

FISH COMMISSION OF OREGON
TRAWL INVESTIGATIONS

Charleston

Report of Cruise 70-9, Shrimp

- Vessel: M/V *Sunrise*, chartered vessel
- Dates: June 3, 6-8, 1970
- Objectives:
1. To collect samples of pink shrimp (*Pandalus jordani*) for benthic distribution study.
 2. To sample shrimp in the area 4 to 10 feet off bottom utilizing a vertical distribution sampler placed in the trawl net.
 3. To determine the location of 0-age shrimp (1970-year-class) within the study area.
 4. To collect associated oceanographic data.
 5. To obtain fish specimens requested by the University of Idaho.
 6. To tag incidentally caught lingcod (*Ophiodon elongatus*) and yellowtail rockfish (*Sebastes flavidus*).
- Methods: The study area for Cruise 70-9 included 12 stations (Figure 1). All stations were 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 it's cod-end consists of 1-1/2-inch mesh. A liner in the cod-end is made of 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.
- 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.
- Two 1/2-mile replicate tows were made at each station. Approximately 200 shrimp were randomly sampled from the catch of each tow.

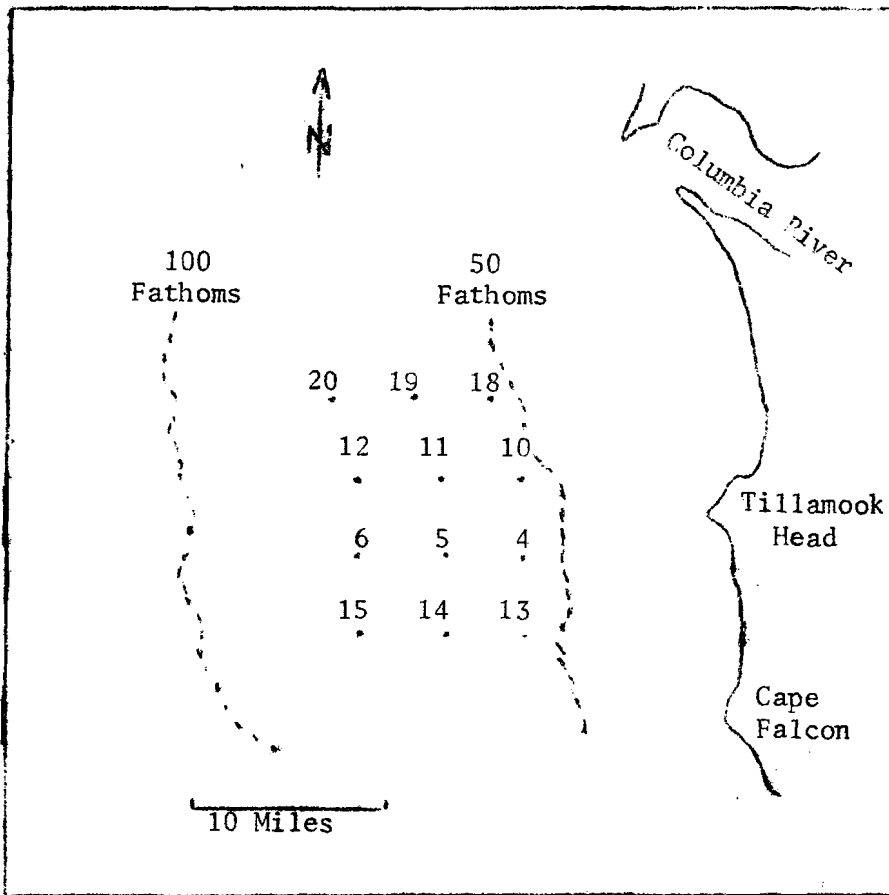


Figure 1. Location of trawl stations

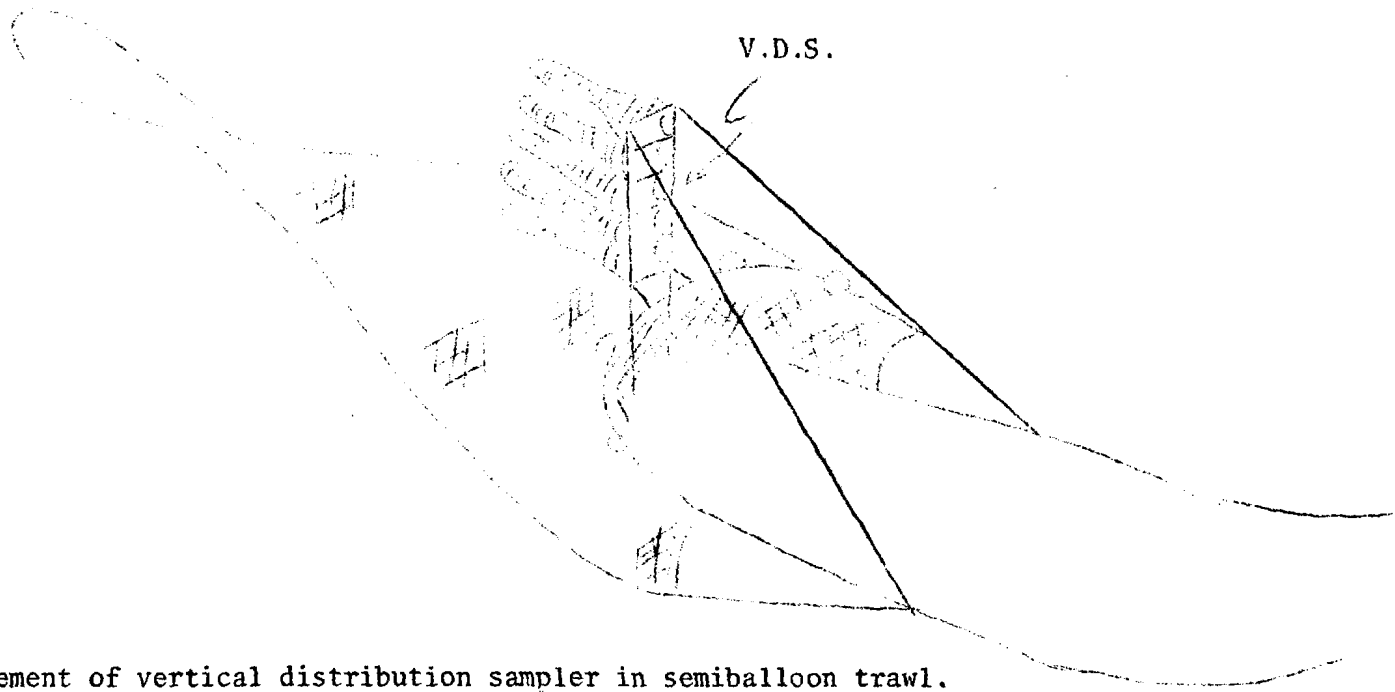


Figure 2. Placement of vertical distribution sampler in semiballoon trawl.

Results: Table 1 summarizes the results of shrimp catches in the semi-balloon trawl of 24 tows made at 12 stations. The average catch per $\frac{1}{2}$ -mile tow was 116 pounds.

An overall pattern of distribution by sex or age, either inshore - offshore or north - south, was not evident from the data. Only at stations 18-20 did there appear to be significant inshore - offshore differences in the sex and age compositions. Males, which are predominantly age I shrimp, make up a larger percentage of the sample at the inshore station than they do at the offshore station.

The transitionals and females, comprising most of the age II and III+ shrimp, were more abundant in the samples taken at the offshore station than those from the inshore station.

1970 year class shrimp were present for the first time in the samples taken from the trawl catch. Because of their size (3.5 - 5.5 mm carapace length) the majority probably passed through the 1-1/8-inch mesh of the body and intermediate and the $\frac{1}{2}$ -inch mesh of the cod end liner. Therefore, the percentages indicated in the samples are not truly representative of what actually could have been at each station. We sampled an additional 500 shrimp from each tow assuming that a larger sample would give a better indication of distribution of 0-age shrimp. We found 1970 year class shrimp in the samples of only 5 stations (Table 2). Stations 10 and 18, both inshore stations, had three 0-age shrimp, the other three found at these stations may indicate that 0-age shrimp were more abundant offshore. The data presented below regarding VDS catches was somewhat similar. However, it is apparent that a sample of 500 shrimp from a trawl catch at this time of year was not adequate to determine numbers of 0-age shrimp present.

Table 3 indicates the total number of 1970 year class shrimp caught in the VDS by tow. The table is set up to portray the relative positions of the stations as they are in the study area. The numbers caught were probably minimal as it was noted that when the bags were handled prior to emptying, many of the 1970 year class shrimp passed through the mesh. However, the numbers probably indicate the relative abundance present at each station. The largest catches were made at the offshore stations except at station 20. Some relatively large catches also were made at the mid-depth stations (11 and 14). This pattern of abundance somewhat corresponds to the pattern of occurrence of 0-age shrimp found in the trawl catches, i.e., an indication that 0-age shrimp were more abundant offshore during the first part of June.

Table 1. Summary of Sex and Age Composition in Per Cent of Shrimp Catches, Cruise 70-9.

Station No.	Depth (fms)	Catch (lbs)	No. Per Pound	Sex Composition (%)			Age Composition (%)			
				Males	Trans.	Females	0	I	II	III+
18a	62	52	159	70.5	18.0	11.5	0.5	67.5	29.5	2.5
b	61-62	93	147	57.9	23.8	18.3		53.4	42.5	4.0
19a	70	67	130	44.0	32.0	24.0		40.5	50.5	9.0
b	69	76	116	39.5	28.0	32.5		35.5	47.5	17.0
20a	78	63	105	26.0	38.5	35.5		23.5	61.5	15.0
b	78	34	106	32.0	34.0	34.0		29.5	51.5	19.0
10a	64	47	127	50.5	23.0	26.5		45.5	44.0	10.5
b	66	64	142	59.0	24.0	17.0		54.0	33.5	7.5
11a	72	107	132	51.5	25.5	23.0		49.5	40.5	10.0
b	71	122	120	51.2	25.4	23.4		46.3	36.3	17.4
12a	82	391	157	57.0	22.5	20.5		54.5	34.5	11.0
b	82	340	138	52.0	25.0	23.0		49.5	38.0	12.5
4a	69	80	157	70.5	17.0	12.5		61.5	27.0	11.5
b	69	91	160	70.8	19.1	10.1		66.9	26.1	7.0
5a	79-80	244	162	68.7	16.9	14.4		61.7	26.4	11.9
b	79	349	149	61.0	23.0	16.0		56.0	32.5	11.5
6a	83-84	148	187	74.5	14.7	10.8	2.0	67.1	26.5	4.4
b	83-84	138	181	67.2	21.4	11.4	0.5	63.7	28.8	7.0
13a	72	74	141	63.3	19.6	18.1		57.3	28.6	14.1
b	72	68	109	40.1	26.7	33.2		31.2	44.6	24.2
14a	79	42	175	75.5	14.5	10.0		73.0	20.5	6.5
b	79	43	161	72.0	18.0	10.0		64.5	28.5	7.0
15a	83	32	130	49.8	28.8	21.4		48.3	34.8	16.9
b	83	26	122	45.8	30.8	23.4	0.5	41.3	43.3	14.9

Table 2. Number of 1970-Yearclass Shrimp per 500 Sampled by Tow

<u>Tow No.</u>	<u>No. 0-Age Shrimp</u>
18a	2
10b	1
12b	1
6a	11
6b	10
15a	1
15b	1

Table 3. Number of 1970-Yearclass Shrimp Caught in VDS, by Tow

Station No. and Tow	No. 1970-Year Class	Station No. and Tow	No. 1970-Year Class	Station No. and Tow	No. 1970-Year Class
20a	4	19a	4	18a	6
b	0	b	8	b	0
12a	178 <u>1/</u>	11a	22	10a	0
b	269	b	7 <u>1/</u>	b	0
6a	156	5a	84	4a	2
b	392	b	9	b	0
15a	66 <u>1/</u>	14a	35	13a	11
b	10	b	30	b	4

1/ One bag not fishing properly.

Results:
(continued)

The VDS catches did give a better indication of 1970 year class distribution than did the 500 shrimp samples from the trawl. Catches in numbers of adult pink shrimp (1969 year class and earlier) in the VDS is presented in Table 4. Numbers caught varied from 2 to 662, a maximum of nearly 5 pounds by weight. Photometer readings to 90 feet were taken after each tow. This data plus the data from the trawl catches will be analyzed for possible correlations with the VDS catches.

Specimens of fish were obtained for the University of Idaho for their ichthyology collection.

Four lingcod and one yellowtail rockfish were tagged.

Personnel:

Gerald Lukas, Party Chief
Michael Hosie, Aquatic Biologist
Rudy Lovvold, Vessel Captain
Tom Lovvold, Crewman.

Gerald Lukas
Fish Commission of Oregon
November 19, 1970

Table 4. Vertical Distribution Sampler catches of adults in numbers, Cruise 70-9.

Station No.	Bag number and distance from bottom					Total
	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.	
18a	2	4	2	0	1	9
b	2	2	0	1	0	5
19a	6	2	6	3	1	18
b	4	8	8	8	4	32
20a	6	3	4	0	1	14
b	0	2	3	1	0	6
10a	1	0	0	1	0	2
b	6	3	0	1	0	10
11a	46	40	26	18	7	137
b	<u>1/</u>	6	9	7	2	24
12a	8 <u>1/</u>	218	139	68	35	468
b	237	206	135	61	23	662
4a	37	37	23	12	6	115
b	43	27	31	14	5	120
5a	128	114	103	55	23	423
b	145	145	98	78	32	498
6a	117	105	58	28	21	329
b	125	127	91	29	16	388
13a	12	7	9	7	2	37
b	10	7	11	7	5	40
14a	14	10	6	7	2	39
b	2	4	4	4	0	14
15a	2	6	5	3	4	20
b	<u>4</u>	<u>3</u>	<u>3</u>	<u>1/</u>	<u>3</u>	<u>13</u>
Totals	957	1086	774	413	193	3423

1/ Bag not fishing properly.