AN EVALUATION OF THE EFFECTS OF ACID RAIN ON LOW CONDUCTIVITY HEADWATER STREAMS IN PENNSYLVANIA

by John R. Ritter and Ann E. Brown

U.S. GEOLOGICAL SURVEY

Open-File Report 81-1025

September 1981

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ILLUSTRATIONS

ILLUSTRATIONS--Continued

TABLES

FACTORS FOR CONVERTING INCH-POUND UNITS TO INTERNATIONAL SYSTEM UNITS (SI)

Multiply inch-pound units	By	To obtain (SI) units
cubic foot per second (ft^3/s)	0.0283	cubic meter per second (m^3/s)
square mile (mi^2)	1.609	square kilometer (km^2)
degree Fahrenheit (°F)	°C=(F-32)/1.8	degree Celsius (°C)

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ABSTRACT

Analyses of water collected at 32 sites on headwater streams in Pennsylvania during low-flow conditions in 1979-80 were compared to pre-1971 data to evaluate whether acid rain had changed the chemistry of the streams in the previous decade. Most pH, alkalinity, and sulfate values of the samples collected in 1979-80 fell within the ranges of values for samples collected before 1971. The limited data indicate, however, that pH may have increased and alkalinity and sulfate may have decreased with time.

INTRODUCTION

The words "acid rain" have become familiar to the American public in recent years, but relatively few data have been collected to evaluate the effects of acid rain on streams as compared to lakes. Acid rain has been defined as rain having a pH less than 5.6, but in a broader sense, the term "acid rain" has also been used to describe atmospheric deposition containing pollutants. Atmospheric deposition occurs not only as rain but also as snow, dew, frost, fog, and dry material (U.S. Environmental Protection Agency, 1980). In the eastern United States, the pH of rain is generally less than 4.5 (U.S. Environmental Protection Agency, 1979). The areal extent of this low-pH precipitation has doubled from 1955 to 1973 (fig. 1).

The low pH is attributed largely to oxides of sulfur and nitrogen in the air. Once in the atmosphere these compounds can be changed by oxidation into sulfuric and nitric acid (U.S. Environmental Protection Agency, 1979). In the eastern United States, sulfur oxides are responsible for about two-thirds of the acid, and nitric oxides, the other third (Great Lakes Focus on Water Quality, 1979). The area of lowest pH rain coincides with, and lies downwind of, an area of high sulfur dioxide emissions from industries burning fossil fuels such as coal and oil. Nitric oxide is contributed by industry and also by automobiles. In recent years, nitric acid has been the major source of increased acid deposition (Galloway and Likens, 1977).

A map of the pH normally measured in precipitation (fig. 1) shows that the lowest pH rain is centered around Pennsylvania and New York. The highest concentrations of sulfate and nitrate are also in the northeastern United States (figs. 2 and 3).

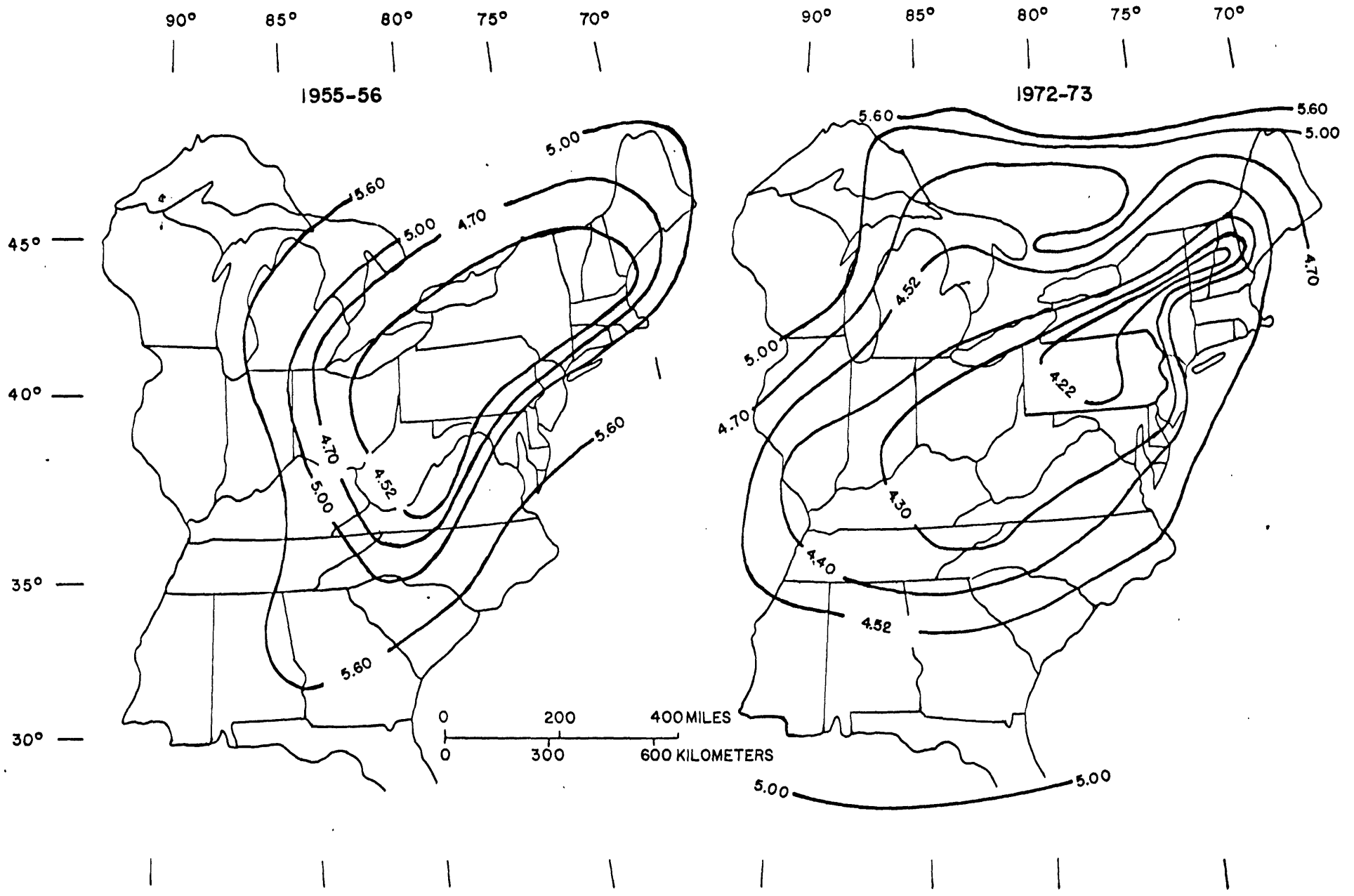


Figure 1.--pH of precipitation in the eastern United States, 1955-56 and 1972-73 (from Likens 1976).

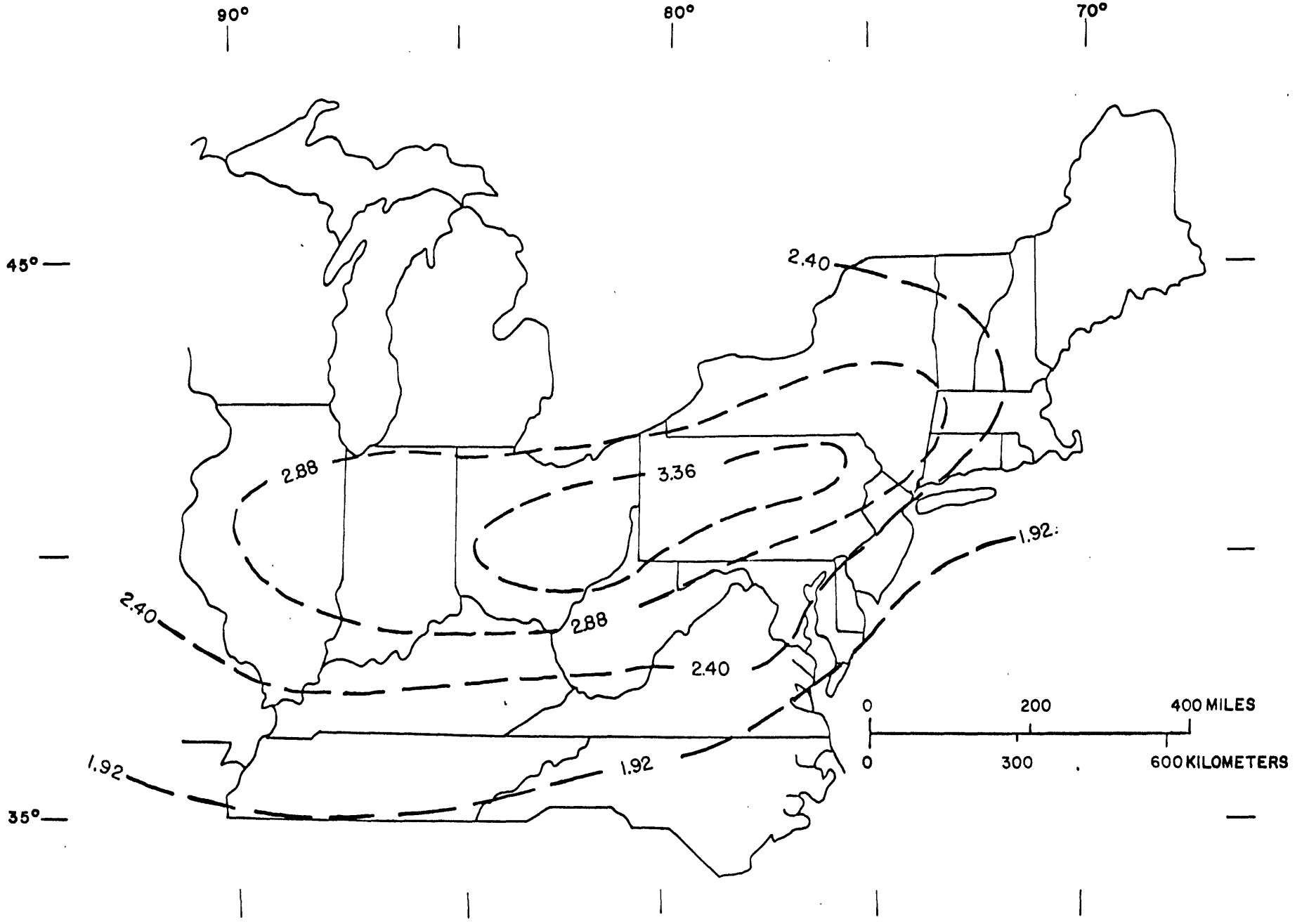


Figure 2.--Average sulfate concentration of precipitation, in milligrams per liter, in the northeastern United States, August 1978-June 1979 (modified from Pack, 1980).

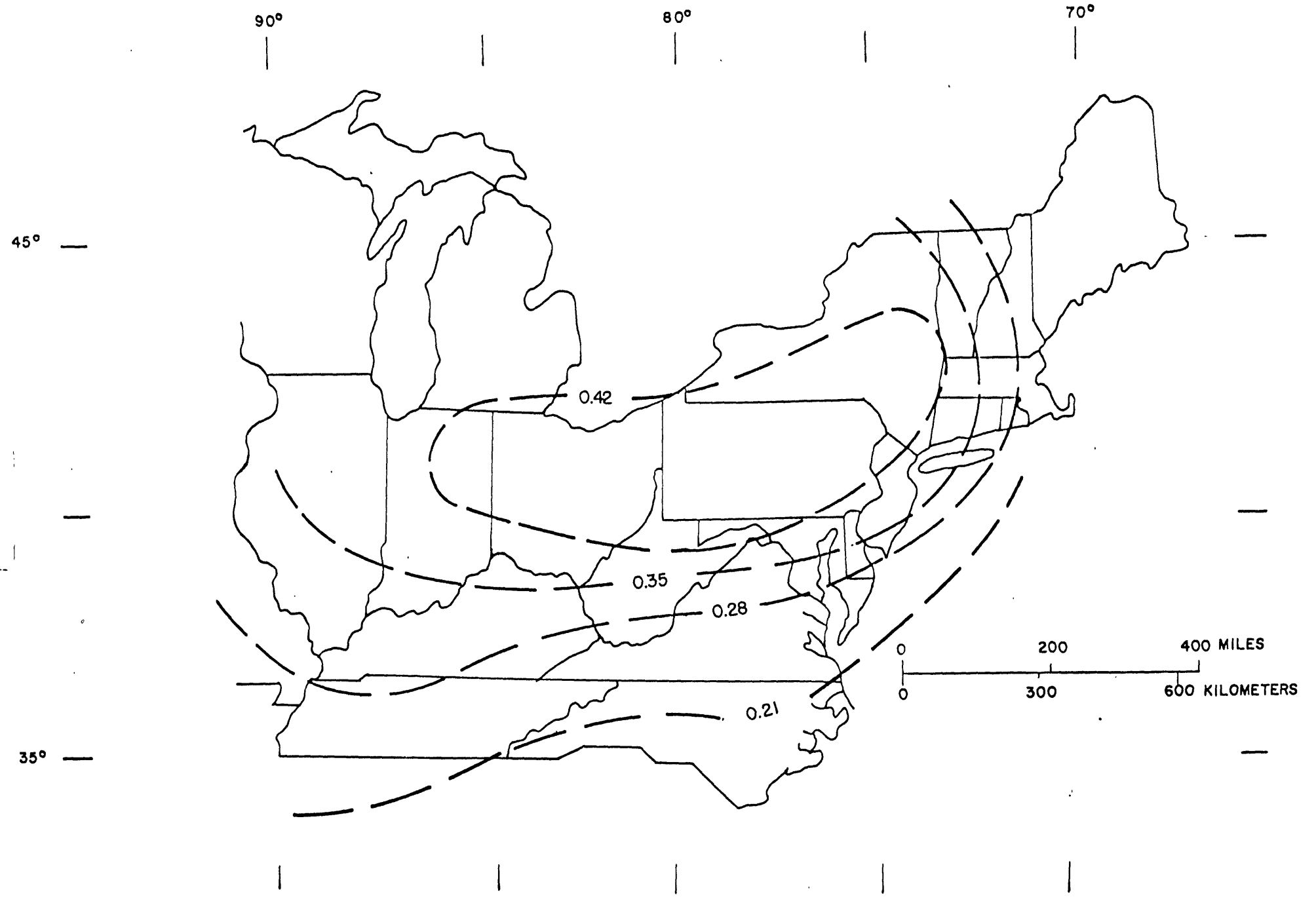


Figure 3.--Average nitrate (as nitrogen) concentration of annual precipitation in the northeastern United States, August 1978-June 1979 (modified from Pack, 1980).

PURPOSE

Because Pennsylvania is receiving some of the most acidic rainfall in the United States (fig. 1), its surface and ground waters may be adversely affected. The purpose of this study was to compare the chemistry of streams in Pennsylvania during low flow in 1979-80 with their chemistry before 1971. If acid rain is affecting the streams, the pH and alkalinity would be expected to decrease and the specific conductance and concentration of sulfate to increase.

METHODS

The sites selected for chemical sampling in 1980 (fig. 4) were mostly small headwater streams where the U.S. Geological Survey had previously collected at least five samples before 1971. The selection was limited to sites where most specific-conductance measurements had been less than 100 micromhos. The low specific conductance indicates that the water does not have high concentrations of dissolved solids and, therefore, probably little buffering capacity. Because of the buffering capacity of calcium carbonate, sites underlain by limestone were eliminated. Initially, only sites having drainage areas of less than 50 mi^2 and minimal human activities were considered; 28 suitable sites were found. This criterion was later expanded to 600 mi^2 to increase the number of sites. The final number of sites used was 32. Samples were taken at low flows because it is easier to compare discharge and stream chemistry between the present and the past under such conditions rather than at high flows when chemical characteristics are changing rapidly. However, although alkalinity can be expected to be stable at low flows, pH can fluctuate considerably due to algal photosynthesis.

Most sites had not been sampled for several years, but two, Mix Run near Driftwood and Laurel Hill Creek at Ursina (01542780 and 0308000), are presently part of the Geological Survey coal-hydrology network and one, Young Womans Creek near Renovo (01545600) is a Hydrologic Benchmark Station. These three stations were not sampled specially for this study; the data presented in this report for those three stations are the results of routine samplings for the coal-hydrology program in 1979-80 and at the Benchmark Station in 1980.

From June to August 1980, two samples were collected at the other 23 sites in the Susquehanna and Delaware River basins. The collections were made about 6 weeks apart, and as noted above, at times of low flow so that the flow conditions would be as similar as possible to the conditions of previous samplings. Only one sample was collected at each of the six sites in the Ohio River basin because the streamflow in July and August was too high to be considered really representative of low-flow conditions. Specific conductance, pH, alkalinity, acidity, and streamflow were measured in the field. Samples were collected for laboratory analyses which included sulfate, nitrogen and phosphorus species, chloride, sodium, potassium, and other common ions.

The field measurements and laboratory analyses were compared with historical data to identify apparent differences between pre-1971 and 1979-80 data. For this report, comparisons were limited to pH, alkalinity, sulfate, and specific conductance because these constituents are ones for which the most data are available and which are believed to be susceptible to changes due to acid rain.

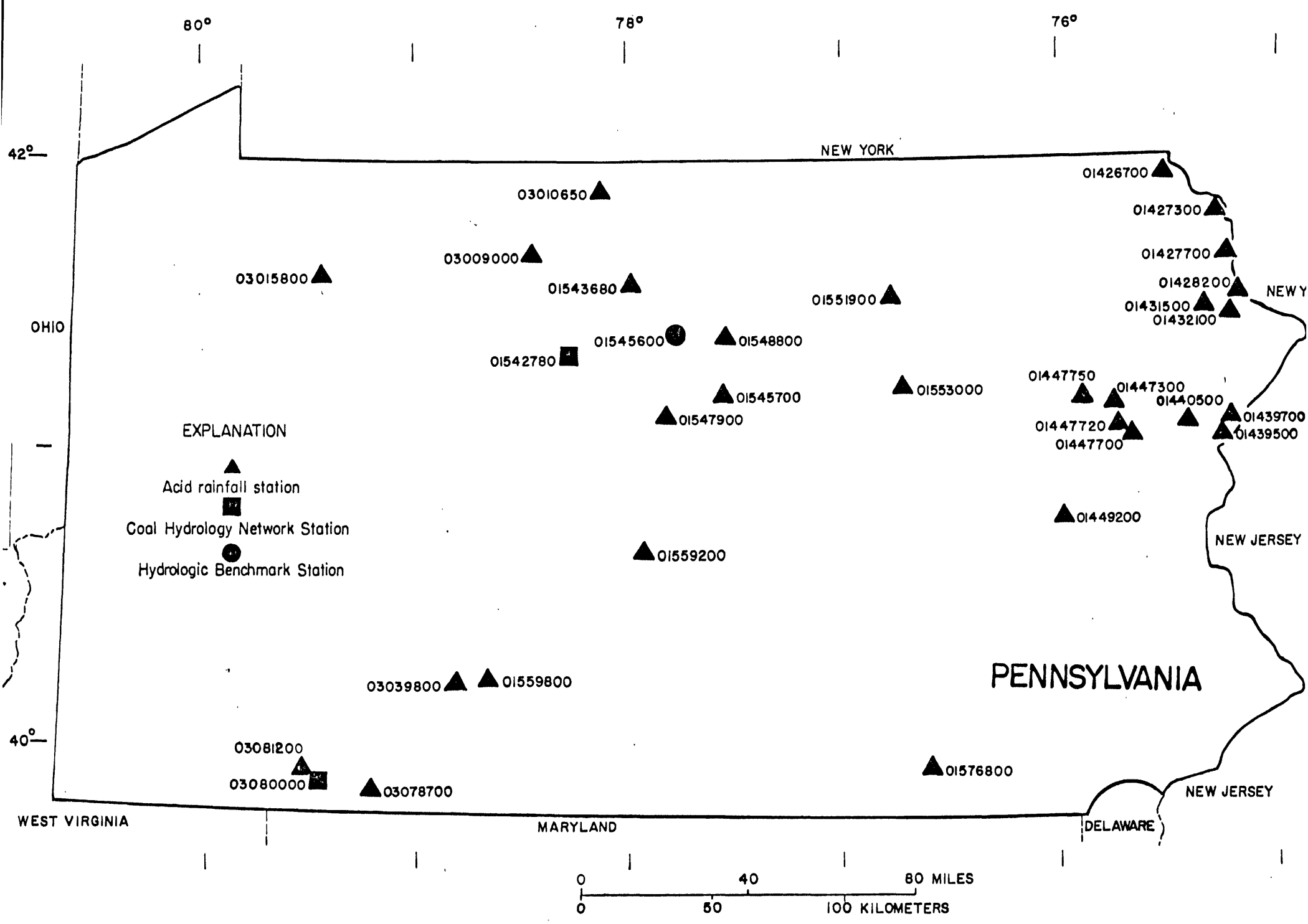


Figure 4.--Sampling sites; numbers refer to stations listed in table 1.

RESULTS AND DISCUSSION

Table 1 shows the ranges of pH, specific conductance, alkalinity, and sulfate of the samples collected before 1971 and during 1979-80. Figures 5A, B, and C illustrations of the data in table 1, show that the pH, specific conductance, alkalinity, and sulfate of most samples collected in 1979 and 1980 fall within the previous ranges. The pH in 1980 was generally in the upper range of the values reported before 1971. The alkalinities and sulfate concentrations in 1980, however, were mostly at the lower end of the pre-1971 ranges. The specific conductances showed no consistent trends. In the Delaware River basin, most conductances in 1980 were higher than the pre-1971 conductances; some of those high values were measured at flows lower than those when previous samples were taken. Because specific conductance is often inversely related to flow, these higher values might be expected. In the Susquehanna and Ohio River basin, the 1980 specific conductances tended to be lower than those measured before 1971.

Comparisons of ranges, although indicative of whether the 1980 values were similar or different from past values, cannot be used for more than a rough estimation of changes. The chemistry of streams is commonly related to flow and often to season and time of day. For example, pH can vary by 0.5 unit or more during a day due to algal photosynthesis. Specific conductance is a surrogate measure of the overall chemistry. Therefore, comparing values of pH, alkalinity, and sulfate concentration at dissimilar flows, seasons, times of day, and conductances can lead to erroneous conclusions.

Most pre-1971 samples were collected in the late spring or early fall; the 1980 samples, in the summer. Therefore, it must be recognized that comparisons of pre-1971 and 1980 data in this report may be affected by dissimilarities in the season of collection.

To consider the possible effects of flows, the specific conductance, pH, alkalinity, and sulfate concentration of samples collected before 1971 at flows within 25 percent of the 1979-80 flows were plotted against the 1979-80 values (fig. 6). In figure 6 more than one pre-1971 value may be plotted against one 1979-80 value. The points should fall equally along each side of the equal line if there was little or no change between the sampling periods. A large majority of the points, plotting above the equal line, suggests a decrease in the values between samplings at approximately equal flows; a large majority below the equal line suggests an increase. This graphical method is exploratory in nature. No computation is made of the probability of such results occurring by chance alone.

In the graph (fig. 6A) showing the comparison of specific conductances, all points for the Delaware River basin plotted on or below the equal line, a definite indication that specific conductance at the particular flows measured increased between 1970 and 1980. On the other hand, about twice as many points for the Susquehanna and Ohio River basins plotted above the equal line as plotted below it, an indication that specific conductance may have decreased in those basins.

Table 1.—Ranges of values of stream characteristics measured at 32 sites
Conductivity, pH, and alkalinity were measured in the field

Year	Number of samples	Ranges: Discharge (ft^3/s)	Conductivity (micromhos)	pH	Alkalinity (mg/L as $CaCO_3$)	Sulfate (mg/L)
		DELAWARE RIVER BASIN				
	01426700	Balls Creek near Winterdale - 15.5 mi^2				
1965-69	6	2.75-28.5	56-76	6.4-7.5	11-25	7-13
1980	2	0.32-3.23	80-89	7.1-7.2	22	8.5-8.8
	01427300	Little Equinunk Creek at Stalker - 24.6 mi^2				
1965-69	7	1.54-38.3	58-67	6.1-7.2	13-19	11-13
1980	2	1.99-2.07	74-80	7.3-7.4	18-19	8.3-8.7
	01427700	Calkins Creek at Milanville - 44.0 mi^2				
1964-69	10	0.29-86.5	76-123	6.5-7.6	16-48	9.6-18
1980	2	1.19-2.14	88-94	7.3-7.5	19-32	11
	01428200	Masthope Creek at Masthope - 32.2 mi^2				
1964-69	8	0.07-52.6	53-71	6.2-7.6	10-19	5.3-13
1980	2	2.81-3.56	65-69	6.9-7.2	12-15	6.8-7.9
	01431500	Lackawaxen River at Hawley - 290 mi^2				
1959-69	36	32-2600	57-146	6.0-7.7	—	9.7-17
1980	2	68-104	118	8.9	24-30	9.5-11
	01432100	Blooming Grove Creek near Rowland - 29.3 mi^2				
1964-69	9	0.65-58.6	42-57	6.2-6.9	6-13	7-14
1980	2	4.81-9.25	62-65	6.6-7.1	6-8	8.2-8.6
	01439500	Bush Kill at Shoemakers - 117 mi^2				
1957-69	9	2.9-375	35-760	5.8-8.1	13-300	4-136
1980	2	33.6-45.6	39-50	7.2-7.5	8-9	7.0-7.4
	01439700	Little Bush Kill at Bushkill - 33.0 mi^2				
1964-68	8	0.76-64.2	41-58	6.1-7.2	5-16	7.2-12
1980	2	7.02-8.02	52-56	6.8-7.1	8	6.6-6.8
	01440500	Paradise Creek at Henryville - 30.2 mi^2				
1966-69	7	13.1-87.4	55-74	6.2-6.9	10-21	8.6-11
1980	2	10.9-19.5	89-90	7.3-7.5	14	7.6-8.0
	01447300	Choke Creek near Thornhurst - 8.06 mi^2				
1966-69	6	1.25-16.6	17-30	5.4-6.5	2-7	2.9-8.0
1980	2	2.3-5.15	17-19	5.4-5.5	2-3	3.8-4.6
	01447700	Tunkhannock Creek near Fernridge - 21.9 mi^2				
1965-69	7	7.48-51.2	20-31	5.2-6.9	2-7	0.4-8.2
1980	2	13.4-16.9	23-24	6.1-6.3	3-4	2.0-2.6
	01447720	Tobyhanna Creek near Blakeslee - 118 mi^2				
1930-66	5	24-109	33-428	6.3-7.2	7-139	<2-19
1980	2	76.4-89.6	36-40	6.8-6.9	7	4.4-4.6
	01447750	Bear Creek near Whitehaven - 35.0 mi^2				
1964-69	8	1.94-71.8	39-59	5.5-6.9	2-10	4.8-12
1980	2	11.9-13	55-69	5.8	4	5.4-6.1
	01449200	Mahoning Creek at Mantzville - 6.36 mi^2				
1966-69	6	0.33-7.52	54-83	6.2-7.4	9-16	5.2-7.6
1980	2	1.11-1.89	73	7.1-7.4	8-12	4.1-6

Table 1.—Ranges of values of stream characteristics measured at 32 sites
Conductivity, pH, and alkalinity were measured in the field—Continued

Year	Number of samples	Ranges: Discharge (ft^3/s)	Conductivity (micromhos)	pH	Alkalinity (mg/L as $CaCO_3$)	Sulfate (mg/L)
		SUSQUEHANNA RIVER BASIN				
	[1]/01542780	Mix Run near Driftwood - 32.6 mi^2				
1964-69	9	0.55-77.3	44-66	6.2-7.4	6-16	7.9-12
1979-80	3	21-341	40-50	7.3-7.5	6-7	6.3-13
	01543680	East Fork Sinnemahoning Creek near Logue - 32.8 mi^2				
1964-69	9	1.37-93.7	46-75	6.5-7.4	10-25	7.5-10
1980	2	9.77-16.1	49-54	6.0-6.6	10-12	7.6-8.8
	[2]/01545600	Young Womans Creek near Renovo - 46.2 mi^2				
1965-70	55	3.2-782	33-58	5.7-7.8	4-15	4.8-12
1980	12	2.4-388	33-48	6.4-7.3	4-14	6.9-9.0
	01545700	Queens Run near Lock Haven - 18.0 mi^2				
1965-69	7	1.19-33.9	50-78	6.1-7.1	9-18	12-15
1980	2	2.16-6.46	53-64	6.6-6.8	10-16	10-11
	01547900	Big Run at Orviston - 34.2 mi^2				
1964-69	9	1.61-105	68-191	4.5-6.8	0-11	24-82
1980	2	14.2-20.9	67-95	5.2-6.1	1-3	23-35
	01548800	Trout Run at Cammel - 16.7 mi^2				
1965-69	8	0.55-49.9	29-48	6.3-7.5	5-16	5.8-8.6
1980	2	1.87-4.76	28-31	6.4-6.5	5-8	5.6-6.1
	01551900	Elk Creek near Estella - 16.0 mi^2				
1965-69	8	0.45-34.8	55-81	6.1-7.5	9-21	7.6-17
1980	2	0.472-2.19	68-81	6.7-6.9	15-17	8.9-9.3
	01553000	Little Muncy Creek at Lairdsville - 39.1 mi^2				
1965-68	9	1.08-55.9	63-97	6.3-7.4	10-25	0.6-15
1980	2	3.38-8.60	80-90	7.0-7.1	18-25	6.0-8.0
	01559200	Laurel Run at McAlevys Fort - 17.2 mi^2				
1966-69	7	1.60-21.4	49-81	6.7-7.9	11-33	2.7-12
1980	2	3.66-4.89	54-65	7.3-7.6	14-19	5.7-6.9
	01559800	Bobs Creek at Weyant - 31.3 mi^2				
1966-69	7	1.02-144	60-113	6.4-7.2	8-21	11-104
1980	2	23.7-24.5	76-80	7.4	8-10	12-13
	01576800	Otter Creek near New Bridgeville - 4.52 mi^2				
1966-69	7	0.32-5.67	67-98	6.3-7.6	11-25	2.5-6.5
1980	2	2.41-3.84	106-110	7.1-7.2	11-12	2.6-4.5

Table 1.--Ranges of values of stream characteristics measured at 32 sites
Conductivity, pH, and alkalinity were measured in the field--Continued

Year	Number of samples	Ranges: Discharge (ft^3/s)	Conductivity (micromhos)	pH	Alkalinity (mg/L as $CaCO_3$)	Sulfate (mg/L)
		OHIO RIVER BASIN				
	03009000	Potato Creek at Betula - 27.6 mi^2				
1965-69	10	1.56-93.5	58-103	6-7.2	4-24	16-25
1980	1	23.2	43	6.9	4	11
	03010650	Oswayo Creek at Coneville - 28.7 mi^2				
1965-69	9	3.55-85.1	59-187	6.4-7.9	12-76	11-14
1980	1	20.6	58	9.0	16	10
	03015800	East Hickory Creek at Endeavor - 37.2 mi^2				
1965-69	10	1.05-133	42-85	5.9-7.6	8-25	4.9-12
1980	1	28.3	43	7.1	6	9.4
	03039800	Clear Shade Creek at Ogletown - 5.17 mi^2				
1965-69	8	1.18-24.8	33-67	5.9-7.6	7-22	2.3-8.8
1980	1	11.5	35	6.8	8	5.9
	03078700	Elklick Creek at Summit Mills - 16.0 mi^2				
1966-69	7	1.42-36.7	74-168	6.2-7.7	7-30	17-52
1980	1	20.3	125	7.3	10	30
	[1]/03080000	Laurel Hill Creek at Ursina - 121 mi^2				
1965-70	6	18-278	71-215	6.5-8.1	6-31	.0-17
1979-80	3	74-594	80-100	6.3-7.0	11-13	10-15
	03081200	Drake Run near Confluence - 6.79 mi^2				
1961-68	7	0.15-22	28-156	5.1-7.1	2-21	6-13
1980	1	8.44	68	5.2	0.4	9

[1]/USGS Coal-hydrology network station
[2]/USGS Hydrologic Benchmark Station

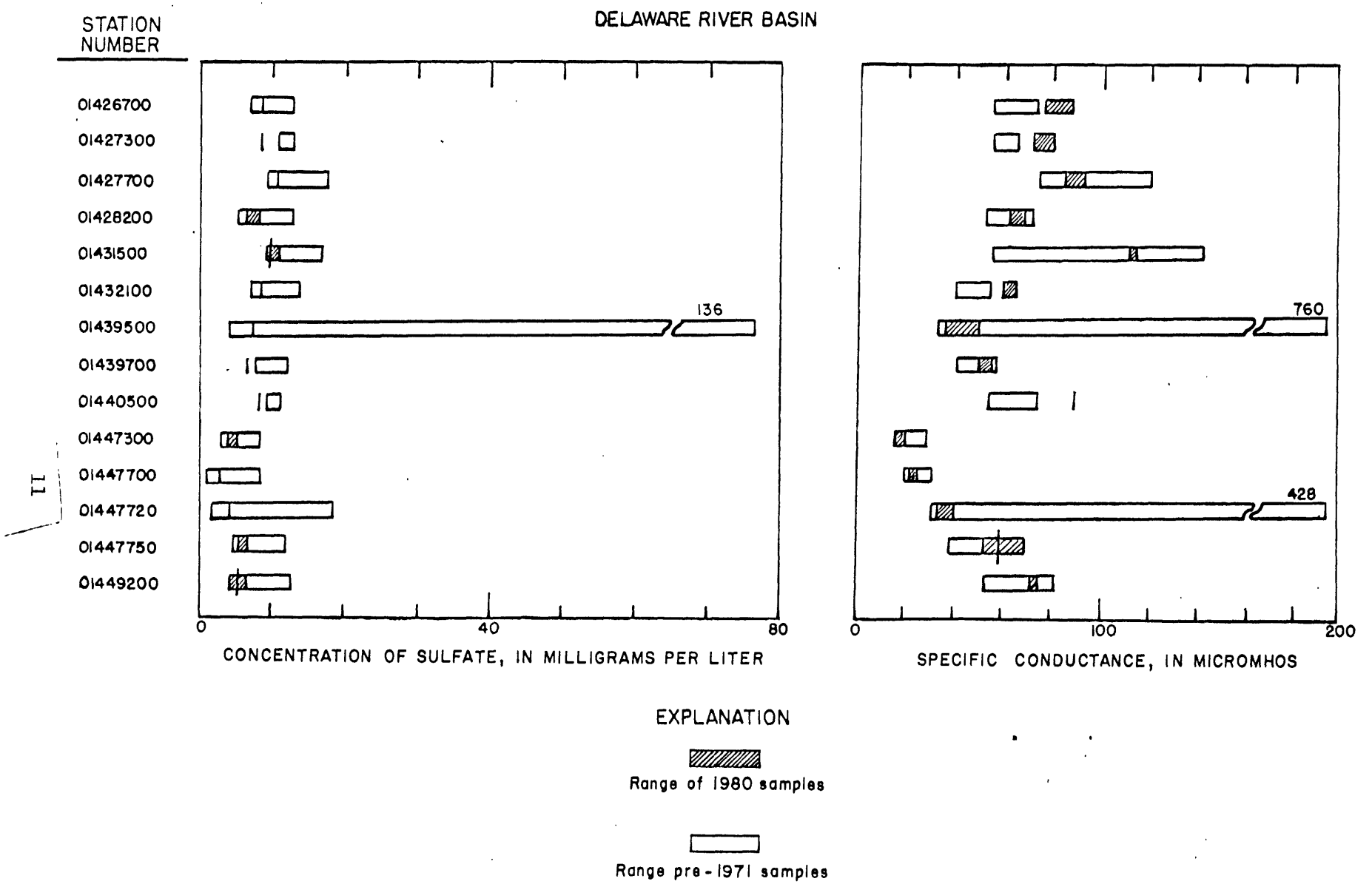


Figure 5A.--Ranges of pH, alkalinity, sulfate, and specific conductance in samples collected before 1971 and during 1979-80 in the Delaware River basin.

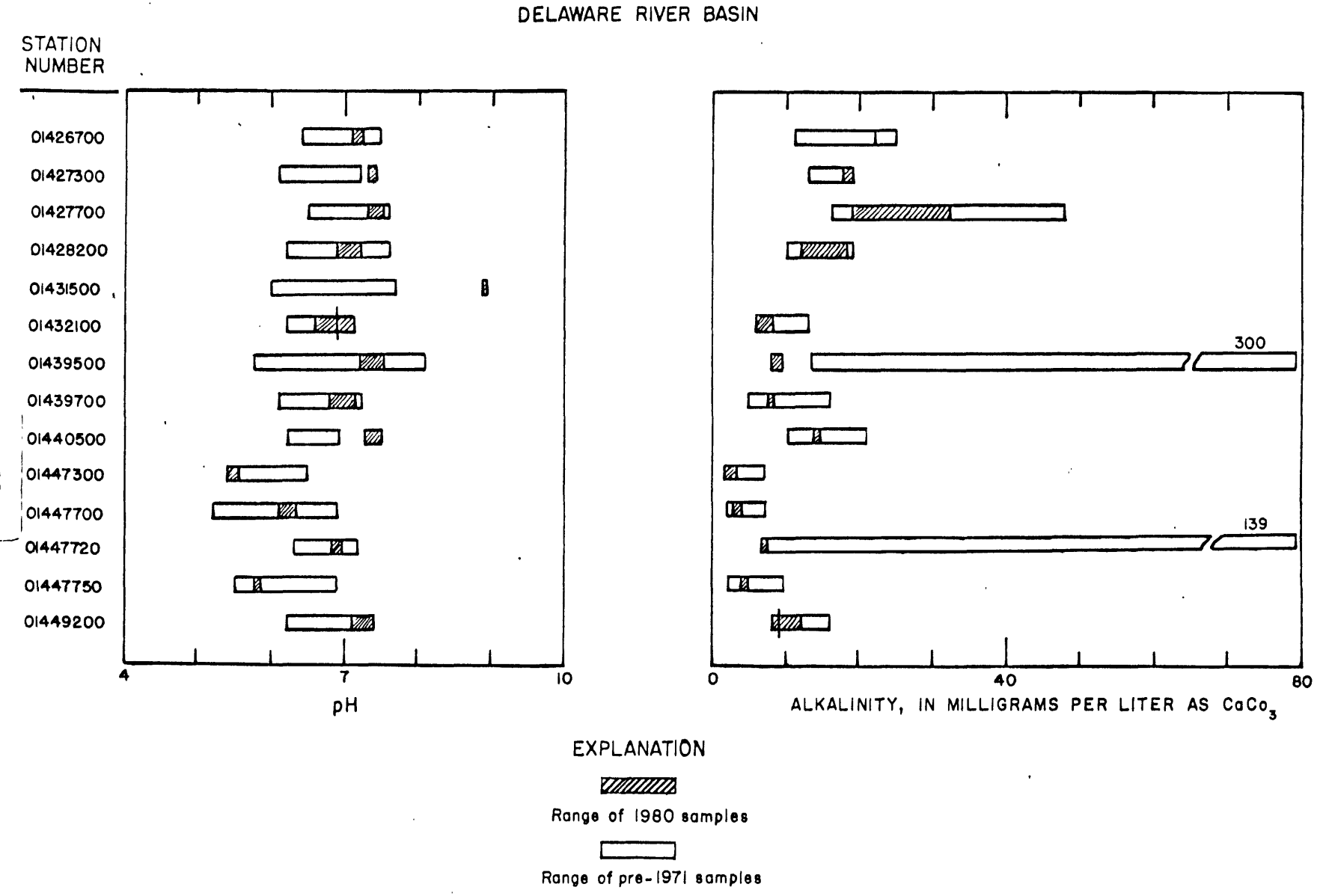
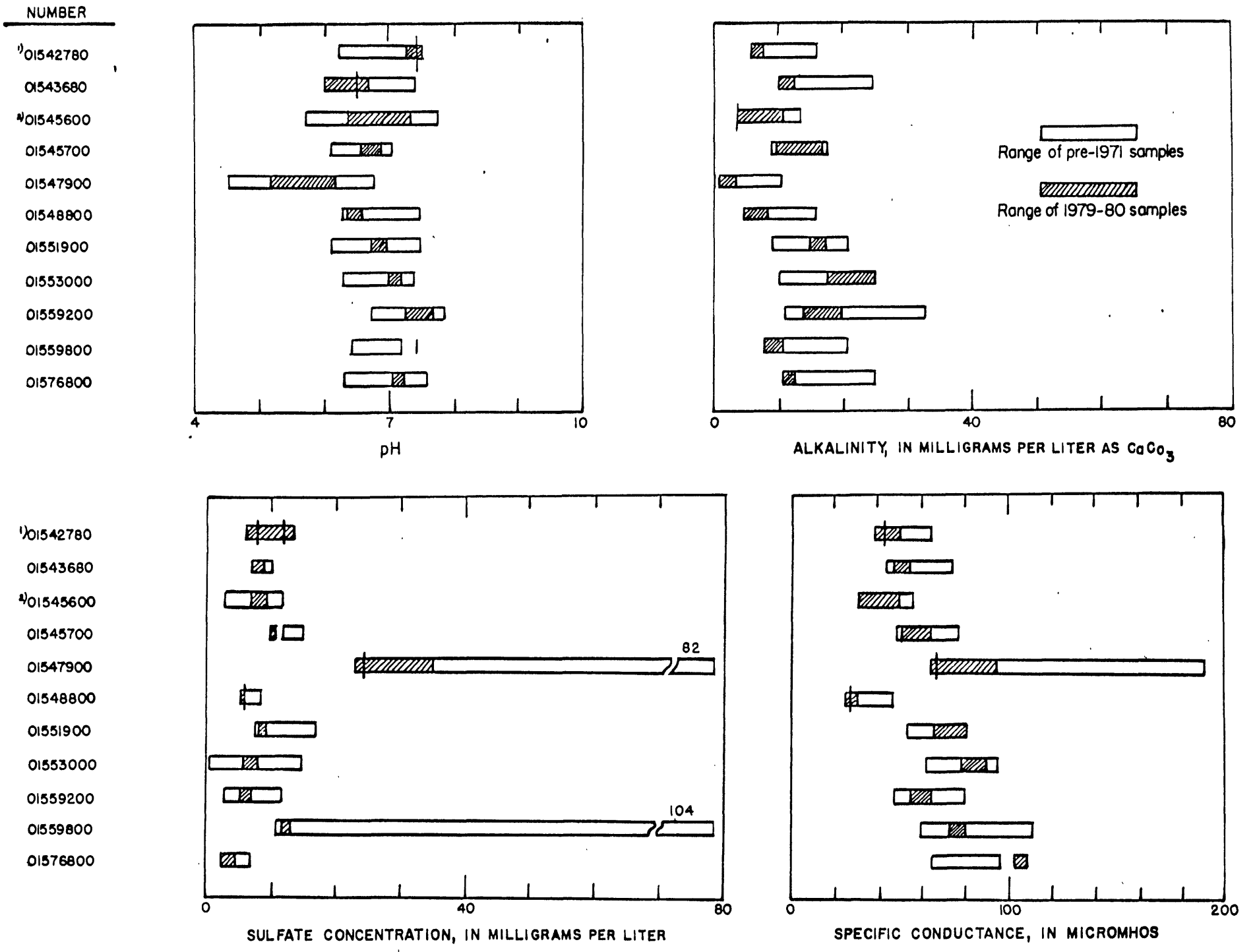


Figure 5A.--Ranges of pH, alkalinity, sulfate, and specific conductance in samples collected before 1971 and during 1979-80 in the Delaware River basin--continued.



1)USGS Coal Hydrology Network Station
2)USGS Hydrologic Benchmark Station

Figure 5B.--Ranges of pH, alkalinity, sulfate, and specific conductance in samples collected before 1971 and during 1979-80 in the Susquehanna River basin.

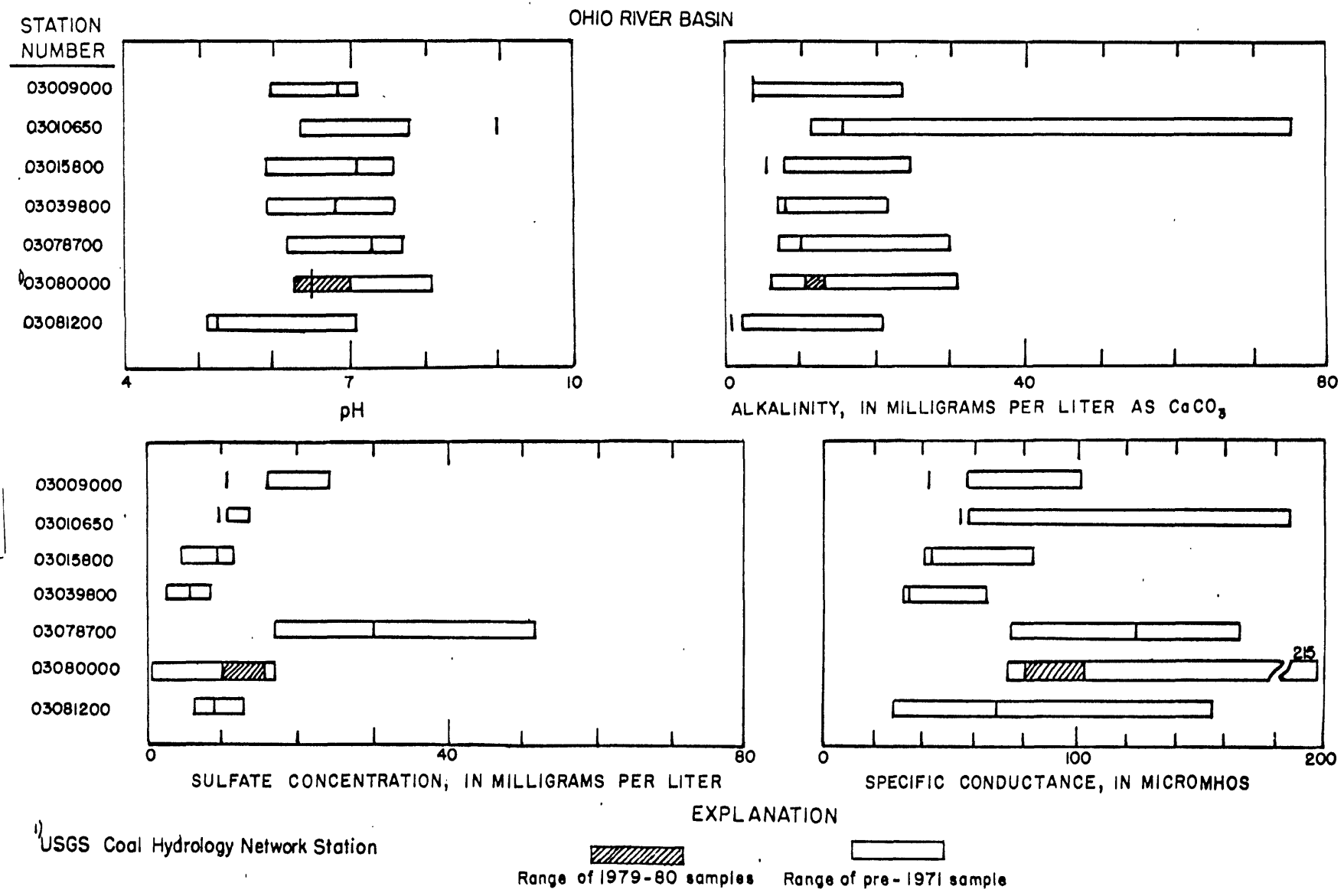


Figure 5C.--Ranges of pH, alkalinity, sulfate, and specific conductance in samples collected before 1971 and during 1979-80 in the Ohio River basin.

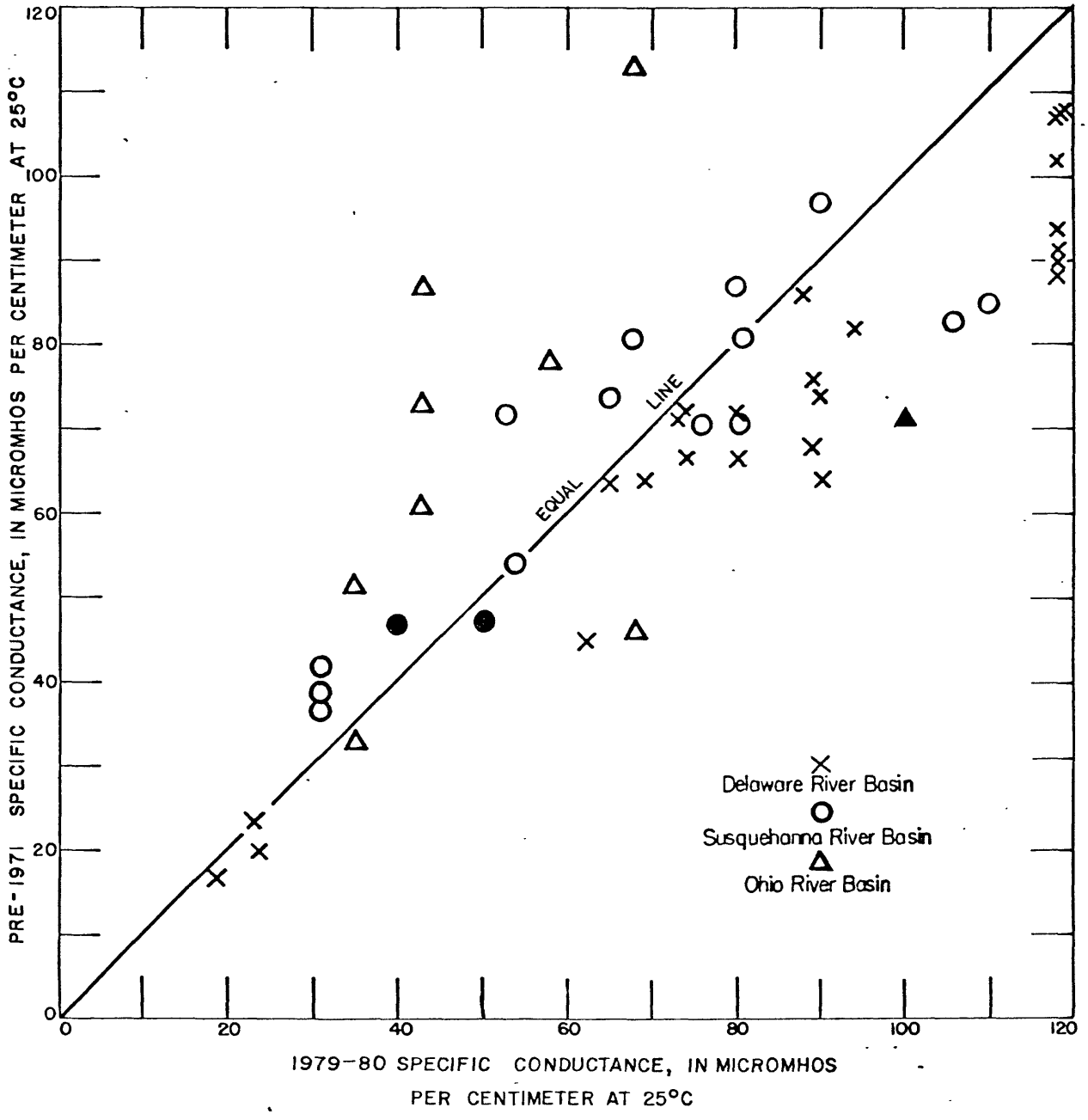


Figure 6A.--Comparisons of specific conductance of samples collected before 1971 and in 1979-80 at comparable flows. Solid symbols designate data from USGS coal hydrology network stations.

Almost 70 percent of the pH values in figure 6B plotted below the equal line; all basins were similar. Therefore, the pH of the streams appears to have increased. The six "x" symbols that plot far to the right in figure 6B represent two 1980 values for the Lackawaxen River at Hawley (01431500) plotted against three pre-1971 values each. Both 1980 samples were collected in the late afternoon when pH is expected to be highest due to algal photosynthesis if nutrient levels are high. Data show measureable ammonia and enough nitrate and orthophosphate to support algal growth. Therefore, the high pH for the 1980 samples may be due to eutrophication rather than an increase in soil or groundwater pH. This is an example of the importance that the time of day may have in comparing pH of streams.

In figures 6C (alkalinity) and 6D (sulfate) most points plotted above the equal line, suggesting that alkalinity and sulfate concentrations have decreased. It should be noted that the points for the Delaware River basin in figure 6C fell about equally above and below the equal line; this suggests that the alkalinity at comparable flows in streams in that basin may not have changed between sample periods. All points for the Susquehanna River basin fell above or on the equal line, a strong indication of a decrease in alkalinity in that basin.

In a similar analysis, the pH, alkalinity, and sulfate concentration of pre-1971 samples, having specific conductances within 10 percent of the 1979-80 conductances, were plotted against the 1979-80 values (figs. 7, A, B, C). These comparisons of numbers of points falling above or below the equal line in figure 7 again suggest that the pH was generally higher and alkalinity and sulfate concentration lower in the 1979-80 samples than in the sample collected before 1971. The points, plotting to the far right in figure 7A, may again represent the effects of algal photosynthesis on pH rather than the effects of soil or ground water. Table 2 summarizes the results of the comparisons of samples collected in 1980 and in the 1960's.

Data from Young Womans Creek near Renovo (01545600) in the Susquehanna River basin were plotted separately (fig. 8). This station is a Hydrologic Benchmark Station, selected as such because of its natural conditions upstream. In figure 8 values of samples collected in 1980 were plotted against values of samples collected in 1968-70 which had both flows and specific conductances within 25 percent of those for the 1980 samples. The results shown in figure 8 are essentially the same as those in figures 6 and 7. The 1980 pH's were higher and the alkalinities and sulfate concentrations lower than those for the samples collected in 1968-70.

Data collected in 1978 and 1979 from Young Womans Creek at Renovo were also used to check whether 1980 data could be considered typical of recent years (figs. 9 and 10). Table 3, a summary of figures 8-10, shows that different conclusions could be drawn if 1978 or 1979 data were used instead of 1980 data. Therefore, any conclusions or suggestions based on the 1980 data above should be used with caution as they probably do not define any trends that can be substantiated at this time.

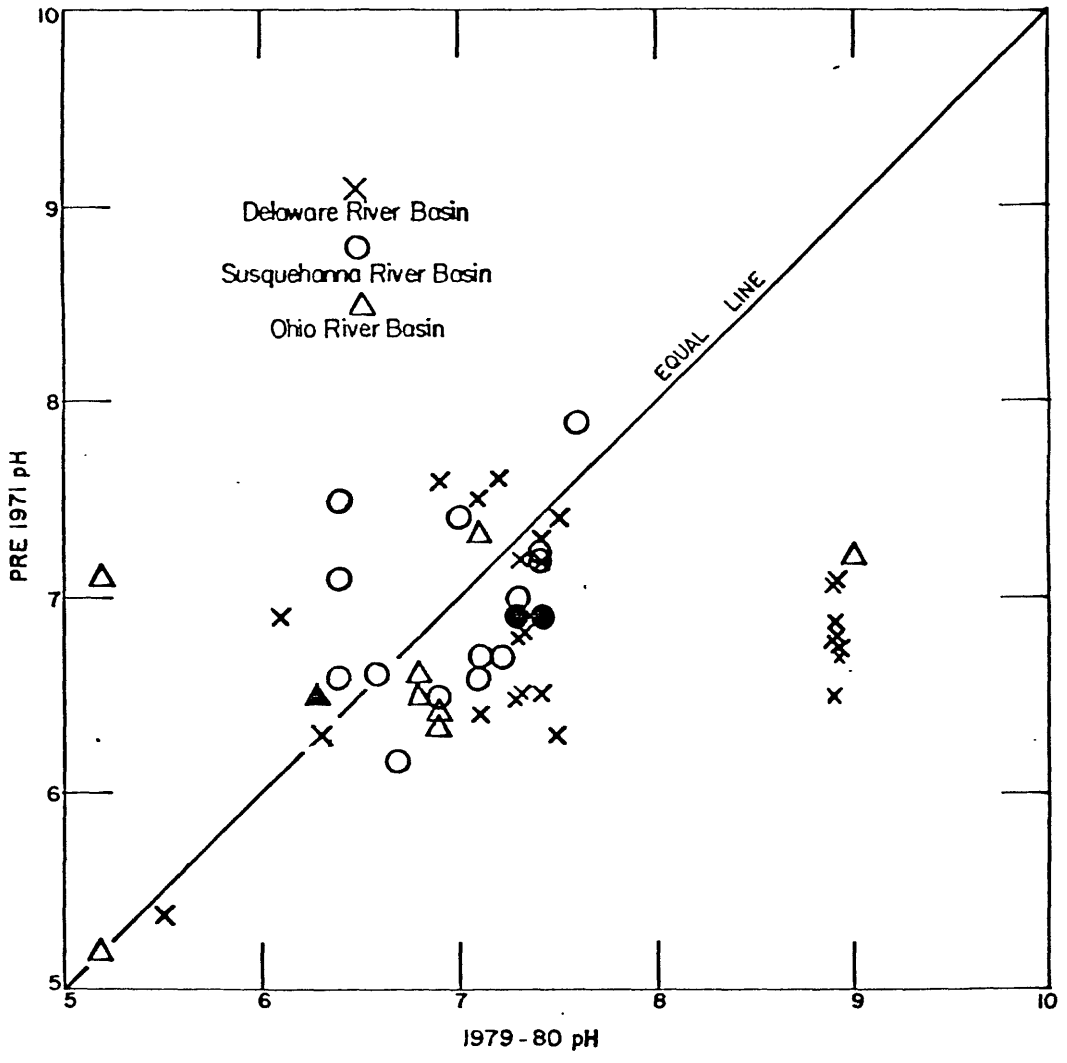


Figure 6B.--Comparisons of pH of samples collected before 1971 and in 1979-80 at comparable flows. Solid symbols designate data from USGS coal hydrology network stations.

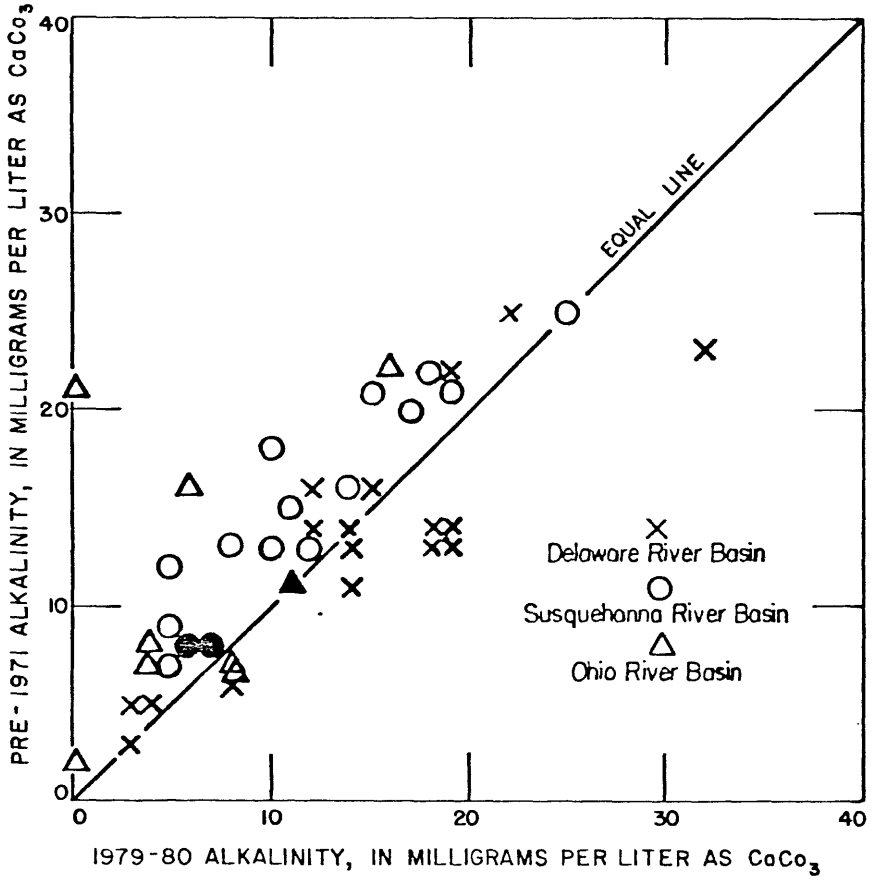


Figure 6C.--Comparisons of alkalinity of samples collected before 1971 and in 1979-80 at comparable flows. Solid symbols designate data from USGS coal hydrology network stations.

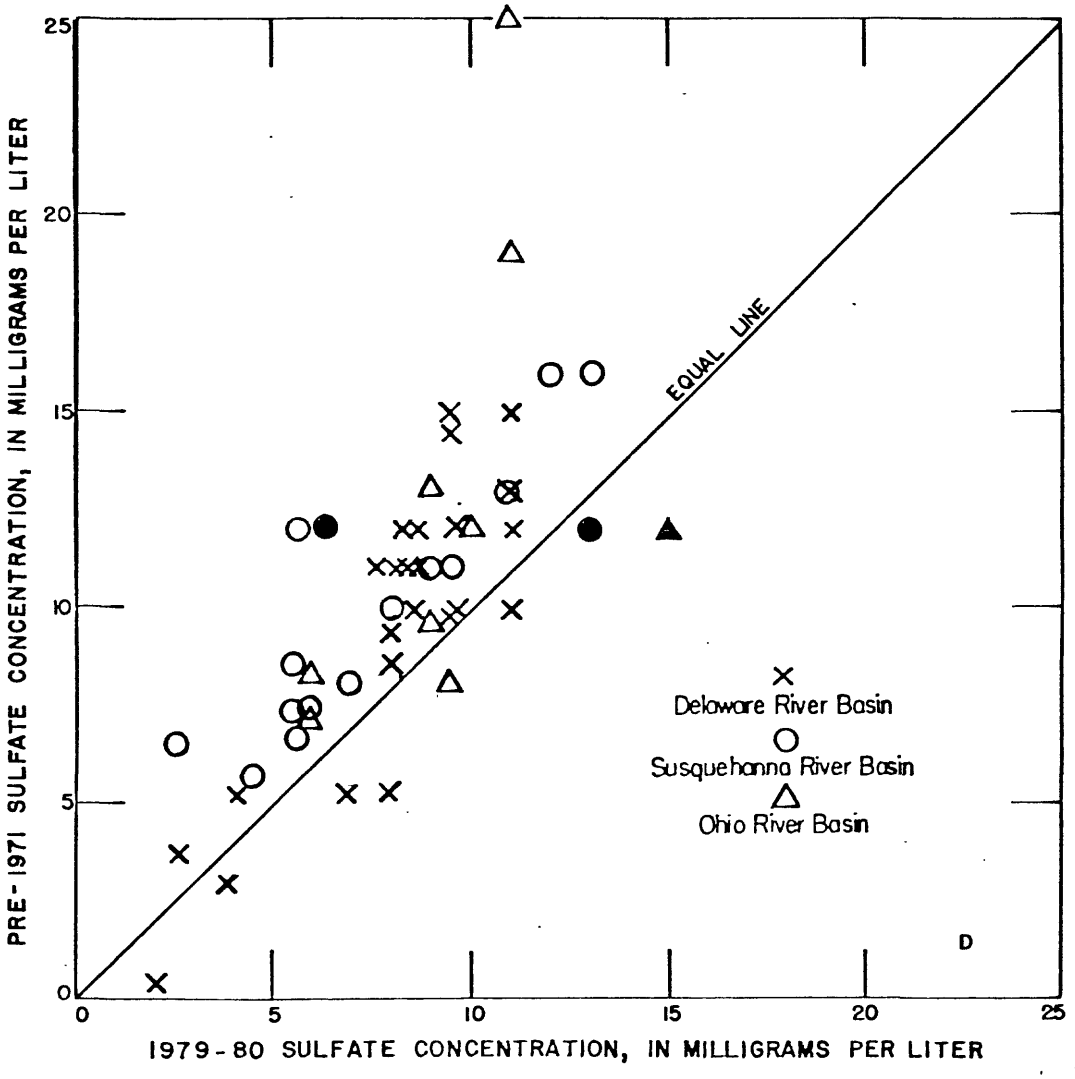


Figure 6D.--Comparisons of sulfate concentration of samples collected before 1971 and in 1979-80 at comparable flows. Solid symbols designate data from USGS coal hydrology network stations.

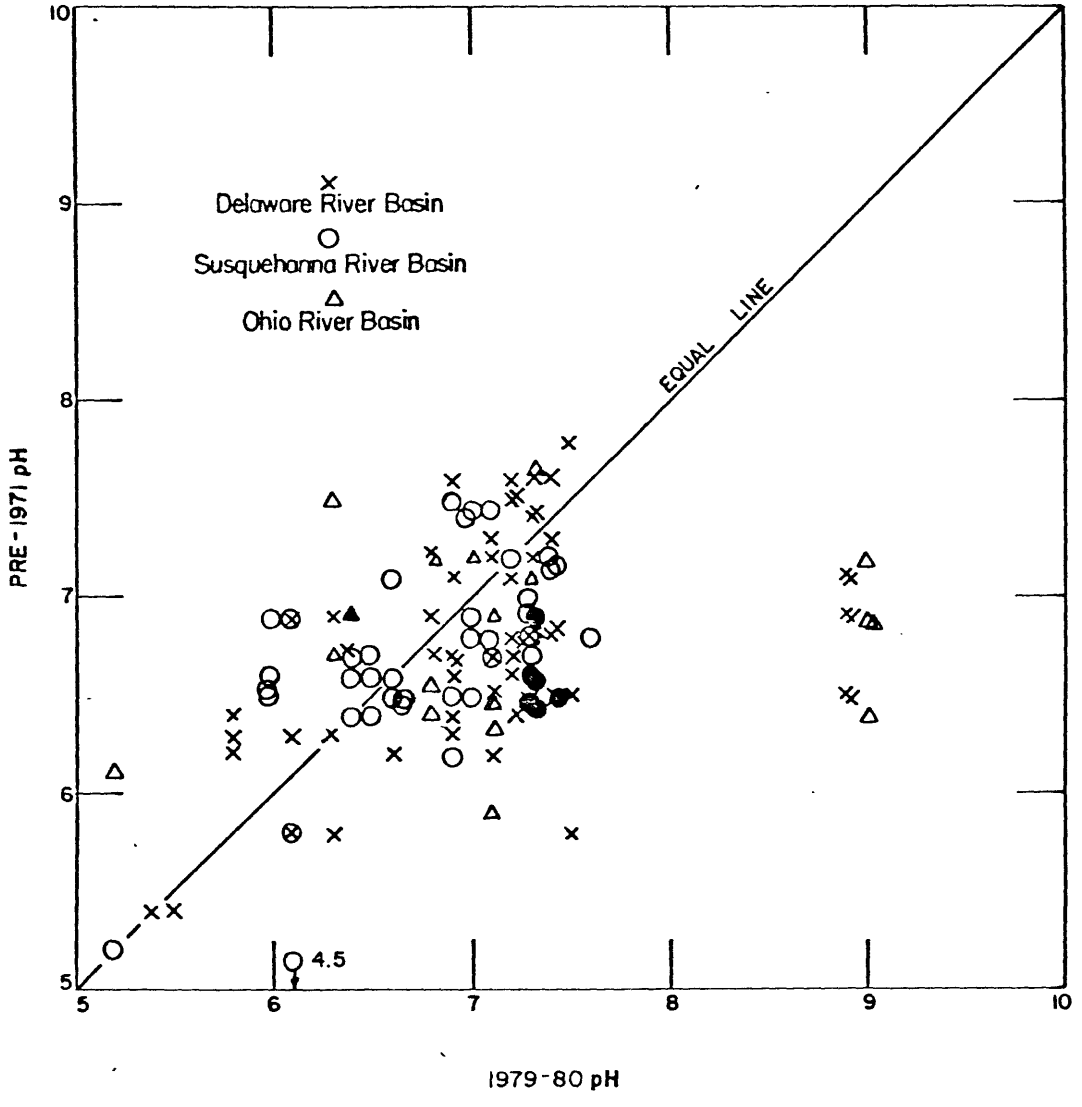


Figure 7A.--Comparisons of pH for samples collected before 1971 and in 1979-80, with comparable specific conductance. Solid symbols designate data from USGS coal hydrology network stations.

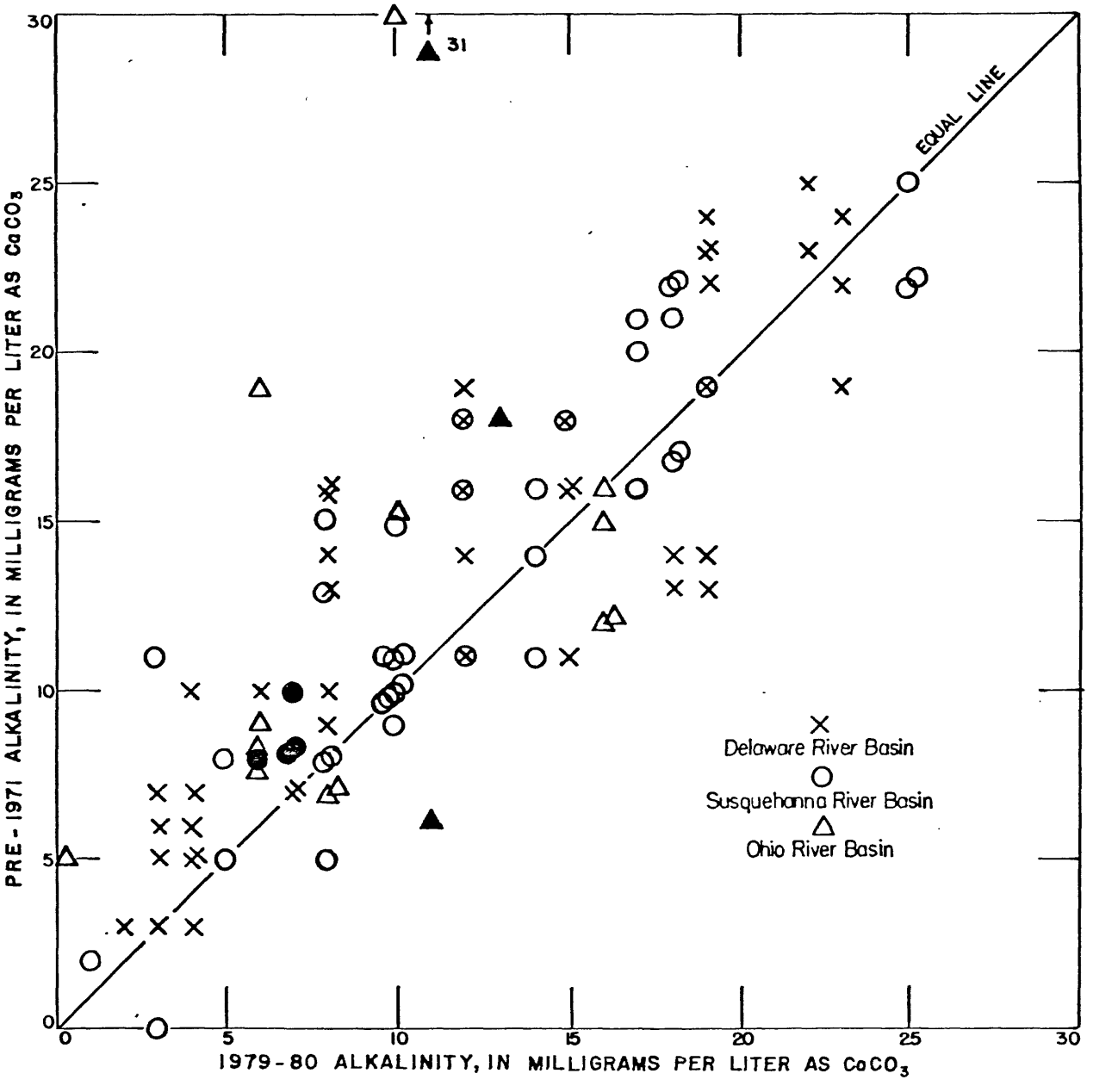


Figure 7B.--Comparisons of alkalinity for samples collected before 1971 and in 1979-80, with comparable specific conductance. Solid symbols designate data from USGS coal hydrology network stations.

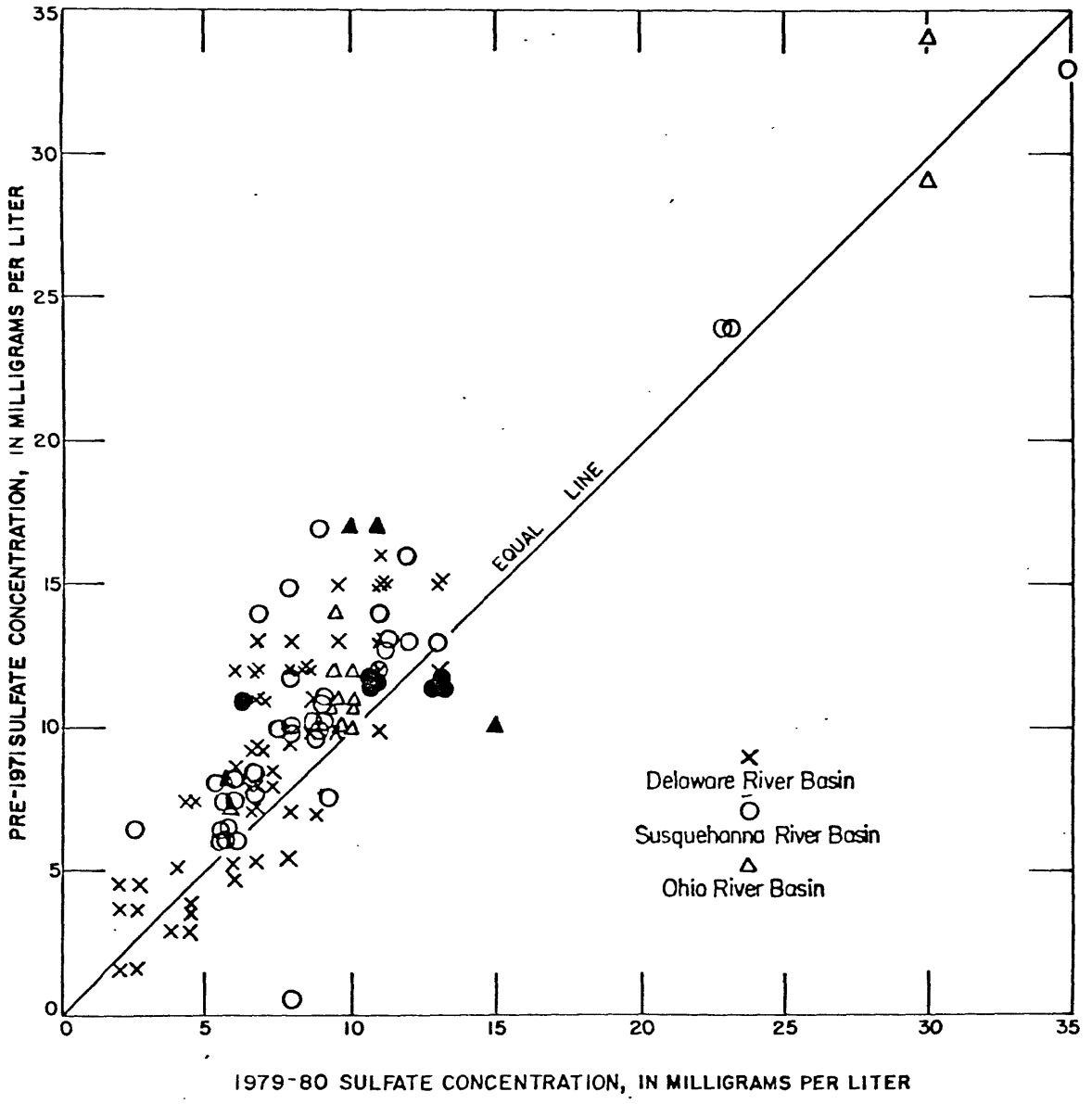
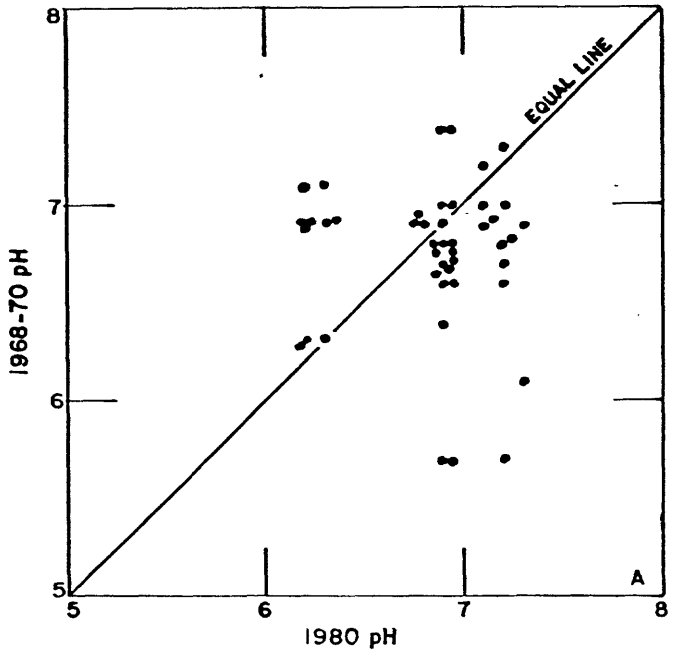
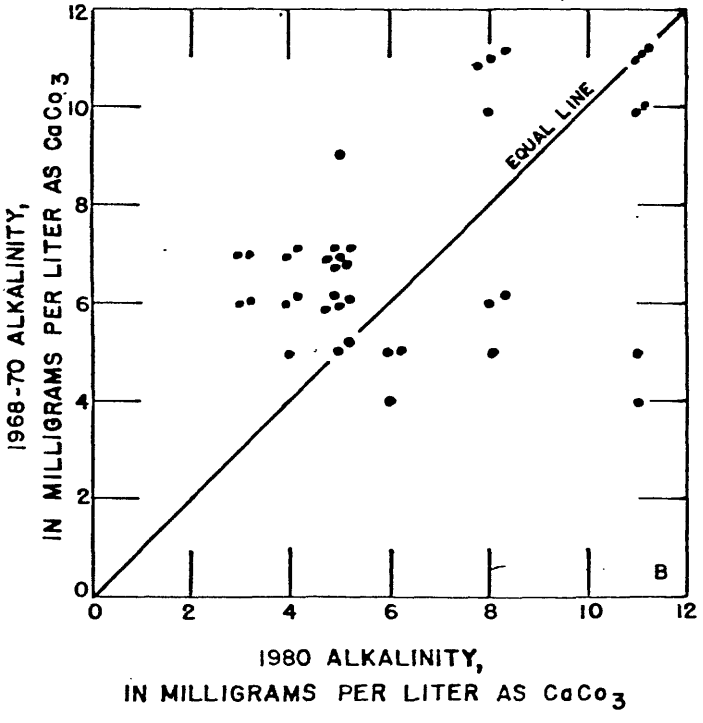


Figure 7C.—Comparisons of sulfate concentration for samples collected before 1971 and in 1979-80, with comparable specific conductance. Solid symbols designate data from USGS coal hydrology network stations.

Table 2.--Summary of conclusions from comparing 1980 samples with those collected before 1971 (Arrow facing upward indicates an increase in the characteristic; one facing downward a decrease.)

Characteristic	Basin			Expected finding if acid rain effects were increasing
	Delaware	Susquehanna	Ohio	
pH	↑	↑	↑	↓
Alkalinity	↓	↓	↓	↓
Sulfate	↓	↓	↓	↑
Specific conductance	↑	↓	↓	↑





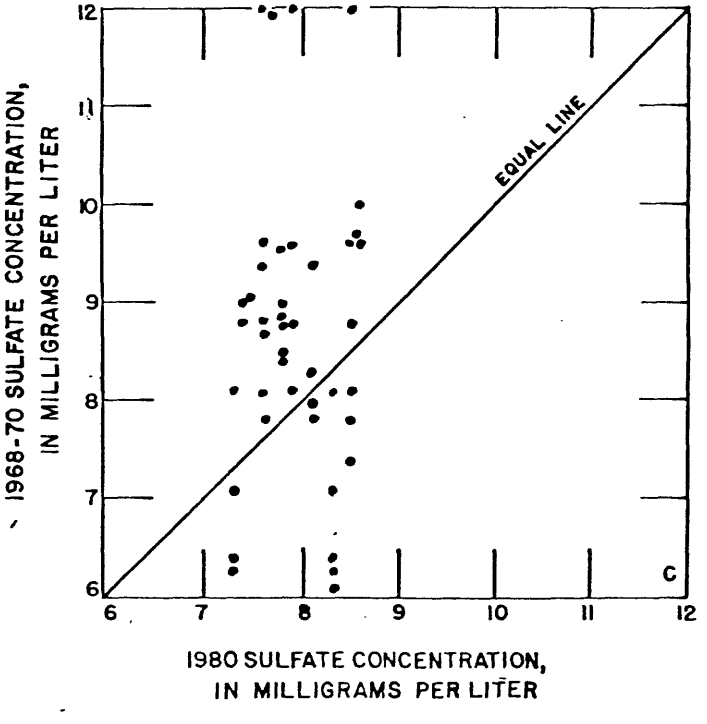
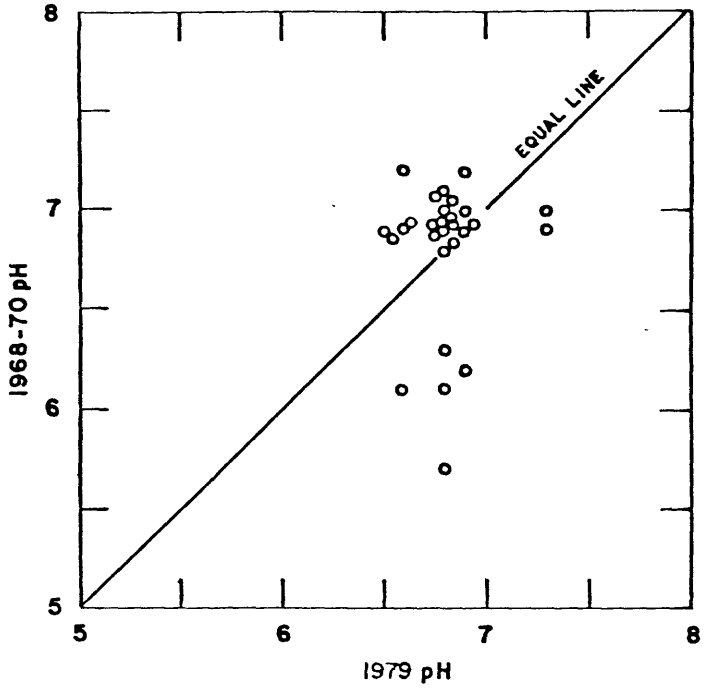
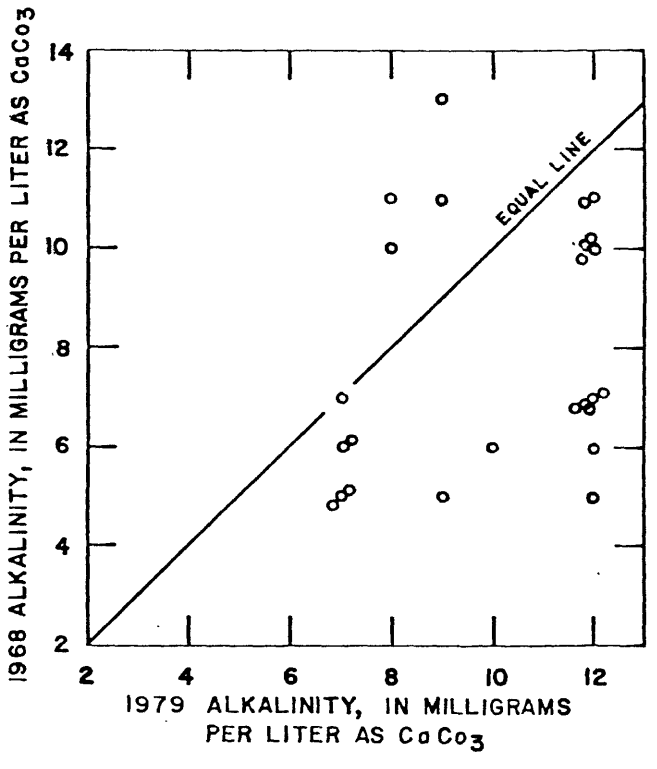


Figure 8.--Comparisons of pH, alkalinity, and sulfate concentration of samples collected at Young Womans Creek near Renovo in 1968-70 and in 1980 and having comparable flows and specific conductances.





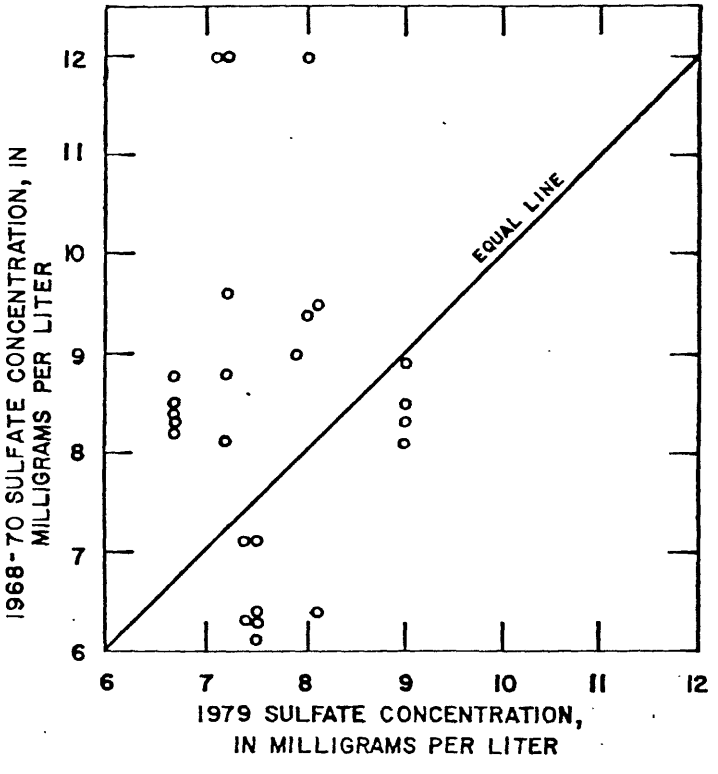
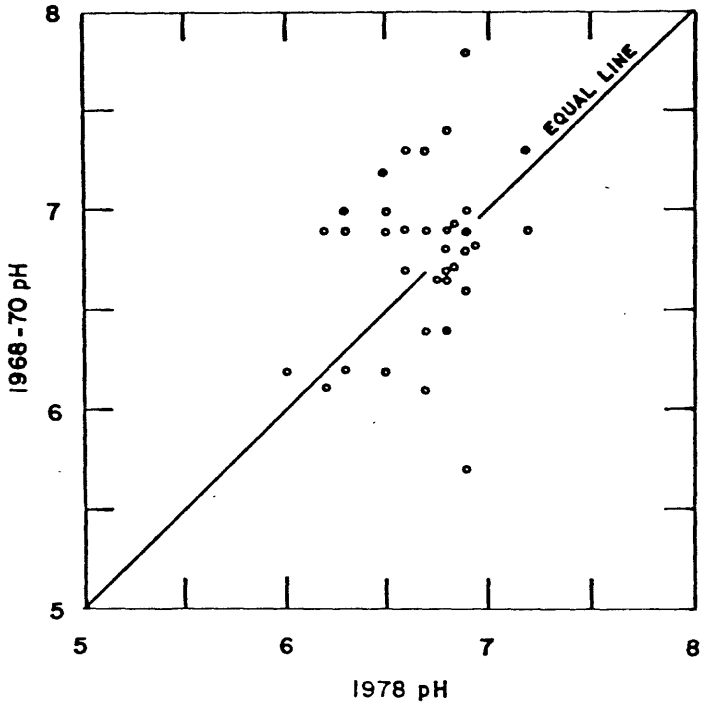


Figure 9.--Comparisons of pH, alkalinity, and sulfate concentration of samples collected at Young Womans Creek near Renovo in 1968-70 and in 1979 and having comparable flows and specific conductances.



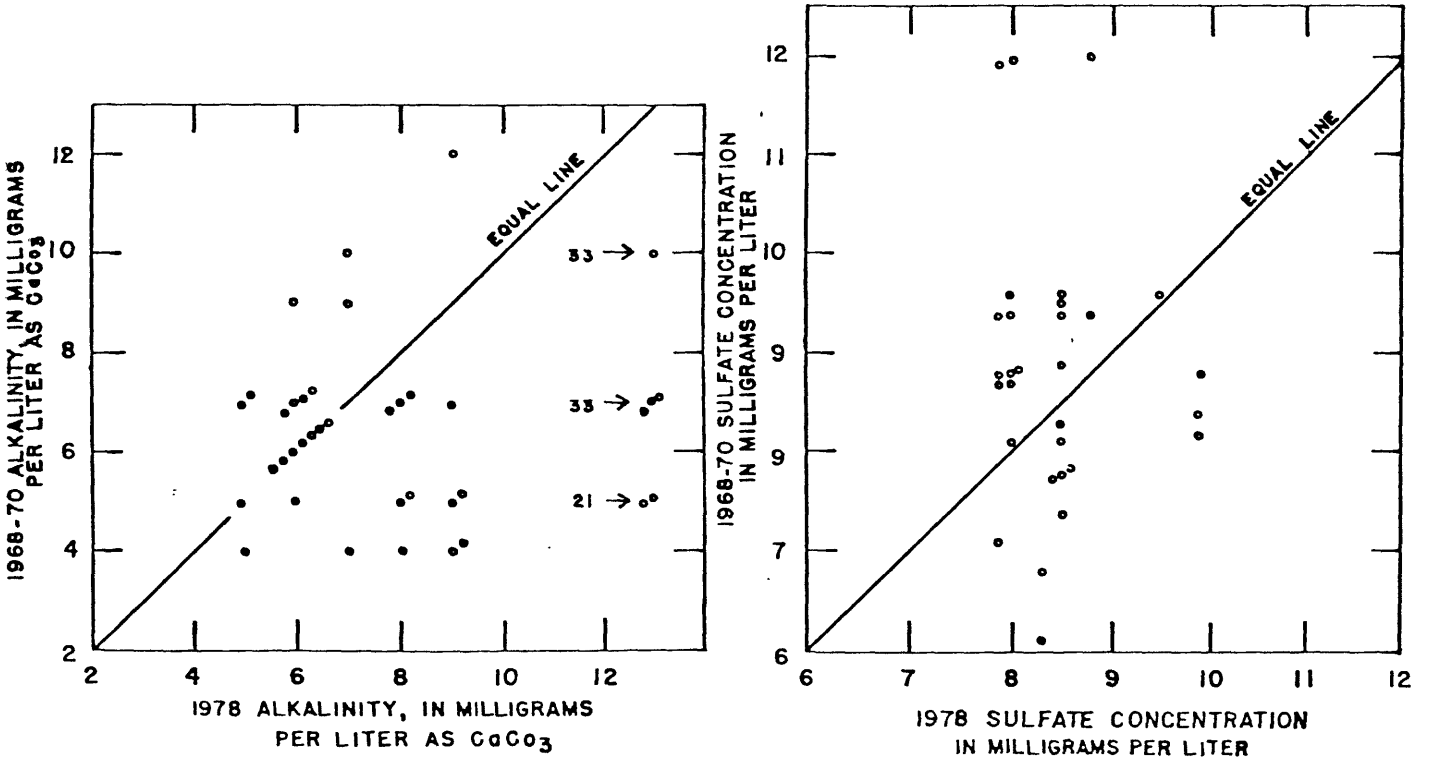


Figure 10.--Comparisons of pH, alkalinity, and sulfate concentration of samples collected at Young Womans Creek near Renovo in 1968-70 and in 1978 and having comparable flows and specific conductances.

Table 3.--Trends indicated from comparisons of data from Young Womans Creek at Renovo collected in 1978, 1979, and 1980 with data collected in 1968-70. (Arrow facing upward indicates an increase; one facing downward, a decrease; a horizontal one, little or no change.)

Chemical Characteristics	Year			Expected finding if acid rain effects were increasing
	1978	1979	1980	
pH	←	↓	↑	↓
Alkalinity	↑	↑	↓	↓
Sulfate	←	←	↓	↑

Table 4 compares the pH and average concentration of sulfate and nitrate of rainfall taken from figures 1-3 and the range of values for the same parameters in the stream samples collected for this study. The median stream pH and sulfate concentration are higher and the median nitrate concentration lower than those determined for rainfall.

Table 4.--pH and dissolved sulfate and nitrate concentrations of rainfall and streams in Pennsylvania. The rainfall values are from figures 1, 2, and 3, and the stream values from 1979-80 samples used in this study

	pH	Sulfate (mg/L)	Nitrate (mg/L as N)
Rainfall	4.2-4.3	2.40- 3.46	0.42
Streams (range)	5.2-9.0	2.0 -35.0	1/.01-5.3
(median)	7.1	8.1	.22

1/includes nitrite.

The complete chemical data collected in 1979-80 are shown in table 5 in the section on water quality data at the end of the report.

SUMMARY

Comparisons of the pH, alkalinity, and sulfate concentration of samples collected in 1979-80 with those collected before 1971 (figs. 5-8), suggest that streams in Pennsylvania in 1980 generally had higher pH's and lower alkalinities and sulfate concentrations than in the 1960's. The specific conductances in 1980 were higher in the Delaware River basin and lower in the Susquehanna and Ohio River basins than they were for comparable discharges before 1971. The results of the pH and sulfate measurements are the opposite of what might be expected if the effects of acid rainfall on a stream were increasing; decreasing alkalinities, however, could be expected. A downward trend in sulfate concentrations was also observed for the air around urban areas in the northeastern United States (Altshuller, 1980). This reduction in atmospheric sulfate was related to a shift in fuel usage from coal to oil and gas.

Data from Young Womans Creek at Renovo, however, indicate that the 1980 data may represent conditions only at the time of sampling and not trends. Different conclusions could be drawn from 1978-to-1979 data. This preliminary study shows that a more intensive study would be necessary to detect any effects of acid rain on headwater streams. Controls on stream chemistry are complex, and the amount, intensity, and temporal and areal distribution of rainfall affect the chemistry of samples taken at discharges of the same magnitude. Therefore, data collected for this study must be interpreted with caution, but they do suggest that acid rain has not affected the chemistry of headwater streams in Pennsylvania.

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Table 5.--Water-quality data, 1979-80

01426700 BALLS CREEK NEAR WINTERDALE, PA

WATER QUALITY DATA, WATER YEAR 1979 TO SEPTEMBER 1980

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS)	SPE-CIFIC CON-DUCT-ANCE (MICRO-MHOS)	PH FIELD (UNITS)	TEMPER-ATURE, WATER (DEG C)	NITRO-GEN, DIS-SOLVED (MG/L AS N)	HARD-NESS (MG/L AS CACO3)	HARD-NESS, NONCAR-BONATE (MG/L CACO3)	ACIDITY (MG/L AS CACO3)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)
JUN											
24...	1700	.32	80	7.2	22.5	.68	27	7	6.0	8.5	1.5
JUL											
22...	0700	3.2	89	7.1	20.0	--	29	3	4.0	9.0	1.5

DATE	SODIUM, DIS-SOLVED (MG/L AS NA)	SODIUM PERCENT	SODIUM AD-SORP-TION RATIO	POTAS-SIUM, DIS-SOLVED (MG/L AS K)	ALKA-LINITY (MG/L AS CACO3)	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)	FLUO-RIDE, DIS-SOLVED (MG/L AS F)	SILICA, DIS-SOLVED (MG/L AS SIO2)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)
JUN											
24...	2.1	14	.2	1.0	20	8.8	1.5	.1	2.4	38	41
JUL											
22...	2.1	13	.2	1.2	26	8.5	1.7	.1	3.1	49	45

DATE	SOLIDS, DIS-SOLVED (TONS PER AC-FT)	SOLIDS, DIS-SOLVED (TONS PER DAY)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS NH4)	NITRO-GEN, ORGANIC DIS-SOLVED (MG/L AS N)	NITRO-GEN, AM-MONIA + ORGANIC DIS. (MG/L AS N)	PHOS-PHORUS, DIS-SOLVED (MG/L AS P)	PHOS-PHORUS, ORTHOPH OSPHATE DISSOL. (MG/L AS P)	PHOS-PHORUS, ORTHOPH OSPHATE DISSOL. (MG/L AS PO4)
JUN										
24...	.05	.03	.61	.010	.01	.06	.07	.020	.000	.00
JUL										
22...	.07	.43	.47	--	--	--	--	--	--	--

01427300 LITTLE EQUINUNK CREEK AT STALKER, PA

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS)	SPE-CIFIC CON-DUCT-ANCE (MICRO-MHOS)	PH FIELD (UNITS)	TEMPER-ATURE, WATER (DEG C)	NITRO-GEN, DIS-SOLVED (MG/L AS N)	HARD-NESS (MG/L AS CACO3)	HARD-NESS, NONCAR-BONATE (MG/L CACO3)	ACIDITY (MG/L AS CACO3)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)
JUN											
24...	1430	2.0	74	7.3	23.0	.76	24	10	2.0	7.5	1.2
JUL											
21...	1530	2.1	80	7.4	27.0	.24	24	6	2.0	7.8	1.2

Table 5.--Water-quality data, 1979-80--Continued

01427300 LITTLE EQUINUNK CREEK AT STALKER, PA

WATER QUALITY DATA, WATER YEAR OCTOBER 1979 TO SEPTEMBER 1980

DATE	SODIUM, DIS-SOLVED (MG/L AS NA)	SODIUM PERCENT	SODIUM AD-SORP-TION RATIO	POTAS-SIUM, DIS-SOLVED (MG/L AS K)	ALKA-LINITY (MG/L AS CACO3)	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)	FLUO-RIDE, DIS-SOLVED (MG/L AS F)	SILICA, DIS-SOLVED (MG/L AS SIO2)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)
JUN 24...	2.3	17	.2	1.1	14	8.7	2.9	.1	2.0	39	37
JUL 21...	2.5	17	.2	1.2	18	8.3	3.3	.1	1.9	44	38

DATE	SOLIDS, DIS-SOLVED (TONS PER AC-FT)	SOLIDS, DIS-SOLVED (TONS PER DAY)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS NH4)	NITRO-GEN, ORGANIC DIS-SOLVED (MG/L AS N)	NITRO-GEN,AM-MONIA + ORGANIC DIS. (MG/L AS N)	PHOS-PHORUS, DIS-SOLVED (MG/L AS P)	PHOS-PHORUS, ORTHOPH OSPHATE DISSOL. (MG/L AS P)	PHOS-PHORUS, ORTHOPH OSPHATE DISSOL. (MG/L AS PO4)
JUN 24...	.05	.21	.64	.010	.01	.11	.12	.020	.010	.03
JUL 21...	.06	.25	.23	.000	.00	.01	.01	.040	.020	.06

01427700 CALKINS CREEK AT MILANVILLE, PA

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS)	SPE-CIFIC CON-DUCT-ANCE (MICRO-MHOS)	PH FIELD (UNITS)	TEMPER-ATURE, WATER (DEG C)	NITRO-GEN, DIS-SOLVED (MG/L AS N)	HARD-NESS (MG/L AS CACO3)	HARD-NESS, NONCAR-BONATE (MG/L CACO3)	ACIDITY (MG/L AS CACO3)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)
JUN 24...	1150	2.1	88	7.3	21.5	.51	28	10	5.0	8.4	1.6
JUL 21...	1300	1.2	94	7.5	27.5	.13	29	3	10	8.7	1.7

DATE	SODIUM, DIS-SOLVED (MG/L AS NA)	SODIUM PERCENT	SODIUM AD-SORP-TION RATIO	POTAS-SIUM, DIS-SOLVED (MG/L AS K)	ALKA-LINITY (MG/L AS CACO3)	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)	FLUO-RIDE, DIS-SOLVED (MG/L AS F)	SILICA, DIS-SOLVED (MG/L AS SIO2)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)
JUN 24...	3.0	18	.2	1.4	18	11	3.3	.1	3.1	44	45
JUL 21...	3.1	18	.3	1.5	26	11	3.8	.1	3.2	60	49

Table 5.—Water-quality data, 1979-80--Continued

01427700 CALKINS CREEK AT MILANVILLE, PA—Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1979 TO SEPTEMBER 1980

DATE	SOLIDS, DIS-SOLVED (TONS PER AC-FT)	SOLIDS, DIS-SOLVED (TONS PER DAY)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS NH4)	NITRO-GEN, ORGANIC DIS-SOLVED (MG/L AS N)	NITRO-GEN,AM-MONIA + ORGANIC DIS. (MG/L AS N)	PHOS-PHORUS, DIS-SOLVED (MG/L AS P)	PHOS-PHORUS, ORTHOPH OSPHATE DISSOL. (MG/L AS P)	PHOS-PHORUS, ORTHOPH OSPHATE DISSOL. (MG/L AS PO4)
JUN 24...	.06	.25	.43	.020	.03	.06	.08	.030	.020	.06
JUL 21...	.08	.19	.12	.000	.00	.01	.01	.030	.020	.06

01428200 MASTHOPE CREEK AT MASTHOPE, PA

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS)	SPE-CIFIC CON-DUCT-ANCE (MICRO-MHOS)	PH FIELD (UNITS)	TEMPER-ATURE, WATER (DEG C)	NITRO-GEN, DIS-SOLVED (MG/L AS N)	HARD-NESS (MG/L AS CACO3)	HARD-NESS, NONCAR-BONATE (MG/L CACO3)	ACIDITY (MG/L AS CACO3)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)
JUN 24...	0900	3.6	65	6.9	18.0	.32	18	4	4.0	4.8	1.5
JUL 22...	1030	2.8	69	7.2	22.5	.45	19	1	2.0	5.1	1.4

DATE	SODIUM, DIS-SOLVED (MG/L AS NA)	SODIUM PERCENT	SODIUM AD-SORP-TION RATIO	POTAS-SIUM, DIS-SOLVED (MG/L AS K)	ALKA-LINITY (MG/L AS CACO3)	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)	FLUO-RIDE, DIS-SOLVED (MG/L AS F)	SILICA, DIS-SOLVED (MG/L AS SIO2)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)
JUN 24...	2.7	23	.3	.9	14	7.9	2.8	.1	2.8	34	33
JUL 22...	2.5	22	.3	.9	18	6.8	2.6	.1	3.0	41	33

DATE	SOLIDS, DIS-SOLVED (TONS PER AC-FT)	SOLIDS, DIS-SOLVED (TONS PER DAY)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS NH4)	NITRO-GEN, ORGANIC DIS-SOLVED (MG/L AS N)	NITRO-GEN,AM-MONIA + ORGANIC DIS. (MG/L AS N)	PHOS-PHORUS, DIS-SOLVED (MG/L AS P)	PHOS-PHORUS, ORTHOPH OSPHATE DISSOL. (MG/L AS P)	PHOS-PHORUS, ORTHOPH OSPHATE DISSOL. (MG/L AS PO4)
JUN 24...	.05	.33	.14	.020	.03	.16	.18	.020	.000	.00
JUL 22...	.06	.31	.04	.000	.00	.41	.41	.020	.010	.03

Table 5.--Water-quality data, 1979-80--Continued

01431500 LACKAWAXEN RIVER AT HAWLEY, PA

WATER QUALITY DATA, WATER YEAR OCTOBER 1979 TO SEPTEMBER 1980

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS)	SPE-CIFIC CON-DUCT-ANCE (MICRO-MHOS)	PH FIELD (UNITS)	TEMPER-ATURE, WATER (DEG C)	NITRO-GEN, DIS-SOLVED (MG/L AS N)	HARD-NESS (MG/L AS CACO3)	HARD-NESS, NONCAR-BONATE (MG/L CACO3)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)	SODIUM, DIS-SOLVED (MG/L AS NA)
JUN											
23...	1645	68	118	8.9	26.5	.81	36	18	12	1.5	4.5
JUL											
23...	1600	104	118	8.9	28.0	.93	36	7	12	1.4	4.0

DATE	SODIUM PERCENT	SODIUM AD-SORP-TION RATIO	POTAS-SIUM, DIS-SOLVED (MG/L AS K)	ALKA-LINITY (MG/L AS CACO3)	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)	FLUO-RIDE, DIS-SOLVED (MG/L AS F)	SILICA, DIS-SOLVED (MG/L AS SIO2)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)
JUN										
23...	21	.3	1.4	18	11	6.9	.1	.9	68	50
JUL										
23...	19	.3	1.5	29	9.5	6.1	.1	1.7	61	54

DATE	SOLIDS, DIS-SOLVED (TONS PER AC-FT)	SOLIDS, DIS-SOLVED (TONS PER DAY)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS NH4)	NITRO-GEN, ORGANIC DIS-SOLVED (MG/L AS N)	NITRO-GEN, AM-MONIA + ORGANIC DIS. (MG/L AS N)	PHOS-PHORUS, DIS-SOLVED (MG/L AS P)	PHOS-PHORUS, ORTHOPH OSPHATE DISSOL. (MG/L AS P)	PHOS-PHORUS, ORTHOPH OSPHATE DISSOL. (MG/L AS PO4)
JUN										
23...	.09	12.5	.17	.060	.08	.58	.64	.080	.060	.18
JUL										
23...	.08	17.1	.05	.100	.13	.78	.88	.080	.040	.12

01432100 BLOOMING GROVE CREEK NEAR ROWLAND, PA

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS)	SPE-CIFIC CON-DUCT-ANCE (MICRO-MHOS)	PH FIELD (UNITS)	TEMPER-ATURE, WATER (DEG C)	NITRO-GEN, DIS-SOLVED (MG/L AS N)	HARD-NESS (MG/L AS CACO3)	HARD-NESS, NONCAR-BONATE (MG/L CACO3)	ACIDITY (MG/L AS CACO3)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)
JUN											
23...	1310	9.3	62	6.6	19.5	.26	14	10	12	3.5	1.2
JUL											
22...	1400	4.8	65	7.1	24.0	.54	14	3	2.0	3.9	1.1

Table 5.--Water-quality data, 1979-80--Continued

01432100 BLOOMING GROVE CREEK NEAR ROWLAND, PA--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1979 TO SEPTEMBER 1980

DATE	SODIUM, DIS-SOLVED (MG/L AS NA)	SODIUM PERCENT	SODIUM AD-SORP-TION RATIO	POTAS-SIUM, DIS-SOLVED (MG/L AS K)	ALKA-LINITY (MG/L AS CACO3)	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)	FLUO-RIDE, DIS-SOLVED (MG/L AS F)	SILICA, DIS-SOLVED (MG/L AS SIO2)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)
JUN											
23...	3.3	33	.4	.7	4	8.6	4.9	.1	3.3	38	29
JUL											
22...	2.9	29	.3	.7	11	8.2	4.6	.1	2.7	30	31

DATE	SOLIDS, DIS-SOLVED (TONS PER AC-FT)	SOLIDS, DIS-SOLVED (TONS PER DAY)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS NH4)	NITRO-GEN, ORGANIC DIS-SOLVED (MG/L AS N)	NITRO-GEN,AM-MONIA + ORGANIC DIS. (MG/L AS N)	PHOS-PHORUS, DIS-SOLVED (MG/L AS P)	PHOS-PHORUS, ORTHOPH OSPHATE DISSOL. (MG/L AS P)	PHOS-PHORUS, ORTHOPH OSPHATE DISSOL. (MG/L AS PO4)
JUN										
23...	.05	.95	.16	.010	.01	.09	.10	.020	.000	.00
JUL										
22...	.04	.39	.07	.000	.00	.47	.47	.020	.000	.00

01439500 BUSH KILL AT SHOEMAKERS, PA

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS)	SPE-CIFIC CON-DUCT-ANCE (MICRO-MHOS)	PH FIELD (UNITS)	TEMPER-ATURE, WATER (DEG C)	NITRO-GEN, DIS-SOLVED (MG/L AS N)	HARD-NESS (MG/L AS CACO3)	HARD-NESS, NONCAR-BONATE (MG/L CACO3)	ACIDITY (MG/L AS CACO3)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)
JUN											
26...	0730	34	50	7.2	22.5	.33	13	7	3.0	3.2	1.1
JUL											
23...	1030	46	39	7.5	24.5	.90	13	4	2.0	3.5	1.1

DATE	SODIUM, DIS-SOLVED (MG/L AS NA)	SODIUM PERCENT	SODIUM AD-SORP-TION RATIO	POTAS-SIUM, DIS-SOLVED (MG/L AS K)	ALKA-LINITY (MG/L AS CACO3)	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)	FLUO-RIDE, DIS-SOLVED (MG/L AS F)	SILICA, DIS-SOLVED (MG/L AS SIO2)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)
JUN											
26...	2.1	26	.3	.4	6	7.4	2.0	.1	2.0	28	22
JUL											
23...	2.2	26	.3	.5	9	7.0	2.1	.1	3.3	34	25

Table 5.--Water-quality data, 1979-80--Continued

01439500 BUSH KILL AT SHOEMAKERS, PA--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1979 TO SEPTEMBER 1980

DATE	SOLIDS, DIS-SOLVED (TONS PER AC-FT)	SOLIDS, DIS-SOLVED (TONS PER DAY)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS NH4)	NITRO-GEN, ORGANIC DIS-SOLVED (MG/L AS N)	NITRO-GEN,AM-MONIA + ORGANIC DIS. (MG/L AS N)	PHOS-PHORUS, DIS-SOLVED (MG/L AS P)	PHOS-PHORUS, ORTHOPH OSPHATE DISSOL. (MG/L AS P)	PHOS-PHORUS, ORTHOPH OSPHATE DISSOL. (MG/L AS PO4)
JUN										
26...	.04	2.57	.09	.030	.04	.21	.24	.030	.000	.00
JUL										
23...	.05	4.22	.05	.000	.00	.85	.85	.030	.000	.00

01439700 LITTLE BUSH KILL AT BUSHKILL, PA

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS)	SPE-CIFIC CON-DUCT-ANCE (MICRO-MHOS)	PH FIELD (UNITS)	TEMPER-ATURE, WATER (DEG C)	NITRO-GEN, DIS-SOLVED (MG/L AS N)	HARD-NESS (MG/L AS CACO3)	HARD-NESS, NONCAR-BONATE (MG/L CACO3)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)	SODIUM, DIS-SOLVED (MG/L AS NA)
JUN											
26...	0920	7.0	52	7.1	17.5	.39	15	2	3.6	1.5	2.2
JUL											
24...	0800	8.0	56	6.8	19.0	.92	14	3	3.6	1.2	2.0

DATE	SODIUM PERCENT	SODIUM AD-SORP-TION RATIO	POTAS-SIUM, DIS-SOLVED (MG/L AS K)	ALKA-LINITY (MG/L AS CACO3)	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)	FLUO-RIDE, DIS-SOLVED (MG/L AS F)	SILICA, DIS-SOLVED (MG/L AS SIO2)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)
JUN										
26...	23	.2	.5	13	6.8	2.0	.1	4.2	34	30
JUL										
24...	23	.2	.5	8	6.6	2.0	.1	4.4	29	28

DATE	SOLIDS, DIS-SOLVED (TONS PER AC-FT)	SOLIDS, DIS-SOLVED (TONS PER DAY)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS NH4)	NITRO-GEN, ORGANIC DIS-SOLVED (MG/L AS N)	NITRO-GEN,AM-MONIA + ORGANIC DIS. (MG/L AS N)	PHOS-PHORUS, DIS-SOLVED (MG/L AS P)	PHOS-PHORUS, ORTHOPH OSPHATE DISSOL. (MG/L AS P)	PHOS-PHORUS, ORTHOPH OSPHATE DISSOL. (MG/L AS PO4)
JUN										
26...	.05	.64	.28	.020	.03	.09	.11	.020	.030	.09
JUL										
24...	.04	.63	.32	.150	.19	.45	.60	.040	.010	.03

Table 5.--Water-quality data, 1979-80--Continued

01440500 PARADISE CREEK AT HENRYVILLE, PA

WATER QUALITY DATA, WATER YEAR OCTOBER 1979 TO SEPTEMBER 1980

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS)	SPE-CIFIC CON-DUCT-ANCE (MICRO-MHOS)	PH FIELD (UNITS)	TEMPER-ATURE, WATER (DEG C)	NITRO-GEN, DIS-SOLVED (MG/L AS N)	HARD-NESS (MG/L AS CACO3)	HARD-NESS, NONCAR-BONATE (MG/L CACO3)	ACIDITY (MG/L AS CACO3)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)
JUN											
25...	1600	20	90	7.3	24.0	.60	19	11	2.0	5.2	1.5
JUL											
23...	1700	11	89	7.5	24.5	.91	19	4	2.0	5.4	1.4

DATE	SODIUM, DIS-SOLVED (MG/L AS NA)	SODIUM PERCENT	SODIUM AD-SORP-TION RATIO	POTAS-SIUM, DIS-SOLVED (MG/L AS K)	ALKA-LINITY (MG/L AS CACO3)	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)	FLUO-RIDE, DIS-SOLVED (MG/L AS F)	SILICA, DIS-SOLVED (MG/L AS SIO2)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)
JUN											
25...	5.7	38	.6	.7	8	8.0	10	.0	3.5	44	41
JUL											
23...	5.1	36	.5	.7	15	7.6	9.7	.1	2.2	48	42

DATE	SOLIDS, DIS-SOLVED (TONS PER AC-FT)	SOLIDS, DIS-SOLVED (TONS PER DAY)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS NH4)	NITRO-GEN, ORGANIC DIS-SOLVED (MG/L AS N)	NITRO-GEN, AM-MONIA + ORGANIC DIS. (MG/L AS N)	PHOS-PHORUS, DIS-SOLVED (MG/L AS P)	PHOS-PHORUS, ORTHOPH OSPHATE DISSOL. (MG/L AS P)	PHOS-PHORUS, ORTHOPH OSPHATE DISSOL. (MG/L AS PO4)
JUN										
25...	.06	2.32	.36	.030	.04	.21	.24	.050	.020	.06
JUL										
23...	.07	1.41	.12	.020	.03	.77	.79	.050	.020	.06

01447300 CHOKE CREEK NEAR THORNHURST, PA

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS)	SPE-CIFIC CON-DUCT-ANCE (MICRO-MHOS)	PH FIELD (UNITS)	TEMPER-ATURE, WATER (DEG C)	NITRO-GEN, DIS-SOLVED (MG/L AS N)	HARD-NESS (MG/L AS CACO3)	HARD-NESS, NONCAR-BONATE (MG/L CACO3)	ACIDITY (MG/L AS CACO3)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)
JUN											
25...	0950	2.3	19	5.5	17.0	.23	4	2	5.0	.8	.5
JUL											
23...	1030	5.2	17	5.4	19.5	1.1	5	4	6.0	1.3	.5

Table 5.--Water-quality data, 1979-80--Continued

01447300 CHOKE CREEK NEAR THORNHURST, PA--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1979 TO SEPTEMBER 1980

DATE	SODIUM, DIS-SOLVED (MG/L AS NA)	SODIUM PERCENT	SODIUM AD-SORP-TION RATIO	POTAS-SIUM, DIS-SOLVED (MG/L AS K)	ALKA-LINITY (MG/L AS CACO3)	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)	FLUO-RIDE, DIS-SOLVED (MG/L AS F)	SILICA, DIS-SOLVED (MG/L AS SIO2)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)
JUN											
25...	.8	28	.2	.3	2	3.8	1.6	.0	.2	10	9
JUL											
23...	.8	23	.2	.5	1	4.6	1.2	.1	1.5	20	11

DATE	SOLIDS, DIS-SOLVED (TONS PER AC-FT)	SOLIDS, DIS-SOLVED (TONS PER DAY)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS NH4)	NITRO-GEN, ORGANIC DIS-SOLVED (MG/L AS N)	NITRO-GEN, AM-MONIA + ORGANIC DIS. (MG/L AS N)	PHOS-PHORUS, DIS-SOLVED (MG/L AS P)	PHOS-PHORUS, ORTHOPH OSPHATE DISSOL. (MG/L AS P)	PHOS-PHORUS, ORTHOPH OSPHATE DISSOL. (MG/L AS PO4)
JUN										
25...	.01	.06	.02	.030	.04	.18	.21	.010	.000	.00
JUL										
23...	.03	.28	.01	.020	.03	1.1	1.1	.020	.000	.00

01447700 TUNKHANNOCK CREEK NEAR FERNRIDGE, PA

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS)	SPE-CIFIC CON-DUCT-ANCE (MICRO-MHOS)	PH FIELD (UNITS)	TEMPER-ATURE, WATER (DEG C)	NITRO-GEN, DIS-SOLVED (MG/L AS N)	HARD-NESS (MG/L AS CACO3)	HARD-NESS, NONCAR-BONATE (MG/L CACO3)	ACIDITY (MG/L AS CACO3)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)
JUN											
25...	1315	17	24	6.3	21.0	.44	6	4	4.0	1.3	.6
JUL											
23...	1400	13	23	6.1	20.5	.62	7	1	7.0	1.7	.6

DATE	SODIUM, DIS-SOLVED (MG/L AS NA)	SODIUM PERCENT	SODIUM AD-SORP-TION RATIO	POTAS-SIUM, DIS-SOLVED (MG/L AS K)	ALKA-LINITY (MG/L AS CACO3)	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)	FLUO-RIDE, DIS-SOLVED (MG/L AS F)	SILICA, DIS-SOLVED (MG/L AS SIO2)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)
JUN											
25...	1.8	39	.3	.3	2	2.0	4.1	.0	.0	21	12
JUL											
23...	1.4	30	.2	.3	6	2.6	3.8	.1	1.1	58	16

Table 5.—Water-quality data, 1979-80--Continued

01447700 TUNKHANNOCK CREEK NEAR FERNRIDGE, PA--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1979 TO SEPTEMBER 1980

DATE	SOLIDS, DIS-SOLVED (TONS PER AC-FT)	SOLIDS, DIS-SOLVED (TONS PER DAY)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS NH4)	NITRO-GEN, ORGANIC DIS-SOLVED (MG/L AS N)	NITRO-GEN,AM-MONIA + ORGANIC DIS. (MG/L AS N)	PHOS-PHORUS, DIS-SOLVED (MG/L AS P)	PHOS-PHORUS, ORTHOPH OSPHATE DISSOL. (MG/L AS P)	PHOS-PHORUS, ORTHOPH OSPHATE DISSOL. (MG/L AS PO4)
JUN										
25...	.03	.96	.21	.020	.03	.21	.23	.010	.000	.00
JUL										
23...	.08	2.10	.09	.000	.00	.53	.53	.010	.000	.00

01447720 TOBYHANNA CREEK NEAR BLAKESLEE, PA

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS)	SPE-CIFIC CON-DUCT-ANCE (MICRO-MHOS)	PH FIELD (UNITS)	TEMPER-ATURE, WATER (DEG C)	NITRO-GEN, DIS-SOLVED (MG/L AS N)	HARD-NESS (MG/L AS CACO3)	HARD-NESS, NONCAR-BONATE (MG/L CACO3)	ACIDITY (MG/L AS CACO3)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)
JUN											
25...	1200	76	40	6.8	20.5	.87	9	7	3.0	2.4	.8
JUL											
23...	1300	90	36	6.9	23.5	.29	10	3	4.0	2.8	.8

DATE	SODIUM, DIS-SOLVED (MG/L AS NA)	SODIUM PERCENT	SODIUM AD-SORP-TION RATIO	POTAS-SIUM, DIS-SOLVED (MG/L AS K)	ALKA-LINITY (MG/L AS CACO3)	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)	FLUO-RIDE, DIS-SOLVED (MG/L AS F)	SILICA, DIS-SOLVED (MG/L AS SIO2)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)
JUN											
25...	2.6	37	.4	.4	2	4.4	5.2	.1	1.0	36	19
JUL											
23...	2.4	33	.3	.4	7	4.6	5.1	.1	1.6	36	22

DATE	SOLIDS, DIS-SOLVED (TONS PER AC-FT)	SOLIDS, DIS-SOLVED (TONS PER DAY)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS NH4)	NITRO-GEN, ORGANIC DIS-SOLVED (MG/L AS N)	NITRO-GEN,AM-MONIA + ORGANIC DIS. (MG/L AS N)	PHOS-PHORUS, DIS-SOLVED (MG/L AS P)	PHOS-PHORUS, ORTHOPH OSPHATE DISSOL. (MG/L AS P)	PHOS-PHORUS, ORTHOPH OSPHATE DISSOL. (MG/L AS PO4)
JUN										
25...	.05	7.39	.09	.020	.03	.76	.78	.010	.000	.00
JUL										
23...	.05	8.75	.04	.030	.04	.22	.25	.010	.000	.00

Table 5.—Water-quality data, 1979-80--Continued

01447750 BEAR CREEK AT BEAR CREEK NEAR WHITE HAVEN, PA

WATER QUALITY DATA, WATER YEAR OCTOBER 1979 TO SEPTEMBER 1980

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS)	SPE-CIFIC CON-DUCT-ANCE (MICRO-MHOS)	PH FIELD (UNITS)	TEMPER-ATURE, WATER (DEG C)	NITRO-GEN, DIS-SOLVED (MG/L AS N)	HARD-NESS (MG/L AS CACO3)	HARD-NESS, NONCAR-BONATE (MG/L CACO3)	ACIDITY (MG/L AS CACO3)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)
JUN											
25...	0750	13	55	5.8	20.0	.36	9	5	5.0	2.1	1.0
JUL											
23...	0800	12	69	5.8	24.0	.97	12	10	4.0	3.0	1.0

DATE	SODIUM, DIS-SOLVED (MG/L AS NA)	SODIUM PERCENT	SODIUM AD-SORP-TION RATIO	POTAS-SIUM, DIS-SOLVED (MG/L AS K)	ALKA-LINITY (MG/L AS CACO3)	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)	FLUO-RIDE, DIS-SOLVED (MG/L AS F)	SILICA, DIS-SOLVED (MG/L AS SIO2)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)
JUN											
25...	4.0	47	.6	.4	4	6.1	7.7	.1	.6	34	25
JUL											
23...	5.1	48	.7	.5	2	5.4	11	.1	1.2	34	29

DATE	SOLIDS, DIS-SOLVED (TONS PER AC-FT)	SOLIDS, DIS-SOLVED (TONS PER DAY)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS NH4)	NITRO-GEN, ORGANIC DIS-SOLVED (MG/L AS N)	NITRO-GEN,AM-MONIA + ORGANIC DIS. (MG/L AS N)	PHOS-PHORUS, DIS-SOLVED (MG/L AS P)	PHOS-PHORUS, ORTHOPH OSPHATE DISSOL. (MG/L AS P)	PHOS-PHORUS, ORTHOPH OSPHATE DISSOL. (MG/L AS PO4)
JUN										
25...	.05	1.19	.03	.020	.03	.31	.33	.010	.000	.00
JUL										
23...	.05	1.09	.04	.020	.03	.91	.93	.020	.000	.00

01449200 MAHONING CREEK AT MANTZVILLE, PA

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS)	SPE-CIFIC CON-DUCT-ANCE (MICRO-MHOS)	PH FIELD (UNITS)	TEMPER-ATURE, WATER (DEG C)	NITRO-GEN, DIS-SOLVED (MG/L AS N)	HARD-NESS (MG/L AS CACO3)	HARD-NESS, NONCAR-BONATE (MG/L CACO3)	ACIDITY (MG/L AS CACO3)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)
JUN											
25...	1340	1.9	73	7.1	24.0	2.1	21	13	6.0	4.4	2.4
JUL											
29...	1300	1.1	73	7.4	22.5	2.2	22	10	6.0	4.6	2.5

Table 5.--Water-quality data, 1979-80--Continued

01449200 MAHONING CREEK AT MANTZVILLE, PA--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1979 TO SEPTEMBER 1980

DATE	SODIUM, DIS-SOLVED (MG/L AS NA)	SODIUM PERCENT	SODIUM AD-SORP-TION RATIO	POTAS-SIUM, DIS-SOLVED (MG/L AS K)	ALKA-LINITY (MG/L AS CACO3)	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)	FLUO-RIDE, DIS-SOLVED (MG/L AS F)	SILICA, DIS-SOLVED (MG/L AS SIO2)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)
JUN											
25...	3.0	23	.3	.7	8	6.0	5.3	.0	6.1	55	41
JUL											
29...	3.1	23	.3	.7	12	4.1	4.3	.1	6.2	48	42

DATE	SOLIDS, DIS-SOLVED (TONS PER AC-FT)	SOLIDS, DIS-SOLVED (TONS PER DAY)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS NH4)	NITRO-GEN, ORGANIC DIS-SOLVED (MG/L AS N)	NITRO-GEN, AM-MONIA + ORGANIC DIS. (MG/L AS N)	PHOS-PHORUS, DIS-SOLVED (MG/L AS P)	PHOS-PHORUS, ORTHOPH OSPHATE DISSOL. (MG/L AS P)	PHOS-PHORUS, ORTHOPH OSPHATE DISSOL. (MG/L AS PO4)
JUN										
25...	.07	.28	1.8	.070	.09	.19	.26	.020	.060	.18
JUL										
29...	.07	.14	2.1	.010	.01	.09	.10	.010	.010	.03

01452780 MIX RUN NEAR DRIFTWOOD, PA

WATER QUALITY DATA, WATER YEAR OCTOBER 1978 TO SEPTEMBER 1979

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS)	SPE-CIFIC CON-DUCT-ANCE (MICRO-MHOS)	PH FIELD (UNITS)	TEMPER-ATURE, WATER (DEG C)	ACIDITY (MG/L AS CACO3)	ALKA-LINITY (MG/L AS CACO3)	SULFATE DIS-SOLVED (MG/L AS SO4)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L)	SOLIDS, DIS-SOLVED (TONS PER AC-FT)	SOLIDS, DIS-SOLVED (TONS PER DAY)
JUN											
15...	1035	23	50	7.3	13.5	.0	7	13	--	--	--
AUG											
07...	1215	21	40	7.5	17.0	.0	6	6.3	68	.09	3.93

WATER QUALITY DATA, WATER YEAR OCTOBER 1979 TO SEPTEMBER 1980

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS)	SPE-CIFIC CON-DUCT-ANCE (MICRO-MHOS)	PH FIELD (UNITS)	TEMPER-ATURE, WATER (DEG C)	ACIDITY (MG/L AS CACO3)	ALKA-LINITY (MG/L AS CACO3)	SULFATE DIS-SOLVED (MG/L AS SO4)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L)	SOLIDS, DIS-SOLVED (TONS PER AC-FT)	SOLIDS, DIS-SOLVED (TONS PER DAY)
MAR											
31...	1600	341	50	7.3	5.0	5.0	5	11	30	.04	27.6

Table 5.--Water-quality data, 1979-80

01543680 EAST FORK SINNEMAHONING CREEK NEAR LOGUE, PA

WATER QUALITY DATA, WATER YEAR OCTOBER 1979 TO SEPTEMBER 1980

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS)	SPE-CIFIC CON-DUCT-ANCE (MICRO-MHOS)	PH FIELD (UNITS)	TEMPER-ATURE, WATER (DEG C)	NITRO-GEN, DIS-SOLVED (MG/L AS N)	HARD-NESS (MG/L AS CACO3)	HARD-NESS, NONCAR-BONATE (MG/L CACO3)	ACIDITY (MG/L AS CACO3)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)
JUN 23...	1610	16	49	6.0	20.0	.58	19	12	14	5.1	1.4
JUL 25...	1345	9.8	54	6.6	21.0	.72	20	5	3.0	5.4	1.5

DATE	SODIUM, DIS-SOLVED (MG/L AS NA)	SODIUM PERCENT	SODIUM AD-SORP-TION RATIO	POTAS-SIUM, DIS-SOLVED (MG/L AS K)	ALKA-LINITY (MG/L AS CACO3)	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)	FLUO-RIDE, DIS-SOLVED (MG/L AS F)	SILICA, DIS-SOLVED (MG/L AS SIO2)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)
JUN 23...	1.0	10	.1	.8	7	8.8	1.5	.1	3.9	30	29
JUL 25...	1.1	10	.1	.9	15	7.6	1.8	.0	4.2	42	34

DATE	SOLIDS, DIS-SOLVED (TONS PER AC-FT)	SOLIDS, DIS-SOLVED (TONS PER DAY)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS NH4)	NITRO-GEN, ORGANIC DIS-SOLVED (MG/L AS N)	NITRO-GEN, AM-MONIA + ORGANIC DIS. (MG/L AS N)	PHOS-PHORUS, DIS-SOLVED (MG/L AS P)	PHOS-PHORUS, ORTHOPH OSPHATE DISSOL. (MG/L AS P)	PHOS-PHORUS, ORTHOPH OSPHATE DISSOL. (MG/L AS PO4)
JUN 23...	.04	1.30	.57	.020	.03	.00	.01	.010	.000	.00
JUL 25...	.06	1.11	.55	.000	.00	.17	.17	.000	.000	.00

Table 5.--Water-quality data, 1979-80

01545600 YOUNG WOMANS CREEK NEAR RENOVO, PA

WATER QUALITY DATA, WATER YEAR OCTOBER 1979 TO SEPTEMBER 1980

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS)	SPE-CIFIC CON-DUCT-ANCE (MICRO-MHOS)	PH FIELD (UNITS)	TEMPER-ATURE, WATER (DEG C)	HARD-NESS (MG/L AS CACO3)	HARD-NESS, NONCAR-BONATE (MG/L CACO3)	ACIDITY (MG/L AS CACO3)	CALCIUM DIS-SOLVED (MG/L AS CA)
OCT									
10...	0820	140	34	7.3	7.5	13	--	--	3.7
NOV									
06...	1100	93	37	7.3	7.0	13	8	--	3.8
DEC									
17...	1100	39	34	7.2	.5	--	--	.0	--
JAN									
17...	0945	34	35	6.9	2.0	13	10	.0	3.6
FEB									
13...	0915	22	38	6.9	.5	13	5	.0	3.7
MAR									
11...	1100	70	37	6.9	.5	13	8	.0	3.7
APR									
10...	0930	388	33	6.4	8.5	13	2	5.0	3.6
MAY									
07...	1445	74	35	6.9	11.5	13	9	5.0	3.5
JUN									
17...	1130	20	36	6.8	13.0	14	6	5.0	3.9
JUL									
08...	1200	13	42	6.8	17.0	15	7	--	4.2
AUG									
12...	1300	9.0	48	6.9	21.5	15	4	5.0	4.2
SEP									
11...	1145	2.4	48	6.7	14.5	17	6	5.0	4.5

Table 5.--Water-quality data, 1979-80--Continued

01545600 YOUNG WOMANS CREEK NEAR RENOVO, PA--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1979 TO SEPTEMBER 1980

DATE	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)	SODIUM, DIS-SOLVED (MG/L AS NA)	SODIUM PERCENT	SODIUM AD-SORP-TION RATIO	POTAS-SIUM, DIS-SOLVED (MG/L AS K)	ALKA-LINITY (MG/L AS CACO3)	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)	FLUO-RIDE, DIS-SOLVED (MG/L AS F)
OCT									
10...	.9	.7	10	.1	.7	9	7.6	.8	.0
NOV									
06...	.9	.8	11	.1	.7	5	7.9	.8	.0
DEC									
17...	--	--	--	--	--	14	7.8	--	--
JAN									
17...	1.0	.8	11	.1	.6	5	8.1	1.2	.0
FEB									
13...	.9	.8	11	.1	.6	8	9.0	1.1	.0
MAR									
11...	1.0	.9	12	.1	.6	5	8.5	1.2	.1
APR									
10...	.9	.6	9	.1	.7	11	8.6	.9	.0
MAY									
07...	.9	.7	10	.1	.6	4	7.8	.8	.0
JUN									
17...	1.0	.9	12	.1	.6	8	7.4	.8	.0
JUL									
08...	1.0	1.0	12	.1	.8	8	7.3	1.1	.0
AUG									
12...	1.2	1.4	15	.2	1.0	11	8.3	1.3	.1
SEP									
11...	1.3	1.7	17	.2	.9	11	6.9	2.0	.1

DATE	SILICA, DIS-SOLVED (MG/L AS SIO2)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)	SOLIDS, DIS-SOLVED (TONS PER AC-FT)	SOLIDS, DIS-SOLVED (TONS PER DAY)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N)	PHOS-PHORUS, DIS-SOLVED (MG/L AS P)	PHOS-PHORUS, ORTHOPH OSPHATE DISSOL. (MG/L AS P)	PHOS-PHORUS, ORTHOPH OSPHATE DISSOL. (MG/L AS PO4)
OCT									
10...	4.6	26	--	.04	9.83	.31	--	.000	.00
NOV									
06...	4.1	26	23	.04	6.53	.21	--	.010	.03
DEC									
17...	--	25	--	.03	2.63	--	--	--	--
JAN									
17...	3.8	22	22	.03	2.02	.30	--	.000	.00
FEB									
13...	3.3	25	25	.03	1.48	.22	.000	.000	.00
MAR									
11...	3.6	30	25	.04	5.67	.43	--	.000	.00
APR									
10...	3.6	27	27	.04	28.3	.40	--	.000	.00
MAY									
07...	3.8	33	22	.04	6.58	.20	--	.020	.06
JUN									
17...	4.1	35	25	.05	1.87	.27	--	.000	.00
JUL									
08...	4.2	20	25	.03	.68	.23	--	.000	.00
AUG									
12...	4.9	38	30	.05	.92	.30	--	.010	.03
SEP									
11...	4.5	29	29	.04	.19	.12	--	.000	.00

Table 5.--Water-quality data, 1979-80--Continued

01545700 QUEENS RUN NEAR LOCK HAVEN, PA

WATER QUALITY DATA, WATER YEAR OCTOBER 1979 TO SEPTEMBER 1980

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS)	SPE-CIFIC CON-DUCT-ANCE (MICRO-MHOS)	PH FIELD (UNITS)	TEMPER-ATURE, WATER (DEG C)	NITRO-GEN, DIS-SOLVED (MG/L AS N)	HARD-NESS (MG/L AS CACO3)	HARD-NESS, NONCAR-BONATE (MG/L CACO3)	ACIDITY (MG/L AS CACO3)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)
JUN											
23...	1310	6.5	53	6.6	16.5	.31	20	6	6.0	6.3	1.0
JUL											
25...	0830	2.2	64	6.8	16.5	.33	23	6	4.0	7.3	1.2

DATE	SODIUM, DIS-SOLVED (MG/L AS NA)	SODIUM PERCENT	SODIUM AD-SORP-TION RATIO	POTAS-SIUM, DIS-SOLVED (MG/L AS K)	ALKA-LINITY (MG/L AS CACO3)	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)	FLUO-RIDE, DIS-SOLVED (MG/L AS F)	SILICA, DIS-SOLVED (MG/L AS SIO2)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)
JUN											
23...	1.0	9	.1	1.0	14	11	1.8	.0	5.1	34	37
JUL											
25...	1.5	12	.1	1.2	17	10	1.6	.0	5.2	44	40

DATE	SOLIDS, DIS-SOLVED (TONS PER AC-FT)	SOLIDS, DIS-SOLVED (TONS PER DAY)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS NH4)	NITRO-GEN, ORGANIC DIS-SOLVED (MG/L AS N)	NITRO-GEN,AM-MONIA + ORGANIC DIS. (MG/L AS N)	PHOS-PHORUS, DIS-SOLVED (MG/L AS P)	PHOS-PHORUS, ORTHOPH OSPHATE DISSOL. (MG/L AS P)	PHOS-PHORUS, ORTHOPH OSPHATE DISSOL. (MG/L AS PO4)
JUN										
23...	.05	.59	.31	.000	.00	.00	.00	.020	.010	.03
JUL										
25...	.06	.26	.29	.000	.00	.04	.04	.210	.190	.58

01547900 BIG RUN AT ORVISTON, PA

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS)	SPE-CIFIC CON-DUCT-ANCE (MICRO-MHOS)	PH FIELD (UNITS)	TEMPER-ATURE, WATER (DEG C)	NITRO-GEN, DIS-SOLVED (MG/L AS N)	HARD-NESS (MG/L AS CACO3)	HARD-NESS, NONCAR-BONATE (MG/L CACO3)	ACIDITY (MG/L AS CACO3)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)
JUN											
23...	1100	21	67	6.1	13.5	.18	22	22	6.0	4.2	2.9
JUL											
29...	0930	14	95	5.2	19.0	.25	31	29	6.0	5.3	4.3

Table 5.--Water-quality data, 1979-80--Continued

01547900 BIG RUN AT ORVISTON, PA--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1979 TO SEPTEMBER 1980

DATE	SODIUM, DIS-SOLVED (MG/L AS NA)	SODIUM PERCENT	SODIUM AD-SORP-TION RATIO	POTAS-SIUM, DIS-SOLVED (MG/L AS K)	ALKA-LINITY (MG/L AS CACO3)	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)	FLUO-RIDE, DIS-SOLVED (MG/L AS F)	SILICA, DIS-SOLVED (MG/L AS SIO2)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)
JUN											
23...	.7	6	.1	.8	0	23	.9	.1	5.1	49	38
JUL											
29...	1.5	9	.1	1.0	2	35	.7	.0	5.6	64	55

DATE	SOLIDS, DIS-SOLVED (TONS PER AC-FT)	SOLIDS, DIS-SOLVED (TONS PER DAY)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS NH4)	NITRO-GEN, ORGANIC DIS-SOLVED (MG/L AS N)	NITRO-GEN,AM-MONIA + ORGANIC DIS. (MG/L AS N)	PHOS-PHORUS, DIS-SOLVED (MG/L AS P)	PHOS-PHORUS, ORTHOPH OSPHATE DISSOL. (MG/L AS P)	PHOS-PHORUS, ORTHOPH OSPHATE DISSOL. (MG/L AS PO4)
JUN										
23...	.07	2.77	.17	.060	.08	.00	.01	.000	.000	.00
JUL										
29...	.09	2.45	.20	.000	.00	.05	.05	.020	.000	.00

01548800 TROUT RUN AT CAMMAL, PA

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS)	SPE-CIFIC CON-DUCT-ANCE (MICRO-MHOS)	PH FIELD (UNITS)	TEMPER-ATURE, WATER (DEG C)	NITRO-GEN, DIS-SOLVED (MG/L AS N)	HARD-NESS (MG/L AS CACO3)	HARD-NESS, NONCAR-BONATE (MG/L CACO3)	ACIDITY (MG/L AS CACO3)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)
JUN											
24...	1025	4.8	28	6.5	13.5	.20	9	6	8.0	2.2	.8
JUL											
25...	1600	1.9	31	6.4	18.5	.31	10	0	5.0	2.4	.9

DATE	SODIUM, DIS-SOLVED (MG/L AS NA)	SODIUM PERCENT	SODIUM AD-SORP-TION RATIO	POTAS-SIUM, DIS-SOLVED (MG/L AS K)	ALKA-LINITY (MG/L AS CACO3)	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)	FLUO-RIDE, DIS-SOLVED (MG/L AS F)	SILICA, DIS-SOLVED (MG/L AS SIO2)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)
JUN											
24...	.8	15	.1	.8	3	6.1	1.1	.0	4.6	20	19
JUL											
25...	1.0	17	.1	.9	13	5.6	1.0	.0	5.0	26	26

Table 5.--Water-quality data, 1979-80--Continued

01548800 TROUT RUN AT CAMMAL, PA—Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1979 TO SEPTEMBER 1980

DATE	SOLIDS, DIS-SOLVED (TONS PER AC-FT)	SOLIDS, DIS-SOLVED (TONS PER DAY)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS NH4)	NITRO-GEN, ORGANIC DIS-SOLVED (MG/L AS N)	NITRO-GEN,AM-MONIA + ORGANIC DIS. (MG/L AS N)	PHOS-PHORUS, DIS-SOLVED (MG/L AS P)	PHOS-PHORUS, ORTHOPH OSPHATE DISSOL. (MG/L AS P)	PHOS-PHORUS, ORTHOPH OSPHATE DISSOL. (MG/L AS PO4)
JUN										
24...	.03	.26	.19	.040	.05	.00	.01	.010	.020	.06
JUL										
25...	.04	.13	.24	.020	.03	.05	.07	.000	.000	.00

01551900 ELK CREEK NEAR ESTELLA, PA

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS)	SPE-CIFIC CON-DUCT-ANCE (MICRO-MHOS)	PH FIELD (UNITS)	TEMPER-ATURE, WATER (DEG C)	NITRO-GEN, DIS-SOLVED (MG/L AS N)	HARD-NESS (MG/L AS CACO3)	HARD-NESS, NONCAR-BONATE (MG/L CACO3)	ACIDITY (MG/L AS CACO3)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)
JUN											
24...	1340	2.2	68	6.7	17.0	.55	23	15	6.0	7.4	1.2
JUL											
28...	1230	.47	81	6.9	21.0	.73	27	11	4.0	8.5	1.4

DATE	SODIUM, DIS-SOLVED (MG/L AS NA)	SODIUM PERCENT	SODIUM AD-SORP-TION RATIO	POTAS-SIUM, DIS-SOLVED (MG/L AS K)	ALKA-LINITY (MG/L AS CACO3)	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)	FLUO-RIDE, DIS-SOLVED (MG/L AS F)	SILICA, DIS-SOLVED (MG/L AS SIO2)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)
JUN											
24...	2.2	16	.2	.9	8	9.3	3.5	.1	4.1	40	36
JUL											
28...	3.2	20	.3	1.0	16	8.9	4.9	.1	3.7	60	44

DATE	SOLIDS, DIS-SOLVED (TONS PER AC-FT)	SOLIDS, DIS-SOLVED (TONS PER DAY)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS NH4)	NITRO-GEN, ORGANIC DIS-SOLVED (MG/L AS N)	NITRO-GEN,AM-MONIA + ORGANIC DIS. (MG/L AS N)	PHOS-PHORUS, DIS-SOLVED (MG/L AS P)	PHOS-PHORUS, ORTHOPH OSPHATE DISSOL. (MG/L AS P)	PHOS-PHORUS, ORTHOPH OSPHATE DISSOL. (MG/L AS PO4)
JUN										
24...	.05	.24	.53	.030	.04	.00	.02	.010	.010	.03
JUL										
28...	.08	.08	.54	.020	.03	.17	.19	.030	.020	.06

Table 5.--Water-quality data, 1979-80--Continued

01553000 LITTLE MUNCY CREEK AT LAIRDSVILLE, PA

WATER QUALITY DATA, WATER YEAR OCTOBER 1979 TO SEPTEMBER 1980

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS)	SPE-CIFIC CON-DUCT-ANCE (MICRO-MHOS)	PH FIELD (UNITS)	TEMPER-ATURE, WATER (DEG C)	NITRO-GEN, DIS-SOLVED (MG/L AS N)	HARD-NESS (MG/L AS CACO3)	HARD-NESS, NONCAR-BONATE (MG/L CACO3)	ACIDITY (MG/L AS CACO3)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)
JUN											
24...	1530	8.6	80	7.0	24.0	.37	29	8	5.0	9.0	1.6
JUL											
28...	0830	3.4	90	7.1	22.5	.41	32	0	3.0	9.7	1.8

DATE	SODIUM, DIS-SOLVED (MG/L AS NA)	SODIUM PERCENT	SODIUM AD-SORP-TION RATIO	POTAS-SIUM, DIS-SOLVED (MG/L AS K)	ALKA-LINITY (MG/L AS CACO3)	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)	FLUO-RIDE, DIS-SOLVED (MG/L AS F)	SILICA, DIS-SOLVED (MG/L AS SIO2)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)
JUN											
24...	3.4	20	.3	.9	21	8.0	6.4	.1	4.1	50	47
JUL											
28...	4.0	21	.3	1.0	32	6.0	6.8	.0	2.1	55	52

DATE	SOLIDS, DIS-SOLVED (TONS PER AC-FT)	SOLIDS, DIS-SOLVED (TONS PER DAY)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS NH4)	NITRO-GEN, ORGANIC DIS-SOLVED (MG/L AS N)	NITRO-GEN, AM-MONIA + ORGANIC DIS. (MG/L AS N)	PHOS-PHORUS, DIS-SOLVED (MG/L AS P)	PHOS-PHORUS, ORTHOPH OSPHATE DISSOL. (MG/L AS P)	PHOS-PHORUS, ORTHOPH OSPHATE DISSOL. (MG/L AS PO4)
JUN										
24...	.07	1.16	.18	.000	.00	.19	.19	.010	.010	.03
JUL										
28...	.07	.50	.28	.020	.03	.11	.13	.080	.060	.18

01559200 LAUREL RUN AT MCALEVYS FORT, PA

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS)	SPE-CIFIC CON-DUCT-ANCE (MICRO-MHOS)	PH FIELD (UNITS)	TEMPER-ATURE, WATER (DEG C)	NITRO-GEN, DIS-SOLVED (MG/L AS N)	HARD-NESS (MG/L AS CACO3)	HARD-NESS, NONCAR-BONATE (MG/L CACO3)	ACIDITY (MG/L AS CACO3)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)
JUN											
24...	1015	4.9	54	7.3	18.0	.71	22	13	6.0	6.5	1.5
AUG											
04...	1650	3.7	65	7.6	24.5	.10	25	6	6.0	7.5	1.6

Table 5.--Water-quality data, 1979-80--Continued

01558200 LAUREL RUN AT MCALEVYS FORT, PA--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1979 TO SEPTEMBER 1980

DATE	SODIUM, DIS-SOLVED (MG/L AS NA)	SODIUM PERCENT	SODIUM AD-SORP-TION RATIO	POTAS-SIUM, DIS-SOLVED (MG/L AS K)	ALKA-LINITY (MG/L AS CACO3)	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)	FLUO-RIDE, DIS-SOLVED (MG/L AS F)	SILICA, DIS-SOLVED (MG/L AS SIO2)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)
JUN 24...	.7	6	.1	.7	9	6.9	.8	.1	4.0	43	27
AUG 04...	.8	6	.1	.7	19	5.7	1.2	.0	3.0	48	32

DATE	SOLIDS, DIS-SOLVED (TONS PER AC-FT)	SOLIDS, DIS-SOLVED (TONS PER DAY)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS NH4)	NITRO-GEN, ORGANIC DIS-SOLVED (MG/L AS N)	NITRO-GEN, AM-MONIA + ORGANIC DIS. (MG/L AS N)	PHOS-PHORUS, DIS-SOLVED (MG/L AS P)	PHOS-PHORUS, ORTHOPH OSPHATE DISSOL. (MG/L AS P)	PHOS-PHORUS, ORTHOPH OSPHATE DISSOL. (MG/L AS PO4)
JUN 24...	.06	.57	.12	.070	.09	.52	.59	.010	.010	.03
AUG 04...	.07	.47	.06	.000	.00	.04	.04	.000	.000	.00

01559800 BOBS CREEK AT WEYANT, PA

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS)	SPE-CIFIC CON-DUCT-ANCE (MICRO-MHOS)	PH FIELD (UNITS)	TEMPER-ATURE, WATER (DEG C)	NITRO-GEN, DIS-SOLVED (MG/L AS N)	HARD-NESS (MG/L AS CACO3)	HARD-NESS, NONCAR-BONATE (MG/L CACO3)	ACIDITY (MG/L AS CACO3)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)
JUN 24...	1745	25	76	7.4	18.5	1.5	25	11	5.0	5.9	2.5
AUG 04...	1030	24	80	7.4	18.5	1.1	26	16	6.0	6.4	2.5

DATE	SODIUM, DIS-SOLVED (MG/L AS NA)	SODIUM PERCENT	SODIUM AD-SORP-TION RATIO	POTAS-SIUM, DIS-SOLVED (MG/L AS K)	ALKA-LINITY (MG/L AS CACO3)	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)	FLUO-RIDE, DIS-SOLVED (MG/L AS F)	SILICA, DIS-SOLVED (MG/L AS SIO2)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)
JUN 24...	1.8	13	.2	1.1	14	12	2.4	.0	5.2	50	45
AUG 04...	2.2	15	.2	1.2	10	13	2.6	.0	5.3	48	44

Table 5.—Water-quality data, 1979-80--Continued

01559800 BOBS CREEK AT WEYANT, PA—Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1979 TO SEPTEMBER 1980

DATE	SOLIDS, DISSOLVED (TONS PER AC-FT)	SOLIDS, DISSOLVED (TONS PER DAY)	NITROGEN, NO2+NO3 DISSOLVED (MG/L AS N)	NITROGEN, AMMONIA DISSOLVED (MG/L AS N)	NITROGEN, AMMONIA DISSOLVED (MG/L AS NH4)	NITROGEN, ORGANIC DISSOLVED (MG/L AS N)	NITROGEN, AMMONIA + ORGANIC DIS. (MG/L AS N)	PHOSPHORUS, DISSOLVED (MG/L AS P)	PHOSPHORUS, ORTHOPHOSPHATE DISSOL. (MG/L AS P)	PHOSPHORUS, ORTHOPHOSPHATE DISSOL. (MG/L AS PO4)
JUN 24...	.07	3.31	1.3	.060	.08	.09	.15	.020	.020	.06
AUG 04...	.07	3.07	1.1	.000	.00	.01	.01	.030	.020	.06

01576800 OTTER CREEK NEAR NEW BRIDGEVILLE, PA

DATE	TIME	STREAMFLOW, INSTANTANEOUS (CFS)	SPECIFIC CONDUCTANCE (MICROMHOS)	PH FIELD (UNITS)	TEMPERATURE, WATER (DEG C)	NITROGEN, DISSOLVED (MG/L AS N)	HARDNESS (MG/L AS CACO3)	HARDNESS, NONCARBONATE (MG/L CACO3)	ACIDITY (MG/L AS CACO3)	CALCIUM DISSOLVED (MG/L AS CA)	MAGNESIUM, DISSOLVED (MG/L AS MG)
JUN 25...	0915	3.8	110	7.1	18.0	5.5	37	26	9.0	7.2	4.5
JUL 29...	0900	2.4	106	7.2	21.0	3.7	31	19	9.0	6.0	4.0

DATE	SODIUM, DISSOLVED (MG/L AS NA)	SODIUM PERCENT	SODIUM ADSORPTION RATIO	POTASSIUM, DISSOLVED (MG/L AS K)	ALKALINITY (MG/L AS CACO3)	SULFATE DISSOLVED (MG/L AS SO4)	CHLORIDE, DISSOLVED (MG/L AS CL)	FLUORIDE, DISSOLVED (MG/L AS F)	SILICA, DISSOLVED (MG/L AS SIO2)	SOLIDS, RESIDUE AT 180 DEG. C DISSOLVED (MG/L)	SOLIDS, SUM OF CONSTITUENTS, DISSOLVED (MG/L)
JUN 25...	4.6	21	.3	1.3	11	4.5	11	.0	4.8	83	68
JUL 29...	4.6	23	.4	1.3	12	2.6	9.9	.0	4.8	64	57

DATE	SOLIDS, DISSOLVED (TONS PER AC-FT)	SOLIDS, DISSOLVED (TONS PER DAY)	NITROGEN, NO2+NO3 DISSOLVED (MG/L AS N)	NITROGEN, AMMONIA DISSOLVED (MG/L AS N)	NITROGEN, AMMONIA DISSOLVED (MG/L AS NH4)	NITROGEN, ORGANIC DISSOLVED (MG/L AS N)	NITROGEN, AMMONIA + ORGANIC DIS. (MG/L AS N)	PHOSPHORUS, DISSOLVED (MG/L AS P)	PHOSPHORUS, ORTHOPHOSPHATE DISSOL. (MG/L AS P)	PHOSPHORUS, ORTHOPHOSPHATE DISSOL. (MG/L AS PO4)
JUN 25...	.11	.86	5.3	.040	.05	.15	.19	.010	.040	.12
JUL 29...	.09	.42	3.7	.010	.01	.00	.01	.010	.010	.03

Table 5.--Water-quality data, 1979-80--Continued

03009000 POTATO CREEK AT BETULA, PA

WATER QUALITY DATA, WATER YEAR OCTOBER 1979 TO SEPTEMBER 1980

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS)	SPE-CIFIC CON-DUCT-ANCE (MICRO-MHOS)	PH FIELD (UNITS)	TEMPER-ATURE, WATER (DEG C)	NITRO-GEN, DIS-SOLVED (MG/L AS N)	HARD-NESS (MG/L AS CACO3)	HARD-NESS, NONCAR-BONATE (MG/L CACO3)	ACIDITY (MG/L AS CACO3)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)
JUN 19...	1315	23	<50	6.9	14.0	1.7	16	7	1.0	3.8	1.5

DATE	SODIUM, DIS-SOLVED (MG/L AS NA)	SODIUM PERCENT	SODIUM AD-SORP-TION RATIO	POTAS-SIUM, DIS-SOLVED (MG/L AS K)	ALKA-LINITY (MG/L AS CACO3)	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)	FLUO-RIDE, DIS-SOLVED (MG/L AS F)	SILICA, DIS-SOLVED (MG/L AS SIO2)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)
JUN 19...	.9	11	.1	.7	4	11	1.2	.1	4.8	32	29

DATE	SOLIDS, DIS-SOLVED (TONS PER AC-FT)	SOLIDS, DIS-SOLVED (TONS PER DAY)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS NH4)	NITRO-GEN, ORGANIC DIS-SOLVED (MG/L AS N)	NITRO-GEN, AM-MONIA + ORGANIC DIS. (MG/L AS N)	PHOS-PHORUS, DIS-SOLVED (MG/L AS P)	PHOS-PHORUS, ORTHOPH OSPHATE DISSOL. (MG/L AS P)	PHOS-PHORUS, ORTHOPH OSPHATE DISSOL. (MG/L AS PO4)
JUN 19...	.04	2.00	.32	.060	.08	1.3	1.4	.000	.000	.00

03010650 OSWAYO CREEK NEAR CONEVILLE, PA

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS)	SPE-CIFIC CON-DUCT-ANCE (MICRO-MHOS)	PH FIELD (UNITS)	TEMPER-ATURE, WATER (DEG C)	NITRO-GEN, DIS-SOLVED (MG/L AS N)	HARD-NESS (MG/L AS CACO3)	HARD-NESS, NONCAR-BONATE (MG/L CACO3)	ACIDITY (MG/L AS CACO3)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)
JUN 19...	1645	21	58	9.0	19.0	.80	25	9	.0	6.5	2.2

DATE	SODIUM, DIS-SOLVED (MG/L AS NA)	SODIUM PERCENT	SODIUM AD-SORP-TION RATIO	POTAS-SIUM, DIS-SOLVED (MG/L AS K)	ALKA-LINITY (MG/L AS CACO3)	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)	FLUO-RIDE, DIS-SOLVED (MG/L AS F)	SILICA, DIS-SOLVED (MG/L AS SIO2)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)
JUN 19...	1.5	11	.1	.9	16	10	1.7	.1	3.9	42	36

Table 5.--Water-quality data, 1979-80--Continued

03010650 OSWAYO CREEK NEAR CONEVILLE, PA--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1979 TO SEPTEMBER 1980

DATE	SOLIDS, DIS-SOLVED (TONS PER AC-FT)	SOLIDS, DIS-SOLVED (TONS PER DAY)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS NH4)	NITRO-GEN, ORGANIC DIS-SOLVED (MG/L AS N)	NITRO-GEN,AM-MONIA + ORGANIC DIS. (MG/L AS N)	PHOS-PHORUS, DIS-SOLVED (MG/L AS P)	PHOS-PHORUS, ORTHOPH OSPHATE DISSOL. (MG/L AS P)	PHOS-PHORUS, ORTHOPH OSPHATE DISSOL. (MG/L AS PO4)
JUN 19...	.06	2.34	.32	.070	.09	.41	.48	.040	.050	.15

03015800 EAST HICKORY CREEK AT ENDEAVOR, PA

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS)	SPE-CIFIC CON-DUCT-ANCE (MICRO-MHOS)	PH FIELD (UNITS)	TEMPER-ATURE, WATER (DEG C)	NITRO-GEN, DIS-SOLVED (MG/L AS N)	HARD-NESS (MG/L AS CACO3)	HARD-NESS, NONCAR-BONATE (MG/L CACO3)	ACIDITY (MG/L AS CACO3)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)
JUN 20...	1050	28	<50	7.1	13.0	.91	13	9	1.0	2.9	1.5

DATE	SODIUM, DIS-SOLVED (MG/L AS NA)	SODIUM PERCENT	SODIUM AD-SORP-TION RATIO	POTAS-SIUM, DIS-SOLVED (MG/L AS K)	ALKA-LINITY (MG/L AS CACO3)	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)	FLUO-RIDE, DIS-SOLVED (MG/L AS F)	SILICA, DIS-SOLVED (MG/L AS SIO2)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)
JUN 20...	2.0	23	.2	.9	6	9.4	2.1	.1	6.3	36	28

DATE	SOLIDS, DIS-SOLVED (TONS PER AC-FT)	SOLIDS, DIS-SOLVED (TONS PER DAY)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS NH4)	NITRO-GEN, ORGANIC DIS-SOLVED (MG/L AS N)	NITRO-GEN,AM-MONIA + ORGANIC DIS. (MG/L AS N)	PHOS-PHORUS, DIS-SOLVED (MG/L AS P)	PHOS-PHORUS, ORTHOPH OSPHATE DISSOL. (MG/L AS P)	PHOS-PHORUS, ORTHOPH OSPHATE DISSOL. (MG/L AS PO4)
JUN 20...	.05	2.75	.34	.110	.14	.46	.57	.010	.000	.00

03039800 CLEAR SHADE CREEK AT OGLETOWN, PA

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS)	SPE-CIFIC CON-DUCT-ANCE (MICRO-MHOS)	PH FIELD (UNITS)	TEMPER-ATURE, WATER (DEG C)	NITRO-GEN, DIS-SOLVED (MG/L AS N)	HARD-NESS (MG/L AS CACO3)	HARD-NESS, NONCAR-BONATE (MG/L CACO3)	ACIDITY (MG/L AS CACO3)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)
JUN 19...	0900	12	35	6.8	11.0	3.3	15	8	1.0	4.5	.8

Table 5.--Water-quality data, 1979-80--Continued

03039800 CLEAR SHADE CREEK AT OGLETOWN, PA--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1979 TO SEPTEMBER 1980

DATE	SODIUM, DIS-SOLVED (MG/L AS NA)	SODIUM PERCENT	SODIUM AD-SORP-TION RATIO	POTAS-SIUM, DIS-SOLVED (MG/L AS K)	ALKA-LINITY (MG/L AS CACO3)	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)	FLUO-RIDE, DIS-SOLVED (MG/L AS F)	SILICA, DIS-SOLVED (MG/L AS SIO2)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)
JUN 19...	.5	7	.1	.7	8	5.9	.9	.0	4.2	36	22

DATE	SOLIDS, DIS-SOLVED (TONS PER AC-FT)	SOLIDS, DIS-SOLVED (TONS PER DAY)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS NH4)	NITRO-GEN, ORGANIC DIS-SOLVED (MG/L AS N)	NITRO-GEN,AM-MONIA + ORGANIC DIS. (MG/L AS N)	PHOS-PHORUS, DIS-SOLVED (MG/L AS P)	PHOS-PHORUS, ORTHOPH OSPHATE DISSOL. (MG/L AS P)	PHOS-PHORUS, ORTHOPH OSPHATE DISSOL. (MG/L AS PO4)
JUN 19...	.05	1.12	.83	.070	.09	2.4	2.5	.010	.000	.00

03078700 ELKLICK CREEK AT SUMMIT MILLS, PA

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS)	SPE-CIFIC CON-DUCT-ANCE (MICRO-MHOS)	PH FIELD (UNITS)	TEMPER-ATURE, WATER (DEG C)	NITRO-GEN, DIS-SOLVED (MG/L AS N)	HARD-NESS (MG/L AS CACO3)	HARD-NESS, NONCAR-BONATE (MG/L CACO3)	ACIDITY (MG/L AS CACO3)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)
JUN 20...	0920	20	125	7.3	13.0	.20	51	38	.6	14	3.8

DATE	SODIUM, DIS-SOLVED (MG/L AS NA)	SODIUM PERCENT	SODIUM AD-SORP-TION RATIO	POTAS-SIUM, DIS-SOLVED (MG/L AS K)	ALKA-LINITY (MG/L AS CACO3)	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)	FLUO-RIDE, DIS-SOLVED (MG/L AS F)	SILICA, DIS-SOLVED (MG/L AS SIO2)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)
JUN 20...	1.2	5	.1	1.2	10	30	2.5	.1	4.9	75	66

DATE	SOLIDS, DIS-SOLVED (TONS PER AC-FT)	SOLIDS, DIS-SOLVED (TONS PER DAY)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS NH4)	NITRO-GEN, ORGANIC DIS-SOLVED (MG/L AS N)	NITRO-GEN,AM-MONIA + ORGANIC DIS. (MG/L AS N)	PHOS-PHORUS, DIS-SOLVED (MG/L AS P)	PHOS-PHORUS, ORTHOPH OSPHATE DISSOL. (MG/L AS P)	PHOS-PHORUS, ORTHOPH OSPHATE DISSOL. (MG/L AS PO4)
JUN 20...	.10	4.11	.15	.040	.05	.01	.05	.010	.000	.00

Table 5.--Water-quality data, 1979-80

03080000 LAUREL HILL CREEK AT URSINA, PA

WATER QUALITY DATA, WATER YEAR OCTOBER 1978 TO SEPTEMBER 1979

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS)	SPE-CIFIC CON-DUCT-ANCE (MICRO-MHOS)	PH FIELD (UNITS)	TEMPER-ATURE, WATER (DEG C)	ACIDITY (MG/L AS CACO3)	ALKA-LINITY (MG/L AS CACO3)	SULFATE DIS-SOLVED (MG/L AS SO4)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L)	SOLIDS, DIS-SOLVED (TONS PER AC-FT)	SOLIDS, DIS-SOLVED (TONS PER DAY)
JUN 13...	1000	74	100	6.3	20.0	--	11	15	--	--	--
AUG 16...	1051	224	81	7.0	16.0	.0	13	11	62	.08	37.5

WATER QUALITY DATA, WATER YEAR OCTOBER 1979 TO SEPTEMBER 1980

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS)	SPE-CIFIC CON-DUCT-ANCE (MICRO-MHOS)	PH FIELD (UNITS)	TEMPER-ATURE, WATER (DEG C)	ACIDITY (MG/L AS CACO3)	ALKA-LINITY (MG/L AS CACO3)	SULFATE DIS-SOLVED (MG/L AS SO4)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L)	SOLIDS, DIS-SOLVED (TONS PER AC-FT)	SOLIDS, DIS-SOLVED (TONS PER DAY)
APR 03...	1030	594	80	6.8	9.0	5.0	6	10	50	.07	80.2

03081200 DRAKE RUN NEAR CONFLUENCE, PA

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS)	SPE-CIFIC CON-DUCT-ANCE (MICRO-MHOS)	PH FIELD (UNITS)	TEMPER-ATURE, WATER (DEG C)	NITRO-GEN, DIS-SOLVED (MG/L AS N)	HARD-NESS (MG/L AS CACO3)	HARD-NESS, NONCAR-BONATE (MG/L CACO3)	ACIDITY (MG/L AS CACO3)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)
JUN 20...	1145	8.4	68	5.2	12.5	1.7	12	10	2.0	3.2	.9

DATE	SODIUM, DIS-SOLVED (MG/L AS NA)	SODIUM PERCENT	SODIUM AD-SORP-TION RATIO	POTAS-SIUM, DIS-SOLVED (MG/L AS K)	ALKA-LINITY (MG/L AS CACO3)	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)	FLUO-RIDE, DIS-SOLVED (MG/L AS F)	SILICA, DIS-SOLVED (MG/L AS SIO2)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)
JUN 20...	2.6	31	.3	.6	0	9.0	6.1	.1	4.6	34	28

DATE	SOLIDS, DIS-SOLVED (TONS PER AC-FT)	SOLIDS, DIS-SOLVED (TONS PER DAY)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS NH4)	NITRO-GEN, ORGANIC DIS-SOLVED (MG/L AS N)	NITRO-GEN, AM-MONIA + ORGANIC DIS. (MG/L AS N)	PHOS-PHORUS, DIS-SOLVED (MG/L AS P)	PHOS-PHORUS, ORTHOPH OSPHATE DISSOL. (MG/L AS P)	PHOS-PHORUS, ORTHOPH OSPHATE DISSOL. (MG/L AS PO4)
JUN 20...	.05	.77	.42	.060	.08	1.2	1.3	.010	.000	.00