THE ASSABET RIVER

1974

part a

massachusetts water resources commission

DIVISION OF WATER POLLUTION CONTROL

thomas c. mcmahon, director

ASSABET RIVER

1974

WATER QUALITY SURVEY DATA

PREPARED BY
WATER QUALITY SECTION
DIVISION OF WATER POLLUTION CONTROL
MASSACHUSETTS WATER RESOURCES COMMISSION

WESTBOROUGH

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ASSABET RIVER

1974

FOREWORD

This report includes 1974 water quality data pertaining to the Assabet River and its major tributaries. The survey was conducted by the Massachusetts Division of Water Pollution Control.

The present report is a continuum of extensive surveys of the river conducted in 1965 by the Massachusetts Department of Public Health and in 1969 by the Massachusetts Division of Water Pollution Control. Those data were published by Water Resources Commission, Division of Water Pollution Control (see SUASCO River Study, 1965 and the Assabet River Report, 1969).

During the week of June 3-7 samples were collected six times daily from 19 stations on the Assabet River and one sample each from Hocomonco Pond, Boons Pond and Warners Pond. During the week of September 16-20, in addition to the above stations, one sample was collected from Cold Harbor Brook and one sample from North Brook. Samples were collected for dissolved oxygen on three consecutive days. Composite samples were collected on Tuesday and Thursday of the above mentioned weeks for general water quality. Flow measurements were taken both weeks.

Samples were conveyed to the Lawrence Experiment Station of the Massachusetts Department of Public Health for analysis. All analyses were performed according to procedures of A.P.H.A.'s Standard Methods for Examination of Water and Wastewater (13th Edition 1971, New York). Data were compiled and placed in tabular form by personnel of the Massachusetts Division of Water Control, Water Quality Section.

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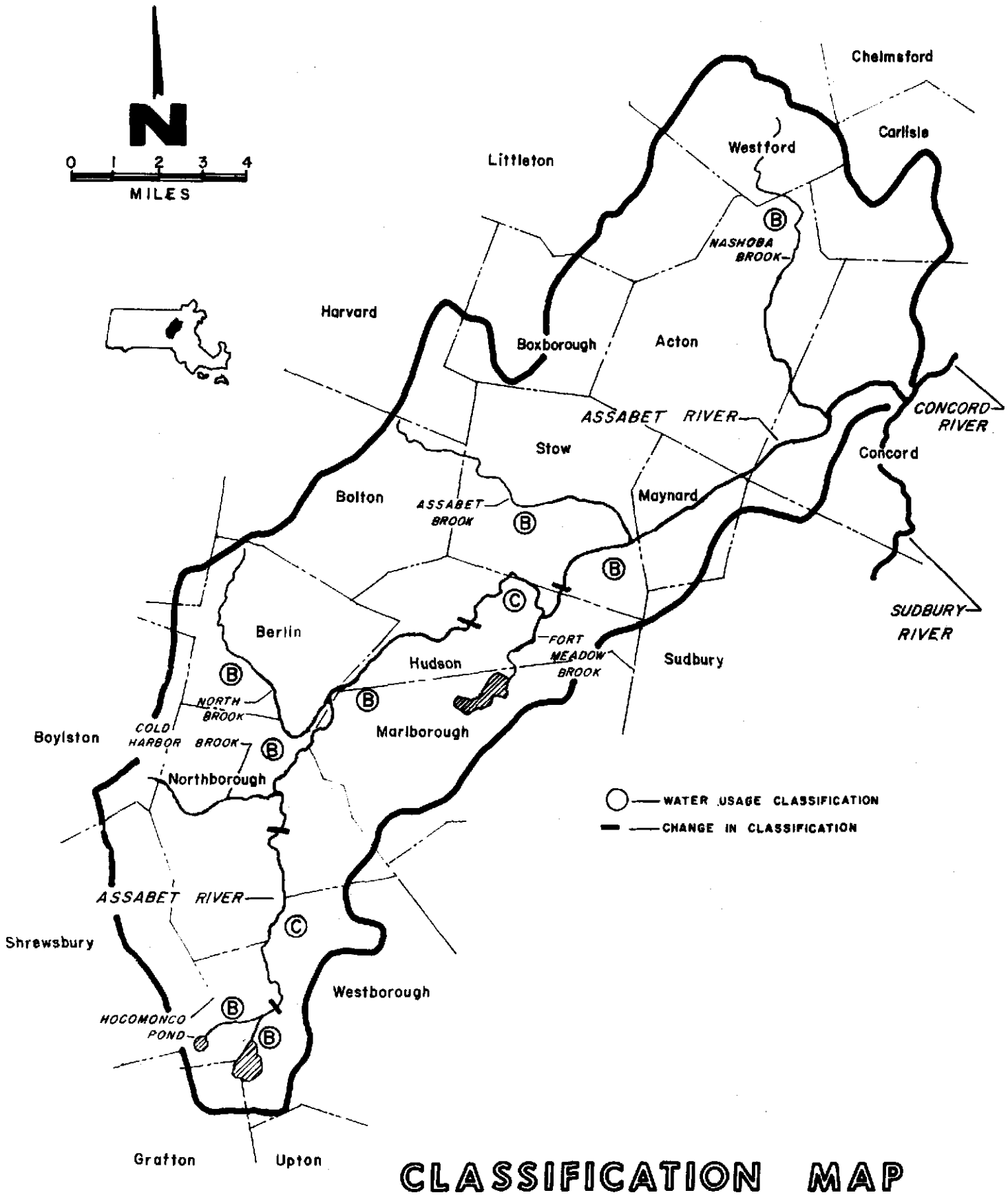
TABLE A

ASSABET RIVER BASIN CLASSIFICATION

BOUNDARY	PRESENT USE	ANTICIPATED FUTURE USE	PRESENT CONDITION	CLASSIFICATION
The Assabet River from its headwaters to the Westborough Sewage Treatment Plant, 0.25 miles south of Route 9, in Westborough	Fish & wildlife propagation, fishing	Same	C	B
The Assabet River from the Westborough Sewage Treatment Plant, 0.25 miles south of Route 9 in Westborough, to the Brigham Street Bridge in Northborough	Assimilation	Fish & wildlife Propagation, fishing, Assimilation	U	C
The Assabet River from the Brigham Street Bridge in Northborough to the Dam in Hudson	Bathing, Fish & wildlife propagation, fishing, Assimilation	Same	C & U	B
The Assabet River from the Dam in Hudson to the confluence with Fort Meadow Brook in Hudson	Fish & wildlife propagation, fishing Assimilation	Same	C & U	C
The Assabet River from the confluence with Fort Meadow Brook in Hudson to its mouth at the Concord River in Concord	Bathing Recreational boating, Fish & wildlife propagation, fishing Assimilation	Same	C	B



CLASSIFICATION MAP

Figure 1

DESCRIPTION OF ASSABET RIVER BASIN

The Assabet River, with its origins in the swampland of southwest Westborough, takes on its first semblance of a stream at the outlet of the newly constructed flow augmentation pond in Westborough. Flowing in a northeast direction, the Assabet River flows through the center of four major population areas - Northborough, Hudson, Maynard, and Concord. In the town of Concord, the Assabet River joins the Sudbury River to form the historic Concord River.

Any river which flows through urban areas is almost certain to have a common characteristic - the existence of dams, used in the past to produce hydroelectric power for the manufacturers in the area. Such is the case with the Assabet River with dams located in Northborough, Hudson, Maynard and a now defunct dam in Concord. The dams alter the natural hydrology of the river and when coupled with pollutant discharges create serious water quality problems. The Assabet River receives the discharge of six sewage treatment plants which cause the degradation of the water quality. Fortunately, there are no major industrial discharges to further complicate the water quality problem.

The total area of the Assabet River basin is 175 square miles. Portions of 18 towns and the city of Marlborough are in this area.

The length of the Assabet River is 31.8 miles from the flow augmentation pond in Westborough to the Sudbury River in Concord.

TABLE 1

ASSABET RIVER 1974 SURVEY

LOCATION OF SAMPLING STATIONS

STATION NUMBER	LOCATION	RIVER MILE
AS01	At Water Intake, Flow Augmentation Pond, Westborough	31.8
AS02	Bridge on Maynard Street, Westborough	31.0
AS03T	Outlet of Hocomonco Pond, Otis Street, Westborough	30.5, 0.5
AS04	Bridge on Route 9, Westborough	30.1
AS05	Bridge on Route 135, Westborough & Northborough Line	29.2
AS06	Bridge on School Street, Northborough	28.3
AS07	Above Dam, Route 20, Northborough	26.5
*AS07T	Outlet Cold Harbor Brook, Hudson Street, Northborough	26.2, 0.1
AS08	Above Dam, Allen Road, Northborough	25.4
AS09	Bridge on Boundary Street, Northborough & Marlborough Line	24.2
AS10	Bridge on Robin Hill Road, Marlborough	23.8
*AS10T	North Brook, Bridge Road, Berlin	22.7
AS11	Bridge on Bigelow Street, Berlin	22.0
AS12	Bridge on Chapin Road, Hudson	19.6
AS13	Above Dam, Route 85, Hudson	18.2
AS14	Cox Street, Hudson	16.2
AS15	Above Dam, Route 62, Gleasondale	14.4
AS16T	Outlet Boons Pond, Stow	12.4, 0.2
AS17	Above Dam, Routes 62 & 117, Maynard	9.0
AS18	Routes 62 & 117, at USGS Gage	7.7
AS19	Above Dam, High Street, Acton	6.5

TABLE 1 (CONTINUED)

STATION NUMBER	LOCATION	RIVER MILE
AS20	Bridge on Route 62, West Concord	4.6
AS21T	Outlet Warners Pond, Commonwealth Avenue, Concord	2.8, 0.2
AS22	Off the shore at the base of Nashawtuc Hill, Concord	0.4

T Denotes tributary to the mainstem of the Assabet River.

* Sampled during week of September 16-20, 1974 only.

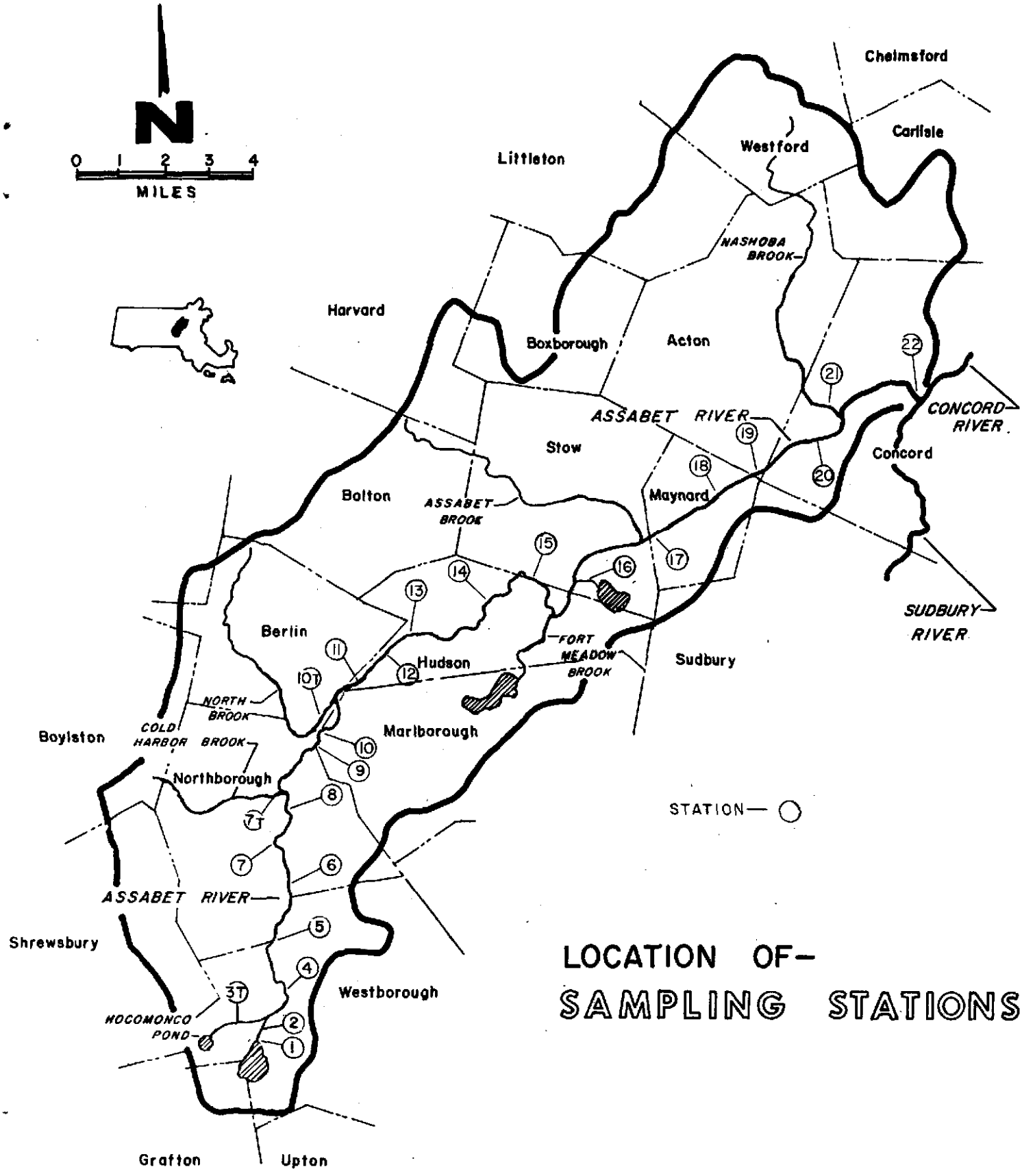

N
0 1 2 3 4
MILES
Chelmsford
Carlisle
Westford
Littleton
NASHOBA BROOK
Harvard
Boxborough
Acton
22
21
ASSABET RIVER
CONCORD RIVER
19
Stow
Concord
18
20
Bolton
ASSABET BROOK
Maynard
15
16
17
14
13
SUDBURY RIVER
Berlin
11
FORT MEADOW BROOK
Hudson
12
Sudbury
10T
NORTH BROOK
COLD HARBOR BROOK
Boylston
Marlborough
10
9
Northborough
8
7T
7
6
ASSABET RIVER
5
Shrewsbury
4
Westborough
3T
HOCOMONCO POND
2
1
Grafton
Upton
STATION
LOCATION OF-
SAMPLING STATIONS

Figure 2

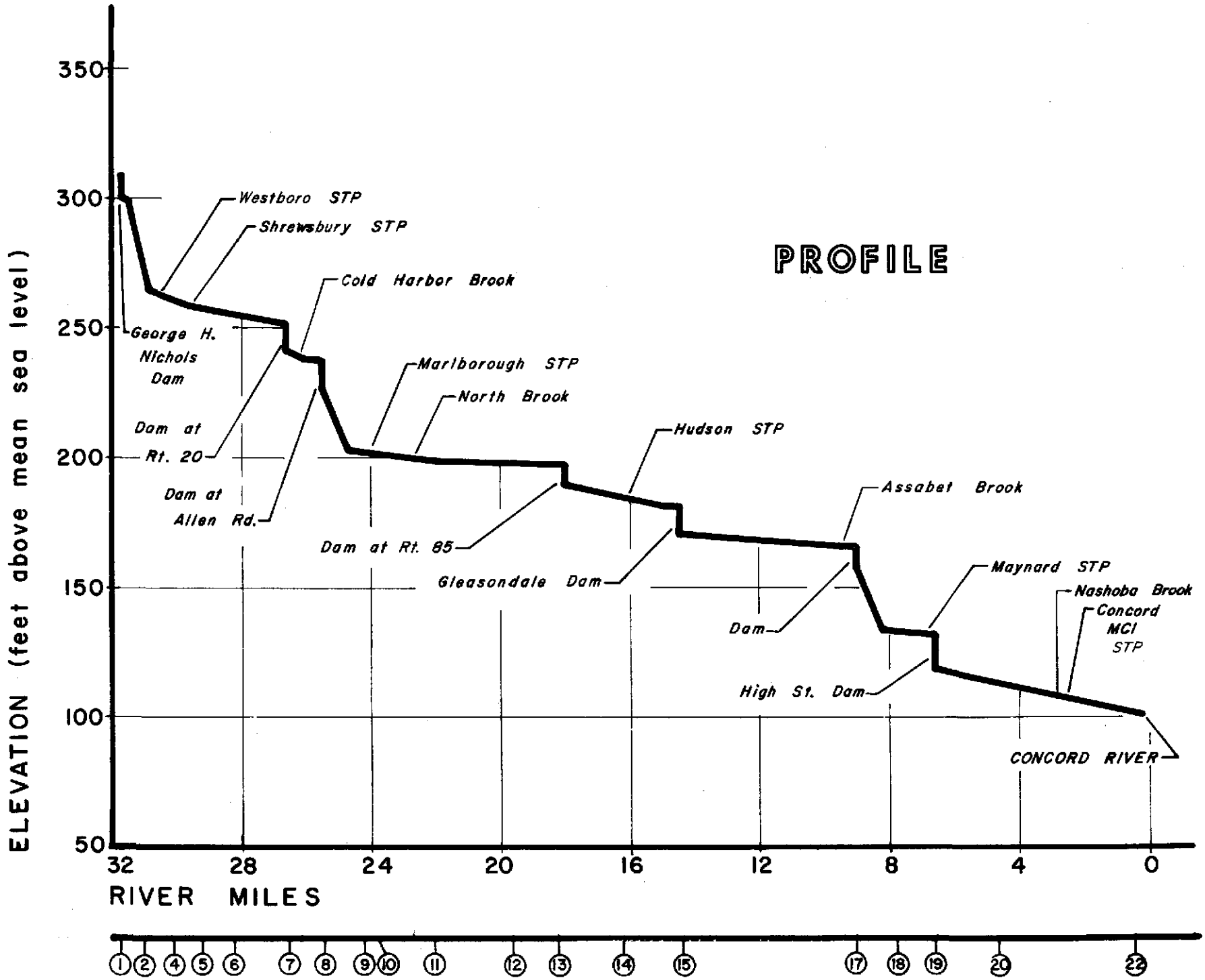

PROFILE
ELEVATION (feet above mean sea level)
350
300
250
200
150
100
50
32
28
24
20
16
12
8
4
0
RIVER MILES
Westboro STP
Shrewsbury STP
Cold Harbor Brook
George H. Nichols Dam
Marlborough STP
North Brook
Dam at Rt. 20
Dam at Allen Rd.
Hudson STP
Assabet Brook
Dam at Rt. 85
Gleasondale Dam
Dam
Maynard STP
Nashoba Brook
Concord MCI STP
High St. Dam
CONCORD RIVER
1 2 4 5 6 7 8 9 10 11 12 13 14 15 17 18 19 20 22

Figure 3

TABLE 2

ASSABET RIVER 1974 SURVEY

DISSOLVED OXYGEN (mg/1) - TIME - TEMPERATURE (F^{o})

		6/4/74						6/5/74			
STATION		RUN 1	RUN 2	RUN 3	RUN 4	RUN 5	RUN 6	RUN 7	RUN 8	RUN 9	RUN 10
AS01	*	0202	0600	1000	1357	1800	2205	0202	0557	0955	1350
	**	63.0	59.0	64.0	66.0	60.0	67.0	66.0	60.0	68.0	73.0
	***	8.3	8.4	7.8	7.5	6.6	7.4	7.7	7.3	7.6	7.6
AS02		0208	0610	1008	1405	1808	2211	0206	0605	1002	1400
		66.0	62.0	65.0	80.0	80.0	76.0	71.0	63.0	74.0	81.0
		8.1	7.2	10.5	10.8	11.1	11.9	8.8	8.5	9.4	10.5
AS03T		0215	0620	1012	1413	1813	2217	0210	0610	1007	1410
		63.0	62.0	67.0	76.0	75.0	70.0	69.0	62.0	72.0	77.0
		9.6	8.4	9.5	9.7	9.7	8.3	6.6	6.3	8.7	9.8
AS04		0220	0628	1016	1417	1818	2219	0214	0615	1010	1415
		60.0	60.0	63.0	69.0	67.0	65.0	66.0	62.0	68.0	74.0
		6.7	7.6	8.1	6.4	7.0	6.3	5.9	6.6	6.9	7.5
AS05		0225	0637	1020	1426	1825	2229	0219	0620	1017	1420
		61.0	60.0	67.0	67.0	68.0	64.0	66.0	61.0	66.0	72.0
		6.8	7.1	7.4	7.2	6.3	6.1	5.0	6.3	6.6	6.8
AS06		0229	0647	1026	1433	1830	2235	0224	0624	1020	1425
		60.0	58.0	60.0	68.0	68.0	68.0	66.0	62.0	66.0	72.0
		4.9	5.0	5.7	5.7	4.2	4.2	3.4	3.3	4.1	4.5
AS07		0235	0652	1035	1440	1835	2241	0229	0632	1030	1435
		61.0	60.0	60.0	66.0	66.0	68.0	68.0	63.0	66.0	70.0
		2.9	2.5	3.2	5.1	3.8	2.6	1.3	1.7	1.7	3.2
AS08		0238	0701	1038	1448	1840	2246	0233	0638	1035	1445
		62.0	62.0	62.0	71.0	67.0	66.0	66.0	65.0	68.0	73.0
		6.5	5.2	6.4	9.2	9.3	6.7	5.3	5.4	5.8	7.8

* Time
** Temperature
*** Dissolved Oxygen

TABLE 2 (continued)

	6/5/74		6/6/74						6/7/74
STATION	RUN 11	RUN 12	RUN 13	RUN 14	RUN 15	RUN 16	RUN 17	RUN 18	RUN 19
AS01	1800	2202	0200	0601	0958	1355	1804	2203	0200
	78.0	72.0	70.0	67.0	68.0	70.0	67.0	69.0	67.0
	6.7	6.7	7.2	6.6	6.6	7.7	6.7	8.1	6.6
AS02	1805	2206	0205	0607	1004	1400	1809	2208	0205
	82.0	75.0	71.0	69.0	71.0	73.0	69.0	72.0	69.0
	9.8	10.6	9.2	8.5	7.3	9.1	9.6	9.0	6.9
AS03T	1810	2214	0211	0613	1008	1406	1814	2212	0209
	77.0	72.0	69.0	67.0	73.0	74.0	71.0	71.0	70.0
	9.6	6.5	5.9	6.4	8.2	9.3	10.2	8.6	6.7
AS04	1818	2218	0215	0618	1012	1412	1818	2216	0213
	76.0	71.0	70.0	67.0	69.0	72.0	68.0	67.0	66.0
	6.6	7.2	5.9	6.0	7.1	9.4	7.8	6.9	6.0
AS05	1825	2222	0221	0623	1020	1417	1823	2223	0219
	73.0	70.0	70.0	64.0	67.0	70.0	67.0	68.0	64.0
	6.4	5.8	4.8	5.8	6.7	7.4	7.1	6.5	5.3
AS06	1830	2227	0225	0628	1026	1423	1827	2230	0222
	72.0	70.0	69.0	65.0	67.0	70.0	69.0	68.0	63.0
	4.4	3.6	7.2	3.1	4.0	4.5	3.7	3.9	3.5
AS07	1840	2232	0231	0635	1040	1430	1833	2235	0230
	72.0	72.0	71.0	67.0	67.0	69.0	68.0	70.0	66.0
	3.2	2.1	5.9	1.6	2.1	3.3	3.4	2.3	1.9
AS08	1845	2239	0235	0631	1038	1434	1837	2241	0233
	71.0	70.0	70.0	69.0	69.0	70.0	68.0	70.0	68.0
	8.5	6.4	7.5	4.8	4.9	7.6	8.7	7.6	4.1

TABLE 2 (continued)

STATION	6/4/74 RUN 1	RUN 2	RUN 3	RUN 4	RUN 5	RUN 6	6/5/74 RUN 7	RUN 8	RUN 9	RUN 10
AS09	0245	0710	1045	1455	1845	2251	0238	0642	1041	1450
	61.0	60.0	62.0	67.0	66.0	65.0	65.0	64.0	67.0	72.0
	6.3	6.4	8.7	9.2	7.2	5.6	5.2	5.4	7.7	8.3
AS10	0250	0723	1049	1500	1850	2255	0242	0645	1044	1455
	61.0	59.0	62.0	68.0	66.0	65.0	66.0	64.0	67.0	72.0
	6.2	6.2	8.4	8.9	7.3	6.1	5.2	5.5	7.3	8.0
AS11	0257	0730	1055	1508	1855	2301	0247	0652	1052	1505
	60.0	60.0	62.0	68.0	67.0	66.0	65.0	63.0	66.0	72.0
	6.3	6.7	8.7	10.0	5.8	6.1	5.2	5.8	8.1	9.9
AS12	0304	0739	1101	1515	1900	2310	0251	0657	1056	1510
	62.0	60.0	62.0	66.0	66.0	67.0	67.0	63.0	66.0	70.0
	9.9	5.4	7.0	8.7	9.2	9.3	6.0	4.7	6.1	8.0
AS13	0311	0745	1108	1523	1907	2317	0257	0705	1104	1520
	61.0	62.0	62.0	67.0	66.0	66.0	66.0	65.0	69.0	72.0
	8.5	7.1	8.6	8.6	9.2	9.4	8.6	6.8	6.1	7.1
AS14	0317	0755	1115	1532	1917	2324	0303	0714	1112	1540
	61.0	63.0	64.0	67.0	68.0	66.0	66.0	64.0	68.0	73.0
	9.4	9.4	10.3	10.7	8.2	7.5	7.3	7.8	9.7	10.7
AS15	0333	0805	1123	1540	1925	2329	0307	0725	1123	1550
	61.0	60.0	63.0	68.0	68.0	68.0	68.0	65.0	67.0	70.0
	7.9	6.5	7.9	8.6	8.8	9.4	7.0	5.9	6.0	7.7

TABLE 2 (continued)

STATION	6/5/74 RUN 11	6/5/74 RUN 12	6/6/74 RUN 13	6/6/74 RUN 14	6/6/74 RUN 15	6/6/74 RUN 16	6/7/74 RUN 17	6/7/74 RUN 18	6/7/74 RUN 19
AS09	1850	2247	0240	0645	1044	1439	1842	2245	0238
	71.0	70.0	69.0	65.0	69.0	70.0	69.0	68.0	65.0
	7.1	5.1	8.0	5.0	7.3	8.2	7.1	4.8	4.9
AS10	1852	2250	0244	0647	1048	1443	1845	2247	0240
	71.0	70.0	69.0	67.0	68.0	70.0	67.0	68.0	66.0
	7.6	5.3	8.4	4.9	7.1	8.1	7.5	5.5	5.3
AS11	1900	2255	0251	0656	1105	1449	1851	2250	0246
	72.0	70.0	69.0	65.0	68.0	69.0	67.0	69.0	65.0
	7.1	5.2	7.5	5.0	7.9	9.7	7.8	5.5	4.8
AS12	1905	2301	0257	0701	1103	1455	1857	2301	0251
	70.0	70.0	69.0	68.0	69.0	69.0	69.0	69.0	68.0
	8.7	7.7	8.1	4.0	5.9	7.6	8.3	7.6	6.2
AS13	1910	2306	0303	0710	1119	1502	1903	2307	0256
	71.0	70.0	69.0	69.0	71.0	70.0	68.0	70.0	68.0
	8.0	7.9	7.3	6.2	5.6	6.8	8.0	8.0	6.8
AS14	1920	2315	0309	0718	1127	1510	1910	2315	0303
	72.0	70.0	70.0	67.0	69.0	71.0	67.0	70.0	68.0
	8.2	7.1	6.5	6.7	9.3	9.8	9.0	7.0	5.9
AS15	1928	2326	0316	0729	1143	1517	1917	2320	0309
	72.0	70.0	70.0	68.0	69.0	69.0	69.0	70.0	68.0
	9.2	8.5	6.8	5.5	5.5	7.0	7.6	8.2	7.0

TABLE 2 (continued)

STATION	6/4/74 RUN 1	RUN 2	RUN 3	RUN 4	RUN 5	RUN 6	6/5/74 RUN 7	RUN 8	RUN 9	RUN 10
AS16 T	0340	0817	1130	1550	1935	2336	0315	0730	1128	1555
	64.0	65.0	66.0	72.0	70.0	67.0	68.0	67.0	74.0	70.0
	10.6	10.0	10.0	9.5	9.5	11.2	9.8	10.0	9.4	9.7
AS17	0353	0823	1144	1605	1947	2349	0325	0741	1145	1620
	63.0	62.0	65.0	66.0	67.0	67.0	68.0	65.0	71.0	71.0
	10.0	7.9	8.0	7.8	7.1	7.4	8.2	7.5	7.9	7.2
AS18	0358	0830	1150	1615	1957	2357	0330	0749	1151	1630
	61.0	63.0	64.0	68.0	66.0	66.0	67.0	67.0	71.0	72.0
	8.6	9.3	9.9	8.8	8.7	7.8	7.9	8.5	9.0	8.9
AS19	0417	0838	1155	1622	2003	0005	0335	0757	1200	1635
	61.0	62.0	64.0	71.0	68.0	66.0	67.0	65.0	70.0	74.0
	8.2	7.9	8.7	8.8	9.2	8.2	7.2	7.2	7.8	9.2
AS20	0424	0845	1205	1630	2007	0010	0339	0803	1204	1645
	63.0	61.0	65.0	69.0	67.0	67.0	66.0	65.0	70.0	74.0
	8.8	9.8	10.5	9.2	7.1	7.6	6.8	8.0	8.5	8.4
AS21 T	0428	0850	1208	1635	2012	0015	0344	0808	1206	1650
	62.0	62.0	63.0	66.0	64.0	67.0	67.0	65.0	68.0	70.0
	9.8	9.2	9.6	8.7	9.7	9.1	8.6	8.6	8.3	8.2
AS22	0438	0900	1225	1645	2025	0026	0353	0819	1217	1700
	62.0	60.0	63.0	68.0	67.0	67.0	66.0	69.0	70.0	72.0
	7.9	8.5	9.1	9.0	9.3	8.5	7.0	6.8	7.0	8.2

TABLE 2 (continued)

STATION	6/5/74 RUN 11	6/5/74 RUN 12	6/6/74 RUN 13	6/6/74 RUN 14	6/6/74 RUN 15	6/6/74 RUN 16	6/7/74 RUN 17	6/7/74 RUN 18	6/7/74 RUN 19
AS16T	1935	2333	0322	0732	1141	1525	1923	2327	0317
	70.0	69.0	70.0	67.0	69.0	69.0	67.0	69.0	69.0
	9.8	9.6	9.7	9.8	9.4	9.5	9.6	9.3	9.2
AS17	1948	2343	0335	0745	1153	1537	1934	2337	0326
	71.0	70.0	70.0	69.0	71.0	71.0	67.0	70.0	69.0
	7.6	7.3	6.8	6.6	6.9	7.5	7.5	7.6	6.4
AS18	1950	2350	0340	0754	1212	1545	1942	2344	0333
	71.0	70.0	69.0	69.0	69.0	69.0	65.0	69.0	68.0
	7.7	7.2	7.2	7.1	8.7	8.7	7.5	7.4	7.4
AS19	2000	2356	0346	0757	1206	1553	1947	2347	0339
	72.0	70.0	70.0	69.0	69.0	69.0	69.0	70.0	68.0
	8.6	7.9	6.4	6.6	6.5	8.2	8.4	8.4	6.5
AS20	2005	0003	0351	0805	1225	1559	1951	2354	0344
	72.0	70.0	70.0	67.0	70.0	69.0	67.0	70.0	68.0
	7.2	7.5	6.6	7.5	8.7	8.8	8.1	7.3	6.8
AS21T	2010	0008	0356	0808	1218	1604	1956	2357	0348
	70.0	70.0	70.0	69.0	71.0	69.0	68.0	70.0	69.0
	8.7	8.7	8.9	8.1	8.4	8.3	8.3	8.9	9.0
AS22	2020	0017	0406	0827	1241	1614	2006	0004	0357
	72.0	70.0	70.0	68.0	69.0	----	69.0	69.0	67.0
	8.0	7.5	6.6	6.5	6.8	7.4	7.9	8.0	6.3

TABLE 3

ASSABET RIVER 1974 SURVEY

DISSOLVED OXYGEN (mg/l) - TIME - TEMPERATURE (F^{O})

STATION		9/17/74 RUN 2	RUN 3	RUN 4	RUN 5	RUN 6	9/18/74 RUN 7	RUN 8	RUN 9	RUN 10	RUN 11
AS01	*	0605	1004	1405	1805	2209	0208	0605	1011	1410	1800
	**	63.0	65.0	75.0	71.0	68.0	68.0	65.0	68.0	71.0	70.0
	***	4.5	5.8	8.6	9.1	6.8	6.0	4.8	5.8	8.1	8.6
AS02		0558	1000	1400	1800	2200	0200	0600	1006	1400	1756
		62.0	62.0	68.0	69.0	68.0	67.0	64.0	64.0	69.0	70.0
		6.8	6.8	6.7	6.3	6.2	6.7	6.1	6.4	5.7	6.4
AS03T		0610	1010	1410	1810	2213	0213	0615	1016	1415	1805
		63.0	64.0	74.0	70.0	69.0	67.0	64.0	67.0	70.0	70.0
		6.1	6.7	9.2	9.3	7.7	6.5	5.9	7.3	9.0	9.6
AS04		0615	1015	1412	1815	2217	0217	0625	1020	1420	1810
		61.0	62.0	70.0	68.0	67.0	66.0	64.0	65.0	68.0	68.0
		5.8	6.6	6.9	6.2	4.9	5.0	4.8	6.0	6.1	5.9
AS05		0621	1020	1420	1820	2222	0221	0630	1024	1425	1815
		60.0	61.0	66.0	66.0	65.0	66.0	63.0	64.0	69.0	66.0
		5.2	5.3	5.9	6.1	4.8	4.6	4.3	4.5	4.9	5.3
AS06		0627	1025	1425	1825	2228	0225	0640	1028	1430	1820
		60.0	61.0	70.0	66.0	65.0	65.0	63.0	63.0	67.0	67.0
		6.3	4.2	4.7	4.8	3.7	3.3	2.9	3.2	3.7	3.8
AS07		0635	1030	1430	1830	2234	0231	0645	1035	1435	1823
		61.0	61.0	63.0	71.0	64.0	64.0	62.0	64.0	65.0	65.0
		2.3	3.2	3.3	3.1	1.4	2.2	2.0	2.7	2.8	2.3
AS07T		0640	1035	1435	1835	2237	0235	0655	1038	1440	1828
		58.0	61.0	62.0	64.0	62.0	62.0	60.0	63.0	66.0	67.0
		8.4	9.0	9.1	7.8	9.0	8.6	7.9	8.1	8.6	9.2

* Time
** Temperature
*** Dissolved Oxygen

TABLE 3 (CONTINUED)

	9/18/74	9/19/74						9/20/74	
STATION	RUN 12	RUN 13	RUN 14	RUN 15	RUN 16	RUN 17	RUN 18	RUN 19	RUN 20
AS01	2207	0205	0605	1007	1405	1805	2205	0210	0604
	65.0	65.0	65.0	67.0	70.0	70.0	70.0	69.0	68.0
	6.9	5.1	5.0	5.4	9.8	9.1	6.8	5.6	5.2
AS02	2202	0200	0600	1005	1400	1800	2201	0206	0600
	64.0	64.0	65.0	66.0	69.0	70.0	69.0	68.0	67.0
	6.6	5.9	6.2	6.3	6.0	6.2	6.0	5.8	5.7
AS03T	2214	0210	0612	1013	1410	1810	2212	0215	0610
	66.0	65.0	64.0	67.0	70.0	70.0	69.0	68.0	67.0
	7.5	6.7	5.9	7.4	9.2	10.0	8.7	7.6	6.6
AS04	2217	0214	0616	1018	1415	1812	2218	0218	0614
	64.0	63.0	64.0	66.0	69.0	69.0	69.0	67.0	66.0
	5.4	5.6	5.6	5.8	6.5	7.1	5.3	5.3	5.1
AS05	2222	0219	0622	1023	1420	1815	2222	0222	0618
	64.0	64.0	63.0	65.0	66.0	67.0	67.0	66.0	65.0
	4.6	4.2	4.7	4.9	5.4	5.6	4.4	4.0	3.9
AS06	2228	0225	0628	1028	1425	1820	2227	0226	0622
	63.0	63.0	64.0	64.0	67.0	67.0	67.0	66.0	65.0
	2.8	3.2	3.0	3.2	3.9	3.7	3.6	2.6	2.5
AS07	2234	0230	0635	1034	1430	1825	2232	0231	0627
	63.0	63.0	64.0	65.0	65.0	67.0	66.0	66.0	65.0
	1.5	1.5	1.2	2.2	2.7	2.1	2.0	1.4	1.4
AS07T	2240	0233	0639	1038	1435	1830	2235	0235	0630
	61.0	61.0	62.0	63.0	66.0	65.0	65.0	64.0	64.0
	8.6	8.8	7.2	7.7	8.7	8.7	8.5	8.1	7.5

TABLE 3 (CONTINUED)

STATION	9/17/74 RUN 2	RUN 3	RUN 4	RUN 5	RUN 6	9/18/74 RUN 7	RUN 8	RUN 9	RUN 10	RUN 11
AS08	0653	1040	1440	1843	2240	0239	0700	1042	1445	1830
	61.0	64.0	65.0	63.0	63.0	63.0	62.0	63.0	68.0	68.0
	4.5	4.5	5.8	6.1	5.7	4.7	4.5	3.7	4.6	6.8
AS09	0659	1046	1445	1850	2245	0243	0707	1046	1450	1835
	59.0	61.0	65.0	65.0	63.0	62.0	60.0	61.0	66.0	66.0
	5.2	6.7	7.2	5.9	4.1	4.3	4.9	6.0	7.1	5.8
AS10	0703	1050	1450	1925	2248	0247	0712	1050	1455	1837
	59.0	61.0	67.0	66.0	64.0	64.0	62.0	63.0	67.0	66.0
	4.8	6.3	7.4	6.1	4.3	4.2	4.3	5.6	7.5	6.4
AS10T	0715	1101	1505	1955	2300	0258	0725	1100	1505	1845
	60.0	63.0	67.0	65.0	65.0	65.0	62.0	65.0	67.0	67.0
	6.7	9.1	9.3	8.0	7.1	7.1	7.4	9.4	9.4	7.2
AS11	0710	1055	1500	1940	2255	0254	0720	1055	1500	1840
	60.0	61.0	64.0	65.0	65.0	64.0	62.0	63.0	67.0	66.0
	5.1	7.6	10.1	7.8	5.4	4.7	3.9	7.2	10.3	7.8
AS12	0723	1107	1510	1945	2306	0306	0735	1107	1515	1852
	62.0	62.0	64.0	64.0	64.0	64.0	61.0	63.0	66.0	65.0
	6.0	5.3	6.1	6.7	6.1	6.5	6.6	6.0	5.9	5.6
AS13	0730	1113	1520	2000	2313	0312	0740	1115	1520	1900
	63.0	65.0	67.0	66.0	65.0	65.0	64.0	66.0	67.0	67.0
	4.7	5.1	6.5	7.5	6.8	6.3	5.7	6.0	5.9	6.5
AS14	0738	1120	1530	2005	2318	0318	0755	1124	1530	1905
	63.0	64.0	68.0	67.0	67.0	66.0	63.0	64.0	69.0	69.0
	5.7	8.2	10.6	8.8	5.8	3.9	4.6	7.1	10.0	8.3

TABLE 3 (CONTINUED)

	9/18/74		9/19/74					9/20/74	
STATION	RUN 12	RUN 13	RUN 14	RUN 15	RUN 16	RUN 17	RUN 18	RUN 19	RUN 20
AS08	2244	0237	0655	1042	1440	1835	2239	0238	0647
	63.0	63.0	63.0	66.0	69.0	68.0	67.0	66.0	65.0
	55.3	4.7	4.0	3.3	5.2	5.9	6.3	6.4	4.2
AS09	2250	0242	0700	1046	1445	1840	2244	0241	0651
	62.0	62.0	62.0	64.0	67.0	66.0	65.0	65.0	64.0
	3.8	3.9	4.0	5.5	7.4	5.5	3.3	3.5	3.3
AS10	2252	0245	0705	1050	1450	1845	2247	0244	0655
	62.0	62.0	63.0	65.0	68.0	67.0	66.0	66.0	65.0
	4.4	4.3	4.3	5.0	7.1	5.8	3.7	3.2	3.3
AS10T	2302	0257	0715	1104	1500	1855	2258	0253	0705
	65.0	63.0	64.0	66.0	68.0	67.0	66.0	66.0	64.0
	6.8	7.4	7.1	9.4	9.8	8.5	7.1	6.9	7.1
AS11	2258	0251	0710	1058	1455	1850	2253	0249	0700
	63.0	63.0	63.0	64.0	67.0	66.0	66.0	66.0	65.0
	5.0	4.8	4.0	7.2	10.2	7.8	5.2	4.8	3.1
AS12	2310	0304	0723	1111	1505	1900	2305	0300	0710
	62.0	63.0	64.0	65.0	67.0	66.0	66.0	66.0	66.0
	4.8	5.5	6.6	5.9	5.9	6.9	5.0	5.4	6.0
AS13	2317	0309	0730	1118	1515	1905	2312	0305	0715
	63.0	64.0	65.0	65.0	68.0	68.0	67.0	66.0	65.0
	6.9	6.9	6.3	6.3	6.7	6.9	7.2	7.0	6.9
AS14	2323	0316	0735	1128	1523	1915	2316	0310	0725
	63.0	63.0	64.0	67.0	69.0	69.0	68.0	68.0	66.0
	4.7	2.6	4.0	6.4	10.1	8.2	4.9	3.0	3.0

TABLE 3 (CONTINUED)

STATION	9/17/74 RUN 2	RUN 3	RUN 4	RUN 5	RUN 6	9/18/74 RUN 7	RUN 8	RUN 9	RUN 10	RUN 11
AS15	0745	1130	1540	2020	2324	0325	0800	1130	1545	1910
	65.0	65.0	67.0	66.0	66.0	67.0	65.0	67.0	69.0	67.0
	5.2	3.9	4.7	4.0	3.9	4.0	4.2	4.2	3.9	2.8
AS16T	0752	1135	1545	2025	2332	0333	0812	1136	1550	1915
	68.0	72.0	70.0	70.0	70.0	70.0	68.0	70.0	72.0	71.0
	7.6	9.0	8.6	8.7	8.1	8.3	8.5	8.6	8.8	8.0
AS17	0804	1147	1600	2030	2343	0344	0825	1147	1605	1925
	66.0	67.0	69.0	69.0	68.0	68.0	65.0	68.0	68.0	68.0
	6.2	8.4	9.2	9.4	8.7	7.8	7.4	8.1	9.4	7.1
AS18	0810	1153	1605	2035	2348	0349	0830	1153	1615	1933
	65.0	67.0	69.0	68.0	67.0	68.0	63.0	68.0	70.0	68.0
	7.2	6.0	8.8	7.3	6.5	6.4	7.0	8.9	8.8	7.3
AS19	0815	1205	1615	2045	2355	0355	0845	1158	1620	1945
	63.0	68.0	69.0	68.0	68.0	68.0	66.0	69.0	68.0	68.0
	6.3	6.8	7.7	8.7	8.3	7.2	4.5	5.9	7.1	8.9
AS20	0821	1210	1620	2052	0000	0400	0855	1205	1625	1950
	64.0	69.0	69.0	66.0	67.0	67.0	64.0	68.0	70.0	67.0
	6.4	9.0	9.2	5.6	5.6	5.6	6.5	9.1	8.9	6.0
AS21T	0826	1215	1630	2055	0005	0405	0900	1210	1635	1955
	66.0	67.0	68.0	67.0	67.0	68.0	65.0	67.0	69.0	67.0
	8.6	8.9	8.7	9.0	8.7	9.2	9.1	9.2	9.0	8.8
AS22	0840	1225	1640	2110	0015	0414	0910	1218	1640	2000
	64.0	64.0	66.0	68.0	68.0	67.0	64.0	67.0	68.0	68.0
	4.9	6.3	8.1	8.3	7.7	6.3	4.5	5.5	7.4	7.9

TABLE 3 (CONTINUED)

	9/18/74		9/19/74					9/20/74	
STATION	RUN 12	RUN 13	RUN 14	RUN 15	RUN 16	RUN 17	RUN 18	RUN 19	RUN 20
AS15	2333	0322	0745	1135	1530	1925	2322	0315	0735
	64.0	64.0	65.0	68.0	68.0	68.0	67.0	66.0	66.0
	2.1	2.6	2.6	2.9	3.2	2.5	1.4	1.5	2.1
AS16T	2340	0329	0750	1142	1535	1930	2329	0322	0752
	67.0	68.0	68.0	70.0	71.0	70.0	70.0	70.0	69.0
	7.4	6.5	8.0	8.5	9.1	9.2	8.6	8.2	8.3
AS17	2350	0341	0802	1153	1550	1945	2341	0332	0802
	65.0	64.0	65.0	69.0	----	69.0	68.0	68.0	67.0
	9.1	8.3	7.6	9.8	10.2	7.2	10.0	8.8	7.7
AS18	2357	0347	0808	1200	1557	1955	2346	0337	0810
	66.0	64.0	65.0	68.0	70.0	69.0	68.0	67.0	68.0
	6.7	6.9	7.1	9.2	8.9	8.1	6.6	7.1	6.7
AS19	0004	0351	0816	1205	1605	2000	2352	0342	0815
	66.0	67.0	66.0	69.0	72.0	69.0	69.0	69.0	68.0
	7.1	7.3	5.2	3.7	5.0	9.1	8.8	6.6	5.5
AS20	0012	0357	0821	1210	1610	2005	2356	0346	0820
	63.0	65.0	66.0	70.0	70.0	68.0	67.0	67.0	66.0
	5.7	5.3	5.7	9.1	9.1	6.3	4.4	4.9	5.2
AS21T	0016	0403	0825	1215	1615	2015	0002	0350	0826
	65.0	65.0	66.0	68.0	68.0	68.0	68.0	68.0	68.0
	8.5	8.8	9.2	9.2	8.9	9.1	8.9	8.6	9.0
AS22	0025	0413	0835	1225	1625	2025	0012	0357	0836
	65.0	65.0	64.0	66.0	67.0	68.0	66.0	68.0	68.0
	7.1	6.2	6.2	6.2	7.2	8.6	7.5	6.5	4.9

TABLE 4

ASSABET RIVER 1974 SURVEY

SUMMARY OF DISSOLVED OXYGEN DATA (mg/l)

	June 4-7, 1974			September 17-20, 1974		
STATION	MAX.	MIN.	AVG.	MAX.	MIN.	AVG.
AS01	11.9	6.9	9.3	9.8	4.5	6.7
AS02	8.4	6.6	7.3	6.8	5.7	6.3
AS03T	10.2	5.9	8.3	10.0	5.9	7.7
AS04	9.4	5.9	6.9	7.1	4.8	5.8
AS05	7.4	4.8	6.4	6.1	3.9	4.9
AS06	7.2	3.1	4.4	6.3	2.5	3.6
AS07	5.9	1.3	2.8	3.3	1.2	2.2
AS07T	---	---	---	9.1	7.2	8.4
AS08	9.3	4.1	6.7	6.8	3.3	5.1
AS09	9.2	4.8	6.7	7.4	3.3	5.1
AS10	8.9	4.9	6.8	7.5	3.2	5.2
AS10T	---	---	---	9.8	6.7	7.9
AS11	10.0	4.8	7.0	10.3	3.1	6.4
AS12	9.9	4.0	7.3	6.9	4.8	5.9
AS13	9.4	5.6	7.6	7.5	4.7	6.4
AS14	10.7	5.9	8.4	10.6	2.6	6.3
AS15	9.4	5.5	7.4	5.2	1.4	3.2
AS16T	11.2	9.2	9.8	9.2	6.5	8.3
AS17	10.0	6.4	7.5	10.2	6.2	8.4
AS18	9.9	7.1	8.2	9.2	6.0	7.4
AS19	9.2	6.4	7.9	9.1	3.7	6.8
AS20	10.5	6.6	8.1	9.2	4.4	6.7
AS21T	9.8	8.1	8.8	9.2	8.5	8.9
AS22	9.3	6.3	7.7	8.6	4.5	6.7

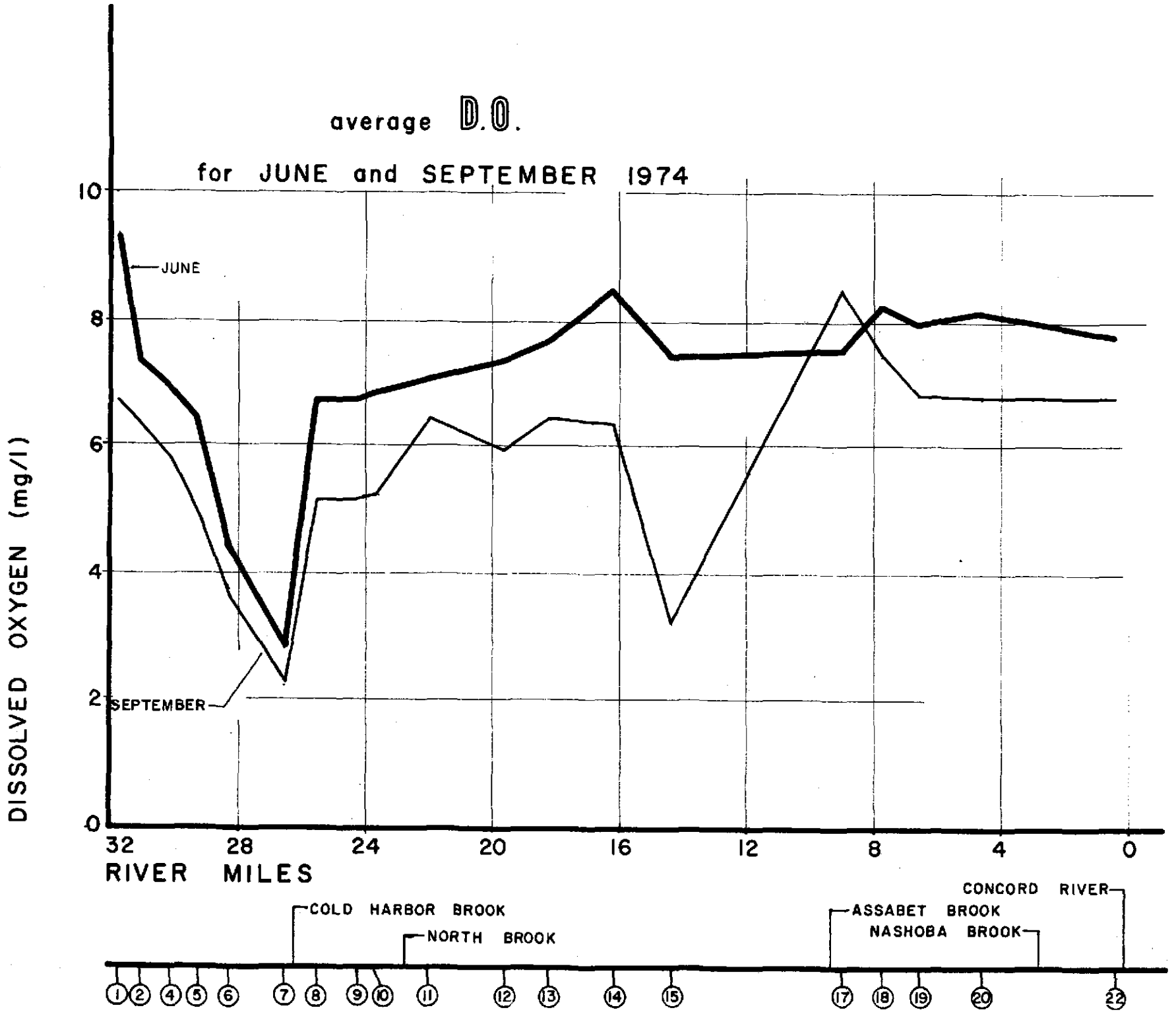

average D.O.
for JUNE and SEPTEMBER 1974
JUNE
SEPTEMBER
DISSOLVED OXYGEN (mg/l)
0
2
4
6
8
10
32
28
24
20
16
12
8
4
0
RIVER MILES
COLD HARBOR BROOK
NORTH BROOK
CONCORD RIVER
ASSABET BROOK
NASHOBA BROOK
1
2
4
5
6
7
8
9
10
11
12
13
14
15
17
18
19
20
22

Figure 4

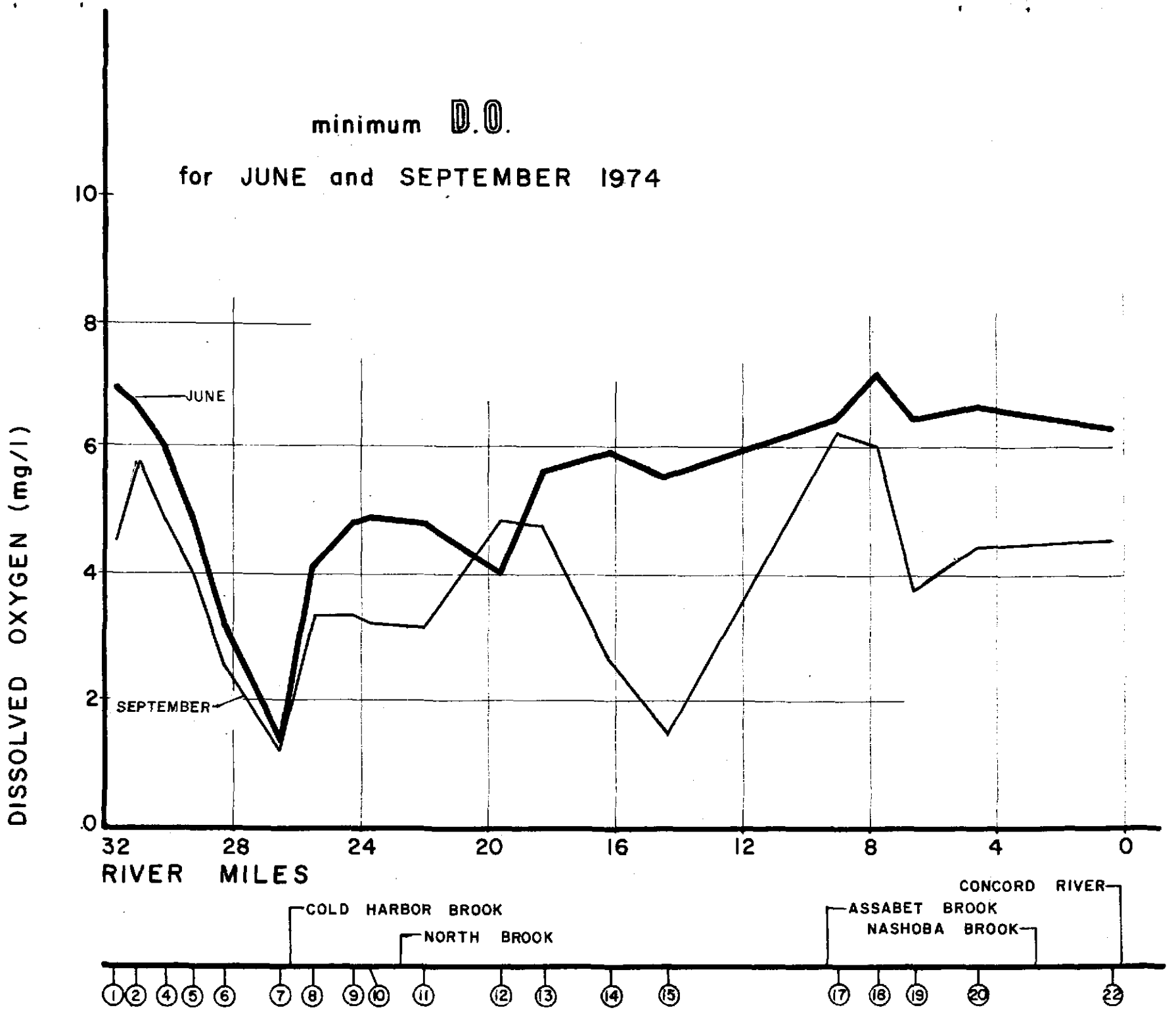

minimum D.O.
for JUNE and SEPTEMBER 1974
DISSOLVED OXYGEN (mg/l)
10
8
6
4
2
0
JUNE
SEPTEMBER
32
28
24
20
16
12
8
4
0
RIVER MILES
COLD HARBOR BROOK
NORTH BROOK
ASSABET BROOK
NASHOBA BROOK
CONCORD RIVER
1
2
4
5
6
7
8
9
10
11
12
13
14
15
17
18
19
20
22

Figure 5

TABLE 5

ASSABET RIVER 1974 SURVEY

SUMMARY OF TEMPERATURE DATA (^{o}F)

	June 4-7, 1974			September 17-20, 1974		
STATION	MAX.	MIN.	AVG.	MAX.	MIN.	AVG.
AS01	82.0	62.0	72.1	75.0	63.0	68.1
AS02	78.0	59.0	67.1	70.0	62.0	66.6
AS03T	77.0	62.0	70.4	74.0	63.0	67.6
AS04	76.0	60.0	67.4	70.0	61.0	66.1
AS05	73.0	60.0	66.6	69.0	60.0	64.9
AS06	72.0	58.0	66.6	70.0	60.0	64.9
AS07	72.0	60.0	66.8	71.0	61.0	64.4
AS07T	---	---	---	67.0	58.0	62.9
AS08	73.0	62.0	67.7	69.0	61.0	64.7
AS09	72.0	60.0	66.6	67.0	59.0	63.4
AS10	72.0	59.0	66.6	68.0	59.0	64.4
AS10T	---	---	---	68.0	60.0	65.0
AS11	72.0	60.0	66.5	67.0	60.0	64.2
AS12	70.0	60.0	66.8	67.0	61.0	64.2
AS13	72.0	61.0	67.5	68.0	63.0	65.6
AS14	73.0	61.0	67.6	69.0	63.0	66.2
AS15	72.0	60.0	67.5	69.0	64.0	66.3
AS16T	74.0	64.0	68.5	72.0	67.0	69.7
AS17	71.0	62.0	68.1	69.0	64.0	67.3
AS18	72.0	61.0	67.6	70.0	63.0	67.3
AS19	74.0	61.0	68.1	72.0	63.0	67.9
AS20	74.0	61.0	67.9	70.0	63.0	67.0
AS21T	71.0	62.0	67.4	69.0	65.0	67.1
AS22	72.0	60.0	67.7	68.0	64.0	66.4

TABLE 6

ASSABET RIVER 1974 SURVEY

5 - DAY BIOCHEMICAL OXYGEN DEMAND DATA (mg/l)

STATION	6/4/74	6/6/74	AVG.	9/17/74	9/19/74	AVG.
AS01	4.2	4.2	4.2	6.3	6.9	6.6
AS02	4.6	3.6	4.1	4.5	3.9	4.2
AS03T	1.8	2.2	2.0	2.2	0.8	1.5
AS04	3.0	2.6	2.8	6.3	2.4	4.4
AS05	7.0	6.8	6.9	9.9	6.0	8.0
AS06	5.6	5.2	5.4	9.0	5.4	7.2
AS07	5.7	5.8	5.8	2.7	5.4	4.0
AS07T	---	---	---	3.0	1.4	2.2
AS08	3.8	4.2	4.0	4.8	4.2	4.5
AS09	3.4	4.8	4.1	3.0	1.8	2.4
AS10	4.6	4.2	4.4	3.3	1.8	2.6
AS10T	---	---	---	1.0	0.8	0.9
AS11	7.2	2.8	5.0	2.9	1.5	2.2
AS12	3.0	2.2	2.6	3.9	1.4	2.6
AS13	2.2	1.8	2.0	3.9	1.2	2.6
AS14	2.8	1.4	2.1	3.9	6.0	5.0
AS15	3.0	2.2	2.6	4.5	4.5	4.5
AS16T	2.6	1.4	2.0	1.8	1.6	1.7
AS17	1.6	2.4	2.0	1.6	2.1	1.8
AS18	2.8	1.8	2.3	1.4	1.5	1.4
AS19	2.2	2.8	2.5	2.6	4.2	3.4
AS20	3.2	2.2	2.7	1.8	4.0	2.9
AS21T	2.2	2.0	2.1	1.4	1.2	1.3
AS22	1.5	1.2	1.4	1.6	1.4	1.5

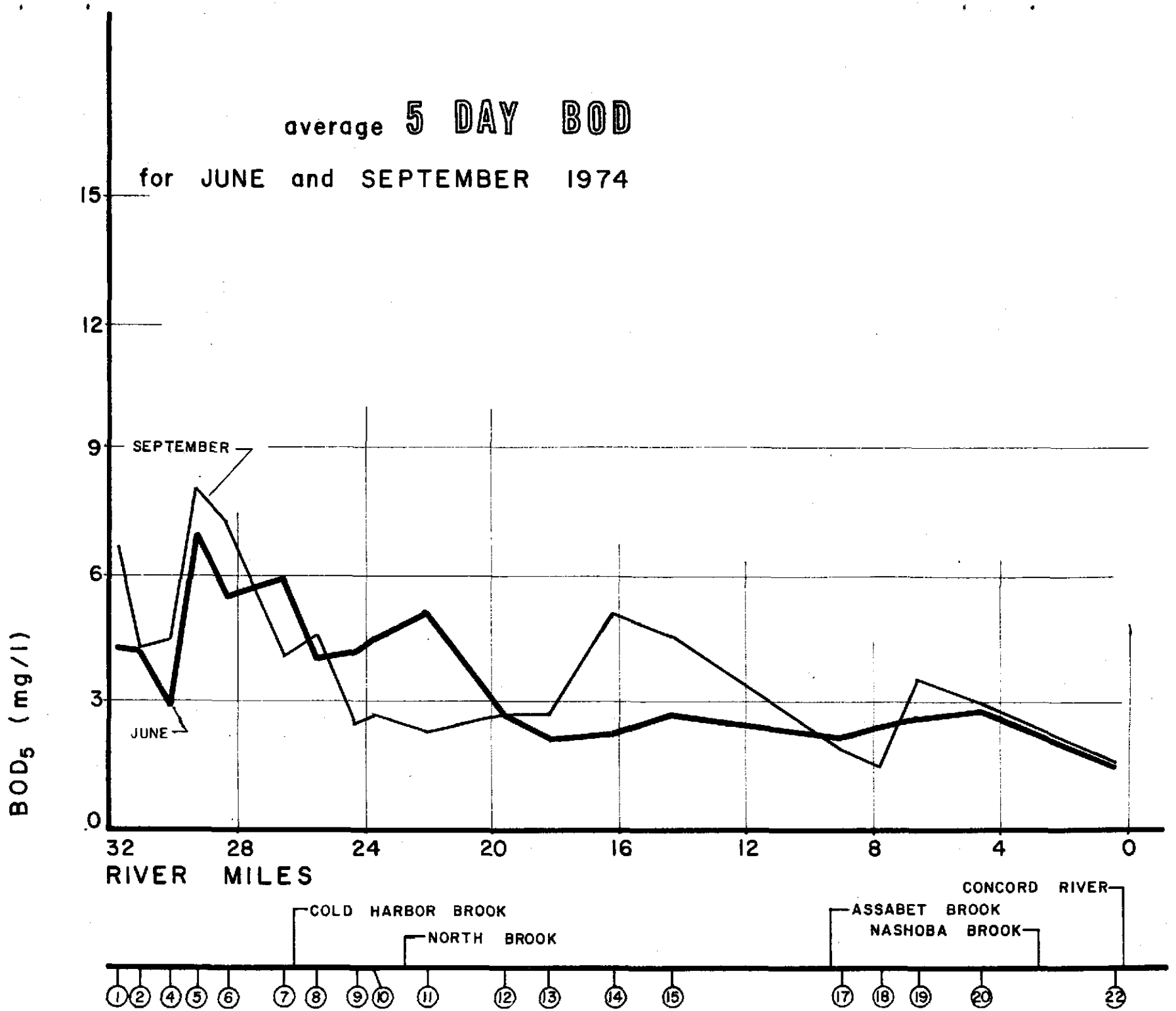

average 5 DAY BOD
for JUNE and SEPTEMBER 1974
15
12
9
6
3
0
SEPTEMBER
JUNE
BOD5 (mg/l)
32
28
24
20
16
12
8
4
0
RIVER MILES
COLD HARBOR BROOK
NORTH BROOK
CONCORD RIVER
ASSABET BROOK
NASHOBA BROOK
1
2
4
5
6
7
8
9
10
11
12
13
14
15
17
18
19
20
22

Figure 6

TABLE 7

ASSABET RIVER 1974 SURVEY

2 - 5 - 7 DAY BIOCHEMICAL OXYGEN DEMAND DATA (mg/l)

Spetember 17, 1974

STATION	B.O.D. 2 - DAY	5 - DAY	7 - DAY
AS01	2.4	6.3	9.6
AS02	2.4	4.5	9.3
AS03T	1.2	2.2	3.4
AS04	2.1	6.3	11.
AS05	3.3	9.9	17.
AS06	2.7	9.0	16.
AS07	0.7	2.7	4.6
AS07T	0.3	3.0	5.7
AS08	2.4	4.8	7.2
AS09	1.5	3.0	6.6
AS10	0.3	3.3	5.7
AS10T	0.2	1.0	2.6
AS11	0.6	2.9	6.3
AS12	1.5	3.9	6.0
AS13	0.6	3.9	4.8
AS14	1.8	3.9	6.3
AS15	1.8	4.5	6.3
AS16T	0.6	1.8	3.0
AS17	0.6	1.6	2.0
AS18	0.4	1.4	2.0
AS19	1.4	2.6	3.4
AS20	0.4	1.8	3.8
AS21T	1.0	1.4	1.6
AS22	0.6	1.6	2.2

TABLE 7a

ASSABET RIVER 1974 SURVEY

LONG TERM BIOCHEMICAL OXYGEN DEMAND DATA (mg/l)

June 4, 1974

STATION	B.O.D. 2-DAY	5-DAY	7-DAY	14-DAY	21-DAY
AS07	2.4	5.7	11.	18.	20.
AS11	2.4	4.2	7.2	9.3	12.

TABLE 8

ASSABET RIVER 1974 SURVEY

AMMONIA - NITROGEN DATA (mg/1)

STATION	6/4/74	6/6/74	AVG.	9/17/74	9/19/74	AVG.
AS01	0.13	0.00	0.06	0.37	0.10	0.24
AS02	0.22	0.10	0.16	0.23	0.13	0.18
AS03T	0.03	0.00	0.02	0.01	0.01	0.01
AS04	0.45	0.13	0.29	0.58	0.49	0.54
AS05	1.50	1.50	1.50	1.80	2.00	1.90
AS06	1.60	1.60	1.60	1.90	2.20	2.05
AS07	1.50	1.50	1.50	1.60	2.00	1.80
AS07T	----	----	----	0.62	0.06	0.34
AS08	0.81	0.75	0.78	0.88	1.20	1.04
AS09	0.37	0.23	0.30	0.13	0.18	0.16
AS10	0.37	0.37	0.37	0.10	0.12	0.11
AS10T	----	----	----	0.02	0.02	0.02
AS11	0.17	0.12	0.14	0.04	0.05	0.04
AS12	0.16	0.05	0.10	0.05	0.06	0.06
AS13	0.18	0.07	0.12	0.05	0.05	0.05
AS14	0.13	0.03	0.08	0.01	0.00	0.01
AS15	0.33	0.29	0.31	0.27	0.37	0.32
AS16T	0.04	0.00	0.02	0.01	0.02	0.02
AS17	0.18	0.12	0.15	0.01	0.01	0.01
AS18	0.18	0.10	0.14	0.03	0.04	0.04
AS19	0.45	0.27	0.36	0.48	1.50	0.99
AS20	0.32	0.26	0.29	0.32	0.58	0.45
AS21T	0.05	0.00	0.02	0.01	0.02	0.02
AS22	0.21	0.15	0.18	0.05	0.04	0.04

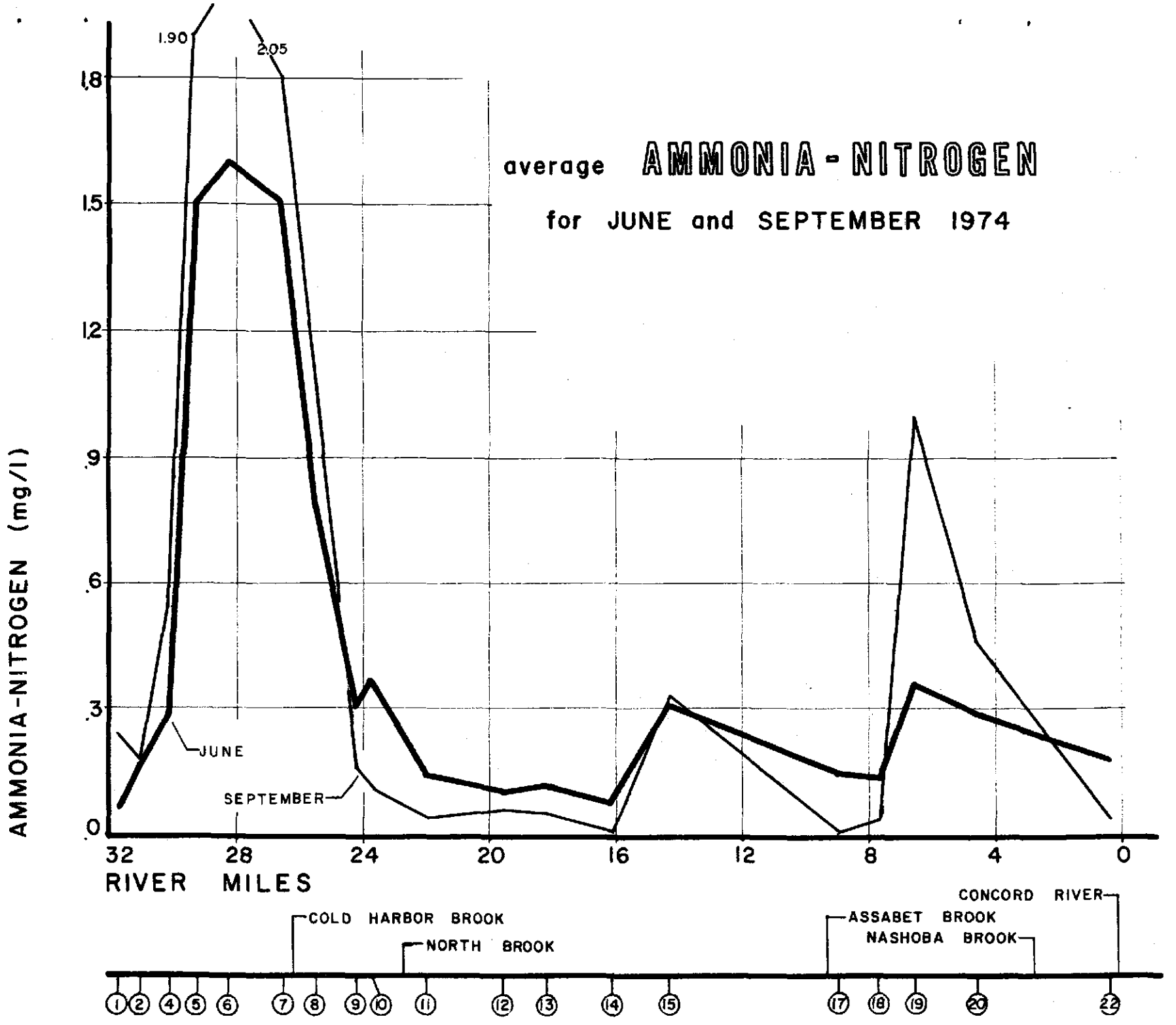

average AMMONIA-NITROGEN
for JUNE and SEPTEMBER 1974
AMMONIA-NITROGEN (mg/l)
1.90
2.05
1.8
1.5
1.2
.9
.6
.3
0
JUNE
SEPTEMBER
32
28
24
20
16
12
8
4
0
RIVER MILES
COLD HARBOR BROOK
NORTH BROOK
ASSABET BROOK
NASHOBA BROOK
CONCORD RIVER
1
2
4
5
6
7
8
9
10
11
12
13
14
15
17
18
19
20
22

Figure 7

TABLE 9

ASSABET RIVER 1974 SURVEY

NITRATE - NITROGEN DATA (mg/l)

STATION	6/4/74	6/6/74	AVG.	9/17/74	9/19/74	AVG.
AS01	0.1	0.0	0.1	0.3	0.2	0.2
AS02	0.3	0.2	0.2	0.5	0.4	0.4
AS03T	0.2	0.2	0.2	0.0	0.0	0.0
AS04	0.5	0.9	0.7	0.7	0.7	0.7
AS05	0.7	0.8	0.8	0.9	0.8	0.8
AS06	0.7	0.8	0.8	0.9	0.8	0.8
AS07	0.9	0.8	0.8	1.2	0.8	1.0
AS07T	---	---	---	0.2	0.3	0.2
AS08	0.9	0.9	0.9	1.4	1.3	1.4
AS09	1.1	1.2	1.2	1.7	1.9	1.8
AS10	1.0	1.1	1.0	1.6	1.8	1.7
AS10T	---	---	---	0.1	0.1	0.1
AS11	0.9	0.9	0.9	1.3	1.5	1.4
AS12	0.9	0.9	0.9	1.1	1.3	1.2
AS13	0.7	0.8	0.8	0.8	0.9	0.8
AS14	0.7	0.7	0.7	0.7	0.8	0.8
AS15	0.7	0.8	0.8	1.0	1.0	1.0
AS16T	0.1	0.1	0.1	0.0	0.0	0.0
AS17	0.5	0.5	0.5	0.5	0.5	0.5
AS18	0.5	0.5	0.5	0.5	0.5	0.5
AS19	0.5	0.5	0.5	0.6	0.8	0.7
AS20	0.7	0.7	0.7	0.9	1.0	1.0
AS21T	0.3	0.2	0.2	0.1	0.1	0.1
AS22	0.6	0.6	0.6	0.9	1.0	1.0

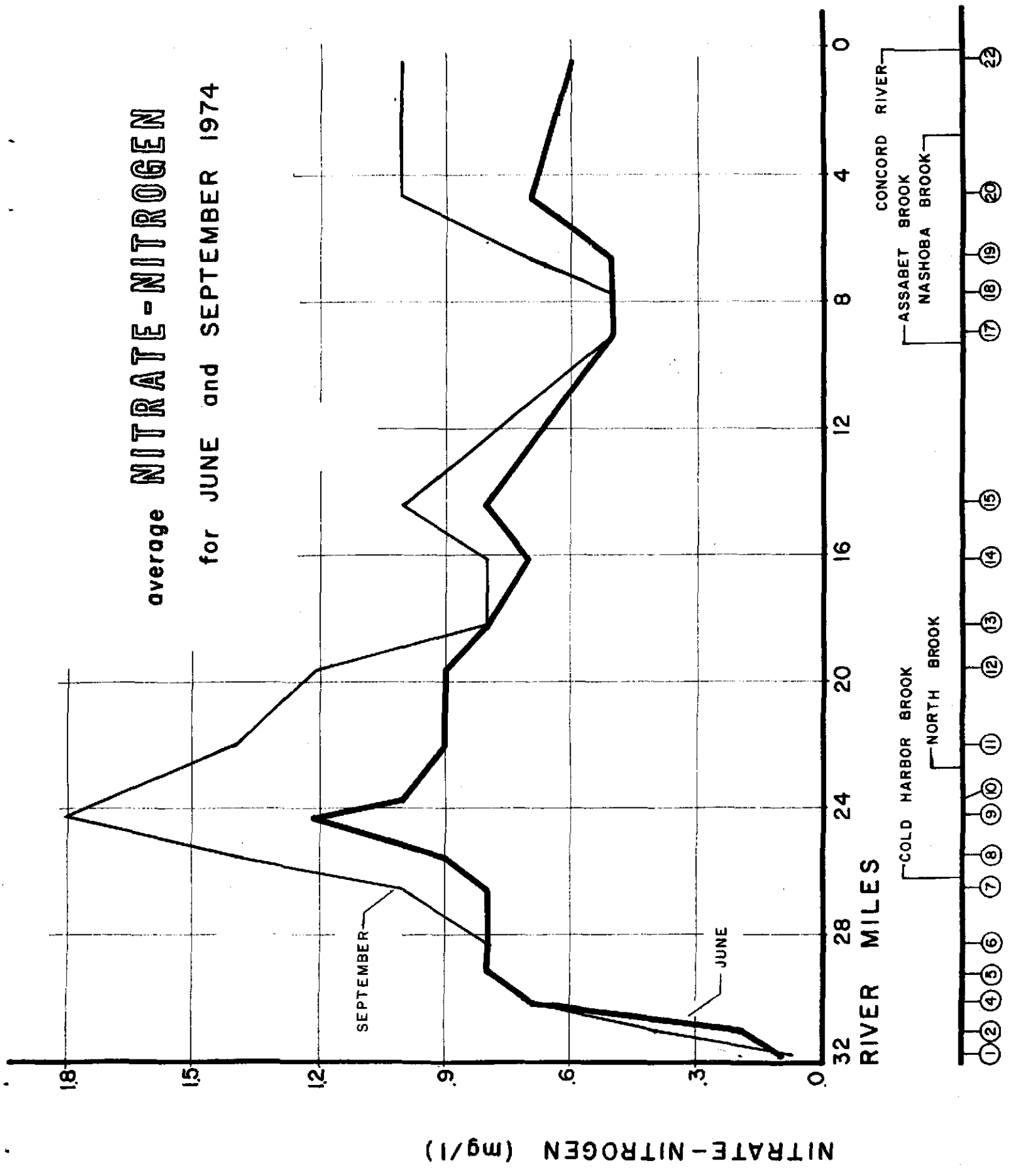

average NITRATE-NITROGEN
for JUNE and SEPTEMBER 1974
NITRATE-NITROGEN (mg/l)
RIVER MILES
SEPTEMBER
JUNE
COLD HARBOR BROOK
NORTH BROOK
ASSABET BROOK
NASHOBA BROOK
CONCORD RIVER

Figure 8

TABLE 10

ASSABET RIVER 1974 SURVEY

TOTAL PHOSPHORUS AS P DATA (mg/l)

STATION	6/4/74	6/6/74	AVG.	9/17/74	9/19/74	AVG.
AS01	0.18	0.15	0.16	0.10	0.11	0.10
AS02	0.14	0.16	0.15	0.10	0.11	0.10
AS03T	0.03	0.03	0.03	0.03	0.02	0.02
AS04	0.75	0.23	0.49	0.65	0.45	0.55
AS05	1.05	0.80	0.92	1.00	1.00	1.00
AS06	1.00	0.80	0.90	1.00	1.00	1.00
AS07	1.10	1.00	1.05	1.00	1.00	1.00
AS07T	----	----	----	0.04	0.04	0.04
AS08	0.65	0.60	0.62	0.50	1.25	0.88
AS09	0.50	0.50	0.50	0.60	0.50	0.55
AS10	0.60	0.50	0.55	0.70	0.75	0.72
AS10T	----	----	----	0.03	0.02	0.02
AS11	0.40	0.50	0.45	0.50	0.50	0.50
AS12	0.38	0.40	0.39	0.46	1.10	0.78
AS13	0.37	0.34	0.36	0.40	0.41	0.40
AS14	0.31	0.30	0.30	0.36	0.34	0.35
AS15	0.26	0.42	0.34	0.70	1.30	1.00
AS16T	0.38	0.06	0.22	0.03	0.03	0.03
AS17	0.03	0.25	0.14	0.48	0.20	0.34
AS18	0.25	0.21	0.23	0.43	0.20	0.32
AS19	0.27	0.32	0.30	0.50	0.30	0.40
AS20	0.36	0.28	0.32	0.60	0.25	0.42
AS21T	0.32	0.05	0.18	0.02	0.04	0.03
AS22	0.04	0.22	0.13	0.40	0.38	0.39

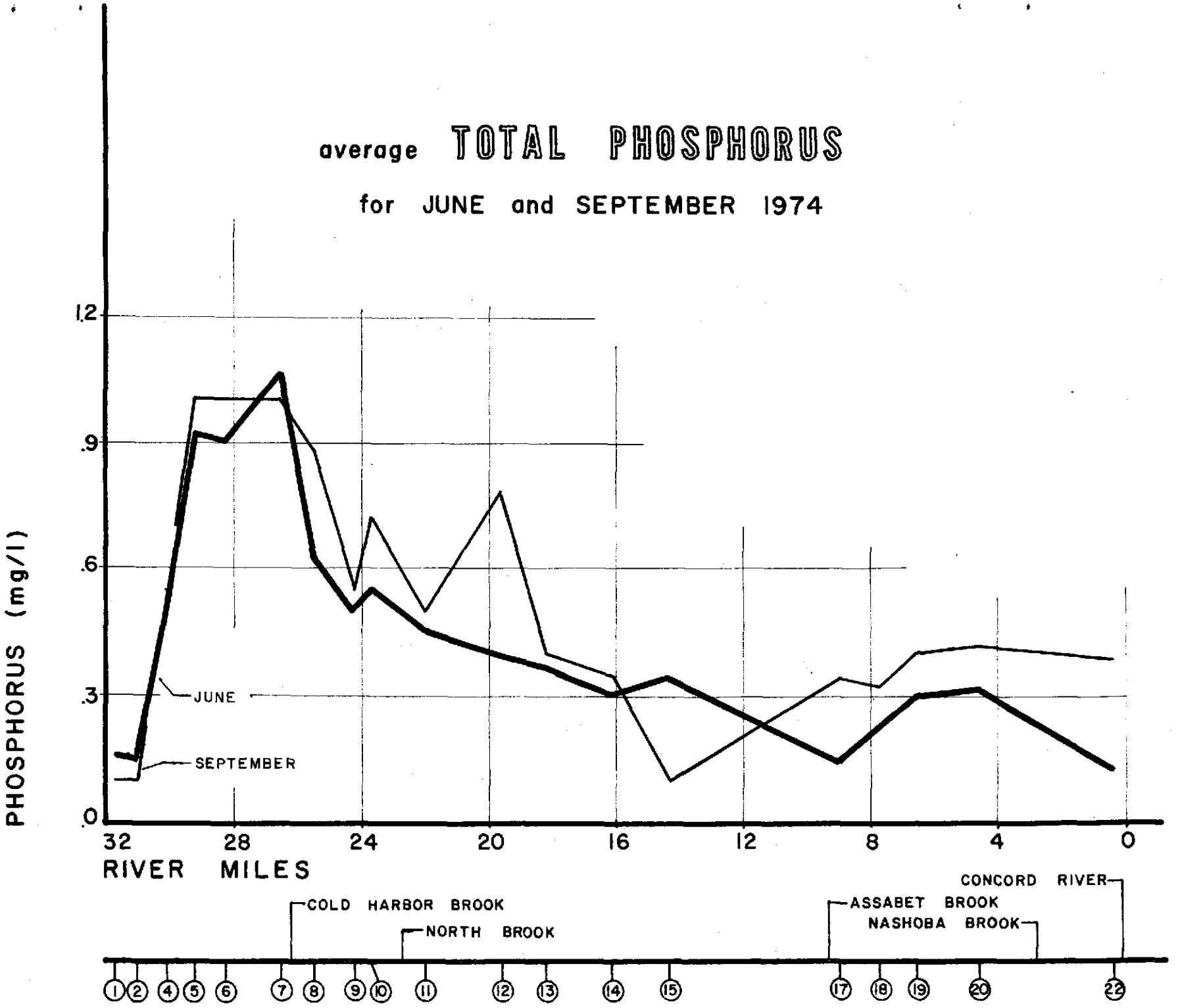

average TOTAL PHOSPHORUS
for JUNE and SEPTEMBER 1974
PHOSPHORUS (mg/l)
1.2
.9
.6
.3
0
JUNE
SEPTEMBER
32
28
24
20
16
12
8
4
0
RIVER MILES
COLD HARBOR BROOK
NORTH BROOK
CONCORD RIVER
ASSABET BROOK
NASHOBA BROOK
1
2
4
5
6
7
8
9
10
11
12
13
14
15
17
18
19
20
22

Figure 9

TABLE 11

ASSABET RIVER 1974 SURVEY

TOTAL ALKALINITY DATA (mg/l)

STATION	6/4/74	6/6/74	AVG.	9/17/74	9/19/74	AVG.
AS01	20	19	20	8	12	10
AS02	21	19	20	9	11	10
AS03T	28	27	28	27	29	28
AS04	26	18	22	17	16	16
AS05	33	32	32	34	35	34
AS06	33	33	33	35	36	36
AS07	32	34	33	32	35	34
AS07T	--	--	--	13	16	14
AS08	24	27	26	23	29	26
AS09	22	24	23	20	22	21
AS10	23	25	24	21	24	22
AS10T	--	--	--	20	19	20
AS11	20	22	21	20	18	19
AS12	21	21	21	18	22	20
AS13	19	22	20	17	19	18
AS14	19	22	20	20	23	22
AS15	19	23	21	20	22	21
AS16T	9	10	10	10	10	10
AS17	17	19	18	22	22	22
AS18	18	18	18	22	22	22
AS19	21	20	20	22	28	25
AS20	20	19	20	22	24	23
AS21T	21	19	20	25	24	24
AS22	18	19	18	20	24	22

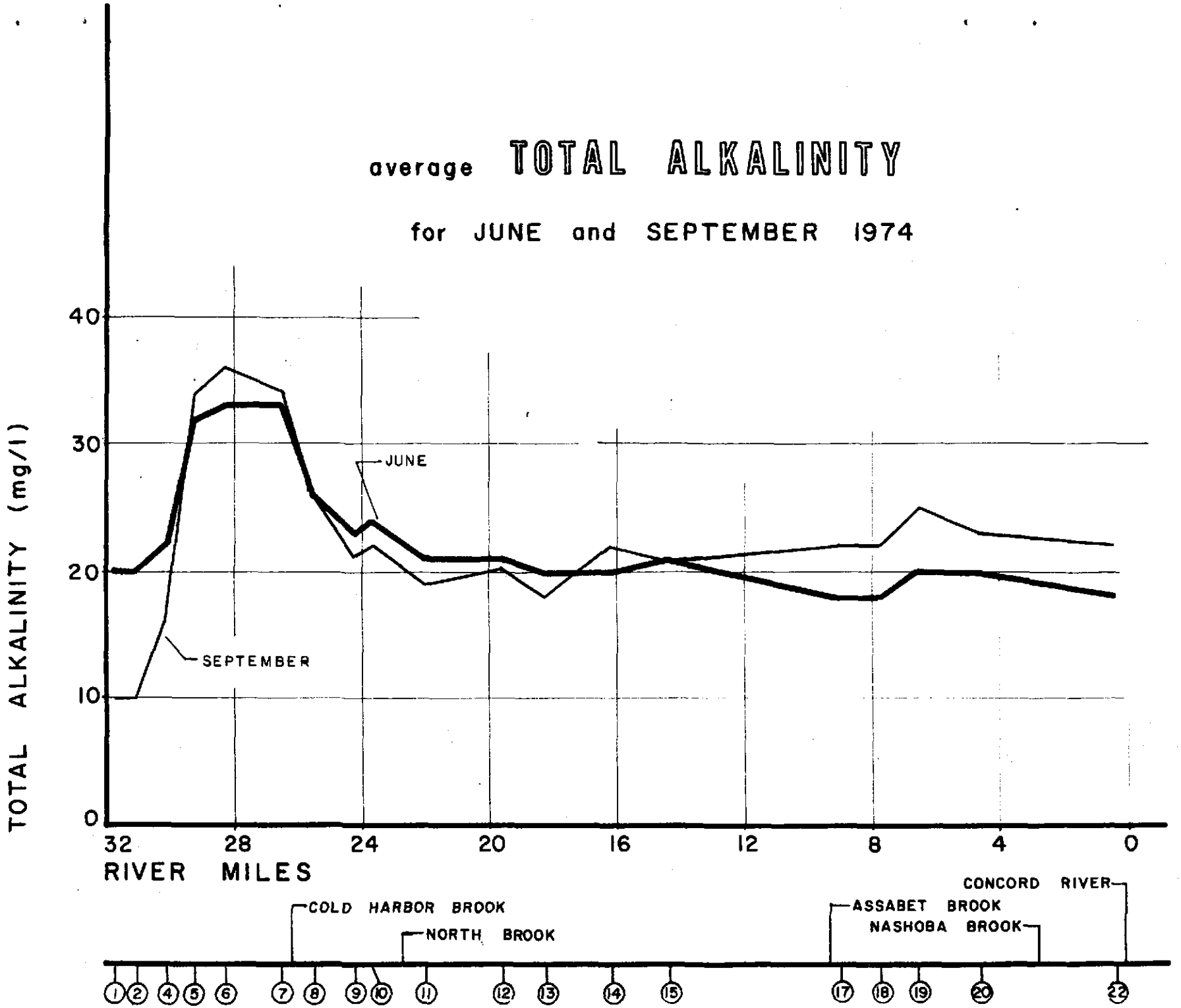

average TOTAL ALKALINITY
for JUNE and SEPTEMBER 1974
TOTAL ALKALINITY (mg/l)
40
30
20
10
0
JUNE
SEPTEMBER
32
28
24
20
16
12
8
4
0
RIVER MILES
COLD HARBOR BROOK
NORTH BROOK
ASSABET BROOK
NASHOBA BROOK
CONCORD RIVER
1
2
4
5
6
7
8
9
10
11
12
13
14
15
17
18
19
20
22

Figure 10

TABLE 12

ASSABET RIVER 1974 SURVEY

pH DATA

STATION	6/4/74	6/6/74	9/17/74	9/19/74
AS01	6.9	7.0	6.2	6.8
AS02	6.9	7.1	6.7	6.9
AS03T	7.3	7.3	6.9	7.4
AS04	7.0	6.5	7.0	6.8
AS05	7.0	7.0	7.2	7.4
AS06	7.0	7.1	7.5	7.3
AS07	6.9	7.2	7.3	7.1
AS07T	---	---	7.2	7.1
AS08	7.0	7.2	7.2	7.0
AS09	7.1	7.2	7.2	7.2
AS10	7.0	7.2	7.4	7.2
AS10T	---	---	7.1	7.3
AS11	7.0	7.1	7.1	6.8
AS12	7.0	7.0	7.1	7.0
AS13	7.1	7.3	7.2	7.2
AS14	7.0	7.2	7.2	7.1
AS15	7.0	7.2	7.2	7.1
AS16T	6.9	7.0	7.2	7.2
AS17	7.0	7.1	7.2	7.3
AS18	7.2	7.1	7.5	7.4
AS19	7.2	7.3	7.2	7.2
AS20	7.2	7.1	7.3	7.4
AS21T	7.2	7.1	7.5	7.5
AS22	7.1	7.1	7.4	7.3

TABLE 13

ASSABET RIVER 1974 SURVEY

SUSPENDED SOLIDS DATA (mg/l)

STATION	6/4/74	6/6/74	AVG.	9/17/74	9/19/74	AVG.
AS01	10	40	25.0	8	15	11.5
AS02	10	8	9.0	6	17	11.5
AS03T	7	2	4.5	6	6	6.0
AS04	16	15	15.5	14	19	16.5
AS05	17	19	18.0	14	9	11.5
AS06	17	16	16.5	16	12	14.0
AS07	8	10	9.0	13	19	16.0
AS07T	---	---	---	7	13	10.0
AS08	7	6	6.5	7	6	6.5
AS09	4	6	5.0	4	5	4.5
AS10	8	8	8.0	1	5	3.0
AS10T	---	---	---	5	1	3.0
AS11	5	4	4.5	1	1	1.0
AS12	1	4	2.5	5	4	4.5
AS13	2	3	2.5	1	3	2.0
AS14	2	3	2.5	1	9	5.0
AS15	4	4	4.0	5	6	5.5
AS16T	4	2	3.0	1	3	2.0
AS17	2	6	4.0	1	7	4.0
AS18	5	4	4.5	2	1	1.5
AS19	10	5	7.5	1	1	1.0
AS20	10	5	7.5	1	6	3.5
AS21T	6	4	5.0	1	1	1.0
AS22	6	4	5.0	3	2	2.5

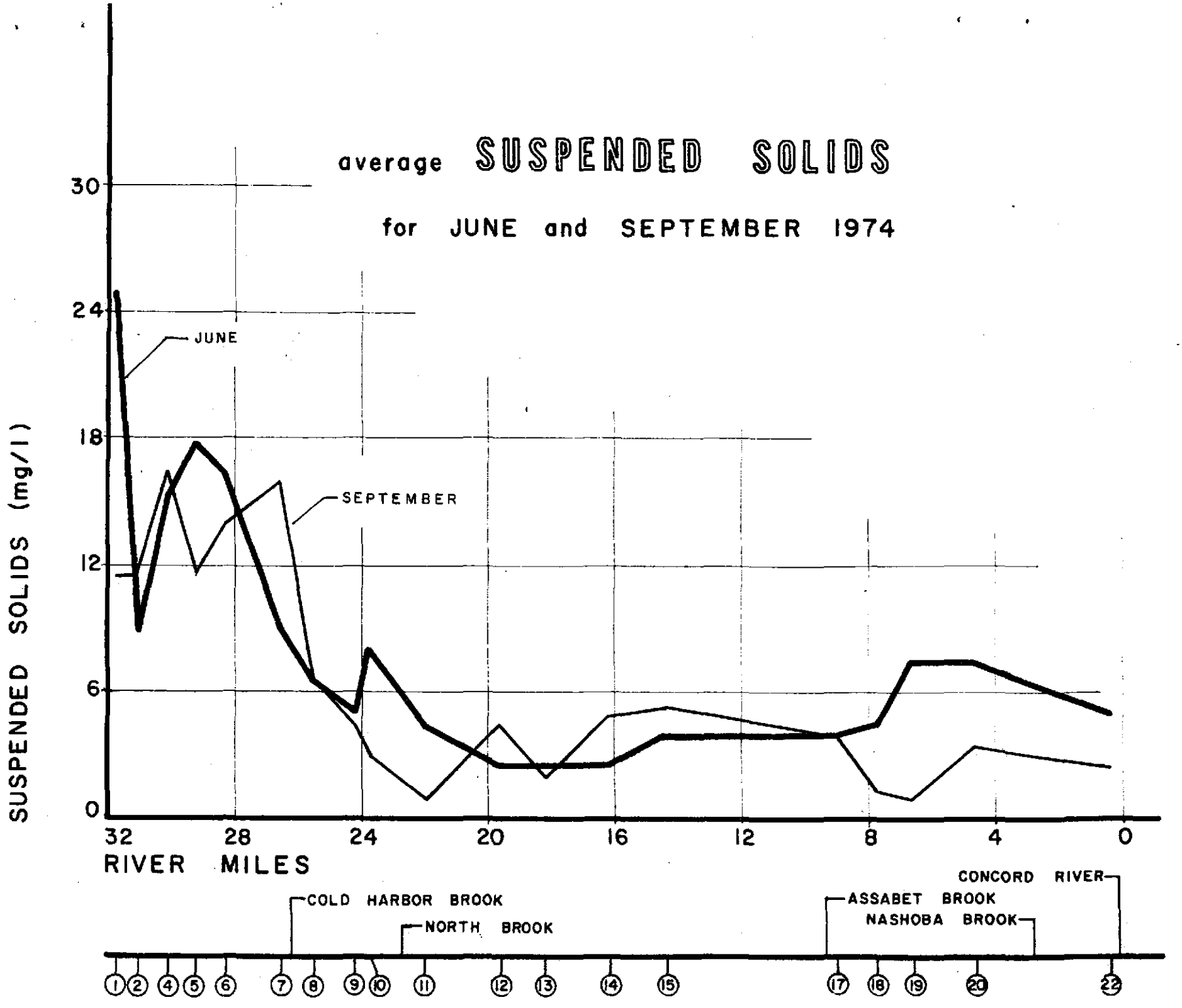

average SUSPENDED SOLIDS
for JUNE and SEPTEMBER 1974
JUNE
SEPTEMBER
SUSPENDED SOLIDS (mg/l)
30
24
18
12
6
0
32
28
24
20
16
12
8
4
0
RIVER MILES
COLD HARBOR BROOK
NORTH BROOK
ASSABET BROOK
NASHOBA BROOK
CONCORD RIVER
1
2
4
5
6
7
8
9
10
11
12
13
14
15
17
18
19
20
22

Figure 11

TABLE 14

ASSABET RIVER 1974 SURVEY

TOTAL SOLIDS DATA (mg/1)

STATION	6/4/74	6/6/74	AVG.	9/17/74	9/19/74	AVG.
AS01	88	108	98	120	120	120
AS02	94	120	107	112	124	118
AS03T	66	94	80	28	36	32
AS04	118	132	125	122	142	132
AS05	144	160	152	132	180	156
AS06	154	150	152	136	154	145
AS07	122	150	136	116	118	117
AS07T	---	---	---	106	88	97
AS08	98	126	112	108	340	224
AS09	94	134	114	112	132	122
AS10	100	144	122	106	130	118
AS10T	---	---	---	58	72	65
AS11	92	120	106	118	146	132
AS12	88	118	103	104	122	113
AS13	102	122	112	100	108	104
AS14	100	120	110	100	132	116
AS15	88	130	109	110	110	110
AS16T	44	56	50	6	32	19
AS17	98	108	103	100	114	107
AS18	98	108	103	110	108	109
AS19	94	124	109	112	126	119
AS20	96	114	105	106	130	118
AS21T	98	124	111	152	132	142
AS22	100	118	109	104	136	120

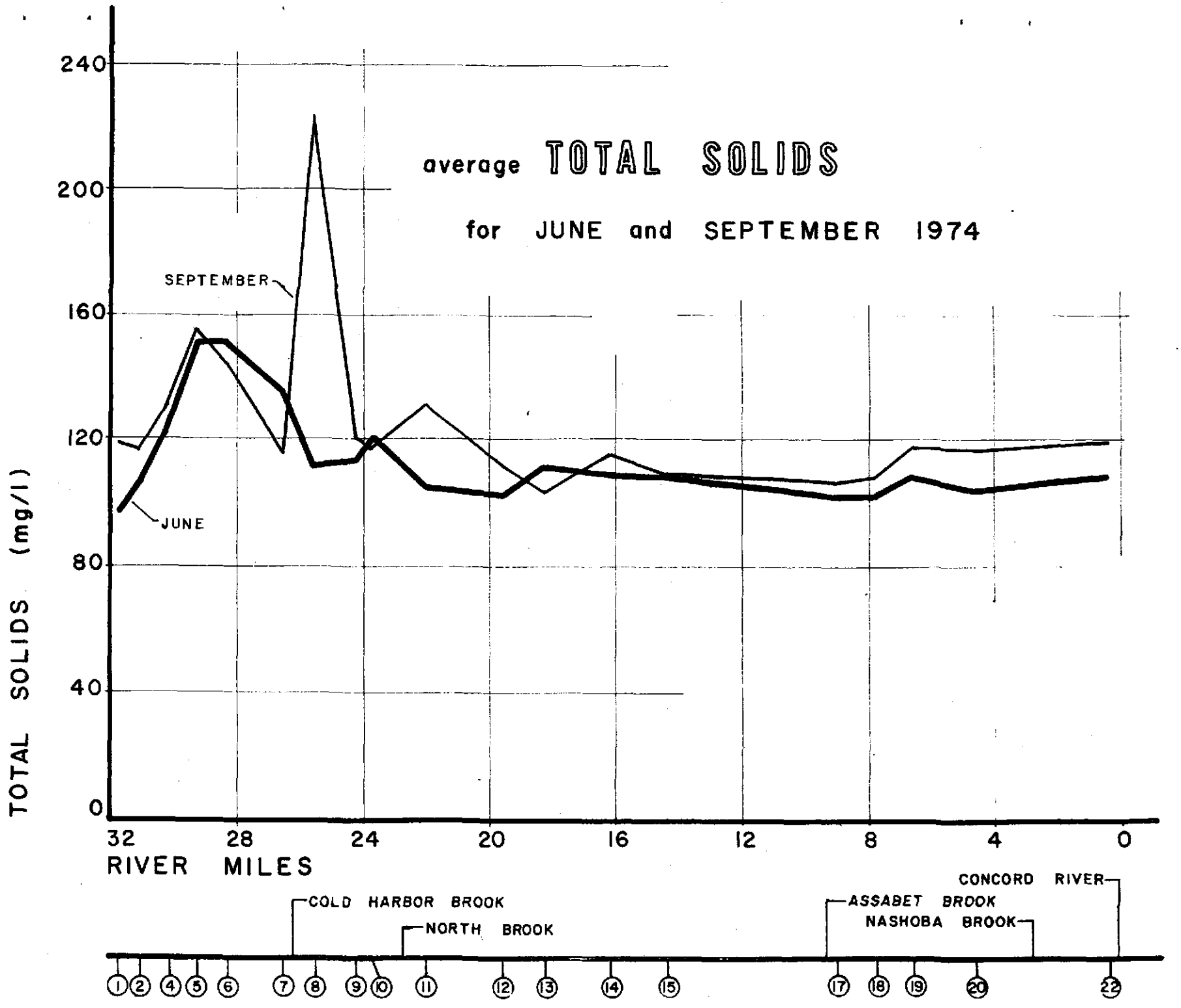

average TOTAL SOLIDS
for JUNE and SEPTEMBER 1974
SEPTEMBER
JUNE
TOTAL SOLIDS (mg/l)
240
200
160
120
80
40
0
32
28
24
20
16
12
8
4
0
RIVER MILES
COLD HARBOR BROOK
NORTH BROOK
CONCORD RIVER
ASSABET BROOK
NASHOBA BROOK
1 2 4 5 6 7 8 9 10 11 12 13 14 15 17 18 19 20 22

Figure 12

TABLE 15

ASSABET RIVER 1974 SURVEY

TOTAL COLIFORM DATA - COLIFORM/100 ml

STATION	6/4/74	6/6/74	GEOMETRIC MEAN	9/17/74	9/19/74	GEOMETRIC MEAN
AS01	200	500	320	200	600	350
AS02	300	100	170	500	100	220
AS03T	300	100	170	400	100	200
AS04	300	200	240	30,000	400	*
AS05	1,500	3,500	2,300	68,000	3,000	*
AS06	1,000	600	780	25,000	2,000	*
AS07	300	800	490	20,000	3,000	*
AS07T	--	--	--	200	800	900
AS08	500	10,000	2,240	2,800	4,300	3,500
AS09	500	3,000	1,230	1,700	2,000	1,840
AS10	200	1,900	620	1,400	1,300	1,350
AS10T	--	--	--	200	400	280
AS11	400	1,200	690	700	1,500	1,030
AS12	200	400	280	400	900	600
AS13	800	200	400	300	100	170
AS14	2,700	3,500	3,100	4,200	3,600	3,890
AS15	300	2,500	870	1,000	1,500	1,230
AS16T	50	100	71	100	100	100
AS17	900	100	300	500	400	447
AS18	1,300	400	720	2,500	3,500	2,960
AS19	32,000	38,000	34,900	300,000	500,000	387,000
AS20	7,000	6,500	6,750	95,000	120,000	107,000
AS21T	300	200	245	100	2,400	490
AS22	8,500	8,000	8,250	20,000	9,000	13,400

* Geometric mean not given because of breakdown in chlorination system at Westborough Sewage Treatment Plant on September 17, 1974.

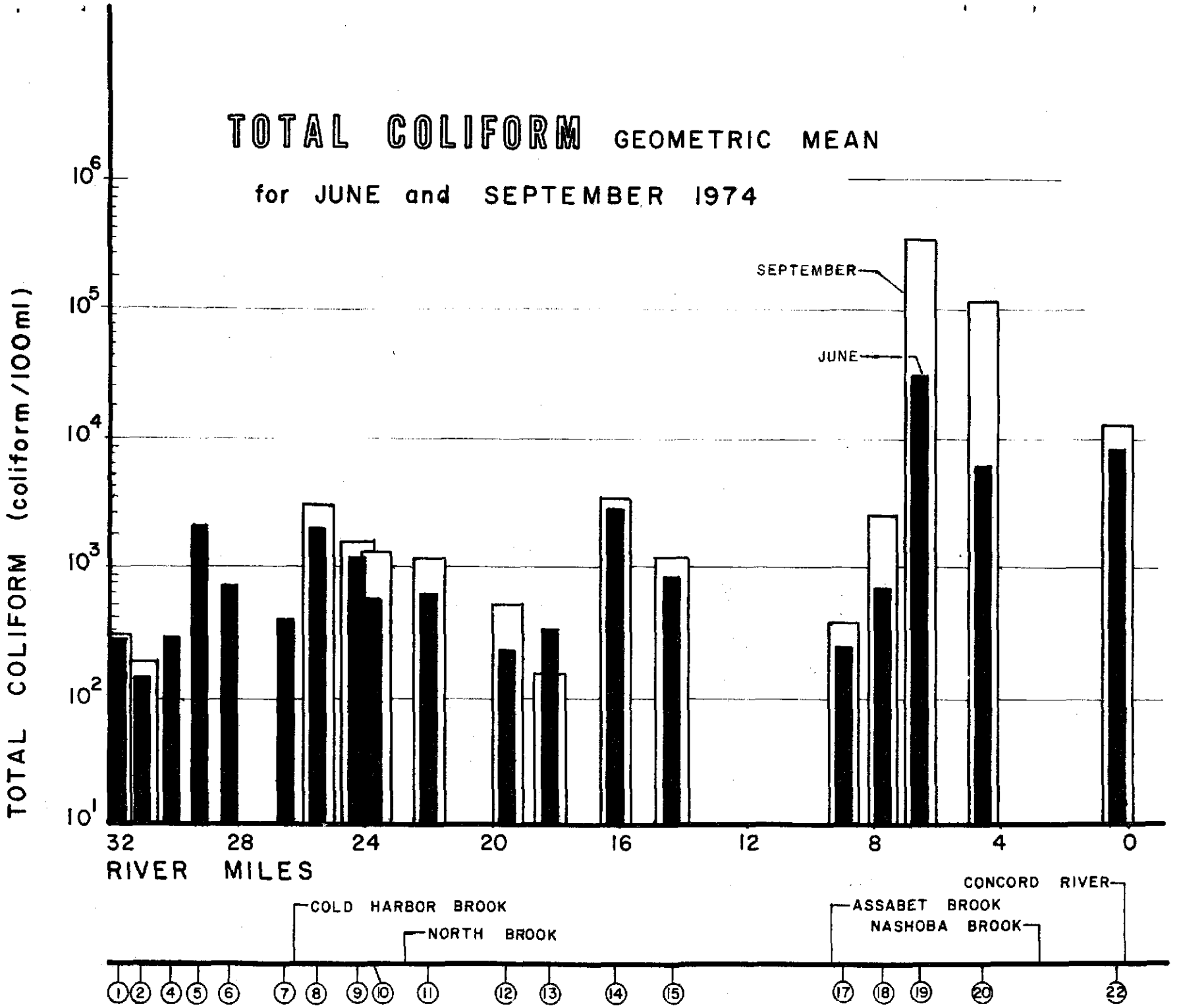

TOTAL COLIFORM GEOMETRIC MEAN
for JUNE and SEPTEMBER 1974
SEPTEMBER
JUNE
TOTAL COLIFORM (coliform/100ml)
10^6
10^5
10^4
10^3
10^2
10^1
32
28
24
20
16
12
8
4
0
RIVER MILES
CONCORD RIVER
ASSABET BROOK
NASHOBA BROOK
COLD HARBOR BROOK
NORTH BROOK
1 2 4 5 6 7 8 9 10 11 12 13 14 15 17 18 19 20 22

Figure 13

TABLE 16

ASSABET RIVER 1974 SURVEY

MICROSCOPIC ANALYSES IN AREAL STANDARD UNITS/ml

June 1974

ORGANISM	STATION										
	AS01	AS02	AS03T	AS04	AS05	AS06	AS07	AS08	AS09	AS10	AS11
ALGAE											
Bacillariophyceae (Diatoms)	47	82	6	53	35	18	65	29	24	71	123
Cyanophyceae (Blue-Green)	29	--	12	--	--	--	--	--	--	--	--
Chlorophyceae (Green)	1164	259	18	171	112	47	129	65	18	41	106
PROTOZOA											
Sarcodina (Ameboid)	--	--	--	--	--	--	--	--	--	--	--
Mastigophora (Flagellates)	112	--	29	71	24	24	24	59	6	24	--
Infusoira (Ciliates)	--	--	--	--	--	--	--	--	--	--	--
AMORPHOUS MATTER	9408	10290	5586	10143	7791	10437	4410	1940	3616	11466	3146
ROTIFERA *	1	--	--	--	--	--	--	--	--	--	--
CRUSTACEA *	10	--	1	--	--	--	--	--	--	--	--

* Number of organisms only.

TABLE 16 (CONTINUED)

June 1974

ORGANISM	STATION										
	AS12	AS13	AS14	AS15	AS16T	AS17	AS18	AS19	AS20	AS21T	AS22
ALGAE											
Bacillariophyceae (Diatoms)	18	35	6	--	41	147	6	12	12	--	71
Cyanophceae (Blue-Green)	--	--	--	--	100	--	--	--	12	--	--
Chlorophyceae (Green)	229	--	--	12	29	59	25	47	59	--	112
PROTOZOA											
Sarcodina (Ameboid)	--	--	--	--	--	--	--	--	--	--	--
Mastigophora (Flagellates)	--	12	253	--	6	241	--	24	--	18	24
Infusoria (Ciliates)	--	--	--	--	--	--	--	18	12	--	12
AMORPHOUS MATTER	3528	4469	4498	6909	5439	1275	4410	6909	7644	3205	6909
ROTIFERA *	--	--	--	--	--	1	--	--	--	--	--
CRUSTACEA *	--	--	--	--	1	--	--	--	--	--	--

* Number of organisms only.

TABLE 16 (CONTINUED)

September 1974

ORGANISM	STATION											
	AS01	AS02	AS03T	AS04	AS05	AS06	AS07	AS07T	AS08	AS09	AS10	AS10T
ALGAE												
Bacillariophyceae (Diatoms)	105	68	--	52	10	21	5	5	21	31	37	16
Cyanophyceae (Blue-Green)	--	--	--	--	--	--	--	--	--	--	--	--
Chlorophyceae (Green)	760	325	--	215	58	73	84	--	26	26	178	--
PROTOZOA												
Sarcodina (Ameboid)	10	--	--	--	--	--	--	--	--	--	--	--
Mastigophora (Flagellates)	293	99	--	16	16	10	10	--	10	--	--	5
Infusoira (Ciliates)	162	--	--	--	--	--	--	--	--	--	--	--
AMORPHOUS MATTER	3144	5371	3537	6026	2594	5895	2070	3720	2437	1441	3275	7467
ROTIFERA*	4	--	--	--	--	--	--	--	--	--	--	--
CRUSTACEA *	--	--	--	--	--	--	--	--	--	--	--	--

* Number of organisms only.

TABLE 16 (CONTINUED)

September 1974

ORGANISM	STATION											
	AS11	AS12	AS13	AS14	AS15	AS16T	AS17	AS18	AS19	AS20	AS21T	AS22
ALGAE												
Bacillariophyceae (Diatoms)	21	26	31	63	299	10	79	68	--	21	5	5
Cyanophyceae (Blue-Green)	--	--	--	--	--	424	--	--	--	--	--	--
Chlorophyceae (Green)	--	--	5	--	5	21	--	10	42	26	--	5
PROTOZOA												
Sarcodina (Ameboid)	--	--	--	--	--	--	10	--	--	--	--	--
Mastigophora (Flagellates)	--	--	--	5	--	--	42	--	--	--	10	16
Infusoria (Ciliates)	--	--	--	--	--	--	--	--	--	--	--	--
AMORPHOUS MATTER	2096	3589	4061	8263	5502	5240	4061	3851	3432	8384	2044	3275
ROTIFERA *	--	--	--	--	--	1	--	--	--	--	--	--
CRUSTACEA *	--	--	--	--	--	--	--	--	--	--	--	--

* Number of organisms only.

TABLE 17

ASSABET RIVER 1974 SURVEY

FLOW DATA

LOCATION	DISCHARGE (cfs)									
	June					September				
	3	4	5	6	7	16	17	18	19	20
Assabet River @ U.S.G.S. Gage, Maynard	220.	184.	152.	128.	114.	98.	73.	59.	52.	49.
Flow Augmentation Pond, Westborough	---	7.2	8.2	6.7	5.8	---	4.6	---	---	---
Maynard St., Westborough	---	---	---	---	---	---	4.5	---	7.0	---
Route 9, Westborough	---	12.8	---	---	---	---	8.7	---	9.7	---
Thayer St. Bridge, Westborough	---	26.4	---	---	---	---	13.4	---	9.9	---
Brigham St., Northborough	---	26.4	---	---	---	---	13,8	---	---	---
Boundary St., Marlborough	---	52.6	---	---	---	---	---	---	---	---
Bigelow St., Berlin	---	---	48.2	---	---	---	34.2	---	26.6	---
Cox St., Hudson	---	87.6	69.4	---	---	---	60.5	---	45.7	---
Route 62, Gleasondale	---	---	---	---	---	---	75.5	---	---	---
Route 62, West Concord (1st Bridge)	---	---	---	---	---	---	95.0	---	56.8	---

TABLE 17 (CONTINUED)

LOCATION	DISCHARGE (cfs)									
	June					September				
	3	4	5	6	7	16	17	18	19	20
Main St., West Concord	---	---	---	---	---	---	---	---	72.8	---
Hocomonco Pond, Westborough	---	---	---	---	---	---	1.1	---	---	---
Cold Harbor Brook, Northborough	---	---	---	---	---	---	3.4	---	---	---
Stirrup Brook, Northborough	---	---	---	---	---	---	1.7	---	---	---
North Brook, Berlin	---	16.1	---	---	---	---	---	9.0	---	---
Tripp Pond, Hudson	---	---	---	---	---	---	---	1.0	---	---
Fort Meadow Brook, Hudson	---	---	---	---	---	---	---	1.3	---	---
Assabet Brook, Stow	---	---	---	---	---	---	---	3.0	---	---
Second Division Brook, West Concord	---	---	---	---	---	---	---	---	0.9	---
Warners Pond, West Concord	---	52.4	---	---	---	---	---	---	6.8	---

TABLE 18

ASSABET RIVER 1974 SURVEY

DAM AERATION STUDY

DAM LOCATION	DATE		ABOVE	BELOW	ABOVE	BELOW	ABOVE	BELOW	ABOVE	BELOW
AS02	6/5/74	*	0605	0604	1002	1000	1400	1405	2206	2208
Flow Augmentation		**	63.0	67.0	74.0	70.0	81.0	74.0	75.0	70.0
Pond, Westborough		***	8.5	8.3	9.4	7.9	10.5	10.1	10.6	7.6
	9/18/74		0605	0605	1011	1011	1410	1410	2207	2209
			65.0	64.0	68.0	67.0	71.0	69.0	65.0	66.0
			4.8	5.6	5.8	6.1	8.1	5.8	6.9	6.6
AS07	6/5/74		0632	0631	1030	1032	1435	1435	2232	2235
Route 20,			63.0	63.0	66.0	65.0	70.0	69.0	72.0	70.0
Northborough			1.7	6.7	1.7	6.6	3.2	5.9	2.1	6.3
	9/18/74		0645	0650	1035	1035	1435	1435	2234	2232
			62.0	62.0	64.0	64.0	65.0	65.0	63.0	63.0
			2.0	6.3	2.7	6.1	2.8	6.0	1.5	5.9
AS08	6/5/74		0638	0636	1035	1035	1445	1445	2239	2242
Allen Road,			65.0	64.0	68.0	68.0	73.0	70.0	70.0	69.0
Northborough			5.4	8.0	5.8	7.8	7.8	8.2	6.4	7.7
	9/18/74		0700	0703	1042	1042	1445	1445	2244	2244
			62.0	62.0	63.0	63.0	68.0	65.0	63.0	63.0
			4.5	7.2	3.7	6.9	4.6	5.5	5.3	6.3

* Time
** Temperature (^{o}F)
*** Dissolved Oxygen (mg/l)

TABLE 18 (CONTINUED)

DAM LOCATION	DATE	ABOVE	BELOW	ABOVE	BELOW	ABOVE	BELOW	ABOVE	BELOW
AS13	6/5/74	0705	0712	1104	1105	1520	1520	2306	2309
Route 85,		65.0	64.0	69.0	68.0	72.0	74.0	70.0	70.0
Hudson		6.8	8.8	6.1	8.1	7.1	8.2	7.9	7.7
	9/18/74	0740	0745	1115	1112	1520	1520	2317	2315
		64.0	64.0	66.0	64.0	67.0	66.0	63.0	63.0
		5.7	7.7	6.0	7.7	5.9	7.5	6.9	7.5
AS15	6/5/74	0725	0724	1123	1125	1550	1545	2326	2323
Gleasondale,		65.0	65.0	67.0	69.0	70.0	70.0	70.0	71.0
Stow		5.9	8.4	6.0	8.0	7.7	8.5	8.5	11.0
	9/18/74	0800	0805	1130	1130	1545	1540	2333	2329
		65.0	65.0	67.0	67.0	69.0	69.0	64.0	64.0
		4.2	7.1	4.2	6.9	3.9	6.8	2.1	5.4
AS17	6/5/74	----	----	1145	1143	1620	1620	2343	2346
Routes 62 and 117,		----	----	71.0	69.0	71.0	72.0	70.0	70.0
Maynard		----	----	7.9	7.9	7.2	11.0	7.3	8.0
	9/18/74	0825	0830	1147	1142	1605	1600	2350	2353
		65.0	65.0	68.0	66.0	68.0	69.0	65.0	65.0
		7.4	8.2	8.1	8.3	9.4	8.8	9.1	8.2
AS19	6/5/74	0752	0755	1200	1155	1635	1635	2356	2358
High Street,		65.0	67.0	70.0	70.0	74.0	72.0	70.0	70.0
Maynard		7.2	8.9	7.8	8.2	9.2	8.5	7.9	8.4
	9/18/74	0845	0850	1158	1200	1620	1620	0004	0006
		66.0	66.0	69.0	66.0	68.0	68.0	66.0	66.0
		4.5	7.6	5.9	7.6	7.1	7.2	7.1	7.0

MEASURES OF WATER POLLUTION

The term "water pollution" has acquired many connotations. Literally, the word pollute means "render impure;" thus, in this sense, any water containing matter other than its chemical constituents of two parts hydrogen to one part oxygen would be considered polluted. Such "pure" water, however, is never found in natural bodies; the ecological balance in a waterbody is dependent on the presence of other material. In this report, water pollution refers to a condition which is in contravention of the Water Quality Standards. Pollution degrades the physical, chemical, and bacterial quality of a waterbody and can make it unsightly, malodorous, and a health hazard, its uses sharply limited. Pollution occurs mainly through the discharge of wastes from homes and industries. The various types of pollution are: (1) oxygen-demanding, such as originates from domestic sewage and certain industrial wastes, (2) toxic materials as in some industrial wastes, (3) radioactive (4) thermal, (5) bacterial, (6) oil, and (7) physical. Stormwater runoff from both urban and rural areas can also add pollutants to a waterbody.

The extent of pollution in a particular waterbody is determined by measuring certain chemical and biological constituents and properties. Chemical constituents, such as dissolved oxygen, phosphates, and metals, are generally measured in milligrams per liter (mg/l); since the unit weight of water is 1.0 grams per milliliter, milligrams per liter are roughly equivalent to parts per million for a solution which is mostly water.

Dissolved Oxygen (D.O.) refers to the uncombined oxygen in water which is available to aquatic life. Since this oxygen is consumed more rapidly in the decomposition of wastes, the D.O. gives an instantaneous picture of the condition of a waterbody. Time of day and temperature of the water are important in interpreting D.O. levels. Temperature affects the amount of oxygen which water can contain. Time of day is related to the effects of algae. Algae consume oxygen through respiration throughout the day and night. During daylight hours, they add oxygen through photosynthesis. D.O. levels are therefore generally highest during the afternoon and lowest just before sunrise.

Biochemical Oxygen Demand (B.O.D.) measures the amount of oxygen required by bacteria to decompose organic matter. The B.O.D. is gradually exerted, consisting of two stages. In the first stage, carbonaceous matter is stabilized while nitrogenous substances are broken down in the second stage. The second stage (nitrification) usually begins after seven days. The ultimate, or total, B.O.D. from both stages may require an incubation period of 30 days or more. Through recurrent use, the 5 day B.O.D. has become the standard test used in water quality analysis.

Chemical Oxygen Demand (C.O.D.) refers to the amount of oxygen required to chemically oxidize waste material. Since some of the organic matter in a waste cannot be decomposed by microorganisms but can be broken down by chemical oxidation, the C.O.D. is generally greater than the B.O.D. The C.O.D. is especially useful in analyzing a waste that contains a great deal of non-biodegradable matter.

Total Solids measures all solids in water including suspended and dissolved, organic and inorganic. They are measured by evaporating the water from a sample of known volume and weighing the residue remaining. The residue then can be ignited in a laboratory furnace to determine the organic portion. the loss on ignition is considered organic and the remaining residue, known as fixed solids, is considered to be inorganic.

Suspended Solids are those which can be removed by passing the water through a filter. The remaining solids are called dissolved solids. Suspended solids provide a good measure of the efficiency of a sewage treatment plant; primary treatment should remove about 50 percent of the suspended solids while secondary treatment should remove about 90 percent.

Coliform Bacteria are found in abundance in the intestinal tract of warm-blooded animals. They are not harmful in themselves, but their presence indicates that pathogenic bacteria also may be present. Since they can be detected by relatively simple test procedures, coliforms are used to indicate the extent of bacterial pollution from sewage. Bacterial tests usually measure the fecal coli and the total coli. Fecal coli make up about 90 percent of the coliforms discharged in fecal matter. Non-fecal coli may originate in soil, grain, or decaying vegetation.

pH measures the hydrogen ion concentration on an inverse logarithmic scale ranging from 0 to 14. pH values under 7 indicate more hydrogen ions and therefore more acidic solutions; pH values over 7 indicate less hydrogen ions and therefore more alkaline solutions. A pH of 7 indicates a neutral solution. Alkalinity is a quantitative measure of the alkaline materials present while acidity is a quantitative measure of acidic materials.

Nutrients are compounds which act as fertilizers for aquatic organisms. Small amounts are necessary to the ecological balance of a waterbody but excessive amounts can upset the balance by causing excessive growths of algae and other aquatic plants. Sewage discharged to a waterbody usually contains large amounts of carbon, nitrogen, and phosphorus. The concentration of carbonaceous matter is reflected in the B.O.D. test. Additional tests are run to determine the concentrations of nitrogen and phosphorus.

Phosphorus appears in waterbodies in combined forms known as ortho-and poly-phosphates and organic phosphorus. The majority of the phosphorus contained in domestic sewage and industrial wastes comes from detergents. Additional phosphorus may enter a waterbody in agricultural runoff where fertilizers are used.

Nitrogen in the form of organic nitrogen decomposes into ammonia nitrogen, nitrite nitrogen and nitrate nitrogen. Since each decomposition reaction is dependent on the preceding one, the progress of decomposition can be determined in terms of the relative amounts of these four forms of nitrogen.

Ammonia Nitrogen is present in sewage and is also generated from the decomposition of organic nitrogen. It can also be formed when nitrites and nitrates are reduced. Ammonia is particularly important since it has high oxygen and chemical demands and is also toxic to fish.

Nitrite Nitrogen is the oxidation product of ammonia. It has a fairly low oxygen demand and is rapidly coverted to nitrate. The presence of nitrite nitrogen usually indicates that active decomposition is taking place.

Nitrate Nitrogen is important since it is the end product in the aerobic decomposition of nitrogenous matter. Nitrogen in this form is readily available to plants.

Turbidity is the measure of the clarity of a water sample. It is expressed in Jackson Standard Units which are related to the scattering and absorption of light by the water sample.

Color is determined by visual comparison of a sample with known concentrations of colored solution and is expressed in standard units of color. Certain waste discharges may turn water to colors which cannot be defined by this method; in such cases, the color is expressed qualitatively rather than numerically.

Specific Conductance yields a measure of a water sample's capacity to convey an electric current. It is dependent on temperature and the concentration of ionized substances in the water. Distilled water exhibits specific conductance of 0.5 to 2.0 micromhos per centimeter while natural waters show values from 50 to 500 micromhos per centimeter.

The above parameters are measured in most water quality surveys. Other constituents such as metals or radioactivity are measured in areas where particular problems are known to exist. Microscopic examinations are conducted on most surveys to measure the amount of algae and other microorganisms present. Additional samples of the river bottom are usually collected in order to determine the types of deposits present. Decomposition of organic suspended matter which settles to the bottom will exert an oxygen demand on the water.

Two types of samples are collected for analysis: grab and composite. A grab sample is an instantaneous sample collected to show conditions at a particular time. Composite samples are collected over a period of time at specific intervals, giving a better picture of the overall water quality situation for the time covered.

Certain levels of the above parameters occur naturally in waterbodies. Since these levels vary among the different ponds, streams, and coastal waters, the following tables are presented for the sake of reference. Table B summarizes the numerical limits for certain paramters as specified by the Massachusetts Water Quality Standards. Table C lists levels found in unpolluted reaches of various Massachusetts waters.

TABLE B

SPECIFIED LEVELS OF CERTAIN PARAMETERS

MASSACHUSETTS WATER QUALITY STANDARDS REVISED 1974

	DISSOLVED OXYGEN	pH	COLIFORM BACTERIA	CHEMICAL CONSTITUENTS
Class A	Not less than 75% of saturation for 16 hours of any 24 hour period and never less than 5 mg/1. For cold water streams the D.O. shall not be less than 6 mg/1. For seasonal cold water the D.O. shall not be less than 6 mg/1 for the season.	As naturally occurs	Not to exceed an average of 50 per 100 ml for any monthly period.	None in concentrations or combinations which would t harmful or offensive to humans, or harmful to anim or aquatic life.
Class B	Same as Above	6.5 - 8.0	Not to exceed an average value of 1000 during any monthly sampling period nor 2400 in more than 20% of samples examined during such period.	None in concentrations or combinations which would t harmful or offensive to humans, or harmful to anim or aquatic life, or any water use specifically assigned to this class.
Class B1	Not less than 5 mg/1 during at least 16 hours of any 24 hour period, nor less than 3 mg/1 at any time. For seasonal cold water fisheries at least 6 mg/1 must be maintained during the season.	6.5 - 8.0	Same as Above	Same as Above
Class C	Same as Above	6.0 - 8.5	None in such concentrations that would impair any usages specifically assigned to this class.*	Same as Above
Class C1	Not less than 2 mg/1 at any time.	6.0 - 8.5	Same as Above	Same as Above

TABLE B (CONTINUED)

	DISSOLVED OXYGEN	pH	COLIFORM BACTERIA	CHEMICAL CONSTITUENTS
Class SA	Not less than 6.5 mg/l.	6.8 - 8.5	Not to exceed a median value of 70 and not more than 10% of samples over 230.	None in concentrations or combinations which would be harmful to human, animal, or aquatic life or which would make the waters unsafe or unsuitable for fish or shellfish or their propagation, impair the palatability of same, or impair the waters for any other uses.
Class SB	Not less than 5.0 mg/l.	6.8 - 8.5	Not to exceed a median value of 700 and not more than 10% of samples over 2300.	Same as Above
Class SC	Not less than 5 mg/l during at least 16 hours of any 24 hour period and never less than 3 mg/l.	6.5 - 8.5	None in concentrations that would impair any usages assigned to this class.*	Same as Above

* No bacteria limit has been placed on this class because of urban runoff and combined sewer problems which have not yet been solved. In waters of this class not subject to this problem the standard shall be less than an average of 5,000 coliform bacteria/100 ml during any monthly sampling period.

TABLE C

SELECTED ANALYSES OF UNPOLLUTED WATERS

	LAKE QUINSIGAMOND WORCESTER	SWIFT RIVER BELOW QUABBIN RESERVOIR	PARKER RIVER BYFIELD	CHARLES RIVER HOPKINTON
Dissolved Oxygen, mg/l	11.2-12.5	7.4-9.2	7.2-8.4	6.2-7.4
5-Day B.O.D., mg/l	0.8	1.8	1.9	0.7
Suspended Solids, mg/l	1.5	5	4	0
pH	6.7	6.5	7.6	6.4
Alkalinity, mg/l	18	8	37	8
Total Coliform per 100 ml.	28	1300	300	170
Fecal Coliform per 100 ml.	5	14	--	--
Color, Std. Units	28	25	68	35
Turbidity, Std. Units	2	4	2	2
Ammonia as N., mg/l	0.04	0.10	0.04	0.0
Nitrite as N., mg/l	--	0.000	0.006	0.0
Nitrate as N., mg/l	--	0.0	0.1	0.0
Total Phosphorus as P, mg/l	0.04	0.07	0.16	0.03