

FISH COMMISSION OF OREGON
TRAWL INVESTIGATION

Cruise Report 66-12, Phase A-Shrimp

Vessel: MV Sunrise

Dates: September 27-November 9, 1966.

- Objectives:
1. Determine distribution and abundance of pink shrimp (Pandalus jordani) off Oregon.
 2. Determine size, sex ratio, and age composition of shrimp caught.
 3. Determine shrimp gravidity and collect gravid females for fecundity studies.
 4. Identify, count, weigh, and collect incidentally caught fish and invertebrates as requested.
 5. Collect length data for Dover sole and age-length data for juvenile Dover, English, and petrale sole as time permits.

Methods: We made 96 tows with a 41-foot headrope Gulf semi-balloon trawl. The trawl was made of 1-1/8-inch stretch mesh netting in the body and intermediate, 1-1/2-inch mesh in the codend, and a 1-1/8-inch innerliner in the anterior one-third of the codend. A 1/2-inch knotless innerliner was in the posterior 2/3 of the codend. Plastic rollers and a 1/4-inch galvanized chain, hung loop-style, were attached to the 52-foot footrope. One half of the chain was removed after tow 29 to relieve excessive digging by the net. A 5/16-inch proof steel tickler chain completed the trawl net, which was attached to the otter boards by 30 feet of bridle.

The catch was sorted after each tow. Fish were either counted or weighed, or both, by species as time permitted. Dover sole were measured to the nearest cm, and Dover, English, and petrale sole shorter than 160 mm were preserved. A one-half to one pound random shrimp sample was drawn, measured, and sexed. Sample weight and spawning condition of females were noted. We preserved requested or unique fish and invertebrate species as time permitted.

Results: Of the 96 total tows, 29 were made in Area 1, 13 in Area 3, and 52 in Area 4. Due to inclement weather we made no tows in Area 2 (Cape Blanco to Umpqua River). Area 1 tows were between the Oregon-California border and Cape Blanco in 46 to 105 fathoms. Area 3 tows were between Yaquina Bay and Siletz Bay in 48 to 93 fathoms. Area 4 tows were between Cape Kiwanda and the Columbia River in 28 to 124 fathoms, but only two tows were shallower than 49 fathoms. Figure 1 shows location of tows and area

surveyed. In general, we found shrimp in abundance in all areas surveyed. A very large 1966 year class was apparently present in Area 1, while in Areas 3 and 4, comparatively few shrimp of this year class were captured. Appendix tables give location of tows, depth, catch of shrimp, average shrimp size per tow, and other data. Tows 1-29 were in Area 1; tows 30-83 were in Area 4; and tows 84-96 were in Area 3. Results by area are summarized below.

Area 1. We caught shrimp at a rate of 381 pounds per hour tow with a range of 0 to 1,680 lbs/hr. Eight tows produced catches greater than 400 lbs/hr; 15 tows were made at greater than 100 lbs/hr. The age composition was:

<u>Year class</u>	<u>By number</u>	<u>By weight</u>
1966	77%	34%
1965	13%	27%
1964	9%	39%

Only a trace of 1963 year class shrimp were captured. Shrimp size ranged from 51 to 780 shrimp per pound. The mean size was 337 shrimp per pound. The catch was composed of 90% male, 1% transitional, and 9% female shrimp. Most females had head roe but none were gravid during the period September 27-October 4, 1966. An estimated 7.8 million pounds of shrimp were within the 258 square mile area. About 3.3 million pounds of this were within the 166 square miles surveyed south of the Rogue River, including 1.3 million pounds of adult shrimp (1+ and 2+ age groups). Age composition between the Rogue River and Cape Blanco differed from that between the Rogue River and the California-Oregon border. South of the Rogue River, catch averaged 92, 4, and 4%, respectively, of the 1966, 1965, and 1964 year classes, while north of the Rogue River, shrimp averaged 60, 24, and 16%, respectively, for the 1966, 1965, and 1964 year classes. Average sizes were 508 and 239 shrimp per pound south and north of the Rogue River, respectively.

Area 3. Shrimp were caught at a rate of 331 pounds per hour tow with a range of 0 to 1,680 lbs/hr. Five of 13 tows yielded catches exceeding 100 lbs/hr. Four tows produced catches exceeding 400 lbs/hr. The age composition was:

<u>Year class</u>	<u>Number</u>	<u>Weight</u>
1966	15%	2%
1965	21%	17%
1964	64%	80%
1963	Trace	1%

Shrimp size ranged from 99 to 621 shrimp per pound with an average of 121. The catch sex ratio was 59% male and 41% females. During the period November 4 to 9, 1966, all but a trace of females showed head roe and 63% of females were gravid. An

estimated 2.7 million pounds of shrimp were in the 167 square mile area surveyed. Shrimp were concentrated in 75-95 fathoms off Depoe Bay. We were unable to survey between Siletz Bay and Cape Kiwanda due to termination of the cruise on November 22 because of the onset of winter weather.

Area 4. We caught shrimp at an average 435 pounds per hour tow catch rate, which ranged from 0 to 1,575 lbs/hr. Catch rates exceeding 100 lbs/hr tow were achieved on 35 of the 54 tows. Catch rates exceeding 400 lbs/hr were gained on 21 tows. Shrimp were abundant throughout Area 4 and occupied a strip of bottom ranging from 54 to 90 fathoms. The width of bottom occupied ranged from 14 to 2 nautical miles. The age composition was:

<u>Year class</u>	<u>Number</u>	<u>Weight</u>
1966	2%	Trace
1965	27%	18
1964	71%	81
1963	Trace	Trace

Shrimp size ranged from 90 to 873 shrimp per pound with an average of 109. Sex composition was 50% males and 50% females. During the survey, shrimp gravidity increased from 6.1% during October 7-15 to 46% during October 28-November 1. Only a trace of nongravid females were without head roe. The estimated population in the 950 square mile area was 31.7 million pounds.

Fish were common in many of the tows. Rex sole, slender sole, smelt, hake, dogfish shark, and arrowtooth flounder were most common. Many small rockfish (Scorpaenidae) were also caught.

Incidentally caught fish were collected for Oregon State University. A number of bottom samples and salinity samples were collected. Length and sex were recorded from 1,404 Dover sole. Dover sole ranged in length from 150 to 605 mm.

Personnel: Jack Robinson, Party Chief 9/28-10/24, 10/31-11/9/66
 Robert Demory, Party Chief 10/25-30/66
 Rudy Lovvold, Vessel Captain
 Gary Milburn, Aquatic Biologist, 10/14-24, 11/2-9/66
 Halbert Bailey, Aquatic Biologist, 10/7-11/2/66
 Terry Link, Biology Technician 9/28-10/13, 10/25-30, 11/7-9/66
 Tom Lovvold, Crewman

Distribution:

Astoria Lab - 12	BCF - Seattle
Newport Lab - 5	Alverson
Charleston Lab	Moore
Brookings Lab	BCF - Auke Bay
Library	WDF - Olympia
OFC - Portland	ADFG - Juneau
Dahlstrom - CFG	Van Hying
Gotshall - CFG	Verhoeven - PMFC
Lindsey - WDF	Pearcy - OSU

Jack Robinson
 February 16, 1967

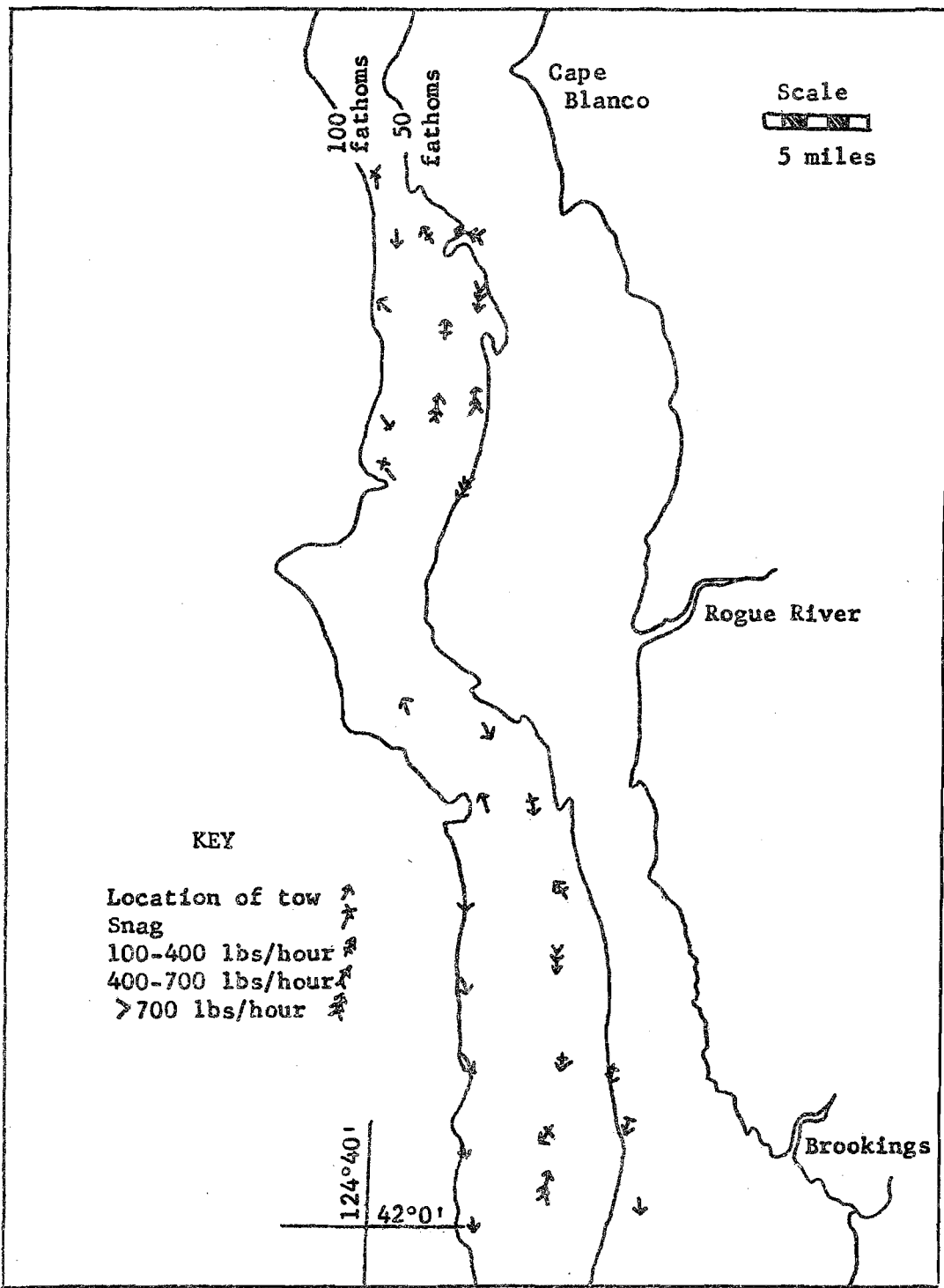


Figure 1. Area 1, tow locations and shrimp catches.

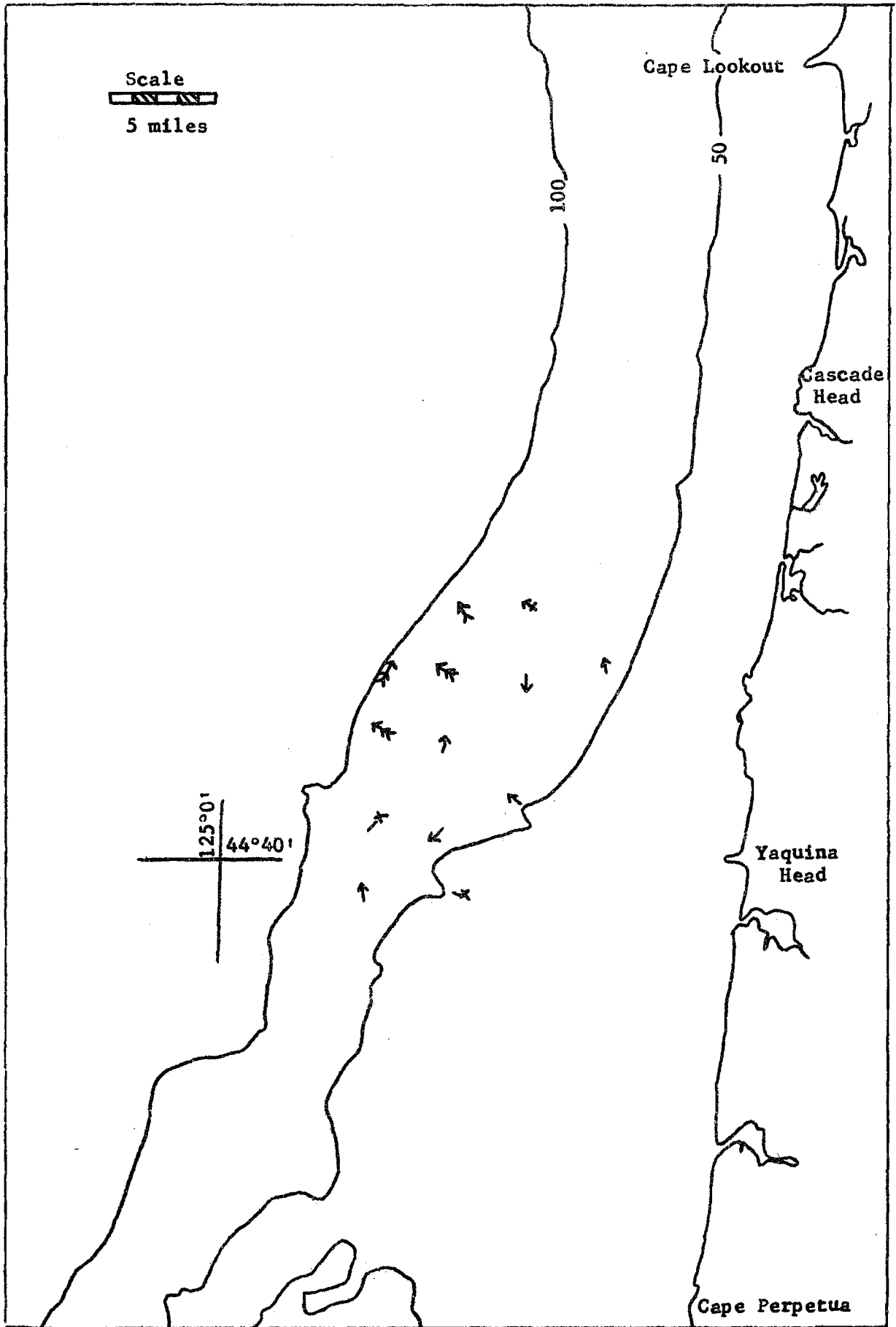


Figure 1. cont'd. Area 3

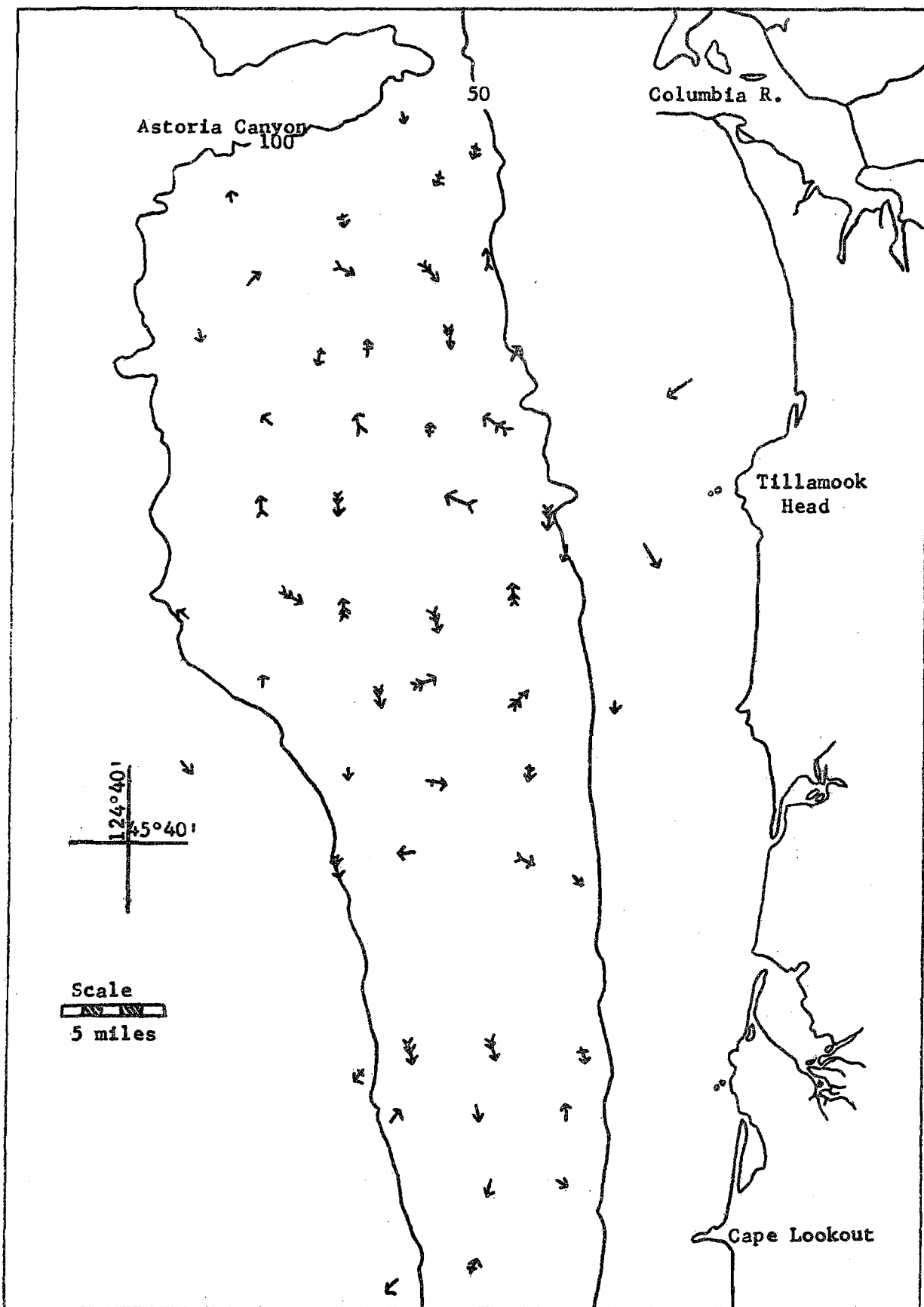


Figure 1. cont'd. Area 4

APPENDIX TABLES
SHRIMP TRIP SUMMARY
MV SUNRISE
September 30, 1966 to November 9, 1966

Drag Number	1	2	3	4	5
Date-66	9-30	9-30	9-30	9-30	9-30
Latitude					
Start	42° 40.1'	42° 39.6'	42° 43.0'	42° 45.5'	42° 43.2'
End	42° 39.5'	42° 39.9'	42° 42.4'	42° 46.0'	42° 43.3'
Longitude					
Start	124° 35.3'	124° 40.6'	124° 40.3'	124° 41.4'	124° 36.3'
End	124° 35.4'	124° 41.2'	124° 40.2'	124° 41.6'	124° 36.8'
Loran 2H3					
Start	1122	1130	1092	1068	1085
End	1128	1132	1097	1065	1085
Depth (fms)					
Start	52	85	83	76	52
End	53	86	83	76	55
Bottom type ^{1/}	-	-	-	co	-
Time net on bottom (Minutes)	15	15	15	10	10
Time gear set	0724	0928	1105	1301	1606
Remarks ^{2/}	-	-	-	H.U.	-
Pink shrimp catch (lbs) ^{3/}	324	0	0	2	234
Shrimp catch					
Hourly rate	1296	0	0	12	1404
Shrimp/lb.	127	-	-	-	216
Scope (fms of cable)	150	225	225	200	-

^{1/} Symbols for types of bottom

gn - green s - sand
gy - gray rk - rock
m - mud co - coral

^{2/} H.U. - hung up net.

T.U. - tore up net.

^{3/} T - trace, less than one pound of shrimp.

SHRIMP TRIP SUMMARY - MV.SUNRISE (cont'd)

Drag Number	6	7	8	9	10
Date-66	10-1	10-1	10-1	10-1	10-1
Latitude					
Start	42° 35.4'	42° 34.9'	42° 32.9'	42° 32.1'	42° 22.6'
End	42° 36.6'	42° 34.5'	42° 33.1'	42° 31.6'	42° 23.0'
Longitude					
Start	124° 35.4'	124° 40.6'	124° 40.4'	124° 35.9'	124° 38.9'
End	124° 35.6'	124° 40.2'	124° 40.6'	124° 36.3'	124° 39.2'
Loran 2H3					
Start	1180	1185	1210	1220	1335
End	1163	1190	1208	1226	1332
Depth (fms)					
Start	52	76	74	50	75
End	54	74	75	50	71
Bottom type	-	-	-	-	-
Time net on bottom (Minutes)	15	15	6	15	14
Time gear set	0739	0910	1030	1136	1419
Remarks	-	-	H.U.	-	-
Pink shrimp catch (lbs)	420	0	T	396	T
Shrimp catch Hourly rate	1680	0	-	1584	-
Shrimp/lb	257	-	51	282	-
Scope (fms of cable)	150	200	200	150	200

SHRIMP TRIP SUMMARY - MV SUNRISE (cont'd)

Drag number	11	12	13	14	15
Date-66	10-1	10-1	10-2	10-2	10-2
Latitude					
Start	42° 21.6'	42° 18.3'	42° 18.4'	42° 14.6'	42° 11.6'
End	42° 21.1'	42° 18.9'	42° 17.8'	42° 14.9'	42° 10.9'
Longitude					
Start	124° 34.3'	124° 34.2'	124° 31.5'	124° 29.8'	124° 29.9'
End	124° 34.2'	124° 34.6'	124° 31.4'	124° 30.2'	124° 29.9'
Loran 2H3					
Start	1348	1388	1392	1440	1478
End	-	1382	1398	1436	1485
Depth (fms)					
Start	61	77	62	62	67
End	65	77	63	62	67
Bottom type	-	gn.m.	-	-	gn.m.
Time net on bottom (Minutes)	15	16	15	15	16
Time gear set	1600	1725	0715	0845	1021
Remarks	-	-	-	-	-
Pink shrimp catch (lbs)	5	20	35	40	275
Shrimp catch Hourly rate	20	75	140	160	1030
Shrimp/lb.	505	-	700	321	485
Scope (fms of cable)	175	200	150	150	175

SHRIMP TRIP SUMMARY - MV SUNRISE (cont'd)

Drag number	16	17	18	19	20
Date-66	10-2	10-3	10-3	10-3	10-3
Latitude					
Start	42° 07.2'	42° 00.8'	42° 01.5'	42° 00.3'	42° 03.5'
End	42° 06.5'	42° 00.2'	42° 02.3'	41° 59.5'	42° 02.8'
Longitude					
Start	124° 29.4'	124° 24.8'	124° 30.2'	124° 34.2'	124° 35.0'
End	124° 29.5'	124° 24.7'	124° 29.8'	124° 34.2'	124° 34.8'
Loran 2H3					
Start	1530	1615	1600	1610	1570
End	1538	1622	1590	1620	1578
Depth (fms)					
Start	64	46	62	86	98
End	64	46	62	85	96
Bottom type	-	-	gn.m.	-	-
Time net on bottom (minutes)	16	15	16	15	15
Time gear set	1145	0710	0830	1005	1145
Remarks	-	-	-	-	-
Pink shrimp catch (lbs)	80	T	210	T	0
Shrimp catch Hourly rate	300	-	788	-	0
Shrimp/lb	155	-	313	-	-
Scope (fms of cable)	175	125	175	225	250

SHRIMP TRIP SUMMARY - MV SUNRISE (cont'd)

Drag number	21	22	23	24	25
Date-66	10-3	10-3	10-3	10-3	10-4
Latitude					
Start	42° 07.4'	42° 03.9'	42° 07.4'	42° 06.7'	42° 10.7'
End	42° 06.8'	42° 03.4'	42° 03.7'	42° 06.0'	42° 10.1'
Longitude					
Start	124° 35.2'	124° 29.9'	124° 25.5'	124° 26.6'	124° 35.3'
End	124° 34.7'	124° 30.5'	124° 25.8'	124° 26.7'	124° 35.0'
Loran 2H3					
Start	1522	1570	1570	1540	1482
End	1530	1576	1578	1548	1490
Depth (fms)					
Start	105	63	48	50	98
End	100	62	50	51	96
Bottom type	-	-	-	-	-
Time net on bottom (minutes)	15	15	15	15	15
Time gear set	1320	1435	1545	1710	0738
Remarks	-	-	-	-	-
Pink shrimp catch (lbs)	T	28	80	220	T
Shrimp catch Hourly rate	-	112	320	880	-
Shrimp/lb	-	430	745	780	-
Scope (fms of cable)	250	150	150	150	250

SHRIMP TRIP SUMMARY - MV SUNRISE (cont'd)

Drag number	26	27	28	29	30
Date-66	10-4	10-4	10-4	10-4	10-7
Latitude					
Start	42° 14.3'	42° 35.3'	42° 38.6'	42° 42.8'	46° 10.9'
End	42° 13.7'	42° 36.1'	42° 39.2'	42° 43.4'	46° 10.5'
Longitude					
Start	124° 35.2'	124° 37.6'	124° 37.3'	124° 38.2'	124° 19.7'
End	124° 35.2'	124° 37.6'	124° 37.2'	124° 38.8'	124° 19.8'
Loran 2H3					
Start	1438	1180	1140	1090	2H4 3485
End	1446	1170	1132	1080	2H4 3480
Depth (fms)					
Start	93	61	58	65	59
End	95	61	58	66	60
Bottom type	-	-	-	-	-
Time net on bottom (minutes)	15	15	15	15	15
Time gear set	0910	1250	1345	1455	1115
Remarks	-	-	-	-	-
Pink shrimp catch (lbs)	T	192	85	34	43
Shrimp catch Hourly rate	-	768	340	136	172
Shrimp/lb.	-	217	433	376	116
Scope (fms of cable)	250	175	175	175	175

SHRIMP TRIP SUMMARY - MV SUNRISE (cont'd)

Drag number	31	32	33	34	35
Date-66	10-7	10-7	10-10	10-10	10-10
Latitude					
Start	46° 14.2'	46° 12.5'	46° 09.2'	46° 09.6'	46° 05.7'
End	46° 13.4'	46° 11.7'	46° 08.4'	46° 10.2'	46° 06.5'
Longitude					
Start	124° 22.4'	124° 17.1'	124° 26.2'	124° 33.7'	124° 32.6'
End	124° 22.2'	124° 17.3'	124° 26.0'	124° 33.8'	124° 31.9'
Loran 2H4					
Start	3525	3505	3460	3462	3415
End	3515	3495	3452	3468	3425
Depth (fms)					
Start	65	51	67	77	74
End	65	50	68	79	74
Bottom type	Shale	m.	-	-	-
Time net on bottom (minutes)	15	15	15	15	15
Time gear set	1240	1345	1040	1200	1315
Remarks	-	-	-	-	-
Pink shrimp catch (lbs)	0	47	31	T	8
Shrimp catch Hourly rate	0	188	124	-	32
Shrimp/lb	-	108	112	-	-
Scope (fms of cable)	175	150	175	175	200

SHRIMP TRIP SUMMARY - MV SUNRISE (cont'd)

Drag number	36	37	38	39	40
Date-66	10-10	10-10	10-10	10-10	10-14
Latitude					
Start	46° 06.7'	46° 06.6'	46° 02.3'	46° 07.1'	46° 03.2'
End	46° 06.5'	46° 06.1'	46° 02.7'	46° 07.4'	46° 02.8'
Longitude					
Start	124° 26.4'	124° 20.4'	124° 14.5'	124° 16.4'	124° 18.9'
End	124° 25.6'	124° 19.8'	124° 14.2'	124° 16.5'	124° 18.8'
Loran 2H4					
Start	3430	3432	3380	3438	3390
End	3428	3425	3388	3442	3385
Depth (fms)					
Start	68	60	52	51	61
End	68	60	52	52	61
Bottom type	-	-	-	-	-
Time net on bottom (minutes)	15	15	15	15	15
Time gear set	1415	1514	1709	1810	1341
Remarks	-	-	-	-	-
Pink shrimp catch (lbs)	140	384	19	165	242
Shrimp catch Hourly rate	560	1536	76	660	968
Shrimp/lb	132	137	90	106	112
Scope (fms of cable)	175	150	150	150	175

SHRIMP TRIP SUMMARY - MV SUNRISE (cont'd)

Drag number	41	42	43	44	45
Date-66	10-14	10-14	10-14	10-15	10-15
Latitude					
Start	46° 02.8'	46° 02.7'	46° 03.7'	45° 58.9'	45° 58.7'
End	46° 03.2'	46° 02.1'	46° 03.1'	45° 59.7'	45° 59.3'
Longitude					
Start	124° 24.3'	124° 27.4'	124° 35.8'	124° 14.7'	124° 20.0'
End	124° 24.5'	124° 27.6'	124° 35.7'	124° 16.6'	124° 20.2'
Loran 2H4					
Start	3382	3380	3373	3338	3335
End	3387	3372	3380	3348	3342
Depth (fms)					
Start	70	73	83	57	71
End	70	73	84	57	71
Bottom type	-	-	-	-	-
Time net on bottom (minutes)	15	15	15	24	15
Time gear set	1450	1555	1728	0715	0855
Remarks	-	-	-	-	-
Pink shrimp catch (lbs)	74	96	20	340	52
Shrimp catch Hourly rate	296	384	80	850	208
Shrimp/lb	104	108	-	104	136
Scope (fms of cable)	200	200	225	150	200

SHRIMP TRIP SUMMARY - MV SUNRISE (cont'd)

Drag number	46	47	48	49	50
Date-66	10-15	10-15	10-15	10-15	10-15
Latitude					
Start	45° 59.3'	45° 59.0'	45° 55.6'	45° 55.5'	45° 55.4'
End	45° 59.7'	45° 59.6'	45° 55.9'	45° 55.0'	45° 55.9'
Longitude					
Start	124° 24.9'	124° 30.7'	124° 31.5'	124° 26.2'	124° 17.4'
End	124° 25.1'	124° 31.6'	124° 31.6'	124° 26.1'	124° 19.2'
Loran 2H4					
Start	3340	3333	3290	3292	3295
End	3345	3340	3295	3286	3300
Depth (fms)					
Start	75	81	83	79	73
End	76	82	83	80	73
Bottom type	-	-	-	-	-
Time net on bottom (minutes)	15	18	10	17	17
Time gear set	0955	1104	1245	1350	1512
Remarks	-	-	-	-	-
Pink shrimp catch (lbs)	108	43	105	200	145
Shrimp catch Hourly rate	432	143	630	706	512
Shrimp/lb	124	116	147	123	115
Scope (fms of cable)	200	225	225	225	225

SHRIMP TRIP SUMMARY - MV SUNRISE (cont'd)

Drag number	51	52	53	54	55
Date- <u>66</u>	10-15	10-15	10-16	10-16	10-16
Latitude					
Start	45° 54.8'	45° 53.3'	45° 51.1'	45° 50.2'	45° 50.6'
End	45° 54.2'	45° 52.7'	45° 51.7'	45° 49.3'	45° 51.2'
Longitude					
Start	124° 11.8'	124° 10.6'	124° 14.2'	124° 19.6'	124° 25.8'
End	124° 11.8'	124° 10.7'	124° 14.3'	124° 19.4'	124° 25.9'
Loran 2H4					
Start	3288	3270	3242	3228	3232
End	3282	3262	3248	3219	3238
Depth (fms)					
Start	60	49	65	77	82
End	60	50	65	77	82
Bottom type	-	-	-	gn.m.	-
Time net on bottom (minutes)	15	15	16	15	15
Time gear set	1623	1725	0727	0847	1020
Remarks	-	-	-	-	-
Pink shrimp catch (lbs)	330	0	420	330	225
Shrimp catch Hourly rate	1320	0	1575	1320	900
Shrimp/lb.	105	-	115	109	126
Scope (fms of cable)	175	150	175	200	225

SHRIMP TRIP SUMMARY - MV SUNRISE (cont'd)

Drag number	56	57	58	59	60
Date-66	10-16	10-16	10-16	10-16	10-16
Latitude					
Start	45° 51.3'	45° 50.1'	45° 47.0'	45° 46.5'	45° 47.0'
End	45° 51.0'	45° 50.4'	45° 47.4'	45° 46.1'	45° 47.3'
Longitude					
Start	124° 29.8'	124° 36.4'	124° 31.1'	124° 23.2'	124° 20.0'
End	124° 28.7'	124° 37.2'	124° 31.2'	124° 23.1'	124° 19.6'
Loran 2H4					
Start	3238	3219	3185	3182	3190
End	3235	3223	3190	3177	3193
Depth (fms)					
Start	83	100	95	83	76
End	83	99	95	79	76
Bottom type	-	-	-	shale co.	-
Time net on bottom (minutes)	11	11	10	10	10
Time gear set	1211	1344	1507	1635	1743
Remarks	-	-	-	-	-
Pink shrimp catch (lbs)	170	0	3	150	250
Shrimp catch Hourly rate	927	0	18	900	1500
Shrimp/lb	120	-	340	122	104
Scope (fms of cable)	225	250	250	225	200

SHRIMP TRIP SUMMARY - MV SUNRISE (cont'd)

Drag number	61	62	63	64	65
Date-66	10-17	10-17	10-17	10-17	10-17
Latitude					
Start	45° 45.9'	45° 46.2'	45° 42.8'	45° 42.4'	45° 43.1'
End	45° 45.4'	45° 46.5'	45° 42.4'	45° 42.3'	45° 42.5'
Longitude					
Start	124° 07.3'	124° 13.8'	124° 13.0'	124° 20.1'	124° 25.4'
End	124° 07.1'	124° 13.3'	124° 12.8'	124° 18.5'	124° 25.2'
Loran 2H4					
Start	3180	3182	3140	3132	3138
End	3176	3186	3136	3131	3132
Depth (fms)					
Start	50	69	69	71	90
End	50	70	69	76	89
Bottom type	-	-	-	-	-
Time net on bottom (minutes)	12	14	12	11	10
Time gear set	0722	0840	0947	1100	1232
Remarks	-	-	-	-	-
Pink shrimp catch (lbs)	0	172	67	30	0
Shrimp catch Hourly rate	0	737	335	164	0
Shrimp/lb	-	138	-	108	-
Scope (fms of cable)	150	175	175	200	-

SHRIMP TRIP SUMMARY - MV SUNRISE (cont'd)

Drag number	66	67	68	69	70
Date- <u>66</u>	10-17	19-17	10-17	10-17	10-18
Latitude					
Start	45° 43.3'	45° 38.2'	45° 39.1'	45° 38.7'	45° 37.9'
End	45° 42.9'	45° 37.4'	45° 39.0'	45° 38.4'	45° 37.4'
Longitude					
Start	124° 36.5'	124° 25.6'	124° 20.7'	124° 13.5'	124° 09.7'
End	124° 36.0'	124° 25.5'	124° 21.7'	124° 12.2'	124° 09.0'
Loran 2H4					
Start	3136	3079	3092	3090	3081
End	3132	3075	3090	3087	3076
Depth (fms)					
Start	112	96	83	70	51
End	115	100	81	71	51
Bottom type	-	-	-	-	-
Time net on bottom (minutes)	10	10	10	10	11
Time gear set	1422	1604	1710	1828	0740
Remarks	-	-	-	-	-
Pink shrimp catch (lbs)	0	228	0	105	0
Shrimp catch Hourly rate	0	1368	0	630	0
Shrimp/lb	-	115	-	120	-
Scope (fms of cable)	275	250	225	200	175

SHRIMP TRIP SUMMARY - MV SUNRISE (cont'd)

Drag number	71	72	73	74	75
Date-66	10-28	10-28	10-28	10-28	10-31
Latitude					
Start	45° 29.3'	45° 29.5'	45° 29.5'	45° 28.5'	46° 01.3'
End	45° 28.8'	45° 29.0'	45° 29.1'	45° 28.2'	46° 00.4'
Longitude					
Start	124° 08.4'	124° 14.4'	124° 20.1'	124° 23.2'	124° 02.4'
End	124° 08.2'	124° 14.3'	124° 19.8'	124° 23.7'	124° 03.9'
Loran 2H4					
Start	2975	2976	2974	2960	3370
End	2970	2970	2968	2958	3359
Depth (fms)					
Start	60	82	94	110	28
End	60	82	94	-	30
Bottom type	gn.s.	gn.m.	gn.m.s.	-	-
Time net on bottom (minutes)	15	15	15	11	27
Time gear set	1421	1533	1648	1812	1222
Remarks	-	-	-	-	-
Pink shrimp catch (lbs)	80	282	330	25	0
Shrimp catch Hourly rate	320	1128	1320	136	0
Shrimp/lb	94	115	107	101	-
Scope (fms of cable)	175	225	250	275	100

SHRIMP TRIP SUMMARY - MV SUNRISE (cont'd)

Drag number	76	77	78	79	80
<u>Date-66</u>	10-31	11-1	11-1	11-1	11-1
Latitude					
Start	45° 53.6'	45° 23.3'	45° 26.3'	45° 26.7'	45° 26.4'
End	45° 52.4'	45° 22.8'	45° 26.9'	45° 26.2'	45° 26.8'
Longitude					
Start	124° 05.4'	124° 09.8'	124° 09.3'	124° 15.3'	124° 20.9'
End	124° 03.1'	124° 09.2'	124° 09.5'	124° 15.1'	124° 20.5'
Loran 2H4					
Start	3275	2900	2938	2940	2935
End	3260	2895	2945	2935	2940
Depth (fms)					
Start	40	64	63	84	95
End	38	62	63	85	96
Bottom type	-	gn.s.	gn.s.	-	gn.m.
Time net on bottom (minutes)	24	18	15	14	15
Time gear set	1358	0633	0745	0859	1008
Remarks	-	-	-	-	-
Pink shrimp catch (lbs)	0	T	T	40	T
Shrimp catch Hourly rate	0	-	-	171	-
Shrimp/lb	-	-	-	105	873
Scope (fms of cable)	125	175	175	225	250

SHRIMP TRIP SUMMARY - MV SUNRISE (cont'd)

Drag number	81	82	83	84	85
Date-66	11-1	11-1	11-1	11-4	11-4
Latitude					
Start	45° 23.3'	45° 18.4'	45° 18.6'	44° 43.6'	44° 42.5'
End	45° 22.4'	45° 17.9'	45° 19.4'	44° 43.9'	44° 41.8'
Longitude					
Start	124° 14.2'	124° 19.7'	124° 15.2'	124° 19.5'	124° 24.5'
End	124° 14.5'	124° 20.8'	124° 14.9'	124° 20.0'	124° 25.4'
Loran 2H4					
Start	2898	2836	2840	2406	2391
End	2887	2830	2850	2410	2382
Depth (fms)					
Start	85	124	87	55	59
End	85	122	87	58	58
Bottom type	gn.m.s.	-	-	-	-
Time net on bottom (minutes)	15	15	15	11	17
Time gear set	1145	1320	1435	0905	0955
Remarks	-	-	-	-	-
Pink shrimp catch (lbs)	10	8	45	0	20
Shrimp catch Hourly rate	40	32	180	0	71
Shrimp/lb	-	-	89	-	621
Scope (fms of cable)	225	325	250	150	175

SHRIMP TRIP SUMMARY - MV SUNRISE (cont'd)

Drag number	86	87	88	89	90
Date-66	11-4	11-4	11-4	11-8	11-8
Latitude					
Start	44° 46.3'	44° 50.0'	44° 49.9'	44° 39.2'	44° 39.2'
End	44° 47.2'	44° 49.3'	44° 50.9'	44° 39.1'	44° 40.0'
Longitude					
Start	124° 25.1'	124° 19.4'	124° 13.8'	124° 23.5'	124° 29.5'
End	124° 24.8'	124° 19.2'	124° 14.0'	124° 22.9'	124° 29.7'
Loran 2H4					
Start	2437	2485	2487	2350	2347
End	2448	2477	2499	2349	2357
Depth (fms)					
Start	72	70	60	48	64
End	74	69	-	49	67
Bottom type	gn.m.	-	-	gn.m. shale	s.co.
Time net on bottom (minutes)	16	11	19	7	15
Time gear set	1125	1306	1411	0946	1059
Remarks	-	-	-	H.U.	-
Pink shrimp catch (lbs)	10	T	0	0	0
Shrimp catch Hourly rate	38	-	0	0	0
Shrimp/lb	104	-	-	-	-
Scope (fms of cable)	200	200	150	150	175

SHRIMP TRIP SUMMARY - MV SUNRISE (cont'd)

Drag number	91	92	93	94	95
Date- <u>66</u>	11-8	11-8	11-8	11-8	11-9
Latitude					
Start	44° 42.6'	44° 47.7'	44° 50.3'	44° 50.2'	44° 53.1'
End	44° 43.4'	44° 47.9'	44° 51.1'	44° 50.8'	44° 53.6'
Longitude					
Start	124° 29.6'	124° 29.2'	124° 29.2'	124° 24.6'	124° 18.7'
End	124° 28.8'	124° 29.9'	124° 28.7'	124° 25.6'	124° 19.7'
Loran 2H4					
Start	2390	2453	2485	2486	2523
End	2399	2455	2495	2492	2530
Depth (fms)					
Start	72	86	97	81	74
End	71	92	98	85	77
Bottom type	r.k.	gn.m.	-	-	gn.m.
Time net on bottom (minutes)	15	10	10	15	10
Time gear set	1212	1351	1509	1624	0746
Remarks	T.U.	New net	-	-	-
Pink shrimp catch (lbs)	0	160	280	180	60
Shrimp catch Hourly rate	0	960	1680	720	360
Shrimp/lb	-	113	105	114	99
Scope (fms of cable)	200	225	250	225	175

SHRIMP TRIP SUMMARY - MV SUNRISE (cont'd)

Drag number	96
-------------	----

Date-66	11-9
---------	------

Latitude	
Start	44° 53.1'
End	44° 53.6'

Longitude	
Start	124° 23.8'
End	124° 24.2'

Loran 2H4	
Start	2522
End	2528

Depth (fms)	
Start	84
End	89

Bottom type	gn.m.
-------------	-------

Time net on bottom (minutes)	10
---------------------------------	----

Time gear set	0856
---------------	------

Remarks	-
---------	---

Pink shrimp catch (lbs)	78
----------------------------	----

Shrimp catch Hourly rate	468
-----------------------------	-----

Shrimp/lb	100
-----------	-----

Scope (fms of cable)	225
----------------------	-----

TABLE 1. FISHING LOG OF MV FAYMAR CRUISE SA-1 (PRELIMINARY)

DRAG NUMBER	1	2	3	4	5	6	7	8	9
DATE	3/3/66	3/3/66	3/3/66	3/3/66	3/3/66	3/3/66	3/3/66	3/3/66	3/3/66
Loran-2H3									
Start	1621	1570	1553	1565	1565	1538	1527	1515	1502
End	1610	1560	1562	1573	1552	1528	1533	1509	1494
Depth, Fathoms	50	50	66	100	88	78	107	98	85
Time Net on Bottom (Minutes)	15	15	15	15	15	15	15	15	15
Time Gear Set	0820	0925	1045	1210	1300	1350	1450	1545	1640
Remarks	-	-	-	-	-	-	-	-	-
Pink Shrimp Catch Pounds	0	0	33	0	0	5	0	0	0
Shrimp Catch Hourly Rate(1)	0	0	132(167)	0	0	20(148)	0	0	0
<hr/>									
DRAG NUMBER	10	11	12	13	14	15	16	17	18
DATE	3/4/66	3/4/66	3/17/66	3/17/66	3/17/66	3/17/66	3/17/66	3/17/66	3/17/66
Loran-2H3									
Start	1483	1470	1520	1465	1440	1430	1445	1435	1395
End	1470	1480	1510	1455	1428	1440	1438	1425	1385
Depth, Fathoms	59	73	65	100	100	79	63	55	60
Time Net on Bottom (Minutes)	20	15	15	15	15	15	15	15	15
Time Gear Set	0635	0750	0815	0945	1035	1137	1250	1335	1435
Remarks	-	-	-	-	-	-	-	-	-
Pink Shrimp Catch Pounds(2)	8	T	T	0	0	T	T	0	3
Shrimp Catch Hourly Rate	24(192)	(161)	-	0	0	(142)	(119)	0	(130)

(1) Figure in parentheses indicates number of whole shrimp per pound. Absence of () indicates ^{no} count taken.

(2) T-Trace less than 1 pound of shrimp taken.

TABLE 1. FISHING LOG OF MV FAYMAR CRUISE SA-1 (PRELIMINARY)--CONTINUED

DRAG NUMBER	19	20	21	22	23	24	25	26	27
DATE	3/22/66	3/22/66	3/22/66	3/22/66	3/22/66	3/23/66	3/23/66	3/23/66	3/23/66
Loran-2H3 Start	1565	1580	1570	1582	1580	1372	1380	1390	1370
End	1580	1572	1580	1574	1587	1366	1396	1400	1365
Depth, Fathoms	68-69	80	58	48	20	58	82	100	80
Time Net on Bottom (Minutes)	20	15	15	15	15	15	15	15	15
Time Gear Set	0850	0955	1105	1200	1300	0725	0830	0925	1030
Remarks	-	-	-	-	-	-	-	-	-
Pink Shrimp Catch Pounds	12	T	0	0	0	T	T	0	T
Shrimp Catch Hourly Rate	36(153)	-	0	0	0	(260)	(106)	0	-
<hr/>									
DRAG NUMBER	28	29	30	31	32	33	34	35	36
DATE	3/23/66	3/23/66	3/23/66	3/23/66	3/26/66	3/26/66	3/26/66	3/26/66	3/26/66
Loran-2H3 Start	1332	1340	1313	1270	1290	1222	1200	1185	1180
End	1327	1334	1306	1260	1284	1206	1195	1180	1175
Depth, Fathoms	62	86	110	85	48	50	77	119	72
Time Net on Bottom (Minutes)	15	15	15	15	15	15	15	15	15
Time Gear Set	1150	1250	1405	1525	0830	1005	1135	1235	1340
Remarks	-	-	- Large Rock In Net	-	-	-	-	-	-
Pink Shrimp Catch Pounds	0	0	2	0	0	0	123	0	T
Shrimp Catch Hourly Rate	0	0	8(87)	0	0	0	492(123)	0	(95)

TABLE 1. FISHING LOG OF MV FAYMAR CRUISE SA-1 (PRELIMINARY)--CONTINUED

DRAG NUMBER	37	38	39	40	41	42	43	44	45
DATE	3/26/66	3/26/66	3/26/66	3/26/66	3/27/66	3/27/66	3/27/66	3/27/66	3/27/66
Loran-2H3									
Start	1160	1170	1145	1124	1085	1087	1095	1083	1057
End	1170	1177	1140	1118	1075	1100	1090	1075	1050
Depth, Fathoms	67	57	67	88	50	75	100	75	87
Time Net on Bottom (Minutes)	15	15	15	15	15	15	15	15	15
Time Gear Set	1440	1530	1645	1740	0635	0735	0835	0930	1035
Remarks	-	-	-	-	-	-	-	-	-
Pink Shrimp Catch Pounds	340	8	T	T	0	T	24	T	5
Shrimp Catch Hourly Rate	1360(116)	32(229)	-	(153)	0	(103)	96(151)	(156)	20(124)
<hr/>									
DRAG NUMBER	46	47	48	49	50	51	52	53	54
DATE	3/27/66	3/27/66	3/27/66	3/27/66	3/27/66	3/27/66	3/28/66	3/28/66	3/28/66
Loran-2H4									
Start	1080	1090	1110	1125	1147	1140	1095	1122	1125
End	1085	1090	1110	1130	1151	1145	1100	1130	1130
Loran-2H5									
Start	3347	3340	3335	3336	3333	3346	3351	3354	3348
End	-	3338	-	-	-	-	-	-	-
Depth, Fathoms	62	100	94	65	120	83	59-60	59	75
Time Net on Bottom (Minutes)	15	15	15	15	10	15	15	15	15
Time Gear Set	1235	1350	1445	1535	1630	1810	0620	0720	0825
Remarks	-	-	-	-	Hung-Up	-	-	-	-
					End of Tow				
Pink Shrimp Catch Pounds	9	5	0	0	0	7	T	97	10
Shrimp Catch Hourly Rate	36(201)	20(128)	0	0	0	28(145)	(291)	388(175)	40(167)

TABLE 1. FISHING LOG OF MV FAYMAR CRUISE SA-1 (PRELIMINARY)--CONTINUED

DRAG NUMBER	55	56	57	58	59	60	61	62	63
DATE	3/28/66	3/28/66	3/28/66	3/28/66	3/28/66	3/28/66	3/28/66	3/28/66	3/28/66
Loran-2H4									
Start	1145	1180	1165	1150	1162	1222	1270	1280	1315
End	1155	1186	1160	1155	1172	1226	1272	1283	1318
Loran-2H5									
Start	3343	3344	3347	3350	3353	3355	3355	3358	3356
Depth, Fathoms	87	100	83	73	70	65	68	50	69
Time Net on Bottom (Minutes)	15	15	15	15	15	11	6	10	10
Time Gear Set	0925	1025	1125	1215	1305	1415	1515	1600	1705
Remarks	-	-	-	-	- Hung-Up	Hung-Up	Hung-Up	Large Rock In Net	Coral & Rock In Net
Pink Shrimp Catch Pounds	148	0	25	537	26	0	0	0	0
Shrimp Catch Hourly Rate	592(187)	0	100(160)	218(149)	104(160)	0	0	0	0
<hr/>									
DRAG NUMBER	64	65	66	67	68	69	70	71	72
DATE	3/28/66	3/29/66	3/29/66	3/29/66	3/29/66	3/29/66	3/29/66	3/29/66	3/29/66
Loran-2H4									
Start	1319	1330	1347	1365	1360	1370	1380	1410	1420
End	1322	1335	1354	1372	1352	1373	1386	1420	1430
Depth, Fathoms	86	95	87	98	73	60	73	86	102
Time Net on Bottom (Minutes)	13	15	15	15	15	10	15	15	15
Time Gear Set	1755	0635	0725	0820	0925	1035	1135	1230	1325
Remarks	Coral and Rock	-	-	-	- Hung-Up	- End of Tow	-	- Hung-Up	- End of Tow
Pink Shrimp Catch Pounds	2	69	58	610	0	0	21	10	825
Shrimp Catch Hourly Rate	9(250)	276(239)	232(222)	2440(149)	0	0	84(214)	40(267)	3300(177)

TABLE 1. FISHING LOG OF MV FAYMAR CRUISE SA-1 (PRELIMINARY)--CONTINUED

DRAG NUMBER	73	74	75	76	77	78	79	80	81
DATE	3/29/66	3/30/66	3/30/66	3/30/66	3/30/66	3/30/66	3/30/66	3/30/66	3/30/66
Loran-2H4 Start	1432	1455	1458	1488	1490	1500	1516	1530	1532
Finish	1440	1460	1463	1495	1496	1506	1522	1540	1537
Depth, Fathoms	75	65	110	53	64	73	90	115	65
Time Net on Bottom (Minutes)	15	15	15	15	15	15	15	15	15
Time Gear Set	1500	0655	0830	1030	1145	1235	1330	1440	1610
Remarks	-	-	-	-	-	-	-	-	-
Pink Shrimp Catch Pounds	0	9	552	T	0	21	379	1	40
Shrimp Catch Hourly Rate	0	3 (285)	2208(128)	-	0	2 (156)	1516(164)	4(64)	160(137)
<hr/>									
DRAG NUMBER	82	83	84	85	86	87	88	89	90
DATE	3/30/66	3/31/66	3/31/66	3/31/66	3/31/66	3/31/66	3/31/66	3/31/66	3/31/66
Loran-2H4 Start	1555	1612	1608	1625	1588	1640	1642	1650	1690
Finish	1560	1617	1613	1631	1595	1647	1650	1657	1700
Depth, Fathoms	51	58	75	75	127	130	130	138	95
Time Net on Bottom (Minutes)	15	15	15	15	15	15	15	15	15
Time Gear Set	1735	0645	0805	0900	1035	1140	1240	1330	1440
Remarks	-	-	- Hung-Up End of Tow	-	-	-	-	-	-
Pink Shrimp Catch Pounds	28	24	0	0	T	T	T	0	0
Shrimp Catch Hourly Rate	112(148)	96(158)	0	0	-	(110)	(98)	0	0

TABLE 1. FISHING LOG OF MV FAYMAR CRUISE SA-1 (PRELIMINARY)--CONTINUED

DRAG NUMBER	91	92	93	94	95	96	97	98	99
DATE	3/31/66	3/31/66	3/31/66	4/1/66	4/1/66	4/1/66	4/1/66	4/1/66	4/1/66
Loran-2H4									
Start	1705	1765	1780	1788	1820	1820	1842	1865	1892
Finish	1710	1770	1790	1794	1830	1838	1850	1870	1897
Loran-2H5									
Start	3370	3367	3373	3370	3376	3368	3365	3365	3363
Depth, Fathoms	98	110	66	93	72	94	88-84	78	70
Time Net on Bottom (Minutes)	15	15	15	15	15	15	15	10	10
Time Gear Set	1525	1645	1755	0605	0720	0845	0940	1030	1120
Remarks	-	-	Rocky Bottom	-	-	-	-	Rocky Bottom	Rocky Bottom
Pink Shrimp Catch Pounds	T	2	0	0	0	2	16	43	T
Shrimp Catch Hourly Rate	(220)	8(133)	0	0	0	8(116)	64(197)	258(230)	-
<hr/>									
DRAG NUMBER	100	101	102	103	104	105	106		
DATE	4/1/66	4/1/66	4/1/66	4/1/66	4/1/66	4/1/66	4/1/66		
Loran-2H4									
Start	1874	1876	1920	1858	1818	1795	1755		
Finish	1870	1880	1915	1853	1809	1785	1745		
Loran-2H5									
Start	3369	3371	3391	3389	3388	3386	3387		
Depth, Fathoms	80	77	57	62	63	62	62		
Time Net on Bottom (Minutes)	10	15	15	15	15	15	15		
Time Gear Set	1215	1255	1430	1540	1630	1715	1800		
Remarks	Hard Bottom	-	-	-	-	-	-		
Pink Shrimp Catch Pounds	2	4	0	T	0	6	30		
Shrimp Catch Hourly Rate	12(141)	16(128)	0	-	0	24(202)	120(195)		

April 18, 1966

To Whom It May Concern:

The attached fishing logs of the chartered fishing vessels Faymar and Columbia are preliminary parts of a cruise report to be completed later this spring. These logs are part of the information gained in recently completed shrimp research cruises planned by the Fish Commission and carried out by the chartered vessels and contracted services of veteran fishermen.

We hope these logs will be of some immediate benefit to the shrimp fishing industry, particularly in those parts of Oregon where fishing has not begun in 1966.

Otter Trawl Investigations
Fish Commission of Oregon

TABLE II. FISHING LOG FOR MV COLUMBIA CRUISE NA-1 3/1-30/66

DRAG NUMBER	1	2	3	4	5	6	7	8	9
DATE-1966	3/3	3/3	3/3	3/3	3/3	3/4	3/11	3/11	3/11
Loran-2H4									
Start	1802	1890	1950	1954	1952	2048	2112	2075	2022
Finish	1810	-	-	-	-	-	-	-	-
Loran-2H5									
Start	-	-	-	3342	3345	3362	3375	3380	3374
Finish	-	-	-	-	-	-	-	-	-
Depth, Fathoms	62-72	73	95-96	62	58	56	48	48	54
Time Net on Bottom (Minutes)	15	7	15	4	5	15	4	15	16
Time Gear Set	0807	1120	1331	1518	1553	0820	0804	0918	1027
Warp, Fathoms	200	-	200	150	125	100	100	100	125
Pink Shrimp Catch Pounds	0	0	T	0	0	0	0	0	0
Shrimp Catch Hourly Rate ₁	0	0	-	0	0	0	0	0	0
Remarks	Hung Up Net Torn	Snag, doors crossed Net torn	-	Hung Up	Hung Up	-	Hung Up	Hard Bottom	-

DRAG NUMBER	10	11	12	13	14	15	16	17	18
DATE-1966	3/11	3/11	3/11	3/11	3/11	3/11	3/12	3/12	3/12
Loran-2H4									
Start	2071	2093	2115	2119	2103	2151	2383	2368	2420
Finish	-	2100	2122	2112	2095	2160	2379	2365	2426
Loran-2H5									
Start	3362	3352	3352	3354	3356	-	3400	3398	3398
Finish	-	-	-	-	-	-	-	-	-
Depth, Fathoms	55	82	94-97	79-80	81	127-128	57	53	70
Time Net on Bottom (Minutes)	11	15	15	15	16	16	15	15	16
Time Gear Set	1211	1337	1423	1517	1557	1706	0701	0745	0845
Warp, Fathoms	125	175	200	175	175	250	125	125	175
Pink Shrimp Catch Pounds	0	0	T	T	T	0	0	0	0
Shrimp Catch Hourly Rate	0	0	-	-	-	0	0	0	0
Remarks	Hung Up	-	-	-	-	Tickler Chain Pulled loose From Starboard Door in Tow			

₁/Figures in parentheses indicate number of whole shrimp per lb. Where no () is included, no count was taken.

TABLE II. FISHING LOG FOR MV COLUMBIA CRUISE NA-1 3/1-30/66--CONTINUED

DRAG NUMBER	19	20	21	22	23	24	25	26	27
DATE-1966	3/12	3/18	3/22	3/22	3/22	3/22	3/22	3/22	3/22
Loran-2H4									
Start	2432	2418	2198	2188	2230	2254	2252	2248	2228
Finish	2431	2423	-	2180	2236	2260	2245	2242	2221
Loran-2H5									
Start	3400	3404	3385	3385	3383	3381	3379	3377	3376
Finish	-	-	-	3384	3384	3381	3378	3374	3376
Depth, Fathoms	71-73	63	49	49-51	59	69	81-83	91-92	81
Time Net on Bottom (Minutes)	15	16	3	17	15	16	17	16	15
Time Gear Set	0935	1048	1229	1253	1356	1434	1525	1623	1709
Warp, Fathoms	175	150	125	125	125	150	175	225	200
Pink Shrimp Catch Pounds	0	0	0	0	0	0	T	T	T
Shrimp Catch Hourly Rate	0	0	0	0	0	0	-	-	-
Remarks	-	-	Hung Up	-	-	-	-	-	-
<hr/>									
DRAG NUMBER	28	29	30	31	32	33	34	35	36
DATE-1966	3/22	3/23	3/23	3/23	3/23	3/23	3/23	3/23	3/23
Loran-2H4									
Start	2210	2258	2259	2262	2278	2308	2323	2340	2364
Finish	2212	-	2265	2266	2285	2313	2330	2346	2370
Loran-2H5									
Start	3378	3387	3383	3382	3376	3381	3383	3382	3379
Finish	3378	-	3384	3384	3376	-	-	-	-
Depth, Fathoms	63	54	70-71	71	98-100	81-82	84	90-91	117
Time Net on Bottom (Minutes)	15	2	15	15	15	15	16	15	15
Time Gear Set	1805	0748	0830	0914	1007	1112	1204	1259	1359
Warp, Fathoms	175	125	125	175	250	200	200	250	275
Pink Shrimp Catch Pounds	0	0	T	0	T	0	0	T	175
Shrimp Catch Hourly Rate	0	0	-	0	-	0	0	-	700(139)
Remarks	-	Hung Up	-	-	-	-	-	-	-

TABLE II. FISHING LOG FOR MV COLUMBIA CRUISE NA-1 3/1-30/66--CONTINUED

DRAG NUMBER	37	38	39	40	41	42	43	44	45
DATE-1966	3/23	3/23	3/23	3/24	3/24	3/24	3/24	3/24	3/24
Loran-2H4									
Start	2368	2408	2438	2478	2488	2575	2586	2603	2568
Finish	2376	2411	2445	2484	2494	2581	2588	2597	2560
Loran-2H5									
Start	3378	3387	3413	3396	3398	3410	3413	3423	3428
Finish	-	-	-	3397	3399	3411	3414	3422	-
Depth, Fathoms	122-124	80-81	55	91	88	92-93	95	74-76	50
Time Net on Bottom (Minutes)	22	15	16	15	16	15	6	15	16
Time Gear Set	1519	1642	1829	0613	0653	0840	0920	1105	1215
Warp, Fathoms	300	200	125	250	225	225	250	175	125
Pink Shrimp Catch Pounds	50	0	0	15	2	90	T	0	0
Shrimp Catch Hourly Rate	136(130)	0	0	60(144)	8()	360(155)	-	0	0
Remarks	-	-	-	-	-	-	Hung Up Old Ship Railing Caught	-	-
DRAG NUMBER	46	47	48	49	50	51	52	53	54
DATE-1966	3/24	3/25	3/25	3/25	3/25	3/25	3/25	3/26	3/26
Loran-2H4									
Start	2558	2629	2663	2673	2668	2722	2728	2754	2808
Finish	2562	2622	2669	2667	2662	2729	2721	2760	2801
Loran-2H5									
Start	3427	3427	3426	3421	3417	3428	3433	3439	3434
Finish	"	"	"	3420	3415	3429	"	"	"
Depth, Fathoms	54-56	73-74	82	101-99	124-125	88	74	54	82
Time Net on Bottom (Minutes)	15	16	15	15	15	15	15	15	15
Time Gear Set	1257	0637	0803	1027	1142	1509	1605	0728	0838
Warp, Fathoms	125	175	175	250	275	200	175	125	175
Pink Shrimp Catch Pounds	0	1	90	150	1	5	1	0	0
Shrimp Catch Hourly Rate	0	4	360(117)	600(138)	4	20(110)	4	0	0
Remarks	-	-	-	-	-	Euphausids Abundant	-	-	-

TABLE II. FISHING LOG FOR MV COLUMBIA CRUISE NA-1 3/1-30/66--CONTINUED

DRAG NUMBER	73	74	75	76	77	78	79	80	81
DATE-1966	3/27	3/27	3/28	3/28	3/28	3/28	3/28	3/28	3/28
Loran-2H4									
Start	3180	3143	3112	3142	3140	3215	3221	3308	3367
Finish	3186	3142	3105	3149	3148	3223	3226	3312	3374
Loran-2H5									
Start	3442	3438	3425	3427	3417	3427	3403	3419	3404
Finish	"	3436	3424	"	"	"	3401	3415	"
Depth, Fathoms	78-80	78-80	91-93	84-83	101	83	99-97	93-91	93-91
Time Net on Bottom (Minutes)	15	17	20	15	15	20	17	15	14
Time Gear Set	1735	1834	0750	0856	1015	1207	1348	1527	1648
Warp, Fathoms	200	200	200	225	250	200	250	250	250
Pink Shrimp Catch Pounds	0	0	15	4	250	25	0	0	0
Shrimp Catch Hourly Rate	0	0	45(314)	16	1000(166)	75(165)	0	0	0
Remarks	-	-	-	-	-	-	-	-	-
DRAG NUMBER	82	83	84	85	86	87	88	89	90
DATE-1966	3/28	3/28	3/29	3/29	3/29	3/29	3/29	3/29	3/29
Loran-2H4									
Start	3378	3418	3458	3478	3478	3497	3504	3537	3483
Finish	3383	3425	3463	3484	3472	3505	3503	3544	3476
Loran-2H5									
Start	3408	3402	3405	3412	3426	3442	3443	-	3452
Finish	"	"	3406	"	"	-	3441	-	3451
Depth, Fathoms	87	99	108-136	94	74-75	73-120	72-74	100-110	61
Time Net on Bottom (Minutes)	15	15	15	15	15	15	11	15	15
Time Gear Set	1734	1838	0625	0712	0845	0939	1042	1206	1345
Warp, Fathoms	225	250	250	200	150	150	175	225	150
Pink Shrimp Catch Pounds	0	0	0	0	T	0	0	0	4 1/2
Shrimp Catch Hourly Rate	0	0	0	0	-	0	0	0	18(146)
Remarks	-	-	-	-	-	Nothing Hang Up Caught	-	-	Fishy

TABLE II. FISHING LOG FOR MV COLUMBIA CRUISE NA-1 3/1-30/66--CONTINUED

DRAG NUMBER	91	92	93	94	95	96	97	98	99
DATE-1966	3/29	3/29	3/29	3/29	3/30	3/30	3/30	3/30	3/30
Loran-2H4							3320		
Start	3453	3420	3387	3385	3278	3298	3220	3435	3460
Finish	3448	3416	3383	3380	3271	3301	3327	3440	3467
Loran-2H5									
Start	3442	3435	3438	3434	3455	3449	3455	3453	3457
Finish	3440	3434	"	"	3456	3448	"	"	3456
Depth, Fathoms	68	70	70	72	59	67	61	58	56
Time Net on Bottom (Minutes)	15	15	15	15	15	15	15	15	15
Time Gear Set	1455	1553	1646	1741	0603	0703	0800	0949	1045
Warp, Fathoms	175	175	175	175	150	175	150	150	150
Pink Shrimp Catch Pounds	75	120	17	60	T	60	T	T	T
Shrimp Catch Hourly Rate	300(197)	480(189)	68(168)	240(157)	-	240(196)	-	-	-
Remarks	-	-	-	-	-	-	-	-	-
								Anchovy 500# and smelt 100 lb	Anchovy
DRAG NUMBER	100	101							
DATE-1966	3/30	3/30							
Loran-2H4									
Start	3498	3522							
Finish	3505	3530							
Loran-2H5									
Start	3455	3456							
Finish	3455	3457							
Depth, Fathoms	60	61-62							
Time Net on Bottom (Minutes)	15	15							
Time Gear Set	1138	1226							
Warp, Fathoms	150	150							
Pink Shrimp Catch Pounds	T	T							
Shrimp Catch Hourly Rate	-	-							
Remarks	Anchovies	Anchovies							
	150#	200#							