperature of 48.0 F while at station 9, the farthest offshore, the sea bed temperature was 43.2 F.

Twenty-eight yellowtail rockfish and three lingcod were tagged with dart tags.

Ten pounds of anchovies were collected for Pelagic Fisheries Investigations. Specimens of 24 species of fish were obtained for the ichthyology collection of the University of Idaho.

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Michael Hosie, Aquatic Biologist
Rudy Lovvold, Vessel Captain
Tom Lovvold, Crewman

Michael Hosie
Fish Commission of Oregon
April 29, 1970

Table 2 Vertical distribution sampler catches, cruise 70-4.

Station no.	Bag number and distance from bottom				
	1 8.8-9.8 ft.	2 7.6-8.6 ft.	3 6.4-7.4 ft.	4 5.2-6.2 ft.	5 4-5 ft.
18	0	0	0	0	0
19	0	0	0	0	0
20	0	0	0	0	0
10	0	0	0	0	0
11	1 smelt 1 anchovy	1 anchovy	0	1 anchovy	0
12	1 smelt	1 pink shrimp, immature male 1 euphasid	1 euphasid	1 pink shrimp, transitional	1 euphasid 2 smelt
3	0	0	0	0	0
4	0	6 euphasids	0	0	0
5	0	0	0	0	0
6	0	0	0	0	0
7	0	0	0	0	0
8	0	0	0	0	0
9	1 lanternfish	1 euphasid 1 smelt	1 euphasid 2 lanternfish	1 anchovy 1 smelt	0
13	0	0	1 smelt	1 smelt	0
14	2 pink shrimp, 1 transitional 1 female	4 pink shrimp, 2 males 2 females	0	0	0
15	0	1 pink shrimp, male	0	0	0