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CODORUS CREEK

WATER QUALITY INVESTIGATION

REPORT

ENVIRONMENTAL PROTECTION AGENCY

REGION III

PHILADELPHIA, PENNSYLVANIA

MARCH, 1972

A Water Quality Investigation

of the

Codorus Creek Watershed

March, 1972

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TABLE OF CONTENTS

LIST OF FIGURES AND TABLES

LIST OF FIGURES AND TABLES (Continued)

Chapter I

Introduction

A. Purpose:

The Water Quality Study was initiated to determine existing conditions of the Codorus Creek Watershed necessary to establish a Wastewater Management Plan. The Susquehanna River Basin Coordinating Committee, in their June, 1970 report, recommended regional sewerage studies be conducted.

A high priority was given to six sub-basin areas, the Codorus Creek being one of these areas. The Coordinating Committee consisted of federal and state officials having jurisdiction within the basin. The Baltimore office of the Corps of Engineers obtained funds to develop a Wastewater Management Plan. Region III of the Environmental Protection Agency was requested by the Corps of Engineers to provide water quality data for the plan.

B. Scope:

The scope of this report is limited to the presentation and interpretation of analytical data relative to the existing water quality of the Codorus Creek Watershed.

C. Objectives:

(1) Establish a base-line record of water quality for the Codorus Creek Basin.

(2) Determine characteristics and rates of natural purification of the Codorus Creek and its tributaries.

(3) Determine patterns of pollution downstream from waste discharges and effects on water uses and monitoring effects of waste discharge.

(4) Estimate waste assimilation capacities of the Codorus Creek and its tributaries.

(5) Estimate reductions in waste loads necessary to meet water quality requirements

D. Authority:

This Study was conducted and the report prepared under the provisions of Section 3 of the Federal Water Pollution Control Act As Amended (33 U. S. C. 466 et seq.) which authorizes the Administrator of the United States Environmental Protection Agency to cooperate with other Federal agencies to make joint investigations for the development of comprehensive programs for the elimination or reduction of interstate waters and tributaries thereof and improving the sanitary condition of surface and underground waters. The Baltimore District, Corps of Engineers, by letter dated August 30, 1971, requested this office make a water quality study of the Codorus Creek Watershed, Tributary of the Susquehanna River, for the purpose of establishing a Wastewater Management Plan.

E. Acknowledgement of Aid and Assistance:

During the course of this Study it was necessary to obtain data and information from various sources. We are indeed grateful for the aid given and wish to express our appreciation to the following:

(1) Data and Information:

Geological Survey, (Department of the Interior)
Harrisburg, Pa.

Pennsylvania Department of Environmental Resources,
Bureau of Water Quality Management, Division of
Water Quality and Bureau of State Parks
Harrisburg, Pa.

Pennsylvania Environmental Protection Field Office,
Region IV, Lewistown, Pa.

York County Planning Commission, York, Pa.

Yule, Jordan and Associates, Camp Hill, Pa.

(2) Field Laboratory Facilities:

Springettsbury Township, Pa.

(3) Wastewater Treatment Plant Samples:

Springettsbury Township, Pa.

City of York, Pa.

Glen Rock Borough, Pa.

Penn Township, Pa.

Red Lion Borough, Pa.

Appreciation is also expressed to the Environmental Protection Agency's Chesapeake Technical Support Laboratory for providing the field sampling and field laboratory personnel necessary to complete the study.

Chapter II

Summary and Conclusions

An intensive field investigation, including sampling and flow measurements, and laboratory analysis were conducted to determine the existing water quality of the Codorus Creek. The summary for this study is as follows:

1. The Codorus Creek watershed, which is a sub-basin of the Susquehanna River, has a drainage area of about 294 square miles.

2. The waters of the Codorus Basin are classified by Pennsylvania as:

(a) water supply for domestic, industrial, live stock, wildlife and irrigation purposes;

(b) recreational use for warm and cold water fishery and water contact sports;

(c) treated waste assimilation and power.

3. There are six municipal wastewater treatment facilities, all of which have secondary treatment.

4. There are forty (40) reported industrial pollution sources of which the State Environmental Protection Field Office, Lewistown, Pa., states twenty-two (22) discharge directly into the Codorus Creek. The remaining industrial pollution sources are discharged into municipal treatment facilities, soil application or to the Codorus Creek. The largest volume of wastewater is discharged by the Glatfelter Paper Company.

5. All seven (7) wastewater discharges, sampled in this survey, do not comply with the effluent standards established by the Pennsylvania Implementation Plan dated December 20, 1967.

6. Concentrations of toxic materials exceeding State water quality standards were found in the stream. These toxic materials are of the type normally found in industrial discharges and are not naturally occurring within this area.

7. Nutrient concentrations far exceed the levels generally found to be necessary to stimulate the growth of algae and aquatic weeds thereby accelerating eutrophication. Stream discoloration, caused by the effluent from P. H. Glatfelter Paper Company, has retarded this phenomena by limiting the light penetration.

8. Bacteriological data show high counts of indicator microorganisms, indicating the potential presence of disease-causing bacteria, suggesting inadequate chlorine applications to treatment plant effluents, direct discharges from individual homes to the receiving stream and livestock waste discharges.

9. Biological data indicated extremely poor water quality within the Main and West Branches below Spring Grove.

10. A summary of all the physical, chemical, biological and bacteriological information indicates the Main and West Branches of the Codorus Creek along with the major tributaries of Oil Creek and Mill Creek are grossly polluted from municipal and industrial wastewater discharges and agricultural runoffs.

Chapter III

Description of Study Area

A. General:

The Codorus Creek Watershed comprises approximately one-third of the total area of York County and contains over 60 per cent of the county's population. The headwaters and outlet drainage occur within the confines of York County although the watershed limits extend very slightly into neighboring Maryland. Three main tributaries drain the watershed; The East Branch (drainage area - 54.0 square miles), the South Branch (drainage area - 117.6 square miles, including the East Branch), and the West Branch (drainage area - 95.4 square miles). At a point about four and a half miles due south of the City of York, the East Branch flows into the South Branch, and approximately three miles southwest of York, the South and West Branches join to form the main stem of Codorus Creek which then flows northeast (through York) for approximately 5.5 miles where the Mill Creek (approximately 20 square miles) joins the Codorus Creek which then flows for approximately 9.5 miles where it empties into the Susquehanna River. At its mouth the Codorus Creek drains a total of 293.6 square miles of open rolling country in the Piedmont Plateau Region. (See Figure I)

The West Branch rises in the southwestern corner of the watershed, flows north to Spring Grove, includes the West Branch, East Branch of the West Branch and Oil Creek, and then northeast to its junction with the South Branch. Lake Marburg, Lake Lehman, Mill Dam and Lake Pahagaco, along with the Indian Rock Floor Control Reservoir are the impoundments in the portion of the watershed. The area drained is generally open rolling country with a drainage pattern sloping gently toward the York-Hanover Valley from an average headwater elevation of approximately 1000 feet. The stream grade falls less than 600 feet to its confluence with the South Branch. Tributary valleys are relatively narrow (500-1000 feet maximum) until reaching the main valley where a broad, flat plain borders the Spring Grove area. Except for isolated reaches, a wide flood plain prevails along the West Branch to its junction with the South Branch.

The South Branch drains an area with characteristics similar to the West Branch. The total fall of the stream from its headwaters to the West Branch confluence is less than 600 feet. Rising in the mid-southern area of the watershed at an approximate elevation of 1000 feet, the stream flows on a general northerly route having a relatively narrow flood plain. The valley floor averages approximately 300-500 feet in width until it reaches the vicinity of the York Water Company Pumping Station below Brill Hart, where alluvial deposits have created a plain of 1000-2000 feet in width.

The East Branch joins the South Branch approximately four miles

above the confluence of the West and South Branches. The Branch rises in the southeastern corner of the watershed at an elevation of approximately 1000 feet and flows in a general direction to the South Branch. The upper reaches of the stream have slightly steeper gradients, the total fall being approximately 600 feet in 12 miles. Expanded Lake Williams is the only impoundment in this Branch.

The Main Branch of the Codorus Creek starts at the confluence of the West and South Branches at an approximate elevation of 400 feet and flows in a northeasterly direction to the Susquehanna River and discharges at an elevation of approximately 250 feet. The main stem of the Codorus Creek has cut a deep rocky gorge through the westward extension of the Hellam Hills near its mouth.

B. Geology:

The Codorus Creek watershed is located in three geologically similar areas:

(1) The Hanover-York Valley consists of limestone (Cambrian and Ordovician), dolomites with minor quartzites. This valley is geologically complicated, badly faulted and contorted.

(2) The Southeastern Upland which consists of schists interlayered matabasalts and phylites (Cambrian and probably early Paleozoic), The Pigeon Hills and Hellam Hills, considered as part of this geological unit, consists of mainly quartzites (Cambrian), and is badly faulted and contorted.

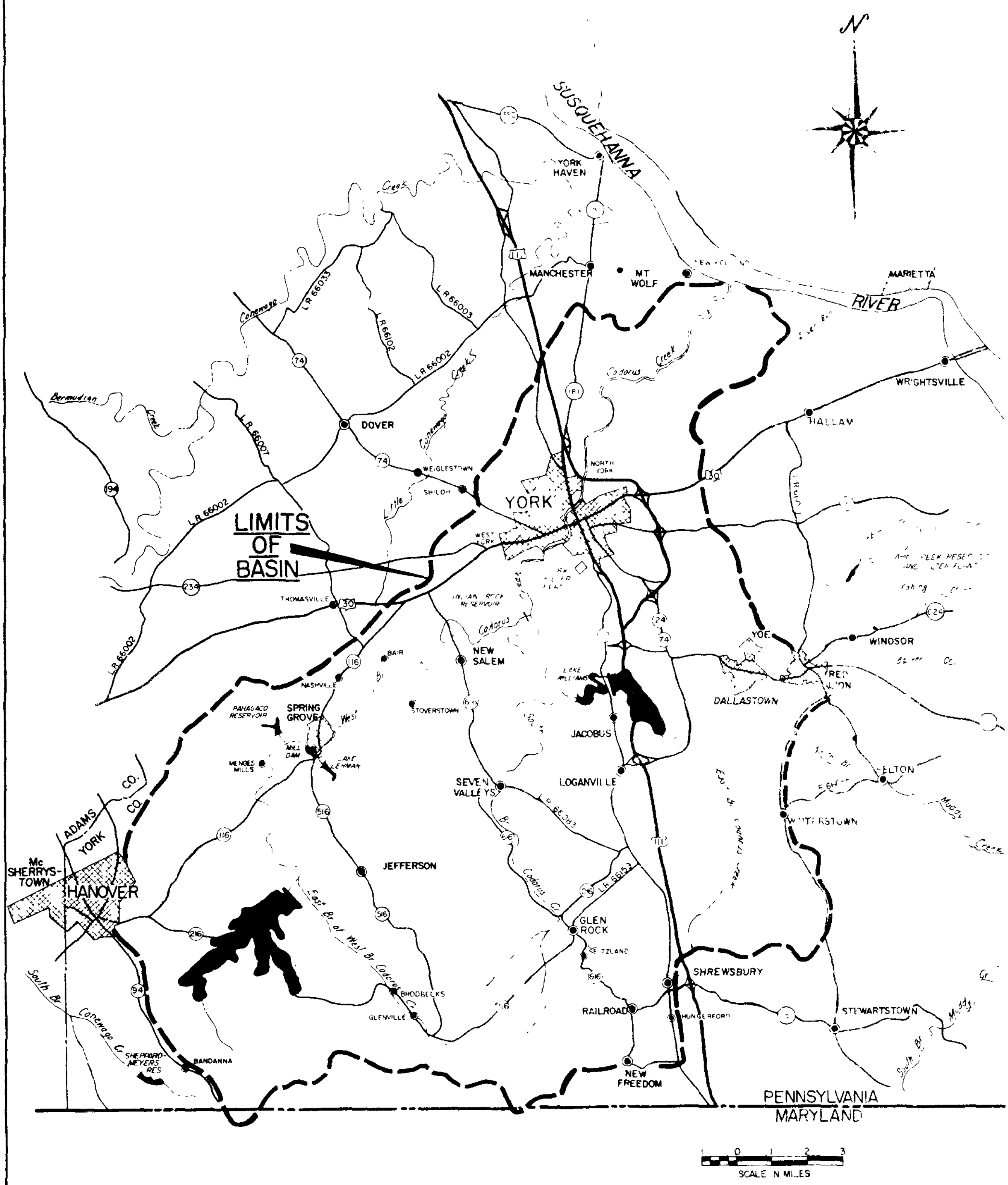
(3) Triassic Upland which is in the Codorus Creek watershed area consists of red shales and sandstone (New Oxford).

C. Climatology:

Generally, a humid continental type climate prevails throughout the Codorus Creek watershed. A growing season approaching 200 days is common with long hot summers and sufficient rainfall, thus promoting the flourishing agricultural industry throughout the region. The summer months alone produce 10-13 inches of rainfall, the average annual amount varying from 36 to 45 inches with the heaviest concentration being along the Maryland border. Drier winter months produce 7 to 9 inches of precipitation of which approximately 30 per cent falls as snow. The average annual depth of snowfall in the watershed is 24 inches.

The mean annual temperature for the area is $54^{o}F$. Winters are relatively short, $32^{o}F$ reading occurring 100 days or less per year, while the long, warm summers produce $90^{o}F$ temperatures approximately 25 days during the season.

Mountain ridges west of the area are a major influence protecting the area from the more severe weather occurring to the west and north induced by the prevailing westerly winds.



CODORUS CREEK SUB-BASIN
SUSQUEHANNA RIVER BASIN

WATER QUALITY STUDY

ENVIRONMENTAL PROTECTION AGENCY
REGION III PHILADELPHIA, PA.

FIGURE I

Chapter IV

Study Methodology

A. Time Period of Study:

The study was started on August 18, 1971. The field work was completed on November 12, 1971, and all laboratory analysis was completed December 2, 1971.

B. Sampling and Analytical Methods:

All sampling and analyses were performed in accordance with either Standard Methods for the Examination of Water and Wastewater, Thirteenth Edition, or The Environmental Protection Agency Methods for Chemical Analysis of Water and Wastes (1971 Edition). The Field Laboratory was established in the Springettsbury Township Wastewater Treatment Plant. The Field Laboratory was supplemented by the Environmental Protection Agency Technical Support Laboratory at Charlottesville, Virginia.

C. Hydrological Methods:

Time of travel and stream flow data were obtained by the utilization of a National Bureau of Standards Calabrated "Pigmy" Flow Meter.

All wastewater flow measurements were obtained from the wastewater treatment plant flow meters.

D. Description and Location of Sampling Stations:

(See Figure II and Table A)

Table A

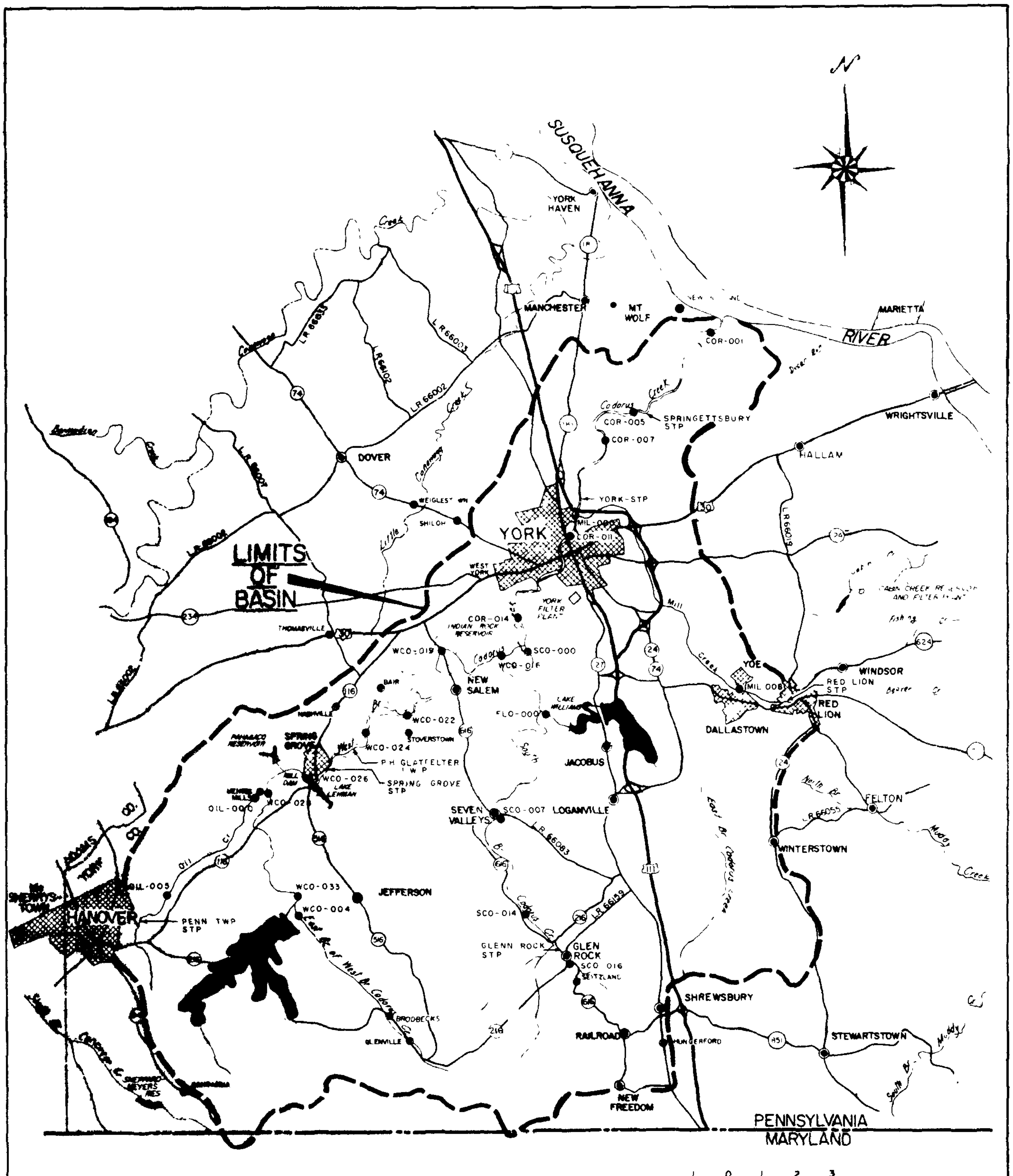
Station Ident.	River Mile	Description
COR001	0.6	Codorus Creek near Codorus Furnace, Pa. Bridge on L. R. 66152.
COR005	5.0	Codorus Creek near Glades, Pa. Bridge on L. R. 66152.
COR005 (STP)	4.8	Springettsbury STP outfall to the Godorus Creek.
COR007	6.7	Codorus Creek near Emigsville, Pa. Bridge at intersection of L. R. 66021 near T-839.
COR009 (STP)	9.0	York, Pa. STP outfall to Codorus Creek.
COR011	10.6	Codorus Creek in York, Pa. Bridge on I-83 (Business)
COR014	14.4	Codorus Creek near West York, Pa. Bridge at intersection of L. R. 66094 and L. R. 66050.
WC0016	16.2	West Branch Codorus Creek near Indian Rock Dam Bridge on L. R. 66210.
WC0019	18.7	West Branch Codorus Creek near New Salem, Pa. Bridge on Pa. Route 616.
WC0022	21.8	West Branch Codorus Creek near Stoverstown, Pa. Bridge on L. R. 66007
WC0024	23.7	West Branch Codorus Creek near Nashville, Pa. Bridge on T-488.
WC0025 (IWP)	24.5	P. H. Glatfelter Industrial STP outfall to West Branch of Codorus Creek.
WC0026 (STP)	25.8	Spring Grove, Pa. STP outfall to West Branch of Codorus Creek.
WC0027	26.2	West Branch of Codorus Creek south of Spring Grove, Pa. Bridge on Penna. State Route 116.
WC0028	28.1	West Branch of Codorus Creek at Menges Mills, Pa. Bridge on L. R. 66048.
WC0033	32.6	West Branch of Codorus Creek near Codorus State Park. Bridge on L. R. 66009 near intersection of L. R. 66217.
WC0034	33.6	East Branch of West Branch of Codorus Creek near Codorus State Park. Bridge on L. R. 66154.

Table A (Continued)

Station Ident.	River Mile	Description
SC0000	0.3	South Branch of Codorus Creek at the York Co. Pumping Station and U. S. G. S. Gaging Station 1-5750. Near intersection of L. R. 66050 and L. R. 660511.
SC007	7.2	South Branch of Codorus Creek at Seven Valleys Bridge on L. R. 66083.
SC0014	14.4	South Branch of Codorus Creek near Larve, Pa. Bridge on T-424.
SC0015 (STP)	15.7	Glen Rock, Pa. STP outfall to South Branch of the Codorus Creek.
SC0016	16.3	South Branch of Codorus Creek at Glen Rock, Pa. Bridge on Pa. Route 216.
EC0000	0.05	East Branch of Codorus Creek at Reynolds Mill, Pa. Bridge on L. R. 66049.
MIL000	0.01	Mill Creek in North York, Pa. R. R. Bridge off L. R. 66106.
MIL008	8.3	Mill Creek in Yoe, Pa. Bridge on L. R. 66004.
MIL009 (STP)	9.1	Red Lion, Pa. STP outfall to Mill Creek.
OIL000	0.2	Oil Creek at Menges Mills, Pa. Bridge on L. R. 66008.
OIL005	4.8	Oil Creek near York Road, Pa. Bridge on T-341.
OIL006 (STP)	6.0	Penn Township, Pa. STP outfall to Oil Creek.

(STP) - Municipal Wastewater Treatment Plant.

(IWP) - Industrial Wastewater Treatment Plant.



CODORUS CREEK SUB-BASIN
SUSQUEHANNA RIVER BASIN

WATER QUALITY STUDY
SAMPLING STATIONS

ENVIRONMENTAL PROTECTION AGENCY
REGION III PHILADELPHIA, PA.

FIGURE II

Chapter V

Analysis and Interpretation of Data

A. Water Quality Standards:

Recommended national water quality criteria were developed by the National Technical Advisory Committee to the Secretary of the Interior and was completed April 1, 1968. A summary of these criteria appear in Table B.

Water quality criteria were also developed by the Pennsylvania Sanitary Water Board specifically for the Codorus Creek. These criteria appear in Table C.

The Pennsylvania Sanitary Water Board also developed an implementation plan indicating effluent requirements and schedule for compliance. This plan appears as Exhibit 1.

TABLE B
WATER QUALITY CRITERIA

National Water Quality Standards*

Water quality	Recreation and aesthetic	Public water supply		Fish and aquatic wildlife		Agriculture		
		Permissible	Desirable	Fresh water organisms	Wild life	Farm water supplies	Livestock	Irrigation
Color, units		75	< 10	10% of light penetrating to bottom	10% of light penetrating 6 ft.			
Temperature, ^{o}F	< 85^{o}	< 85^{o}	< 85^{o}	83 - 96^{o}				55 - 85^{o}
Temperature, ^{o}C	< 24.9^{o}	< 24.9^{o}	< 24.9^{o}	28.3^{o} - 35.6^{o} for 6 hr.				12.8^{o}-24.9^{o}
Fecal coliform, no/100 mg	2000-200	2000	20					4000
Alkalinity ($CACO_3$) mg/1		30-500	30-500	> 20	35-200			
Chloride		250	25					
Hexavalent chromium, mg/1		0.05	Absent			0.05	0.05	5-20
Copper, mg/1		1.0	Absent			1.0		0.2-5.0
Dissolved oxygen, mg/1		> 3.0	Near to saturation	> 4.0	Bottom aerobic			
Hardness ($CACO_3$), mg/1	300-500	60-120						
Iron, mg/1	0.3	Virtually absent				0.3		

TABLE B (Continued)

Water quality	Recreation and aesthetic	Public water supply		Fish and aquatic wildlife		Agriculture		
		Permissible	Desirable	Fresh water organisms	Wild life	Farm water supplies	Livestock	Irrigation
Manganese, mg/l		0.05	Absent			0.05		2.0 - 20
Nitrates, mg/l		10.0(N) Ind. NO_2	Virtually absent			45.0		
Nitrates & Nitrites		10	Virtually absent					
pH	5.0-9.0	6.0-8.5		6-9	7.0-9.2	6.0-8.5		4.5-9.0
Sulfate, mg/l		250	50					
Total dissolved solids, mg/l		500	200			500-5000	10,000	0-5000
Cyanide, mg/l		0.20	Absent					
Turbidity, mg/l			Virtually absent	50-warm water 10-cold water				

* As established by the National Technical Advisory Committee to the Secretary of the Interior

Table C

General Criteria:

The water shall not contain substances attributable to municipal, industrial or other waste discharges in concentrations or amounts sufficient to be inimical or harmful to the water uses to be protected or to human animal, plant or aquatic life.

Specific substances to be controlled include, but are not limited to, floating debris, oil, scum and other floating materials; toxic substances; substances that produce color, tastes, odors or settle to form sludge deposits.

Table C (Continued)

Standard Criteria:

Water Quality Indicator	Code	Criteria
pH	a	Not less than 6.0; not to exceed 8.5
Dissolved Oxygen	b 2	Minimum daily average of 5.0 mg/l with no value less than 4.0 mg/l.
Total Iron	c	Not to exceed 1.5 mg/l.
Temperature	d 2	Not to exceed 5°F rise above ambient temperature or a maximum of 87°F (30.6°C), whichever is less; not to be changed by more than 2°F during any one hour period.
Dissolved Solids	e	Not to exceed 500 mg/l as a monthly average value; not to exceed 750 mg/l at any time.
Bacteria (Coliforms/100 mg)	f	For the period 5/15 - 9/15 of any year; not to exceed 1,000/100 ml as an arithmetic average value; not to exceed 1,000/100 ml in more than two consecutive samples; not to exceed 2,400/100 ml in more than one sample. For the period 9/16 - 5/14 of any year; not to exceed 5,000/100 ml as a monthly average value, nor to exceed this number in more than 20% of the samples collected during any month; nor to exceed 20,000/100 ml in more than 5% of the samples.

Table C (Continued)

<u>Water Use List</u>:

1.	Aquatic Life	-	Warm Water Fishery
2.	Water Supply	-	Domestic
			Industrial
			Live Stock
			Wildlife
			Irrigation
3.	Recreation	-	Fishing
			Water Contact Sports
4.	Other	-	Power
			Treated Waste Assimilation

Table C (Continued)

Watershed Criteria:

Description of Zone: Zone Name	Limits of Zone	Exceptions to Standard Water Use List	Exceptions to Standard Water Quality Criteria List
Codorus Creek	Confluence of South and West Branches to mouth	None	Add color not to exceed 50 units
East Branch to the South Branch of Codorus Creek	From source to mouth, and all tributaries, named and unnamed	Add Cold Water Fishery	Delete b_2, d_2 Add minimum daily average of 6.0 mg/l with no value less than 5.0 mg/l. Temperature not to exceed 58°F (14.4°C) or natural temperatures, whichever is greater.
West Branch of Codorus Creek	From its confluence with its East Branch to its confluence with Oil Creek	Add Cold water Fishery	Delete b_2, d_2, Add minimum daily average of 6.0 mg/l with no value less than 5.0 mg/l.
West Branch of Codorus Creek	From its confluence with Oil Creek to its confluence with the South Branch	None	Add color not to exceed 50 units.

Table C (Continued)

Treatment Plant Effluent Criteria:

Facilities are expected to be designed to meet the criteria at the critical periods. In addition, facilities must be operated at all times at that level of efficiency needed to meet requirements for thecritical conditions. This will result in stream quality higher than the criteria most of the time.

Specific: A minimum of secondary treatment is required for all waste discharge in this area.

Secondary treatment is that degree of treatment which, in the opinion of the Sanitary Water Board, will remove practically all of the suspended solids; will remove at least eighty-five (85) percent of the organic pollution load as measured by the biochemical oxygen demand test; will accomplish the removal of oils, greases, acids, alkalis, toxic, putrescible, taste and odor producing substances, and other substances inimical to the public interest in the receiving stream; will provide effective disinfection to control disease producing germs; will provide satisfactory disposal of sludge; and will produce a final effluent that is suitable for discharge into the receiving waters.

In certain waters of this area, secondary treatment of the present waste discharges is inadequate now, or will be in the future, if the water quality criteria recommended in Section VI of this report are to be met. Tertiary treatment of wastes or other methods of advanced water quality control will be needed for the following waters of this area:

Watershed	Zone Name	Limits of Zone	Abatement Requirements
Codorus Creek	Codorus Creek	Entire Codorus Creek Basin	95% to 98% BOD reduction; Nutrient reduction; Color removal or - Flow augmentation plus Nutrient reduction and Color removal or - Transport secondary Effluent to the Susquehanna River or - a combination of the above

Exhibit 1

IMPLEMENTATION PLAN

I. GENERAL

The Sanitary Water Board, in accordance with its powers under the Clean Streams Law, will issue appropriate orders, modify permits or take other appropriate action to have all persons or municipalities under its jurisdiction abate pollution to comply with the criteria. The Board, in all cases, will require either immediate abatement or the submission of a detailed abatement schedule providing for abatement within as short a period of time as is technically possible and will cause appropriate investigations to be made to assure itself of compliance with the standards.

Facilities are expected to be designed to meet the criteria at the critical periods. In addition, facilities must be operated at all times at that level of efficiency needed to meet requirements for the critical conditions. This will result in stream quality higher than the criteria most of the time.

II. SPECIFIC

A minimum of secondary treatment, or its equivalent, is required for all waste discharges in this area.

Secondary treatment is that degree of treatment which, in the opinion of the Sanitary Water Board, will remove practically all of the suspended solids; will remove at least eighty-five (85) percent of the organic pollution load as measured by the biochemical oxygen demand test; will accomplish the removal of oils, greases, acids, alkalis, toxic, putrescible, taste and odor producing substances, and other substances inimical to the public interest in the receiving stream; will provide effective disinfection to control disease producing germs; will provide satisfactory disposal of sludge; and will produce a final effluent that is suitable for discharge into the receiving waters.

Color:

The effluents containing color must be controlled or other steps must be taken to provide the following residual color in the receiving stream during critical flow periods. Adequate steps taken to provide flow augmentation or other unused flow will be considered in the calculation of effluent requirements.

Date	Color not to be exceeded, Pt-Co. Units
7/1/69	500
12/31/72	250
12/31/74	125
12/31/76	50 (Tentative)

Dissolved Solids:

i). Where dissolved solids criteria are presently being met - Present.

ii). Where dissolved solids criteria are not being met - No later than 12/31/76.

All other criteria:

No later than 12/31/70.

Appropriate orders will be issued in the following cases for control of the materials indicated:

1. Sewerage - Additional bacteria control is needed at all sewage discharges. In addition, the following BOD reductions or effluent standards are also needed:

Name	Effluent Requirements
(a) Glen Rock Borough York County	95% BOD reduction
(b) New Freedom Borough York County	BOD not to exceed 15 mg/l in effluent, D.O. not less than 6 mg/l
(c) Spring Grove Borough York County	BOD not to exceed 7 mg/l in effluent, D.O. not less than 6 mg/l
(d) Red Lion Borough York County	BOD not to exceed 10 mg/l in effluent, D.O. not less than 6 mg/l
(e) PennTownship York County	BOD not to exceed 10 mg/l in effluents D.O. not less than 6 mg/l
(f) City of York York County	BOD not to exceed 7 mg/l in effluent, D.O. not less than 6 mg/l. Effluent requirements for toxic materials to be established (1)

Exhibit 1 (Continued)

2. Industrial Waste Cases - Additional control is needed as indicated for the following cases:

Case Name	Requirements
(a) Hanover Wire Cloth Hanover Borough York County	Control of toxic materials. Effluent requirements to be established. (1)
(b) Keystone - Seneca Wire Cloth Co. Hanover Borough York County	Control of toxic materials. Effluent requirements to be established. (1)
(c) N.W. Boyd Laundromat New Freedom Borough York County	95% BOD and detergent reduction.
(d) Williamson Veneer New Freedom Borough York County	Go to New Freedom Sewer System or, BOD not to exceed 15 mg/l in effluent.
(e) P. H. Glatfelter Spring Grove Borough York County	BOD not to exceed 7 mg/l, D.O. not less than 6 mg/l, color not to exceed 60 units, all in the effluent.
(f) AMP Codorus Township York County	Control of toxic materials. Effluent requirements to be established. (1)
(g) Certain-Teed Co. Spring Garden Township York County	Go to City of York, or 97% BOD reduction based on Normal Raw Waste standards.
(h) The McKay Co. Spring Garden Township York County	Control of toxic materials. Effluent requirements to be established. (1)
(i) New York Wire Cloth Co. Spring Garden Township York County	Control of toxic materials. Effluent requirements to be established. (1)

Exhibit 1 (Continued)

Case Name	Requirements
(j) United Piece Dye Spring Garden Township York County	BOD not to exceed 10 mg/l in the effluent. Effluent requirements for toxic materials to be established. (1)
(k) York Corporation Spring Garden Township York County	Control of toxic materials. Effluent requirements to be established. (1)
(l) Massell Mfg. Corp. Spring Garden Township York County	Control of toxic materials. Effluent requirements to be established. (1)
(m) Molybdenum Corp. Spring Garden Township York County	Control of toxic materials. Effluent requirements to be established. (1)
(n) American Chain City of York York County	Control of toxic materials. Effluent requirements to be established. (1)
(o) Massell Mfg. Corp City of York York County	Control of toxic materials. Effluent requirements to be established. (1)
(p) New York Wire Cloth City of York York County	Control of toxic materials. Effluent requirements to be established. (1)
(q) Penn Dairies City of York York County	Go to city sewers or, 95% BOD reduction from Normal Raw Waste Standards.

Note (1): - Toxic material requirements for waters are to be based on USPHS Drinking Water Standards or fish and aquatic life needs, whichever is less. Effluent requirements will be uniform for discharges affecting the same body of water. Materials to be controlled and the water quality standards include, but are not limited to: Copper (0.02 mg/l), Zinc (0.05 mg/l), Ammonia - N (1.5 mg/l), Hexavalent Chromium (0.05 mg/l), trivalent chromium (1.0 mg/l), and nickel (0.1 mg/l).

B. Physical and Chemical Quality:

1. Physical Quality

(a) Color exceeded the Pennsylvania Standard set for the West Branch and the Main Branch from the point of discharge of the P. H. Glatfelter's Treatment Plant outfall at river mile 24.5 to approximately the sample point at river mile 10.6. The color increased again at the discharge for the York City Treatment Plant outfall at river mile 9.0 to the last sample point at river mile 0.6.

Color in excess of 50 units (Platinum - cobalt method) may limit photosynthesis and have a deleterious effect upon aquatic life, particularly phytoplankton, and the benthic biota. Color can modify water temperature and fish will have difficulty finding food. (See Figure III)

(b) Turbidity was not included in the Pennsylvania Water Quality criteria however, the National Water Quality committee set criteria as follows: "Turbidity in the receiving water due to a discharge should not exceed 50 JTU in warm-water streams or 10 JTU in cold-water streams."

This parameter is exceeded from the sample point at river mile 32.6 to the confluence of the West Branch and Oil Creek at river mile 28.1. This Section is classified by Pennsylvania as cold-water fishery. (See Figure IV)

(c) Temperature standards were only exceeded from the sampling point at P. H. Glatfelter's Treatment Plant outfall at river mile 24.5 to the sampling point at river mile 14.4. Warm waste discharges raise the temperature of the receiving waters with the following concomitant effects:

(a) higher temperatures diminish the solubility of dissolved oxygen and thus decrease the availability of this essential gas,

(b) elevated temperatures increase the metabolism, respiration, and oxygen demand of fish and other aquatic life, approximately doubling the respiration for a 10^{o}C rise in temperature; hence the demand for oxygen is increased under conditions where the supply is lowered,

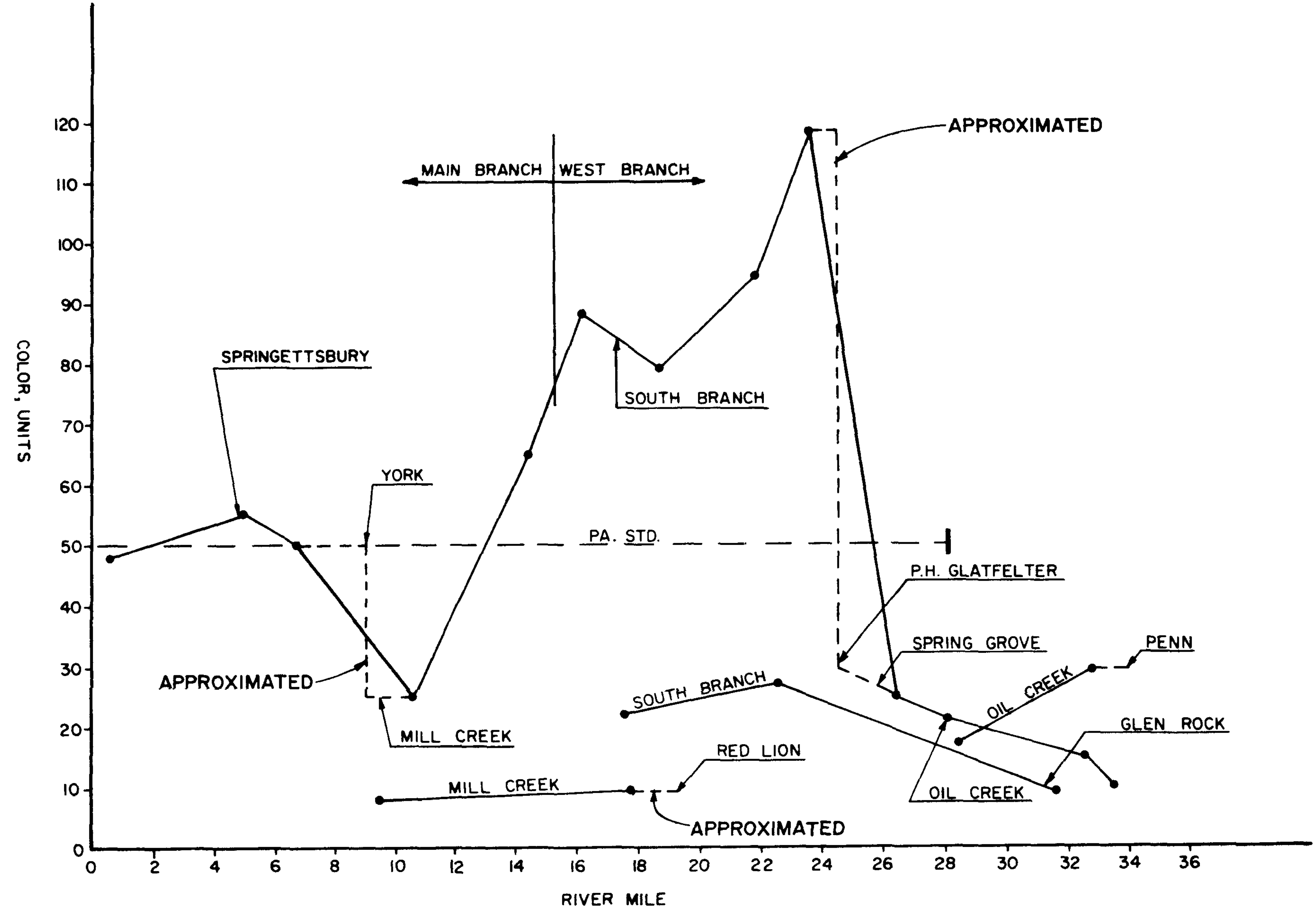
(c) the toxicity of many substances is intensified as the temperature rises,

(d) higher temperatures militate against desirable fish life by favoring the growth of sewage fungus and the putrefaction of sludge deposits, and finally

(e) even with adequate dissolved oxygen and the absence of any toxic substances, there is a maximum temperature that each species of fish or other organism can tolerate; higher temperatures produce death in 24 hours or less. (See Figure V)

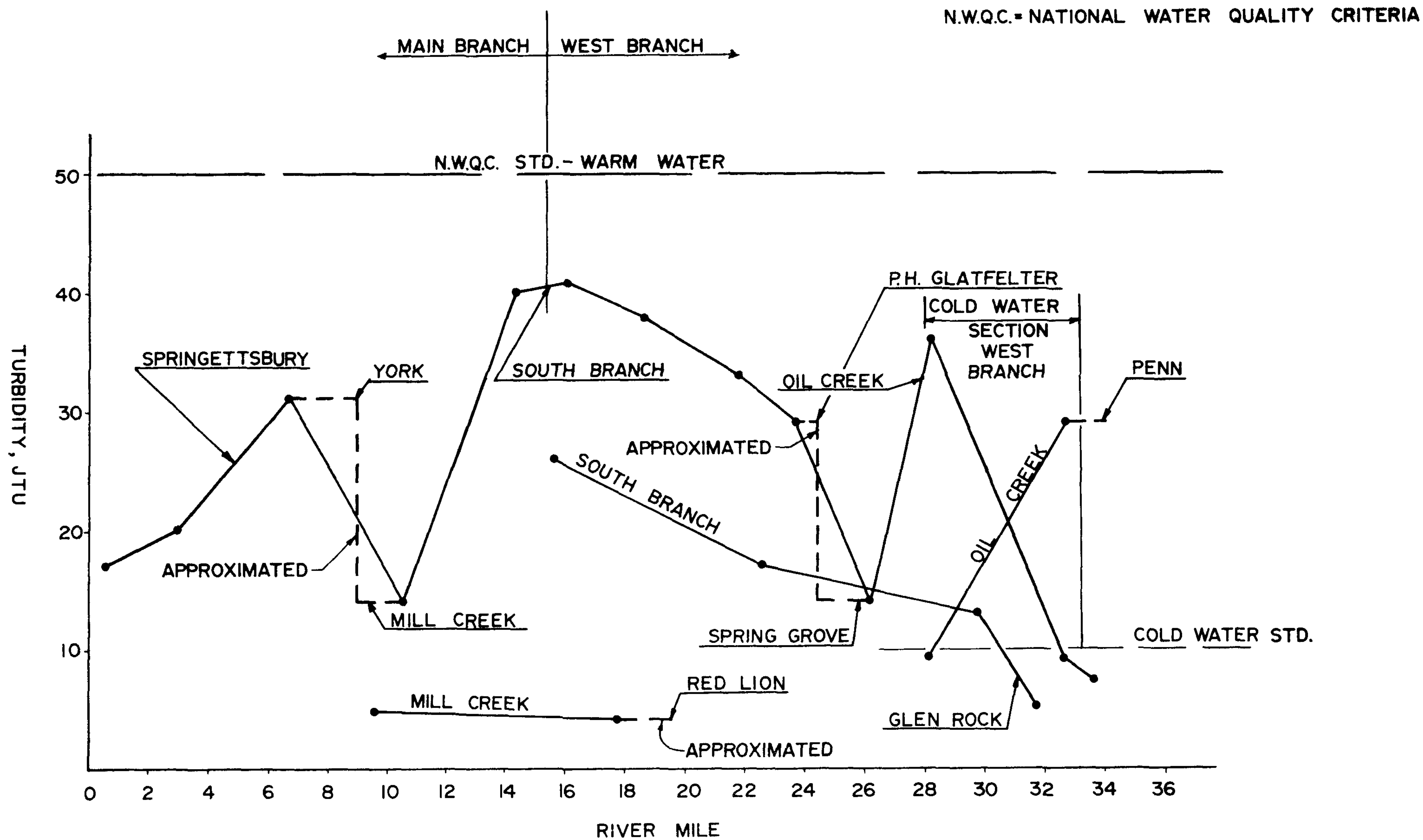
(d) pH in most fresh, natural waters usually has a range between 6.5 and 8.5. In primary contact recreation waters, the pH should be within the range of 6.5 and 8.3. The pH range for surface water criteria for public water supplies is 6.0 to 8.5. (See Figure VI)

(e) Solids in general are high; however, the concentrations are within the limits of water quality criteria for designated usage. Dissolved solid concentrations limit the light penetration, which in turn limits the food chain for aquatic growth. Soil runoff has produced some sediment problems, and is indicated in the concentration increase of suspended solids during rainstorms.



CODORUS CREEK STUDY— COLOR

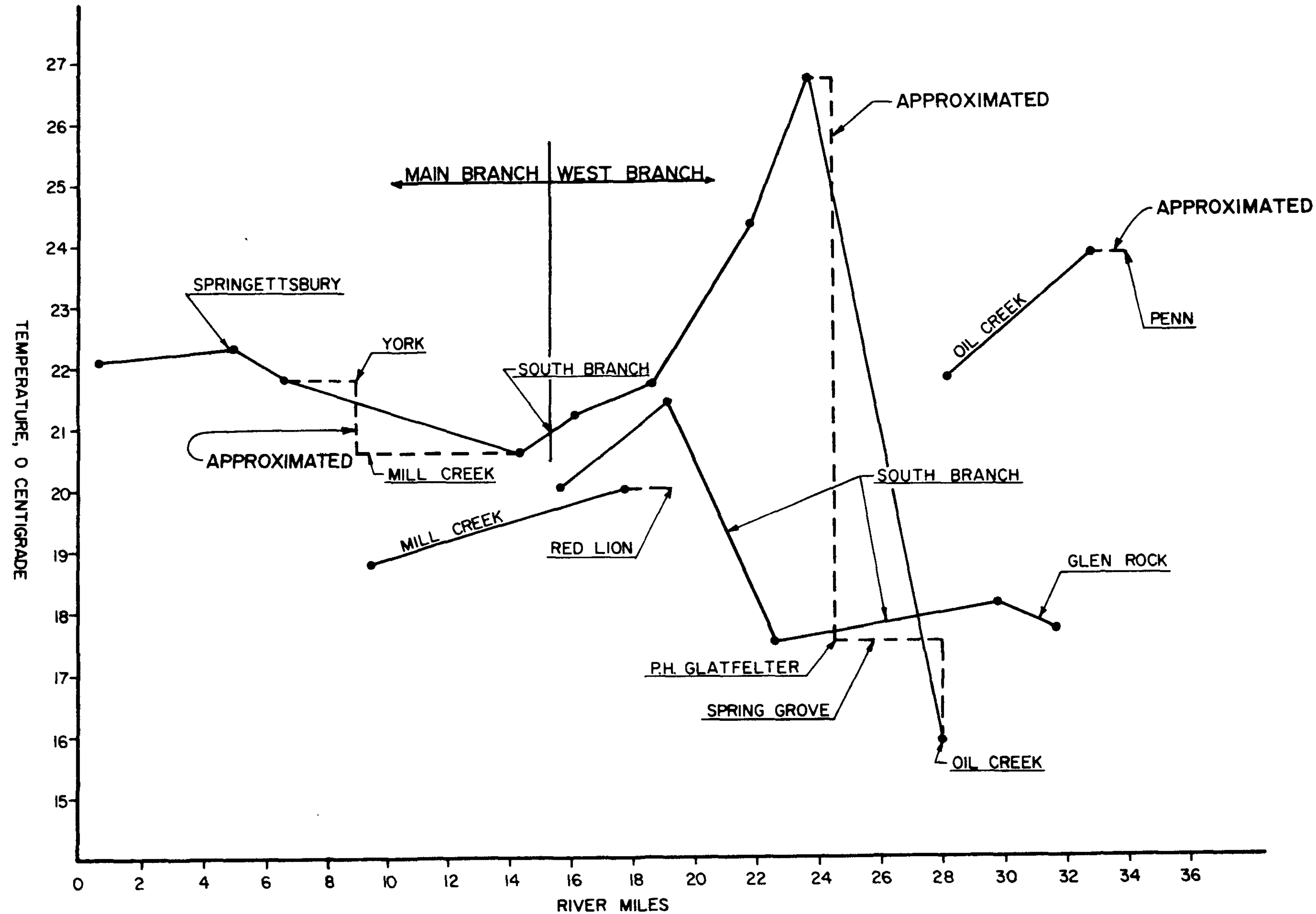
FIGURE III



TURBIDITY, JTU

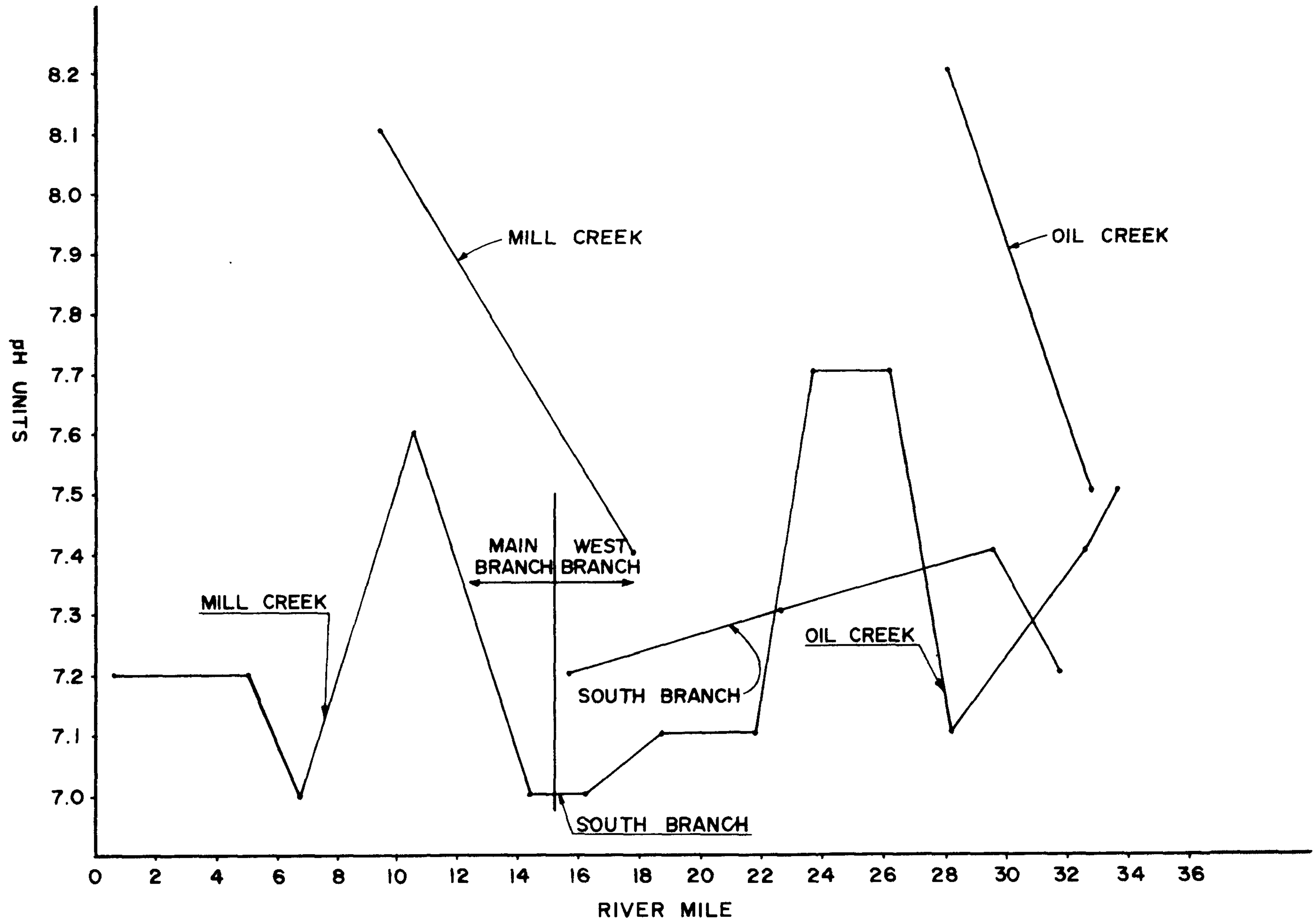
CODORUS CREEK STUDY

FIGURE IV



CODORUS CREEK STUDY-TEMPERATURE

FIGURE V



CODORUS CREEK STUDY - pH

FIGURE VI

2. Chemical Quality

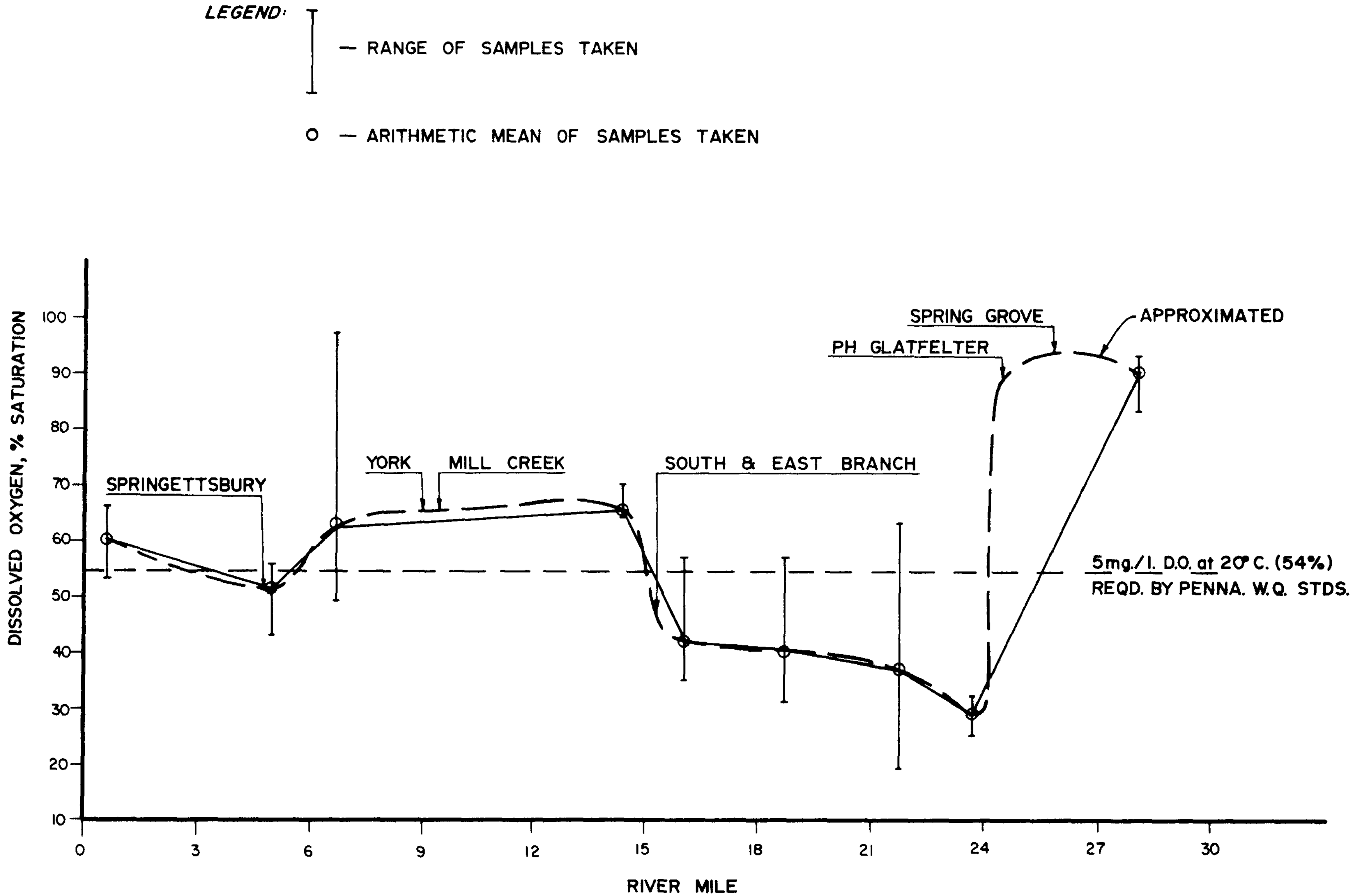
(a) Dissolved Oxygen, Biochemical Oxygen Demand, Chemical Oxygen and Total Organic Carbon.

The results of these analyses were not completely representative Concentrations of various chemicals, metals and organic material (i.e., tennins and lignins) inhibited the bacterial action and interfered with the chemical procedure for determining dissolved oxygen and the biochemical oxygen demand. However, the analyses indicated that there is a definite problem in the Codorus Creek which establishes an existence of a number of dissolved oxygen values lower than acceptable limits. (See Figure VII)

A bacterial seed for the biochemical oxygen demand determination is required. This requires a period of one to two months to develop.

A mathematical model for the oxygen balance could not be developed. Recommendation is made that in the summer of 1972 additional samples be taken after a proper seed has been developed to determine the dissolved oxygen concentrations and long term biochemical oxygen demands, with the resultant deoxygenation rate values.

When Chemical Oxygen Demand analyses are made, organic matter is converted to Carbon Dioxide and water regardless of the biological assimilability of the substances. Therefore, C.O.D. values are greater than B.O.D. values when significant amounts of biologically resistant organic matter is present.



DISSOLVED OXYGEN PROFILE
CODORUS CREEK STUDY

FIGURE VII

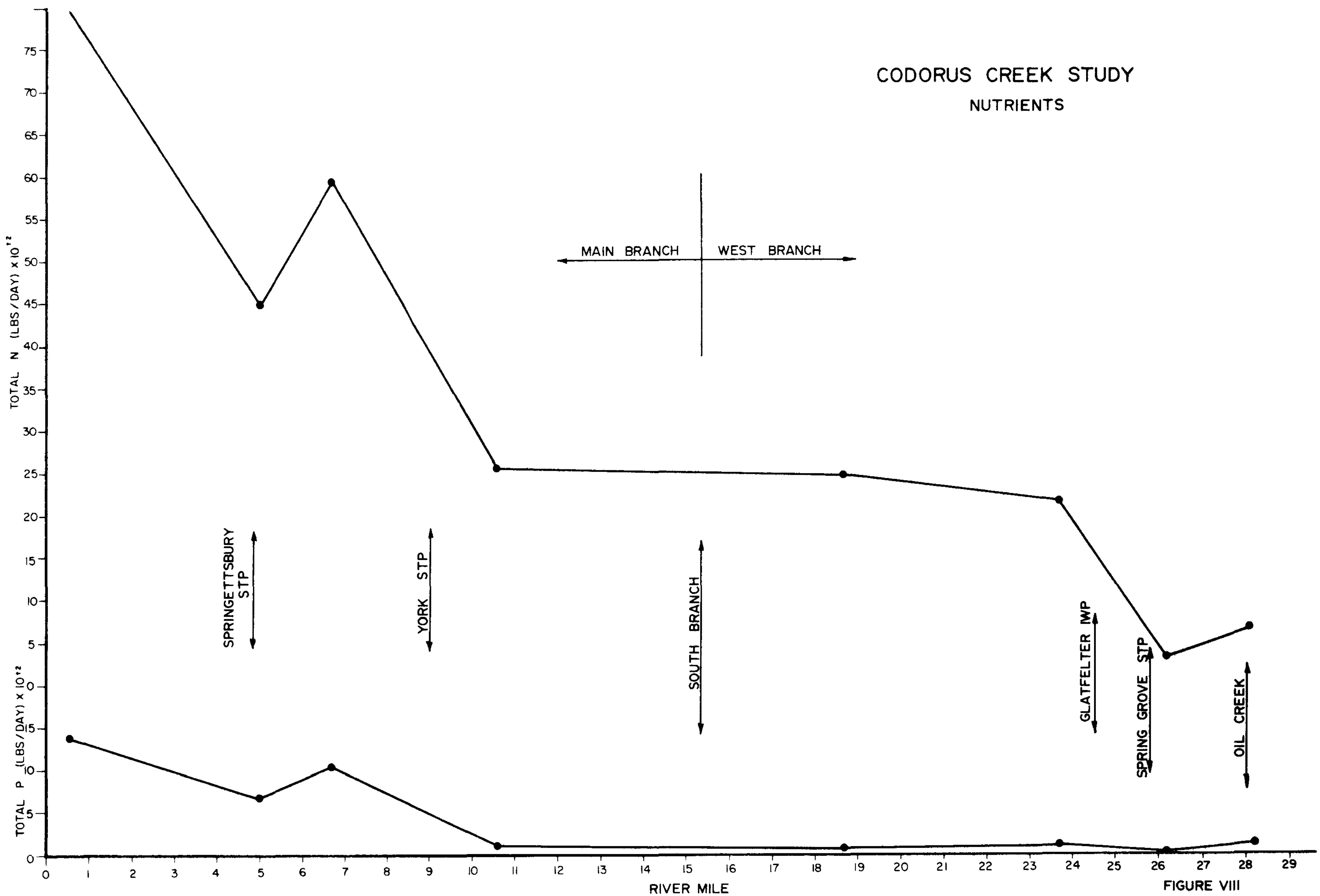

CODORUS CREEK STUDY
NUTRIENTS
TOTAL N (LBS/DAY) x 10^+2
TOTAL P (LBS/DAY) x 10^+2
MAIN BRANCH
WEST BRANCH
SPRINGETTSBURY STP
YORK STP
SOUTH BRANCH
GLATFELTER IWP
SPRING GROVE STP
OIL CREEK
RIVER MILE

FIGURE VIII

(b) Nutrients - (Phosphorous and Nitrogen)

Nutrient concentration in this Basin is adequate to stimulate troublesome growth of algae and aquatic plants. The color concentration has limited this reaction. Evaluation of the Main and West Branches, including loadings from wastewater treatment facilities and tributaries, indicates that the impoundments at Spring Grove, for the Glatfelter Company, reduced nutrients and the discharges from the wastewater treatment facilities of Spring Grove and Glatfelter increased the loading on the stream. However, the major loading occurred within the city of York, either from the municipal facilities or the industrial complex. (See Figure VIII)

Approximately 40 per cent of the total phosphorous and 20 per cent of the total nitrogen entered the surface waters from the municipal wastewater treatment facilities. The remainder was discharged from industry and agricultural activities.

All wastewater treatment facilities sampled, except Penn Township, exceeded the Pennsylvania concentration limit of 1.5 mg/l for ammonia (as N) as a toxic material.

(c) Metals

Analyses for various toxic heavy metals were conducted; however, only three were present in measurable quantities. (See Table D) Two of these, zinc and aluminum, are attributable to the metal finishing wastewater. Mercury, the third toxic metal, is harmful to aquatic life, wildlife and human life, and comes from industrial wastes.

The concentration of aluminum in this Basin does not appear to be toxic to the aquatic life. The high concentration noted at Station SC0000 was more likely from wash water from the water treatment plant in the form of aluminum hydroxide. Any concentration more than 0.5 mg/1 will cause acute eye irritations. If any portion of this stream is to be used as a body contact sport the concentration must be lowered to less than 0.1 mg/1 to eliminate the eye irritation problem.

The Pennsylvania Water Quality Standards set the zinc toxic concentration at a maximum of 0.05 mg/1 for this basin. Most locations exceed this limit. Zinc is affected by the degree of hardness. This stream has hard water since the total hardness (as Calcium Carbonate) exceeds 120 mg/1 at most locations. Calcium is antagonistic toward the toxicity of zinc. Therefore, the concentrations of zinc are not a hazard in the aquatic environment.

Mercury is a highly toxic metal. All municipal and industrial wastewater facilities sampled indicated measurable amounts of mercury. Other industries in the area appear to be discharging mercury into the receiving waters also. The sources of discharge of this metal should be identified and eliminated.

Pennsylvania has set a limit of 1.5 mg/l of total iron, and the Water Quality Criteria established by NTAC sets a limit of 0.3 mg/l of iron, 0.05 mg/l for manganese for the usage classification of this stream.

Iron and manganese concentrations vary within the various areas of the Basin and exceed the above mentioned limits. Most high concentrations are from municipal and industrial wastewater discharges, and from backwashing of municipal water treatment plant filters. Iron, at present concentrations, may cause problems with live stock watering and fish. Cows will not drink this type of water which results in lower milk production. Irritation and blocking of respiratory channels in fish along with the smothering of eggs due to iron sedimentation will reduce the fish population.

METALS - Table D

	Station	River Mile	Fe mg/l	Zn mg/l	Mn mg/l	Al mg/l	Hg mg/l
	COR001	0.6	0.8	0.08	0.16	1	1
STP	COR005	4.8	0.6	0.07	0.06	1	1
	COR007	6.7	1.3	0.06	0.24	1	2
STP	COR009	9.0	1.7	0.28	0.11	1	10.3
	COR014	14.4	-	-	-	-	9
	WC0024	23.7	1.20	0.06	0.73	2	1
IWP	WC0025	24.5	0.6	0.10	1.28	1	3
STP	WC0026	25.8	-	-	-	-	2
	WC0033	32.6	0.3	-	0.50	-	-
	WC0034	33.5	0.2	-	0.05	-	-
	SC0000	0.3	4.0	0.06	0.15	6	3
	SC0007	7.2	0.9	0.03	0.08	1	1
	SC0015	16.3	-	-	-	-	3
	OIL000	0.2	0.4	0.07	0.10	1	1
STP	OIL006	6.0	0.3	0.14	0.05	1	3
	MIL000	0.01	0.3	0.04	0.06	1	7
STP	MIL009	9.1	-	-	-	-	5

(d) Miscellaneous Chemicals (See Table E)

Chlorides are found in most natural waters. In this Basin they could be of natural mineral origin and derived from human or animal sewage; from salts spread on fields for agricultural purposes; or from industrial wastes. The highest concentration is discharged from the Glatfelter plant.

Sulfates are also found in most natural waters. Sulfates are discharged in numerous industrial wastes. Glatfelters plant discharges the highest concentration.

Total Hardness, as Calcium Carbonate, determination along with Calcium and Moynesium indicate the characteristic of this stream is hard. This is generally due to the geology of the basin.

MISCL. CHEMICALS - Table E

	STATION	RIVER MILE	CHLORIDE MG/L	SULFATE MG/L
	COR001	0.6	75	36
STP	COR005	4.8	36	64
	COR005	5.0	81	31
	COR007	6.7	81	30
STP	COR009	9.0	49	78
	COR014	14.4	77	23
	WC0016	16.2	141	37
	WC0019	18.7	147	39
	WC0022	21.8	139	38
	WC0024	23.7	194	44
IWP	WC0025	24.5	468	99
STP	WC0026	25.8	42	39
	WC0028	28.1	8	10
	SC0000	0.3	15	11
	SC0007	7.2	8	8
	SC0014	14.4	8	8
STP	SC0015	15.7	35	27
	SC0016	16.3	10	9
	EC0000	0.05	14	10
	MIL000	0.01	35	35
	MIL008	8.3	29	20
STP	MIL009	9.1	57	40
	OIL000	0.2	32	29
	OIL005	4.8	55	63
STP	OIL006	6.0	57	64

MISCL. CHEMICALS - Table E (Continued)

	STATION	RIVER MILE	Ca mg/1	Mg mg/1	Total Hardness As $CaCo_2$ mg/1
	COR001	0.6	39	8	130
STP	COR005	4.8	41	7	131
	COR007	6.7	38	8	128
STP	COR009	9.0	36	8	123
	WC0024	23.7	58	8	178
IWP	WC0025	24.5	103	10	299
	SC0000	0.3	15	4	54
	SC0007	7.2	15	4	54
	OIL000	0.2	39	8	130
STP	OIL006	6.0	25	6	81
	MIL000	0.01	36	10	131

C. Bacteriological Quality:

All bacteriological determinations were accomplished by the Membrane Filter technique.

(1) Total coliforms are introduced to water courses via water run-off and wastewater outfalls. They are considered significant as indicator organisms because of their predominance in the intestinal tracts of warmblooded animals. The fecal coliform density is roughly proportional to the amount of excremental waste present. With exceptions, elevated coliform populations are suggestive of significant contamination by excrement of warmblooded animals. Several factors which cause fluctuations in total coliform populations are summarized as follows:

Higher	Lower
Sewage intrusion	pH changes
Nutritive effluents (Containing sugar, dairy wastes, etc.)	Temperature changes
Storm drains	Land run-off (prolonged flow)
Land run-off (Initial flow)	Toxic wastes

Total coliform population limits set by Pennsylvania for this watershed are for the period May 15 to September 15 of any year; not to exceed

1000/100 ml as an arithmetic average value; not to exceed 1000/100 ml in more than two consecutive samples; not to exceed 2400/100 ml in more than one sample. For the period September 16 to May 14 of any year; not to exceed 5000/100 ml as a monthly average value, nor to exceed this number in more than 20 per cent of the samples collected during any month; nor to exceed 20000/100 ml in more than 5 per cent of the samples.

The National Technical Advisory Committee to the Secretary of the Interior on Water Quality Criteria limits the total coliform by watershed usage as follows:

> Water Supply - 10,000/100 ml as permissable; less than 100/100 ml as desirable
>
> Agricultural Usage - 5,000/100 ml as the monthly arithmetic average density for two consecutive samples; 20,000/100 ml for any one sample

The West and South Branches along with the Main Section of the Codorus Creek exceeds the National Water Quality Criteria and Pennsylvania Criteria. The East Branch of the Codorus Creek, the Mill Creek and the Oil Creek appear to meet the standards. (See Figures IX and X)

(2) Fecal coliforms are gaining notoriety as pollution indicies because of their relatively infrequent occurrence, except in association with fecal pollution. Moreover, because survival of the fecal coliform group is shorter in water courses than for the coliform group as a whole, high fecal coliform levels indicate relatively recent pollution.

National Water Quality Criteria for fecal coliforms is as follows:

Primary Contact Recreation	200/100 ml
General Recreation	2000/100 ml
Public Water Supply	2000/100 ml permissable 20/100 ml desirable

The entire watershed with the exception of the East Branch of the Codorus Creek and Mill Creek is only suitable for General Recreation as indicated by this bacteriological indicator.

(3) Fecal Streptococci do not occur in pure water or virgin soil, their presence in water courses indicates the existance of warmblooded animal pollution. Their validity as an index of pollution is enhanced by their inability to reproduce in water courses. The following points should be considered when interpreting fecal streptococci data:

(a) The presence of this indicator in untreated water indicates the presence of fecal pollution by warmblooded animals.

(b) Where the source and significance of the coliform group are questionable, the presence of this group should be interpreted as indicating that at least a portion of the coliform group is derived from fecal sources. Water quality criteria for fecal streptococci has not been established, however, their presence in the entire watershed is an indication that there is fecal pollution present.

(4) Fecal streptococci determinations, when accompanied by fecal coliform studies, serve as a valuable tool in the differentiation

of animal from human wastes. In intestinal wastes of human origin, the ratio of number of fecal coliforms to number of fecal streptococci tends to be greater than four. When this ratio is less than 0.7, this suggests pollution derived predominately or entirely from livestock or poultry wastes. Ratios falling between 4.0 - 0.7 are not quite so certain. Limitations to this ratio are:

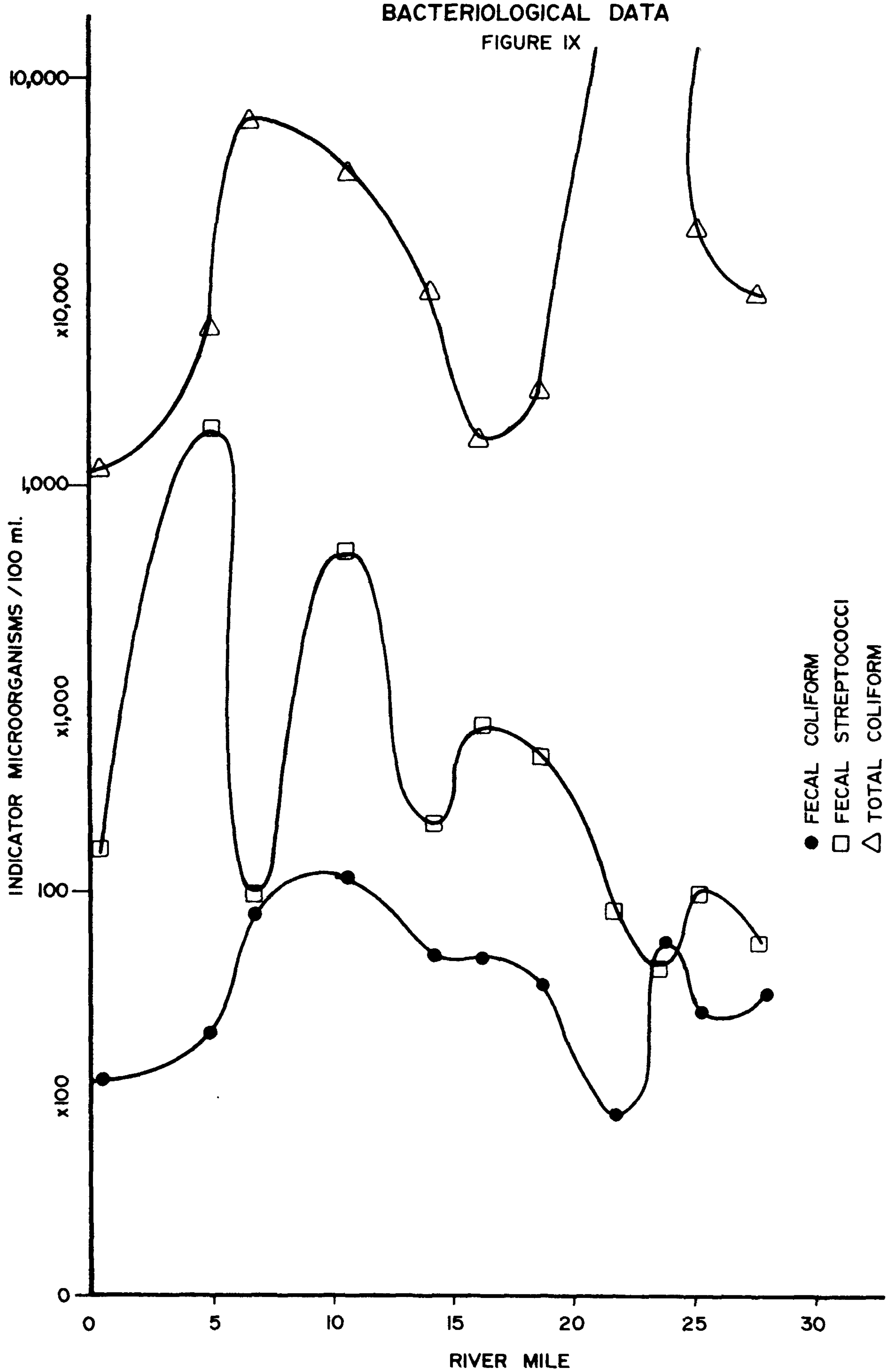
(a) Samples taken within 24 hours of flow time from origin of pollution.

(b) pH range of 4.0 to 9.0.

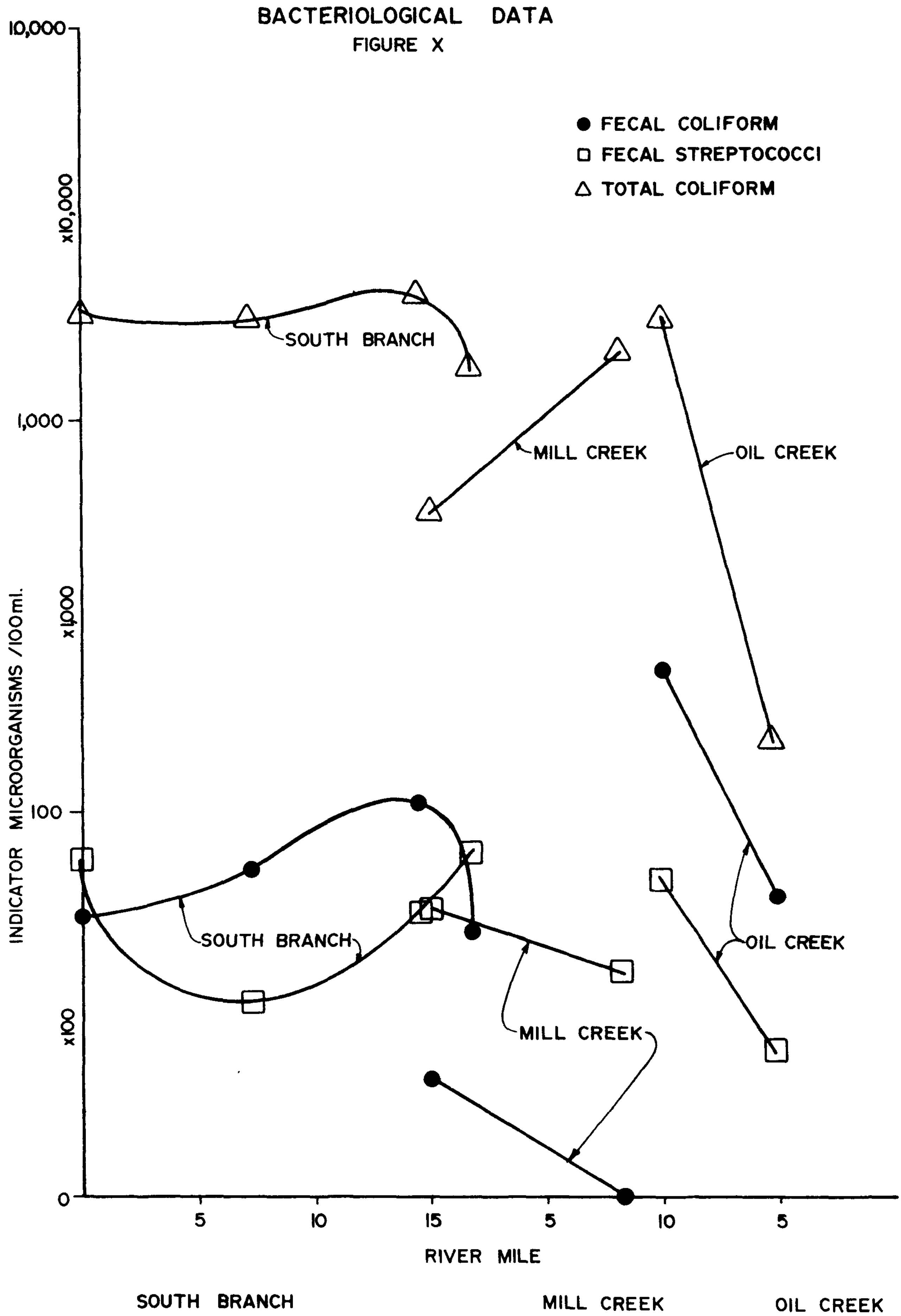
These limitations do not appear to affect the results of this study.

The results of this study indicates bacteriological pollution is caused mainly by livestock or poultry wastes. There are some indications of human waste pollution.

BACTERIOLOGICAL DATA
FIGURE IX



MAIN STEM & WEST BRANCH



BACTERIOLOGICAL DATA
FIGURE X
FECAL COLIFORM
FECAL STREPTOCOCCI
TOTAL COLIFORM
10,000
x10,000
1,000
x1,000
100
x100
0
INDICATOR MICROORGANISMS /100 ml.
SOUTH BRANCH
MILL CREEK
OIL CREEK
SOUTH BRANCH
MILL CREEK
OIL CREEK
5
10
15
5
10
5
RIVER MILE
SOUTH BRANCH
MILL CREEK
OIL CREEK

D. Biological Quality: (See Figure XI)

This portion of the study was accomplished in 1966 as a tributary to the Susquehanna River Basin.

COR - 001 about 0.5 mile below LR66152 Bridge, York County.

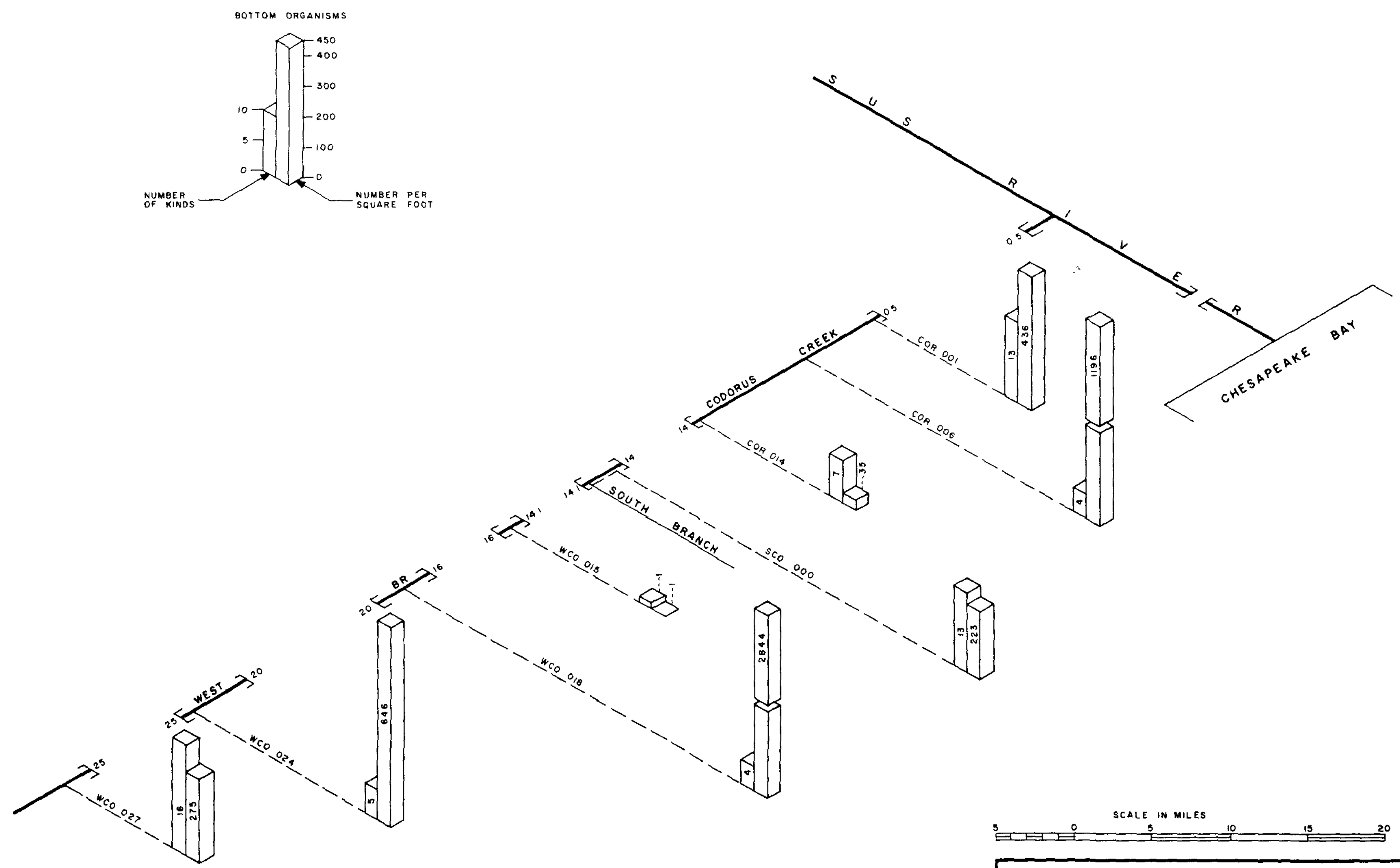
At mile 1, Codorus Creek had recovered to the point where it supported 13 kinds of bottom organisms. However, pollution-tolerant *Physa* sp. snails, sludgeworms, and leeches still predominated. The Susquehanna River receives an organic pollution loading from the inflow of Codorus Creek.

COR - 006 about two miles below Bridge at intersection of T-839 and LR66021.

Below the City of York, significant organic pollution was indicated. Only four kinds of bottom organisms were found, with sludgeworms making up 1,191 of the 1,196 organisms in the quantitative sample.

COR - 014 at Pennsylvania Route 182 Bridge above York, Penna.

Codorus Creek was sampled immediately below the confluence of the West Branch and the South Branch, and upstream from the City of York, Pennsylvania. Seven kinds of bottom organisms were found in the population of 35 organisms per square foot. Among these were three kinds of caddis flies. Biological conditions at this station showed an average of the high quality from the South Branch and the low quality from the West Branch.



CODORUS CREEK SUB-BASIN
SUSQUEHANNA RIVER BASIN

WATER QUALITY STUDY
BIOLOGICAL SURVEY

U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION III PHILADELPHIA, PA.

FIGURE XI

WCO - 016 at First Bridge on LR66210 above Indian Rock Dam, York County

This station was just above the confluence of the West Branch with the South Branch Codorus Creek. Only one genera was present; however, the size of the boulders in the stream did not permit collection of a quantitiative sample. This genera was the pollution-tolerant Physa snail, which was very abundant. Organic pollution is still indicated at this station.

WCO - 019 at Pennsylvania Route 616 Bridge, North of New Salem, Pennsylvania

About eight miles below Spring Grove, at mile 18, further biological degradation from organic pollution was observed, with a reduction in the number of kinds to four. Again sludgeworms (1,945 per square foot) and air-breathing snails (895 per square foot) constituted the majority of the total botton organism population of 2,844 organisms per square foot.

WCO - 025 at T-452 Bridge, York County

This station was just below Spring Grove and reflected the results of organic pollution from the Spring Grove area. Only five genera were found, and pollution-tolerant kinds (air-breathing snails and sludgeworms) dominated the population of 646 organisms per square foot.

WCO - 028 South of LR66008 South of Spring Grove, Pennsylvania

Codorus Creek is formed by the juncture of its South Branch and West Branch at stream mile 14.1. The West Branch is considered the main stem. The first station on this tributary was located upstream from Spring Grove at mile 27 on the West Branch. Good quality water was indicated by the 18 kinds (genera) of bottom organisms which included clean-water associated caddisflies and mayflies, with a population of 275 per square foot.

SCO - 000 near York, Pennsylvania Pumping Station below dam

The South Branch was sampled near its mouth, and unpolluted biological conditions were found to exist. Thirteen genera of bottom organisms were found in the population of 223. These genera included many clean-water associated forms.

Main Stem - SUQ - 043 at Wrightsville (W. B.) above US 30 Bridge

The last station on the Susquehanna River West Bank was located at Wrightsville, Pennsylvania, opposite the Columbia, Pennsylvania, station on the East Bank. The number of kinds of bottom organisms here was reduced to ten, with 245 per square foot. Although clean-water associated forms perdominated, with caddisflies (the dominant form), scuds, mayflies, and gill-breathing snails present, the reduction in number of kinds reflected the deleterious effects of Codorus Creek, which enters in this reach.

Biotic Index (An index valve based on biological findings and indicative of the cleanliness, with regard to organic pollution of a portion of a stream)

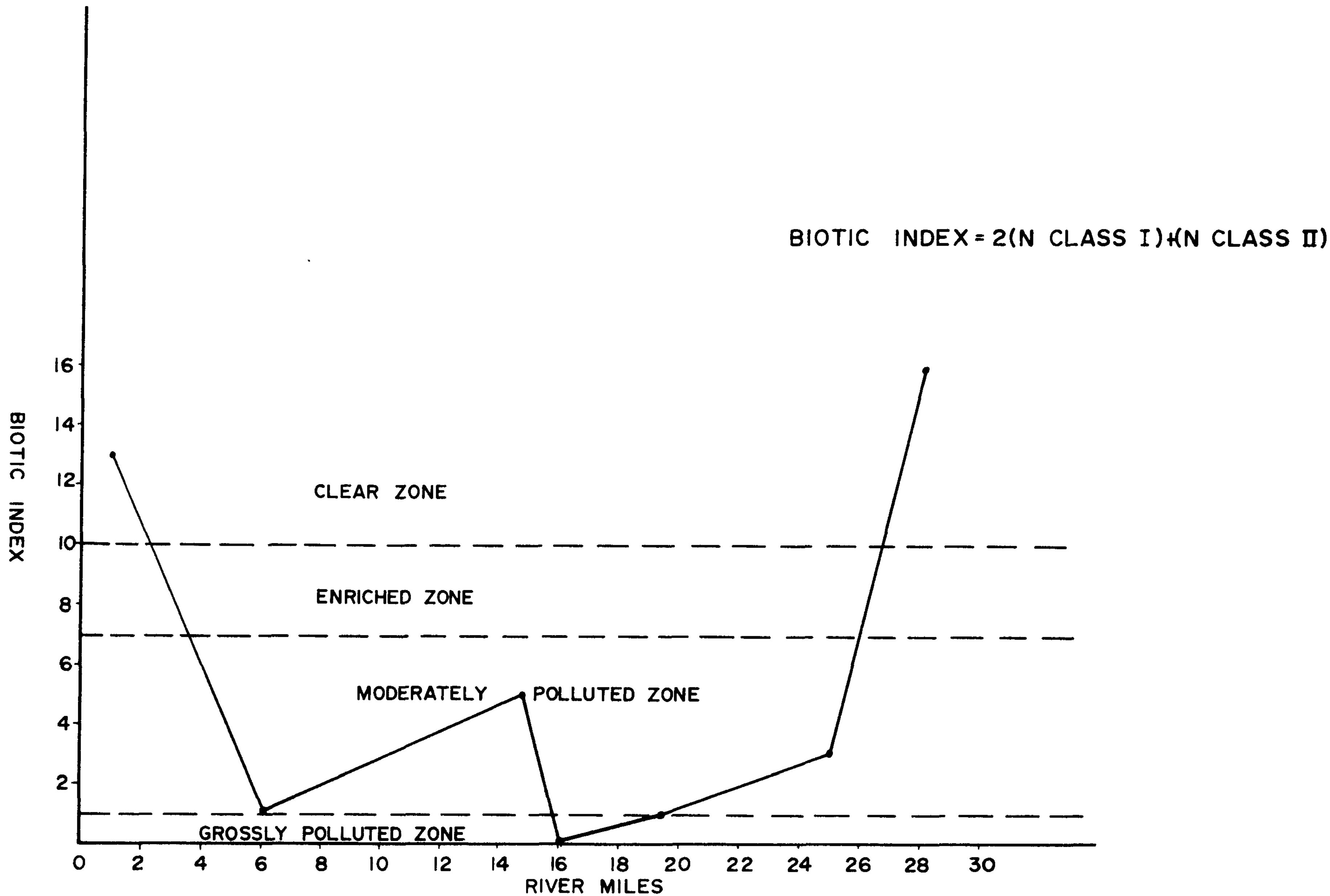
Determinations at each of the stream stations was made for the number of species of organisms that tolerate no appreciable organic pollution (Class I) and the number of species that tolerate moderate organic pollution but cannot exist under near anaerobic conditions (Class II).

Biotic Index = 2(N Class I) + (N Class II)

N = Number of Species

The index may vary from 0 to 40. Above 10 is indicative of a clean stream; a reading from 7 to 9 indicates an enriched stream; a moderately polluted stream has readings between 1 to 6; a 0 reading indicates a grossly polluted stream. (See Figure XII)

STATION	N CLASS I	N CLASS II	BIOTIC INDEX
COR 001	3	7	13
COR 006	0	1	1
COR 014	0	5	5
WCO 016	0	0	0
WCO 019	0	1	1
WCO 025	0	3	3
WCO 028	3	10	16
SCO 000	3	10	16



CODORUS CREEK STUDY-1971

FIGURE XII

CHAPTER VI

SOURCES OF WASTEWATER DISCHARGES

A. Domestic Wastewater Discharges: (See Tables F and G)

All six (6) municipal wastewater treatment facilities located in the Codorus Creek Basin discharge both domestic and industrial treated wastewater. Located in this basin are four (4) small school treatment facilities and one (1) discharge from a trailer court. Only the six (6) municipal outfalls were sampled during this study.

Springettsbury Township MUA facility utilizes a contact stabilization process, chlorination and followed by a polishing lagoon before discharging into the Codorus Creek. The capacity of this facility is 8MGD. Nutrients appear to be high in the wastewater discharge. Since this is a new facility, the plant is experiencing some problems due to industrial wastes being discharged in the collection system without adequate pretreatment.

The City of York facility is also using the contact stabilization process followed by chlorination, and has a capacity of 18 M.G.D. There is a plant by-pass; however, the by-pass flow can be chlorinated. All parameters analyzed indicate that this facility should be upgraded to meet water quality standards for this section of the watershed. Also, enforcement of the industrial waste ordinance is required.

Imhoff tanks followed by a standard rate trickling filter and chlorination is the process utilized by the Spring Grove facility with a capacity of 0.25 M.G.D. This facility is outdated and in poor condition with the resulting poor effluent quality. Extensive upgrading is required. The P. H. Glatfelter treatment plant requires the addition of nutrients to its industrial waste. Before Spring Grove undertakes any upgrading, they should investigate the feasibility of combining their waste with Glatfelter, thus providing the nutrients for the industrial waste.

The Penn Township treatment plant utilizes the contact stabilization process and chlorination to treat its wastes. The plant capacity is 1.2 M.G.D. for parameters investigated. Concentrations indicate an upgrading for existing criteria requirements. Industrial wastes discharged to this plant also appear to lower treatment efficiencies.

The contact stabilization process at Glen Rock is followed by chlorination and a polishing pond. The capacity is 0.3 M.G.D. Nutrient removal is still a requirement for this facility.

Phase-out of The Red Lion facility is being considered. ~~to be phased-out shortly~~. An intercepter from this facility to the Springettbury Township plant has been proposed. Federal and State funds have been applied for.

TABLE F

Average Municipal Wastewater Discharges for Period of Study

Treatment Plant	Flow	BOD 5 Day	COD	TOC	Nitrogen	Phosphorous	Solids Total	Solids Suspended	Solids Dissolved	Chlorides	Sulfates	Ph	Temp	Color	Fe	Mn	Zn	Al	Hg
	MGD	Lbs./day ←									→	Units	°C	Units	Lbs./day ←				→
1. Springettsbury Twp. S. A.	5.3	288	1550	1019	497	199	14880	664	14216	1591	2829	7.3	21.1	25	27	3	3	44	0.044
2. City of York S. A.	15.5	3361	17064	7368	1982	827	57784	5042	52742	6334	10083	7.3	24.8	25	220	14	36	129	1.29
3. Spring Grove M.A.	0.16	31	88	59	33	12	446	56	390	56	52	7.3	22.3	40	-	-	-	-	0.003
4. Penn Twp. M. A.	1.19	50	427	238	62	92	4594	89	4505	238	635	7.4	26.0	20	3	0.5	1.4	10	0.03
5. Glen Rock S. A.	0.17	11	82	34	24	14	479	52	427	50	38	6.9	19.0	27	-	-	-	-	0.009
6. Red Lion M.S.A.	2.9	121	1403	580	723	387	8465	435	8030	1379	1548	7.6	25.1	33	-	-	-	-	0.12

MISCELLANEOUS TREATMENT FACILITIES - Table G

Owner	Design Flow (GPD)	Type of Treatment	Receiving Waterways
Main Stem Drainage Basin			
Dallastown Sch. Dist. Ore Valley Elem. Sch. York Township	8,000	Aeration, Cont. Stab., & Sand Filter	Little Codorus Creek
Dallastown Sch. Dist. Leaders Heights Elem. Sch. York Township	8,000	Aeration, Cont. Stab., & Sand Filter	Main Stem Codorus Creek
M&G Trailer Court York Township	12,300		Little Codorus Creek
East Branch Drainage Basin			
Dallastown Sch. Dist. Jr.-Sr. High Sch. York Township	54,000	Aeration, Cont. Stab., & Sand Filter	East Branch, Codorus Creek
South Branch Drainage Basin			
Spring Grove Sch. Dist. Sevel Valleys Elem. Center Seven Valleys Borough	6,300	Aeration, Sand Filter	South Branch, Codorus Creek

B. Industrial Waste Discharges: (See Tables I, J, and K)

There are three recorded lists of industrial wastewater discharges into the Codorus Creek Basin. These lists do not agree, and a study would be required to determine which industries discharge directly into the Codorus Creek Watershed and those that discharge into municipal wastewater treatment facilities.

The laboratory results, as show in the Appendix, indicates a high concentration of heavy metals, solids, color and oxygen demanding materials which could be attributed to the types of industries located in this watershed. Metal finishing or plating industries contribute heavy metals, color and solids. Paper industries contribute color, solids and oxygen demanding substances. The agricultural and food processing industries contribute nutrients, oxygen demanding materials, turbidity, solids and bacteria.

One industry was sampled, P. H. Glatfelter, which discharges into the West Branch of the Codorus Creek. Average outfall loadings to the stream are listed in Table H.

The various parameters examined indicate additional treatment is required to meet the water quality standards required for this portion of the watershed. The existing system includes primary with chemical treatment followed by a secondary process.

TABLE H

Average Discharge Loading from P. H. Glatfelter
Wastewater Treatment Plant

Flow MGD	BOD 5 Day	COD	TOC	Nitrogen	Phosphorus	Solids Total	Solids Suspended	Solids Dissolved	Chlorides	Sulfate	Al	Cu
	Lbs./day ←											→
16.4	1559	24346	11216	1176	20.5	197505	3830	193675	64011	13541	274	82

Fe	Mn	Zn	Hg	Lignins	Ca	Mg	Ph	Color	Temp.	Total Coliform	Fecal Strep.
Lbs./day ←						→	Units	Units	^oC	n/100 ml	n/100 ml
82	178	14	0.41	892	14088	1368	7.5	204	34.7	1,700,000	110

Table 1

YORK COUNTY PLANNING COMMISSION INVENTORY

List of Industrial Waste Treatment Plants

Industry	Location	General Type of Operation
AMP, Inc.	Codorus Township	Metal Finishing
Glen Rock Water Authority	Glen Rock Borough	Water Filtration Plan
Hanover Wire Cloth Division	Hanover Borough	Metal Finishing
Keystone-Seneca Wire Cloth	Hanover Borough	Metal Finishing
N. W. Boyd Laundromat	New Freedom Borough	Laundry
Charles G. Summers Co., Inc.	New Freedom Borough	Cannery
SKF Industries, Inc.	Penn Township	Metal Finishing
American Machine & Foundry Co.	Springettsbury Township	Metal Finishing
Campbell Chain Co.	Springettsbury Township	Metal Finishing
Caterpillar Tractor Co.	Springettsbury Township	Metal Finishing
Cole Steel Equipment Co., Inc., (N. P.)	Springettsbury Township	Metal Finishing
Cole Steel Equipment Co., Inc. (L. M.)	Springettsbury Township	Metal Finishing
York Division - Borg-Warner Corp.	Spring Garden Town-ship	Metal Finishing
Certain-Teed Products Corp.	Spring Garden Town-ship	Mineral Products
Ness, Inc.	Spring Garden Town-ship	Washing Equipment
New York Wire Cloth Co., Inc.	Spring Garden Town-ship	Metal Finishing
McKay Co.	Spring Garden Town-ship	Metal Finishing
Schmidt and Ault Paper Co.	Spring Garden Town-ship	Paper and Pulp
United Piece Dye Works, Inc.	Spring Garden Town-ship	Textiles
Yorktowne Paper Mills	Spring Garden Town-ship	Paper and Pulp
P. H. Glatfelter Co.	Spring Garden Town-ship	Paper and Pulp
American Chain & Cable Co.	York City	Metal Finishing
New York Wire Co.	York City	Metal Finishing
Pfaltzgraff Co.	West York Borough	Mineral Products

Table J

U. S. Army Corps of Engineers

List of

Existing Industrial Direct Wastewater Discharges

Industry Name	Type of Industry
GREATER YORK URBAN NODE	
Manchester Township	
General Time Corp.	Metal Finishing
Springettsbury Township	
American Machine & Foundry	Metal Finishing
Cole Steel Equip. Company	Metal Finishing
York-Shipley, Inc.	Metal Finishing
Spring Garden Township	
Borg-Warner, York Div.	Metal Finishing
Cole Steel Equip. Company	Metal Finishing
The McKay Company	Metal Finishing
Ness Company	Washing Equipment
New York Wire Company	Metal Finishing
York Water Company	Water Filtration Plant
West Manchester Township	
Bowen McLaughlin	Ordnance
Dolomite Brick Corp	Mineral Products
York Stone and Supply	Mining
West York Borough	
Medusa Cement	Mineral Products
The Pfaltzgraff Company	Mineral Products
York City	
American Chain & Cable Company	Metal Finishing
ACCO-E. W. Plant	Metal Finishing
New York Wire Company	Metal Finishing
RED LION URBAN NODE	
Red Lion Borough	
Flinchbaugh Pr., Inc.	Metal Finishing
GLEN ROCK URBAN NODE	
Codorus Township	
Aircraft Marine Pr.	Metal Finishing

Table J (Continued)

Existing Industrial Direct Wastewater Discharges

Industry Name	Type of Industry
SHREWSBURY-NEW FREEDOM RAILROAD URBAN NODE	
Shrewsbury Borough	
Hungerford Packing	Food Products
Superior Wire	Metal Finishing
New Freedom Borough	
Boyds Laundromat	Laundry
Charles G. Summers, Inc.	Food Products
SPRING GROVE URBAN NODE	
Spring Grove Borough	
P. H. Glatfelter	Paper and Pulp
HANOVER PENN TWP. URBAN NODE	
Hanover Borough	
Keystone-Seneca Wire Cloth	Metal Finishing

Table K

STATE LIST OF DIRECT INDUSTRIAL WASTE DISCHARGES INTO THE CODORUS CREEK BASIN

York City		
American Chain & Cable	-	(Thermal) Metal Plating
Cole Steel		
New York Wire		
Hanover Boro		
Keystone Wire & Cloth	-	Metal Plating
Hanover Wire Cloth	-	Thermal
Spring Garden Twp		
N. Y. Wire Cloth		Metal Plating
York Div. - Borg/Warner (Thermal)		
Cole Steel Co.		
Molybdenum Co.	-	Acid & Alk.
York Water Co.	-	Sludge
Yorktowne Paper Mill	-	Thermal
West York Twp.		
PFALTZGRAFF Co.		Mineral Products
Codorus Twp.		
AMP, Inc.		Metal Plating (Thermal)
Glen Rock Boro		
Glen Rock Water Co.		Sludge
Manchester Twp		
General Time Corp.		Acid - Alk.
New Freedom Boro		
Boyd Laundry		Abs - Las
Charles Summers, Co. Inc.		Thermal

Table K (Continued)

<u>Shewsbury Boro</u>		
Hungerford Packing		Thermal, Industrial Waste Spray
<u>Springettsbury Twp</u>		
Cole Steel Co.	}	Metal Plating
American Mach. & Foundry	}	Metal Plating
<u>Springfield Twp</u>		
York City Sanitary Landfill		
<u>West Manchester Twp</u>		
Bowen McLaughlin	-	Metal Plating & Domestic
<u>York Twp</u>		
Gichner Mobile Systems	-	Metal Plating

APPENDIX

CODORUS CREEK STUDY 1971

RAIN FALL

Date	Classification	Precipitation Time Begin	Time End	Amount @8PM
Sept.				
11	Showers & Thunder Showers	NA	2400	0.53
12	Showers & Thunder Showers	0000	2400	0.63
13	Showers & Thunder Showers	0000	0700	0.05
14	Showers & Thunder Showers	2050	-	0.08
17	Showers	0730	1315	0.07
19	Showers	0845	0930	Trace
20	Showers	-	0615	Trace
21	Showers & Thunder Showers	2130	-	0.90

EPA, REGION III, TECHNICAL SUPPORT LABORATORY DATA SHEET #1 PHYSICAL DATA

Sample No.	Date Sampled	pH Units	Alkalinity As Ca Co_3 mg/l	Conduct.	Color Units	Turbidity JTU	Temp. ^oC
COR001	9/8/71	6.8			35	14	23.5
	9/14/71	7.5			40	33	21
	9/16/71				30	20	23
	9/20/71				80	10	21
	10/29/71	7.4	81		53	10	16
	11/11/71			475			9
COR005	9/8/71	7.0			40	17	23.5
	9/14/71	7.4			35	34	22
	9/16/71				70	26	23
	9/20/71				100	11	20.5
	10/29/71	7.3	85		32	14	16
	11/11/71			480			9
COR005	9/8/71	7.2			20	6	22.0
STP	9/14/71	7.3			25	7	20
	9/16/71				25	8	21.5
	9/20/71				30	5	21
COR007	9/8/71	6.7			45	18	23.0
	9/14/71	7.2			35	65	22
	9/16/71				40	26	22
	9/20/71				80	15	20
COR009	9/8/71	7.3			40	32	27.0
STP	9/14/71	7.3			45	36	25
	9/16/71				40	41	25
	9/20/71				120	49	22
COR011	10/29/71	7.55	69		25	14	16
	11/11/71			495			10

EPA, REGION III, TECHNICAL SUPPORT LABORATORY DATA SHEET #2 PHYSICAL DATA

Sample No.	Date Sampled	pH Units	Alkalinity As Ca Co_3 mg/l	Conduct.	Color Units	Turbidity JTU	Temp. °C
COR014	9/8/71	7.0			65	19	22.9
	9/14/71	7.0			55	100	19.0
	9/16/71				40	28	20.5
	9/20/71				100	11	20.0
	11/11/71			420			9
WC0016	9/8/71	6.9			60	28	23.7
	9/14/71	7.1			60	87	19.5
	9/16/71				30	38	20.5
	9/20/71				200	11	21.0
WC0019	9/8/71	6.8			55	31	23.8
	9/14/71	7.3			25	72	20.0
	9/16/71				35	36	21.5
	9/20/71				200	11	21.5
	11/11/71			790			11
WC0022	9/8/71	6.9			55	34	26.1
	9/14/71	7.2			45	51	21.5
	9/16/71				35	36	23.4
	9/20/71				240	10	26
	11/11/71			900			12

EPA, REGION III, TECHNICAL SUPPORT LABORATORY DATA SHEET #3 PHYSICAL DATA

Sample No.	Date Sampled	pH Units	Alkalinity As $CaCO_3$ mg/l	Conduct.	Color Units	Turbidity JTU	Temp. ^oC
WC0024	9/8/71	7.2			55	35	27.4
	9/14/71	7.4			60	51	X
	9/16/71				45	33	25.2
	9/20/71				280	14	27.5
	10/29/71	7.75	109		150	14	20
	11/11/71			1100			14
WC0025	9/8/71	7.2			45	31	36.0
IWP	9/14/71	7.7			50	31	35
	9/16/71				45	19	33.4
	9/20/71				480	12	34.5
	10/28/71		155		400	17	
WC0026	9/8/71	7.0			55	49	24.1
STP	9/14/71	7.5			25	20	21.1
	9/16/71				40	23	21.4
	9/20/71				40	10	22.5
WC0027	10/29/71	7.7	51		25	14	19
	11/11/71			240			9
WC0028	9/8/71	6.9			5	3	13.9
	9/14/71	7.3			50	120	18.3
	9/16/71				15	13	15.0
	9/20/71				15	7	16.0
	11/11/71			125			6
WC0033	10/29/71	7.4	31		15	9	X
	11/11/71			135			6

EPA, REGION III, TECHNICAL SUPPORT LABORATORY DATA SHEET #4 PHYSICAL DATA

Sample No.	Date Sampled	pH Units	Alkalinity As Ca Co_3 mg/l	Conduct.	Color Units	Turbidity JTU	Temp. °C
WC0034	10/29/71	7.5	25		10	7	X
	11/11/71			115			7
SC0000	9/8/71	7.0			7	7	22.8
	9/14/71	7.4			40	70	18.5
	9/16/71				20	13	19.5
	9/20/71				20	12	19.0
SC0007	9/14/71	7.5			60	37	17.5
	9/16/71				10	7	17.5
	9/20/71				10	6	17.5
SC0014	9/8/71	7.0			3	3	20.0
	9/14/71	7.5			30	16	18.0
	9/16/71				10	6	17.0
	9/20/71				10	3	17.5
SC0015	9/8/71	7.0			35	5	20.0
STP	9/14/71	6.7			8	7	19.0
	9/16/71				35	50	19.0
	9/20/71				30	11	19.0
SC0016	9/8/71	6.9			3	2	19.1
	9/14/71	7.4			15	8	18.0
	9/16/71				8	5	16.5
	9/20/71				10	3.5	17.0

EPA, REGION III, TECHNICAL SUPPORT LABORATORY DATA SHEET #5 PHYSICAL DATA

Sample No.	Date Sampled	pH Units	Alkalinity As $CaCo_3$ mg/l	Conduct.	Color Units	Turbidity JTU	Temp. °C
EC0000	9/8/71	7.2			7	6	25.0
	9/14/71	7.6			15	8	22.0
	9/16/71				8	5	22.5
	9/20/71				10	5	21.0
MIL000	9/8/71	7.7			7	6	20.5
	9/14/71	8.4			5	4	18.0
	9/16/71				8	4	19
	9/20/71				10	4	17.5
MIL008	9/8/71	7.2			7	3	24.5
	9/14/71	7.5			5	3	16.5
	9/16/71				10	4	22.5
	9/20/71				15	4.5	16.5
MIL009	9/8/71	7.3			25	6	27.0
STP	9/14/71	7.8			25	8	27.0
	9/16/71				40	22	23.5
	9/20/71				40	10	23.0
OIL000	9/8/71	8.4			13	7	23.6
	9/14/71	8.0			20	10	22.2
	9/16/71				20	11	21.0
	9/20/71				15	8	20.5
	11/11/71			415			7.0
OIL005	9/8/71	7.3			15	13	26.7
	9/14/71	7.7			25	20	23.9
	9/16/71				45	70	24.7
	9/20/71				30	25	20
	11/11/71			445			10

EPA, REGION III, TECHNICAL SUPPORT LABORATORY DATA SHEET #6 PHYSICAL DATA

Sample No.	Date Sampled	pH Units	Alkalinity As Ca Co_3 mg/l	Conduct.	Color Units	Turbidity JTU	Temp. °C
OIL006	9/8/71	7.3			5	3	27.3
STP	9/16/71				20	10	27.4
	9/20/71				20	4.5	22
	9/14/71	7.4					27.2

EPA, REGION III, TECHNICAL SUPPORT LABORATORY DATA SHEET #1 OXYGEN DEMAND

Sample No.	Date Sampled	BOD 5 Day mg/l	TOC mg/l	COD mg/l	D.O. mg/l	Temp. °C	Flow Cfs
COR001	9/8/71	9.36	18	-	4.80	23.5	148
	9/14/71		22	40*	5.92	21	552
	9/16/71	9.70	21	35	4.59	23	174
	9/20/71	7.95	22	35	5.78	21	156
	10/29/71	5.80	25	28	7.8	16	360
	11/11/71	7.95	32		10.6	9	276
COR005	9/8/71	7.06	19	-	3.68	23.5	140
	9/14/71		22	45*	4.93	22	412
	9/16/71	10.6	21	37*	4.61	23	163
	9/20/71	10.95	22	42	4.70	20.5	144
	10/29/71	7.95	26	25	7.1	16	263
	11/11/71	8.10			9.7	9	225
COR005 STP	9/8/71	8.10	21	-	X	22.0	3
	9/14/71		37	36*	4.66	20	3
	9/16/71	5.10	16	34	11.22	21.5	4
	9/20/71	6.35	18	34	8.37	21	3
COR007	9/8/71	3.72	17	-	4.29	23.0	133
	9/14/71		28	47*	4.62	22	387
	9/16/71	5.50	28	42	8.58	22	153
	9/20/71	10.65	24	47*	5.03	20	136
COR009 STP	9/8/71	19.05	33	59*	3.4	27.0	9
	9/14/71		44	130*	2.4	25	10
	9/16/71	50.75	83	130*	2.0	25	9
	9/20/71	77.15	67	210*	2.67	22	11

*.25N Cr_2O_7

EPA, REGION III, TECHNICAL SUPPORT LABORATORY DATA SHEET #2 OXYGEN DEMAND

Sample No.	Date Sampled	BOD 5 Day mg/1	TOC mg/1	COD mg/1	D.O. mg/1	Temp °C	Flow Cfs
COR011	10/29/71	6.8	23	27	8.15	16	206
	11/11/71	17.5	31		9.9	10	193
COR014	9/8/71	1.72	21	55*	5.60	22.9	99
	9/14/71		44	130*	6.13	19.0	275
	9/16/71	2.45	24	31*	5.83	20.5	110
	9/20/71	1.3	22	40*	6.39	20.0	102
	11/11/71	X			10.8	9	160
WC0016	9/8/71	4.46	35	77*	3.50	23.7	87
	9/14/71		21	51*	5.27	19.5	222
	9/16/71	5.40	36	50*	3.36	20.5	96
	9/20/71	4.95	42	74*	3.17	21.0	90
WC0019	9/8/71	10.85	35	77*	2.94	23.8	72
	9/14/71		23	46*	5.22	20.0	179
	9/16/71	2.15	51	48*	3.19	21.5	78
	9/20/71	7.3	41	70	2.80	21.5	74
	11/11/71	X			9.6	11	107
WC0022	9/8/71	3.40	44	78*	1.57	26.1	60
	9/14/71		16	42*	5.57	21.5	151
	9/16/71	4.15	56	45*	3.04	23.4	65
	9/20/71	9.95	53	87	2.61	26	62
	11/11/71	X			9.2	12	88
WC0024	9/8/71	4.69	38	81*	2.03	27.4	54
	9/14/71		22	40*	5.46	X	138
	9/16/71	11.45	45	64*	0.13	25.2	58
	9/20/71	4.05	64	130*	2.58	27.5	56
	10/29/71	6.1	43	65	7.5	20	90
	11/11/71	6.5	64		10.0	14	78

#.25N Cr_2O7

EPA, REGION III, TECHNICAL SUPPORT LABORATORY DATA SHEET #3 OXYGEN DEMAND

Sample No.	Date Sampled	BOD 5 Day mg/l	TOC mg/l	COD mg/l	D.O. mg/l	Temp °C	Flow Cfs
WC0025	9/8/71	1.80	83	180*	6.5	36.0	11
IWP	9/14/71		70	150*	7.2	35	11
	9/16/71	9.50	76	150*	6.6	33.4	10
	9/20/71	8.65	104	230*	6.9	34.5	9
	10/28/71	25.5	88	180			10
WC0026	9/8/71	48.27	71	77*	1.26	24.1	0.1
STP	9/14/71		30	53*	7.80	21.1	0.2
	9/16/71	9.65	47	70*	0.45	21.4	0.3
	9/20/71	11.05	28	62	X	22.5	0.1
WC0027	10/29/71	3.15	16	4	8.5	19	41
	11/11/71	3.85	21		12.0	9	36
WC0028	9/8/71	0.8	4	8	9.68	13.9	46
	9/14/71		16	37*	7.85	18.3	48
	9/16/71	1.85	10	8	9.21	15.0	46
	9/20/71	1.95	7	11	9.27	16.0	31
	11/11/71	X			12.3	6	31
WC0033	10/29/71	2.65	8	4	X	X	27
	11/11/71	1.45	11		12.2	6	21
SC0000	9/8/71	2.04	14	-	7.41	22.8	41
	9/14/71		24	54*	7.13	18.5	112
	9/16/71	1.85	7	10	7.64	19.5	47
	9/20/71	1.75	7	7	8.02	19.0	47
	11/11/71	X			11.0	8.0	93

*.25N Cr_2O_7

EPA, REGION III, TECHNICAL SUPPORT LABORATORY DATA SHEET #4 OXYGEN DEMAND

Sample No.	Date Sampled	BOD 5 Day mg/1	TOC mg/1	COD mg/1	D.O mg/1	Temp °C	Flow Cfs
SC0007	9/14/71		8	30*	8.2	17.5	80
	9/16/71	1.40	3	9	8.99	17.5	34
	9/20/71	1.55	3	5	9.31	17.5	34
	11/10/71				12.2	6	68
SC0014	9/8/71	2.98	2	5	9.68	20.0	13
	9/14/71		5	11	8.53	18.0	58
	9/16/71	1.70	3	6	9.32	17.0	16
	9/20/71	0.90	5	5	9.46	17.5	16
	11/10/71	X			13.0	4	50
SC0015	9/8/71	3.77	17	40*	4.06	20.0	0.1
STP	9/14/71		17	29	1.77	19.0	0.1
	9/16/71	12.25	48	130*	0.10	19.0	0.1
	9/20/71	X	14	31	0.37	19.0	0.1
SC0016	9/8/71	2.00	3	5	9.39	19.1	9
	9/14/71		7	9	8.72	18.0	31
	9/16/71	2.25	14	4	9.46	16.5	11
	9/20/71	1.35	4	7	9.55	17.0	11
	11/10/71				12.4	6.0	24
EC0000	9/8/71	3.00	5	12	7.46	25.0	28
	9/14/71		8	13	7.20	22.0	84
	9/16/71	3.25	7	17	7.34	22.5	37
	9/20/71	2.10	7	11	7.57	21.0	37
	11/10/71	X			10.6	11.5	72

*.25N Cr_2O7

EPA, REGION III, TECHNICAL SUPPORT LABORATORY DATA SHEET #5 OXYGEN DEMAND

Sample No.	Date Sampled	BOD 5 Day mg/l	TOC mg/l	COD mg/l	D.O. mg/l	Temp °C	Flow Cfs
MIL000	9/8/71	3.05	5	9	8.59	20.5	11
	9/14/71		10	10	8.42	18.0	15
	9/16/71	0.65	5	10	7.44	19	11
	9/20/71	1.45	8	8	8.51	17.5	11
	11/10/71	X			16.6	8	11
MIL008	9/8/71	4.00	8	15	7.26	24.5	4
	9/14/71		5	-	7.32	16.5	5
	9/16/71	1.55	5	13	X	22.5	4
	9/20/71	4.40	8	12	7.62	16.5	4
	11/10/71	X			9.7	10	4
MIL009 STP	9/8/71	2.59	25	55	2.73	27.0	2
	9/14/71		23	51	1.2	27.0	2
	9/16/71	2.35	25	74*	1.2	23.5	2
	9/20/71	8.89	24	51	1.2	23.0	2
OIL000	9/8/71	2.19	8	13	11.77	23.6	19
	9/14/71		7	15	9.09	22.2	19
	9/16/71	2.50	10	17	9.67	21.0	12
	9/20/71	2.20	18	13	8.60	20.5	19
	11/11/71	X			11.4	7.0	13
OIL005	9/8/71	4.10	18	19	4.73	26.7	8
	9/14/71		12	23	6.56	23.9	8
	9/16/71	8.20	21	40*	4.75	24.7	2
	9/20/71	11.55	22	25	6.08	20	8
	11/11/71	X			8.4	10	3
OIL006 STP	9/8/71	3.54	22	31	4.8	27.3	.1
	9/14/71				4.21	27.2	.1
	9/16/71	5.50	35	64*	3.32	27.4	.1
	9/20/71	X	15	35	6.8	22	.1

*.25N Cr_2O7

EPA, REGION III, TECHNICAL SUPPORT LABORATORY DATA SHEET #1 Nutrients

Sample No.	Date Sampled	Flow Cfs	TKN	Organic N.	NH_3-N	NO_2-N	NO_3-N	Total Phos-P mg/1	Ortho Phos-P mg/1
			←		mg/1		→		
COR001	9/8/71	148	2.02	1.94	.08	.36	7.4	1.4	1.0
	9/14/71	552	2.24	1.68	.56	.14	2.9	.98	.55
	9/16/71	174	2.0	1.49	.51	.22	1.6	1.1	.50
	9/20/71	156	1.7	1.19	.51	.18	3.3	.95	.50
	10/29/71	360	1.57	1.17	.40	.115	2.5	.53	.42
COR005	9/20/71	144	3.1	2.65	.45	.14	2.4	1.2	.60
	10/29/71	263	2.24	1.70	.54	.047	.95	.30	.20
COR005	9/14/71	3	11.2	4.8	6.4	.07	.17	3.0	2.2
STP	9/16/71	4	10.1	7.3	2.8	.71	.87	2.5	1.8
	9/20/71	3	9.0	6.25	2.75	.59	.96	8.0	3.1
COR007	9/8/71	133	1.68	1.61	.07	.09	2.0	.80	.60
	9/14/71	387	4.48	3.89	.59	.14	2.6	1.1	.75
	9/16/71	153	2.52	1.92	.6	.12	1.8	.67	.42
	9/20/71	136	2.0	1.31	.69	.07	1.1	1.0	.50
COR009	9/14/71	10	15.7	8.38	7.32	.40	1.4	5.8	3.6
STP	9/16/71	9	11.5	9.26	2.24	.08	.17	3.4	2.0
	9/20/71	11	15.7	10.89	4.81	.22	.81	10	4.8
COR011	10/29/71	216	1.23	1.21	.02	.014	.94	.09	.08
WC0019	9/8/71	72	1.85	1.82	.03	.05	2.0	.27	.12
	9/14/71	179	2.24	1.71	.53	.09	1.6	6.5	.03
	9/16/71	78	3.4	2.42	.98	.27	3.1	.19	.06
	9/20/71	74	2.24	1.72	.52	.20	1.9	.16	.05

EPA, REGION III, TECHNICAL SUPPORT LABORATORY DATA SHEET #2 Nutrients

Sample No.	Date Sampled	Flow Cfs	TKN	Organic N.	NH_3-N	NO_2-N	NO_3-N	Total Phos-P	Ortho Phos-P
			←		mg/1			mg/1 →	mg/1
WC0024	9/8/71	54	2.80	2.07	.73	.06	.75	.23	.05
	9/14/71	138	3.36	2.76	.60	.08	1.4	.38	.05
	9/20/71	56	4.8	3.84	.96	.18	1.2	.17	.04
	10/29/71	90	2.69	1.77	.92	.055	1.6	.14	.12
WC0025	9/8/71	11	5.04	3.16	1.88	.04	.48	.19	.04
IWP	9/20/71	9	10.98	7.17	3.81	.07	.50	.15	.04
	10/28/71	10	NS*	NS*	1.8	.046	.25	.10	.02
WC0026	9/8/71	0.1	36.4	33.27	3.13	.01	5.5	13	8.4
STP	9/14/71	0.2	8.12	5.82	2.3	.03	5.5	3.5	2.7
	9/20/71	0.1	8.4	4.86	3.54	.61	8.9	10	5.0
WC0027	10/29/71	41	0.28	0.26	.02	.026	1.1	.15	.09
WC0028	9/14/71	48	1.96	1.88	.08	.04	2.1	1.0	.92
	9/20/71	31	.45	0.41	.04	.04	1.1	.07	.03
WC0033	10/28/71	27	.39	.37	<.02	0.010	0.41	.04	.03
WC0034	10/28/71	17	.28	.26	<.02	0.005	0.16	.18	.03
SC0000	9/8/71	41	0.34	0.33	.01	.01	1.3	.04	.03
	9/14/71	112	3.36	3.26	.1	.02	1.8	.80	.03
	9/16/71	47	.56	.56	.001	.01	3.6	.08	.03
	9/20/71	47	.56	.56	.001	.01	1.9	.06	.04
SC007	9/20/71	136	.28	0.11	.17	.01	2.2	.07	.05
SC0014	9/8/71	13	0.22	.22	.001	.01	1.5	.13	.09
	9/14/71	58	1.51	1.50	.01	.01	2.0	.13	.06
	9/16/71	16	.56	.56	.001	.01	1.7	.09	.08
	9/20/71	16	.28	.28	.001	.01	1.1	.17	.08

EPA, REGION III, TECHNICAL SUPPORT LABORATORY DATA SHEET #3 Nutrients

Sample No.	Date Sampled	Flow Cfs	TKN mg/l	Organic N. mg/l	NH_3-N mg/l	NO_2-N mg/l	NO_3-N mg/l	Total Phos-P mg/l	Ortho Phos-P mg/l
SC0015	9/8/71	0.1	3.25	3.13	.12	.07	9.9	12	8.6
STP	9/14/71	0.1	4.2	2.95	1.25	.01	7.6	9.3	8.1
	9/16/71	0.1	21.8	18.95	2.95	.16	5.8	9.0	8.0
	9/20/71	0.1	8.1	5.58	2.52	.32	7.4	9.4	3.3
EC0000	9/8/71	28	0.45	0.45	.002	.02	0.8	.02	.02
	9/14/71	34	1.12	1.05	.07	.02	1.4	.04	.02
	9/16/71	37	1.12	1.04	.08	.02	1.6	.11	.01
	9/20/71	80	.84	0.68	.16	.03	1.2	.03	.01
MIL000	9/8/71	11	.84	0.79	.05	.13	4.5	1.2	.71
	9/14/71	15	.56	0.39	.17	.12	4.5	.65	.56
	9/16/71	11	.84	0.79	.05	.09	7.5	.75	.53
	9/20/71	11	1.12	1.12	< .001	.04	4.6	.76	.70
MIL008	9/14/71	5	1.68	0.90	.78	.56	7.1	4.2	3.0
	9/16/71	4	1.96	1.31	.65	.44	7.8	3.8	3.2
	9/20/71	4	1.12	0.82	.30	.43	4.4	4.6	3.9
MIL009	9/14/71	2	24.1	22.2	1.9	.16	3.0	15	12
	9/16/71	2	19.0	16.85	2.15	.17	4.2	14	14
	9/20/71	2	11.8	6.72	5.08	.27	6.0	19	14
OIL000	9/14/71	8	1.68	1.67	.01	.05	3.0	.82	.67
	9/20/71	8	.56	0.35	.21	.09	2.6	.67	.48
OIL006	9/8/71	.1	1.96	1.95	.01	< .01	.10	NS*	1.0
	9/14/71	.1	3.92	3.82	.1	< .01	.24	9.0	2.6
	9/20/71	.1	11.2	10.81	.39	.70	.57	9.5	4.4

*Not enough Sample

EPA, REGION III, TECHNICAL SUPPORT LABORATORY DATA SHEET #1 SOLIDS

Sample No.	Date Sampled	Flow Cfs	Total Solids mg/1	Suspended Solids mg/1	Dissolved Solids mg/1
COR001	9/8/71	148	360	31	329
	9/14/71	552	330	53	277
	9/16/71	144	411	5	406
	9/20/71	156	478	22	456
	10/29/71	360	350	22	328
COR005	9/8/71	140	358	25	333
	9/14/71	412	413	35	378
	9/16/71	163	402	19	383
	9/20/71	144	478	22	456
	10/29/71	263	310	19	291
COR005 STP	9/8/71	3	354	23	331
	9/14/71	3	345	16	329
	9/16/71	4	426	9	417
	9/20/71	3	218	10	208
COR007	9/8/71	133	342	29	313
	9/14/71	387	405	121	284
	9/16/71	153	417	1	416
	9/20/71	136	419	24	395
COR009 STP	9/8/71	9	398	43	355
	9/14/71	10	410	42	368
	9/16/71	9	510	3	507
	9/20/71	11	471	66	405
COR011	10/29/71	206	260	17	243

EPA, REGION III, TECHNICAL SUPPORT LABORATORY DATA SHEET #2 SOLIDS

Sample No.	Date Sampled	Flow Cfs	Total Solids mg/l	Suspended Solids mg/l	Dissolved Solids mg/l
COR014	9/8/71	99	416	52	364
	9/14/71	275	589	470	119
	9/16/71	110	351	64	287
	9/20/71	102	449	23	426
WC0016	9/8/71	87	780	65	715
	9/14/71	222	470	186	284
	9/16/71	96	501	17	484
	9/20/71	90	741	31	710
WC0019	9/8/71	72	699	76	623
	9/14/71	179	409	144	265
	9/16/71	78	495	43	452
	9/20/71	74	649	27	622
WC0022	9/8/71	60	697	74	623
	9/14/71	151	279	91	188
	9/16/71	65	558	68	490
	9/20/71	62	767	22	745
WC0024	9/8/71	54	728	55	673
	9/14/71	138	404	80	324
	9/16/71	58	690	56	634
	9/20/71	56	984	28	956
WC0025	9/8/71	11	1515	37	1478
IWP	9/14/71	11	1212	40	1172
	9/16/71	10	1238	28	1210
	9/20/71	9	1564	14	1550
	10/28/71	10	1690	18	1672

EPA, REGION III, TECHNICAL SUPPORT LABORATORY DATA SHEET #3 SOLIDS

Sample No.	Date Sampled	Flow Cfs	Total Solids mg/l	Suspended Solids mg/l	Dissolved Solids mg/l
WC0026	9/8/71	0.1	338	94	244
STP	9/14/71	0.2	306	29	277
	9/16/71	0.3	326	29	297
	9/20/71	0.1	364	14	350
WC0027	10/29/71	41	150	14	136
WC0028	9/8/71	46	87	19	68
	9/14/71	48	302	258	44
	9/16/71	46	51	6	45
	9/20/71	31	90	10	80
WC0033	10/29/71	29	64	12	52
WC0034	10/29/71	17	120	13	107
SC0000	9/8/71	41	X	16	X
	9/14/71	112	726	704	22
	9/16/71	47	38	8	30
	9/20/71	47	102	13	89
SC0007	9/14/71	84	117	50	67
	9/16/71	34	42	5	37
	9/20/71	34	57	4	53
SC0014	9/8/71	13	420	13	407
	9/14/71	58	71	27	44
	9/16/71	16	34	9	25
	9/20/71	16	47	44	44

EPA, REGION III, TECHNICAL SUPPORT LABORATORY DATA SHEET #4 SOLIDS

Sample No.	Date Sampled	Flow Cfs	Total Solids mg/l	Suspended Solids mg/l	Dissolved Solids mg/l
SC0015 STP	9/8/71	0.1	270	30	240
	9/14/71	0.1	268	19	249
	9/16/71	0.1	492	93	399
	9/20/71	0.1	323	5	318
SC0016	9/8/71	9	386	11	375
	9/14/71	31	119	14	105
	9/16/71	11	161	5	156
	9/20/71	11	84	2	82
EC0000	9/8/71	28	109	17	92
	9/14/71	84	197	15	182
	9/16/71	37	139	24	115
	9/20/71	37	32	13	19
MIL000	9/8/71	11	315	15	300
	9/14/71	15	331	27	304
	9/16/71	11	346	29	317
	9/20/71	11	204	9	195
MIL008	9/8/71	4	215	11	204
	9/14/71	5	170	4	166
	9/16/71	4	226	16	210
	9/20/71	4	149	13	136

EPA, REGION III, TECHNICAL SUPPORT LABORATORY DATA SHEET #5 SOLIDS

Sample No.	Date Sampled	Flow Cfs	Total Solids mg/l	Suspended Solids mg/l	Dissolved Solids mg/l
MIL009	9/8/71	2	374	17	357
STP	9/14/71	2	340	14	326
	9/16/71	2	401	27	374
	9/20/71	2	283	13	270
OIL000	9/8/71	19	293	13	280
	9/14/71	19	256	16	240
	9/16/71	12	254	4	250
	9/20/71	19	255	12	243
OIL000	9/8/71	8	419	25	394
	9/14/71	8	356	35	321
	9/16/71	2	501	125	376
	9/20/71	8	222	31	191
OIL006	9/8/71	0.1	522	13	509
STP	9/16/71	0.1	571	6	565
	9/20/71	0.1	299	8	291

EPA, REGION III, TECHNICAL SUPPORT LABORATORY DATA SHEET #1 - METALS

Sample No.	Date Sampled	Flow Cfs	Fe ←	Cu	Zn	Mn mg/l	Al	Ca	Mg →	Mercury Microgram ug/l
COR001	9/8/71	148	.6	<.1	.06	.15	<1	40	8	<2
	9/14/71	552	1.2	<.1	.08	.20	1	35	7	<1
	9/16/71	174	.8	<.1	.04	.15	<1	35	8	1
	9/20/71	156	.6	<.1	.12	.15	<1	45	9	<1
COR005 STP	9/8/71	3	.7	<.1	.08	.10	<1	40	7	<1
	9/14/71	3	.6	<.1	.08	.05	<1	40	7	<1
	9/16/71	4	.7	<.1	.08	.05	<1	45	8	1
	9/20/71	3	.4	<.1	.04	.05	<1	40	7	<1
COR007	9/3/71	133	.5	<.1	.04	.15	<1	40	8	1
	9/14/71	387	2.8	<.1	.06	.35	3	30	6	1
	9/16/71	153	1.2	<.1	.08	.25	<1	40	8	4
	9/20/71	136	.5	<.1	.04	.20	<1	40	8	2
COR009 STP	9/8/71	9	.8	.1	.24	.10	<1	35	8	<1
	9/14/71	10	2.3	.1	.32	.10	1	35	8	2
	9/16/71	9	2.5	<.1	.14	.15	<1	35	9	24
	9/20/71	11	1.3	.1	.42	.10	<1	40	8	5
WC0024	9/8/71	54	.7	.1	.08	.80	2	65	7	<1
	9/14/71	138	2.0	.1	.06	.40	2	40	6	<1
	9/16/71	58	1.5	.1	.04	.70	1	55	9	<1
	9/20/71	56	.6	.1	.04	1.0	<1	70	9	2
WC0025 IWP	9/8/71	11	.9	.6	.18	1.4	2	110	10	1
	9/14/71	11	.4	<.1	.06	1.0	<1	85	9	5
	9/16/71	10	.4	<.1	.06	1.1	<1	95	10	2
	9/20/71	9	.6	<.1	.08	1.6	<1	120	11	<1

EPA, REGION III, TECHNICAL SUPPORT LABORATORY DATA SHEET #2 METALS

Sample No.	Date Sampled	Flow Cfs	Fe	Cu	Zn	Mn mg/l	Al	Ca	Mg >	Mercury Microgram ug/l
WC0033	10/28/71	27	.3	<.1	<.05	.50				
WC0034	10/28/71	17	.2	<.1	<.05	.05				
SC0000	9/8/71	41	.3	<.1	.02	.05	1	15	4	5
	9/14/71	112	15.0	<.1	.10	.40	20	10	3	2
	9/16/71	47	.4	<.1	.04	.10	1	15	4	1
	9/20/71	47	.3	<.1	.06	.05	1	20	5	<1
SC0007	9/14/71	84	1.6	<.1	.04	.10	1	15	4	
	9/20/71	34	.2	<.1	.02	.05	1	15	4	1
MIL000	9/8/71	11	.3	<.1	.02	.05	1	35	11	7
	9/14/71	15	.3	<.1	.02	.05	1	35	10	<1
	9/16/71	11	.2	<.1	.04	.10	1	40	10	12
	9/20/71	11	.2	<.1	.06	.05	1	35	10	1
OIL000	9/8/71	19	.3	<.1	.08	.10	1	40	8	1
	9/14/71	19	.5	<.1	.06	.10	1	40	8	<1
	9/16/71	12	.5	<.1	.10	.10	1	35	8	1
	9/20/71	19	.3	<.1	.04	.10	1	40	8	<1
COR014	9/14/71	275								-
WC0026	9/16/71	0.3								1
STP	9/20/71	0.1								2

EPA, REGION III, TECHNICAL SUPPORT LABORATORY DATA SHEET #3 METALS

Sample No.	Date Sampled	Flow Cfs	Fe	Cu	Zn	Mn mg/l	Al	Ca	Mg	Mercury Microgram ug/l
SC0015	9/16/71	0.1								<1
	9/20/71	0.1								6
MIL009	9/16/71	2								<1
STP	9/20/71	2								5
OIL006	9/8/71	0.1								<1
STP	9/14/71	0.1								2
	9/16/71	0.1								<1
	9/20/71	0.1								3

EPA, REGION III, TECHNICAL SUPPORT LABORATORY DATA SHEET MISC. CHEMICAL DATA SHEET #1

Sample No.	Date Sampled	Flow Cfs	Chlorides mg/l	Sulfate mg/l	Tannins & Lignins mg/l	Total Chlorine Residuals mg/l
COR001	9/8/71	148	89	38		
	9/14/71	552	56	27		
	9/16/71	174	66	42		
	9/20/71	156	87	36		
	11/11/71	276			1.34	0
COR005	9/8/71	140	86	34		
	9/14/71	412	87	25		
	9/16/71	163	69	27		
	9/20/71	144		36		
	11/11/71	225			1.26	0
COR005 STP	9/8/71	3	35	72		0.7
	9/14/71	3	33	59		0.4
	9/16/71	4	43	84		0.8
	9/20/71	3	33	41		0.3
COR007	9/8/71	133	89	36		
	9/14/71	387	73	24		
	9/16/71	153	72	30		
	9/20/71	136	88	31		
COR009 STP	9/8/71	9				0.6
	9/14/71	10	43	70		0.1
	9/16/71	9	52	95		0.4
	9/20/71	11	51	68		0.1
COR011	11/11/71	193			1.40	0
COR014	9/8/71	99	130	23		
	9/14/71	275	26	19		
	9/16/71	110	74	27		

MISC. CHEMICAL DATA SHEET #2

(Con't)

Sample No.	Date Sampled	Flow Cfs	Chlorides mg/l	Sulfate mg/l	Tannins & Lignins mg/l	Total Chlorine Residuals mg/l
	9/20/71	120				
	11/11/71	160				
WC0016	9/8/71	87	200	34		
	9/14/71	222	42	24		
	9/16/71	96	120	40		
	9/20/71	90	200	49		
WC0019	9/8/71	72	210	48		
	9/14/71	179	39	20		
	9/16/71	78	130	48		
	9/20/71	74	210	40		
	11/11/71	107				0
WC0022	9/8/71	60	220	42		
	9/14/71	151	47	24		
	9/16/71	65	150	49		
	9/20/71	62	-	-		
	11/11/71	88				
WC0024	9/8/71	54	220	53		
	9/14/71	138	75	27		
	9/16/71	58	200	49		
	9/20/71	56	280	48		
	11/11/71	78			4.32	0
WC0025	9/8/71	11	510	99		0
IWP	9/14/71	11	390	103		0
	9/16/71	10	410	112		

MISC. CHEMICAL DATA SHEET #3

(Cont)

Sample No.	Date Sampled	Flow Cfs	Chlorides mg/1	Sulfate mg/1	Tannins & Lignins mg/1	Total Chlorine Residuals mg/1
	9/20/71	9	560	82		
	11/11/71	12			6.52	
WC0026 STP	9/8/71	0.1	59	38		0
	9/14/71	0.2	27	47		1.0
	9/16/71	0.3	41	36		1.0
	9/20/71	0.1	41	36		
WC0028	9/8/71	46	7	11		
	9/14/71	48	7	11		
	9/16/71	46	8	8		
	9/20/71	31	8	11		
WC0033	10/25/71	27			0.08	
WC0034	10/28/71	17			0.1	
SC0000	9/8/71	41 =	12	8	8	
	9/14/71	112	8	13		
	9/16/71	47	10	10		
	9/20/71	47	30	11	0	
SC0007	9/16/71	34	9	8	-	
	9/20/71	34	7	8	1	
	11/11/71	68				0
SC00014	9/8/71	13	8	9		
	9/14/71	58	8	6		
	9/16/71	16	8	8		
	9/20/71	16	8	8		
	11/11/71	50				0

MISC. CHEMICAL DATA SHEET #4

(Con't)

Sample No.	Date Sampled	Flow Cfs	Chlorides mg/l	Sulfate mg/l	Tannins & Lignins mg/l	Total Chlorine Residuals mg/l
SC0015	9/8/71	0.1	38	23		0.25
STP	9/14/71	0.1	39	24		1.0
	9/16/71	0.1	32	29		1.0
	9/20/71	0.1	32	30		1.0
SC0016	9/8/71	9	10	9		
	9/14/71	31	10	8		
	9/16/71	11	10	8		
	9/20/71	11	10	9		
	11/11/71	24				0
EC0000	9/8/71	28	14	10		
	9/14/71	84	13	7		
	9/16/71	37	14	8		
	9/20/71	37	14	13		
	11/11/71	72				0.12
MIL000	9/8/71	11	36	38		
	9/14/71	15	-	38		
	9/16/71	11	38	36		
	9/20/71	11	30	27		
	11/11/71	11				0
MIL008	9/8/71	4	31	28		
	9/14/71	5	26	16		
	9/16/71	4	28	15		
	9/20/71	4	29	19		
	11/11/71	4				0

MISC. CHEMICAL DATA SHEET #5

(Con't)

Sample No.	Date Sampled	Flow Cfs	Chlorides mg/1	Sulfate mg/1	Tannins & Lignins mg/1	Total Chlorine Residuals mg/1
MIL009	9/8/71	2	55	43		1.5
STP	9/14/71	2	53	39		1.5
	9/16/71	2	53	36		1.1
	9/20/71	2	68	43		0.6
OIL000	9/8/71	19	44	11		
	9/14/71	19	13	29		
	9/16/71	12	37	36		
	9/20/71	19	32	40		
	11/11/71	13				0
OIL005	9/8/71	8	68	114		
	9/14/71	8	51	46		
	9/16/71	2	65	42		
	9/20/71	8	36	49		
	11/11/71	3				Trace
OIL006	9/8/71	0.1	130	102		1.0
STP	9/14/71	0.1	10	56		1.0
	9/16/71	0.1	27	51		0.2
	9/20/71	0.1	60	46		1.0

EPA, REGION III, TECHNICAL SUPPORT LABORATORY DATA SHEET #1 LONG TERM BOD

Sample No.	Date Sampled	2 Day	5 Day	7 Day	8 Day	10 Day	11 Day	14 Day	17 Day	20 Day
COR001	9/8/71	3.73	9.36	13.57		32.53				
	9/16/71	6.00	9.70		13.55		20.40	25.15	36.90	45.95
	9/20/71	4.00	7.95		6.00		13.40	21.90	42.65	52.80
	10/29/71	2.85	5.80		6.80		7.75	9.80	13.00	15.60
	11/11/71	4.83	7.95		11.10		17.60	21.00	21.70	29.35
COR005	9/8/71	3.81	7.06	12.67		15.50				
	9/16/71	4.05	10.60		13.65		16.85	28.75	36.80	51.75
	9/20/71	6.70	10.95		7.85		13.40	16.95	25.40	33.55
	10/29/71	5.45	7.95		10.2		9.15	10.7	12.3	13.00
	11/11/71	3.8	8.10		7.6		12.5	12.55	11.35	14.00
COR005	9/8/71		8.10							
STP	9/16/71		5.10							
	9/20/71		6.35							
COR007	9/8/71	1.71	3.72	8.33		12.37				
	9/16/71	2.30	5.50		6.25		7.40	11.35	11.15	24.25
	9/20/71	5.80	10.65		9.35		12.15	15.95	16.95	24.20
COR009	9/8/71		19.05							
STP	9/16/71		50.75							
	9/20/71		77.15							
COR011	10/29/71	3.10	6.80		5.55		13.25	9.55	9.65	9.85
	11/11/71	5.41	17.50		20.93		34.08	38.38	40.4	45.73

(Con't)

Sample No.	Date Sampled	2 Day	5 Day	7 Day	8 Day	10 Day	11 Day	14 Day	17 Day	20 Day
COR014	9/8/71	0.95	1.72	7.29		10.45				
	9/16/71	0.70	2.45		2.90		5.25	7.80	13.30	17.75
	9/20/71	2.25	1.30		4.15		7.90	13.00	10.75	14.25
WC0016	9/8/71	1.71	4.46	4.78		15.70				
	9/16/71	1.70	5.40		5.80		11.60	15.60	25.35	19.85
	9/20/71	3.75	4.95		6.7		8.15	13.95	12.70	15.50

STP - Municipal Wastewater Treatment Plant
L.A.- Laboratory Accident

EPA, REGION III, TECHNICAL SUPPORT LABORATORY DATA SHEET #2 LONG TERM BOD

Sample Date	Date Sampled	2 Day	5 Day	7 Day	8 Day	10 Day	11 Day	14 Day	17 Day	20 Day
WC0022	9/8/71	1.73	L.A.	8.08		16.80				
	9/16/71	L.A.	2.15		5.25		8.05	L.A.	15.35	15.50
	9/20/71	7.50	7.30		6.35		13.50	18.75	26.00	39.75
WC0022	9/8/71	0.27	3.40	10.75		26.71				
	9/16/71	4.30	4.15		3.40		3.05	14.45	22.15	33.15
	9/20/71	6.40	9.95		13.65		17.80	23.65	31.65	37.40
WC0024	9/8/71	1.88	4.69	12.94		22.20				
	9/16/71	8.60	11.45		15.45		12.50	14.20	30.85	40.40
	9/20/71	5.25	4.05		13.65		17.40	17.00	41.40	48.15
	10/29/71	3.77	8.05		11.63		10.4	13.8	13.07	19.97
	11/11/71	3.30	6.50		8.73		13.13	23.65	14.55	18.55
WC0025 IWP	9/8/71		1.80							
	9/16/71		9.50							
	9/20/71		8.65							
	10/29/71	12.0	25.50		26.15		31.00	37.25	35.65	40.15
WC0026 STP	9/8/71		48.27							
	9/16/71		9.65							
	9/20/71		11.05							
WC0027	10/29/71	2.75	3.15		3.45		5.45	5.05	6.4	8.1
	11/11/71	2.04	3.85		4.38		8.48	11.58	12.0	15.45

(Con't)

Sample Date	Date Sampled	2 Day	5 Day	7 Day	8 Day	10 Day	11 Day	14 Day	17 Day	20 Day
WC0028	9/8/71	L.A.	L.A.	6.21		13.87				
	9/16/71	2.00	1.85		2.60		3.15	2.90	3.60	4.60
	9/20/71	0	1.95		0.95		1.85	2.30	4.60	5.00
WC0033	10/29/71	1.45	2.65		3.0		5.5	6.05	8.5	11.4
	11/11/71	1.35	1.45		2.75		3.3	3.95	3.25	3.9
WC0034	10/29/71	1.45	3.05		2.3		4.0	6.8	7.55	8.45
	11/11/71	0.85	1.15		1.5		2.9	3.2	2.8	4.15

LA - Laboratory Accident

IWP - Industrial Wastewater Treatment Plant

STP - Municipal Wastewater Treatment Plant

EPA, REGION III, TECHNICAL SUPPORT LABORATORY DATA SHEET #3 LONG TERM BOD

Sample No.	Date Sampled	2 Day	5 Day	7 Day	8 Day	10 Day	11 Day	14 Day	17 Day	20 Day
SC0000	9/8/71	L.A.	2.04	9.19		22.20				
	9/16/71	0.97	1.85		2.05		1.75	2.60	3.75	4.40
	9/20/71	0.30	1.75		1.85		2.00	2.00	2.80	4.40
SC0007	9/16/71	0.60	1.40		1.40		1.15	2.35	3.10	5.80
	9/20/71	0.40	1.55		1.90		1.70	2.65	3.70	5.20
SC0014	9/8/71	L.A.	2.98	8.82		12.93				
	9/16/71	1.15	1.70		1.60		1.35	2.05	2.95	2.95
	9/20/71	0.15	0.90		1.30		1.10	1.55	1.84	2.87
SC0015	9/8/71		3.77							
STP	9/16/71		12.25							
SC0016	9/8/71	0.88	2.00	3.32		9.00				
	9/16/71	1.15	2.25		2.60		3.20	3.55	5.75	5.60
	9/20/71	0	1.35		2.95		1.33	3.55	3.50	4.25
EC0000	9/8/71	0.52	3.00	7.52		L.A.				
	9/16/71	1.35	3.25		1.75		4.50	4.00	4.95	5.55
	9/20/71	6.30	2.10		2.40		2.60	3.75	4.40	5.00
MIL000	9/8/71	0.35	3.05	7.80		17.80				
	9/16/71	0.35	0.65		1.50		0.70	1.25	2.25	3.35
	9/20/71	0.20	1.45		1.25		1.95	9.75	7.35	6.30
MIL008	9/8/71	L.A.	4.00	9.50		20.17				
	9/16/71	1.30	1.55		2.75		10.25	13.15	14.10	15.20
	9/20/71	1.40	4.40		7.20		10.20	11.25	11.70	12.35

(Con't)

Sample No.	Date Sample	2 Day	5 Day	7 Day	8 Day	10 Day	11 Day	14 Day	17 Day	20 Day
MIL009	9/8/71		2.59							
STP	9/16/71		2.35							
	9/20/71		8.89							

L.A. - Laboratory accident

STP - Municipal Wastewater Treatment Plant

EPA, REGION III, TECHNICAL SUPPORT LABORATORY DATA SHEET # 4 LONG TERM BOD

Sample No.	Date Sampled	2 Day	5 Day	7 Day	8 Day	10 Day	11 Day	14 Day	17 Day	20 Day
OIL000	9/8/71	L.A.	2.19	9.45		20.80				
	9/16/71	0.80	2.50		3.75		5.00	7.75	11.75	18.05
	9/20/71	1.70	2.20		2.70		4.20	7.15	12.90	18.00
OIL005	9/8/71	L.A.	4.10	3.95		12.64				
	9/16/71	3.70	8.20		7.50		9.95	24.00	38.20	49.25
	9/20/71	5.10	11.55		9.30		10.90	15.25	20.50	45.20
OIL006	9/8/71		3.54							
STP	9/16/71		5.50							

CODORUS CREEK STUDY 1971

DIURNAL OXYGEN STUDY

Station	Time	Temp °C	D. O. Sat.	D. O. Obs.	Sat.
COR001	2600	23	8.68	5.07	0.58
9/9/71	0745	23	8.68	5.02	0.58
	0955	24	8.53	5.35	0.63
	1140	24.5	8.45	5.64	0.67
	1340	26	8.22	5.81	0.71
	1545	26	8.22	5.87	0.71
	1545	26	8.22	5.68	0.68
	1940	25	8.38	5.54	0.66
COR005	0615	23	8.68	3.45	0.40
9/9/71	0810	23	8.68	3.60	0.41
	1008	23	8.68	3.90	0.45
	1155	23.5	8.60	4.34	0.50
	1357	24	8.53	5.17	0.61
	1556	24.3	8.48	4.80	0.57
	1800	24	8.53	4.95	0.58
	1954	25	8.38	4.91	0.59
COR007	0615	21	8.99	4.92	0.55
9/15/71	0800	20	9.17	-	-
	1015	21	8.99	5.17	0.58
	1210	22	8.83	5.17	0.59
	1405	23.5	8.60	5.11	0.59
	1600	25	8.38	4.76	0.57
	1805	26	8.22	4.41	0.54
	2005	25	8.38	5.34	0.64
COR014	0615	21	8.99	7.02	0.78
9/21/71	0820	20	9.17	6.53	0.71
	1010	20	9.17	6.14	0.67
	1210	20.5	9.08	6.28	0.69
	1410	20	9.17	7.10	0.77
	1610	20	9.17	6.86	0.75
	1815	20	9.17	6.99	0.76
	2010	19	9.35	7.15	0.76
WCO 016	0615	23	8.68	3.52	0.41
	0810	23	8.68	3.40	0.39
	0950	23	8.68	3.54	0.41

Con't

Station	Time	Temp°C	D. O. Sat.	D. O. Obs.	Sat.
WC0016	1205	24	8.53	4.40	0.52
	1405	24	8.53	4.15	0.49
	1605	25	8.38	4.08	0.49
	1755	24.5	8.45	4.45	0.48
	1900	24.5	8.45	4.38	0.52
	1955	24.5	8.45	4.41	0.52
WC0019 9/9/71	0605	23	8.68	3.50	0.40
	0755	23	8.68	3.48	0.40
	0955	24	8.53	3.81	0.45
	1155	25	8.38	4.31	0.51
	1350	25	8.38	4.03	0.48
	1550	25.5	8.30	3.69	0.44
	1800	25	8.38	3.65	0.44
	1850	25	8.38	3.69	0.44
	2000	25	8.38	3.70	0.44
WC0022 9/15/71	0620	23.5	8.60	3.45	0.40
	0830	23.5	8.60	3.63	0.42
	1030	24	8.53	3.36	0.39
	1220	24.5	8.45	3.33	0.39
	1400	25	8.38	3.14	0.57
	1600	25.5	8.30	3.37	0.41
	1800	25.5	8.30	3.02	0.36
	2000	25	8.38	3.44	0.41
WC0024 9/15/71	0635	25	8.38	3.24	0.39
	0805	25	8.38	3.28	0.39
	1005	25.5	8.30	3.44	0.41
	1205	26	8.22	3.37	0.41
	1435	27	8.07	3.64	0.45
	1630	27	8.07	3.35	0.42
	1830	27.5	7.99	3.75	0.47
	2030	27	8.07	4.57	0.57
WC0028	0620	14.5	10.26	9.24	0.90
	0800	14.5	10.26	9.19	0.90
	1016	13.0	10.60	9.45	0.89
	1205	14.5	10.26	9.82	0.96
	1400	15	10.15	10.09	0.99
	1600	16	9.95	10.01	1.01
	1800	16	9.95	9.76	0.98
	2000	16	9.95	9.40	0.94
SC0000 9/21/71	0625	20	9.17	7.49	0.82
	0810	19.5	9.26	6.94	0.75
	1000	19.5	9.26	7.12	0.77

(Con't)

Station	Time	Temp °C	D.O. Sat.	D.O. Obs.	Sat.
SC0000	1200	19.5	9.26	7.05	0.76
	1400	20	9.17	7.46	0.81
	1600	20.5	9.08	7.22	0.80
	1805	20	9.17	7.48	0.82
	2000	20	9.17	7.92	0.86
SC0007 9/21/71	0645	18.5	9.44	7.46	0.79
	0825	18.5	9.44	7.66	0.81
	1013	18	9.54	7.65	0.80
	1210	19	9.35	7.75	0.83
	1405	20	9.17	8.31	0.91
	1610	20.5	9.08	6.90	0.76
	1800	20	9.17	7.93	0.86
	2000	19.5	9.26	8.01	0.86
SC0014 9/21/71	0635	18.5	9.44	7.46	0.79
	0802	18	9.54	8.35	0.88
	1000	18	9.54	7.81	0.82
	1157	19	9.35	8.18	0.87
	1345	19.5	9.26	8.31	0.90
	1605	20.5	9.08	8.14	0.90
	1745	20.5	9.08	8.08	0.89
	1945	19	9.35	7.83	0.84
SC0016 9/21/71	0625	18	9.54	8.86	0.93
	0745	18	9.54	8.07	0.85
	0920	17.5	9.64	8.81	0.91
	0945	18	9.54	8.97	0.94
	1145	18.5	9.44	--	--
	1330	20	9.17	8.80	0.96
	1545	21	8.99	9.54	1.06
	1735	19.5	9.26	8.38	0.90
	1935	18.5	9.44	8.30	0.88
EC0000 9/21/71	0635	21.5	8.91	7.87	0.88
	0755	22	8.83	7.50	0.85
	0950	22	8.83	7.93	0.90
	1150	22	8.83	8.14	0.92
	1350	22	8.83	7.77	0.88
	1550	22	8.83	7.69	0.87
	1755	22	8.83	7.73	0.88
	1950	21	8.99	7.52	0.84

(Con't)

Station	Time	Temp °C	D.O. Sat.	D.O. Obs.	Sat.
MIL000	0605	19	9.35	8.20	0.88
	0815	18	9.54	8.27	0.87
9/15/71	0955	18.5	9.44	8.58	0.91
	1155	20	9.17	9.52	1.04
	1350	21.5	8.91	9.62	1.08
	1550	23.5	8.60	9.66	1.12
	1755	24	8.53	9.67	1.13
	1950	23	8.68	9.16	1.06
OIL000	0641	20.5	9.08	5.03	0.55
9/9/71	0812	20.5	9.08	5.94	0.65
	1012	22	8.83	8.65	0.98
	1219	24.5	8.45	11.85	1.40
	1415	27	8.07	12.74	1.58
	1615	27.5	7.99	11.86	1.48
	1815	26.5	8.14	8.92	1.10
	2000	25.5	8.30	5.94	0.72

D.O. - Dissolved Oxygen

Sat. - Saturation

Obs. - Observed

CODORUS CREEK STUDY 1971

BACTERIOLOGICAL ANALYSIS

Station	Date	Total Coliform Per 100 ml	Fecal Coliform Per 100 ml	Fecal Streptoccocus Per 100 ml	FC/FS
COR001	10/29/71	11000	345	1300	0.27
COR005	10/29/71	25000	455	14000	0.03
COR005 STP	9/20/71	11000	150	<10	> 15
COR007	9/20/71	80000	900	1000	0.90
COR009 STP	9/20/71	6300	260	360	0.72
COR011	10/29/71	59000	1100	7000	0.16
COR014	9/20/71	30000	700	1500	0.47
WC0016	9/20/71	13000	700	2600	0.27
WC0019	9/20/71	17000	600	2200	0.27
WC0022	9/20/71	TNTC	280	920	0.30
WC0024	10/29/71	310000	770	660	1.17
WC0025 IWP	10/29/71	1700000	L.A.	110	X
WC0026 STP	9/20/71	700	< 10	< 10	X
WC0027	10/29/71	43000	510	1000	0.51
WC0028	9/20/71	29000	560	750	0.75
SC0000	9/20/71	19000	540	750	0.72
SC0007	9/20/71	18000	700	330	2.12
SC0014	9/20/71	21000	1040	550	1.89
SC0015 STP	10/29/71	1100	0	40	X
SC0016	9/20/71	14000	480	780	0.62
EC0000	9/20/71	2000	50	1700	0.03
MIL000	9/20/71	5800	200	580	0.34
MIL008	9/20/71	15000	100	380	0.26
MIL009 STP	9/20/71	1900	20	30	0.66

(Con't)

Station	Date	Total Coliform Per 100 ml	Fecal Coliform Per100 ml	Fecal Streptoccocus Per 100 ml	FC/FS
OIL000	9/20/71	18000	2300	650	3.54
OIL005	9/20/71	1500	600	230	2.61
OIL006 STP	9/20/71	$<$ 10	$<$ 10	10	$<$ 1

STP - Municipal Wastewater Treatment Plant

IWP - Industrial Wastewater Treatment Plant

TNTC - Too numerous to count

L.A. - Laboratory Accident

BOTTOM ORGANISM DATA

Station Location	Station Code	River Mile	Bottom Organisms Number Of Kinds	Bottom Organisms Number Per Square Foot
Codorus Creek	COR-001	50.1 - 1	13	436
Codorus Creek	COR-006	50.1 - 6	4	1,196
Codorus Creek	COR-014	50.1 - 14	7	35
West Branch Codorus Creek	WCO-016	50.1 - 15	1	1
West Branch Codorus Creek	WCO-019	50.1 - 18	4	2,844
West Branch Codorus Creek	WCO-025	50.1 - 24	5	646
West Branch Codorus Creek	WCO-028	50.1 - 27	18	275
Susquehanna River at Wrightsville (W.B.)	SUQ-043	43	10	245

Station	Biological Data Invertebrates Present in Qualitative Sample	Number of Each Organism in Quantitative Sample	Per Cent of Quantitative Sample
COR-001	Oligochaeta		
	Tubificidae		
	Tubifex sp.	73	16.74
	Hirudinea		
	Erpobdella sp.	73	16.74
	Glossiphonia sp.	1	0.23
	Odonata		
	Anisoptera		
	Boyeria sp.	1	0.23
	Libellula sp.	1	0.23
	Zygoptera		
	Ischnura sp.	1	0.23
	Neuroptera		
	Sialis sp.	1	0.23
	Coleoptera		
	Ilybius sp.	1	0.23
	Peltodytes sp.	1	0.23
	Diptera		
	Tendipedidae		
	Polypedilum sp.	1	0.23
	Simuliidae		
	Simulium sp.	1	0.23
	Mollusca		
	Gastropoda		
	Pulmonata		
	Gyraulus sp.	11	2.53
	Physa sp.	270	61.92

	Total Number of Organisms	436	
COR-006	Oligocheata		
	Tubificidae		
	Tubifex sp.	1191	99.59
	Coleoptera		
	Gyrinus sp.	1	0.08
	Trichoptera		
	Hydropsyche sp.	3	0.25
	Diptera		
	Tendipedidae		
	Tendipes sp.	1	0.08
		-----	-------
	Total Number of Organisms	1196	

Station	Invertebrates Present in Qualitative Sample	Number of Each Organism in Qualitative Sample	Per Cent of Qualitative Sample
COR-014	Oligochaeta		
	Tubificidae		
	Tubifex sp.	5	14.29
	Odonata		
	Anisoptera		
	Macromia sp.	1	2.86
	Trichoptera		
	Hydropsyche sp.	15	42.91
	Neophylax sp.	1	2.86
	Dipera		
	Diamesinae	3	8.57
	Tendipedidae		
	Crytochironomus sp.	1	2.86
	Mollusca		
	Castropoda		
	Pulmonata		
	Physa sp.	9	25.71
	Total Number of Organisms	35	
WCO-016	Mollusca		
	Gastropoda		
	Pulmonata		
	Physa sp.	1	100.00
	Total Number of Organisms	1	
WCO-019	Oligochaeta		
	Tubificidae		
	Tubifex sp.	1945	68.39
	Coleoptera		
	Hyroporus sp.	1	0.03
	Diptera		
	Tendipedodae		
	Metriocnemus sp.	3	0.11
	Mollusca		
	Gastropoda		
	Pulmonata		
	Physa sp.	895	31.47
	Total Number of Organisms	2844	
WCO-025	Oligochaeta		
	Tubificidae		
	Tubifex sp.	73	11.30
	Trichoptera		
	Hydropsyche sp.	1	0.15
	Diptera		
	Tendipedidae		
	Polypedilum sp.	62	9.60

Station	Invertebrates Present in Qualitative Sample	Number of Each Organism in Qualitative Sample	Per Cent of Qualitative Sample
	Mollusca		
	Gastropoda		
	Pulmonata		
	Gyraulus sp.	125	19.38
	Physa sp.	385	59.57

	Total Number of Organisms	646	
WCO-028	Oligochaeta		
	Tubificidae		
	Limnodrilus sp.	1	0.36
	Tubifex sp.	7	2.55
	Malacostraca		
	Isopoda		
	Asellus sp.	1	0.36
	Decapoda		
	Cambarus sp.	1	0.36
	Ephemeroptera		
	Hexagenia sp.	1	0.36
	Isonychia sp.	4	1.45
	Stenonema sp.	21	7.65
	Odonata		
	Anisoptera		
	Boyeria sp.	1	0.36
	Neuroptera		
	Sialis sp.	1	0.36
	Coleoptera		
	Stenelmis sp.	1	0.36
	Trichoptera		
	Hydropsyche sp.	224	81.46
	Neophylax sp.	1	0.36
	Diptera		
	Diamesinae	1	0.36
	Tendipedidae		
	Polypedilum sp.	1	0.36
	Tabanidae		
	Tabanus sp.	1	0.36
	Mollusca		
	Gastropoda		
	Pulmonata		
	Ferrissia sp.	6	2.18
	Gyraulis sp.	1	0.36
	Physa sp.	1	0.36

	Total Number of Organisms	275	

Station	Invertebrates Present in Qualitative Sample	Number of Each Organism in Qualitative Sample	Per Cent of Qualitative Sample
SCO-000	Turbellaria		
	Tricladia		
	Dugesia sp.	32	14.35
	Oligochaeta		
	Naididae		
	Nais sp.	1	0.45
	Hirudinea		
	Erpobdella sp.	1	0.45
	Ephemeroptera		
	Heptagenia sp.	1	0.45
	Isonychia sp.	16	7.18
	Stenonema sp.	8	3.58
	Coleoptera		
	Psephenus sp.	1	0.45
	Stenelmis sp.	1	0.45
	Trichoptera		
	Hydropsyche sp.	120	53.81
	Neophylax sp.	1	0.45
	Diptera		
	Diamesinae	32	14.35
	Mollusca		
	Gastropoda		
	Prosobranchia		
	Lioplax sp.	8	3.58
	Pulmonata		
	Ferrissia sp.	1	0.45

Total Number of Organisms		223	