

**BUZZARDS BAY  
OUTER NEW BEDFORD HARBOR**



**SPECIAL WATER QUALITY STUDY 1980**

massachusetts department of environmental quality engineering

DIVISION OF WATER POLLUTION CONTROL

thomas c. mcMahon, director



SPECIAL WATER QUALITY STUDY

BUZZARDS BAY AND OUTER NEW BEDFORD HARBOR

1980

DEPARTMENT OF ENVIRONMENTAL QUALITY ENGINEERING

DIVISION OF WATER POLLUTION CONTROL

TECHNICAL SERVICES BRANCH

WESTBOROUGH, MASSACHUSETTS

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## INTRODUCTION

This report contains data from water quality surveys conducted during the summer and fall of 1980. The study was coordinated by the Massachusetts Division of Water Pollution Control with assistance from Dr. William Bannister of the University of Lowell; Dr. William Curby of Lahey Clinic; Al Davis and C.H. Clifford of Woods Hole Oceanographic Institute; and Dr. David Kan of Massachusetts Maritime Academy. The purpose of the study was to provide additional water quality data for the assessment of the City of New Bedford's application for a 301(h) waiver. Section 301(h) of the 1977 amendments to the Clean Water Act makes provision for the waiver of secondary treatment of wastewater discharged from publicly owned treatment works into marine waters under specified conditions. With a 301(h) waiver, the outfall from the New Bedford STP would be extended out into Buzzards Bay, into deeper water; without a 301(h) waiver, the New Bedford STP would be upgraded to provide secondary treatment, with the outfall remaining at the present location.

A total of eight surveys were undertaken during the period of July 2, 1980 to October 15, 1980. Five stations in the vicinity of the proposed extended outfall site, and two stations in the area of the present sewage treatment plant outfall were sampled. Temperature, salinity, and dissolved oxygen measurements were taken at regular depth intervals. Samples of the surface and bottom waters were taken for chemical analysis including, but not limited to: BOD<sub>5</sub>, chlorides, total phosphorus, total Kjeldahl nitrogen, nitrate nitrogen, and suspended solids. Analyses for PCBs and metals were run on bottom sediment samples taken from four locations.

Sample analyses were performed at the Lawrence Experiment Station, Massachusetts Department of Environmental Quality Engineering. All were run in accordance with A.P.H.A. Standard Methods for the Examination of Water and Wastewater (14th ed.) and EPA Oceanographic Sampling and Analytical Procedures Manual, 1979, procedure A-4.

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# LOCATIONS OF SAMPLING STATIONS NEW BEDFORD HARBOR

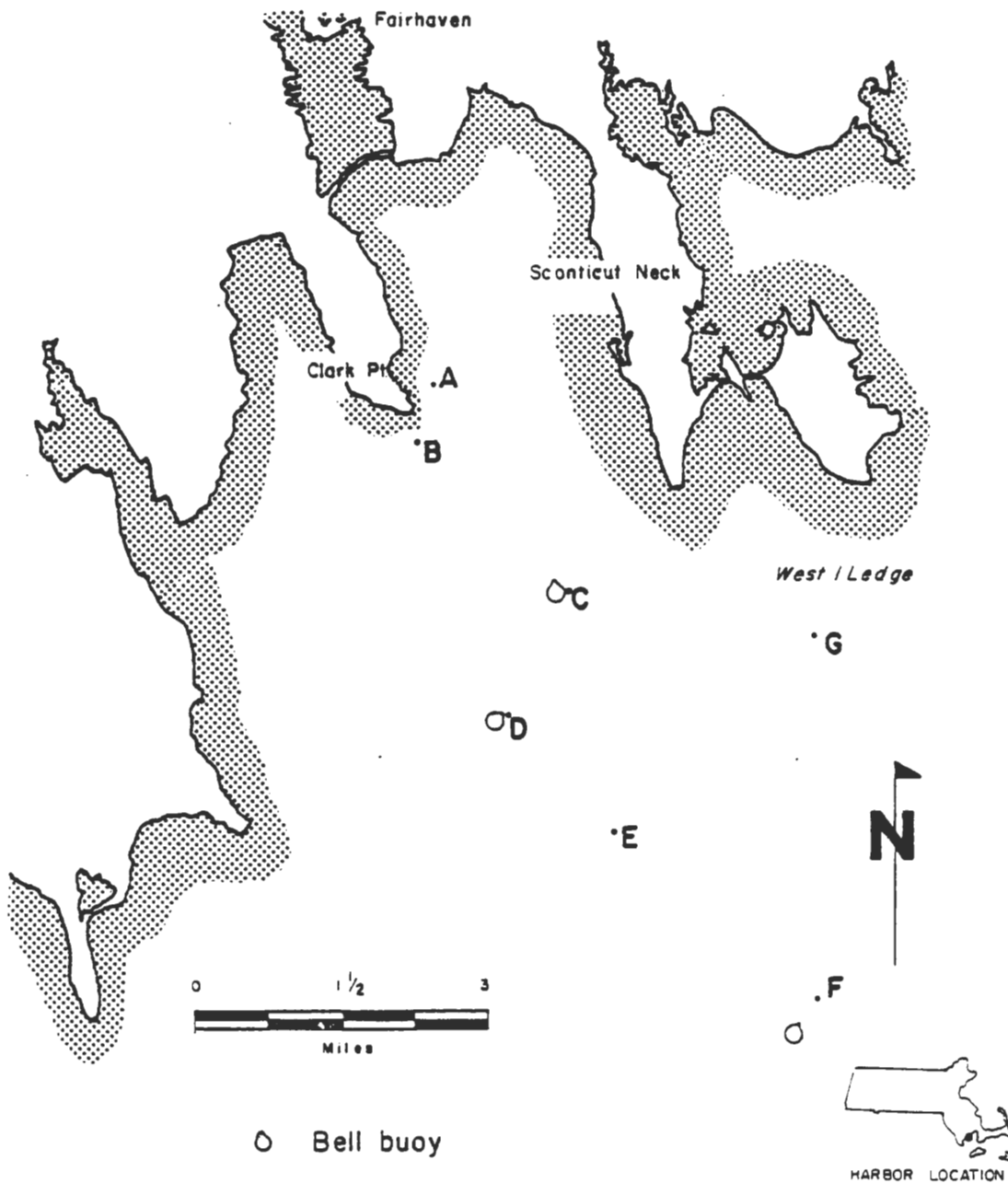


FIGURE 1

TABLE 1  
 NEW BEDFORD SPECIAL WATER QUALITY STUDY  
 LOCATION OF SAMPLING STATIONS

<u>STATION</u>	<u>LORAN T.D.</u>	<u>LATITUDE - LONGITUDE</u>
A	14196.1 43999.2	41° 35' 56" 70° 53' 23"
B <sup>1</sup>	14199.6 43994.9	41° 34' 88" 70° 53' 35"
C	14195.0 43987.1	41° 34' 00" 70° 52' 03"
D	14203.1 43981.3	41° 33' 00" 70° 52' 69"
E <sup>2</sup>	14201.6 43973.4	41° 32' 03" 70° 51' 81"
F	14194.3 43961.8	41° 30' 76" 70° 49' 75"
G	14180.8 43982.2	41° 33' 83" 70° 49' 58"

---

<sup>1</sup>Site of New Bedford Sewage Treatment Plant outfall

<sup>2</sup>Proposed outfall site

TABLE 2  
 NEW BEDFORD SPECIAL WATER QUALITY STUDY  
 COLIFORM DATA (COLIFORM/100 ml)\*

<u>STATION</u>	<u>COUNT</u>	<u>DATE</u>
A	150	7/2/80
B	112	7/2/80
C	2-8	7/2/80
D	1	7/2/80

TABLE 3  
 NEW BEDFORD SPECIAL WATER QUALITY STUDY  
 FECAL COLIFORM DATA (COLIFORM/100 ml)\*

<u>STATION</u>	<u>COUNT</u>	<u>DATE</u>
A	140	7/2/80
B	55	7/2/80
C	3	7/2/80
D	1/500 ml	7/2/80

---

\*Analyses by Lahey Clinic

TABLE 4

## NEW BEDFORD SPECIAL WATER QUALITY STUDY

CHLOROPHYLL-a (mg/m<sup>3</sup>)

<u>STATION</u>	<u>CHLOROPHYLL-a</u>
A - surface	5.81
bottom	--
B - surface	3.74
bottom	--
C - surface	4.98
bottom	--
D - surface	4.15
bottom	--
E - surface	1.90
bottom	--
F - surface	2.49
bottom	--
G - surface	3.32
1.0 m.	2.49
2.5 m.	3.32
4.0 m.	3.32
5.5 m.	3.32
7.0 m.	2.91
8.5 m.	3.12
10.0 m.	1.76
11.5 m.	2.17
13.0 m.	1.76

DATE: 8/12/80

TABLE 5

## NEW BEDFORD SPECIAL WATER QUALITY STUDY

## AMMONIA - NITROGEN (mg/l)

STATION	DATE		
	8/12/80	8/26/80	9/16/80
A - surface	0.02	0.00	0.02
bottom	0.05	0.03	0.03
B - surface	0.46	0.10	1.10
bottom	0.10	0.02	0.05
C - surface	0.08	0.02	0.02
bottom	0.04	0.02	0.02
D - surface	0.05	0.02	0.02
bottom	0.05	0.04	0.01
E - surface	0.24	0.07	0.01
bottom	0.08	0.04	0.05
F - surface	0.08	0.03	--
bottom	0.04	0.01	0.01
G - surface	0.08	0.03	0.02
bottom	0.07	0.01	0.01

TABLE 6  
 NEW BEDFORD SPECIAL WATER QUALITY STUDY  
 pH (STANDARD UNITS)

<u>STATION</u>	<u>8/26/80</u>	DATE	<u>9/16/80</u>
A - surface	7.9		7.7
bottom	8.0		7.8
B - surface	7.9		7.4
bottom	7.7		7.8
C - surface	7.9		7.9
bottom	7.8		7.9
D - surface	8.0		8.0
bottom	7.8		7.9
E - surface	8.1		8.0
bottom	7.8		8.0
F - surface	7.9		--
bottom	7.8		7.8
G - surface	7.9		8.0
bottom	7.8		8.0

TABLE 7

## NEW BEDFORD SPECIAL WATER QUALITY STUDY

## NITRATE-NITROGEN (mg/l)

STATION	DATE					
	7/2/80	7/8/80	7/22/80	8/12/80	8/26/80	9/16/80
A - surface	0.05	--	0.01	0.02	0.00	0.00
bottom	0.03	--	0.02	0.05	0.00	0.00
B - surface	0.03	0.03	0.03	0.46	0.00	0.00
bottom	0.03	0.01	0.03	0.10	0.00	0.00
C - surface	0.01	0.01	0.02	0.08	0.00	0.00
bottom	0.02	0.03	0.00	0.04	0.00	0.00
D - surface	0.04	0.02	0.81	0.05	0.00	0.00
bottom	0.03	0.90	0.01	0.05	0.00	0.00
E - surface	0.65	0.01	0.05	0.24	0.00	0.00
bottom	0.05	0.01	0.05	0.08	0.00	0.00
F - surface	0.02	0.03	0.03	0.08	0.00	0.00
bottom	0.02	0.03	0.03	0.04	0.00	0.00
G - surface	0.03	0.00	0.02	0.08	0.00	0.00
bottom	0.00	0.03	0.03	0.07	0.00	0.00

TABLE 8  
 NEW BEDFORD SPECIAL WATER QUALITY STUDY  
 KJELDAHL-NITROGEN (mg/l)

STATION	DATE					
	7/2/80	7/8/80	7/22/80	8/12/80	8/26/80	9/16/80
A - surface	0.3	--	0.4	0.5	0.8	0.6
bottom	0.4	--	0.7	0.2	1.4	0.6
B - surface	0.3	1.1	0.8	0.6	0.7	2.4
bottom	0.2	0.4	0.4	0.2	1.2	0.5
C - surface	0.2	0.2	0.6	0.2	0.5	0.3
bottom	0.2	0.3	0.6	0.2	0.7	0.6
D - surface	0.2	0.4	0.3	0.3	0.5	0.4
bottom	0.1	0.3	0.2	0.2	1.2	0.4
E - surface	0.2	0.3	0.3	0.2	0.6	0.5
bottom	0.2	0.2	0.3	0.1	1.1	0.5
F - surface	0.1	0.3	0.4	0.1	0.7	--
bottom	0.2	0.3	0.3	0.0	1.1	0.5
G - surface	0.1	0.2	0.2	0.1	0.5	0.6
bottom	0.1	0.3	0.0	0.1	0.3	0.5



TABLE 9

## NEW BEDFORD SPECIAL WATER QUALITY STUDY

## TOTAL PHOSPHORUS AS P (mg/l)

STATION	DATE					
	7/2/80	7/8/80	7/22/80	8/12/80	8/26/80	9/16/80
A - surface	0.02	--	0.01	0.14	0.12	0.33
bottom	0.01	--	0.00	0.14	0.20	0.15
B - surface	0.02	0.57	0.03	0.29	0.13	0.51
bottom	0.02	0.04	0.01	0.13	0.10	0.14
C - surface	0.00	0.02	0.00	0.12	0.09	0.14
bottom	0.01	0.02	0.00	0.12	0.09	0.14
D - surface	0.00	0.02	0.01	0.14	0.09	0.15
bottom	0.00	0.04	0.00	0.09	0.08	0.11
E - surface	0.01	0.02	0.00	0.09	0.08	0.15
bottom	0.00	0.02	0.00	0.09	0.08	0.10
F - surface	0.00	0.02	0.01	0.09	0.07	--
bottom	0.00	0.02	0.04	0.08	0.07	0.09
G - surface	0.00	0.04	0.01	0.10	0.12	0.12
bottom	0.00	0.04	0.01	0.09	0.04	0.11

TABLE 10  
 NEW BEDFORD SPECIAL WATER QUALITY STUDY  
 CHLORIDES (mg/l)

STATION	DATE					
	7/2/80	7/8/80	7/22/80	8/12/80	8/26/80	9/16/80
A - surface	18,270	--	18,540	18,000	18,000	17,200
bottom	18,270	--	18,270	18,000	18,000	17,200
B - surface	18,000	16,660	16,660	17,000	18,000	16,400
bottom	18,540	18,270	17,730	18,000	18,000	17,600
C - surface	18,270	18,270	18,270	18,000	18,000	17,600
bottom	18,270	18,270	18,810	17,000	18,000	17,600
D - surface	18,540	18,270	18,810	18,000	18,000	17,200
bottom	18,270	18,270	18,270	18,000	18,000	17,600
E - surface	18,270	18,540	18,270	18,000	--	17,600
bottom	18,270	18,270	18,270	18,000	18,000	17,600
F - surface	18,270	18,270	18,270	18,000	18,000	--
bottom	18,270	18,270	18,270	18,000	18,000	17,200
G - surface	18,270	18,270	18,270	18,000	17,600	17,200
bottom	18,270	18,270	18,270	18,000	17,600	17,200

TABLE 11  
 NEW BEDFORD SPECIAL WATER QUALITY STUDY  
 5-DAY BIOCHEMICAL OXYGEN DEMAND (mg/l)

STATION	DATE					
	7/2/80	7/8/80	7/22/80	8/12/80	8/26/80	9/16/80
A - surface	1.5	--	2.2	2.4	4.3	2.0
bottom	1.6	--	1.8	2.4	1.6	0.8
B - surface	2.1	>7.0	>7.2	6.3	4.4	9.6
bottom	1.7	2.8	1.6	1.8	1.8	0.8
C - surface	1.0	1.7	1.8	2.4	4.2	1.0
bottom	1.4	1.7	1.7	1.2	1.6	0.4
D - surface	1.0	1.4	2.0	2.4	2.8	1.4
bottom	0.8	3.2	1.0	1.5	1.2	0.6
E - surface	3.4	1.6	1.4	1.5	4.8	0.8
bottom	0.8	2.4	1.1	0.9	1.0	1.0
F - surface	0.8	1.9	0.9	1.2	3.8	--
bottom	1.0	1.6	1.4	0.9	3.0	0.8
G - surface	1.9	1.7	1.2	1.2	1.4	0.8
bottom	1.3	1.6	1.0	1.2	1.8	0.4

TABLE 12  
 NEW BEDFORD SPECIAL WATER QUALITY STUDY  
 SUSPENDED SOLIDS (mg/l)

STATION	DATE					
	7/2/80	7/8/80	7/22/80	8/12/80	8/26/80	9/16/80
A - surface	33	--	25	17	2.0	23
bottom	33	--	26	17	5.0	21
B - surface	36	112	50	24	18	35
bottom	40	35	34	13	4.5	22
C - surface	41	31	40	18	74	22
bottom	32	36	37	10	24	29
D - surface	39	28	35	15	17	32
bottom	33	35	38	70	10	23
E - surface	33	26	36	16	6.5	24
bottom	42	35	38	14	9.5	25
F - surface	32	37	34	14	5.5	--
bottom	31	26	33	5.5	4.5	20
G - surface	36	41	38	16	6.5	37
bottom	38	37	36	11	5.5	23

TABLE 13

## NEW BEDFORD SPECIAL WATER QUALITY STUDY

POLYCHLORINATED BIPHENYL (WET WEIGHT  $\mu\text{g}/\text{kg}$ )

DATE: OCTOBER 15, 1980

STATION AND SEDIMENT DEPTH*	POLYCHLORINATED BIPHENYL AROCOR NUMBER 1248	POLYCHLORINATED BIPHENYL AROCOR NUMBER 1260	PERCENT MOISTURE
A - 0-2 cm.	323	88	61.14
A - 2-4 cm.	250	264	56.24
A - 4-8 cm.	333	531	56.16
A - 8-12 cm.	45	114	50.90
B - surface grab	3,592	22,787	29.69
E - 0-2 cm.	62	0	60.63
E - 2-4 cm.	222	0	55.24
E - 4-8 cm.	196	0	37.28
E - 8-12 cm.	367	0	33.07
F - 0-2 cm.	103	0	64.20
F - 2-4 cm.	86	0	52.13
F - 4-8 cm.	86	0	49.00
F - 8-12 cm.	234	0	45.53

\*Samples at Stations A, E and F were taken with a Soutar box corer.  
Sample at Station B was taken with an Eckman dredge.

TABLE 14  
 NEW BEDFORD SPECIAL WATER QUALITY STUDY  
 METALS\* (mg/kg)

<u>STATION AND SEDIMENT DEPTH</u>		<u>PERCENT VOLATILE SOLIDS</u>	<u>COPPER</u>	<u>LEAD</u>	<u>ZINC</u>	<u>CHROMIUM</u>	<u>CADMIUM</u>	<u>NICKEL</u>	<u>ARSENIC</u>	<u>MERCURY</u>
A -	0-2 cm.	2.9	148	97	191	182	48	27	8.8	0.250
A -	2-4 cm.	2.7	190	98	180	140	4.2	25	9.1	0.105
A -	4-8 cm.	2.8	227	116	191	147	3.1	23	6.2	0.085
A -	8-12 cm.	2.5	183	100	185	100	1.2	19	7.5	0.274
E -	0-2 cm.	2.1	15	36	73	28	0.7	15	6.5	0.102
E -	2-4 cm.	1.8	14	31	61	24	7.0	16	6.2	0.082
E -	4-8 cm.	1.1	11	25	50	21	0.0	10	5.4	0.097
E -	8-12 cm.	1.1	9	19	48	15	8.0	8	5.3	0.642
F -	0-2 cm.	2.4	12	28	57	24	0.0	13	10.2	0.298
F -	2-4 cm.	1.9	14	29	68	28	0.8	20	10.0	0.400
F -	4-8 cm.	1.9	12	30	62	29	0.8	16	9.0	0.074
F -	8-12 cm.	1.9	13	30	65	31	0.0	16	7.4	0.074

\*Samples taken with a Soutar box corer.

TABLE 15  
NEW BEDFORD SPECIAL WATER QUALITY STUDY  
TIDAL DATA FOR NEW BEDFORD (EST)

<u>DATE</u>	<u>HIGH TIDE (HRS)</u>	<u>LOW TIDE (HRS)</u>
7/2/80	1049	1607
7/8/80	1637	0952
7/22/80	1537	0810
8/5/80	1520	0827
8/12/80	0920	1520
8/26/80	0740	1321
9/16/80	1229	1740
10/15/80	1154	1715

TABLE 16  
 NEW BEDFORD SPECIAL WATER QUALITY STUDY  
 DISSOLVED OXYGEN, TEMPERATURE, AND SALINITY

<u>DATE</u>	<u>STATION AND DEPTH (m)</u>	<u>TEMPERATURE (°C)</u>	<u>SALINITY (°/00)</u>	<u>DISSOLVED OXYGEN (mg/l)</u>
7/2/80	A - surface	20.0	32.3	8.5
	1.5	20.5	32.3	8.2
	3.0	20.1	32.2	8.4
	4.6	20.1	32.2	8.2
	6.1	20.0	32.2	8.0
	7.6	19.8	32.3	7.7
	9.1	19.7	32.1	---
	10.7	19.7	31.9	---
7/8/80	A - surface	---	34.0	11.1
	1	---	34.0	---
	2	---	34.0	7.6
	3	---	34.0	---
	4	---	34.0	7.6
	5	---	34.0	---
	6	---	34.2	---
	7	---	34.0	---
8/5/80	A - surface	26.0	32.2	7.6
	1.5	26.0	32.3	---
	2.0	---	---	7.5
	3.0	25.8	32.4	---
	4.0	---	---	6.5
	4.6	24.4	32.3	---
	6.0	---	---	6.8
	6.1	23.9	32.2	---
7.6	23.0	32.2	---	
8/12/80	A - surface	24.3	32.1	6.4
	1.5	24.2	32.1	---
	2.0	---	---	5.2
	3.0	24.3	32.2	---
	4.0	---	---	6.1
	4.6	24.1	32.2	---
	6.0	---	---	6.0
	6.1	24.2	32.2	---
8/26/80	A - surface	23.0	32.2	9.3
	1.0	---	---	9.0
	1.5	23.0	32.2	---
	3.0	22.2	32.2	8.5
	4.6	22.2	32.1	---
	5.0	---	---	6.9
	6.1	21.7	32.2	---
	7.6	21.4	32.2	---



TABLE 16 (CONTINUED)

<u>DATE</u>	<u>STATION AND DEPTH (m)</u>	<u>TEMPERATURE (°C)</u>	<u>SALINITY (°/00)</u>	<u>DISSOLVED OXYGEN (mg/l)</u>
9/16/80	A - surface	20.5	32.8	3.9
	1.5	20.5	32.7	---
	2.0	---	---	4.1
	3.0	20.5	32.7	---
	4.0	---	---	3.9
	4.6	20.5	32.8	---
	6.0	---	---	4.3
	6.1	20.3	32.8	---
	7.6	19.8	33.0	---
10/15/80	A - surface	14.2	32.3	7.8
	1.5	14.2	32.3	---
	2.0	---	---	7.9
	3.0	14.1	32.3	---
	4.0	---	---	7.6
	4.6	13.9	32.4	---
	6.0	---	---	7.8
	6.1	13.8	32.3	---
7/2/80	B - surface	19.8	31.8	9.6
	1.5	19.8	32.1	8.1
	3.0	19.9	32.1	9.1
	4.6	19.9	32.2	8.1
	6.1	19.8	32.2	8.4
	7.6	19.6	32.1	8.0
	9.1	19.1	32.2	6.2
	10.7	19.0	32.2	6.3
7/8/80	B - surface	19.8	30.1	6.7
	1.5	19.7	32.1	---
	2.0	---	---	7.8
	3.0	19.8	32.0	---
	4.0	---	---	7.5
	4.6	19.7	32.1	---
	6.0	---	---	8.3
	6.1	19.7	33.1	---
7/22/80	B - surface	---	30.0	6.6
	1.0	---	30.5	---
	2.0	---	34.0	6.0
	3.0	---	34.0	---
	4.0	---	34.0	7.2
	5.0	---	34.0	---
	6.0	---	34.0	6.7
	7.0	---	34.0	---
8/5/80	B - surface	25.9	31.6	6.8
	1.5	26.1	32.3	---
	2.0	---	---	7.2
	3.0	26.1	32.3	---
	4.0	---	---	7.7

TABLE 16 (CONTINUED)

<u>DATE</u>	<u>STATION AND DEPTH (m)</u>	<u>TEMPERATURE (°C)</u>	<u>SALINITY (°/00)</u>	<u>DISSOLVED OXYGEN (mg/l)</u>
8/5/80	B - 4.6	24.6	32.2	---
	6.0	---	---	6.6
	6.1	23.5	32.2	---
8/12/80	B - surface	24.1	31.3	6.1
	1.5	24.0	31.8	---
	2.0	---	---	6.9
	3.0	23.8	32.2	---
	4.0	---	---	6.0
	4.6	24.0	32.2	---
	6.0	---	---	6.0
	6.1	24.0	32.2	---
8/26/80	B - surface	22.9	30.8	8.8
	1.5	22.8	32.2	---
	2.0	---	---	9.2
	3.0	22.4	32.2	---
	4.0	---	---	7.6
	4.6	21.9	32.1	---
	6.1	21.3	32.3	---
	7.6	21.2	32.3	---
9/16/80	B - surface	20.7	32.8	6.8
	1.5	20.5	32.8	---
	2.0	---	---	6.2
	3.0	20.4	32.8	---
	4.0	---	---	7.2
	4.6	20.4	32.8	---
	6.0	---	---	7.1
	6.1	20.3	32.9	---
	7.6	20.3	33.0	---
10/15/80	B - surface	20.2	33.0	---
	1.5	15.0	30.7	7.5
	2.0	14.6	32.4	---
	3.0	---	---	7.9
	4.0	14.5	32.4	---
	4.6	---	---	7.4
	6.0	14.5	32.4	---
	6.1	---	---	7.8
	7.6	14.5	32.4	---
7/2/80	C - surface	19.5	32.2	8.5
	1.5	19.5	32.1	8.7
	3.0	19.5	32.2	8.1
	4.6	19.5	32.1	8.3
	6.1	19.5	32.1	7.9
	7.6	19.4	32.2	8.4
	9.1	19.4	32.2	8.1
	10.7	19.5	32.2	8.3

TABLE 16 (CONTINUED)

<u>DATE</u>	<u>STATION AND DEPTH (m)</u>	<u>TEMPERATURE (°C)</u>	<u>SALINITY (°/00)</u>	<u>DISSOLVED OXYGEN (mg/l)</u>
7/2/80	C - 12.2	19.4	32.3	7.2
	13.7	19.1	32.3	---
7/8/80	C - surface	19.8	30.1	6.7
	1.5	19.7	32.1	---
	2.0	---	---	7.8
	3.0	19.8	32.0	---
	4.0	---	---	7.5
	4.6	19.7	32.1	---
	6.0	---	---	8.3
	6.1	19.7	33.1	---
7/22/80	C - surface	---	33.2	7.6
	1.0	---	33.5	---
	2.0	---	33.5	7.6
	3.0	---	34.0	---
	4.0	---	33.8	9.0
	5.0	---	33.5	---
	6.0	---	34.2	7.2
	7.0	---	34.0	---
	8.0	---	34.8	6.9
	9.0	---	33.8	---
	10.0	---	34.0	---
8/5/80	C - surface	24.9	32.3	7.4
	1.5	24.3	32.3	---
	2.0	---	---	6.0
	3.0	24.2	32.3	---
	4.0	---	---	6.3
	4.6	23.4	32.2	---
	6.0	---	---	6.9
	6.1	23.2	32.3	---
	7.6	23.0	32.2	---
	8.0	---	---	6.9
9.1	22.6	32.1	---	
8/12/80	C - surface	23.4	32.3	6.6
	1.5	23.6	32.2	---
	2.0	---	---	6.7
	3.0	23.6	32.2	---
	4.0	---	---	7.0
	4.6	23.5	32.2	---
	6.0	---	---	6.5
	6.1	23.5	32.3	---
	7.6	23.4	32.3	---
	8.0	---	---	6.3
	9.1	23.4	32.3	---
10.7	23.4	32.5	---	
8/26/80	C - surface	22.9	32.3	7.0
	1.5	22.4	32.3	---
	2.0	---	---	7.0

TABLE 16 (CONTINUED)

<u>DATE</u>	<u>STATION AND DEPTH (m)</u>	<u>TEMPERATURE (°C)</u>	<u>SALINITY (°/00)</u>	<u>DISSOLVED OXYGEN (mg/l)</u>
8/26/80	C- 3.0	21.9	32.2	---
	4.0	---	---	7.5
	4.6	21.9	32.3	---
	6.0	---	---	7.2
	6.1	21.7	32.3	---
	7.6	21.6	32.2	---
	8.0	---	---	7.6
	9.1	21.5	32.2	---
	10.7	21.3	32.2	---
9/16/80	C -surface	20.3	32.8	7.5
	1.5	20.3	32.8	---
	2.0	---	---	7.8
	3.0	20.3	32.8	---
	4.0	---	---	7.5
	4.6	20.3	32.8	---
	6.0	---	---	7.7
	6.1	20.4	32.9	---
	7.6	20.3	32.9	---
	8.0	---	---	7.5
	9.1	20.3	32.9	---
10.7	20.3	32.9	---	
12.2	20.3	32.9	---	
7/2/80	D -surface	19.2	32.2	8.0
	1.5	19.4	32.2	9.0
	3.0	19.4	32.2	9.3
	4.6	19.4	32.3	8.1
	6.1	19.4	32.3	8.3
	7.6	19.5	32.4	8.1
	9.1	19.4	32.2	8.3
	10.7	19.5	32.2	8.8
	12.2	19.5	32.2	8.0
	13.7	19.4	32.2	---
7/8/80	D -surface	19.0	32.0	8.0
	1.5	19.0	31.9	---
	2.0	---	---	7.8
	3.0	19.0	32.0	---
	4.0	---	---	7.8
	4.6	19.0	32.0	---
	6.0	---	---	7.7
	6.1	19.0	32.0	---
	7.6	18.9	32.0	---
	8.0	---	---	7.7
9.1	18.7	32.0	---	
7/22/80	D -surface	---	33.2	---
	1.0	---	33.8	---
	2.0	---	34.0	7.2
	3.0	---	34.0	---
	4.0	---	34.0	8.0
	5.0	---	34.0	---

TABLE 16 (CONTINUED)

<u>DATE</u>	<u>STATION AND DEPTH (m)</u>	<u>TEMPERATURE (°C)</u>	<u>SALINITY (‰/00)</u>	<u>DISSOLVED OXYGEN (mg/l)</u>
7/22/80	D - 6.0	---	34.0	6.9
	7.0	---	34.0	---
	8.0	---	34.0	7.0
	9.0	---	34.0	---
	10.0	---	34.0	---
	11.0	---	34.0	---
8/5/80	D - surface	24.5	32.3	---
	1.5	23.9	32.2	---
	3.0	23.9	32.3	---
	4.6	23.7	32.3	---
	5.0	---	---	---
	6.1	23.6	32.3	---
	7.0	---	---	6.6
	7.6	23.3	32.2	---
	9.1	22.9	32.3	---
	10.7	22.3	32.2	---
	12.2	22.0	32.1	---
8/12/80	D - surface	23.1	32.1	6.7
	1.5	23.0	32.2	---
	2.0	---	---	6.7
	3.0	23.1	32.1	---
	4.0	---	---	6.7
	4.6	23.0	32.2	---
	6.0	---	---	6.7
	6.1	23.0	32.2	---
	7.6	22.9	32.2	---
	8.0	---	---	6.6
	9.1	22.8	32.2	---
10.7	22.6	32.3	---	
8/26/80	D - surface	21.9	32.3	7.7
	1.0	---	---	8.1
	1.5	22.1	32.3	---
	3.0	21.8	32.2	7.1
	4.6	21.4	32.2	---
	5.0	---	---	7.1
	6.1	21.3	32.2	---
	7.0	---	---	7.4
	7.6	20.9	32.2	---
	9.0	---	---	6.7
	9.1	20.8	32.2	---
10.7	20.6	32.3	---	
9/16/80	D - surface	20.3	32.9	7.5
	1.5	20.3	32.9	---
	2.0	---	---	3.7
	3.0	20.3	32.9	---
	4.0	---	---	4.0
	4.6	20.3	32.9	---

TABLE 16 (CONTINUED)

<u>DATE</u>	<u>STATION AND DEPTH (m)</u>	<u>TEMPERATURE (°C)</u>	<u>SALINITY (‰)</u>	<u>DISSOLVED OXYGEN (mg/l)</u>
9/16/80	D - 6.0	---	---	3.6
	6.1	20.3	32.9	---
	7.6	20.3	32.9	---
	8.0	---	---	3.6
	9.1	20.3	32.9	---
	10.7	20.3	32.9	---
	12.2	20.3	32.9	---
	7/2/80	E - surface	20.0	32.3
1.5		18.9	32.3	9.6
3.0		18.8	32.2	8.6
4.6		18.5	32.2	9.0
6.1		18.2	32.4	8.5
7.6		18.1	32.5	8.8
9.1		17.9	32.5	8.5
10.7		17.9	32.3	9.1
12.2		17.9	32.4	8.4
13.7		17.8	32.4	8.7
15.2		17.3	32.4	---
7/8/80	E - surface	18.9	32.0	8.1
	1.5	18.9	32.0	---
	2.0	---	---	8.0
	3.0	18.9	32.0	---
	4.0	---	---	8.0
	4.6	18.9	31.9	---
	6.0	---	---	7.6
	6.1	18.9	32.0	---
	7.6	18.9	32.0	---
	8.0	---	---	8.2
	9.1	18.9	32.0	---
	10.0	---	---	7.9
	10.7	18.8	32.0	---
	12.0	---	---	8.4
	12.2	18.7	32.0	---
13.7	18.7	32.1	---	
14.0	---	---	8.3	
7/22/80	E - surface	22.5	32.8	7.2
	1.0	---	33.0	---
	2.0	---	33.0	7.6
	3.0	---	33.0	---
	4.0	---	33.8	8.3
	5.0	---	34.2	---
	6.0	22.5	34.0	7.2
	7.0	---	34.0	---
	8.0	21.5	34.0	7.2
	9.0	---	33.8	---
	10.0	20.0	33.8	7.3
	11.0	---	33.5	---
	12.0	---	33.8	7.0
13.0	21.0	34.2	---	

TABLE 16 (CONTINUED)

<u>DATE</u>	<u>STATION AND DEPTH (m)</u>	<u>TEMPERATURE (°C)</u>	<u>SALINITY (°/00)</u>	<u>DISSOLVED OXYGEN (mg/l)</u>
8/5/80	E - surface	24.1	32.3	7.0
	1.5	24.0	32.3	---
	3.0	22.8	32.1	---
	4.0	---	---	6.8
	4.6	22.1	32.0	---
	6.0	---	---	6.9
	6.1	22.0	32.2	---
	7.6	21.6	32.2	---
	8.0	---	---	6.4
	9.1	21.6	32.1	---
	10.0	---	---	6.4
	10.7	21.5	32.1	---
	12.0	---	---	6.3
	12.2	21.5	32.1	---
	13.7	21.5	32.2	---
	15.2	21.3	31.7	---
8/12/80	E - surface	22.6	31.7	7.1
	1.0	---	---	7.0
	1.5	22.4	31.7	---
	2.5	---	---	6.8
	3.0	22.4	32.0	---
	4.0	---	---	6.9
	4.6	22.4	31.2	---
	5.5	---	---	6.9
	6.1	22.4	31.8	---
	7.0	---	---	6.8
	7.6	22.2	31.9	---
	8.5	---	---	7.0
	9.1	22.1	31.8	---
	10.0	---	---	6.7
	10.7	21.7	31.9	---
	11.5	---	---	7.4
12.2	20.8	31.8	---	
13.0	---	---	6.8	
13.7	20.5	31.9	---	
8/26/80	E - surface	21.2	32.1	6.9
	1.0	---	---	7.8
	1.5	21.3	32.2	---
	3.0	21.2	32.3	8.0
	4.6	20.9	32.3	---
	5.0	---	---	7.4
	6.1	20.2	32.3	---
	7.0	---	---	7.1
	7.6	20.1	32.3	---
	9.0	---	---	7.1
	9.1	20.0	32.3	---
	10.7	20.0	32.3	---
	11.0	---	---	7.0
12.2	20.0	32.3	---	

TABLE 16 (CONTINUED)

<u>DATE</u>	<u>STATION AND DEPTH (m)</u>	<u>TEMPERATURE (°C)</u>	<u>SALINITY (°/00)</u>	<u>DISSOLVED OXYGEN (mg/l)</u>	
9/16/80	E - surface	20.1	32.5	7.9	
	1.0	---	---	7.9	
	1.5	20.0	32.5	---	
	3.0	20.1	32.5	8.1	
	4.6	20.1	32.4	---	
	5.0	---	---	7.6	
	6.1	20.0	32.4	---	
	7.0	---	---	7.5	
	7.6	20.0	32.4	---	
	9.0	---	---	7.8	
	9.1	20.0	32.4	---	
	10.7	20.0	32.4	---	
	11.0	---	---	7.7	
	12.2	20.0	32.4	---	
	13.7	20.0	32.5	---	
15.2	20.2	32.6	---		
10/15/80	E - surface	15.0	32.3	7.8	
	1.5	15.0	32.4	---	
	2.0	---	---	8.2	
	3.0	15.0	32.4	---	
	4.0	---	---	6.9	
	4.6	15.0	32.4	---	
	6.0	---	---	7.8	
	6.1	15.0	32.4	---	
	7.6	15.0	32.4	---	
	8.0	---	---	7.7	
	9.1	15.0	32.3	---	
	10.0	---	---	7.9	
	10.7	15.0	32.3	---	
	12.0	---	---	7.8	
	12.2	15.0	32.4	---	
13.7	15.0	32.4	---		
7/2/80	F - surface	18.0	32.1	8.4	
	1.5	18.0	32.1	8.6	
	3.0	17.8	32.2	8.3	
	4.6	17.7	32.2	8.6	
	6.1	17.5	32.2	8.2	
	7.6	17.0	32.2	8.5	
	9.1	16.8	32.2	8.5	
	10.7	16.7	32.2	8.5	
	12.2	16.7	32.2	8.5	
	13.7	16.6	32.2	8.4	
	15.2	16.6	32.3	---	
	16.8	16.6	32.3	---	
	18.3	16.5	32.2	---	
	7/8/80	F - surface	19.2	32.0	7.5
		1.5	19.1	32.0	---
2.0		---	---	7.5	



TABLE 16 (CONTINUED)

<u>DATE</u>	<u>STATION AND DEPTH (m)</u>	<u>TEMPERATURE (°C)</u>	<u>SALINITY (°/00)</u>	<u>DISSOLVED OXYGEN (mg/l)</u>
7/8/80	3.0	19.1	32.0	---
	4.0	---	---	7.7
	4.6	19.0	32.0	---
	6.0	---	---	7.7
	6.1	19.0	32.0	---
	7.6	19.0	32.0	---
	8.0	---	---	8.1
	9.1	19.0	32.0	---
	10.0	---	---	7.4
	10.7	19.0	32.0	---
	12.0	---	---	7.8
	12.2	18.9	32.0	---
	13.7	18.6	32.0	---
	14.0	---	---	7.9
	15.2	18.2	31.9	---
	16.0	---	---	8.0
7/22/80	F - surface	22.5	34.0	---
	1.0	---	34.5	---
	2.0	22.5	34.5	7.4
	3.0	---	34.5	---
	4.5	22.5	34.2	7.9
	5.0	---	34.0	---
	6.0	22.0	34.2	8.6
	7.0	---	34.2	---
	8.0	21.0	33.8	7.4
	9.0	---	33.2	---
	10.0	21.7	33.0	7.6
	11.0	---	33.2	---
	12.0	21.0	34.0	8.1
	13.0	---	33.2	---
	14.0	20.5	34.5	---
	16.0	20.5	---	6.8
8/5/80	F - surface	23.6	32.2	7.2
	1.5	23.7	32.3	---
	3.0	23.1	32.3	7.0
	4.6	22.2	32.2	---
	5.0	---	---	6.9
	6.1	22.2	32.2	---
	7.6	21.9	32.1	---
	9.0	---	---	7.3
	9.1	21.9	32.2	---
	10.7	21.3	32.2	---
	11.0	---	---	7.1
	12.2	20.9	32.2	---
	13.0	---	---	6.4
	13.7	20.8	32.1	---
	15.0	---	---	6.5
	15.2	20.7	32.1	---
16.8	20.9	32.1	---	

TABLE 16 (CONTINUED)

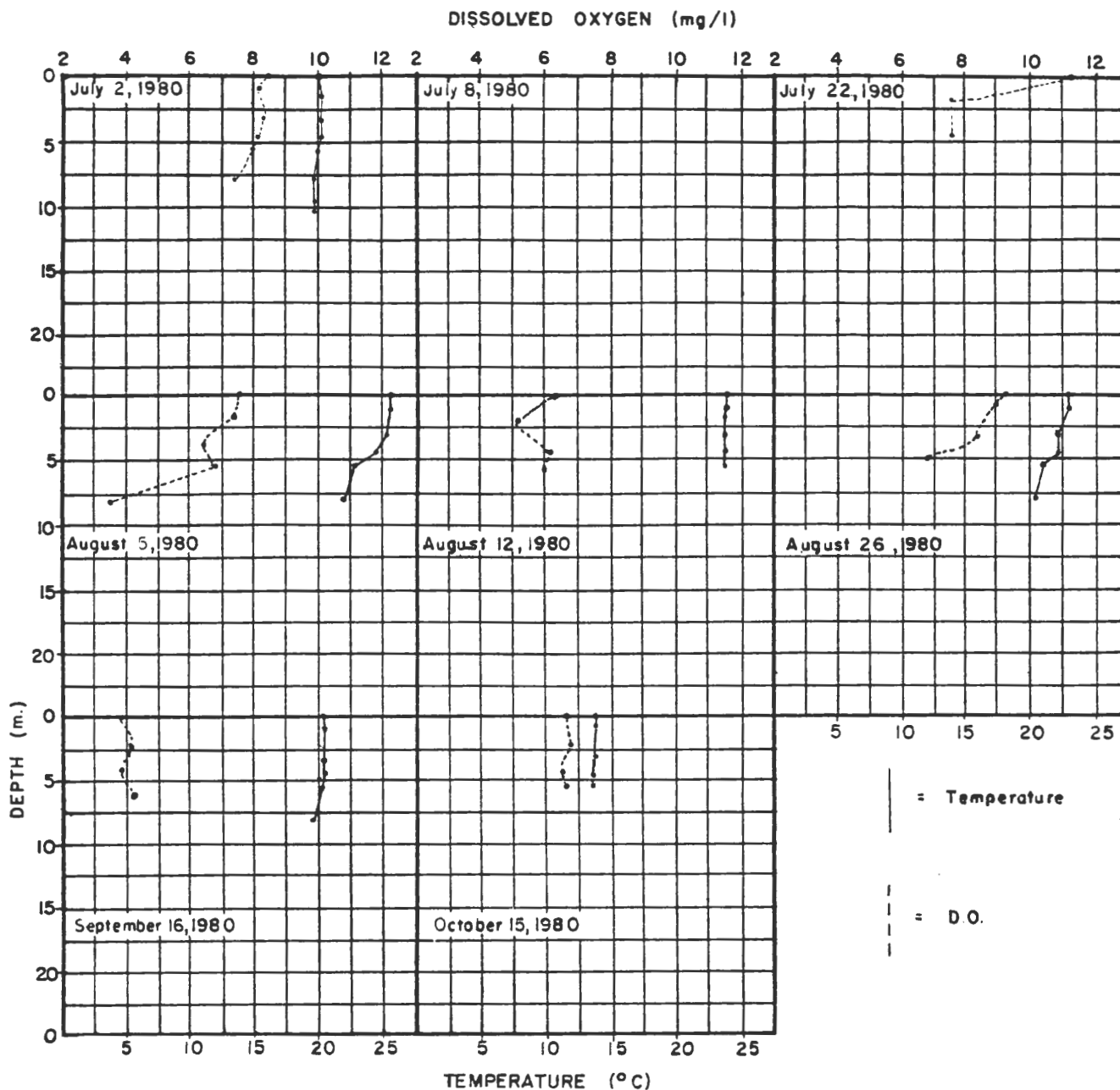
<u>DATE</u>	<u>STATION AND DEPTH (m)</u>	<u>TEMPERATURE (°C)</u>	<u>SALINITY (°/00)</u>	<u>DISSOLVED OXYGEN (mg/l)</u>
8/12/80	F - surface	21.7	32.0	7.4
	1.5	21.8	32.0	---
	2.0	---	---	7.6
	3.0	21.8	32.0	---
	4.0	---	---	7.4
	4.6	21.6	32.2	---
	6.0	---	---	7.6
	6.1	21.0	32.2	---
	7.0	---	---	7.6
	7.6	20.4	32.1	---
	9.0	---	---	7.7
	9.1	18.8	32.1	---
	10.7	18.7	32.1	---
	11.0	---	---	7.0
	12.2	18.7	32.2	---
	13.0	---	---	7.4
	13.7	18.7	32.3	---
15.0	---	---	7.3	
15.2	18.5	32.2	---	
8/26/80	F - surface	20.6	32.2	7.7
	1.0	---	---	7.7
	1.5	20.0	32.2	---
	3.0	19.5	32.3	7.7
	4.6	19.4	32.3	---
	5.0	---	---	7.5
	6.1	19.4	32.2	---
	7.0	---	---	7.6
	7.6	19.4	32.3	---
	9.0	---	---	8.2
	9.1	19.4	32.1	---
	10.7	19.4	32.2	---
	11.0	---	---	7.7
	12.2	19.3	32.2	---
	13.0	---	---	7.0
	13.7	19.2	32.3	---
	15.0	---	---	7.4
15.2	19.1	32.3	---	
9/16/80	F - surface	19.7	34.2	7.9
	1.5	19.7	34.2	7.9
	3.0	19.7	34.1	7.8
	4.6	19.7	33.9	7.9
	6.1	19.7	33.6	7.7
	7.6	19.8	33.5	---
	9.0	---	---	7.9
	9.1	19.8	33.5	---
	10.7	19.8	33.6	---

TABLE 16 (CONTINUED)

<u>DATE</u>	<u>STATION AND DEPTH (m)</u>	<u>TEMPERATURE (°C)</u>	<u>SALINITY (°/00)</u>	<u>DISSOLVED OXYGEN (mg/l)</u>
9/16/80	11.0	---	---	7.9
	12.2	19.6	34.0	---
	13.0	---	---	7.7
	13.7	19.7	33.3	---
	15.0	---	---	7.7
	15.2	19.5	33.3	---
	16.8	19.7	33.3	---
	18.3	19.6	33.3	---
10/15/80	F - surface	14.8	32.4	---
	1.5	14.8	32.4	---
	3.0	14.8	32.4	7.7
	4.6	14.8	32.4	---
	5.0	---	---	7.8
	6.1	14.8	32.4	---
	7.0	---	---	7.6
	7.6	14.9	32.4	---
	9.0	---	---	7.9
	9.1	14.8	32.4	---
	10.7	14.8	32.4	---
	11.0	---	---	7.7
	12.2	14.8	32.4	---
	13.0	---	---	7.7
	13.7	14.8	32.5	---
15.0	---	---	7.7	
15.2	14.8	32.5	---	
7/2/80	G - surface	19.2	32.2	7.8
	1.5	19.7	32.5	---
	4.6	19.7	32.2	---
	6.1	19.8	32.2	---
	7.6	19.8	32.1	---
	9.1	19.7	32.2	---
	10.7	19.7	32.1	8.3
	12.2	19.7	32.1	---
7/8/80	G - surface	19.8	32.0	7.4
	1.5	19.8	31.9	---
	2.0	---	---	7.1
	3.0	19.8	31.9	---
	4.0	---	---	7.0
	4.6	19.8	31.9	---
	6.1	19.7	31.9	---
	7.3	19.8	31.9	---
7/22/80	G - surface	23.0	35.0	7.5
	1.0	---	35.0	---
	2.0	23.0	35.0	6.8
	3.0	---	35.0	---
	4.0	22.5	34.5	7.3

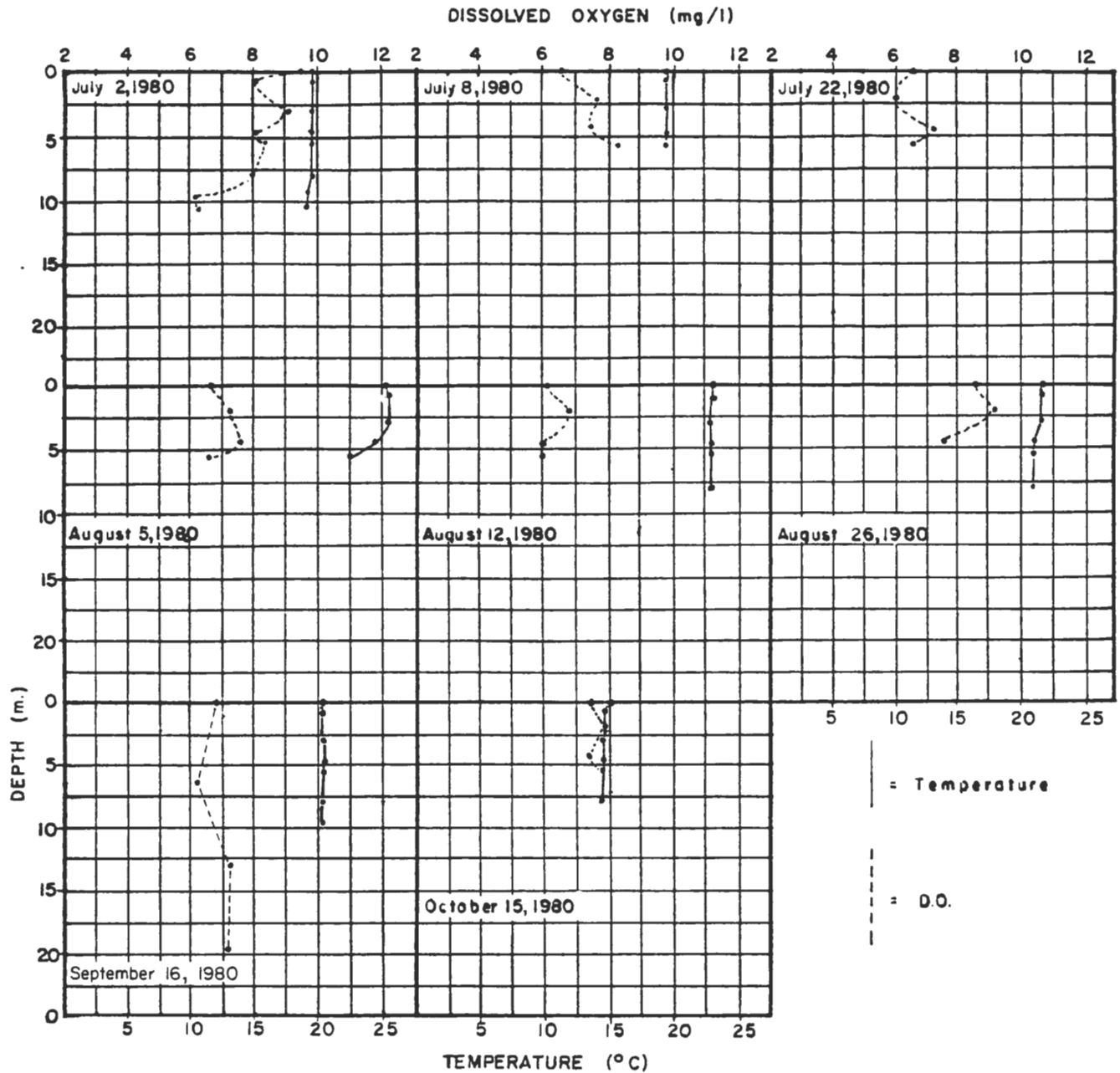
TABLE 16 (CONTINUED)

<u>DATE</u>	<u>STATION AND DEPTH (m)</u>	<u>TEMPERATURE (°C)</u>	<u>SALINITY (°/00)</u>	<u>DISSOLVED OXYGEN (mg/l)</u>
7/22/80	5.0	---	35.0	---
	6.0	22.5	35.0	6.3
	7.0	---	35.5	---
	8.0	22.0	35.2	6.2
8/5/80	G - surface	24.0	32.3	6.0
	1.5	23.8	32.3	---
	2.0	---	---	6.1
	3.0	23.6	32.2	---
	4.0	---	---	5.9
	4.6	23.6	32.3	---
	6.0	---	---	6.2
	6.1	23.3	32.2	---
	7.6	23.3	32.0	---
8/12/80	G - surface	23.1	32.1	6.5
	1.5	23.3	32.2	6.4
	2.0	---	---	6.3
	3.0	23.2	32.2	---
	4.0	---	---	6.2
	4.6	22.8	32.5	---
	5.0	---	---	6.0
	6.1	23.1	32.5	---
	7.6	22.9	32.2	---
8/26/80	G - surface	21.6	32.4	7.7
	1.0	---	---	6.2
	1.5	21.4	32.4	---
	3.0	21.5	32.4	7.5
	4.6	21.5	32.4	---
	5.0	---	---	7.9
	6.1	21.4	32.4	---
	7.6	21.4	32.3	---
9/16/80	G - surface	19.9	33.0	7.0
	1.5	19.9	32.8	---
	2.0	---	---	7.9
	3.0	19.9	32.8	---
	4.0	---	---	6.7
	4.6	30.0	32.9	---
	6.0	---	---	7.1
	6.1	20.0	32.9	---
	7.6	19.9	32.9	---
	8.0	---	---	7.3
	9.1	19.9	32.9	---
10.0	---	---	6.9	



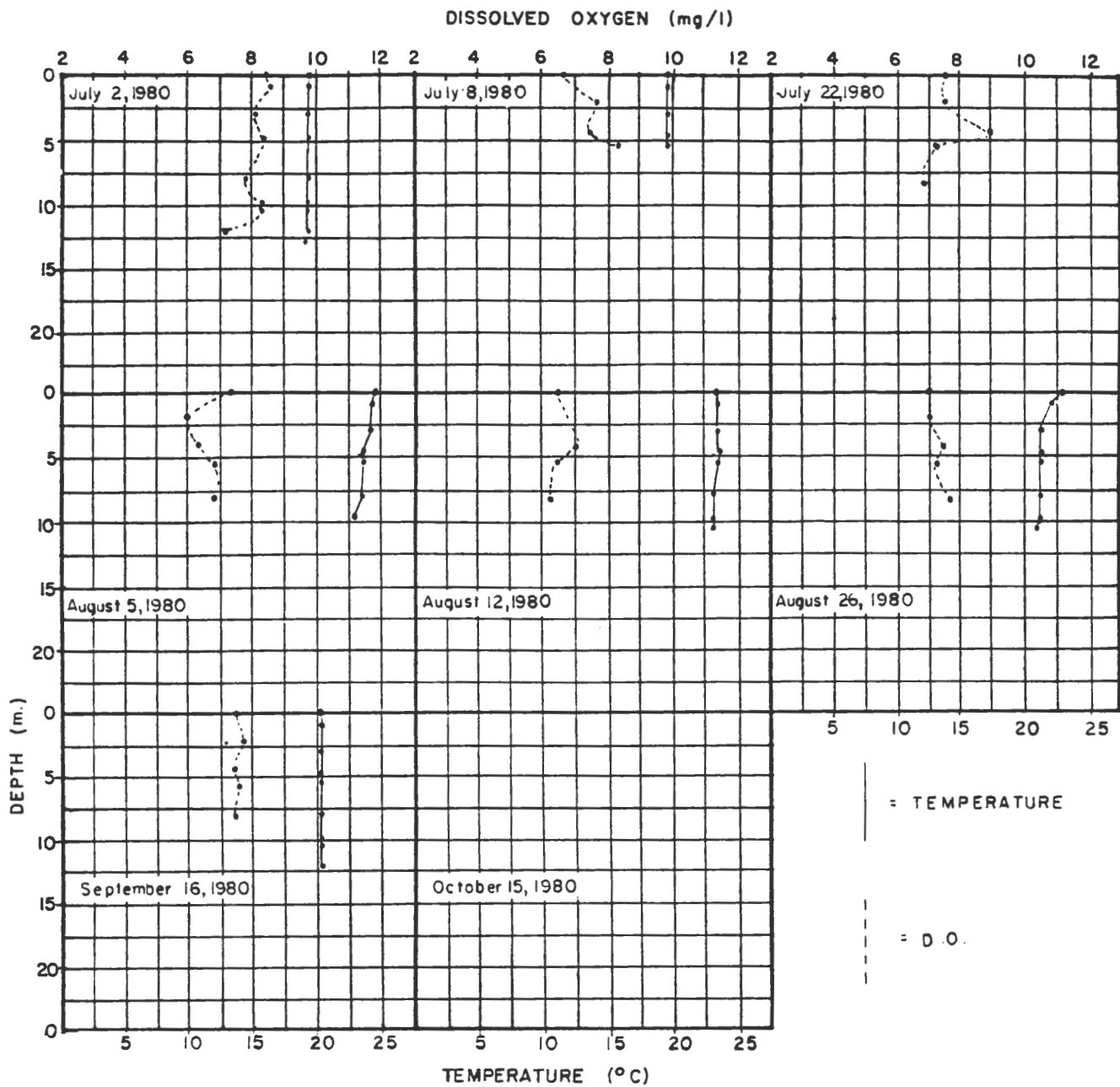
**NEW BEDFORD HARBOR STUDY  
DISSOLVED OXYGEN AND  
TEMPERATURE PROFILES  
STATION A**

FIGURE 2



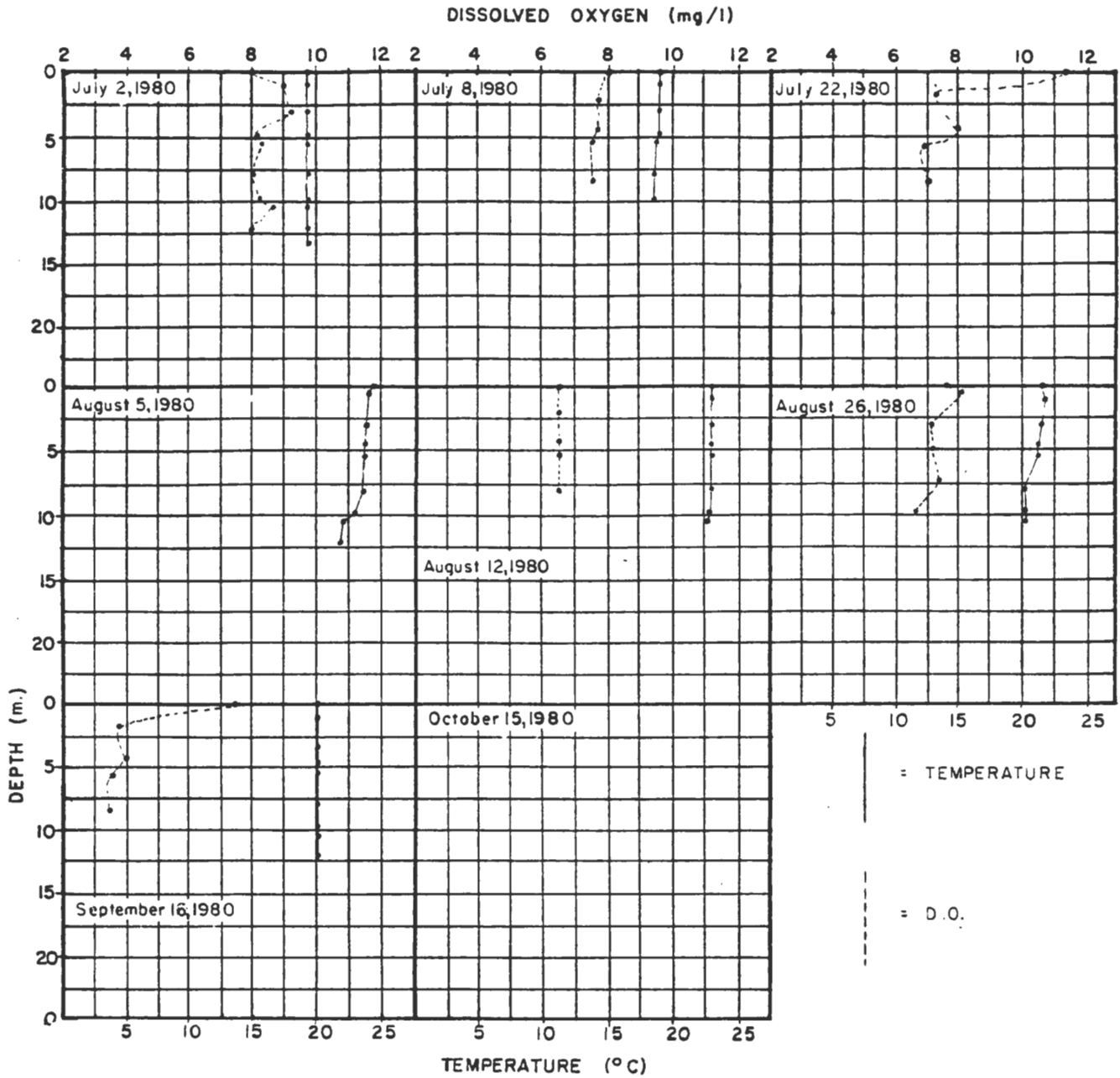
**NEW BEDFORD HARBOR STUDY  
DISSOLVED OXYGEN AND  
TEMPERATURE PROFILES  
STATION B**

FIGURE 3



NEW BEDFORD HARBOR STUDY  
DISSOLVED OXYGEN AND  
TEMPERATURE PROFILES  
STATION C

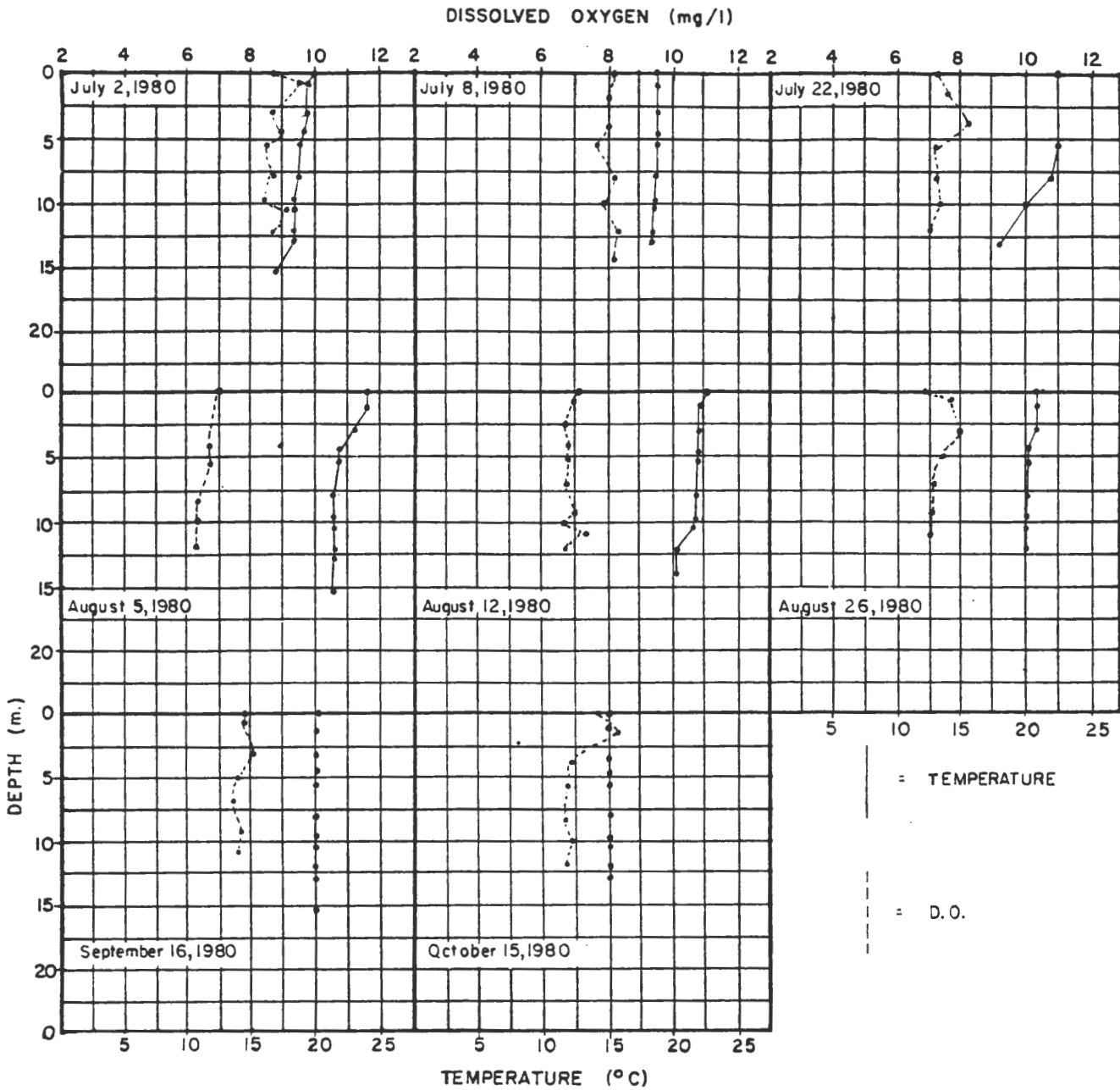
FIGURE 4



NEW BEDFORD HARBOR STUDY  
DISSOLVED OXYGEN AND  
TEMPERATURE PROFILES  
STATION D

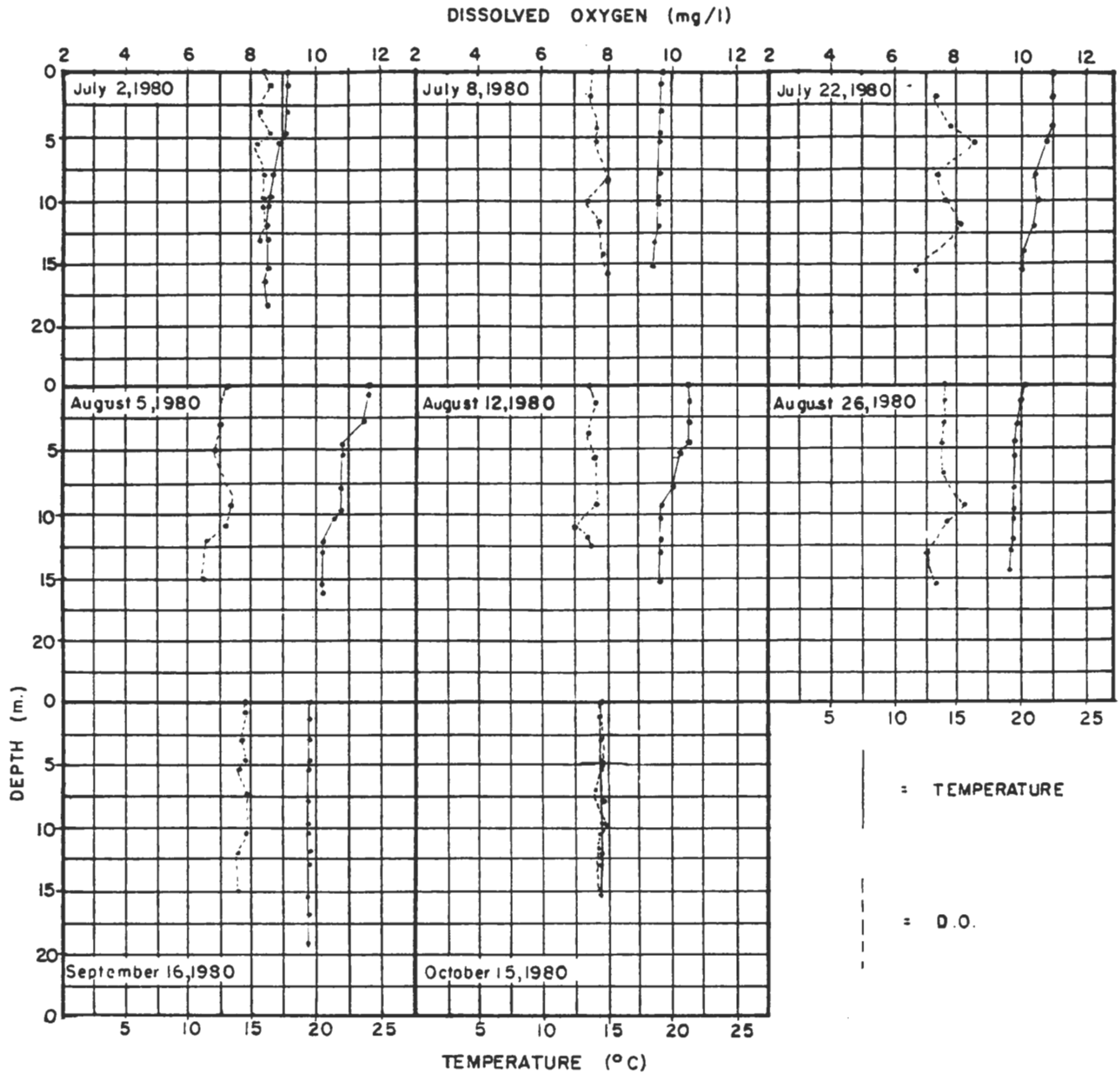
FIGURE 5





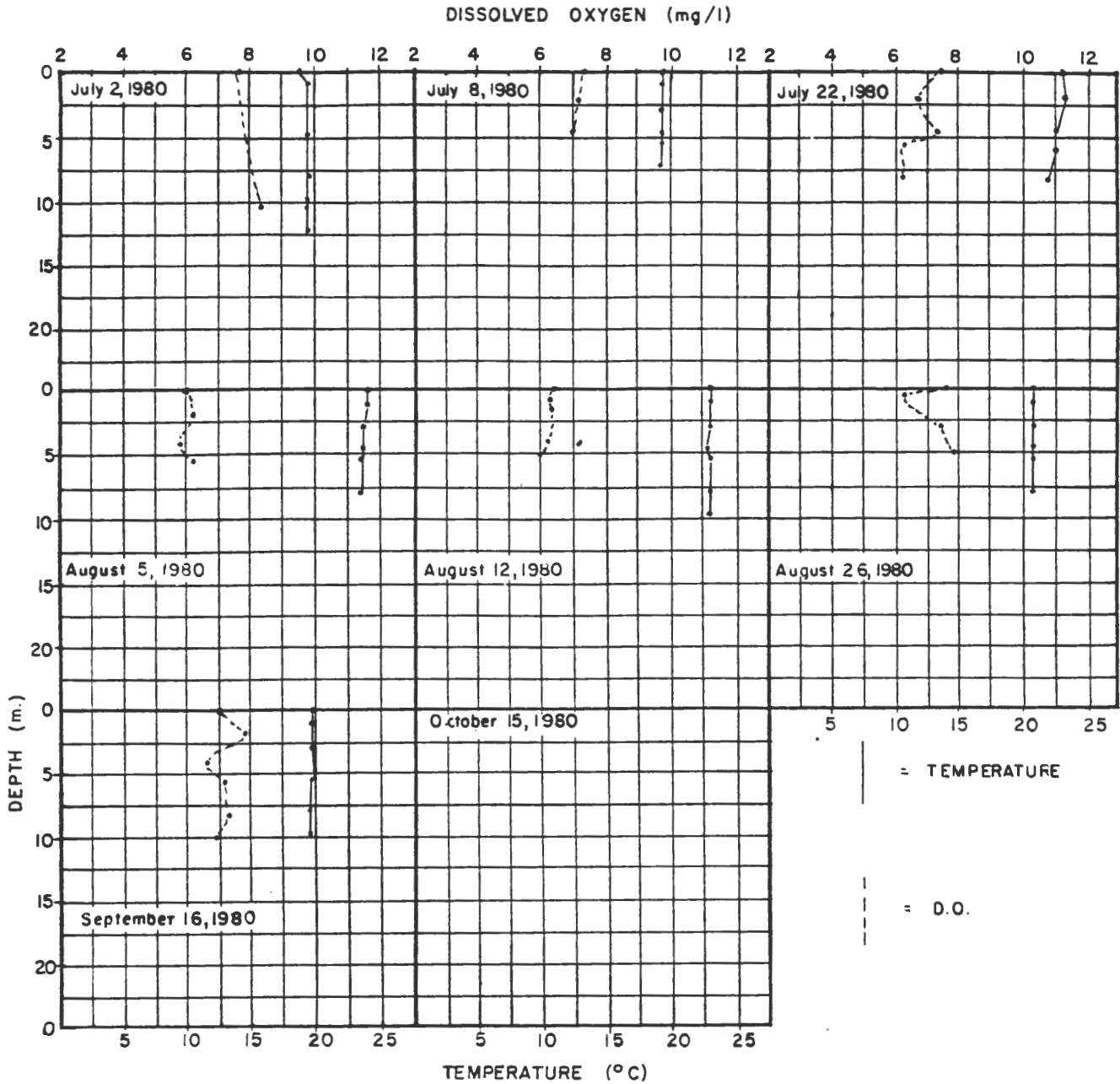
NEW BEDFORD HARBOR STUDY  
DISSOLVED OXYGEN AND  
TEMPERATURE PROFILES  
STATION E

FIGURE 6



NEW BEDFORD HARBOR STUDY  
DISSOLVED OXYGEN AND  
TEMPERATURE PROFILES  
STATION F

FIGURE 7



NEW BEDFORD HARBOR STUDY  
DISSOLVED OXYGEN AND  
TEMPERATURE PROFILES  
STATION G

FIGURE 8

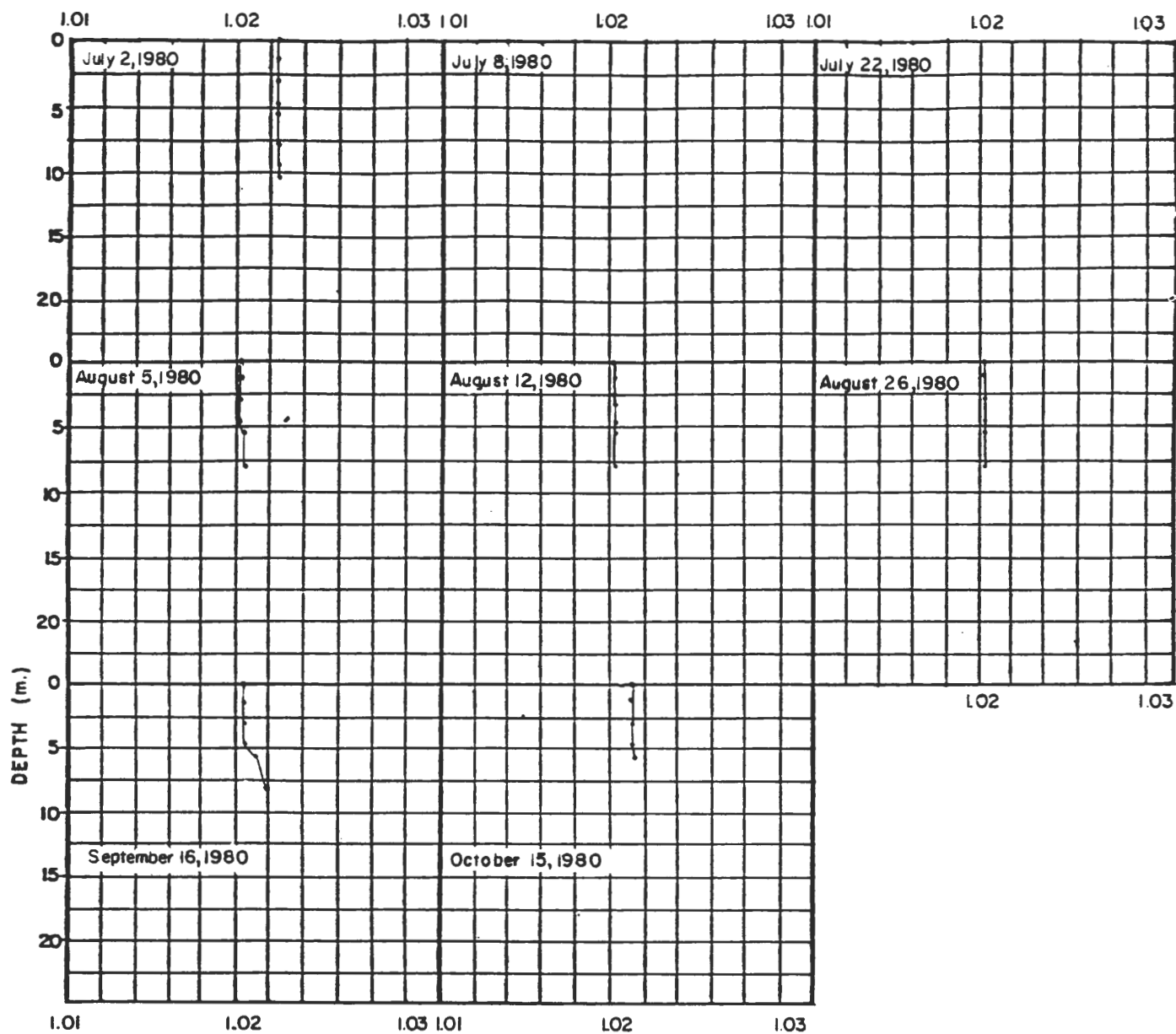
TABLE 17  
 NEW BEDFORD SPECIAL WATER QUALITY STUDY  
 APPROXIMATE SPECIFIC GRAVITY DATA

<u>DATE</u>	<u>STATION AND DEPTH (m)</u>	<u>APPROXIMATE SPECIFIC GRAVITY</u>
7/2/80	A - surface	1.02250
	1.5	1.02250
	3.0	1.02250
	4.6	1.02250
	6.1	1.02250
	7.6	1.02260
	9.1	1.02260
	10.7	1.02260
	8/5/80	A - surface
1.5		1.02110
3.0		1.02110
4.6		1.02110
6.1		1.02150
7.6		1.02170
8/12/80		A - surface
	1.5	1.02110
	3.0	1.02110
	4.6	1.02110
	6.1	1.02110
8/26/80	A - surface	1.02190
	1.5	1.02190
	3.0	1.02200
	4.6	1.02200
	6.1	1.02220
	7.6	1.02220
	9/16/80	A - surface
1.5		1.02300
3.0		1.02300
4.6		1.02300
6.1		1.02370
7.6		1.02400
10/15/80		A - surface
	1.5	1.02360
	3.0	1.02360
	4.6	1.02360
	6.1	1.02370
7/2/80	B - surface	1.02240
	1.5	1.02250
	3.0	1.02250
	4.6	1.02250
	6.1	1.02250
	7.6	1.02250
	9.1	1.02250
	10.7	1.02250

TABLE 17 (CONTINUED)

<u>DATE</u>	<u>STATION AND DEPTH (m)</u>	<u>APPROXIMATE SPECIFIC GRAVITY</u>
7/3/80	B - surface	1.02098
	1.5	1.02250
	3.0	1.02250
	4.6	1.02250
	6.1	1.02290
8/5/80	B - surface	1.01990
	1.5	1.02110
	3.0	1.02110
	4.6	1.02120
	6.1	1.02130
8/12/80	B - surface	1.01970
	1.5	1.01990
	3.0	1.01990
	4.6	1.01990
	6.1	1.01990
	7.6	1.01990
8/26/80	B - surface	1.02020
	1.5	1.02170
	3.0	1.02170
	4.6	1.02200
	6.1	1.02200
	7.6	1.02200
9/16/80	B - surface	1.02370
	1.5	1.02370
	3.0	1.02370
	4.6	1.02370
	6.1	1.02370
	7.6	1.02370
10/15/80	B - surface	1.02215
	1.5	1.02365
	3.0	1.02365
	4.6	1.02365
	6.1	1.02365
	7.6	1.02365

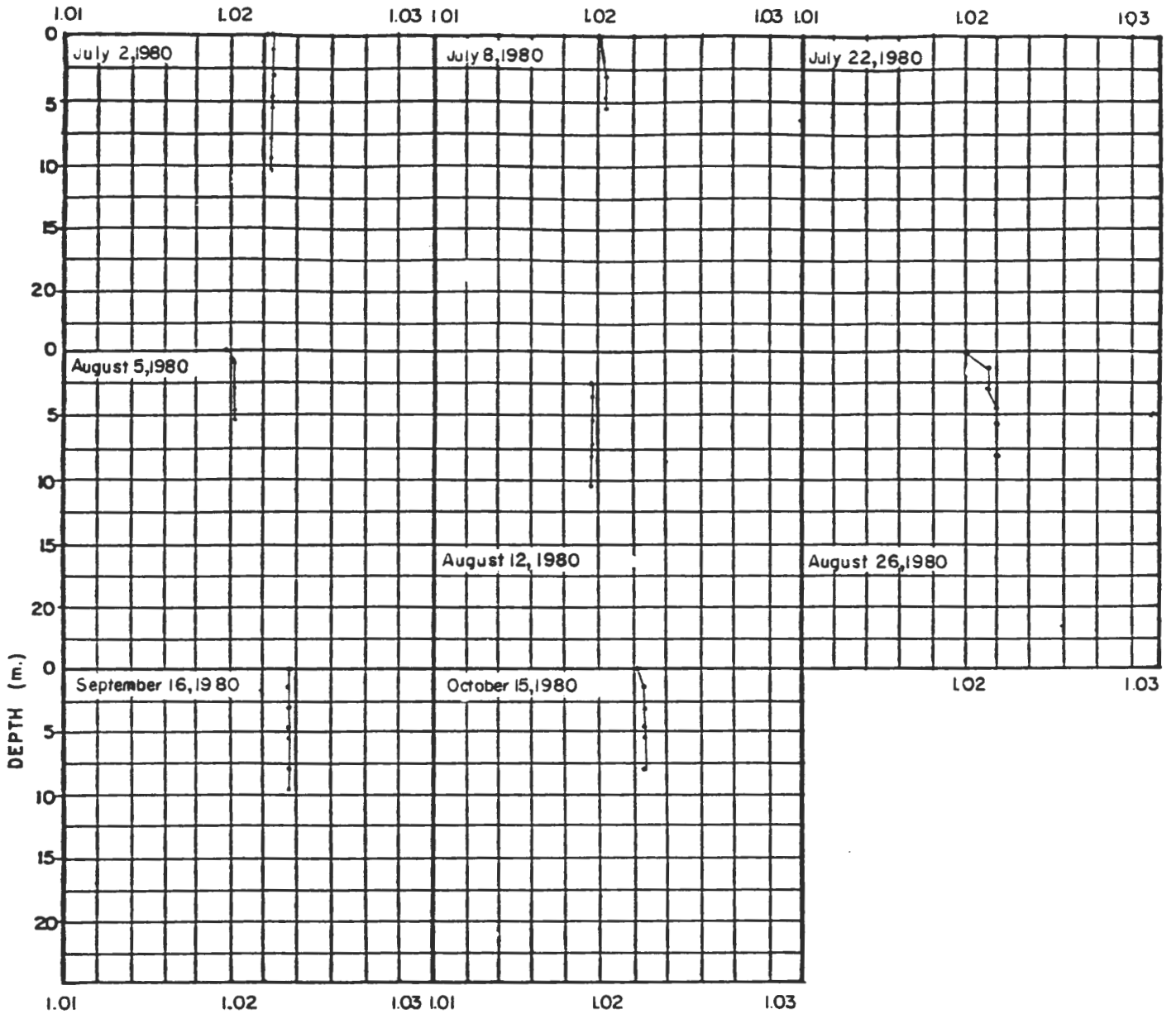
SPECIFIC GRAVITY



NEW BEDFORD HARBOR STUDY  
SPECIFIC GRAVITY PROFILES  
STATION A

FIGURE 9

SPECIFIC GRAVITY



NEW BEDFORD HARBOR STUDY  
SPECIFIC GRAVITY PROFILES  
STATION B

FIGURE 10

