DATA REPORT

of the

DIURNAL FLUCTUATIONS

of the

DISSOLVED OXYGEN CONTENT

in the

SUSQUEHANNA RIVER

between

HARRISBURG AND COLUMBIA, PENNSYLVANIA

1970

Field Operations Branch
Surveillance & Analysis Division
EPA - Region III
Philadelphia, Pennsylvania

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I. INTRODUCTION

The Susquehanna River between Harrisburg and Columbia, Pennsylvania is a shallow stream with numerous rapids caused by outcropping rock formations across the stream bed. Organic and nutrient loadings from waste treatment facilities discharging into the Susquehanna River and its tributaries have provided the environment conducive to the growth of numerous varieties of aquatic vegetation. The turbulence, caused by the outcropping rock formations, and photosynthetic cycle of the aquatic vegetation is the primary source of dissolved oxygen. However, the photosynthetic oxygen production fluctuates from day to night.

II. PURPOSE

The purpose of this study was to quantify the diurnal fluctuations of the dissolved oxygen content and the pH values of the Susquehanna River between Harrisburg and Columbia, Pennsylvania.

This fluctuation is a measure of the oxygen input caused by the photosynthetic activity of aquatic vegetation.

III. SCOPE

The scope of the study was limited to a partial survey of two locations on the Susquehanna River during August, 1968.

Sample traverses were made at the Market Street Bridge (US 11) in Harrisburg and at the Columbia Bridge (US 30) between Columbia and Wrightsville, Pennsylvania. Water quality parameters sampled included pH, water temperature, specific conductance, stream flow and dissolved oxygen content.

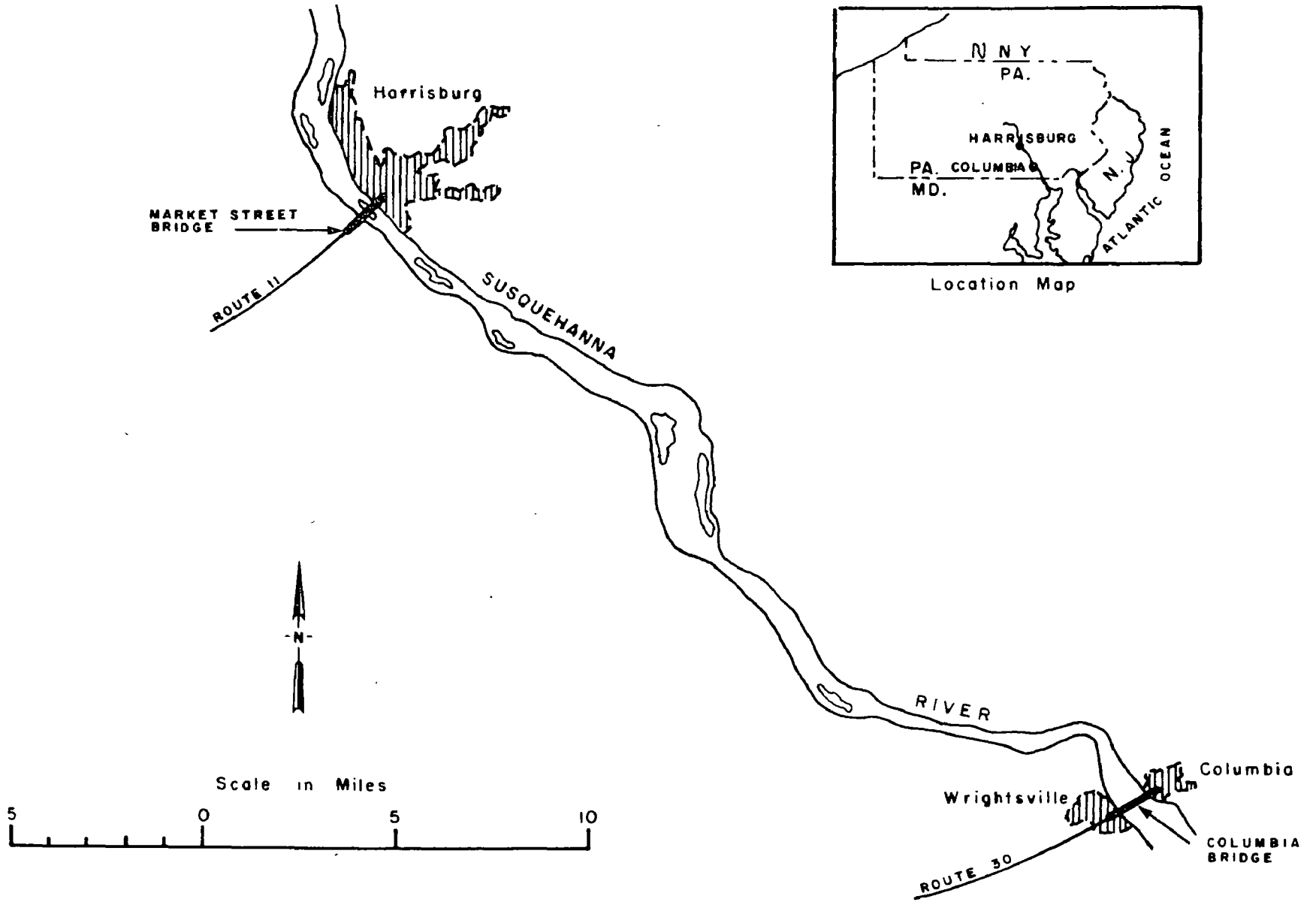


FIGURE 1

STUDY AREA and BRIDGE LOCATIONS

III. Scope (cont'd.)

Table 1 shows the diurnal fluctuations at the Columbia Bridge and Table 2, the diurnal fluctuations at the Market Street Bridge. See figure 2 for sample station locations at each bridge.

IV. PROCEDURE

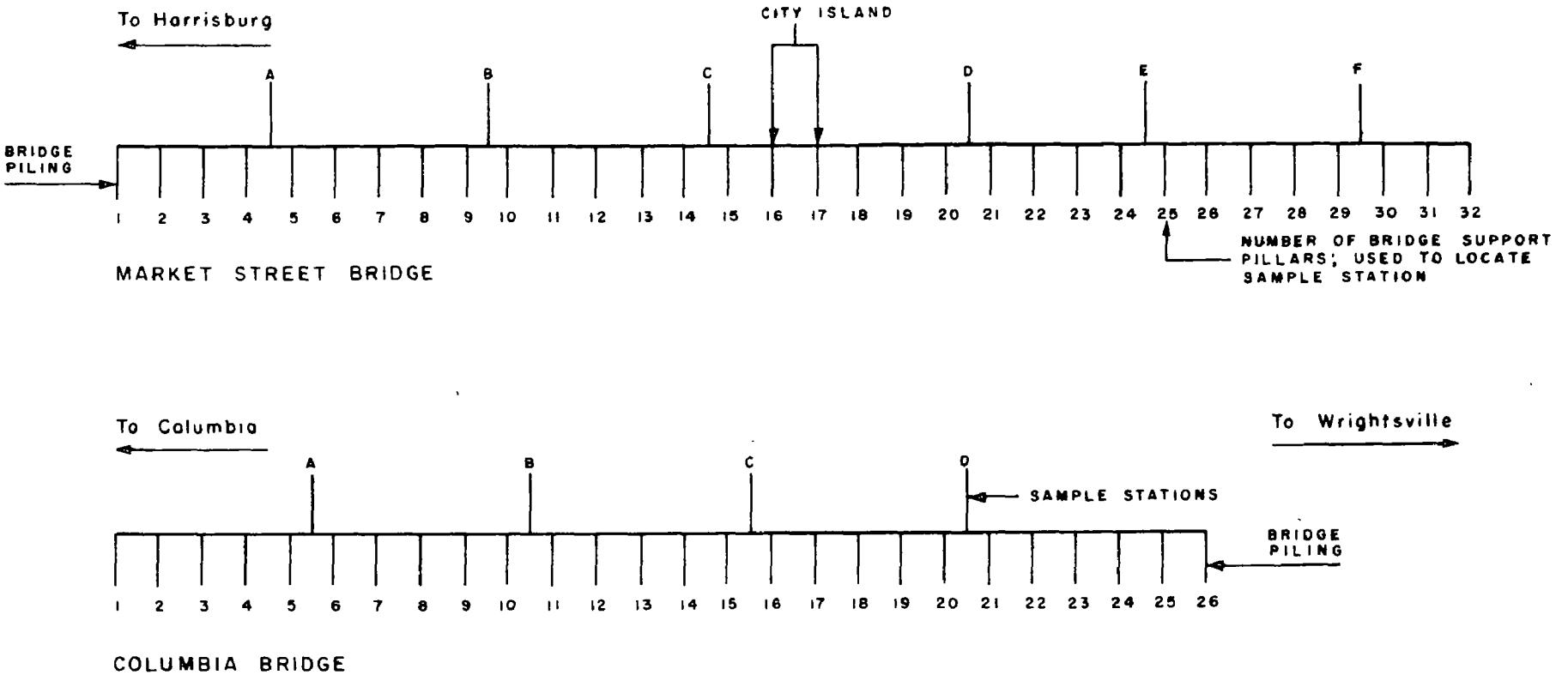
Stream conditions in the Susquehanna River at the time of sampling were ideal for a diurnal type of study. The stream flow was low and there had been no fluctuations in river stage for more than a month prior to the survey. Cloud cover had been minimal and the air temperatures were generally in the upper 80's which, in turn, resulted in very favorable water temperatures for the growth of aquatic vegetation.

The samples were taken according to routine field methods and analyzed according to methods outlined in the publication "Standard Methods for Examination of Water and Wastewater" 12th ed., 1965.

V. STATION DESCRIPTION

Stations included in this study are described below. (See Figure 1)

Station	River Mile	Station Description
Market Street Bridge	67	Susquehanna River at Market Street Bridge (US 11) at Harrisburg, Pennsylvania
Columbia Bridge	43	Susquehanna River at Columbia Bridge (US 30) at Columbia, Pennsylvania



SAMPLE STATION LOCATIONS
(schematic detail)

FIGURE 2

TABLE 1

Diurnal Dissolved Oxygen Fluctuations
Susquehanna River, Pennsylvania

Diurnal Study - Susquehanna River

(Columbia Bridge @ Columbia, Pa.)

Stations	Time	Date 1968	Temp. (°F)	pH	Spec. Conduct. mhos	D.O. mg/l	%(approx.) Saturation	Q river (cfs)
A	0915	8/12	80	7.6	355	7.9	98	5,780
A	1048	8/12	81	8.3	350	-	-	-
A	1255	8/12	81	8.45	360	10.0	125	
A	1455	8/12	82	8.20	380	11.1	142	
B	9:05	8/12	80	7.8	368	7.7	96	
B	10:40	8/12	80.5	8.5	360	-	-	
B	12:30	8/12	80.5	8.6	370	9.8	122	
B	2:40	8/12	82.	8.7	370	11.1	142	
C	8:55	8/12	80	8.1	378	8.2	102	
C	10:30	8/12	81	8.6	365	-		
C	12:45	8/12	81	8.6	370	9.6	120	
C	2:30	8/12	82	8.8	335	10.8	139	
D	8:45	8/12	79	8.2	380	8.8	109	
D	10:20	8/12	79	8.4	380	-	-	
D	1:00	8/12	80.5	8.3	370	10.7	133	
D	2:15	8/12	81.5	8.7	375	11.3	143	

TABLE 2

Diurnal Dissolved Oxygen Fluctuations
Susquehanna River, Pennsylvania

Diurnal Study - Susquehanna River

(Market Street Bridge @ Harrisburg, Pa.)

Stations	Time	Date 1968	Temp. (°F)	pH	Spec. Conduct. mhos	D.O. mg/l	%(approx) Saturation	Q river (cfs)
A	0745	8/5	72	6.8	335	8.1	92	6280
A	0900	8/5	73	6.2	500	9.8	101	
A	1128	8/5	74	6.5	475	-	-	
A	1250	8/5	76	6.4	480	11.3	135	
A	1440	8/5	78	6.8	510	-	-	
A	1555	8/5	79	6.5	510	10.9	135	
B	8:02	8/5	72	8.3	350	8.1	92	
B	9:10	8/5	73	6.5	370	8.3	95	
B	11:22	8/5	74	6.5	375	-	-	
B	1:00	8/5	76	6.6	385	9.8	117	
B	2:50	8/5	78	8.0	380	-	-	
B	4:00	8/5	79	7.8	385	10.6	131	
C	8:10	8/5	73	6.5	335	7.2	83	
C	9:15	8/5	73	7.2	300	8.5	98	
C	11:17	8/5	74	6.4	290	-	-	
C	1:10	8/5	76	8.1	295	-	-	
C	3:00	8/5	78	8.8	305	10.4	127	
C	4:10	8/5	80	9.0	300	-	-	
D	8:24	8/5	73	8.5	335	8.3	95	
D	9:20	8/5	74	7.2	280	8.5	99	
D	11:10	8/5	75	7.2	280	-	-	
D	1:21	8/5	78	9.1	280	11.5	140	
D	4:26	8/5	80	9.1	275	11.3	140	
E	9:25	8/5	73	7.6	295	8.7	100	
E	11:00	8/5	74	8.7	280	-	-	
E	1:30	8/5	75	8/4	280	10.6	126	
E	3:20	8/5	78	8.9	280	-	-	
E	4:30	8/5	80	8.7	280	11.7	145	
F	10:50	8/5	74	7.5	300	7.9	92	
F	1:40	8/5	75	7.8	340	9.8	117	
F	3:26	8/5	78	7.5	300	-	-	
F	4:40	8/5	79	8.8	280	11.7	144	