

61-1

**Department of Oceanography**

**SCHOOL OF SCIENCE**

**OREGON STATE COLLEGE**

**Corvallis, Oregon**

**PHYSICAL HYDROGRAPHIC DATA OFFSHORE**

**FROM NEWPORT, OREGON, FOR JULY 1958**

**TO JULY 1959**

**by**

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**and**

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**Data Report No. 4**

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Chairman**

## INTRODUCTION

The Department of Oceanography at Oregon State College initiated an oceanographic survey of the Oregon coast on July 1, 1958. The purpose of this report is to present salinity, temperature, and oxygen data collected for the interval from July 1958 to July 1959, and to present a preliminary interpretation of the results.

## PROCEDURE

Coast Guard vessels of 40 and 52 feet in length stationed at Newport and commanded by BMI McAdams and BMI Dwyer were used to make surveys at the stations which were located at five mile intervals, from the intersections of the south jetty of Yaquina Bay and the beach to 25 miles offshore, (Figure 1). Samples from the surface, 50 and 100 feet were obtained at each station with the aid of a Frautschy or Kemmerer bottle. Generally the wire angles were negligible. However, an additional four feet of wire was payed out with wire angles between  $5^{\circ}$  and  $10^{\circ}$ . Temperatures were taken on deck with a bucket thermometer. Although no tests were made, the accuracy of the temperature measurements was estimated as  $0.2^{\circ}\text{C}$ . Salinity and oxygen samples were analyzed in the laboratory by standard methods.

## INDICATIONS OF WATER MASS CHARACTERISTICS OFF NEWPORT, OREGON

Upwelled water has a relatively high salinity, and a relatively low temperature and dissolved oxygen content. Early indications show that during part of the summer a narrow band of upwelling exists to at least five miles and possibly to 15 miles offshore from Newport. Salinities of  $33.31/_{\text{oo}}$ ,  $32.70/_{\text{oo}}$ , and  $32.63/_{\text{oo}}$  were present at stations 1, 2, and 3 off Newport in August, 1958 (Table 1). Similar values were obtained during the September and October cruises at these same stations (Table 1 and Figures 4 and 5). Associated with these high salinities, relatively low temperatures were recorded (Station 1, July,  $15.2^{\circ}\text{C}$ ., Station 1, August,  $10.9^{\circ}\text{C}$ ., Station 1, September,  $11.4^{\circ}\text{C}$ .) further substantiating the presence of upwelling, Figure 4 and Table 1.

According to Reid, Roden and Wyllie (1956), the California current system at its upper latitudes should have a minimum salt content of about  $32.5^{\circ}/\text{oo}$ . Lower salinity water might result from the influence of the Columbia River or other coastal runoff. Surface salinity values at Station 3 (15 mile station) for July and September were  $29.00^{\circ}/\text{oo}$ , and  $31.92^{\circ}/\text{oo}$  respectively, (Figures 3 and 4 and Table 1), indicating the possible presence of Columbia River water. Salinity and temperature results obtained during cruises made in November, January, March, and April are more difficult to interpret. More extensive observations made by the U. S. Coast and Geodetic Survey R/V EXPLORER in February of 1960 and by Oregon State College Department of Oceanography should provide indications of winter circulation off the Oregon coast.

#### DISTRIBUTION OF PROPERTIES

Survey data are presented graphically. Figure 2 is a vertical time section of temperature, salinity, and dissolved oxygen at the 10 mile station off Newport. Figures 3 through 8 are vertical sections of salinity, dissolved oxygen, sigma t, and temperature for stations occupied from July 1, 1958 to June 2, 1959. Observations used to construct curves are presented in Table 1.

#### BIBLIOGRAPHY

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- U. S. Hydrographic Office (1955). Instruction Manual for Oceanographic Observations. H. O. Pub. 607. pp. 1 - 210.

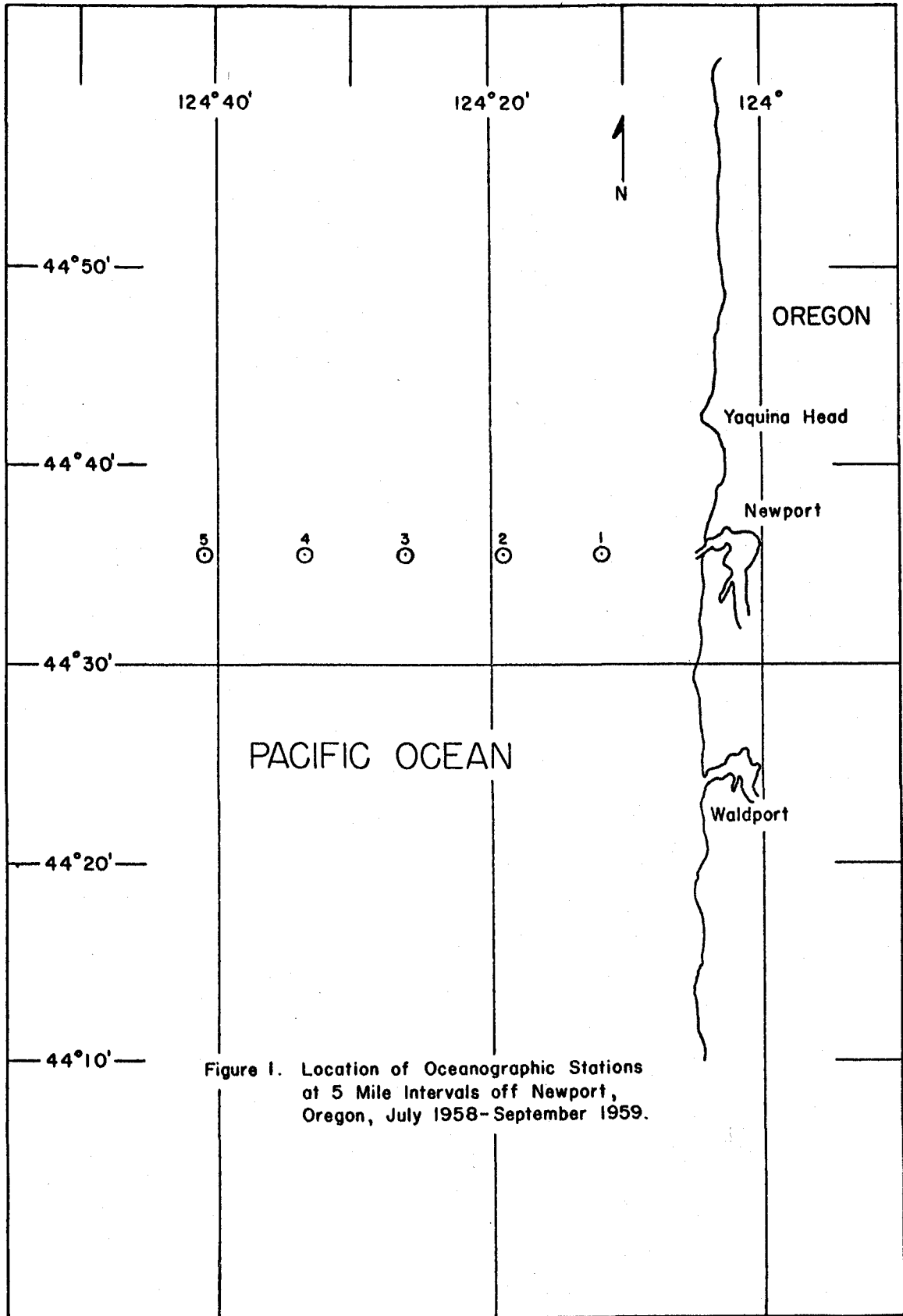


Figure 1. Location of Oceanographic Stations at 5 Mile Intervals off Newport, Oregon, July 1958-September 1959.

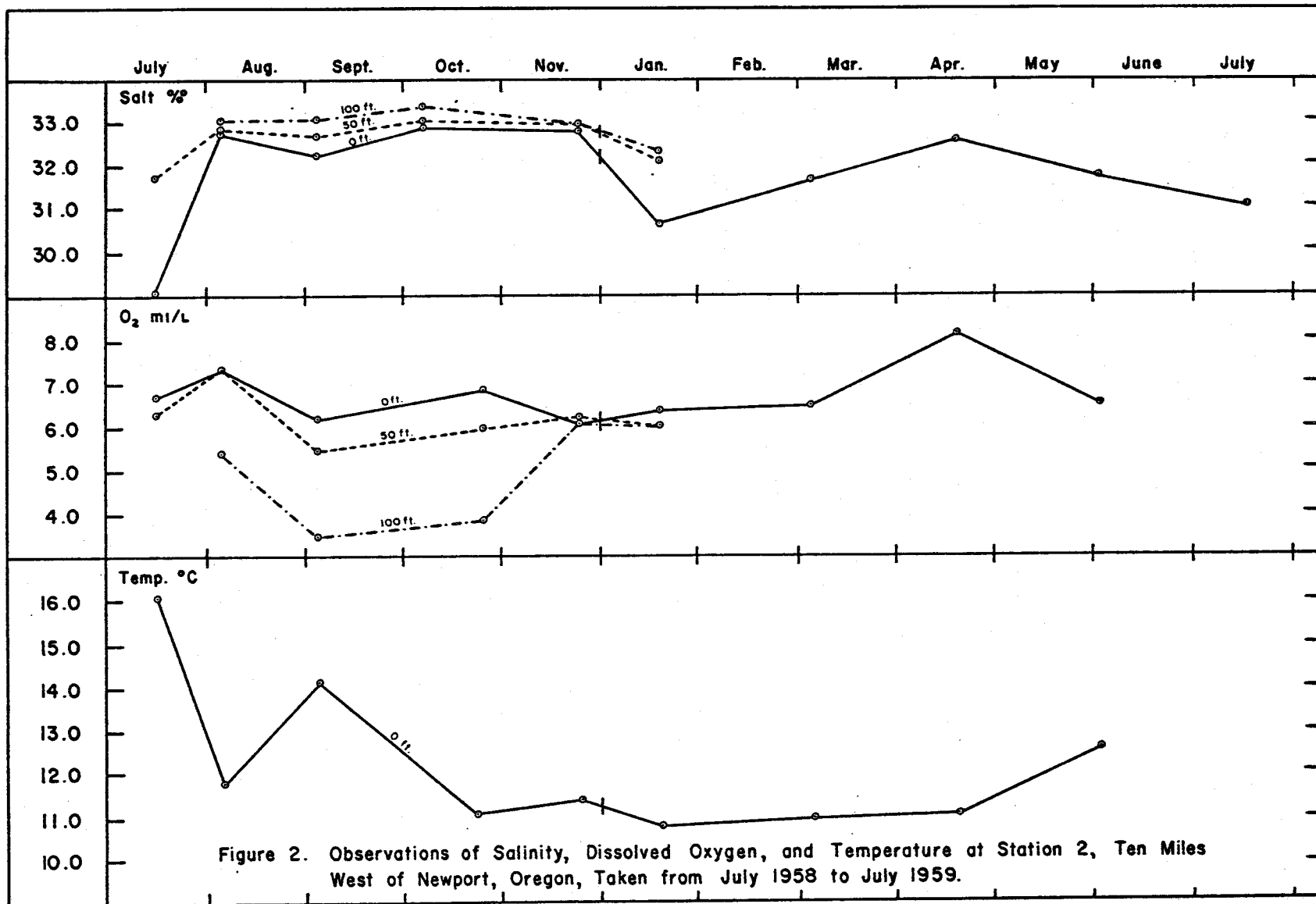


Figure 2. Observations of Salinity, Dissolved Oxygen, and Temperature at Station 2, Ten Miles West of Newport, Oregon, Taken from July 1958 to July 1959.

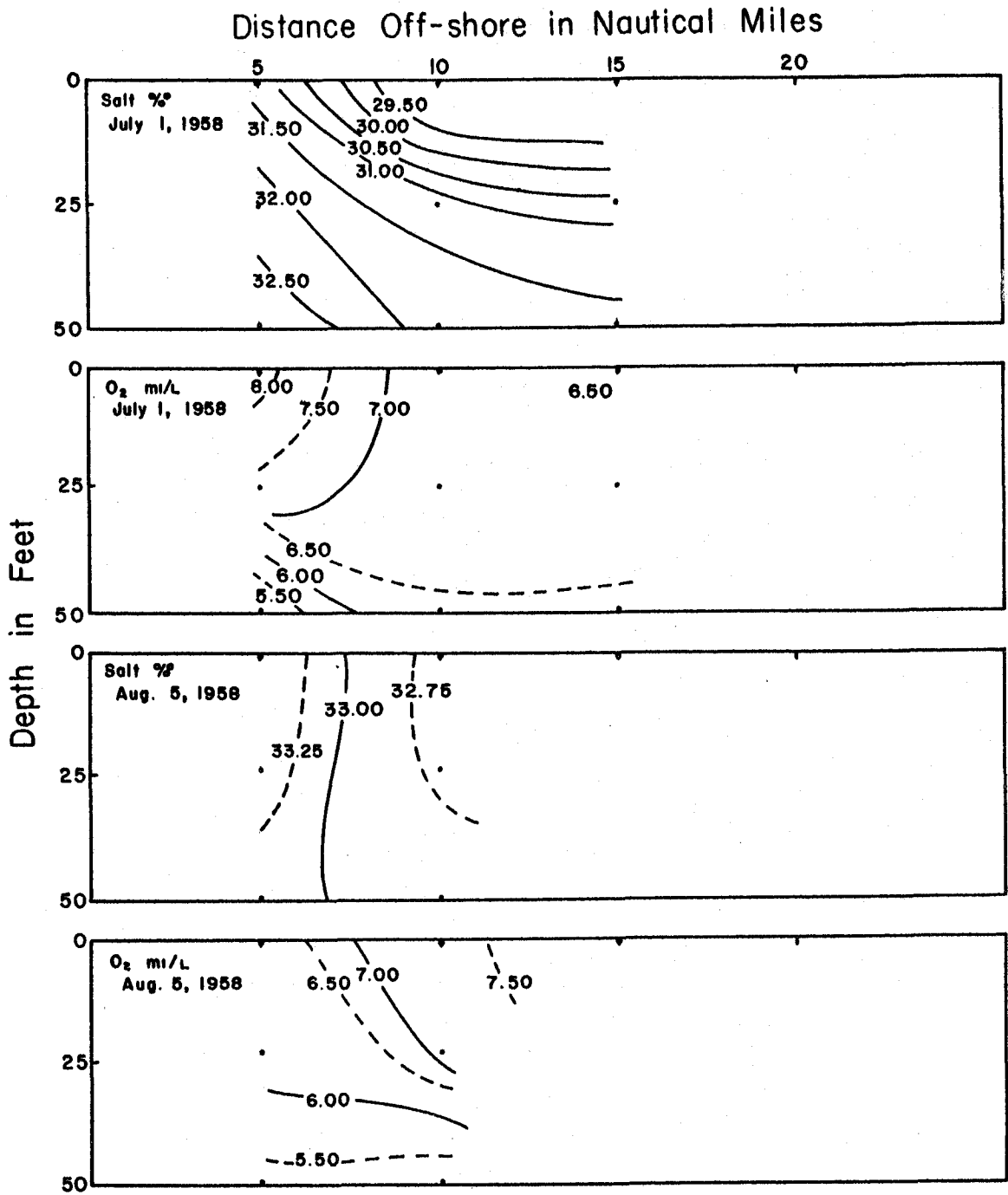


Figure 3. Vertical Distribution of Salinity and Dissolved Oxygen at Three Stations West of Newport, Oregon, on July 1, 1958 and August 5, 1958.

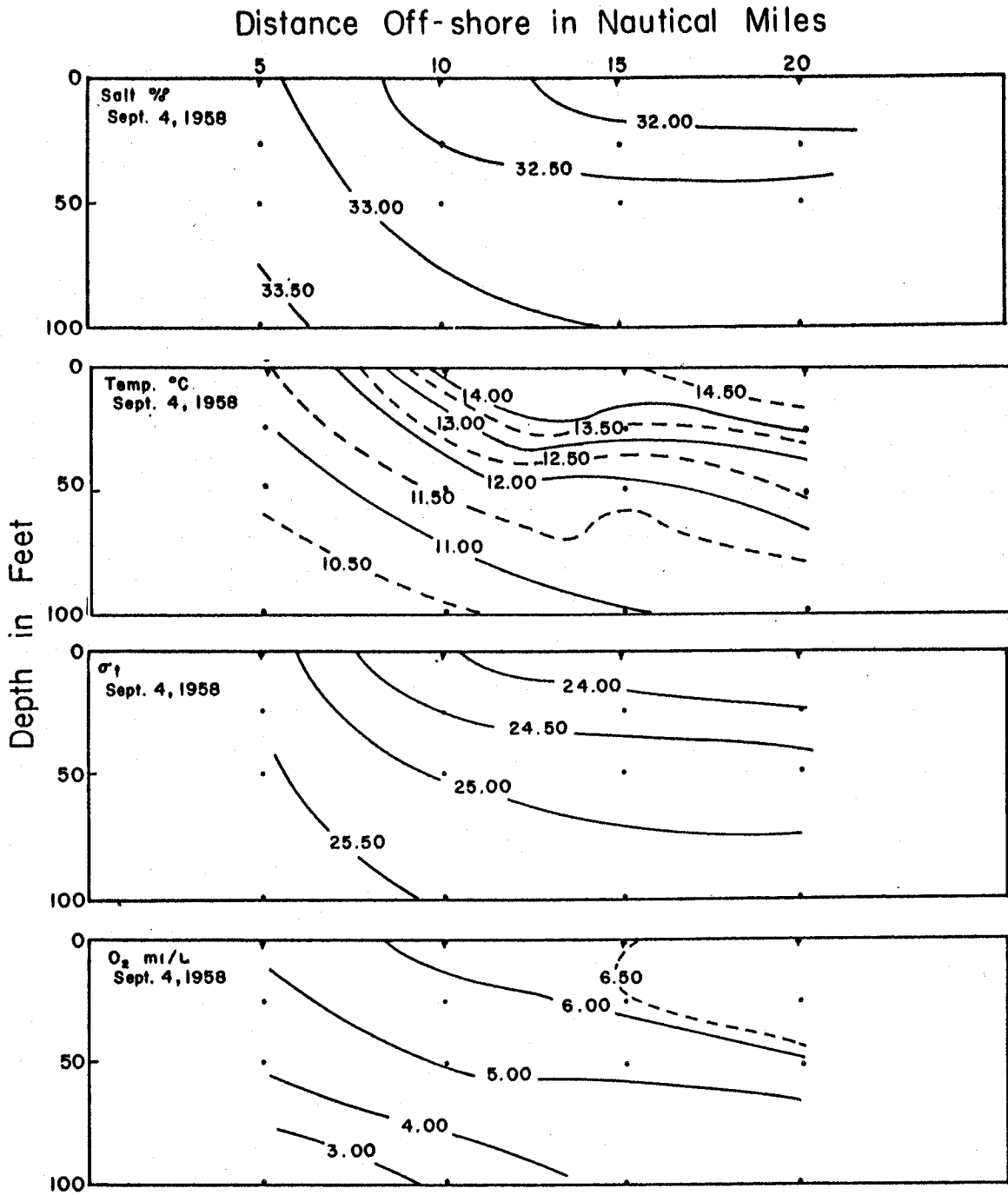


Figure 4. Vertical Distribution of Salinity, Temperature,  $\sigma_t$ , and Dissolved Oxygen at Four Stations West of Newport, Oregon, on September 4, 1958.

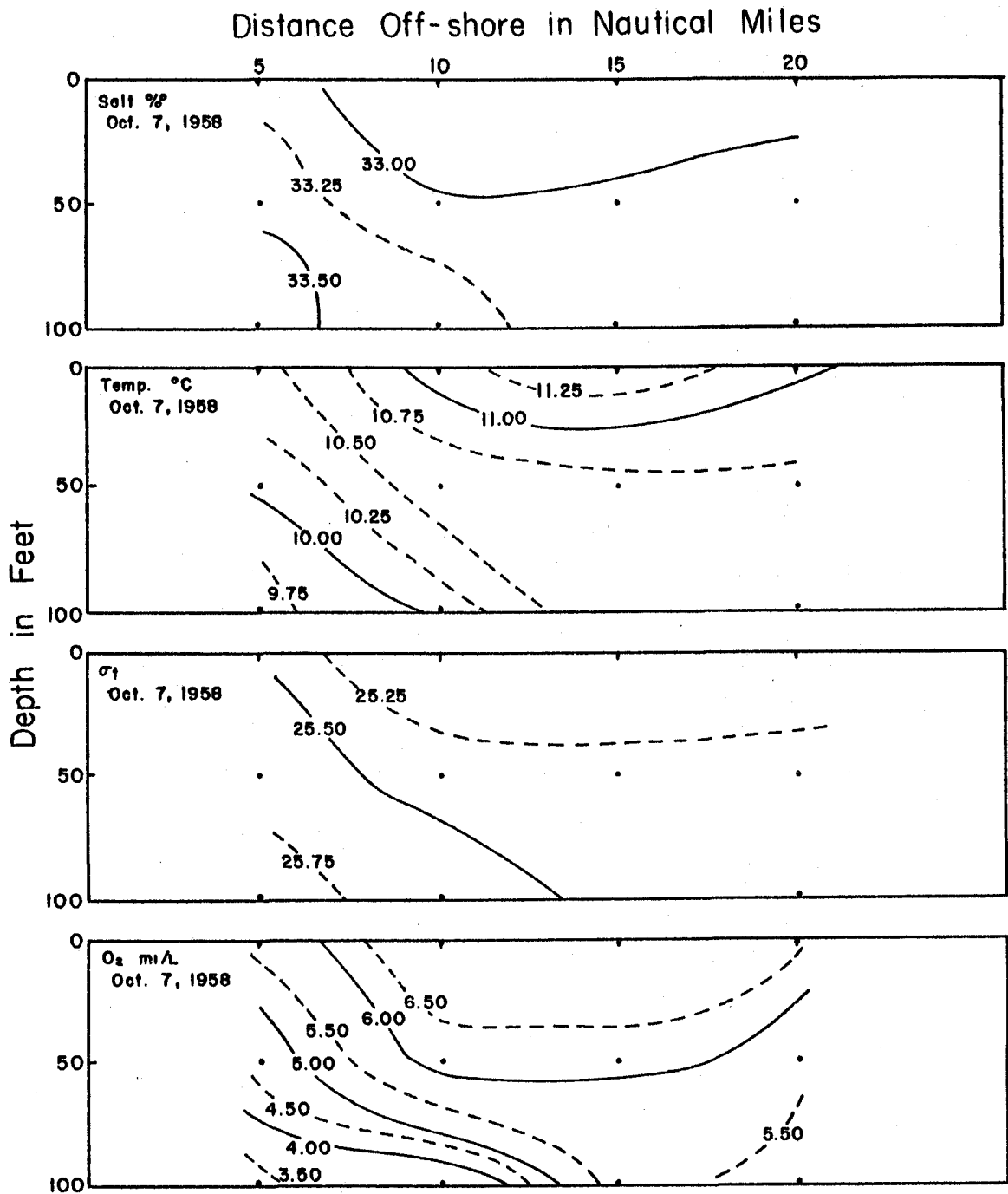


Figure 5. Vertical Distribution of Salinity, Temperature,  $\sigma_t$ , and Dissolved Oxygen at Four Stations West of Newport, Oregon, on October 7, 1958.



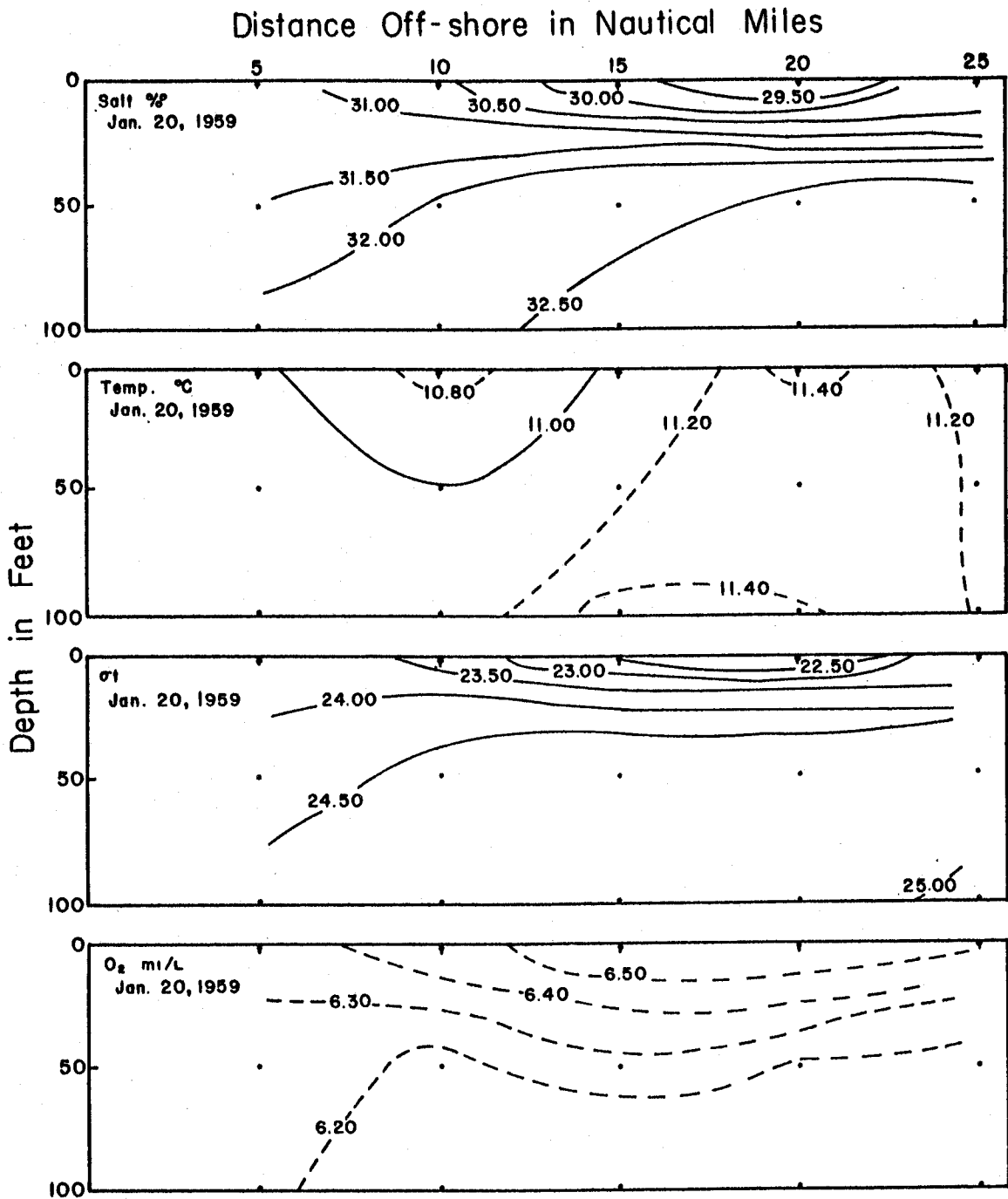


Figure 6. Vertical Distribution of Salinity, Temperature,  $\sigma_t$ , and Dissolved Oxygen at Five Stations West of Newport, Oregon, on January 20, 1959.

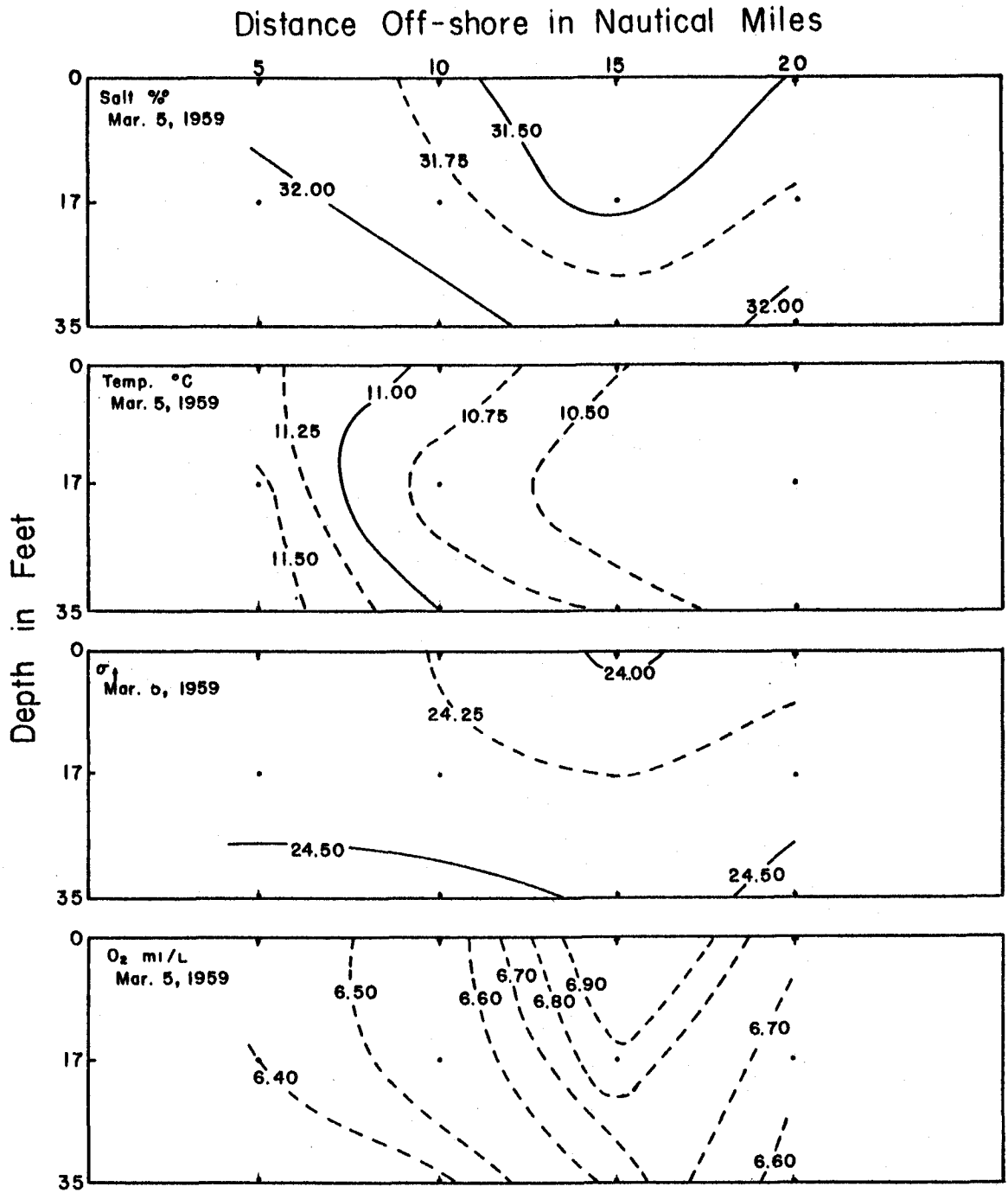


Figure 7. Vertical Distribution of Salinity, Temperature,  $\sigma_t$ , and Dissolved Oxygen at Four Stations West of Newport, Oregon, on March 5, 1959.

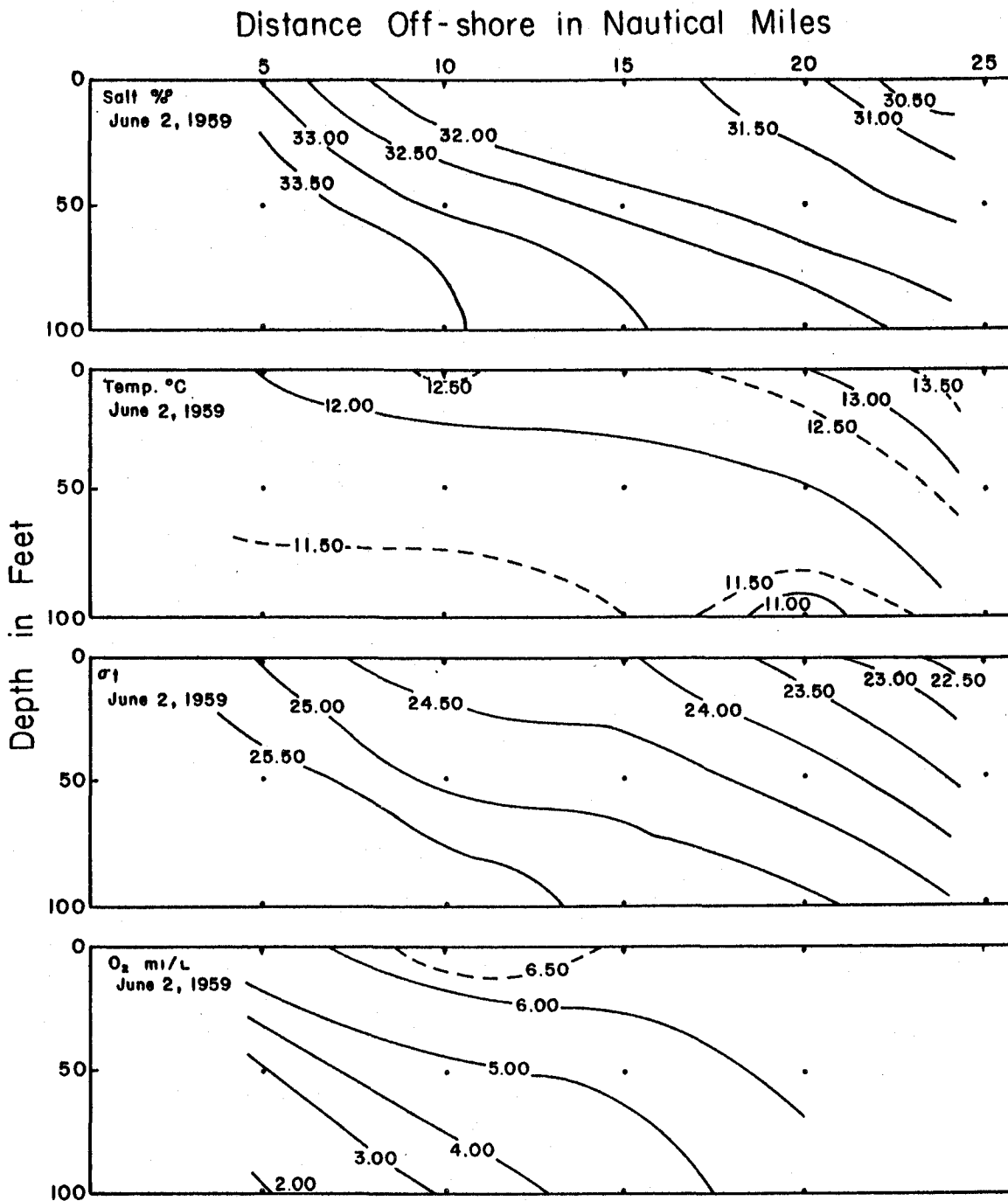


Figure 8. Vertical Distribution of Salinity, Temperature,  $\sigma_t$ , and Dissolved Oxygen at Five Stations West of Newport, Oregon, on June 2, 1959.

TABLE I. Observations of Salinity, Temperature, Sigma t, and Dissolved Oxygen Taken from Five Stations Located at Five Mile Intervals West of Newport, Oregon from July 1, 1958, to June 2, 1959.

Station <u>1</u>		<u>44° 35.8'</u>		<u>N</u>
Date <u>7-1-58</u>		<u>124° 10.9'</u>		<u>W</u>
Time <u>0955 PST</u>		Depth <u>29 fathoms</u>		
Depth feet	Temp. (°C)	O <sub>2</sub> ml/l	Salinity ‰	σ <sub>t</sub>
0	15.2	8.14	31.53	
25		7.24	32.30	
50		5.05	32.92	

Station <u>2</u>		<u>44° 35.8'</u>		<u>N</u>
Date <u>8-5-58</u>		<u>124° 17.8'</u>		<u>W</u>
Time <u>1130 PST</u>		Depth <u>42 fathoms</u>		
Depth feet	Temp. (°C)	O <sub>2</sub> ml/l	Salinity ‰	σ <sub>t</sub>
0	11.9	7.27	32.70	
50		7.30	32.72	
100		5.31	32.88	

Station <u>2</u>		<u>44° 35.8'</u>		<u>N</u>
Date <u>7-1-58</u>		<u>124° 17.8'</u>		<u>W</u>
Time <u>1050 PST</u>		Depth <u>42 fathoms</u>		
Depth feet	Temp. (°C)	O <sub>2</sub> ml/l	Salinity ‰	σ <sub>t</sub>
0	16.1	6.77	29.16	
25		6.71	31.27	
50		6.30	31.80	

Station <u>3</u>		<u>44° 35.8'</u>		<u>N</u>
Date <u>8-5-58</u>		<u>124° 24.8'</u>		<u>W</u>
Time <u>1155 PST</u>		Depth <u>37 fathoms</u>		
Depth feet	Temp. (°C)	O <sub>2</sub> ml/l	Salinity ‰	σ <sub>t</sub>
0	12.6	7.99	32.63	

Station <u>3</u>		<u>44° 35.8'</u>		<u>N</u>
Date <u>7-1-58</u>		<u>124° 24.8'</u>		<u>W</u>
Time <u>1135 PST</u>		Depth <u>37 fathoms</u>		
Depth feet	Temp. (°C)	O <sub>2</sub> ml/l	Salinity ‰	σ <sub>t</sub>
0	17.4	6.46	29.00	
25		6.68	30.73	
50		6.46	31.71	

Station <u>1</u>		<u>44° 35.8'</u>		<u>N</u>
Date <u>9-4-58</u>		<u>124° 10.9'</u>		<u>W</u>
Time <u>0955 PST</u>		Depth <u>29 fathoms</u>		
Depth feet	Temp. (°C)	O <sub>2</sub> ml/l	Salinity ‰	σ <sub>t</sub>
0	11.4	5.30	33.15	25.29
25	10.8	4.50	33.26	25.48
50	10.6	4.17	33.37	25.60
100	10.1	2.74	33.69	25.93

Station <u>1</u>		<u>44° 35.8'</u>		<u>N</u>
Date <u>8-5-58</u>		<u>124° 10.9'</u>		<u>W</u>
Time <u>1100 PST</u>		Depth <u>29 fathoms</u>		
Depth feet	Temp. (°C)	O <sub>2</sub> ml/l	Salinity ‰	σ <sub>t</sub>
0	10.9	6.35	33.31	
50		6.22	33.28	
100		5.40	33.21	

Station <u>2</u>		<u>44° 35.8'</u>		<u>N</u>
Date <u>9-4-58</u>		<u>124° 17.8'</u>		<u>W</u>
Time <u>1030 PST</u>		Depth <u>42 fathoms</u>		
Depth feet	Temp. (°C)	O <sub>2</sub> ml/l	Salinity ‰	σ <sub>t</sub>
0	14.1	6.13	32.27	24.08
25	12.7	5.86	32.45	24.50
50	11.9	5.45	32.65	24.81
100	10.4	3.54	33.06	25.39

Station	3	44° 35.8'	N	
Date	9-4-58	124° 24.8'	W	
Time	1120 PST	Depth	37 fathoms	
Depth feet	Temp. (°C)	O <sub>2</sub> ml/l	Salinity ‰	σ <sub>t</sub>
0	14.4	6.45	31.92	23.75
25	13.1	6.54	32.18	24.21
50	11.6	5.89	32.65	24.86
100	10.9	4.87	32.92	25.20

Station	3	44° 35.8'	N	
Date	10-7-58	124° 24.8'	W	
Time	1235 PST	Depth	37 fathoms	
Depth feet	Temp. (°C)	O <sub>2</sub> ml/l	Salinity ‰	σ <sub>t</sub>
0	11.4	6.76	32.92	25.11
50	10.7	6.09	33.03	25.31
100		5.74	33.06	

Station	4	44° 35.8'	N	
Date	9-4-58	124° 31.7'	W	
Time	1200 PST	Depth	79 fathoms	
Depth feet	Temp. (°C)	O <sub>2</sub> ml/l	Salinity ‰	σ <sub>t</sub>
0	14.7	6.70	31.87	23.65
25	14.4	6.86	31.91	23.74
50	12.3	6.64	32.66	24.74
100	11.2	4.73	33.04	25.24

Station	4	44° 35.8'	N	
Date	10-7-58	124° 31.7'	W	
Time	1310 PST	Depth	79 fathoms	
Depth feet	Temp. (°C)	O <sub>2</sub> ml/l	Salinity ‰	σ <sub>t</sub>
0	11.0	6.53	32.92	25.18
50	10.6	5.65	33.10	25.39
100	10.5	5.29	33.15	25.44

Station	1	44° 35.8'	N	
Date	10-7-58	124° 10.9'	W	
Time	1115 PST	Depth	29 fathoms	
Depth feet	Temp. (°C)	O <sub>2</sub> ml/l	Salinity ‰	σ <sub>t</sub>
0	10.4	5.53	33.21	25.51
50	10.1	4.62	33.48	25.77
100	9.7	3.47	33.60	25.92

Station	1	44° 35.8'	N	
Date	11-24-58	124° 17.8'	W	
Time	1120 PST	Depth	42 fathoms	
Depth feet	Temp. (°C)	O <sub>2</sub> ml/l	Salinity ‰	σ <sub>t</sub>
0	11.5	6.20	32.41	24.70
50	11.9	6.11	32.57	24.75
100	12.1	6.02	32.68	24.79

Station	2	44° 35.8'	N	
Date	10-7-58	124° 17.8'	W	
Time	1200 PST	Depth	42 fathoms	
Depth feet	Temp. (°C)	O <sub>2</sub> ml/l	Salinity ‰	σ <sub>t</sub>
0	11.1	6.88	32.95	25.16
50	10.6	6.09	33.01	25.32
100	10.0	3.82	33.31	25.66

Station	2	44° 35.8'	N	
Date	11-24-58	124° 17.8'	W	
Time	1200 PST	Depth	42 fathoms	
Depth feet	Temp. (°C)	O <sub>2</sub> ml/l	Salinity ‰	σ <sub>t</sub>
0	11.4	6.08	32.86	25.06
50	11.6	6.17	32.97	25.11
100	11.8	6.08	32.97	25.08

Station <u>1</u> <u>44° 35.8'</u> N				
Date <u>1-20-59</u> <u>124° 10.9'</u> W				
Time <u>1105 PST</u> Depth <u>29 fathoms</u>				
Depth feet	Temp. (°C)	O <sub>2</sub> ml/l	Salinity ‰	σ <sub>t</sub>
0	11.0	6.32	31.27	23.90
50	11.0	6.23	31.55	24.12
100	11.1	6.26	32.38	24.74

Station <u>5</u> <u>44° 35.8'</u> N				
Date <u>1-20-59</u> <u>124° 38.6'</u> W				
Time <u>1330 PST</u> Depth <u>147 fathoms</u>				
Depth feet	Temp. (°C)	O <sub>2</sub> ml/l	Salinity ‰	σ <sub>t</sub>
0	11.1	6.53	30.32	23.15
50	11.2	6.17	32.57	24.87
100	11.2	6.14	32.75	25.01

Station <u>2</u> <u>44° 35.8'</u> N				
Date <u>1-20-59</u> <u>124° 17.8'</u> W				
Time <u>1145 PST</u> Depth <u>42 fathoms</u>				
Depth feet	Temp. (°C)	O <sub>2</sub> ml/l	Salinity ‰	σ <sub>t</sub>
0	10.8	6.47	30.66	23.46
50	11.0	6.17	32.14	24.57
100	11.0	6.17	32.39	24.77

Station <u>1</u> <u>44° 35.8'</u> N				
Date <u>3-5-59</u> <u>124° 10.9'</u> W				
Time <u>1100 PST</u> Depth <u>29 fathoms</u>				
Depth feet	Temp. (°C)	O <sub>2</sub> ml/l	Salinity ‰	σ <sub>t</sub>
0	11.2	6.47	31.91	24.36
17	11.6	6.41	32.09	24.43
35	11.5	6.32	32.25	24.57

Station <u>3</u> <u>44° 35.8'</u> N				
Date <u>1-20-59</u> <u>124° 24.8'</u> W				
Time <u>1215 PST</u> Depth <u>37 fathoms</u>				
Depth feet	Temp. (°C)	O <sub>2</sub> ml/l	Salinity ‰	σ <sub>t</sub>
0	11.0	6.59	29.52	22.55
50	11.2	6.29	32.47	24.80
100	11.5	6.17	32.79	24.99

Station <u>2</u> <u>44° 35.8'</u> N				
Date <u>3-5-59</u> <u>124° 17.8'</u> W				
Time <u>1130 PST</u> Depth <u>42 fathoms</u>				
Depth feet	Temp. (°C)	O <sub>2</sub> ml/l	Salinity ‰	σ <sub>t</sub>
0	11.0	6.53	31.73	24.25
17	10.6	6.56	31.87	24.44
35	11.0	6.38	32.14	24.57

Station <u>4</u> <u>44° 35.8'</u> N				
Date <u>1-20-59</u> <u>124° 31.7'</u> W				
Time <u>1245 PST</u> Depth <u>79 fathoms</u>				
Depth feet	Temp. (°C)	O <sub>2</sub> ml/l	Salinity ‰	σ <sub>t</sub>
0	11.4	6.56	29.42	22.41
50	11.3	6.17	32.61	24.89
100	11.4	6.17	32.68	24.92

Station <u>3</u> <u>44° 35.8'</u> N				
Date <u>3-5-59</u> <u>124° 24.8'</u> W				
Time <u>1200 PST</u> Depth <u>37 fathoms</u>				
Depth feet	Temp. (°C)	O <sub>2</sub> ml/l	Salinity ‰	σ <sub>t</sub>
0	10.5	6.94	31.27	23.99
17		6.91	31.29	
35	10.7	6.62	31.94	24.47

Station <u>4</u>		<u>44° 35.8'</u> N		
Date <u>3-5-59</u>		<u>124° 31.7'</u> W		
Time <u>1230 PST</u>		Depth <u>79 fathoms</u>		
Depth feet	Temp. (°C)	O <sub>2</sub> ml/l	Salinity ‰	σ <sub>t</sub>
0	10.5	6.76	31.49	24.15
17	10.6	6.64	31.73	24.32
35	10.5	6.59	32.07	24.61

Station <u>4</u>		<u>44° 35.8'</u> N		
Date <u>4-21-59</u>		<u>124° 31.7'</u> W		
Time <u>1230 PST</u>		Depth <u>79 fathoms</u>		
Depth feet	Temp. (°C)	O <sub>2</sub> ml/l	Salinity ‰	σ <sub>t</sub>
0	11.0	5.59	31.47	24.06
17	11.2		31.49	24.03
35	10.9	6.73	32.03	24.50

Station <u>1</u>		<u>44° 35.8'</u> N		
Date <u>4-21-59</u>		<u>124° 10.9'</u> W		
Time <u>1100 PST</u>		Depth <u>29 fathoms</u>		
Depth feet	Temp. (°C)	O <sub>2</sub> ml/l	Salinity ‰	σ <sub>t</sub>
0	11.1	8.23		
17	11.0	7.50		
35	11.1	7.79		

Station <u>5</u>		<u>44° 35.8'</u> N		
Date <u>4-21-59</u>		<u>124° 38.6'</u> W		
Time <u>1300 PST</u>		Depth <u>147 fathoms</u>		
Depth feet	Temp. (°C)	O <sub>2</sub> ml/l	Salinity ‰	σ <sub>t</sub>
0	11.8	5.06	30.93	23.49
17	11.5	6.94	31.17	23.74
35	11.2	6.44	31.42	23.98

Station <u>2</u>		<u>44° 35.8'</u> N		
Date <u>4-21-59</u>		<u>124° 17.8'</u> W		
Time <u>1125 PST</u>		Depth <u>42 fathoms</u>		
Depth feet	Temp. (°C)	O <sub>2</sub> ml/l	Salinity ‰	σ <sub>t</sub>
0	11.1	8.23	32.54	
17	11.2	7.67	32.57	
35	11.1	8.56	32.95	

Station <u>1</u>		<u>44° 35.8'</u> N		
Date <u>6-2-59</u>		<u>124° 10.9'</u> W		
Time <u>1045 PST</u>		Depth <u>29 fathoms</u>		
Depth feet	Temp. (°C)	O <sub>2</sub> ml/l	Salinity ‰	σ <sub>t</sub>
0	12.0	5.36	33.24	25.24
50	11.8	2.71	33.73	25.67
100	11.5	1.95	33.86	25.82

Station <u>3</u>		<u>44° 35.8'</u> N		
Date <u>4-21-59</u>		<u>124° 24.8'</u> W		
Time <u>1155 PST</u>		Depth <u>37 fathoms</u>		
Depth feet	Temp. (°C)	O <sub>2</sub> ml/l	Salinity ‰	σ <sub>t</sub>
0	11.0	6.82	32.09	24.53
17	11.1	6.70	32.14	24.57
35	10.6	6.67	32.27	24.75

Station <u>2</u>		<u>44° 35.8'</u> N		
Date <u>6-2-59</u>		<u>124° 17.8'</u> W		
Time <u>1125 PST</u>		Depth <u>42 fathoms</u>		
Depth feet	Temp. (°C)	O <sub>2</sub> ml/l	Salinity ‰	σ <sub>t</sub>
0	12.5	6.55	31.80	24.04
50	11.8	4.67	32.80	24.94
100	11.0	2.99	33.51	25.64

Station <u>3</u>		<u>44° 35.8'</u>		<u>N</u>
Date <u>6-2-59</u>		<u>124° 24.8'</u>		<u>W</u>
Time <u>1200 PST</u>		Depth <u>37 fathoms</u>		
Depth feet	Temp. (°C)	O <sub>2</sub> ml/l	Salinity ‰	σ <sub>t</sub>
0	12.1	6.48	31.78	24.09
50	11.9	5.38	32.45	24.65
100	11.5	4.14	33.03	25.17

Station <u>4</u>		<u>44° 35.8'</u>		
Date <u>6-2-59</u>		<u>124° 31.7'</u>		<u>W</u>
Time <u>1225 PST</u>		Depth <u>79 fathoms</u>		
Depth feet	Temp. (°C)	O <sub>2</sub> ml/l	Salinity ‰	σ <sub>t</sub>
0	13.0	6.48	31.17	23.38
50	12.0	6.20	31.94	24.24
100	10.5	5.88	32.72	25.11

Station <u>5</u>		<u>44° 35.8'</u>		<u>N</u>
Date <u>6-2-59</u>		<u>124° 31.7'</u>		<u>W</u>
Time <u>1305 PST</u>		Depth <u>79 fathoms</u>		
Depth feet	Temp. (°C)	O <sub>2</sub> ml/l	Salinity ‰	σ <sub>t</sub>
0	13.5		30.03	22.48
50	13.0		31.06	23.37
100	12.0		32.38	24.58



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