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## Dissolved oxygen measurements in the Machipongo River system near Willis Wharf, Virginia

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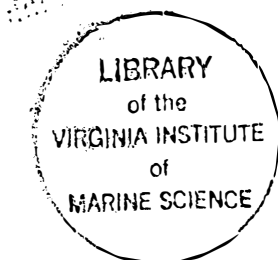
**DISSOLVED OXYGEN MEASUREMENTS  
IN THE MACHIPONGO RIVER SYSTEM  
NEAR WILLIS WHARF, VIRGINIA**

**Bruce Neilson, Cheol Mo, and Rodney Jackson**

**Data Report No. 41**

**September 1992**

**Virginia Institute of Marine Science  
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## INTRODUCTION

Most aquatic organisms require oxygen to survive and consequently, the dissolved oxygen (DO) content of the water is one of the most important measures of water quality. Sources of oxygen are the atmosphere and photosynthesis. Oxygen is consumed by plants and animals during respiration and by microorganisms that decompose organic matter. The more sources and sinks of oxygen, the more difficult it is to understand and predict the oxygen dynamics of a river system. Grossly polluted systems turn out to be quite simple, because the pollutant source dominates. Natural, unimpacted systems often show a balance between a number of sources and sinks and therefore are much more complex. The rivers of the Eastern Shore of Virginia typify this latter case.

The Machipongo River, including its tributary Parting Creek, drains mostly agricultural land and forest. The river has extensive fringe marshes and tidal flats which are exposed at low water. A large mechanized clam processing facility located at Willis Wharf, Virginia also discharged wastewaters to Parting Creek. The organic loadings in these wastewaters have varied over time as processing techniques and production levels changed.

Mathematical models are very useful tools that allow water quality managers to predict the environmental response to various actions, such as an increase in pollutant loads when a new facility begins discharging wastewaters or a decrease in pollutant loads when treatment levels are increased. Models can be only as good as the field data upon which they are based. When a system is complex, the data set must be comprehensive, and often extensive in time, so that there is sufficient information to allow the effects of all major factors to be determined. For the Machipongo River, such a field effort would be very expensive. Consequently, studies have been more limited in scope and designed to examine one factor only, namely the effects of the clam processing wastewaters.

In the spring of 1989, a field study was undertaken to see if water quality differed between Parting Creek, which received the clam wastes, and the Machipongo River, which had no comparable wastewater loading. In the fall of 1990, another study was conducted to see whether conditions had changed in response to waste load reductions at the clam processing plant. Subsequently, the clam processing plant was closed, so the waste loading to Parting Creek was eliminated. This report describes the data collected during the spring of 1992, when there was no discharge from the plant. At a later date, these data will be compared with those from prior years to determine what, if any, change in water quality has resulted from the elimination of this point source of organic wastes.

## I. STUDY DESIGN

Water temperature, conductivity and dissolved oxygen concentration were monitored from May 29, 1992 to June 29, 1992 at two sites in the Machipongo River system. This sampling effort was a continuation of studies done in 1989 and 1990 (Neilson & Wilson, 1990, 1991).

The Machipongo River has an elevation of 55 feet above sea level at its source, is 15.8 miles long, and drains 41.49 square miles of land on the Eastern Shore, Virginia (Virginia Division of Water Resources, 1972). Parting Creek, one of four tributaries of the Machipongo, has an elevation of 30 feet at its source, is 5.9 miles long, and drains 9.42 square miles. It debouches to the Machipongo River 3.1 miles above the mouth of the river (ibid.). Land use is approximately 50% agriculture, 40% forest, and 10% residential and commercial (Athearn et al., 1974). The Machipongo River system includes 2,540 acres of Type I marsh - "saltmarsh cordgrass community" (Silberhorn & Harris, 1977).

The two monitoring sites have been named "Willis Wharf" and "Quinby Bridge" (Figure 1). "Willis Wharf" sampling was from a dock on Parting Creek adjacent to the American Original facility, a clam processing plant, in the small town of Willis Wharf, Virginia. "Quinby Bridge" sampling was from a dock at a crab shedding operation, approximately 30 meters downriver from the Route 182 bridge across the Machipongo River. There are 174 acres of marsh on Parting Creek, virtually all of which is upriver of Willis Wharf. On the Machipongo River there are 731 acres of marsh that are located upriver of the Route 182 bridge.

Hydrolab data loggers, model DataSonde 2 or model DataSonde 3, were deployed at the monitoring sites as follows:

Table 1. Deployment dates for 1992 Study

<b>Deployment</b>	<b>Retrieval</b>	<b>Unit Deployed</b>
May 29	June 10	DataSonde 2
June 10	June 17	DataSonde 3
June 17	June 29	DataSonde 2

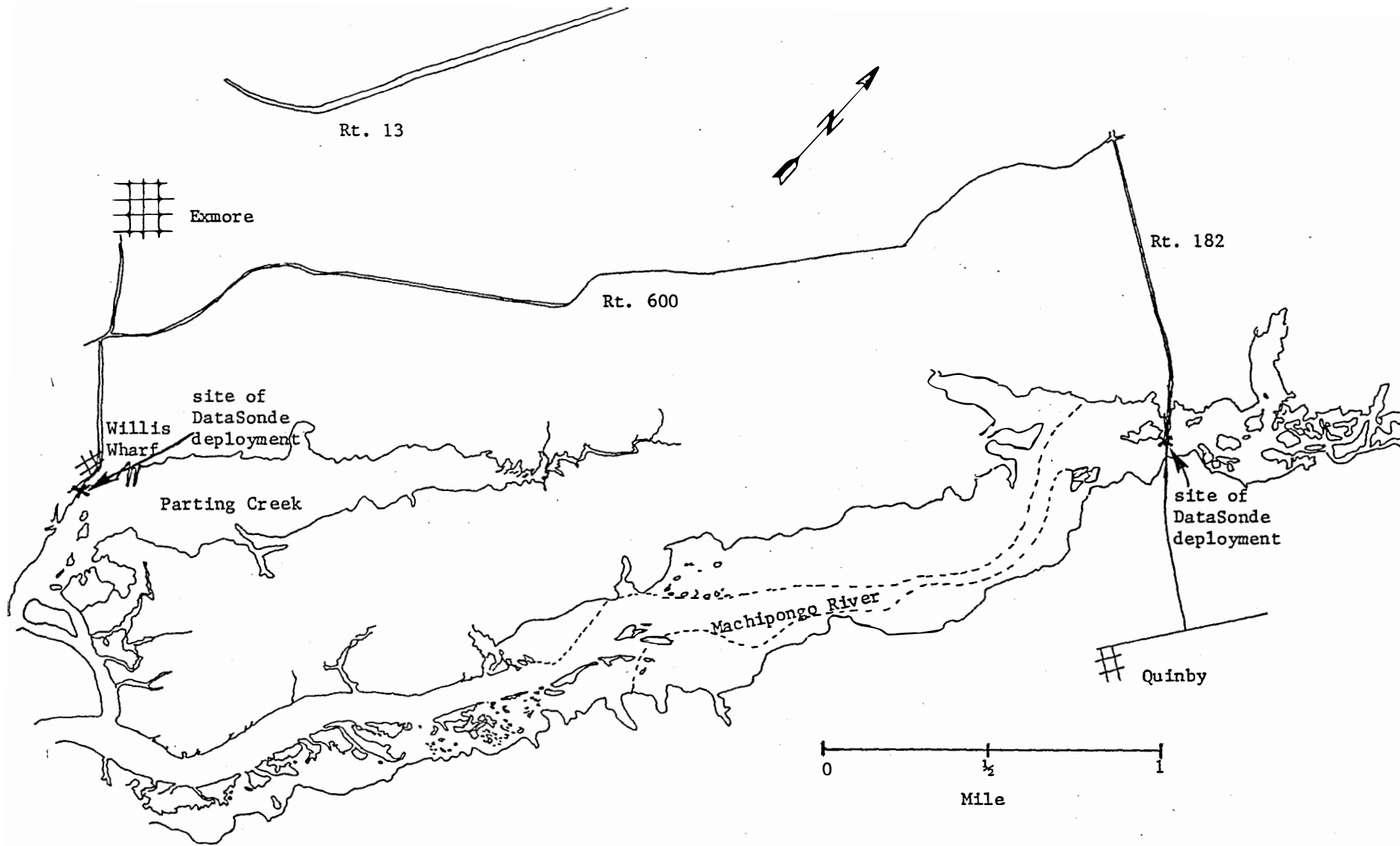


Figure 1. Map of Willis Wharf, Virginia area showing the two deployment sites.

All DataSonde units had a temperature sensor, a conductivity sensor, and, a polarographic dissolved oxygen sensor with 1-mil Teflon membrane. The instruments were calibrated a day prior to each deployment and checked after retrieval. An IBM-compatible personal computer, connected to the DataSondes through the Hydrolab 20XX-Data Management Unit, was used for data retrieval and programming. Each unit was programmed to record every 30 minutes:

- (1) time (EST),
- (2) temperature (°C),
- (3) conductivity (ms/cm) standardized to 25 °C,
- (4) dissolved oxygen concentration (mg/L) corrected for ambient temperature and salinity, and

(5) battery voltage. Additionally, the DataSonde 3 units recorded the calculated salinity (ppt) and depth (feet). The dissolved oxygen readings were compensated for the flow regime of "M" (factor of 1.042) internally.

After data retrieval, salinity records of DataSonde 2 units were calculated by the function:

$$\text{Salinity (ppt)} = 20.0 + 0.69608 C + 1.3904 \times 10^{-3} C^2 - 11.918 \times 10^{-6} C^3 + 173.92 \times 10^{-9} C^4 - 3.1112 \times 10^{-9} C^5$$

where C is the 25°C-standardized-conductivity in ms/cm minus a constant 32.188. For the periods June 17, 1992, 14:00 EST to June 20, 1992, 23:30 EST for Quinby Bridge and June 17, 1992, 16:30 EST to June 17, 1992, 23:30 EST for Willis Wharf the DO data were adjusted to compensate for "bad" salinity readings. This was accomplished by removing the salinity correction for the conductivity recorded by the DataSonde and then correcting for a salinity of 28 ppt. These correction factors were:

$F(C_{25}) = 1.0 - C_{25} [3.439 \times 10^{-3} + 0.361 / (22.1 + T^2)]$ , where  $C_{25}$  is the conductivity reading and T is the temperature reading, and

$F(C_{\text{new}}) = 1.0 - C_{\text{new}} [3.439 \times 10^{-3} + 0.361 / (22.1 + T^2)]$  where  $C_{\text{new}}$  is the conductivity at 28 ppt salinity.

The temperature, salinity, and dissolved oxygen concentration data with no editing other than the removal of pre- and post-deployment readings, are reported in appendices.



## RESULTS

All data, with readings occurring before deployment and after retrieval removed (*i.e.* readings when the units were out of the water), are listed in tables in the appendices; Willis Wharf data are in Appendix 1 and data for the Quinby Bridge site are in Appendix 2. The unedited data are shown graphically in Appendix 3. The edited data set are shown in Figures 2-a and 2-b.

**Data Recovery:** The recovery of data was good in general (see Table 2). Most of the problems occurred during the second deployment, when the tide range was unusually large and low tides were unusually low. Consequently, the sensors were out of the water at times during parts of several days. If for any given day a significant portion of the data was "bad", the data were not used to calculate daily values; that is the daily mean, minimum and maximum were not determined. "Bad" data were identified by depth readings that were zero or negative, and by conductivity readings that were unreasonable, especially sudden changes in conductivity. These instances occurred primarily at Willis Wharf and from 11 June through 15 June 1992 (see figures in Appendix 3).

At the beginning of the third deployment, when the instrument at Quinby Bridge was lowered into the water, it apparently went into the bottom sediments and the opening for the conductivity sensor was clogged. Conductivity readings were off for several days (June 17 - June 19), but eventually returned to "normal" readings (see plots in Appendix 3). During this period a salinity of 28 parts per thousand (ppt) has been assumed and the dissolved oxygen data adjusted to reflect this average salinity (see Figure 2-b). The same problem may have occurred at Willis Wharf; abnormally low salinities were recorded at the beginning of the deployment, but here the salinity returned to more typical values within a few hours.

Table 2. Remarks on Daily Data Sets

<b>Date</b>	<b>Willis Wharf</b>	<b>Quinby Bridge</b>
May 29	Partially missing	Partially missing
June 12	All missing	
June 13	Mostly missing	
June 14	Mostly missing	
June 15	Mostly missing	
June 17	Partially missing	Mostly missing
June 18		All missing
June 19		Partially missing
June 29	Partially missing	Partially missing

**Quality Assurance:** With one exception, water samples were collected and *in situ* measurements of dissolved oxygen were made using a YSI meter when the DataSondes were deployed or retrieved. Water samples were analyzed in the laboratory for salinity and dissolved oxygen, which was determined using Winkler titrations. The DataSonde, YSI, and Winkler measurements of DO and the DataSonde and lab measurements of salinity are listed in Table 3. In general, the readings agreed reasonably well. Differences among the measurements tended to be smaller when DataSondes were deployed than when they were retrieved, perhaps due to bio-fouling.

**Daily Values:** Daily means and extremes were determined for those days having essentially complete records (Tables 4, 5, & 6). Mean temperatures ranged between about 18 C and 26 C. These values are low relative to those observed in May and June of 1989. That year the daily means were nearly 18 C on May 11, about 23 C on May 29th (the beginning date for the 1992 study), and over 29 C on June 28. The warming trend observed in early June is typical of this season (see Figures 3a & 3b). It also is common for temperatures to rise and fall abruptly in response to the passage of meteorological fronts; these digressions from the seasonal pattern usually last only a few days. In 1992, however, temperature did not rise during mid-June and fell several degrees around June 20th. In short, the weather patterns in 1992 were unusual.

Daily mean salinities ranged between 27.5 and 31 parts per thousand (ppt) at Willis Wharf (see Figure 4a), and between 23 and 29.3 ppt at Quinby Bridge (see Figure 4b). The variation in salinity in response to the tidal cycle increased at both sites and the mean salinity decreased at Quinby Bridge in early June, presumably in response to rainfall and runoff. Salinities in 1989 were in the same general range, with slightly lower means and greater variations at Quinby Bridge (relative to Willis Wharf).

At both sites, daily average dissolved oxygen (DO) concentrations were below 5 mg/l in both early June (June 5 - 17) and later that month (June 25 - 28; see Figures 5a and 5b). Daily minimum DOs went below 4 mg/l during the same periods. Minimum DO's went below 4 mg/l sooner at Willis Wharf (June 2 vs June 6 at Quinby Bridge). Minimum DOs below 2 mg/l were observed at both sites.

The difference between the daily average and the daily minimum DO was about 1 mg/l much of the time at Willis Wharf. The range of DOs at Quinby Bridge appeared to be greater than that at Willis Wharf.

# Willis Wharf - 1992

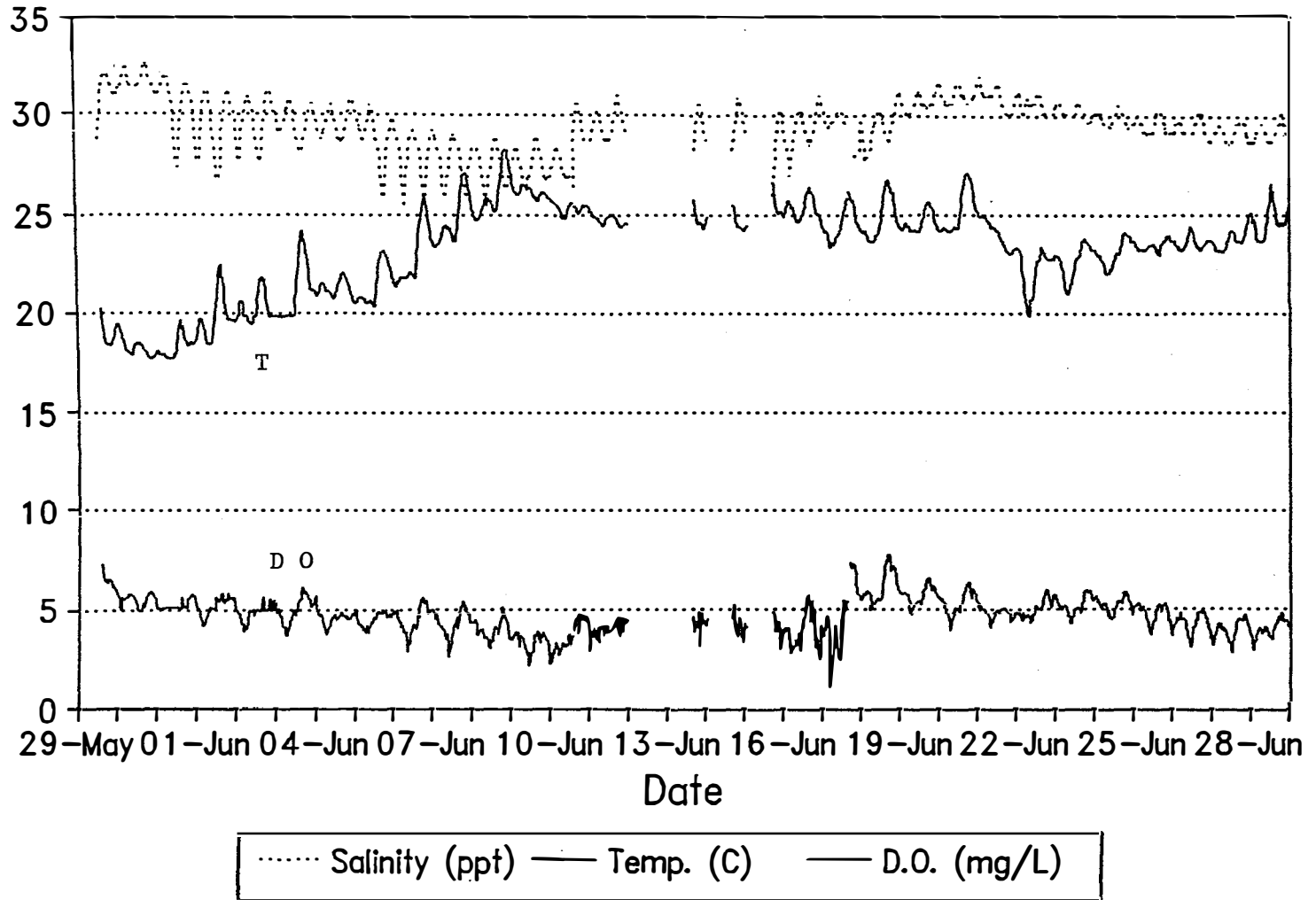


Figure 2a. Time variation of water temperature, salinity, and dissolved oxygen concentrations at Willis Wharf.

# Quinby Bridge - 1992

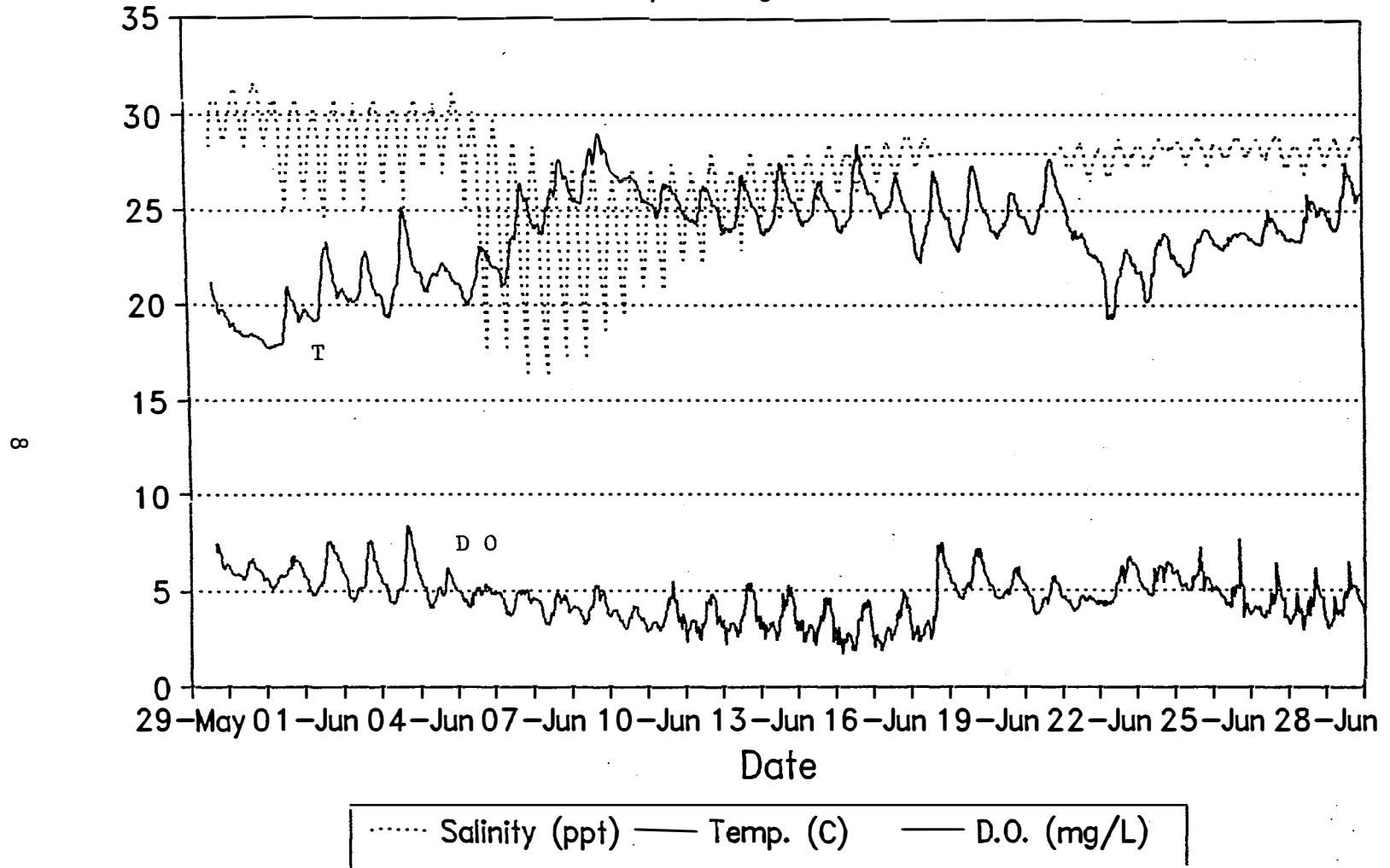


Figure 2b. Time variation of water temperature, salinity, and dissolved oxygen concentrations at Quinby Bridge.

# Willis Wharf - 1992

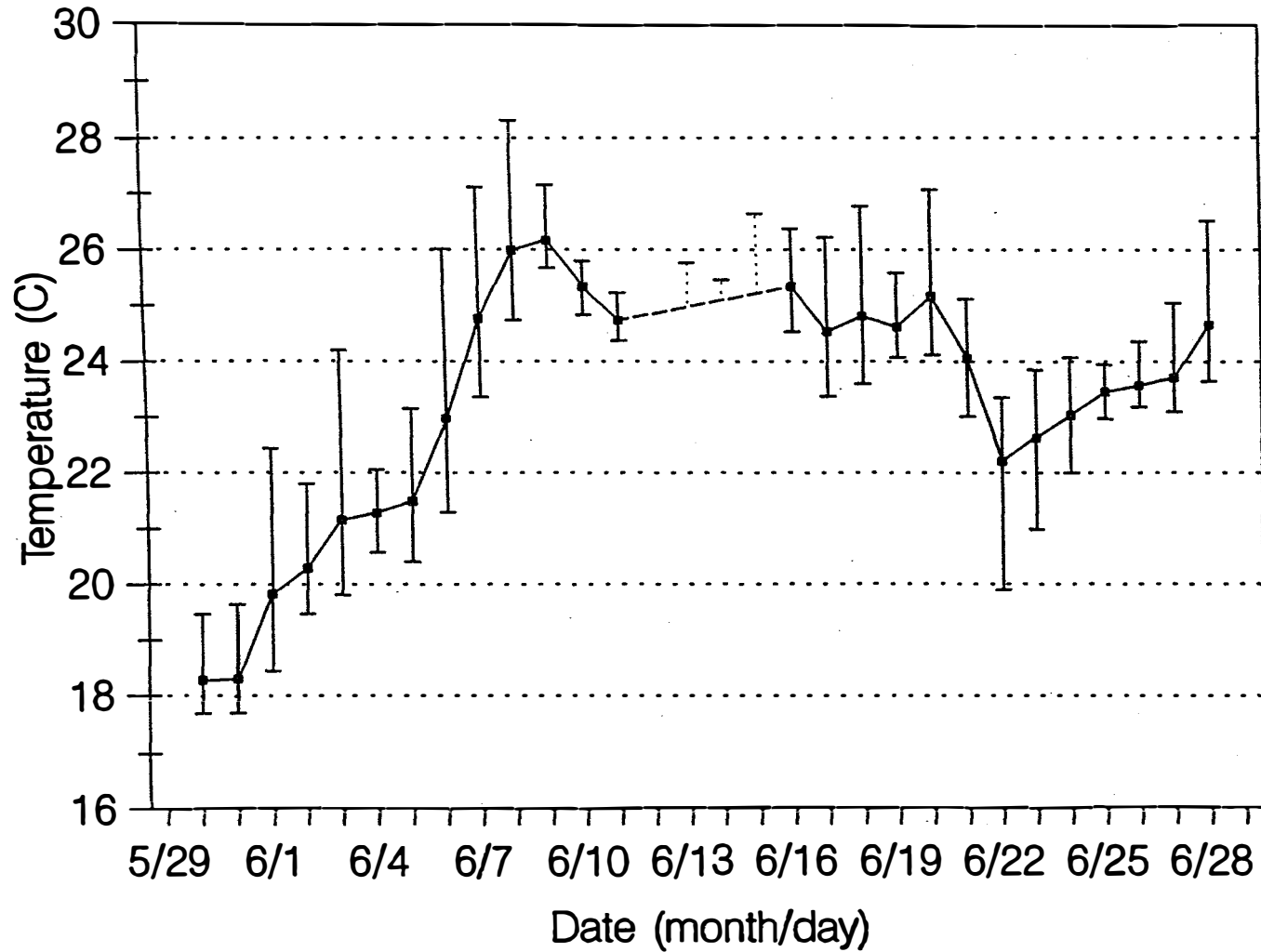


Figure 3a. Daily average and range of water temperatures at Willis Wharf.

# Quinby Bridge - 1992

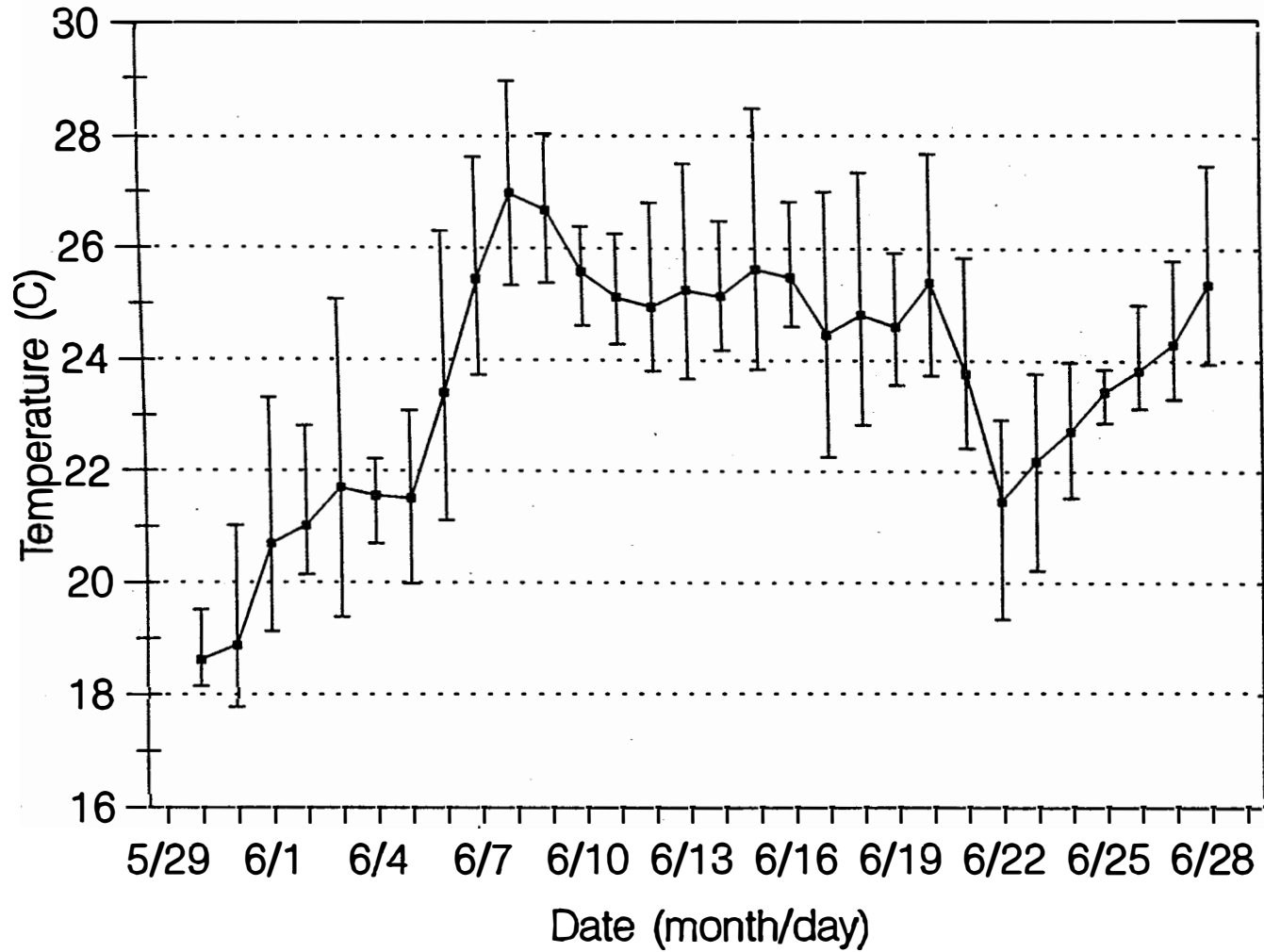


Figure 3b. Daily average and range of water temperatures at Quinby Bridge.

# Willis Wharf - 1992

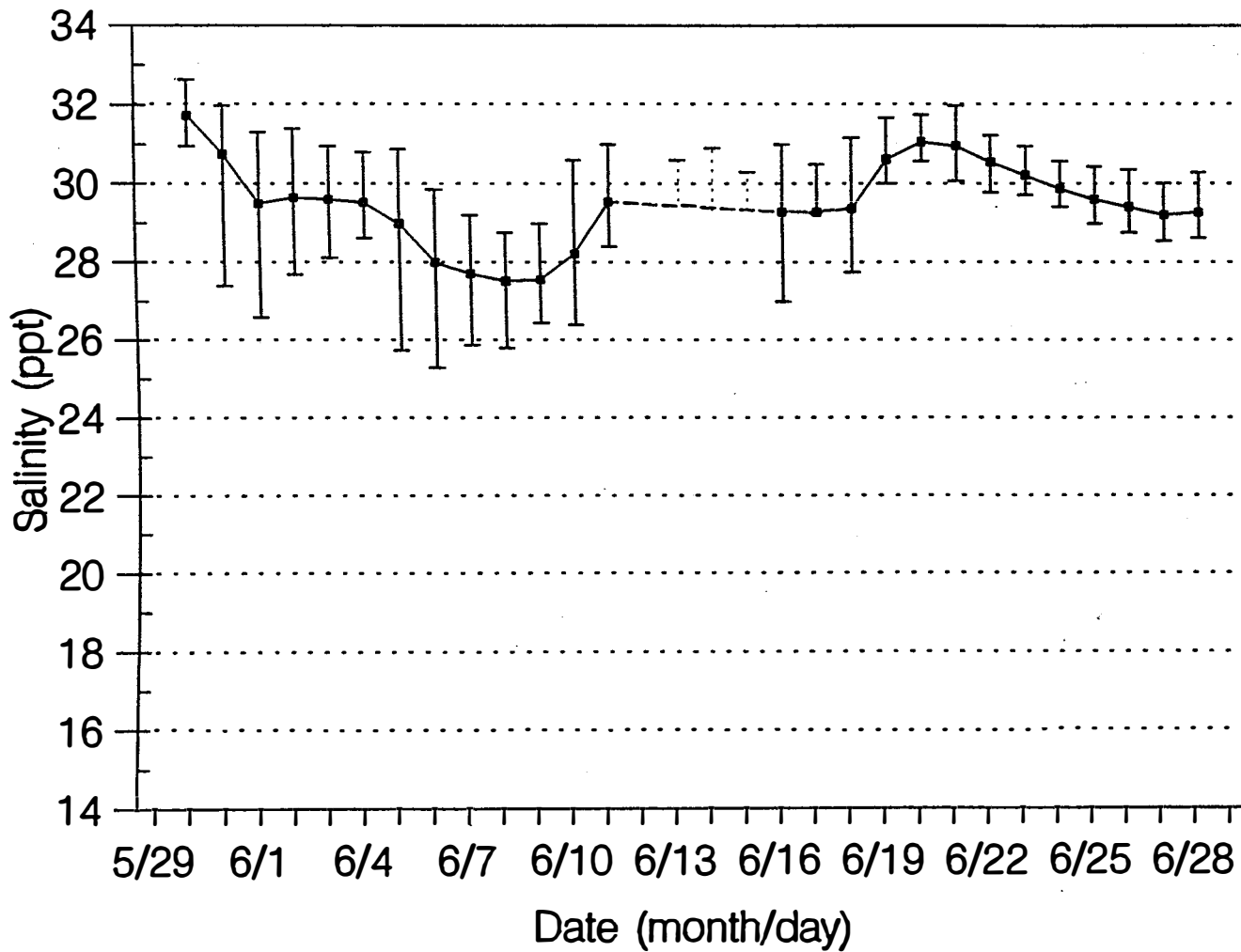
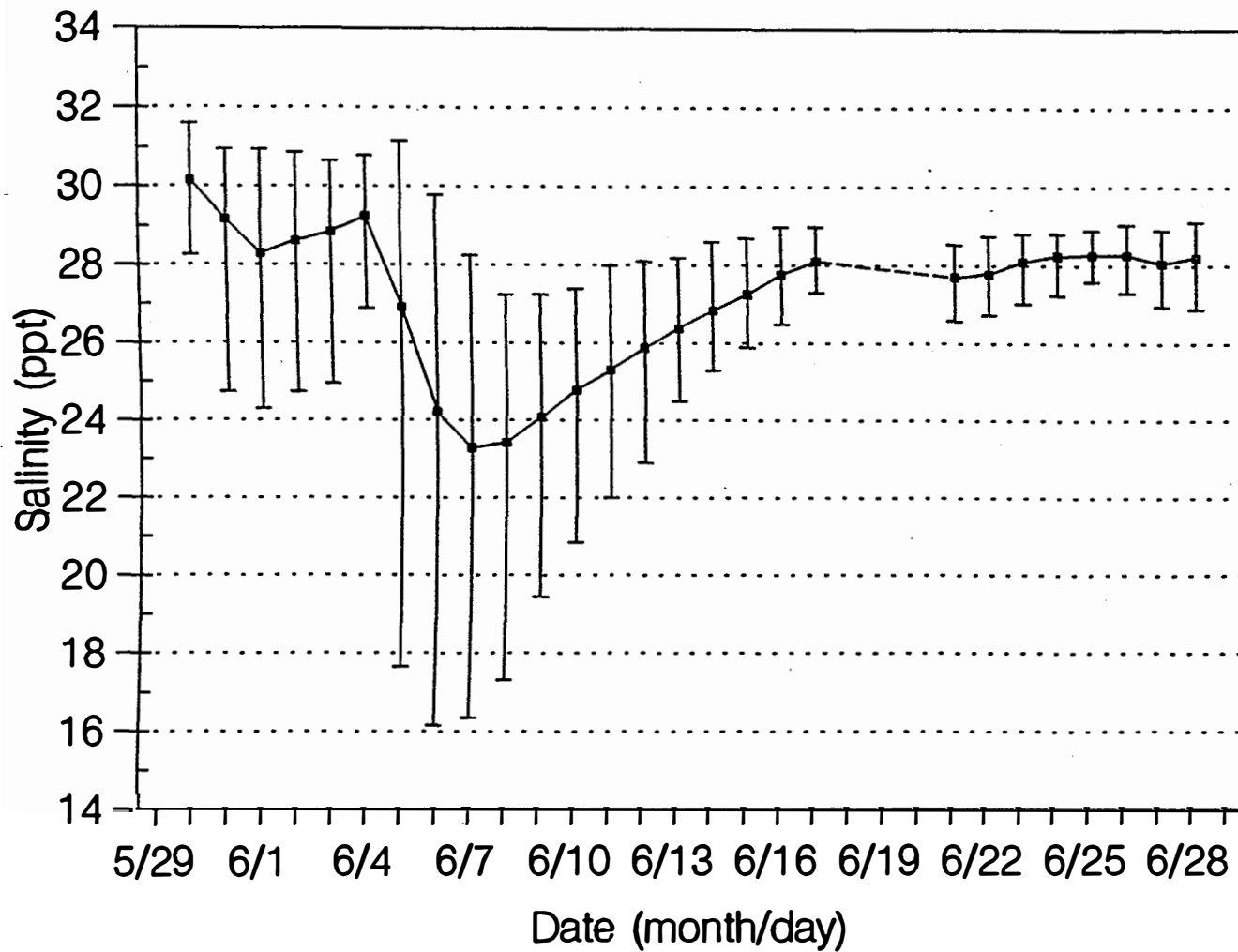


Figure 4a. Daily average and range of salinities at Willis Wharf.

# Quinby Bridge - 1992

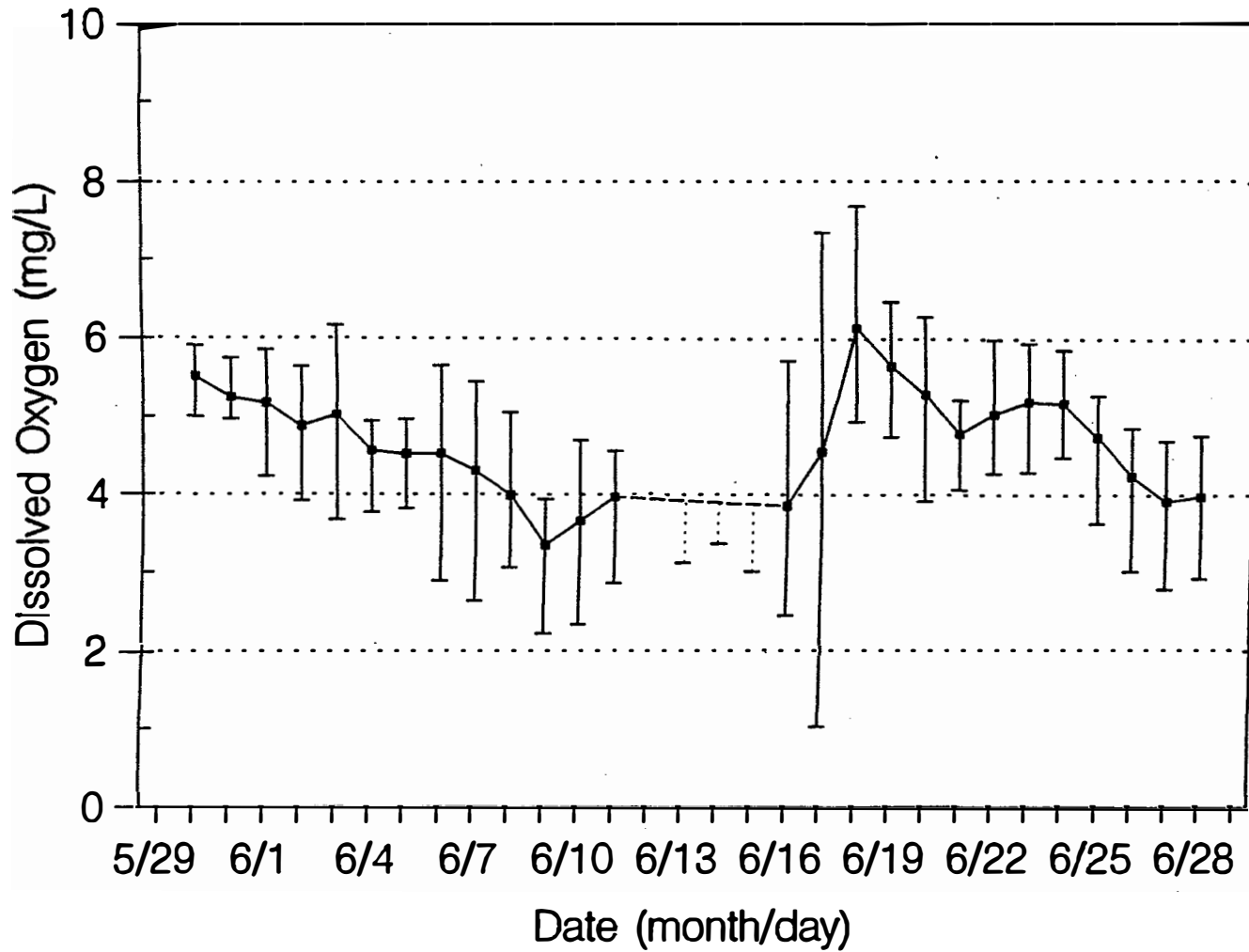


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Figure 4b. Daily average and range of salinities at Quinby Bridge.



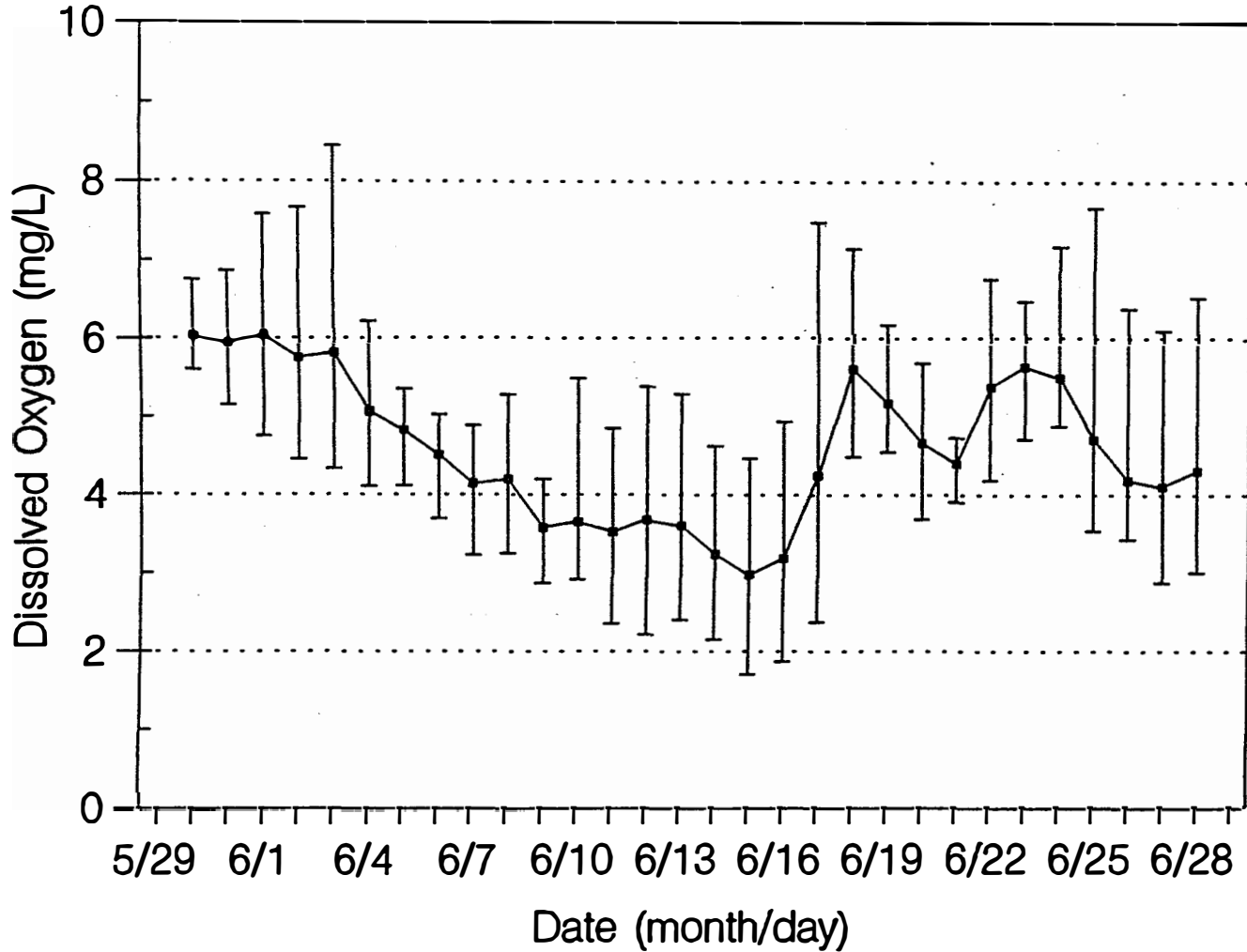
# Willis Wharf - 1992



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Figure 5a. Daily average and range of dissolved oxygen concentrations at Willis Wharf.

# Quinby Bridge - 1992



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Figure 5b. Daily average and range of dissolved oxygen concentrations at Quinby Bridge.

Table 3. Comparison of *in situ* and laboratory measurements of salinity and dissolved oxygen. (All times are Eastern Standard Time)

SALINITY (parts per thousand)

Willis Wharf-May 29		Sample	DataSonde
Time		14:32	14:30
Depth	0.5 m	29.94	28.69
Quinby Bridge-May 29		Sample	DataSonde
Time		15:09	15:30
Depth	0.5 m	28.40	28.33
Willis Wharf-June 17	DataSonde	Sample	DataSonde
Time	15:30	16:00	16:00
Depth	0.5 m	28.98	***
Quinby Bridge-June 17	DataSonde	Sample	DataSonde
Time	15:00	15:30	15:30
Depth	0.5 m	26.04	***
Willis Wharf-June 29	DataSonde	Sample	
Time	14:30	14:49	
Depth	0.5 m	29.14	
Quinby Bridge-June 29	DataSonde	Sample	
Time	15:00	15:20	
Depth	0.5 m	28.12	

DISSOLVED OXYGEN (mg/l)

Willis Wharf-May 29	DataSonde	YSI	Winkler	DataSonde
Time		14:32	15:00	14:30
Depth (m)				
0	Not	6.90	7.00	
0.5	Deployed	7.14		7.29
1.0		7.14		
2.0		6.74		
Quinby Bridge-May 29	DataSonde	YSI	Winkler	DataSonde
Time		15:09	15:30	15:30
Depth (m)				
0	Not	7.38	7.32	
0.5	Deployed	7.38		7.09
1.0		7.38		
2.0		7.38		

Table 3 (continued).

DISSOLVED OXYGEN (mg/l)

Willis Wharf-June 17 Time	DataSonde 15:30	YSI 16:00	Winkler 16:30	DataSonde 16:00
Depth (m)				
0		6.80	6.63	
0.5	5.39	6.52		6.48
1.0		6.39		
2.0		5.98		
Quinby Bridge-June 17 Time	DataSonde 15:00	YSI 15:30	Winkler 16:00	DataSonde 15:30
Depth (m)				
0		6.85	6.29	
0.5	3.83	6.69		8.52***
1.0		6.72		
2.0		6.61		
Willis Wharf-June 29 Time	DataSonde 14:30	YSI 14:49	Winkler 15:00	
Depth (m)				
0		4.86	4.72	
0.5	4.25	4.82		
1.0		4.82		
2.0		4.59		
Quinby Bridge-June 29 Time	DataSonde 15:00	YSI 15:20	Winkler 15:40	
Depth (m)				
0		5.59	5.88	
0.5	5.59	5.59		
1.0		5.51		
2.0		5.51		

\*\*\* Data are suspect; clogging of conductivity sensor and DO membrane with bottom sediments is believed to have occurred when instruments were lowered into position.

Table 4. Daily means and extremes of water temperature (degree C).

Date	Willis Wharf			Quinby Bridge		
	Mean	Min.	Max.	Mean	Min.	Max.
05/29/92	-	-	-	-	-	-
05/30/92	18.29	17.70	19.47	18.62	18.16	19.51
05/31/92	18.31	17.70	19.64	18.88	17.78	21.03
06/01/92	19.83	18.46	22.43	20.70	19.13	23.32
06/02/92	20.29	19.47	21.80	21.02	20.15	22.81
06/03/92	21.15	19.81	24.20	21.71	19.39	25.09
06/04/92	21.28	20.57	22.05	21.56	20.70	22.22
06/05/92	21.48	20.40	23.15	21.52	19.98	23.10
06/06/92	22.97	21.29	26.02	23.41	21.12	26.31
06/07/92	24.76	23.36	27.12	25.45	23.74	27.62
06/08/92	26.00	24.75	28.30	26.99	25.34	28.98
06/09/92	26.17	25.68	27.16	26.70	25.39	28.05
06/10/92	25.35	24.84	25.81	25.59	24.63	26.40
06/11/92	24.75	24.38	25.23	25.14	24.30	26.27
06/12/92	-	-	-	24.96	23.82	26.83
06/13/92	-	-	25.78	25.26	23.68	27.52
06/14/92	-	-	25.47	25.15	24.19	26.51
06/15/92	-	-	26.65	25.64	23.84	28.51
06/16/92	25.34	24.54	26.38	25.50	24.62	26.84
06/17/92	24.54	23.38	26.23	24.47	22.27	27.03
06/18/92	24.81	23.61	26.78	24.83	22.85	27.37
06/19/92	24.62	24.08	25.60	24.61	23.57	25.93
06/20/92	25.17	24.12	27.08	25.40	23.74	27.71
06/21/92	24.07	23.02	25.13	23.77	22.43	25.85
06/22/92	22.21	19.89	23.36	21.47	19.35	22.94
06/23/92	22.63	20.99	23.86	22.19	20.23	23.78
06/24/92	23.04	22.01	24.08	22.74	21.54	23.99
06/25/92	23.46	22.98	23.95	23.45	22.89	23.86
06/26/92	23.58	23.19	24.37	23.83	23.15	25.01
06/27/92	23.72	23.10	25.05	24.31	23.32	25.81
06/28/92	24.67	23.65	26.53	25.38	23.95	27.50
06/29/92	-	-	-	-	-	-

Table 5. Daily means and extremes of salinity (ppt).

Date	Willis Wharf			Quinby Bridge		
	Mean	Min.	Max.	Mean	Min.	Max.
05/29/92	-	-	-	-	-	-
05/30/92	31.72	30.95	32.64	30.16	28.25	31.61
05/31/92	30.75	27.39	31.98	29.17	24.73	30.95
06/01/92	29.49	26.59	31.31	28.29	24.30	30.95
06/02/92	29.64	27.68	31.39	28.61	24.73	30.88
06/03/92	29.61	28.11	30.95	28.84	24.95	30.66
06/04/92	29.53	28.62	30.80	29.25	26.88	30.80
06/05/92	28.98	25.73	30.88	26.92	17.66	31.17
06/06/92	28.00	25.30	29.85	24.22	16.16	29.78
06/07/92	27.70	25.88	29.20	23.28	16.36	28.25
06/08/92	27.51	25.80	28.76	23.42	17.32	27.24
06/09/92	27.55	26.45	28.98	24.08	19.45	27.24
06/10/92	28.22	26.40	30.60	24.79	20.85	27.40
06/11/92	29.54	28.40	31.00	25.30	22.00	28.00
06/12/92	-	-	-	25.87	22.90	28.10
06/13/92	-	-	30.60	26.38	24.50	28.20
06/14/92	-	-	30.90	26.84	25.30	28.60
06/15/92	-	-	30.30	27.26	25.90	28.70
06/16/92	29.30	27.00	31.00	27.77	26.50	29.00
06/17/92	-	-	30.50	28.11	27.30	29.00
06/18/92	29.37	27.75	31.17	-	-	-
06/19/92	30.62	30.00	31.68	-	-	-
06/20/92	31.06	30.58	31.75	-	-	-
06/21/92	30.96	30.07	31.98	27.71	26.59	28.54
06/22/92	30.55	29.78	31.24	27.79	26.74	28.76
06/23/92	30.22	29.71	30.95	28.10	27.03	28.83
06/24/92	29.87	29.42	30.58	28.25	27.24	28.83
06/25/92	29.60	28.98	30.44	28.28	27.60	28.91
06/26/92	29.41	28.76	30.36	28.28	27.31	29.05
06/27/92	29.20	28.54	30.00	28.07	26.95	28.91
06/28/92	29.26	28.62	30.29	28.22	26.88	29.12
06/29/92	-	-	-	-	-	-

Table 6. Daily means and extremes of dissolved oxygen (mg/L).

Date	Willis Wharf			Quinby Bridge		
	Mean	Min.	Max.	Mean	Min.	Max.
05/29/92	-	-	-	-	-	-
05/30/92	5.51	5.00	5.91	6.03	5.60	6.75
05/31/92	5.25	4.96	5.75	5.95	5.15	6.87
06/01/92	5.17	4.23	5.85	6.04	4.75	7.59
06/02/92	4.87	3.92	5.64	5.76	4.45	7.67
06/03/92	5.02	3.67	6.17	5.81	4.33	8.45
06/04/92	4.56	3.77	4.94	5.07	4.11	6.22
06/05/92	4.52	3.82	4.96	4.83	4.12	5.36
06/06/92	4.52	2.89	5.66	4.51	3.70	5.03
06/07/92	4.30	2.63	5.45	4.15	3.23	4.89
06/08/92	3.99	3.07	5.06	4.20	3.25	5.29
06/09/92	3.35	2.22	3.94	3.58	2.87	4.20
06/10/92	3.66	2.33	4.69	3.66	2.91	5.50
06/11/92	3.97	2.86	4.56	3.53	2.35	4.85
06/12/92	-	-	-	3.68	2.21	5.39
06/13/92	-	3.13	-	3.61	2.40	5.30
06/14/92	-	3.36	-	3.24	2.15	4.63
06/15/92	-	3.01	-	2.98	1.70	4.47
06/16/92	3.86	2.45	5.72	3.19	1.87	4.94
06/17/92	4.55	1.03	7.37	4.25	2.37	7.49
06/18/92	6.15	4.94	7.70	5.62	4.49	7.16
06/19/92	5.66	4.74	6.48	5.18	4.55	6.19
06/20/92	5.29	3.92	6.29	4.67	3.69	5.70
06/21/92	4.79	4.06	5.22	4.40	3.91	4.74
06/22/92	5.04	4.28	6.00	5.39	4.19	6.78
06/23/92	5.20	4.29	5.95	5.66	4.72	6.49
06/24/92	5.18	4.48	5.87	5.52	4.89	7.19
06/25/92	4.74	3.63	5.28	4.72	3.54	7.68
06/26/92	4.24	3.02	4.86	4.20	3.43	6.40
06/27/92	3.92	2.79	4.69	4.11	2.88	6.12
06/28/92	3.98	2.93	4.76	4.31	3.01	6.54
06/29/92	-	-	-	-	-	-

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## APPENDIX 1

Tables of water temperature (degree C), salinity (parts per thousand), and dissolved oxygen concentration (mg/L) at the Willis Wharf site (unedited\*).

- \* Data prior to deployment and after the DataSonde had been removed from the water have been eliminated; otherwise the data are unedited. Blank spaces represent periods when no measurements were made.

**Willis Wharf, 1992.**

	May 29			May 30			May 31		
Hour	Temp.	Salinity	D.O.	Temp.	Salinity	D.O.	Temp.	Salinity	D.O.
00:00				19.43	31.24	5.76	18.04	31.53	5.09
00:30				19.47	31.02	5.61	18.04	31.24	5.10
01:00				19.47	31.02	5.55	17.95	31.31	5.11
01:30				19.39	30.95	5.11	17.95	31.17	5.08
02:00				19.09	31.02	5.02	17.95	30.80	4.96
02:30				19.05	31.09	5.61	17.95	30.80	5.09
03:00				18.97	31.31	5.49	17.91	30.88	5.16
03:30				18.75	31.31	5.55	17.95	31.02	5.09
04:00				18.63	31.39	5.54	17.91	31.31	5.05
04:30				18.25	31.53	5.62	17.91	31.31	5.05
05:00				18.16	31.61	5.66	17.82	31.39	5.12
05:30				18.12	31.83	5.66	17.82	31.75	5.11
06:00				18.12	31.98	5.69	17.74	31.83	5.12
06:30				18.08	32.12	5.69	17.74	31.98	5.12
07:00				18.04	32.34	5.75	17.74	31.98	5.12
07:30				17.99	32.42	5.79	17.70	31.98	5.12
08:00				17.95	32.42	5.76	17.74	31.98	5.12
08:30				17.95	32.12	5.77	17.74	31.98	5.12
09:00				17.95	31.98	5.72	17.74	31.98	5.15
09:30				18.04	31.68	5.68	17.74	31.98	5.12
10:00				18.25	31.68	5.59	17.82	31.39	5.15
10:30				18.33	31.46	5.49	17.91	31.17	5.15
11:00				18.42	31.39	5.41	17.95	30.80	5.12
11:30				18.46	31.39	5.28	18.12	30.51	5.14
12:00				18.54	31.31	5.06	18.42	29.85	5.15
12:30				18.54	31.31	5.00	18.75	28.98	5.13
13:00				18.46	31.39	5.00	18.97	28.47	5.12
13:30				18.54	31.31	5.00	19.30	27.82	5.09
14:00				18.42	31.39	5.01	19.64	27.60	5.08
14:30	20.23	28.69	7.29	18.37	31.46	5.01	19.47	27.39	5.64
15:00	19.51	29.63	6.81	18.33	31.46	5.33	19.13	28.40	5.13
15:30	18.97	30.36	6.48	18.33	31.46	5.14	19.39	28.69	5.18
16:00	18.75	31.17	6.42	18.16	31.61	5.13	19.05	29.34	5.17
16:30	18.71	31.17	6.58	18.08	31.68	5.55	18.92	29.78	5.18
17:00	18.59	31.61	6.47	18.04	31.68	5.65	18.67	30.29	5.17
17:30	18.46	31.83	6.39	17.99	31.90	5.71	18.59	30.66	5.13
18:00	18.46	31.98	6.60	17.95	32.12	5.74	18.54	30.88	5.54
18:30	18.42	32.20	6.53	17.82	32.49	5.81	18.42	31.09	5.55
19:00	18.37	32.05	6.61	17.78	32.56	5.88	18.37	31.31	5.55
19:30	18.42	32.20	6.47	17.74	32.56	5.88	18.37	31.46	5.61
20:00	18.33	32.12	6.40	17.74	32.56	5.91	18.42	31.53	5.69
20:30	18.42	32.05	6.29	17.70	32.64	5.89	18.54	31.46	5.73
21:00	18.42	32.05	6.17	17.74	32.27	5.83	18.54	31.46	5.73
21:30	18.59	31.75	6.31	17.78	32.05	5.74	18.46	31.53	5.75
22:00	18.75	31.61	6.13	17.82	31.90	5.64	18.42	31.39	5.66
22:30	18.97	31.61	6.00	17.91	31.83	5.54	18.46	31.09	5.73
23:00	19.13	31.46	6.10	17.95	31.75	5.34	18.54	30.88	5.41
23:30	19.35	31.31	5.89	17.99	31.75	5.09	18.63	30.80	5.09

Willis Wharf, 1992.

	June 1			June 2			June 3		
Hour	Temp.	Salinity	D.O.	Temp.	Salinity	D.O.	Temp.	Salinity	D.O.
00:00	18.75	30.51	5.08	19.68	30.29	5.03	19.85	30.58	5.03
00:30	19.01	30.00	5.07	19.77	30.22	4.87	19.85	30.29	4.82
01:00	19.26	29.49	5.08	19.85	30.00	4.83	19.85	30.14	5.04
01:30	19.47	28.62	4.92	19.85	29.85	4.81	19.85	30.14	4.89
02:00	19.64	28.18	4.73	20.44	28.98	4.64	19.85	30.00	4.80
02:30	19.73	27.53	4.55	20.61	28.40	4.54	19.85	29.71	4.66
03:00	19.68	27.53	4.37	20.61	28.25	4.37	19.85	29.42	4.70
03:30	19.56	27.60	4.23	20.61	27.68	4.26	19.89	29.34	4.30
04:00	19.35	28.25	4.24	20.57	27.82	4.29	19.81	29.12	4.22
04:30	19.30	28.54	4.23	19.89	28.62	3.92	19.85	29.12	4.13
05:00	19.09	29.34	4.36	19.89	28.76	4.04	19.81	29.27	4.10
05:30	18.84	29.85	4.47	19.89	29.20	4.06	19.85	29.42	3.85
06:00	18.59	30.36	4.65	19.85	29.42	4.09	19.85	29.27	3.67
06:30	18.46	30.73	4.77	19.77	29.93	4.30	19.85	29.42	3.88
07:00	18.46	30.88	4.83	19.64	30.00	4.59	19.85	29.71	3.99
07:30	18.46	30.88	4.93	19.60	30.36	5.01	19.85	29.85	4.20
08:00	18.46	31.09	5.11	19.56	30.51	4.82	19.85	30.29	4.43
08:30	18.46	31.24	5.10	19.51	30.58	4.95	19.85	30.29	4.49
09:00	18.54	31.31	5.09	19.51	30.88	4.94	19.85	30.44	4.61
09:30	18.67	31.24	5.07	19.47	30.88	4.95	19.85	30.58	4.78
10:00	18.97	30.95	5.04	19.51	30.88	4.85	19.85	30.95	4.93
10:30	19.26	30.58	5.04	19.77	30.66	4.73	19.85	30.95	5.02
11:00	19.64	30.14	5.01	19.81	30.51	4.97	19.94	30.88	4.71
11:30	19.81	29.71	5.66	19.85	30.29	5.03	20.70	30.44	4.86
12:00	20.40	28.98	5.57	19.85	30.29	5.03	21.12	30.29	4.90
12:30	20.78	28.62	5.44	20.32	29.93	4.98	21.63	29.78	5.31
13:00	21.12	27.89	5.47	20.70	29.42	4.98	22.01	29.34	5.41
13:30	21.63	27.39	5.47	21.08	28.83	4.94	22.39	29.05	5.48
14:00	22.01	26.88	5.52	21.29	28.69	4.95	22.77	28.91	5.51
14:30	22.39	26.67	5.81	21.58	28.18	4.96	23.15	28.69	5.54
15:00	22.43	26.59	5.84	21.75	28.04	4.99	23.44	28.47	5.95
15:30	21.84	26.88	5.46	21.80	27.75	5.64	23.65	28.33	5.78
16:00	21.80	27.31	5.51	21.80	27.75	5.38	24.03	28.11	6.17
16:30	21.63	27.96	5.39	21.58	28.04	4.96	24.20	28.11	5.95
17:00	21.29	28.40	5.60	21.71	28.11	5.00	23.65	28.18	5.79
17:30	20.61	29.12	5.53	21.42	28.62	4.99	23.74	28.25	5.91
18:00	19.94	29.63	5.50	21.29	28.83	4.98	23.44	28.47	5.78
18:30	19.85	30.14	5.85	20.78	29.34	5.03	23.32	28.69	5.66
19:00	19.73	30.44	5.62	20.44	29.71	5.03	22.89	28.98	5.54
19:30	19.68	30.44	5.60	19.89	30.29	5.57	22.18	29.20	5.47
20:00	19.73	30.73	5.61	19.89	30.44	5.02	21.75	29.34	5.39
20:30	19.73	31.02	5.57	19.85	30.95	5.05	21.46	29.56	5.13
21:00	19.68	31.02	5.61	19.89	30.88	5.13	21.25	29.85	5.18
21:30	19.64	31.24	5.64	19.85	31.24	5.37	21.20	30.07	5.24
22:00	19.64	31.09	5.43	19.85	31.39	5.48	21.25	30.29	5.29
22:30	19.64	31.09	5.64	19.85	31.24	5.01	21.20	30.51	5.40
23:00	19.64	30.80	5.05	19.85	31.09	5.37	21.16	30.51	5.73
23:30	19.60	30.51	5.00	19.89	30.88	5.01	21.16	30.51	5.32

Willis Wharf, 1992.

	June 4			June 5			June 6		
Hour	Temp.	Salinity	D.O.	Temp.	Salinity	D.O.	Temp.	Salinity	D.O.
00:00	21.12	30.58	4.92	20.53	30.88	4.96	21.58	29.34	4.95
00:30	20.99	30.22	4.94	20.53	30.88	4.63	21.42	29.63	4.88
01:00	20.91	30.14	4.93	20.57	30.80	4.48	21.29	29.85	4.97
01:30	20.91	30.00	4.79	20.61	30.51	4.51	21.42	29.78	4.64
02:00	20.99	29.93	4.72	20.61	30.36	4.31	21.46	29.42	4.67
02:30	21.16	29.63	4.68	20.74	30.22	4.27	21.58	29.20	4.58
03:00	21.33	29.34	4.75	20.78	29.93	4.30	21.63	29.05	4.37
03:30	21.50	29.12	4.56	20.82	29.71	4.16	21.71	28.98	4.37
04:00	21.54	29.05	4.47	20.82	29.42	4.19	21.80	28.62	4.16
04:30	21.50	28.83	4.28	20.82	29.42	4.13	21.80	28.33	4.20
05:00	21.42	28.76	4.09	20.82	29.27	4.02	21.84	28.04	4.12
05:30	21.33	28.76	4.09	20.74	29.20	4.06	21.80	27.46	3.99
06:00	21.29	28.98	3.77	20.70	29.05	3.83	21.84	26.88	3.91
06:30	21.20	29.05	4.01	20.57	28.62	3.82	21.84	26.16	3.87
07:00	21.20	29.05	3.84	20.53	28.62	4.22	21.80	25.59	3.77
07:30	21.20	29.20	4.01	20.57	28.91	4.03	21.84	25.30	3.89
08:00	21.20	29.34	4.15	20.53	28.91	3.85	21.84	26.59	2.89
08:30	21.12	29.34	4.22	20.57	28.91	4.06	21.84	26.88	3.24
09:00	21.08	29.71	4.36	20.57	29.49	4.13	21.92	27.53	3.28
09:30	20.99	29.93	4.60	20.65	29.71	4.32	22.09	27.82	3.49
10:00	20.95	29.93	4.64	20.61	29.71	4.39	22.09	28.25	3.79
10:30	20.87	30.29	4.66	20.57	29.93	4.36	22.05	28.54	3.96
11:00	20.74	30.36	4.77	20.49	30.14	4.45	22.01	28.76	4.02
11:30	20.78	30.51	4.67	20.40	30.51	4.60	21.96	28.76	4.25
12:00	20.78	30.51	4.55	20.40	30.51	4.54	21.92	28.83	4.29
12:30	20.99	30.22	4.51	20.65	30.29	4.57	21.84	28.98	4.23
13:00	21.08	30.00	4.53	21.03	30.00	4.77	21.80	29.20	4.29
13:30	21.25	29.85	4.66	21.42	29.78	4.87	22.09	29.12	4.09
14:00	21.42	29.63	4.62	21.80	29.49	4.89	22.64	29.05	4.26
14:30	21.58	29.34	4.78	22.34	29.12	4.83	23.06	28.91	4.69
15:00	21.71	29.27	4.88	22.68	28.69	4.85	23.40	28.76	4.67
15:30	21.75	28.91	4.85	22.89	28.40	4.86	23.95	28.54	4.96
16:00	21.96	28.76	4.69	22.94	28.40	4.86	24.50	28.47	5.49
16:30	22.01	28.76	4.68	23.06	27.75	4.86	24.84	28.40	5.60
17:00	22.05	28.69	4.71	23.10	27.17	4.87	25.05	27.96	5.66
17:30	22.01	28.62	4.69	23.10	26.45	4.92	25.17	27.75	5.59
18:00	21.84	28.69	4.56	23.15	25.73	4.96	25.30	27.03	5.39
18:30	21.84	28.69	4.70	23.15	25.73	4.93	25.60	26.52	5.38
19:00	21.75	28.76	4.51	22.94	26.02	4.73	25.89	25.80	5.49
19:30	21.67	28.83	4.58	22.89	26.16	4.64	26.02	25.66	5.40
20:00	21.54	29.20	4.58	22.85	27.46	4.70	25.60	26.02	4.95
20:30	21.29	29.42	4.58	22.77	27.82	4.64	25.43	26.52	4.88
21:00	21.20	29.63	4.67	22.47	28.40	4.77	25.22	27.03	4.92
21:30	21.08	30.00	4.68	22.30	28.69	4.67	24.92	27.24	4.85
22:00	20.95	30.07	4.75	22.18	28.76	4.74	24.54	28.04	4.90
22:30	20.87	30.29	4.75	22.09	28.83	4.84	24.08	28.33	4.98
23:00	20.74	30.51	4.70	21.84	29.12	4.81	23.74	28.54	4.99
23:30	20.57	30.80	4.75	21.75	29.20	4.76	23.70	28.69	4.91

**Willis Wharf, 1992.**

	June 7			June 8			June 9		
Hour	Temp.	Salinity	D.O.	Temp.	Salinity	D.O.	Temp.	Salinity	D.O.
00:00	23.61	28.76	4.92	25.30	27.96	4.35	27.16	27.53	3.47
00:30	23.53	28.98	4.68	25.13	28.18	4.37	27.08	27.46	3.63
01:00	23.44	28.91	4.50	25.01	28.40	4.46	26.57	27.68	3.67
01:30	23.40	29.20	4.77	24.88	28.62	4.41	26.40	27.75	3.69
02:00	23.36	28.98	4.34	24.84	28.47	4.31	26.27	27.96	3.85
02:30	23.40	28.91	4.31	24.79	28.54	3.76	26.19	28.04	3.81
03:00	23.44	28.91	4.28	24.79	28.54	3.79	26.10	28.33	3.86
03:30	23.48	28.62	4.23	24.79	28.54	3.95	26.02	28.54	3.63
04:00	23.57	28.25	4.14	24.75	28.40	3.90	26.02	28.40	3.15
04:30	23.65	28.18	4.16	24.75	28.18	4.01	26.02	28.40	3.28
05:00	23.70	28.04	4.08	24.88	27.96	4.00	26.02	28.11	3.67
05:30	23.91	27.75	3.98	25.05	27.68	4.02	26.06	27.82	3.67
06:00	24.03	27.39	3.97	25.17	27.46	3.88	26.15	27.53	3.64
06:30	24.16	26.88	3.89	25.34	27.10	3.73	26.31	27.39	3.53
07:00	24.29	26.31	3.84	25.43	26.81	3.57	26.48	27.17	3.33
07:30	24.37	26.09	3.45	25.47	26.52	3.63	26.53	26.88	3.23
08:00	24.50	25.88	3.52	25.55	26.31	3.57	26.48	26.67	3.04
08:30	24.46	25.88	3.74	25.72	25.95	3.61	26.48	26.81	3.01
09:00	24.29	26.38	2.63	25.93	25.80	3.39	26.48	26.52	2.68
09:30	24.37	26.67	2.70	25.51	26.16	3.23	26.44	26.45	2.76
10:00	24.25	27.10	3.06	25.81	26.38	3.07	26.44	26.45	2.81
10:30	24.33	27.31	3.34	25.81	26.81	3.51	26.27	26.81	2.22
11:00	24.16	27.89	3.57	25.68	27.03	3.33	26.36	26.74	2.40
11:30	24.03	28.25	3.87	25.72	27.24	3.38	26.31	26.74	2.53
12:00	24.03	28.25	4.09	25.64	27.60	3.64	26.36	27.10	2.83
12:30	23.78	28.54	4.17	25.47	27.82	3.89	26.27	27.31	2.84
13:00	23.70	28.69	4.12	25.39	28.04	4.00	26.19	27.39	3.36
13:30	23.70	28.98	4.41	25.22	28.25	4.12	26.02	27.60	3.37
14:00	23.70	28.98	4.60	25.17	28.40	4.09	26.02	27.89	3.73
14:30	23.99	28.83	4.08	25.22	28.69	4.03	25.93	28.18	3.68
15:00	24.33	28.69	4.50	25.26	28.76	4.02	25.93	28.33	3.72
15:30	24.63	28.62	4.60	25.34	28.69	3.78	25.81	28.69	3.94
16:00	25.17	28.40	4.94	25.68	28.76	4.37	25.68	28.98	3.87
16:30	25.68	28.33	5.29	25.93	28.47	4.26	25.68	28.91	3.58
17:00	26.06	27.96	5.45	26.44	28.25	4.52	25.72	28.83	3.37
17:30	26.31	27.82	5.39	26.86	27.96	4.72	25.85	28.62	3.75
18:00	26.44	27.31	5.26	27.08	27.75	5.06	25.98	28.25	3.57
18:30	26.61	27.24	5.21	27.12	27.82	5.02	26.02	27.96	3.72
19:00	26.91	26.81	5.11	27.58	27.24	4.65	26.10	27.53	3.85
19:30	27.08	26.45	5.04	27.88	26.95	4.62	26.10	27.39	3.73
20:00	27.12	26.31	4.76	28.17	26.81	4.59	26.10	27.39	3.68
20:30	27.12	26.16	4.77	28.26	26.59	4.41	26.15	27.10	3.57
21:00	26.99	25.95	4.79	28.30	26.09	4.17	26.10	26.88	3.45
21:30	26.86	26.45	4.56	28.26	26.23	4.07	26.02	26.81	3.49
22:00	26.57	26.74	4.39	28.26	26.23	3.63	25.98	26.74	3.23
22:30	26.40	27.24	4.32	27.88	26.45	3.57	25.93	26.59	2.98
23:00	26.15	27.53	4.37	27.79	26.74	3.52	25.81	26.81	2.59
23:30	25.64	27.82	4.34	27.58	27.03	3.61	25.81	26.95	2.25

Willis Wharf, 1992.

	June 10			June 11			June 12		
Hour	Temp.	Salinity	D.O.	Temp.	Salinity	D.O.	Temp.	Salinity	D.O.
00:00	25.81	26.95	2.33	25.23	28.40	3.48	24.43	29.00	4.26
00:30	25.77	27.10	2.59	25.15	28.70	2.86	24.30	29.00	4.01
01:00	25.72	27.39	2.83	25.16	28.60	3.77	24.06	9.20	2.77
01:30	25.68	27.39	2.78	25.06	28.80	3.87	24.13	9.20	3.58
02:00	25.68	27.68	3.01	25.02	28.90	3.55	24.19	9.30	4.06
02:30	25.60	27.75	3.07	24.96	29.10	3.60	24.04	9.30	3.76
03:00	25.64	27.96	3.32	24.91	29.20	4.01	24.06	9.30	4.16
03:30	25.55	28.18	3.19	24.90	29.40	3.66	24.03	9.40	4.00
04:00	25.47	28.33	3.01	24.88	29.60	3.91	24.10	9.60	3.99
04:30	25.43	28.40	2.67	24.85	29.80	3.41	24.17	9.80	4.52
05:00	25.43	28.25	2.76	24.81	30.00	3.86	24.14	9.90	4.02
05:30	25.43	28.25	2.86	24.76	30.20	4.09	24.12	10.20	3.96
06:00	25.22	27.96	3.09	24.71	30.10	3.27	24.09	10.40	3.53
06:30	25.09	27.96	3.32	24.72	30.10	3.92	24.04	10.70	3.97
07:00	24.88	27.68	3.13	24.59	29.80	4.07	24.04	10.80	4.23
07:30	24.84	27.53	3.29	24.56	29.70	4.12	24.06	10.80	4.50
08:00	24.84	27.31	3.27	24.47	29.50	4.10	24.04	10.60	4.16
08:30	24.88	27.10	3.16	24.46	29.30	3.86	24.08	10.20	4.55
09:00	24.84	27.03	3.28	24.48	29.20	3.66	24.06	10.10	4.71
09:30	24.84	27.03	3.20	24.56	29.00	4.06	24.08	9.90	4.49
10:00	25.09	26.74	3.34	24.66	28.90	4.06	24.15	9.60	4.76
10:30	25.17	26.81	3.62	24.82	28.80	3.80	24.25	9.50	4.26
11:00	25.39	26.67	3.79	24.90	28.70	4.15	24.41	9.40	4.75
11:30	25.47	26.88	3.73	23.46	0.10	5.04	24.63	9.30	4.35
12:00	25.47	26.88	3.65	23.13	5.70	4.81	24.82	15.10	4.49
12:30	25.51	27.03	3.22	24.93	28.80	3.69	22.12	0.10	7.33
13:00	25.60	27.17	3.42	25.02	28.70	3.92	21.52	0.10	6.61
13:30	25.60	27.31	3.60	25.00	28.90	3.94	25.07	10.80	4.96
14:00				24.96	29.00	3.84	25.33	9.60	5.64
14:30	25.39	26.40	4.42	25.02	29.10	4.10	25.26	10.00	5.37
15:00	25.45	28.50	3.90	24.97	29.10	4.01	25.08	14.50	5.05
15:30	25.43	29.50	4.47	24.91	29.40	4.13	25.03	16.90	4.97
16:00	25.31	30.00	4.39	24.87	29.70	4.20	24.87	20.60	4.59
16:30	25.18	30.40	4.62	24.80	30.10	4.37	24.74	23.30	4.30
17:00	25.07	30.60	4.69	24.72	30.40	3.97	24.63	25.30	4.26
17:30	25.13	30.50	3.75	24.65	30.80	4.56	24.47	26.50	4.01
18:00	25.09	30.60	4.47	24.56	31.00	4.19	24.41	27.40	4.35
18:30	25.17	30.30	4.66	24.48	31.00	3.91	24.39	28.10	3.92
19:00	25.28	30.00	4.44	24.45	31.00	3.61	24.34	28.60	4.78
19:30	25.41	29.80	4.42	24.39	30.70	4.46	24.25	28.60	3.26
20:00	25.48	29.50	4.54	24.38	30.40	4.38	24.21	28.50	4.50
20:30	25.46	29.20	4.60	24.45	30.20	3.87	24.12	28.20	4.51
21:00	25.43	29.10	4.41	24.50	29.90	4.35	24.10	27.60	4.27
21:30	25.45	28.90	4.36	24.54	29.60	4.46	24.12	26.90	4.18
22:00	25.46	28.70	4.49	24.54	29.50	4.34	24.21	26.50	4.35
22:30	25.47	28.60	4.53	24.56	29.40	4.29	24.29	26.00	4.54
23:00	25.42	28.40	4.26	24.54	29.20	4.39	24.38	25.30	4.40
23:30	25.37	28.40	4.08	24.51	29.10	4.39	24.45	24.90	4.54

Willis Wharf, 1992.

	June 13			June 14			June 15		
Hour	Temp.	Salinity	D.O.	Temp.	Salinity	D.O.	Temp.	Salinity	D.O.
00:00	24.48	23.40	4.74	24.76	28.90	4.10	24.32	29.50	4.10
00:30	24.48	22.00	4.70	24.89	28.80	4.51	24.41	29.30	4.07
01:00	24.40	19.70	4.44	24.95	28.60	4.43	24.50	29.10	4.10
01:30	19.96	0.10	5.09	24.94	28.50	4.36	24.58	29.00	4.27
02:00	19.19	9.90	3.63	21.75	0.10	5.34	24.55	28.90	4.04
02:30	23.82	9.10	3.86	20.13	0.10	8.77	24.48	28.90	3.96
03:00	24.09	9.00	4.15	19.37	0.10	3.73	20.94	0.10	4.12
03:30	24.03	9.10	4.27	24.24	9.00	3.49	21.59	9.50	2.63
04:00	24.01	9.10	3.85	24.42	9.00	3.83	23.97	9.10	3.14
04:30	23.93	9.10	4.26	24.47	9.00	4.04	24.23	9.10	3.65
05:00	23.90	9.20	3.81	24.45	9.00	3.68	24.17	9.20	3.52
05:30	23.86	9.40	4.24	24.32	9.10	3.95	24.19	9.20	3.70
06:00	23.84	9.40	4.01	24.21	9.20	3.99	24.12	9.20	3.80
06:30	23.82	9.40	3.87	24.14	9.30	4.14	24.10	9.30	3.93
07:00	23.81	9.60	3.58	24.10	9.40	4.24	24.08	9.40	3.88
07:30	23.81	9.50	3.94	24.06	9.50	4.01	24.05	9.50	3.47
08:00	23.86	9.60	3.46	24.06	9.50	3.93	24.04	9.50	4.03
08:30	23.95	9.60	4.50	24.08	9.50	3.45	24.03	9.60	3.34
09:00	24.05	9.50	4.66	24.10	9.50	3.55	24.04	9.60	2.58
09:30	24.19	9.40	4.84	24.21	9.50	4.83	24.20	9.60	3.49
10:00	24.36	9.40	4.86	24.30	9.40	4.93	24.32	9.60	4.17
10:30	24.54	9.50	4.80	24.43	9.40	4.86	24.72	9.60	4.66
11:00	24.72	9.30	5.03	24.58	9.30	4.75	24.93	9.50	4.86
11:30	25.00	9.20	5.18	24.82	9.30	4.79	25.18	9.50	4.75
12:00	25.26	9.20	5.36	25.02	9.20	4.90	25.52	9.40	5.07
12:30	25.48	10.60	5.44	25.23	9.20	5.06	25.82	9.70	5.18
13:00	23.12	0.00	8.35	25.37	9.10	5.29	26.08	9.40	4.90
13:30	23.25	0.00	8.20	21.51	0.10	6.99	26.31	9.30	5.28
14:00	23.05	0.00	8.59	23.44	0.10	7.76	26.58	9.30	5.72
14:30	25.82	26.30	5.20	23.20	0.10	8.17	24.76	0.10	6.06
15:00	25.80	27.50	4.98	25.06	10.10	4.71	24.88	0.10	8.16
15:30	25.78	27.90	4.24	25.50	28.00	4.82	25.54	0.20	4.85
16:00	25.62	28.20	4.66	25.47	28.30	4.51	26.76	22.30	5.18
16:30	25.47	28.30	3.84	25.41	28.50	5.19	26.91	24.80	5.11
17:00	25.15	28.50	4.32	25.24	28.70	4.83	26.65	25.90	4.85
17:30	24.97	28.90	4.15	24.96	28.80	3.89	26.54	26.50	4.70
18:00	24.74	29.30	4.36	24.71	29.20	4.39	26.21	27.50	4.72
18:30	24.56	29.80	4.06	24.56	29.50	3.74	25.69	27.70	3.87
19:00	24.56	30.10	4.82	24.43	29.90	4.02	25.45	28.30	4.00
19:30	24.63	30.50	4.57	24.39	30.20	3.63	25.17	29.00	4.07
20:00	24.60	30.60	4.11	24.39	30.60	4.03	25.02	29.40	4.36
20:30	24.54	30.60	3.13	24.39	30.90	4.53	25.06	29.80	3.86
21:00	24.54	30.60	4.81	24.36	30.90	4.24	25.17	30.10	4.06
21:30	24.34	30.20	4.32	24.34	30.80	4.03	25.21	30.30	3.01
22:00	24.26	29.90	4.46	24.28	30.60	3.55	25.13	30.20	3.24
22:30	24.34	29.60	4.23	24.21	30.20	4.09	25.17	30.20	3.22
23:00	24.47	29.30	4.29	24.19	29.90	3.36	25.00	29.90	3.75
23:30	24.59	29.10	4.35	24.25	29.60	4.25	24.93	29.50	3.98

**Willis Wharf, 1992**

	June 16			June 17			June 18		
Hour	Temp.	Salinity	D.O.	Temp.	Salinity	D.O.	Temp.	Salinity	D.O.
00:00	25.04	29.10	3.77	24.35	30.40	3.75	24.20	29.71	5.80
00:30	25.15	28.90	3.90	24.22	30.20	3.63	24.20	29.56	5.72
01:00	25.31	28.60	4.03	24.14	29.90	3.97	24.12	29.05	5.73
01:30	25.45	28.40	3.99	24.15	29.80	3.89	24.08	28.62	5.77
02:00	25.59	28.20	3.91	24.19	29.60	4.16	24.20	28.54	5.80
02:30	25.67	28.10	4.04	24.10	29.60	4.67	24.20	27.82	5.92
03:00	25.68	27.60	3.62	23.95	29.40	4.36	24.08	27.75	5.96
03:30	25.61	27.00	3.39	23.81	29.40	4.22	23.99	27.82	5.88
04:00	25.50	27.80	2.78	23.64	29.40	4.02	23.70	28.04	5.69
04:30	25.30	28.10	3.20	23.39	29.50	2.69	23.65	27.89	5.51
05:00	25.37	28.20	2.92	23.38	29.50	1.03	23.65	27.89	5.32
05:30	25.21	28.60	3.10	23.45	29.60	1.93	23.65	28.04	4.94
06:00	25.11	28.80	3.03	23.59	29.70	2.65	23.65	28.47	5.02
06:30	24.95	29.10	3.16	23.45	29.70	2.55	23.65	28.91	5.15
07:00	24.82	29.20	3.40	23.50	29.80	3.11	23.61	29.12	5.29
07:30	24.74	29.50	3.26	23.68	29.90	3.09	23.65	29.34	5.37
08:00	24.71	29.70	3.12	23.83	30.00	4.10	23.65	29.49	5.46
08:30	24.71	30.00	3.19	23.93	30.10	3.46	23.78	29.56	5.46
09:00	24.72	30.20	3.79	23.97	30.20	2.65	23.95	29.71	5.48
09:30	24.78	30.20	3.31	24.01	30.40	2.76	23.99	29.85	5.49
10:00	24.78	30.30	2.93	24.01	30.50	2.45	24.03	30.29	5.45
10:30	24.80	30.20	3.28	24.20	30.50	2.54	24.03	30.44	5.40
11:00	24.96	30.20	4.07	24.22	30.40	2.44	24.25	30.36	5.48
11:30	25.09	30.00	4.08	24.47	30.40	3.31	24.37	30.29	5.48
12:00	25.22	29.70	4.51	24.74	30.20	4.49	24.71	30.07	5.85
12:30	25.41	29.50	4.55	25.02	30.10	4.45	25.17	29.85	6.20
13:00	25.63	29.30	4.76	25.09	29.90	5.41	25.43	29.85	6.61
13:30	25.84	29.20	5.23	25.26	29.80	5.34	25.77	29.78	6.90
14:00	25.99	29.00	5.36	25.41	29.70	4.87	25.98	29.63	7.15
14:30	26.16	28.90	5.72	25.56	29.60	5.17	26.27	29.42	7.38
15:00	26.29	28.80	5.21	25.72	29.60	5.34	26.40	29.20	7.44
15:30	26.36	28.60	5.35	25.82	29.40	5.39	26.57	28.83	7.43
16:00	26.38	28.60	5.10	25.77	17.00	6.48	26.69	28.83	7.70
16:30	26.11	28.40	4.32	26.23	17.18	8.19	26.78	28.83	7.70
17:00	26.23	28.80	5.06	25.89	19.80	7.77	26.61	28.76	7.31
17:30	26.14	29.00	5.43	25.81	21.97	7.83	26.44	28.62	6.94
18:00	26.03	29.10	4.31	25.72	23.52	7.89	26.31	29.12	7.01
18:30	25.84	29.30	4.97	25.77	25.88	7.77	26.23	29.20	7.14
19:00	25.45	29.40	4.42	25.64	26.52	7.75	26.15	29.49	7.16
19:30	25.28	29.60	3.02	25.39	27.17	7.35	26.10	29.78	7.11
20:00	25.15	29.90	3.06	25.05	27.39	6.63	25.81	29.71	6.97
20:30	25.08	30.30	3.56	24.88	28.25	6.43	25.34	29.93	6.48
21:00	25.02	30.60	3.11	24.71	28.91	6.12	25.09	30.07	6.29
21:30	24.98	30.90	3.00	24.58	29.42	6.02	24.84	30.44	6.17
22:00	24.87	31.00	2.54	24.46	29.78	5.94	24.67	30.66	6.01
22:30	24.76	31.00	2.45	24.37	30.14	5.84	24.58	30.88	5.91
23:00	24.74	30.90	2.61	24.33	30.07	5.85	24.46	31.09	5.88
23:30	24.54	30.70	4.15	24.29	30.36	5.79	24.37	31.17	5.79



**Willis Wharf, 1992**

Hour	June 19			June 20			June 21		
	Temp.	Salinity	D.O.	Temp.	Salinity	D.O.	Temp.	Salinity	D.O.
00:00	24.37	31.17	5.77	24.20	31.75	5.46	25.13	31.75	5.22
00:30	24.33	30.95	5.76	24.20	31.75	5.42	25.01	31.90	5.17
01:00	24.29	30.80	5.80	24.20	31.46	5.47	24.88	31.98	4.92
01:30	24.29	30.51	5.78	24.20	31.31	5.32	24.88	31.83	5.12
02:00	24.33	30.36	5.76	24.20	31.17	5.32	24.88	31.53	5.13
02:30	24.41	30.29	5.71	24.29	30.95	5.25	24.88	31.53	5.06
03:00	24.54	30.22	5.71	24.33	30.80	5.25	24.88	31.24	5.00
03:30	24.54	30.22	5.71	24.33	30.80	5.18	24.88	31.24	4.96
04:00	24.41	30.00	5.61	24.33	30.80	5.10	25.01	31.17	4.94
04:30	24.37	30.14	5.42	24.29	30.80	4.96	25.01	31.02	4.91
05:00	24.37	30.00	5.27	24.25	30.66	4.76	24.88	30.95	4.81
05:30	24.33	30.07	5.10	24.20	30.58	4.60	24.79	31.02	4.69
06:00	24.29	30.07	4.80	24.16	30.58	4.28	24.67	30.95	4.48
06:30	24.20	30.14	4.74	24.16	30.58	3.92	24.58	30.88	4.27
07:00	24.20	30.29	4.96	24.12	30.66	4.19	24.54	31.02	4.06
07:30	24.16	30.29	4.97	24.20	30.88	4.29	24.58	31.02	4.28
08:00	24.20	30.29	5.11	24.20	30.73	4.54	24.46	31.09	4.27
08:30	24.20	30.44	5.17	24.25	30.66	4.70	24.33	31.24	4.29
09:00	24.20	30.44	5.25	24.29	30.80	4.76	24.37	31.02	4.56
09:30	24.20	30.58	5.37	24.33	30.95	4.87	24.33	31.24	4.70
10:00	24.16	30.88	5.37	24.37	31.02	5.01	24.33	31.24	4.76
10:30	24.12	30.95	5.37	24.33	31.39	5.07	24.33	31.24	4.86
11:00	24.08	31.24	5.31	24.33	31.53	5.07	24.29	31.24	4.83
11:30	24.08	31.24	5.20	24.33	31.68	5.00	24.20	31.61	4.93
12:00	24.12	31.24	5.22	24.33	31.68	4.97	24.20	31.46	4.93
12:30	24.20	31.17	5.44	24.37	31.61	4.93	24.20	31.75	4.90
13:00	24.41	31.02	5.60	25.01	31.61	4.87	24.12	31.53	4.76
13:30	24.54	30.80	5.78	25.01	31.61	5.11	23.95	31.46	4.85
14:00	24.79	30.58	5.93	25.43	31.39	5.47	23.91	31.39	4.99
14:30	24.88	30.66	6.00	25.85	31.24	5.69	23.91	31.24	4.98
15:00	25.17	30.29	6.19	26.19	31.02	5.75	23.65	30.80	5.02
15:30	25.34	30.51	6.30	26.48	31.09	5.92	23.65	30.51	5.05
16:00	25.43	30.58	6.42	26.69	30.95	6.05	23.57	30.58	5.06
16:30	25.55	30.44	6.47	26.86	30.95	6.18	23.48	30.51	5.03
17:00	25.60	30.44	6.48	26.99	30.88	6.24	23.40	30.44	5.04
17:30	25.60	30.29	6.31	27.08	30.80	6.29	23.32	30.36	4.97
18:00	25.60	30.44	6.06	27.08	30.80	6.27	23.23	30.22	4.89
18:30	25.43	30.29	5.95	27.08	30.66	6.11	23.15	30.14	4.86
19:00	25.43	30.44	5.96	26.82	30.95	5.53	23.06	30.07	4.77
19:30	25.39	30.58	6.14	26.74	30.88	5.80	23.02	30.07	4.38
20:00	25.30	30.66	6.18	26.82	30.80	5.96	23.02	30.07	4.45
20:30	25.17	30.58	5.98	26.74	30.88	5.97	23.06	30.07	4.45
21:00	24.88	30.66	5.87	26.57	30.88	5.91	23.06	30.07	4.56
21:30	24.71	30.80	5.73	26.06	30.95	5.69	23.10	30.22	4.55
22:00	24.58	31.17	5.70	25.72	31.02	5.52	23.15	30.29	4.78
22:30	24.46	31.24	5.60	25.51	31.09	5.38	23.23	30.51	4.76
23:00	24.41	31.46	5.57	25.34	31.31	5.34	23.27	30.51	4.73
23:30	24.29	31.68	5.56	25.22	31.53	5.27	23.32	30.80	4.77

Willis Wharf, 1992.

	June 22			June 23			June 24		
Hour	Temp.	Salinity	D.O.	Temp.	Salinity	D.O.	Temp.	Salinity	D.O.
00:00	23.27	30.95	4.74	22.94	30.44	5.37	23.27	30.07	5.59
00:30	23.32	31.09	4.76	22.89	30.51	5.28	23.27	30.07	5.49
01:00	23.27	31.09	4.57	22.94	30.73	5.24	23.10	30.22	5.38
01:30	23.23	31.17	4.68	22.89	30.80	5.16	23.02	30.07	5.37
02:00	23.15	31.17	4.41	22.85	30.80	5.14	22.98	30.29	5.29
02:30	23.06	30.95	4.42	22.72	30.95	5.03	22.98	30.14	5.19
03:00	22.89	30.80	4.45	22.68	30.66	5.00	22.94	30.14	5.00
03:30	22.26	30.51	4.79	22.47	30.66	5.12	22.85	30.22	4.99
04:00	21.88	30.29	4.53	22.30	30.29	5.13	22.77	30.29	5.23
04:30	21.58	30.07	4.57	22.09	30.29	5.14	22.72	30.00	5.27
05:00	21.12	30.44	4.63	21.84	30.07	5.13	22.64	29.93	5.24
05:30	20.74	30.36	4.70	21.63	30.07	5.06	22.51	29.85	5.26
06:00	20.44	30.44	4.68	21.37	29.93	5.02	22.47	29.78	5.15
06:30	19.94	30.88	4.58	21.16	30.07	4.78	22.30	29.42	5.06
07:00	19.89	30.88	4.62	21.12	30.14	4.66	22.13	29.56	4.96
07:30	19.89	30.88	4.28	20.99	29.93	4.66	22.05	29.56	4.61
08:00	20.65	30.80	4.38	20.99	29.93	4.66	22.01	29.49	4.89
08:30	20.74	30.58	4.35	20.99	29.93	4.30	22.05	29.42	4.58
09:00	20.65	30.44	4.41	21.33	29.93	4.29	22.01	29.49	4.56
09:30	20.65	30.44	4.71	21.42	29.93	4.57	22.26	29.56	4.48
10:00	20.74	30.58	4.69	21.54	29.78	4.62	22.22	29.49	4.51
10:30	20.95	30.73	5.01	21.71	30.00	4.91	22.18	29.49	4.54
11:00	21.37	30.73	5.11	21.96	29.93	4.95	22.30	29.42	4.58
11:30	22.01	30.66	5.06	22.30	30.00	4.99	22.43	29.63	4.92
12:00	22.39	30.73	5.01	22.60	30.07	5.02	22.68	29.78	5.02
12:30	22.43	30.80	5.00	22.72	30.14	5.07	22.85	29.78	5.19
13:00	22.68	30.95	4.99	22.85	30.36	5.07	22.94	30.00	5.22
13:30	22.68	31.24	5.00	22.85	30.66	4.97	23.02	30.07	5.42
14:00	22.77	31.17	4.90	22.89	30.80	4.85	23.10	30.07	5.31
14:30	22.94	31.02	5.10	22.94	30.73	4.81	23.06	30.36	5.34
15:00	23.10	31.09	5.21	22.98	30.73	5.02	23.02	30.58	5.34
15:30	23.36	30.73	5.44	23.19	30.58	5.26	23.10	30.51	5.35
16:00	23.27	30.66	5.64	23.32	30.51	5.34	23.15	30.44	5.27
16:30	23.10	30.51	5.79	23.65	30.36	5.62	23.32	30.51	5.45
17:00	22.98	30.14	5.89	23.70	30.51	5.86	23.53	30.36	5.66
17:30	22.89	30.22	5.95	23.86	30.36	5.91	23.70	30.36	5.77
18:00	22.89	30.07	6.00	23.65	30.22	5.92	24.03	30.14	5.87
18:30	22.81	29.93	5.95	23.65	29.93	5.95	24.08	29.78	5.87
19:00	22.81	29.78	5.74	23.70	29.93	5.88	24.03	29.85	5.76
19:30	22.77	29.85	5.42	23.61	30.00	5.89	24.03	29.71	5.63
20:00	22.72	29.85	5.23	23.57	29.85	5.90	24.03	29.71	5.49
20:30	22.72	30.00	5.08	23.53	29.71	5.91	23.95	29.56	5.35
21:00	22.72	29.85	5.44	23.48	29.78	5.66	23.95	29.42	5.28
21:30	22.72	30.00	5.68	23.44	29.78	5.55	23.99	29.42	5.23
22:00	22.72	30.07	5.72	23.27	29.78	5.46	23.91	29.49	5.07
22:30	22.85	30.14	5.73	23.27	29.93	5.48	23.70	29.49	4.69
23:00	22.77	30.14	5.52	23.27	30.07	5.47	23.65	29.49	4.95
23:30	22.94	30.14	5.49	23.27	30.07	5.64	23.65	29.49	5.04

**Willis Wharf, 1992.**

	June 28			June 29		
Hour	Temp.	Salinity	D.O.	Temp.	Salinity	D.O.
00:00	25.13	28.62	3.54	25.60	29.05	3.89
00:30	25.09	28.69	3.32	25.77	28.91	3.70
01:00	24.88	28.83	2.93	25.77	28.91	3.37
01:30	24.63	28.83	3.31	25.77	28.76	3.06
02:00	24.79	28.69	3.32	25.47	28.98	2.57
02:30	24.58	28.83	3.50	25.39	29.05	3.00
03:00	24.46	28.98	3.61	25.43	28.83	2.84
03:30	24.16	28.98	3.74	25.22	29.12	3.13
04:00	23.82	29.12	3.73	25.09	29.12	3.45
04:30	23.74	29.42	4.01	24.79	29.12	3.45
05:00	23.70	29.49	3.99	24.46	29.27	3.67
05:30	23.65	29.49	3.99	24.37	29.42	3.71
06:00	23.70	29.49	3.95	24.25	29.42	3.91
06:30	23.70	29.49	3.71	24.25	29.56	3.83
07:00	23.70	29.49	3.80	24.25	29.56	3.61
07:30	23.70	29.63	3.82	24.29	29.63	3.51
08:00	23.70	29.49	3.86	24.33	29.78	3.03
08:30	23.65	29.49	4.06	24.41	29.71	3.70
09:00	23.74	29.42	4.03	24.54	29.63	4.11
09:30	24.12	29.20	3.97	24.79	29.42	4.19
10:00	24.41	29.12	3.88	25.05	29.42	4.16
10:30	24.71	28.91	3.74	25.39	29.20	4.06
11:00	25.09	28.83	3.66	25.72	29.05	3.90
11:30	25.39	28.76	3.58	26.06	28.98	3.71
12:00	25.68	28.69	3.57	26.44	28.91	3.69
12:30	25.98	28.76	3.44	26.74	28.83	3.92
13:00	26.53	28.83	3.51	26.99	28.69	3.90
13:30	26.15	28.69	3.81	26.99	28.76	4.06
14:00	26.19	28.91	4.00	27.03	28.62	3.92
14:30	25.81	28.91	4.04	27.03	28.91	4.25
15:00	25.47	28.98	4.19			
15:30	25.05	29.27	4.30			
16:00	24.84	29.42	4.41			
16:30	24.67	29.42	4.39			
17:00	24.54	29.49	4.65			
17:30	24.46	29.63	4.41			
18:00	24.50	29.63	4.67			
18:30	24.58	30.00	4.76			
19:00	24.63	30.00	4.74			
19:30	24.63	30.29	4.42			
20:00	24.58	30.00	4.38			
20:30	24.50	29.93	4.44			
21:00	24.54	29.63	4.44			
21:30	24.54	29.63	4.44			
22:00	24.71	29.49	4.45			
22:30	24.88	29.34	4.25			
23:00	25.09	29.20	4.16			
23:30	25.30	29.12	4.10			

## APPENDIX 2

Tables of water temperature (degree C), salinity (parts per thousand), and dissolved oxygen concentration (mg/L) at the Quinby Bridge site (unedited\*).

- \* Data prior to deployment and after the DataSonde had been removed from the water have been eliminated; otherwise the data are unedited. Blank spaces represent periods when no measurements were made.

Quinby Bridge, 1992.

	May 29			May 30			May 31		
Hour	Temp.	Salinity	D.O.	Temp.	Salinity	D.O.	Temp.	Salinity	D.O.
00:00				19.51	29.20	6.23	18.08	30.14	5.62
00:30				19.43	28.76	6.18	17.99	29.85	5.51
01:00				19.39	28.83	6.09	17.91	29.42	5.38
01:30				19.35	28.54	6.03	17.87	29.12	5.25
02:00				19.26	28.76	5.93	17.78	28.69	5.28
02:30				19.18	28.83	5.96	17.82	28.47	5.15
03:00				18.92	29.12	5.91	17.78	28.33	5.16
03:30				18.88	29.49	5.86	17.82	29.12	5.21
04:00				19.01	29.93	5.88	17.78	29.20	5.26
04:30				19.05	30.22	5.93	17.87	29.12	5.34
05:00				18.92	30.44	5.90	17.87	29.78	5.43
05:30				18.84	30.73	5.90	17.87	29.93	5.52
06:00				18.75	30.80	5.89	17.87	30.14	5.63
06:30				18.71	30.95	5.89	17.87	30.29	5.70
07:00				18.71	30.95	5.86	17.91	30.58	5.73
07:30				18.63	31.17	5.76	17.91	30.58	5.84
08:00				18.63	31.17	5.76	17.91	30.58	5.84
08:30				18.63	31.17	5.63	17.91	30.58	5.82
09:00				18.63	31.02	5.61	17.99	30.88	5.77
09:30				18.59	30.73	5.68	17.95	30.73	5.80
10:00				18.54	30.44	5.80	17.99	30.51	5.83
10:30				18.54	30.29	5.96	17.99	30.00	5.82
11:00				18.46	30.14	6.09	17.99	29.49	5.84
11:30				18.46	29.85	6.26	18.12	29.05	5.94
12:00				18.42	29.34	6.41	18.50	28.33	6.04
12:30				18.37	29.20	6.61	18.88	27.24	6.17
13:00				18.42	28.91	6.51	19.22	26.67	6.25
13:30				18.46	28.83	6.48	19.47	26.38	6.24
14:00				18.37	28.40	6.75	20.19	26.02	6.21
14:30				18.37	28.25	6.62	20.78	24.73	6.62
15:00				18.42	28.69	6.52	21.03	25.52	6.84
15:30	21.25	28.33	7.09	18.46	29.20	6.49	20.57	26.59	6.36
16:00	20.87	29.20	7.50	18.50	30.14	6.24	20.78	26.59	6.87
16:30	20.78	29.93	7.46	18.50	30.29	6.18	20.61	27.03	6.74
17:00	20.61	30.36	7.37	18.46	30.51	6.23	20.27	28.18	6.55
17:30	20.44	30.44	7.23	18.46	30.66	6.17	20.32	28.83	6.64
18:00	20.36	30.66	7.11	18.42	30.88	6.17	20.27	29.12	6.66
18:30	20.23	30.80	6.98	18.42	31.02	6.14	20.15	29.56	6.61
19:00	20.15	30.88	6.77	18.42	31.02	6.09	20.02	29.78	6.56
19:30	19.85	30.88	6.54	18.33	31.24	6.04	19.94	30.22	6.48
20:00	19.60	30.95	6.23	18.33	31.24	5.96	19.77	30.29	6.40
20:30	19.68	30.88	6.19	18.29	31.46	5.89	19.64	30.44	6.32
21:00	19.73	30.66	6.22	18.29	31.61	5.74	19.56	30.51	6.20
21:30	19.81	30.44	6.24	18.29	31.46	5.60	19.13	30.95	6.08
22:00	19.81	30.29	6.45	18.29	31.31	5.67	19.18	30.95	5.90
22:30	19.77	30.00	6.41	18.25	31.02	5.67	19.26	30.73	5.78
23:00	19.73	29.71	6.43	18.20	30.88	5.68	19.35	30.51	5.80
23:30	19.64	29.42	6.33	18.16	30.58	5.65	19.43	30.22	5.67

Quinby Bridge, 1992.

Hour	June 1			June 2			June 3		
	Temp.	Salinity	D.O.	Temp.	Salinity	D.O.	Temp.	Salinity	D.O.
00:00	19.56	29.85	5.62	20.65	30.14	5.84	20.57	30.66	5.44
00:30	19.68	29.27	5.54	20.74	30.07	5.73	20.57	30.51	5.42
01:00	19.77	28.69	5.37	20.82	29.42	5.69	20.57	30.36	5.38
01:30	19.81	27.53	5.20	20.87	29.20	5.54	20.53	29.93	5.32
02:00	19.77	26.67	5.02	20.82	28.47	5.30	20.44	29.49	5.24
02:30	19.68	26.38	4.98	20.74	28.04	5.05	20.36	29.12	5.15
03:00	19.56	25.95	4.89	20.61	27.17	4.79	20.15	28.76	4.96
03:30	19.47	25.59	4.75	20.49	26.31	4.63	19.89	28.47	4.70
04:00	19.47	25.73	4.77	20.44	26.02	4.64	19.60	27.68	4.47
04:30	19.47	26.52	4.91	20.36	25.45	4.67	19.43	27.03	4.40
05:00	19.35	26.74	4.84	20.32	26.45	4.62	19.51	26.67	4.40
05:30	19.39	27.24	4.79	20.15	27.03	4.45	19.47	26.16	4.45
06:00	19.30	28.40	4.95	20.32	27.39	4.52	19.39	27.24	4.40
06:30	19.22	28.98	5.05	20.40	28.40	4.68	19.39	27.68	4.33
07:00	19.13	29.20	5.13	20.32	28.98	4.80	19.56	27.75	4.37
07:30	19.13	29.49	5.20	20.23	29.34	4.88	19.89	28.62	4.49
08:00	19.18	29.63	5.26	20.19	29.56	5.00	20.11	29.12	4.62
08:30	19.22	29.78	5.33	20.23	29.63	5.07	20.19	29.56	4.70
09:00	19.26	29.71	5.30	20.19	29.85	5.12	20.40	29.56	4.85
09:30	19.26	30.36	5.48	20.23	30.00	5.16	20.61	29.71	4.99
10:00	19.35	30.14	5.41	20.27	30.07	5.15	20.74	29.93	5.09
10:30	19.56	30.00	5.51	20.27	30.58	5.16	20.95	29.93	5.16
11:00	19.94	29.71	5.68	20.32	30.07	5.17	21.03	30.00	5.10
11:30	20.53	29.27	5.89	20.40	30.00	5.11	20.99	30.36	5.09
12:00	21.12	29.05	6.44	20.57	29.71	5.22	21.20	30.22	5.04
12:30	21.75	28.25	6.87	20.74	29.27	5.39	21.63	30.07	5.19
13:00	22.22	27.53	7.37	21.08	29.05	5.68	22.01	29.78	5.43
13:30	22.56	26.38	7.59	21.54	28.40	6.15	22.51	29.56	5.88
14:00	22.56	25.95	7.45	21.92	28.04	6.59	23.19	29.12	6.62
14:30	22.98	25.52	7.57	22.30	27.46	7.03	23.86	28.62	7.30
15:00	22.94	24.80	7.59	22.47	27.17	7.48	24.58	28.33	7.85
15:30	23.02	24.30	7.48	22.56	26.52	7.50	25.09	27.82	8.45
16:00	22.94	25.37	7.20	22.72	26.45	7.53	25.05	27.39	8.33
16:30	23.32	26.52	7.34	22.81	24.73	7.67	24.88	27.10	8.27
17:00	23.02	26.52	7.35	22.68	26.02	7.54	24.41	26.09	7.87
17:30	22.64	27.68	7.11	22.68	26.88	7.38	24.37	24.95	8.12
18:00	22.34	28.62	7.04	22.30	27.46	7.09	24.46	27.53	7.57
18:30	22.09	28.83	6.98	21.88	28.47	6.72	24.16	27.24	7.51
19:00	21.88	29.27	6.91	21.71	28.76	6.60	23.91	28.04	7.23
19:30	21.58	29.63	6.81	21.50	29.34	6.56	23.44	28.76	6.92
20:00	21.33	29.78	6.62	21.33	29.49	6.44	23.19	29.27	6.71
20:30	21.16	30.07	6.55	21.16	29.93	6.23	22.81	29.49	6.52
21:00	20.95	30.22	6.40	21.08	30.00	6.07	22.60	29.63	6.29
21:30	20.82	30.36	6.30	20.91	30.29	5.96	22.34	30.00	6.11
22:00	20.74	30.58	6.15	20.78	30.36	5.89	22.18	30.14	6.01
22:30	20.40	30.95	6.07	20.70	30.44	5.77	22.05	30.22	5.89
23:00	20.49	30.73	5.94	20.61	30.66	5.61	21.92	30.29	5.76
23:30	20.53	30.36	5.90	20.53	30.88	5.51	21.84	30.51	5.65

### Quinby Bridge, 1992.

	June 4			June 5			June 6		
Hour	Temp.	Salinity	D.O.	Temp.	Salinity	D.O.	Temp.	Salinity	D.O.
00:00	21.71	30.80	5.48	21.25	30.51	4.98	22.09	28.33	4.91
00:30	21.75	30.73	5.36	21.20	30.66	4.89	22.05	28.69	4.91
01:00	21.71	30.58	5.25	21.20	31.17	4.90	22.01	28.54	4.94
01:30	21.71	30.44	5.21	21.20	30.80	4.78	22.05	29.42	4.76
02:00	21.71	30.29	5.14	21.16	30.73	4.62	22.01	29.78	4.88
02:30	21.63	29.93	5.21	21.16	30.58	4.55	22.01	29.49	4.72
03:00	21.54	29.63	5.09	21.12	30.29	4.45	21.92	28.62	4.61
03:30	21.42	29.27	4.90	20.99	30.07	4.53	21.88	28.18	4.53
04:00	21.20	28.83	4.65	20.87	29.71	4.44	21.80	27.46	4.34
04:30	20.99	28.47	4.43	20.70	29.34	4.45	21.67	26.02	4.17
05:00	20.70	27.75	4.21	20.53	28.98	4.30	21.54	24.30	4.07
05:30	20.78	27.39	4.11	20.36	28.62	4.18	21.33	22.32	3.95
06:00	20.78	27.10	4.25	20.27	28.18	4.12	21.20	20.99	3.86
06:30	20.74	27.10	4.28	20.32	27.82	4.15	21.12	20.15	3.79
07:00	20.74	27.89	4.15	20.11	26.59	4.41	21.12	19.38	3.82
07:30	20.95	28.04	4.35	20.02	25.52	4.66	21.12	18.97	3.94
08:00	21.12	28.54	4.39	20.15	27.17	4.28	21.16	17.73	3.70
08:30	21.37	29.27	4.53	19.98	24.95	4.89	21.37	19.11	3.76
09:00	21.42	29.56	4.65	20.27	27.75	4.87	21.96	20.50	3.80
09:30	21.54	29.78	4.84	20.40	28.11	4.81	21.96	21.83	3.84
10:00	21.63	29.93	5.02	20.40	28.11	4.97	22.39	23.52	3.93
10:30	21.67	30.14	5.15	20.53	28.33	5.04	22.81	24.87	4.28
11:00	21.67	30.14	5.20	20.70	28.69	5.11	23.10	25.59	4.52
11:30	21.63	30.36	5.20	20.87	28.76	5.14	23.23	26.23	4.65
12:00	21.67	30.36	5.10	21.08	29.05	5.12	23.48	26.67	4.77
12:30	21.58	30.58	4.89	21.20	29.12	5.05	23.57	27.39	4.91
13:00	21.63	30.36	4.79	21.33	30.14	4.81	23.70	27.75	4.98
13:30	21.71	30.14	4.81	21.33	29.78	4.79	23.70	28.18	4.98
14:00	21.80	30.07	4.80	21.71	29.56	4.88	23.48	28.62	4.86
14:30	21.92	29.71	4.97	22.01	28.98	4.99	23.61	28.69	4.75
15:00	22.01	29.49	5.34	22.43	28.25	5.01	23.99	27.82	4.86
15:30	22.09	29.12	5.63	22.72	27.46	5.06	24.37	27.46	4.94
16:00	22.18	28.76	5.87	23.10	25.59	5.36	24.88	26.52	4.98
16:30	22.22	28.25	6.21	22.98	24.95	5.35	25.30	25.73	4.93
17:00	22.22	27.96	6.22	23.02	23.74	5.23	25.77	24.59	4.78
17:30	22.09	27.89	5.93	23.06	22.53	5.24	26.06	23.17	5.03
18:00	22.01	27.68	5.84	22.98	21.27	5.24	26.31	21.97	5.03
18:30	21.80	26.88	5.85	22.94	20.15	5.06	26.31	20.78	4.99
19:00	21.92	28.18	5.64	22.85	17.93	5.11	26.02	19.80	4.84
19:30	21.80	28.11	5.51	22.72	17.66	4.91	25.85	18.69	4.59
20:00	21.80	28.69	5.40	22.56	19.18	4.92	25.64	17.45	4.45
20:30	21.71	29.34	5.20	22.68	20.57	4.86	25.47	16.16	4.38
21:00	21.58	29.63	5.16	22.77	22.67	4.91	25.47	18.97	4.36
21:30	21.54	29.78	5.13	22.60	24.45	4.91	25.47	19.66	4.41
22:00	21.46	30.00	5.06	22.39	25.73	4.82	25.60	22.32	4.60
22:30	21.37	30.22	5.02	22.26	26.59	4.87	25.17	23.81	4.54
23:00	21.33	30.44	4.98	22.18	27.24	4.88	24.96	24.95	4.48
23:30	21.29	30.44	5.00	22.13	27.89	4.89	24.79	25.45	4.54

### Quinby Bridge, 1992.

	June 7			June 8			June 9		
Hour	Temp.	Salinity	D.O.	Temp.	Salinity	D.O.	Temp.	Salinity	D.O.
00:00	24.63	25.80	4.58	26.31	24.16	4.11	28.05	22.32	3.73
00:30	24.46	26.23	4.52	26.15	24.95	4.13	27.96	23.52	3.89
01:00	24.33	26.74	4.48	26.02	25.30	4.14	27.75	24.02	3.99
01:30	24.25	27.10	4.46	25.89	25.52	4.15	27.54	24.80	3.93
02:00	24.16	27.82	4.38	25.77	25.88	4.15	27.41	25.16	3.96
02:30	24.03	28.25	4.46	25.64	26.38	4.06	27.29	25.52	4.01
03:00	24.03	28.25	4.28	25.60	26.67	4.00	27.20	25.80	3.99
03:30	24.16	26.67	4.25	25.51	27.10	4.00	27.08	25.88	3.92
04:00	24.16	26.67	4.02	25.51	26.59	3.97	26.99	26.38	3.64
04:30	24.16	25.66	3.86	25.51	26.16	3.84	26.95	26.67	3.79
05:00	24.16	24.80	3.64	25.47	25.30	3.71	26.91	26.38	3.62
05:30	24.12	23.52	3.59	25.43	24.66	3.66	26.95	26.09	3.48
06:00	23.99	22.18	3.48	25.47	23.66	3.54	26.86	25.37	3.41
06:30	23.86	20.71	3.34	25.43	22.67	3.38	26.78	24.59	3.46
07:00	23.74	19.94	3.29	25.39	21.48	3.28	26.78	23.59	3.33
07:30	23.78	19.18	3.33	25.34	20.57	3.25	26.74	23.24	3.21
08:00	23.86	18.14	3.24	25.43	19.94	3.33	26.69	22.18	3.14
08:30	24.16	17.38	3.23	25.55	19.24	3.46	26.61	21.41	3.06
09:00	24.33	16.36	3.45	25.98	18.35	3.51	26.53	20.78	3.01
09:30	24.54	18.14	3.49	26.36	17.32	3.95	26.48	20.15	2.98
10:00	25.13	19.38	3.81	26.65	18.76	4.05	26.48	19.45	3.11
10:30	25.01	20.99	3.74	26.86	20.36	3.96	26.53	19.45	3.23
11:00	25.17	22.67	3.73	27.03	20.71	4.24	26.48	20.15	3.40
11:30	25.43	23.95	4.10	26.86	22.25	4.11	26.61	21.69	3.45
12:00	25.64	24.80	4.39	27.03	23.24	4.25	26.61	22.11	3.66
12:30	25.85	25.37	4.77	27.24	24.02	4.54	26.65	23.17	3.59
13:00	25.93	25.88	4.79	27.62	24.80	4.96	26.69	24.09	3.74
13:30	26.15	26.02	4.89	27.92	25.30	5.24	26.65	24.80	4.02
14:00	25.98	26.67	4.80	28.00	25.52	5.26	26.65	25.09	4.20
14:30	25.98	26.95	4.72	28.22	25.73	5.28	26.69	25.73	4.14
15:00	25.72	27.39	4.55	28.05	26.23	5.29	26.69	26.09	4.10
15:30	25.68	27.46	4.32	27.88	26.74	5.12	26.74	26.38	4.16
16:00	26.02	26.81	4.45	27.41	27.17	4.83	26.74	26.67	4.11
16:30	26.44	26.16	4.63	27.37	27.24	4.52	26.69	26.67	3.94
17:00	26.86	25.37	4.57	27.75	26.74	4.68	26.65	27.10	3.66
17:30	27.16	24.66	4.52	28.05	26.23	4.75	26.61	27.24	3.72
18:00	27.46	23.24	4.81	28.38	25.37	4.77	26.61	27.03	3.62
18:30	27.54	22.53	4.74	28.60	24.87	4.89	26.57	26.31	3.59
19:00	27.62	21.34	4.65	28.76	24.16	4.97	26.57	26.16	3.47
19:30	27.58	20.85	4.43	28.85	23.17	4.72	26.48	25.73	3.47
20:00	27.29	20.01	4.21	28.98	22.11	4.52	26.40	25.09	3.59
20:30	27.08	19.11	4.01	28.89	21.34	4.28	26.27	24.16	3.57
21:00	26.82	17.86	3.86	28.60	20.71	4.04	26.15	23.31	3.44
21:30	26.61	17.18	3.95	28.43	20.01	3.84	26.02	22.67	3.24
22:00	26.74	20.15	3.89	28.22	19.24	3.75	25.89	21.90	3.15
22:30	26.61	20.08	4.02	27.92	18.35	3.81	25.77	21.69	3.01
23:00	26.74	21.90	4.07	28.17	20.57	3.66	25.64	21.20	2.87
23:30	26.57	23.17	4.17	28.05	21.27	3.73	25.39	20.92	2.91



Quinby Bridge, 1992.

Hour	June 10			June 11			June 12		
	Temp.	Salinity	D.O.	Temp.	Salinity	D.O.	Temp.	Salinity	D.O.
00:00	25.55	21.97	2.98	24.98	22.70	2.35	24.41	24.60	3.04
00:30	25.39	22.74	2.98	24.81	22.40	2.76	24.21	24.20	2.84
01:00	25.39	23.31	2.99	24.87	22.90	2.96	24.09	23.90	2.21
01:30	25.51	24.16	3.21	24.61	23.70	3.00	24.00	23.70	3.06
02:00	25.47	24.66	3.30	24.54	24.00	3.15	24.02	24.00	2.94
02:30	25.34	25.37	3.32	24.76	24.40	3.37	23.82	24.70	2.94
03:00	25.39	25.66	3.36	24.72	25.00	3.43	23.82	24.80	3.00
03:30	25.30	25.88	3.34	24.65	25.50	3.50	24.04	25.30	3.09
04:00	25.26	26.31	3.33	24.55	25.70	3.31	24.10	25.80	3.26
04:30	25.26	26.45	3.31	24.48	25.90	3.38	24.04	26.10	3.24
05:00	25.26	27.03	3.07	24.44	26.20	3.40	24.02	26.30	3.29
05:30	25.34	27.24	3.19	24.46	26.40	3.07	23.90	26.50	3.29
06:00	25.17	26.74	3.11	24.41	26.40	2.79	23.93	26.70	3.12
06:30	25.01	26.16	2.92	24.54	27.00	2.75	23.94	26.80	3.10
07:00	24.88	25.95	2.91	24.50	26.80	3.15	23.93	26.90	2.86
07:30	24.67	25.37	3.11	24.43	26.40	2.83	24.04	27.20	3.02
08:00	24.63	24.66	3.16	24.33	26.10	2.52	24.06	27.20	2.52
08:30	24.71	24.38	3.16	24.30	25.80	2.44	24.03	26.90	2.89
09:00	24.84	23.45	3.24	24.33	25.30	2.47	24.04	26.60	2.85
09:30	24.88	22.60	3.39	24.44	25.00	3.13	24.13	26.20	2.79
10:00	25.09	22.32	3.67	24.68	24.40	3.29	24.28	25.90	3.25
10:30	25.30	21.97	3.89	24.87	23.90	3.05	24.48	25.60	3.51
11:00	25.51	21.41	4.05	25.07	23.30	3.39	24.79	25.10	3.32
11:30	25.89	20.85	4.28	25.39	23.10	3.24	25.05	24.70	3.69
12:00	26.23	20.92	4.62	25.72	22.70	3.64	25.35	24.50	3.68
12:30	26.19	22.46	4.26	26.04	22.00	4.40	25.70	24.30	3.93
13:00	26.40	23.31	4.74	26.07	22.50	4.36	26.08	23.90	4.55
13:30	26.15	24.23	4.59	26.17	23.50	4.43	26.70	22.90	4.91
14:00	26.31	24.95	4.66	26.27	23.90	4.53	26.74	23.70	5.26
14:30	26.36	25.80	4.89	25.98	24.50	4.30	26.83	24.60	5.03
15:00	26.23	24.80	5.50	26.02	25.10	4.63	26.74	24.70	5.32
15:30	26.29	25.40	4.53	26.13	25.50	4.83	26.15	25.40	4.90
16:00	26.29	25.80	4.38	26.17	25.80	4.85	26.30	25.90	5.32
16:30	26.29	26.20	4.46	26.04	26.10	4.71	26.32	26.20	5.39
17:00	26.27	26.40	4.46	25.92	26.40	4.56	26.15	26.40	4.94
17:30	26.19	26.60	4.10	25.85	26.80	4.58	26.02	26.60	4.99
18:00	26.08	26.90	3.71	25.78	26.90	4.50	25.95	27.00	4.86
18:30	25.89	27.40	3.70	25.63	27.10	4.35	25.85	27.20	4.56
19:00	25.91	27.20	3.33	25.54	27.20	3.59	25.65	27.30	4.45
19:30	25.89	26.70	3.65	25.25	28.00	3.26	25.48	27.40	4.04
20:00	25.85	26.40	3.63	25.29	27.80	3.52	25.39	27.60	3.50
20:30	25.80	26.10	2.96	25.27	27.40	3.67	25.16	28.10	3.34
21:00	25.67	25.60	3.28	25.27	27.10	3.69	25.16	27.60	3.65
21:30	25.57	25.20	3.31	25.22	26.90	3.13	25.14	27.60	3.39
22:00	25.55	24.60	3.77	25.11	26.50	3.29	25.14	27.30	3.58
22:30	25.44	24.00	3.48	25.03	26.10	3.17	25.05	27.00	2.97
23:00	25.26	23.40	3.18	24.89	25.40	3.48	24.94	26.60	3.63
23:30	25.07	22.80	3.00	24.68	25.10	3.05	24.83	26.30	3.10

Quinby Bridge, 1992.

	June 13			June 14			June 15		
Hour	Temp.	Salinity	D.O.	Temp.	Salinity	D.O.	Temp.	Salinity	D.O.
00:00	24.65	25.80	2.99	25.26	27.00	2.90	24.93	27.60	2.72
00:30	24.44	25.60	3.36	25.05	26.70	3.41	24.85	27.50	3.07
01:00	24.23	25.20	3.06	24.90	26.30	3.40	24.74	27.20	2.99
01:30	24.08	24.80	2.51	24.76	25.90	2.94	24.59	27.00	2.18
02:00	23.96	24.70	2.71	24.59	25.60	2.70	24.39	26.90	2.19
02:30	23.84	24.60	3.18	24.46	25.40	2.30	24.20	26.40	2.51
03:00	23.86	24.90	2.86	24.47	25.30	2.33	24.11	26.20	1.85
03:30	23.68	25.40	2.90	24.43	25.40	2.68	24.00	25.90	1.70
04:00	23.70	25.60	2.90	24.29	25.70	2.85	23.97	25.90	2.49
04:30	23.93	26.00	3.09	24.19	26.00	2.79	23.93	26.20	2.33
05:00	24.00	26.40	3.27	24.26	26.20	2.78	23.84	26.60	2.28
05:30	24.02	26.70	3.25	24.43	26.60	3.06	23.94	26.70	2.37
06:00	23.99	26.90	3.31	24.43	26.90	3.12	24.17	27.10	2.72
06:30	23.93	27.00	3.16	24.45	27.20	3.22	24.18	27.40	2.76
07:00	23.98	27.20	3.11	24.42	27.30	3.14	24.20	27.60	2.77
07:30	24.06	27.30	3.03	24.43	27.40	3.09	24.20	27.70	2.72
08:00	24.08	27.30	2.82	24.46	27.50	2.92	24.19	27.70	2.65
08:30	24.21	27.70	2.88	24.52	27.60	2.32	24.30	27.90	2.53
09:00	24.25	27.50	2.40	24.63	28.00	2.68	24.44	27.90	2.22
09:30	24.41	27.20	2.85	24.61	27.80	2.54	24.46	27.90	1.88
10:00	24.50	26.90	2.59	24.66	27.60	2.15	24.54	28.20	1.94
10:30	24.74	26.60	2.90	24.74	27.40	2.98	24.70	28.10	2.15
11:00	25.09	26.20	3.32	24.85	27.20	2.78	24.92	27.90	1.86
11:30	25.44	26.00	3.72	25.13	26.80	3.10	25.33	27.70	2.26
12:00	25.83	25.60	3.66	25.42	26.60	3.00	25.85	27.40	2.49
12:30	26.64	25.30	4.84	25.79	26.40	3.32	26.29	27.20	2.72
13:00	26.66	25.10	4.20	26.08	26.00	3.70	26.68	27.00	3.43
13:30	27.08	24.90	3.95	26.16	25.80	3.45	27.10	26.60	3.52
14:00	27.16	24.50	4.35	26.23	25.70	3.43	27.39	26.50	3.48
14:30	27.52	24.50	4.52	26.36	25.60	3.51	27.60	26.30	3.55
15:00	27.28	25.30	4.20	26.51	25.30	4.55	27.65	26.20	3.44
15:30	27.41	25.40	5.30	26.30	25.70	3.53	28.43	26.00	4.02
16:00	27.03	25.60	5.09	26.47	26.10	4.63	28.51	26.10	4.29
16:30	26.64	26.20	4.70	26.25	25.90	4.39	27.91	26.50	3.94
17:00	26.61	26.60	4.93	25.93	26.40	4.28	27.95	26.50	4.32
17:30	26.64	26.70	5.16	25.80	26.90	4.56	27.50	26.70	4.24
18:00	26.49	26.90	4.97	25.80	27.10	4.58	27.06	27.00	4.08
18:30	26.30	27.20	4.64	25.68	27.30	4.59	26.95	27.40	4.37
19:00	26.18	27.40	4.65	25.57	27.40	4.23	26.89	27.60	4.47
19:30	26.04	27.60	4.51	25.46	27.70	3.99	26.72	27.70	4.42
20:00	25.83	27.70	4.11	25.37	27.80	3.79	26.55	27.80	4.01
20:30	25.72	27.80	3.78	25.29	28.00	3.76	26.42	28.10	3.85
21:00	25.52	28.00	3.28	25.20	28.10	3.53	26.29	28.20	3.58
21:30	25.39	28.20	3.38	25.16	28.10	2.33	26.21	28.20	3.45
22:00	25.42	28.10	2.89	25.00	28.60	3.06	26.08	28.40	2.77
22:30	25.43	27.70	3.37	25.02	28.40	2.40	25.87	28.70	2.55
23:00	25.42	27.50	3.22	25.02	28.30	2.67	25.89	28.60	2.61
23:30	25.37	27.10	3.31	25.00	28.10	2.22	25.91	28.50	2.07

Quinby Bridge, 1992.

	June 16			June 17			June 18		
Hour	Temp.	Salinity	D.O.	Temp.	Salinity	D.O.	Temp.	Salinity	D.O.
00:00	25.93	28.30	2.38	24.89	29.00	2.44	24.63	8.34	6.26
00:30	25.94	28.10	2.70	24.74	28.90	2.75	24.58	8.21	6.14
01:00	25.89	27.90	2.49	24.50	28.50	2.68	24.46	8.09	6.14
01:30	25.8	27.70	2.44	24.28	28.50	2.68	24.33	8.02	6.16
02:00	25.67	27.50	2.39	23.93	28.40	2.76	24.12	8.02	6.17
02:30	25.5	27.20	2.25	23.68	28.30	3.12	23.91	7.96	6.06
03:00	25.35	26.90	2.24	23.21	28.00	2.84	23.70	7.90	5.82
03:30	25.26	26.80	1.87	22.95	27.70	2.37	23.44	7.96	5.67
04:00	25.14	26.50	1.92	22.68	27.50	2.51	23.27	7.83	5.50
04:30	25.03	26.50	1.97	22.63	27.40	2.37	23.19	7.83	5.35
05:00	24.98	26.70	2.20	22.56	27.30	2.59	23.19	7.77	5.23
05:30	24.68	27.10	2.38	22.43	27.30	2.61	23.10	7.77	5.27
06:00	24.62	27.20	2.53	22.42	27.50	2.65	23.06	7.77	5.34
06:30	24.9	27.40	2.74	22.27	27.80	2.69	22.94	7.77	5.27
07:00	24.92	27.60	2.77	22.43	27.80	2.99	22.85	7.83	5.17
07:30	24.9	27.90	3.01	22.92	28.10	3.16	22.94	7.90	5.36
08:00	24.88	28.10	3.03	23.10	28.30	3.20	23.19	7.96	5.51
08:30	24.89	28.10	2.95	23.15	28.40	3.22	23.40	8.09	5.62
09:00	24.98	28.30	2.94	23.35	28.50	3.29	23.53	8.53	5.72
09:30	25.06	28.50	2.97	23.45	28.60	3.42	23.65	9.10	5.90
10:00	25.11	28.60	2.42	23.60	28.60	3.07	23.86	9.80	6.06
10:30	25.09	28.60	2.39	23.80	28.60	2.98	24.08	10.64	6.09
11:00	25.2	28.50	2.71	23.77	28.60	2.89	24.20	11.81	6.07
11:30	25.16	28.50	2.72	24.19	28.80	2.51	24.29	12.27	5.98
12:00	25.24	28.30	2.94	24.24	28.60	2.68	24.46	11.88	5.76
12:30	25.31	28.10	2.96	24.49	28.50	2.95	24.63	10.45	6.02
13:00	25.44	27.90	3.04	24.78	28.30	3.62	24.96	9.42	6.29
13:30	25.61	27.80	3.19	25.11	28.10	3.39	25.47	8.72	6.68
14:00	25.95	27.50	3.70	25.46	28.00	3.50	25.89	8.40	7.17
14:30	26.3	27.30	3.84	25.80	27.80	3.94	26.31	8.34	7.42
15:00	26.57	27.10	3.98	26.13	27.50	3.83	26.74	8.27	7.67
15:30	26.7	27.00	3.53	27.03	7.65	8.52	26.99	8.09	7.93
16:00	26.74	26.80	3.70	26.91	7.46	8.00	27.12	8.09	7.85
16:30	26.84	26.80	4.24	26.82	7.46	8.38	27.37	8.02	8.20
17:00	26.66	26.90	4.40	26.74	7.46	8.33	27.29	8.02	8.01
17:30	26.49	27.20	4.49	26.48	7.52	8.04	27.16	8.09	7.76
18:00	26.29	27.40	4.94	26.53	7.65	8.63	27.03	8.09	7.69
18:30	26.08	27.50	4.61	26.15	7.58	8.33	26.99	8.09	8.23
19:00	25.87	27.80	4.66	25.93	7.58	8.00	26.57	8.15	7.94
19:30	25.67	28.10	4.63	25.64	7.77	7.56	26.15	8.27	7.28
20:00	25.54	28.20	4.06	25.43	7.83	7.37	26.10	8.59	7.43
20:30	25.4	28.30	4.31	25.22	7.96	7.33	25.72	9.03	7.10
21:00	25.26	28.50	4.16	25.05	7.90	7.17	25.47	10.77	6.81
21:30	25.13	28.60	3.87	24.92	8.02	7.05	25.30	13.60	6.63
22:00	25.03	28.70	3.79	24.79	8.02	6.92	25.17	15.75	6.46
22:30	24.94	28.80	3.39	24.71	8.15	6.76	25.09	16.77	6.34
23:00	24.92	28.90	3.09	24.58	8.34	6.63	25.01	18.14	6.23
23:30	24.96	29.00	3.08	24.54	8.34	6.47	24.92	18.76	6.12

Quinby Bridge, 1992.

	June 19			June 20			June 21		
Hour	Temp.	Salinity	D.O.	Temp.	Salinity	D.O.	Temp.	Salinity	D.O.
00:00	24.88	19.18	5.93	24.58	27.17	5.46	25.85	28.11	4.73
00:30	24.88	19.31	5.86	24.58	27.17	5.31	25.72	28.18	4.68
01:00	24.79	18.69	5.81	24.67	27.24	5.23	25.68	28.25	4.50
01:30	24.75	17.73	5.77	24.58	27.17	5.15	25.60	28.40	4.50
02:00	24.63	16.63	5.86	24.50	26.95	5.04	25.51	28.18	4.45
02:30	24.50	15.75	5.78	24.41	26.74	5.08	25.34	28.18	4.49
03:00	24.33	14.27	5.70	24.29	26.31	5.02	25.26	28.11	4.37
03:30	24.16	12.93	5.59	24.20	26.31	4.86	25.05	27.96	4.46
04:00	23.99	11.62	5.39	24.08	26.02	4.69	24.92	27.75	4.37
04:30	23.91	10.38	5.32	23.95	25.80	4.48	24.71	27.82	4.24
05:00	23.91	9.80	5.31	23.82	25.45	4.26	24.41	27.60	4.19
05:30	23.91	9.42	5.25	23.82	25.23	4.12	24.20	27.31	4.07
06:00	23.91	9.29	5.25	23.82	24.80	4.02	24.12	27.24	3.98
06:30	23.86	9.55	5.22	23.78	24.80	3.98	23.99	27.03	3.91
07:00	23.70	10.58	5.19	23.74	25.02	4.11	23.91	27.10	3.91
07:30	23.57	12.60	5.22	23.78	25.52	4.03	23.95	27.17	4.00
08:00	23.82	13.67	5.18	23.82	26.02	4.04	23.82	27.39	3.99
08:30	23.65	17.38	5.06	24.08	26.31	4.23	23.48	27.75	4.04
09:00	23.78	17.59	5.20	24.20	26.45	4.31	23.61	27.68	4.07
09:30	23.91	22.60	5.19	24.33	26.95	4.43	23.95	27.89	4.26
10:00	23.95	24.87	5.23	24.46	27.24	4.55	23.78	27.96	4.42
10:30	23.99	25.23	5.27	24.71	27.39	4.67	23.65	28.04	4.56
11:00	24.08	26.02	5.25	24.92	27.53	4.78	23.57	27.96	4.67
11:30	24.08	25.88	5.24	25.13	27.68	4.89	23.61	28.25	4.73
12:00	24.08	25.88	5.14	25.34	27.68	4.93	23.57	28.11	4.74
12:30	24.33	26.09	5.17	25.30	27.82	4.87	23.61	28.40	4.71
13:00	24.20	25.80	5.15	25.22	27.96	4.73	23.61	28.40	4.63
13:30	24.33	25.73	5.30	25.26	27.82	4.58	23.65	28.47	4.52
14:00	24.50	25.23	5.51	25.47	27.82	4.79	23.82	28.54	4.43
14:30	24.79	24.66	5.73	25.72	27.68	4.97	23.61	28.40	4.53
15:00	25.09	23.81	5.98	26.15	27.39	5.20	23.61	28.25	4.39
15:30	25.39	23.24	6.11	26.65	27.24	5.50	23.44	27.96	4.54
16:00	25.68	21.90	6.37	27.03	26.95	5.73	23.27	27.75	4.62
16:30	25.93	22.04	6.61	27.33	26.81	5.82	23.19	27.53	4.68
17:00	25.93	20.15	6.59	27.58	26.67	5.99	23.10	27.46	4.62
17:30	25.89	19.24	6.75	27.67	26.59	6.11	23.02	27.24	4.56
18:00	25.81	19.52	6.31	27.71	26.45	6.09	22.89	27.17	4.52
18:30	25.85	20.57	6.68	27.62	26.38	5.94	22.77	26.95	4.54
19:00	25.81	21.76	6.76	27.54	26.52	5.75	22.68	26.74	4.49
19:30	25.55	22.60	6.48	27.41	26.59	5.74	22.77	26.81	4.40
20:00	25.30	23.66	6.05	27.20	26.74	5.79	22.64	26.59	4.45
20:30	25.30	24.87	5.96	26.91	27.17	5.84	22.64	26.88	4.39
21:00	25.05	25.59	5.89	26.86	27.24	5.56	22.56	27.24	4.26
21:30	24.88	25.95	5.80	26.61	27.39	5.35	22.64	27.17	4.25
22:00	24.75	26.52	5.75	26.36	27.68	5.10	22.64	27.46	4.42
22:30	24.71	26.67	5.73	26.15	27.82	5.00	22.60	27.68	4.40
23:00	24.67	26.88	5.63	26.06	27.82	4.93	22.47	27.75	4.33
23:30	24.63	27.17	5.55	25.93	27.89	4.87	22.43	27.89	4.36

Quinby Bridge, 1992.

	June 22			June 23			June 24		
Hour	Temp.	Salinity	D.O.	Temp.	Salinity	D.O.	Temp.	Salinity	D.O.
00:00	22.43	28.04	4.41	21.88	28.11	5.74	22.68	28.18	6.00
00:30	22.34	28.11	4.42	21.75	28.18	5.61	22.51	28.54	5.99
01:00	22.30	28.11	4.29	21.71	28.25	5.50	22.39	28.47	5.86
01:30	22.34	28.25	4.21	21.71	28.40	5.42	22.30	28.54	5.74
02:00	22.30	28.25	4.24	21.75	28.47	5.28	22.22	28.62	5.60
02:30	22.18	28.18	4.41	21.71	28.54	5.18	22.18	28.62	5.45
03:00	21.92	28.11	4.42	21.80	28.47	5.17	22.13	28.69	5.20
03:30	21.84	28.18	4.19	21.67	28.40	5.08	22.18	28.62	5.19
04:00	21.67	28.11	4.26	21.46	28.40	5.10	22.18	28.62	5.22
04:30	21.33	27.89	4.36	21.25	28.11	5.07	22.13	28.54	5.23
05:00	20.74	27.75	4.36	20.91	28.04	5.02	22.05	28.62	5.31
05:30	19.81	27.46	4.44	20.70	27.89	4.92	21.92	28.40	5.34
06:00	19.39	27.31	4.30	20.36	27.68	4.91	21.67	28.25	5.20
06:30	19.35	26.88	4.43	20.23	27.60	4.79	21.54	28.04	5.03
07:00	19.35	26.88	4.38	20.23	27.31	4.80	21.54	28.04	4.96
07:30	19.51	26.74	4.47	20.23	27.17	4.75	21.58	27.75	5.01
08:00	19.56	26.88	4.57	20.32	27.10	4.72	21.67	27.82	5.00
08:30	19.39	26.88	4.65	20.36	27.10	4.76	21.75	27.46	4.97
09:00	19.35	26.88	4.71	20.44	27.03	4.81	21.75	27.46	5.02
09:30	19.35	27.03	4.70	20.78	27.39	5.29	21.75	27.60	5.13
10:00	19.43	27.24	5.36	21.12	27.60	5.40	21.80	27.89	5.14
10:30	20.02	27.46	5.46	21.75	27.75	6.12	21.84	28.18	5.62
11:00	20.61	27.82	5.36	21.63	27.75	5.74	21.84	28.04	5.70
11:30	20.74	28.04	5.50	21.96	27.89	5.53	21.96	27.89	5.48
12:00	21.03	28.11	5.66	22.43	28.18	5.68	22.26	28.18	5.66
12:30	21.29	28.25	5.86	22.72	28.25	6.04	22.56	28.40	5.71
13:00	21.37	28.33	5.97	22.98	28.25	6.23	22.72	28.40	5.78
13:30	21.54	28.33	6.26	23.10	28.54	6.27	22.94	28.54	5.82
14:00	21.58	28.33	6.20	23.23	28.62	6.24	23.15	28.54	5.96
14:30	22.01	28.76	5.73	23.32	28.54	6.23	23.27	28.62	5.99
15:00	21.96	28.62	5.43	23.40	28.69	6.19	23.40	28.69	7.19
15:30	22.05	28.62	5.57	23.44	28.62	6.19	23.44	28.76	6.61
16:00	22.26	28.33	5.89	23.15	28.83	5.43	23.44	28.76	6.41
16:30	22.51	28.11	6.13	23.40	28.69	5.92	23.32	28.83	6.02
17:00	22.77	27.96	6.43	23.44	28.62	5.96	23.40	28.76	5.94
17:30	22.89	27.89	6.56	23.65	28.47	6.28	23.48	28.76	4.91
18:00	22.94	27.82	6.68	23.78	28.40	6.36	23.70	28.62	5.28
18:30	22.94	27.68	6.78	23.78	28.25	6.49	23.78	28.54	5.47
19:00	22.85	27.46	6.78	23.78	28.11	6.44	23.86	28.33	5.64
19:30	22.77	27.39	6.55	23.70	28.04	6.37	23.95	28.25	5.67
20:00	22.68	27.31	6.39	23.61	28.11	6.35	23.95	28.18	5.61
20:30	22.56	27.39	6.41	23.53	28.04	6.29	23.99	28.11	5.60
21:00	22.60	27.68	6.34	23.44	27.96	6.16	23.99	27.96	5.41
21:30	22.34	27.68	6.41	23.10	28.18	5.93	23.99	27.82	5.39
22:00	22.18	27.89	6.38	22.72	28.25	5.87	23.91	27.75	5.30
22:30	22.09	27.68	6.24	22.64	28.33	5.85	23.82	27.24	4.89
23:00	22.22	27.89	6.21	22.47	28.18	5.96	23.78	27.60	5.07
23:30	22.09	27.96	6.00	22.68	28.04	6.03	23.74	27.46	5.12

**Quinby Bridge, 1992.**

	June 25			June 26			June 27		
Hour	Temp.	Salinity	D.O.	Temp.	Salinity	D.O.	Temp.	Salinity	D.O.
00:00	23.53	27.75	4.98	23.61	27.96	3.77	23.44	27.39	3.23
00:30	23.53	27.75	5.14	23.44	28.04	3.76	23.44	27.10	3.19
01:00	23.53	28.25	5.21	23.48	28.04	3.94	23.48	27.31	3.38
01:30	23.36	28.40	5.11	23.53	28.18	4.05	23.40	27.53	3.45
02:00	23.27	28.47	5.04	23.48	28.33	4.11	23.48	27.60	3.54
02:30	23.23	28.47	5.07	23.40	28.40	4.08	23.57	27.82	3.71
03:00	23.19	28.54	5.00	23.36	28.40	4.08	23.53	28.04	3.71
03:30	23.15	28.54	4.89	23.32	28.54	4.01	23.48	28.18	3.73
04:00	23.15	28.54	4.69	23.27	28.62	3.99	23.48	28.18	3.88
04:30	23.15	28.69	4.80	23.23	28.62	4.13	23.44	28.33	4.86
05:00	23.10	28.69	4.71	23.23	28.62	3.97	23.40	28.40	4.08
05:30	23.06	28.62	4.65	23.23	28.76	3.99	23.40	28.40	3.94
06:00	23.02	28.47	4.61	23.23	28.62	3.77	23.40	28.54	3.78
06:30	22.98	28.25	4.49	23.23	28.62	3.67	23.40	28.69	3.93
07:00	22.94	28.25	4.39	23.15	28.40	3.61	23.40	28.54	4.01
07:30	22.89	28.18	4.27	23.15	28.40	3.61	23.40	28.40	4.01
08:00	22.94	27.96	4.20	23.15	28.25	3.54	23.36	28.25	3.84
08:30	23.02	27.96	4.26	23.32	28.18	3.59	23.32	28.18	2.88
09:00	23.15	27.68	4.30	23.57	27.96	3.66	23.32	28.04	3.05
09:30	23.19	27.82	4.32	23.82	27.82	3.91	23.36	27.82	3.11
10:00	23.27	27.60	4.06	23.82	27.68	3.86	23.57	27.68	3.31
10:30	23.19	27.68	4.27	24.08	27.68	3.88	23.82	27.39	3.62
11:00	23.19	27.82	4.10	24.29	27.53	3.74	23.99	27.31	3.70
11:30	23.61	27.82	5.02	24.50	27.68	4.18	24.50	27.24	4.12
12:00	23.53	27.89	5.11	24.20	27.68	4.23	24.71	26.95	4.41
12:30	23.36	28.11	4.65	25.01	27.96	4.82	24.67	27.10	4.24
13:00	23.48	28.33	4.70	24.67	27.96	4.77	24.37	27.17	3.64
13:30	23.61	28.40	5.05	24.41	28.11	4.39	25.81	27.60	4.60
14:00	23.65	28.47	5.24	24.54	28.33	4.30	25.30	27.53	4.44
14:30	23.65	28.62	5.28	24.63	28.40	4.57	25.05	27.82	4.16
15:00	23.70	28.62	5.23	24.63	28.54	4.81	25.26	28.11	4.27
15:30	23.74	28.69	5.15	24.50	28.62	4.80	25.43	28.25	4.60
16:00	23.74	28.83	5.07	24.46	28.62	6.40	25.51	28.33	4.85
16:30	23.74	28.83	7.68	24.41	28.83	5.63	25.47	28.40	6.12
17:00	23.61	28.91	6.27	24.29	28.91	5.41	25.39	28.54	5.38
17:30	23.61	28.91	5.45	24.20	28.91	5.27	25.34	28.69	5.25
18:00	23.74	28.83	5.19	24.03	28.91	5.00	25.26	28.62	5.20
18:30	23.78	28.69	5.12	23.86	29.05	4.75	25.17	28.69	5.12
19:00	23.82	28.62	3.54	23.95	28.98	4.54	24.96	28.83	4.80
19:30	23.86	28.47	4.05	23.95	28.83	4.43	24.71	28.91	4.77
20:00	23.86	28.47	4.25	23.95	28.54	4.44	24.79	28.83	4.62
20:30	23.86	28.33	4.25	23.95	28.25	4.54	24.79	28.83	4.56
21:00	23.86	28.18	4.16	23.91	28.18	3.54	24.88	28.62	4.58
21:30	23.82	28.11	3.99	23.91	28.18	3.64	25.01	28.54	4.60
22:00	23.78	27.96	3.93	23.78	27.82	3.64	25.09	28.33	4.10
22:30	23.74	27.75	3.89	23.74	27.75	3.62	25.13	28.18	3.86
23:00	23.70	27.60	3.70	23.57	27.46	3.49	25.13	28.04	3.71
23:30	23.65	27.82	3.82	23.48	27.31	3.43	25.05	27.96	3.51

**Quinby Bridge, 1992.**

	June 28			June 29		
Hour	Temp.	Salinity	D.O.	Temp.	Salinity	D.O.
00:00	25.05	27.53	3.32	25.85	28.25	3.68
00:30	24.96	27.46	3.19	25.72	28.18	3.53
01:00	24.88	27.39	3.01	25.55	28.18	2.94
01:30	24.75	27.31	3.09	25.39	27.89	2.72
02:00	24.67	27.53	3.15	25.26	27.68	2.47
02:30	24.46	27.82	3.16	25.22	27.75	2.69
03:00	24.54	27.75	3.25	25.13	27.89	2.76
03:30	24.58	28.11	3.38	24.96	28.18	2.77
04:00	24.41	28.25	3.49	25.05	28.11	2.91
04:30	24.29	28.33	3.52	25.13	28.47	3.34
05:00	24.16	28.40	4.64	25.05	28.54	3.36
05:30	24.03	28.47	3.94	24.96	28.54	3.37
06:00	24.03	28.47	3.96	24.88	28.62	3.42
06:30	23.99	28.69	3.94	24.79	28.69	3.40
07:00	23.95	28.69	3.70	24.88	28.62	3.53
07:30	23.99	28.83	3.89	24.84	28.76	3.46
08:00	23.99	28.69	3.84	24.88	28.76	3.34
08:30	24.03	28.62	3.94	24.96	28.98	3.54
09:00	24.12	28.62	3.93	24.96	28.83	3.57
09:30	24.37	28.25	3.64	25.17	28.83	3.69
10:00	24.67	28.25	3.82	25.43	28.69	3.76
10:30	25.05	28.11	4.13	25.68	28.62	3.86
11:00	25.43	27.89	4.51	26.06	28.40	4.15
11:30	25.77	27.60	4.90	26.48	28.25	4.67
12:00	25.72	27.53	4.81	26.91	28.11	5.10
12:30	25.77	27.53	4.57	27.24	28.04	5.32
13:00	26.44	27.24	4.87	27.29	27.96	5.31
13:30	26.95	26.88	5.05	28.00	27.75	5.70
14:00	26.61	27.53	5.02	28.26	27.75	6.10
14:30	27.50	27.75	6.54	28.26	27.89	5.94
15:00	27.16	27.82	5.77	28.26	27.96	5.59
15:30	26.78	28.04	5.10			
16:00	26.82	28.11	5.04			
16:30	26.86	28.40	5.27			
17:00	26.69	28.47	5.25			
17:30	26.53	28.62	5.23			
18:00	26.48	28.76	5.23			
18:30	26.27	28.76	5.12			
19:00	25.98	28.83	4.95			
19:30	25.85	28.91	4.86			
20:00	25.81	28.91	4.65			
20:30	25.39	29.12	4.58			
21:00	25.51	28.98	4.43			
21:30	25.64	28.91	4.44			
22:00	25.68	28.91	4.39			
22:30	25.81	28.69	4.19			
23:00	25.85	28.62	4.21			
23:30	25.89	28.33	4.10			

### APPENDIX 3

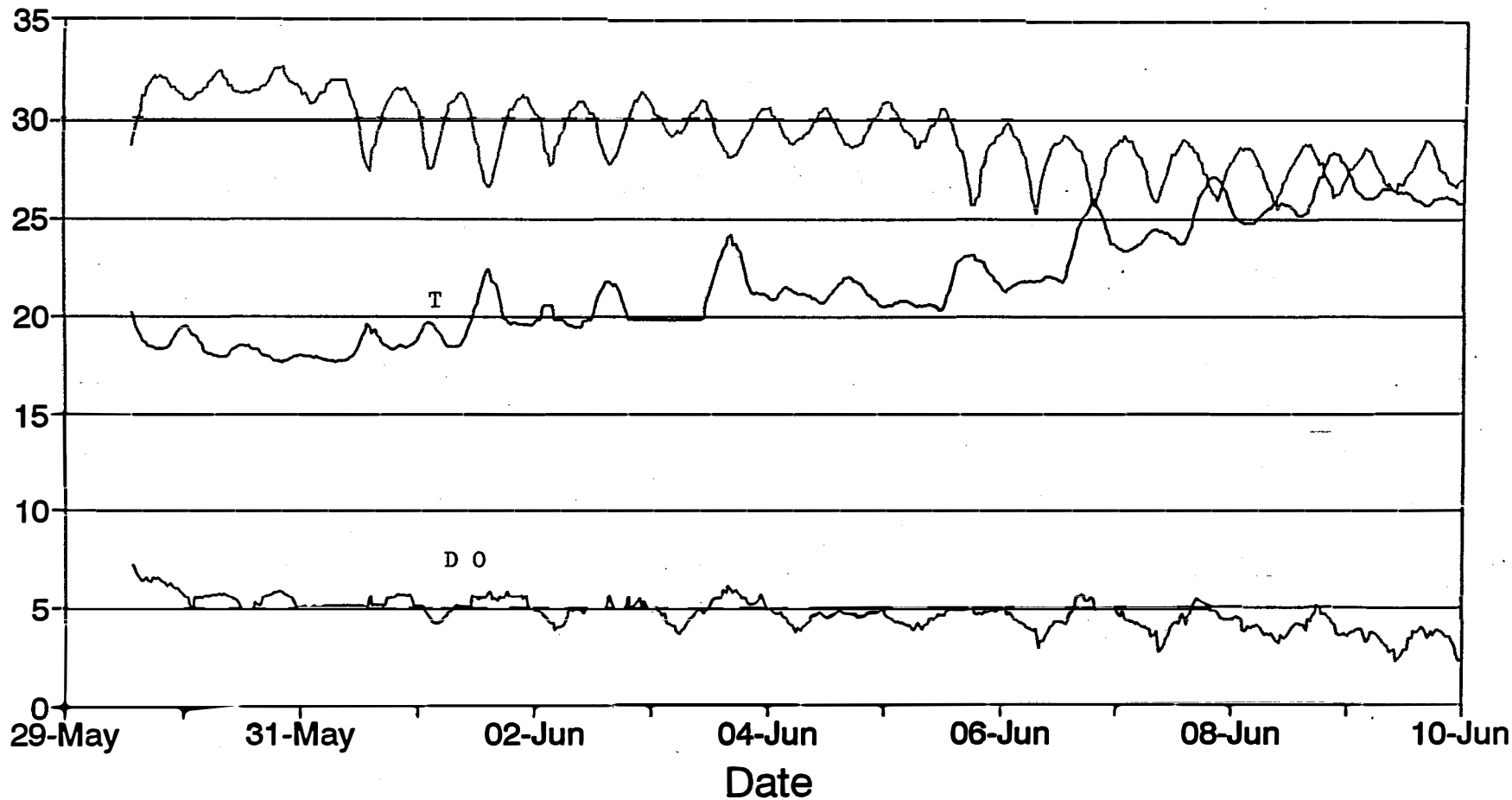
Figures showing the time variation of water temperature (degree C), salinity (parts per thousand), and dissolved oxygen concentration (mg/L) at both sites (uneditted data\*).

- \* Data prior to deployment and after the DataSonde had been removed from the water have been eliminated; otherwise the data are unedited. Blank spaces represent periods when no measurements were made.



# Willis Wharf - 1992

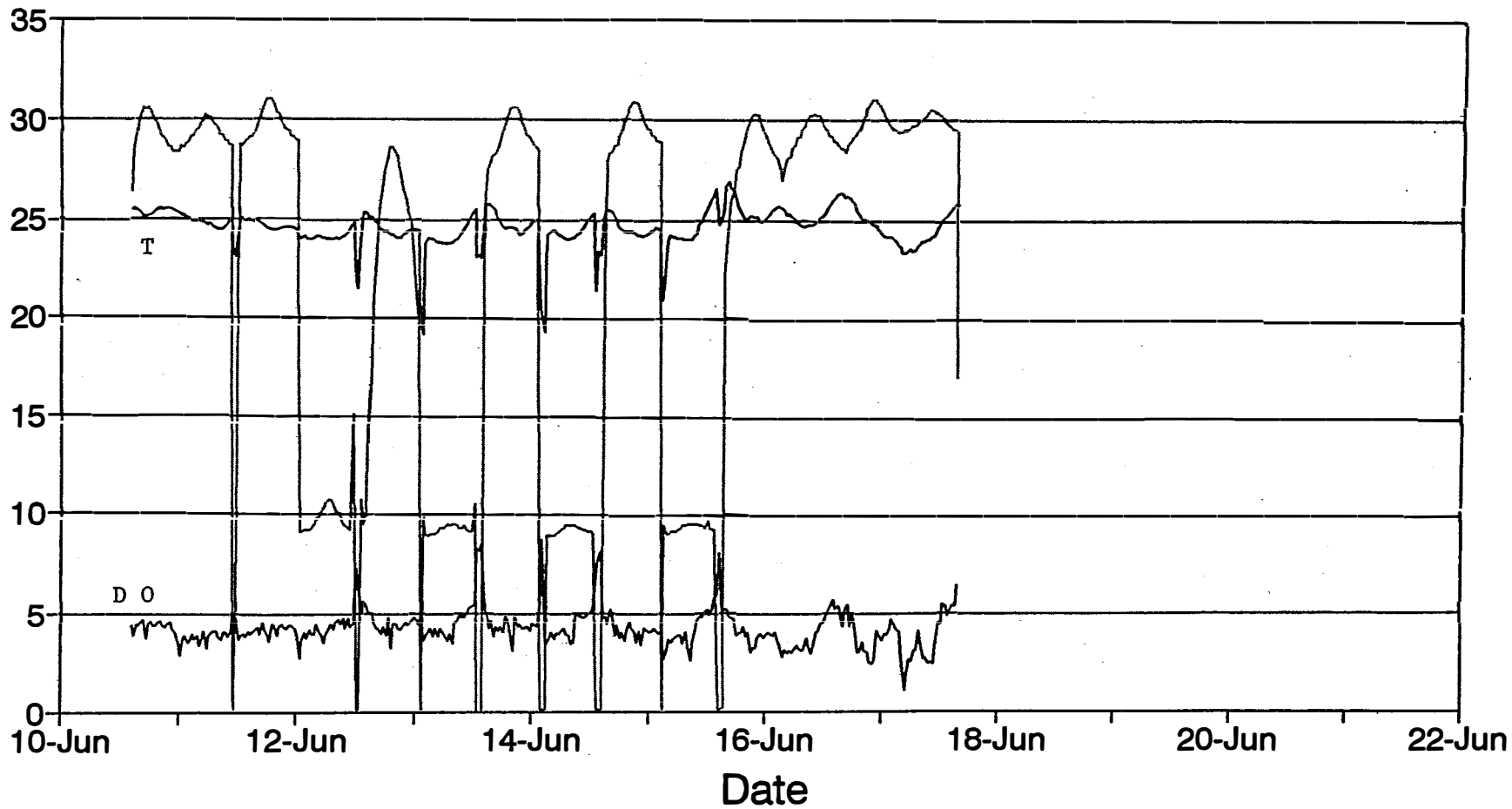
46



— Salinity (ppt) — Temp. (C) — D.O. (mg/L)

# Willis Wharf - 1992

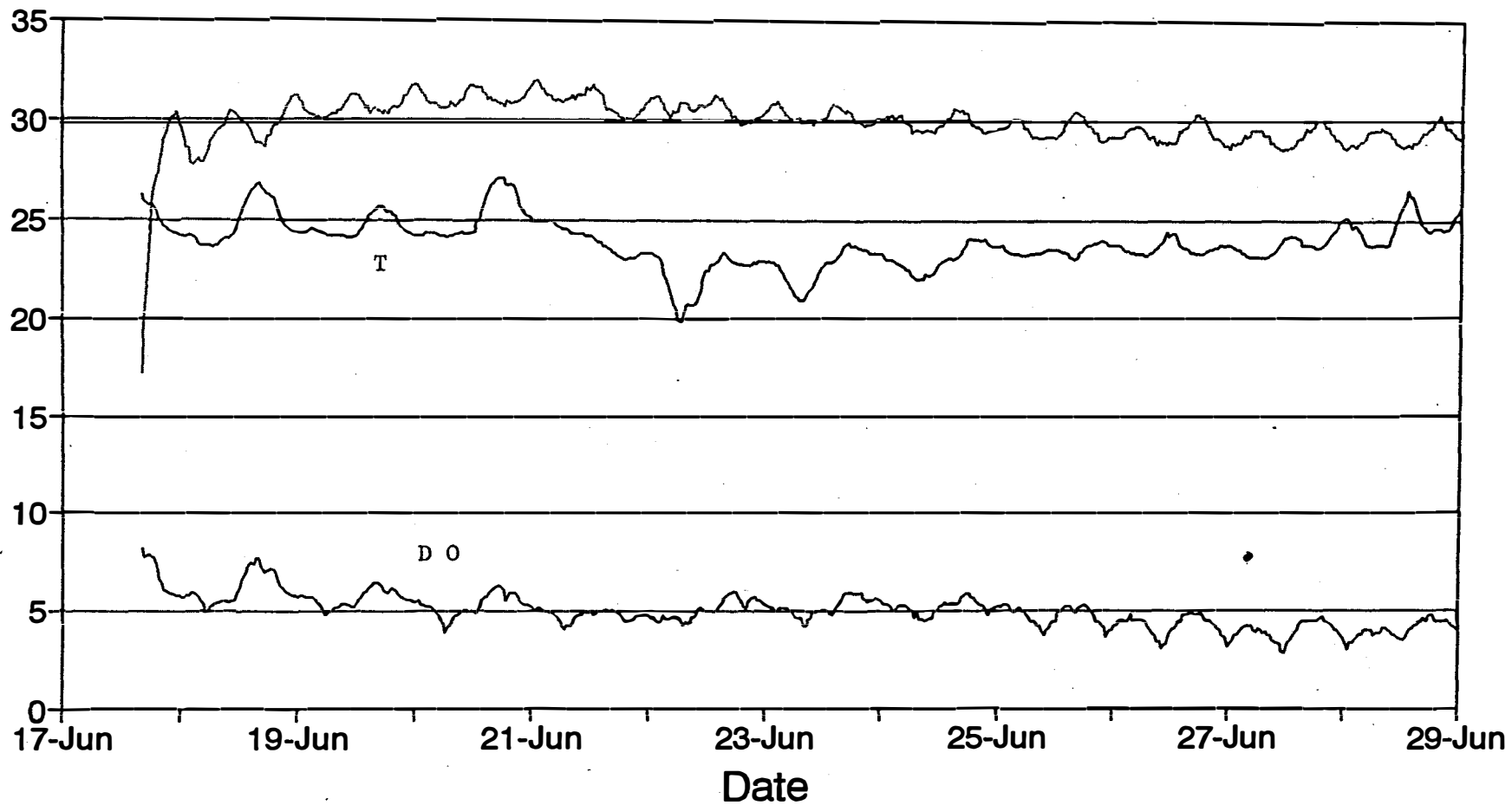
47



— Salinity (ppt) — Temp. (C) — D.O. (mg/L)

# Willis Wharf - 1992

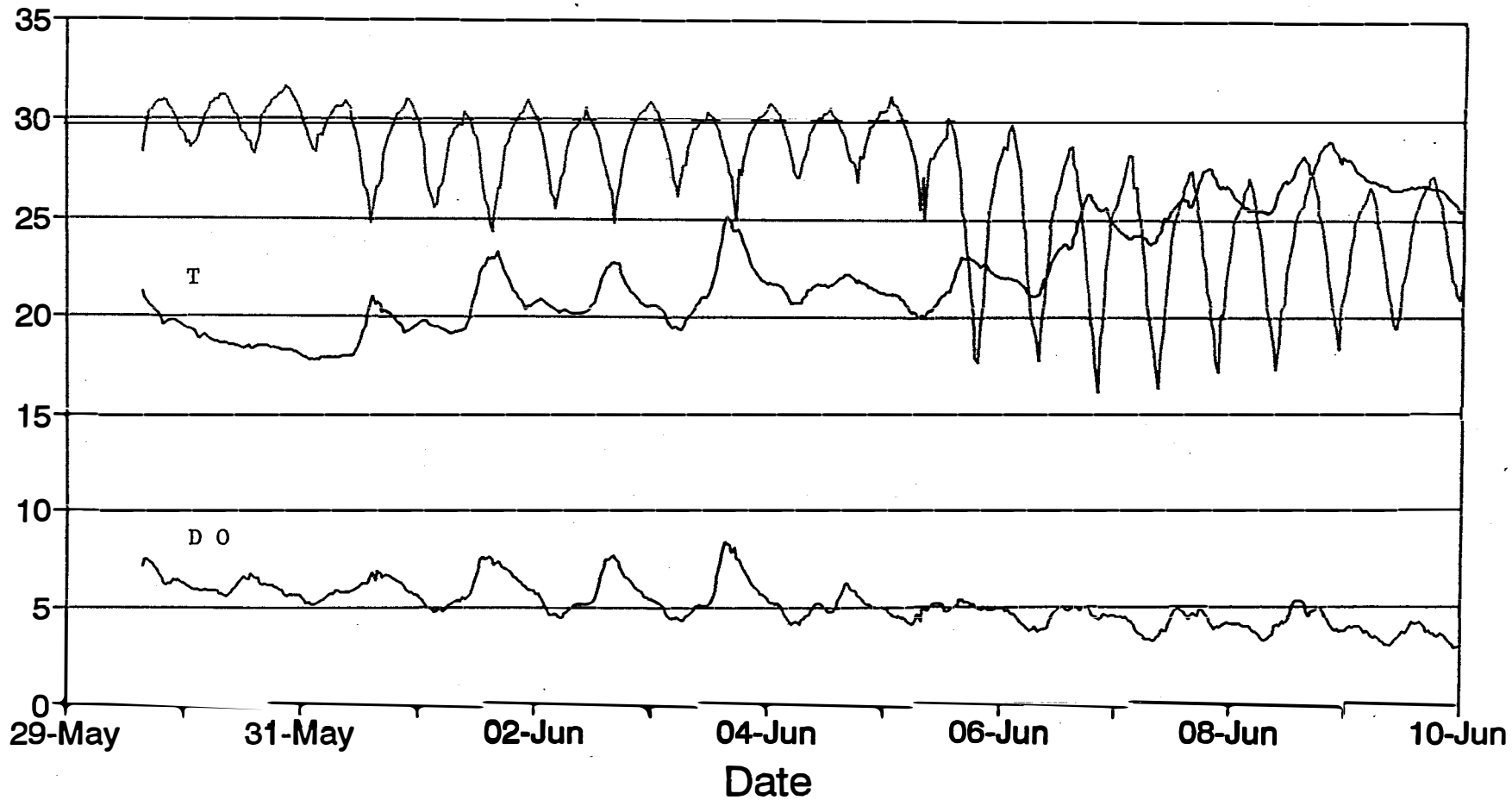
48



— Salinity (ppt) — Temp. (C) — D.O. (mg/L)

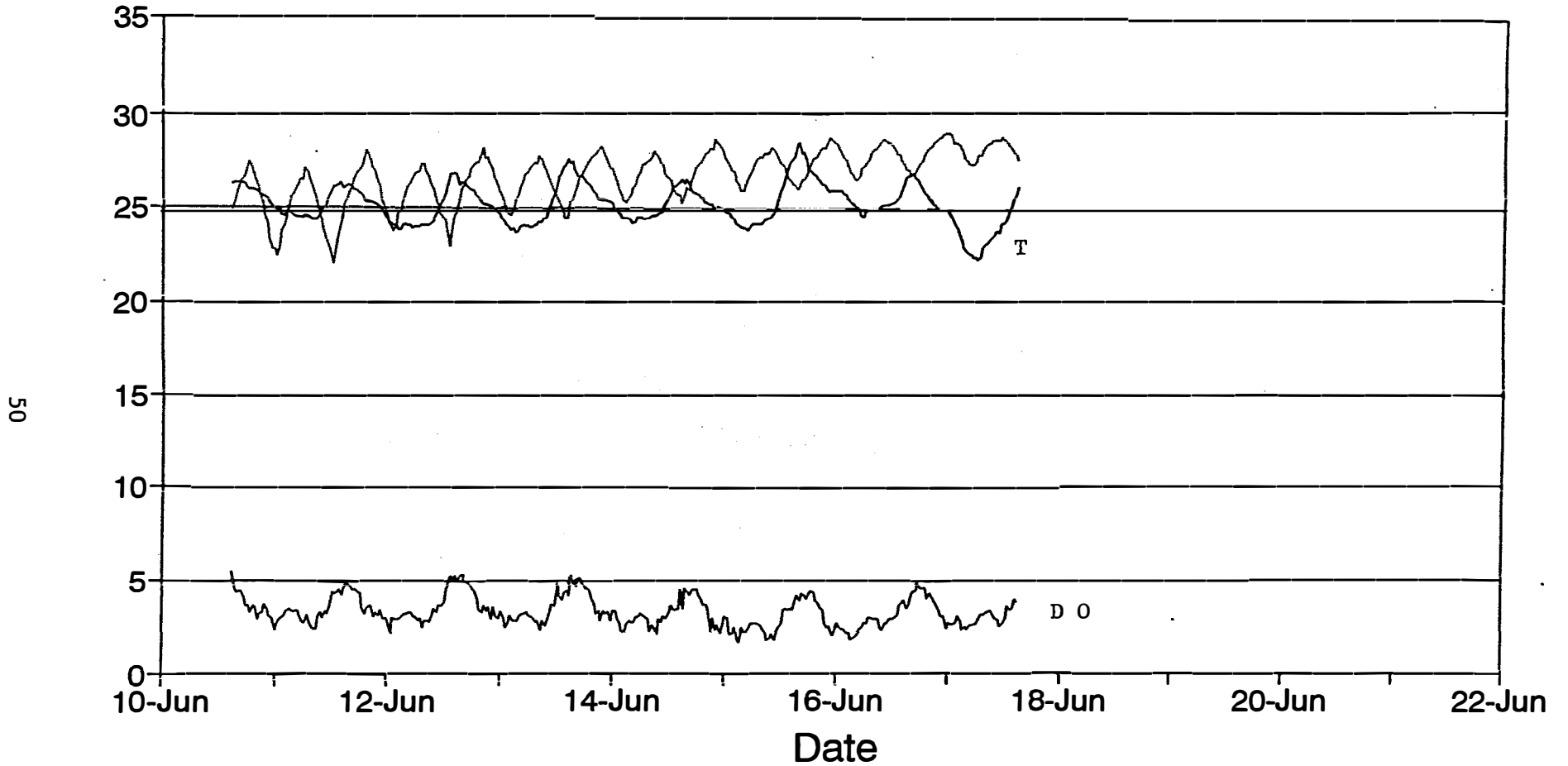
# Quinby Bridge - 1992

67



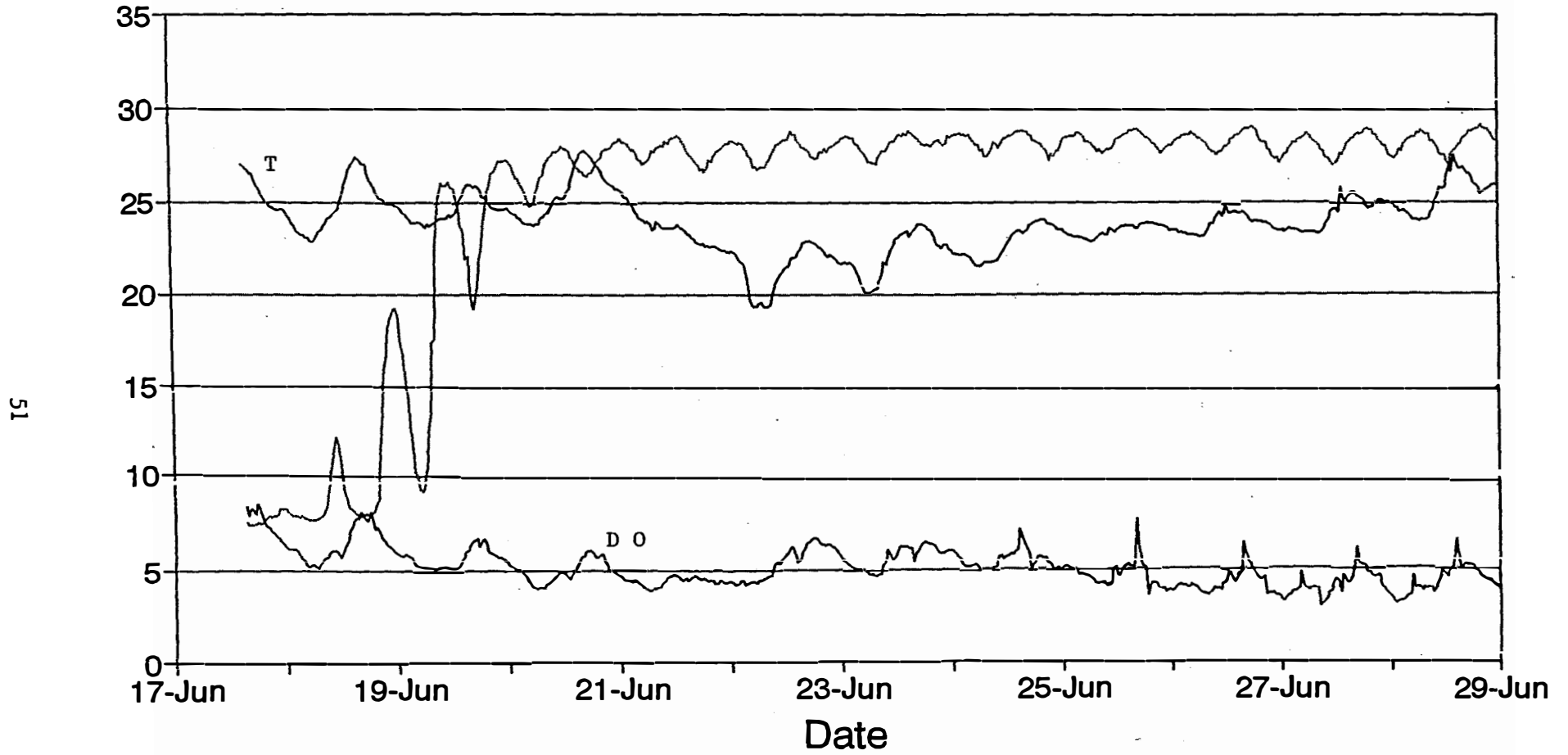
— Salinity (ppt) — Temp. (C) — D.O. (mg/L)

# Quinby Bridge - 1992



— Salinity (ppt) — Temp. (C) — D.O. (mg/L)

# Quinby Bridge - 1992



— Salinity (ppt) — Temp. (C) — D.O. (mg/L)