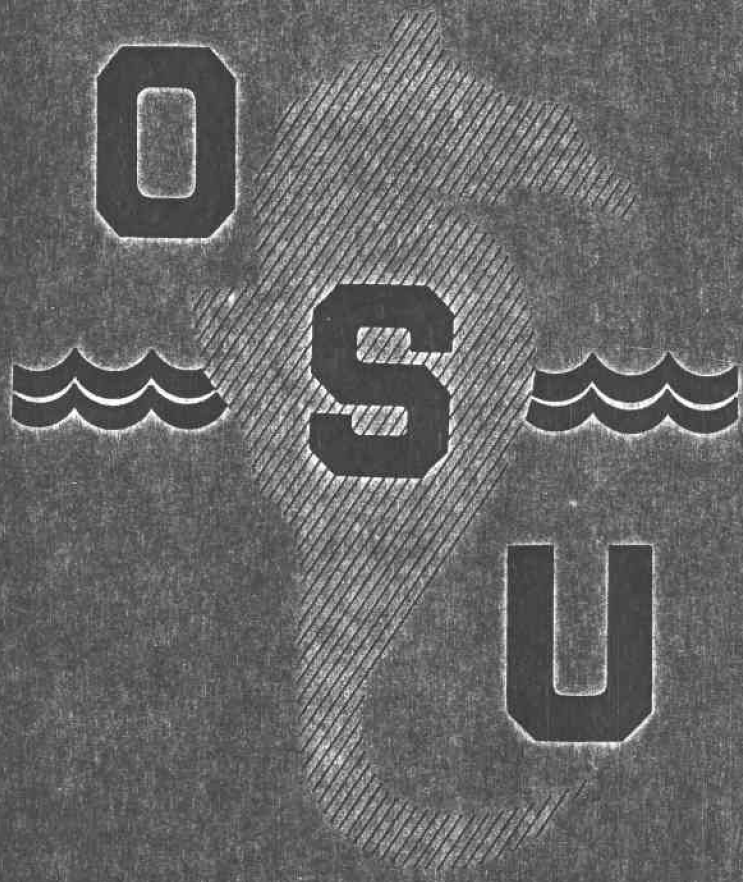


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# OCEANOGRAPHY



SCHOOL OF SCIENCE

OREGON STATE UNIVERSITY

Sea Surface Temperature and Salinity  
Conditions in 1969 at Agate Beach and  
Yaquina Bay, Oregon. A Technical  
Report to the Office of Naval Research.

By  
Jefferson J. Goror  
and  
Alan B. Thum

Office of Naval Research  
Contract N0014-67-A-0368-0001  
Project NR 104-936

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February 1970

DEPARTMENT OF OCEANOGRAPHY  
SCHOOL OF SCIENCE

OREGON STATE UNIVERSITY  
Corvallis, Oregon 97331

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AND YAQUINA BAY, OREGON. A TECHNICAL REPORT TO THE OFFICE OF NAVAL  
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Data Report No. 39

OFFICE OF NAVAL RESEARCH

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Project NR 104 936

J. W. Hedgpeth, Principal Investigator  
J. J. Gonor, Associate Investigator

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John V. Byrne, Chairman  
Department of Oceanography

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Observations on temperature and salinity at shore stations were continued in 1969 as part of an ecological investigation on inshore marine populations. Since October 1967 a shore observation station has been maintained at Agate Beach, Oregon (see location map, Fig. 1). The data from 1967 and 1968 was reported in our technical report for 1968. Since that report a statistical summary has been prepared of all the data gathered to date. This summary (Table 1 and Fig. 2) facilitates comparisons between years by making annual seasonal trends more apparent.

At Agate Beach, the general annual pattern of seasonal changes in sea surface temperature is one of cooling from September to January and continuous warming from January to June. Coincident with the onset of coastal upwelling, the warming period is interrupted by considerable fluctuation in surf temperatures in the June to August period. After the upwelling season, surface warming is briefly reestablished in August and September before the seasonal fall cooling commences. Annual changes during 1969 in the mean values for 15 day periods ranged from a low of  $8.45 \pm .79^{\circ}\text{C}$  in January, to  $13.86 \pm .48^{\circ}\text{C}$  in late May.

The effects of coastal upwelling and precipitation are also apparent in the 1969 data. In 1968 the effects of upwelling on inshore conditions were apparent by early April and continued into August. By contrast, inshore temperatures, which were lower in January, 1969, than the preceding year, showed a steady rise until May. Weak upwelling began in late June, 1969, and produced a period of low, falling temperatures inshore during June and July, periods usually showing the greatest annual range of temperature. August and September inshore temperatures were also affected by the

late 1969 upwelling, and were lower than those of 1968. The absence inshore of high salinity upwelled water produced slightly lower inshore salinity conditions in 1969, compared to 1968.

The daily values for Agate Beach temperature and salinity measurements in 1969 are given in Table 2. During most of the year measurements were made on samples taken in the surf during the mid- or late afternoon (ca. 1600 PST) without respect to tide state. During the summer both morning (0800 PDT) and mid-afternoon samples were taken, as in 1968. The temperature was read at the station to the nearest 0.1° C on a calibrated thermometer fixed in a brass bucket. Salinity was determined to 0.01 o/oo on samples by conductance, using a C.S.I.R.O. Inductively Coupled Salinometer.

During 1969, additional biological studies were initiated inside Yaquina Bay in order to compare populations living under the estuarine conditions of the embayment with those living at the open coast rocky beach stations under study. As part of our long range program of measuring in detail the physical conditions of the intertidal habitat, we have designed an intertidal temperature recording system and have installed it in Yaquina Bay at the Marine Science Center dock (Fig. 1) where its behavior can be studied before an improved version is installed on the open coast. This installation, and a bay water surface temperature recorder that we have operated since 1968, have produced detailed temperature data which allows the influence of the tide state on inshore temperatures in the Bay to be examined in detail. Temperature measurements made at low tide in the sediment at our sand flat study stations are very close to those

made on surface water simultaneously by the dock recorders. The temperature conditions indicated by our recordings can therefore be taken to be a close approximation of the annual temperature regime experienced by intertidal, mid-water and shallow subtidal organisms living in Yaquina Bay within four miles of the bay mouth.

Table 3 presents daily data on surface water temperature in Yaquina Bay at the time of the four semidiurnal tide states. Temperatures from April 2, 1968 through September 18, 1969 when the instrument failed, were recorded on a Foxboro Expansion Bulb Thermograph with a temperature range of 30° to 90° F. The instrument was mounted on a floating dock. Temperature values were read from the circular charts in degrees Fahrenheit and converted by calculation to degrees Centigrade, with an accuracy of 1.0° C. From October 17, 1969 through December 31, 1969, sea surface temperatures were read from continuous linear recordings made from a piling-mounted thermistor chain by an Esterline-Angus Multi-channel Recorder. The thermistor chain is mounted adjacent to a tide gauge and the temperatures at or near the water surface at any time may be read directly to 0.15° C by comparing the tide gauge and the thermograph recordings. Blank spaces in Table 3 indicate absent records; asterisks indicate days with only three tides. At the present time bay water temperature and air temperature near the water surface is being continuously recorded electronically from thermistor probes by a Rustrak temperature recorder mounted on a floating dock at the Marine Science Center.

The following components of the annual, seasonal and daily water

temperature regime in Yaquina Bay can be identified in these records: tide, upwelling, seasonal heating and cooling in the Bay shallows and river run-off of precipitation. The high tide temperature conditions correspond closely to those at the Agate Beach coastal station during much of the year, and this data may be used as a detail supplement to those from Agate Beach.

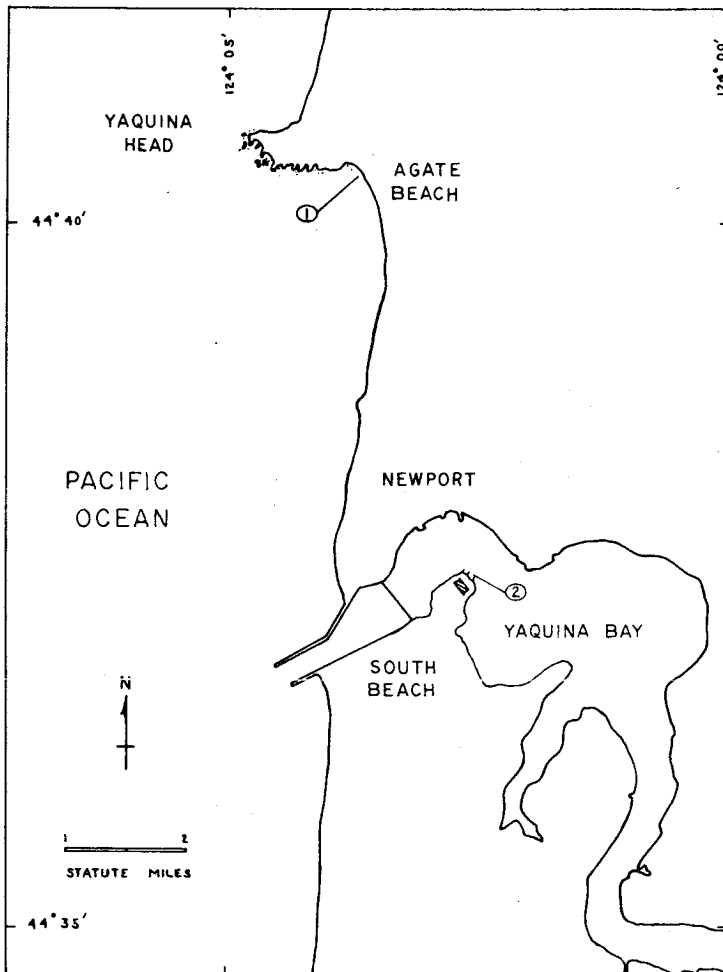


Figure 1. Location of the station at Agate Beach, Oregon (1), and the estuarine station in Yaquina Bay at the O. S. U. Marine Science Center dock (2).

Table 1. Statistical summary of daily sea surface temperature and salinity measurements made at Agate Beach, Oregon (see Fig. 1 ), from October, 1967 through December, 1969.

Standard statistical analyses were made on one-half month intervals, and reported as highest, lowest, sample size (N), mean, mean + 2 x standard error, and mean - 2 x standard error. For each month, period 1 is day 1 - 15, and period 2 is 16 - 30(31).



Summary of Sea Water Temperatures at Agate Beach, Oregon, October 1967 - December 1969. Each month is divided into two equal periods. Period 1 is day 1-14; Period 2 is day 15-30. All temperatures are mid afternoon.

Month	Period	High	Low	N	Mean	Mean + 2 SE	Mean - 2 SE
Oct. 1967	1	14.4	12.3	12	13.35	13.75	12.95
	2	14.4	13.2	15	13.53	13.70	13.36
Nov. 1967	1	13.2	11.9	12	12.56	12.77	12.36
	2	12.6	10.3	15	11.50	11.97	11.02
Dec. 1967	1	10.4	8.8	13	9.73	10.05	9.41
	2	9.5	8.9	15	9.20	9.29	9.12
Jan. 1968	1	9.7	8.1	14	8.80	9.06	8.54
	2	9.6	8.5	16	8.97	9.21	8.73
Feb. 1968	1	10.4	8.4	15	9.39	9.67	9.10
	2	12.5	8.3	14	10.65	11.48	9.81
Mar. 1968	1	11.9	10.5	11	11.31	11.57	11.06
	2	13.8	10.3	14	11.29	11.86	10.71
Apr. 1968	1	12.1	10.1	13	11.50	11.86	11.15
	2	11.6	9.9	15	10.88	11.18	10.57
May 1968	1	11.9	9.9	15	11.27	11.51	11.02
	2	15.0	13.3	15	14.31	14.52	14.10
June 1968	1	14.6	11.9	14	13.45	13.91	13.00
	2	14.2	11.4	15	12.15	12.54	11.75
July 1968	1	14.7	10.2	15	12.76	13.39	12.13
	2	15.6	10.8	9	13.08	14.23	11.94
Aug. 1968	1	13.8	10.8	11	12.44	13.16	11.72
	2	17.0	15.0	10	15.85	16.29	15.40
Sep. 1968	1	15.6	13.0	13	14.35	14.81	13.89
	2	15.6	10.2	13	13.89	14.96	12.82
Oct. 1968	1	13.1	11.3	13	11.88	12.17	11.59
	2	13.0	11.4	16	12.13	12.34	11.91
Nov. 1968	1	12.4	10.6	14	11.98	12.24	11.72
	2	12.3	10.5	12	11.50	11.83	11.17
Dec. 1968	1	10.6	9.7	13	10.30	10.54	10.06
	2	9.8	8.0	16	9.05	9.28	8.81
Jan. 1969	1	11.5	7.5	14	9.34	10.00	8.67
	2	10.8	6.0	16	8.45	9.24	7.65
Feb. 1969	1	11.3	8.1	14	9.52	10.06	8.97
	2	9.8	8.6	13	9.16	9.40	8.93
Mar. 1969	1	11.5	8.7	15	10.08	10.50	9.67
	2	11.2	9.6	13	10.18	10.42	9.94
Apr. 1969	1	13.2	9.8	15	11.28	11.78	10.78
	2	13.9	10.8	15	12.72	13.25	12.20
May 1969	1	14.5	12.0	15	13.48	13.85	13.10
	2	15.1	12.9	12	13.86	14.34	13.38
June 1969	1	15.1	13.6	4	14.27	14.89	13.65
	2	16.3	11.7	14	13.69	14.50	12.87
July 1969	1	17.1	10.8	15	13.43	14.56	12.30
	2	13.9	9.2	16	11.28	11.89	10.66
Aug. 1969	1	13.9	10.2	15	12.28	12.89	11.66
	2	14.4	9.5	16	12.28	12.98	11.58
Sep. 1969	1	12.1	8.9	14	10.32	10.87	9.77
	2	15.5	10.0	15	12.70	13.69	11.70
Oct. 1969	1	14.9	10.6	14	13.12	13.80	12.45
	2	12.4	11.3	16	11.93	12.08	11.77
Nov. 1969	1	12.4	11.2	15	11.82	12.02	11.61
	2	11.0	10.0	15	10.50	10.63	10.36
Dec. 1969	1	10.6	9.9	12	10.23	10.35	10.11
	2	10.6	9.3	11	9.73	9.98	9.48

Summary of Sea Surface Salinities at Anate Beach, Oregon, October 1967 - December 1969.  
 Each month is divided into two equal periods. Period 1 is day 1-14; Period 2 is day  
 15-30. All salinities are mid afternoon.

Month	Period	High	Low	N	Mean	Mean + 2 SE	Mean - 2 SE
Oct. 1967	1	-	-	-	-	-	-
	2	32.61	30.04	16	32.00	32.29	31.72
Nov. 1967	1	32.28	31.00	10	31.69	31.98	31.41
	2	35.02	29.84	15	32.12	32.74	31.50
Dec. 1967	1	32.40	29.67	13	30.84	31.56	30.12
	2	32.44	31.30	14	31.83	32.07	31.59
Jan. 1968	1	32.43	27.40	12	30.83	31.55	30.12
	2	32.41	29.21	16	31.03	31.57	30.50
Feb. 1968	1	33.32	25.65	15	31.31	32.20	30.41
	2	33.25	23.54	12	29.12	30.82	27.41
Mar. 1968	1	31.16	29.25	7	30.08	30.82	29.34
	2	31.25	30.44	13	30.72	30.87	30.58
Apr. 1968	1	33.14	29.22	12	31.82	32.45	31.19
	2	33.32	31.78	15	32.66	32.91	32.41
May 1968	1	33.62	31.32	14	32.86	33.23	32.49
	2	32.77	29.40	15	31.08	31.61	30.56
June 1968	1	32.63	30.20	13	31.76	32.23	31.28
	2	33.59	32.75	14	33.22	33.40	33.04
July 1968	1	33.64	29.32	15	32.69	33.37	32.01
	2	33.78	32.03	10	33.07	33.43	32.71
Aug. 1968	1	33.63	33.27	11	33.53	33.60	33.46
	2	33.92	25.77	8	31.34	33.07	29.61
Sep. 1968	1	32.99	31.86	12	32.52	32.73	32.30
	2	33.14	30.29	11	32.43	32.92	31.95
Oct. 1968	1	33.01	31.02	13	32.17	32.50	31.84
	2	31.99	30.16	15	31.46	31.71	31.21
Nov. 1968	1	32.07	27.48	14	29.95	30.87	29.02
	2	30.53	28.23	12	29.53	30.22	28.83
Dec. 1968	1	29.65	25.49	13	27.49	28.80	26.18
	2	31.24	23.51	15	27.80	29.23	26.76
Jan. 1969	1	28.62	23.18	13	26.82	27.74	25.91
	2	30.56	21.39	14	27.94	29.26	26.62
Feb. 1969	1	30.59	20.28	13	27.04	28.68	25.40
	2	30.74	27.19	13	29.83	30.42	29.24
Mar. 1969	1	32.32	29.30	15	31.28	31.68	30.87
	2	32.06	29.50	13	30.92	31.36	30.48
Apr. 1969	1	33.65	27.03	15	31.37	32.15	30.60
	2	33.27	30.37	12	31.43	31.96	30.91
May 1969	1	32.78	30.01	15	31.87	32.31	31.44
	2	32.74	29.56	12	31.57	32.16	30.98
June 1969	1	-	-	-	-	-	-
	2	33.13	27.83	19	31.29	31.86	30.71
July 1969	1	33.21	30.49	15	32.32	32.79	31.85
	2	33.86	32.85	16	33.53	33.69	33.37
Aug. 1969	1	33.83	33.49	15	33.71	33.76	33.66
	2	33.82	32.68	13	33.29	33.54	33.03
Sep. 1969	1	33.83	33.07	11	33.67	33.79	33.54
	2	33.67	31.66	15	32.46	32.76	32.17
Oct. 1969	1	32.86	31.54	14	32.20	32.42	31.97
	2	32.91	31.02	16	32.43	32.69	32.17
Nov. 1969	1	32.54	30.36	15	31.86	32.24	31.49
	2	32.41	31.15	15	32.09	32.24	31.93
Dec. 1969	1	32.18	29.09	15	31.38	31.80	30.97
	2	31.04	28.19	16	29.72	30.10	29.35

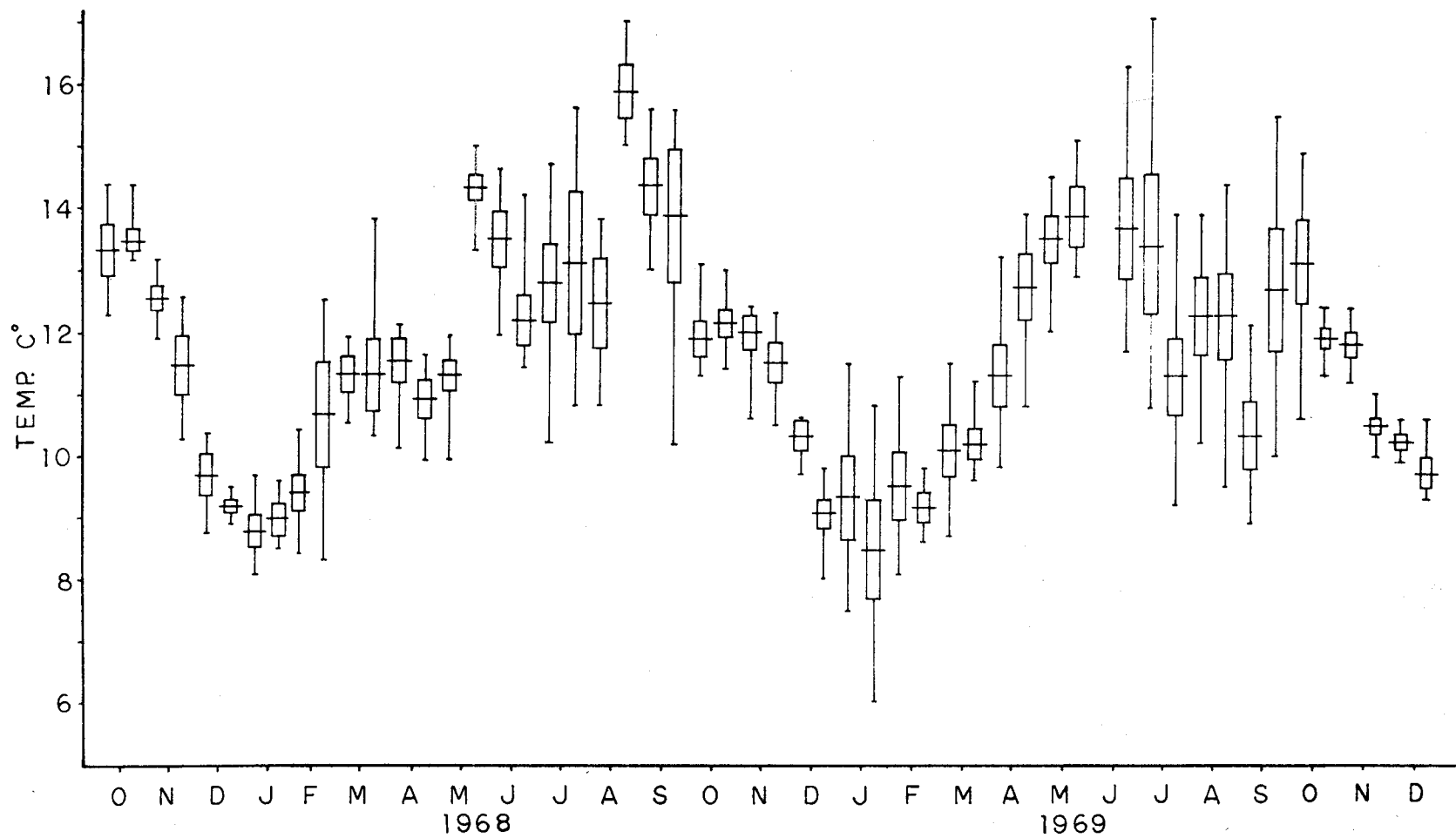


Figure 2. Bimonthly sea surface temperatures at Agate Beach, Oregon for 1968 and 1969. The range, mean and 2 x standard error are indicated for each period.

Table 2. Inshore sea surface temperature and salinity at Agate Beach, Oregon, October, 1968 through December, 1969.

1968

Date	T. °C.	S o/oo
Oct. 1	12.0	33.01
2	12.8	32.28
3	11.3	31.18
4	13.1	32.72
5	11.8	32.63
6	11.7	31.91
7	12.0	31.89
8	12.0	32.01
9	11.5	32.71
10	11.5	32.61
11	11.7	32.20
12	-	-
13	11.6	31.02
14	11.5	32.02
15	-	-
16	11.6	31.30
17	12.0	31.86
18	12.0	30.16
19	11.7	31.91
20	11.4	-
21	11.6	31.99
22	12.0	31.68
23	12.0	30.76
24	12.0	31.70
25	12.5	31.58
26	12.5	31.93
27	12.5	31.45
28	13.0	31.57
29	12.5	31.49
30	12.5	31.07
31	12.3	31.44
Dec. 1	10.6	29.65
2	11.0	25.49
3	11.0	20.39
4	10.6	28.01
5	10.4	28.66
6	10.4	28.78
7	-	-
8	-	-
9	10.4	28.24
10	10.3	27.33
11	10.0	27.31
12	9.8	27.93
13	10.0	28.85
14	9.7	28.17
15	9.8	28.55
16	9.8	26.87
17	9.2	25.64
18	8.7	31.24
19	8.2	30.38
20	8.8	27.16
21	9.0	30.22
22	8.9	30.07
23	9.2	29.56
24	9.3	29.54
25	9.3	28.88
26	9.6	26.83
27	9.4	23.51
28	9.3	24.73
29	8.9	29.80
30	8.0	25.53
31	9.2	12.69

1968

Date	T. °C.	S o/oo
Nov. 1	10.6	31.71
2	12.3	31.76
3	12.4	31.79
4	11.8	32.07
5	12.3	31.74
6	12.3	29.58
7	12.0	31.46
8	12.0	28.08
9	12.0	27.48
10	12.3	27.65
11	12.2	29.11
12	12.3	28.79
13	12.0	29.47
14	11.3	28.56
15	-	-
16	-	-
17	-	-
18	12.0	28.23
19	12.0	30.37
20	12.0	29.82
21	12.1	26.57
22	12.3	29.54
23	11.0	30.30
24	11.0	30.14
25	11.3	30.53
26	11.3	29.92
27	11.6	30.34
28	-	-
29	11.0	28.34
30	10.5	30.20

1969

Date	T. °C.	S o/oo
Jan. 1	9.0	23.59
2	-	-
3	7.5	27.27
4	8.0	27.27
5	7.9	23.18
6	8.3	26.47
7	8.9	28.62
8	9.3	28.05
9	9.9	-
10	11.1	27.65
11	10.1	27.61
12	9.8	27.71
13	8.7	28.06
14	11.5	26.65
15	10.8	26.55
16	10.5	26.84
17	10.8	28.43
18	10.2	28.40
19	9.6	27.54
20	10.7	28.31
21	8.5	29.34
22	7.6	28.39
23	8.6	30.56
24	7.2	30.49
25	6.0	21.39
26	6.3	24.48
27	6.8	15.82
28	7.0	18.71
29	7.7	30.09
30	8.6	29.33
31	9.1	27.60

1969		1969		1969			
Date	T. °C.	S o/oo	Date	T. °C.	S o/oo		
Feb.	1	9.0	30.16	Mar.	1	9.5	30.43
	2	8.9	29.86		2	10.1	30.89
	3	9.2	30.59		3	10.3	30.82
	4	9.6	29.61		4	10.1	30.64
	5	-	-		5	8.7	30.89
	6	9.0	28.10		6	9.0	31.68
	7	8.3	26.18		7	9.7	31.67
	8	8.6	27.19		8	10.1	32.29
	9	9.3	26.57		9	9.4	32.32
	10	11.0	24.63		10	11.3	32.28
	11	11.0	23.28		11	11.0	31.96
	12	11.3	1.78		12	10.7	31.96
	13	10.3	20.28		13	11.5	30.64
	14	9.7	27.52		14	10.3	30.67
	15	8.1	27.52		15	9.6	30.00
	16	8.6	28.62		16	10.5	30.11
	17	9.0	27.19		17	9.8	-
	18	9.1	29.01		18	10.0	-
	19	9.0	29.07		19	10.5	-
	20	8.9	30.10		20	10.1	30.44
	21	8.7	30.51		21	9.7	30.55
	22	9.8	30.59		22	10.2	31.58
	23	9.7	30.74		23	10.5	31.79
	24	8.6	30.72		24	10.1	32.06
	25	9.1	30.58		25	9.6	30.89
	26	9.6	30.48		26	10.3	29.50
	27	9.4	30.12		27	11.2	31.81
	28	9.7	30.07		28	-	31.25
					29	-	31.51
					30	-	30.18
					31	9.9	30.30
Apr.	1	9.8	30.29	May	1	13.2	32.59
	2	10.3	27.03		2	12.8	31.55
	3	10.5	31.41		3	13.2	31.51
	4	10.1	31.42		4	13.0	32.70
	5	10.3	31.34		5	12.0	31.90
	6	11.0	31.40		6	13.1	30.01
	7	12.2	31.53		7	14.3	30.30
	8	12.0	31.68		8	13.4	32.27
	9	12.1	32.16		9	13.8	32.36
	10	11.9	33.65		10	14.5	32.48
	11	12.0	33.63		11	13.9	32.81
	12	11.0	31.28		12	14.2	31.75
	13	11.6	31.24		13	12.6	32.78
	14	11.3	31.48		14	14.4	32.74
	15	13.2	31.07		15	13.8	31.60
	16	11.8	31.06		16	13.0	32.33
	17	10.8	31.18		17	13.0	32.51
	18	11.9	31.18		18	13.8	30.19
	19	12.5	30.83		19	13.2	29.56
	20	13.8	30.38		20	12.9	32.34
	21	13.6	30.37		21	14.1	32.25
	22	12.9	31.22		22	13.0	32.30
	23	13.3	31.24		23	14.3	32.74
	24	13.3	-		24	14.7	30.96
	25	12.0	31.30		25	14.3	30.97
	26	11.6	-		26	15.0	30.88
	27	11.8	-		27	15.1	31.80
	28	13.9	32.60		28		
	29	13.8	32.58		29		
	30	13.9	33.27		30		
					31		

1969				1969			
Date	T. °C.		S o/oo	Date	T. °C.		S o/oo
	AM	PM			AM	PM	
June				July			
1				1	12.1	12.4	31.17
2				2	12.0	15.8	30.49
3				3	13.4	17.1	31.82
4				4	13.9	17.1	31.46
5				5	12.2	16.3	32.20
6				6	10.2	12.1	33.12
7				7	10.9	13.8	32.95
8				8	9.5	12.7	32.95
9				9	9.4	11.0	33.14
10				10	9.4	11.0	33.21
11	13.5			11	10.8	12.0	32.91
12	13.6	14.2	31.40	12	12.4	14.1	32.91
13	13.7	15.1	30.54	13	10.9	12.4	32.64
14	13.9	14.2	31.52	14	10.9	10.8	32.27
15	12.2	13.6	31.52	15	10.5	12.9	32.60
16	11.0	13.0	32.41	16	9.6	13.2	33.39
17	10.6	12.7	33.13	17	9.7	13.9	33.36
18	10.4	11.8	32.76	18	9.7	11.7	33.34
19	11.2	11.7	32.48	19	9.4	10.3	33.18
20	12.2	13.7	32.39	20	10.0	12.7	33.73
21	11.2	12.1	32.53	21	9.0	11.2	33.83
22	11.8	12.8	30.08	22	8.0	10.8	33.79
23	13.4	13.9	30.86	23	7.2	10.2	33.74
24	12.6	13.1	31.42	24	8.5	11.2	33.57
25	12.4	14.5	30.35	25	7.8	10.4	33.82
26	-	-	27.83	26	8.2	10.9	33.86
27	-	16.3	30.50	27	9.0	10.7	33.81
28	13.9	14.3	30.70	28	9.4	10.2	32.85
29	14.3	16.1	30.30	29	8.7	12.2	32.99
30	16.1	15.7	31.72	30	9.8	9.2	33.66
				31	9.3	11.7	33.52
Aug.				Sep.			
1	8.4	10.9	33.83	1	9.9	9.6	33.07
2	8.1	12.4	33.80	2	9.4	11.0	33.66
3	9.4	12.8	33.74	3	9.0	10.5	33.66
4	9.6	13.5	33.61	4	9.1	12.1	33.65
5	10.8	12.4	33.70	5	-	10.6	33.68
6	10.1	13.3	33.64	6	9.6	12.0	-
7	8.9	12.4	33.80	7	9.3	10.1	-
8	9.1	12.1	33.55	8	8.3	9.5	-
9	9.3	10.9	33.49	9	8.8	-	-
10	9.9	13.1	33.80	10	8.9	9.2	33.71
11	9.1	13.9	33.65	11	8.7	8.9	33.80
12	11.3	14.0	33.76	12	8.0	9.2	33.83
13	9.0	11.1	33.76	13	9.6	11.5	33.73
14	8.7	10.2	33.79	14	10.9	10.2	33.76
15	9.4	11.2	33.73	15	7.9	10.2	33.76
16	9.2	10.3	33.80	16		10.0	33.67
17	9.4	9.5	33.82	17		10.0	33.17
18	9.4	12.0	33.67	18		10.2	33.16
19	10.5	12.6	33.75	19		11.3	32.91
20	10.8	13.3	-	20		11.1	32.54
21	11.1	13.7	33.66	21		11.6	32.86
22	9.0	12.2	33.61	22		11.9	32.54
23	10.3	10.8	-	23		13.1	32.27
24	11.6	11.5	32.80	24		13.5	32.08
25	11.1	14.4	24.09	25		14.5	32.00
26	11.8	12.8	32.68	26		14.2	32.05
27	13.1	13.4	32.82	27		13.8	32.04
28	12.4	13.4	32.92	28		14.7	32.00
29	-	13.3	33.06	29		15.5	31.98
30	12.0	12.8	32.71	30		15.1	31.66
31	11.7	10.5	33.45				

1969			1969		
Date	T.°C.	S o/oo	Date	T.°C.	S o/oo
Oct. 1	14.9	31.54	Nov. 1	12.4	32.54
2	14.7	31.75	2	12.3	32.25
3	14.5	31.98	3	12.3	32.49
4	13.5	32.38	4	12.4	30.64
5	12.8	32.65	5	11.8	31.86
6	13.6	32.10	6	11.6	31.80
7	-	-	7	11.3	30.86
8	13.7	31.88	8	11.2	30.36
9	13.0	31.64	9	11.3	31.25
10	13.4	31.96	10	11.7	32.18
11	13.6	32.25	11	12.1	32.38
12	12.3	32.52	12	11.5	32.43
13	11.9	32.67	13	11.8	32.36
14	11.3	32.86	14	11.8	32.38
15	10.6	32.59	15	11.8	32.18
16	12.0	32.65	16	10.8	32.41
17	11.9	32.59	17	10.6	32.36
18	12.1	32.73	18	10.5	32.24
19	11.6	32.85	19	10.4	32.33
20	11.7	32.86	20	10.2	31.14
21	12.2	32.91	21	10.4	31.74
22	12.1	32.63	22	10.3	32.03
23	11.7	32.85	23	10.8	31.99
24	11.7	32.80	24	10.4	32.10
25	11.3	32.60	25	10.6	32.12
26	11.7	32.23	26	11.0	32.14
27	11.8	31.67	27	10.0	32.13
28	12.0	31.91	28	10.4	32.19
29	12.3	31.02	29	10.3	32.19
30	12.4	32.24	30	10.8	32.16
31	12.4	32.36			
Dec. 1	9.8	32.18			
2	9.3	32.15			
3	9.8	31.45			
4	9.3	31.99			
5	9.3	32.11			
6	9.3	31.96			
7	10.6	32.11			
8	10.0	31.10			
9	9.7	30.78			
10	9.8	31.03			
11	10.1	31.09			
12		31.08			
13		29.09			
14		31.22			
15		31.43			
16		30.06			
17		30.22			
18		30.51			
19		28.59			
20	10.5	31.04			
21	10.4	29.09			
22	10.3	29.55			
23	10.0	28.19			
24	10.6	29.31			
25	10.3	29.44			
26	10.1	29.74			
27	9.9	29.18			
28	10.2	29.85			
29	10.3	30.03			
30	10.2	30.10			
31	10.0	30.70			



Table 3. Daily surface water temperature measurements made coincident with the four common semi-diurnal tidal states at the Marine Science Center dock in Yaquina Bay.

1968					1968				
Surface Temperature °C					Surface Temperature °C				
Tide State	HH	LL	LH	HL	Tide State	HH	LL	LH	HL
Apr. 1					May 1	11.00	13.75	11.83	14.03
2			11.00	11.28	2	11.55	14.03	11.83	14.58
3	10.18	12.10	11.55	12.10	3	12.10	14.85	10.73	13.48
4	11.00	11.55	11.00	10.73	4	11.00	14.03	9.35	11.83
5	10.18	11.83	10.18	*	5	9.90	12.93	10.45	*
6	10.18	11.27	10.45	11.00	6	10.18	14.03	10.45	11.00
7	9.90	12.38	11.00	10.45	7	9.35	13.20	10.18	10.45
8	9.90	12.65	10.73	9.90	8	9.35	13.75	9.63	11.00
9	10.73	12.65	11.00	10.45	9	9.90	12.65	9.08	11.55
10	10.45	12.38	11.00	11.55	10	10.45	12.10	10.18	12.10
11	10.18	12.38	11.00	11.28	11	9.90	12.38	10.45	11.55
12	9.08	11.55	10.73	11.83	12	9.90	12.38	9.90	10.45
13	*	11.00	9.90	11.28	13	*	11.83	11.28	12.10
14	9.35	11.00	9.63	10.18	14	10.73	12.38	11.00	11.55
15	9.35	10.73	9.90	10.45	15	11.00	12.93	12.10	12.93
16	9.08	11.00	10.18	11.00	16	11.00	14.03	11.83	13.20
17	9.08	11.55	10.45	11.00	17	11.55	14.30	12.10	13.48
18	9.08	11.28	9.90	9.90	18	11.83	15.40	11.55	13.75
19	9.08	11.28	9.35	*	19	12.38	14.03	12.38	*
20	9.08	11.55	9.35	9.35	20	12.38	14.03	12.38	12.93
21	9.63	11.83	8.80	9.35	21	12.93	14.30	12.38	13.20
22	10.18	12.10	9.35	9.35	22	13.48	13.75	12.93	15.13
23	10.18	12.10	9.90	10.45	23	13.75	13.75	13.20	15.40
24	10.45	12.38	10.45	11.00	24	13.48	14.85	14.03	14.85
25	10.45	11.55	10.45	11.55	25	13.75	14.85	13.48	15.13
26	10.45	11.28	10.73	12.38	26	13.20	14.85	13.20	14.03
27	*	11.83	11.55	13.20	27	13.75	14.85	13.20	15.68
28	10.45	13.20	11.00	13.20	28	*	15.95	14.58	16.78
29	10.45	13.75	11.00	13.75	29	14.30	17.05	15.13	16.50
30	9.63	12.93	10.73	13.75	30	13.75	16.78	14.03	15.95
					31	13.48	15.95	12.65	14.85
Tide State	HH	LL	LH	HL	Tide State	HH	LL	LH	HL
June 1	13.20	14.85	12.65	14.02	July 1	11.55	16.78	11.00	13.75
2	13.20	16.23	14.30	14.85	2	10.45	15.40	11.55	14.03
3	15.40	16.50	13.75	13.48	3	12.10	15.40	11.83	*
4	13.75	16.78	14.30	*	4	12.10	14.03	11.55	15.13
5	11.55	16.50	14.30	15.40	5	11.00	14.85	12.38	14.58
6	11.00	14.58	13.20	15.40	6	9.90	15.40	11.28	14.03
7	11.00	14.30	12.65	14.85	7	9.35	15.68	10.45	13.75
8	10.45	14.58	11.55	14.03	8	9.90	15.68	9.90	12.65
9	10.18	14.03	10.73	14.03	9	11.00	15.40	10.73	13.75
10	11.28	13.75	10.45	13.48	10	*	15.95	11.55	13.20
11	*	13.75	12.10	13.20	11	11.00	15.95	11.55	12.10
12	12.10	14.03	12.10	14.03	12	12.65	14.85	13.48	14.30
13	12.10	14.58	12.93	15.40	13	13.20	15.40	13.75	14.30
14	13.75	15.68	14.85	15.95	14	13.75	15.13	14.30	15.40
15	12.65	16.78	14.30	15.40	15	15.30	16.23	14.58	15.95
16	13.20	17.05	13.20	15.13	16	15.30	17.05	14.85	16.78
17	12.10	17.33	12.65	*	17	14.30	*	15.40	17.33
18	12.10	17.60	12.65	15.40	18	12.65	17.33	15.40	17.33
19	10.45	15.68	13.20	15.95	19	13.48	17.33	14.85	17.33
20	10.45	15.13	14.30	15.40	20	11.83	17.05	14.30	14.30
21	9.90	15.13	11.55	15.13	21	10.73	17.05	13.75	14.03
22	11.83	14.30	11.28	15.40	22	9.90	16.78	11.55	13.48
23	11.00	14.85	13.75	14.85	23	9.90	16.23	11.00	13.48
24	10.73	15.40	13.20	15.95	24	9.63	15.95	9.63	14.03
25	9.90	15.95	11.55	15.95	25	*	15.68	11.28	12.93
26	*	15.68	9.35	13.20	26	9.90	15.40	10.73	12.93
27	10.45	15.40	11.83	13.20	27	9.35	15.40	10.45	12.65
28	10.18	15.13	11.55	14.03	28	9.08	15.40	10.18	12.65
29	10.45	14.58	11.28	14.03	29	8.80	15.13	10.18	13.20
30	10.73	15.13	12.10	14.30	30	9.63	14.58	9.08	13.20
					31	9.90	13.75	9.08	13.75

1968		Surface Temperature °C			
Tide State	HH	LL	LH	HL	
Aug. 1	10.73	14.03	10.18	13.20	
2	11.00	*	11.00	13.20	
3	11.83	14.58	11.83	14.85	
4	12.10	15.13	11.83	13.48	
5	12.65	15.13	12.10	14.85	
6	11.28	15.68	12.93	14.30	
7	10.45	15.95	12.10	13.20	
8	*	15.68	11.00	12.93	
9	9.90	14.85	10.18	11.83	
10	10.18	14.30	11.28	12.10	
11	9.90	13.75	10.73	12.93	
12	11.28	13.75	9.90	12.65	
13	9.90	12.93	9.63	12.38	
14	12.10	13.48	10.45	12.10	
15	12.93	*	12.38	13.48	
16	14.03	14.03	13.20	14.58	
17	12.93	15.13	13.20	14.30	
18	12.65	15.40	13.20	14.03	
19	13.48	15.40	13.20	15.40	
20	14.03	15.68	14.30	15.68	
21	14.85	16.23	14.58	16.23	
22	17.05	16.50	17.05	16.23	
23	14.85	15.95	14.85	15.40	
24	14.58	15.68	14.85	15.13	
25	*	15.68	14.85	15.40	
26	15.40	15.95	14.85	14.85	
27	15.13	15.68	14.85	15.40	
28	15.95	16.50	14.85	16.23	
29	14.85	14.85	15.40	16.23	
30	15.40	16.78	15.95	17.88	
31	14.85	*	14.85	17.60	

1968		Surface Temperature °C			
Tide State	HH	LL	LH	HL	
Sept. 1	14.58	17.88	14.85	17.60	
2	14.85	18.15	14.30	16.50	
3	13.48	17.05	14.30	16.78	
4	13.20	17.05	13.75	16.50	
5	12.10	16.78	12.65	15.95	
6	11.55	16.50	11.55	14.58	
7	*	15.95	12.93	14.03	
8	14.58	14.85	12.93	15.13	
9	11.55	14.58	11.83	15.13	
10	12.38	14.03	11.83	14.03	
11	14.03	14.85	13.20	14.58	
12	14.30	15.13	14.03	14.30	
13	14.30	15.68	14.03	15.40	
14	12.65	*	13.20	14.58	
15	13.48	14.85	12.65	13.48	
16	13.75	14.58	13.48	14.30	
17	14.57	15.40	14.30	15.95	
18	14.03	15.95	14.03	15.68	
19	14.30	15.40	14.03	15.40	
20	13.20	15.40	12.93	14.58	
21	13.75	14.85	13.48	14.85	
22	12.93	14.85	*	14.85	
23	12.93	14.85	12.65	14.58	
24	14.30	15.13	13.20	14.30	
25	13.48	15.40	12.92	14.58	
26	12.10	15.13	12.10	14.58	
27	11.55	14.85	11.00	13.20	
28	10.45	14.30	10.18	12.10	
29	10.45	*	9.90	12.65	
30	10.73	13.48	10.45	13.48	

Tide State	HH	LL	LH	HL
Oct. 1	10.73	13.48	10.18	12.38
2	9.63	12.93	10.18	11.83
3	9.63	12.65	9.35	11.55
4	9.35	12.10	11.00	9.63
5	10.73	11.83	10.18	11.83
6	10.45	11.83	*	11.83
7	11.00	12.10	10.45	11.55
8	11.00	12.10	10.45	11.28
9	11.00	12.10	10.18	11.28
10	10.18	11.55	10.18	10.73
11	10.73	11.83	10.45	10.73
12	11.00	11.55	10.73	11.00
13	10.73	11.28	10.73	11.00
14	10.73	*	10.45	11.28
15	11.00	11.83	10.73	11.00
16	11.23	11.55	10.73	11.55
17	11.23	11.55	12.65	11.83
18	11.28	11.55	11.28	11.83
19	11.00	11.28	11.00	11.83
20	11.00	11.28	11.00	11.28
21	11.28	11.83	*	11.28
22	11.28	11.55	11.00	11.55
23	11.55	11.83	11.28	11.55
24	11.55	12.10	11.55	11.55
25	11.55	12.38	11.83	12.65
26	12.10	12.10	11.83	12.10
27			11.00	
28				
29				
30				
31				

Tide State	HH	LL	LH	HL
Nov. 1				
2				
3				
4				
5		11.28		
6	10.18	10.73	10.73	10.45
7	11.28	11.00	11.28	11.00
8	11.83	12.10	11.55	11.83
9	12.10	11.55	11.83	11.55
10	11.55	11.83	10.73	11.00
11	12.38	11.55	12.38	12.38
12	11.28	10.73	11.00	11.00
13	9.63	*	10.73	10.73
14	8.80	9.90	8.53	9.35
15	8.25	9.08	9.90	9.90
16	10.45	10.18	10.18	9.63
17	10.18	11.00	10.73	10.73
18	11.00	11.55	11.00	11.28
19	11.28	11.55	*	11.55
20	11.28	11.83	11.28	11.55
21	11.83	12.10	11.28	12.10
22	11.55	11.83	11.55	12.10
23	11.83	11.55	11.28	11.55
24	11.00	11.00	10.73	11.55
25	11.28	10.73	10.73	11.00
26	9.90	10.45	11.00	10.18
27	9.90	*	11.00	11.00
28	9.63	9.90	10.45	11.00
29	10.18	10.45	9.63	11.28
30	9.63			10.18

1968					1969						
Surface Temperature °C					Surface Temperature °C						
Tide State	HH	LL	LH	HL	Tide State	HH	LL	LH	HL		
Dec.	1				Jan.	1	6.88	7.98	*	8.25	
	2					2	7.43	8.53	7.15	7.70	
	3					3	8.53	9.35	7.98	8.80	
	4					4	9.08	9.63	9.08	9.63	
	5					5	9.35	9.90	9.35	9.90	
	6					6	9.90	9.90	9.90	10.18	
	7	8.53	10.18			7	8.80	8.80	9.08	9.35	
	8	9.35	9.90	9.08	9.08	8	8.25	9.08	7.98	8.53	
	9	9.90	9.35	9.08	9.90	9	8.25	8.53	7.43	8.53	
	10	9.35	9.90	8.80	9.35	10	7.70	7.70	7.43	8.25	
	11	8.53	8.53	8.53	8.53	11	6.88	7.43	6.88	7.15	
	12	7.98	8.53	8.25	8.80	12	6.05	6.60	5.78	*	
	13	7.98	*	8.53	8.80	13	6.33	7.43	6.88	6.88	
	14	8.53	9.08	8.80	9.35	14	6.60	7.15	5.78	7.43	
	15	8.80	8.80	9.35	9.63	15	6.60	7.15	5.78	7.98	
	16	8.25	9.08	7.70	9.63	16	6.05	7.43	*	7.15	
	17	7.43	9.90	9.08	9.08	17	6.60	8.25	6.33	7.43	
	18	7.98	9.35	*	9.63	18	6.60	8.25	5.78	6.88	
	19	7.15	9.63	6.88	9.08	19	6.88	8.25	6.05	7.98	
	20	7.43	9.08	6.05	9.08	20	6.88	8.25	6.60	8.25	
	21	7.70	8.80	6.60	9.35	21	6.60	7.98	6.33	8.53	
	22	8.25	9.35	6.88	8.80	22	6.05	8.25	6.05	7.70	
	23	8.25	9.08	8.80	9.35	23	4.95	6.33	5.78	7.15	
	24	8.53	8.53	7.70	9.08	24	3.30	6.05	3.85	4.95	
	25	7.15	8.25	8.25	7.70	25	3.30	4.95	3.30	4.40	
	26	7.15	9.08	8.80	7.98	26	2.20	6.60	4.40	*	
	27	7.98	8.25	7.15	*	27	4.40	5.78	2.75	6.33	
	28	6.60	7.15	6.33	7.70	28	2.20	4.95	3.85	3.30	
	29	5.23	7.15	6.33	6.88	29	3.58	5.50	3.85	4.95	
	30	3.30	5.50	2.75	6.60	30	4.40	6.88	5.78	6.05	
	31	5.78	8.53	7.43	6.60	31	4.95	6.88	*	7.15	
Tide State	HH	LL	LH	HL	Tide State	HH	LL	LH	HL		
Feb.	1	4.13	6.05	4.95	6.88	Mar.	1	7.98	8.80	7.98	7.70
1969	2	4.95	6.60	4.40	6.60	2	8.25	8.53	*	8.25	
	3	5.78	7.15	5.50	7.15	3	8.25	8.80	7.98	9.08	
	4	5.78	6.88	6.33	7.15	4	8.25	8.80	7.70	9.08	
	5	6.05	6.88	4.68	6.88	5	8.53	8.80	8.80	8.80	
	6	5.78	6.88	6.05	7.43	6	8.25	8.80	7.98	8.53	
	7	5.50	7.43	6.60	7.15	7	7.15	9.35	8.25	8.53	
	8	6.88	7.43	6.60	7.43	8	6.87	9.35	8.80	8.53	
	9	6.33	6.88	6.60	6.60	9	7.15	9.63	9.08	9.08	
	10	6.33	8.53	7.98	8.53	10	6.88	9.35	7.70	7.98	
	11	7.43	8.80			11	6.88	8.80	8.25	7.70	
	12					12	6.88	9.35	7.70	*	
	13					13	7.15	9.63	7.98	7.70	
	14					14	7.70	9.63	8.25	8.25	
	15					15	8.80	9.90	9.35	8.80	
	16					16	9.35	9.90	9.63	9.35	
	17					17	9.90	9.90	*	9.90	
	18					18	9.63	9.90	9.63	10.18	
	19					19	9.35	10.18	9.90	10.73	
	20					20	9.08	10.73	10.18	11.55	
	21	7.15	8.53	7.98	7.70	21	9.08	10.73	10.18	11.28	
	22	7.70	8.53	8.25	7.70	22	9.63	10.73	9.35	9.63	
	23	6.60	7.43	7.43	6.60	23	8.53	10.73	10.18	11.00	
	24	5.50	7.43	6.88	6.88	24	8.80	11.28	10.73	11.55	
	25	6.33	8.25	7.70	*	25	9.35	11.55	10.45	11.00	
	26	6.88	7.98	7.43	7.43	26	9.63	12.38	10.73	*	
	27	6.88	7.98	7.70	7.43	27	9.63	12.38	10.45	11.55	
	28	7.70	8.25	7.15	7.98	28	10.18	12.93	10.18	10.73	
						29	9.90	11.83	10.18	11.55	
						30	10.45	11.83	10.45	11.55	
						31	10.45	11.83	10.73	11.28	

1969		Surface Temperature °C			
Tide State		HH	LL	LH	HL
Apr.	1	10.18	11.00	10.73	11.28
	2	9.90	10.73	10.45	11.00
	3	*	10.73	10.18	10.45
	4	9.90	10.18	9.90	10.45
	5	9.90	10.73	10.45	11.55
	6	10.18	11.55	11.28	11.83
	7	10.18	12.10	11.28	12.38
	8	10.18	12.38	11.00	12.10
	9	11.00	11.83	10.18	*
	10	10.18	12.93	10.73	11.00
	11	10.73	12.93	11.00	11.55
	12	10.73	11.83	11.00	12.10
	13	11.00	11.83	10.73	11.28
	14	11.00	12.10	11.28	11.55
	15	11.28	12.10	11.28	12.10
	16	*	12.10	11.28	11.55
	17	10.73	11.83	11.00	11.28
	18	10.45	11.28	11.00	11.55
	19	10.73	11.28	11.00	11.55
	20	10.73	12.38	11.83	12.93
	21	11.28	12.65	11.83	13.75
	22	12.10	13.20	11.55	12.65
	23	11.28	12.10	11.83	12.38
	24	11.00	13.20	11.83	*
	25	11.00	13.75	12.38	11.55
	26	11.83	15.13	12.65	12.10
	27	12.38	14.58	12.38	13.75
	28	11.55	13.20	12.10	13.20
	29	11.00	12.38	11.55	13.20
	30	11.00	12.10	11.28	12.10

1969		Surface Temperature °C			
Tide State		HH	LL	LH	HL
May	1	11.55	12.10	11.55	13.48
	2	*	13.20	11.83	13.48
	3	11.55	12.93	11.83	12.38
	4	10.73	13.20	11.28	13.20
	5	10.45	13.75	11.00	13.48
	6	10.18	14.58	11.00	14.30
	7	10.18	15.95	10.45	14.30
	8	10.45	14.03	11.28	*
	9	11.55	14.30	11.83	12.93
	10	11.28	14.30	11.55	12.93
	11	10.18	14.30	10.73	13.20
	12	9.90	13.20	9.90	13.75
	13	10.45	13.20	10.18	12.65
	14	10.73	12.65	11.00	12.65
	15	10.73	12.93	11.83	13.75
	16	*	13.75	11.55	14.30
	17	11.00	14.30	12.93	15.68
	18	10.73	14.58	10.18	12.10
	19	11.00	13.48	10.73	12.93
	20	11.55	14.03	12.65	14.58
	21	11.55	16.50	14.30	16.23
	22	12.38	15.95	12.10	15.68
	23	12.65	14.85	13.75	14.30
	24	12.38	14.85	12.93	*
	25	12.65	15.13	13.48	14.85
	26	13.75	14.30	12.65	13.75
	27	13.75	14.03	13.48	14.58
	28	13.20	12.65	12.10	16.23
	29	13.20	14.58	13.20	13.75
	30	12.38	13.48	12.65	14.85
	31	12.65	15.68	13.48	16.23

Tide State		HH	LL	LH	HL
June	1	*	16.78	13.20	16.50
	2	11.55	16.50	11.83	15.40
	3	13.20	16.23	10.73	14.85
	4	11.28	15.13	11.83	14.03
	5	12.10	15.40	12.93	14.58
	6	12.93	15.13	13.48	14.30
	7	13.48	16.78	14.30	*
	8	12.65	16.78	14.30	15.13
	9	11.83	15.95	12.65	15.68
	10	11.83	15.40	11.55	14.58
	11	13.48	14.85	12.93	14.30
	12	14.58	14.85	14.03	14.85
	13	14.30	15.13	15.40	15.40
	14				
	15				
	16				
	17			11.83	15.95
	18	10.73	15.40	11.00	13.75
	19	11.55	14.58	11.83	14.30
	20	12.10	15.68	12.93	14.58
	21	12.65	16.23	13.20	14.85
	22	13.20	15.95	12.10	*
	23	13.20	14.30	12.65	14.85
	24	12.65	14.30	13.48	15.40
	25	13.20	14.85	13.20	15.40
	26	14.30	15.40	13.48	15.13
	27	12.85	15.68	14.30	15.68
	28	14.30	16.23	14.58	15.13
	29	13.75	16.23	15.40	16.78
	30	*	17.33	14.30	17.05

Tide State		HH	LL	LH	HL
July	1	12.38	17.05	13.75	15.13
	2	11.55	15.68	11.55	14.58
	3	12.93	15.95	12.93	15.40
	4	12.10	15.68	13.20	15.13
	5	12.10	16.50	11.28	15.13
	6	11.00	16.23	11.00	15.13
	7	11.55	16.23	11.83	*
	8	11.00	15.40	13.20	15.68
	9	9.90	16.23	12.10	14.58
	10	10.18	15.40	13.20	15.95
	11	11.55	14.30	11.28	15.13
	12	11.55	14.58	11.28	14.58
	13	10.45	14.85	12.10	14.30
	14	10.45	15.40	12.10	14.03
	15	9.90	15.68	12.10	13.75
	16	*	15.68	11.28	14.30
	17	10.18	15.68	11.28	13.48
	18	10.18	16.23	11.00	14.03
	19	10.45	15.95	10.73	14.30
	20	11.55	15.95	9.90	14.58
	21	10.45	15.40	10.73	14.85
	22	9.90	15.40	10.45	*
	23	9.90	15.13	10.18	15.13
	24	9.35	15.13	9.63	13.75
	25	9.08	15.40	9.35	13.75
	26	8.80	15.40	9.35	13.75
	27	9.90	15.95	9.35	13.20
	28	9.35	15.40	10.18	11.83
	29	9.08	14.85	9.90	11.83
	30	8.80	14.58	9.08	10.73
	31	8.80	13.48	9.63	11.00

1969					1969						
Surface Temperature °C					Surface Temperature °C						
Tide State	HH	LL	LH	HL	Tide State	HH	LL	LH	HL		
Aug.	1	9.90	12.93	8.80	11.83	Sept.	1	10.01	13.81	9.63	13.20
	2	10.18	12.93	8.80	12.38		2	10.73	14.41	10.01	12.76
	3	9.90	12.65	9.08	12.93		3	10.29	*	10.23	12.98
	4	10.45	13.20	9.35	12.38		4	10.45	14.30	10.18	13.31
	5	11.28	*	11.28	13.75		5	9.74	14.52	10.40	11.94
	6	10.45	14.58	11.00	13.75		6	9.35	14.47	8.80	13.09
	7	10.45	15.13	10.73	13.48		7	8.97	14.47	8.53	14.30
	8	9.90	15.13	10.18	12.10		8	9.19	14.36	8.80	12.65
	9	9.08	15.40	9.63	12.65		9	9.41	13.97	9.35	11.94
	10	9.35	15.13	10.45	12.65		10	9.02	13.26	10.07	12.38
	11	9.90	15.13	9.63	13.75		11	*	13.09	9.24	12.32
	12	9.90	14.58	9.90	12.65		12	8.86	12.27	8.69	12.65
	13	*	14.58	10.45	13.48		13	9.68	12.71	8.97	12.05
	14	9.35	14.85	9.63	13.20		14	10.07	12.71	9.63	11.99
	15	9.63	14.58	9.08	13.20		15	9.63	12.43	9.02	11.33
	16	10.18	14.03	9.90	13.20		16	9.41	11.94	9.41	10.73
	17	9.63	13.48	9.35	12.93		17	10.23	12.05	9.90	10.89
	18	10.18	13.48	9.35	12.65		18	10.34	12.21	10.01	11.28
	19	10.18	14.03	9.90	13.20	Oct.	17	12.1	11.9		
	20	10.73	*	10.73	13.20		18	12.1	*	11.65	11.65
	21	10.73	15.13	11.28	14.58		19	11.75	11.9	11.4	12.1
	22	10.18	15.95	10.18	14.85		20	11.9	11.9	11.2	12.3
	23	9.90	15.68	9.35	13.20		21	11.65	12.3	11.65	12.3
	24	12.10	15.40	11.00	11.55		22	11.65	12.1	11.9	12.6
	25	12.10	15.40	12.38	13.75		23	11.9	12.4	11.9	12.3
	26	12.10	15.13	12.10	13.20		24	11.9	12.3	*	11.9
	27	*	14.58	12.38	13.48		25	12.1	12.3	12.1	11.9
	28	12.38	14.03	12.65	14.03		26	11.9	12.3	11.9	11.9
	29	12.10	14.03	12.65	14.03		27	12.1	12.1	12.1	11.9
	30	12.65	13.75	11.83	11.00		28	12.6	12.3	12.1	12.1
	31	11.55	14.03	11.00	13.48		29	12.6	12.7	12.3	12.1
							30	12.6	13.1	12.6	12.5
							31	12.6	13.3	12.4	12.3
Tide State	HH	LL	LH	HL							
Nov.	1	13.5	13.3	13.6	12.6	Dec.	1	8.55	8.2	9.1	8.35
	2	12.3	*	12.15	12.35		2	8.35	*	8.55	7.7
	3	12.3	12.8	12.7	13.6		3	8.55	8.2	9.4	8.85
	4	12.1	12.8	12.3	12.6		4	8.85	9.1	9.5	8.55
	5	12.1	11.9	12.1	12.1		5	9.3	8.7	9.5	8.55
	6	12.1	12.3	12.1	11.9		6	9.7	9.3	10.4	8.85
	7	11.9	11.65	11.9	11.4		7	10.4	9.7	10.4	9.9
	8	11.9	11.65	11.9	11.4		8	10.6	9.7	*	10.0
	9	12.1	11.9	*	11.4		9	10.4	9.3	10.5	9.9
	10	12.1	11.7	11.9	11.1		10	10.4	9.3	10.1	9.3
	11	11.9	11.9	11.9	10.9		11	10.6	9.9	10.4	10.1
	12	12.1	11.65	11.9	11.2		12	10.8	9.3	10.6	10.4
	13	12.1	11.65	11.65	11.0		13	11.0	9.7	10.6	10.4
	14	11.9	11.65	11.65	11.0		14	11.0	10.1	10.6	10.1
	15	11.9	11.2	11.65	11.4		15	10.6	9.5	10.1	9.7
	16	11.4	*	11.4	10.8		16	10.1	*	10.1	9.9
	17	10.8	10.8	11.0	10.6		17	10.6	9.7	10.4	9.9
	18	11.2	10.6	11.0	10.6		18	10.8	10.4	10.8	10.1
	19	10.8	10.4	11.0	11.0		19	10.5	10.7	11.0	10.1
	20	10.8	10.6	11.0	10.6		20	11.1	10.8	11.0	10.7
	21	11.0	11.0	11.0	10.6		21	11.0		*	10.8
	22	10.8	10.4	*	10.4		22	10.6	10.4	10.8	10.4
	23	11.0	10.1	10.8	10.1		23	10.8	9.9	10.8	10.1
	24	11.0	10.0	11.0	9.9		24	9.9	9.8	10.8	9.3
	25	10.1	9.7	10.1	9.6		25	10.7	9.9	10.6	9.7
	26	10.6	9.7	9.9	9.3		26	10.6	9.1	10.8	9.7
	27	10.3	9.2	9.7	8.9		27	9.9	9.1	10.4	8.55
	28	10.2	8.85	9.3	8.6		28	9.8	8.85	10.4	8.85
	29	9.9	8.7	8.85	8.35		29	9.9	8.85	10.1	9.1
	30	9.3	8.55	8.85	8.55		30	9.5	8.6	9.6	8.4
							31	9.7	8.35	8.85	8.35

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13. ABSTRACT Daily temperature and salinity conditions measured in the surf at Agate Beach, Oregon are summarized by 15 day periods for 1968 and 1969. For each period the number of observations, the high, the low, the mean and the standard deviation of the temperature and salinity measurements are tabulated and figured. Daily data for 1969, derived from afternoon measurements is also given. A map indicating the stations is included, and the data are briefly discussed with the differences between the two years emphasized. The late occurrence of upwelling in 1969 accounts for the major differences between the two years. A water surface temperature station approximately 3 miles inside the mouth of Yaquina Bay was maintained in 1968 and 1969 by use of continuously recording thermographs. Daily data are given, starting in April, 1968, of surface temperature at higher high, lower low, lower high, and higher low waters. The influence of the state of the tide on bay temperatures, as well as that of other seasonal hydrographic phenomena are evident in the tabulations.			

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