

FISH COMMISSION OF OREGON
TRAWL INVESTIGATIONS

Report of Cruise 70-7, Shrimp

Vessel: M/V *Sunrise*, chartered vessel

Dates: April 27-30, 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 (VDS) placed in the trawl net.
 3. To collect associated oceanographic data.
 4. To tag incidentally caught ling cod (*Ophiodon elongatus*) and yellowtail rockfish (*Sebastes flavidus*).
 5. To obtain fish specimens requested by the University of Idaho.
 6. To conduct cooperative research with personnel of the Oregon State University research vessel *Coyuse* on the distribution and abundance of pink shrimp.

Methods: The study area for cruise 70-7 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 its 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.

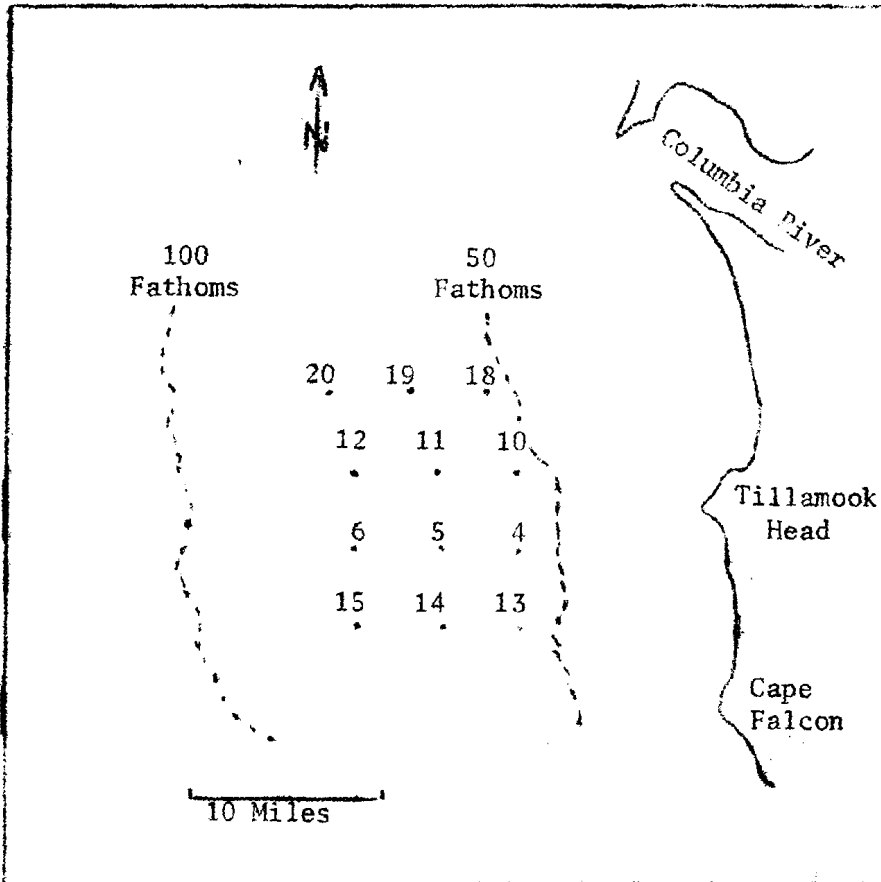


Figure 1. Location of trawl stations, Cruise 70-7.

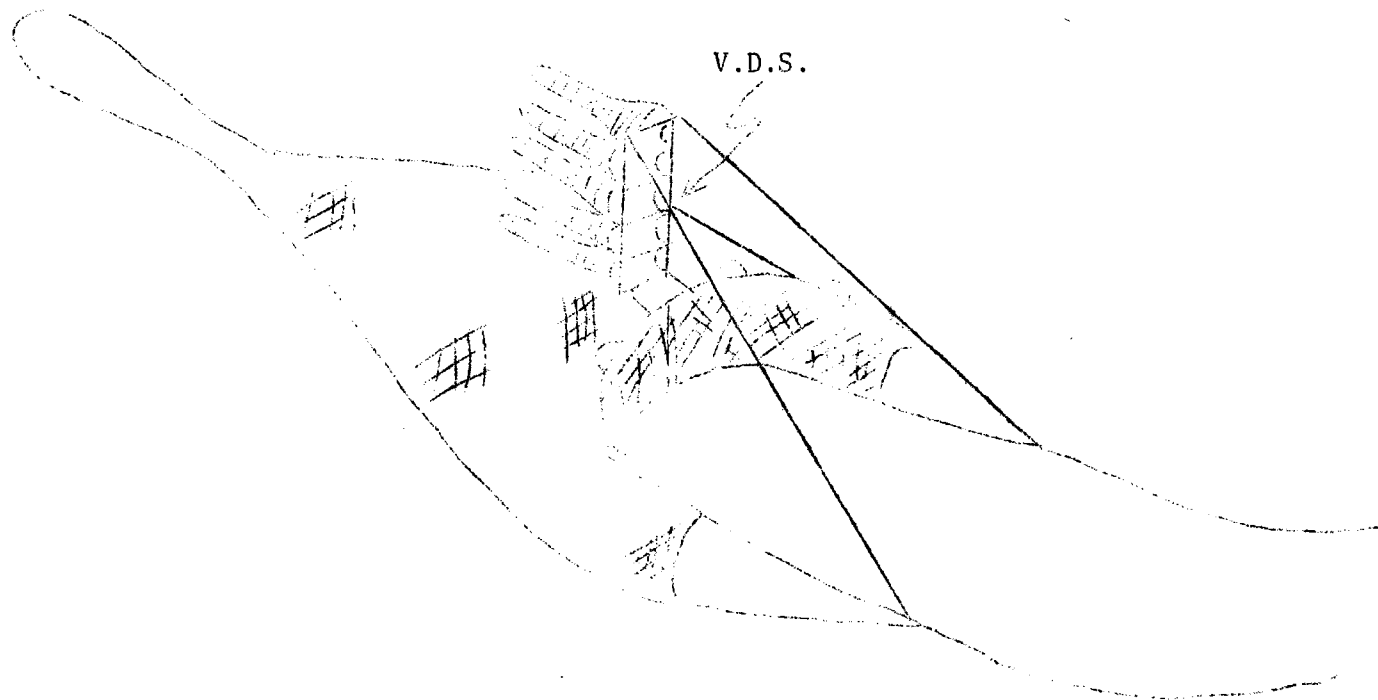


Figure 2. Placement of vertical distribution sampler in semiballoon trawl.

Two $\frac{1}{2}$ -mile replicate tows were made at each station. Approximately 200 shrimp were randomly sampled from the catch of each tow.

Cooperative work with OSU involved side-by-side towing to compare the shrimp catching efficiency of a beam trawl towed by the R/V *Cayuse* with our semi-balloon Gulf 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 towed was 93 pounds.

An inshore-offshore distribution based on age and sex composition in per cent was indicated by the samples of the 12 stations. Age-I shrimp consisting of most of the males appear to be more abundant at the inshore stations and a higher percentage of age II and III and primarily females and transitionals, are present at the offshore stations. An exception to this was at the northern stations (18-20) where there was little difference in the percentages of age III and females inshore or offshore.

No distinct north-south distribution by age or sex was evident from the samples.

The results of catches in the VDS are summarized in Table 2. During the trip, shrimp were caught in all five bags of the VDS during daytime towing. During the cruise we began towing as early as 7:29 AM and the latest we completed a tow was 7:06 PM. Assuming that the VDS was positioned vertically with respect to the bottom while being towed it is apparent that during the day shrimp are, at times at least, 10-feet off the bottom. The smaller number of shrimp caught in the lower bags may in some part be reflective of possible interference caused by that portion of the headrope immediately in front of the bags.

Photometer readings were taken to a depth of 90-feet immediately after the second tow made at each station. This data will be analyzed for possible correlation between the extrapolated light intensity value at the bottom and catches of shrimp in the VDS.

Six cooperative tows were made with the R/V *Cayuse* at stations 4-6 and 10-12.

We made XBT casts at 3 stations, 18-20.

Table 1. Summary of Sex and Age Composition in Per Cent of Shrimp Catches, Cruise 70-7.

Station No.	Depth (fms)	Catch (lbs)	No. Per Pound	Sample Size	Sex Composition (%)			Age Composition (%)		
					Males	Trans.	Females	I	II	III+
18a	62	57	153	200	63.5	11.0	25.5	56.5	26.5	17.0
b	63	41	164	200	66.5	16.0	17.5	58.0	29.0	13.0
19a	69	64	141	200	54.0	19.0	27.0	49.0	32.0	19.0
b	69	56	173	201	71.7	13.4	14.9	63.7	26.4	9.9
20a	77	44	130	198	42.9	32.8	24.3	29.3	53.0	17.7
b	77	54	146	200	51.0	28.5	20.5	39.5	49.0	11.5
10a	68-69	226	213	200	80.0	10.0	10.0	74.5	18.5	7.0
b	68	114	171	200	67.5	11.5	21.0	62.5	25.0	12.5
11a	76	121	130	199	46.7	14.6	38.7	36.2	39.7	24.1
b	76	181	159	200	63.5	17.0	19.5	54.5	31.5	14.0
12a	83	92	128	202	36.6	27.7	35.7	30.7	44.1	25.2
b	84	57	120	198	37.4	26.3	36.3	27.8	48.0	24.2
4a	65	81	194	200	74.0	12.0	14.0	68.5	25.0	6.5
b	61-62	76	175	200	66.5	17.5	16.0	56.5	38.0	5.5
5a	79	86	104	201	26.4	19.4	54.2	19.4	41.3	39.3
b	78-79	95	108	199	35.7	22.6	41.7	23.6	40.7	35.7
6a	82	31	140	199	52.3	21.1	26.6	42.7	39.7	17.6
b	84	27	120	200	39.5	29.5	31.0	27.5	49.0	23.5
13a	73	87	263	200	88.0	4.0	8.0	82.5	13.5	4.0
b	73	135	282	200	88.5	6.5	5.0	85.0	13.5	1.5
14a	79	108	124	200	38.0	22.0	40.0	27.5	47.0	25.5
b	79	212	148	199	52.3	23.1	24.6	37.7	48.2	14.1
15a	82-83	38	124	200	40.0	29.5	30.5	20.5	60.5	19.0
b	82	151	119	200	38.5	26.5	35.0	17.5	59.0	23.5

Table 2. Vertical Distribution Sampler Shrimp Catches in Numbers, Cruise 70-7.

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	3	5	6	1	1	16
b	Open Bag	8	3	2	1	14
19a	0	0	0	0	1	1
b	2	2	1	0	3	8
20a	0	0	0	0	1	1
b	17	20	6	6	7	56
10a	2	2	1	0	2	7
b	1	1	1	0	1	4
11a	22	14	13	34	44	127
b	81	59	37	10	19	206
12a	11	18	9	Open Bag	1	39
b	5	4	5	2	1	17
4a	2	1	1	0	0	4
b	0	0	Open Bag	1	0	1
5a	11	8	10	5	2	36
b	28	22	9	7	2	68
6a	1	0	2	1	1	5
b	1	1	0	0	1	3
13a	2	4	2	1	0	9
b	1	0	Open Bag	2	0	3
14a	2	2	2	4	0	10
b	1	0	0	2	0	3
15a	0	0	0	0	0	0
b	2	0	1	1	0	4
	<u>195</u>	<u>171</u>	<u>109</u>	<u>79</u>	<u>88</u>	<u>642</u>

Differences in bottom temperatures were slight ranging from 43.8-44.3 F.

Specimens representing 10 different species were obtained for the ichthyology collection at the University of Idaho.

One yellowtail rockfish and two lingcod were tagged.

Personnel:

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

Gerald Lukas
Fish Commission of Oregon
September 10, 1970