Data on the Quantity and Chemical Quality of Precipitation, Catoctin Mountain, North-Central Maryland, 1982-91

By Karen C. Rice, Margaret M. Kennedy, Owen P. Bricker, and Colleen A. Donnelly

---

U.S. GEOLOGICAL SURVEY

Open-File Report 93-169

Prepared in Cooperation with the National Acid Precipitation Assessment Program, the Maryland Department of the Environment, and the Maryland Department of Natural Resources

Towson, Maryland
1993

U.S. DEPARTMENT OF THE INTERIOR
BRUCE BABBITT, Secretary

U.S. GEOLOGICAL SURVEY
Robert M. Hirsch, Acting Director

For additional information write to:

Area Assistant Regional Hydrologist,
U.S. Geological Survey, WRD
8600 LaSalle Rd, 208 Carroll Bldg.
Towson, MD 21286

Copies of this report can be purchased from:

U.S. Geological Survey
Earth Science Information Center
Open-File Reports Section
Box 25286, MS 517
Denver Federal Center
Denver, CO 80225

CONTENTS

FIGURES

TABLES

TABLES (continued)

Data on the Quantity and Chemical Quality of Precipitation, Catoctin Mountain, North-Central Maryland, 1982-91

By Karen C. Rice, Margaret M. Kennedy, Owen P. Bricker, and Colleen A. Donnelly

ABSTRACT

This report presents data on the quantity and chemical quality of precipitation from Catoctin Mountain in Cunningham Falls State Park, near Thurmont, Maryland, collected by the U.S. Geological Survey (USGS) from January 1982 through December 1991 at a USGS precipitation-collection station. Data on the quantity of precipitation are presented in tables as daily, monthly, and annual totals of precipitation, in inches. Data on the chemical quality of precipitation are presented in tables as concentrations, in microequivalents per liter. Data on the quantity and chemical quality of precipitation and statistical information about the data are summarized in tables. Data for annual precipitation-weighted mean concentrations of constituents in precipitation are summarized in tables. Annual precipitation-weighted mean concentrations of selected precipitation constituents are illustrated in graphs.

INTRODUCTION

This report presents data for precipitation that were collected by the U.S. Geological Survey (USGS) as part of the interagency National Acid Precipitation Assessment Program (NAPAP), in cooperation with the Maryland Department of the Environment and the Maryland Department of Natural Resources. A mandate for NAPAP was established by Congress in 1980. A precipitation-collection station was installed in 1981 by the USGS at Catoctin Mountain in Cunningham Falls State Park, north-central Maryland (fig. 1), to monitor the quantity and chemistry of precipitation in the area as a result of the mandate. In 1990, additional funding was given to the USGS by the Maryland Department of the Environment and the Maryland Department of Natural Resources.

Purpose and Scope

The purpose of this report is to present data on the quantity and chemical quality of precipitation collected at the USGS precipitation-collection station at Catoctin Mountain, Maryland, from January 1982 through December 1991. Descriptions of the instrumentation and methods used to collect samples of precipitation and field data and descriptions of the instrumentation and methods used for laboratory analyses of the samples are included. Data for the quantity and chemical quality of precipitation, statistical information about the data, and precipitation-weighted mean chemical data are found in tables. The report also includes graphs showing annual precipitation-weighted mean constituent concentrations of selected data.

Description of Study Area

The USGS precipitation-collection station at Catoctin Mountain is located in the William Houck Area in Cunningham Falls State Park, 3 mi west of the town of Thurmont, in Frederick County, Md. (fig. 1). The precipitation-collection station is situated on a raised wooden platform (6.5 ft) constructed on top of a 25-ft high water-storage tank in one of the campgrounds in the park. The water-storage tank is located at an elevation of 1,700 ft and is in the middle of a clearing, with the nearest tree canopy 25 ft from the tank.

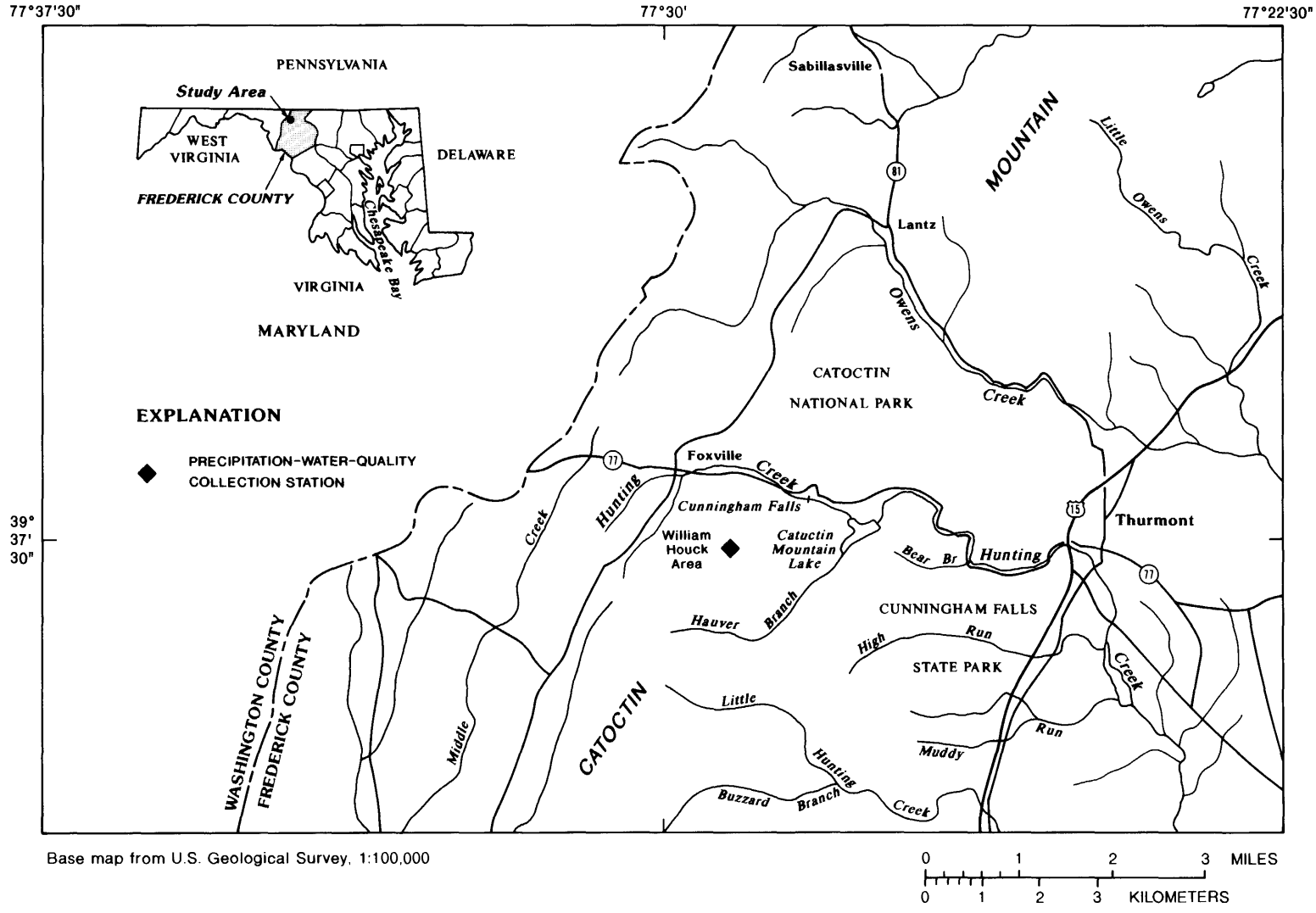

Figure 1. Location of the U.S. Geological Survey precipitation-collection station at Catoctin Mountain, Maryland.

Acknowledgments

The authors would like to thank the Maryland Department of Natural Resources for allowing the precipitation-collection station to be maintained on Cunningham Falls State Park property. Appreciation is also given to the park rangers of Cunningham Falls State Park for their assistance, by providing access to the precipitation-collection station during and following inclement weather.

COLLECTION AND ANALYSIS OF DATA

Collection of data on the quantity and chemical quality of precipitation at the USGS Catoctin Mountain precipitation-collection station began in January 1982. Although this report summarizes data collected from January 1982 through December 1991, data continue to be collected from the station.

Instrumentation of Precipitation-Collection Station

A Belfort[1] #5-780 Series Universal Recording weighing-bucket rain gage was used to record the data on the quantity of precipitation. The data were recorded with ink on a 7-day paper chart, driven by a spring-wound chart-drive mechanism. An Aerochem Metrics model #301 automatic-sensing wet/dry atmospheric-deposition collector, powered by a 12-volt marine wet-cell battery, was used to collect samples of precipitation for chemical analysis. Only wet-deposition samples were collected. The Aerochem Metrics collector was selected for this site to be consistent with the equipment used by the National Atmospheric Deposition Program (NADP) and the National Trends Network (NTN) program.

Field Data-Collection Methods

Samples were collected from the precipitation-collection station on a weekly basis, usually on a Tuesday at 9:00 a.m., in conformance with NADP guidelines. Collecting precipitation data on a weekly basis on Tuesday is important so that all programs that collect precipitation data are consistent and data collected by different programs and at different localities can be compared. If data could not be collected that day (for example if a holiday fell on a Tuesday or if inclement weather prevented access to the precipitation-collection station), the data were collected on the previous or following day, when possible.

Data on the quantity of precipitation were collected from the site by removing the paper chart from the Belfort weighing-bucket rain gage. The Belfort weighing-bucket rain gage was serviced by adjusting the water level in the weighing bucket, adding antifreeze to prevent freezing or mineral oil to prevent evaporation (depending on the season), winding the chart-drive mechanism, and installing a new paper chart. Later, the paper chart, which held the data from the previous week, was read and the daily amounts of precipitation were recorded in tables. Two lines were recorded on the paper chart--one showed the quantity of precipitation for each day of the week and the second showed the time and date that the lid opened automatically on the Aerochem Metrics wet collector.

Wet-only precipitation-chemistry samples were collected weekly from the Aerochem Metrics collector, if a sufficient volume of precipitation was available in the bucket (equivalent to 0.2 in. of precipitation). The bucket was retrieved and replaced with a spare bucket that had been triple-rinsed with distilled water. If the quantity of precipitation collected in the bucket was too small for any measurements to be made, the sample was discarded and the bucket was replaced with a clean spare bucket. If no sample was available in the collection bucket, the empty bucket was replaced with a clean spare bucket.

If up to 2 fl. oz of precipitation sample were available, temperature-compensated measurements of specific conductance and pH of the sample were performed in the field. A small aliquot (up to 2 fl. oz) of unfiltered sample was poured into a plastic cup. The specific conductance and pH measurements were made on this separate aliquot of sample. When a limited amount of precipitation sample was available, the volume of the separate aliquot of sample was only large enough to wet the conductivity cell and pH electrode sufficiently to obtain a reading in order to preserve an adequate amount of sample to be prepared for laboratory analyses. For some weeks, there was a sufficient volume of sample to perform only field measurements.

[1] The use of trade or product names in this report is for identification purposes only and does not constitute endorsement by the U.S. Geological Survey. Field Data-Collection Methods

From January 1982 through December 1989, specific conductance was measured using a Labline model MC-1 Mark V temperature-compensated specific conductance meter. Beginning in January 1990, a YSI model #34 Conductance-Resistance meter and a model #3417 conductivity cell were used to measure specific conductance. The performance of the cell was checked with specific conductance standard solutions before use. From January 1982 through December 1988, a Beckman Phi 30 pH meter with a Futura II glass combination electrode was used to measure pH of the precipitation samples. Beginning in January 1989, a Beckman Phi 31 pH meter with an Orion Ross glass combination electrode was used to measure pH. The electrode was calibrated before each use with standard buffer solutions of pH 7 and 4. The calibration of the electrode was then checked in 1 x 10^{-4} normal sulfuric acid. This pH measurement is reported in the tables as "pH, field."

If a sufficient volume of precipitation sample was available after the field measurements of specific conductance and pH were made, the remaining sample was prepared for laboratory analysis. The sample was filtered through a 0.1-micron pore size cellulose nitrate filter, using positive pressure delivered by a peristaltic pump. Approximately 4 oz (125 mL) of the filtered sample was chilled to 4°C in a brown polyethylene bottle. An additional 4 oz of sample was filtered into a white, polyethylene, nitric acid-rinsed bottle; approximately 0.0068 fl. oz (equivalent to 200 µL) of Baker's Instra-Analyzed concentrated nitric acid was added to preserve the sample. The filtered samples were sent to the Geochemical Cycling of Trace Elements and Nutrients Laboratory of the Eastern Region Branch of Regional Research of the USGS in Reston, Va., for analysis of the major inorganic ions and the unspeciated (or total) form of aluminum and iron.

Beginning in April 1990, samples were collected for analysis of the stable isotopic ratios of deuterium/protium (δD) and oxygen-18/oxygen-16 ($\delta^{18}O$). A 2-fl. oz unfiltered precipitation sample was decanted into a flint glass bottle with a polyseal cap. The bottle caps were covered with Parafilm to further ensure against evaporation. The samples were sent to the Isotope Fractionation Laboratory of the Eastern Region Branch of Regional Research of the USGS in Reston, Va., for analysis.

Laboratory-Analysis Methods and Instrumentation

Filtered precipitation samples were analyzed in the Geochemical Cycling of Trace Elements and Nutrients Laboratory of the Eastern Region Branch of Regional Research of the USGS in Reston, Va., for determination of major ions and unspeciated (or total) aluminum and iron. Samples that had been filtered and chilled in the field were analyzed for determination of the concentrations of dissolved ammonium, dissolved chloride, dissolved nitrite, dissolved nitrate, and dissolved sulfate. Laboratory pH of these samples was determined for quality-control purposes. Samples that had been filtered and preserved with nitric acid in the field were analyzed for determination of the concentrations of dissolved calcium, dissolved magnesium, dissolved sodium, dissolved potassium, and the unspeciated forms of dissolved aluminum and iron.

From January 1982 through January 1991, laboratory pH was determined for samples that had equilibrated with room temperature, using a Beckman Phi 71 pH meter with an Orion Ross glass combination electrode. In January 1991, the laboratory also began using an Orion model 920A pH meter with a Corning glass combination electrode.

Detection limits for each constituent are given in the following discussion of laboratory instrumentation. A detection limit--the concentration that can be detected with 95- percent confidence--is determined by statistical calculation. Because the detection limit depends on the signal and electronic noise of the instrument, it is a function of the whole instrument. The computer software incorporated in the Direct Current Plasma Atomic Emission Spectrophotometer (DCP-A) instrument employed by the Geochemical Cycling of Trace Elements and Nutrients Laboratory can calculate a detection limit for every sample analyzed. It is possible that a measured concentration reported in the tables is lower than the reported detection limit, because the unique combination of the signal and the noise for that sample made it possible for a concentration to be measured that was lower than the normal detection limit.

In order to determine the concentrations of dissolved ammonium, dissolved chloride, dissolved nitrite, dissolved nitrate, and dissolved sulfate, the laboratory used a Dionex 16 ion chromatograph from January 1982 through October 1987. During that time, detection limits, in microequivalents per liter, were as follows: ammonium, 2.8; chloride, 1.8; nitrite, 0.8; nitrate, 0.45; and sul-

fate, 0.8. Beginning in October 1987, a Dionex 2110i ion chromatograph was used for these analyses. Detection limits for that time period remained the same as for the previous instrument. Beginning in July 1989, a Dionex 100DX ion chromatograph also was used to determine ammonium concentrations with a detection limit of 2.4 µeq/L.

During January 1982 through April 1988, the laboratory used a Perkin-Elmer #603 Atomic Absorption Spectrophotometer (AA) to determine calcium and magnesium concentrations, and an IL 351 AA to determine sodium and potassium concentrations. During this period, detection limits, in microequivalents per liter, were as follows: calcium, 2.5; magnesium, 0.8; sodium, 0.4; and potassium, 0.64. Unspeciated dissolved aluminum and iron concentrations were not determined before May 1988. From May 1988 through May 1989, the laboratory used a Varian Spectra AA-300 for determination of cation concentrations. During this period, detection limits, in microequivalents per liter, were as follows: calcium, 0.5; magnesium, 0.24; sodium, 0.09; potassium, 0.77; aluminum, 3.3; and iron, 2.2. Beginning in June 1989, an ARL Spectra Span V DCP-A was used for cation-concentration determinations. During this period, detection limits, in microequivalents per liter, were as follows: calcium, 0.45; magnesium, 0.05; sodium, 0.13; potassium, 0.2; aluminum, 0.22; and iron, 0.38. Beginning in May 1988, concentrations of unspeciated dissolved aluminum and iron in the precipitation samples were always below the detection limits; therefore, no values for these cations are reported in the data tables.

Quality assurance and quality control of the laboratory analyses were continuously carried out through a series of approved methods, which included the analysis of standards, duplicates, blanks, and field blanks. During chemical analysis, known standard solutions were routinely analyzed after every fifth sample. Beginning in 1985, National Institute of Standards and Technology (NIST) standard solutions were analyzed at the beginning and end of each analysis session. Interlaboratory comparisons of analytical results were initiated in 1987.

Unfiltered precipitation samples for isotopic analysis were analyzed in the Isotope Fractionation Laboratory of the Eastern Region Branch of Regional Research of the USGS in Reston, Va. The method described by Coplen and others (1991) was used to determine the isotopic ratio of deuterium/protium (δD). The isotopic ratio of oxygen-18/oxygen-16 ($\delta^{18}O$) was determined according to the method described by Epstein and Mayeda (1953).

DATA ON QUANTITY OF PRECIPITATION

Data on the quantity of precipitation for the study area are presented in tables as daily and monthly totals of precipitation, in inches, for each year for the period of record (tables 1-10). Monthly and annual total precipitation-quantity data are summarized in table 11. A statistical summary of the monthly and annual total quantity data of precipitation for the period of record is shown in table 12.

The precipitation-quantity sample date is the date of the 24-hour period, from midnight to midnight, during which the reported amount of precipitation fell. Some daily amounts of precipitation had to be estimated when the equipment malfunctioned. The estimated quantities of precipitation were obtained from a nearby National Oceanic and Atmospheric Administration precipitation-collection station, in Catoctin Mountain Park.

DATA ON CHEMICAL QUALITY OF PRECIPITATION

Data on the chemical quality of precipitation from the study area are presented in tables as concentrations, in microequivalents per liter, for each year of the period of record (tables 13-22). The precipitation-chemistry sample date is the date the sample was collected from the field and includes all precipitation that fell after the previous sample-collection date. Samples for which the concentration of the constituent was below the analytical detection limit are shown as "less than" (<) the detection limit. Samples for which the constituent was not analyzed are designated as "n.a." in the tables. Stable-isotope data of precipitation are expressed as the deviation (delta, δ) of the ratio measured in the sample from the standard, in units of per mille (per mil, ‰).

A statistical summary of data on the chemical quality of precipitation for the period of record is presented in table 23. The means of the chemical data were calculated as follows: samples that were not analyzed were omitted from the calculations; for samples in which the concentration was below the detection limit, one-half of the detection limit was used in the calculations. The medians of the chemical data were determined by ranking all attempted measurements and identifying the value at the 50th percentile (the central value of the distribution).

During a rainstorm, the chemistry of the rain is generally more concentrated at the beginning of the storm and becomes less concentrated as the storm continues. This means that constituent concentrations are usually higher for smaller rainstorms (less than 0.5 in.) than for larger rainstorms (more than 1 in.). This change in concentration during a storm is the result of acids and dry particulate matter washing out of the atmosphere. The chemical data were precipitation-weighted to take the "washing out" effect into account and to be able to compare chemical data of precipitation from different localities. The annual precipitation-weighted mean constituent concentrations were calculated by use of the relation,

$$C_w = \frac{\sum_{i=1}^{n} [C_i P_i]}{\sum_{i=1}^{n} [P_i]} ,$$

where

C_w = annual precipitation-weighted mean constituent concentration, in microequivalents per liter;

n = number of samples for the given year;

C_i = individual sample concentration, in microequivalents per liter; and

P_i = the quantity of precipitation for the weekly interval, in inches.

Annual precipitation-weighted mean field and laboratory hydrogen-ion and pH-data for the period of record are summarized in table 24. Annual precipitation-weighted mean concentrations of chemical data of the precipitation for the period of record are summarized in table 25. The quantity of precipitation used to make the precipitation-weighted calculations (tables 24 and 25) is smaller than the total annual quantity of precipitation (table 11), because small rainstorms occur each year that do not produce a sufficient quantity of precipitation for collection and chemical analysis. Selected precipitation-weighted data are presented graphically. Annual precipitation-weighted means of field hydrogen-ion concentrations are shown in figure 2. The annual precipitation-weighted mean concentrations of the sum of base cations (calcium, magnesium, sodium, and potassium), sulfate, and nitrate are shown in figure 3.

SUMMARY OF PRECIPITATION DATA

The quantity of precipitation on Catoctin Mountain for the period of record ranged from a minimum of 36.89 in. in 1982 to a maximum of 58.48 in. in 1984 (table 11). The mean annual quantity of precipitation for the 10-year period of record was 44.45 in., and the median quantity was 42.86 in. (table 12). The long-term mean (1931-80) for annual precipitation in the region was 44.09 in. (Katz and others, 1985). The mean monthly data indicated that with the exception of January, all months averaged more than 3 in. of precipitation (table 12). The medians of the monthly data indicated that December was the month in which the least precipitation fell (1.88 in.), whereas May was the month in which the most precipitation fell (5.43 in.).

Specific conductance ranged from a minimum of 1 µS/cm on November 2, 1987, to a maximum of 290 µS/cm on August 6, 1991 (table 23). The mean specific conductance for the period of record was 40.2 S/cm, and the median was 30 µS/cm (table 23).

Mean pH values and precipitation-weighted pH values were calculated by first converting pH to hydrogen-ion activity using the relation pH = -log [hydrogen ion (in microequivalents per liter)], then calculating the mean of hydrogen-ion activities or precipitation-weighting hydrogen-ion activities, and finally converting back to pH. Field pH ranged from a minimum of 2.96 on June 21, 1988, to a maximum of 5.17 on October 1, 1985 (table 23). The mean field pH for the period of record was 4.07, and the median was 4.18 (table 23). Precipitation-weighted mean field pH for the period of record was 4.16 (table 24). Laboratory pH ranged from a minimum of 3.5 on August 11, 1987, to a maximum of 5.96 on February 24, 1987 (table 23). The mean laboratory pH for the period of record was 4.25, and the median was 4.37 (table 23). Precipitation-weighted mean laboratory pH for the period of record was 4.34 (table 24).

Calcium concentrations ranged from a minimum of 0.05 µeq/L on April 22, 1982, to a maximum of 92.8 µeq/L on October 2, 1990 (table 23). The mean calcium concentration for the period of record was 11.3 µeq/L, and the median was 9.11 µeq/L (table 23). The precipitation-weighted mean calcium concentration for the period of record was 9.06 µeq/L (table 25).

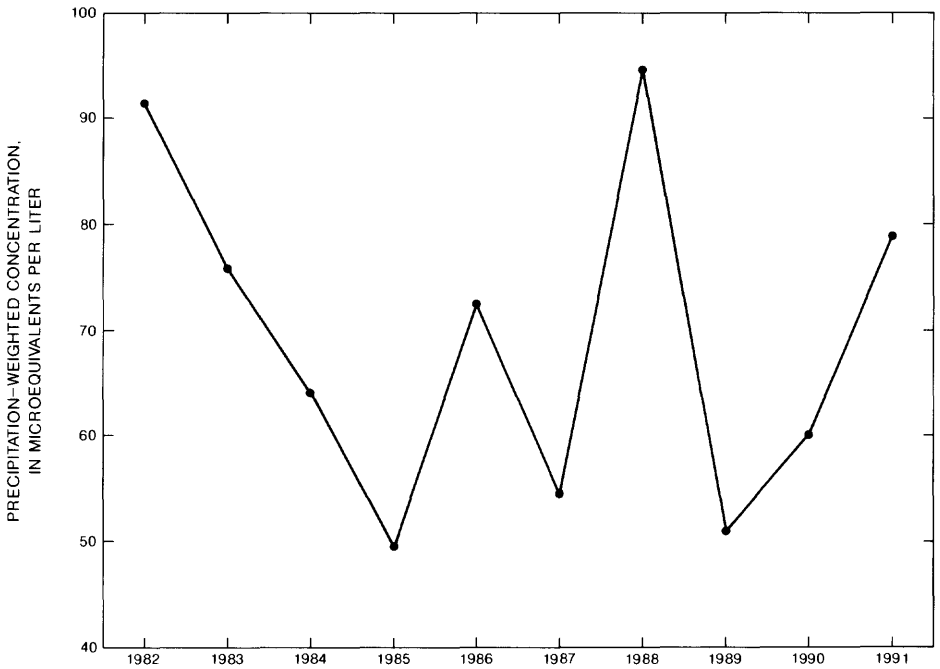

Figure 2. Annual precipitation-weighted mean field hydrogen-ion concentrations.

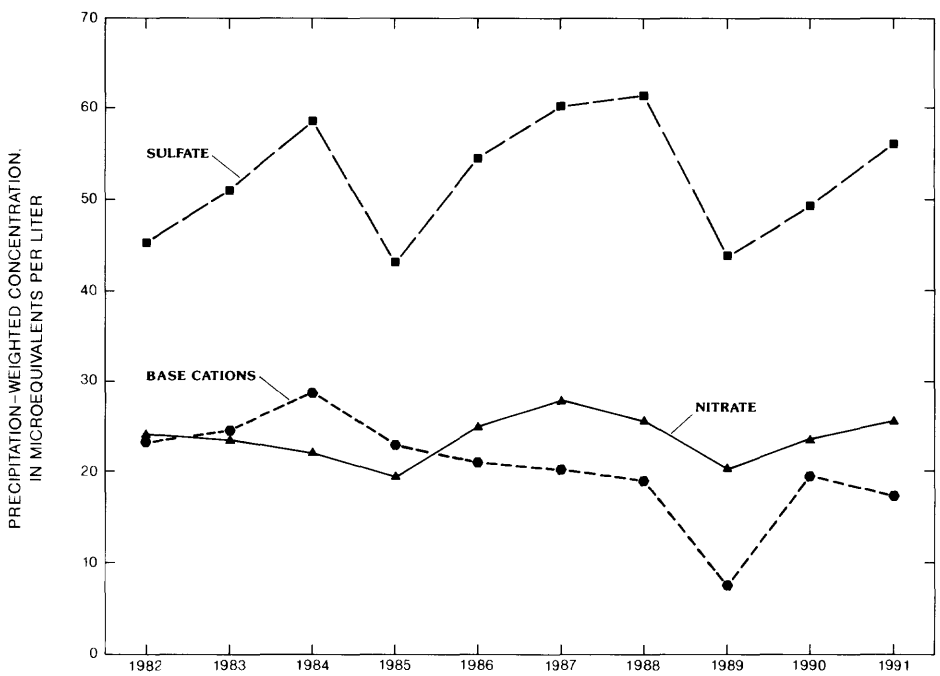

Figure 3. Annual precipitation-weighted mean concentrations of sum of base cations, sulfate, and nitrate.

Magnesium concentrations ranged from a minimum of 0.03 µeq/L on March 10, 1983, to a maximum of 208 µeq/L on December 23, 1991 (table 23). The mean magnesium concentration for the period of record was 3.66 µeq/L, and the median was 2.08 µeq/L (table 23). The precipitation-weighted mean magnesium concentration for the period of record was 2.64 µeq/L (table 25).

Sodium concentrations ranged from a minimum of 0.1 µeq/L on December 10, 1991, to a maximum of 62.9 µeq/L on November 26, 1982 (table 23). The mean sodium concentration for the period of record was 6.49 µeq/L, and the median was 4.26 µeq/L (table 23). The precipitation-weighted mean sodium concentration for the period of record was 6.87 µeq/L (table 25).

Potassium concentrations ranged from a minimum of 0.08 µeq/L on August 20, 1991 and December 17, 1991, to a maximum of 25.8 µeq/L on August 19, 1987 (table 23). The mean potassium concentration for the period of record was 2.54 µeq/L, and the median was 1.36 µeq/L (table 23). The precipitation-weighted mean potassium concentration for the period of record was 1.99 µeq/L (table 25).

Ammonium concentrations ranged from a minimum of 0.76 µeq/L on January 25, 1984, to a maximum of 105 µeq/L on May 13, 1982 (table 23). The mean ammonium concentration for the period of record was 17.9 µeq/L, and the median was 13.6 µeq/L (table 23). A precipitation-weighted mean ammonium concentration was not calculated because of the small amount of data available.

Chloride concentrations ranged from a minimum of 1.05 µeq/L on June 13, 1989, to a maximum of 174 µeq/L on December 23, 1991 (table 23). The mean chloride concentration for the period of record was 13.0 µeq/L, and the median was 9.49 µeq/L (table 23). The precipitation-weighted mean chloride concentration for the period of record was 11.11 µeq/L (table 25).

Nitrite concentrations ranged from a minimum of 0.1 µeq/L on June 15, 1982 and October 28, 1982, to a maximum of 9.4 µeq/L on August 11, 1982 (table 23). The mean nitrite concentration for the period of record was 0.54 µeq/L, and the median was 0.4 µeq/L (table 23). A precipitation-weighted mean nitrite concentration was not calculated because of the small amount of data available.

Nitrate concentrations ranged from a minimum of 4.2 µeq/L on December 2, 1982, to a maximum of 123 µeq/L on August 5, 1986 (table 23). The mean nitrate concentration for the period of record was 28.3 µeq/L, and the median was 23.7 µeq/L (table 23). The precipitation-weighted mean nitrate concentration for the period of record was 23.24 µeq/L (table 25).

Sulfate concentrations ranged from a minimum of 4.9 µeq/L on October 28, 1982, to a maximum of 322 µeq/L on August 5, 1986 (table 23). The mean sulfate concentration for the period of record was 62.6 µeq/L, and the median was 47.8 µeq/L (table 23). The precipitation-weighted mean sulfate concentration for the period of record was 52.73 µeq/L (table 25).

δ ranged from a minimum of -120.5 per mil on October 22, 1991, to a maximum of +4.5 per mil on July 23, 1991 (table 23). The mean δ D for the period of record was -43.1 per mil, and the median was -38.5 per mil (table 23). A precipitation-weighted mean δ D for the period of record was not calculated because data have been collected only since April 1990. The precipitation-weighted mean δ D for 1991 was -47.89 per mil (table 25).

$\delta^{18}O$ ranged from a minimum of -16.1 per mil on October 22, 1991, to a maximum of -0.8 per mil on July 23, 1991 (table 23). The mean $\delta^{18}O$ for the period of record was -7.62 per mil, and the median was -7.1 per mil (table 23). A precipitation-weighted mean $\delta^{18}O$ for the period of record was not calculated because data have been collected only since April 1990. The precipitation-weighted mean $\delta^{18}O$ for 1991 was -8.03 per mil (table 25).

SELECTED REFERENCES

Bricker, O.P., and Rice, K.C., 1989, Acidic deposition to streams--A geology-based method predicts their sensitivity: Environmental Science and Technology, v. 23, no. 4, p.379-385.

Coplen, T.B., Wildman, J.D., and Chen, Julie, 1991, Improvements in the gaseous hydrogen-water equilibration technique for hydrogen isotope ratio analysis: Analytical Chemistry, v. 63, no. 9, p. 910-912.

Epstein, Samuel, and Mayeda, T.K., 1953, Variation of $\delta^{18}O$ content of waters from natural sources: Geochimica et Cosmochimica Acta, v. 4, no. 5, p. 213-224.

Katz, B.G., Bricker, O.P., and Kennedy, M.M., 1985, Geochemical mass-balance relationships for selected ions in precipitation and stream water, Catoctin Mountains, Maryland: American Journal of Science, v. 285, December, p. 931-962.

Rice, K.C., and Bricker, O.P., 1992a, Acid rain and its effect on streamwater quality on Catoctin Mountain, Maryland: U.S. Geological Survey Open-File Report 92-168, Water Fact Sheet, 2 p.

____1992b, Acid-rain induced changes in streamwater quality during storms on Catoctin Mountain, Maryland: U.S. Geological Survey Open-File Report 92-649, Water Fact Sheet, 2 p.

— PAGE 11 FOLLOWS —

TABLES 1-25

Table 1.--Quantity of daily precipitation collected from the U.S. Geological Survey precipitation-collection station at Catoctin Mountain, Maryland, in 1982

[All values reported in inches]

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	[1]0.84	0.00	0.00	0.00	0.00	0.21	0.00	0.00	0.10	0.00	0.00	0.19
2	[1].00	.22	.05	.00	.00	.00	.00	.03	.00	.00	.00	.00
3	[1].04	.79	.00	1.47	.00	.52	.56	.00	.00	.00	.00	.00
4	.00	.00	.01	.00	.00	.06	.00	.40	.00	.00	.90	.00
5	.00	.00	.00	.05	.00	1.57	.00	.00	.00	.00	.00	.00
6	.00	.00	.00	.47	.00	.00	.00	.00	.00	.00	.00	.00
7	.00	.00	.89	.00	.00	.00	.00	.00	.00	.00	.00	.00
8	.00	.00	.01	.00	.20	.00	.10	.00	.06	.00	.00	.00
9	.05	.20	.00	.22	.00	.00	.00	.05	.00	.00	.00	.00
10	.37	.00	.00	.00	.00	.35	.00	.00	.00	.00	.00	.00
11	.00	.00	.35	.00	.00	.15	.03	.17	.00	.00	.00	.00
12	.00	.00	.00	.00	.00	.67	.00	.00	.00	.00	.50	.13
13	.42	.14	.06	.05	.00	1.90	.00	.00	.00	.65	.00	.00
14	.03	.00	.00	.00	.00	.05	.00	.00	.00	.00	.00	.00
15	.00	.00	.00	.00	.00	.00	.00	.00	.03	.00	.00	.09
16	.05	.14	.80	.00	.00	1.09	.00	.00	.02	.00	.00	.62
17	.00	.65	.01	.60	.48	.58	.00	.19	.00	.00	.00	.00
18	.00	.06	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
19	.02	.49	.08	.00	.00	.00	.55	.00	.00	.00	.05	.04
20	.02	.11	.19	.01	.02	.00	.25	.00	.30	.14	.02	.02
21	.18	.02	.03	.01	.00	.00	.00	.00	.00	.01	.00	.00
22	.18	.00	.00	.00	.17	.00	.00	.00	.42	.00	.11	.00
23	.55	.00	.00	.00	.18	.00	.00	.00	.01	.00	.01	.14
24	.00	.00	.00	.00	.03	.00	.00	.08	.00	.00	.07	.01
25	.04	.00	.01	.00	.01	.00	.00	.02	.00	.73	.00	.00
26	.00	.00	.10	1.03	.01	.00	.00	.00	1.10	.02	.00	.07
27	.01	.00	.00	.55	.05	.00	2.55	.00	1.19	.00	.00	.13
28	.00	.00	.00	.00	.30	.00	.08	.00	.00	.00	1.15	.05
29	.00	--	.00	.00	.08	.05	.00	.00	.00	.00	.22	.00
30	.00	--	.00	.00	.62	.04	.05	.00	.00	.00	.00	.00
31	.07	--	.35	--	.00	--	.00	.00	--	.00	--	.00
Total	[1]2.87	2.82	2.94	4.46	2.15	7.24	4.17	.94	3.23	1.55	3.03	1.49

[1] Estimated value.

Table 2.--Quantity of daily precipitation collected from the U.S. Geological Survey precipitation-collection station at Catoctin Mountain, Maryland, in 1983

[All values reported in inches]

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.56	0.00	0.05	0.00	0.00
2	.00	1.51	.04	1.40	.00	.03	.00	.01	.00	.00	.00	.05
3	.00	.26	.00	.15	.27	.25	.00	.39	.00	.00	.10	.00
4	.00	.00	.00	.00	.08	1.43	.00	.02	.00	.00	.00	.80
5	.04	.00	.00	.00	.02	.00	.14	.45	.00	.15	.06	.00
6	.00	.11	.44	.01	.00	.00	.00	.00	.00	.00	.04	.65
7	.00	.09	.36	.14	.00	.00	.00	.00	.00	.00	.00	.00
8	.00	.00	.80	.55	.40	.00	.00	.00	.00	.00	.00	.00
9	.05	.00	.20	1.10	.00	.00	.00	.00	.00	.00	.00	.00
10	.95	.00	.06	.97	.00	.00	.00	.00	.00	.05	1.24	.00
11	.00	1.06	.01	.12	.00	.00	.00	.63	.00	.60	.61	.00
12	.00	.04	.00	.00	.00	.00	.00	.00	.50	2.64	.00	1.47
13	.00	.00	.00	.00	.00	.00	.00	.00	.45	1.46	.00	1.39
14	.00	.00	.01	.10	.07	.00	.00	.00	.00	.00	.00	.00
15	.28	.00	.00	1.61	.53	.00	.00	.00	.00	.00	.30	.00
16	.00	.00	.00	.01	1.32	.00	.00	.00	.00	.00	.00	.00
17	.02	.00	.02	.03	.08	.18	.00	.00	.00	.00	.00	.00
18	.00	.00	2.41	.00	.00	1.32	.00	.14	.00	.05	.00	.00
19	.00	.00	.63	.00	.61	.08	.00	.00	.00	.08	.00	.00
20	.00	.00	.00	.03	.00	.96	1.23	.00	.00	.30	1.00	.00
21	.00	.00	.46	.00	.49	.01	.00	.00	1.26	.02	.00	.06
22	.08	.00	.00	.00	.64	.00	.00	.00	.00	.26	.00	1.21
23	.58	.03	.04	.45	.01	.00	.10	.00	.00	2.10	.00	.00
24	.00	.00	.00	2.23	.00	.00	.00	.00	.00	.20	.70	.00
25	.01	.04	.00	.04	.00	.00	.00	.00	.00	.39	.42	.00
26	.01	.00	.00	.00	.68	.00	.00	.00	.00	.01	.00	.00
27	.00	.00	.85	.00	.00	.00	.00	.00	.00	.00	.00	.00
28	.00	.00	.00	.00	.00	.27	.00	.00	.00	.00	.65	.69
29	.00	.01	.00	.00	.27	.08	.00	[1].15	.00	.00	.00	.02
30	.16	--	.00	.00	.00	.00	.00	.00	.70	.00	.00	.00
31	.00	--	.00	--	.02	--	.00	[1].50	--	.00	--	.00
Total	2.18	3.15	6.39	8.94	5.49	4.61	1.47	[1]2.85	2.91	8.36	5.12	6.34

[1] Estimated value.

Table 3.--Quantity of daily precipitation collected from the U.S. Geological Survey precipitation-collection station at Catoctin Mountain, Maryland, in 1984

[All values reported in inches]

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	0.23	0.00	0.00	0.00	0.04	0.00	0.35	0.00	0.00	0.58	0.00	0.01
2	.00	.00	.00	.00	.00	.00	.00	.08	.00	.02	.00	.02
3	.00	.07	.00	.00	1.74	.00	.00	.87	.32	.00	.00	.26
4	[1].00	.08	.00	1.25	.03	.00	.00	.00	.26	.00	.40	.00
5	[1].00	.15	.42	.30	.00	.00	.25	.20	.00	.00	.09	.00
6	.00	.02	.00	.00	.15	.00	2.48	.00	.00	.00	.00	.26
7	.00	.00	.00	.00	.19	.00	.02	.00	.00	.00	.00	.00
8	.00	.00	.22	.00	1.67	.00	.00	.00	.00	.00	.00	.26
9	.00	.00	.02	.00	.00	.00	.00	.30	.00	.00	.00	.09
10	.40	.15	.00	.00	.00	.00	.12	5.93	.00	.00	.05	.02
11	.00	.31	.00	.00	.00	.13	.10	.87	.00	.00	.00	.02
12	.00	.01	.00	.00	.10	.00	.00	.60	.00	.00	.00	.00
13	.06	.64	.51	.00	.05	.00	.00	1.51	.00	.00	.00	.05
14	.04	4.66	.06	.82	.00	.00	.00	.14	.05	.00	.00	.00
15	.00	.49	.00	.40	.00	.00	.00	.00	.12	.00	.00	.00
16	.05	.00	.00	.58	.00	.05	.00	.00	.00	.00	.00	.04
17	.00	.07	.00	.25	.00	.59	.00	.00	.00	.00	.00	.00
18	.27	.03	.00	.00	.00	.61	.25	.00	.00	.00	.04	.00
19	.03	.02	.00	.00	.10	.01	.00	.79	.00	.07	.37	.21
20	.00	.03	.03	.00	.00	.00	.00	.00	.00	.01	.02	.00
21	.00	.00	1.14	.00	.01	.00	1.03	.00	.00	.00	.00	.45
22	.00	.00	.00	.64	.70	.00	.09	.00	.00	.90	.00	.00
23	.00	1.20	.00	.06	1.25	.05	.00	.85	.00	.27	.00	.00
24	.48	.10	.00	.07	.00	.92	.00	.00	.00	.15	.00	.12
25	.00	.67	.15	.00	.00	.05	.00	.00	.00	.00	.00	.00
26	.00	.00	.13	.00	.00	.00	.00	.00	.04	.00	.00	.00
27	.00	.03	.08	.00	.00	.00	.90	.00	.06	.00	.00	.00
28	.00	.55	1.60	.21	.32	.00	.00	.00	.44	.52	.50	.00
29	.00	.00	1.21	.00	1.29	.15	.00	.00	.02	.05	1.01	.00
30	.10	--	.00	.09	.09	.15	.00	.00	.19	.02	.70	.03
31	.00	--	.00	--	.00	--	.00	.00	--	.00	--	.02
Total	[1]1.66	9.28	5.57	4.67	7.73	2.71	5.59	12.14	1.50	2.59	3.18	1.86

[1]Estimated value.

Table 4.--Quantity of daily precipitation collected from U.S. Geological Survey precipitation-collection station at Catoctin Mountain, Maryland, in 1985

[All values reported in inches]

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	0.05	0.50	0.00	0.03	0.00	0.05	0.09	0.08	0.00	0.00	0.04	0.40
2	.58	.34	.00	.00	1.37	.00	.05	.00	.00	.55	.10	[1].02
3	.00	.01	.00	.00	.40	.00	.00	.00	.00	.02	1.69	[1].00
4	.12	.00	.08	.00	.00	.00	.00	.00	.00	.16	[1]2.42	[1].00
5	.10	.26	.00	.00	.00	1.25	.00	.00	[1].00	.18	[1]1.52	[1].00
6	.00	.04	.00	.00	.00	.00	.53	.00	[1].00	.00	[1].10	[1].35
7	.05	.00	.03	.00	.00	.09	.00	.73	[1].00	.00	[1].00	[1].00
8	.00	.02	.05	.00	.00	.01	.03	.72	[1].00	.00	.00	[1].00
9	.00	.00	.00	.10	.00	.00	.14	.00	[1].74	.00	.00	[1].00
10	.07	.00	.00	.00	.00	.00	.03	.00	[1].00	.00	.00	[1].00
11	.00	.00	.36	.00	.00	.00	.00	.00	[1].00	.00	.10	.00
12	.00	1.58	.06	.00	.55	.00	.32	.00	.00	.00	.05	.00
13	[1].06	.00	.00	.05	.00	.00	.00	.00	.00	.00	.00	.70
14	[1].08	.00	.00	.00	.00	.00	.00	.20	.00	.10	.26	.00
15	.00	.00	.00	.00	.05	.28	.30	.00	.00	.08	.00	.00
16	.00	.00	.00	.05	.37	.22	.00	.00	.00	.00	.77	.00
17	.13	.00	.00	.00	.86	.00	.00	.00	.00	.00	.00	.00
18	.02	.00	.00	.00	.12	.02	.00	.14	.00	.00	.00	.00
19	.05	.00	.00	.00	.00	.00	.05	.00	.00	.00	.00	.00
20	.00	.00	.00	.00	.00	.00	.00	.03	.00	.41	.00	.00
21	.00	.00	.00	.00	.28	.00	.00	.67	.00	[1]1.28	.00	.00
22	.00	.00	.10	.00	.00	.04	.00	.00	.00	[1].57	1.22	.00
23	.00	.00	1.25	.00	.72	.26	.00	.00	.35	.30	[1].00	.01
24	.02	.00	.37	.00	.00	.00	.00	.63	.00	.25	[1].00	.03
25	.12	.00	.02	.05	.00	.00	1.28	.19	.00	.00	[1].15	.00
26	.01	.11	.00	.00	.00	.00	[1]2.12	1.08	.23	.00	[1].15	.00
27	.00	.00	.00	.00	.00	.00	[1].63	.00	1.14	.00	.20	.00
28	.00	.00	.00	.00	.20	.03	[1].00	.00	.00	.00	.89	.00
29	.02	--	.45	.00	.00	.00	[1].00	.00	.00	.00	.00	.00
30	.00	--	.50	.00	.00	.00	.00	.03	.00	.00	.26	.00
31	.30	--	.35	--	.45	--	.04	.00	--	.00	--	.00
Total	[1]1.78	2.86	3.62	.28	5.37	2.25	[1]5.61	4.50	[1]2.46	[1]3.90	[1]9.92	[1]1.51

[1] Estimated value.

Table 5.--Quantity of daily precipitation collected from the U.S. Geological Survey precipitation-collection station at Catoctin Mountain, Maryland, in 1986

[All values reported in inches]

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	0.00	[1]0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.03	1.01	0.15	0.00
2	.00	[1].00	.01	.00	.00	.00	.67	.11	.32	.00	.26	1.79
3	.00	[1].00	.00	.00	.00	.00	.00	.50	.33	.04	.00	.00
4	.00	[1].75	.00	.00	.00	.00	.00	.00	.07	.50	.09	.00
5	.00	[1].00	.00	.21	.00	.00	.00	.00	.00	.00	.98	.00
6	.03	.03	.00	.16	.00	3.36	.00	.62	.00	.00	.00	.00
7	.02	.00	.00	.00	[1].00	.25	.00	.18	.00	.00	.42	.00
8	.01	.00	.00	.00	.00	.00	.00	.00	.00	.00	.06	.36
9	.00	.10	.00	.00	.03	.00	.39	.00	.00	.00	.11	.56
10	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.02
11	.00	.00	.51	.06	.00	.00	.00	.00	.00	.00	[1].90	.21
12	.00	.00	.02	.00	.00	.00	.00	.00	.00	.00	.00	.00
13	.00	.00	.54	.00	.00	.00	.06	.00	.00	.23	.00	.00
14	.00	.00	1.40	.00	.12	.00	.00	.00	.00	.34	.00	[1].00
15	.00	.00	.23	1.55	.00	.00	.00	.00	.00	.00	.00	[1].00
16	.00	.09	.00	.21	.54	.00	.00	.00	.00	.00	.00	[1].00
17	.00	[1].19	.02	.50	.00	.23	.00	.13	.00	.00	.00	.00
18	.00	[1].10	.00	.00	.00	.00	.00	.00	.03	.00	.90	.81
19	.51	.30	.00	.00	.03	.00	.38	.00	.00	.00	.00	.00
20	[1].14	[1].05	.00	.00	1.80	.20	.37	.16	.00	.00	.93	.00
21	[1].00	[1].10	.00	.02	.36	.00	.00	.73	.00	.00	.00	.00
22	.00	[1].30	.00	.28	.00	.00	.00	.00	.00	.00	.00	.00
23	.00	[1].00	.00	.00	.06	.00	.00	.00	.00	.00	.06	.00
24	.00	[1].20	.00	.00	.00	.72	.04	.03	.15	.00	.13	1.55
25	.03	.02	.00	.00	.00	.00	.00	.00	.00	.06	.00	.00
26	.26	.04	.00	.00	.00	.00	.00	.00	.00	.45	.52	.00
27	.01	.04	.00	.00	.08	.03	.00	.24	.00	.00	.00	.00
28	.00	.03	.00	.00	.00	.00	.00	.28	.00	.00	.00	.00
29	.00	--	.00	.03	.00	.00	.00	.00	.00	.00	.00	[1].00
30	[1].00	--	.00	.00	.00	.00	.00	.00	.00	.00	.00	[1].00
31	[1].00	--	.00	--	.00	--	.00	.00	--	.00	--	[1].00
Total	[1]1.01	[1]3.34	2.74	3.02	[1]3.02	4.79	1.91	2.98	.93	2.63	[1]5.51	[1]5.30

[1] Estimated value.

Table 6.--Quantity of daily precipitation, in inches, at the USGS Catoctin Mountain precipitation-collection station at Catoctin Mountain, Maryland, 1987

[All values reported in inches]

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	[1]0.46	[1]0.00	0.29	0.00	0.00	0.09	0.20	0.00	0.00	0.00	0.00	0.00
2	[1].32	[1].00	.00	.26	.05	.00	.56	.00	.00	.00	.00	.00
3	[1].00	[1].00	.00	.79	.31	.10	.00	.00	.00	.23	.00	.00
4	[1].00	.00	.00	2.38	.74	.09	.10	.00	.00	.00	.00	.08
5	[1].00	.00	.00	.64	.00	.00	.00	.41	.04	.00	.00	.00
6	[1].00	.00	.00	.15	.00	.00	.22	.00	.77	.59	[1].00	.00
7	[1].00	.00	.00	.25	.00	.03	.83	.00	.09	.00	[1].00	.00
8	[1].00	.00	.00	.00	.04	.00	.00	.00	1.99	.00	[1].00	.00
9	[1].00	[1].00	.00	.00	.00	.25	.00	.00	.00	.00	[1].03	.00
10	[1]4.20	[1].00	.00	.00	.00	.00	.00	.00	.00	.00	[1].48	.00
11	[1].00	.00	.00	.00	.00	.00	.30	.00	.14	.04	[1].44	.00
12	[1].00	.10	.00	.10	.21	.13	.18	.00	.51	.00	[1].00	.00
13	[1].00	.00	.00	.00	.00	.96	.10	.00	.14	.00	[1].00	.00
14	.00	.00	.00	.00	.00	.00	.75	.00	.00	.00	[1].00	.00
15	.08	.00	.00	.05	.02	.00	.00	.00	.00	.00	[1].00	.65
16	.00	.00	.00	.83	.00	.00	.00	.00	.00	.00	[1].00	.00
17	.00	.00	.00	.62	.00	.00	.00	.00	1.79	.00	[1].08	.00
18	.05	.00	.00	.00	.13	.00	.00	.00	.00	.00	[1].39	.00
19	.80	.00	.00	.00	.37	.00	.00	.14	.15	.00	[1].03	.25
20	[1].09	.00	.00	.00	.85	.26	.00	.00	.23	.12	.51	.18
21	[1].00	.00	.00	.00	.08	.00	.00	.00	.00	.08	.00	.00
22	[1]1.03	.56	.00	.00	.00	.06	.00	.70	.04	.00	.00	.00
23	[1].20	.24	.00	.00	.45	.00	.00	.00	.00	.00	.00	.00
24	[1].00	.00	.00	.09	.00	.04	.00	.00	.00	.00	.00	.00
25	[1].03	.00	.18	.00	.00	.00	.00	.00	.00	.00	.00	.40
26	[1].20	.00	.00	.00	.00	.55	.03	.14	.00	.00	.00	.18
27	[1].00	.00	.00	.00	.00	.00	.00	.00	.00	1.30	.21	.00
28	[1].00	.84	.07	.00	.00	.00	.00	.03	.00	.00	.33	.00
29	.01	--	.00	.00	.00	.00	.00	.00	.00	.00	2.15	.00
30	.05	--	.56	.00	.00	.00	.00	.00	.40	.00	.00	.00
31	.00	--	.87	--	.00	--	.00	.03	--	.00	--	.16
Total	[1]7.52	[1]1.74	1.97	6.16	3.25	2.56	3.27	1.45	6.29	2.36	[1]4.65	1.90

[1] Estimated value.

Table 7.--Quantity of daily precipitation collected from the U.S. Geological Survey precipitation-collection station at Catoctin Mountain, Maryland, in 1988

[All values reported in inches]

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	0.09	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00
2	.00	.28	.00	.00	.00	.02	.00	.00	.00	.13	.00	.00
3	.00	.00	.21	.05	.00	.05	.00	.00	.00	.02	.00	.00
4	.00	.25	.64	.03	.07	.00	.00	.00	1.28	.00	.20	.00
5	.00	.00	.00	[1].00	1.53	.00	.00	.00	.04	.00	1.23	.00
6	.00	.00	.00	[1].00	1.12	.00	.00	.12	.00	.00	.03	.00
7	.00	.00	.00	[1].71	.00	.00	.00	.00	.00	.00	.00	.00
8	.00	.00	.00	[1].15	.00	.06	.00	.00	.00	.00	.00	.00
9	.00	.00	.00	[1].03	.05	.45	.04	.00	.00	.00	.00	.00
10	.00	.00	.00	[1].00	.06	.00	.03	.00	.00	.00	.00	.00
11	.00	.00	.00	[1].00	.00	.00	.47	.00	.00	.06	.00	.00
12	.18	.08	.00	[1].00	.00	.00	.46	.00	.00	.00	.00	.00
13	.00	.00	.08	.00	.00	.00	.00	.00	.20	.00	.47	.08
14	.00	.15	.00	.00	.00	.00	.00	.00	.00	.00	.00	.05
15	.00	.45	.00	.05	.00	.00	.00	.00	.00	.00	.00	.00
16	.00	.00	.00	.00	.24	.06	.00	.00	.00	.00	.00	.00
17	.29	.00	.00	.00	.01	.00	.05	.23	.37	.00	.25	.00
18	.05	.00	.01	.38	[1]2.39	.00	1.19	.00	.02	.17	.00	.00
19	.40	.40	.00	.00	[1]4.65	.00	.04	.25	.00	.00	.58	.00
20	.80	.00	.00	.00	[1].21	.00	.72	.86	.06	.00	1.42	.00
21	.00	.00	.00	[1].00	[1].57	.00	.10	.03	.00	1.05	.00	.22
22	.00	.00	.00	[1].00	[1].00	.00	.00	.00	.00	.00	.00	.00
23	.00	.00	.00	[1].07	[1].01	.00	.41	1.29	.00	.00	.00	.24
24	.00	.00	.00	[1].22	[1].65	.00	.00	.00	.75	.17	.00	.61
25	.04	.00	.00	[1].00	.36	.00	.00	.00	.17	.00	.00	.00
26	.00	.00	.65	[1].00	.00	.00	.00	.00	.00	.00	.00	.00
27	.00	.00	.00	.48	.00	.00	.00	.00	.00	.00	.39	.00
28	.00	.00	.00	.00	.00	.00	.00	.08	.00	.00	.00	.15
29	.00	.00	.00	.00	.00	.00	.00	.59	.00	.00	.00	.00
30	.00	--	.00	.00	.00	.00	.20	.00	.00	.00	.00	.00
31	.00	--	.00	--	.00	--	.00	.00	--	.00	--	.00
Total	1.85	1.66	1.59	[1]2.17	[1]11.92	.64	3.71	3.45	2.89	1.60	4.60	1.35

[1] Estimated value.

Table 8.--Quantity of daily precipitation collected from the U.S. Geological Survey precipitation-collection station at Catoctin Mountain, Maryland, in 1989

[All values reported in inches]

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	0.00	0.00	0.00	0.00	1.64	0.00	0.00	0.00	0.00	0.92	0.00	0.00
2	.25	.00	.00	.10	.30	.00	.00	.00	.00	.81	.00	.00
3	.00	.60	.00	.15	.00	.19	.00	.00	.00	.02	.00	.00
4	.00	.00	.08	.05	.00	.11	1.89	.00	.00	.00	.00	.00
5	.00	.03	.30	.10	2.10	.00	.85	.00	.10	.00	.00	.00
6	.00	.06	.31	.06	.91	.24	.15	.06	.00	.00	.05	.00
7	.00	.00	.00	.00	.00	.16	.05	.08	.00	.00	.00	.00
8	.90	.00	.00	.08	.00	.00	.00	.00	.00	.00	.40	.00
9	.00	.00	.00	.09	.66	1.73	.00	.00	.00	.00	.25	.00
10	.00	.00	.00	.00	1.22	.00	.00	.00	.00	.05	.00	.09
11	.00	.00	.00	.00	.14	.00	.00	.00	.00	.00	.00	.15
12	.52	.00	.00	.00	.00	.00	.00	.06	.00	.00	.00	.00
13	.00	.40	.00	.00	.00	.06	.60	.00	.00	.00	.00	.00
14	.00	[1].29	.00	.00	.39	.15	.07	.00	.00	.00	.00	.00
15	.57	[1].25	.00	.31	1.01	.51	.00	.00	.00	.00	.04	.00
16	.00	[1].13	.00	.04	.00	.35	.23	.03	.65	.00	.86	.00
17	.00	[1].00	.00	.00	.00	.26	.00	.00	.01	.50	.00	.00
18	.00	[1].00	.75	.15	.00	.00	.00	.00	.00	.70	.00	.00
19	.00	[1].00	.00	.05	.00	.00	.09	.24	.20	1.09	.00	.00
20	.00	[1].00	.15	.00	.04	.15	.51	.00	.20	.92	.00	.00
21	.00	[1].28	.10	.00	.00	.05	.00	.16	.00	.00	.09	.00
22	.00	.34	.00	.00	.00	.36	.00	.15	.60	.00	.00	.00
23	.00	.00	.11	.00	.21	.54	.00	.02	.09	.00	.00	.00
24	.00	.00	1.01	.00	.36	.00	.00	.00	.00	.00	.00	.00
25	.00	.00	.05	.00	.00	.01	.00	.00	.15	.00	.14	.25
26	.20	.03	.00	.00	.17	.00	.00	.00	.35	.00	.10	.00
27	.00	.00	.00	.00	.19	.66	.00	.00	.00	.00	.10	.05
28	.00	.00	.00	.00	.00	.07	.00	.00	.00	.00	.09	.00
29	.00	--	.06	.20	.00	.00	.00	.00	.00	.00	.00	.00
30	.17	--	.25	.04	.00	.00	.89	.25	.00	.00	.00	.00
31	.00	--	.24	--	.00	--	.15	.00	--	.16	--	1.11
Total	2.61	[1]2.41	3.41	1.42	9.34	5.60	5.48	1.05	2.35	5.17	2.12	1.65

[1] Estimated value.

Table 9.--Quantity of daily precipitation collected from the U.S. Geological Survey precipitation-collection station at Catoctin Mountain, Maryland, in 1990

[All values reported in inches]

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	0.00	0.00	0.00	0.14	0.01	0.00	0.05	0.00	0.00	0.00	0.00	0.00
2	.00	.00	.00	.94	.00	.11	.00	.00	.00	.00	.00	.00
3	.00	.37	.00	.00	.08	.05	.00	.00	.00	.00	.00	1.17
4	.07	.10	.00	.07	.75	.00	.00	.05	.00	.10	.00	.45
5	.00	.00	.00	.00	.10	.00	.97	.33	.00	.00	.47	.00
6	.00	.00	.00	.07	.00	.00	.00	.88	.00	.00	.00	.00
7	.00	.00	.00	.40	.00	.10	.00	.04	.00	.00	.00	.00
8	.00	.00	.00	.00	.00	.31	.00	.00	.00	.00	[1].07	.00
9	.23	.13	.10	.00	.00	.20	.00	.17	.00	.00	[1].07	.00
10	.00	.57	.00	[1].08	2.10	.00	.00	.06	.00	.22	[1].94	.00
11	.00	.00	.00	[1].00	.00	.00	.57	.10	.00	1.65	.00	.00
12	.00	.00	.00	[1].00	.00	.00	1.24	.00	.00	.10	.00	.00
13	.00	.00	.00	[1].00	.55	.00	.20	.66	.25	[1]1.35	.00	.00
14	.00	.00	.00	[1].20	.00	.00	.95	.00	.02	.09	.00	.00
15	.04	.02	.00	[1].40	.00	.00	[1].40	.00	.00	.00	.00	.80
16	.00	.00	.05	[1].00	.84	.00	.00	.00	.39	.00	.00	.00
17	.00	[1].00	.75	[1].15	.03	.00	.00	.00	.00	.00	.18	.10
18	.00	[1].00	.00	.00	.00	1.37	.00	.00	.00	1.03	.00	.55
19	.00	[1].00	.14	.00	.00	.05	.00	.46	.33	.00	.00	.17
20	.26	.00	.00	.00	.07	[1].02	.24	1.45	.00	.00	.00	.02
21	.24	.00	.15	.02	.12	[1].00	.39	.16	.00	.00	.00	.33
22	.00	.01	.00	.00	.04	[1].02	.12	1.65	.75	.10	.00	.01
23	.00	.65	.00	.00	.00	[1].13	.00	.29	.00	2.40	.20	.36
24	.00	.00	.00	.00	.00	[1].15	.00	.03	.00	.29	.00	[1].37
25	.70	.00	.17	.00	.00	[1].00	.00	.00	.00	.00	.00	[1].00
26	.23	.00	.00	.00	1.45	[1].00	.00	.00	.01	.00	.00	[1].00
27	.21	.10	.00	.00	.03	.00	.00	.00	.00	.00	.00	[1].00
28	.00	.00	.00	.00	.16	.00	.00	.00	.00	.00	.00	[1].83
29	1.53	--	.05	.46	1.31	.15	.00	.00	.00	.00	.00	[1].00
30	.00	--	.26	.20	.00	.35	.01	.00	.03	.00	.00	[1].00
31	.00	--	.11	--	.00	--	.00	.00	--	.00	--	[1].24
Total	3.51	[1]1.95	1.78	[1]3.13	7.64	[1]3.01	[1]5.14	6.33	1.78	[1]7.33	[1]1.93	[1]5.40

[1] Estimated value.

Table 10.--Quantity of daily precipitation collected from the U.S. Geological Survey precipitation-collection station at Catoctin Mountain, Maryland, in 1991

[All values reported in inches]

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	[1]0.00	0.00	0.00	0.03	0.01	0.00	0.00	0.00	0.00	0.00	0.00	[1]0.35
2	[1].00	.00	.34	.00	.00	.00	.80	.00	.00	.00	.00	[1]1.88
3	.00	.00	.45	.00	.02	.00	.00	.00	.00	.00	.00	[1].15
4	.00	.00	.99	.00	.00	.00	.08	.04	1.85	.00	.00	.00
5	.03	.00	.00	.15	.10	.00	.10	.00	.08	.73	.00	.00
6	.31	.50	.23	.00	1.05	.00	.00	.00	.10	.65	.00	.00
7	.02	.11	.00	.00	[1].00	.00	.00	.03	.00	.00	.00	.00
8	.00	.00	.00	.00	[1].00	.00	.00	.00	.00	.00	.00	.00
9	.15	.00	.00	.20	[1].12	.00	.00	.97	.00	.00	.00	.76
10	.00	.00	.00	.00	[1].00	.00	.00	[1].00	.05	.00	.45	.00
11	.15	.00	.00	.00	[1].00	.00	.00	[1].00	.00	.37	.13	.00
12	.66	[1].00	.00	.00	[1].00	.00	.20	[1].00	.00	.00	.10	.00
13	.00	[1].03	.00	[1].30	[1].12	.00	.47	[1].00	.00	.00	.00	.23
14	.15	[1].59	.00	[1].21	[1].02	.00	.00	.00	.20	.00	.00	.09
15	.00	1.00	.40	[1].49	.00	.00	.00	.00	.00	.17	.00	.00
16	.88	[1].00	.00	[1].00	.00	.77	.00	.00	.00	.00	.00	.00
17	.00	[1].00	.00	.00	.85	.00	.00	.00	.00	.50	.00	.00
18	.00	[1].17	.56	.00	.00	[1]1.47	.00	.10	2.68	.00	.00	.00
19	.00	[1].19	.00	.15	.05	.05	.00	.20	.35	.00	.00	.00
20	.00	.00	.00	.15	.00	.00	.00	1.24	.00	.00	.00	.00
21	.15	.00	.04	.75	.00	.00	.00	.00	.00	.00	.44	.00
22	.00	.00	.16	.00	.00	.00	.05	.00	.00	.00	1.50	.00
23	.00	.00	1.25	.00	.00	.20	.03	.00	.05	.00	.00	.15
24	.00	.00	.00	.10	.00	.00	.00	.00	.05	[1].00	.00	.00
25	.00	.00	.00	.00	.00	.00	.00	.18	.36	[1].00	.00	.00
26	.00	.00	.07	.00	.00	.00	.70	.00	.00	[1].00	.00	.00
27	.00	.00	.21	.00	.00	.00	.00	.00	.00	[1].00	.00	.00
28	.00	.00	.00	.00	.04	.00	.00	.00	.00	[1].00	.00	.41
29	.00	--	.19	.06	.00	.00	.22	.00	.00	[1].00	.00	.65
30	.30	--	.22	.00	.04	.00	.00	.00	.00	.00	[1].08	.00
31	.00	--	.00	--	.00	--	.00	.00	--	.00	--	.00
Total	[1]2.80	[1]1.59	5.11	[1]2.59	[1]2.42	[1]2.49	2.65	[1]2.76	5.77	[1]2.42	[1]2.70	[1]4.67

[1] Estimated value.

Table 11.--Quantity of total monthly precipitation collected from the U.S. Geological Survey precipitation-collection station at Catoctin Mountain, Maryland, for 1982-91

[All values reported in inches. This table includes estimated values from tables 1-10]

Month	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
January	2.87	2.18	1.66	1.78	1.01	7.52	1.85	2.61	3.51	2.80
February	2.82	3.14	9.28	2.86	3.34	1.74	1.66	2.41	1.95	1.59
March	2.94	6.39	5.57	3.62	2.74	1.97	1.59	3.41	1.78	5.11
April	4.46	8.94	4.67	.28	3.02	6.16	2.17	1.42	3.13	2.59
May	2.15	5.49	7.73	5.37	3.02	3.25	11.92	9.34	7.64	2.42
June	7.24	4.61	2.71	2.25	4.79	2.56	.64	5.60	3.01	2.49
July	4.17	1.47	5.59	5.61	1.91	3.27	3.71	5.48	5.14	2.65
August	.94	2.85	12.14	4.50	2.98	1.45	3.45	1.05	6.33	2.76
September	3.23	2.91	1.50	2.46	.93	6.29	2.89	2.35	1.78	5.77
October	1.55	8.36	2.59	3.90	2.63	2.36	1.60	5.17	7.33	2.42
November	3.03	5.12	3.18	9.92	5.51	4.65	4.60	2.12	1.93	2.70
December	1.49	6.34	1.86	1.51	5.30	1.90	1.35	1.65	5.40	4.67
TOTAL	36.89	57.80	58.48	44.06	37.18	43.12	37.43	42.61	48.93	37.97

Table 12.--Statistical summary of the quantity of precipitation collected from the U.S. Geological Survey precipitation-collection station at Catoctin Mountain, Maryland, for 1982-91

[This table includes estimated values from tables 1-10]

Month	Precipitation, in inches					
	Minimum	Year	Maximum	Year	Mean	Median
January	1.01	1986	7.52	1987	2.78	2.40
February	1.59	1991	9.28	1984	3.08	2.62
March	1.59	1988	6.39	1983	3.51	3.18
April	.28	1985	8.94	1983	3.68	3.08
May	2.15	1982	11.92	1988	5.83	5.43
June	.64	1988	7.24	1982	3.59	2.86
July	1.47	1983	5.61	1985	3.90	3.94
August	.94	1982	12.14	1984	3.84	2.92
September	.93	1986	6.29	1987	3.01	2.68
October	1.55	1982	8.36	1983	3.79	2.61
November	1.93	1990	9.92	1985	4.28	3.89
December	1.35	1988	6.34	1983	3.15	1.88
ANNUAL TOTAL	36.89	1982	58.48	1984	44.45	42.86

Table 13.--Chemical analyses of precipitation collected from the U.S. Geological Survey precipitation-collection

[µS/cm, microsiemens per centimeter, µeq/L, microequivalents per liter; n.a., not analyzed; <, less than]

Date	Specific conduct–ance (µS/cm)	pH, field (standard units)	Hydrogen ion, field (µeq/L)	pH, labora–tory (stan–dard units)	Hydrogen ion, lab–oratory (µeq/L)	Calcium, dissolved (µeq/L)	Magnesium, dissolved (µeq/L)
01/15/82	13	4.4	39.81	4.75	17.78	24.5	0.9
01/22/82	30	3.9	125.89	4.3	50.12	13	2.47
01/28/82	21	4.2	63.1	4.38	41.69	17	2.22
02/04/82	16	4.3	50.12	4.49	32.36	7.49	1.97
02/11/82	20	4.2	63.1	4.38	41.69	7.98	3.87
02/18/82	79	3.8	158.49	3.97	107.15	11	4.44
02/25/82	25	4.25	56.23	4.33	46.77	7.98	4.9
03/04/82	102	3.72	190.55	3.75	177.83	<2.5	<.8
03/11/82	22	4.25	56.23	4.39	40.74	5.99	.74
03/18/82	24	4.25	56.23	4.5	31.62	9.48	5.42
03/25/82	47	3.96	109.65	4.53	29.51	18.9	2.96
04/01/82	27	4.2	63.1	4.55	28.18	24.7	6.74
04/07/82	21	4.25	56.23	4.68	20.89	<2.5	<.8
04/10/82	15	4.26	54.95	4.85	14.13	<2.5	<.8
04/16/82	103	3.8	158.49	n.a.	n.a.	n.a.	n.a.
04/22/82	15	4.5	31.62	4.73	18.62	.05	2.38
04/29/82	13	4.45	35.48	4.64	22.91	3.66	.57
05/13/82	121	3.65	223.87	3.8	158.49	25.4	8.14
05/20/82	49	4.1	79.43	4.18	66.07	34.4	8.14
05/27/82	65	4	100	n.a.	n.a.	n.a.	n.a.
06/02/82	25	4.2	63.1	4.39	40.74	6.49	1.56
06/08/82	29	3.95	112.2	4.39	40.74	10.5	1.56
06/15/82	25	4	100	4.35	44.67	3.49	1.23
06/17/82	17	4.15	70.79	4.54	28.84	4.49	.99
06/24/82	39	4	100	4.09	81.28	7.49	1.81
07/01/82	65	3.6	251.19	3.93	117.49	<2.5	<.8
07/08/82	39	3.9	125.89	4.22	60.26	4.8	1.97
07/14/82	101	3.4	398.11	3.79	162.18	<2.5	<.8
07/21/82	56	3.8	158.49	4.56	27.54	16.5	2.9
07/28/82	87	3.6	251.19	3.83	147.91	17	2.6
08/04/82	122	3.6	251.19	3.68	208.93	29.4	5.67
08/11/82	65	3.8	158.49	3.91	123.03	14.9	2.38
08/18/82	153	3.4	398.11	3.56	275.42	32.4	6.83
08/25/82	77	3.7	199.53	3.93	117.49	45.2	5.67
09/08/82	172	3.4	398.11	3.51	309.03	<2.5	<.8
09/22/82	63	3.9	125.89	3.96	109.65	<2.5	1.4
09/29/82	16	4.57	26.92	4.55	28.18	<2.5	1.07
10/14/82	36	4.27	53.7	4.31	48.98	10.9	2.1
10/21/82	40	4.02	95.5	n.a.	n.a.	n.a.	n.a.
10/28/82	30	5.04	9.12	5.93	1.17	4.2	2.4
11/04/82	55	3.93	117.49	4.32	47.86	11.5	5.76
11/12/82	14	4.6	25.12	4.95	11.22	5.99	3.29
11/19/82	26	4.33	46.77	4.59	25.7	12	2.5
11/26/82	72	3.92	120.23	4.1	79.43	18	<.8
12/02/82	12	4.58	26.3	4.93	11.75	6.99	.8
12/20/82	16	4.44	36.31	4.68	20.89	9.48	.82
12/31/82	29	4.18	66.07	4.15	70.79	16.5	4.9

station at Catoctin Mountain, Maryland, in 1982

Sodium, dissolved (µeq/L)	Potassium, dissolved (µeq/L)	Ammonium, dissolved (µeq/L)	Chloride, dissolved (µeq/L)	Nitrite, dissolved (µeq/L)	Nitrate, dissolved (µeq/L)	Sulfate, dissolved (µeq/L)	Date
20.7	2.73	26.2	2.85	<0.8	11.4	36.2	01/15/82
4.5	3.65	17.2	7.87	<.8	51	34.2	01/22/82
14.6	8.18	9.12	6.16	<.8	41.2	73.2	01/28/82
6.71	5.45	10.3	8.14	<.8	41.2	44.2	02/04/82
2.31	3.05	<2.8	14.5	<.8	46.6	20.6	02/11/82
6.16	2.12	9.8	5.47	<.8	49.2	26.4	02/18/82
2.12	<.64	7.33	7.01	<.8	23.3	38	02/25/82
6.67	7.68	<2.8	9.27	<.8	13.8	169	03/04/82
4	12.5	6.66	3.85	<.8	10.7	33	03/11/82
8.26	<.64	15.6	4.13	<.8	22.9	37.4	03/18/82
4.8	6.7	15.8	4.9	1.3	41.1	69.8	03/25/82
6.9	3.1	16.3	11.9	.8	36.6	46.4	04/01/82
34.5	2.3	<2.8	9.9	<.8	17.9	39.4	04/07/82
8.1	1	3.2	8.1	<.8	15.3	11.4	04/10/82
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	04/16/82
35.8	2.4	<2.8	22.8	<.8	14.3	31.4	04/22/82
2.83	<.64	8.37	13	<.8	13.8	24.2	04/29/82
7.9	8.9	105	16.4	<.8	114	230	05/13/82
2.1	<.64	79	10.7	5.8	59	104	05/20/82
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	05/27/82
4.9	<.64	29.8	5.7	<.8	26.1	26.4	06/02/82
3.2	<.64	23.1	6.7	<.8	26.7	49.6	06/08/82
11.5	<.64	8.6	10.3	.1	16.4	45.8	06/15/82
2.5	<.64	15.6	8.8	<.8	7.9	32.8	06/17/82
6	<.64	9.4	9.6	.9	24.3	75.8	06/24/82
3.1	2.6	18.5	9.7	1.5	47.7	107	07/01/82
39.5	1.44	9.2	6.7	<.8	24.5	78.2	07/08/82
6.7	2.7	20.7	25.1	<.8	52.9	130	07/14/82
4.86	4.46	23.2	11	.95	28.6	88.8	07/21/82
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	07/28/82
4.49	4.82	31.9	22.8	<.8	79.3	192	08/04/82
1.78	1.99	25.1	8.4	9.4	31.1	114	08/11/82
14.1	<.64	31.1	19.1	<.8	102	238	08/18/82
5.8	2.6	19.7	17.6	5.5	34.2	126	08/25/82
10.7	10.7	38.8	45.8	<.8	63.2	138	09/08/82
3	<.64	16.8	5.5	.9	36.9	82.2	09/22/82
4.2	1.8	9.9	4.2	.2	11	14	09/29/82
7.7	6.4	26	12.5	1.3	27.6	30.9	10/14/82
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	10/21/82
8.9	17.9	4	18.8	.1	<.45	4.9	10/28/82
11.2	5.8	9.6	31.2	2.7	22.9	54.2	11/04/82
4.6	5.1	11.8	11.1	<.8	5.7	9.5	11/12/82
10.8	4.7	13.9	32.8	<.8	19.7	36	11/19/82
62.9	2.3	49.5	56.5	<.8	53.5	112	11/26/82
3.8	1.1	2.9	23.7	5.1	4.2	10.9	12/02/82
10.9	1.5	4.3	21.9	4.2	10.5	10.8	12/20/82
16.1	4.4	8.5	29.4	<.8	18.4	54	12/31/82

Table 14.--Chemical analyses of precipitation collected from the U.S. Geological Survey precipitation-collection

[µS/cm, microsiemens per centimeter; µeq/L, microequivalents per liter; n.a., not analyzed; <, less than]

Date	Specific conduct–ance (µS/cm)	pH, field (standard units)	Hydrogen ion, field (µeq/L)	pH, labora–tory (stan–dard units)	Hydrogen ion, lab–oratory (µeq/L)	Calcium, dissolved (µeq/L)	Magnesium, dissolved (µeq/L)
01/06/83	43	4.28	52.48	n.a.	n.a.	n.a.	n.a.
01/13/83	28	4.26	54.95	4.41	38.9	8.98	<0.8
01/20/83	31	4.23	58.88	n.a.	n.a.	n.a.	n.a.
01/27/83	14	4.53	29.51	n.a.	n.a.	10.6	<.8
02/03/83	27	4.25	56.23	4.16	69.18	3.99	.8
02/10/83	56	4.22	60.26	n.a.	n.a.	n.a.	n.a.
02/17/83	80	3.76	173.78	3.9	125.89	31.4	5.76
03/03/83	59	3.98	104.71	n.a.	n.a.	n.a.	n.a.
03/10/83	45	4.02	95.5	4.24	57.54	19	.03
03/24/83	18	4.43	37.15	4.62	23.99	11	<.8
03/31/83	27	4.35	44.67	4.36	43.65	19.5	7.4
04/07/83	35	4.21	61.66	4.2	63.1	9.48	6.58
04/14/83	22	4.28	52.48	4.42	38.02	6.99	5.76
04/21/83	25	4.29	51.29	4.35	44.67	11	4.11
04/28/83	22	4.44	36.31	4.48	33.11	6.99	3.29
05/05/83	43	4.19	64.57	4.16	69.18	31.9	10.7
05/12/83	52	4.02	95.5	4.11	77.62	18.5	5.76
05/19/83	16	4.42	38.02	4.71	19.5	11	1.64
05/26/83	29	4.22	60.26	4.46	34.67	19	4.93
06/02/83	52	3.89	128.82	4.09	81.28	19.5	4.93
06/09/83	39	4.11	77.62	4.2	63.1	9.98	1.64
06/23/83	39	4.03	93.33	4.19	64.57	9.48	1.64
06/30/83	68	3.84	144.54	3.91	123.03	17.5	3.29
07/07/83	144	3.49	323.59	3.84	144.54	28.9	7.4
07/21/83	114	3.67	213.8	3.62	239.88	23.5	4.11
07/28/83	215	3.43	371.54	n.a.	n.a.	n.a.	n.a.
08/05/83	61	3.91	123.03	4.1	79.43	13.5	3.62
08/11/83	108	3.73	186.21	3.85	141.25	24.5	4.93
08/18/83	70	3.96	109.65	3.85	141.25	16.7	3.62
09/01/83	124	3.7	199.53	3.64	229.09	25	8.39
09/15/83	67	4.13	74.13	4.05	89.13	30.9	6.58
09/22/83	26	4.3	50.12	4.68	20.89	3.61	1.37
10/06/83	18	4.06	87.1	4.51	30.9	14	4.93
10/13/83	19	4.5	31.62	4.76	17.38	13.5	9.05
10/20/83	22	3.84	144.54	4.58	26.3	13.5	3.29
10/27/83	15	4.46	34.67	4.8	15.85	7.49	2.47
11/03/83	27	4.37	42.66	n.a.	n.a.	n.a.	n.a.
11/09/83	38	4.1	79.43	n.a.	n.a.	n.a.	n.a.
11/16/83	20	3.58	263.03	4.63	23.44	6.49	.82
11/23/83	14	4.43	37.15	5.07	8.51	9.98	6.58
12/01/83	23	4.31	48.98	4.5	31.62	5.99	1.65
12/08/83	17	4.35	44.67	4.54	28.84	12.5	2.47
12/15/83	7	4.87	13.49	5.23	5.89	2.99	1.65

Sodium, dissolved (µeq/L)	Potassium, dissolved (µeq/L)	Ammonium, dissolved (µeq/L)	Chloride, dissolved (µeq/L)	Nitrite, dissolved (µeq/L)	Nitrate, dissolved (µeq/L)	Sulfate, dissolved (µeq/L)	Date
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	01/06/83
16.6	3.2	11.6	28.8	<0.8	22.4	41.8	01/13/83
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	01/20/83
10.6	5.8	11.7	17.8	2.9	14.3	30.4	01/27/83
9.57	.75	n.a.	27.4	<.8	13.9	28.3	02/03/83
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	02/10/83
8.27	1.75	n.a.	25.1	<.8	84.8	109	02/17/83
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	03/03/83
6.13	2.16	n.a.	10.7	<.8	48.2	59.9	03/10/83
6.18	.58	n.a.	8.33	<.8	18.5	36.4	03/24/83
5.39	1.66	n.a.	6.08	<.8	25.1	57.1	03/31/83
8.05	.83	n.a.	14	<.8	30.3	55.8	04/07/83
2.26	.5	n.a.	7.63	<.8	18	34.1	04/14/83
16.5	.75	n.a.	17.4	<.8	26.8	52.9	04/21/83
5.22	.42	n.a.	6.02	<.8	9.9	40	04/28/83
10.9	4	n.a.	16.6	<.8	17	99	05/05/83
4.26	1.41	n.a.	11.2	<.8	7.68	67	05/12/83
3.48	.75	n.a.	4.24	<.8	15.7	34	05/19/83
8.7	2.33	n.a.	13.3	<.8	31.4	57.2	05/26/83
3.48	.83	n.a.	10.9	<.8	61.6	102	06/02/83
3.91	.75	n.a.	8.28	<.8	12.4	80	06/09/83
4.39	.75	n.a.	17.2	<.8	25.9	66.8	06/23/83
3.05	.25	n.a.	17.6	<.8	29.7	72.4	06/30/83
9.13	.58	n.a.	49.3	<.8	30.6	98.3	07/07/83
2.61	.66	n.a.	54.4	<.8	38.1	135	07/21/83
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	07/28/83
3.91	.65	n.a.	28.3	<.8	24.9	69.9	08/05/83
3.04	.76	n.a.	45.2	<.8	68.2	178	08/11/83
10.9	2.76	n.a.	29.7	<.8	47.2	156	08/18/83
10.4	2.91	n.a.	24.8	<.8	77.4	226	09/01/83
5.65	1.92	n.a.	20.2	<.8	15.4	114	09/15/83
3.11	.64	n.a.	6.34	<.8	5.49	27.3	09/22/83
11.7	2.79	n.a.	11.1	<.8	7.69	38.4	10/06/83
30	.75	n.a.	32	<.8	7.8	24.4	10/13/83
5.65	.58	n.a.	13.5	<.8	23.6	33.6	10/20/83
5.22	.33	n.a.	10.7	<.8	16.9	22.6	10/27/83
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	11/03/83
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	11/09/83
3.04	.49	n.a.	15	<.8	32.8	31.9	11/16/83
23.6	.75	n.a.	40.5	<.8	5	23.2	11/23/83
3.04	.58	n.a.	11.9	<.8	21.5	37.7	12/01/83
4.39	1.16	n.a.	14.8	<.8	25.3	31.6	12/08/83
5.65	.39	n.a.	14.1	<.8	4.4	13.1	12/15/83

Table 15.--Chemical analyses of precipitation collected from the U.S. Geological Survey precipitation-collection

[µS/cm, microsiemens per centimeter; µeq/L, microequivalents per liter; n.a., not analyzed; <, less than]

Date	Specific conduct–ance (µS/cm)	pH, field (standard units)	Hydrogen ion, field (µeq/L)	pH, labora–tory (stan–dard units)	Hydrogen ion, lab–oratory (µeq/L)	Calcium, dissolved (µeq/L)	Magnesium, dissolved (µeq/L)
01/05/84	7	4.77	16.98	4.98	10.47	9.27	<0.8
01/16/84	18	4.49	32.36	4.65	22.39	11.8	4.9
01/25/84	22	4.42	38.02	4.54	28.84	14	5.1
02/07/84	20	4.3	50.12	n.a.	n.a.	n.a.	n.a.
02/15/84	14	4.62	23.99	5.04	9.12	6.18	3.21
02/21/84	33	4.11	77.62	4.33	46.77	11.3	3.21
02/28/84	25	4.49	32.36	4.5	31.62	6.18	2.62
03/06/84	48	4	100	4.23	58.88	15.4	8.86
03/27/84	38	4.06	87.1	4.25	56.23	7.21	2.93
04/03/84	43	4.05	89.13	4.15	70.79	17.5	3.06
04/10/84	41	4.08	83.18	4.27	53.7	22	3.42
04/17/84	34	4.13	74.13	4.39	40.74	16	1.58
04/24/84	38	4.07	85.11	4.32	47.86	13	2.5
05/01/84	65	3.91	123.03	4.27	53.7	57.9	10.1
05/08/84	26	4.18	66.07	4.45	35.48	8.98	1.18
05/15/84	30	4.25	56.23	4.61	24.55	26	7.88
05/22/84	122	3.7	199.53	n.a.	n.a.	n.a.	n.a.
05/30/84	19	4.38	41.69	4.86	13.8	19.1	5.2
06/12/84	98	3.79	162.18	n.a.	n.a.	15.1	5.59
06/19/84	45	4	100	4.05	89.13	8.66	.99
06/26/84	23	4.31	48.98	4.37	42.66	6.93	1.23
07/03/84	39	4.12	75.86	4.07	85.11	13.5	1.66
07/10/84	12	4.63	23.44	4.78	16.6	14.3	2.18
07/17/84	80	3.9	125.89	n.a.	n.a.	n.a.	n.a.
07/24/84	16	4.14	72.44	4.56	27.54	15.6	.24
07/31/84	50	3.85	141.25	4.02	95.5	14.6	1.92
08/07/84	38	3.68	208.93	4.15	70.79	13.5	1.79
08/14/84	40	4.1	79.43	4.15	70.79	13.5	1.32
08/21/84	55	3.96	109.65	4.03	93.33	19.3	1.42
08/28/84	33	4.09	81.28	4.22	60.26	19.3	1.42
09/05/84	45	3.96	109.65	4.15	70.79	20.6	1.68
09/18/84	76	3.77	169.82	n.a.	n.a.	n.a.	n.a.
10/03/84	14	4.45	35.48	4.87	13.49	11.4	1.93
10/23/84	10	4.56	27.54	4.99	10.23	12	.17
10/30/84	17	4.26	54.95	4.54	28.84	8.33	.12
11/06/84	14	4.46	34.67	4.83	14.79	5.56	.44
11/13/84	24	4.12	75.86	n.a.	n.a.	n.a.	n.a.
11/20/84	17	4.44	36.31	4.6	25.12	13	.15
12/04/84	15	4.66	21.88	4.93	11.75	10.2	.54
12/12/84	15	4.47	33.88	4.75	17.78	6.48	.9
12/24/84	39	4.08	83.18	4.21	61.66	13	.19
12/31/84	16	4.35	44.67	n.a.	n.a.	n.a.	n.a.

Sodium, dissolved (µeq/L)	Potassium, dissolved (µeq/L)	Ammonium, dissolved (µeq/L)	Chloride, dissolved (µeq/L)	Nitrite, dissolved (µeq/L)	Nitrate, dissolved (µeq/L)	Sulfate, dissolved (µeq/L)	Date
2.74	0.65	n.a.	7.93	1.72	8.69	17.8	01/05/84
15.5	1.62	n.a.	19.7	2.96	27.5	29.4	01/16/84
15.8	.76	0.76	22	<.8	17.5	39.1	01/25/84
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	02/07/84
22.6	.68	n.a.	32.9	<.8	13.1	29.2	02/15/84
4.7	.59	n.a.	12	<.8	15.7	42.2	02/21/84
5.44	.88	n.a.	12.1	<.8	18.9	45.1	02/28/84
33.9	4.98	n.a.	15	<.8	33	81.1	03/06/84
7.2	.9	n.a.	11.5	<.8	18.3	62.8	03/27/84
4.12	1.13	n.a.	9.63	<.8	22.2	70.8	04/03/84
5.59	2.38	n.a.	15.3	<.8	26.1	93.3	04/10/84
3.22	1.13	n.a.	2.38	<.8	25.7	53.6	04/17/84
2.54	1.13	n.a.	9.39	1.33	12.2	60.4	04/24/84
10.2	5.84	n.a.	8.02	<.8	73.3	152	05/01/84
13.8	1.13	n.a.	2.86	<.8	23	58	05/08/84
13.7	10.7	n.a.	4.48	<.8	32.5	95.4	05/15/84
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	05/22/84
15	5.65	n.a.	6.33	<.8	19.6	46	05/30/84
7.32	3.38	n.a.	27.6	<.8	35.2	92.2	06/12/84
3.76	2.15	n.a.	2.81	<.8	30.5	103	06/19/84
3.37	1.59	n.a.	4	<.8	19.7	51.5	06/26/84
7.57	1.43	n.a.	4.95	<.8	22.2	77.1	07/03/84
5.13	1.85	n.a.	6.83	<.8	11.3	28.4	07/10/84
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	07/17/84
10.8	2.14	n.a.	3.34	<.8	14.4	39.5	07/24/84
13.2	1.71	n.a.	6.75	<.8	29.4	132	07/31/84
4.13	1.43	n.a.	4.18	<.8	26.6	85	08/07/84
12.3	1.08	n.a.	4.45	<.8	28.4	81.8	08/14/84
3.05	1.97	n.a.	5.8	<.8	27.6	127	08/21/84
3.27	1.25	n.a.	2.82	<.8	22.7	83.6	08/28/84
5.54	1.82	n.a.	2.71	<.8	24.8	97.5	09/05/84
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	09/18/84
4.4	1.44	n.a.	6.49	<.8	11	25	10/03/84
13.3	.82	n.a.	8.53	<.8	11	20.2	10/23/84
11.9	.96	n.a.	6.34	<.8	17.6	31.1	10/30/84
19.2	.56	n.a.	20.9	<.8	12.9	23.9	11/06/84
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	11/13/84
1.83	.8	n.a.	3.53	<.8	35.8	17.6	11/20/84
15.1	2.46	n.a.	19.2	<.8	13.6	24.9	12/04/84
11	.82	n.a.	10.5	<.8	22.6	23.4	12/12/84
13.7	.85	n.a.	8.61	<.8	46.9	69.4	12/24/84
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	12/31/84

Table 16.--Chemical analyses of precipitation collected from the U.S. Geological Survey precipitation-collection

[µS/cm, microsiemens per centimeter, µeq/L, microequivalents per liter; n.a., not analyzed; <, less than]

Date	Specific conduct–ance (µS/cm)	pH, field (standard units)	Hydrogen ion, field (µeq/L)	pH, labora–tory (stan–dard units)	Hydrogen ion, lab–oratory (µeq/L)	Calcium, dissolved (µeq/L)	Magnesium, dissolved (µeq/L)
01/08/85	14	4.47	33.88	4.7	19.95	4.54	1.88
01/15/85	15	4.37	42.66	n.a.	n.a.	n.a.	n.a.
01/22/85	18	4.4	39.81	n.a.	n.a.	n.a.	n.a.
01/29/85	n.a.	4.34	45.71	n.a.	n.a.	n.a.	n.a.
02/05/85	13	4.55	28.18	4.89	12.88	3.79	1.52
02/13/85	16	4.4	39.81	4.57	26.92	10.6	2.89
02/27/85	32	4.1	79.43	n.a.	n.a.	n.a.	n.a.
03/05/85	81	4.03	93.33	n.a.	n.a.	n.a.	n.a.
03/12/85	31	4.21	61.66	4.3	50.12	12.1	4.63
03/26/85	17	4.38	41.69	4.51	30.9	7.2	1.01
04/02/85	29	4.19	64.57	4.37	42.66	9.09	4.05
04/09/85	41	4.18	66.07	n.a.	n.a.	n.a.	n.a.
04/16/85	n.a.	4.1	79.43	n.a.	n.a.	n.a.	n.a.
04/23/85	44	3.98	104.71	n.a.	n.a.	n.a.	n.a.
04/30/85	n.a.	4.25	56.23	n.a.	n.a.	n.a.	n.a.
05/08/85	21	4.27	53.7	4.34	45.71	4.54	2.64
05/14/85	10	4.7	19.95	5.11	7.76	6.32	1.89
05/21/85	19	4.32	47.86	4.41	38.9	7.98	1.23
05/28/85	34	4.12	75.86	4.31	48.98	11.8	1.81
06/05/85	31	4.22	60.26	4.25	56.23	7.32	1.27
06/11/85	42	3.87	134.9	4.02	95.5	3.99	2.84
06/18/85	30	4.02	95.5	4.19	64.57	9.48	6.29
06/25/85	28	4.11	77.62	4.18	66.07	12	7.4
07/02/85	36	3.98	104.71	n.a.	n.a.	n.a.	n.a.
07/11/85	25	4.23	58.88	4.3	50.12	11.8	13
07/16/85	26	4.18	66.07	4.26	54.95	8.48	5.8
07/23/85	n.a.	3.45	354.81	n.a.	n.a.	n.a.	n.a.
07/30/85	7	4.51	30.9	4.65	22.39	9.19	.99
08/06/85	95	3.69	204.17	n.a.	n.a.	n.a.	n.a.
08/13/85	9	4.46	34.67	4.85	14.13	7.88	.99
08/20/85	77	3.91	123.03	3.93	117.49	27.6	4.67
08/27/85	32	3.99	102.33	4.15	70.79	6.57	.85
09/05/85	n.a.	3.35	446.68	n.a.	n.a.	n.a.	n.a.
09/11/85	55	3.9	125.89	4.01	97.72	19.7	2.41
09/26/85	34	4.07	85.11	4.18	66.07	7.88	4.1
10/01/85	4	5.17	6.76	5.85	1.41	.81	.13
10/08/85	31	4.21	61.66	4.28	52.48	4.9	2.53
10/15/85	57	3.71	194.98	n.a.	n.a.	n.a.	n.a.
10/23/85	18	4.68	20.89	4.82	15.14	9	11.5
10/31/85	28	4.41	38.9	n.a.	n.a.	n.a.	n.a.
11/06/85	n.a.	n.a.	n.a.	5.15	7.08	4.1	6.3
11/12/85	41	3.96	109.65	n.a.	n.a.	n.a.	n.a.
11/21/85	33	4.19	64.57	4.24	57.54	2.44	1.1
12/02/85	21	4.4	39.81	4.35	44.67	<2.5	.7
12/10/85	11	4.8	15.85	n.a.	n.a.	n.a.	n.a.
12/17/85	25	4.09	81.28	4.33	46.77	2.44	.53

station at Catoctin Mountain, Maryland, in 1985

Sodium, dissolved (µeq/L)	Potassium, dissolved (µeq/L)	Ammonium, dissolved (µeq/L)	Chloride, dissolved (µeq/L)	Nitrite, dissolved (µeq/L)	Nitrate, dissolved (µeq/L)	Sulfate, dissolved (µeq/L)	Date
4	1.3	n.a.	4.84	<0.8	14.5	32.2	01/08/85
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	01/15/85
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	01/22/85
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	01/29/85
2.62	1.06	n.a.	3.08	<.8	16.9	17.1	02/05/85
12.7	5.17	n.a.	11.8	<.8	13.2	30.5	02/13/85
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	02/27/85
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	03/05/85
4.84	2.24	n.a.	5.58	<.8	31.3	56.5	03/12/85
1.52	.94	n.a.	3.41	<.8	17.5	35.3	03/26/85
6.91	1.75	n.a.	8.37	<.8	24	64.4	04/02/85
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	04/09/85
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	04/16/85
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	04/23/85
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	04/30/85
4.14	2.21	n.a.	6.2	<.8	29.8	56.3	05/08/85
2.35	1.62	n.a.	4.97	<.8	12	15.3	05/14/85
2.76	.35	n.a.	4.92	1.88	20	42.5	05/21/85
1.52	.81	n.a.	4.54	<.8	36.1	77.5	05/28/85
2.62	1.39	n.a.	5.16	<.8	21.8	59.3	06/05/85
2.49	.98	n.a.	5.33	<.8	35.2	88.8	06/11/85
1.66	1.11	n.a.	7.38	<.8	26.3	75.6	06/18/85
2.9	.81	n.a.	10	<.8	30	69	06/25/85
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	07/02/85
1.66	1.97	n.a.	6.13	<.8	25.5	74.8	07/11/85
2.07	1.04	n.a.	5.48	<.8	22.2	67.2	07/16/85
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	07/23/85
1.11	1.48	n.a.	4.23	<.8	15.8	36.4	07/30/85
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	08/06/85
3.04	2.21	n.a.	4.23	<.8	11.2	24.7	08/13/85
3.73	7.01	n.a.	16.9	<.8	47.5	167	08/20/85
2.11	3.69	n.a.	3.34	<.8	23	64.7	08/27/85
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	09/05/85
2.76	1.85	n.a.	6.26	<.8	27.1	47.1	09/11/85
10.4	2.21	n.a.	20.3	<.8	20.8	26.5	09/26/85
2.61	1.48	n.a.	1.67	<.8	13.3	16.5	10/01/85
2.8	9.6	n.a.	5	<.8	25.2	56.5	10/08/85
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	10/15/85
28.1	4.06	n.a.	28	<.8	17.8	37.8	10/23/85
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	10/31/85
30.3	11.1	n.a.	28.6	<.8	9.54	20.7	11/06/85
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	11/12/85
4.61	.72	n.a.	5.13	.98	23.6	53.2	11/21/85
3.4	.72	n.a.	4.79	.5	13.6	35.9	12/02/85
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	12/10/85
2.4	1.5	n.a.	2.05	1	21	35.5	12/17/85

Table 17.--Chemical analyses of precipitation collected from the U.S. Geological Survey precipitation-collection

[µS/cm, microsiemens per centimeter; µeq/L, microequivalents per liter; n.a., not analyzed; <, less than]

Date	Specific conduct-ance (µS/cm)	pH, field (standard units)	Hydrogen ion, field (µeq/L)	pH, labora-tory (stan-dard units)	Hydrogen ion, lab-oratory (µeq/L)	Calcium, dissolved (µeq/L)	Magnesium, dissolved (µeq/L)
01/08/86	n.a.	3.63	234.42	n.a.	n.a.	n.a.	n.a.
01/21/86	20	4.27	53.7	4.38	41.69	5.7	4.13
01/28/86	17	4.28	52.48	4.47	33.88	3.3	2.13
02/05/86	26	4.26	54.95	4.43	37.15	13.1	1.98
02/10/86	n.a.	3.84	144.54	n.a.	n.a.	n.a.	n.a.
02/18/86	22	4.13	74.13	4.39	40.74	7.88	1.27
02/24/86	40	3.94	114.82	4.23	58.88	13.1	3.11
03/05/86	24	4.26	54.95	4.39	40.74	10.5	1.84
03/11/86	30	4.5	31.62	4.54	28.84	15.8	5.94
03/18/86	22	4.31	48.98	4.52	30.2	6.57	.57
04/09/86	88	3.93	117.49	3.92	120.23	15.9	8.35
04/15/86	68	4.02	95.5	n.a.	n.a.	n.a.	n.a.
04/24/86	21	4.41	38.9	4.46	34.67	12.3	1.86
04/29/86	52	3.96	109.65	n.a.	n.a.	n.a.	n.a.
05/21/86	18	4.26	54.95	4.63	23.44	11.1	2.32
05/28/86	53	4.31	48.98	4	100	17.2	2.94
06/10/86	33	3.99	102.33	4.27	53.7	11.1	1.7
06/17/86	116	3.74	181.97	3.81	154.88	16.4	4.25
06/24/86	69	3.9	125.89	4.09	81.28	14.7	7.36
07/08/86	33	4.25	56.23	4.14	72.44	8.03	2.26
07/15/86	47	3.81	154.88	4.01	97.72	13.4	4.81
07/22/86	72	3.83	147.91	3.92	120.23	20.1	7.36
07/28/86	154	3.46	346.74	n.a.	n.a.	n.a.	n.a.
08/05/86	154	3.44	363.08	3.53	295.12	34.4	10.1
08/12/86	45	3.99	102.33	4.07	85.11	11.1	1
08/19/86	36	4.15	70.79	4.51	30.9	7.37	3.11
08/26/86	14	4.46	34.67	4.55	28.18	6.15	.37
09/04/86	25	4.21	61.66	4.32	47.86	6.15	.25
09/23/86	73	3.74	181.97	n.a.	n.a.	n.a.	n.a.
09/30/86	34	4.07	85.11	4.35	44.67	14.9	3.14
10/07/86	24	4.31	48.98	4.42	38.02	13.1	3.27
10/14/86	6	4.84	14.45	5.06	8.71	1.75	.78
10/28/86	17	4.49	32.36	4.47	33.88	6.13	.78
11/03/86	8	4.92	12.02	5.03	9.33	12.3	3.27
11/12/86	21	4.33	46.77	4.4	39.81	6.13	1.05
11/25/86	42	4.06	87.1	4.13	74.13	16.3	1
12/02/86	17	4.62	23.99	4.69	20.42	8.15	4.29
12/08/86	9	4.76	17.38	4.97	10.72	4.08	.14
12/16/86	34	4.16	69.18	4.25	56.23	10.2	1
12/23/86	96	3.76	173.78	3.82	151.36	10.2	1.43
12/30/86	9	4.51	30.9	4.67	21.38	10.2	.57

Sodium, dissolved (µeq/L)	Potassium, dissolved (µeq/L)	Ammonium, dissolved (µeq/L)	Chloride, dissolved (µeq/L)	Nitrite, dissolved (µeq/L)	Nitrate, dissolved (µeq/L)	Sulfate, dissolved (µeq/L)	Date
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	01/08/86
19	2.2	n.a.	18.5	<0.8	25.9	33.7	01/21/86
10	1.5	n.a.	10	<.8	15.7	31.3	01/28/86
9.07	1.49	n.a.	5.88	<.8	26.9	43.4	02/05/86
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	02/10/86
5.36	1.27	n.a.	9.8	<.8	22.4	39.8	02/18/86
8.25	4.25	n.a.	8.05	<.8	34.6	64	02/24/86
6.6	7.64	n.a.	11.1	<.8	42.1	19.5	03/05/86
19.2	1.49	n.a.	19.1	<.8	31.1	55.8	03/11/86
4.54	.64	n.a.	2.47	<.8	14.2	32.5	03/18/86
13.2	4.23	n.a.	20.3	<.8	65.4	130	04/09/86
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	04/15/86
5.61	2.35	n.a.	5.52	<.8	15.6	43.1	04/24/86
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	04/29/86
2.41	3.76	n.a.	8.74	<.8	17	38.8	05/21/86
4.61	2.12	n.a.	12	<.8	38.6	96.4	05/28/86
5.21	.94	n.a.	7.36	<.8	16.1	53.4	06/10/86
5.81	2.58	n.a.	52.8	.5	41.2	124	06/17/86
4.09	1.78	n.a.	9.95	<.8	43.9	92.5	06/24/86
1.29	.4	n.a.	19.5	<.8	18.3	67.2	07/08/86
4.31	1.2	n.a.	19.3	<.8	25.3	97	07/15/86
5.17	1.59	n.a.	14.6	<.8	37.2	135	07/22/86
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	07/28/86
6.37	4.01	n.a.	65.3	<.8	123	322	08/05/86
3.18	3.24	n.a.	10.4	<.8	32.2	102	08/12/86
12.7	4.77	n.a.	34.7	<.8	14.1	22.6	08/19/86
4.6	1.91	n.a.	6.75	<.8	12.6	31.2	08/26/86
3.18	1.14	n.a.	10.2	<.8	20.3	53	09/04/86
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	09/23/86
5.9	2.92	n.a.	24.6	<.8	22.4	58.7	09/30/86
7.39	2.66	n.a.	4.1	<.8	15.6	52.6	10/07/86
5.98	3.83	n.a.	7.95	<.8	7.58	10.7	10/14/86
3.46	1.69	n.a.	8.43	<.8	21.2	34.5	10/28/86
5.66	2.9	n.a.	8	<.8	4.58	13.5	11/03/86
1.42	1.45	n.a.	2.91	<.8	13.9	28.6	11/12/86
2.59	.78	n.a.	10.4	<.8	40.3	60.1	11/25/86
29.3	.78	n.a.	21	<.8	8.2	25.6	12/02/86
2.2	.39	n.a.	12.9	<.8	8.59	8.06	12/08/86
2.85	.78	n.a.	11.9	<.8	32.3	52.3	12/16/86
9.99	3.53	n.a.	18.7	<.8	104	121	12/23/86
3.63	.91	n.a.	10.5	<.8	11.3	30.8	12/30/86

Table 18.--Chemical analyses of precipitation collected from the U.S. Geological Survey precipitation-collection

[µS/cm, microsiemens per centimeter; µeq/L, microequivalents per liter; n.a., not analyzed; <, less than]

Date	Specific conduct–ance (µS/cm)	pH, field (standard units)	Hydrogen ion, field (µeq/L)	pH, labora–tory (stan–dard units)	Hydrogen ion, lab–oratory (µeq/L)	Calcium, dissolved (µeq/L)	Magnesium, dissolved (µeq/L)
01/07/87	18	4.65	22.39	4.66	21.88	8.15	1.57
01/13/87	43	4.13	74.13	4.19	64.57	12.2	1.43
01/20/87	27	4.36	43.65	4.85	14.13	12.2	1.29
01/28/87	8	4.81	15.49	4.38	41.69	6.11	.29
02/03/87	49	4.01	97.72	n.a.	n.a.	n.a.	n.a.
02/17/87	61	3.93	117.49	n.a.	n.a.	n.a.	n.a.
02/24/87	8	4.8	15.85	5.96	1.1	10.2	.86
03/03/87	14	4.61	24.55	4.87	13.49	4.08	1.72
03/31/87	26	4.34	45.71	4.61	24.55	14	1.39
04/07/87	16	4.52	30.2	4.77	16.98	12	.28
04/14/87	58	4.23	58.88	4.24	57.54	21.9	1.39
04/21/87	31	4.34	45.71	4.61	24.55	7.86	2.53
04/28/87	28	4.33	46.77	4.65	22.39	14.2	1.01
05/06/87	41	4.16	69.18	4.36	43.65	2.8	1.52
05/13/87	100	3.77	169.82	3.81	154.88	18.8	3.04
05/19/87	79	3.77	169.82	3.87	134.9	3.14	1.01
05/26/87	43	4.11	77.62	4.18	66.07	1.57	1.01
06/02/87	50	4.05	89.13	4.06	87.1	1.57	4.05
06/09/87	83	3.84	144.54	3.83	147.91	14.2	3.8
06/16/87	32	3.95	112.2	3.92	120.23	6.9	3.15
06/23/87	49	4.04	91.2	4	100	12.4	2.8
06/30/87	80	3.81	154.88	3.77	169.82	5.11	1.89
07/08/87	44	4.12	75.86	4.12	75.86	10.2	2.52
07/14/87	46	4.06	87.1	4.19	64.57	7.48	1.65
08/11/87	142	3.49	323.59	3.5	316.23	17	2.46
08/19/87	89	3.81	154.88	3.8	158.49	33.8	7.92
08/24/87	46	4.07	85.11	4.04	91.2	12.5	17.3
09/01/87	65	3.98	104.71	4.01	97.72	22	18.4
09/08/87	8	4.98	10.47	5.03	9.33	2.25	1.65
09/15/87	45	4.04	91.2	4.01	97.72	4.04	1.65
09/22/87	27	4.45	35.48	4.3	50.12	5.47	1.65
09/30/87	19	4.43	37.15	4.51	30.9	6.49	4.12
10/05/87	36	4.22	60.26	4.32	47.86	15.7	8.22
10/13/87	23	4.35	44.67	4.48	33.11	4.79	2.46
10/27/87	35	4.11	77.62	4.45	35.48	23.2	14
11/02/87	1	5.04	9.12	5.16	6.92	5	.82
11/13/87	38	4.14	72.44	4.38	41.69	6.48	2.46
11/24/87	17	4.58	26.3	4.7	19.95	6.98	4.11
12/01/87	11	4.85	14.13	4.88	13.18	2.5	1.65
12/08/87	25	4.39	40.74	4.62	23.99	32.4	5.76
12/15/87	30	4.48	33.11	4.37	42.66	9.98	5.76
12/22/87	31	4.32	47.86	4.36	43.65	<2.5	<.8
12/30/87	23	4.28	52.48	4.58	26.3	5.48	1.64

Sodium, dissolved (µeq/L)	Potassium, dissolved (µeq/L)	Ammonium, dissolved (µeq/L)	Chloride, dissolved (µeq/L)	Nitrite, dissolved (µeq/L)	Nitrate, dissolved (µeq/L)	Sulfate, dissolved (µeq/L)	Date
11.3	1.05	n.a.	17.1	<0.8	16.8	28.8	01/07/87
14.4	7.45	n.a.	19.4	<.8	52.8	73.5	01/13/87
12.3	4.57	n.a.	21.7	<.8	25	33.1	01/20/87
2.59	.98	n.a.	7.02	<.8	13.1	16.6	01/28/87
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	02/03/87
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	02/17/87
5.18	.78	n.a.	9.9	<.8	8.66	19	02/24/87
9.8	.91	n.a.	10.5	<.8	6.85	21.8	03/03/87
11.8	4.32	n.a.	14	<.8	17.6	50.2	03/31/87
7.76	3.85	n.a.	14.5	<.8	15.6	28.5	04/07/87
5.72	2.02	n.a.	14.1	<.8	44.5	84.4	04/14/87
8.01	3.21	n.a.	19.8	<.8	22.6	61.2	04/21/87
4.88	1.19	n.a.	16.4	<.8	11.5	43.3	04/28/87
7.03	3.62	n.a.	7.79	4.1	36.4	64.2	05/06/87
9.92	7.24	n.a.	23.5	<.8	102	140	05/13/87
4.82	2.59	n.a.	12.8	<.8	48.3	162	05/19/87
1.93	1.55	n.a.	7.5	<.8	30.9	102	05/26/87
5.24	2.07	n.a.	25.1	<.8	18	51.4	06/02/87
2.34	2.07	n.a.	19.2	<.8	107	230	06/09/87
4.14	2.18	n.a.	18	<.8	70.1	198	06/16/87
12.5	1.12	n.a.	20.7	<.8	67.1	127	06/23/87
6.13	1.08	n.a.	29.7	<.8	79.2	153	06/30/87
5.57	1.21	n.a.	11.6	<.8	30.4	80.8	07/08/87
2.78	.81	n.a.	12.9	<.8	36.2	91.3	07/14/87
10.5	2.05	n.a.	29.5	<.8	88.6	306	08/11/87
16.9	25.8	n.a.	52.3	<.8	55.5	168	08/19/87
7.05	1.79	n.a.	10.7	<.8	32.1	84.7	08/24/87
15.2	2.8	n.a.	51.1	<.8	41.5	124	09/01/87
4.78	.51	n.a.	11.6	<.8	4.57	27.3	09/08/87
3.91	1.54	n.a.	10.2	<.8	34.6	91.1	09/15/87
3.48	1.28	n.a.	10.8	<.8	21.7	60.1	09/22/87
2.17	1.79	n.a.	12.2	<.8	27.3	38.8	09/30/87
21.3	<.64	n.a.	133	<.8	75.8	60.1	10/05/87
3.48	2.44	n.a.	11.9	<.8	24.9	33.3	10/13/87
16.5	4.8	n.a.	62.3	<.8	60.2	66.6	10/27/87
1.3	1.03	n.a.	9.49	<.8	5.05	16.2	11/02/87
4.78	1.03	n.a.	6.48	<.8	20.4	35.4	11/13/87
12.6	2.05	n.a.	14.3	<.8	12.6	29.8	11/24/87
5.22	.51	n.a.	9.96	<.8	8.23	14.9	12/01/87
7.39	2.02	n.a.	21.5	<.8	41.1	34.8	12/08/87
15.2	3.59	n.a.	13.2	<.8	22	62.2	12/15/87
2.17	3.59	n.a.	10.8	<.8	15.4	46.9	12/22/87
2.17	1.03	n.a.	12.6	<.8	14.2	47.3	12/30/87

Table 19.--Chemical analyses of precipitation collected from the U.S. Geological Survey precipitation-collection

[µS/cm, microsiemens per centimeter; µeq/L, microequivalents per liter; n.a., not analyzed; <, less than]

Date	Specific conduct–ance (µS/cm)	pH, field (standard units)	Hydrogen ion, field (µeq/L)	pH, labora–tory (stan–dard units)	Hydrogen ion, lab–oratory (µeq/L)	Calcium, dissolved (µeq/L)	Magnesium, dissolved (µeq/L)
01/12/88	10	4.85	14.13	5.26	5.5	11.5	2.47
01/19/88	14	4.57	26.92	4.82	15.14	17.5	2.47
01/27/88	16	4.44	36.31	4.6	25.12	4.5	.82
02/02/88	17	4.6	25.12	4.72	19.05	12.5	4.11
02/09/88	16	4.54	28.84	4.61	24.55	9.48	2.47
02/16/88	17	4.41	38.9	4.55	28.18	13.5	1.65
02/23/88	26	4.3	50.12	4.49	32.36	11.1	4.44
03/08/88	24	4.34	45.71	4.43	37.15	7.86	1.97
03/29/88	10	4.67	21.38	4.77	16.98	8.36	3.13
04/05/88	44	4.05	89.13	n.a.	n.a.	n.a.	n.a.
04/12/88	27	4.45	35.48	4.37	42.66	22.8	3.46
04/19/88	31	4.13	74.13	4.38	41.69	6.71	5.1
04/26/88	38	4.12	75.86	4.27	53.7	11	6.25
05/03/88	52	3.88	131.83	4.07	85.11	10.2	7.4
05/10/88	29	4.18	66.07	4.29	51.29	8.57	3.46
05/17/88	83	3.78	165.96	3.85	141.25	20.1	9.21
05/24/88	29	4.08	83.18	4.28	52.48	10.2	2.47
05/31/88	45	3.87	134.9	4.01	97.72	11.4	2.39
06/07/88	96	3.73	186.21	n.a.	n.a.	n.a.	n.a.
06/14/88	38	3.91	123.03	4.1	79.43	16.7	4.11
06/21/88	268	2.96	1096.48	n.a.	n.a.	n.a.	n.a.
07/12/88	77	3.4	398.11	3.76	173.78	15.4	3.7
07/19/88	51	3.79	162.18	3.89	128.82	7.04	1.07
07/28/88	27	3.86	138.04	4.18	66.07	2.84	1.32
08/02/88	53	3.7	199.53	3.94	114.82	23.9	6.58
08/09/88	35	3.97	107.15	n.a.	n.a.	n.a.	n.a.
08/23/88	82	3.44	363.08	3.76	173.78	13.6	2.71
08/30/88	21	4.17	67.61	4.28	52.48	5.94	2.3
09/06/88	17	4.25	56.23	4.4	39.81	2.79	1.23
09/13/88	33	3.68	208.93	n.a.	n.a.	n.a.	n.a.
09/19/88	38	3.72	190.55	4.15	70.79	18.6	1.97
09/27/88	14	4.22	60.26	4.54	28.84	7.63	1.32
10/04/88	31	4.15	70.79	n.a.	n.a.	n.a.	n.a.
10/11/88	57	3.83	147.91	n.a.	n.a.	n.a.	n.a.
10/18/88	23	4.21	61.66	n.a.	n.a.	13.6	5.76
10/25/88	18	4.33	46.77	n.a.	n.a.	2.54	1.07
11/08/88	15	4.58	26.3	n.a.	n.a.	8.03	3.95
11/15/88	27	4.16	69.18	n.a.	n.a.	2.59	2.96
11/22/88	18	4.33	46.77	4.57	26.92	1.1	.58
11/29/88	9	4.83	14.79	4.94	11.48	2.84	1.97
12/27/88	22	4.2	63.1	4.27	53.7	4.24	1.81

station at Catoctin Mountain, Maryland, in 1988

Sodium, dissolved (µeq/L)	Potassium, dissolved (µeq/L)	Ammonium, dissolved (µeq/L)	Chloride, dissolved (µeq/L)	Nitrite, dissolved (µeq/L)	Nitrate, dissolved (µeq/L)	Sulfate, dissolved (µeq/L)	Date
3.48	5.13	n.a.	8.54	<0.8	31.6	35.5	01/12/88
8.26	5.13	n.a.	10.3	<.8	13.8	26.2	01/19/88
2.17	.77	n.a.	10.1	<.8	13.5	31.1	01/27/88
13.9	8.18	n.a.	18.5	<.8	19	22.9	02/02/88
8.08	2.81	n.a.	6.31	1.1	9.54	34.2	02/09/88
6.76	1.53	n.a.	7.32	<.8	15.2	35.7	02/16/88
15.3	13.3	n.a.	13.3	<.8	27.3	78.7	02/23/88
5.22	2.05	n.a.	12	<.8	18	42	03/08/88
3.48	1.02	n.a.	7.13	<.8	22.9	21.4	03/29/88
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	04/05/88
12.2	4.78	n.a.	10.6	<.8	18.3	55.5	04/12/88
6.96	4.09	n.a.	9.35	<.8	23.7	62.9	04/19/88
22.6	16.4	n.a.	14.2	<.8	34.3	97.5	04/26/88
10.4	8.18	n.a.	14.2	<.8	38.8	51	05/03/88
10.4	3.07	n.a.	11.1	<.8	28.2	89.2	05/10/88
15.7	12.3	n.a.	29.1	<.8	4.86	142	05/17/88
5.22	2.05	n.a.	12.5	<.8	29	64.2	05/24/88
3.74	4.22	n.a.	11.4	.39	39.2	79.8	05/31/88
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	06/07/88
2.39	2.3	n.a.	8	.46	41	72.7	06/14/88
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	06/21/88
.96	1.99	n.a.	12.1	<.8	40.9	154	07/12/88
<.09	.66	n.a.	7.08	<.8	32.2	104	07/19/88
2.48	.9	n.a.	6.5	<.8	29	52.8	07/28/88
4.48	1.94	n.a.	15.2	<.8	43.8	131	08/02/88
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	08/09/88
3.87	.97	n.a.	9.56	<.8	69	157	08/23/88
3.48	.92	n.a.	8.58	<.8	18.4	45.4	08/30/88
2.17	.72	n.a.	6.4	<.8	14.4	34.9	09/06/88
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	09/13/88
2.74	2.23	n.a.	6.58	<.8	28.5	90.9	09/19/88
.57	.56	n.a.	4.38	<.8	13.1	28.5	09/27/88
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	10/04/88
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	10/11/88
5.13	18	n.a.	9.13	1.62	14.3	43.6	10/18/88
2.44	.95	n.a.	5.21	<.8	20.3	27.5	10/25/88
8.66	1.99	n.a.	13.1	<.8	12.2	33.4	11/08/88
12.4	1.25	n.a.	18.7	<.8	11.6	44.3	11/15/88
1.26	.23	n.a.	3.63	<.8	12.9	26.2	11/22/88
7.26	2.05	n.a.	9.97	<.8	8.07	15.9	11/29/88
5.35	1.64	n.a.	10.4	<.8	28.6	52.2	12/27/88

Table 20.--Chemical analyses of precipitation collected from the U.S. Geological Survey precipitation-collection

[µS/cm, microsiemens per centimeter; µeq/L, microequivalents per liter; n.a., not analyzed; <, less than]

Date	Specific conduct–ance (µS/cm)	pH, field (standard units)	Hydrogen ion, field (µeq/L)	pH, labora–tory (stan–dard units)	Hydrogen ion, lab–oratory (µeq/L)	Calcium, dissolved (µeq/L)	Magnesium, dissolved (µeq/L)
01/03/89	16	4.4	39.81	4.52	30.2	5.74	2.06
01/10/89	24	4.3	50.12	4.37	42.66	7.78	1.07
01/17/89	15	4.43	37.15	4.55	28.18	.6	.66
01/31/89	35	4.11	77.62	4.2	63.1	3.39	.99
02/07/89	27	4.26	54.95	4.3	50.12	9.33	2.06
02/14/89	31	4.24	57.54	4.33	46.77	6.49	1.89
02/21/89	35	4.15	70.79	4.25	56.23	1.15	.91
02/28/89	24	4.25	56.23	4.23	58.88	1.4	.58
03/09/89	21	4.37	42.66	4.36	43.65	5.64	1.65
03/21/89	20	4.42	38.02	4.54	28.84	8.43	1.81
03/29/89	8	4.66	21.88	4.73	18.62	.5	.74
04/04/89	49	3.97	107.15	4.09	81.28	14.5	3.46
04/11/89	51	4.01	97.72	4.12	75.86	17.7	3.78
04/18/89	48	4.01	97.72	4.09	81.28	6.74	1.56
04/24/89	43	4.06	87.1	4.19	64.57	18.7	5.68
05/02/89	22	4.31	48.98	4.33	46.77	.45	.33
05/09/89	11	4.56	27.54	4.64	22.91	.65	.41
05/17/89	29	4.21	61.66	4.25	56.23	1.9	.66
05/23/89	55	3.96	109.65	n.a.	n.a.	n.a.	n.a.
05/30/89	37	4.09	81.28	4.15	70.79	8.88	2.22
06/06/89	43	3.99	102.33	4.05	89.13	4.59	1.23
06/13/89	6	4.81	15.49	4.75	17.78	.9	.16
06/20/89	12	4.53	29.51	4.58	26.3	4.84	1.23
06/27/89	36	4.04	91.2	4.1	79.43	4.34	1.4
07/05/89	24	4.24	57.54	4.3	50.12	2.79	.91
07/11/89	35	4.11	77.62	4.2	63.1	11.2	2.38
07/18/89	40	4.01	97.72	4.08	83.18	2.79	.66
07/25/89	17	4.36	43.65	4.38	41.69	2.25	.99
08/01/89	52	3.95	112.2	3.97	107.15	3.59	.9
08/08/89	53	3.91	123.03	4.03	93.33	23.4	5.43
08/15/89	10	4.88	13.18	n.a.	n.a.	n.a.	n.a.
08/22/89	55	3.89	128.82	3.92	120.23	8.48	1.73
08/29/89	37	4.01	97.72	n.a.	n.a.	n.a.	n.a.
09/05/89	36	4.02	95.5	4.09	81.28	5.94	.66
09/19/89	27	4.32	47.86	4.33	46.77	1.2	.58
09/26/89	12	4.61	24.55	4.62	23.99	2.3	2.06
10/03/89	13	4.49	32.36	4.57	26.92	.1	.66
10/18/89	13	4.52	30.2	4.54	28.84	2.44	.66
10/24/89	12	4.53	29.51	4.58	26.3	.9	<.05
10/31/89	36	4.19	64.57	n.a.	n.a.	n.a.	n.a.
11/07/89	20	4.42	38.02	4.45	35.48	11.2	2.8
11/14/89	17	4.61	24.55	4.4	39.81	4.64	.74
11/21/89	8	4.82	15.14	4.76	17.38	5.49	1.56
11/29/89	24	4.28	52.48	4.4	39.81	7.54	1.97
12/18/89	n.a.	n.a.	n.a.	4.44	36.31	3.99	1.23
12/27/89	15	4.47	33.88	n.a.	n.a.	n.a.	n.a.

Sodium, dissolved (µeq/L)	Potassium, dissolved (µeq/L)	Ammonium, dissolved (µeq/L)	Chloride, dissolved (µeq/L)	Nitrite, dissolved (µeq/L)	Nitrate, dissolved (µeq/L)	Sulfate, dissolved (µeq/L)	Date
4.18	1.2	n.a.	7.53	<0.8	23.3	32.1	01/03/89
1.87	1.59	n.a.	7.66	.9	27.3	39.3	01/10/89
.91	.28	10.4	5.3	<.8	9.88	24.1	01/17/89
1	1.25	n.a.	5.68	<.8	32.8	46.4	01/31/89
3.52	1.38	n.a.	21	<.8	30.8	47.8	02/07/89
3.05	.59	n.a.	8.24	<.8	30	33.8	02/14/89
.3	.51	n.a.	5.79	<.8	32.4	45	02/21/89
<.09	.38	n.a.	3.81	<.8	24.7	37.4	02/28/89
3.48	.92	n.a.	5.3	<.8	16.8	34.7	03/09/89
1.13	1.02	n.a.	4.29	<.8	16	46.2	03/21/89
1.22	.31	n.a.	4.63	<.8	9.1	18.1	03/29/89
5	1.18	n.a.	7.76	<.8	59.6	88.5	04/04/89
3.7	5.06	n.a.	9.23	<.8	57.2	74.8	04/11/89
3.78	9.28	n.a.	11.9	<.8	33.7	102	04/18/89
8.2	10.5	n.a.	16.1	<.8	39.2	102	04/24/89
<.09	.51	n.a.	3.16	<.8	17.2	41.8	05/02/89
<.09	4.76	n.a.	2.39	<.8	9.38	19.5	05/09/89
<.09	.26	n.a.	3.47	<.8	24.2	54.9	05/17/89
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	05/23/89
.3	1.23	n.a.	5.11	<.8	36.2	76.8	05/30/89
<.13	.74	n.a.	4.47	<.8	29.5	84.9	06/06/89
<.13	.54	n.a.	1.05	<.8	7.14	12.5	06/13/89
.74	1.36	n.a.	2.71	<.8	12.8	26	06/20/89
2	.84	n.a.	4.87	<.8	47.2	62.8	06/27/89
.91	.61	n.a.	3.51	<.8	12.3	57.5	07/05/89
1.74	4.63	19.7	6.37	<.8	27.2	75.5	07/11/89
.26	.2	25.4	3.48	<.8	32.9	84.1	07/18/89
1.35	.56	10.6	3.66	<.8	16.3	45.4	07/25/89
1	.97	32.5	5.82	<.8	45.1	96.7	08/01/89
11.4	8.59	18.3	16.4	<.8	47.2	122	08/08/89
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	08/15/89
2.65	9.72	27	5.19	<.8	35.5	127	08/22/89
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	08/29/89
1.39	3.48	4.92	5.2	1.34	25.7	73.7	09/05/89
.26	.77	17.9	4.02	<.8	28	47.2	09/19/89
8.13	.79	9.46	12.3	<.8	7.09	31.2	09/26/89
.44	.61	13.9	4.35	<.8	13.1	31.7	10/03/89
.7	.64	7.63	2.87	<.8	12.7	23.7	10/18/89
.13	.23	4.48	2	<.8	7.18	20.3	10/24/89
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	10/31/89
3.87	4.02	10.4	9.56	<.8	20.7	40.8	11/07/89
.44	.97	9.5	4.62	<.8	19.2	39.5	11/14/89
3.22	1.25	6.63	5.37	<.8	8.26	18	11/21/89
4.87	2.84	9.89	8.32	<.8	23.4	38.1	11/29/89
1.83	1.25	8.84	8.89	<.8	31.7	12.9	12/18/89
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	12/27/89

Table 21.--Chemical analyses of precipitation collected from the U.S. Geological Survey precipitation-collection

[µS/cm, microsiemens per centimeter; µeq/L, microequivalents per liter; ‰, per mil; n.a., not analyzed; <, less than]

Date	Specific conduct–ance (µS/cm)	pH, field (standard units)	Hydrogen ion, field (µeq/L)	pH, labora–tory (stan–dard units)	Hydrogen ion, lab–oratory (µeq/L)	Calcium, dissolved (µeq/L)	Magnesium, dissolved (µeq/L)	Sodium, dissolved (µeq/L)
01/02/90	22	4.33	46.77	4.39	40.74	1.75	0.82	2.78
01/09/90	18	4.37	42.66	4.42	38.02	4.34	1.32	3.57
01/23/90	26	4.29	51.29	4.42	38.02	6.79	1.23	3.09
01/30/90	20	4.38	41.69	4.46	34.67	1.2	.9	2.57
02/06/90	36	4.06	87.1	4.24	57.54	29.7	1.56	4.78
02/13/90	30	4.2	63.1	4.26	54.95	4.34	.99	1.35
02/20/90	143	3.67	213.8	n.a.	n.a.	n.a.	n.a.	n.a.
02/27/90	29	4.24	57.54	4.33	46.77	5.94	3.21	9.18
03/13/90	53	3.94	114.82	n.a.	n.a.	n.a.	n.a.	n.a.
03/21/90	25	4.33	46.77	4.4	39.81	7.58	2.88	6.96
03/27/90	46	4.08	83.18	n.a.	n.a.	n.a.	n.a.	n.a.
04/03/90	53	4.05	89.13	4.05	89.13	6.87	1.81	3.48
04/10/90	30	4.2	63.1	4.25	56.23	9.13	1.89	1.87
04/17/90	39	4.1	79.43	4.13	74.13	6.79	4.52	13.6
04/25/90	111	3.61	245.47	3.65	223.87	27.1	5.43	5.7
04/30/90	33	4.22	60.26	4.23	58.88	3.34	1.15	1.04
05/08/90	43	4.08	83.18	4.09	81.28	11.2	3.04	2.13
05/15/90	75	4.76	17.38	4.81	15.49	2.99	1.4	1.17
05/23/90	25	4	100	4.49	32.36	30	18.2	4.09
05/29/90	28	4.27	53.7	4.29	51.29	2.2	.58	1.04
06/05/90	12	4.7	19.95	4.95	11.22	12.1	2.22	6.09
06/12/90	59	3.88	131.83	3.9	125.89	14.5	2.88	2.74
06/19/90	35	4.17	67.61	4.14	72.44	10.5	2.22	.48
06/26/90	67	3.81	154.88	3.86	138.04	18.9	4.36	4.13
07/03/90	55	4.01	97.72	3.98	104.71	11.3	2.88	1.04
07/10/90	43	4.06	87.1	4.11	77.62	18	3.62	1.91
07/17/90	24	4.28	52.48	4.29	51.29	2.99	1.15	1.57
07/24/90	50	3.9	125.89	3.95	112.2	4.99	.99	.74
07/31/90	61	3.79	162.18	n.a.	n.a.	n.a.	n.a.	n.a.
08/07/90	29	4.21	61.66	4.33	46.77	4.49	.58	.57
08/14/90	40	4.09	81.28	4.2	63.1	7.09	1.15	1.13
08/21/90	41	4.11	77.62	4.12	75.86	3.49	.49	<.13
08/28/90	31	3.81	154.88	4.26	54.95	3.29	1.4	3.96
09/18/90	63	3.83	147.91	4.25	56.23	16	4.77	2.78
09/25/90	41	4.03	93.33	4.12	75.86	3.19	.49	.78
10/02/90	94	3.65	223.87	4.45	35.48	92.8	10.2	16.8
10/09/90	40	4.08	83.18	4.58	26.3	49.3	7.98	14.2
10/16/90	17	4.6	25.12	5.08	8.32	8.63	8.72	38.8
10/24/90	9	4.72	19.05	4.99	10.23	2.49	1.48	4.13
11/06/90	27	4.29	51.29	4.47	33.88	8.98	3.29	8.53
11/13/90	14	4.49	32.36	4.74	18.2	4.99	1.64	5.48
11/20/90	30	4.12	75.86	4.67	21.38	36.9	3.95	6.96
11/27/90	n.a.	4.26	54.95	4.63	23.44	24	2.71	3.57
12/04/90	23	4.3	50.12	4.43	37.15	3.99	2.3	7.87
12/18/90	17	4.41	38.9	4.79	16.22	9.48	.82	.96
12/26/90	16	4.83	14.79	5.8	1.58	26.4	9.46	57

Potassium, dissolved (µeq/L)	Ammonium, dissolved (µeq/L)	Chloride, dissolved (µeq/L)	Nitrite, dissolved (µeq/L)	Nitrate, dissolved (µeq/L)	Sulfate, dissolved (µeq/L)	δ D (‰)	δ ^{18}O (‰)	Date
1.28	10.2	5.49	<0.8	12.1	33.6	n.a.	n.a.	01/02/90
2.89	8.01	8.08	<.8	20	30.2	n.a.	n.a.	01/09/90
21.7	26.4	26.4	<.8	29.7	41.5	n.a.	n.a.	01/23/90
.2	9.36	5.75	<.8	15	28.3	n.a.	n.a.	01/30/90
4.96	18.2	8.76	<.8	36.2	54.9	n.a.	n.a.	02/06/90
1.1	14.6	3.71	<.8	28.2	48	n.a.	n.a.	02/13/90
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	02/20/90
3.3	12.8	14.4	<.8	31	37.5	n.a.	n.a.	02/27/90
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	03/13/90
1.13	20.9	8.53	<.8	28.5	40.8	n.a.	n.a.	03/21/90
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	03/27/90
1.2	44.9	5.85	<.8	53.5	86.1	n.a.	n.a.	04/03/90
1.15	7.57	7.01	<.8	39.5	33.8	n.a.	n.a.	04/10/90
1.25	21.4	16.8	<.8	42.3	68.1	−46	−8.05	04/17/90
8.21	58.7	21.7	<.8	98.4	246	n.a.	n.a.	04/25/90
1.53	25.3	4	<.8	31	58.2	−37	−6.45	04/30/90
1.46	33.2	6.11	<.8	47.2	86.5	−22.5	−4.75	05/08/90
2.02	5.51	2.94	<.8	7.67	17.6	−38.5	−6.8	05/15/90
21.7	29.2	6.92	<.8	36.4	87.6	−7	−2.4	05/23/90
.79	14.6	3.52	<.8	20.5	48.3	−49.5	−8.1	05/29/90
2.43	<2.4	8.29	<.8	17.6	17	−56.5	n.a.	06/05/90
1.13	29.4	6.68	<.8	52.8	116	−15.5	n.a.	06/12/90
.79	24	3.89	<.8	20.6	75.1	−20.5	n.a.	06/19/90
3.63	22.6	9.5	<.8	58.6	138	−58	n.a.	06/26/90
1.48	45.2	6.69	<.8	47.1	116	−14	n.a.	07/03/90
1.97	41.1	5.28	<.8	28.6	108	−15.5	n.a.	07/10/90
1.13	9.92	5.88	<.8	21.8	41.4	−35.5	n.a.	07/17/90
1.02	16.6	5.14	<.8	27.4	108	−37.5	n.a.	07/24/90
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	07/31/90
.41	18.5	4.21	<.8	20.5	54.8	−36	n.a.	08/07/90
.72	45.6	5.41	<.8	31.1	85.9	−25.5	n.a.	08/14/90
.31	24.9	3.35	<.8	30.2	73.7	−36	n.a.	08/21/90
.61	13.2	8.79	<.8	27.5	51.9	−37	n.a.	08/28/90
1.28	27.3	21.8	<.8	63.8	93.2	−40	−7	09/18/90
.59	28.1	2.88	<.8	32.5	80.6	−31.5	−6.15	09/25/90
9.08	41	18	<.8	61.2	121	n.a.	n.a.	10/02/90
10.9	28.1	15.8	<.8	29.3	87.4	n.a.	n.a.	10/09/90
1.25	6.82	46.9	<.8	6.82	28.5	−13	−3.45	10/16/90
.61	<2.4	5.89	<.8	6.69	14.1	−26.5	−6.25	10/24/90
2.2	10.8	9.99	<.8	24.3	43.3	−4.5	−4.05	11/06/90
.36	9.68	8.74	<.8	12	15.9	−51.5	−9	11/13/90
4.35	20.9	9.52	<.8	43.8	36.1	−55	−9.5	11/20/90
11.2	6.26	12.4	<.8	22.9	29.4	−72	−10.55	11/27/90
.54	11.6	11.8	<.8	18.8	34.4	−10	−4.9	12/04/90
.38	8.24	3.15	<.8	10.2	30.2	−62.5	−10.15	12/18/90
19.7	38.7	54.7	<.8	21.8	44.1	−27.5	−5.1	12/26/90

Table 22.--Chemical analyses of precipitation collected from the U.S. Geological Survey precipitation-collection

[µS/cm, microsiemens per centimeter; µeq/L, microequivalents per liter; ‰, per mil; n.a., not analyzed; <, less than]

Date	Specific conduct–ance (µS/cm)	pH, field (standard units)	Hydrogen ion, field (µeq/L)	pH, labora–tory (stan–dard units)	Hydrogen ion, lab–oratory (µeq/L)	Calcium, dissolved (µeq/L)	Magnesium, dissolved (µeq/L)	Sodium, dissolved (µeq/L)
01/02/91	6	4.89	12.88	5.25	5.62	2.64	1.15	1.17
01/08/91	20	4.21	61.66	4.6	25.12	3.99	2.06	1
01/15/91	12	4.55	28.18	5.16	6.92	7.49	1.35	2.78
01/22/91	28	4.16	69.18	4.56	27.54	11	4.69	9.35
02/05/91	23	4.28	52.48	5.04	9.12	17.5	1.56	1.44
02/12/91	63	3.82	151.36	4.06	87.1	7.98	3.95	4.09
02/19/91	36	4.14	72.44	4.38	41.69	6.49	2.38	.91
02/26/91	26	4.27	53.7	4.73	18.62	11.5	7.24	5.09
03/05/91	18	4.48	33.11	4.89	12.88	13.5	2.3	7.13
03/12/91	36	4.2	63.1	4.93	11.75	52.9	11.1	5.48
03/19/91	22	4.26	54.95	4.63	23.44	17.5	1.15	1.44
03/26/91	23	4.27	53.7	4.63	23.44	14.5	1.4	1.17
04/02/91	50	3.98	104.71	4.55	28.18	28.9	3.37	3.57
04/09/91	23	4.28	52.48	5.51	3.09	39.9	5.02	7.13
04/16/91	28	4.19	64.57	4.66	21.88	26.4	3.87	4.61
04/23/91	34	4.08	83.18	4.37	42.66	11	2.88	7.57
04/29/91	43	4.04	91.2	4.44	36.31	27.9	14.1	7.39
05/07/91	20	4.4	39.81	4.85	14.13	16	5.59	2.04
05/14/91	73	3.76	173.78	4.13	74.13	70.4	11.1	4.31
05/21/91	18	4.35	44.67	4.78	16.6	17.5	3.45	1.91
05/28/91	106	3.51	309.03	n.a.	n.a.	n.a.	n.a.	n.a.
06/04/91	138	3.49	323.59	n.a.	n.a.	n.a.	n.a.	n.a.
06/18/91	36	4.08	83.18	4.24	57.54	3.99	.99	.74
06/25/91	88	3.61	245.47	4.04	91.2	8.48	2.8	2.61
07/09/91	56	3.88	131.83	4.08	83.18	12	2.71	2.91
07/17/91	29	4.07	85.11	4.2	63.1	2.5	1.07	.87
07/23/91	152	3.36	436.52	n.a.	n.a.	n.a.	n.a.	n.a.
07/30/91	38	4	100	4.12	75.86	10.3	2.06	.83
08/06/91	290	3.17	676.08	n.a.	n.a.	n.a.	n.a.	n.a.
08/13/91	73	3.75	177.83	3.86	138.04	4.44	1.15	1.44
08/20/91	38	3.99	102.33	4.08	83.18	.6	1	3.2
08/27/91	68	3.61	245.47	3.87	134.9	6.04	2.71	3.35
09/10/91	42	3.98	104.71	4.13	74.13	2.4	.7	.9
09/17/91	52	4.27	53.7	4.13	74.13	12.9	2.71	1.87
09/24/91	48	3.87	134.9	4.13	74.13	6.1	4.2	.96
10/01/91	37	4.09	81.28	4.61	24.55	5.1	37.4	.17
10/08/91	19	4.37	42.66	4.61	24.55	3.89	2.63	<.13
10/15/91	55	3.84	144.54	4.04	91.2	10.1	1.89	.65
10/22/91	14	4.55	28.18	4.94	11.48	6.04	6.42	.22
11/12/91	20	4.35	44.67	4.79	16.22	4.59	1.4	1.52
11/19/91	69	3.88	131.83	n.a.	n.a.	n.a.	n.a.	n.a.
11/26/91	13	4.62	23.99	5.14	7.24	11.3	5.8	2.87
12/03/91	11	4.53	29.51	4.71	19.5	1.65	1.89	.13
12/10/91	17	4.41	38.9	4.96	10.96	6.89	16.5	.1
12/17/91	20	4.39	40.74	4.78	16.6	4.54	2.4	.43
12/23/91	68	4.06	87.1	4.45	35.48	13.7	208	6.61
12/30/91	12	4.57	26.92	4.9	12.59	5.99	1.32	<.13

station at Catoctin Mountain, Maryland, in 1991

Potassium, dissolved (µeq/L)	Ammonium, dissolved (µeq/L)	Chloride, dissolved (µeq/L)	Nitrite, dissolved (µeq/L)	Nitrate, dissolved (µeq/L)	Sulfate, dissolved (µeq/L)	δ D (‰)	δ ^{18}O (‰)	Date
0.49	5.62	3.96	<0.8	9.17	9.56	−94	−13.45	01/02/91
.95	9.98	4.89	<.8	19.2	30.5	−110.5	−15.1	01/08/91
1.02	6.37	7.6	<.8	13.3	20.3	−63.5	−10.6	01/15/91
.64	n.a.	19.3	<.8	24.4	41.3	−39.5	−8.05	01/22/91
.92	n.a.	4.71	<.8	21.3	33.6	−84.5	−11.85	02/05/91
1.46	n.a.	11.3	<.8	74.2	84.5	−14.5	−4.4	02/12/91
.56	n.a.	4.99	<.8	39.9	41.5	−103	−15	02/19/91
1.2	n.a.	7.78	<.8	21.7	35.2	−39	−7.4	02/26/91
.56	n.a.	10.9	<.8	20.6	26.2	−47	−7.1	03/05/91
3.07	n.a.	8.09	<.8	48	78.4	−44.5	−7.2	03/12/91
.69	n.a.	4.97	<.8	19.6	29.4	−65	−10.8	03/19/91
.56	n.a.	4.03	<.8	21.1	35.8	−50	−7.8	03/26/91
1.79	n.a.	7.86	<.8	47	82.7	−60.5	−9.1	04/02/91
2.3	n.a.	10.2	<.8	19.3	37.2	−16	−4.6	04/09/91
.89	n.a.	7.49	<.8	24.4	49.8	−28.5	−6.35	04/16/91
.43	n.a.	10.8	<.8	22.4	60.2	−103.5	−15	04/23/91
2.1	n.a.	10.7	<.8	37.4	70	−38.5	−6.95	04/29/91
1.56	n.a.	7.12	<.8	22.6	44.4	−34	−6.4	05/07/91
12.3	n.a.	16.6	<.8	56.8	141	−32.5	−4.6	05/14/91
1.13	16.7	9.24	<.8	15.1	34.4	−45.5	−7.35	05/21/91
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	−17	−3.2	05/28/91
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	−19.5	−3.5	06/04/91
.43	n.a.	8.04	1.07	31.9	67.5	−29.5	−5.6	06/18/91
1.43	n.a.	30.9	<.8	66.4	90.6	−39.5	−6.3	06/25/91
1.02	n.a.	9.56	<.8	40.2	113	−26	−4.7	07/09/91
.69	n.a.	11.9	<.8	17.6	60.7	−26.5	−5.45	07/17/91
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	4.5	−.8	07/23/91
<.2	n.a.	7.69	<.8	42.4	86.2	−29	−5	07/30/91
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	−6	−1.5	08/06/91
.28	n.a.	10.4	<.8	53.1	140	−18.5	−4.5	08/13/91
.08	n.a.	7.84	<.8	23.7	83.1	−52	−8.55	08/20/91
.7	n.a.	13.7	<.8	66.6	146	−49	−8.3	08/27/91
1.3	n.a.	5.78	<.8	26.3	79.3	−36	−6.85	09/10/91
1.2	n.a.	14.9	<.8	44.7	94.7	−29.5	−5.4	09/17/91
.28	n.a.	9.64	<.8	28.5	107	−14.5	−4.4	09/24/91
.56	<2.4	60.6	<.8	25	40.9	−45	−8.15	10/01/91
<.2	<2.4	6.52	<.8	12.8	28	−64	−10.1	10/08/91
<.2	n.a.	9.48	<.8	68.4	72.5	−52.5	−8.75	10/15/91
.15	n.a.	4.7	<.8	16.1	30.9	−120.5	−16.1	10/22/91
.66	n.a.	5.85	<.8	13.4	31.3	−62.5	−10.1	11/12/91
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	11/19/91
.51	n.a.	9.96	<.8	8.82	18.6	−17.5	−4.6	11/26/91
<.2	n.a.	3.36	<.8	5.57	17.8	−78.5	−11.35	12/03/91
<.2	n.a.	21.5	<.8	13.6	27.5	−90	−13.1	12/10/91
.08	n.a.	2.96	<.8	13	26.3	−73	−9.8	12/17/91
.1	n.a.	174	<.8	7.09	8.81	−87	−12	12/23/91
<.2	n.a.	2.44	<.8	4.26	17.8	−60	−10.05	12/30/91

Table 23.--Statistical summary of the chemical analyses of precipitation collected from the U.S. Geological Survey precipitation-collection station at Catoctin Mountain, Maryland, for 1982-91

[All values in microequivalents per liter, except where noted; µS/cm, microsiemens per centimeter; ‰, per mil]

Physical properties and constituents	Minimum	Date	Maximum	Date	Mean	Median
Specific conductance (µS/cm)	1	11/02/87	290	08/06/91	40.2	30
Field pH (standard units)	2.96	06/21/88	5.17	10/01/85	4.07	4.18
Laboratory pH (standard units)	3.5	08/11/87	5.96	02/24/87	4.25	4.37
Calcium	.05	04/22/82	92.8	10/02/90	11.3	9.11
Magnesium	.03	03/10/83	208	12/23/91	3.66	2.08
Sodium	.1	12/10/91	62.9	11/26/82	6.49	4.26
Potassium	.08	08/20/91 12/17/91	25.8	08/19/87	2.54	1.36
Ammonium	.76	01/25/84	105	05/13/82	17.9	13.6
Chloride	1.05	06/13/89	174	12/23/91	13	9.49
Nitrite	.1	06/15/82 10/28/82	9.4	08/11/82	.54	.4
Nitrate	4.2	12/02/82	123	08/05/86	28.3	23.7
Sulfate	4.9	10/28/82	322	08/05/86	62.6	47.8
δ D (‰)	−120.5	10/22/91	4.5	07/23/91	−43.1	−38.5
$\delta^{18}O$ (‰)	−16.1	10/22/91	−.8	07/23/91	−7.62	−7.1

Table 24.--Annual precipitation-weighted mean concentrations of field and laboratory hydrogen ion and pH of precipitation collected from the U.S. Geological Survey precipitation-collection station at Catoctin Mountain, Maryland, for 1982-91

[µeq, microequivalents per liter]

Year	FIELD			LABORATORY		
	Quantity used to precipitation-weight (inches)	Hydrogen ion (µeq/L)	pH (standard units)	Quantity used to precipitation-weight (inches)	Hydrogen ion (µeq/L)	pH (standard units)
1982	35.97	91.68	4.04	32.86	44.9	4.35
1983	55.74	75.8	4.12	54.76	48.75	4.31
1984	57.57	63.95	4.19	56.65	42.14	4.38
1985	42.65	49.45	4.3	40.41	35.7	4.45
1986	37.12	72.52	4.14	36.72	52.53	4.28
1987	42.93	54.39	4.26	42.77	47.32	4.32
1988	36.94	94.93	4.02	36.28	58.07	4.24
1989	41.5	50.87	4.29	40.87	44.86	4.35
1990	49.95	60.1	4.22	49.65	44.79	4.35
1991	37.97	79.06	4.1	37.7	42.83	4.37
The following data are the totals and precipitation-weighted means for the 10-year period of record:						
1982-91	438.34	68.26	4.16	428.67	45.97	4.34

Table 25.--Annual precipitation-weighted mean concentrations of chemical constituents in precipitation collected from the U.S. Geological Survey precipitation-collection station at Catoctin Mountain, Maryland, for 1982-91

[All values in microequivalents per liter, except where noted; ‰, per mil;--, data not collected]

Year	Quantity used to volume-weight (inches)	Base cations				Sum of base cations	Chloride	Nitrate	Sulfate	δD (‰)	$\delta^{18}O$ (‰)
		Calcium	Magnesium	Sodium	Potassium						
1982	32.86	8.51	2.1	9.95	2.68	23.24	11.2	23.51	45.3	--	--
1983	54.76	11.86	3.4	7.88	1.02	24.17	16.48	23.04	51.19	--	--
1984	56.65	13.17	2.39	11.01	1.88	28.44	10.35	21.68	58.79	--	--
1985	40.41	6.92	3.37	8.9	3.51	22.7	10.25	19.07	43.18	--	--
1986	36.72	10.73	2.22	6.01	1.85	20.81	10.8	24.64	54.78	--	--
1987	42.77	8.06	2.12	7.14	2.61	19.93	14.77	27.56	60.71	--	--
1988	36.28	8.67	2.51	5.24	2.28	18.69	9.99	25.3	61.73	--	--
1989	40.87	3.51	1.04	1.37	1.35	7.28	4.89	20	44	--	--
1990	49.65	7.33	2.71	6.93	2.35	19.33	10.75	23.24	49.55	--	--
1991	37.7	9.78	4.31	2.28	.71	17.08	9.79	25.39	56.54	-47.89	-8.03
The following data are the totals and precipitation-weighted means for the 10-year period of record:											
1982-91	428.67	9.06	2.64	6.87	1.99	20.55	11.11	23.24	52.73	--	--

CONVERSION FACTORS, VERTICAL DATUM, AND ABBREVIATED WATER-CHEMISTRY UNITS

Multiply	By	To obtain
inch (in.)	25.4	millimeter
foot (ft)	0.3048	meter
mile (mi)	1.609	kilometer
ounce, fluid (fl. oz)	29.57	milliliter
ounce, fluid (fl. oz)	0.02957	liter

Water temperature in degrees Celsius (°C) can be converted to degrees Fahrenheit (°F) by use of the following equation:

$$°F = 1.8(°C) + 32$$

Sea level: In this report, "sea level" refers to the National Geodetic Vertical Datum of 1929--a geodetic datum derived from a general adjustment of the first-order level nets of the United States and Canada, formerly called Sea Level Datum of 1929.

Abbreviated water-chemistry units: In this report, specific conductance and chemical concentration are given in metric units. Specific conductance is expressed in microsiemens per centimeter at 25 degrees Celsius (µS/cm). Chemical concentration is expressed in microequivalents per liter (µeq/L). Microequivalents per liter units are used because they are the most accurate and meaningful units with which to report the chemistry of precipitation. If the reader prefers to use units of milligrams per liter (mg/L) rather than the microequivalents per liter units used in this report, values can be converted by use of the following factors:

Multiply microequivalent per liter units	By	To obtain milligram per liter units for:
Hydrogen (H^+)	0.00101	H^+
Calcium (Ca^{2+})	0.02004	Ca^{2+}
Magnesium (Mg^{2+})	0.01215	Mg^{2+}
Sodium (Na^+)	0.02299	Na^+
Potassium (K^+)	0.03909	K^+
Ammonium (NH_4^+)	0.01804	NH_4^+
Chloride (Cl^-)	0.03545	Cl^-
Nitrite (NO_2^-)	0.04600	NO_2^-
Nitrate (NO_3^-)	0.06200	NO_3^-
Sulfate (SO_4^{2-})	0.04803	SO_4^{2-}