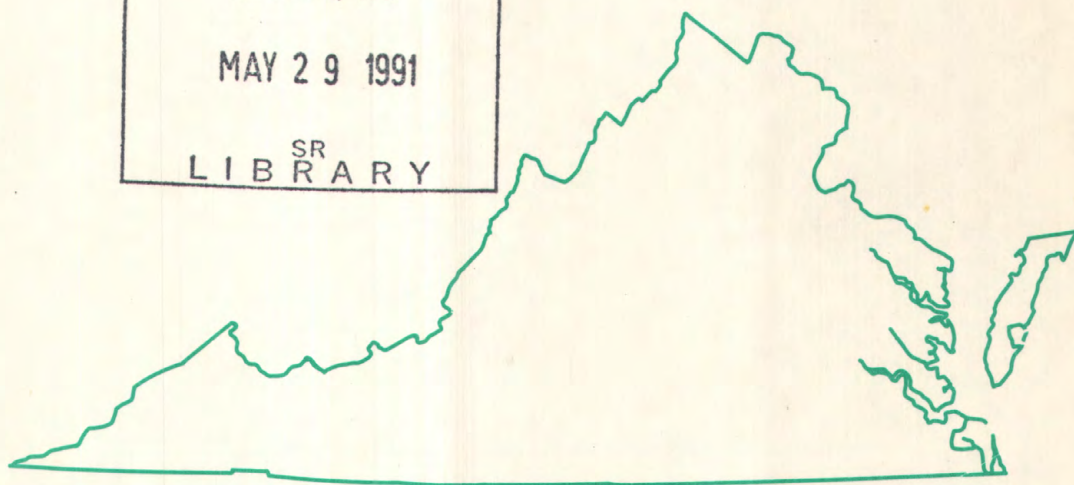
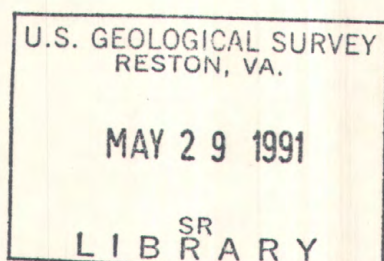


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Water Resources Data Virginia Water Year 1990

Volume 1. Surface Water and Surface-Water-
Quality Records



U.S. GEOLOGICAL SURVEY WATER-DATA REPORT VA-90-1
Prepared in cooperation with the State of Virginia
and with other agencies

CALENDAR FOR WATER YEAR 1990

1989

OCTOBER							NOVEMBER							DECEMBER						
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
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29	30	31					26	27	28	29	30			24	25	26	27	28	29	30
														31						

1990

JANUARY							FEBRUARY							MARCH						
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
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21	22	23	24	25	26	27	18	19	20	21	22	23	24	18	19	20	21	22	23	24
28	29	30	31				25	26	27	28				25	26	27	28	29	30	31

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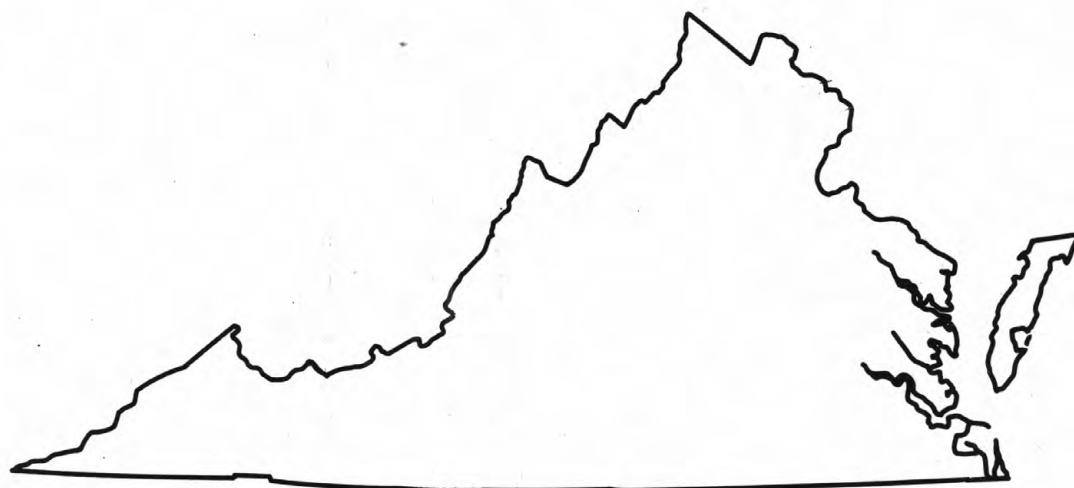
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29	30	31					26	27	28	29	30	31		23	24	25	26	27	28	29
														30						



Water Resources Data Virginia Water Year 1990

Volume 1. Surface Water and Surface-Water- Quality Records

by Byron J. Prugh, Jr., Fred J. Easton, and Donna L. Belval



U.S. GEOLOGICAL SURVEY WATER-DATA REPORT VA-90-1
Prepared in cooperation with the State of Virginia
and with other agencies

U.S. DEPARTMENT OF THE INTERIOR

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U.S. GEOLOGICAL SURVEY

Dallas L. Peck, Director

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Suite 210, 1936 Arlington Blvd.
Charlottesville, Virginia 22903

1991

PREFACE

This volume of the annual hydrologic data report of Virginia is one of a series of annual reports that document hydrologic data gathered from the U.S. Geological Survey's and cooperating agencies' surface- and ground-water data-collection networks in each State, Puerto Rico, and the Trust Territories. These records of streamflow, ground-water levels, and water quality provide the hydrologic information needed by State, local, and Federal agencies, and the private sector for developing and managing our Nation's land and water resources. Hydrologic data for Virginia are contained in two volumes:

Volume 1. Surface Water and Surface-Water-Quality Records

Volume 2. Ground Water and Ground-Water-Quality Records

This report (Volume 1) is the culmination of a concerted effort by dedicated personnel of the U.S. Geological Survey and the Virginia Water Control Board who collected, compiled, analyzed, verified, and organized the data, and who typed, edited, and assembled the report. In addition to the authors, who prepared the summary of hydrologic conditions in the introductory text and who had primary responsibility for assuring that the information contained herein is accurate, complete, and adheres to Geological Survey policy and established guidelines, the following personnel contributed significantly to the collection, computation, processing, and completion of this information:

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16. Abstract (Limit: 200 words) Water-resources data for the 1990 water year for Virginia includes records of stage, discharge, and water quality of streams and stage, contents, and water quality of lakes and reservoirs. This volume contains records for water discharge at 171 gaging stations; stage only at 1 gaging station; stage and contents at 10 lakes and reservoirs; and water quality at 51 gaging stations. Also included are data for 100 crest-stage partial-record stations. Locations of these sites are shown on figures 6 and 7. Miscellaneous hydrologic data were collected at 70 measuring sites and 25 water-quality sampling sites not involved in the systematic data-collection program. The data in this report represent that part of the National Water Data System collected by the U.S. Geological Survey and cooperating State and Federal agencies in Virginia.				
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WATER RESOURCES DATA - VIRGINIA, 1990

VOLUME 1. SURFACE WATER AND SURFACE-WATER-QUALITY RECORDS

INTRODUCTION

The Water Resources Division of the U.S. Geological Survey, in cooperation with State agencies, obtains a large amount of data pertaining to the water resources of Virginia each water year. These data, accumulated during many water years, constitute a valuable data base for developing an improved understanding of the water resources of the State. To make these data readily available to interested parties outside the Geological Survey, the data are published annually in this report series entitled "Water Resources Data - Virginia."

This report series includes records of stage, discharge, and water quality of streams and stage, contents, and water quality of lakes and reservoirs. This volume contains records for water discharge at 171 gaging stations; stage only at 1 gaging station; stage and contents at 10 lakes and reservoirs; and water quality at 51 gaging stations. Also included are data for 100 crest-stage partial-record stations. Locations of these sites are shown on figures 6 and 7. Miscellaneous hydrologic data were collected at 70 measuring sites and 25 water-quality sampling sites not involved in the systematic data-collection program. The data in this report represent that part of the National Water Data System collected by the U.S. Geological Survey and cooperating State and Federal agencies in Virginia.

This series of annual reports for Virginia began with the 1961 water year with a report that contained only data relating to the quantities of surface water. For the 1964 water year, a similar report was introduced that contained only data relating to water quality. Beginning with the 1975 water year, the report format was changed to present, in one volume, data on quantities of surface water, quality of surface and ground water, and ground-water levels. Beginning with the 1990 water year, the report format was changed to two volumes. Volume 1 contains surface water and surface-water-quality data and Volume 2 contains ground water and ground-water-quality data.

Prior to introduction of this series and for several water years concurrent with it, water-resources data for Virginia were published in U.S. Geological Survey Water-Supply Papers. Data on stream discharge and stage and on lake or reservoir contents and stage, through September 1960, were published annually under the title "Surface-Water Supply of the United States, Parts 6A and 6B." For the 1961 through 1970 water years, the data were published in two 5-year reports. Data on chemical quality, temperature, and suspended sediment for the 1941 through 1970 water years were published annually under the title "Quality of Surface Waters of the United States." The above mentioned Water-Supply Papers may be consulted in the libraries of the principal cities of the United States and may be purchased from U.S. Geological Survey, Books and Open-File Reports, Federal Center, Bldg. 41, Box 25425, Denver, CO 80225.

Publications similar to this report are published annually by the Geological Survey for all States. These official Survey reports have an identification number consisting of the two-letter State abbreviation, the last two digits of the water year, and the volume number. For example, this volume is identified as "U.S. Geological Survey Water-Data Report VA-90-1." For archiving and general distribution, the reports for 1971-74 water years also are identified as water-data reports. These water-data reports are for sale in paper copy or in microfiche by the National Technical Information Service, U.S. Department of Commerce, Springfield, VA 22161.

Additional information, including current prices, for ordering specific reports may be obtained from the Office Chief at the address given on the back of the title page or by telephone (804) 771-2427.

COOPERATION

The U.S. Geological Survey and agencies of the State of Virginia have had joint-funding agreements for the collection of water-resource records since 1930. Organizations that assisted in collecting the data in this report through joint-funding agreements with the Survey are:

VIRGINIA WATER CONTROL BOARD, Richard N. Burton, executive director.

VIRGINIA DEPARTMENT OF TRANSPORTATION, Ray O. Pethtel, commissioner.

JAMES CITY COUNTY, David B. Norman, County Administrator.

CITY OF ALEXANDRIA, Vola Lawson, city manager.

CITY OF NEWPORT NEWS, C. C. Crowder, director, Department of Public Utilities.

CITY OF ROANOKE, Kit B. Kiser, director, Utilities and Operations.

NORTHERN VIRGINIA PLANNING DISTRICT COMMISSION, G. Mark Gibb, executive director.

SOUTHEASTERN PUBLIC SERVICE AUTHORITY, Durwood S. Curling, executive director.

UNIVERSITY OF VIRGINIA, Dr. James N. Galloway.

RAPPAHANNOCK-RAPIDAN PLANNING DISTRICT COMMISSION, Richard B. Stroemple, executive director.

Assistance with funds or services was given by the U.S. Army Corps of Engineers in collecting records for 59 gaging stations and 4 water-quality stations throughout the State.

Under a cooperative agreement covering the Tennessee River basin, the Tennessee Valley Authority provided financial assistance for the operation of 4 gaging stations, the records for which are published herein. Assistance was also provided by the Water Quality Office, Environmental Protection Agency. Agencies that aided in collecting records are the Appalachian Power Company, Virginia Power, City of Danville, City of Radford, and STS Hydropower.

Organizations that provided data are acknowledged in station descriptions.

RECORDS COLLECTED BY THE STATE OF VIRGINIA

In addition to data collected by the U.S. Geological Survey, there are included herein records for 80 gaging stations operated by the Virginia Water Control Board. These records are published as provided and are acknowledged in the "COOPERATION" paragraph of each individual station. The Virginia Water Control Board is under the direction of Richard N. Burton, executive director. Published material for the gaging-station records is supplied, respectively, through the Office of Water Resources Management, William L. Woodfin, Jr., deputy executive director of operations, and Office of Surface-Water Investigations, Fred J. Easton, division director.

SUMMARY OF HYDROLOGIC CONDITIONS

Surface Water

The 1990 water year was characterized by a continuation of the trend for above-average streamflows that began in Virginia in May 1989. The trend persisted throughout the year with two minor interruptions in December and March. The departure from average conditions was greatest early in the water year and diminished as the year progressed (fig. 1). New monthly high streamflows were recorded at 14 streamflow gages during the year (12 in October, 2 in May); no new monthly low flows were recorded.

For the water year, annual mean streamflows were generally above normal (in the upper 25 percent of historic annual flows) in the southwestern and southcentral areas of the State in streams in the Tennessee, Big Sandy, New, and Roanoke River basins. In the central, northern, and eastern portions of the State, annual flows were above average but within the normal range expected for streams in the James, upper York, lower Chowan, Rapidan, and South Fork Shenandoah River basins. In the northeastern and southeastern portion of the State, the annual flows were below average but within the normal range expected for streams in the upper Chowan, lower York, mainstem Rappahannock, and North Fork Shenandoah River basins as well as in many smaller tributaries to the Potomac River.

Annual mean streamflows during 1990 were the highest since 1987 for many streams in the Roanoke and James River basins. Figure 2 shows the annual mean flow for 1990 in contrast to the annual mean flows for previous years and the long-term mean annual flow at four stream-gaging stations representative of different regions in the State.

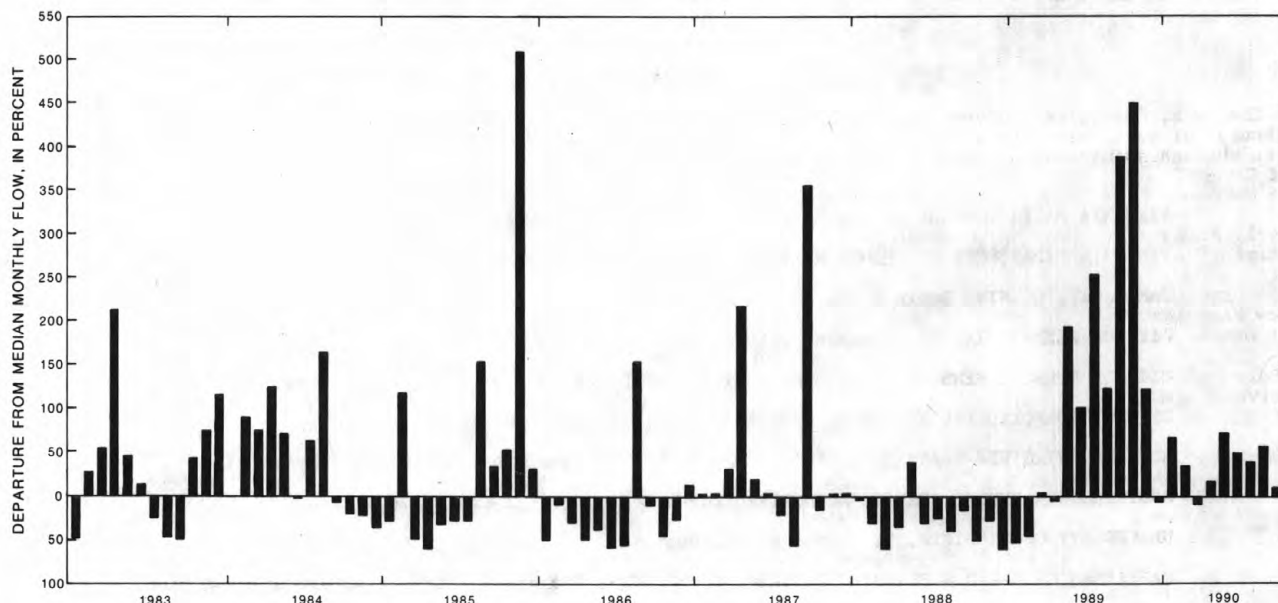


Figure 1.--Monthly departure of actual streamflow from median streamflow.

Annual mean flow during 1990 water year at eight representative streamflow-gaging stations				
Gaging station	Part of State	Annual mean flow for 1990 in cubic feet per second	Percentage of median annual flow	Length of record, in years
N.F. Shenandoah River near Strasburg, Va.	Northwestern	508	87	65
Rappahannock River near Fredericksburg, Va.	Northeastern	1,630	99	82
James River at Buchanan, Va.	Western	3,060	123	92
Slate River near Arvonnia, Va.	Central	283	124	64
Nottoway River near Stony Creek, Va.	Southeastern	606	107	61
Dan River at Danville, Va.	Southern	3,195	130	56
New River at Allisonia, Va.	Southwestern	4,095	129	61
Russell Fork at Haysi, Va.	Southwestern	433	132	64

The 1990 water year began with a continuation of the high flows resulting from runoff from Hurricane Hugo, which passed over the southwestern corner of the State on September 22. At 12 streamflow gages, new monthly high flows for October were recorded. At three of these streamflow gages--Russell Fork at Haysi, Potts Creek near Covington, and New River at Allisonia--the previous record for highest October flow had been established in 1937.

Despite the high monthly flows, only a few streamflow gages in the Big Sandy, New, and Roanoke River basins recorded their annual maximum instantaneous flows during the month. Elsewhere in the State, streamflows for the month were the highest for October since at least 1980. Statewide, streamflows averaged 453 percent above the long-term median for the month and were observed to have their greatest departure from normal for the water year (fig. 1).

New high monthly mean flows recorded at selected streamflow-gaging stations in October 1989					
Gaging station	Basin	Monthly mean flow for October 1989 in cubic feet per second	Previous record flow in cubic feet per second	Year	Length of record, in years
New River at Allisonia, Va.	New	6,790	6,515	1937	61
New River at Radford, Va.	New	7,620	7,210	1976	59
Walker Creek at Bane, Va.	New	721	536	1976	52
Wolf Creek near Narrows, Va.	New	621	611	1976	60
Russell Fork at Haysi, Va.	Big Sandy	975	448	1937	64
Pound River below Flannagan Dam near Haysi, Va.	Big Sandy	927	635	1984	64
SF Holston River at Riverside near Chilhowie, Va.	Tennessee	162	157	1976	59
Potts Creek near Covington, Va.	James	548	428	1937	53
South Mayo River near Nettleridge, Va.	Roanoke	304	208	1979	28
Smith River near Philpott, Va.	Roanoke	755	702	1959	44

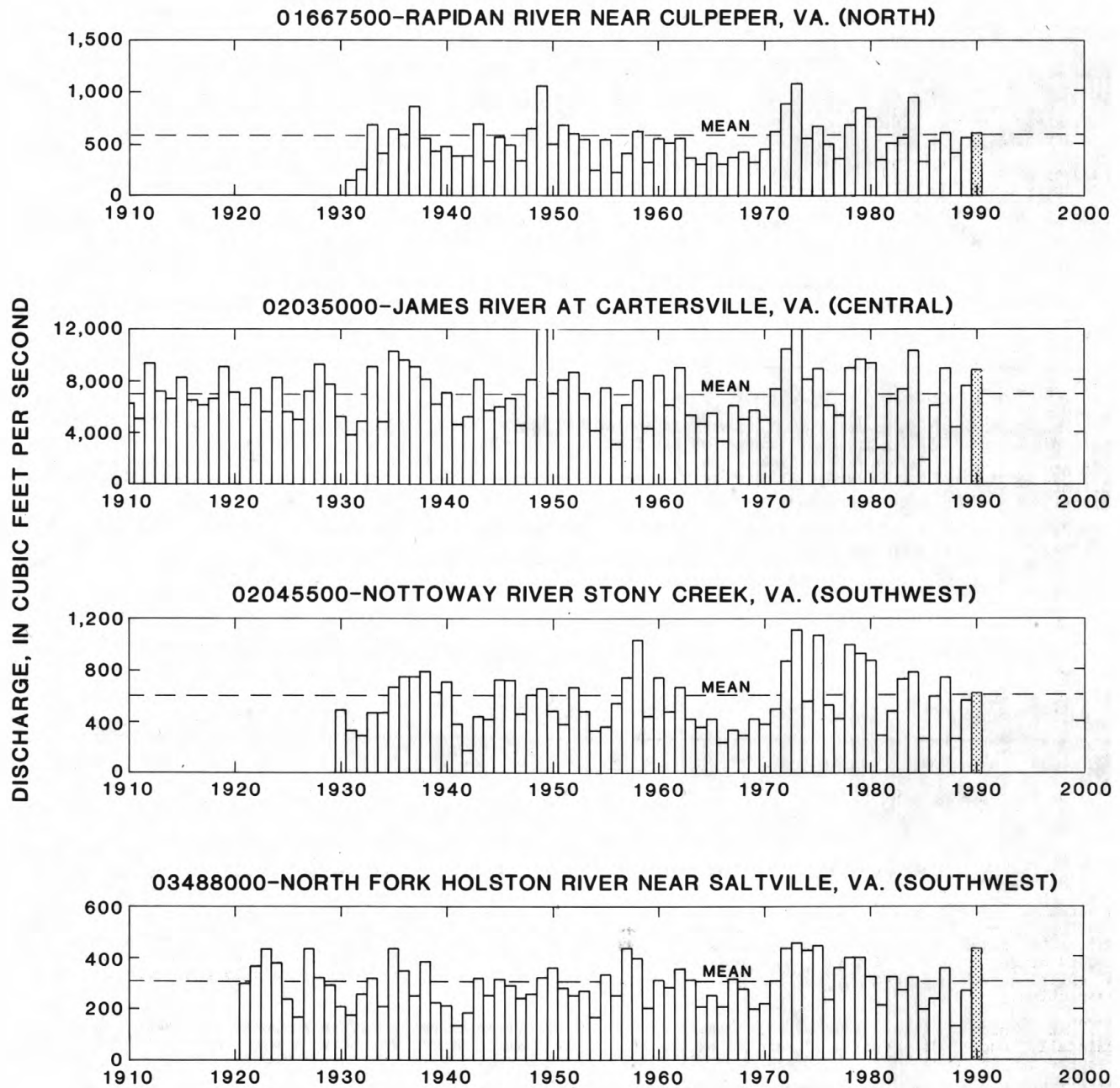


Figure 2.--Annual mean discharge at streamflow-gaging stations.

Streamflows decreased during November but remained above normal in the western two-thirds of the State. Many streams had the highest monthly flows for November since 1985 when runoff from Hurricane Juan and other storms produced major flooding in the Commonwealth. No major flooding occurred in 1989, just high streamflows resulting from above-normal ground-water discharges as a legacy of the above-normal precipitation received during the previous six months. Statewide, streamflows averaged 124 percent above the long-term median for the month but were declining at monthend. Annual maximum instantaneous flows on many streams in the New and upper James River basins were recorded during the month.

Streamflows continued to decrease during December and, by the end of the month, averaged 6 percent below the long-term median for the month. December was the first time in 8 months that the average streamflows in the State were below the long-term median for the month. Flows in streams in the Big Sandy and New River basins in the southwestern portion of the State and in the Roanoke River basin in the southern portion of the State, remained above average for the month. Flows in streams on the central and northern Coastal Plain were below normal--in the lower 25 percent of historical flows for the month. In contrast to these low flows, flows in streams on the Eastern Shore and in southeastern Virginia were above normal in December--in the upper 25 percent of historical flows for the month.

Runoff from melting accumulated snow and widespread moderate rains the last two days of the month caused bankfull stages and minor flooding along many streams. Annual maximum instantaneous discharges on Back Creek and other tributaries to the Jackson River in the headwaters of the James River basin were recorded on the last day of the month.

Streamflows increased during January and were above average across the entire State except in the extreme northern corner of the State around Leesburg. Streamflows averaged 68 percent above the long-term median for the month and flows returned to the above-average pattern prevalent for 8 of the previous 9 months. The monthly mean flow in the Pamunkey River near Hanover was the highest for January since 1949.

Annual maximum stages and discharges were recorded early in the month at many gaging stations in the upper James, New, Tennessee, and Chowan River basins. These peaks were the culmination of the runoff event that began at the end of December. There were as many as three additional episodes of high water recorded during the month, although the initial peak early in the month was the largest of the four peaks.

Streamflows remained above average during February across Virginia; however, flows varied from above normal in the southern and southwestern part of the State to slightly below average in the northeastern corner of the State. Statewide, streamflows averaged 35 percent above the long-term median for February.

Annual maximum monthly and annual maximum instantaneous flows for the 1990 water year were recorded at many streamflow gages in the Tennessee River basin during February (fig. 3--North Fork Holston River near Saltville). There were no new record-high flows observed during the month and, by monthend, streamflows were decreasing or holding steady across the Commonwealth.

Flows decreased in most streams during March and Statewide averaged 9 percent below the long-term median for the month. March, along with December, were the only two months during the 1990 water year when streamflows averaged below the long-term median for that time of the year.

The highest monthly flows of the year historically occur in Virginia streams during March; the 1990 water year was an exception to this pattern (fig. 3). Only one peak of significance occurred during March--on March 18-19. Annual maximum instantaneous flows occurred in several streams in the middle Roanoke River basin during this runoff event.

Flows increased in most Virginia streams during April except in the New, Tennessee, and Big Sandy River basins. A well-defined pattern in flow conditions was noted with a gradual transition from above-normal flows in the Tidewater area to below-average flows west of the Blue Ridge. Statewide, streamflows averaged 19 percent above the long-term median for the month. Streamflows in April returned to the trend for above-average flow conditions that had persisted in Virginia, with only two minor interruptions, since May 1989. No new record extreme flows were recorded during the month. Although above average, the general trend in streamflows was downward with one brief deviation on April 15-16 when runoff from widespread rains on the Piedmont resulted in rises of several feet on many streams.

Despite runoff from locally heavy rainfall during the month, flows in many streams in the Potomac, Shenandoah, Roanoke, and Chowan River basins decreased during May. The Statewide average flow was 74 percent above the long-term median for the month. Streamflows were above average for the entire State except in the Blackwater River in southeastern Virginia. Flows were the highest for May since 1978 at many gaging stations in the Roanoke and James River basins. New high monthly flows were recorded at two streamflow gages in the Tennessee River basin. One streamflow gage--on the North Fork Holston River near Saltville--had historical record dating to 1921. The second streamflow gage was on the Middle Fork Holston River near Meadowview and had a split period of record: 1932-53 and 1976-90. The old record flows at these sites date from 1958 and 1984, respectively.

At monthend, streamflows were decreasing after having peaked on May 29-30 in response to runoff from heavy rainfall. Unofficial reports of rain in excess of 4 inches near Richmond for this event were received. The recurrence interval for the peak on the Pamunkey River near Hanover--located about 10 miles northeast of Richmond--was about 5 years. Annual maximum instantaneous stages and discharges on most streams in the Shenandoah, Potomac, Rappahannock, York, and middle James River basins, and many smaller streams tributary to the Chesapeake Bay, occurred during the month.

Streamflows decreased during June but were 50 percent above the long-term median for the month. The June streamflows continued the trend for near or above-average flow conditions that had persisted in Virginia since May 1989. This was the longest period of above-average flows since the period October 1983 through August 1984 (fig. 1). The short-term trend in streamflows was downward for the month, and by monthend, daily flows were below the long-term median for this time of year.

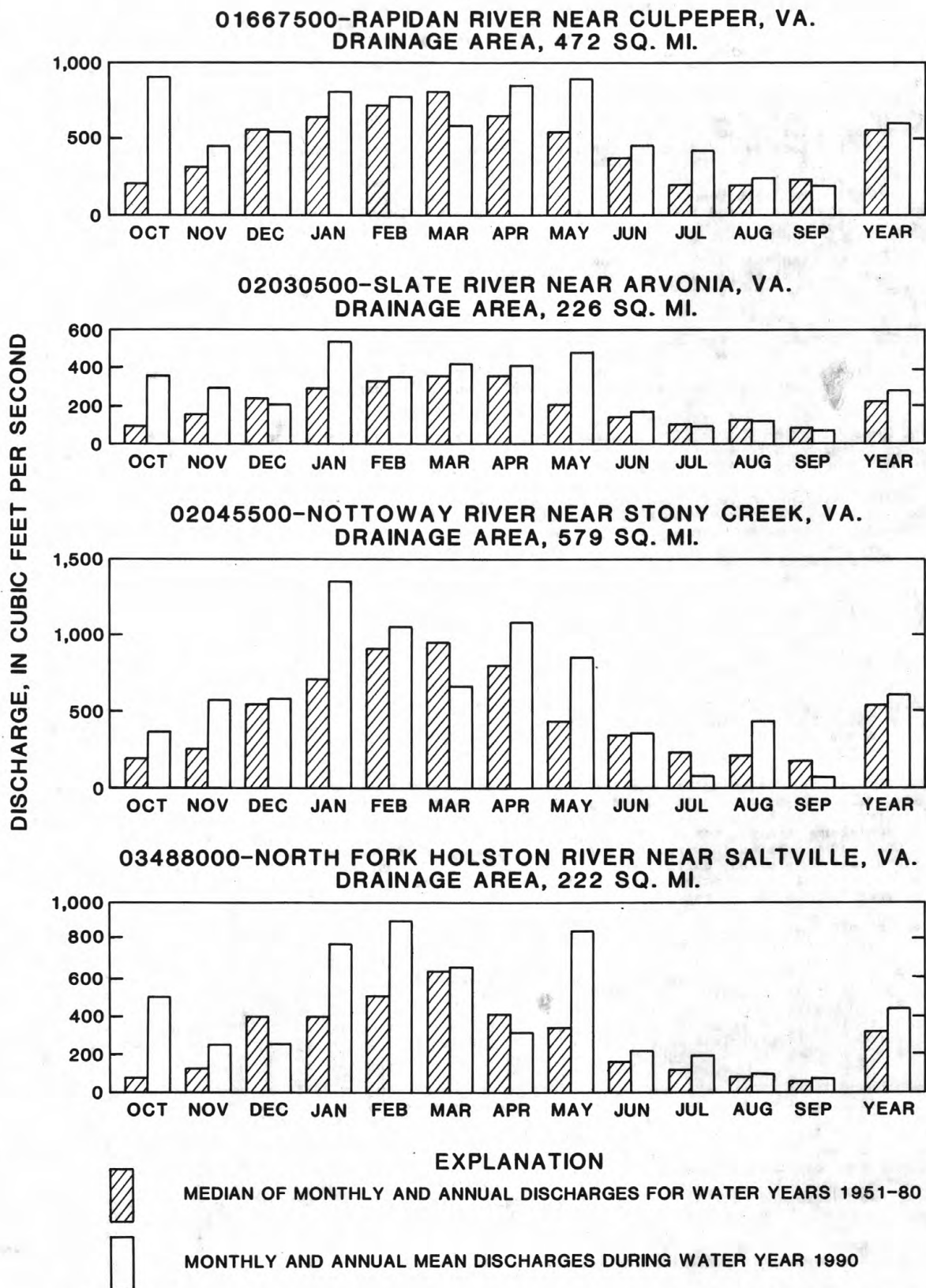


Figure 3.--Monthly and annual mean discharge during 1990 water year compared with median of monthly and annual mean discharge for 1951-80 at four representative streamflow-gaging stations.

Streamflows continued to decrease in most Virginia streams during July but, for the month, averaged 40 percent above the long-term median for July. Flows were below average in most streams until mid-month when runoff from rains associated with a stalled frontal system over the northern part of the State resulted in increased flows. By monthend, flows were again decreasing, and daily flows in most streams were below average for this time of year. Annual maximum discharges for the 1990 water year in a few streams in the lower Shenandoah and Rappahannock River basins occurred during the month, as did the annual minimum daily flows at several streamflow gages in the Rappahannock and York River basins and on smaller tributaries to the Chesapeake Bay.

There was no well-defined pattern to changes in flow conditions during August. In general, flows in streams west of the Blue Ridge and in the Roanoke River basin decreased during the month; elsewhere in the State, flows of most streams were higher in August than in July. Statewide, streamflows averaged 59 percent above the long-term median for the month. Flows in a few streams in the Chowan River basin and in northern Virginia were in the upper 25 percent of historical flows for the period. Flows were below average but within the normal range expected for August in the Dan and New River basins in the southwestern part of the State and in the Appomattox and York River basins in the central and eastern part of the State. Elsewhere, streamflows were above average but within the normal range expected for August.

Annual maximum flows were recorded at a few small streams on the Coastal Plain and southern Piedmont during August as the result of runoff from locally heavy thunderstorms. Annual minimum daily flows were recorded at streamflow gages in the Shenandoah and parts of the Chowan River basin and in several smaller streams on the Coastal Plain. At monthend, the trend in streamflows was downward.

Streamflows decreased during September but, although down from August, averaged 11 percent above the long-term median for the month. In general, flows in streams west of the Blue Ridge and on the northern Piedmont were above average while flows in streams in the New River basin and on the central and southern Piedmont were below the long-term median for September. Except for streams on the Eastern Shore, which had above-normal flows, the flows in all streams in the State were within the normal range for the month. The overall trend was for decreasing streamflows as the month progressed. Annual minimum daily flows were recorded for most of the streams in the State during the month, the exceptions being streams in the Shenandoah Valley, the Coastal Plain, and the Chowan River basin where annual minimum flows were recorded earlier in the water year.

In summary, the 1990 water year was a period of predominately above-average streamflows and was a continuation of the trend for higher flows that began in May 1989.

Water Quality

The median concentration of total phosphorus as P at the 10 National Stream-Quality Accounting Network (NASQAN) stations in Virginia from regularly scheduled sampling was 0.05 mg/L (milligrams per liter) in water year 1990. The median concentration of dissolved orthophosphorus as P was 0.02 mg/L. The greatest median concentration of total phosphorus and dissolved orthophosphorus were 0.08 and 0.05 mg/L, respectively, in the Dan River near Paces. In past years, the James River at Cartersville showed the greatest median values for these constituents. As shown in figure 4, the median value of total phosphorus increased sixfold between 1974 and 1989 at the James River site, but decreased dramatically in 1990. This decrease probably resulted from changes in point-source discharges and (or) agricultural practices in the basin, or from the above-normal flows in the State that began in May 1989.

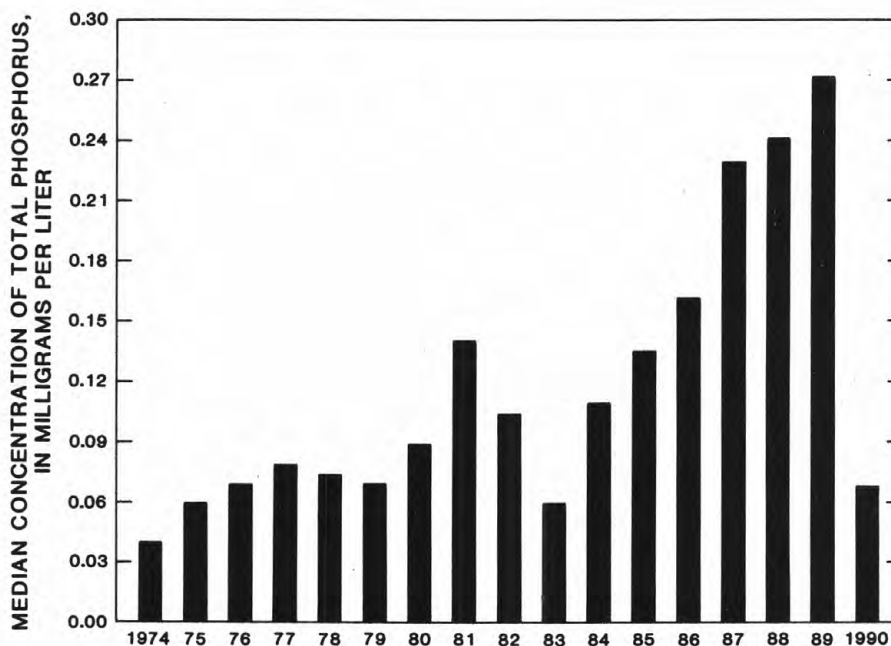


Figure 4.--Annual median concentration of total phosphorus for 1974-90 in James River at Cartersville, Va.

The median concentration of total nitrogen as N at the 10 NASQAN stations was 0.7 mg/L in water year 1990. The greatest median concentration of total nitrogen, 1.1 mg/L, was found in the New River at Glen Lyn, and the lowest, 0.48 mg/L, in the Appomattox River at Matoaca. The median concentration of dissolved nitrate as N at the New River station was 0.7 mg/L, accounting for nearly 61 percent of the total nitrogen.

Dissolved-oxygen concentrations measured during routine sampling at NASQAN stations in water year 1990 averaged 90 percent of saturation, with a mean concentration of 9.2 mg/L. Of the 54 dissolved-oxygen measurements made during NASQAN sampling throughout the year, only one value below 5.0 mg/L was recorded. On August 15, a dissolved-oxygen measurement of 4.4 mg/L was recorded in the Meherrin River at Emporia.

The concentrations of trace metals, including arsenic, barium, cadmium, chromium, lead, mercury, silver, and selenium in all samples collected from NASQAN stations were well below the U.S. Environmental Protection Agency (USEPA) regulations for safe drinking water. In most cases, concentrations were less than one-tenth of the established regulation. However, concentrations of dissolved iron and dissolved manganese reached relatively high concentrations at some stations. Dissolved-iron concentrations in excess of 1,000 µg/L (micrograms per liter) were measured on August 22 in the Mattaponi River near Beulahville and on May 5 and August 23 in the Blackwater River near Franklin. A dissolved-manganese concentration greater than 100 µg/L was measured May 17 in the Meherrin River at Emporia. Although these concentrations of iron and manganese in water exceed USEPA secondary drinking-water regulations, they are not a threat to human health; however, they can produce objectionable taste and stain laundered clothing.

The median counts of fecal coliform and fecal streptococcal bacteria at the 10 NASQAN stations were 65 and 54 col/100 mL (colonies per 100 milliliters), respectively. The greatest median count of fecal coliform bacteria was 150 col/100 mL in the Blackwater River near Franklin, and the Dan River at Paces had the greatest median count of fecal streptococcal bacteria, 188 col/100 mL. The Pamunkey River near Hanover had the single greatest count of fecal coliform bacteria, 1,400 col/100 mL on January 26, while the Dan River at Paces had the single greatest count of fecal streptococcal bacteria, 4,500 col/100 mL, on January 10; both samples were collected during above-average flow conditions. The lowest median count of fecal coliform bacteria, 16 col/100 mL, was recorded in the Appomattox River at Matoaca. The lowest median count of fecal streptococcal bacteria, 17 col/100 mL, was recorded in the James River at Cartersville.

SPECIAL NETWORKS AND PROGRAMS

Hydrologic Bench-Mark Network is a network of 57 sites in small drainage basins around the country whose purpose is to provide consistent data on the hydrology, including water quality, and related factors in representative undeveloped watersheds nationwide, and to provide analyses on a continuing basis to compare and contrast conditions observed in basins more obviously affected by the activities of man.

National Stream-Quality Accounting Network (NASQAN) is a nationwide data-collection network designed by the U.S. Geological Survey to meet many of the information needs of government agencies and other groups involved in natural or regional water-quality planning and management. The 500 or so sites in NASQAN are generally located at the downstream ends of hydrologic accounting units designated by the U.S. Geological Survey Office of Water Data Coordination in consultation with the Water Resources Council. The objectives of NASQAN are (1) to obtain information on the quality and quantity of water moving within and from the United States through a systematic and uniform process of data collection, summarization, analysis, and reporting such that the data may be used for, (2) description of the areal variability of water quality in the Nation's rivers through analysis of data from this and other programs, (3) detection of changes or trends with time in the pattern of occurrence of water-quality characteristics, and (4) providing a nationally consistent data base useful for water-quality assessment and hydrologic research.

The National Trends Network (NTN) is a 150-station network for sampling atmospheric deposition in the United States. The purpose of the network is to determine the variability, both in location and in time, of the composition of atmospheric deposition, which includes snow, rain, dust particles, aerosols, and gases. The core from which the NTN was built was the already-existing deposition-monitoring network of the National Atmospheric Deposition Program (NADP).

Radiochemical Programs is a network of regularly sampled water-quality stations where samples are collected to be analyzed for radioisotopes. The streams that are sampled represent major drainage basins in the conterminous United States.

Tritium Network is a network of stations which has been established to provide baseline information on the occurrence of tritium in the Nation's surface waters. In addition to the surface-water stations in the network, tritium data are also obtained at a number of precipitation stations. The purpose of the precipitation stations is to provide an estimate sufficient for hydrologic studies of the tritium input to the United States.

EXPLANATION OF THE RECORDS

The surface-water and quality-of-water records published in this report are for the 1990 water year that began October 1, 1989, and ended September 30, 1990. A calendar of the water year is provided on the inside of the front cover. The records contain streamflow data, stage and content data for lakes and reservoirs, and water-quality data for surface water. The locations of the stations where the data were collected are shown in figures 6 and 7. The following sections of the introductory text are presented to provide users with a more detailed explanation of how the hydrologic data published in this report were collected, analyzed, computed, and arranged for presentation.

Station Identification Numbers

Each data station in this report is assigned a unique identification number. This number is unique in that it applies specifically to a given station and to no other. The number usually is assigned when a station is first established and is retained for that station indefinitely. The system used by the U.S. Geological Survey to assign identification numbers for surface-water stations is based on geographic location. The "downstream order" system is used for regular surface-water stations and the "latitude-longitude" system is occasionally used for surface-water stations where only miscellaneous measurements are made.

Downstream Order System

Since October 1, 1950, the order of listing hydrologic-station records in Survey reports is in a downstream direction along the main stream. All stations on a tributary entering upstream from a mainstream station are listed before that station. A station on a tributary that enters between two mainstream stations is listed between them. A similar order is followed in listing stations on first rank, second rank, and other ranks of tributaries. The rank of any tributary with respect to the stream to which it is immediately tributary is indicated by an indentation in the "List of Stations" in the front of this report. Each indentation represents one rank. This downstream order and system of indentation shows which stations are on tributaries between any two stations and the rank of the tributary on which each station is situated.

The station-identification number is assigned according to downstream order. In assigning station numbers, no distinction is made between partial-record stations and other stations; therefore, the station number for a partial-record station indicates downstream-order position in a list made up of both types of stations. Gaps are left in the series of numbers to allow for new stations that may be established; hence, the numbers are not consecutive. The complete eight-digit number for each station, such as 02027500, which appears just to the left of the station name, includes the two-digit Part number "02" plus the six-digit downstream-order number "027500." The Part number designates the major river basin; for example, Part "02" is the James River basin.

Latitude-Longitude System

The identification numbers for miscellaneous surface-water sites are assigned according to the grid system of latitude and longitude. The number consists of 15 digits. The first six digits denote the degrees, minutes, and seconds of latitude, the next seven digits denote degrees, minutes, and seconds of longitude, and the last two digits (assigned sequentially) identify the sites within a 1-second grid. This site-identification number, once assigned, is a pure number and has no locational significance. In the rare instance where the initial determination of latitude and longitude are found to be in error, the station will retain its initial identification number; however, its true latitude and longitude will be listed in the LOCATION paragraph of the station description.

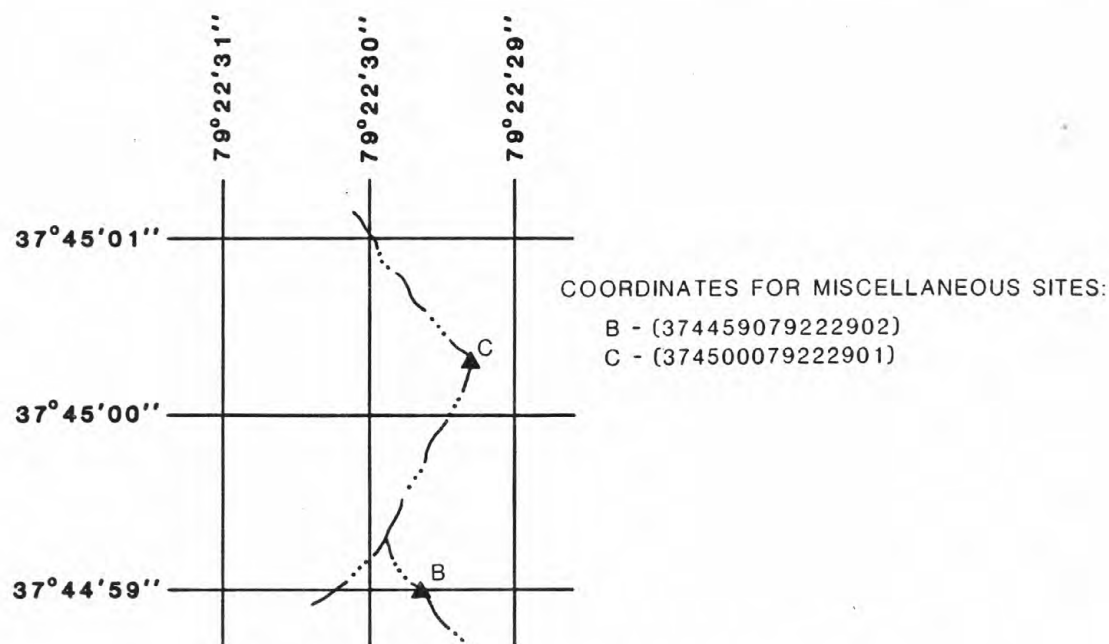


Figure 5.--System for numbering miscellaneous sites.

Records of Stage and Water Discharge

Records of stage and water discharge may be complete or partial. Complete records of discharge are those obtained using a continuous stage-recording device through which either instantaneous or mean daily discharges may be computed for any time, or any period of time, during the period of record. Complete records of lake or reservoir content, similarly, are those for which stage or content may be computed or estimated with reasonable accuracy for any time, or period of time. They may be obtained using a continuous stage-recording device, but need not be. Because daily mean discharges and end-of-day contents commonly are published for such stations, they are referred to as "daily stations."

By contrast, partial records are obtained through discrete measurements without using a continuous stage-recording device, and pertain only to a few flow characteristics, or perhaps only one. The nature of the partial record is indicated by table titles such as "Crest-stage partial records," or "Low-flow partial records." Records of miscellaneous discharge measurements or of measurements from special studies, such as low-flow seepage studies, may be considered as partial records, but they are presented separately in this report. Location of all complete-record and crest-stage partial-record stations for which data are given in this report are shown in figures 6 and 7.

Data Collection and Computation

The data obtained at a complete-record gaging station on a stream or canal consist of a continuous record of stage, individual measurements of discharge throughout a range of stages, and notations regarding factors that may affect the relationships between stage and discharge. These data, together with supplemental information, such as weather records, are used to compute daily discharges. The data obtained at a complete-record gaging station on a lake or reservoir consist of a record of stage and of notations regarding factors that may affect the relationship between stage and lake content. These data are used with stage-area and stage-capacity curves or tables to compute water-surface areas and lake storage.

Continuous records of stage are obtained with analog recorders that trace continuous graphs of stage or with digital recorders that punch stage values on paper tapes at selected time intervals. Measurements of discharge are made with current meters using methods adopted by the Geological Survey as a result of experience accumulated since 1880. These methods are described in standard textbooks, in Water-Supply Paper 2175, and in U.S. Geological Survey Techniques of Water-Resources Investigations, Book 3, Chapter A6.

In computing discharge records, results of individual measurements are plotted against the corresponding stages, and stage-discharge relation curves are then constructed. From these curves, rating tables indicating the approximate discharge for any stage within the range of the measurements are prepared. If it is necessary to define extremes of discharge outside the range of the current-meter measurements, the curves are extended using: (1) logarithmic plotting; (2) velocity-area studies; (3) results of indirect measurements of peak discharge, such as slope-area or contracted-opening measurements, and computations of flow over dams or weirs; or (4) step-backwater techniques.

Daily mean discharges are computed by applying the daily mean stages (gage heights) to the stage-discharge curves or tables. If the stage-discharge relation is subject to change because of frequent or continual change in the physical features that form the control, the daily mean discharge is determined by the shifting-control method, in which correction factors based on the individual discharge measurements and notes of the personnel making the measurements are applied to the gage heights before the discharges are determined from the curves or tables. This shifting-control method also is used if the stage-discharge relation is changed temporarily because of aquatic growth or debris on the control. For some stations, formation of ice in the winter may so obscure the stage-discharge relations that daily mean discharges must be estimated from other information such as temperature and precipitation records, notes of observations, and records for other stations in the same or nearby basins for comparable periods.

At some stream-gaging stations, the stage-discharge relation is affected by the backwater from reservoirs, tributary streams, or other sources. This necessitates the use of the slope method in which the slope or fall in a reach of the stream is a factor in computing discharge. The slope or fall is obtained by means of an auxiliary gage set at some distance from the base gage. At some stations the stage-discharge relation is affected by changing stage; at these stations the rate of change in stage is used as a factor in computing discharge.

In computing records of lake or reservoir contents, it is necessary to have available from surveys, curves or tables defining the relationship of stage and content. The application of stage to the stage-content curves or tables gives the contents from which daily, monthly, or yearly changes then are determined. If the stage-content relationship changes because of deposition of sediment in a lake or reservoir, periodic resurveys may be necessary to redefine the relationship. Even when this is done, the contents computed may become increasingly in error as the lapsed time since the last survey increases. Discharges over lake or reservoir spillways are computed from stage-discharge relationships much as other stream discharges are computed.

For some gaging stations, there are periods when no gage-height record is obtained, or the recorded gage height is so faulty that it cannot be used to compute daily discharge or contents. This happens when the recorder stops or otherwise fails to operate properly, intakes are plugged, the float is frozen in the well, or for various other reasons. For such periods, the daily discharges are estimated from the recorded range in stage, previous or following record, discharge measurements, weather records, and comparison with other station records from the same or nearby basins. Likewise, daily contents may be estimated from operator's logs, previous or following record, inflow-outflow studies, and other information. Information explaining how estimated daily-discharge values are identified in station records is included in the next two sections, "Data Presentation" (REMARKS paragraph) and "Identifying Estimated Daily Discharge."

Data Presentation

The records published for each gaging station consist of two parts, the manuscript or station description and the data table for the current water year. The manuscript provides, under various headings, descriptive information, such as station location; period of record; average discharge; historical extremes; record accuracy; and other remarks pertinent to station operation and regulation. The following information, as appropriate, is provided with each continuous record of discharge or lake content. Comments to follow clarify information presented under the various headings of the station description.

LOCATION.--Information on locations is obtained from the most accurate maps available. The location of the gage with respect to the cultural and physical features in the vicinity and with respect to the reference place mentioned in the station name is given. River mileages, given for only a few stations, were determined by methods given in "River Mileage Measurement," Bulletin 14, Revision of October 1968, prepared by the Water Resources Council or were provided by the U.S. Army Corps of Engineers.

DRAINAGE AREA.--Drainage areas are measured using the most accurate maps available. Because the type of maps available varies from one drainage basin to another, the accuracy of drainage areas likewise varies. Drainage areas are updated as better maps become available.

PERIOD OF RECORD.--This indicates the period for which there are published records for the station or for an equivalent station. An equivalent station is one that was in operation at a time that the present station was not and whose location was such that records from it can reasonably be considered equivalent with records from the present station.

REVISED RECORDS.--Published records, because of new information, occasionally are found to be incorrect, and revisions are printed in later reports. Listed under this heading are all the reports in which revisions have been published for the station and the water years to which the revisions apply. If a revision did not include daily, monthly, or annual figures of discharge, that fact is noted after the year dates as follows: "(M)" means that only the instantaneous maximum discharge was revised; "(m)" that only the instantaneous minimum was revised; and "(P)" that only peak discharges were revised. If the drainage area has been revised, the report in which the most recently revised figure was first published is given.

GAGE.--The type of gage in current use, the datum of the current gage referred to National Geodetic Vertical Datum of 1929 (see glossary), and a condensed history of the types, locations, and datums of previous gages are given under this heading.

REMARKS.--All periods of estimated daily-discharge record will either be identified by date in this paragraph of the station description for water-discharge stations or flagged in the daily-discharge table. (See next section, "Identifying Estimated Daily Discharge.") If a remarks statement is used to identify estimated record, the paragraph will begin with this information presented as the first entry. The paragraph is also used to present information relative to the accuracy of the records, to special methods of computation, to conditions that affect natural flow at the station and, possibly, to other pertinent items. For reservoir stations, information is given on the dam forming the reservoir, the capacity, outlet works and spillway, and purpose and use of the reservoir.

COOPERATION.--Records provided by a cooperating organization or obtained for the Geological Survey by a cooperating organization are identified here.

AVERAGE DISCHARGE.--The discharge value given is the arithmetic mean of the water-year mean discharges. It is computed only for stations having at least 5 water years of complete record, and only water years of complete record are included in the computation. It is not computed for stations where diversions, storage, or other water-use practices cause the value to be meaningless. If water developments significantly altering flow at a station are put into use after the station has been in operation for a period of years, a new average is computed as soon as 5 water years of record have accumulated following the development. The median of yearly mean discharges also is given under this heading for stations having 10 or more water years of record if the median differs from the average given by more than 10 percent.

EXTREMES FOR PERIOD OF RECORD.--Extremes may include maximum and minimum stages and maximum and minimum discharges or content. Unless otherwise qualified, the maximum discharge or content is the instantaneous maximum corresponding to the highest stage that occurred. The highest stage may have been obtained from a graphic or digital recorder, a crest-stage gage, or by direct observation of a nonrecording gage. If the maximum stage did not occur on the same day as the maximum discharge or content, it is given separately. Similarly, the minimum is the instantaneous minimum discharge, unless otherwise qualified, and was determined and is reported in the same manner as the maximum.

EXTREMES OUTSIDE PERIOD OF RECORD.--Included here is information concerning major floods or unusually low flows that occurred outside the stated period of record. The information may or may not have been obtained by the U.S. Geological Survey.

EXTREMES FOR CURRENT YEAR.--Extremes given here are similar to those for the period of record, except the peak discharge listing may include secondary peaks. For stations meeting certain criteria, all peak discharges and stages occurring during the water year and equal to or greater than a selected base discharge are presented under this heading. The peaks equal to or greater than the base discharge, excluding the highest one, are referred to as secondary peaks. Peak discharges are not published for canals, ditches, drains, or streams for which the peaks are subject to substantial control by man. The time of occurrence for peaks is expressed in 24-hour local standard time. For example, 12:30 a.m. is 0030, and 1:30 p.m. is 1330. The minimum for the current water year appears below the table of peak data.

REVISIONS.--If a critical error in published records is discovered, a revision is included in the first report published following discovery of the error.

Although rare, occasionally the records of a **discontinued gaging station** may need revision. Because, for these stations, there would be no current or, possibly, future station manuscript published to document the revision in a "Revised Records" entry, users of data for these stations who obtained the record from previously published data reports may wish to contact the offices whose addresses are given on the back of the title page of this report to determine if the published records were ever revised after the station was discontinued. Of course, if the data were obtained by computer retrieval, the data would be current and there would be no need to check because any published revision of data is always accompanied by revision of the corresponding data in computer storage.

Manuscript information for **lake or reservoir** stations differs from that for stream stations in the nature of the "Remarks" and in the inclusion of a skeleton stage-capacity table when daily contents are given.

The **daily table** for stream-gaging stations gives mean discharge for each day and is followed by monthly and yearly summaries. In the monthly summary below the daily table, the line headed "**TOTAL**" gives the sum of the daily figures. The line headed "**MEAN**" gives the average flow in cubic feet per second during the month. The lines headed "**MAX**" and "**MIN**" give the maximum and minimum daily discharges, respectively, for the month. Discharge for the month also is usually expressed in cubic feet per second per square mile (line headed "**CFSM**"), or in inches (line headed "**IN.**"), or in acre-feet (line headed "**AC-FT**"). Figures for cubic feet per second per square mile and runoff in inches are omitted if there is extensive regulation or diversion or if the drainage area includes large noncontributing areas. In the yearly summary below the monthly summary, the figures shown are the appropriate discharges for the calendar and water years. At some stations monthly and (or) yearly observed discharges are adjusted for reservoir storage or diversion, or diversions or reservoir contents are given. These figures are identified by a symbol and corresponding footnote.

Data collected at **partial-record stations** follow the information for continuous-record sites. Data for partial-record discharge stations are presented in two tables. The first is a table of annual maximum stage and discharge at **crest-stage stations**, and the second is a table of discharge measurements at **low-flow partial-record stations**. The tables of partial-record stations are followed by a listing of discharge measurements made at sites other than continuous-record or partial-record stations. These measurements are generally made in times of drought or flood to give better areal coverage to those events. Those measurements and others collected for some special reason are called **measurements at miscellaneous sites**.

Identifying Estimated Daily Discharge

Estimated daily-discharge values published in the water-discharge tables of annual State data reports are identified either by flagging individual daily values with the letter symbol "e" and printing a table footnote, "**e Estimated**," or by listing the dates of the estimated record in the REMARKS paragraph of the station description.

Accuracy of the Records

The accuracy of streamflow records depends primarily on: (1) The stability of the stage-discharge relation or, if the control is unstable, the frequency of discharge measurements; and (2) the accuracy of measurements of stage, measurements of discharge, and interpretation of records.

The accuracy attributed to the records is indicated under "REMARKS." "**Excellent**" means that about 95 percent of the daily discharges are within 5 percent of their true values; "**good**," within 10 percent; and "**fair**," within 15 percent. Records that do not meet the criteria mentioned are rated "**poor**." Different accuracies may be attributed to different parts of a given record.

Daily mean discharges in this report are given to the nearest hundredth of a cubic foot per second for values less than 1 ft³/s to the nearest tenth between 1.0 and 10 ft³/s; to whole numbers between 10 and 1,000 ft³/s; and to 3 significant figures for more than 1,000 ft³/s. The number of significant figures used is based solely on the magnitude of the discharge value. The same rounding rules apply to discharges listed for partial-record stations and miscellaneous sites.

Discharge at many stations, as indicated by the monthly mean, may not reflect natural runoff due to the effects of diversion, consumption, regulation by storage, increase or decrease in evaporation due to artificial causes, or to other factors. For such stations, figures of cubic feet per second per square mile and of runoff, in inches, are not published unless satisfactory adjustments can be made for diversions, for changes in contents of reservoirs, or for other changes incident to use and control. Evaporation from a reservoir is not included in the adjustments for changes in reservoir contents, unless it is so stated. Even at those stations where adjustments are made, large errors in computed runoff may occur if adjustments or losses are large in comparison with the observed discharge.

Other Records Available

Information used in the preparation of the records in this publication, such as discharge-measurement notes, gage-height records, temperature measurements, and rating tables is on file in the Virginia Office of the Mid-Atlantic District. Also, most of the daily mean discharges are in computer-readable form and have been analyzed statistically. Information on the availability of the unpublished information or on the results of statistical analyses of the published records may be obtained from the offices whose addresses are given on the back of the title page of this report.

Records of Surface-Water Quality

Records of surface-water quality ordinarily are obtained at or near stream-gaging stations because interpretation of records of surface-water quality nearly always requires corresponding discharge data. Records of surface-water quality in this report may involve a variety of types of data and measurement frequencies.

Classification of records

Water-quality data for surface-water sites are grouped into one of three classifications. A continuing-record station is a site where data are collected on a regularly scheduled basis. Frequency may be once or more times daily, weekly, monthly, or quarterly. A partial-record station is a site where limited water-quality data are collected systematically over a period of years. Frequency of sampling is usually less than quarterly. A miscellaneous sampling site is a location other than a continuing or partial-record station where random samples are collected to give better areal coverage to define water-quality conditions in the river basin.

A careful distinction needs to be made between "continuing records", as used in this report, and "continuous recordings," which refers to a continuous graph or a series of discrete values punched at short intervals on a paper tape. Some records of water quality, such as temperature and specific conductance, may be obtained through continuous recordings; however, because of costs, most data are obtained only monthly or less frequently. Locations of stations for which records on the quality of surface water appear in this report are shown in figure 6.

Arrangement of Records

Water-quality records collected at a surface-water daily record station are published immediately following that record, regardless of the frequency of sample collection. Station number and name are the same for both records. Where a surface-water daily record station is not available or where the water quality differs significantly from that at the nearby surface-water station, the continuing water-quality record is published with its own station number and name in the regular downstream-order sequence. Water-quality data for partial-record stations and for miscellaneous sampling sites appear in separate tables following the table of discharge measurements at miscellaneous sites.

On-site Measurements and Sample Collection

In obtaining water-quality data, a major concern needs to be assuring that the data obtained represent the in situ quality of the water. To assure this, certain measurements, such as water temperature, pH, and dissolved oxygen, need to be made onsite when the samples are taken. To assure that measurements made in the laboratory also represent the in situ water, carefully prescribed procedures need to be followed in collecting the samples, in treating the samples to prevent changes in quality pending analysis, and in shipping the samples to the laboratory. Procedures for onsite measurements and for collecting, treating, and shipping samples are given in publications on "Techniques of Water-Resources Investigations," Book 1, Chap. D2; Book 3, Chap. C2; Book 5, Chap. A1, A3, and A4. All of these references are listed under "PUBLICATIONS ON TECHNIQUES OF WATER-RESOURCES INVESTIGATIONS" which appears at the end of the introductory text. Detailed information on collecting, treating, and shipping samples may be obtained from the Virginia Office of the Mid-Atlantic District.

One sample can define adequately the water quality at a given time if the mixture of solutes throughout the stream cross section is homogeneous. However, the concentration of solutes at different locations in the cross section may vary widely with different rates of water discharge, depending on the source of material and the turbulence and mixing of the stream. Some streams must be sampled through several vertical sections to obtain a representative sample needed for an accurate mean concentration and for use in calculating load. All samples obtained for the National Stream Quality Accounting Network (see definitions) are obtained from at least several verticals. Whether samples are obtained from the centroid of flow or from several verticals depends on flow conditions and other factors which must be evaluated by the collector.

Chemical-quality data published in this report are considered to be the most representative values available for the stations listed. The values reported represent water-quality conditions at the time of sampling as much as possible, consistent with available sampling techniques and methods of analysis. In the rare case where an apparent inconsistency exists between a reported pH value and the relative abundance of carbon dioxide species (carbonate and bicarbonate), the inconsistency is the result of a slight uptake of carbon dioxide from the air by the sample between measurement of pH in the field and determination of carbonate and bicarbonate in the laboratory.

For chemical-quality stations equipped with digital monitors, the records consist of daily maximum, minimum, and mean values for each constituent measured and are based upon hourly punches beginning at 0100 hours and ending at 2400 hours for the day of record. More detailed records (hourly values) may be obtained from the Virginia Office of the Mid-Atlantic District whose address is given on the back of the title page of this report.

Water Temperature

Water temperatures are measured at most of the water-quality stations. In addition, water temperatures are taken at the time of discharge measurements for water-discharge stations. For stations where water temperatures are taken manually once or twice daily, the water temperatures are taken at about the same time each day. Large streams have a small diurnal temperature change; shallow streams may have a daily range of several degrees and may follow closely the changes in air temperature. Some streams may be affected by waste-heat discharges.

At stations where recording instruments are used, either mean temperatures or maximum and minimum temperatures for each day are published. Water temperatures measured at the time of water-discharge measurements are on file in the Virginia Office of the Mid-Atlantic District.

Sediment

Suspended-sediment concentrations are determined from samples collected by using depth-integrating samplers. Samples usually are obtained at several verticals in the cross section, or a single sample may be obtained at a fixed point and a coefficient applied to determine the mean concentration in the cross sections.

During periods of rapidly changing flow or rapidly changing concentration, samples may have been collected more frequently (twice daily or, in some instances, hourly). The published sediment discharges for days of rapidly changing flow or concentration were computed by the subdivided-day method (time-discharge weighted average). Therefore, for those days when the published sediment discharge value differs from the value computed as the product of discharge times mean concentration times 0.0027, the reader can assume that the sediment discharge for that day was computed by the subdivided-day method. For periods when no samples were collected, daily discharges of suspended sediment were estimated on the basis of water discharge, sediment concentrations observed immediately before and after the periods, and suspended-sediment loads for other periods of similar discharge.

At other stations, suspended-sediment samples were collected periodically at many verticals in the stream cross section. Although data collected periodically may represent conditions only at the time of observations, such data are useful in establishing seasonal relations between quality and streamflow and in predicting long-term sediment-discharge characteristics of the stream.

In addition to the records of suspended-sediment discharge, records of the periodic measurements of the particle-size distribution of the suspended sediment and bed material are included for some stations.

Laboratory Measurements

Sediment samples, samples for biochemical-oxygen demand (BOD), samples for indicator bacteria, and daily samples for specific conductance are analyzed locally. All other samples are analyzed in the Geological Survey laboratory in Arvada, Colorado. Methods used in analyzing sediment samples and computing sediment records are given in TWRI, Book 5, Chap. C1. Methods used by the Geological Survey laboratory are given in TWRI, Book 1, Chap. D2; Book 3, Chap. C2; Book 5, Chap. A1, A3, and A4.

Data Presentation

For continuing-record stations, information pertinent to the history of station operation is provided in descriptive headings preceding the tabular data. These descriptive headings give details regarding location, drainage area, period of record, type of data available, instrumentation, general remarks, cooperation, and extremes for parameters currently measured daily. Tables of chemical, physical, biological, radiochemical data, and so forth, obtained at a frequency less than daily, are presented first. Tables of "daily values" of specific conductance, pH, water temperature, dissolved oxygen, and suspended sediment then follow in sequence.

In the descriptive headings, if the location is identical to that of the discharge gaging station, neither the LOCATION nor the DRAINAGE AREA statements are repeated. The following information, as appropriate, is provided with each continuous-record station. Comments that follow clarify information presented under the various headings of the station description.

LOCATION.--See Data Presentation under "Records of Stage and Water Discharge;" same comments apply.

DRAINAGE AREA.--See Data Presentation under "Records of Stage and Water Discharge;" same comments apply.

PERIOD OF RECORD.--This indicates the periods for which there are published water-quality records for the station. The periods are shown separately for records of parameters measured daily or continuously and those measured less than daily. For those measured daily or continuously, periods of record are given for the parameters individually.

INSTRUMENTATION.--Information on instrumentation is given only if a water-quality monitor temperature record, sediment pumping sampler, or other sampling device is in operation at a station.

REMARKS.--Remarks provide added information pertinent to the collection, analysis, or computation of the records.

COOPERATION.--Records provided by a cooperating organization or obtained for the Geological Survey by a cooperating organization are identified here.

EXTREMES.--Maximums and minimums are given only for parameters measured daily or more frequently. None are given for parameters measured weekly or less frequently, because the true maximums or minimums may not have been sampled. Extremes, when given, are provided for both the period of record and for the current water year.

REVISIONS.--If errors in published water-quality records are discovered after publication, appropriate updates are made to the Water-Quality File in the U.S. Geological Survey's computerized data system, WATSTORE, and subsequently by monthly transfer of update transactions to the U.S. Environmental Protection Agency's STORET system. Because the usual volume of updates makes it impractical to document individual changes in the State data-report series or elsewhere, potential users of U.S. Geological Survey water-quality data are encouraged to obtain all required data from the appropriate computer file to insure the most recent updates.

The surface-water-quality records for partial-record stations and miscellaneous sampling sites are published in separate tables following the table of discharge measurements at miscellaneous sites. No descriptive statements are given for these records. Each station is published with its own station number and name in the regular downstream-order sequence.

REMARK CODES

The following remark codes may appear with the water-quality data in this report:

PRINTED OUTPUT	REMARK
E	Estimated value
>	Actual value is known to be greater than the value shown
<	Actual value is known to be less than the value shown
K	Results based on colony count outside the acceptance range (non-ideal colony count)
L	Biological organism count less than 0.5 percent (organism may be observed rather than counted)
D	Biological organism count equal to or greater than 15 percent (dominant)
&	Biological organism estimated as dominant

ACCESS TO WATSTORE DATA

The **National Water Data Storage and Retrieval System (WATSTORE)** was established for handling water-data collected through the activities of the U.S. Geological Survey and to provide for more effective and efficient means of releasing the data to the public. The system is operated and maintained on the central computer facilities of the Survey at its National Center in Reston, Virginia.

WATSTORE can provide a variety of useful products ranging from simple data tables to complex statistical analyses. A minimal fee, plus the actual computer cost incurred in producing a desired product, is charged to the requester. Information about the availability of specific types of data, the acquisition of data or products, and user charges can be obtained locally from the offices whose addresses are given on the back of the title page.

General inquiries about **WATSTORE** may be directed to:

Chief Hydrologist
U.S. Geological Survey
437 National Center
Reston, Virginia 22092

DEFINITION OF TERMS

Terms related to streamflow, water-quality, and other hydrologic data, as used in this report, are defined below. See also table for converting English units to International System (SI) Units on the inside of the back cover.

Acre-foot (AC-FT, acre-ft) is the quantity of water required to cover 1 acre to a depth of 1 foot and is equivalent to 43,560 cubic feet or about 326,000 gallons or 1,233 cubic meters.

Adenosine triphosphate (ATP) is an organic, phosphate-rich, compound important in the transfer of energy in organisms. Its central role in living cells makes it an excellent indicator of the presence of living material in water. A measure of ATP therefore provides a sensitive and rapid estimate of biomass. ATP is reported in micrograms per liter of the original water sample.

Algae are mostly aquatic single-celled, colonial, or multi-celled plants, containing chlorophyll and lacking roots, stems, and leaves.

Algal growth potential (AGP) is the maximum algal dry weight biomass that can be produced in a natural water sample under standardized laboratory conditions. The growth potential is the algal biomass present at stationary phase and is expressed as milligrams dry weight of algae produced per liter of sample.

Bacteria are microscopic unicellular organisms, typically spherical, rodlike, or spiral and threadlike in shape, often clumped into colonies. Some bacteria cause disease, while others perform an essential role in nature in the recycling of materials; for example, by decomposing organic matter into a form available for reuse by plants.

Total coliform bacteria are a particular group of bacteria that are used as indicators of possible sewage pollution. They are characterized as aerobic or facultative anaerobic, gram-negative, nonspore-forming, rod-shaped bacteria which ferment lactose with gas formation within 48 hours at 35°C. In the laboratory these bacteria are defined as all the organisms that produce colonies with a golden-green metallic sheen within 24 hours when incubated at 35°C ± 1.0°C on M-Endo medium (nutrient medium for bacterial growth). Their concentrations are expressed as number of colonies per 100 mL of sample.

Fecal coliform bacteria are bacteria that are present in the intestine or feces of warm-blooded animals. They are often used as indicators of the sanitary quality of the water. In the laboratory they are defined as all organisms that produce blue colonies within 24 hours when incubated at 44.5°C ± 0.2°C on M-FC medium (nutrient medium for bacterial growth). Their concentrations are expressed as number of colonies per 100 mL of sample.

Fecal streptococcal bacteria are bacteria found also in the intestine of warm-blooded animals. Their presence in water is considered to verify fecal pollution. They are characterized as gram-positive, cocci bacteria which are capable of growth in brain-heart infusion broth. In the laboratory they are defined as all the organisms which produce red or pink colonies within 48 hours at 35°C ± 1.0°C on KF-streptococcus medium (nutrient medium for bacterial growth). Their concentrations are expressed as number of colonies per 100 mL of sample.

Bed material is the sediment mixture of which a streambed, lake, pond, reservoir, or estuary bottom is composed.

Biochemical oxygen demand (BOD) is a measure of the quantity of dissolved oxygen, in milligrams per liter, necessary for the decomposition of organic matter by micro-organisms, such as bacteria.

Biomass is the amount of living matter present at any given time, expressed as the mass per unit area or volume of habitat.

Ash mass is the mass or amount of residue present after the residue from the dry mass determination has been ashed in a muffle furnace at a temperature of 500°C for 1 hour. The ash mass values of zooplankton and phytoplankton are expressed in grams per cubic meter (g/m³), and periphyton and benthic organisms in grams per square mile (g/m²).

Dry mass refers to the mass of residue present after drying in an oven at 105°C for zooplankton and periphyton, until the mass remains unchanged. This mass represents the total organic matter, ash and sediment, in the sample. Dry-mass values are expressed in the same units as ash mass.

Organic mass or volatile mass of the living substance is the difference between the dry mass and ash mass and represents the actual mass of the living matter. The organic mass is expressed in the same units as for ash mass and dry mass.

Wet mass is the mass of living matter plus contained water.

Bottom material: See Bed material.

Cells/volume refers to the number of cells of any organism which is counted by using a microscope and grid or counting cell. Many planktonic organisms are multicelled and are counted according to the number of contained cells per sample, usually milliliters (mL) or liters (L).

Chemical oxygen demand (COD) is a measure of the chemically oxidizable material in the water and furnishes an approximation of the amount of organic and reducing material present. The determined value may correlate with natural water color or with carbonaceous organic pollution from sewage or industrial wastes.

Chlorophyll refers to the green pigments of plants. Chlorophyll a and b are the two most common green pigments in plants.

Color unit is produced by one milligram per liter of platinum in the form of the chloroplatinate ion. Color is expressed in units of the platinum-cobalt scale.

Contents is the volume of water in a reservoir or lake. Unless otherwise indicated, volume is computed on the basis of a level pool and does not include bank storage.

Control designates a feature downstream from the gage that determines the stage-discharge relation at the gage. This feature may be a natural constriction of the channel, an artificial structure, or a uniform cross section over a long reach of the channel.

Control structure as used in this report is a structure on a stream or canal that is used to regulate the flow or stage of the stream or to prevent the intrusion of salt water.

Cubic feet per second per square mile [(ft³/s)/mi²] is the average number of cubic feet of water flowing per second from each square mile of area drained, assuming that the runoff is distributed uniformly in time and area.

Cubic foot per second (ft³/s) is the rate of discharge representing a volume of 1 cubic foot passing a given point during 1 second and is equivalent to 7.48 gallons per second or 448.8 gallons per minute or 0.02832 cubic meters per second.

Cubic-foot-per-second day is the volume of water represented by a flow of 1 cubic foot per second for 24 hours. It is equivalent to 86,400 cubic feet, approximately 1.9835 acre-feet, about 646,000 gallons, or 2,445 cubic meters.

Discharge is the volume of water (or more broadly, volume of fluid plus suspended sediment) that passes a given point within a given period of time.

Mean discharge (MEAN) is the arithmetic mean of individual daily mean discharges during a specific period.

Instantaneous discharge is the discharge at a particular instant of time.

Dissolved refers to that material in a representative water sample which passes through a 0.45 μ m membrane filter. This is a convenient operational definition used by Federal agencies that collect water data. Determinations of "dissolved" constituents are made on subsamples of the filtrate.

Dissolved-solids concentration of water is determined either analytically by the "residue-on-evaporation" method, or mathematically by totaling the concentrations of individual constituents reported in a comprehensive chemical analysis. During the analytical determination of dissolved solids, the bicarbonate (generally a major dissolved component of water) is converted to carbonate. Therefore, in the mathematical calculation of dissolved-solids concentration, the bicarbonate value, in milligrams per liter, is multiplied by 0.492 to reflect the change.

Drainage area of a stream at a specified location is that area, measured in a horizontal plane, enclosed by a topographic divide from which direct surface runoff from precipitation normally drains by gravity into the stream above the specified point. Figures of drainage area given herein include all closed basins, or noncontributing areas, within the area unless otherwise specified.

Drainage basin is a part of the surface of the earth that is occupied by a drainage system, which consists of a surface stream or a body of impounded surface water together with all tributary surface streams and bodies of impounded surface water.

Gage height (G.H.) is the water-surface elevation referred to some arbitrary gage datum. Gage height is often used interchangeably with the more general term "stage," although gage height is more appropriate when used with a reading on a gage.

Gaging station is a particular site on a stream, canal, lake, or reservoir where systematic observations of hydrologic data are obtained.

Hardness of water is a physical-chemical characteristic that is commonly recognized by the increased quantity of soap required to produce lather. It is computed as the sum of equivalents of polyvalent cations and is expressed as the equivalent concentration of calcium carbonate (CaCO₃).

Hydrologic Bench-Mark Network is a network of 57 sites in small drainage basins around the country whose purpose is to provide consistent data on the hydrology, including water quality, and related factors in representative undeveloped watersheds nationwide, and to provide analyses on a continuing basis to compare and contrast conditions observed in basins more obviously affected by the activities of man.

Hydrologic unit is a geographic area representing part or all of a surface drainage basin or distinct hydrologic feature as delineated by the Office of Water Data Coordination on the State Hydrologic Unit Maps; each hydrologic unit is identified by an eight-digit number.

Metamorphic stage refers to the stage of development that an organism exhibits during its transformation from an immature form to an adult form. This developmental process exists for most insects, and the degree of difference from the immature stage to the adult form varies from relatively slight to pronounced, with many intermediates. Examples of metamorphic stages of insects are egg-larva-adult or egg-nymph-adult.

Methylene blue active substances (MBAS) are apparent detergents. The determination depends on the formation of a blue color when methylene blue dye reacts with synthetic anionic detergent compounds.

Micrograms per gram ($\mu\text{g/g}$) is a unit expressing the concentration of a chemical constituent as the mass (micrograms) of the element per unit mass (gram) of material analyzed.

Micrograms per liter ($\mu\text{g/L}$, ug/L) is a unit expressing the concentration of chemical constituents in solution as mass (micrograms) of solute per unit volume (liter) of water. One thousand micrograms per liter is equivalent to one milligram per liter.

Milligrams per liter (mg/L , mg/L) is a unit for expressing the concentration of chemical constituents in solution. Milligrams per liter represents the mass of solute per unit volume (liter) of water. Concentration of suspended sediment also is expressed in mg/L and is based on the mass of dry sediment per liter of water-sediment mixture.

National Geodetic Vertical Datum of 1929 (NGVD of 1929) is a geodetic datum derived from a general adjustment of the first order level nets of both the United States and Canada. It was formerly called "Sea Level Datum of 1929" or "mean sea level" in this series of reports. Although the datum was derived from the average sea level over a period of many years at 26 tide stations along the Atlantic, Gulf of Mexico, and Pacific Coasts, it does not necessarily represent local mean sea level at any particular place.

National Stream Quality Accounting Network (NASQAN) is a nationwide data-collection network designed by the U.S. Geological Survey to meet many of the information needs of government agencies and other groups involved in natural or regional water-quality planning and management. The 500 or so sites in NASQAN are generally located at the downstream ends of hydrologic accounting units designated by the U.S. Geological Survey Office of Water Data Coordination in consultation with the Water Resources Council. The objectives of NASQAN are (1) to obtain information on the quality and quantity of water moving within and from the United States through a systematic and uniform process of data collection, summarization, analysis, and reporting such that the data may be used for, (2) description of the areal variability of water quality in the Nation's rivers through analysis of data from this and other programs, (3) detection of changes or trends with time in the pattern of occurrence of water-quality characteristics, and (4) providing a nationally consistent data base useful for water-quality assessment and hydrologic research.

The National Trends Network (NTN) is a 150-station network for sampling atmospheric deposition in the United States. The purpose of the network is to determine the variability, both in location and in time, of the composition of atmospheric deposition, which includes snow, rain, dust particles, aerosols, and gases. The core from which the NTN was built was the already-existing deposition-monitoring network of the National Atmospheric Deposition Program (NADP).

Organism is any living entity.

Organism count/area refers to the number of organisms collected and enumerated in a sample and adjusted to the number per area habitat, usually square meter (m^2), acre, or hectare. Periphyton, benthic organisms, and macrophytes are expressed in these terms.

Organism count/volume refers to the number of organisms collected and enumerated in a sample and adjusted to the number per sample volume, usually milliliter (mL) or liter (L). Numbers of planktonic organisms can be expressed in these terms.

Total organism count is the total number of organisms collected and enumerated in any particular sample.

Parameter Code is a 5-digit number used in the U.S. Geological Survey computerized data system, WATSTORE, to uniquely identify a specific constituent. The codes used in WATSTORE are the same as those used in the U.S. Environmental Protection Agency data system, STORET. The Environmental Protection Agency assigns and approves all requests for new codes.

Partial-record station is a particular site where limited streamflow and/or water-quality data are collected systematically over a period of years for use in hydrologic analyses.

Particle size is the diameter, in millimeters (mm), of a particle determined by either sieve or sedimentation methods. Sedimentation methods (pipet, bottom-withdrawal tube, visual-accumulation tube) determine fall diameter of particles in either distilled water (chemically dispersed) or in native water (the river water at the time and point of sampling).

Particle-size classification used in this report agrees with the recommendation made by the American Geophysical Union Subcommittee on Sediment Terminology. The classification is as follows:

<u>Classification</u>	<u>Size (mm)</u>	<u>Method of analysis</u>
Clay.....	0.00024 - 0.004	Sedimentation
Silt.....	.004 - .062	Sedimentation
Sand.....	.062 - 2.0	Sedimentation or sieve
Gravel.....	2.0 - 64.0	Sieve

The particle-size distributions given in this report are not necessarily representative of all particles in transport in the stream. Most of the organic matter is removed, and the sample is subjected to mechanical and chemical dispersion before analysis in distilled water. Chemical dispersion is not used for native-water analysis.

Percent composition is a unit for expressing the ratio of a particular part of a sample or population to the total sample or population, in terms of types, numbers, mass, or volume.

Periphyton is the assemblage of microorganisms attached to and living upon submerged solid surfaces. While primarily consisting of algae, they also include bacteria, fungi, protozoa, rotifers, and other small organisms.

Pesticides are chemical compounds used to control undesirable organisms. Major categories of pesticides include insecticides, miticides, fungicides, herbicides, and rodenticides.

Picocurie (PC, pCi) is one trillionth (1×10^{-12}) of the amount of radioactivity represented by a curie (Ci). A curie is the amount of radioactivity that yields 3.7×10^{10} radioactive disintegrations per second. A picocurie yields 2.22 dpm (disintegrations per minute).

Plankton is the community of suspended, floating, or weakly swimming organisms that live in the open water of lakes and rivers.

Phytoplankton is the plant part of the plankton. They are usually microscopic and their movement is subject to the water currents. Phytoplankton growth is dependent upon solar radiation and nutrient substances. Because they are able to incorporate as well as release materials to the surrounding water, the phytoplankton have a profound effect upon the quality of the water. They are the primary food producers in the aquatic environment and are commonly known as algae.

Blue-green algae are a group of phytoplankton organisms having a blue pigment, in addition to the green pigment called chlorophyll. Blue-green algae often cause nuisance conditions in water.

Diatoms are the unicellular or colonial algae having a siliceous shell. Their concentrations are expressed as number of cells per milliliter (cells/mL) of sample.

Green algae have chlorophyll pigments similar in color to those of higher green plants. Some forms produce algae mats or floating "moss" in lakes. Their concentrations are expressed as number of cells per milliliter (cells/mL) of sample.

Zooplankton is the animal part of the plankton. Zooplankton are capable of extensive movements within the water column and are often large enough to be seen with the unaided eye. Zooplankton are secondary consumers feeding upon bacteria, phytoplankton, and detritus. Because they are the grazers in the aquatic environment, the zooplankton are a vital part of the aquatic food web. The zooplankton community is dominated by small crustaceans and rotifers.

Primary productivity is a measure of the rate at which new organic matter is formed and accumulated through photosynthetic and chemosynthetic activity of producer organisms (chiefly, green plants). The rate of primary production is estimated by measuring the amount of oxygen released (oxygen method) or the amount of carbon assimilated by the plants (carbon method).

Milligrams of carbon per area or volume per unit time [$\text{mg C}/(\text{m}^2 \cdot \text{time})$] for periphyton and macrophytes and [$\text{mg C}/(\text{m}^3 \cdot \text{time})$] for phytoplankton are units for expressing primary productivity. They define the amount of carbon dioxide consumed as measured by radioactive carbon (carbon 14). The carbon 14 method is of greater sensitivity than the oxygen light and dark bottle method and is preferred for use in unenriched waters. Unit time may be either the hour or day, depending on the incubation period.

Milligrams of oxygen per area or volume per unit time [$\text{mg O}_2/(\text{m}^2 \cdot \text{time})$] for periphyton and macrophytes and [$\text{mg O}_2/(\text{m}^3 \cdot \text{time})$] for phytoplankton are the units for expressing primary productivity. They define production and respiration rates as estimated from changes in the measured dissolved-oxygen concentration. The oxygen light and dark bottle method is preferred if the rate of primary production is sufficient for accurate measurements to be made within 24 hours. Unit time may be either the hour or day, depending on the incubation period.

Radiochemical program is a network of regularly sampled water-quality stations where samples are collected to be analyzed for radioisotopes. The streams that are sampled represent major drainage basins in the conterminous United States.

Recoverable from bottom material is the amount of a given constituent that is in solution after a representative sample of bottom material has been digested by a method (usually using an acid or mixture of acids) that results in dissolution of readily soluble substances. Complete dissolution of all bottom material is not achieved by the digestion treatment and thus the determination represents less than the total amount (that is, less than 95 percent) of the constituent in the sample. To achieve comparability of analytical data, equivalent digestion procedures would be required of all laboratories performing such analyses because different digestion procedures are likely to produce different analytical results.

Return period is the average time interval between occurrences of a hydrological event of a given or greater magnitude, usually expressed in years. May also be called recurrence interval.

Runoff in inches (IN., in.) shows the depth to which the drainage area would be covered if all the runoff for a given time period were uniformly distributed on it.

Sediment is solid material that originates mostly from disintegrated rocks and is transported by, suspended in, or deposited from water; it includes chemical and biochemical precipitates and decomposed organic material, such as humus. The quantity, characteristics, and cause of the occurrence of sediment in streams are influenced by environmental factors. Some major factors are degree of slope, length of slope, soil characteristics, land usage, and quantity and intensity of precipitation.

Bed load is the sediment that is transported in a stream by rolling, sliding, or skipping along the bed and very close to it. In this report, bed load is considered to consist of particles in transit within 0.25 ft of the streambed.

Bed load discharge (tons per day) is the quantity of bed load measured by dry weight that moves past a section as bed load in a given time.

Suspended sediment is the sediment that at any given time is maintained in suspension by the upward components of turbulent currents or that exists in suspension as a colloid.

Suspended-sediment concentration is the velocity-weighted concentration of suspended sediment in the sampled zone (from the water surface to a point approximately 0.3 ft above the bed) expressed as milligrams of dry sediment per liter of water-sediment mixture (mg/L).

Mean concentration is the time-weighted concentration of suspended sediment passing a stream section during a 24-hour day.

Suspended-sediment discharge (tons/day) is the rate at which dry mass of sediment passes a section of a stream or is the quantity of sediment, as measured by dry mass or volume, that passes a section in a given time. It is calculated in units of tons per day as follows: concentration (mg/L) x discharge (ft³/s) x 0.0027.

Suspended-sediment load is a general term that refers to material in suspension. It is not synonymous with either discharge or concentration.

Total sediment discharge (tons/day) is the sum of the suspended-sediment discharge and the bed-load discharge. It is the total quantity of sediment, as measured by dry mass or volume, that passes a section during a given time.

Total-sediment load or total load is a term which refers to the total sediment (bed load plus suspended-sediment load) that is in transport. It is not synonymous with total-sediment discharge.

7-day 10-year low flow (7 Q₁₀) is the discharge at the 10-year recurrence interval taken from a frequency curve of annual values of the lowest mean discharge for 7 consecutive days (the 7-day low flow).

Sodium-adsorption-ratio (SAR) is the expression of relative activity of sodium ions in exchange reactions within soil and is an index of sodium or alkali hazard to the soil. Waters range in respect to sodium hazard from those which can be used for irrigation on almost all soils to those which are generally unsatisfactory for irrigation.

Solute is any substance that is dissolved in water.

Specific conductance is a measure of the ability of a water to conduct an electrical current. It is expressed in microsiemens per centimeter at 25°C. Specific conductance is related to the type and concentration of ions in solution and can be used for approximating the dissolved-solids content of the water. Commonly, the concentration of dissolved solids (in milligrams per liter) is about 65 percent of the specific conductance (in microsiemens). This relation is not constant from stream to stream, and it may vary in the same source with changes in the composition of the water.

Stage-discharge relation is the relation between gage height (stage) and volume of water, per unit of time, flowing in a channel.

Streamflow is the discharge that occurs in a natural channel. Although the term "discharge" can be applied to the flow of a canal, the word "streamflow" uniquely describes the discharge in a surface stream course. The term "streamflow" is more general than "runoff" as streamflow may be applied to discharge whether or not it is affected by diversion or regulation.

Substrate is the physical surface upon which an organism lives.

Natural substrate refers to any naturally occurring emerged or submersed solid surface, such as a rock or tree, upon which an organism lives.

Artificial substrate is a device which is purposely placed in a stream or lake for colonization of organisms. The artificial substrate simplifies the community structure by standardizing the substrate from which each sample is taken. Examples of artificial substrates are basket samplers (made of wire cages filled with clean streamside rocks) and multiplate samplers (made of hardboard) for benthic organism collection, and plexiglass strips for periphyton collection.

Surface area of a lake is that area outlined on the latest U.S.G.S. topographic map as the boundary of the lake and measured by a planimeter in acres. In localities not covered by topographic maps, the areas are computed from the best maps available at the time planimetered. All areas shown are those for the stage when the planimetered map was made.

Surficial bed material is the part (0.1 to 0.2 ft) of the bed material that is sampled using U.S. Series Bed-Material Samplers.

Suspended (as used in tables of chemical analyses) refers to the amount (concentration) of undissolved material in a water-sediment mixture. It is associated with the material retained on a 0.45-micrometer filter.

Suspended, recoverable is the amount of a given constituent that is in solution after the part of a representative water-suspended sediment sample that is retained on a 0.45 μ m membrane filter has been digested by a method (usually using a dilute acid solution) that results in dissolution of only readily soluble substances. Complete dissolution of all the particulate matter is not achieved by the digestion treatment and thus the determination represents something less than the "total" amount (that is, less than 95 percent) of the constituent present in the sample. To achieve comparability of analytical data, equivalent digestion procedures are required of all laboratories performing such analyses because different digestion procedures are likely to produce different analytical results. Determinations of "suspended, recoverable" constituents are made either by analyzing portions of the material collected on the filter or, more commonly, by difference, based on determinations of (1) dissolved and (2) total recoverable concentrations of the constituent.

Suspended, total is the total amount of a given constituent in the part of a representative water-suspended sediment sample that is retained on a 0.45 μ m membrane filter. This term is used only when the analytical procedure assures measurement of at least 95 percent of the constituent determined. A knowledge of the expected form of the constituent in the sample, as well as the analytical methodology used, is required to determine when the results should be reported as "suspended, total."

Determinations of "suspended, total" constituents are made either by analyzing portions of the material collected on the filter or, more commonly, by difference, based on determinations of (1) dissolved and (2) total concentrations of the constituent.

Taxonomy is the division of biology concerned with the classification and naming of organisms. The classification of organisms is based upon a hierarchical scheme beginning with Kingdom and ending with Species at the base. The higher the classification level, the fewer features the organisms have in common. For example, the taxonomy of a particular mayfly, *Hexagenia limbata*, is the following:

Kingdom.....	Animal
Phylum.....	Arthropoda
Class.....	Insecta
Order.....	Ephemeroptera
Family.....	Ephemeridae
Genus.....	<i>Hexagenia</i>
Species.....	<i>Hexagenia limbata</i>

Thermograph is an instrument that continuously records variations of temperature on a chart. The more general term "temperature recorder" is used in the table headings and refers to any instrument that records temperature whether on a chart, a tape, or any other medium.

Time-weighted average is computed by multiplying the number of days in the sampling period by the concentrations of individual constituents for the corresponding period and dividing the sum of the products by the total number of days. A time-weighted average represents the composition of water that would be contained in a vessel or reservoir that had received equal quantities of water from the stream each day for the year.

Tons per acre-foot indicates the dry mass of dissolved solids in 1 acre-foot of water. It is computed by multiplying the concentration of the constituent, in milligrams per liter, by 0.00136.

Tons per day (T/DAY) is the quantity of a substance in solution or suspension that passes a stream section during a 24-hour period.

Total is the total amount of a given constituent in a representative water-suspended sediment sample, regardless of the constituent's physical or chemical form. This term is used only when the analytical procedure assures measurement of at least 95 percent of the constituent present in both the dissolved and suspended phases of the sample. A knowledge of the expected form of the constituent in the sample, as well as the analytical methodology used, is required to judge when the results should be reported as "total." (Note that the word "total" does double duty here, indicating both that the sample consists of a water-suspended sediment mixture and that the analytical method determined all of the constituent in the sample.)

Total discharge is the total quantity of any individual constituent, as measured by dry mass or volume, that passes through a stream cross-section per unit of time. This term needs to be qualified, such as "total sediment discharge," "total chloride discharge," and so on.

Total, recoverable is the amount of a given constituent that is in solution after a representative water-suspended sediment sample has been digested by a method (usually using a dilute acid solution) that results in dissolution of only readily soluble substances. Complete dissolution of all particulate matter is not achieved by the digestion treatment, and thus the determination represents something less than the "total" amount (that is, less than 95 percent) of the constituent present in the dissolved and suspended phases of the sample. To achieve comparability of analytical data, equivalent digestion procedures are required of all laboratories performing such analyses because different digestion procedures are likely to produce different analytical results.

Tritium Network is a network of stations which has been established to provide baseline information on the occurrence of tritium in the Nation's surface waters. In addition to the surface-water stations in the network, tritium data are also obtained at a number of precipitation stations. The purpose of the precipitation stations is to provide an estimate sufficient for hydrologic studies of the tritium input to the United States.

Water year in Geological Survey reports dealing with surface-water supply is the 12-month period October 1 through September 30. The water year is designated by the calendar year in which it ends and which includes 9 of the 12 months. Thus, the year ending September 30, 1990, is called the "1990 water year."

WRD is used as an abbreviation for "Water-Data Report" in the REVISED RECORDS paragraph to refer to State annual hydrologic-data reports (WRD was used as an abbreviation for "Water-Resources Data" in reports published prior to 1976).

Weighted average is used in this report to indicate discharge-weighted average. It is computed by multiplying the discharge for a sampling period by the concentrations of individual constituents for the corresponding period and dividing the sum of the products by the sum of the discharges. A discharge-weighted average approximates the composition of water that would be found in a reservoir containing all the water passing a given location during the water year after thorough mixing in the reservoir.

WSP is used as an abbreviation for "Water-Supply Paper" in reference to previously published reports.

PUBLICATIONS ON TECHNIQUES OF WATER-RESOURCES INVESTIGATIONS

The U.S. Geological Survey publishes a series of manuals describing procedures for planning and conducting specialized work in water-resources investigations. The material is grouped under major subject headings called books and is further divided into sections and chapters. For example, Section A of Book 3 (Applications of Hydraulics) pertains to surface water. The chapter, the unit of publication, is limited to a narrow field of subject matter. This format permits flexibility in revision and publication as the need arises.

The reports listed below are for sale by the U.S. Geological Survey, Books and Open-File Reports Section, Federal Center, Box 25425, Denver, Colorado 80225 (authorized agent of the Superintendent of Documents, Government Printing Office). Prepayment is required. Remittance should be sent by check or money order payable to the U.S. Geological Survey. Prices are not included because they are subject to change. Current prices can be obtained by writing to the above address. When ordering or inquiring about prices for any of these publications, please give the title, book number, chapter number, and "U.S. Geological Survey Techniques of Water-Resources Investigations."

- 1-D1. **Water temperature--influential factors, field measurement, and data presentation**, by H. H. Stevens, Jr., J. F. Ficke, and G. F. Smoot: USGS--TWRI Book 1, Chapter D1. 1975. 65 pages.
- 1-D2. **Guidelines for collection and field analysis of ground-water samples for selected unstable constituents**, by W. W. Wood: USGS--TWRI Book 1, Chapter D2. 1976. 24 pages.
- 2-D1. **Application of surface geophysics to ground-water investigations**, by A. A. R. Zohdy, G. P. Eaton, and D. R. Mabey: USGS--TWRI Book 2, Chapter D1. 1974. 116 pages.
- 2-D2. **Application of seismic-refraction techniques to hydrologic studies**, by F. P. Haeni: USGS--TWRI Book 2, Chapter D2. 1988. 86 pages.
- 2-E1. **Application of borehole geophysics to water-resources investigations**, by W. S. Keys and L. M. MacCary: USGS--TWRI Book 2, Chapter E1. 1971. 126 pages.
- 2-F1. **Application of drilling, coring, and sampling techniques to test holes and wells**, by Eugene Shuter and Warren E. Teasdale: USGS--TWRI Book 2, Chapter F1. 1989. 97 pages.
- 3-A1. **General field and office procedures for indirect discharge measurements**, by M. A. Benson and Tate Dalrymple: USGS--TWRI Book 3, Chapter A1. 1967. 30 pages.
- 3-A2. **Measurement of peak discharge by the slope-area method**, by Tate Dalrymple and M. A. Benson: USGS--TWRI Book 3, Chapter A2. 1967. 12 pages.

- 3-A3. **Measurement of peak discharge at culverts by indirect methods**, by G. L. Bodhaine: USGS--TWRI Book 3, Chapter A3. 1968. 60 pages.
- 3-A4. **Measurement of peak discharge at width contractions by indirect methods**, by H. J. Matthai: USGS--TWRI Book 3, Chapter A4. 1967. 44 pages.
- 3-A5. **Measurement of peak discharge at dams by indirect methods**, by Harry Hulsing: USGS--TWRI Book 3, Chapter A5. 1967. 29 pages.
- 3-A6. **General procedure for gaging streams**, by R. W. Carter and Jacob Davidian: USGS--TWRI Book 3, Chapter A6. 1968. 13 pages.
- 3-A7. **Stage measurements at gaging stations**, by T. J. Buchanan and W. P. Somers: USGS--TWRI Book 3, Chapter A7. 1968. 28 pages.
- 3-A8. **Discharge measurements at gaging stations**, by T. J. Buchanan and W. P. Somers: USGS--TWRI Book 3, Chapter A8. 1969. 65 pages.
- 3-A9. **Measurement of time of travel and dispersion in streams by dye tracing**, by E. F. Hubbard, F. A. Kilpatrick, L. A. Martens, and J. F. Wilson, Jr.: USGS--TWRI Book 3, Chapter A9. 1982. 44 pages.
- 3-A10. **Discharge ratings at gaging stations**, by E. J. Kennedy: USGS--TWRI Book 3, Chapter A10. 1984. 59 pages.
- 3-A11. **Measurement of discharge by moving-boat method**, by G. F. Smoot and C. E. Novak: USGS--TWRI Book 3, Chapter A11. 1969. 22 pages.
- 3-A12. **Fluorometric procedures for dye tracing**, by J. F. Wilson, Jr., E. D. Cobb, and F. A. Kilpatrick: USGS--TWRI Book 3, Chapter A12. 1986. 41 pages.
- 3-A13. **Computation of continuous records of streamflow**, by E. J. Kennedy: USGS--TWRI Book 3, Chapter A13. 1983. 53 pages.
- 3-A14. **Use of flumes in measuring discharge**, by F. A. Kilpatrick and V. R. Schneider: USGS--TWRI Book 3, Chapter A14. 1983. 46 pages.
- 3-A15. **Computation of water-surface profiles in open channels**, by Jacob Davidian: USGS--TWRI Book 3, Chapter A-15. 1984. 48 pages.
- 3-A16. **Measurement of discharge using tracers**, by F. A. Kilpatrick and E. D. Cobb: USGS--TWRI Book 3, Chapter A-16. 1985. 52 pages.
- 3-A17. **Acoustic velocity meter systems**, by Antonius Laenen: USGS--TWRI Book 3, Chapter A17. 1985. 38 pages.
- 3-A18. **Determination of stream reseration coefficients by use of tracers**, by F. A. Kilpatrick, R. E. Rathburn, N. Yotsukura, G. W. Parker, and L. L. DeLong: USGS--TWRI Book 3, Chapter A18. 1989. 52 pages.
- 3-A19. **Levels of streamflow gaging stations**, by E. J. Kennedy: USGS--TWRI Book 3, Chapter A19. 1990. 27 pages.
- 3-B1. **Aquifer-test design, observation, and data analysis**, by R. W. Stallman: USGS--TWRI Book 3, Chapter B1. 1971. 26 pages.
- 3-B2. **Introduction to ground-water hydraulics, a programmed test for self-instruction**, by G. D. Bennett: USGS--TWRI Book 3, Chapter B2. 1976. 172 pages.
- 3-B3. **Type curves for selected problems of flow to wells in confined aquifers**, by J. E. Reed: USGS--TWRI Book 3, Chapter B3. 1980. 106 pages.
- 3-B4. **Regression modeling of ground-water flow**, by Richard L. Cooley and Richard L. Naff: USGS--TWRI Book 3, Chapter B4. 1990. 232 pages.
- 3-B5. **Definition of boundary and initial conditions in the analysis of saturated ground-water flow systems--An introduction**, by O. L. Franke, T. E. Reilly, and G. D. Bennett: USGS--TWRI Book 3, Chapter B5. 1987. 15 pages.
- 3-B6. **The principle of superposition and its application in ground-water hydraulics**, by T. E. Reilly, O. L. Franke, and G. D. Bennett: USGS--TWRI Book 3, Chapter B6. 1987. 28 pages.
- 3-C1. **Fluvial sediment concepts**, by H. P. Guy: USGS--TWRI Book 3, Chapter C1. 1970. 55 pages.
- 3-C2. **Field methods for measurement of fluvial sediment**, by H. P. Guy and V. W. Norman: USGS--TWRI Book 3, Chapter C2. 1970. 59 pages.
- 3-C3. **Computation of fluvial-sediment discharge**, by George Porterfield: USGS--TWRI Book 3, Chapter C3. 1972. 66 pages.

- 4-A1. **Some statistical tools in hydrology**, by H. C. Riggs: USGS--TWRI Book 4, Chapter A1. 1968. 39 pages.
- 4-A2. **Frequency curves**, by H. C. Riggs: USGS--TWRI Book 4, Chapter A2. 1968. 15 pages.
- 4-B1. **Low-flow investigations**, by H. C. Riggs: USGS--TWRI Book 4, Chapter B1. 1972. 18 pages.
- 4-B2. **Storage analyses for water supply**, by H. C. Riggs and C. H. Hardison: USGS--TWRI Book 4, Chapter B2. 1973. 20 pages.
- 4-B3. **Regional analyses of streamflow characteristics**, by H. C. Riggs: USGS--TWRI Book 4, Chapter B3. 1973. 15 pages.
- 4-D1. **Computation of rate and volume of stream depletion by wells**, by C. T. Jenkins: USGS--TWRI Book 4, Chapter D1. 1970. 17 pages.
- 5-A1. **Methods for determination of inorganic substances in water and fluvial sediments**, by M. W. Skougstad and others, editors: USGS--TWRI Book 5, Chapter A1. 1979. 626 pages.
- 5-A2. **Determination of minor elements in water by emission spectroscopy**, by P. R. Barnett and E. C. Mallory, Jr.: USGS--TWRI Book 5, Chapter A2. 1971. 31 pages.
- 5-A3. **Methods for analysis of organic substances in water**, by D. F. Goerlitz and Eugene Brown: USGS--TWRI Book 5, Chapter A3. 1972. 40 pages.
- 5-A4. **Methods for collection and analysis of aquatic biological and microbiological samples**, edited by P. E. Greeson, T. A. Ehlke, G. A. Irwin, B. W. Lium, and K. V. Slack: USGS--TWRI Book 5, Chapter A4. 1977. 332 pages.
- 5-A5. **Methods for determination of radioactive substances in water and fluvial sediments**, by L. L. Thatcher, V. J. Janzer, and K. W. Edwards: USGS--TWRI Book 5, Chapter A5. 1977. 95 pages.
- 5-A6. **Quality assurance practices for the chemical and biological analyses of water and fluvial sediments**, by L. C. Friedman and D. E. Erdmann: USGS--TWRI Book 5, Chapter A6. 1982. 181 pages.
- 5-C1. **Laboratory theory and methods for sediment analysis**, by H. P. Guy: USGS--TWRI Book 5, Chapter C1. 1969. 58 pages.
- 6-A1. **A modular three-dimensional finite-difference ground-water flow model**, by M. G. McDonald and A. W. Harbaugh: USGS--TWRI Book 6, Chapter A1. 1988. 586 pages.
- 7-C1. **Finite difference model for aquifer simulation in two dimensions with results of numerical experiments**, by P. C. Trescott, G. F. Pinder, and S. P. Larson: USGS--TWRI Book 7, Chapter C1. 1976. 116 pages.
- 7-C2. **Computer model of two-dimensional solute transport and dispersion in ground water**, by L. F. Konikow and J. D. Bredehoeft: USGS--TWRI Book 7, Chapter C2. 1978. 90 pages.
- 7-C3. **A model for simulation of flow in singular and interconnected channels**, by R. W. Schaffranek, R. A. Baltzer, and D. E. Goldberg: USGS--TWRI Book 7, Chapter C3. 1981. 110 pages.
- 8-A1. **Methods of measuring water levels in deep wells**, by M. S. Garber and F. C. Koopman: USGS--TWRI Book 8, Chapter A1. 1968. 23 pages.
- 8-A2. **Installation and service manual for U.S. Geological Survey manometers**, by J. D. Craig: USGS--TWRI Book 8, Chapter A2. 1983. 57 pages.
- 8-B2. **Calibration and maintenance of vertical-axis type current meters**, by G. F. Smoot and C. E. Novak: USGS--TWRI Book 8, Chapter B2. 1968. 15 pages.

SELECTED U.S. GEOLOGICAL SURVEY REPORTS ON WATER RESOURCES IN VIRGINIA

Listed below is a selection of reports on water resources in Virginia which are available through the Virginia Office of the Mid-Atlantic District at the U.S. Geological Survey, WRD, 3600 West Broad Street, Room 606, Richmond, Virginia 23230.

An index of geophysical logging in Virginia by the U.S. Geological Survey, by J. D. Mulheren, J. D. Larson, and H. T. Hopkins: U.S. Geological Survey Open-File Report 82-432. 1982. 34 pages.

Availability and quality of ground water in the Piedmont Province of Virginia, by J. D. Powell and J. M. Abe: U.S. Geological Survey Water-Resources Investigations Report 85-4235. 1985. 33 pages.

Conceptualization and analysis of ground-water flow system in the Coastal Plain of Virginia and Adjacent Parts of Maryland and North Carolina, by J. F. Harsh and R. J. Lacznik: U.S. Geological Survey Professional Paper 1404-F. 1990.

Effects of fracturing on well yields in the coalfield areas of Wise and Dickenson Counties, southwestern Virginia, by W. G. Wright: U.S. Geological Survey Water-Resources Investigations Report 85-4061. 1985. 21 pages.

Flood of November 1985 in West Virginia, Pennsylvania, Maryland, and Virginia, by Joseph B. Lescinsky: U.S. Geological Survey Open-File Report 86-486. 1987. 33 pages.

Ground-water availability along the Blue Ridge Parkway, Virginia, by H. T. Hopkins: U.S. Geological Survey Water-Resources Investigations Report 84-4168. 1984. 154 pages.

Guide to obtaining U.S. Geological Survey information, by K. Dodd, H. K. Fuller, and P. F. Clarke: U.S. Geological Survey Circular 900. 1985. 35 pages.

Hydrogeology and analysis of the ground-water flow system in the coastal plain of southeastern Virginia, by P. A. Hamilton and J. D. Larson: U.S. Geological Survey Water-Resources Investigations Report 87-4240. 1988. 175 pages.

Hydrologic conditions and trends in Shenandoah National Park, Virginia, 1983-84, by D. D. Lynch: U.S. Geological Survey Water-Resources Investigations Report 87-4131. 1987. 115 pages.

Hydrology and effects of mining in the upper Russell Fork basin, Buchanan and Dickenson Counties, Virginia, by J. D. Larson and J. D. Powell: U.S. Geological Survey Water-Resources Investigations Report 85-4238. 1986. 63 pages.

Hydrology of Area 16, Eastern Coal Province, Virginia and Tennessee, by P. W. Hufschmidt and others: U.S. Geological Survey Water-Resources Investigations Report 81-204. 1981. 67 pages.

Low-flow characteristics of streams in Virginia, by D. C. Hayes: U.S. Geological Survey Open-File Report 89-586. 1990. 80 pages.

Low flow of streams in Fairfax County, Virginia, by E. H. Mohler, Jr. and G. F. Hagan: U.S. Geological Survey Open-File Report 81-63. 1981. 30 pages.

Preliminary investigation of soil and ground-water contamination at the U.S. Army Petroleum Training Facility, Fort Lee, Virginia, September-October 1989, by W. G. Wright and J. D. Powell: U.S. Geological Survey Open-File Report 90-387. 1990.

Quality of ground water in southern Buchanan County, Virginia, by S. M. Rogers and J. D. Powell: U.S. Geological Survey Water-Resources Investigations 82-4022. 1983. 36 pages.

Relation between ground-water quality and mineralogy in the coal-producing Norton Formation of Buchanan County, Virginia, by J. D. Powell and J. D. Larson: U.S. Geological Survey Water-Supply Paper 2274. 1985. 30 pages.

Selected hydrologic data for the Powell River basin in Wise County, Virginia, by J. D. Larson: U.S. Geological Survey Open-File Report 85-186. 1985. 22 pages.

Selected publications on the water resources of Virginia, by N. R. Carrington: U.S. Geological Survey Open-File Report 86-418. 1986. 34 pages.

Sensitivity of stream basins in Shenandoah National Park to acid deposition, by D. D. Lynch and N. B. Dise: U.S. Geological Survey Water-Resources Investigations Report 85-4115. 1985. 61 pages.

Water-level hydrographs for observation wells in Virginia, by S. Farrington, N. R. Carrington, and W. V. Daniels: U.S. Geological Survey Open-File Report 84-134. 1984. 167 pages.

DISCONTINUED GAGING STATIONS

The following continuous-record streamflow stations in Virginia have been discontinued or converted to partial-record stations. Daily streamflow records were collected and published for the period of record shown for each station.

Discontinued gaging stations			
STATION NUMBER	STATION NAME	DRAINAGE AREA (mi ²)	PERIOD OF RECORD
POTOMAC RIVER BASIN			
01613900*	Hogue Creek near Hayfield, Va.	15.0	1960-86
01615500	Abrams Creek at Winchester, Va.	5.6	1946-49
01621000	Dry River at Rawley Springs, Va.	72.6	1946-48
01621500	Cooks Creek at Mt. Crawford, Va.	42	1905-06
01622500	Castle Spring near Churchville, Va.	-	1949-56
01623000	Bell Creek at St. Pauls Chapel, near Staunton, Va.	.61	1948-55
01623500	Bell Creek near Staunton, Va.	3.8	1948-55
01624000	Bell Creek at Franks Mill, near Staunton, Va.	9.6	1948-56
01624300	Middle River near Verona, Va.	178	1967-86
01624500	Lewis Creek near Staunton, Va.	18	1905-06
01625500	North River at Port Republic, Va.	804	1895-99
01625900	Back Creek near Lyndhurst, Va.	40.9	1974-77
01626500	South River at Waynesboro, Va.	133	1905-06, 1928-52
01628000	South River at Port Republic, Va.	248	1895-99
01629000	Elk Run at Elkton, Va.	17	1901-06
01630000	Hawksbill Creek near Luray, Va.	52	1905-06
01630500	Yagers Spring near Luray, Va.	-	1949-56
01632500	Plains Mill Spring near New Market, Va.	-	1949-56
01633500	Stony Creek at Columbia Furnace, Va.	79.4	1947-56
01635000	Marlboro Spring at Marlboro, Va.	-	1949-56
01636000	North Fork Shenandoah River near Riverton, Va.	1,040	1899-1906
01636210	Happy Creek at Front Royal, Va.	14.0	1948-77
01643610	Big Spring near Leesburg, Va.	.03	1968-69
01644290	Stave Run at Reston, Va.	.05	1966-71, 1973
01644291	Stave Run near Reston, Va.	.08	1971-82
01644295	Smilax Branch at Reston, Va.	.32	1967-78
01645784*	Snakeden Branch at Reston, Va.	.79	1973-78
01652500*	Fourmile Run at Alexandria, Va.	14.4	1951-69, 1974-75, 1979-82
01654500	Long Branch near Annandale, Va.	3.71	1947-57
01655000	Accotink Creek near Accotink Station, Va.	37.0	1948-57
01655500*	Cedar Run near Warrenton, Va.	12.3	1950-86
01656100	Cedar Run near Aden, Va.	155	1973-88
01656500	Broad Run at Buckland, Va.	50.5	1950-86

* Currently operated as a crest-stage partial-record station.

Discontinued gaging stations--Continued

STATION NUMBER	STATION NAME	DRAINAGE AREA (mi ²)	PERIOD OF RECORD
POTOMAC RIVER BASIN--Continued			
01656650	Broad Run near Bristow, Va.	89.6	1974-86
01656700	Occoquan River near Manassas, Va.	343	1968-81
01656725	Bull Run near Catharpin, Va.	25.8	1969-86
01656960	Cub Run near Bull Run, Va.	49.9	1972-86
01657000	Bull Run near Manassas, Va.	147	1950-81
01657020*	Bull Run near Manassas Park, Va.	148	1984-87
01657415	Bull Run near Clifton, Va.	185	1972-84
01657500	Occoquan River (Creek) near Occoquan, Va.	570	1913-16, 1920-23, 1937-56
01657655	Hooes Run near Occoquan, Va.	4.18	1974-82
01658480	Quantico Creek near Dumfries, Va.	6.90	1983-85
01658550	South Fork Quantico Creek near Joplin, Va.	9.62	1983-85
01658650	South Fork Quantico Creek near Dumfries, Va.	16.6	1983-85
01659000*	North Branch Chopawamsic Creek near Independent Hill, Va.	5.79	1951-57
01659500*	Middle Fork Chopawamsic Creek near Garrisonville, Va.	4.51	1951-57, 1960-67
01660000*	South Branch Chopawamsic Creek near Garrisonville, Va.	2.56	1951-57
01660500*	Beaverdam Run near Garrisonville, Va.	12.7	1951-57
GREAT WICOMICO RIVER BASIN			
01661800	Bush Mill Stream near Heathsville, Va.	6.82	1964-86
RAPPAHANNOCK RIVER BASIN			
01661900*	Carter Run near Marshall, Va.	19.5	1976-82
01662000*	Rappahannock River near Warrenton, Va.	195	1942-86
01662500	Rush River at Washington, Va.	14.7	1953-77
01663000	Thornton River near Laurel Mills, Va.	142	1943-56
01664500	Rappahannock River at Kellys Ford, Va.	641	1924-52
01666000	Robinson River at Locust Dale, Va.	148	1942
01667000	Rapidan River at Rapidan, Va.	446	1924-31
01668800*	Hoskins Creek near Tappahannock, Va.	15.5	1964-86
PIANKATANK RIVER BASIN			
01669500	Dragon Swamp near Church View, Va.	84.9	1943-81
YORK RIVER BASIN			
01670000	Beaverdam Swamp near Ark, Va.	6.63	1950-89
01670300*	Contrary Creek near Mineral, Va.	5.53	1975-86

* Currently operated as a crest-stage partial-record station.

Discontinued gaging stations--Continued

STATION NUMBER	STATION NAME	DRAINAGE AREA (mi ²)	PERIOD OF RECORD
YORK RIVER BASIN--Continued			
01670500	North Anna River near Hewlett, Va.	424	1926-28
01671000	North Anna River near Doswell, Va.	441	1928-86
01671500	Bunch Creek near Boswells Tavern, Va.	4.37	1948-79
01672000	South Anna River at Vontay, Va.	332	1926-30
01673500	Totopotomoy Creek near Atlee, Va.	5.89	1948-77
01674500	Mattaponi River near Beulahville, Va.	601	1941-87
JAMES RIVER BASIN			
02010000	Bolar Spring at Bolar, Va.	-	1949-56
02010500	Muddy Run Spring near Warm Springs, Va.	-	1946-56
02011000	Warm Spring at Warm Springs, Va.	-	1928-44
02011480	Back Creek on Rt. 600, near Mountain Grove, Va.	131	1951-84
02012000	Falling Spring Creek near Falling Spring, Va.	11.5	1947-52
02012500*	Jackson River at Falling Spring, Va.	411	1925-83
02012900	Jackson River at Covington, Va.	440	1907-08
02014500	Smith Creek above Old Dam, near Clifton Forge, Va.	12.4	1947-56
02015000	Smith Creek near Clifton Forge, Va.	12.5	1944-47
02015500	Stuart Spring near McDowell, Va.	-	1949-56
02017000	Meadow Creek at New Castle, Va.	13.8	1929-52
02019000	Catawba Creek near Fincastle, Va.	104	1928-37
02020000	Karnes Spring near Buchanan, Va.	-	1949-56
02021000	Calfpasture River at Goshen, Va.	190	1925-38
02022000	Big Spring at Kerrs Creek, Va.	-	1949-56
02023000	Maury River near Lexington, Va.	487	1925-60
02023500	South River near Riverside, Va.	111	1949-62
02024300	Buffalo Creek near Glasgow, Va.	123	1962-64
02024500	Maury River at Glasgow, Va.	831	1895-1906
02025000	Pedlar River near Pedlar Mills, Va.	91	1942-56
02026500	Tye River at Roseland, Va.	68	1927-38
02028000	Tye (Buffalo) River near Norwood, Va.	360	1940-60
02029500	Hardware River near Scottsville, Va.	104	1925-39
02031000	Mechums River near Ivy, Va.	97	1942-51
02031500	North Fork Moormans River near White Hall, Va.	11.4	1951-63, 1982-84
02032000	Moormans River near White Hall, Va.	18	1943-46
02032500	South Fork Rivanna River near Earlysville, Va.	216	1951-66
02033000	Rivanna River near Charlottesville, Va.	473	1925
02033500	Rivanna River below Moores Creek, near Charlottesville, Va.	507	1925-34

* Currently operated as a crest-stage partial-record station.

Discontinued gaging stations--Continued

STATION NUMBER	STATION NAME	DRAINAGE AREA (mi ²)	PERIOD OF RECORD
JAMES RIVER BASIN--Continued			
02034500*	Willis River at Lakeside Village (Flannagan Mills), Va.	262	1926-86
02035500	Lickinghole Creek near Goochland, Va.	70	1944-46
02036000	Beaverdam Creek at State Farm, Va.	42	1944-47
02038500	Falling Creek near Drewrys Bluff, Va.	54	1942-56, 1957-64
02038880	Vaughns Creek near Hixburg, Va.	23.2	1980-81
02038830	Fishpond Creek near Hixburg, Va.	14.0	1980-81
02040500*	Flat Creek near Amelia, Va.	73	1946-48
02041500	Appomattox River near Petersburg, Va.	1,335	1926-66
02042000	Swift Creek near Chester, Va.	143	1943-49
GREAT DISMAL SWAMP BASIN			
02043550	Washington Ditch near Cypress Chapel, Va.	41	1979-81
CHOWAN RIVER BASIN			
02044000*	Nottoway River near Burkeville, Va.	38.7	1946-86
02045000	Nottoway River near McKenney, Va.	362	1946-50
02045200	Waqua Creek near Alberta, Va.	15.0	1966-67
02046500	Anderson Branch at Sussex, Va.	5.4	1948-56
02047100	Assamoosick Swamp near Sebrell, Va.	86.4	1982-88
02048000	Blackwater River at Zuni, Va.	456	1943-89
02048500	Seacock Creek at Unity, Va.	102	1942-49
02049000	Blackwater River near Burdette, Va.	576	1941-44
02050500	North Meherrin River near Keysville, Va.	9.2	1948-61
02051600*	Great Creek near Cochran, Va.	30.7	1958-86
02053000	Fontaine Creek near Emporia, Va.	96	1943-53
ROANOKE RIVER BASIN			
02054000	Big Springs at Elliston, Va.	-	1949-56
02055500	Tinker Creek at Roanoke, Va.	70	1907-08
02056500	Back Creek near Roanoke, Va.	43	1907-08
02057000	Blackwater River near Union Hall, Va.	208	1924-63
02057500	Roanoke River near Toshes, Va.	1,020	1925-63
02058000	Snow Creek at Sago, Va.	60	1934-44
02058500	Pigg River near Toshes, Va.	394	1930-63
02059000	Roanoke River near Gretna, Va.	1,430	1925-30
02060000	Goose Creek at Huddleston, Va.	218	1929-31
02061000	Big Otter River near Bedford, Va.	116	1943-60

* Currently operated as a crest-stage partial-record station.

Discontinued gaging stations--Continued

STATION NUMBER	STATION NAME	DRAINAGE AREA (mi ²)	PERIOD OF RECORD
ROANOKE RIVER BASIN--CONTINUED			
02062000	Big Otter River near Altavista, Va.	372	1929-37
02063000	Caldwells Creek near Appomattox, Va.	5.1	1954-60
02063500	Falling River at Spring Mills, Va.	52.2	1954-60
02064500	Little Falling River at Hat Creek, Va.	43	1929-35
02065000	Falling River near Brookneal, Va.	228	1935-41
02065200	Roanoke River at Clarkton, Va.	2,691	1963-76
02066500	Roanoke Creek at Saxe, Va.	135	1946-72
02067000	Roanoke River near Clover, Va.	3,230	1929-52
02067500	Roanoke River above Dan River, at Clarksville, Va.	-	1895-98
02073500	Leatherwood Creek near Old Liberty, Va.	68	1925-34
02076000*	Dan River at South Boston, Va.	2,730	1900-07, 1922-52
02078000	Hycos River near Omega, Va.	413	1934-50
02078500	Dan River at Clarksville, Va.	-	1895-98
02079000	Roanoke River at Clarksville, Va.	7,320	1934-52
02079500*	Roanoke River at Buggs Island, Va.	7,780	1947-62
KANAWHA RIVER BASIN			
03163000	New River near Baywood, Va.	1,000	1928-30
03164500	New River near Grayson, Va.	1,160	1908-12
03165500	New River at Ivanhoe, Va.	1,340	1927, 1929-78
03166000	Cripple Creek near Ivanhoe, Va.	148	1930-34
03166500	Neff-Litz Spring near Rural Retreat, Va.	-	1947-56
03168500	Peak Creek at Pulaski, Va.	58.3 60.9	1927-33, 1951-57
03169500	Little River near Copper Valley, Va.	239	1908-16
03171500	New River at Eggleston, Va.	2,941	1914-76
03172000	Wabash Spring near Poplar Hill, Va.	-	1949-51
03172500	Walker Creek at Staffordsville, Va.	277	1908-16
03173500	Francis Spring near Bane, Va.	-	1951-56
03174500	Wolf Creek near Burkes Garden, Va.	36	1927-28
03175000	West Fork Cove Creek near Bluefield, Va.	5.5	1929-32
03177700	Bluestone River at Bluefield, Va.	39.8	1965-80
BIG SANDY RIVER BASIN			
03207500*	Levisa Fork near Grundy, Va.	235	1941-74, 1986-87
03208040*	Russell Fork at Council, Va.	10.2	1981-83
03208100*	Russell Fork near Birchleaf, Va.	87.4	1981-83

* Currently operated as a crest-stage partial-record station.

Discontinued gaging stations--Continued

STATION NUMBER	STATION NAME	DRAINAGE AREA (mi ²)	PERIOD OF RECORD
BIG SANDY RIVER BASIN--Continued			
03208700*	North Fork Pound River at Pound, Va.	18.5	1961-87
03208800*	Pound River above Indian Creek, at Pound, Va.	36.7	1965-78
03208850*	Pound River below Bold Camp Creek, at Pound, Va.	61.2	1965-78
03208900*	Pound River near Georges Fork, Va.	82.5	1963-82
03209200*	Russell Fork at Bartlick, Va.	526	1962-81
03213577	Kersaw Branch near Hurley, Va.	.60	1980-82
03213590*	Knox Creek at Kelsa, Va.	84.3	1980-81
03471000	Steve Keesling Spring at Sugar Grove, Va.	-	1928, 1948-55
TENNESSEE RIVER BASIN			
03472000	South Fork Holston River near Chilhowie, Va.	89.5	1907-09
03472500*	Beaverdam Creek at Damascus, Va.	56.0	1947-59
03473500*	Middle Fork Holston River at Groseclose, Va.	7.39	1947-57 1988-89
03474000*	Middle Fork Holston River at Seven Mile Ford, Va.	132	1942-81 1988-89
03474500	Middle Fork Holston River at Chilhowie, Va.	155	1907-09, 1920-31
03475500	Cedarville Spring at Cedarville, Va.	-	1949-52
03477500	Beaver Creek near Wallace, Va.	13.7	1945-57
03478000	Percy Preston Spring near Wallace, Va.	-	1949-56
03487800*	Lick Creek near Chatham Hill, Va.	25.5	1966-68
03488100	North Fork Holston River near Plasterco, Va.	259	1963-66
03488445	Brumley Creek near Hansonville, Va.	4.29	1979-81
03488450*	Brumley Creek at Brumley Gap, Va.	21.1	1979-81
03488500	North Fork Holston River at Holston, Va.	402	1951-59
03489500	North Fork Holston River near Mendota, Va.	493	1920-31
03489850	Cove Creek near Hilton, Va.	17.6	1966-68
03489870*	Big Moccasin Creek at Collinwood, near Hansonville, Va.	41.9	1966-68
03489900	Big Moccasin Creek near Gate City, Va.	79.6	1952-59, 1966-68
03490000*	North Fork Holston River near Gate City, Va.	672	1931-81
03520500	Taylor Springs at Cedar Bluff, Va.	-	1952-53
03521000	Clinch River at Cedar Bluff, Va.	125	1944-46
03521500*	Clinch River at Richlands, Va.	137	1945-89
03522000	Little River at Wardell, Va.	103	1949-52
03522500	Will Brooks Spring at Wardell, Va.	-	1949-52
03523000	Cedar Creek near Lebanon, Va.	51.5	1952-59
03523500	Thompson Creek near Coulwood, Va.	14.0	1942-48

* Currently operated as a crest-stage partial-record station.

Discontinued gaging stations--Continued

STATION NUMBER	STATION NAME	DRAINAGE AREA (mi ²)	PERIOD OF RECORD
TENNESSEE RIVER BASIN--Continued			
03524500*	Guest River at Coeburn, Va.	87.3	1949-59, 1979-81
03524900*	Stony Creek at Ka, Va.	30.9	1980-81
03525000	Stony Creek at Fort Blackmore, Va.	41.4	1949-52
03525500	Clinch River at Clinchport, Va.	986	1907-09
03526000*	Copper Creek near Gate City, Va.	106	1947-72
03526500	Quillen Springs near Gate City, Va.	-	1954-56
03527000*	Clinch River at Speers Ferry, Va.	1,126	1920-76, 1979-81
03527500	North Fork Clinch River at Duffield, Va.	23.1	1952-59
03529500*	Powell River at Big Stone Gap, Va.	112	1944-59, 1979-81
03530000	South Fork Powell River at Big Stone Gap, Va.	40	1944-47, 1951-77
03530500*	North Fork Powell River at Pennington Gap, Va.	71.4	1944-51, 1979-81
03531000	Powell River near Pennington Gap, Va.	290	1920-31

* Currently operated as a crest-stage partial-record station.

DISCONTINUED WATER-QUALITY STATIONS

The following water-quality stations have been discontinued in Virginia. Continuous-daily records of water temperature, specific conductance, sediment, and monthly or periodic sampling of chemical quality were collected for the period of record shown for each station.

Discontinued water-quality stations				
STATION NUMBER	STATION NAME	DRAINAGE AREA (mi ²)	TYPE OF RECORD	PERIOD OF RECORD
POTOMAC RIVER BASIN				
01627500	South River at Harriston, Va.	212	SC	1949
01629500	South Fork Shenandoah River near Luray, Va.	1,377	SC	1949
01631000	South Fork Shenandoah River at Front Royal, Va.	1,642	T, SC SED C	1953-56, 1968-77, 1980 1953-56 1949, 1953-56, 1968-86
01634000	North Fork Shenandoah River near Strasburg, Va.	768	T, SC SED C	1949, 1956, 1969-71 1956 1930, 1949, 1952, 1956, 1970-86
01644000	Goose Creek near Leesburg, Va.	332	T, SC	1969-71
01644291	Stave Run near Reston, Va.	.08	SED	1971-74
01644295	Smilax Branch at Reston, Va.	.32	SED	1971-75
01645784	Snakeden Branch at Reston, Va.	.79	SED	1973-78
01656100	Cedar Run near Aden, Va.	155	SED	1974
01656725	Bull Run near Catharpin, Va.	25.8	SED	1974
01656960	Cub Run near Bull Run, Va.	49.9	SED	1972-74
01657415	Bull Run near Clifton, Va.	185	SED	1973-74
01658620	South Fork Quantico Creek near Triangle, Va.	15.7	T, SC	1973
RAPPAHANNOCK RIVER BASIN				
01661900	Carter Run near Marshall, Va.	19.5	SED	1977-78
01663500	Hazel River at Rixeyville, Va.	287	T SC SED	1951-55 1953-55 1952-55
01667500	Rapidan River near Culpeper, Va.	472	T SC SED	1946, 1951-56 1953-56 1951-56
01668000*	Rappahannock River near Fredericksburg, Va.	1,596	T, SC	1956, 1968-74
01668020	Rappahannock River at VEPCO Dam, at Fredericksburg, Va.	-	T, SC	1971-72
YORK RIVER BASIN				
01670600	North Anna River below Lake Anna, near Hewlett, Va.	-	T, SC	1972-73
01671500	Bunch Creek near Boswells Tavern, Va.	4.37	T	1954-56
01673000*	Pamunkey River near Hanover, Va.	1,081	T SC	1946, 1968-76 1968-76

TYPE OF RECORD: C (chemical quality); SED (sediment); SC (specific conductance);
T (temperature).

* Presently active periodic sampling station.

Discontinued water-quality stations--Continued

STATION NUMBER	STATION NAME	DRAINAGE AREA (mi ²)	TYPE OF RECORD	PERIOD OF RECORD
YORK RIVER BASIN--Continued				
01674000	Mattaponi River near Bowling Green, Va.	257	T	1946
01674500*	Mattaponi River near Beulahville, Va.	601	T	1946
JAMES RIVER BASIN				
02012500	Jackson River at Falling Spring, Va.	411	T, SC C	1969-86 1930, 1948, 1968-86
02019500	James River at Buchanan, Va.	2,075	T SC SED C	1948, 1951-56, 1968-86 1953-56, 1968-86 1951-56 1930, 1948, 1951-56, 1968-86
02026000	James River at Bent Creek, Va.	3,683	T	1948
02029000	James River at Scottsville, Va.	4,584	T, SC SED	1951-56, 1987 1951-56
02035000*	James River at Cartersville, Va.	6,257	T, SC SED	1968-76, 1979, 1981 1981
02037000	James River and Kanawha Canal, near Richmond, Va.	-	C, T, SC	1972-73
02037500	James River near Richmond, Va.	6,758	T, SC	1948-51, 1953-56
02038830	Fishpond Creek near Hixsburg, Va.	14.0	SC	1981
02038880	Vaughans Creek near Hixsburg, Va.	23.2	SC	1981
CHOWAN RIVER BASIN				
02044000	Nottoway River near Burkeville, Va.	38.7	T	1947
02047000*	Nottoway River near Sebrell, Va.	1,421	T	1947
02048000	Blackwater River at Zuni, Va.	456	T	1947
02051000	North Meherrin River near Lunenburg, Va.	55.6	T	1947
02052000*	Meherrin River at Emporia, Va.	747	T, SC	1968-80
ROANOKE RIVER BASIN				
02054500	Roanoke River at Lafayette, Va.	257	T, SC	1951
02060500	Roanoke River at Altavista, Va.	1,789	T SC SED C	1951, 1953-56, 1968-86 1953-56, 1968-86 1953-56 1951, 1953-56, 1968-86
02066000	Roanoke River at Randolph, Va.	2,977	T, SC SED C	1951-56, 1968-82 1954-81 1930, 1951-86

TYPE OF RECORD: C (chemical quality); SED (sediment); SC (specific conductance);
T (temperature).

* Presently active periodic sampling station.

Discontinued water-quality stations--Continued

STATION NUMBER	STATION NAME	DRAINAGE AREA (mi ²)	TYPE OF RECORD	PERIOD OF RECORD
ROANOKE RIVER BASIN--Continued				
02075500*	Dan River at Paces, Va.	2,550	T, SC	1954-56
02076000	Dan River at South Boston, Va.	2,730	T SC	1952 1951-52
02079785	Lake Gaston near Elams, NC	-	T, SC SED	1988 1988
02079882	Pea Hill Creek near Bowens Corner, nr Valentines, Va.	-	T, SC SED	1988 1988
KANAWHA RIVER BASIN				
03164000	New River near Galax, Va.	1,131	T, SC C	1950, 1968-83 1931, 1950, 1952, 1968-86
03170000	New River at Radford, Va.	2,748	T, SC	1950, 1956
03171500	New River at Eggleston, Va.	2,941	T, SC	1953-55
03176500*	New River at Glen Lyn, Va.	3,768	SC T	1968-88 1964-88
BIG SANDY RIVER BASIN				
03207500	Levisa Fork near Grundy, Va.	235	T, SC SED	1950 1986
03207800	Levisa Fork at Big Rock, Va.	297	T, SC SED	1970-81 1970-81
03208034	Grissom Creek near Council, Va.	2.82	T, SC, C, SED	1982-83
03208036	Barton Fork near Council, Va.	10.2	T, SC, C, SED	1981-83
03208040	Russell Fork at Council, Va.	1.23	T, SC C	1981-83 1982-83
03208100	Russell Fork near Birchleaf, Va.	87.4	T, SC, C	1982-83
TENNESSEE RIVER BASIN				
03473000	South Fork Holston River near Damascus, Va.	301	T SC C	1950, 1968-73 1950 1950, 1952, 1968-86
03474500	Middle Fork Holston River at Chilhowie, Va.	155	T	1962
03488445	Brumley Creek near Hansonville, Va.	4.29	T	1980-81
03488450	Brumley Creek at Brumley Gap, Va.	21.1	T	1979-81
03488500	North Fork Holston River at Holston, Va.	402	T, SC	1952-56
03490000	North Fork Holston River near Gate City, Va.	672	T SC SED	1950-51, 1968-78 1950-51 1935-38, 1963-65
03527000	Clinch River at Speers Ferry, Va.	1,126	T SC SED	1950, 1965-67 1950 1935-38, 1963-65
03529500	Powell River at Big Stone Gap, Va.	112	T, SC	1950
03531500	Powell River near Jonesville, Va.	319	T	1964-67

TYPE OF RECORD: C (chemical quality); SED (sediment); SC (specific conductance);
T (temperature).

* Presently active periodic sampling station.

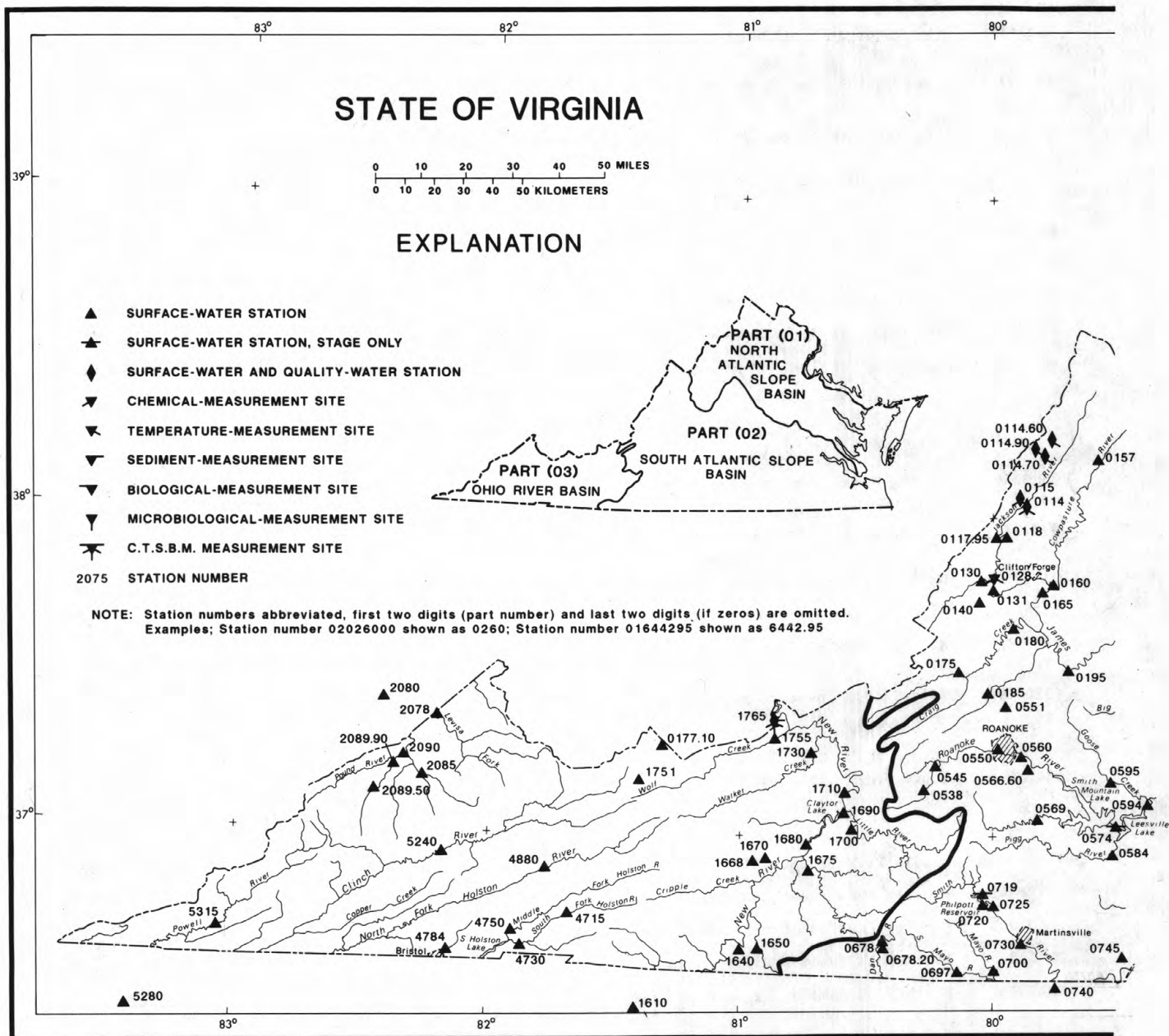
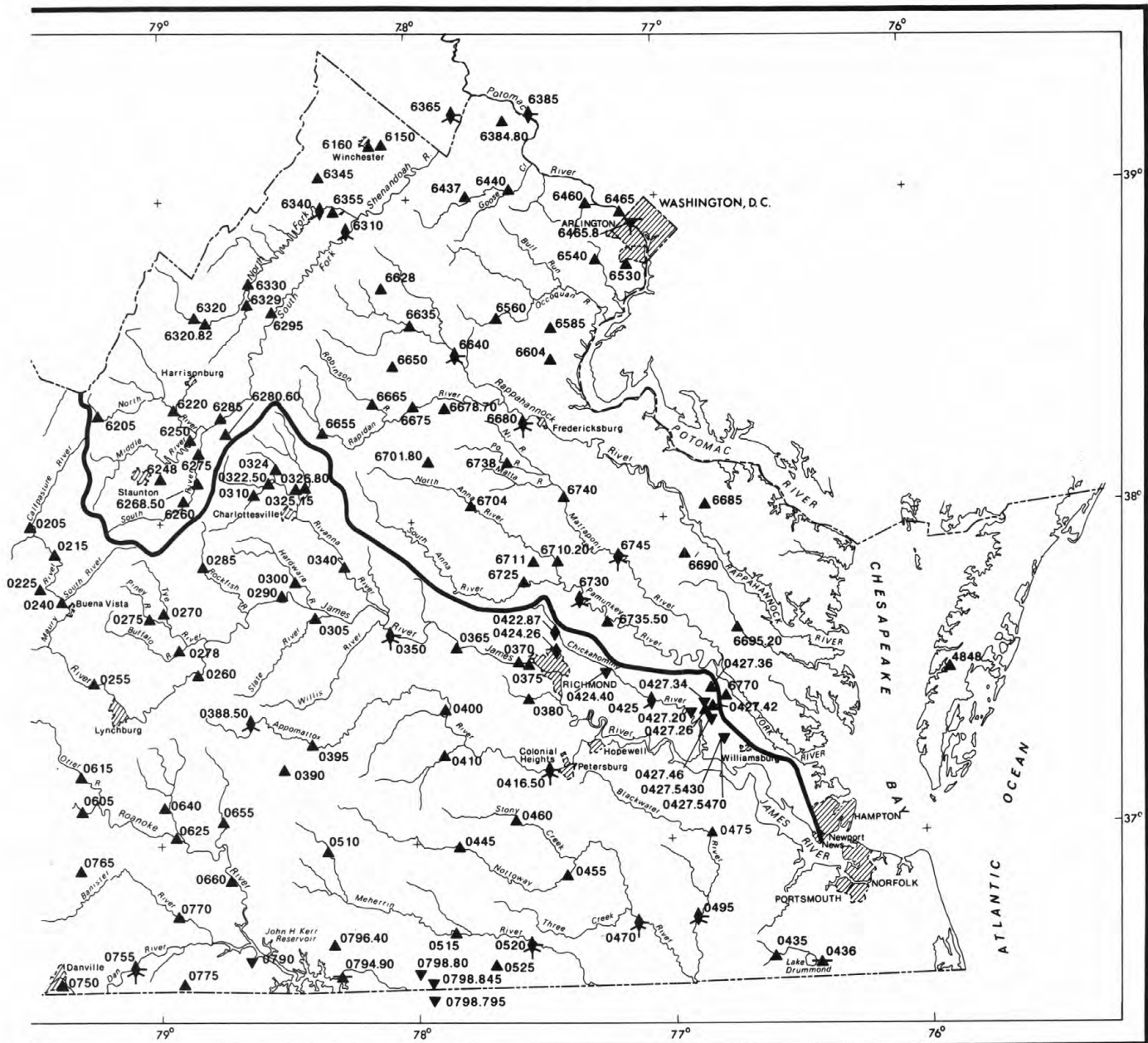


Figure 6.--Location of surface-water and water-quality data-collection stations.



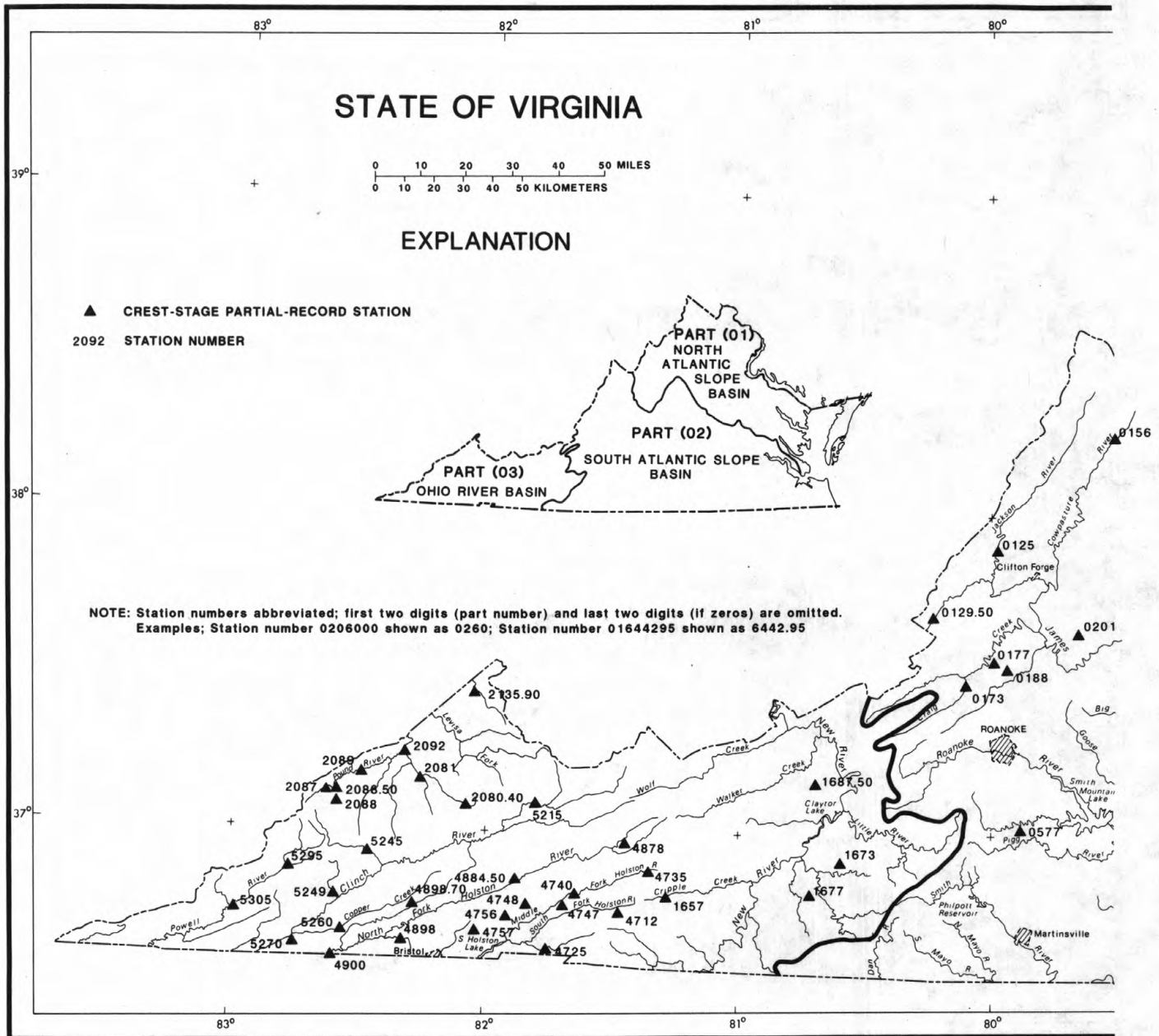
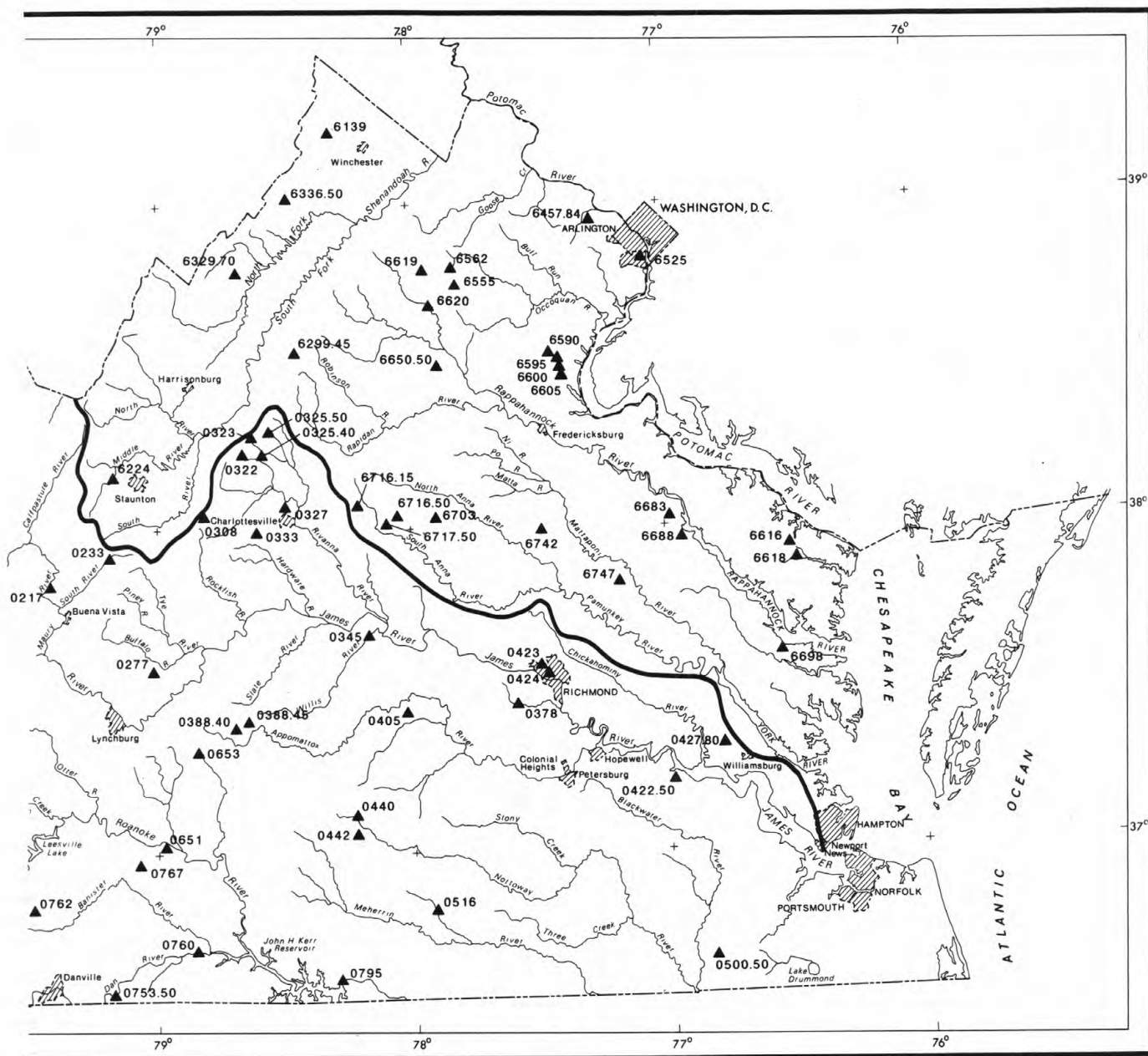


Figure 7.--Location of surface-water partial-record stations.



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SURFACE-WATER AND SURFACE-WATER-QUALITY RECORDS

HYDROLOGIC-DATA STATION RECORDS

NORTH ATLANTIC SLOPE BASINS

NASSAWADOX CREEK BASIN

01484800 GUY CREEK NEAR NASSAWADOX, VA

LOCATION.--Lat 37°30'08", long 75°52'22", Northampton County, Hydrologic Unit 02080109, on left bank 25 ft upstream from bridge on State Highway 606, 1.9 mi northwest of Nassawadox, and 2.1 mi upstream from mouth.

DRAINAGE AREA.--1.72 mi².

PERIOD OF RECORD.--November 1963 to current year.

GAGE.--Water-stage recorder. Datum of gage is 11.67 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records fair except those for period with ice effect, Dec. 19-25, and period of no gage-height record, Jan. 1, 2, which are poor. Some diversion into pond for irrigation upstream from station, amount unknown. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

COOPERATION.--Records were provided by the Virginia Water Control Board.

AVERAGE DISCHARGE.--26 years (water years 1965-90), 1.35 ft³/s, 10.66 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 171 ft³/s, Aug. 22, 1990, gage height, 6.84 ft, from rating curve extended above 20 ft³/s; no flow at times in 1964, 1966, 1981, 1983-85, and 1987.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 171 ft³/s, Aug. 22, gage height, 6.84 ft; minimum, 0.01 ft³/s, June 30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.74	1.2	1.4	e10	2.3	2.2	7.5	1.0	2.0	.16	.28	.85
2	1.1	.96	1.3	e4.9	2.1	2.1	5.2	.74	1.4	.41	.11	.70
3	.97	1.5	1.2	3.4	1.9	3.2	8.4	.68	1.0	.25	.12	3.1
4	.83	1.2	1.1	3.0	2.2	3.3	5.6	.69	.91	.19	.17	1.6
5	.77	1.0	1.1	2.8	1.9	2.5	4.3	1.1	.76	.15	.17	1.0
6	.74	.96	1.1	3.7	1.6	2.1	3.5	1.5	.69	.25	.35	.86
7	.71	.94	1.1	3.9	1.8	1.7	4.1	1.1	.60	.24	.23	.79
8	.70	.96	1.1	4.7	1.7	1.6	3.4	.86	.62	.13	.19	.78
9	.67	3.1	1.2	5.3	1.6	1.6	2.7	.75	.62	.12	.22	.67
10	.66	3.1	1.5	4.2	4.1	1.6	2.5	.90	1.2	.29	.29	.68
11	.67	2.1	1.8	3.5	5.1	1.4	2.3	1.4	.73	.79	.21	.64
12	.52	1.6	2.6	3.2	3.6	1.3	1.9	.86	.62	1.6	.15	.61
13	.52	1.3	6.3	2.5	2.7	1.3	1.6	.79	.60	.59	.16	.62
14	.62	1.2	4.9	2.2	2.4	1.2	1.4	.75	.51	.58	.24	.68
15	.53	1.1	4.0	2.1	2.1	1.1	2.5	.68	.47	.52	.12	.66
16	.61	1.3	4.4	2.0	2.8	.99	2.4	.65	.48	.47	.12	.59
17	.61	1.3	3.2	1.9	4.6	1.0	1.9	.61	.45	.41	.09	.54
18	.66	1.1	2.7	1.8	2.9	4.6	1.5	.41	.52	.34	.06	.52
19	.97	1.0	e2.3	1.7	3.8	3.4	1.3	.33	.50	.36	.06	.55
20	1.1	1.1	e2.0	1.6	3.4	2.5	1.2	.31	.44	.25	.32	.49
21	.89	1.0	e1.8	1.7	2.5	1.9	1.3	.54	.41	.19	.31	.38
22	.77	.98	e1.6	1.6	2.6	1.5	1.5	.59	.46	.41	40	.53
23	.73	4.9	e1.3	1.5	4.7	1.4	1.3	.60	.46	.39	27	.54
24	.73	3.6	e1.2	1.5	6.8	1.2	.92	.45	.30	.35	6.8	.44
25	.72	2.8	e1.1	3.4	4.2	1.8	.81	.44	.31	.21	4.0	.34
26	.69	2.5	1.4	5.0	3.0	1.7	.66	.90	.29	.26	2.7	.24
27	.68	2.1	1.3	4.2	2.7	1.3	.62	14	.21	.35	1.7	.32
28	.66	1.9	1.2	3.3	2.5	1.2	.57	5.8	.16	.37	1.1	.33
29	.67	1.7	1.2	2.9	---	1.7	.99	9.8	.15	.41	1.2	.26
30	.70	1.4	1.6	3.2	---	7.8	1.5	6.2	.17	.39	2.1	.30
31	1.8	---	2.6	2.6	---	9.2	---	3.3	---	.35	1.1	---
TOTAL	23.74	50.90	62.6	99.3	83.6	71.39	75.37	58.73	18.04	11.78	91.67	20.61
MEAN	.77	1.70	2.02	3.20	2.99	2.30	2.51	1.89	.60	.38	2.96	.69
MAX	1.8	4.9	6.3	10	6.8	9.2	8.4	14	2.0	1.6	40	3.1
MIN	.52	.94	1.1	1.5	1.6	.99	.57	.31	.15	.12	.06	.24
CFSM	.45	.99	1.17	1.86	1.74	1.34	1.46	1.10	.35	.22	1.72	.40
IN.	.51	1.10	1.35	2.15	1.81	1.54	1.63	1.27	.39	.25	1.98	.45

CAL YR 1989 TOTAL 637.30 MEAN 1.75 MAX 22 MIN .38 CFSM 1.02 IN. 13.78
WTR YR 1990 TOTAL 667.73 MEAN 1.83 MAX 40 MIN .06 CFSM 1.06 IN. 14.44

e Estimated.

01615000 OPEQUON CREEK NEAR BERRYVILLE, VA

LOCATION.--Lat 39°10'40", long 78°04'20", Frederick County, Hydrologic Unit 02070004, on left bank between the bridges on State Highway 7, 0.2 mi upstream from Abrams Creek, and 5.0 mi west of Berryville.

DRAINAGE AREA.--57.4 mi².

PERIOD OF RECORD.--October 1943 to current year.

REVISED RECORDS.--WSP 2103: Drainage area. WDR VA-72-1: 1971(P).

GAGE.--Water-stage recorder. Datum of gage is 503.24 ft above National Geodetic Vertical Datum of 1929. Prior to July 26, 1949, nonrecording gage at same site and datum.

REMARKS.--Records good except for period of no gage-height record, Feb. 21 to Mar. 7, which is fair. Some diurnal fluctuation caused by mills and sewage treatment plant upstream from station. Most of water discharged from the treatment plant was diverted from another drainage basin for municipal supply. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

COOPERATION.--Records were provided by the Virginia Water Control Board.

AVERAGE DISCHARGE.--47 years, 42.5 ft³/s, 10.05 in/yr, unadjusted.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 12,600 ft³/s, May 18, 1988, gage height, 13.49 ft, from rating curve extended above 4,800 ft³/s; minimum daily, 0.20 ft³/s, Sept. 12, 13, 1966.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in October 1942 reached a stage of 18.4 ft, discharge not determined, from information by local residents.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 850 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
July 15	1700	*627	*4.45	No peak equal to or greater than base discharge.			

Minimum discharge, 8.8 ft³/s, Aug. 19, Sept. 9, 11; minimum daily, 11 ft³/s, Aug. 18, 19.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	13	20	21	65	65	e30	82	51	36	18	13	14
2	44	19	20	46	53	e29	71	35	29	15	13	13
3	22	19	20	41	45	e28	106	29	26	13	13	13
4	17	18	18	41	70	e27	65	32	24	12	13	13
5	14	18	20	64	62	e25	48	39	22	12	18	13
6	14	18	19	52	48	e24	44	30	21	13	37	13
7	13	18	19	38	43	e23	124	26	19	12	19	12
8	13	23	18	33	39	22	114	24	19	12	15	12
9	13	41	17	34	36	22	68	22	18	12	14	12
10	13	39	18	57	77	22	53	45	17	12	14	12
11	13	26	19	50	84	22	47	60	16	12	14	12
12	13	22	19	39	69	22	39	32	15	37	14	13
13	13	20	19	31	53	21	35	28	15	217	13	182
14	13	19	18	27	45	21	32	26	15	55	13	47
15	13	19	18	26	40	20	36	23	15	280	12	33
16	13	106	18	25	38	20	34	22	13	113	12	22
17	21	75	17	24	35	25	31	26	14	39	12	20
18	24	42	17	23	30	30	30	22	14	26	11	17
19	184	32	16	22	29	24	28	19	17	20	11	16
20	281	28	17	22	27	33	27	19	15	18	23	16
21	93	24	16	25	e26	38	29	19	14	22	15	15
22	48	23	15	25	e25	30	31	19	14	25	24	16
23	33	23	14	23	e30	26	28	20	14	21	43	17
24	27	23	14	21	e60	25	27	19	13	18	139	16
25	24	23	13	24	e46	31	26	18	13	16	41	15
26	22	26	14	62	e37	52	25	31	13	15	26	15
27	21	26	15	58	e32	38	25	36	13	14	19	15
28	20	26	15	41	e31	32	26	31	13	14	17	15
29	19	24	15	55	---	29	26	225	12	14	15	14
30	19	22	16	248	---	29	98	114	12	14	14	14
31	19	---	20	94	---	125	---	54	---	14	14	---
TOTAL	1109	862	535	1436	1275	945	1455	1196	511	1135	671	657
MEAN	35.8	28.7	17.3	46.3	45.5	30.5	48.5	38.6	17.0	36.6	21.6	21.9
MAX	281	106	21	248	84	125	124	225	36	280	139	182
MIN	13	18	13	21	25	20	25	18	12	12	11	12
(*)	6.99	6.05	5.35	6.75	6.37	5.54	6.36	7.55	6.79	8.03	7.83	5.99

CAL YR 1989 TOTAL 13979 MEAN 38.3 MAX 610 MIN 11 (*) 6.88

WTR YR 1990 TOTAL 11787 MEAN 32.3 MAX 281 MIN 11 (*) 6.63

* Discharge from sewage treatment plant, equivalent in cubic feet per second; provided by the Frederick-Winchester Service Authority.

e Estimated.

POTOMAC RIVER BASIN

01616000 ABRAMS CREEK NEAR WINCHESTER, VA

LOCATION.--Lat 39°10'40", long 78°05'10", Frederick County, Hydrologic Unit 02070004, on right bank 1,000 ft upstream from bridge on State Highway 659, 0.9 mi upstream from mouth, and 4.4 mi east of Winchester.

DRAINAGE AREA.--16.5 mi².

PERIOD OF RECORD.--July 1949 to September 1960, June 1979 to current year.

GAGE.--Water-stage recorder. Datum of gage is 526.46 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records good except those for periods with ice effect, Dec. 4, 9, and Feb. 26, and period of no gage-height record, Dec. 12-31, which are fair. Slight diurnal fluctuation prior to September caused by wastewater treatment plant upstream from station at Winchester. Several measurements of water temperature were made during the year.

COOPERATION.--Records were provided by the Virginia Water Control Board.

AVERAGE DISCHARGE.--22 years, 21.2 ft³/s, 17.45 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,220 ft³/s, May 18, 1988, gage height, 6.14 ft; maximum gage height, 6.16 ft, Dec. 4, 1950; minimum discharge, 3.5 ft³/s, Oct. 8, 1954.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 200 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Oct. 20	0630	233	2.61	July 12	2030	226	2.58
Nov. 16	0730	203	2.48	Aug. 5	2100	*329	*3.01

Minimum discharge, 4.3 ft³/s, Feb. 26, result of freezeup, Aug. 17, result of regulation; minimum daily, 6.0 ft³/s, June 29.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	18	12	9.6	7.8	16	12	15	13	14	12	8.8	8.4
2	28	12	9.9	7.4	15	12	23	12	13	8.0	9.2	7.8
3	12	12	9.2	10	16	11	20	11	13	7.1	8.4	8.0
4	11	11	e8.5	13	17	11	15	15	12	6.9	8.8	7.7
5	10	11	9.5	15	15	11	13	14	12	7.3	36	7.1
6	11	12	9.3	13	14	11	18	11	11	7.3	18	7.6
7	10	12	8.9	11	14	11	26	10	10	7.1	12	7.9
8	10	24	9.6	12	13	10	19	9.7	9.3	6.9	10	7.7
9	10	22	e8.5	13	12	10	15	9.4	8.8	6.4	9.7	7.7
10	11	15	7.9	14	20	9.9	14	33	8.5	6.7	9.9	7.2
11	13	12	6.6	13	16	9.3	14	15	8.1	7.9	8.7	8.1
12	11	11	e8.2	12	15	9.3	12	12	9.0	52	8.2	18
13	10	11	e8.0	11	14	9.0	12	12	8.8	28	9.9	36
14	9.8	11	e7.2	9.9	13	9.3	11	11	8.7	20	9.2	11
15	9.0	11	e7.2	10	13	9.9	14	10	8.4	33	7.7	13
16	10	43	e7.2	11	12	9.3	11	10	8.9	16	7.3	9.4
17	24	16	e6.8	10	12	15	11	11	8.1	12	6.9	8.8
18	14	14	e6.4	9.9	11	9.7	11	9.2	7.7	11	7.3	9.1
19	55	12	e6.4	9.6	11	9.6	11	9.0	9.8	9.6	7.3	10
20	60	12	e6.8	10	11	15	11	8.9	8.4	12	19	9.1
21	20	11	e6.6	9.7	11	11	14	9.0	7.7	11	8.7	8.5
22	14	11	e6.4	9.6	11	11	11	10	8.7	31	26	11
23	13	13	e6.2	9.8	20	9.9	11	9.2	8.2	15	30	8.5
24	13	10	e6.1	9.9	18	12	10	9.0	7.6	11	44	8.4
25	12	10	e6.1	14	13	13	9.4	9.2	7.7	10	15	8.3
26	11	11	e6.2	17	e9.0	12	9.2	31	7.0	9.9	12	9.1
27	11	11	e6.5	13	11	11	9.7	15	6.9	9.5	11	8.9
28	10	11	e6.5	12	12	10	9.7	24	6.8	9.2	9.8	8.1
29	10	10	e6.5	32	---	10	18	42	6.0	9.4	9.2	7.4
30	10	9.6	e7.0	34	---	11	21	22	7.6	8.8	8.8	8.1
31	13	---	e15	19	---	27	---	16	---	8.9	8.3	---
TOTAL	483.8	403.6	240.8	402.6	385.0	352.2	419.0	442.6	271.7	410.9	405.1	295.9
MEAN	15.6	13.5	7.77	13.0	13.7	11.4	14.0	14.3	9.06	13.3	13.1	9.86
MAX	60	43	15	34	20	27	26	42	14	52	44	36
MIN	9.0	9.6	6.1	7.4	9.0	9.0	9.2	8.9	6.0	6.4	6.9	7.1
CFSM	.95	.82	.47	.79	.83	.69	.85	.87	.55	.80	.79	.60
IN.	1.09	.91	.54	.91	.87	.79	.94	1.00	.61	.93	.91	.67

CAL YR 1989 TOTAL 5805.8 MEAN 15.9 MAX 124 MIN 6.1 CFSM .96 IN. 13.09
WTR YR 1990 TOTAL 4513.2 MEAN 12.4 MAX 60 MIN 6.0 CFSM .75 IN. 10.18

e Estimated.

01620500 NORTH RIVER NEAR STOKESVILLE, VA

LOCATION.--Lat 38°20'15", long 79°14'25", Augusta County, Hydrologic Unit 02070005, George Washington National Forest, on left bank 575 ft upstream from highway bridge, 2.8 mi upstream from city of Staunton dam, 3.8 mi upstream from Broad Run, 5.0 mi west of Stokesville, and 7.8 mi upstream from Skidmore Fork.

DRAINAGE AREA.--17.2 mi².

PERIOD OF RECORD.--October 1946 to current year.

REVISED RECORDS.--WSP 1903: 1960. WSP 2103: Drainage area. WDR VA-89-1: 1949 (M).

GAGE.--Water-stage recorder. Datum of gage is 2,054.57 ft above National Geodetic Vertical Datum of 1929. Prior to June 10, 1958, at site 575 ft downstream at datum 6.0 ft lower.

REMARKS.--Records fair except those for periods of doubtful or no gage-height record, Oct. 2, 3, Jan. 1, 2, and period with ice effect, Dec. 16-28, which are poor. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

AVERAGE DISCHARGE.--44 years, 25.9 ft³/s, 20.45 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 9,530 ft³/s, June 17, 1949, gage height, 10.9 ft, from floodmarks, site and datum then in use, from rating curve extended above 900 ft³/s on basis of computation of peak flow over dam; maximum gage height, 19.8 ft, Nov. 5, 1985, from floodmarks (backwater from Elkhorn Lake); minimum discharge, 0.10 ft³/s, Sept. 15, 16, 19-22, 1962, Sept. 7-13, 1966.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in October 1942 reached a stage of 8.4 ft, from information by local residents.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 200 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Nov. 16	1345	306	4.85	May 29	1615	*374	*4.97
Dec. 31	0430	247	4.72				

Minimum daily discharge, 0.57 ft³/s, Aug. 21.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	34	15	14	e130	49	30	32	11	63	2.2	1.1	1.7
2	e130	13	14	e105	41	28	33	10	45	2.1	1.1	1.6
3	e113	12	13	67	38	25	32	9.7	37	2.0	1.0	1.4
4	71	12	13	49	57	23	29	9.5	31	1.8	.97	1.3
5	50	11	12	42	76	20	26	11	25	1.7	.95	1.2
6	38	10	12	36	67	18	25	11	21	1.6	.98	1.1
7	30	10	11	32	56	16	24	11	17	1.5	.93	1.1
8	25	11	11	30	44	15	22	11	15	1.5	.90	1.1
9	21	12	9.9	27	37	14	27	10	13	1.4	.86	1.1
10	18	11	9.5	25	52	13	45	14	11	1.3	.84	.96
11	16	10	9.4	23	78	12	61	15	9.8	1.2	.79	.89
12	14	10	9.3	21	71	12	60	16	8.6	1.3	.77	.87
13	12	8.8	8.9	20	55	11	50	18	7.6	1.3	.72	.98
14	11	7.2	8.4	17	45	10	41	18	6.8	1.6	.70	1.1
15	10	7.1	8.1	16	38	9.7	36	17	6.2	2.3	.67	1.1
16	9.4	198	e7.8	16	34	10	31	16	5.2	3.0	.65	1.2
17	14	158	e7.1	15	30	15	26	15	4.8	3.4	.62	.99
18	21	84	e7.4	14	26	19	23	14	4.3	3.0	.65	.93
19	80	55	e6.8	14	24	23	20	12	4.1	2.6	.61	.94
20	113	42	e7.0	13	23	25	18	11	3.9	2.3	.61	1.0
21	75	33	e6.6	14	21	24	17	11	3.7	2.2	.57	1.1
22	53	26	e6.4	13	20	24	17	12	3.5	2.1	.58	1.1
23	40	22	e6.5	13	22	25	15	11	3.3	2.0	1.9	1.1
24	33	19	e6.2	12	36	26	14	9.7	3.2	2.0	2.5	1.1
25	28	18	e5.8	14	41	26	13	8.9	3.0	1.9	2.2	1.1
26	24	17	e5.6	17	39	25	12	16	2.8	1.7	2.1	1.0
27	21	16	e5.5	19	37	28	12	64	2.5	1.6	2.1	.91
28	19	16	e5.2	20	34	29	11	107	2.4	1.4	2.3	.84
29	17	16	5.5	24	---	29	12	316	2.3	1.3	2.2	.81
30	16	15	42	50	---	29	12	216	2.1	1.3	2.0	.79
31	16	---	217	58	---	31	---	105	---	1.2	1.9	---
TOTAL	1172.4	895.1	511.9	966	1191	644.7	796	1136.8	368.1	57.8	36.77	32.41
MEAN	37.8	29.8	16.5	31.2	42.5	20.8	26.5	36.7	12.3	1.86	1.19	1.08
MAX	130	198	217	130	78	31	61	316	63	3.4	2.5	1.7
MIN	9.4	7.1	5.2	12	20	9.7	11	8.9	2.1	1.2	.57	.79
CFSM	2.20	1.73	.96	1.81	2.47	1.21	1.54	2.13	.71	.11	.07	.06
IN.	2.54	1.94	1.11	2.09	2.58	1.39	1.72	2.46	.80	.13	.08	.07

CAL YR 1989 TOTAL 14522.8 MEAN 39.8 MAX 534 MIN 2.2 CFSM 2.31 IN. 31.41
WTR YR 1990 TOTAL 7808.98 MEAN 21.4 MAX 316 MIN .57 CFSM 1.24 IN. 16.89

e Estimated.

POTOMAC RIVER BASIN

01622000 NORTH RIVER NEAR BURKETOWN, VA

LOCATION.--Lat 38°20'25", long 78°54'50", Rockingham County, Hydrologic Unit 02070005, on right bank 0.8 mi downstream from Pleasant Run, 2.8 mi northeast of Burkettown, and 8.5 mi upstream from Middle River.

DRAINAGE AREA.--379 mi².

PERIOD OF RECORD.--October 1925 to October 1972, May 1975 to current year. Monthly discharge only for some periods, published in WSP 1302.

REVISED RECORDS.--WSP 1171: 1936(M). WSP 1302: 1928-29(M), 1932-34(M), 1937-38(M). WSP 2103: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,103.49 ft above National Geodetic Vertical Datum of 1929. Prior to Dec 12, 1938, nonrecording gage at site 3.0 mi downstream at different datum.

REMARKS.--Records good except for period with ice effect, Dec. 23-26, which is fair. At a point 26.8 mi upstream from station, there is an aqueduct tunnel diversion of about 2.9 ft³/s from Staunton Dam Reservoir by city of Staunton for industrial and municipal use. Some diurnal fluctuation caused by discharge from sewage treatment plant about 0.9 mi upstream from station and diversion during low flow by irrigation at points upstream. Several measurements of water temperature were made during the year.

COOPERATION.--Records were provided by the Virginia Water Control Board.

AVERAGE DISCHARGE.--62 years, 370 ft³/s, 13.26 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 65,000 ft³/s, Nov. 5, 1985, gage height, 35.85 ft, from high-water mark, from rating curve extended above 16,000 ft³/s on basis of slope-area measurements at gage heights 32.4 ft and 36.3 ft, and contracted-opening measurements at gage heights 35.85 ft and 36.3 ft; maximum gage height, 36.3 ft, June 18, 1949; minimum discharge, 16 ft³/s, Nov. 23, 1965, result of temporary dam upstream.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage since at least 1852, that of June 18, 1949.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 2,500 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
May 29	1600	*2,720	*6.68	No other peak equal to or greater than base discharge.			

Minimum discharge, 57 ft³/s, Aug. 19, gage height, 1.83 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	517	343	262	1420	723	433	433	233	1080	109	76	143
2	1240	316	254	1180	667	410	450	222	799	106	72	138
3	1450	301	248	963	639	395	447	215	627	95	70	129
4	1160	284	238	808	920	373	432	210	504	86	68	121
5	906	276	230	724	972	350	405	254	408	83	73	119
6	723	268	223	621	881	327	410	219	355	84	132	115
7	589	255	214	544	796	310	496	209	312	79	94	112
8	492	253	218	505	705	291	503	197	280	82	80	110
9	433	264	212	470	625	280	609	191	258	88	75	109
10	383	249	199	451	728	272	712	285	268	72	83	107
11	350	242	191	422	769	265	817	253	226	83	77	99
12	322	239	195	403	783	258	781	233	204	138	73	97
13	297	229	194	377	732	244	704	235	192	111	71	207
14	278	224	182	352	676	238	630	238	182	187	69	158
15	263	222	177	334	609	232	592	225	174	215	68	132
16	250	1070	172	313	576	228	512	232	170	157	67	122
17	371	1830	163	300	518	300	453	229	162	169	64	123
18	355	1360	166	293	484	279	410	217	157	361	63	110
19	969	1020	156	280	427	261	369	207	150	255	66	109
20	1170	780	153	273	394	285	343	203	145	193	122	109
21	1090	607	144	274	368	275	335	214	142	160	71	105
22	913	501	140	265	360	273	338	224	146	142	79	111
23	748	453	e134	253	392	272	309	227	162	136	573	100
24	632	395	e126	245	541	286	286	204	137	120	331	95
25	547	353	e126	264	486	312	272	191	132	114	949	90
26	485	336	e127	312	481	318	262	242	124	115	521	85
27	439	322	127	300	470	332	255	475	121	102	351	83
28	407	303	130	305	463	359	243	873	117	98	253	83
29	379	285	131	387	---	386	251	2410	109	98	201	78
30	358	273	128	703	---	400	251	2160	105	95	173	79
31	348	---	292	733	---	426	---	1490	---	85	158	---
TOTAL	18864	13853	5652	15074	17185	9670	13310	13217	7948	4018	5223	3378
MEAN	609	462	182	486	614	312	444	426	265	130	168	113
MAX	1450	1830	292	1420	972	433	817	2410	1080	361	949	207
MIN	250	222	126	245	360	228	243	191	105	72	63	78
CFSM	1.61	1.22	.48	1.28	1.62	.82	1.17	1.12	.70	.34	.44	.30
IN.	1.85	1.36	.55	1.48	1.69	.95	1.31	1.30	.78	.39	.51	.33

CAL YR 1989 TOTAL 166655 MEAN 457 MAX 3110 MIN 60 CFSM 1.20 IN. 16.36
WTR YR 1990 TOTAL 127392 MEAN 349 MAX 2410 MIN 63 CFSM .92 IN. 12.50

e Estimated.

01624800 CHRISTIANS CREEK NEAR FISHERSVILLE, VA

LOCATION.--Lat 38°07'42", long 78°59'41", Augusta County, Hydrologic Unit 02070005, on right bank at upstream side of bridge on State Highway 794, 2.2 mi northwest of Fishersville, and 12 mi upstream from mouth.

DRAINAGE AREA.--70.1 mi².

PERIOD OF RECORD.--October 1967 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 1,230 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Records good except for period of no gage-height record, Dec. 15-29, which is fair. Some diurnal fluctuation caused by discharge of about 1.4 ft³/s from sewage treatment plants upstream from station. Most of the water discharged from the treatment plants was diverted from another drainage basin for municipal supply. Several measurements of water temperature were made during the year.

COOPERATION.--Records were provided by the Virginia Water Control Board.

AVERAGE DISCHARGE.--23 years, 71.7 ft³/s, 13.89 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 4,520 ft³/s, Nov. 4, 1985, gage height, 13.58 ft, from rating curve extended above 2,400 ft³/s; minimum, 3.8 ft³/s, Jan. 11, 1977, result of freezeup.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 1,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Oct. 2	0800	2,360	9.28	Dec. 31	1700	1,760	7.59
Oct. 17	1600	*3,290	*11.35	May 29	0600	1,020	5.32
Oct. 19	0800	1,820	7.77				

Minimum discharge, 18 ft³/s, part of each day Sept. 24-30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	185	81	54	496	113	79	73	56	117	39	25	22
2	945	78	54	188	106	78	79	54	104	37	24	22
3	241	75	53	150	189	79	83	52	96	35	24	22
4	157	71	51	137	289	74	73	55	90	33	23	21
5	127	69	52	126	163	71	68	69	82	32	26	21
6	111	68	52	113	140	70	81	53	77	32	27	21
7	100	67	51	104	130	67	178	51	74	31	27	21
8	94	70	53	114	119	66	164	48	70	32	24	22
9	87	73	52	127	113	66	132	47	67	32	24	22
10	82	65	52	131	154	65	115	119	68	30	26	22
11	80	63	51	117	142	63	108	79	62	29	25	21
12	75	61	53	107	126	62	96	60	59	31	23	20
13	72	59	53	96	117	60	89	65	57	33	22	41
14	69	59	51	92	111	59	85	60	57	92	31	33
15	66	58	e50	91	106	58	94	53	56	69	26	25
16	66	202	e41	87	110	58	83	53	54	45	22	22
17	1170	90	e33	83	100	153	79	51	51	38	22	22
18	359	78	e47	81	92	114	75	46	50	35	22	21
19	1020	70	e45	78	91	86	70	44	50	34	22	21
20	306	67	e46	77	86	96	70	44	47	37	22	22
21	199	63	e41	77	83	89	70	48	47	48	23	20
22	150	61	e40	73	88	81	70	64	49	36	25	22
23	128	64	e39	70	100	76	65	56	51	33	82	20
24	120	61	e39	69	107	78	62	48	44	31	60	20
25	109	61	e39	87	88	84	60	46	43	30	35	19
26	101	66	e40	139	82	82	59	91	41	29	33	19
27	95	64	e40	103	83	76	57	223	40	28	28	19
28	90	62	e41	93	83	72	56	277	40	28	26	18
29	86	58	e41	132	---	72	61	636	38	28	25	18
30	83	56	43	191	---	73	61	211	37	27	24	20
31	81	---	631	126	---	80	---	140	---	26	23	---
TOTAL	6654	2140	2028	3755	3311	2387	2516	2999	1818	1120	871	659
MEAN	215	71.3	65.4	121	118	77.0	83.9	96.7	60.6	36.1	28.1	22.0
MAX	1170	202	631	496	289	153	178	636	117	92	82	41
MIN	66	56	33	69	82	58	56	44	37	26	22	18
CFSM	3.06	1.02	.93	1.73	1.69	1.10	1.20	1.38	.86	.52	.40	.31
IN.	3.53	1.14	1.08	1.99	1.76	1.27	1.34	1.59	.96	.59	.46	.35

CAL YR 1989 TOTAL 36675 MEAN 100 MAX 1380 MIN 19 CFSM 1.43 IN. 19.46
WTR YR 1990 TOTAL 30258 MEAN 82.9 MAX 1170 MIN 18 CFSM 1.18 IN. 16.06

e Estimated.

POTOMAC RIVER BASIN

01625000 MIDDLE RIVER NEAR GROTTOS, VA

LOCATION.--Lat 38°15'42", long 78°51'44", Augusta County, Hydrologic Unit 02070005, on left bank at upstream side of bridge on State Highway 769 at Mount Meridian, 1.8 mi upstream from mouth, and 2.0 mi west of Grottoes.

DRAINAGE AREA.--375 mi².

PERIOD OF RECORD.--April 1927 to current year. Records for February 1925 to September 1926, published in WSP 601 and 621, are unreliable and should not be used.

REVISED RECORDS.--WSP 1051: 1928-29, 1930(M), 1932, 1935-37, 1938(M), 1940. WSP 1171: 1933. WSP 1302: 1928-29(M), 1931-34(M). WSP 2103: Drainage area. See also PERIOD OF RECORD.

GAGE.--Water-stage recorder. Datum of gage is 1,061.51 ft above National Geodetic Vertical Datum of 1929. Prior to Sept. 1, 1938, nonrecording gage at same site and datum.

REMARKS.--Records good except for period with ice effect, Dec. 18-29, which is fair. There are discharges of about 6.2 ft³/s from sewage treatment plants upstream from station. Most of water discharged from sewage treatment plants was diverted from another drainage basin for industrial and municipal supply. Small diurnal fluctuation at low flow caused by mills upstream from station. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

COOPERATION.--Records were provided by the Virginia Water Control Board.

AVERAGE DISCHARGE.--63 years, 313 ft³/s, 11.33 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 38,500 ft³/s, Nov. 5, 1985, gage height, 33.09 ft, from rating curve extended above 15,000 ft³/s on basis of slope-area measurement of peak flow; minimum, 18 ft³/s, Dec. 16, 1988, result of freezeup.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage since at least 1877, that of Nov. 5, 1985.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 3,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Oct. 2	1800	3,080	9.97	Jan. 1	0900	*4,820	*12.31
Oct. 17	2230	3,560	10.69	May 29	1530	3,350	10.38
Oct. 19	1400	3,330	10.35				

Minimum daily discharge, 98 ft³/s, Aug. 19.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	569	368	264	2890	633	408	366	261	758	157	109	145
2	2070	347	258	1450	548	380	398	248	593	163	106	139
3	1590	332	252	939	555	374	488	237	506	150	101	135
4	956	316	243	752	1350	357	418	239	475	141	101	128
5	709	303	240	684	1130	333	383	355	418	139	102	123
6	581	297	242	580	855	318	372	290	380	139	118	121
7	506	292	235	512	710	302	617	260	351	135	119	122
8	456	288	239	490	616	287	838	245	328	132	110	119
9	423	312	247	538	537	282	767	236	307	135	108	118
10	390	290	222	569	645	281	774	365	300	130	113	117
11	369	268	237	512	917	273	755	517	285	130	107	114
12	347	261	235	474	773	267	636	408	262	144	104	112
13	326	252	238	435	653	261	541	362	249	160	104	142
14	310	248	226	405	572	255	481	445	245	264	122	222
15	295	245	221	391	520	248	490	335	238	360	150	187
16	285	714	194	376	496	245	445	302	236	257	116	152
17	1110	1140	145	354	485	386	402	290	227	191	102	137
18	1770	684	e204	342	429	553	376	257	220	169	99	127
19	2500	509	e200	326	411	417	348	240	240	156	98	125
20	1680	424	e204	314	396	412	330	231	210	146	101	123
21	1100	380	e185	315	377	421	324	251	204	161	102	121
22	823	345	e174	306	368	378	328	284	198	162	123	121
23	666	343	e170	290	422	352	309	349	224	147	379	119
24	578	323	e168	281	556	343	292	339	205	142	1170	117
25	517	300	e168	309	617	381	280	307	193	133	475	118
26	479	307	e176	499	508	376	272	326	182	125	325	109
27	446	317	e178	534	461	357	265	874	175	120	250	108
28	419	298	e180	478	442	368	256	983	170	117	205	104
29	397	283	e195	507	---	368	255	2690	160	114	181	103
30	378	271	207	1000	---	368	283	2140	160	113	167	103
31	372	---	468	774	---	373	---	1120	---	112	153	---
TOTAL	23417	11057	6815	18626	16982	10724	13089	15786	8699	4844	5720	3831
MEAN	755	369	220	601	606	346	436	509	290	156	185	128
MAX	2500	1140	468	2890	1350	553	838	2690	758	360	1170	222
MIN	285	245	145	281	368	245	255	231	160	112	98	103
CFSM	2.01	.98	.59	1.60	1.62	.92	1.16	1.36	.77	.42	.49	.34
IN.	2.32	1.10	.68	1.85	1.68	1.06	1.30	1.57	.86	.48	.57	.38

CAL YR 1989 TOTAL 150351 MEAN 412 MAX 3690 MIN 85 CFSM 1.10 IN. 14.91
WTR YR 1990 TOTAL 139590 MEAN 382 MAX 2890 MIN 98 CFSM 1.02 IN. 13.85

e Estimated.

01626000 SOUTH RIVER NEAR WAYNESBORO, VA

LOCATION.--Lat 38°03'27", long 78°54'30", Waynesboro City, Hydrologic Unit 02070005, on right bank 80 ft downstream from bridge on State Highway 664, 1.3 mi southwest of Waynesboro post office, and 2.4 mi downstream from Back Creek.

DRAINAGE AREA.--127 mi², of which 41 mi² are above flood-detention structures.

PERIOD OF RECORD.--October 1952 to current year.

REVISED RECORDS.--WSP 2103: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,296.20 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--No estimated daily discharges. Records good. At a point 13.8 mi upstream from station, there is a diversion of about 0.74 ft³/s from Coles Run Reservoir, capacity 80,000,000 gal., by Augusta County Service Authority for industrial and municipal use. Flow from 41 mi² upstream from station slightly regulated by flood-detention reservoirs (sixteen of which were built by Soil Conservation Service between 1954 and 1961). Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

COOPERATION.--Records were provided by the Virginia Water Control Board.

AVERAGE DISCHARGE.--38 years, 143 ft³/s, 15.29 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 17,500 ft³/s, Nov. 4, 1985, gage height, 15.30 ft, from rating curve extended above 4,200 ft³/s on basis of contracted-opening measurement at gage height 13.95 ft; minimum, 7.0 ft³/s, July 18, 1966; minimum daily, 17 ft³/s, Aug. 8, 1966.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in October 1942 reached a stage of 14.3 ft, from floodmarks, discharge, 14,500 ft³/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 1,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Oct. 2	2330	1,060	5.13	Oct. 19	1000	*1,250	*5.52

Minimum daily discharge, 33 ft³/s, Sept. 5, 6, 11, 12, 24-29.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	333	181	136	788	236	174	220	122	307	57	44	35
2	898	168	132	535	219	167	220	117	249	57	43	34
3	886	170	130	374	218	169	236	116	218	54	42	34
4	571	158	124	309	319	158	220	113	202	52	42	34
5	429	151	124	275	307	147	205	152	174	50	43	33
6	348	146	123	241	273	141	202	144	156	49	44	33
7	294	142	119	216	255	134	249	139	141	48	43	34
8	256	144	121	216	234	129	267	126	130	49	42	34
9	232	154	122	229	216	128	268	117	122	49	42	34
10	209	143	115	232	231	125	259	209	133	48	44	34
11	193	133	114	219	247	122	251	270	117	47	43	33
12	178	130	116	208	220	119	228	211	105	47	42	33
13	166	127	120	190	202	116	204	185	100	50	41	40
14	155	122	113	177	193	114	193	164	97	83	49	37
15	148	120	111	171	185	111	217	153	93	132	48	36
16	141	302	105	165	186	111	201	144	92	98	43	35
17	182	365	99	157	183	291	191	126	86	72	42	34
18	364	265	106	154	165	453	182	116	83	63	40	34
19	1070	223	99	148	162	322	169	109	85	59	40	34
20	917	204	101	143	156	301	162	103	78	59	40	35
21	591	187	94	143	148	269	162	109	76	75	41	34
22	443	173	85	135	157	269	169	127	73	61	44	35
23	357	174	88	131	232	253	156	132	81	55	57	34
24	308	160	84	127	244	236	147	110	72	52	69	33
25	274	152	83	138	221	235	141	105	68	50	47	33
26	250	160	89	196	200	223	137	115	65	48	42	33
27	228	162	87	184	192	204	132	245	63	48	40	33
28	210	153	88	170	186	190	127	220	61	47	38	33
29	196	146	87	175	---	187	128	697	59	47	36	33
30	184	139	91	274	---	195	128	646	57	46	35	34
31	184	---	225	261	---	216	---	421	---	45	35	---
TOTAL	11195	5154	3431	7081	5987	6009	5771	5863	3443	1797	1341	1025
MEAN	361	172	111	228	214	194	192	189	115	58.0	43.3	34.2
MAX	1070	365	225	788	319	453	268	697	307	132	69	40
MIN	141	120	83	127	148	111	127	103	57	45	35	33
CFSM	2.84	1.35	.87	1.80	1.68	1.53	1.51	1.49	.90	.46	.34	.27
IN.	3.28	1.51	1.00	2.07	1.75	1.76	1.69	1.72	1.01	.53	.39	.30

CAL YR 1989 TOTAL 75278 MEAN 206 MAX 1740 MIN 48 CFSM 1.62 IN. 22.05
WTR YR 1990 TOTAL 58097 MEAN 159 MAX 1070 MIN 33 CFSM 1.25 IN. 17.02

01626850 SOUTH RIVER NEAR DOOMS, VA

LOCATION.--Lat 38°05'19", long 78°52'38", Augusta County, Hydrologic Unit 02070005, on left bank at downstream side of Hopeman Parkway Road bridge, 1.1 mi downstream from Steele Run, and 1.6 mi southwest of Dooms.

DRAINAGE AREA.--149 mi².

PERIOD OF RECORD.--April 1974 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,247.04 ft above National Geodetic Vertical Datum of 1929 (Norfolk and Western Railway bench mark). Prior to Sept. 18, 1980, nonrecording gage at site 30 ft upstream at same datum.

REMARKS.--Records good except for period of no gage-height record, Dec. 16-28, which is fair. There is a discharge of about 5.75 ft³/s from an industrial wastewater treatment plant, 2.6 mi upstream from station, originating from well fields. Several measurements of water temperature were made during the year.

COOPERATION.--Records were provided by the Virginia Water Control Board.

AVERAGE DISCHARGE.--16 years, 205 ft³/s, 18.68 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 19,100 ft³/s, Nov. 4, 1985, gage height, 14.03 ft, from floodmarks, from rating curve extended above 8,100 ft³/s; minimum, 42 ft³/s, Aug. 29, 30, 1981, gage height, 2.17 ft.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 1,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Oct. 2	1000	1,300	6.16	May 29	1400	1,040	5.49
Oct. 19	0930	*1,800	*7.35				

Minimum daily discharge, 53 ft³/s, Sept. 28, 29.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	406	236	173	910	288	210	271	160	378	79	67	58
2	1070	223	170	614	269	202	277	153	310	78	66	58
3	1010	223	168	439	286	203	291	148	273	77	64	58
4	645	206	161	367	394	189	273	146	254	73	64	56
5	495	196	161	326	371	178	255	186	218	72	66	55
6	422	191	159	287	328	170	258	179	195	72	66	56
7	367	186	153	260	306	161	321	169	178	70	67	66
8	322	194	156	262	283	155	342	160	165	71	65	56
9	293	204	157	275	264	155	341	150	154	73	67	57
10	266	188	150	279	280	154	331	263	163	70	67	57
11	247	173	147	267	292	150	319	319	151	70	66	56
12	227	170	150	253	264	146	297	255	135	70	64	56
13	211	165	155	233	242	141	266	229	129	77	63	101
14	198	156	144	217	235	138	251	202	125	128	94	64
15	189	153	142	210	225	135	290	186	119	179	74	61
16	178	379	e136	202	225	135	266	179	119	130	64	58
17	278	441	e130	192	221	348	250	157	114	98	62	57
18	426	338	e137	188	200	508	236	145	118	87	61	56
19	1410	289	e130	180	195	373	219	137	112	81	60	60
20	1070	266	e130	175	187	356	205	129	106	80	59	64
21	673	243	e123	175	179	315	204	142	102	98	63	60
22	517	224	e112	167	192	319	215	166	100	85	70	63
23	430	227	e115	160	274	299	199	165	105	78	98	61
24	380	206	e110	156	284	279	187	140	98	74	106	58
25	343	194	e108	176	261	279	178	131	92	74	77	55
26	315	204	e115	242	237	265	175	197	87	72	69	55
27	291	209	e113	228	230	240	171	341	86	71	67	54
28	270	199	e114	210	223	226	164	320	83	71	64	53
29	252	188	115	227	---	224	166	917	80	70	62	53
30	239	179	120	332	---	236	168	768	78	70	60	55
31	243	---	278	315	---	263	---	501	---	68	59	---
TOTAL	13683	6650	4432	8524	7235	7152	7386	7440	4427	2566	2121	1777
MEAN	441	222	143	275	258	231	246	240	148	82.8	68.4	59.2
MAX	1410	441	278	910	394	508	342	917	378	179	106	101
MIN	178	153	108	156	179	135	164	129	78	68	59	53
CFSM	2.96	1.49	.96	1.85	1.73	1.55	1.65	1.61	.99	.56	.46	.40
IN.	3.42	1.66	1.11	2.13	1.81	1.79	1.84	1.86	1.11	.64	.53	.44

CAL YR 1989 TOTAL 95344 MEAN 261 MAX 2280 MIN 66 CFSM 1.75 IN. 23.80
WTR YR 1990 TOTAL 73393 MEAN 201 MAX 1410 MIN 53 CFSM 1.35 IN. 18.32

e Estimated.

01627500 SOUTH RIVER AT HARRISTON, VA

LOCATION.--Lat 38°13'07", long 78°50'13", Augusta County, Hydrologic Unit 02070005, on left bank 100 ft downstream from bridge on State Highway 778, 0.3 mi northwest of Harriston, 0.6 mi downstream from Paine Run, and 7.2 mi upstream from confluence with North River.

DRAINAGE AREA.--212 mi².

PERIOD OF RECORD.--February 1925 to September 1951, October 1968 to current year.

REVISED RECORDS.--WSP 1171: 1926(M), 1927-28, 1929-32(M), 1933, 1934(M), 1935, 1937. WSP 1302: 1937(M), 1938(M). WSP 2103: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,129.87 ft above National Geodetic Vertical Datum of 1929. Prior to Sept. 1, 1938, nonrecording gage at same site and datum.

REMARKS.--Records good except those for periods with ice effect, Dec. 16, 17, 20, 22-28, which are fair. There is a discharge of about 5.75 ft³/s from an industrial wastewater treatment plant, 16.4 mi upstream from station, originating from well fields. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

COOPERATION.--Records were provided by the Virginia Water Control Board.

AVERAGE DISCHARGE.--48 years, 257 ft³/s, 16.46 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 28,100 ft³/s, Nov. 4, 1985, gage height, 15.47 ft, from rating curve extended above 10,000 ft³/s on basis of slope-area measurement of peak flow; maximum gage height, 17.2 ft, Oct. 15, 1942; minimum discharge, 17 ft³/s, Nov. 14, 1941.

EXTREMES OUTSIDE PERIOD OF RECORD.--Floods in 1870 and 1877 reached a stage of about 18.8 ft, from information by observer in 1925.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 1,200 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Oct. 2	1500	1,790	5.83	Jan. 1	1000	1,240	4.94
Oct. 17	1730	1,890	5.98	May 29	1630	1,590	5.51
Oct. 19	1300	*2,870	*7.31				

Minimum daily discharge, 68 ft³/s, Sept. 5.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	535	318	221	1130	435	277	371	206	581	104	79	71
2	1380	294	217	916	397	264	383	193	459	102	78	71
3	1430	293	214	663	401	263	432	186	389	99	77	71
4	979	274	205	540	607	250	407	183	359	96	75	70
5	742	259	203	478	574	231	374	225	309	91	77	68
6	606	250	202	413	506	219	370	228	276	90	79	69
7	508	243	195	365	463	208	456	209	253	90	77	72
8	436	251	198	362	422	198	498	194	233	90	77	79
9	390	269	201	388	383	196	492	183	214	91	77	71
10	349	250	187	397	406	193	487	294	215	87	81	71
11	320	229	187	381	428	187	459	431	205	86	78	69
12	295	219	188	359	383	185	425	353	180	89	76	70
13	271	214	196	327	347	180	378	327	170	90	74	122
14	254	205	184	300	330	177	351	311	163	142	92	85
15	239	197	180	287	313	172	395	265	157	214	106	77
16	229	429	e166	275	307	171	365	259	154	176	80	74
17	832	597	e157	262	306	376	341	227	148	127	76	74
18	811	459	173	255	273	720	322	199	145	113	75	72
19	2260	383	162	245	262	549	300	182	147	105	74	74
20	1740	345	e162	233	254	517	280	173	139	102	74	81
21	1130	317	156	232	237	461	279	186	133	112	77	77
22	845	291	e142	225	238	461	292	212	133	112	86	80
23	676	293	e145	214	347	436	268	227	136	100	119	78
24	574	270	e140	205	381	412	253	190	132	95	120	76
25	503	251	e138	230	351	406	241	170	123	91	103	73
26	450	256	e145	326	313	382	232	185	116	89	86	72
27	408	268	e143	327	301	350	225	565	113	86	81	72
28	372	254	e145	297	294	323	214	474	110	85	79	70
29	346	242	147	306	---	313	214	1300	105	85	76	70
30	322	229	148	497	---	329	221	1240	103	83	75	73
31	324	---	251	487	---	358	---	816	---	81	73	---
TOTAL	20556	8649	5498	11922	10259	9764	10325	10393	6100	3203	2557	2252
MEAN	663	288	177	385	366	315	344	335	203	103	82.5	75.1
MAX	2260	597	251	1130	607	720	498	1300	581	214	120	122
MIN	229	197	138	205	237	171	214	170	103	81	73	68
CFSM	3.13	1.36	.84	1.81	1.73	1.49	1.62	1.58	.96	.49	.39	.35
IN.	3.61	1.52	.96	2.09	1.80	1.71	1.81	1.82	1.07	.56	.45	.40

CAL YR 1989 TOTAL 125977 MEAN 345 MAX 2900 MIN 80 CFSM 1.63 IN. 22.11
WTR YR 1990 TOTAL 101478 MEAN 278 MAX 2260 MIN 68 CFSM 1.31 IN. 17.81

e Estimated.

01628060 WHITE OAK RUN NEAR GROTTOS, VA

LOCATION.--Lat 38°15'01", long 78°44'57", Rockingham County, Hydrologic Unit 02070005, Shenandoah National Park, on left bank 700 ft upstream from Madison Run, 0.2 mi south of Madison Run Forest Trail, 1.4 mi upstream from southwest boundary of Shenandoah National Park, and 4.3 mi southeast of Grottoes.

DRAINAGE AREA.--1.94 mi².

PERIOD OF RECORD.--October 1979 to current year.

REVISED RECORDS.--WDR VA-85-1: 1983-84(P).

GAGE.--Water-stage recorder. Elevation of gage is 1,480 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Records good except for period with ice effect, Dec. 23-27, which is fair. Several measurements of water temperature were made during the year.

AVERAGE DISCHARGE.--11 years, 2.48 ft³/s, 17.36 in/yr. The figure published in the 1989 report was in error; the correct figure is 10 years, 2.44 ft³/s, 17.08 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 515 ft³/s, Nov. 4, 1985, gage height, 6.17 ft, from floodmarks; no flow many days in 1980-89.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 30 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Oct. 2	0930	39	2.28	Oct. 19	1200	97	2.95
Oct. 17	1445	*106	*3.04	May 29	2000	40	2.29

Minimum discharge, 0.02 ft³/s, July 10, Aug. 19-22; minimum gage height, 0.97 ft, July 10.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3.4	1.2	.92	19	8.9	2.5	3.6	1.5	8.1	.10	.11	.15
2	28	.97	.82	13	6.8	2.3	4.4	1.3	5.5	.10	.09	.15
3	24	.87	.91	8.0	5.4	2.2	5.9	1.0	4.2	.08	.08	.12
4	13	.76	.83	5.8	6.6	1.8	6.8	.99	3.3	.07	.06	.11
5	7.6	.66	.79	4.3	7.0	1.5	6.2	1.5	2.5	.05	.06	.11
6	5.1	.61	.76	3.3	6.9	1.3	5.4	1.3	1.9	.04	.07	.09
7	3.7	.53	.65	2.5	6.2	1.0	5.1	1.2	1.5	.03	.07	.10
8	2.7	.60	.53	2.4	4.9	.92	5.6	1.1	1.2	.04	.06	.20
9	2.1	.67	.49	2.0	4.0	.92	6.9	1.1	1.0	.04	.05	.14
10	1.5	.60	.47	2.1	4.4	.88	7.7	5.6	.85	.03	.06	.13
11	1.1	.51	.44	2.2	4.3	.77	7.9	13	.69	.05	.06	.10
12	.85	.49	.43	2.4	4.5	.71	6.6	10	.59	.14	.05	.09
13	.69	.45	.40	2.0	4.4	.64	5.4	7.5	.49	.10	.04	.11
14	.58	.44	.37	1.7	4.1	.59	4.5	5.3	.42	.60	.05	.15
15	.50	.48	.33	1.6	3.7	.56	4.4	3.8	.37	6.9	.05	.13
16	.42	3.0	.32	1.4	3.3	.53	3.7	3.1	.36	7.6	.04	.11
17	37	4.6	.30	1.3	2.7	2.5	3.4	2.6	.31	4.6	.06	.13
18	40	4.7	.25	1.2	2.1	4.8	3.0	2.0	.26	2.7	.04	.12
19	73	4.1	.24	1.1	1.9	5.1	2.5	1.6	.24	1.8	.03	.11
20	38	3.8	.24	.91	1.8	5.2	2.4	1.4	.21	1.2	.02	.13
21	17	4.3	.22	.92	1.4	4.5	2.7	1.3	.21	.90	.02	.12
22	10	3.0	.21	.90	1.4	5.1	2.9	1.1	.20	.67	.03	.12
23	6.9	2.5	e.20	.79	1.7	5.2	3.0	.92	.28	.53	.06	.13
24	5.0	1.9	e.19	.74	2.4	4.9	3.1	.70	.20	.42	.19	.11
25	3.9	1.5	e.18	.86	2.4	4.5	3.0	.60	.16	.33	.21	.09
26	3.1	1.5	e.17	2.4	2.5	4.1	2.8	1.0	.14	.26	.29	.08
27	2.5	1.3	e.17	3.4	2.8	3.6	2.5	2.5	.12	.21	.29	.07
28	2.1	1.1	.17	4.2	2.8	3.2	2.3	4.1	.11	.19	.24	.06
29	1.7	1.0	.16	5.1	---	3.0	2.1	28	.10	.17	.22	.06
30	1.5	.92	.16	10	---	2.9	1.8	27	.08	.16	.21	.05
31	1.5	---	6.4	12	---	3.1	---	14	---	.14	.17	---
TOTAL	338.44	49.06	18.72	119.52	111.3	80.82	127.6	148.11	35.59	30.25	3.08	3.37
MEAN	10.9	1.64	.60	3.86	3.97	2.61	4.25	4.78	1.19	.98	.099	.11
MAX	73	4.7	6.4	19	8.9	5.2	7.9	28	8.1	7.6	.29	.20
MIN	.42	.44	.16	.74	1.4	.53	1.8	.60	.08	.03	.02	.05
CFSM	5.63	.84	.31	1.99	2.05	1.34	2.19	2.46	.61	.50	.05	.06
IN.	6.49	.94	.36	2.29	2.13	1.55	2.45	2.84	.68	.58	.06	.06

CAL YR 1989 TOTAL 1390.54 MEAN 3.81 MAX 73 MIN .01 CFSM 1.96 IN. 26.66
WTR YR 1990 TOTAL 1065.86 MEAN 2.92 MAX 73 MIN .02 CFSM 1.51 IN. 20.44

e Estimated.

01628500 SOUTH FORK SHENANDOAH RIVER NEAR LYNNWOOD, VA

LOCATION.--Lat 38°19'21", long 78°45'18", Rockingham County, Hydrologic Unit 02070005, on left bank 1.2 mi northeast of Lynnwood and 3.3 mi downstream from confluence of North and South Rivers.

DRAINAGE AREA.--1,084 mi².

PERIOD OF RECORD.--September 1930 to current year.

REVISED RECORDS.--WSP 1171: 1933(M). WSP 2103: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,013.17 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records good except those for period with ice effect, Dec. 18-22, and period of no gage-height record, Dec. 23-31, which are fair. Diurnal fluctuation at low flow prior to 1960 caused by mill at Lynnwood. National Weather Service rain gage and gage-height telemeters at station. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

COOPERATION.--Records were provided by the Virginia Water Control Board.

AVERAGE DISCHARGE.--60 years, 1,005 ft³/s, 12.59 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 95,100 ft³/s, Nov. 5, 1985, gage height, 29.46 ft, from floodmarks, from rating curve extended above 22,000 ft³/s on basis of computations of flow over dam at gage heights 23.60 ft and 27.2 ft; minimum, 32 ft³/s, Sept. 20, 1932, gage height, 1.63 ft; minimum daily, 93 ft³/s, Sept. 21, 29, 1930.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage since at least 1870, that of Nov. 5, 1985.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 7,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Oct. 19	1500	*8,480	*10.05	May 29	1730	8,340	9.96
Jan. 1	1130	8,170	9.85				

Minimum daily discharge, 263 ft³/s, Sept. 30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1530	1050	790	6060	1940	1160	1170	729	2670	399	304	375
2	4730	980	771	3940	1740	1090	1310	693	2020	400	293	363
3	4990	941	755	2780	1650	1070	1450	667	1620	381	287	356
4	3410	893	730	2240	3110	1020	1290	658	1410	359	285	341
5	2540	849	718	2010	2910	954	1190	838	1190	341	286	331
6	2020	828	713	1730	2430	904	1150	769	1040	337	315	329
7	1680	807	697	1520	2130	865	1670	705	940	333	359	328
8	1430	800	700	1420	1880	824	2060	668	866	329	307	333
9	1280	850	714	1480	1650	805	1980	638	811	342	297	322
10	1150	811	657	1520	1850	793	2030	847	804	329	310	316
11	1060	759	648	1400	2270	772	2130	1280	753	344	305	309
12	984	737	674	1310	2090	756	1960	1010	687	419	297	303
13	912	714	685	1200	1860	732	1720	904	648	420	292	396
14	857	695	650	1110	1690	711	1520	995	630	600	300	528
15	817	681	618	1060	1540	696	1540	837	614	817	357	422
16	783	1890	612	1020	1450	683	1380	794	600	679	321	364
17	2060	3900	569	962	1390	940	1230	760	576	520	287	344
18	3760	2770	e560	923	1250	1590	1130	699	558	600	282	324
19	6360	2080	e555	894	1160	1240	1030	647	575	585	285	321
20	5320	1680	e560	862	1090	1180	963	628	533	483	323	319
21	3740	1400	e540	862	1030	1160	947	661	513	454	292	315
22	2850	1220	e500	843	995	1090	976	701	505	453	308	316
23	2250	1150	e495	805	1160	1040	906	802	550	411	897	317
24	1900	1060	e480	781	1540	1010	850	753	516	387	2060	301
25	1650	960	e470	826	1540	1080	811	690	480	365	1520	295
26	1480	945	e500	1180	1360	1080	785	738	452	352	1090	280
27	1340	950	e510	1230	1270	1020	762	1720	435	344	742	278
28	1240	899	e540	1120	1240	1030	737	2260	427	332	582	268
29	1160	853	e600	1230	---	1060	732	6560	410	329	488	266
30	1090	816	e800	2480	---	1090	775	6210	397	328	434	263
31	1060	---	e1140	2140	---	1140	---	3830	---	312	398	---
TOTAL	67433	34968	19951	48938	47215	30585	38184	40691	24230	13084	14903	9923
MEAN	2175	1166	644	1579	1686	987	1273	1313	808	422	481	331
MAX	6360	3900	1140	6060	3110	1590	2130	6560	2670	817	2060	528
MIN	783	681	470	781	995	683	732	628	397	312	282	263
CFSM	2.01	1.08	.59	1.46	1.56	.81	1.17	1.21	.75	.39	.44	.31
IN.	2.31	1.20	.68	1.68	1.62	1.05	1.31	1.40	.83	.45	.51	.34

CAL YR 1989 TOTAL 468661 MEAN 1284 MAX 9850 MIN 251 CFSM 1.18 IN. 16.08
WTR YR 1990 TOTAL 390105 MEAN 1069 MAX 6560 MIN 263 CFSM .99 IN. 13.39

e Estimated.

POTOMAC RIVER BASIN

01629500 SOUTH FORK SHENANDOAH RIVER NEAR LURAY, VA

LOCATION.--Lat 38°38'46", long 78°32'06", Page County, Hydrologic Unit 02070005, on right bank between bridges on U.S. Highway 211, 1.2 mi downstream from Big Run, 2.2 mi upstream from Mill Creek, and 4.1 mi west of Luray.

DRAINAGE AREA.--1,377 mi².

PERIOD OF RECORD.--April 1925 to September 1930, October 1938 to September 1951, June 1979 to current year.

GAGE.--Water-stage recorder. Datum of gage is 721.76 ft above National Geodetic Vertical Datum of 1929. April 1925 to September 1930, nonrecording gage at same site and datum.

REMARKS.--Records good except those for periods with ice effect, Dec. 18-29 and Jan. 1, which are fair. Diurnal fluctuation at low and medium flow caused by powerplant 10 mi upstream from station. Several measurements of water temperature were made during the year.

COOPERATION.--Records were provided by the Virginia Water Control Board.

AVERAGE DISCHARGE.--29 years, 1,324 ft³/s, 13.06 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 110,000 ft³/s, Nov. 5, 1985, gage height, 26.72 ft; minimum, 70 ft³/s, Sept. 27, 1941, gage height, 2.15 ft; minimum daily, 135 ft³/s, Sept. 16, 1925, Sept. 28, 1930.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Mar. 18, 1936, reached a stage of 23.6 ft, from floodmarks, discharge, 81,600 ft³/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 8,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Oct. 3	0430	8,070	7.78	Jan. 1	1430	Ice jam	*11.50
Oct. 19	2230	*11,700	9.31	May 30	0200	10,300	8.74

Minimum discharge, 220 ft³/s, Aug. 1; minimum daily, 341 ft³/s, Aug. 18.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1850	1400	1030	e5900	2670	1520	1570	1020	3710	494	462	509
2	3240	1340	1000	5940	2340	1470	1600	937	2770	602	415	456
3	6920	1250	978	3720	2130	1390	2050	894	2210	526	451	484
4	4660	1210	949	2880	3110	1340	1900	881	1910	506	433	486
5	3360	1120	900	2490	3760	1260	1730	970	1670	487	405	422
6	2650	1100	905	2190	3180	1180	1640	1110	1440	444	472	459
7	2210	1080	910	1920	2740	1110	1980	965	1290	439	446	413
8	1880	1040	888	1770	2420	1060	2810	903	1170	496	490	437
9	1700	1090	888	1780	2140	1030	2700	839	1100	456	444	444
10	1530	1100	867	1820	2130	1010	2730	961	1070	483	438	410
11	1390	1010	802	1820	2800	987	2800	1700	995	466	518	442
12	1280	958	821	1700	2710	956	2640	1590	937	565	446	411
13	1190	954	850	1580	2420	929	2290	1400	808	607	403	696
14	1110	909	828	1450	2200	898	2030	1350	803	560	433	745
15	1050	867	811	1340	2020	874	2010	1270	775	1110	446	799
16	986	1150	764	1320	1900	856	1920	1110	754	1410	481	544
17	983	3860	671	1240	1840	949	1720	1050	737	959	500	526
18	4850	3570	e670	1200	1680	1790	1570	969	754	757	341	454
19	6600	2670	e665	1140	1560	1790	1440	877	830	775	496	458
20	8670	2180	e680	1100	1460	1630	1360	837	761	773	469	400
21	5490	1880	e660	1090	1370	1600	1330	812	681	666	458	437
22	4010	1620	e650	1070	1310	1640	1380	872	681	706	458	438
23	3120	1490	e640	1030	1410	1580	1290	940	658	780	484	433
24	2550	1400	e620	979	1950	1530	1210	980	698	605	1930	416
25	2220	1270	e600	988	1990	1520	1140	910	716	612	1740	407
26	1990	1200	e640	1310	1790	1560	1090	973	649	570	1950	384
27	1810	1230	e660	1680	1660	1510	1060	1280	593	487	1200	365
28	1690	1200	e720	1540	1610	1420	1000	2520	573	543	937	382
29	1570	1110	e850	1540	---	1430	1000	5420	537	503	752	353
30	1470	1070	1020	3230	---	1460	1020	8930	519	470	613	343
31	1400	---	1310	3110	---	1500	---	5480	---	499	558	---
TOTAL	85429	43328	25247	61867	60300	40779	52010	50750	32799	19356	20069	13953
MEAN	2756	1444	814	1996	2154	1315	1734	1637	1093	624	647	465
MAX	8670	3860	1310	5940	3760	1790	2810	8930	3710	1410	1950	799
MIN	983	867	600	979	1310	856	1000	812	519	439	341	343
CFSM	2.00	1.05	.59	1.45	1.56	.96	1.26	1.19	.79	.45	.47	.34
IN.	2.31	1.17	.68	1.67	1.63	1.10	1.41	1.37	.89	.52	.54	.38

CAL YR 1989 TOTAL 613735 MEAN 1681 MAX 15300 MIN 375 CFSM 1.22 IN. 16.58
WTR YR 1990 TOTAL 505887 MEAN 1386 MAX 8930 MIN 341 CFSM 1.01 IN. 13.67

e Estimated.

01631000 SOUTH FORK SHENANDOAH RIVER AT FRONT ROYAL, VA

LOCATION.--Lat 38°54'50", long 78°12'40", Warren County, Hydrologic Unit 02070005, on left bank 0.7 mi downstream from bridge on State Highway 619, 1.0 mi west of Front Royal, and 3.5 mi upstream from confluence with North Fork.

DRAINAGE AREA.--1,642 mi².

PERIOD OF RECORD.--June 1899 to September 1906, September 1930 to current year. Monthly discharge only for some periods, published in WSP 1302.

REVISED RECORDS.--WSP 951: 1936(M). WSP 1171: 1935(M), 1937(M). WSP 2103: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 469.38 ft above National Geodetic Vertical Datum of 1929. June 1899 to July 1906, nonrecording gage at site 1.0 mi upstream at different datum.

REMARKS.--Records good except those for periods with ice effect, Dec. 18-30 and Jan. 2, which are fair. Large diurnal fluctuation at low and medium flow caused by powerplants upstream from station prior to 1954; occasional large diurnal fluctuation thereafter. National Weather Service gage-height telemeter at station. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

AVERAGE DISCHARGE.--67 years, 1,594 ft³/s, 13.18 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 130,000 ft³/s, Oct. 16, 1942, gage height, 34.8 ft, from floodmark in gage well, from rating curve extended above 92,000 ft³/s on basis of slope-area measurement of peak flow; minimum, 59 ft³/s, Jan. 30, 1934, gage height, 0.56 ft; minimum daily, 103 ft³/s, Sept. 30, 1930.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage since at least 1870, that of Oct. 16, 1942.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 8,500 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Oct. 20	1000	*11,300	7.72	May 30	1400	9,670	7.06
Jan. 2	0430	Ice jam	*7.87				

Minimum daily discharge, 354 ft³/s, Sept. 28.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2120	1500	1180	1730	3290	1780	1800	1220	4640	662	502	575
2	2050	1500	1170	e7900	2880	1670	1900	1190	3430	610	669	687
3	5250	1450	1140	5420	2580	1630	1980	1130	2720	737	452	602
4	5530	1340	1110	3920	2490	1560	2360	1060	2280	630	406	543
5	4000	1330	1100	3230	3900	1500	2120	1090	1990	559	370	801
6	3130	1180	1040	2570	3630	1400	1980	1170	1790	553	623	583
7	2580	1240	1070	2250	3170	1350	2110	1250	1570	495	728	632
8	2210	1190	1070	2030	2850	1220	2780	1120	1390	468	663	476
9	1900	1180	1080	1920	2550	1220	3190	1050	1290	560	500	491
10	1790	1190	1020	1930	2430	1180	3070	1050	1220	647	673	564
11	1560	1200	1050	1990	2710	1160	3080	1260	1160	506	498	615
12	1550	1150	966	1920	3130	1150	3060	1880	1080	600	635	489
13	1440	1090	996	1810	2870	1120	2800	1670	1030	793	618	847
14	1240	1100	1040	1670	2630	1090	2470	1580	902	595	449	1210
15	1180	1050	1090	1560	2430	1050	2340	1500	908	861	464	850
16	1190	1080	897	1470	2310	1030	2320	1370	898	1340	526	1320
17	1150	1850	876	1440	2130	1070	2130	1270	861	1590	553	717
18	1980	4110	e850	1360	2010	1270	1910	1170	842	1090	586	759
19	4720	3140	e880	1330	1840	2090	1760	1080	890	896	570	643
20	9470	2550	e860	1310	1720	2010	1620	1020	910	715	448	774
21	6810	2160	e830	1260	1620	1900	1590	1000	857	967	682	493
22	4880	1860	e780	1240	1560	1880	1590	963	775	781	563	414
23	3790	1710	e800	1220	1520	1850	1590	1020	798	1210	615	689
24	3070	1570	e760	1190	1870	1850	1480	1080	758	1120	703	507
25	2600	1480	e750	1160	2230	1820	1390	1090	779	851	2400	628
26	2270	1380	e810	1270	2130	1830	1320	1170	1030	637	2120	493
27	2090	1340	e830	1690	1950	1840	1250	1290	631	736	2190	484
28	1880	1380	e910	1880	1830	1750	1260	1770	731	555	1570	354
29	1760	1320	e1000	1760	---	1680	1200	3510	574	592	1040	385
30	1650	1210	e1200	2600	---	1680	1250	8400	546	586	1050	422
31	1580	---	1280	3960	---	1770	---	6970	---	665	797	---
TOTAL	88420	46830	30435	67990	68260	47400	60700	53393	39280	23607	24663	19047
MEAN	2852	1561	982	2193	2438	1529	2023	1722	1309	762	796	635
MAX	9470	4110	1280	7900	3900	2090	3190	8400	4640	1590	2400	1320
MIN	1150	1050	750	1160	1520	1030	1200	963	546	468	370	354
CFSM	1.74	.95	.60	1.34	1.48	.93	1.23	1.05	.80	.46	.48	.39
IN.	2.00	1.06	.69	1.54	1.55	1.07	1.38	1.21	.89	.53	.56	.43

CAL YR 1989 TOTAL 665730 MEAN 1824 MAX 16500 MIN 381 CFSM 1.11 IN. 15.08
WTR YR 1990 TOTAL 570025 MEAN 1562 MAX 9470 MIN 354 CFSM .95 IN. 12.91

e Estimated.

01632000 NORTH FORK SHENANDOAH RIVER AT COOTES STORE, VA

LOCATION.--Lat 38°38'13", long 78°51'11", Rockingham County, Hydrologic Unit 02070006, on right bank at Cootes Store, 300 ft upstream from bridge on State Highway 259, and 3.7 mi upstream from Linville Creek.

DRAINAGE AREA.--210 mi².

PERIOD OF RECORD.--February 1925 to current year.

REVISED RECORDS.--WSP 726: 1928-31. WSP 951: 1936, 1939(M). WSP 1171: 1935, 1937, 1938(M). WSP 1502: 1926, 1927-28(M), 1929, 1930-34(M). WSP 2103: Drainage area.

GAGE.--Water-stage recorder and concrete control. Datum of gage is 1,051.8 ft above National Geodetic Vertical Datum of 1929 (U.S. Army Corps of Engineers bench mark). Prior to Nov. 15, 1937, nonrecording gage at same site and datum.

REMARKS.--Records good except for period with ice effect, Dec. 18-30, which is fair. National Weather Service gage-height telemeter at station. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

AVERAGE DISCHARGE.--65 years, 191 ft³/s, 12.35 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 50,000 ft³/s, Oct. 15, 1942, gage height, 25.3 ft, from floodmark, from rating curve extended above 9,000 ft³/s on basis of contracted-opening measurement of peak flow; minimum, 0.20 ft³/s, Aug. 28, 29, Sept. 4, 1957, Sept. 7-10, 1966; minimum gage height, 1.74 ft, Sept. 7-10, 1966.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage since at least 1836, that of Oct. 15, 1942.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 3,500 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
May 29	1445	*3,240	*7.16	No peak equal to or greater than base discharge.			

Minimum discharge, 3.8 ft³/s, Aug. 19; minimum gage height, 2.01 ft, July 11, Aug. 19.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	158	88	103	1520	329	115	232	93	447	11	36	41
2	836	80	98	587	286	110	247	85	291	11	27	34
3	741	73	95	405	251	109	305	78	218	9.1	16	28
4	427	67	88	325	280	103	274	75	172	8.4	20	25
5	280	62	88	313	273	95	240	77	140	7.7	9.2	22
6	206	58	83	264	258	87	229	71	116	9.6	11	20
7	159	55	78	223	248	80	289	66	98	7.5	11	17
8	131	57	76	202	225	72	383	61	84	7.1	9.3	16
9	113	79	70	184	203	69	555	56	70	6.5	8.6	16
10	95	73	61	189	268	67	571	74	62	5.8	9.9	15
11	81	67	61	194	309	66	522	101	52	8.4	8.2	13
12	70	65	62	191	299	63	400	84	46	19	7.3	12
13	61	62	62	169	268	61	312	82	41	164	6.7	77
14	54	60	54	148	245	58	254	88	37	169	7.0	68
15	49	60	53	141	219	56	229	176	33	475	5.9	50
16	45	1830	50	132	199	56	198	322	31	427	5.2	36
17	54	1290	52	124	176	74	172	277	28	217	5.1	29
18	73	641	e49	118	151	70	151	204	25	138	4.5	25
19	1130	401	e48	113	137	65	131	156	25	101	5.5	24
20	1130	302	e46	108	129	80	120	128	22	84	8.2	22
21	645	240	e45	108	117	83	123	114	20	83	5.9	19
22	411	197	e44	105	110	84	146	108	20	61	6.3	20
23	283	174	e42	99	120	87	129	107	22	61	329	18
24	219	148	e41	93	199	92	121	91	19	47	267	16
25	179	131	e42	96	152	101	114	81	17	43	575	14
26	152	129	e41	112	128	113	109	375	16	57	301	13
27	135	125	e42	111	126	175	104	1140	14	55	165	12
28	121	117	e41	107	122	187	99	805	13	50	113	11
29	109	112	e42	128	---	187	103	2400	12	46	83	10
30	100	106	e40	342	---	184	103	1710	11	43	64	9.8
31	93	---	136	375	---	214	---	780	---	40	51	---
TOTAL	8340	6949	1933	7326	5827	3063	6965	10065	2202	2472.1	2181.8	732.8
MEAN	269	232	62.4	236	208	98.8	232	325	73.4	79.7	70.4	24.4
MAX	1130	1830	136	1520	329	214	571	2400	447	475	575	77
MIN	45	55	40	93	110	56	99	56	11	5.8	4.5	9.8
CFSM	1.28	1.10	.30	1.13	.99	.47	1.11	1.55	.35	.38	.34	.12
IN.	1.48	1.23	.34	1.30	1.03	.54	1.23	1.78	.39	.44	.39	.13

CAL YR 1989 TOTAL 71829 MEAN 197 MAX 2800 MIN 10 CFSM .94 IN. 12.72
WTR YR 1990 TOTAL 58056.7 MEAN 159 MAX 2400 MIN 4.5 CFSM .76 IN. 10.28

e Estimated.

POTOMAC RIVER BASIN

57

01632082 LINVILLE CREEK AT BROADWAY, VA

LOCATION.--Lat 38°36'24", long 78°48'13", Rockingham County, Hydrologic Unit 02070006, on left bank at Linville, 170 ft downstream from bridge on State Highway 1421, and 1.1 mi upstream from mouth.

DRAINAGE AREA.--45.5 mi².

PERIOD OF RECORD.--August 1985 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,029.90 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records good except those for periods with ice effect, Dec. 4, 9-11, and Dec. 13 to Jan. 1, which are fair. Several measurements of water temperature were made during the year.

COOPERATION.--Records were provided by the Virginia Water Control Board.

AVERAGE DISCHARGE.--5 years, 29.8 ft³/s, 8.89 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 3,160 ft³/s, Nov. 4, 1985, gage height, 6.22 ft; minimum, 2.8 ft³/s, Sept. 13, 14, 17, 1986.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 500 ft³/s (revised) and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Nov. 16	0630	696	3.46	Aug. 25	0400	*846	3.71
Jan. 1	0330	Ice jam	*4.80				

Minimum daily discharge, 6.7 ft³/s, Aug. 17, 18.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	26	34	28	e129	58	44	26	20	34	10	7.2	17
2	90	30	27	86	53	43	28	18	30	8.8	7.2	16
3	60	28	26	69	52	41	26	18	28	8.5	6.9	15
4	47	26	e25	66	84	37	25	18	26	8.0	7.1	14
5	39	25	24	63	68	35	24	19	23	7.9	7.4	14
6	33	25	23	54	59	33	29	17	22	8.3	9.6	14
7	29	24	23	48	55	31	41	16	21	7.4	8.2	14
8	27	24	23	46	49	30	77	16	20	7.9	7.2	14
9	25	27	e22	44	45	30	74	15	19	7.5	7.5	14
10	22	21	e22	49	78	29	60	21	18	7.7	8.4	13
11	21	19	e21	46	70	27	55	17	16	10	7.0	12
12	20	19	21	43	60	27	48	15	16	12	6.9	13
13	19	18	e21	38	54	26	43	18	15	10	6.9	143
14	18	17	e20	35	50	25	41	16	15	17	9.1	45
15	17	17	e19	34	46	23	41	17	15	20	6.8	32
16	16	214	e19	32	45	25	38	16	14	15	6.9	24
17	23	82	e18	30	40	32	34	18	13	11	6.7	21
18	24	63	e17	28	35	26	32	15	13	10	6.7	20
19	175	55	e17	27	34	24	30	15	12	9.1	10	19
20	103	50	e16	27	31	29	29	15	11	13	15	18
21	78	44	e14	25	28	26	30	16	11	13	9.6	16
22	67	42	e13	23	30	25	29	19	17	11	10	19
23	57	41	e12	22	69	24	29	18	17	13	85	16
24	51	37	e12	21	110	26	27	15	13	10	50	14
25	47	36	e12	24	62	27	26	15	11	9.1	155	13
26	43	36	e13	32	54	30	26	26	11	8.6	49	13
27	39	33	e13	29	51	28	24	24	10	7.8	34	12
28	36	31	e14	27	49	27	22	36	9.9	8.0	26	12
29	35	30	e15	65	---	28	23	104	9.3	7.7	22	12
30	32	29	e16	119	---	27	22	58	9.1	7.9	21	11
31	33	---	e18	69	---	29	---	42	---	8.5	18	---
TOTAL	1352	1177	584	1450	1519	914	1059	713	499.3	313.7	638.3	630
MEAN	43.6	39.2	18.8	46.8	54.2	29.5	35.3	23.0	16.6	10.1	20.6	21.0
MAX	175	214	28	129	110	44	77	104	34	20	155	143
MIN	16	17	12	21	28	23	22	15	9.1	7.4	6.7	11
CFSM	.96	.86	.41	1.03	1.19	.65	.78	.51	.37	.22	.45	.46
IN.	1.11	.96	.48	1.19	1.24	.75	.87	.58	.41	.26	.52	.52

CAL YR 1989 TOTAL 10698.0 MEAN 29.3 MAX 261 MIN 6.8 CFSM .64 IN. 8.75
WTR YR 1990 TOTAL 10849.3 MEAN 29.7 MAX 214 MIN 6.7 CFSM .65 IN. 8.87

e Estimated.

POTOMAC RIVER BASIN

01632900 SMITH CREEK NEAR NEW MARKET, VA

LOCATION.--Lat 38°41'36", long 78°38'35", Shenandoah County, Hydrologic Unit 02070006, on left bank 25 ft upstream from bridge on State Highway 620 (revised), 3.6 mi north of New Market, and 4.4 mi upstream from mouth.

DRAINAGE AREA.--93.2 mi².

PERIOD OF RECORD.--August 1960 to current year.

REVISED RECORDS.--WSP 2103: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 881.50 ft above National Geodetic Vertical Datum of 1929. Prior to Aug. 2, 1963, on right bank a short distance downstream, at datum 0.71 ft higher.

REMARKS.--Records good except those for periods with ice effect, Dec. 10, 11 and Dec. 13 to Jan. 3, which are fair. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

COOPERATION.--Records were provided by the Virginia Water Control Board.

AVERAGE DISCHARGE.--30 years, 71.9 ft³/s, 10.48 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 10,600 ft³/s, Oct. 6, 1972, gage height, 16.38 ft, from rating curve extended above 2,300 ft³/s on basis of contracted-opening measurement of peak flow; minimum, 4.5 ft³/s, Feb. 9, 1981, result of freezeup.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Oct. 1, 1959, reached a stage of 10.7 ft, discharge not determined, from information by local residents.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 650 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Jan. 1	1030	Ice jam	*7.22	No peak equal to or greater than base discharge.			

Minimum discharge, 17 ft³/s, Aug. 18, 19, Sept. 11, 12, gage height, 1.35 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	34	52	43	e300	156	108	89	74	110	33	24	25
2	60	46	41	e250	134	101	115	66	90	30	22	24
3	69	45	40	e159	124	97	102	62	83	28	21	24
4	52	43	38	123	210	87	89	60	77	26	22	22
5	46	41	39	109	177	79	80	98	68	26	21	21
6	43	40	39	91	146	75	89	76	61	26	27	21
7	41	39	37	79	132	69	179	63	57	25	31	20
8	39	40	39	75	118	65	247	58	55	25	24	21
9	38	45	40	72	106	64	319	54	52	24	23	21
10	36	41	e36	85	182	63	258	76	70	22	28	20
11	34	37	e36	94	216	60	223	112	54	27	25	19
12	34	36	37	84	160	59	179	71	48	35	23	18
13	32	34	e38	73	135	56	153	94	45	32	22	229
14	31	34	e35	64	123	54	136	98	44	38	23	99
15	29	33	e34	62	111	52	171	65	42	51	24	58
16	29	175	e33	59	109	51	153	69	41	63	20	44
17	36	134	e32	57	104	64	132	70	39	41	19	40
18	62	80	e32	56	88	80	118	56	38	33	18	35
19	237	63	e31	53	84	61	104	52	65	30	18	33
20	204	58	e31	52	79	83	100	51	41	29	21	32
21	131	53	e30	52	73	84	125	52	37	46	22	29
22	98	51	e28	49	73	77	149	56	42	53	23	32
23	79	54	e27	47	97	74	110	59	113	158	44	29
24	67	50	e27	45	406	73	97	50	49	50	62	26
25	61	48	e28	48	189	79	89	45	40	40	52	24
26	57	50	e29	79	142	92	82	88	37	35	47	23
27	53	50	e30	78	129	98	76	96	34	32	37	22
28	52	47	e31	66	122	86	73	99	32	31	33	21
29	50	45	e32	86	---	81	77	395	31	29	31	21
30	47	44	e33	431	---	81	88	235	29	27	29	21
31	48	---	e39	210	---	96	---	142	---	26	26	---
TOTAL	1929	1608	1065	3188	3925	2349	4002	2742	1624	1171	862	1074
MEAN	62.2	53.6	34.4	103	140	75.8	133	88.5	54.1	37.8	27.8	35.8
MAX	237	175	43	431	406	108	319	395	113	158	62	229
MIN	29	33	27	45	73	51	73	45	29	22	18	18
CFSM	.67	.58	.37	1.10	1.50	.81	1.43	.95	.58	.41	.30	.38
IN.	.77	.64	.43	1.27	1.57	.94	1.60	1.09	.65	.47	.34	.43

CAL YR 1989 TOTAL 19358 MEAN 53.0 MAX 690 MIN 13 CFSM .57 IN. 7.73
WTR YR 1990 TOTAL 25539 MEAN 70.0 MAX 431 MIN 18 CFSM .75 IN. 10.19

e Estimated.

POTOMAC RIVER BASIN

59

01633000 NORTH FORK SHENANDOAH RIVER AT MOUNT JACKSON, VA

LOCATION.--Lat 38°44'43", long 78°38'21", Shenandoah County, Hydrologic Unit 02070006, on right bank at upstream side of bridge on State Highway 698 at Mount Jackson and 0.4 mi downstream from Mill Creek.

DRAINAGE AREA.--506 mi².

PERIOD OF RECORD.--October 1943 to current year.

REVISED RECORDS.--WSP 1382: 1945, 1948-50(M), 1951-53(P), 1954(M). WSP 2103: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 838.55 ft above National Geodetic Vertical Datum of 1929. Prior to July 1, 1976, nonrecording gage, and July 1, 1976, to Oct. 23, 1981, water-stage recorder, at site 400 ft upstream at same datum.

REMARKS.--Records good except those for periods with ice effect, Dec. 10, 11, 15, 16, 18, 23-30, and Jan. 1, which are fair. Some diversion during low flow by irrigation at points upstream from station. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

COOPERATION.--Records were provided by the Virginia Water Control Board.

AVERAGE DISCHARGE.--47 years, 386 ft³/s, 10.36 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 50,800 ft³/s, Nov. 5, 1985, gage height, 17.79 ft, from rating curve extended above 19,000 ft³/s on basis of peak runoff for stations at Cootes Store and near Strasburg; maximum gage height, 18.10 ft, Oct. 6, 1972; minimum discharge observed, 7.0 ft³/s, Sept. 3, 1966, gage height, 1.97 ft.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in October 1942 reached a stage of 20.2 ft, from floodmarks, discharge, about 80,000 ft³/s, from rating curve extended above 18,000 ft³/s on basis of peak runoff for flood in October 1942 for stations at Cootes Store and near Strasburg.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 5,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
May 29	1730	*5,350	*8.79	No other peak equal to or greater than base discharge.			

Minimum daily discharge, 49 ft³/s, Aug. 18.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	247	234	220	e1430	697	354	454	249	864	90	69	114
2	862	216	211	1180	616	334	483	232	618	84	64	102
3	1170	204	206	794	554	325	568	219	497	74	60	95
4	750	190	192	637	661	304	520	214	422	69	57	86
5	537	184	191	608	656	283	468	247	355	66	57	80
6	420	179	187	547	593	267	444	227	307	67	65	76
7	345	170	181	471	566	250	596	209	273	68	75	74
8	289	170	177	429	523	235	804	196	251	65	62	69
9	257	200	174	404	475	228	1060	184	229	62	60	69
10	228	202	e156	407	594	222	1020	217	228	58	70	67
11	204	183	e153	437	785	216	961	290	202	68	64	64
12	188	175	157	423	684	210	777	246	179	107	60	61
13	172	168	159	387	619	201	632	251	167	191	58	453
14	160	162	145	338	573	193	544	288	160	292	59	294
15	149	161	e148	321	524	187	528	242	150	557	59	205
16	140	2060	e145	302	488	183	473	564	144	688	54	152
17	150	2190	142	284	454	216	416	523	137	401	50	129
18	202	1100	e140	270	393	243	376	441	128	260	49	111
19	1260	720	139	259	360	209	332	354	149	191	51	105
20	1910	558	146	248	338	240	309	307	124	158	58	100
21	1160	464	126	244	310	251	321	284	112	193	65	92
22	790	393	113	236	297	245	389	273	112	166	63	96
23	585	360	e112	225	319	241	335	288	203	311	323	94
24	471	316	e113	214	817	244	307	255	129	160	592	82
25	401	283	e114	219	539	264	289	229	109	126	755	76
26	350	272	e120	277	424	286	275	350	99	107	586	71
27	312	270	e118	291	398	356	264	1620	92	96	345	69
28	284	254	e128	268	383	395	253	1270	86	88	240	67
29	263	241	e138	284	---	387	259	3490	82	81	186	64
30	244	228	e148	923	---	384	274	3000	78	79	155	64
31	232	---	197	818	---	422	---	1410	---	74	132	---
TOTAL	14732	12507	4796	14175	14640	8375	14731	18169	6686	5097	4643	3281
MEAN	475	417	155	457	523	270	491	586	223	164	150	109
MAX	1910	2190	220	1430	817	422	1060	3490	864	688	755	453
MIN	140	161	112	214	297	183	253	184	78	58	49	61
CFSM	.94	.82	.31	.90	1.03	.53	.97	1.16	.44	.32	.30	.22
IN.	1.08	.92	.35	1.04	1.08	.62	1.08	1.34	.49	.37	.34	.24

CAL YR 1989 TOTAL 130926 MEAN 359 MAX 4920 MIN 44 CFMS .71 IN. 9.63
WTR YR 1990 TOTAL 121832 MEAN 334 MAX 3490 MIN 49 CFMS .66 IN. 8.96

e Estimated.

POTOMAC RIVER BASIN

01634000 NORTH FORK SHENANDOAH RIVER NEAR STRASBURG, VA

LOCATION.--Lat 38°58'36", long 78°20'11", Warren County, Hydrologic Unit 02070006, on right bank at downstream side of bridge on State Highway 55, 1.5 mi southeast of Strasburg, 2.2 mi upstream from Cedar Creek, and 10 mi upstream from confluence with South Fork.

DRAINAGE AREA.--768 mi².

PERIOD OF RECORD.--March 1925 to current year.

REVISED RECORDS.--WSP 951: 1936(M). WSP 1001: 1931. WSP 1171: 1929(M), 1933(M), 1936-37. WSP 1302: 1928(M), 1930(M). WSP 2103: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 494.03 ft above National Geodetic Vertical Datum of 1929. Prior to Sept. 21, 1930, nonrecording gage at same site and datum.

REMARKS.--Records good except for period with ice effect, Dec. 16 to Jan. 6, which is fair. Large diurnal fluctuation at low and medium flow from unknown cause. National Weather Service gage-height telemeter at station. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

AVERAGE DISCHARGE.--65 years, 582 ft³/s, 10.29 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 100,000 ft³/s, Oct. 16, 1942, gage height, 31.2 ft, from high-water mark in well, from rating curve extended above 46,000 ft³/s; minimum, 6.0 ft³/s, Feb. 9, 1934, gage height, 1.52 ft; minimum daily, 35 ft³/s, Oct. 15, 1985, Sept. 14, 18, 1986.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage since at least 1870, that of Oct. 16, 1942.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 6,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Jan. 3	2045	Ice jam	*8.66	No peak equal to or greater than base discharge.			

Minimum discharge, 106 ft³/s, July 30; minimum daily, 114 ft³/s, July 8, 9.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	408	341	364	e481	1040	563	632	423	1620	153	163	241
2	399	330	352	e2550	904	530	674	380	1150	163	155	226
3	951	321	341	e3840	816	505	751	353	883	182	147	217
4	1220	300	329	e1990	776	487	818	344	741	150	133	193
5	855	284	302	e1420	892	462	734	340	627	127	143	186
6	664	272	305	e1050	851	435	680	341	554	126	181	173
7	542	271	303	807	782	407	758	345	472	121	173	171
8	453	265	305	638	745	386	977	317	419	114	168	182
9	393	292	295	594	694	372	1130	291	379	114	165	137
10	375	319	318	563	711	363	1320	307	333	116	155	131
11	318	327	308	557	933	343	1250	325	307	115	147	138
12	283	285	245	583	1010	344	1150	431	287	197	155	142
13	275	293	267	559	905	335	960	374	263	1530	155	216
14	262	264	256	522	825	324	819	343	223	1350	154	750
15	246	262	234	473	768	314	748	397	219	917	142	697
16	232	369	e260	449	714	320	715	343	209	1890	137	448
17	246	3320	e245	428	669	287	653	554	199	1320	137	365
18	252	2000	e250	407	622	340	588	588	192	822	137	257
19	432	1270	e245	389	560	370	539	518	191	578	142	245
20	1770	940	e260	381	521	355	495	436	173	552	143	222
21	1830	760	e230	371	492	345	478	392	185	526	134	210
22	1260	648	e220	354	466	378	484	365	173	462	145	201
23	938	591	e215	347	468	366	548	355	177	450	224	192
24	737	534	e209	340	612	371	501	358	185	538	618	189
25	616	486	e207	340	1080	386	461	352	216	398	1030	180
26	536	449	e208	364	742	412	440	387	172	291	1040	166
27	485	436	e209	424	608	434	415	798	152	212	899	156
28	448	431	e211	453	592	515	392	1920	145	227	607	150
29	400	408	e205	441	---	558	384	1990	138	214	457	145
30	373	382	e212	615	---	552	395	4400	132	144	343	141
31	359	---	e204	1270	---	578	---	2700	---	178	268	---
TOTAL	18558	17450	8114	24000	20798	12737	20889	21767	11116	14277	8797	7067
MEAN	599	582	262	774	743	411	696	702	371	461	284	236
MAX	1830	3320	364	3840	1080	578	1320	4400	1620	1890	1040	750
MIN	232	262	204	340	466	287	384	291	132	114	133	131
CFSM	.78	.76	.34	1.01	.97	.53	.91	.91	.48	.60	.37	.31
IN.	.90	.85	.39	1.16	1.01	.62	1.01	1.05	.54	.69	.43	.34

CAL YR 1989 TOTAL 186594 MEAN 511 MAX 4090 MIN 70 CFSM .67 IN. 9.04
WTR YR 1990 TOTAL 185570 MEAN 508 MAX 4400 MIN 114 CFSM .66 IN. 8.99

e Estimated.

POTOMAC RIVER BASIN

61

01634500 CEDAR CREEK NEAR WINCHESTER, VA

LOCATION.--Lat 39°04'52", long 78°19'47", Frederick County, Hydrologic Unit 02070006, on left bank 0.2 mi upstream from Fawcett Run, 0.3 mi upstream from bridge on State Highway 628, 1.3 mi downstream from Froman Run, and 11.4 mi southwest of Winchester.

DRAINAGE AREA.--103 mi².

PERIOD OF RECORD.--June 1937 to current year.

REVISED RECORDS.--WSP 2103: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 647.09 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records good except those for periods with ice effect, Dec. 4, 9-11, 14-25, and Jan. 1, 2, 4-11, 14, and period of no gage-height record, Dec. 26-31, which are fair. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

COOPERATION.--Records were provided by the Virginia Water Control Board.

AVERAGE DISCHARGE.--53 years, 93.9 ft³/s, 12.38 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 22,000 ft³/s, Oct. 15, 1942, gage height, 27.0 ft, from floodmarks, from rating curve extended above 15,000 ft³/s; minimum, 1.8 ft³/s, Feb. 19, 1941, Dec. 7, 1958, result of freezeups; minimum daily, 2.8 ft³/s, Sept. 7, 1964, Sept. 3, 4, 7, 8, 1966; minimum gage height, 1.04 ft, Feb. 19, 1941.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Mar. 17, 1936, reached a stage of about 25 ft, discharge, about 18,000 ft³/s, from information by local residents.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 1,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Jan. 30	0300	*703	*3.93	No peak equal to or greater than base discharge.			

Minimum daily discharge, 11 ft³/s, July 10, 11, Aug. 18, 19.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	27	41	50	e304	164	90	141	59	141	48	17	24
2	92	37	48	e240	138	85	133	58	109	33	15	22
3	68	35	45	191	122	82	148	46	98	20	14	21
4	51	33	e45	e175	155	73	124	48	84	15	13	20
5	43	32	47	e230	136	66	111	67	71	15	17	17
6	39	31	44	e150	116	62	106	55	61	18	40	16
7	36	31	41	e111	109	56	159	50	55	13	31	15
8	34	36	39	e95	100	53	187	45	51	12	20	14
9	33	69	e39	e91	94	54	157	42	46	12	17	15
10	30	56	e38	e89	125	53	139	79	42	11	18	15
11	29	45	e39	e87	132	51	136	110	36	11	18	13
12	28	40	42	79	121	49	116	72	33	37	15	12
13	26	37	41	66	108	46	101	69	32	185	14	94
14	25	34	e36	e64	103	45	94	64	31	90	15	59
15	24	34	e35	58	96	43	98	55	28	114	13	42
16	23	300	e34	55	94	42	90	52	28	155	12	32
17	34	206	e33	52	87	53	83	64	25	77	12	34
18	48	138	e32	51	74	57	75	52	24	55	11	27
19	171	106	e30	49	71	46	67	44	22	85	11	25
20	177	94	e32	48	67	64	64	41	21	63	22	26
21	129	83	e30	53	61	63	68	40	20	56	18	23
22	99	72	e28	50	60	59	75	42	19	65	40	24
23	81	72	e25	46	74	56	65	49	23	67	112	23
24	70	64	e24	44	313	57	60	39	19	48	128	19
25	63	60	e24	49	156	65	57	35	17	38	107	16
26	56	67	e25	76	113	83	55	75	15	31	86	16
27	51	63	e26	76	105	86	52	116	14	27	57	16
28	47	61	e27	68	101	79	50	99	13	24	44	15
29	46	57	e27	107	---	77	56	423	12	22	37	14
30	42	52	e29	451	---	78	66	308	12	21	32	14
31	42	---	e35	216	---	152	---	195	---	20	27	---
TOTAL	1764	2086	1090	3521	3195	2025	2933	2593	1202	1488	1033	723
MEAN	56.9	69.5	35.2	114	114	65.3	97.8	83.6	40.1	48.0	33.3	24.1
MAX	177	300	50	451	313	152	187	423	141	185	128	94
MIN	23	31	24	44	60	42	50	35	12	11	11	12
CFSM	.55	.68	.34	1.10	1.11	.63	.95	.81	.39	.47	.32	.23
IN.	.64	.75	.39	1.27	1.15	.73	1.06	.94	.43	.54	.37	.26

CAL YR 1989 TOTAL 31181 MEAN 85.4 MAX 1180 MIN 11 CFMS .83 IN. 11.26
WTR YR 1990 TOTAL 23653 MEAN 64.8 MAX 451 MIN 11 CFMS .63 IN. 8.54

e Estimated.

POTOMAC RIVER BASIN

01635500 PASSAGE CREEK NEAR BUCKTON, VA

LOCATION.--Lat 38°57'29", long 78°16'01", Warren County, Hydrologic Unit 02070006, on right bank 350 ft upstream from bridge on State Highway 55, 1.2 mi south of Buckton railroad station, 1.4 mi upstream from mouth, and 4.2 mi west of Riverton.

DRAINAGE AREA.--87.8 mi².

PERIOD OF RECORD.--October 1905 to July 1906 (gage heights only), April 1932 to current year. Prior to October 1966 published as "at Buckton."

REVISED RECORDS.--WSP 2103: Drainage area.

GAGE.--Water-stage recorder and concrete control. Datum of gage is 525.14 ft above National Geodetic Vertical Datum of 1929. October 1905 to July 1906, nonrecording gage at site 1 mi downstream at different datum. Apr. 4, 1932, to Oct. 7, 1937, nonrecording gage at site 350 ft downstream at different datum.

REMARKS.--Records good except those for periods with ice effect, Dec. 10, 11, 14, 15, and Jan. 2-4, and period of no gage-height record, Dec. 16 to Jan. 1, which are fair. Occasional diurnal fluctuation during low flow caused by State Fish Hatchery 2 mi upstream from station. At a point 14.2 mi upstream from station on Little Passage Creek, there is a diversion of about 0.33 ft³/s from Strasburg Reservoir, capacity, 54.6 acre-ft, by town of Strasburg for municipal water supply. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

COOPERATION.--Records were provided by the Virginia Water Control Board.

AVERAGE DISCHARGE.--58 years, 68.2 ft³/s, 10.55 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 21,000 ft³/s, Oct. 15, 1942, gage height, 15.5 ft, from high-water mark in well, from rating curve extended above 5,200 ft³/s; minimum observed, 0.1 ft³/s, Aug. 5, 1932.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 1,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
May 29	1930	*872	*5.82	No peak equal to or greater than base discharge.			

Minimum daily discharge, 3.3 ft³/s, July 10.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	11	24	30	e50	128	74	111	59	131	18	12	8.0
2	20	24	29	e130	113	68	106	52	100	26	9.9	7.1
3	25	22	27	e77	101	67	115	47	84	12	8.7	6.7
4	18	20	27	e56	116	59	101	47	78	8.9	7.6	6.6
5	14	19	28	147	119	52	89	52	59	7.1	10	5.0
6	12	19	26	88	102	48	88	47	46	5.9	20	5.4
7	11	19	24	86	96	45	172	40	39	5.0	23	5.2
8	10	18	23	69	86	41	258	37	35	4.7	15	5.0
9	9.9	22	21	68	79	41	217	34	32	4.6	11	6.7
10	8.9	25	e18	74	128	40	182	43	31	3.3	10	5.4
11	8.5	22	e20	84	173	39	158	68	27	3.9	11	4.4
12	8.5	20	24	75	140	37	130	45	23	33	10	4.3
13	8.9	18	23	62	119	35	112	40	20	108	11	113
14	8.6	18	e19	58	109	34	102	70	19	55	10	80
15	8.1	19	e19	52	98	33	115	54	18	72	11	37
16	7.4	71	e18	47	94	32	107	46	16	130	8.5	27
17	9.0	111	e18	44	85	38	93	48	15	56	6.9	25
18	14	62	e18	43	71	47	82	39	14	35	6.4	21
19	112	48	e17	41	67	39	71	32	17	26	6.2	16
20	142	42	e17	39	62	49	67	29	14	22	6.7	16
21	98	38	e14	41	55	60	73	29	13	25	7.3	14
22	64	36	e13	39	53	55	88	28	12	36	8.8	13
23	48	36	e13	36	62	53	73	32	15	148	27	14
24	41	34	e13	35	273	50	66	28	16	65	50	13
25	37	32	e14	38	143	57	63	24	12	37	31	11
26	33	35	e14	75	101	75	59	77	9.9	27	23	9.8
27	31	38	e15	97	91	99	54	169	8.4	21	19	9.2
28	28	36	e16	75	85	85	51	117	7.5	18	15	7.9
29	26	34	e17	78	---	77	52	587	7.3	16	12	7.2
30	25	31	e18	286	---	74	74	406	6.3	15	10	7.3
31	24	---	e26	169	---	111	---	193	---	15	9.2	---
TOTAL	921.8	993	619	2359	2949	1714	3129	2619	925.4	1059.4	427.2	511.2
MEAN	29.7	33.1	20.0	76.1	105	55.3	104	84.5	30.8	34.2	13.8	17.0
MAX	142	111	30	286	273	111	258	587	131	148	50	113
MIN	7.4	18	13	35	53	32	51	24	6.3	3.3	6.2	4.3
CFSM	.34	.38	.23	.87	1.20	.63	1.19	.96	.35	.39	.16	.19
IN.	.39	.42	.26	1.00	1.25	.73	1.33	1.11	.39	.45	.18	.22

CAL YR 1989 TOTAL 22095.9 MEAN 60.5 MAX 1150 MIN 4.6 CFSM .69 IN. 9.36
WTR YR 1990 TOTAL 18227.0 MEAN 49.9 MAX 587 MIN 3.3 CFSM .57 IN. 7.72

e Estimated.

01636500 SHENANDOAH RIVER AT MILLVILLE, WV
(National stream-quality accounting network station)

LOCATION.--Lat 39°16'55", long 77°47'22", Jefferson County, Hydrologic Unit 02070007, on left bank 0.4 mi downstream from Cattail Run, 1.0 mi upstream from Millville, 5.0 mi upstream from Harpers Ferry, and at mile 5.0.
DRAINAGE AREA.--3,040 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--April 1895 to March 1909, August 1928 to current year.
REVISED RECORDS.--WSP 951: 1936(M). WSP 1432: Drainage area at former site, 1895-99, 1901-2, 1905, 1907-8, 1932(M), 1935(M).
GAGE.--Water-stage recorder. Datum of gage is 293.00 ft above National Geodetic Vertical Datum of 1929. Apr. 15, 1895, to Mar. 31, 1909, nonrecording gage at site 0.8 mi downstream at datum 0.32 ft higher.
REMARKS.--Records good except those for periods of estimated discharges, Dec. 12-31 and Aug. 8-14, which are fair. Regulation by hydroelectric plants, particularly that of Potomac Light and Power Company, 0.5 mi upstream from station. National Weather Service gage-height telemeter and U.S. Army Corps of Engineers satellite telemeter at station.
AVERAGE DISCHARGE.--75 years (water years 1896-1908, 1929-90) 2,682 ft³/s, 11.98 in/yr.
EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 230,000 ft³/s, Oct. 16, 1942, gage height, 32.4 ft, from floodmarks; minimum, 59 ft³/s, Oct. 4, 1930, gage height, 0.39 ft; minimum daily, 194 ft³/s, July 24, 1930.
EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of 1870 reached practically same stage as flood of Mar. 18, 1936, 26.36 ft, discharge, 151,000 ft³/s.
EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 15,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Jan. 3	0115	*19,300	*9.56	May 31	0030	15,600	8.60

Minimum daily discharge, 533 ft³/s, July 11-14.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2760	2120	1740	1750	5690	2850	3190	2090	8520	661	822	1060
2	2760	1970	1660	2950	4850	2740	3290	2020	6050	841	794	974
3	2720	2020	1630	9260	4340	2590	3630	1930	4740	894	781	771
4	7390	1890	1590	6140	3990	2510	3790	1810	3940	949	764	852
5	6000	1670	1540	5360	4290	2380	3880	1710	3320	885	607	755
6	4570	1750	1530	4740	5400	2270	3540	1750	2880	764	722	878
7	3710	1570	1470	3990	4840	2100	3560	1820	2540	727	1220	835
8	3070	1660	1480	3380	4360	2030	4320	1870	2260	668	e1100	755
9	2680	1560	1500	3080	4010	1880	5140	1700	2080	590	e850	680
10	2310	1630	1460	2910	3780	1900	5280	1690	1960	550	e750	645
11	2180	1650	1320	2910	4040	1820	5260	1750	1800	533	e850	634
12	1900	1640	e1300	2980	4650	1760	5100	2080	1680	533	e760	740
13	1880	1550	e1200	2830	4670	1720	4800	2670	1590	533	e700	792
14	1770	1490	e1150	2640	4320	1600	4300	2390	1480	533	e750	1120
15	1450	1480	e1100	2440	3940	1600	3950	2250	1340	1400	745	1820
16	1560	1450	e1100	2290	3640	1630	3750	2200	1290	2630	626	1510
17	1500	2210	e1080	2160	3410	1680	3630	2080	1270	3880	595	1590
18	1540	6510	e1060	2090	3200	1740	3270	2060	1210	3030	708	1160
19	3590	5810	e1030	2030	2950	1990	2940	1990	1230	2080	698	991
20	7850	4470	e1000	1960	2720	2960	2720	1840	1210	1690	936	999
21	11700	3670	e990	1900	2530	2790	2570	1680	1260	1540	731	998
22	7900	3060	e980	1860	2400	2700	2540	1590	1110	1830	751	856
23	5930	2720	e970	1770	2320	2670	2530	1530	1110	1610	865	727
24	4790	2450	e960	1750	2540	2650	2550	1580	1060	2020	955	777
25	3970	2270	e950	1740	3660	2660	2350	1610	1050	1840	1620	841
26	3430	2140	e950	1850	3840	2670	2210	1750	1090	1470	3260	773
27	2990	2020	e950	2100	3320	2740	2100	1920	1310	1170	2920	806
28	2730	1930	e950	2600	3000	2770	1990	2680	889	1020	2680	778
29	2450	1980	e950	2710	---	2740	1980	4990	942	1060	2040	704
30	2310	1880	e1000	3290	---	2730	2060	10300	901	740	1500	566
31	2170	---	e1500	5340	---	2900	---	13400	---	921	1390	---
TOTAL	113560	70220	38090	94800	106700	71770	102220	82730	63112	39592	34490	27387
MEAN	3663	2341	1229	3058	3811	2315	3407	2669	2104	1277	1113	913
MAX	11700	6510	1740	9260	5690	2960	5280	13400	8520	3880	3260	1820
MIN	1450	1450	950	1740	2320	1600	1980	1530	889	533	595	566
CFSM	1.21	.77	.40	1.01	1.25	.76	1.12	.88	.69	.42	.37	.30
IN.	1.39	.86	.47	1.16	1.31	.88	1.25	1.01	.77	.48	.42	.34

CAL YR 1989 TOTAL 977138 MEAN 2677 MAX 21600 MIN 601 CFSM .88 IN. 11.96
WTR YR 1990 TOTAL 844671 MEAN 2314 MAX 13400 MIN 533 CFSM .76 IN. 10.34

e Estimated.

01636500 SHENANDOAH RIVER AT MILLVILLE, WV--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1960-63, 1965, 1969-71, 1979 to current year.

INSTRUMENTATION.--Water-quality monitor October 1980 to September 1983.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: October 1980 to September 1983 (discontinued).

WATER TEMPERATURES: October 1980 to September 1983 (discontinued).

EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE (water years 1981-82): Maximum, 778 microsiemens, Dec. 29, 1980; minimum, 212 microsiemens, Jan. 17, 1982.

WATER TEMPERATURE: Maximum, 30.0°C, July 20, 21, 1981; minimum, 0.0°C on many days during winter periods.

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	TIME	Dis-charge, instantaneous (ft ³ /s)	Specific conductance (US/CM)	Ph (stand-ard units)	Temper-ature, water (deg C)	Temper-ature, air (deg C)	Baro-metric pres-sure (mm of Hg)	Tur-bid-ity (ntu)	Oxygen, dis-solved (mg/L)	Oxygen, dis-solved (per-cent saturation)
OCT										
30...	0905	2490	305	7.78	13.5	20.0	762	3.3	10.5	101
JAN										
29...	0900	2700	320	8.08	6.0	15.0	757	6.7	11.8	95
MAR										
05...	0900	2370	255	8.53	6.0	5.0	766	4.7	12.6	101
APR										
30...	0900	2080	275	8.06	20.0	18.0	755	2.9	7.5	83
JUN										
25...	0950	1040	338	7.68	24.0	24.0	757	--	6.7	80
SEP										
04...	0915	1920	273	7.68	25.0	24.0	765	6.4	7.6	92

DATE	Coli-form, fecal, 0.7 UM-MF (col/100 ML)	Strep-tococci, fecal, KF agar (cols. per 100 ML)	Calcium dis-solved (mg/L as Ca)	Magne-sium, dis-solved (mg/L as Mg)	Sodium, dis-solved (mg/L as Na)	Potas-sium, dis-solved (mg/L as K)	Alka-linity, wat wh tot fet field (mg/L as CaCO ₃)	Sulfate dis-solved (mg/L as SO ₄)	Chlo-ride, dis-solved (mg/L as Cl)	Fluo-ride, dis-solved (mg/L as F)	Silica, dis-solved (mg/L as SiO ₂)
OCT											
30...	72	68	38	9.6	8.2	2.1	113	21	8.3	0.10	5.5
JAN											
29...	100	K85	39	13	11	2.2	122	15	12	<0.10	4.3
MAR											
05...	K2	K6	37	9.8	6.3	1.8	137	15	10	0.10	0.51
APR											
30...	250	340	36	10	6.6	1.8	115	14	10	0.10	0.77
JUN											
25...	K40	220	--	--	--	--	136	--	--	--	--
SEP											
04...	K32	470	38	10	6.6	3.8	122	19	12	<0.10	8.0

DATE	Solids, residue at 180 deg. C dis-solved (mg/L)	Solids, sum of consti-tuents, dis-solved (mg/L)	Nitro-gen, nitrate dis-solved (mg/L as N)	Nitro-gen, nitrite dis-solved (mg/L as N)	Nitro-gen, NO ₂ +NO ₃ dis-solved (mg/L as N)	Nitro-gen, ammonia total (mg/L as N)	Nitro-gen, ammonia dis-solved (mg/L as N)	Nitro-gen, ammonia + organic total (mg/L as N)	Phos-phorous total (mg/L as P)	Phos-phorous dis-solved (mg/L as P)	Phos-phorous ortho, dis-solved (mg/L as P)
OCT											
30...	147	167	1.39	<0.010	1.40	0.020	0.010	0.30	0.050	0.030	0.030
JAN											
29...	180	174	0.890	0.010	0.900	0.080	0.080	0.40	0.120	0.080	0.080
MAR											
05...	158	168	1.08	0.020	1.10	0.020	0.040	0.30	0.120	0.010	<0.010
APR											
30...	162	152	0.690	0.010	0.700	0.030	0.050	0.60	0.080	0.040	0.030
JUN											
25...	--	--	--	--	--	--	--	--	--	--	--
SEP											
04...	153	177	1.29	<0.010	1.30	0.030	0.030	0.60	0.110	0.110	0.090

< Actual value is known to be less than the value shown.

K Results based on colony count outside the acceptance range (non-ideal colony count).

POTOMAC RIVER BASIN

65

01636500 SHENANDOAH RIVER AT MILLVILLE, WV--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	Alum- inum, dis- solved (ug/L as Al)	Arsenic, dis- solved (ug/L as As)	Barium, dis- solved (ug/L as BA)	Beryl- lium, dis- solved (ug/L as BE)	Cadmium, dis- solved (ug/L as Cd)	Chro- mium, dis- solved (ug/L as CR)	Cobalt, dis- solved (ug/L as CO)	Copper, dis- solved (ug/L as Cu)	Iron, dis- solved (ug/L as Fe)	Lead, dis- solved (ug/L as Pb)	Lithium dis- solved (ug/L as Li)
OCT 30...	<10	<1	31	<0.5	<1	<1	<3	1	27	<1	<4
JAN 29...	--	--	--	--	--	--	--	--	--	--	--
MAR 05...	<10	<1	26	<0.5	<1	<5	<3	<10	28	<10	5
APR 30...	30	<1	30	<0.5	1	<1	<3	1	32	<1	5
JUN 25...	--	--	--	--	--	--	--	--	--	--	--
SEP 04...	20	2	37	<0.5	3	<1	<3	6	11	<1	8

DATE	Manga- nese, dis- solved (ug/L as Mn)	Mercury dis- solved (ug/L as Hg)	Molyb- denum, dis- solved (ug/L as Mo)	Nickel, dis- solved (ug/L as Ni)	Sele- nium, dis- solved (ug/L as SE)	Silver, dis- solved (ug/L as Ag)	Stron- tium, dis- solved (ug/L as Sr)	Vana- dium, dis- solved (ug/L as V)	Zinc, dis- solved (ug/L as Zn)	Hard- ness total (mg/L as CaCO3)
OCT 30...	29	<0.1	<10	1	<1	<1.0	130	<6	<3	130
JAN 29...	--	--	--	--	--	--	--	--	--	150
MAR 05...	16	<0.1	<10	<10	<1	<1.0	130	<6	<3	130
APR 30...	32	<0.1	<10	1	<1	<1.0	140	<6	6	130
JUN 25...	--	--	--	--	--	--	--	--	--	--
SEP 04...	17	0.2	<10	2	<1	<1.0	140	<6	15	140

< Actual value is known to be less than the value shown.

PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT

DATE	TIME	Dis- charge, instan- taneous (ft ³ /s)	Sedi- ment, sus- pended (mg/L)	Sedi- ment, dis- charge, sus- PENDED (T/DAY)	Sed. susp. sieve diam. % finer than .062 MM
OCT 30...	0905	2490	11	74	94
JAN 29...	0900	2700	6	44	100
MAR 05...	0900	2370	8	51	100
APR 30...	0900	2080	11	62	80
JUN 25...	0950	1040	14	39	99
SEP 04...	0915	1920	17	88	97

POTOMAC RIVER BASIN

01638480 CATOCTIN CREEK AT TAYLORSTOWN, VA

LOCATION.--Lat 39°15'18", long 77°34'36", Loudoun County, Hydrologic Unit 02070008, on left bank at downstream side of bridge on State Highway 663 at Taylorstown and 3.2 mi downstream from Milltown Creek.

DRAINAGE AREA.--89.6 mi².

PERIOD OF RECORD.--August 1971 to current year.

GAGE.--Water-stage recorder. Datum of gage is 247.37 ft above National Geodetic Vertical Datum of 1929. Prior to Nov. 3, 1983, at site 60 ft upstream at datum 1.78 ft higher.

REMARKS.--Records good except those for periods with ice effect, Dec. 4, 9, 10, 14-31, which are fair. Several measurements of water temperature were made during the year.

COOPERATION.--Records were provided by the Virginia Water Control Board.

AVERAGE DISCHARGE.--19 years, 101 ft³/s, 15.31 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 23,800 ft³/s, June 22, 1972, gage height, 23.83 ft, from floodmarks, site and datum then in use, from rating curve extended above 7,400 ft³/s on basis of contracted-opening measurement of peak flow; minimum daily, 0.20 ft³/s, Sept. 23, 1986.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 1,200 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
May 29	1945	*856	*5.48	No peak equal to or greater than base discharge.			

Minimum daily discharge, 6.4 ft³/s, Oct. 8.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	7.5	19	21	139	151	64	170	87	139	21	15	16
2	41	19	20	86	126	60	228	61	113	38	12	15
3	33	19	20	61	110	60	422	53	117	21	11	14
4	14	18	e18	54	155	55	225	56	149	17	9.3	13
5	9.5	17	19	61	129	51	183	87	94	16	45	12
6	7.5	18	20	63	97	48	172	62	76	15	181	12
7	7.0	17	20	49	87	45	325	52	68	14	116	12
8	6.4	18	19	43	81	43	238	46	62	13	41	11
9	6.9	26	e18	44	73	44	185	43	86	13	33	11
10	7.4	41	e19	55	129	46	161	156	241	12	48	10
11	7.8	26	18	72	153	45	157	183	84	12	36	10
12	7.7	21	20	54	108	44	132	79	63	16	27	9.9
13	7.8	18	22	38	90	42	112	69	54	92	22	19
14	7.7	17	e22	36	83	40	102	65	50	73	21	32
15	7.6	17	e21	37	77	38	165	54	47	130	18	21
16	7.0	46	e18	33	75	44	129	51	45	54	16	18
17	9.8	62	e16	33	72	85	102	61	41	32	15	14
18	20	33	e15	33	60	137	96	49	57	23	14	14
19	121	25	e15	30	58	65	81	40	45	20	13	11
20	197	23	e15	28	54	126	76	38	37	19	54	13
21	94	21	e16	33	50	168	82	42	33	62	40	12
22	47	21	e14	32	51	99	91	41	33	58	35	14
23	32	22	e11	29	62	82	75	40	35	53	101	16
24	26	23	e9.0	27	187	83	67	36	32	34	108	13
25	23	22	e9.0	36	94	92	61	35	27	24	72	10
26	21	23	e10	255	63	115	60	176	25	20	42	11
27	20	25	e12	158	65	83	54	123	23	18	33	12
28	19	26	e14	96	65	71	51	73	22	16	26	12
29	18	26	e15	133	---	70	55	507	21	15	22	11
30	16	23	e16	490	---	84	93	378	19	15	19	10
31	17	---	e20	212	---	259	---	196	---	17	17	---
TOTAL	866.6	732	522.0	2550	2605	2388	4150	3039	1938	983	1262.3	408.9
MEAN	28.0	24.4	16.8	82.3	93.0	77.0	138	98.0	64.6	31.7	40.7	13.6
MAX	197	62	22	490	187	259	422	507	241	130	181	32
MIN	6.4	17	9.0	27	50	38	51	35	19	12	9.3	9.9
CFSM	.31	.27	.19	.92	1.04	.86	1.54	1.09	.72	.35	.45	.15
IN.	.36	.30	.22	1.06	1.08	.99	1.72	1.26	.80	.41	.52	.17

CAL YR 1989 TOTAL 31298.9 MEAN 85.8 MAX 2650 MIN 5.4 CFSM .96 IN. 12.99
WTR YR 1990 TOTAL 21444.8 MEAN 58.8 MAX 507 MIN 6.4 CFSM .66 IN. 8.90

e Estimated.

01638500 POTOMAC RIVER AT POINT OF ROCKS, MD

LOCATION.--Lat 39°16'25", long 77°32'35", Frederick County, Hydrologic Unit 02070008, on left bank at downstream side of bridge on U.S. Highway 15 at Point of Rocks, 0.3 mi downstream from Catoctin Creek (Virginia), 6 mi upstream from Monocacy River, and at mile 159.5.

DRAINAGE AREA.--9,651 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--February 1895 to current year.

REVISED RECORDS.--WSP 192: 1895-1905. WSP 1432: 1899, 1901-2, 1904-5, 1912, 1914(M), 1915, 1917(M), 1918, 1919(M), 1920, 1921-23(M), 1924, 1925-28(M), 1930(M).

GAGE.--Water-stage recorder. Datum of gage is 200.63 ft above National Geodetic Vertical Datum of 1929. Prior to Oct. 28, 1929, nonrecording gage at same site. Prior to Sept. 2, 1902, at datum about 0.45 ft higher.

REMARKS.--Records good except those for period of ice effect, Dec. 17 to Jan. 3, which are fair. Low flow affected slightly from 1913 to July 1981 by Stony River Reservoir, since December 1950 by Savage River Reservoir, and since July 1981 by Jennings Randolph Lake. Low flow affected extensively at times by run-of-the-river hydroelectric plants. National Weather Service gage-height telemeter at station.

AVERAGE DISCHARGE.--95 years, 9,365 ft³/s, 13.18 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 480,000 ft³/s, Mar. 19, 1936, gage height, 41.03 ft, from rating curve extended above 300,000 ft³/s on the basis of adjustment of figure of peak flow at station near Washington for inflow and storage, and slope-area measurement of peak flow; minimum discharge, 530 ft³/s, Sept. 11, 12, 1966, gage height, 0.27 ft.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 2, 1889, reached a stage of 40.2 ft, from floodmarks, discharge, about 460,000 ft³/s from rating curve extended as explained above.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 35,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
May 31	2330	*39,800	*9.30	No other peak equal to or greater than base discharge.			

Minimum discharge, 1,700 ft³/s, Aug. 16, 17, gage height, 0.94 ft.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	5730	5060	5990	e4000	25400	6830	7000	5380	33100	2540	2490	3480
2	5720	4980	5700	e6500	20400	6720	8040	5540	23200	2450	2460	3070
3	5780	5010	5450	e16000	17300	6610	10600	5380	17200	2520	2120	2630
4	10300	4720	5140	16300	16100	6450	12200	5130	14800	4000	2280	2590
5	11500	4480	4890	13700	16400	6240	12100	5200	12800	3930	2110	2400
6	9390	4260	4820	12700	18000	6060	10900	5860	11000	3330	2700	2210
7	7740	4070	4750	14800	16900	5770	10400	9270	9230	2840	2820	2420
8	6540	4050	4600	14000	15600	5560	10500	9300	7970	2570	2800	2190
9	5760	4160	4640	12400	14300	5270	11300	7910	7210	2530	2690	2160
10	5150	4240	4400	10600	13400	5200	11400	7580	7020	2400	2610	2090
11	4730	4800	3990	10100	14100	5100	11200	8470	6350	2790	2230	2110
12	4320	4870	4180	10400	16200	5010	11600	10800	5790	3060	2180	2190
13	4150	4930	4320	10800	16300	4930	11800	10300	5770	3470	1940	2550
14	3910	4530	4140	10100	15000	4770	11100	9740	5410	5520	2070	2580
15	3650	4380	3940	9050	13800	4690	10300	8810	4940	11300	2290	4040
16	3520	4450	3540	8370	12600	4690	9550	7930	4440	13400	1870	4470
17	3460	9130	e2600	7920	11800	4950	8940	7490	4260	13700	1740	3920
18	3460	22800	e2400	7910	11000	4920	8340	7070	4010	12400	1780	3830
19	4780	20200	e2200	7730	10200	4860	7670	6900	4160	9240	1810	3720
20	10200	14800	e2200	7960	9340	6150	7050	6420	4190	7140	2100	3390
21	24200	11600	e2100	8190	8730	6320	6690	5850	3940	6000	3630	2850
22	21700	10100	e2100	8230	8230	6310	6430	5490	3510	5820	3710	2890
23	15900	8770	e2200	9140	7720	6270	6270	5350	3360	6090	3610	2730
24	12400	7740	e2200	9110	8120	6060	6270	5160	3100	5430	5770	2620
25	10000	7100	e2200	8660	8740	5910	6140	4680	3010	5420	9450	2890
26	8450	6530	e2200	9020	8740	5870	5890	5470	3010	4790	10100	2680
27	7370	6100	e2100	9850	7780	5930	5460	7340	3190	4150	8030	2620
28	6670	5960	e2300	10400	7100	5990	5230	17100	2960	3410	7050	2410
29	6110	6090	e2500	10200	---	6050	5170	25900	2590	3200	5700	2390
30	5650	6210	e2800	16100	---	6080	5200	30200	2740	2820	4680	2260
31	5280	---	e3200	e30000	---	6630	---	37700	---	2660	4090	---
TOTAL	243520	216120	109790	340240	369300	178200	260740	300720	224260	160920	110910	84380
MEAN	7855	7204	3542	10980	13190	5748	8691	9701	7475	5191	3578	2813
MAX	24200	22800	5990	30000	25400	6830	12200	37700	33100	13700	10100	4470
MIN	3460	4050	2100	4000	7100	4690	5170	4680	2590	2400	1740	2090
CFSM	.81	.75	.37	1.14	1.37	.60	.90	1.01	.77	.54	.37	.29
IN.	.94	.83	.42	1.31	1.42	.69	1.01	1.16	.86	.62	.43	.33

CAL YR 1989 TOTAL 3543630 MEAN 9709 MAX 71200 MIN 2100 CFSM 1.01 IN. 13.66
WTR YR 1990 TOTAL 2599100 MEAN 7121 MAX 37700 MIN 1740 CFSM .74 IN. 10.02

e Estimated.

POTOMAC RIVER BASIN

01638500 POTOMAC RIVER AT POINT OF ROCKS, MD--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1961 to current year.

PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: October 1960 to current year.

SUSPENDED-SEDIMENT DISCHARGE: October 1960 to current year.

REMARKS.--Water temperatures are measured daily in field by local observer at time of sampling.

EXTREMES FOR PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: Maximum daily, 33.5°C, Aug. 24, 1964, July 19, 1977; minimum daily, 0.0°C on many days during winter periods.

SEDIMENT CONCENTRATION: Maximum daily mean, 2,690 mg/L, Nov. 7, 1985; minimum daily mean, 1 mg/L, on many days most years.

SEDIMENT LOAD: Maximum daily, 1,930,000 tons, Nov. 7, 1985; minimum daily, 2.0 tons on many days during 1964, 1966-1969.

EXTREMES FOR CURRENT YEAR.--

WATER TEMPERATURE: Maximum daily, 28.5°C, June 28, July 9; minimum daily, 0.0°C, Dec. 13.

SEDIMENT CONCENTRATION: Maximum daily mean, 255 mg/L, May 31; minimum daily mean, 1 mg/L, Aug. 19.

SEDIMENT LOAD: Maximum daily, 26,000 tons, May 31; minimum daily, 4.9 tons, Aug. 19.

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
INSTANTANEOUS VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	15.0	2.0	---	6.0	---	9.5	18.0	15.5	25.0	26.5	---
2	18.0	12.0	4.0	10.0	6.0	---	10.0	19.0	---	---	27.0	---
3	---	11.0	5.0	---	7.0	---	12.0	19.0	---	---	27.0	---
4	17.0	10.0	---	---	6.0	---	10.0	16.5	19.0	---	---	---
5	---	---	---	---	6.0	8.0	10.0	18.0	18.5	---	---	---
6	17.0	10.0	4.0	---	7.0	8.0	8.5	17.0	21.0	25.5	---	---
7	15.0	15.0	3.0	---	7.0	6.0	9.0	16.0	22.0	26.0	---	---
8	---	11.0	---	---	7.0	9.0	9.0	16.5	21.0	27.0	---	---
9	13.0	11.0	---	---	7.5	9.0	9.5	20.0	22.5	28.5	---	23.0
10	---	15.0	---	---	7.0	11.0	10.0	17.0	24.0	28.0	---	23.0
11	12.0	14.0	---	---	6.0	11.0	10.0	17.0	21.5	28.0	---	24.0
12	17.0	11.0	---	---	6.0	14.0	---	17.0	24.0	26.0	---	---
13	---	9.0	.0	---	6.5	16.0	10.0	18.0	23.0	---	---	---
14	17.0	---	1.0	---	6.5	16.0	13.0	18.5	---	26.0	---	---
15	---	11.0	---	---	7.0	18.0	14.5	19.0	24.0	24.5	---	---
16	18.0	12.0	---	---	8.0	18.0	13.0	19.0	24.0	23.0	---	21.5
17	19.0	8.0	---	---	7.0	16.0	11.0	19.0	25.0	---	---	20.0
18	17.0	8.0	---	5.0	6.0	14.0	12.5	19.5	25.0	---	---	18.0
19	16.0	8.0	---	5.0	7.0	13.0	13.0	20.0	27.0	---	24.0	17.0
20	---	---	---	4.0	6.0	10.0	14.0	20.0	25.0	---	24.0	20.0
21	12.0	---	---	---	5.5	9.5	14.5	19.0	26.0	26.0	23.0	---
22	13.0	5.0	---	---	8.5	12.0	15.0	18.0	26.0	26.5	22.0	---
23	12.0	5.0	---	6.0	9.0	10.0	17.5	19.0	25.0	26.0	22.0	---
24	13.0	4.0	---	7.0	8.0	8.5	17.0	19.0	24.0	26.5	22.0	19.5
25	11.0	4.0	---	6.0	8.0	9.0	19.0	---	22.0	26.5	23.0	20.0
26	11.0	---	---	---	3.0	9.5	23.0	19.0	24.5	28.0	23.0	20.0
27	12.0	5.0	---	6.0	2.5	9.5	20.0	18.0	27.0	28.0	23.0	19.5
28	13.0	7.0	---	---	---	10.0	20.0	18.0	28.5	26.0	25.0	---
29	15.0	7.0	---	---	---	9.0	20.0	15.0	28.0	26.0	26.0	---
30	12.0	---	---	5.0	---	9.0	18.0	16.0	27.0	26.0	25.5	---
31	19.0	---	---	5.0	---	9.0	---	15.0	---	28.0	25.0	---

01638500 POTOMAC RIVER AT POINT OF ROCKS, MD--Continued

SEDIMENT, SUSPENDED CONCENTRATION (MG/L), WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DAY	MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)
OCTOBER			NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH	
1	18	278	7	96	6	97	e4	43	95	6520	e5	92
2	18	278	12	161	6	92	8	140	45	2480	e4	73
3	20	312	17	230	6	88	74	3200	27	1260	e4	71
4	72	2000	7	89	5	69	e50	2200	20	869	e4	70
5	80	2480	8	97	5	66	e30	1110	14	620	7	118
6	54	1370	9	104	4	52	e15	514	17	826	15	245
7	35	731	7	77	4	51	e20	799	15	684	21	327
8	24	424	5	55	4	50	e15	567	12	505	9	135
9	17	264	5	56	4	50	e12	402	11	425	9	128
10	14	195	6	69	4	48	e10	286	9	326	8	112
11	12	153	8	104	5	54	e9	245	9	343	7	96
12	9	105	23	302	5	56	e9	253	12	525	7	95
13	8	90	27	359	3	35	e9	262	13	572	9	120
14	7	74	8	98	3	34	e9	245	11	445	8	103
15	6	59	6	71	e3	32	e9	220	10	373	4	51
16	5	48	10	120	e3	29	e9	203	10	340	6	76
17	10	93	28	690	e3	21	e9	192	9	287	7	94
18	7	65	103	6340	e3	19	9	192	7	208	11	146
19	18	232	74	4040	e3	18	7	146	8	220	6	79
20	40	1100	34	1360	e3	18	9	193	7	177	7	116
21	210	13700	23	720	e3	17	9	199	4	94	8	137
22	100	5860	14	382	e15	85	9	200	3	67	10	170
23	57	2450	8	189	e10	59	12	296	4	83	11	186
24	33	1100	7	146	e5	30	17	418	4	88	12	196
25	21	567	7	134	e4	24	11	257	5	118	13	207
26	13	297	6	106	e4	24	21	511	8	189	9	143
27	11	219	4	66	e4	23	30	798	5	105	27	432
28	9	162	4	64	e4	25	33	927	e5	96	13	210
29	8	132	4	66	e4	27	19	523	---	---	12	196
30	7	107	5	84	e4	30	57	2480	---	---	12	197
31	7	100	---	---	e4	35	185	15000	---	---	14	251
TOTAL	---	35045	---	16475	---	1358	---	33021	---	18845	---	4672
APRIL			MAY		JUNE		JULY		AUGUST		SEPTEMBER	
1	30	567	15	218	212	18900	12	82	e6	40	e4	38
2	47	1020	16	239	182	11400	12	79	e5	33	e4	33
3	45	1290	14	203	102	4740	12	82	e5	29	e4	28
4	28	922	13	180	43	1720	22	238	e5	31	e4	28
5	24	784	19	267	38	1310	20	212	e5	28	e3	19
6	16	471	33	522	34	1010	13	117	e10	73	e3	18
7	15	421	35	876	30	748	12	92	e8	61	e3	20
8	19	539	28	703	26	559	11	76	e6	45	e3	18
9	21	641	21	448	25	487	10	68	e5	36	4	23
10	23	708	19	389	23	436	10	65	e5	35	2	11
11	20	605	27	617	22	377	15	113	e5	30	e2	11
12	21	658	33	962	22	344	20	165	e4	24	e2	12
13	23	733	27	751	19	296	26	244	e4	21	e3	21
14	21	629	e25	657	17	248	60	894	e4	22	e4	28
15	20	556	e25	595	15	200	72	2200	e6	37	e10	109
16	18	464	e25	535	15	180	64	2320	e5	25	e6	72
17	18	434	25	506	15	173	e70	2590	e4	19	8	85
18	19	428	21	401	14	152	e65	2180	e3	14	6	62
19	15	311	22	410	12	135	e50	1250	1	4.9	6	60
20	13	247	25	433	12	136	e40	771	7	40	12	110
21	10	181	23	363	11	117	63	1020	7	69	e10	77
22	10	174	17	252	10	95	60	943	10	100	e8	62
23	11	186	16	231	10	91	18	296	19	185	e5	37
24	12	203	16	223	11	92	12	176	16	249	3	21
25	12	199	14	177	11	89	12	176	21	536	3	23
26	9	143	23	340	12	98	11	142	22	600	3	22
27	11	162	36	713	15	129	8	90	23	499	4	28
28	19	268	108	4990	14	112	6	55	21	400	e4	26
29	15	209	140	9790	12	84	e6	52	10	154	e4	26
30	15	211	185	15100	12	89	e6	46	4	51	e4	24
31	---	---	255	26000	---	---	e6	43	e4	44	---	---
TOTAL	---	14364	---	68091	---	44547	---	16877	---	3534.9	---	1152

TOTAL LOAD FOR YEAR
e Estimated.

257981.9 TONS

POTOMAC RIVER BASIN

01643700 GOOSE CREEK NEAR MIDDLEBURG, VA

LOCATION.--Lat 38°59'11", long 77°47'49", Loudoun County, Hydrologic Unit 02070008, on right bank 250 ft upstream from bridge on State Highway 611, 2.0 mi downstream from Panther Skin Creek, and 3.4 mi northwest of Middleburg.

DRAINAGE AREA.--123 mi².

PERIOD OF RECORD.--October 1965 to September 1967, July 1969 to current year.

REVISED RECORDS.--WSP 2103: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 329.80 ft above National Geodetic Vertical Datum of 1929. October 1965 to September 1967, at site 300 ft downstream at datum 0.73 ft lower.

REMARKS.--Records good except those for periods with ice effect, Dec. 4 and Dec. 17 to Jan. 10, periods of backwater from beaver dam, Aug. 16-19, Aug. 29 to Sept. 12, and Sept. 18-26, and above 1,200 ft³/s, which are fair. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

COOPERATION.--Records were provided by the Virginia Water Control Board.

AVERAGE DISCHARGE.--23 years, 129 ft³/s, 14.24 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 19,200 ft³/s, June 22, 1972, gage height, 27.46 ft, from floodmarks, from rating curve extended above 2,900 ft³/s on basis of slope-area measurements at gage heights 14.44 ft and 27.46 ft; no flow Sept. 21-26, 1985, Sept. 29 to Oct. 3, 1986.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 1,350 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
July 16	0030	*1,470	*7.23	No other peak equal to or greater than base discharge.			

Minimum daily discharge, 13 ft³/s, Oct. 15, 16.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	18	49	35	e140	224	104	215	158	174	38	38	e50
2	122	41	34	e115	193	101	232	127	146	35	32	e46
3	78	38	34	e90	168	101	307	109	136	24	30	e43
4	42	36	e31	e80	204	92	232	107	140	19	28	e38
5	31	34	33	e94	164	86	207	128	108	19	37	e35
6	26	33	33	e93	141	83	204	99	94	22	400	e36
7	24	33	33	e80	134	78	347	85	85	18	199	e35
8	20	34	30	e78	126	75	311	76	79	15	97	e34
9	20	49	33	e88	119	78	261	70	79	16	77	e33
10	20	56	31	e100	187	78	238	359	120	15	87	e32
11	18	40	33	137	172	74	231	269	72	14	72	e33
12	17	36	33	115	152	73	196	172	61	42	59	e30
13	16	33	36	93	136	69	172	160	57	451	113	148
14	14	31	31	80	131	67	157	142	54	196	145	85
15	13	32	32	79	122	65	220	119	50	489	76	61
16	13	78	31	70	122	64	165	112	50	529	e52	53
17	15	75	e28	59	112	130	146	122	45	171	e47	77
18	35	50	e27	58	98	139	131	95	47	118	e41	e47
19	269	43	e25	55	98	97	119	79	79	91	e38	e39
20	342	41	e26	51	92	182	113	76	49	73	485	e40
21	181	38	e23	53	86	187	124	82	42	97	140	e36
22	112	35	e19	49	90	165	129	76	38	96	148	e34
23	79	40	e14	45	114	154	106	79	43	107	292	e36
24	64	39	e14	43	244	147	95	68	37	73	335	e31
25	56	38	e15	60	127	172	91	63	32	58	248	e28
26	50	42	e17	280	109	186	96	109	29	50	188	e26
27	45	48	e20	192	109	152	83	111	27	45	135	29
28	42	44	e23	152	110	140	76	92	24	42	105	29
29	38	40	e24	183	---	139	93	428	22	41	e80	29
30	36	36	e25	519	---	156	247	318	20	43	e64	28
31	39	---	e34	282	---	272	---	219	---	46	e55	---
TOTAL	1895	1262	857	3613	3884	3706	5344	4309	2039	3093	3943	1301
MEAN	61.1	42.1	27.6	117	139	120	178	139	68.0	99.8	127	43.4
MAX	342	78	36	519	244	272	347	428	174	529	485	148
MIN	13	31	14	43	86	64	76	63	20	14	28	26
CFSM	.50	.34	.22	.95	1.13	.97	1.45	1.13	.55	.81	1.03	.35
IN.	.57	.38	.26	1.09	1.17	1.12	1.62	1.30	.62	.94	1.19	.39

CAL YR 1989 TOTAL 39345.7 MEAN 108 MAX 2590 MIN 9.7 CFSM .88 IN. 11.90
WTR YR 1990 TOTAL 35246 MEAN 96.6 MAX 529 MIN 13 CFSM .79 IN. 10.66

e Estimated.

01644000 GOOSE CREEK NEAR LEESBURG, VA

LOCATION.--Lat 39°01'10", long 77°34'40", Loudoun County, Hydrologic Unit 02070008, on left bank 400 ft upstream from bridge on State Highway 621 at Evergreen Mills, 1.4 mi downstream from Little River, 6.7 mi south of Leesburg, and 10.9 mi upstream from mouth.

DRAINAGE AREA.--332 mi².

PERIOD OF RECORD.--July 1909 to April 1911, September 1911 to December 1912, January 1930 to current year.

REVISED RECORDS.--WSP 851: 1935-37. WSP 951: 1933(M), 1937. WSP 1302: 1934-35(M). WSP 2103: Drainage area.

WDR VA-72-1: 1937(M), 1943(M), 1951(M), 1956(M). WDR VA-79-1: 1978.

GAGE.--Water-stage recorder. Datum of gage is 248.93 ft above National Geodetic Vertical Datum of 1929. July 12, 1909, to Dec. 31, 1912, nonrecording gage at site 1,000 ft downstream at different datum. Jan. 21, 1930, to Nov. 28, 1938, nonrecording gage at site 400 ft downstream at datum 4.20 ft lower than present datum.

REMARKS.--Records good except those for periods of no gage-height record, Feb. 1 to Mar. 7, June 28-30, and July 15 to Aug. 8, which are fair. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

COOPERATION.--Records were provided by the Virginia Water Control Board.

AVERAGE DISCHARGE.--62 years (water years 1910, 1912, 1931-90), 314 ft³/s, 12.84 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 78,100 ft³/s, June 22, 1972, gage height, 30.59 ft, from high-water mark in gage house, from rating curve extended above 11,000 ft³/s on basis of slope-area measurement of peak flow; minimum daily, 0.40 ft³/s, Sept. 27-30, 1941.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in May or June 1889 reached a stage of about 29 ft, discharge, about 45,000 ft³/s, site and datum in use 1930-38, from information by local residents.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 4,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Aug. 20	1400	*2,340	*4.46	No peak equal to or greater than base discharge.			

Minimum daily discharge, 34 ft³/s, Oct. 16, Dec. 25, July 11.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	42	85	79	239	e612	e273	689	533	467	60	e93	117
2	109	90	77	306	e534	e255	830	374	385	77	e76	109
3	202	82	74	219	e466	e255	1320	311	339	61	e67	103
4	93	78	e73	203	e552	e237	816	285	352	49	e61	90
5	66	74	75	217	e530	e210	673	350	283	43	e64	83
6	53	71	71	235	e405	e202	613	297	234	53	e1130	84
7	48	70	71	204	e372	e184	1100	242	212	47	e739	82
8	45	71	70	185	e356	173	1040	212	198	40	e268	79
9	42	83	66	191	e318	174	753	192	189	37	188	74
10	41	122	72	239	e500	180	649	1100	341	37	222	74
11	42	100	76	327	e588	174	636	1180	205	34	193	77
12	40	82	75	283	e478	169	535	588	161	57	147	70
13	39	77	77	219	e406	168	463	490	145	1150	123	268
14	37	74	69	177	e380	161	411	435	138	654	383	295
15	35	71	74	179	e353	152	588	346	130	e950	171	155
16	34	95	71	166	e340	147	510	311	126	e1320	125	116
17	37	207	65	158	e322	200	410	345	120	e484	109	149
18	56	123	63	156	e264	477	373	289	112	e330	96	119
19	449	98	58	148	e251	265	325	221	193	e243	87	91
20	799	87	58	132	e239	376	303	204	149	e194	938	93
21	502	81	59	130	e214	539	321	206	112	e215	450	86
22	247	76	52	130	e212	409	361	204	101	e340	298	79
23	172	79	43	119	e273	371	304	201	101	e291	609	85
24	139	83	36	113	e580	341	269	182	99	e231	659	76
25	117	80	34	148	e390	400	252	164	82	e161	523	67
26	104	83	39	776	e268	511	250	226	73	e132	399	64
27	94	93	45	636	e289	410	228	328	68	e113	296	66
28	87	97	51	440	e282	358	210	235	e63	e98	231	65
29	82	93	57	469	---	343	211	1240	e59	e96	187	62
30	79	85	61	1490	---	383	682	1090	e54	e109	158	60
31	78	---	74	799	---	880	---	618	---	e100	134	---
TOTAL	4010	2690	1965	9433	10774	9377	16125	12999	5291	7806	9224	3038
MEAN	129	89.7	63.4	304	385	302	537	419	176	252	298	101
MAX	799	207	79	1490	612	880	1320	1240	467	1320	1130	295
MIN	34	70	34	113	212	147	210	164	54	34	61	60
CFSM	.39	.27	.19	.92	1.16	.91	1.62	1.26	.53	.76	.90	.31
IN.	.45	.30	.22	1.06	1.21	1.05	1.81	1.46	.59	.87	1.03	.34

CAL YR 1989 TOTAL 102675 MEAN 281 MAX 4430 MIN 16 CFSM .85 IN. 11.50
WTR YR 1990 TOTAL 92732 MEAN 254 MAX 1490 MIN 34 CFSM .77 IN. 10.39

e Estimated.

POTOMAC RIVER BASIN

01646000 DIFFICULT RUN NEAR GREAT FALLS, VA

LOCATION.--Lat 38°58'33", long 77°14'46", Fairfax County, Hydrologic Unit 02070008, on right bank 250 ft downstream from bridge on State Highway 193, 300 ft downstream from Rocky Run, 0.7 mi upstream from mouth, and 1.5 mi southeast of Great Falls.

DRAINAGE AREA.--57.9 mi².

PERIOD OF RECORD.--October 1934 to current year. Monthly discharge only October to December 1934, published in WSP 1302.

REVISED RECORDS.--WSP 951: 1936(M), 1937-38, 1939-40(M). WSP 2103: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 151.30 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records good except those for periods with ice effect, Dec. 10, 15-17, Dec. 22 to Jan. 1, and Jan. 4, 5, which are fair. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

COOPERATION.--Records were provided by the Virginia Water Control Board.

AVERAGE DISCHARGE.--56 years, 59.4 ft³/s, 13.93 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 32,200 ft³/s, June 22, 1972, gage height, 21.40 ft, from floodmarks, from rating curve extended above 1,600 ft³/s on basis of contracted-opening measurement at gage height 13.18 ft and slope-area measurement at gage height 21.40 ft; minimum, 0.05 ft³/s, Sept. 9, 10, 1966, gage height, 1.65 ft.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 1,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Nov. 16	1500	*1,000	*7.31	No other peak equal to or greater than base discharge.			
Minimum daily discharge, 13 ft ³ /s, Sept. 25, 29, 30.							

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	22	43	33	e358	67	46	91	91	53	77	20	23
2	178	30	32	87	60	46	236	65	47	41	18	22
3	42	36	33	59	55	52	329	55	44	24	17	21
4	26	34	30	e52	85	45	104	53	43	20	16	20
5	22	29	31	e54	60	42	81	154	38	19	22	20
6	21	28	31	50	51	42	86	69	37	39	296	22
7	20	29	31	44	50	40	212	55	36	19	75	22
8	18	45	31	54	47	39	110	51	35	18	31	20
9	19	64	33	80	47	41	81	46	124	17	138	18
10	25	37	e31	91	126	43	72	331	167	17	469	19
11	25	31	31	63	85	40	89	180	45	16	87	18
12	24	30	32	53	68	40	66	73	37	140	44	19
13	18	28	38	46	55	39	59	70	35	380	37	26
14	17	29	36	43	53	38	58	66	34	140	49	23
15	17	31	e33	43	49	38	265	54	33	141	31	20
16	17	531	e34	42	55	38	92	51	33	69	28	57
17	97	126	e33	42	52	165	75	63	30	37	27	53
18	80	59	29	42	45	150	74	59	29	31	25	19
19	503	46	29	39	46	66	61	43	43	28	24	17
20	343	44	30	38	43	123	58	42	33	26	143	18
21	81	40	28	41	41	85	87	44	28	76	41	16
22	47	38	e25	38	50	61	80	45	38	67	54	22
23	39	43	e23	37	148	54	62	44	65	35	72	20
24	36	40	e23	37	100	64	56	40	32	26	42	16
25	34	35	e24	96	58	86	53	38	27	24	39	13
26	32	43	e25	378	46	78	53	100	25	22	33	15
27	30	41	e24	103	46	60	50	60	23	19	30	21
28	28	38	e24	67	48	54	46	47	22	19	28	14
29	27	36	e25	126	---	55	106	453	21	21	26	13
30	27	34	e28	331	---	92	275	120	20	30	26	13
31	33	---	e73	87	---	184	---	65	---	22	23	---
TOTAL	1948	1718	963	2721	1736	2046	3167	2727	1277	1660	2011	640
MEAN	62.8	57.3	31.1	87.8	62.0	66.0	106	88.0	42.6	53.5	64.9	21.3
MAX	503	531	73	378	148	184	329	453	167	380	469	57
MIN	17	28	23	37	41	38	46	38	20	16	16	13
CFSM	1.09	.99	.54	1.52	1.07	1.14	1.82	1.52	.74	.92	1.12	.37
IN.	1.25	1.10	.62	1.75	1.12	1.31	2.03	1.75	.82	1.07	1.29	.41

CAL YR 1989 TOTAL 24184 MEAN 66.3 MAX 2310 MIN 10 CFSM 1.14 IN. 15.54
WTR YR 1990 TOTAL 22614 MEAN 62.0 MAX 531 MIN 13 CFSM 1.07 IN. 14.53

e Estimated.

01646500 POTOMAC RIVER NEAR WASHINGTON, DC

LOCATION.--Lat 38°56'58", long 77°07'40", Montgomery County, Md., Hydrologic Unit 02070008, on left bank just upstream from Little Falls Dam, 1 mi upstream from District of Columbia boundary line, 1.2 mi upstream from Chain Bridge, 1.8 mi east of Langley, Fairfax County, Va., and at mile 117.4.

DRAINAGE AREA.--11,560 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--March 1930 to current year.

REVISED RECORDS.--WSP 726: Drainage area. WDR MD-DE-75-1: 1973-74(M).

GAGE.--Water-stage recorder and concrete control. Datum of gage is 37.95 ft above National Geodetic Vertical Datum of 1929. Prior to June 7, 1930, nonrecording gage, and June 7, 1930, to Jan. 22, 1965, water-stage recorder at site 1 mi upstream on right bank at same datum.

REMARKS.--Records good except those for estimated daily discharges (ice effect), which are fair. Diversions at Great Falls through aqueducts, and since June 1959, from gage pool at Little Falls Dam, for municipal supply of Washington, D.C.; since October 1958, at Rockville Filtration Plant, for municipal supply of city of Rockville; since April 1961, at Potomac Filtration Plant for water supply of Washington Suburban Sanitary District; since October 1961, at Fairfax Water Treatment Plant for water supply of city of Fairfax (from Goose Creek); since April 1964, at Violets Lock to Chesapeake and Ohio Canal; and since October 1985, at Fairfax County Water Authority Treatment Plant for water supply of the county. Low flow affected slightly prior to July 1981 by Stony River Reservoir, since December 1950, by Savage River Reservoir (see station 01597500), and since July 1981, by Jennings Randolph Lake. Gage-height, telemeter at station.

AVERAGE DISCHARGE.--60 years, 11,480 ft³/s, 13.49 in/yr, adjusted for diversions.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 484,000 ft³/s, Mar. 19, 1936, gage height, 28.1 ft, site then in use; minimum daily discharge observed at gaging station, 121 ft³/s, Sept. 9, 1966, does not include diversion of 489 ft³/s for municipal use; minimum daily discharge (adjusted), 601 ft³/s, Sept. 10, 1966, includes diversion of 449 ft³/s for municipal use.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 2, 1889, was of approximately the same magnitude as that of March 19, 1936.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 45,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
May 31	1130	*61,000	*7.24	No other peak equal to or greater than base discharge.			

Minimum daily discharge, 1,530 ft³/s, Aug. 19, does not include diversion for municipal use; minimum daily (adjusted) discharge, 2,450 ft³/s, Aug. 19.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	6610	5620	6720	e4000	35800	8760	10400	8000	46200	2780	2420	4270
2	6760	5240	6380	e5500	27800	8500	10500	7490	30700	2810	2360	3570
3	6390	5160	5740	e7000	23000	8300	20900	6990	22400	2550	2100	3100
4	6610	5150	5450	19600	20800	8080	20100	6520	18600	2510	1810	2550
5	12600	4810	5190	18300	20800	7760	17900	6680	16600	3770	1890	2470
6	11600	4530	5050	16200	21400	7510	16100	7090	14300	3980	5450	2240
7	9480	4290	5020	15900	21200	7200	16500	8450	12100	3370	4890	2030
8	7910	4150	4960	17400	19600	6770	16300	11200	10400	3020	3660	2160
9	6690	4270	4910	15400	17900	6560	15300	10300	9680	2640	3560	2020
10	5770	4490	4680	14200	17300	6320	15300	10600	11300	2530	5800	1890
11	5150	4860	4390	13200	18100	6240	15000	18500	8610	2340	3790	1720
12	4760	5360	4150	13200	19700	6170	14800	16700	7230	3240	2770	1720
13	4340	5200	4370	13200	20000	5900	15000	14300	6480	5900	2580	1890
14	4090	5110	4470	12600	19100	5740	14600	14000	6330	6130	2240	2390
15	3900	4700	4130	11500	17600	5480	14900	13200	5730	12400	2200	2560
16	3490	7010	3670	10400	16100	5420	13900	11100	5240	16200	2220	4000
17	3640	6610	3140	9670	15000	6040	12400	9980	4730	15500	2030	4690
18	3720	17800	2570	9360	14000	7420	11500	10000	4600	15500	1540	3900
19	6150	25300	2400	9290	13000	7290	10500	8990	4650	12500	1530	3750
20	10700	18600	e2350	9250	11900	7120	9560	8360	4960	9300	1910	3530
21	23800	14000	e2300	9550	10900	8840	8970	7470	4810	8020	2780	3260
22	30100	11900	e2250	9940	10400	8720	8810	6860	4250	7170	4000	2880
23	21500	10600	e2300	10400	10300	8420	8290	6560	4030	6860	4500	2850
24	16000	9180	e2350	10900	10600	8040	8020	6260	3670	6880	6660	2620
25	12700	8270	e2400	10900	12400	7950	7680	5750	3320	5950	8660	2530
26	10500	7560	e2350	13800	11700	8070	7460	6340	3170	5470	11400	2750
27	8880	6820	e2300	16600	10500	7860	7000	8640	3110	4730	10600	2710
28	7780	6540	e2400	14800	9390	7650	6450	12900	3210	4040	8370	2430
29	7050	6500	e2600	14000	---	7630	6310	30200	3030	3340	7100	2190
30	6420	6690	e2800	22700	---	7820	7470	44700	2520	3050	5800	2190
31	5990	---	e3000	40600	---	9910	---	58900	---	2740	4690	---
TOTAL	281080	236320	116790	419360	476290	229490	367920	403030	285960	187220	131310	82860
MEAN	9067	7877	3767	13530	17010	7403	12260	13000	9532	6039	4236	2762
MAX	30100	25300	6720	40600	35800	9910	20900	58900	46200	16200	11400	4690
MIN	3490	4150	2250	4000	9390	5420	6310	5750	2520	2340	1530	1720
(*)	603	567	564	556	549	564	593	631	691	707	627	650
MEAN#	9998	8755	4640	14380	17860	8273	13180	13970	10600	7138	5206	3767
CFSM#	.86	.76	.40	1.24	1.54	.72	1.14	1.21	.82	.62	.45	.33
IN.#	1.00	.85	.46	1.43	1.61	.83	1.27	1.39	1.02	.71	.52	.36

CAL YR 1989	TOTAL	4365110	MEAN	11920	MAX	92000	MIN	2250	MEAN#	12630	CFSM#	1.09	IN.#	14.83
WTR YR 1990	TOTAL	3217630	MEAN	8815	MAX	58900	MIN	1530	MEAN#	9756	CFSM#	.84	IN.#	11.46

* Diversions, in cubic feet per second, for municipal supply of Washington, D.C., Washington Suburban Sanitary District, city of Rockville, city of Fairfax (from Goose Creek), Fairfax County, and the Chesapeake and Ohio Canal (insignificant diversion to canal during current water year). Records provided by U.S. Army Corps of Engineers, Washington Suburban Sanitary Commission, city of Rockville, city of Fairfax, and Fairfax County Water Authority.

Adjusted for diversion.

e Estimated.

POTOMAC RIVER BASIN

01646500 POTOMAC RIVER NEAR WASHINGTON, DC--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--October 1988 to September 1989.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: October 1988 to September 1989.

WATER TEMPERATURE: October 1988 to September 1989.

INSTRUMENTATION.--Water-quality monitor October 1988 to September 1989.

REMARKS--Periods of missing record due to monitor malfunction.

EXTREMES FOR PERIOD OF DAILY RECORD--

SPECIFIC CONDUCTANCE: Maximum, 543 microsiemens, Jan. 9, 1989; minimum, 80 microsiemens, May 6, 1989.

WATER TEMPERATURE: Maximum, 30.6°C, July 6, 1990; minimum, 0.0°C, on many days during winter periods.

EXTREMES FOR CURRENT PERIOD.--

SPECIFIC CONDUCTANCE: Maximum, 532 microsiemens, Jan. 1; minimum, 152 microsiemens, June 9.

WATER TEMPERATURE: Maximum, 30.6°C, July 6; minimum, 0.0°C, on many days during winter periods.

SPECIFIC CONDUCTANCE, US/CM @ 25 DEGREES CENTIGRADE, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	275	272	273	268	264	265	263	256	258	532	354	419
2	274	184	232	277	268	273	270	263	266	363	354	359
3	268	246	259	284	277	280	272	270	271	361	337	349
4	275	268	271	286	284	285	275	271	273	358	331	346
5	287	271	278	290	286	289	276	274	275	351	305	331
6	284	282	283	292	289	291	278	276	277	308	263	292
7	301	284	293	294	290	292	278	274	276	263	222	239
8	301	284	294	299	292	296	278	274	276	268	219	227
9	284	272	276	297	290	294	280	275	278	353	268	279
10	275	273	274	305	296	302	283	277	280	345	287	320
11	273	260	266	308	300	305	293	280	288	287	249	266
12	263	259	261	307	302	304	305	291	298	249	242	244
13	271	271	268	312	307	310	355	305	330	246	242	243
14	276	272	275	314	309	312	378	353	364	248	245	246
15	282	276	280	321	312	315	366	351	358	252	248	250
16	290	281	286	324	160	280	390	321	345	258	251	255
17	293	261	289	262	245	255	391	368	374	257	253	255
18	286	254	272	308	260	287	374	367	369	262	255	258
19	288	218	244	309	234	280	368	357	360	270	262	265
20	256	158	231	241	220	231	366	358	362	272	269	270
21	300	256	281	220	216	218	369	358	364	274	269	271
22	298	280	288	217	215	216	368	356	360	276	271	273
23	290	248	271	235	215	217	377	360	368	276	271	273
24	246	222	230	238	214	220	366	357	362	270	265	268
25	222	216	219	238	216	224	369	359	365	287	261	272
26	218	214	216	255	238	247	374	362	368	---	---	---
27	228	218	223	256	248	253	381	366	374	---	---	---
28	235	228	232	256	251	254	379	372	375	---	---	---
29	245	235	240	256	254	255	388	373	382	---	---	---
30	255	245	250	256	253	255	385	374	381	---	---	---
31	264	255	260	---	---	---	469	374	393	---	---	---
MONTH	301	158	262	324	160	270	469	256	331	---	---	---

01646500 POTOMAC RIVER NEAR WASHINGTON, DC--Continued

SPECIFIC CONDUCTANCE, US/CM @ 25 DEGREES CENTIGRADE, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY				MARCH			APRIL			MAY		
1	---	---	---	273	264	266	262	249	256	262	255	259
2	---	---	---	275	271	273	260	195	253	264	259	261
3	---	---	---	275	268	272	236	179	216	271	264	266
4	---	---	---	275	270	273	240	219	227	278	271	274
5	---	---	---	275	270	273	255	240	249	277	261	269
6	---	---	---	275	270	273	256	248	254	279	268	275
7	---	---	---	275	270	273	248	224	232	281	271	276
8	---	---	---	276	273	275	224	220	222	291	273	281
9	---	---	---	279	276	278	223	221	222	296	283	290
10	---	---	---	280	276	278	227	221	224	283	185	252
11	---	---	---	279	275	277	231	226	228	236	203	219
12	---	---	---	282	279	280	229	226	227	215	209	212
13	---	---	---	286	280	283	233	228	231	241	213	230
14	---	---	---	290	284	286	236	232	234	248	239	245
15	---	---	---	293	284	288	233	191	217	247	223	236
16	---	---	---	296	288	292	227	225	226	238	225	233
17	---	---	---	302	244	285	231	225	227	246	238	241
18	---	---	---	291	259	277	231	224	227	248	240	244
19	---	---	---	301	291	296	229	227	228	248	242	245
20	---	---	---	298	280	290	234	228	229	254	242	247
21	---	---	---	293	279	286	238	233	235	255	252	253
22	---	---	---	299	292	295	237	234	235	257	253	255
23	---	---	---	302	293	296	243	237	241	256	253	255
24	---	---	---	302	296	300	248	243	245	259	252	255
25	---	---	---	301	293	299	251	248	250	260	253	256
26	---	---	---	299	294	296	256	251	254	263	226	253
27	---	---	---	296	280	288	263	256	259	261	254	258
28	268	262	266	280	272	277	267	262	264	256	242	248
29	---	---	---	279	274	276	270	265	267	268	211	236
30	---	---	---	282	276	278	265	246	251	212	199	205
31	---	---	---	277	213	254	---	---	---	203	190	197
MONTH	---	---	---	302	213	282	270	179	238	296	185	249
DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
JUNE				JULY			AUGUST			SEPTEMBER		
1	190	181	185	301	287	294	281	277	279	310	300	303
2	183	180	181	300	285	291	278	273	275	308	300	304
3	189	182	185	306	285	294	289	274	280	309	305	307
4	194	188	191	306	285	292	304	286	295	305	295	299
5	202	194	198	305	280	288	304	285	295	295	290	294
6	211	202	207	314	293	303	288	248	265	291	288	289
7	216	211	214	323	297	313	248	219	228	290	286	287
8	225	216	221	329	315	322	237	224	230	291	287	289
9	232	152	224	329	316	322	241	218	228	297	289	293
10	225	163	211	349	323	331	234	181	208	306	297	301
11	239	214	230	358	320	333	236	212	225	308	304	306
12	242	236	238	364	321	343	260	236	251	312	306	308
13	246	242	245	343	273	300	280	260	270	318	311	314
14	254	246	251	322	246	309	287	277	283	321	317	319
15	256	250	253	272	216	252	303	279	290	327	319	323
16	261	254	257	331	221	275	309	295	302	325	300	319
17	260	251	255	342	300	329	314	291	302	330	279	308
18	261	246	253	341	267	313	314	296	304	345	330	336
19	259	240	251	273	263	269	311	297	305	354	345	351
20	266	241	256	280	271	275	303	281	293	365	354	359
21	282	266	274	278	215	264	291	283	286	366	360	363
22	292	282	287	256	222	250	310	288	298	361	357	359
23	290	281	284	256	239	249	310	284	297	359	349	354
24	296	279	288	267	251	261	347	310	328	355	339	350
25	293	281	286	276	267	272	342	314	331	340	328	336
26	293	281	287	278	274	276	350	317	332	329	319	325
27	290	279	286	288	275	278	355	325	337	320	318	319
28	289	285	287	292	282	286	326	302	313	325	318	322
29	300	289	293	297	278	285	311	301	304	334	325	329
30	304	293	296	297	282	288	327	311	323	337	333	335
31	---	---	---	286	280	284	324	310	318	---	---	---
MONTH	304	152	246	364	215	292	355	181	286	366	279	320

POTOMAC RIVER BASIN

01646500 POTOMAC RIVER NEAR WASHINGTON, DC--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
OCTOBER			NOVEMBER			DECEMBER			JANUARY			
1	18.3	17.9	18.1	15.5	14.9	15.2	5.0	4.3	4.6	.2	.0	.0
2	18.7	17.8	18.2	14.9	13.8	14.1	4.9	3.6	4.2	.2	.0	.0
3	20.0	18.3	19.0	13.8	13.0	13.4	4.2	2.8	3.7	.2	.0	.0
4	18.9	17.6	18.3	13.0	11.6	12.1	2.8	1.4	2.0	.0	.0	.0
5	17.6	16.6	17.0	12.1	10.7	11.4	1.9	1.1	1.5	.2	.0	.0
6	17.1	16.7	16.9	11.9	11.1	11.5	2.6	1.7	2.1	.3	.0	.0
7	17.7	16.5	17.0	11.9	11.2	11.5	3.5	2.3	2.7	.3	.0	.1
8	16.5	15.7	16.1	12.3	11.7	11.9	3.0	1.7	2.4	.2	.0	.1
9	15.8	14.9	15.3	13.1	12.3	12.7	1.7	1.3	1.5	.4	.0	.1
10	15.3	14.1	14.7	12.9	11.9	12.3	1.6	.6	1.1	1.1	.4	.7
11	15.9	13.9	14.8	12.0	10.6	11.2	1.2	.4	.7	1.5	.9	1.2
12	16.5	14.2	15.4	11.7	10.4	11.0	1.1	.8	.9	1.7	1.4	1.5
13	17.5	15.2	16.3	11.4	10.1	10.8	1.5	.8	1.1	1.5	.5	.9
14	18.4	16.5	17.4	12.5	10.5	11.3	1.5	.6	1.0	1.1	.4	.7
15	19.7	17.5	18.5	14.0	12.0	12.8	.9	.3	.6	2.1	1.1	1.6
16	20.6	18.4	19.5	15.3	13.2	14.1	.5	.1	.1	3.2	1.9	2.5
17	20.2	19.4	19.7	13.2	11.1	12.2	.2	.0	.1	4.3	2.7	3.4
18	19.5	18.2	19.0	11.1	8.8	9.7	.3	.0	.2	5.9	3.6	4.9
19	18.2	14.7	15.9	8.8	8.3	8.6	.2	.0	.1	5.8	4.9	5.4
20	15.1	13.7	14.5	8.7	7.8	8.3	.3	.0	.2	4.9	4.6	4.8
21	13.7	12.9	13.2	8.7	6.6	7.8	.3	.0	.1	5.5	4.6	4.9
22	13.4	12.6	13.0	6.6	5.4	6.2	.3	.1	.2	5.5	4.7	5.0
23	13.1	12.1	12.6	5.5	4.3	5.0	.4	.0	.2	5.5	4.7	5.0
24	12.8	12.0	12.5	5.0	4.0	4.5	.2	.0	.1	6.1	5.1	5.6
25	12.8	12.1	12.4	5.1	4.0	4.4	.2	.0	.0	7.4	6.0	6.6
26	13.5	12.4	12.8	5.8	4.4	5.1	.1	.0	.0	---	---	---
27	14.3	12.6	13.3	5.4	4.9	5.1	.1	.0	.0	---	---	---
28	14.6	13.1	13.7	6.6	5.2	5.9	.2	.0	.0	---	---	---
29	15.2	13.8	14.4	6.4	5.7	6.2	.1	.0	.0	---	---	---
30	15.5	14.2	14.8	5.7	4.6	5.1	.1	.0	.0	---	---	---
31	15.6	14.9	15.2	---	---	---	.1	.0	.0	---	---	---
MONTH	20.6	12.0	15.8	15.5	4.0	9.7	5.0	.0	1.0	---	---	---
DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY			MARCH			APRIL			MAY			
1	---	---	---	5.7	3.7	4.5	9.9	9.3	9.6	20.8	19.2	19.9
2	---	---	---	5.4	4.3	4.9	12.0	9.8	10.5	20.5	19.2	19.8
3	---	---	---	7.1	5.1	5.9	12.1	11.5	11.8	19.8	18.8	19.2
4	---	---	---	6.8	5.4	6.0	11.7	9.8	10.5	18.9	17.8	18.5
5	---	---	---	6.9	5.1	5.8	10.9	9.1	10.0	18.5	17.0	17.7
6	---	---	---	6.7	5.8	6.3	11.1	9.9	10.5	18.7	17.1	17.7
7	---	---	---	6.9	5.2	5.9	10.0	9.3	9.7	19.0	16.7	17.7
8	---	---	---	6.8	4.7	5.6	10.1	8.5	9.4	19.9	17.8	18.7
9	---	---	---	8.1	5.3	6.6	10.9	9.2	10.1	20.3	19.1	19.6
10	---	---	---	10.2	7.2	8.5	11.9	10.9	11.3	19.8	18.0	19.2
11	---	---	---	11.2	9.1	10.1	12.5	11.6	12.1	18.2	17.5	17.9
12	---	---	---	13.2	10.3	11.5	11.7	10.8	11.2	17.8	16.3	16.8
13	---	---	---	15.1	11.9	13.4	11.7	10.2	11.0	16.9	16.3	16.6
14	---	---	---	16.5	13.8	15.1	12.1	10.9	11.5	18.2	16.4	17.2
15	---	---	---	17.7	15.2	16.4	13.3	12.1	12.8	19.1	18.0	18.6
16	---	---	---	18.2	16.4	17.3	14.6	13.2	13.8	20.3	19.2	19.8
17	---	---	---	17.9	17.0	17.5	14.8	13.4	14.3	21.7	20.0	20.7
18	---	---	---	17.5	16.0	16.8	13.8	12.2	13.0	21.2	20.1	20.5
19	---	---	---	16.0	14.4	15.3	13.9	12.2	12.9	21.0	19.5	20.2
20	---	---	---	14.2	10.7	12.7	14.3	12.7	13.6	21.9	20.1	21.1
21	---	---	---	11.2	9.4	10.2	14.8	13.7	14.4	21.8	21.0	21.4
22	---	---	---	12.2	9.7	10.7	16.3	13.7	14.9	21.0	19.2	20.0
23	---	---	---	13.7	11.0	12.2	18.0	15.0	16.3	19.9	18.1	19.0
24	---	---	---	12.3	10.6	11.6	19.2	16.2	17.6	20.7	18.6	19.7
25	---	---	---	10.6	9.9	10.2	20.4	17.8	19.0	22.0	19.6	20.9
26	---	---	---	10.9	9.3	10.0	22.1	19.0	20.4	21.1	20.3	20.7
27	---	---	---	11.4	9.5	10.2	23.0	20.6	21.8	20.4	19.8	20.1
28	4.9	2.8	3.6	11.5	9.4	10.3	24.0	21.6	22.8	19.8	18.5	19.0
29	---	---	---	10.8	10.2	10.6	23.0	20.9	22.2	18.6	16.5	17.3
30	---	---	---	10.3	9.3	9.6	20.9	19.5	20.0	16.8	15.8	16.3
31	---	---	---	9.4	8.4	9.1	---	---	---	16.2	15.2	15.7
MONTH	---	---	---	18.2	3.7	10.3	24.0	8.5	14.0	22.0	15.2	19.0

POTOMAC RIVER BASIN

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01646500 POTOMAC RIVER NEAR WASHINGTON, DC--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	17.3	15.4	16.3	29.8	28.4	29.2	28.8	26.9	28.1	27.7	25.3	26.6
2	19.0	16.7	17.7	28.7	27.0	27.9	28.1	26.6	27.3	27.6	25.5	26.7
3	20.5	18.5	19.3	27.8	26.4	27.0	28.0	26.7	27.2	27.9	26.0	27.1
4	20.5	19.8	20.1	29.0	26.7	27.7	28.4	27.2	27.8	27.3	25.8	26.7
5	20.3	19.0	19.7	30.3	27.9	29.0	28.2	27.2	27.7	26.6	25.4	26.0
6	21.2	19.4	20.2	30.6	28.4	29.7	27.2	25.1	26.2	26.6	25.6	26.2
7	22.3	21.2	21.9	29.9	28.2	29.1	26.5	24.5	25.4	27.3	26.3	26.8
8	23.5	22.1	22.7	28.8	27.4	28.2	26.6	24.5	25.7	27.0	26.2	26.7
9	25.5	22.9	24.1	29.4	27.5	28.3	26.1	24.6	25.2	26.3	24.8	25.2
10	25.0	23.1	24.2	29.8	28.5	28.9	24.6	22.4	23.3	25.7	24.4	24.9
11	23.7	22.3	23.2	29.8	28.9	29.3	25.1	22.9	23.9	25.5	24.2	24.7
12	23.7	21.4	22.5	29.6	28.4	28.8	26.5	24.2	25.3	26.0	25.2	25.5
13	23.5	22.1	22.9	28.5	24.8	26.1	28.4	25.7	26.8	25.8	25.1	25.5
14	25.1	22.3	23.6	24.8	23.5	24.2	28.2	26.6	27.2	25.3	24.7	25.0
15	24.7	23.7	24.2	24.3	23.4	23.9	28.4	27.2	27.7	25.2	24.1	24.7
16	25.7	23.1	24.5	25.3	23.7	24.3	28.0	27.4	27.7	24.7	22.2	23.8
17	27.5	24.4	26.1	25.5	24.7	25.1	28.4	27.0	27.6	22.4	20.9	21.6
18	28.0	25.5	26.8	25.9	24.9	25.4	30.3	27.2	28.0	21.3	19.6	20.4
19	28.0	25.9	27.0	26.6	25.3	26.0	29.0	27.9	28.5	19.9	18.7	19.2
20	27.5	25.3	26.4	27.7	26.2	26.8	28.6	26.0	27.2	20.7	18.7	19.5
21	28.2	25.6	26.8	27.8	26.1	27.0	25.9	24.4	25.1	20.9	19.0	20.1
22	28.2	26.1	27.2	28.0	26.2	26.9	24.4	23.0	23.5	20.7	19.6	20.2
23	28.0	25.8	26.9	28.8	26.7	27.7	23.0	22.3	22.5	20.4	19.2	19.9
24	27.4	25.7	26.7	28.1	27.2	27.6	23.3	22.1	22.6	19.9	18.3	19.3
25	27.1	25.0	26.2	28.7	26.4	27.5	24.4	22.9	23.6	19.4	17.9	18.8
26	27.1	24.8	26.1	29.1	26.9	27.9	25.8	23.8	24.8	19.0	17.9	18.4
27	27.6	25.6	26.4	29.1	27.1	28.1	26.1	25.0	25.5	19.3	18.1	18.7
28	29.0	26.5	27.6	28.9	27.3	28.1	27.4	25.4	26.3	20.4	18.7	19.4
29	29.8	27.4	28.6	28.5	27.1	27.8	27.8	26.3	26.9	20.9	19.7	20.2
30	30.4	28.4	29.4	29.0	27.0	28.0	27.8	26.1	26.8	21.3	20.4	20.8
31	---	---	---	29.3	27.5	28.5	27.8	25.6	26.7	---	---	---
MONTH	30.4	15.4	24.2	30.6	23.4	27.4	30.3	22.1	26.1	27.9	17.9	23.0

01646580 POTOMAC RIVER AT CHAIN BRIDGE AT WASHINGTON, DC
(National stream-quality accounting network station)

LOCATION.--Lat 38°55'46", long 77°07'02", Arlington County, Va., Hydrologic Unit 02070010, under right downstream side of bridge on Virginia State Highway 123, and at river mile 115.9.

DRAINAGE AREA.--11,570 mi².

PERIOD OF RECORD.--Water years 1973 to current year. Prior to October 1977, published as "at Great Falls."

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: June 1978 to September 1981 (discontinued).

pH: June 1978 to September 1981 (discontinued).

WATER TEMPERATURE: June 1978 to September 1981 (discontinued).

DISSOLVED OXYGEN: June 1978 to September 1981 (discontinued).

SUSPENDED SEDIMENT DISCHARGE: October 1978 to September 1981 (discontinued).

INSTRUMENTATION.--Water-quality monitor June 1978 to September 1981.

REMARKS.--High flows are sampled from the George Mason Memorial Bridge (14th Street) located 6 mi downstream from Chain Bridge. Duplicate samples taken on some days for quality-assurance checks.

EXTREMES FOR PERIOD OF DAILY RECORD--

SPECIFIC CONDUCTANCE (water years 1979, 1981): Maximum, 598 microsiemens, Sept. 12, 1981; minimum, 116 microsiemens, Jan. 25, 1979.

pH (water years 1979, 1981): Maximum, 9.3 units, Mar. 29, 1981; minimum, 6.7 units, June 2, 1981.

WATER TEMPERATURE (water years 1979, 1981): Maximum, 31.0°C, July 23-24, 1978; minimum, 0.0°C on many days during winter periods.

DISSOLVED OXYGEN (water years 1979, 1981): Maximum, 16.4 mg/L, on many days in 1979; minimum, 5.6 mg/L, June 2, 1981.

SEDIMENT CONCENTRATION: Maximum daily mean, 812 mg/L, Sept. 6, 1979; minimum daily mean, 1 mg/L on many days during winter periods.

SEDIMENT LOAD: Maximum daily, 281,000 tons, Feb. 27, 1979; minimum daily, 3.2 tons, Jan. 5, 1981.

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	TIME	Dis-charge, instantaneous (ft3/s)	Spe-cific con-ductance (US/CM)	Ph (stand-ard units)	Temper-ature, water (deg C)	Temper-ature, air (deg C)	Baro-metric pres-sure (mm of Hg)	Tur-bid-ity (ntu)	Oxygen, dis-solved (mg/L)	Oxygen, dis-solved (per-cent satur-ation)	Coli-form, fecal, 0.7 UM-MF (col/100 ML)	
OCT												
31...	1130	6100	274	7.42	15.0	24.0	762	6.6	9.9	98	200	
*31...	1135	6100	274	7.42	15.0	24.0	762	--	9.9	98	--	
JAN												
30...	1100	17200	272	7.43	5.5	12.0	765	18	13.3	105	--	
*30...	1105	17200	260	6.91	5.5	12.0	765	--	13.3	105	--	
MAR												
06...	1230	7590	285	8.23	9.0	14.0	774	1.8	13.1	112	K5	
*06...	1235	7590	290	8.15	9.0	14.0	774	--	13.1	112	--	
MAY												
01...	1100	8340	258	7.65	18.0	20.0	763	6.6	8.7	92	K90	
*01...	1105	8340	265	7.27	18.0	20.0	763	--	8.7	92	--	
JUN												
26...	1045	3220	305	8.08	24.0	28.0	767	1.1	8.0	95	290	
*26...	1050	3220	293	8.23	24.0	28.0	767	--	8.0	95	--	
SEP												
05...	1100	2550	292	7.43	26.0	25.0	769	7.0	8.0	98	340	
*05...	1105	2550	288	7.35	26.0	25.0	769	--	8.0	98	--	
DATE		Strep-tococci fecal, KF agar (cols. per 100 ML)	Calcium dis-solved (mg/L as Ca)	Magne-sium, dis-solved (mg/L as Mg)	Sodium, dis-solved (mg/L as Na)	Potas-sium, dis-solved (mg/L as K)	Alka-linity, wat wh tot fet field (mg/L as CaCO3)	Sulfate dis-solved (mg/L as SO4)	Chlo-ride, dis-solved (mg/L as Cl)	Fluo-ride, dis-solved (mg/L as F)	Silica, dis-solved (mg/L as SiO2)	Solids, residue at 180 deg. C dis-solved (mg/L)
OCT												
31...	310	34	7.4	7.6	2.4	81	28	9.8	0.10	6.2	156	
31...	--	--	--	--	--	82	--	--	--	5.9	--	
JAN												
30...	930	29	6.8	9.0	2.1	62	29	14	0.10	4.5	142	
30...	--	--	--	--	--	62	--	--	--	4.2	--	
MAR												
06...	K15	37	8.2	7.4	1.9	107	28	9.6	0.70	0.44	150	
06...	--	--	--	--	--	109	--	--	--	0.30	--	
MAY												
01...	310	32	7.5	8.1	1.9	80	26	10	0.10	0.90	131	
01...	--	--	--	--	--	85	--	--	--	0.50	--	
JUN												
26...	370	36	9.7	9.3	2.4	96	32	13	0.10	1.9	158	
26...	--	--	--	--	--	92	--	--	--	1.7	--	
SEP												
05...	520	35	9.3	9.5	3.3	89	30	14	<0.10	7.7	161	
05...	--	--	--	--	--	89	--	--	--	7.7	--	

* Water-quality samples collected from an automatic sampler on same day for quality-assurance purposes.

< Actual value is known to be less than the value shown.

K Results based on colony count outside the acceptance range (non-ideal colony count).

01646580 POTOMAC RIVER AT CHAIN BRIDGE AT WASHINGTON, DC

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	Solids, sum of constituents, dissolved (mg/L)	Nitro-gen, nitrate dis-solved (mg/L as N)	Nitro-gen, nitrite dis-solved (mg/L as N)	Nitro-gen, NO2+NO3 dis-solved (mg/L as N)	Nitro-gen, ammonia total (mg/L as N)	Nitro-gen, ammonia dis-solved (mg/L as N)	Nitro-gen, ammonia + organic total (mg/L as N)	Nitro-gen, ammonia + organic DIS. (mg/L as N)	Phos-phorous total (mg/L as P)	Phos-phorous dis-solved (mg/L as P)	Phos-phorous ortho, dis-solved (mg/L as P)
OCT											
31...	151	--	<0.010	1.40	0.030	<0.010	0.50	--	0.060	0.040	0.030
31...	--	1.40	0.005	1.40	--	<0.010	0.40	0.60	0.050	0.030	0.030
JAN											
30...	132	--	--	--	--	--	--	--	--	--	--
30...	--	1.79	0.013	1.80	--	0.060	0.70	0.20	0.100	<0.010	0.010
MAR											
06...	164	1.48	0.020	1.50	<0.010	0.010	0.20	--	0.030	0.010	<0.010
06...	--	1.49	0.009	1.50	--	<0.010	0.40	0.30	<0.010	0.020	<0.010
MAY											
01...	138	0.690	0.010	0.700	0.010	0.010	0.70	--	0.100	0.020	<0.010
01...	--	0.769	0.031	0.800	--	0.020	0.80	0.50	0.100	0.010	<0.010
JUN											
26...	165	--	<0.010	0.700	0.010	0.020	1.0	--	0.050	<0.010	<0.010
26...	--	0.689	0.011	0.700	--	0.010	0.90	0.90	0.050	<0.010	<0.010
SEP											
05...	169	--	<0.010	1.50	0.020	0.020	0.40	--	0.070	0.060	0.050
05...	--	1.49	0.008	1.50	--	0.030	0.60	0.30	0.070	0.050	0.050

DATE	Alum-inum, dis-solved (ug/L as Al)	Arsenic, dis-solved (ug/L as As)	Barium, dis-solved (ug/L as BA)	Beryl-lium, dis-solved (ug/L as BE)	Cadmium dis-solved (ug/L as Cd)	Chro-mium, dis-solved (ug/L as CR)	Cobalt, dis-solved (ug/L as CO)	Copper, dis-solved (ug/L as Cu)	Iron, dis-solved (ug/L as Fe)	Lead, dis-solved (ug/L as Pb)	Lithium dis-solved (ug/L as Li)
OCT											
31...	20	<1	34	<0.5	<1	<1	<3	1	30	<1	4
31...	20	--	--	--	--	--	--	--	--	--	--
JAN											
30...	--	--	--	--	--	--	--	--	--	--	--
30...	40	--	--	--	--	--	--	--	--	--	--
MAR											
06...	30	<1	32	<0.5	<1	<5	<3	<10	24	<10	5
06...	20	--	--	--	--	--	--	--	--	--	--
MAY											
01...	<10	<1	35	<0.5	3	2	<3	2	35	<1	4
01...	<10	--	--	--	--	--	--	--	--	--	--
JUN											
26...	--	--	--	--	--	--	--	--	--	--	--
26...	20	--	--	--	--	--	--	--	--	--	--
SEP											
05...	10	<1	39	<0.5	<1	<1	<3	3	10	1	7
05...	10	--	--	--	--	--	--	--	--	--	--

DATE	Manga-nese, dis-solved (ug/L as Mn)	Mercury dis-solved (ug/L as Hg)	Molyb-denum, dis-solved (ug/L as Mo)	Nickel, dis-solved (ug/L as Ni)	Sele-nium, dis-solved (ug/L as SE)	Silver, dis-solved (ug/L as Ag)	Stron-tium, dis-solved (ug/L as Sr)	Vana-dium, dis-solved (ug/L as V)	Zinc, dis-solved (ug/L as Zn)	Carbon, organic total (mg/L as C)	Hard-ness total (mg/L as CaCO3)
OCT											
31...	9	0.4	<10	<1	<1	<1.0	140	<6	<3	2.7	120
31...	--	--	--	--	--	--	--	--	--	2.9	--
JAN											
30...	--	--	--	--	--	--	--	--	--	5.6	100
30...	--	--	--	--	--	--	--	--	--	5.9	--
MAR											
06...	9	<0.1	<10	<10	<1	<1.0	150	<6	<3	2.7	130
06...	--	--	--	--	--	--	--	--	--	2.1	--
MAY											
01...	14	<0.1	<10	<1	<1	<1.0	150	<6	<3	3.7	110
01...	--	--	--	--	--	--	--	--	--	6.8	--
JUN											
26...	--	--	--	--	--	--	--	--	--	5.6	130
26...	--	--	--	--	--	--	--	--	--	4.2	--
SEP											
05...	11	0.2	<10	1	<1	<1.0	170	<6	<3	5.6	130
05...	--	--	--	--	--	--	--	--	--	4.0	--

< Actual value is known to be less than the value shown.

POTOMAC RIVER BASIN

01646580 POTOMAC RIVER AT CHAIN BRIDGE AT WASHINGTON, DC

PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT

DATE	TIME	Dis-charge, instantaneous (ft ³ /s)	Sedi-ment, sus-pended (mg/L)	Sedi-ment, dis-charge, sus-pended (T/DAY)	Sed. susp. sieve diam. % finer than .062 MM
OCT					
31...	1130	6100	29	478	94
31...	1135	6100	17	280	--
JAN					
30...	1100	17200	67	3110	95
30...	1105	17200	72	3340	--
MAR					
06...	1230	7590	3	61	97
06...	1235	7590	10	205	--
MAY					
01...	1100	8340	18	405	91
01...	1105	8340	31	698	--
JUN					
26...	1045	3220	18	156	--
26...	1050	3220	20	174	--
SEP					
05...	1100	2550	19	131	94
05...	1105	2550	11	76	--

RADIOCHEMICAL ANALYSES

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND	GROSS ALPHA, DIS-SOLVED (UG/L AS U-NAT)	GROSS ALPHA, SUSP. TOTAL (UG/L AS U-NAT)	GROSS BETA, DIS-SOLVED (PCI/L AS CS-137)	GROSS BETA, SUSP. TOTAL (PCI/L AS CS-137)	RADIUM 226, DIS-SOLVED, RADON METHOD (PCI/L)	GROSS BETA, DIS-SOLVED (PCI/L AS SR/YT-90)	GROSS BETA, SUSP. TOTAL (PCI/L AS SR/YT-90)	URANIUM NATURAL DIS-SOLVED (UG/L AS U)
SEP 1989										
06...	1050	3460	1.5	<0.4	5.9	0.6	0.07	7.4	0.7	0.35
MAR 1990										
06...	1230	7590	<0.4	<0.4	1.9	<0.4	0.07	2.3	<0.4	<0.01

< Actual value is known to be less than the value shown.

01653000 CAMERON RUN AT ALEXANDRIA, VA

LOCATION.--Lat 38°48'23", long 77°06'36", Fairfax County, Hydrologic Unit 02070010, on left downstream side of Norfolk Southern Railway bridge at Alexandria, 800 ft downstream from confluence of Holmes Run and Backlick Run, 0.5 mi east of the U.S. Army Quartermaster Depot, and 3.4 mi upstream from mouth.

DRAINAGE AREA.--33.7 mi².

PERIOD OF RECORD.--June 1955 to March 1979, October 1979 to September 1980, October 1980 to September 1986 (annual maximum only), October 1986 to current year.

GAGE.--Water-stage recorder. Gage reinstalled Nov. 8, 1979. Datum of gage is 31.07 ft above National Geodetic Vertical Datum of 1929. Prior to Sept. 20, 1965, at present site at datum 7.78 ft higher. Sept. 20, 1965, to Jan. 19, 1976, at present site at datum 5.44 ft higher. Jan. 20, 1976, to Nov. 8, 1976, at site 1,200 ft downstream at datum 10.00 ft lower. Nov. 9, 1976, to Mar. 31, 1979, at site 0.5 mi downstream at datum 7.22 ft lower.

REMARKS.--Records good except those for periods of doubtful gage-height record, Oct. 1, 4-12, and periods with ice effect, Dec. 4, 9, 16-28, which are fair. Some regulation by Lake Barcroft, formerly Alexandria Reservoir, on Holmes Run 3.6 mi upstream, usable capacity 2,092 acre-ft. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

AVERAGE DISCHARGE.--28 years (water year 1956-78, 1980, 1987-90), 36.6 ft³/s, 14.75 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 19,900 ft³/s, June 22, 1972, gage height, 18.14 ft, from rating curve extended above 2,500 ft³/s on basis of culvert computations of peak flow for main channel and bypass channels; minimum, 1.1 ft³/s, Aug. 15, 1957, Sept. 22-25, 1964.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 3,510 ft³/s, July 5, gage height, 5.67 ft; minimum daily, 5.4 ft³/s, Sept. 25.

CORRECTIONS.--The maximum gage height for water years 1987-89 was not previously published.

	<u>Water year</u>		<u>Date</u>	<u>Gage height</u>	<u>Discharge</u>							
	1987		12-24-86	6.34	3,890							
	1988		5-18-88	5.33	2,980							
	1989		5- 6-89	9.50	6,960							

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990												
MEAN VALUES												
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e37	25	9.6	322	23	13	66	28	17	41	8.8	8.3
2	327	10	11	46	20	13	242	20	16	14	7.7	8.2
3	36	23	10	23	37	17	145	17	35	7.7	7.2	8.2
4	e21	14	e9.6	23	61	15	50	26	19	7.6	8.2	8.2
5	e10	11	9.9	21	23	13	43	182	15	295	31	8.0
6	e9.5	10	10	17	19	13	94	26	15	64	421	8.2
7	e8.6	12	8.9	15	21	12	144	19	13	15	33	8.2
8	e7.8	120	10	129	17	12	36	17	13	9.3	11	7.3
9	e7.9	39	e11	71	15	12	30	15	180	8.3	354	6.5
10	e7.6	15	14	37	140	13	24	328	77	7.4	740	6.5
11	e8.2	11	13	23	35	12	24	60	14	17	81	6.8
12	e8.0	9.9	24	18	28	11	22	21	12	135	36	6.5
13	8.0	9.6	43	15	19	12	19	126	10	194	128	11
14	8.1	11	22	12	19	12	19	34	10	213	90	7.6
15	8.4	16	12	14	16	13	487	18	20	66	23	6.6
16	8.4	300	e13	14	23	15	45	17	10	55	17	91
17	151	37	e11	14	19	293	43	16	9.2	16	14	15
18	136	15	e11	13	15	111	33	17	12	13	12	6.5
19	476	12	e10	12	15	28	23	13	32	11	10	6.8
20	283	12	e9.6	17	14	50	20	13	12	9.8	114	7.3
21	51	9.5	e9.0	12	13	26	34	18	10	125	19	6.5
22	26	12	e8.5	9.3	35	19	24	16	12	39	127	28
23	21	41	e9.0	9.7	47	18	19	13	14	15	128	6.8
24	15	22	e8.6	9.9	42	37	17	12	9.7	12	27	5.5
25	11	14	e8.2	140	20	42	17	12	8.1	10	17	5.4
26	10	17	e8.5	327	17	24	17	154	7.5	9.0	12	6.1
27	11	15	e8.8	54	14	19	16	19	7.4	8.7	10	6.2
28	9.9	13	e8.5	32	13	16	15	15	7.4	8.7	11	5.8
29	11	9.7	8.7	136	---	17	232	461	6.7	96	17	5.6
30	11	10	10	146	---	45	167	48	6.8	14	11	7.8
31	24	---	205	34	---	141	---	23	---	12	9.2	---
TOTAL	1768.4	875.7	565.4	1765.9	780	1094	2167	1804	630.8	1548.5	2535.1	326.4
MEAN	57.0	29.2	18.2	57.0	27.9	35.3	72.2	58.2	21.0	50.0	81.8	10.9
MAX	476	300	205	327	140	293	487	461	180	295	740	91
MIN	7.6	9.5	8.2	9.3	13	11	15	12	6.7	7.4	7.2	5.4
CFSM	1.69	.87	.54	1.69	.83	1.05	2.14	1.73	.62	1.48	2.43	.32
IN.	1.95	.97	.62	1.95	.86	1.21	2.39	1.99	.70	1.71	2.80	.36

CAL YR 1989 TOTAL 15416.5 MEAN 42.2 MAX 1140 MIN 4.7 CFSM 1.25 IN. 17.02
WTR YR 1990 TOTAL 15861.2 MEAN 43.5 MAX 740 MIN 5.4 CFSM 1.29 IN. 17.51

e Estimated.

01654000 ACCOTINK CREEK NEAR ANNANDALE, VA

LOCATION.--Lat 38°48'46", long 77°13'43", Fairfax County, Hydrologic Unit 02070010, on left bank 800 ft upstream from bridge on State Highway 620, 0.2 mi upstream from Long Branch, and 2.3 mi southwest of Annandale.

DRAINAGE AREA.--23.5 mi².

PERIOD OF RECORD.--March 1947 to current year (fragmentary prior to October 1947).

REVISED RECORDS.--WSP 1502: 1952. WSP 2103: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 191.24 ft above National Geodetic Vertical Datum of 1929 (levels by Stone and Webster Engineering Corporation). Prior to May 12, 1949, nonrecording gage at site 800 ft downstream at datum 0.33 ft lower. May 12, 1949, to June 4, 1970, water-stage recorder at site 800 ft downstream at datum 0.33 ft lower.

REMARKS.--Records good except those for periods with ice effect, Dec. 12-16, 22-31, which are fair. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

COOPERATION.--Records were provided by the Virginia Water Control Board.

AVERAGE DISCHARGE.--43 years, 27.4 ft³/s, 15.83 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 12,000 ft³/s, June 22, 1972, gage height, 15.96 ft, from high-water mark in gage house, from rating curve extended above 6,600 ft³/s on basis of contracted-opening and flow-over-road measurement of peak flow; minimum, 0.02 ft³/s, Oct. 9-13, 1986, Oct. 18, 1988.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 1,400 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Apr. 15	0245	1,450	7.96	Aug. 10	1400	*2,040	*8.95
July 21	2030	1,480	8.01				

Minimum daily discharge, 2.5 ft³/s, Sept. 29.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	22	14	6.3	233	16	10	27	23	12	48	4.3	4.6
2	182	4.9	6.1	21	14	11	186	16	11	7.8	3.5	4.4
3	11	13	6.2	14	18	15	82	13	14	3.6	3.4	4.6
4	5.1	5.4	5.9	15	39	9.6	24	16	15	3.2	3.4	4.7
5	4.0	4.6	6.9	15	15	8.9	19	99	8.7	96	30	4.4
6	4.2	4.8	7.0	11	12	8.7	56	19	8.5	17	298	4.0
7	3.4	5.3	6.4	9.6	12	8.2	101	13	8.4	4.8	19	3.9
8	3.2	51	6.6	36	11	8.3	26	12	8.1	3.8	7.5	3.9
9	3.4	20	7.6	38	12	8.7	18	11	77	3.6	161	3.5
10	3.2	7.2	8.1	30	88	8.7	17	186	30	3.3	653	3.8
11	3.9	5.2	9.3	15	21	8.6	19	31	8.6	7.4	34	3.6
12	3.2	4.9	e10	12	21	8.5	14	15	7.4	105	15	3.6
13	3.1	5.0	e14	9.4	13	8.4	13	35	7.1	172	87	9.0
14	3.1	5.5	e11	8.6	12	8.3	19	19	6.9	90	33	6.1
15	3.1	6.5	e8.4	8.9	12	8.3	409	13	6.8	38	10	3.7
16	3.0	137	e8.1	8.6	17	8.4	29	13	6.8	29	8.6	52
17	123	14	7.1	8.3	12	218	28	26	6.1	7.8	7.6	17
18	36	8.3	6.0	8.6	11	65	20	13	7.0	6.4	6.6	4.2
19	319	6.9	6.5	8.0	11	18	15	9.4	10	5.4	6.2	3.7
20	184	6.9	6.8	9.6	9.8	63	15	9.3	6.2	4.7	49	4.0
21	16	6.7	6.0	10	9.4	20	36	15	5.3	262	8.0	3.3
22	8.8	7.0	e5.0	8.0	16	15	18	17	19	28	39	15
23	6.5	23	e4.5	7.6	42	13	14	9.9	15	12	29	5.1
24	6.1	12	e4.5	7.6	36	31	13	8.9	5.5	6.5	11	3.1
25	5.4	7.9	e5.0	98	11	31	12	8.1	4.6	5.3	12	2.8
26	5.5	13	e5.6	241	9.7	18	12	69	4.4	4.7	7.5	9.3
27	4.9	9.8	e4.8	26	11	13	12	13	4.3	4.4	6.7	6.2
28	4.8	7.6	e5.2	16	11	12	11	12	4.0	3.9	7.9	2.8
29	4.8	6.8	e4.8	106	---	13	150	336	3.9	53	6.1	2.5
30	4.7	6.4	e6.6	118	---	40	101	29	5.4	9.0	5.8	3.4
31	10	---	e71	21	---	88	---	15	---	4.9	5.0	---
TOTAL	1000.4	430.6	277.3	1178.8	522.9	805.6	1516	1124.6	337.0	1050.5	1578.1	202.2
MEAN	32.3	14.4	8.95	38.0	18.7	26.0	50.5	36.3	11.2	33.9	50.9	6.74
MAX	319	137	71	241	88	218	409	336	77	262	653	52
MIN	3.0	4.6	4.5	7.6	9.4	8.2	11	8.1	3.9	3.2	3.4	2.5
CFSM	1.37	.61	.38	1.62	.79	1.11	2.15	1.54	.48	1.44	2.17	.29
IN.	1.58	.68	.44	1.87	.83	1.28	2.40	1.78	.53	1.66	2.50	.32

CAL YR 1989 TOTAL 11213.0 MEAN 30.7 MAX 1570 MIN 1.0 CFSM 1.31 IN. 17.75
WTR YR 1990 TOTAL 10024.0 MEAN 27.5 MAX 653 MIN 2.5 CFSM 1.17 IN. 15.87

e Estimated.

01656000 CEDAR RUN NEAR CATLETT, VA

LOCATION.--Lat 38°38'12", long 77°37'31", Fauquier County, Hydrologic Unit 02070010, on right bank 100 ft downstream from bridge on State Highway 806, 0.9 mi downstream from Licking Run, and 1.4 mi southeast of Catlett.

DRAINAGE AREA.--93.4 mi².

PERIOD OF RECORD.--July 1950 to December 1986, January 1986 to September 1989 (annual maximum only), October 1989 to September 1990.

REVISED RECORDS.--WSP 2103: Drainage area. WDR VA-79-1: 1973-77(P).

GAGE.--Water-stage recorder. Gage reinstalled Sept. 19, 1989. Datum of gage is 199.15 ft above National Geodetic Vertical Datum of 1929. July 1950 to December 1986, water-stage recorder at same site and datum.

REMARKS.--Records good except those for periods with ice effect, Dec. 4, 9-11, and Dec. 20 to Jan. 1, which are fair. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

COOPERATION.--Records were provided by the Virginia Water Control Board.

AVERAGE DISCHARGE.--37 years, 87.8 ft³/s, 12.77 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 38,600 ft³/s, June 22, 1972, gage height, 27.66 ft, from floodmarks, from rating curve extended above 5,000 ft³/s, on basis of contracted-opening measurement of peak flow; no flow many days in 1954, 1957, 1959, 1963-64, 1966, and 1983.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Oct 15, 1942, reached a stage of about 22 ft, discharge not determined, from information by local residents.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 1,800 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Jan. 1	0300	Ice jam	8.59	May 29	1630	*2,170	*9.14

Minimum daily discharge, 1.5 ft³/s, Sept. 28.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	8.9	53	38	e1110	177	66	174	140	115	6.7	4.6	7.8
2	467	39	34	431	148	62	440	84	83	14	5.6	6.7
3	196	37	34	185	144	73	505	62	66	9.6	3.1	5.5
4	70	35	e29	175	301	60	220	51	75	5.7	2.3	4.5
5	36	28	25	188	178	49	152	113	50	5.7	1.8	5.6
6	25	25	26	140	128	45	142	72	38	100	5.4	3.6
7	19	25	27	103	112	41	513	50	32	21	32	4.2
8	15	68	26	168	97	37	301	41	28	11	13	3.4
9	12	140	e30	278	86	38	173	33	26	8.9	8.6	2.9
10	10	89	e30	250	242	40	130	569	23	7.0	28	2.6
11	8.9	54	e26	175	207	38	121	398	20	6.0	22	2.4
12	11	41	31	134	152	36	92	152	16	11	17	2.5
13	7.9	34	35	98	113	37	72	213	15	92	21	3.0
14	6.4	30	47	75	96	32	64	318	13	141	136	9.8
15	6.1	30	45	72	84	30	408	122	12	285	30	8.5
16	5.8	480	40	72	88	29	155	90	11	94	18	4.9
17	147	182	39	66	89	156	104	72	11	44	13	3.5
18	202	102	31	61	64	258	86	54	11	30	11	3.9
19	1070	69	27	56	60	108	67	39	41	20	7.8	3.1
20	699	59	e26	51	54	198	56	35	22	15	137	2.3
21	297	52	e24	58	47	150	66	35	14	12	45	2.5
22	161	40	e22	51	57	101	84	36	11	35	29	2.8
23	104	46	e20	44	240	80	60	38	16	32	43	2.9
24	78	45	e19	44	202	73	49	29	13	21	196	3.5
25	62	44	e19	176	114	111	47	25	9.9	13	78	2.7
26	54	84	e20	736	74	133	75	101	7.7	9.7	40	2.0
27	44	87	e22	320	68	91	49	112	6.1	6.5	26	1.6
28	38	67	e24	191	70	73	40	72	4.8	5.6	20	1.5
29	34	55	e23	261	---	71	58	1310	3.9	4.6	15	2.5
30	31	43	e29	685	---	120	261	442	3.5	4.3	13	2.1
31	32	---	e82	265	---	258	---	188	---	4.8	10	---
TOTAL	3958.0	2183	950	6719	3492	2694	4764	5096	797.9	1076.1	1032.2	114.8
MEAN	128	72.8	30.6	217	125	86.9	159	164	26.6	34.7	33.3	3.83
MAX	1070	480	82	1110	301	258	513	1310	115	285	196	9.8
MIN	5.8	25	19	44	47	29	40	25	3.5	4.3	1.8	1.5
CFSM	1.37	.78	.33	2.32	1.34	.93	1.70	1.76	.28	.37	.36	.04
IN.	1.58	.87	.38	2.68	1.39	1.07	1.90	2.03	.32	.43	.41	.05

WTR YR 1990 TOTAL 32877.0 MEAN 90.1 MAX 1310 MIN 1.5 CFSM .96 IN. 13.09

e Estimated.

POTOMAC RIVER BASIN

01658500 SOUTH FORK QUANTICO CREEK NEAR INDEPENDENT HILL, VA

LOCATION.--Lat 38°35'14", long 77°25'44", Prince William County, Hydrologic Unit 02070011, on left bank at upstream side of bridge on State Highway 619, 3.4 mi south of Independent Hill, 5.6 mi west of Dumfries, and 6.5 mi upstream from mouth.

DRAINAGE AREA.--7.64 mi².

PERIOD OF RECORD.--May 1951 to current year.

REVISED RECORDS.--WSP 2103: Drainage area.

GAGE.--Water-stage recorder and concrete control. Datum of gage is 238.88 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records good except those for periods of backwater from leaves, Oct. 7-17 and Nov. 5, 6, and period with ice effect, Dec. 15-28, which are fair. Several measurements of water temperature were made during the year.

AVERAGE DISCHARGE.--39 years, 6.85 ft³/s, 12.18 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 4,160 ft³/s, May 6, 1989, gage height, 11.62 ft; no flow at times in 1954, 1957, 1962-66, 1983, 1985, 1987, and 1988.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 200 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Jan. 1	0430	*386	*6.39	Apr. 15	0730	349	6.09

Minimum discharge, 0.17 ft³/s, Aug. 4, gage height, 1.32 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.89	4.3	4.5	141	8.8	3.9	13	12	5.6	2.3	.36	.44
2	37	2.8	4.4	20	7.6	4.2	21	6.8	4.2	1.8	.26	.36
3	8.6	4.0	4.6	11	7.9	4.7	35	5.0	3.6	.93	.25	.37
4	2.5	4.5	4.6	9.9	22	4.0	14	4.7	3.2	.73	.21	.34
5	1.7	e3.2	5.0	8.9	12	3.4	9.0	17	2.6	.66	.21	.33
6	1.5	e3.0	5.3	6.9	7.8	3.2	8.4	7.5	2.4	.80	8.4	.34
7	e1.3	5.0	5.2	5.4	6.8	3.0	28	4.9	2.4	.73	1.6	.39
8	e1.2	11	5.1	13	5.9	2.9	17	3.9	2.2	.64	.78	.54
9	e1.1	13	5.8	18	5.4	3.4	9.7	3.4	2.0	.64	4.4	.43
10	e1.0	5.1	5.7	17	21	3.7	7.7	69	1.9	.51	16	.40
11	e.96	3.2	5.8	9.5	15	3.4	9.0	34	1.6	.51	3.5	.35
12	e.92	2.6	6.4	6.9	10	3.4	6.0	11	1.4	.82	1.5	.30
13	e.88	2.3	7.7	4.8	6.9	3.2	4.9	24	1.3	2.3	1.0	.34
14	e.85	3.2	7.6	3.9	6.0	3.0	4.7	28	1.2	2.6	3.5	.41
15	e.82	4.9	e6.8	4.1	5.5	2.9	110	11	1.2	3.1	1.3	.40
16	e.79	22	e6.0	3.8	5.7	2.9	24	7.5	1.2	1.8	.91	.36
17	e3.0	10	e5.4	3.6	5.1	29	16	5.9	1.2	1.2	.80	.51
18	8.8	4.6	e4.8	3.8	3.9	31	13	4.3	1.1	.95	.66	.38
19	53	3.2	e4.4	3.5	4.5	11	9.2	3.4	1.5	.80	.56	.32
20	38	2.9	e4.2	3.5	4.0	17	8.2	3.2	1.2	.65	4.1	.37
21	13	3.1	e4.0	4.2	3.5	12	9.8	4.9	1.0	.57	1.6	.33
22	4.9	3.6	e3.8	3.5	4.7	7.4	9.7	4.8	1.0	.55	1.5	.41
23	2.9	5.0	e3.7	3.3	14	5.6	7.5	4.4	1.5	.47	3.8	.47
24	2.1	4.8	e3.6	3.1	10	5.2	6.5	3.3	1.2	.41	3.0	.34
25	1.8	5.1	e3.5	16	5.3	8.1	5.8	2.9	1.1	.38	2.0	.29
26	1.6	11	e3.4	52	3.9	7.0	5.5	13	.89	.37	1.3	.29
27	1.5	9.6	e3.8	20	4.1	5.1	5.0	9.8	.90	.31	1.0	.29
28	1.5	6.3	e4.8	11	4.4	4.3	4.3	5.8	.90	.33	.84	.27
29	1.5	5.3	5.4	12	---	4.7	7.2	100	.77	.37	.66	.27
30	1.6	4.7	5.9	32	---	13	27	25	.67	.43	.59	.33
31	2.3	---	21	13	---	21	---	9.2	---	.46	.50	---
TOTAL	199.51	173.3	172.2	468.6	221.7	236.6	456.1	449.6	52.93	29.12	67.09	10.97
MEAN	6.44	5.78	5.55	15.1	7.92	7.63	15.2	14.5	1.76	.94	2.16	.37
MAX	53	22	21	141	22	31	110	100	5.6	3.1	16	.54
MIN	.79	2.3	3.4	3.1	3.5	2.9	4.3	2.9	.67	.31	.21	.27
CFSM	.84	.76	.73	1.98	1.04	1.00	1.99	1.90	.23	.12	.28	.05
IN.	.97	.84	.84	2.28	1.08	1.15	2.22	2.19	.26	.14	.33	.05

CAL YR 1989 TOTAL 3564.33 MEAN 9.77 MAX 549 MIN .10 CFSM 1.28 IN. 17.36
WTR YR 1990 TOTAL 2537.72 MEAN 6.95 MAX 141 MIN .21 CFSM .91 IN. 12.36

e Estimated.

POTOMAC RIVER BASIN

85

01660400 AQUIA CREEK NEAR GARRISONVILLE, VA

LOCATION.--Lat 38°29'25", long 77°26'02", Stafford County, Hydrologic Unit 02070011, on right bank at bridge on State Highway 641, 1.1 mi northwest of Garrisonville, and 3.0 mi upstream from Beaverdam Run.

DRAINAGE AREA.--34.9 mi².

PERIOD OF RECORD.--September 1971 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 120 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Records good except those for periods with ice effect, Dec. 10, 15-21, and Jan. 1, period of no gage-height record, Dec. 22-28, and periods of backwater from debris, Aug. 31 to Sept. 7, Sept. 9-11, 16-23, which are fair. Several measurements of water temperature were made during the year.

COOPERATION.--Records were provided by the Virginia Water Control Board.

AVERAGE DISCHARGE.--19 years, 35.7 ft³/s, 13.89 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 11,600 ft³/s, June 22, 1972, gage height, 16.32 ft, from rating curve extended above 1,600 ft³/s on basis of contracted-opening measurement of peak flow; no flow part or all of each day Sept. 15-17, 1980, Aug. 24-27, 1983, Aug. 13-19, Sept. 21-24, 1988.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 500 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Jan. 1	0400	Ice jam	4.01	May 29	1100	*879	*4.33
May 13	2230	870	4.31				

Minimum daily discharge, 0.62 ft³/s, Sept. 26.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	16	24	22	e430	43	27	74	45	36	31	2.3	e2.3
2	165	17	22	96	39	25	223	32	29	24	1.8	e2.0
3	50	24	20	58	39	30	189	25	25	10	1.8	e1.7
4	21	20	19	52	87	29	74	25	23	6.7	1.4	e1.5
5	13	18	19	53	57	25	54	61	20	23	1.4	e1.3
6	11	18	19	41	42	24	50	34	18	22	3.1	e1.2
7	10	19	19	35	37	22	159	25	16	9.4	3.8	e1.2
8	9.8	54	18	67	34	21	100	21	15	6.7	3.0	1.5
9	9.2	70	20	93	31	21	58	18	15	5.9	13	e1.3
10	7.9	35	e20	70	71	22	47	185	20	5.5	59	e1.1
11	8.0	23	19	48	62	22	44	149	15	4.8	19	e.90
12	7.9	20	20	40	52	21	36	49	12	6.5	10	.90
13	8.1	18	24	32	42	21	31	237	10	10	6.1	1.5
14	8.1	19	26	27	36	20	29	260	9.2	26	4.6	2.7
15	7.3	19	e25	26	32	19	230	63	8.6	30	4.1	2.5
16	7.1	125	e24	26	32	18	82	45	8.6	14	4.1	e1.9
17	11	69	e22	25	33	62	54	37	8.4	9.2	3.4	e1.6
18	22	36	e19	25	28	134	46	28	8.6	6.9	3.0	e1.7
19	260	26	e17	23	27	50	36	22	11	5.4	3.3	e1.1
20	161	23	e16	22	28	60	33	21	9.7	4.3	4.7	e1.2
21	63	22	e15	23	26	56	34	27	7.8	4.3	4.0	e.90
22	34	20	e13	23	28	40	35	30	8.1	6.0	4.3	e1.0
23	24	26	e11	22	55	32	30	27	12	5.0	9.8	e1.3
24	19	27	e10	21	52	28	26	22	10	3.6	59	1.5
25	17	25	e10	84	35	32	24	19	7.0	3.1	16	.85
26	16	41	e11	261	27	33	24	67	6.0	2.5	8.6	.62
27	15	48	e11	96	28	27	22	58	16	2.0	6.0	.78
28	15	37	e12	57	30	24	20	37	13	2.0	4.5	1.0
29	15	28	12	50	---	26	42	526	7.2	2.2	3.6	.87
30	14	23	18	112	---	48	90	134	5.8	3.0	3.0	1.0
31	15	---	73	58	---	98	---	51	---	2.9	e2.5	---
TOTAL	1060.4	974	606	2096	1133	1117	1996	2380	411.0	297.9	274.2	40.92
MEAN	34.2	32.5	19.5	67.6	40.5	36.0	66.5	76.8	13.7	9.61	8.85	1.36
MAX	260	125	73	430	87	134	230	526	36	31	59	2.7
MIN	7.1	17	10	21	26	18	20	18	5.8	2.0	1.4	.62
CFSM	.98	.93	.56	1.94	1.16	1.03	1.91	2.20	.39	.28	.25	.04
IN.	1.13	1.04	.65	2.23	1.21	1.19	2.13	2.54	.44	.32	.29	.04

CAL YR 1989 TOTAL 15159.7 MEAN 41.5 MAX 1810 MIN 1.3 CFSM 1.19 IN. 16.16
WTR YR 1990 TOTAL 12386.42 MEAN 33.9 MAX 526 MIN .62 CFSM .97 IN. 13.20

e Estimated.

RAPPAHANNOCK RIVER BASIN

01662800 BATTLE RUN NEAR LAUREL MILLS, VA

LOCATION.--Lat 38°39'20", long 78°04'27", Rappahannock County, Hydrologic Unit 02080103, on left bank just upstream from bridge on State Highway 729, 0.8 mi upstream from mouth, and 1.0 mi northeast of Laurel Mills.

DRAINAGE AREA.--27.6 mi².

PERIOD OF RECORD.--April 1958 to current year.

REVISED RECORDS.--WSP 2103: Drainage area. WDR VA-72-1: 1971. WDR VA-74-1: 1972.

GAGE.--Water-stage recorder. Datum of gage is 374.62 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records good except those for periods with ice effect, Dec. 3, 9-11, 14, 16-20, and Feb. 26, and periods of no gage-height record, Dec. 4-7, 21-29, which are fair. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

COOPERATION.--Records were provided by the Virginia Water Control Board.

AVERAGE DISCHARGE.--32 years, 25.8 ft³/s, 12.69 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 9,120 ft³/s, Oct. 9, 1976, gage height, 13.90 ft, from floodmarks, from rating curve extended above 2,500 ft³/s on basis of velocity-area study; no flow many days in September 1966.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 310 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
May 10	1500	*410	*5.29	No other peak equal to or greater than base discharge.			
Minimum discharge, 3.4 ft ³ /s, Sept. 12.							

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	8.7	16	16	33	54	23	31	25	45	28	6.5	4.7
2	46	14	15	26	46	23	44	22	38	16	5.6	4.4
3	23	14	e14	22	42	23	59	20	37	9.6	5.1	4.1
4	15	13	e12	20	51	21	47	21	34	7.7	4.8	3.7
5	12	12	e13	21	40	20	40	33	28	14	4.8	3.7
6	11	13	e13	20	36	20	44	23	25	13	44	4.0
7	9.7	13	e13	18	35	19	69	20	24	8.1	18	4.1
8	9.2	13	12	20	32	19	60	19	22	7.4	9.7	4.3
9	9.1	16	e14	23	30	19	51	18	21	6.9	12	4.5
10	8.6	14	e12	25	38	19	45	155	24	6.6	14	5.4
11	8.7	13	e13	26	34	18	42	96	18	8.8	10	4.2
12	8.6	12	11	23	32	18	36	56	16	23	8.8	3.8
13	8.6	11	12	21	30	18	32	66	16	27	9.0	28
14	8.5	12	e13	19	29	17	30	54	15	25	11	13
15	8.4	14	11	19	27	17	44	45	14	67	6.9	7.5
16	8.4	28	e9.6	18	28	17	33	35	16	49	5.8	6.2
17	16	18	e9.0	17	25	37	30	30	12	24	5.5	6.4
18	16	16	e9.4	17	23	26	27	24	17	19	5.4	5.2
19	96	15	e9.4	16	24	21	26	22	19	15	5.3	5.6
20	80	15	e10	16	22	30	25	22	13	13	7.4	6.1
21	48	15	e9.8	16	21	27	29	23	12	12	6.3	5.0
22	34	14	e9.7	15	24	24	27	24	15	12	7.5	6.8
23	27	18	e9.4	14	30	23	24	22	18	21	13	6.0
24	23	20	e9.3	14	39	24	22	19	12	13	15	4.6
25	21	17	e9.1	19	27	28	22	18	10	9.9	12	4.3
26	19	18	e9.1	38	e21	30	22	49	9.6	8.6	12	4.8
27	17	19	e9.2	30	25	26	21	37	8.7	8.9	8.4	5.4
28	16	18	e9.3	27	25	25	20	38	7.8	7.6	6.8	4.6
29	15	17	e9.3	54	---	26	27	130	7.2	7.1	5.9	4.3
30	14	16	9.5	115	---	29	35	81	6.8	6.9	5.5	6.3
31	15	---	23	68	---	32	---	58	---	11	4.9	---
TOTAL	660.5	464	358.1	830	890	719	1064	1305	561.1	506.1	296.9	181.0
MEAN	21.3	15.5	11.6	26.8	31.8	23.2	35.5	42.1	18.7	16.3	9.58	6.03
MAX	96	28	23	115	54	37	69	155	45	67	44	28
MIN	8.4	11	9.0	14	21	17	20	18	6.8	6.6	4.8	3.7
CFSM	.77	.56	.42	.97	1.15	.84	1.29	1.53	.68	.59	.35	.22
IN.	.89	.63	.48	1.12	1.20	.97	1.43	1.76	.76	.68	.40	.24

CAL YR 1989 TOTAL 7045.4 MEAN 19.3 MAX 236 MIN 4.6 CFSM .70 IN. 9.50
WTR YR 1990 TOTAL 7835.7 MEAN 21.5 MAX 155 MIN 3.7 CFSM .78 IN. 10.56

e Estimated.

01663500 HAZEL RIVER AT RIXEYVILLE, VA

LOCATION.--Lat 38°35'30", long 77°57'55", Culpeper County, Hydrologic Unit 02080103, on right bank at downstream side of bridge on State Highway 229, 0.4 mi upstream from Waterford Run, 1.1 mi northeast of Rixeyville, 2.8 mi downstream from Thornton River, and 9.1 mi upstream from mouth.

DRAINAGE AREA.--287 mi².

PERIOD OF RECORD.--August 1942 to current year.

REVISED RECORDS.--WSP 971: 1942. WSP 1622: 1957-58. WSP 2103: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 288.30 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records good except those for periods with ice effect, Dec. 5, 11, 16-30, and Feb. 26, and period of doubtful gage-height record, Jan. 3-7, which are fair. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

COOPERATION.--Records were provided by the Virginia Water Control Board.

AVERAGE DISCHARGE.--48 years, 337 ft³/s, 15.95 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 60,000 ft³/s, Oct. 15, 1942, gage height, 31.8 ft, from rating curve extended above 27,000 ft³/s; minimum, 1.1 ft³/s, Sept. 10-13, 1966; minimum gage height, 1.58 ft, Aug. 18, 19, 1988.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Apr. 26, 1937, reached a stage of 28.4 ft, from floodmarks, discharge, 43,500 ft³/s, from information by local residents.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 3,300 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
May 10	1900	*2,870	*9.66	No peak equal to or greater than base discharge.			

Minimum discharge, 63 ft³/s, Aug. 5.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	240	298	198	817	642	303	436	347	597	147	100	134
2	1140	268	195	770	558	293	599	301	489	188	82	121
3	767	261	192	e600	495	300	925	273	427	112	75	111
4	510	245	169	e440	619	283	634	262	407	87	70	98
5	402	235	e180	e480	532	265	537	362	341	77	65	92
6	341	232	183	e430	462	257	487	305	304	125	190	89
7	303	226	181	e350	437	246	732	265	278	95	364	83
8	264	227	181	342	406	238	717	244	260	76	153	82
9	249	266	193	379	382	240	595	230	242	78	127	81
10	228	247	168	365	430	240	542	1270	256	77	195	100
11	218	218	e180	367	461	234	518	1040	219	106	174	86
12	204	209	189	341	413	232	461	581	194	347	149	72
13	193	199	193	307	379	227	420	535	184	305	128	422
14	184	196	183	276	366	221	396	618	180	302	228	466
15	177	197	176	271	348	217	498	445	171	764	154	259
16	169	294	e167	266	348	214	435	396	173	866	121	190
17	312	342	e150	256	342	287	389	363	160	402	104	196
18	442	258	e160	253	304	430	359	314	198	285	91	160
19	1830	235	e162	243	301	298	333	273	298	225	85	145
20	1480	227	e158	235	291	383	323	260	177	188	93	151
21	1000	216	e150	246	273	423	334	265	155	177	114	134
22	740	204	e148	233	289	371	359	266	142	181	109	135
23	586	225	e140	222	426	361	320	298	219	383	155	153
24	498	212	e138	216	468	351	299	244	163	265	681	120
25	437	206	e135	243	366	389	286	223	134	194	669	104
26	393	221	e139	500	e290	401	286	398	120	163	497	98
27	358	248	e140	466	323	372	267	526	110	141	322	99
28	330	232	e138	388	318	350	254	395	102	127	249	93
29	311	219	e150	397	---	346	282	1440	92	120	201	88
30	294	202	e210	1220	---	400	492	1180	84	132	176	92
31	293	---	331	802	---	435	---	780	---	118	151	---
TOTAL	14893	7065	5377	12721	11269	9607	13515	14699	6876	6853	6072	4254
MEAN	480	235	173	410	402	310	450	474	229	221	196	142
MAX	1830	342	331	1220	842	435	925	1440	597	866	681	466
MIN	169	196	135	216	273	214	254	223	84	76	65	72
CFSM	1.67	.82	.60	1.43	1.40	1.08	1.57	1.65	.80	.77	.68	.49
IN.	1.93	.92	.70	1.65	1.46	1.25	1.75	1.91	.89	.89	.79	.55

CAL YR 1989 TOTAL 111600 MEAN 306 MAX 3110 MIN 65 CFSM 1.07 IN. 14.47
WTR YR 1990 TOTAL 113201 MEAN 310 MAX 1830 MIN 65 CFSM 1.08 IN. 14.67

e Estimated.

RAPPAHANNOCK RIVER BASIN

01664000 RAPPAHANNOCK RIVER AT REMINGTON, VA

LOCATION.--Lat 38°31'50", long 77°48'50", Fauquier County, Hydrologic Unit 02080103, on left bank 80 ft upstream from bridge on alternate U.S. Highway 29, at Remington, 0.3 mi upstream from Tinpot Run, 0.4 mi downstream from Ruffans Run, and 2.5 mi downstream from Hazel River.

DRAINAGE AREA.--620 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1942 to current year.

REVISED RECORDS.--WSP 1171: 1944. WSP 2103: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 252.53 ft above National Geodetic Vertical Datum of 1929. Prior to Nov. 21, 1951, nonrecording gage at bridge 80 ft downstream at same datum.

REMARKS.--Records good except for period with ice effect, Dec. 9-29, which is fair. National Weather Service gage-height telemeter at station.

AVERAGE DISCHARGE.--48 years, 671 ft³/s, 14.70 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 90,000 ft³/s, Oct. 16, 1942, gage height, 30.0 ft, from floodmarks, from rating curve extended above 43,000 ft³/s on basis of slope-area measurement of peak flow; minimum, 2.8 ft³/s, Sept. 13, 1966, gage height, 2.31 ft.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum flood since at least 1828, that of Oct. 16, 1942.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 6,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
May 11	0015	*6,280	*11.38	No other peak equal to or greater than base discharge.			

Minimum discharge, 124 ft³/s, Sept. 30; minimum gage height, 3.10 ft, Aug. 5, Sept. 13.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	329	538	347	1900	1350	609	973	942	1240	218	229	216
2	2050	488	335	1750	1160	572	1220	747	1020	418	175	199
3	1610	454	329	1180	1040	586	1920	639	867	255	155	188
4	933	427	297	951	1300	554	1370	585	827	188	144	174
5	704	393	315	1050	1170	498	1150	776	699	165	137	161
6	580	381	310	964	975	474	1020	760	594	318	342	158
7	504	377	306	775	898	454	1600	602	537	242	1140	153
8	429	401	304	776	832	428	1740	532	493	175	430	147
9	395	508	e290	945	772	429	1330	490	455	166	294	147
10	366	488	e270	874	904	439	1180	1950	466	163	350	156
11	341	410	e280	893	1100	426	1130	3390	432	158	375	162
12	320	369	e287	814	920	419	1020	1380	358	427	326	142
13	300	347	e270	704	819	408	907	1200	330	734	266	243
14	283	336	e255	587	763	395	839	1720	321	975	481	846
15	269	337	e245	586	718	384	1150	1080	310	1990	331	397
16	257	544	e257	556	703	376	1070	911	305	1750	247	276
17	459	771	e238	525	699	513	890	820	297	962	214	246
18	976	511	e242	514	602	993	815	719	297	618	193	231
19	3870	431	e250	494	574	629	733	595	679	454	178	192
20	3540	402	e242	464	555	747	697	552	386	363	195	191
21	2200	377	e235	483	510	1000	716	557	294	318	331	188
22	1410	347	e228	466	518	808	812	556	267	396	239	175
23	1080	377	e220	432	998	738	716	634	363	615	276	201
24	888	381	e215	416	1090	687	648	537	343	598	671	178
25	766	350	e210	497	874	769	610	471	261	367	1080	153
26	685	392	e212	1390	656	865	640	652	232	292	837	142
27	618	456	e220	1340	648	780	590	1190	218	250	536	140
28	563	434	e210	993	640	711	543	846	210	223	402	138
29	521	402	e230	926	---	680	555	3240	190	208	326	132
30	486	364	297	2740	---	788	1170	3040	176	219	278	128
31	475	---	396	1770	---	953	---	1650	---	226	245	---
TOTAL	28207	12793	8342	28755	23788	19112	29754	33763	13467	14451	11423	6200
MEAN	910	426	269	928	850	617	992	1089	449	466	368	207
MAX	3870	771	396	2740	1350	1000	1920	3390	1240	1990	1140	846
MIN	257	336	210	416	510	378	543	471	178	158	137	128
CFSM	1.47	.69	.43	1.50	1.37	.99	1.60	1.76	.72	.75	.59	.33
IN.	1.69	.77	.50	1.73	1.43	1.15	1.79	2.03	.81	.87	.69	.37

CAL YR 1989 TOTAL 233381 MEAN 639 MAX 12600 MIN 113 CFSM 1.03 IN. 14.00
WTR YR 1990 TOTAL 230055 MEAN 630 MAX 3870 MIN 128 CFSM 1.02 IN. 13.80

e Estimated.

RAPPAHANNOCK RIVER BASIN

89

01664000 RAPPAHANNOCK RIVER AT REMINGTON, VA--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1951 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: October 1951 to September 1956, October 1965 to October 1986.

WATER TEMPERATURE: May 1951 to September 1956, October 1965 to September 1976, October 1977 to October 1986.

SUSPENDED-SEDIMENT DISCHARGE: April 1951 to current year.

REMARKS.--Daily sediment samples Oct. 1 to Nov. 3 by observer; biweekly samples thereafter by USGS personnel.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: Maximum daily, 150 microsiemens, Sept. 3, 1974; minimum daily, 24 microsiemens, July 6, 1975.

WATER TEMPERATURE: Maximum, 33.0°C, July 6, 1986; minimum, 0.0°C on many days during winter periods.

SEDIMENT CONCENTRATION: Maximum daily mean, 1,910 mg/L, Mar. 15, 1986; minimum daily mean, 1 mg/L on many days during each year.

SEDIMENT LOAD: Maximum daily, 55,600 tons, Sept. 26, 1975; minimum daily, 0.03 ton, Sept. 9, 11, 1983, Oct. 9-12, 1986.

EXTREMES FOR CURRENT YEAR.--

SEDIMENT CONCENTRATION: Maximum daily mean, 477 mg/L, May 11; minimum daily mean, 1 mg/L, Sept. 5-12, 22, 24-30.

SEDIMENT LOAD: Maximum daily, 5,270 tons, May 11; minimum daily, 0.35 ton, Sept. 30.

SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DAY	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)
	OCTOBER		NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH	
1	7	6.2	9	13	6	5.6	39	200	25	91	12	20
2	376	2810	7	9.2	6	5.4	26	123	23	72	11	17
3	171	828	6	7.4	5	4.4	17	54	22	62	11	17
4	33	83	6	6.9	5	4.0	15	39	31	109	11	16
5	15	29	6	6.4	4	3.4	19	54	25	79	10	13
6	11	17	5	5.1	4	3.3	17	44	21	55	10	13
7	8	11	5	5.1	4	3.3	16	33	19	46	10	12
8	5	5.8	8	8.7	4	3.3	18	38	18	40	9	10
9	3	3.2	11	15	4	3.1	37	94	16	33	9	10
10	4	4.0	7	9.2	4	2.9	36	85	18	44	8	9.5
11	4	3.7	6	6.6	4	3.0	30	72	25	74	8	9.2
12	4	3.5	6	6.0	4	3.1	29	64	20	50	7	7.9
13	3	2.4	6	5.6	3	2.2	27	51	18	40	7	7.7
14	3	2.3	6	5.4	3	2.1	25	40	16	33	6	6.4
15	2	1.5	6	5.5	3	2.0	22	35	15	29	6	6.2
16	3	2.1	29	47	3	2.1	19	29	15	28	6	6.1
17	25	50	30	62	3	1.9	16	23	15	28	9	12
18	71	187	13	18	3	2.0	13	18	12	20	19	51
19	403	5000	10	12	4	2.7	11	15	10	15	11	19
20	180	1720	10	11	5	3.3	10	13	9	13	13	26
21	100	594	10	10	5	3.2	9	12	8	11	16	43
22	32	122	10	9.4	6	3.7	7	8.8	11	15	14	31
23	19	55	10	10	6	3.6	7	8.2	125	337	12	24
24	13	31	9	9.3	7	4.1	6	6.7	135	397	8	15
25	10	21	9	8.5	7	4.0	43	58	82	194	12	25
26	7	13	9	9.5	8	4.6	212	845	17	30	14	33
27	7	12	11	14	8	4.8	82	297	13	23	11	23
28	7	11	8	9.4	8	4.5	40	107	12	21	10	19
29	7	9.8	12	13	8	5.0	26	65	---	---	9	17
30	7	9.2	7	6.9	8	6.4	42	311	---	---	11	23
31	7	9.0	---	---	15	16	29	139	---	---	20	51
TOTAL	---	11656.7	---	365.1	---	123.0	---	2981.7	---	1989	---	593.0

SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

[illegible]

RAPPAHANNOCK RIVER BASIN

91

01665000 MOUNTAIN RUN NEAR CULPEPER, VA

LOCATION.--Lat 38°28'50", long 78°03'10", Culpeper County, Hydrologic Unit 02080103, on left bank 30 ft upstream from bridge on State Highway 641, 2.4 mi upstream from Bond Branch, and 3.0 mi west of Culpeper.

DRAINAGE AREA.--15.9 mi², of which 10.9 mi² are above flood-detention structures.

PERIOD OF RECORD.--September 1949 to current year.

REVISED RECORDS.--WSP 1332: 1950-51. WSP 2103: Drainage area. WDR VA-89-1: 1951 (M).

GAGE.--Water-stage recorder. Datum of gage is 389.46 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--No estimated daily discharges. Records good. Some regulation since 1959 by two reservoirs, combined flood storage, 2,240 acre-ft; 531 acre-ft additional storage used for low-water regulation for municipal supply for town of Culpeper. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

COOPERATION.--Records were provided by the Virginia Water Control Board.

AVERAGE DISCHARGE.--41 years, 16.7 ft³/s, 14.26 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 5,940 ft³/s, Dec. 4, 1950, gage height, 11.20 ft, from rating curve extended above 910 ft³/s on basis of slope-area measurements at gage heights 10.52 ft and 11.00 ft; minimum, 0.09 ft³/s, Sept. 30, Oct. 1, 1954.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 300 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Oct. 19	0845	305	4.87	July 14	1730	*873	*7.28

Minimum discharge, 1.8 ft³/s, Sept. 4, 5, 6.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	14	20	13	93	27	17	26	16	21	5.5	4.5	2.5
2	131	16	13	44	24	17	36	35	16	3.8	3.8	2.2
3	64	15	13	30	24	18	39	14	14	2.8	3.5	2.1
4	27	13	12	26	39	16	29	13	12	2.3	3.2	2.1
5	17	12	12	24	32	15	23	20	10	9.0	3.3	2.0
6	14	12	12	22	26	15	23	16	9.2	20	4.9	2.0
7	12	12	12	20	24	14	49	13	8.7	11	4.9	3.0
8	9.8	15	14	23	22	14	45	11	8.2	7.0	4.0	2.9
9	9.4	22	16	31	20	14	32	10	9.4	5.6	4.7	2.6
10	8.6	19	15	32	30	15	26	89	18	5.5	8.1	2.7
11	8.5	15	13	27	31	15	24	68	13	58	7.5	2.4
12	8.0	13	14	23	26	15	20	33	8.7	86	6.1	2.2
13	8.1	12	17	20	23	15	18	26	7.4	46	6.1	34
14	8.0	11	16	18	21	15	17	25	6.8	174	10	29
15	7.8	12	14	18	19	16	36	19	6.3	177	7.2	14
16	7.7	30	14	17	20	13	28	16	6.5	91	5.3	8.3
17	45	26	13	16	19	25	22	15	5.7	35	4.1	8.7
18	58	18	12	16	17	30	19	12	16	21	3.4	6.1
19	204	15	12	16	17	20	17	10	19	15	3.0	5.0
20	119	14	12	15	16	28	16	9.6	9.9	13	3.0	5.2
21	73	15	12	16	16	28	18	12	7.1	12	3.1	4.5
22	30	12	11	15	22	22	19	13	5.8	11	3.8	5.1
23	20	15	9.7	14	55	18	17	14	6.6	12	6.2	4.9
24	17	14	9.8	14	40	17	15	11	5.2	11	10	4.0
25	14	14	9.6	21	28	20	15	10	4.3	8.8	10	3.3
26	13	17	10	56	21	20	14	22	3.7	7.3	7.7	2.9
27	12	18	11	40	19	17	13	23	3.4	6.5	6.0	3.1
28	12	17	11	29	19	15	12	21	3.3	6.0	4.6	3.0
29	11	16	12	31	---	17	16	100	2.9	5.6	3.9	2.9
30	11	14	12	51	---	23	19	56	2.7	6.6	3.6	3.2
31	14	---	29	34	---	27	---	30	---	5.8	2.8	---
TOTAL	1007.9	474	406.1	852	697	571	703	782.6	270.8	881.1	162.3	175.9
MEAN	32.5	15.8	13.1	27.5	24.9	18.4	23.4	25.2	9.03	28.4	5.24	5.86
MAX	204	30	29	93	55	30	49	100	21	177	10	34
MIN	7.7	11	9.6	14	16	13	12	9.6	2.7	2.3	2.8	2.0
CFSM	2.04	.99	.82	1.73	1.57	1.16	1.47	1.59	.57	1.79	.33	.37
IN.	2.36	1.11	.95	1.99	1.63	1.34	1.64	1.83	.63	2.06	.38	.41

CAL YR 1989 TOTAL 7678.7 MEAN 21.0 MAX 306 MIN 4.1 CFSM 1.32 IN. 17.97
WTR YR 1990 TOTAL 6983.7 MEAN 19.1 MAX 204 MIN 2.0 CFSM 1.20 IN. 16.34

01665500 RAPIDAN RIVER NEAR RUCKERSVILLE, VA

LOCATION.--Lat 38°16'50", long 78°20'25", Madison County, Hydrologic Unit 02080103, on left bank 250 ft downstream from bridge on U.S. Highway 29, 0.2 mi downstream from Elk Run, 1.7 mi upstream from White Run, 3.6 mi northeast of Ruckersville, and at mile 63.5.

DRAINAGE AREA.--114 mi².

PERIOD OF RECORD.--September 1942 to current year.

REVISED RECORDS.--WSP 1171: 1944-45(M). WSP 1382: 1943(M). WSP 2103: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 439.44 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records good except those for periods with ice effect, Dec. 10, 15, 16, 23-29, 31, and Jan. 1, which are fair. Diversion 0.4 mi upstream from station since 1973 by Rapidan Service Authority for municipal water supply of Greene County and town of Stanardsville averaged about 0.44 ft³/s. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

COOPERATION.--Records were provided by the Virginia Water Control Board.

AVERAGE DISCHARGE.--48 years, 148 ft³/s, 17.63 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 30,700 ft³/s, Oct. 15, 1942, gage height, 20.8 ft, from floodmark in gage house, from rating curve extended above 12,000 ft³/s on basis of slope-area measurement at gage height 17.78 ft; minimum daily, 0.90 ft³/s, Sept. 12, 1966.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 1,400 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Oct. 2	0730	1,860	5.16	Jan. 1	0400	Ice jam	5.04
Oct. 17	1630	1,640	4.83	May 10	1100	4,040	8.10
Oct. 19	0330	1,630	4.82	July 11	1900	*4,140	*8.22

Minimum daily discharge, 28 ft³/s, Sept. 6, 7.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	128	161	85	e572	285	170	201	118	322	45	39	43
2	898	146	83	287	257	164	257	108	272	44	38	41
3	545	137	81	232	256	164	332	104	243	41	38	36
4	404	127	77	208	357	147	295	104	215	38	37	32
5	328	119	77	200	287	135	270	149	189	36	38	30
6	278	112	77	182	260	130	275	113	174	38	48	28
7	241	107	74	163	243	121	362	103	154	36	50	28
8	213	118	77	186	224	116	311	96	142	40	38	31
9	196	132	76	201	208	116	280	90	132	41	45	38
10	176	108	e76	193	256	112	264	1210	171	44	61	42
11	161	96	84	178	243	107	252	630	121	625	50	34
12	146	90	72	166	231	105	229	408	108	202	45	36
13	134	84	74	148	214	103	212	342	99	93	39	133
14	126	80	68	135	204	100	201	297	94	251	55	91
15	118	81	e73	132	196	96	263	250	88	554	46	60
16	111	211	e70	128	196	99	210	225	86	378	41	47
17	466	157	65	122	181	201	198	203	82	236	38	44
18	419	132	79	118	165	217	182	177	104	171	35	39
19	1240	120	69	112	163	179	169	159	92	127	35	41
20	799	117	74	109	151	239	164	148	75	106	62	42
21	579	107	66	110	141	222	172	160	72	128	47	37
22	451	104	50	105	207	209	174	162	70	99	55	43
23	367	113	e47	101	263	217	154	152	79	81	73	39
24	316	98	e47	98	240	214	143	128	63	67	117	36
25	275	95	e48	142	207	213	135	117	59	58	117	34
26	246	104	e54	249	192	201	131	217	56	53	106	32
27	222	110	e62	210	188	192	124	209	53	47	89	30
28	202	99	e70	189	182	178	118	238	49	44	75	29
29	188	93	e75	202	---	185	139	739	46	43	63	29
30	174	88	82	390	---	198	140	516	43	46	57	29
31	174	---	e232	321	---	206	---	394	---	44	50	---
TOTAL	10321	3446	2344	5889	6197	5056	6357	8066	3553	3856	1727	1254
MEAN	333	115	75.6	190	221	163	212	260	118	124	55.7	41.8
MAX	1240	211	232	572	357	239	362	1210	322	625	117	133
MIN	111	80	47	98	141	96	118	90	43	36	35	28
CFSM	2.92	1.01	.66	1.67	1.94	1.43	1.86	2.28	1.04	1.09	.49	.37
IN.	3.37	1.12	.76	1.92	2.02	1.65	2.07	2.63	1.16	1.26	.56	.41

CAL YR 1989 TOTAL 54586 MEAN 150 MAX 1760 MIN 30 CFSM 1.31 IN. 17.81
WTR YR 1990 TOTAL 58066 MEAN 159 MAX 1240 MIN 28 CFSM 1.40 IN. 18.95

e Estimated.

01666500 ROBINSON RIVER NEAR LOCUST DALE, VA

LOCATION.--Lat 38°19'30", long 78°05'45", Madison County, Hydrologic Unit 02080103, on right bank 100 ft upstream from bridge on State Highway 614, 1.1 mi upstream from Great Run, 1.7 mi upstream from mouth, 2.0 mi southeast of Locust Dale, and 3.4 mi downstream from Crooked Run.

DRAINAGE AREA.--179 mi².

PERIOD OF RECORD.--July 1943 to current year. Prior to October 1965, published as Robertson River near Locust Dale.

REVISED RECORDS.--WSP 1171: 1948(M). WSP 2103: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 283.70 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records good except those for periods with ice effect, Dec. 10, 11 and Dec. 15 to Jan. 1, which are fair. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

COOPERATION.--Records were provided by the Virginia Water Control Board.

AVERAGE DISCHARGE.--47 years, 220 ft³/s, 16.69 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 24,500 ft³/s, June 22, 1972, gage height, 20.92 ft, from rating curve extended above 9,100 ft³/s on basis of records for other stations in Rappahannock River basin; minimum, 1.2 ft³/s, Sept. 7, 13, 1954; minimum daily, 1.8 ft³/s, Sept. 13, 27, 1954.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Oct. 15, 1942, reached a stage of 23.9 ft, from floodmarks, discharge, about 44,000 ft³/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 1,700 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Oct. 2	1100	3,100	10.72	Jan. 1	0500	Ice jam	*11.04
Oct. 19	1100	2,540	9.64	May 10	1500	*3,190	10.89

Minimum daily discharge, 49 ft³/s, Sept. 12.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	223	211	147	e2340	373	221	271	198	332	72	69	89
2	1460	183	143	888	336	215	376	181	287	72	63	80
3	656	184	143	359	325	219	459	170	252	66	60	75
4	429	171	134	296	489	203	352	170	234	62	58	67
5	339	165	136	288	377	190	309	241	207	58	56	64
6	292	162	136	257	329	183	288	195	190	73	85	61
7	255	160	133	229	306	174	519	177	176	63	90	57
8	224	187	135	259	281	168	436	167	167	61	70	56
9	209	229	143	326	265	170	351	158	156	66	67	57
10	192	186	e139	310	339	168	329	1390	179	65	103	65
11	182	165	e139	267	344	164	317	749	147	101	91	56
12	170	159	132	243	303	163	285	427	134	276	77	49
13	162	151	140	216	275	158	261	360	129	167	68	412
14	154	148	131	199	263	153	251	336	126	385	95	358
15	149	149	e135	196	249	151	471	275	120	450	98	228
16	143	283	e131	188	248	150	305	250	120	369	82	168
17	315	255	e115	182	239	263	269	230	112	226	73	160
18	442	205	e122	181	215	297	247	209	136	174	66	133
19	1700	186	e118	173	216	217	229	190	181	143	63	122
20	1110	181	e120	168	205	303	221	183	118	123	84	121
21	732	167	e110	172	193	304	225	194	110	123	73	105
22	542	161	e90	163	211	254	246	191	103	137	74	105
23	422	178	e89	157	482	245	220	197	120	131	93	104
24	352	164	e90	155	325	237	208	175	102	133	463	90
25	304	158	e92	208	270	248	199	164	92	111	412	82
26	270	177	e100	481	241	238	192	235	88	98	282	78
27	241	187	e108	345	236	219	185	268	82	87	210	74
28	224	173	e120	289	233	206	178	232	81	82	167	72
29	210	162	e135	284	---	211	200	991	75	79	136	69
30	197	152	e150	567	---	247	266	605	71	85	119	67
31	201	---	e270	435	---	288	---	414	---	78	100	---
TOTAL	12501	5399	4026	10821	8168	6627	8665	9922	4427	4216	3647	3324
MEAN	403	180	130	349	292	214	289	320	148	136	118	111
MAX	1700	283	270	2340	489	304	519	1390	332	450	463	412
MIN	143	148	89	155	193	150	178	158	71	58	56	49
CFSM	2.25	1.01	.73	1.95	1.63	1.19	1.61	1.79	.82	.76	.66	.62
IN.	2.60	1.12	.84	2.25	1.70	1.38	1.80	2.06	.92	.88	.76	.69

CAL YR 1989 TOTAL 93751 MEAN 257 MAX 5300 MIN 60 CFSM 1.43 IN. 19.48
WTR YR 1990 TOTAL 81743 MEAN 224 MAX 2340 MIN 49 CFSM 1.25 IN. 16.99

e Estimated.

RAPPAHANNOCK RIVER BASIN

01667500 RAPIDAN RIVER NEAR CULPEPER, VA

LOCATION.--Lat 38°21'01", long 77°58'31", Culpeper County, Hydrologic Unit 02080103, on left bank 0.7 mi upstream from Cedar Run and bridge on U.S. Highway 522, 8.5 mi south of Culpeper, and at mile 29.6.

DRAINAGE AREA.--472 mi².

PERIOD OF RECORD.--October 1930 to current year. Monthly discharge only for some periods, published in WSP 1302.

REVISED RECORDS.--WSP 741: 1931. WSP 801: 1934(M), 1936(M). WSP 1081: 1943-46. WSP 1171: 1932(M), 1933-35. WSP 2103: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 241.36 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records good except those for period with ice effect, Dec. 18 to Jan. 1, and periods of doubtful or no gage-height record, June 11, July 23, 24, Aug. 15, and Sept. 11-13, which are fair. Diurnal fluctuation at low flow caused by mill at Rapidan. National Weather Service gage-height telemeter at station. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

COOPERATION.--Records were provided by the Virginia Water Control Board.

AVERAGE DISCHARGE.--60 years, 526 ft³/s, 15.13 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 58,100 ft³/s, Oct. 16, 1942, gage height, 30.3 ft, from floodmark, from rating curve extended above 43,000 ft³/s on basis of slope-area measurement of peak flow; minimum, 2.1 ft³/s, Oct. 4, 5, 11, 1954; minimum daily, 2.2 ft³/s, Oct. 4, 1954.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 4,500 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Oct. 2	1445	5,750	8.65	Jan. 1	0430	Ice jam	7.51
Oct. 19	1400	5,320	8.03	May 10	2015	*6,130	*9.19

Minimum discharge observed, 107 ft³/s, Sept. 12, gage height, 0.72 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	517	561	362	e2780	930	560	845	534	1050	170	197	176
2	3230	484	350	1420	850	531	922	453	890	166	179	161
3	1850	511	348	1020	811	559	1270	405	807	153	169	151
4	1230	452	322	928	1350	513	994	395	795	140	161	139
5	970	416	323	834	1070	454	894	807	660	135	155	131
6	817	402	326	735	909	429	825	592	578	143	171	128
7	699	393	321	636	840	404	1320	447	528	140	216	124
8	587	503	316	672	780	382	1350	400	486	131	200	119
9	532	778	342	969	728	386	1010	371	445	146	176	118
10	475	555	299	883	838	382	916	2690	453	151	196	122
11	435	449	319	770	970	372	890	2700	e390	155	244	e130
12	398	412	334	696	823	370	808	1310	345	1320	224	e110
13	366	384	338	595	747	356	744	1070	324	509	205	e372
14	346	365	326	520	704	349	696	985	316	744	187	711
15	330	364	303	498	661	342	1840	797	305	1710	e205	402
16	312	672	282	472	645	339	1060	709	303	1220	175	293
17	369	760	245	444	634	551	864	635	284	839	162	260
18	1290	545	e270	428	542	960	785	553	304	614	143	230
19	3550	480	e270	409	540	641	695	462	661	481	134	207
20	2630	459	e260	387	518	841	647	439	315	397	159	210
21	1730	424	e240	392	466	970	654	491	278	349	173	198
22	1330	396	e220	375	486	773	734	475	261	435	161	190
23	1080	440	e210	356	1210	721	627	503	329	e413	201	205
24	935	418	e200	345	867	691	562	434	280	e346	578	176
25	828	391	e210	475	738	726	527	386	237	295	748	153
26	746	435	e225	1280	623	702	504	495	224	267	502	143
27	667	499	e260	985	601	622	472	919	211	245	383	137
28	608	449	e290	779	600	571	446	658	202	231	307	133
29	563	413	e310	715	---	571	468	2890	189	220	256	128
30	522	375	e340	1280	---	733	799	1870	177	213	223	125
31	518	---	e475	1070	---	867	---	1260	---	208	196	---
TOTAL	30460	14185	9236	24148	21481	17668	25168	27135	12627	12686	7386	5882
MEAN	983	473	298	779	767	570	839	875	421	409	238	196
MAX	3550	778	475	2780	1350	970	1840	2890	1050	1710	748	711
MIN	312	364	200	345	466	339	446	371	177	131	134	110
CFSM	2.08	1.00	.63	1.65	1.63	1.21	1.78	1.85	.89	.87	.50	.42
IN.	2.40	1.12	.73	1.90	1.69	1.39	1.98	2.14	1.00	1.00	.58	.46

CAL YR 1989 TOTAL 232561 MEAN 637 MAX 14000 MIN 148 CFSM 1.35 IN. 18.33
WTR YR 1990 TOTAL 208062 MEAN 570 MAX 3550 MIN 110 CFSM 1.21 IN. 16.40

e Estimated.

RAPPAHANNOCK RIVER BASIN

95

01667870 MOUNTAIN RUN NEAR BURR HILL, VA

LOCATION.--Lat 38°21'13", long 77°53'38", Orange County, Hydrologic Unit 02080103, in center of downstream side of bridge on State Highway 611, 2.4 mi west of Burr Hill, and 4.4 mi upstream from mouth.

DRAINAGE AREA.--28.8 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1989 to September 1990.

GAGE.--Water-stage recorder. Elevation of gage is 620 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Records fair except those for period of no gage-height record, Oct. 1-10, period with ice effect, Dec. 16-30, and below 10 ft³/s, which are poor.

EXTREMES FOR CURRENT YEAR.--Maximum discharge during period October 1989 to September 1990, 849 ft³/s, Jan. 1, gage height, 5.96 ft; minimum, 2.4 ft³/s, Sept. 29, 30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e11	18	16	419	34	21	36	23	23	9.3	6.9	5.5
2	e130	15	15	53	32	22	38	21	20	7.0	6.4	5.3
3	e45	22	14	39	35	25	48	20	22	6.0	6.2	5.3
4	e21	17	13	39	73	21	33	20	26	5.5	6.0	5.0
5	e16	15	14	38	41	20	27	50	18	6.3	6.0	4.9
6	e14	16	14	33	35	20	26	26	16	6.5	9.8	4.9
7	e12	15	13	30	33	19	79	22	15	5.7	11	4.8
8	e11	45	13	49	29	19	50	22	14	5.5	7.3	4.8
9	e11	48	14	54	28	19	35	19	14	8.2	12	4.9
10	e10	23	14	41	36	19	31	288	13	14	25	5.2
11	10	19	13	34	34	18	30	70	11	31	13	4.8
12	9.4	18	14	31	31	18	24	33	10	20	9.9	4.6
13	9.0	16	16	28	27	18	22	31	10	9.7	8.3	13
14	8.9	16	15	26	26	18	21	29	13	115	7.6	11
15	8.8	17	15	26	25	17	222	24	11	154	7.9	5.7
16	8.2	114	e14	26	26	17	49	23	10	25	7.8	4.5
17	12	33	e12	25	24	38	37	22	9.1	17	7.6	4.4
18	16	22	e10	25	21	38	32	19	21	13	8.7	3.8
19	153	19	e8.6	24	24	23	28	18	22	12	9.9	3.5
20	114	19	e9.2	24	22	39	27	18	11	11	11	3.9
21	38	18	e8.0	25	20	33	28	24	9.8	11	11	3.5
22	24	17	e4.4	23	25	25	27	21	9.0	17	12	4.1
23	20	19	e4.5	22	50	22	25	20	11	10	13	4.1
24	18	18	e4.8	22	33	21	24	18	8.6	9.1	18	3.2
25	17	18	e4.9	48	25	22	23	17	7.6	8.2	13	3.0
26	17	24	e8.7	157	22	21	23	27	7.2	7.7	8.9	2.8
27	16	20	e8.0	50	22	19	21	28	6.8	7.1	7.6	2.7
28	15	19	e10	38	22	19	21	22	6.8	7.1	6.8	2.8
29	15	17	e12	41	---	20	25	323	6.4	7.3	6.4	2.5
30	15	15	e15	87	---	30	30	55	6.0	10	6.1	2.6
31	16	---	43	40	---	47	---	30	---	8.1	5.7	---
TOTAL	841.3	712	390.1	1617	855	728	1142	1383	388.3	584.3	296.8	141.1
MEAN	27.1	23.7	12.6	52.2	30.5	23.5	38.1	44.6	12.9	18.8	9.57	4.70
MAX	153	114	43	419	73	47	222	323	26	154	25	13
MIN	8.2	15	4.4	22	20	17	21	17	6.0	5.5	5.7	2.5
CFSM	.94	.82	.44	1.81	1.06	.82	1.32	1.55	.45	.65	.33	.16
IN.	1.09	.92	.50	2.09	1.10	.94	1.48	1.79	.50	.75	.38	.18

WTR YR 1990 TOTAL 9078.9 MEAN 24.9 MAX 419 MIN 2.5 CFMS .66 IN. 11.73

e Estimated.

RAPPAHANNOCK RIVER BASIN

01667870 MOUNTAIN RUN NEAR BURR HILL, VA--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--October 1989 to September 1990.

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED SATUR- ATION (00301)	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	HARD- NESS TOTAL (MG/L AS CACO3) (00900)
NOV 07...	0830	13	122	7.6	10.5	757	10.2	92	270	54

DATE	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)
NOV 07...	16	3.3	3.2	1.6	47	4.0	4.9	0.10	10	70

DATE	SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L) (70301)	NITRO- GEN, NO2+NO3 TOTAL (MG/L AS N) (00630)	NITRO- GEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS ORTHO TOTAL (MG/L AS P) (70507)	CADMIUM TOTAL RECOV- ERABLE (UG/L AS CD) (01027)	CHRO- MIUM, TOTAL RECOV- ERABLE (UG/L AS CR) (01034)	COPPER, TOTAL RECOV- ERABLE (UG/L AS CU) (01042)	IRON, TOTAL RECOV- ERABLE (UG/L AS FE) (01045)
NOV 07...	72	0.500	0.010	0.20	0.010	0.020	<1	<1	1	680

DATE	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, TOTAL RECOV- ERABLE (UG/L AS PB) (01051)	MANGA- NESE, TOTAL RECOV- ERABLE (UG/L AS MN) (01055)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY TOTAL RECOV- ERABLE (UG/L AS HG) (71900)	NICKEL, TOTAL RECOV- ERABLE (UG/L AS NI) (01067)	ZINC, TOTAL RECOV- ERABLE (UG/L AS ZN) (01092)	CARBON, ORGANIC TOTAL (MG/L AS C) (00680)	PHENOLS TOTAL (UG/L) (32730)	
NOV 07...	220	1	40	34	0.30	1	<10	2.	7	<1

< Actual value is known to be less than the value shown.

01668000 RAPPAHANNOCK RIVER NEAR FREDERICKSBURG, VA
(National stream-quality accounting network station)

LOCATION.--Lat 38°19'20", long 77°31'05", Spotsylvania County, Hydrologic Unit 02080104, on right bank 1.6 mi upstream from Virginia Power dam, 2.2 mi downstream from Motts Run, and 3.8 mi upstream from Fredericksburg.

DRAINAGE AREA.--1,596 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--September 1907 to current year. Monthly discharge only for some periods, published in WSP 1302.

REVISED RECORDS.--WSP 801: 1924(M). WSP 951: 1937(M). WSP 1302: 1907-12, 1913(M), 1916(M), 1918(M), 1920-21(M). WSP 2103: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 55.18 ft above National Geodetic Vertical Datum of 1929. Prior to Jan. 15, 1922, nonrecording gage, and Jan. 15, 1922, to Aug. 2, 1966, water-stage recorder at same site at datum 1.00 ft higher.

REMARKS.--Records good except those for periods with ice effect, Dec. 9, 10, 14-29, which are fair.

AVERAGE DISCHARGE.--83 years, 1,652 ft³/s, 14.06 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 140,000 ft³/s, Oct. 16, 1942, gage height, 26.9 ft, present datum, from floodmarks, from rating curve extended above 76,000 ft³/s on basis of flow-over-dam and slope-area measurements at gage heights 26.1 ft and 26.9 ft, present datum; minimum, 5 ft³/s, Oct. 11, 12, 1930.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in June 1889 was probably several feet lower than that of Oct. 16, 1942.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 16,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
May 11	0730	*17,900	*8.68	May 29	2300	16,800	8.42

Minimum discharge, 326 ft³/s, Aug. 5-6, gage height, 1.91 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1010	1260	1070	9690	2980	1440	2750	2220	2790	438	491	507
2	4570	1330	1020	5900	2510	1360	3070	1570	2230	512	467	472
3	7340	1250	994	3060	2250	1380	5030	1310	1900	616	396	452
4	2920	1240	958	2390	3570	1410	3530	1180	1810	459	358	428
5	1980	1110	897	2430	3560	1270	2600	1670	1620	431	336	397
6	1560	1040	933	2140	2560	1190	2190	2010	1380	577	337	372
7	1330	1020	924	1840	2180	1150	3300	1390	1270	560	994	365
8	1150	1120	927	1750	1960	1090	5500	1180	1190	464	1020	374
9	1010	2460	e1010	3180	1780	1060	3220	1080	1130	395	653	350
10	944	1920	e1000	2890	1920	1070	2570	2510	1110	400	701	352
11	884	1410	849	2360	3160	1060	2360	13000	1140	442	787	348
12	844	1190	996	2010	2370	1040	2150	4090	979	1520	705	382
13	792	1100	1010	1740	2060	1040	1870	2660	882	1660	599	377
14	756	1030	e972	1490	1810	1010	1710	3680	834	1450	546	1190
15	729	1030	e870	1360	1680	987	5790	2450	806	7270	746	1380
16	701	2800	e879	1350	1600	964	4120	1870	765	3980	588	873
17	689	3690	e982	1280	1610	1110	2410	1650	749	2700	507	676
18	2110	1920	e972	1240	1490	3280	2020	1470	717	1650	466	595
19	7560	1460	e1080	1200	1380	2120	1740	1250	1130	1210	425	552
20	10900	1280	e1020	1140	1380	1860	1570	1130	1220	967	426	498
21	6590	1210	e934	1120	1280	2830	1530	1140	812	815	437	493
22	3630	1110	e888	1140	1220	2120	1630	1210	699	813	551	511
23	2660	1120	e843	1070	2480	1790	1640	1170	673	919	494	485
24	2150	1170	e817	1020	2720	1660	1440	1190	811	1100	640	510
25	1840	1110	e817	1160	2210	1620	1330	1030	685	882	1770	478
26	1640	1190	e879	5430	1660	1760	1280	1090	574	681	1590	442
27	1490	1610	e934	4860	1450	1700	1260	2280	522	589	1210	427
28	1370	1510	e915	2690	1460	1540	1180	1990	857	529	901	431
29	1280	1350	e852	2160	---	1460	1160	8040	524	497	742	440
30	1210	1160	943	5120	---	1640	2540	10800	459	483	628	432
31	1180	---	1030	4310	---	2380	---	4130	---	496	558	---
TOTAL	74819	43200	29215	80520	58290	47391	74490	83440	32268	35505	21069	15589
MEAN	2414	1440	942	2597	2082	1529	2483	2692	1076	1145	680	520
MAX	10900	3690	1080	9690	3570	3280	5790	13000	2790	7270	1770	1380
MIN	689	1020	817	1020	1220	964	1160	1030	459	395	336	348
CFSM	1.51	.90	.59	1.63	1.30	.96	1.56	1.69	.67	.72	.43	.33
IN.	1.74	1.01	.68	1.88	1.36	1.10	1.74	1.94	.75	.83	.49	.36

CAL YR 1989 TOTAL 659147 MEAN 1806 MAX 42000 MIN 343 CFSM 1.13 IN. 15.36
WTR YR 1990 TOTAL 595796 MEAN 1632 MAX 13000 MIN 336 CFSM 1.02 IN. 13.89

e Estimated.

01668000 RAPPAHANNOCK RIVER NEAR FREDERICKSBURG, VA--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1929-30, 1956, 1967-74, 1978 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: October 1955 to September 1956, April 1968 to August 1974.

WATER TEMPERATURE: October 1955 to September 1956, April 1968 to August 1974.

COOPERATION.--Chemical data as noted were provided by the Virginia Division of Consolidated Laboratory Services (VDCLS) and reviewed by the U.S. Geological Survey.

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	AGENCY ANA- LYZING SAMPLE (CODE NUMBER) (00028)	TUR- BID- ITY (NTU) (00076)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)
OCT											
02...	1500	2280	70	7.0	18.0	756	VDCLS	15	9.2	98	--
03...	1100	6840	70	6.9	18.0	759	VDCLS	65	8.6	91	--
04...	1115	2900	78	7.2	17.5	762	USGS	--	9.2	96	--
04...	1116	2900	78	7.2	17.5	762	VDCLS	63	9.2	96	--
13...	1100	792	80	7.2	14.0	762	VDCLS	--	9.2	89	--
20...	1130	9230	65	7.1	13.0	755	VDCLS	96	7.6	72	--
21...	1145	6330	73	7.4	12.5	758	VDCLS	71	9.8	93	--
NOV											
06...	1000	1040	82	7.4	10.0	761	VDCLS	--	11.1	99	--
28...	1000	1520	102	7.2	7.5	761	USGS	4.5	12.5	104	390
28...	1001	1520	102	7.2	7.5	761	VDCLS	--	12.5	104	--
DEC											
07...	1500	925	77	7.9	4.0	767	VDCLS	--	14.2	107	--
18...	1530	834	80	--	0.0	767	VDCLS	--	13.5	92	--
JAN											
02...	1230	5140	77	7.5	1.0	772	VDCLS	190	14.5	101	--
03...	1300	2880	77	7.3	1.0	770	VDCLS	71	14.4	100	--
29...	1000	2160	83	7.7	3.0	765	USGS	10	12.7	94	--
29...	1001	2160	83	7.7	5.0	765	VDCLS	--	12.7	99	--
FEB											
08...	0900	2010	83	7.4	8.0	763	VDCLS	--	11.4	96	--
20...	1100	1390	83	7.0	9.0	767	VDCLS	--	11.6	100	--
MAR											
13...	1000	1040	75	7.6	14.5	760	VDCLS	--	9.9	97	--
23...	0930	1780	83	7.1	13.5	759	USGS	10	11.1	107	540
23...	0931	1780	83	7.1	13.5	759	VDCLS	5.8	11.1	107	--
APR											
03...	1300	5840	81	7.3	13.5	750	VDCLS	--	10.1	98	--
04...	1300	3350	74	7.2	11.5	748	VDCLS	--	10.2	96	--
05...	1500	2540	68	7.2	12.5	749	VDCLS	--	10.4	99	--
23...	1000	1650	78	7.6	15.0	757	VDCLS	--	9.9	99	--
MAY											
09...	0945	1070	83	7.3	19.5	760	USGS	4.3	10.1	110	43
09...	0946	1070	83	7.3	19.5	760	VDCLS	--	10.1	110	--
11...	1200	15300	55	6.8	16.5	760	VDCLS	--	8.1	83	--
12...	1000	4110	62	7.1	15.5	768	VDCLS	--	10.0	100	--
14...	1230	4300	67	7.1	16.5	764	USGS	--	10.0	103	--
14...	1231	4300	67	7.1	16.5	764	VDCLS	--	10.0	103	--
25...	1200	1020	70	6.9	18.5	764	VDCLS	--	9.9	105	--
27...	1230	2490	50	6.6	18.0	756	VDCLS	--	8.7	92	--
30...	1000	11700	68	7.1	16.0	763	VDCLS	--	8.6	870	--
31...	1100	4090	71	7.3	15.5	770	VDCLS	--	9.0	89	--
JUN											
14...	0930	843	75	8.4	22.0	755	VDCLS	--	7.9	91	--
26...	0945	579	73	7.3	21.0	758	USGS	10	8.9	101	K11
26...	0946	579	73	7.3	21.0	758	VDCLS	--	8.9	101	--
JUL											
13...	0920	1670	80	6.8	25.0	758	VDCLS	--	7.6	93	--
23...	1000	953	40	5.8	25.0	751	VDCLS	--	6.0	74	--
AUG											
06...	0915	335	83	6.9	26.0	755	VDCLS	--	6.5	81	--
28...	0930	915	65	7.0	25.0	752	USGS	5.8	6.7	82	15
28...	0931	915	65	7.0	25.0	752	VDCLS	--	6.7	82	--
SEP											
10...	1000	354	83	7.5	21.0	757	VDCLS	--	6.5	73	--
14...	1330	1480	68	7.6	24.0	759	VDCLS	--	8.8	105	--
27...	0930	432	103	8.0	18.0	758	VDCLS	--	7.9	84	--

K Results based on colony count outside the acceptance range (non-ideal colony count).

RAPPAHANNOCK RIVER BASIN

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01668000 RAPPAHANNOCK RIVER NEAR FREDERICKSBURG, VA--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	STREP- TOCOCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)	HARD- NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	ALKA- LITY LAB (MG/L AS CACO3) (90410)	ALKA- LITY WAT DIS TOT IT FIELD MG/L AS CACO3 (39086)	BICAR- BONATE WATER DIS IT FIELD MG/L AS HCO3 (00453)	ALKA- LITY WAT WH TOT FET FIELD MG/L AS CACO3 (00410)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)
OCT											
02...	--	--	--	--	--	--	--	--	--	19	--
03...	--	--	--	--	--	--	--	--	--	16	--
04...	--	--	--	--	--	--	--	--	--	--	--
04...	--	--	--	--	--	--	--	--	--	18	--
13...	--	--	--	--	--	--	--	--	--	21	--
20...	--	--	--	--	--	--	--	--	--	17	--
21...	--	--	--	--	--	--	--	--	--	17	--
NOV											
06...	--	--	--	--	--	--	--	--	--	24	--
28...	100	32	8.0	3.0	4.7	1.9	25	24	29	--	9.0
28...	--	--	--	--	--	--	--	--	--	25	--
DEC											
07...	--	--	--	--	--	--	--	--	--	23	--
18...	--	--	--	--	--	--	--	--	--	24	--
JAN											
02...	--	--	--	--	--	--	--	--	--	14	--
03...	--	--	--	--	--	--	--	--	--	15	--
29...	--	27	6.8	2.5	4.0	1.9	18	18	22	--	9.0
29...	--	--	--	--	--	--	--	--	--	18	--
FEB											
08...	--	--	--	--	--	--	--	--	--	18	--
20...	--	--	--	--	--	--	--	--	--	20	--
MAR											
13...	--	--	--	--	--	--	--	--	--	21	--
23...	18	26	6.4	2.4	3.8	1.6	20	18	22	--	6.9
23...	--	--	--	--	--	--	--	--	--	20	--
APR											
03...	--	--	--	--	--	--	--	--	--	21	--
04...	--	--	--	--	--	--	--	--	--	18	--
05...	--	--	--	--	--	--	--	--	--	19	--
23...	--	--	--	--	--	--	--	--	--	21	--
MAY											
09...	K9	25	6.2	2.3	3.9	1.3	22	21	26	--	5.4
09...	--	--	--	--	--	--	--	--	--	22	--
11...	--	--	--	--	--	--	--	--	--	13	--
12...	--	--	--	--	--	--	--	--	--	13	--
14...	--	--	--	--	--	--	--	--	--	--	--
14...	--	--	--	--	--	--	--	--	--	17	--
25...	--	--	--	--	--	--	--	--	--	22	--
27...	--	--	--	--	--	--	--	--	--	21	--
30...	--	--	--	--	--	--	--	--	--	17	--
31...	--	--	--	--	--	--	--	--	--	17	--
JUN											
14...	--	--	--	--	--	--	--	--	--	21	--
26...	K12	22	5.2	2.3	3.7	1.9	21	21	26	--	4.6
26...	--	--	--	--	--	--	--	--	--	22	--
JUL											
13...	--	--	--	--	--	--	--	--	--	18	--
23...	--	--	--	--	--	--	--	--	--	10	--
AUG											
06...	--	--	--	--	--	--	--	--	--	--	--
28...	29	22	5.7	1.9	3.9	2.0	17	18	21	--	5.6
28...	--	--	--	--	--	--	--	--	--	16	--
SEP											
10...	--	--	--	--	--	--	--	--	--	--	--
14...	--	--	--	--	--	--	--	--	--	--	--
27...	--	--	--	--	--	--	--	--	--	--	--

K Results based on colony count outside the acceptance range (non-ideal colony count).

RAPPAHANNOCK RIVER BASIN

01668000 RAPPAHANNOCK RIVER NEAR FREDERICKSBURG, VA--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L) (70301)	RESIDUE TOTAL AT 105 DEG. C, SUS- PENDE (MG/L) (00530)	RESIDUE VOLA- TILE, SUS- PENDE (MG/L) (00535)	RESIDUE FIXED NON FILTER- ABLE (MG/L) (00540)	NITRO- GEN, NITRATE DIS- SOLVED (MG/L AS N) (00618)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)
OCT										
02...	--	--	11	--	--	13	3	10	0.540	<0.010
03...	--	--	8.4	--	--	284	32	252	0.520	0.010
04...	--	--	10	--	--	63	8	55	0.600	<0.010
04...	--	--	10	--	--	70	10	60	0.670	<0.010
13...	--	--	12	--	--	6	2	4	0.600	<0.010
20...	--	--	8.3	--	--	180	20	160	0.450	0.010
21...	--	--	10	--	--	66	9	57	0.590	<0.010
NOV										
06...	--	--	13	--	--	4	1	3	0.410	<0.010
28...	6.5	0.10	12	71	63	5	<1	5	--	<0.010
28...	--	--	12	--	--	7	2	5	0.640	<0.010
DEC										
07...	--	--	10	--	--	1	1	0	0.440	<0.010
18...	--	--	11	--	--	1	1	0	0.240	<0.010
JAN										
02...	--	--	7.1	--	--	200	20	180	0.950	0.010
03...	--	--	9.3	--	--	74	8	66	1.02	0.010
29...	6.0	<0.10	12	67	57	17	16	1	--	<0.010
29...	--	--	12	--	--	12	1	11	0.790	<0.010
FEB										
08...	--	--	12	--	--	4	2	2	0.800	<0.010
20...	--	--	10	--	--	6	1	5	0.590	<0.010
MAR										
13...	--	--	4.3	--	--	3	3	0	0.300	<0.010
23...	5.4	<0.10	10	63	50	11	4	7	--	<0.010
23...	--	--	10	--	--	16	3	13	0.570	<0.010
APR										
03...	--	--	9.6	--	--	98	14	84	0.520	<0.010
04...	--	--	9.8	--	--	8	6	2	0.580	0.020
05...	--	--	11	--	--	30	17	13	0.590	<0.010
23...	--	--	11	--	--	7	1	6	0.590	<0.010
MAY										
09...	4.4	<0.10	9.8	54	48	<1	<1	--	--	<0.010
09...	--	--	9.5	--	--	4	1	3	0.450	<0.010
11...	--	--	6.5	--	--	724	84	640	0.600	0.010
12...	--	--	9.6	--	--	316	40	276	0.710	<0.010
14...	--	--	12	--	--	43	15	28	--	<0.010
14...	--	--	12	--	--	94	12	82	0.630	<0.010
25...	--	--	11	--	--	6	6	0	0.550	<0.010
27...	--	--	11	--	--	11	2	9	0.530	<0.010
30...	--	--	8.1	--	--	264	30	234	0.860	0.050
31...	--	--	11	--	--	120	13	107	0.870	<0.010
JUN										
14...	--	--	6.5	--	--	18	4	14	0.240	<0.010
26...	3.3	0.10	13	59	49	--	--	--	--	<0.010
26...	--	--	9.5	--	--	2	2	0	0.500	<0.010
JUL										
13...	--	--	9.7	--	--	36	17	19	0.930	0.020
23...	--	--	7.4	--	--	10	<1	10	0.190	<0.010
AUG										
06...	--	--	8.0	--	--	7	7	0	0.050	<0.010
28...	4.4	<0.10	12	58	49	<1	<1	--	--	<0.010
28...	--	--	12	--	--	6	4	2	0.660	<0.010
SEP										
10...	--	--	8.9	--	--	--	--	--	<0.040	<0.010
14...	--	--	8.8	--	--	18	5	13	<0.040	0.010
27...	--	--	9.9	--	--	8	4	4	<0.040	0.020

< Actual value is known to be less than the value shown.

RAPPAHANNOCK RIVER BASIN

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01668000 RAPPAHANNOCK RIVER NEAR FREDERICKSBURG, VA--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	ALUM- INUM, DIS- SOLVED (UG/L AS AL) (01106)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BARIUM, DIS- SOLVED (UG/L AS BA) (01005)
OCT										
02...	0.540	<0.040	--	0.30	0.070	0.020	0.030	--	--	--
03...	0.530	0.050	--	1.6	0.600	0.050	0.050	--	--	--
04...	0.600	0.030	--	0.50	0.140	--	0.020	--	--	--
04...	0.670	0.050	--	0.90	0.140	0.030	0.050	--	--	--
13...	0.600	<0.040	--	0.30	0.020	0.010	0.020	--	--	--
20...	0.460	<0.040	--	1.0	0.240	0.040	0.040	--	--	--
21...	0.590	<0.040	--	0.70	0.150	0.040	0.030	--	--	--
NOV										
06...	0.410	<0.040	--	0.20	0.020	0.010	0.010	--	--	--
28...	0.630	0.030	0.021	0.40	0.041	<0.010	0.030	60	<1	18
28...	0.640	0.070	--	0.40	0.030	<0.010	0.010	--	--	--
DEC										
07...	0.440	<0.040	--	0.20	0.010	0.010	<0.010	--	--	--
18...	0.240	<0.040	--	0.20	0.020	0.010	0.010	--	--	--
JAN										
02...	0.960	0.270	--	1.5	0.370	0.060	0.040	--	--	--
03...	1.03	0.190	--	0.50	0.140	0.030	0.020	--	--	--
29...	0.800	0.020	0.030	0.40	0.040	0.020	0.010	--	--	--
29...	0.790	0.070	--	0.40	0.070	0.010	0.020	--	--	--
FEB										
08...	0.800	<0.040	--	0.30	0.040	0.020	0.010	--	--	--
20...	0.590	<0.040	--	0.20	0.020	<0.010	<0.010	--	--	--
MAR										
13...	0.300	0.040	--	0.20	0.010	<0.010	<0.010	--	--	--
23...	0.600	<0.010	<0.010	0.30	0.040	0.030	0.020	30	<1	17
23...	0.570	<0.040	--	0.30	0.040	0.010	0.030	--	--	--
APR										
03...	0.520	0.050	--	1.2	0.350	0.010	0.010	--	--	--
04...	0.600	0.070	--	0.90	0.240	0.020	0.020	--	--	--
05...	0.590	0.040	--	0.40	0.110	0.020	0.010	--	--	--
23...	0.590	0.040	--	0.30	<0.040	<0.010	0.010	--	--	--
MAY										
09...	0.400	0.010	<0.010	0.20	0.030	0.020	0.020	30	<1	15
09...	0.450	<0.040	--	0.30	0.020	<0.010	<0.010	--	--	--
11...	0.610	0.170	--	2.8	1.10	0.020	0.010	--	--	--
12...	0.710	0.070	--	1.0	0.340	0.020	0.020	--	--	--
14...	0.700	0.030	--	0.40	0.100	--	0.020	--	--	--
14...	0.630	<0.040	--	0.60	0.140	0.010	0.010	--	--	--
25...	0.550	<0.040	--	0.20	0.020	<0.010	0.010	--	--	--
27...	0.530	<0.040	--	0.30	0.050	<0.010	<0.010	--	--	--
30...	0.910	<0.040	--	1.7	>0.500	0.030	0.020	--	--	--
31...	0.870	<0.040	--	0.50	0.120	0.020	0.020	--	--	--
JUN										
14...	0.240	0.040	--	0.20	0.040	0.010	<0.010	--	--	--
26...	0.500	0.070	0.050	0.30	0.020	0.020	<0.010	--	--	--
26...	0.500	<0.040	--	0.20	0.030	0.020	0.010	--	--	--
JUL										
13...	0.950	<0.040	--	0.80	0.240	0.030	<0.010	--	--	--
23...	0.190	<0.040	--	0.50	0.070	0.020	0.010	--	--	--
AUG										
06...	0.050	<0.040	--	0.20	0.030	0.020	0.010	--	--	--
28...	0.600	0.030	0.020	0.40	0.050	0.030	0.020	100	2	12
28...	0.660	<0.040	--	0.30	0.050	0.030	0.010	--	--	--
SEP										
10...	<0.040	0.040	--	0.30	0.030	0.010	<0.010	--	--	--
14...	<0.040	<0.040	--	0.30	<0.010	<0.010	0.010	--	--	--
27...	--	<0.040	--	0.20	0.020	<0.010	<0.010	--	--	--

< Actual value is known to be less than the value shown.

RAPPAHANNOCK RIVER BASIN

01668000 RAPPAHANNOCK RIVER NEAR FREDERICKSBURG, VA--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	BERYL- LIUM, DIS- SOLVED (UG/L AS BE) (01010)	CADMIUM DIS- SOLVED (UG/L AS CD) (01025)	CHRO- MIUM, DIS- SOLVED (UG/L AS CR) (01030)	COBALT, DIS- SOLVED (UG/L AS CO) (01035)	COPPER, DIS- SOLVED (UG/L AS CU) (01040)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)
OCT										
02...	--	--	--	--	--	--	--	--	--	--
03...	--	--	--	--	--	--	--	--	--	--
04...	--	--	--	--	--	--	--	--	--	--
04...	--	--	--	--	--	--	--	--	--	--
13...	--	--	--	--	--	--	--	--	--	--
20...	--	--	--	--	--	--	--	--	--	--
21...	--	--	--	--	--	--	--	--	--	--
NOV										
06...	--	--	--	--	--	--	--	--	--	--
28...	<0.5	2.0	<1	<3	5	200	<1	<4	9	<0.1
28...	--	--	--	--	--	--	--	--	--	--
DEC										
07...	--	--	--	--	--	--	--	--	--	--
18...	--	--	--	--	--	--	--	--	--	--
JAN										
02...	--	--	--	--	--	--	--	--	--	--
03...	--	--	--	--	--	--	--	--	--	--
29...	--	--	--	--	--	--	--	--	--	--
29...	--	--	--	--	--	--	--	--	--	--
FEB										
08...	--	--	--	--	--	--	--	--	--	--
20...	--	--	--	--	--	--	--	--	--	--
MAR										
13...	--	--	--	--	--	--	--	--	--	--
23...	<0.5	<1.0	<5*	<3	<10*	110	<10*	<4	10	<0.1
23...	--	--	--	--	--	--	--	--	--	--
APR										
03...	--	--	--	--	--	--	--	--	--	--
04...	--	--	--	--	--	--	--	--	--	--
05...	--	--	--	--	--	--	--	--	--	--
23...	--	--	--	--	--	--	--	--	--	--
MAY										
09...	<0.5	2.0	<1	<3	4	270	5	<4	17	<0.1
09...	--	--	--	--	--	--	--	--	--	--
11...	--	--	--	--	--	--	--	--	--	--
12...	--	--	--	--	--	--	--	--	--	--
14...	--	--	--	--	--	--	--	--	--	--
14...	--	--	--	--	--	--	--	--	--	--
25...	--	--	--	--	--	--	--	--	--	--
27...	--	--	--	--	--	--	--	--	--	--
30...	--	--	--	--	--	--	--	--	--	--
31...	--	--	--	--	--	--	--	--	--	--
JUN										
14...	--	--	--	--	--	--	--	--	--	--
26...	--	--	--	--	--	--	--	--	--	--
26...	--	--	--	--	--	--	--	--	--	--
JUL										
13...	--	--	--	--	--	--	--	--	--	--
23...	--	--	--	--	--	--	--	--	--	--
AUG										
06...	--	--	--	--	--	--	--	--	--	--
28...	<0.5	1.0	<1	<3	6	200	8	<4	16	<0.1
28...	--	--	--	--	--	--	--	--	--	--
SEP										
10...	--	--	--	--	--	--	--	--	--	--
14...	--	--	--	--	--	--	--	--	--	--
27...	--	--	--	--	--	--	--	--	--	--

* An alternate analytical method resulted in a change of the minimum reporting level for these constituents.

< Actual value is known to be less than the value shown.

RAPPAHANNOCK RIVER BASIN

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01668000 RAPPAHANNOCK RIVER NEAR FREDERICKSBURG, VA--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	NICKEL, DIS- SOLVED (UG/L AS NI) (01065)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	SILVER, DIS- SOLVED (UG/L AS AG) (01075)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)	VANA- DIUM, DIS- SOLVED (UG/L AS V) (01085)	ZINC, DIS- SOLVED (UG/L AS ZN) (01090)	CARBON, ORGANIC TOTAL (MG/L AS C) (00680)	SEDI- MENT, SUS- PENDE (MG/L) (80154)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
OCT										
02...	--	--	--	--	--	--	--	3.0	--	--
03...	--	--	--	--	--	--	--	7.1	--	--
04...	--	--	--	--	--	--	--	7.1	--	--
04...	--	--	--	--	--	--	--	5.4	--	--
13...	--	--	--	--	--	--	--	2.1	--	--
20...	--	--	--	--	--	--	--	7.9	--	--
21...	--	--	--	--	--	--	--	5.9	--	--
NOV										
06...	--	--	--	--	--	--	--	1.9	--	--
28...	<10	2	<1	<1.0	42	<6	18	3.3	6	87
28...	--	--	--	--	--	--	--	2.6	--	--
DEC										
07...	--	--	--	--	--	--	--	2.5	--	--
18...	--	--	--	--	--	--	--	3.2	--	--
JAN										
02...	--	--	--	--	--	--	--	7.4	--	--
03...	--	--	--	--	--	--	--	5.7	--	--
29...	--	--	--	--	--	--	--	3.9	14	100
29...	--	--	--	--	--	--	--	2.8	--	--
FEB										
08...	--	--	--	--	--	--	--	2.0	--	--
20...	--	--	--	--	--	--	--	2.6	--	--
MAR										
13...	--	--	--	--	--	--	--	1.7	--	--
23...	<10	<10*	<1	<1.0	35	<6	8	4.2	12	93
23...	--	--	--	--	--	--	--	4.6	--	--
APR										
03...	--	--	--	--	--	--	--	5.8	--	--
04...	--	--	--	--	--	--	--	5.2	--	--
05...	--	--	--	--	--	--	--	3.4	--	--
23...	--	--	--	--	--	--	--	2.1	--	--
MAY										
09...	<10	<1	<1	<1.0	33	<6	18	2.7	5	84
09...	--	--	--	--	--	--	--	2.7	--	--
11...	--	--	--	--	--	--	--	8.8	--	--
12...	--	--	--	--	--	--	--	6.2	--	--
14...	--	--	--	--	--	--	--	6.4	--	--
14...	--	--	--	--	--	--	--	3.7	--	--
25...	--	--	--	--	--	--	--	2.2	--	--
27...	--	--	--	--	--	--	--	3.2	--	--
30...	--	--	--	--	--	--	--	9.3	--	--
31...	--	--	--	--	--	--	--	3.5	--	--
JUN										
14...	--	--	--	--	--	--	--	2.5	--	--
26...	--	--	--	--	--	--	--	--	3	80
26...	--	--	--	--	--	--	--	2.8	--	--
JUL										
13...	--	--	--	--	--	--	--	5.4	--	--
23...	--	--	--	--	--	--	--	7.9	--	--
AUG										
06...	--	--	--	--	--	--	--	2.4	--	--
28...	<10	2	<1	<1.0	35	<6	8	3.0	8	87
28...	--	--	--	--	--	--	--	2.4	--	--
SEP										
10...	--	--	--	--	--	--	--	--	--	--
14...	--	--	--	--	--	--	--	2.1	--	--
27...	--	--	--	--	--	--	--	2.3	--	--

* An alternate analytical method resulted in a change of the minimum reporting level for these constituents.

< Actual value is known to be less than the value shown.

RAPPAHANNOCK RIVER BASIN

01668500 CAT POINT CREEK NEAR MONTROSS, VA

LOCATION.--Lat 38°02'23", long 76°49'38", Richmond County, Hydrologic Unit 02080104, on right bank 200 ft upstream from bridge on State Highway 637, 1.7 mi west of Farmers Fork, 3.8 mi south of Montross, and 11.4 mi upstream from mouth.

DRAINAGE AREA.--45.6 mi².

PERIOD OF RECORD.--September 1943 to current year.

REVISED RECORDS.--WSP 1382: 1944(M), 1945, 1946-51(M), 1952(P), 1953-54(M). WSP 2103: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 3.04 ft above National Geodetic Vertical Datum of 1929. Prior to Aug. 19, 1953, nonrecording gage near right bank at downstream side of highway bridge at same datum.

REMARKS.--Records good except those for periods of no gage-height record, Dec. 15-31 and Jan. 2-4, which are fair. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

COOPERATION.--Records were provided by the Virginia Water Control Board.

AVERAGE DISCHARGE.--47 years, 44.8 ft³/s, 13.34 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 6,820 ft³/s, Aug. 20, 1969, gage height, 10.45 ft, from rating curve extended above 1,400 ft³/s; no flow at times in 1943, 1957, 1959-60, 1966, and 1977.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in September 1935 exceeded 9.3 ft.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 250 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Apr. 3	0600	285	5.43	May 29	2400	*1,360	*7.45
May 27	0400	605	6.23				

Minimum discharge, 1.4 ft³/s, July 29.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	38	96	53	179	77	59	129	95	198	22	11	16
2	72	89	51	e186	75	58	112	67	148	24	4.8	9.2
3	78	86	48	e114	78	68	243	51	120	21	2.8	5.9
4	62	75	45	e96	135	71	187	46	105	16	2.1	3.9
5	45	68	45	94	120	62	137	185	102	12	1.6	4.0
6	38	62	46	99	98	57	115	166	89	9.5	2.0	4.3
7	34	59	47	96	88	53	132	102	77	7.5	2.4	4.2
8	30	60	49	95	82	50	128	70	68	6.7	1.8	4.4
9	29	88	58	121	76	50	108	55	64	5.9	16	4.5
10	29	96	60	111	137	51	95	101	144	5.1	59	4.4
11	29	81	60	88	195	50	98	159	102	13	104	3.8
12	28	70	60	77	139	50	94	116	69	49	98	3.3
13	27	59	70	66	109	48	84	82	54	27	49	3.9
14	27	56	72	61	99	47	77	66	47	23	23	13
15	28	78	e70	59	89	44	101	56	48	21	12	14
16	28	72	e67	56	92	42	114	50	50	15	7.0	12
17	28	67	e64	54	94	51	97	45	44	12	4.6	14
18	33	61	e60	51	82	128	80	38	41	8.4	3.3	11
19	71	56	e57	51	86	115	71	32	47	5.3	2.6	9.1
20	122	53	e53	49	83	81	66	29	56	3.7	3.3	9.4
21	130	52	e50	50	76	67	67	46	61	5.4	4.8	8.3
22	91	50	e49	50	73	58	71	44	47	13	7.6	11
23	62	62	e46	48	73	52	67	41	40	5.8	117	16
24	52	61	e42	45	79	49	61	35	31	4.0	174	15
25	46	61	e40	70	71	60	56	30	24	2.6	92	10
26	43	68	e40	195	62	60	54	92	20	2.1	44	7.0
27	41	71	e42	192	61	54	50	500	16	1.8	24	5.5
28	39	70	e42	130	61	48	47	245	15	1.7	13	5.2
29	38	63	e43	105	---	54	56	797	15	7.6	10	4.8
30	37	55	e56	97	---	81	106	855	13	15	28	4.7
31	68	---	e68	85	---	112	---	333	---	17	23	---
TOTAL	1523	2045	1653	2870	2590	1930	2903	4629	1955	383.1	947.7	241.8
MEAN	49.1	68.2	53.3	92.6	92.5	62.3	96.8	149	65.2	12.4	30.6	8.06
MAX	130	96	72	195	195	128	243	855	198	49	174	16
MIN	27	50	40	45	61	42	47	29	13	1.7	1.6	3.3
CFSM	1.08	1.49	1.17	2.03	2.03	1.37	2.12	3.27	1.43	.27	.67	.18
IN.	1.24	1.67	1.35	2.34	2.11	1.57	2.37	3.78	1.59	.31	.77	.20

CAL YR 1989 TOTAL 19953.7 MEAN 54.7 MAX 569 MIN 4.0 CFSM 1.20 IN. 16.28
WTR YR 1990 TOTAL 23670.6 MEAN 64.9 MAX 855 MIN 1.6 CFSM 1.42 IN. 19.31

e Estimated.

01669000 PISCATAWAY CREEK NEAR TAPPAHANNOCK, VA

LOCATION.--Lat 37°52'37", long 76°54'03", Essex County, Hydrologic Unit 02080104, on right bank at upstream side of bridge on State Highway 691, 0.6 mi south of Hensley Fork, 2.3 mi downstream from Sturgeon Swamp, and 4.2 mi southwest of Tappahannock.

DRAINAGE AREA.--28.0 mi².

PERIOD OF RECORD.--July 1951 to current year.

REVISED RECORDS.--WSP 2103: Drainage area. WDR VA-79-1: 1970-76(P), 1978(P).

GAGE.--Water-stage recorder. Datum of gage is 2.50 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records good except those for periods with ice effect, Dec. 10, 16, 17, 19-25, which are fair. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

COOPERATION.--Records were provided by the Virginia Water Control Board.

AVERAGE DISCHARGE.--39 years, 31.6 ft³/s, 15.33 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,380 ft³/s, Aug. 20, 1969, gage height, 7.52 ft, from rating curve extended above 1,400 ft³/s; minimum, 0.01 ft³/s, Oct. 2, 1954; minimum gage height, 0.07 ft, July 24, 25, 1985.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 250 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
May 27	1700	268	3.73	May 29	2100	*433	*4.31

Minimum discharge, 5.4 ft³/s, Sept. 13.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	41	40	28	88	46	36	58	55	69	17	14	15
2	66	36	28	72	46	36	54	42	61	16	12	12
3	62	40	28	54	47	44	144	39	57	14	10	9.8
4	44	40	26	50	71	47	91	35	59	12	8.7	8.5
5	34	33	27	52	62	39	73	39	54	12	8.1	7.8
6	30	30	28	54	51	35	65	42	47	14	8.3	6.8
7	29	30	28	53	50	33	73	34	44	15	11	7.1
8	26	33	29	52	49	33	71	31	41	12	11	7.0
9	25	57	34	61	46	33	60	28	38	11	28	7.3
10	25	66	e32	52	53	33	57	50	35	11	65	7.4
11	25	46	31	46	65	32	60	88	32	18	45	6.8
12	24	39	33	43	53	33	58	55	29	74	25	6.1
13	24	34	42	40	46	32	53	42	28	52	18	7.5
14	24	33	42	38	44	31	50	37	27	30	14	21
15	25	41	40	38	43	30	65	33	27	26	12	25
16	23	45	e39	38	45	29	72	31	29	22	12	16
17	23	39	e38	37	48	32	56	29	27	20	12	11
18	29	33	33	37	43	70	48	26	25	20	11	7.9
19	56	30	e32	36	47	57	46	22	33	17	9.9	7.1
20	78	30	e31	34	50	41	45	21	36	15	13	7.3
21	65	30	e30	36	43	37	48	26	28	17	15	7.3
22	42	29	e30	36	41	35	51	34	23	25	15	9.8
23	32	45	e26	33	43	33	47	33	21	22	19	18
24	29	45	e25	32	45	31	45	29	20	16	24	18
25	28	38	e26	47	39	38	45	24	18	12	24	13
26	27	38	32	105	35	42	40	41	17	10	18	9.8
27	26	36	33	86	35	35	38	189	17	10	14	8.3
28	26	34	32	62	37	32	36	93	18	14	11	8.0
29	25	32	32	55	---	37	43	295	18	17	14	7.8
30	26	30	35	54	---	63	72	238	15	18	29	7.5
31	35	---	49	50	---	62	---	89	---	18	24	---
TOTAL	1074	1132	999	1571	1323	1201	1764	1870	993	607	555.0	311.9
MEAN	34.6	37.7	32.2	50.7	47.2	38.7	58.8	60.3	33.1	19.6	17.9	10.4
MAX	78	66	49	105	71	70	144	295	69	74	65	25
MIN	23	29	25	32	35	29	36	21	15	10	8.1	6.1
CFSM	1.24	1.35	1.15	1.81	1.69	1.38	2.10	2.15	1.18	.70	.64	.37
IN ₁	1.43	1.50	1.33	2.09	1.76	1.60	2.34	2.48	1.32	.81	.74	.41

CAL YR 1989 TOTAL 12383.3 MEAN 33.9 MAX 201 MIN 3.8 CFSM 1.21 IN. 16.45
WTR YR 1990 TOTAL 13400.9 MEAN 36.7 MAX 295 MIN 6.1 CFSM 1.31 IN. 17.80

e Estimated.

PIANKATANK RIVER BASIN

01669520 DRAGON SWAMP AT MASCOT, VA

LOCATION.--Lat 37°38'01", long 76°41'48", King and Queen County, Hydrologic Unit 02080102, on right bank at upstream side of bridge on State Highway 603, 0.8 mi east of Mascot, 2.1 mi downstream from Church Swamp, and 3.3 mi west of Warner.

DRAINAGE AREA.--108 mi².

PERIOD OF RECORD.--August 1981 to current year.

GAGE.--Water-stage recorder. Datum of gage is 21.60 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records good except those for periods with ice effect, Dec. 15-17, 19, 21, 22, period of no gage-height record, Dec. 25, 26, and periods with backwater from debris, July 19 to Aug. 10 and Aug. 16 to Sept. 13, which are fair.

COOPERATION.--Records were provided by the Virginia Water Control Board.

AVERAGE DISCHARGE.--9 years, 106 ft³/s, 13.33 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,530 ft³/s, Apr. 17, 1983, gage height, 8.85 ft, from rating curve extended above 1,400 ft³/s; minimum, 0.18 ft³/s, July 18-20, 1986.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 600 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
May 31	0900	*1,690	*8.14	No other peak equal to or greater than base discharge.			

Minimum daily discharge, 11 ft³/s, Aug. 5, 6.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	113	69	99	191	186	122	177	64	1070	36	e17	e37
2	165	67	93	252	166	115	182	62	729	36	e15	e32
3	167	85	89	291	156	121	202	60	512	35	e13	e29
4	138	86	84	305	178	124	195	65	348	32	e12	e26
5	117	91	80	298	190	119	178	76	235	32	e11	e24
6	108	96	76	258	190	116	169	82	166	29	e11	e23
7	109	96	73	217	207	113	207	69	129	24	e13	e24
8	107	101	72	215	208	109	197	62	110	19	e12	e24
9	93	144	78	239	185	106	166	59	107	16	e25	e22
10	76	168	85	223	180	103	145	77	96	13	e54	e20
11	60	170	88	209	205	100	133	129	89	23	155	e19
12	50	165	93	195	197	98	123	126	85	84	160	e18
13	43	162	105	174	173	97	114	113	76	144	190	e30
14	39	170	109	154	161	95	107	153	67	273	220	77
15	35	165	e112	137	154	94	108	174	65	371	210	66
16	33	147	e112	124	153	92	110	150	74	306	e100	54
17	32	127	e117	114	161	92	105	109	85	220	e50	51
18	31	114	101	109	153	143	101	78	79	153	e30	49
19	45	107	e89	104	159	151	96	57	69	e85	e22	46
20	67	99	81	99	171	148	91	46	57	e50	e18	42
21	83	92	e79	97	171	136	91	41	51	e60	e23	38
22	88	87	e70	95	161	129	92	45	52	e76	e21	38
23	100	125	60	92	153	125	87	47	59	e58	e23	44
24	122	129	55	89	155	116	81	48	56	e40	e22	40
25	135	128	e49	108	148	118	75	47	73	e28	e49	35
26	124	125	e49	154	137	112	69	61	74	e20	e60	31
27	106	122	50	197	131	104	62	215	57	e15	e56	30
28	89	120	50	220	127	97	57	292	45	e14	e45	30
29	76	117	52	262	---	100	56	609	37	e24	e39	31
30	66	108	64	258	---	133	67	1090	31	e22	e44	33
31	67	---	94	223	---	159	---	1570	---	e20	e45	---
TOTAL	2684	3582	2508	5703	4716	3587	3643	5876	4783	2358	1765	1063
MEAN	86.6	119	80.9	184	168	116	121	190	159	76.1	56.9	35.4
MAX	167	170	117	305	208	159	207	1570	1070	371	220	77
MIN	31	67	49	89	127	92	56	41	31	13	11	18
CFSM	.80	1.11	.75	1.70	1.56	1.07	1.12	1.76	1.48	.70	.53	.33
IN.	.92	1.23	.86	1.96	1.62	1.24	1.25	2.02	1.65	.81	.61	.37

CAL YR 1989 TOTAL 40239.1 MEAN 110 MAX 727 MIN 5.7 CFSM 1.02 IN. 13.86
WTR YR 1990 TOTAL 42268 MEAN 116 MAX 1570 MIN 11 CFSM 1.07 IN. 14.56

e Estimated.

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LOCATION.--Lat 38°11'33", long 77°58'09", Orange County, Hydrologic Unit 02080106, on right bank 75 ft south of bridge on State Highway 669, 0.45 mi south of Lahore, and 3.8 mi upstream from Lake Anna.

WATER-DISCHARGE RECORDS

GAGE.--Water-stage recorder. Elevation of gage is 280 ft above National Geodetic Vertical Datum of 1929, from topographic map.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,500 ft³/s, May 29, 1990, gage height, 7.19 ft; minimum, 1.4 ft³/s, Dec. 23, 1989, gage height, 1.78 ft, result of freezeup.

EXTREMES FOR PERIOD AUGUST 1989 TO SEPTEMBER 1990.--August to September 1989: Maximum discharge, 233 ft³/s, Sept. 26, gage height, 3.34 ft; minimum, 9.8 ft³/s, Sept. 4, 5, 6.
Water year 1990: Maximum discharge, 1,500 ft³/s, May 29, gage height, 7.19 ft; minimum, 1.4 ft³/s, Dec. 23, gage height, 1.78 ft, result of freezeup.

[illegible]

YORK RIVER BASIN

01670180 PAMUNKEY CREEK AT LAHORE, VA--Continued

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	15	27	29	652	47	28	68	35	48	12	8.6	6.5
2	189	23	27	95	43	28	54	30	41	11	7.0	7.9
3	56	40	27	65	49	33	64	27	37	9.9	6.9	8.9
4	29	28	24	60	122	29	47	29	38	10	6.7	10
5	22	25	24	60	64	26	41	111	32	12	6.5	11
6	19	24	28	48	49	26	41	46	30	19	7.9	12
7	18	24	26	41	45	26	124	35	29	14	13	14
8	15	70	25	79	39	26	84	30	28	14	8.6	17
9	15	86	27	98	37	27	57	27	26	16	11	16
10	14	42	25	65	53	28	49	327	25	21	31	16
11	14	32	28	50	52	27	51	138	22	18	20	15
12	13	28	28	44	43	27	42	62	20	28	14	14
13	13	25	32	37	37	27	37	50	20	18	10	32
14	13	24	32	33	36	26	35	44	20	129	9.5	33
15	13	24	27	33	33	26	323	36	20	187	9.3	21
16	13	182	27	32	34	26	98	34	20	36	8.4	17
17	17	63	20	31	34	72	65	32	18	24	8.2	19
18	24	40	18	30	28	73	54	28	33	20	7.0	16
19	179	32	15	29	30	43	45	25	48	16	7.1	15
20	128	31	e16	28	29	66	42	25	24	15	8.3	18
21	57	29	e14	29	26	59	44	38	21	28	8.8	15
22	35	25	e7.5	28	30	43	48	33	18	49	9.8	15
23	28	28	e7.7	26	69	38	40	31	23	21	12	17
24	25	26	e8.6	25	43	34	36	26	17	17	31	13
25	24	27	e8.4	66	34	34	34	24	15	13	19	9.3
26	22	45	e15	195	26	35	33	64	14	12	13	7.7
27	21	48	e14	80	27	32	32	157	13	10	10	7.4
28	21	38	e17	54	30	29	30	51	14	10	9.3	6.4
29	21	34	e21	56	---	33	34	712	12	9.5	8.8	5.1
30	21	29	23	124	---	53	49	138	11	13	7.8	4.4
31	22	---	121	60	---	94	---	66	---	11	6.9	---
TOTAL	1116	1199	762.2	2353	1189	1174	1801	2511	737	823.4	345.4	419.6
MEAN	36.0	40.0	24.6	75.9	42.5	37.9	60.0	81.0	24.6	26.6	11.1	14.0
MAX	189	182	121	652	122	94	323	712	48	187	31	33
MIN	13	23	7.5	25	26	26	30	24	11	9.5	6.5	4.4
CFSM	.89	.99	.61	1.87	1.05	.94	1.48	2.00	.61	.66	.28	.35
IN.	1.03	1.10	.70	2.16	1.09	1.08	1.65	2.31	.68	.76	.32	.39

WTR YR 1990 TOTAL 14430.6 MEAN 39.5 MAX 712 MIN 4.4 CFSM .98 IN. 13.25

e Estimated.

YORK RIVER BASIN

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01670180 PAMUNKEY CREEK AT LAHORE, VA--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--August 1989 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE-CIFIC CON-DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, (PER- CENT SATUR- ATION) (00301)	COLI- FORM, FECAL, 0.7 UM-MF (COLS. / 100 ML) (31625)	HARD- NESS TOTAL (MG/L AS CACO3) (00900)
NOV 07...	1335	24	82	7.4	11.5	757	10.5	97	200	31

DATE	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)
NOV 07...	7.7	2.9	3.9	1.4	29	4.0	4.5	0.10	12	58

DATE	SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L) (70301)	NITRO- GEN, NO2+NO3 TOTAL (MG/L AS N) (00630)	NITRO- GEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS TOTAL (MG/L AS P) (70507)	CADMIUM TOTAL RECOV- ERABLE (UG/L AS CD) (01027)	CHRO- MIUM, TOTAL RECOV- ERABLE (UG/L AS CR) (01034)	COPPER, TOTAL RECOV- ERABLE (UG/L AS CU) (01042)	IRON, TOTAL RECOV- ERABLE (UG/L AS FE) (01045)
NOV 07...	54	0.400	0.010	<0.20	0.010	0.010	<1	<1	1	900

DATE	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, TOTAL RECOV- ERABLE (UG/L AS PB) (01051)	MANGA- NESE, TOTAL RECOV- ERABLE (UG/L AS MN) (01055)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY TOTAL RECOV- ERABLE (UG/L AS HG) (71900)	NICKEL, TOTAL RECOV- ERABLE (UG/L AS NI) (01067)	ZINC, TOTAL RECOV- ERABLE (UG/L AS ZN) (01092)	CARBON, ORGANIC TOTAL (MG/L AS C) (00680)	PHENOLS TOTAL (UG/L) (32730)
NOV 07...	230	<1	60	42	<0.10	2	30	3.0	2

< Actual value is known to be less than the value shown.

YORK RIVER BASIN

01670400 NORTH ANNA RIVER NEAR PARTLOW, VA

LOCATION.--Lat 38°00'46", long 77°42'06", Spotsylvania County, Hydrologic Unit 02080106, on left downstream side of bridge on State Highway 601, 1.1 mi upstream from Northeast Creek, and 3.8 mi southwest of Partlow.

DRAINAGE AREA.--344 mi².

PERIOD OF RECORD.--October 1978 to current year.

GAGE.--Water-stage recorder. Datum of gage is 168.25 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--No estimated daily discharges. Records good. Flow regulated since January 1972 by Lake Anna, capacity, 373,000 acre-ft, 0.5 mi upstream. Several measurements of water temperature were made during the year.

COOPERATION.--Records were provided by the Virginia Water Control Board.

AVERAGE DISCHARGE.--12 years, 295 ft³/s, 11.65 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 11,700 ft³/s, Feb. 26, 1979, gage height, 25.30 ft, from rating curve extended above 7,200 ft³/s; minimum, 25 ft³/s, Aug. 1, 1988.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 22, 1972, reached a stage of 36.32 ft, from floodmark.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 5,230 ft³/s, May 29, gage height, 15.17 ft; minimum, 31 ft³/s, June 29; minimum daily, 40 ft³/s, July 31.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	46	188	188	2980	491	155	1170	386	1060	64	41	41
2	53	188	188	2710	302	155	849	255	387	46	42	41
3	60	485	190	1380	578	380	1700	97	678	45	42	42
4	61	185	188	427	1680	170	558	241	945	44	42	43
5	61	148	188	527	516	156	557	1850	233	49	42	43
6	63	125	188	527	516	201	433	1240	78	59	42	45
7	66	186	188	526	516	200	801	389	77	59	41	55
8	65	183	188	859	263	154	1030	286	178	58	42	47
9	65	1000	188	1180	237	121	556	137	178	58	43	47
10	57	346	188	528	1300	68	322	764	178	60	42	47
11	48	187	188	440	681	83	459	921	166	63	42	47
12	48	187	182	265	516	296	188	389	66	68	41	48
13	51	185	326	257	454	174	187	390	46	67	43	51
14	57	186	325	210	409	120	231	238	46	66	42	57
15	61	186	292	188	320	189	1390	161	55	73	42	47
16	63	1640	296	188	300	221	827	288	57	72	42	49
17	65	1480	188	188	260	921	554	123	57	68	42	50
18	64	391	188	386	156	1970	234	43	64	56	41	49
19	1380	273	188	327	418	719	185	43	352	61	41	49
20	1320	187	188	210	157	349	185	43	246	66	41	49
21	341	234	188	245	156	348	324	349	87	65	42	49
22	188	187	188	185	277	347	320	391	80	69	42	49
23	302	283	100	186	229	445	154	178	139	66	41	50
24	428	188	78	187	157	556	224	43	63	66	43	50
25	188	188	77	774	211	409	148	102	62	63	285	50
26	188	339	78	2100	156	187	244	733	62	60	93	55
27	188	345	67	1300	156	188	206	4030	61	59	105	47
28	188	225	45	517	156	188	99	2560	64	59	204	46
29	188	234	184	516	---	220	261	4010	55	59	205	46
30	188	188	221	981	---	559	387	4600	52	55	116	46
31	188	---	230	515	---	561	---	2430	---	40	41	---
TOTAL	6329	10347	5699	21809	11568	10810	14783	27710	5872	1863	2053	1435
MEAN	204	345	184	704	413	349	493	894	196	60.1	66.2	47.8
MAX	1380	1640	326	2980	1680	1970	1700	4600	1060	73	285	57
MIN	46	125	45	185	156	68	99	43	46	40	41	41
CFSM	.59	1.00	.53	2.05	1.20	1.01	1.43	2.60	.57	.17	.19	.14
IN.	.68	1.12	.62	2.36	1.25	1.17	1.60	3.00	.63	.20	.22	.16

CAL YR 1989 TOTAL 124162 MEAN 340 MAX 5420 MIN 38 CFSM .99 IN. 13.43
WTR YR 1990 TOTAL 120278 MEAN 330 MAX 4600 MIN 40 CFSM .96 IN. 13.01

01671020 NORTH ANNA RIVER AT HART CORNER, NEAR DOSWELL, VA

LOCATION.--Lat 37°51'00", long 77°25'41", Hanover County, Hydrologic Unit 02080106, on right bank at downstream side of bridge on State Highway 30, 0.3 mi west of Hart Corner, 2.1 mi east of Doswell, and 5.4 mi upstream from confluence with South Anna River.

DRAINAGE AREA.--463 mi².

PERIOD OF RECORD.--October 1979 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 43 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Records good except those for period with ice effect, Dec. 22-27, periods of doubtful or no gage-height record, June 5, July 3, and July 19-25, which are fair. Flow regulated since January 1972 by Lake Anna, capacity, 373,000 acre-ft, 27.7 mi upstream. At a point 0.8 mi upstream from station, there is diversion for municipal water supply by Hanover County Department of Public Utilities since June 1975. Several measurements of water temperature were made during the year.

COOPERATION.--Records were provided by the Virginia Water Control Board.

AVERAGE DISCHARGE.--11 years, 389 ft³/s, 11.41 in/yr, unadjusted.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 11,100 ft³/s, Mar. 30, 1984, gage height, 21.28 ft; minimum, 39 ft³/s, Aug. 28, 1988.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in August 1969 reached a stage of 28.02 ft, from floodmark, discharge not determined.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 6,730 ft³/s, May 30, gage height, 18.10 ft; minimum, 48 ft³/s, Aug. 6, 8, 9; minimum daily, 49 ft³/s, Aug. 6, 8.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	113	244	261	1830	652	245	1400	530	2520	76	55	58
2	149	243	255	3560	524	243	932	478	971	86	51	54
3	244	405	254	2560	431	308	2090	271	549	e74	51	53
4	218	477	251	988	1630	434	1600	188	1290	65	50	52
5	163	279	248	729	1320	261	868	1170	e592	67	50	53
6	135	211	251	727	742	247	725	2040	298	64	49	55
7	126	204	254	701	672	303	753	788	174	70	51	56
8	119	250	259	732	569	254	1460	498	178	70	49	65
9	115	608	266	1700	368	237	827	342	244	69	82	64
10	111	891	262	910	772	197	702	244	238	72	230	60
11	105	521	261	722	1740	152	493	1410	231	69	114	58
12	95	276	268	459	860	206	488	576	204	71	106	56
13	92	260	317	394	707	352	322	480	118	72	96	87
14	90	257	430	350	541	209	308	448	94	107	81	120
15	90	252	417	278	571	210	692	270	92	111	70	102
16	88	521	452	266	364	259	1550	267	94	94	65	85
17	90	2080	294	259	521	324	719	314	97	87	62	72
18	97	850	271	261	318	2060	595	188	109	81	60	64
19	442	529	259	534	322	1760	318	107	204	e77	60	60
20	1570	303	257	292	486	590	300	99	393	e69	58	60
21	1340	263	254	300	280	518	300	148	236	e74	59	59
22	376	315	e251	294	268	488	483	450	136	e72	63	60
23	286	289	e240	251	416	452	347	426	120	e106	68	61
24	466	350	e175	250	307	589	285	202	172	e68	70	59
25	366	269	e155	330	278	643	287	111	106	e70	127	58
26	245	275	e150	2220	281	402	269	242	101	66	242	57
27	243	553	e145	2540	244	297	322	4690	97	62	120	60
28	241	370	137	1110	247	282	260	4570	131	63	115	62
29	240	324	109	720	---	290	200	4560	107	62	193	59
30	240	306	319	1050	---	546	503	6540	93	68	205	56
31	241	---	267	741	---	924	---	5090	---	73	126	---
TOTAL	8536	12975	7989	28058	16431	14282	20398	37737	9989	2335	2878	1925
MEAN	275	432	258	905	587	461	680	1217	333	75.3	92.8	64.2
MAX	1570	2080	452	3560	1740	2060	2090	6540	2520	111	242	120
MIN	88	204	109	250	244	152	200	99	92	62	49	52
(*)	2.71	2.40	2.15	2.43	2.34	2.51	2.71	2.66	3.31	3.34	3.51	2.71
MEAN#	278	434	260	907	589	464	683	1220	336	78.6	96.3	66.9
CFSM#	.60	.94	.56	1.96	1.27	1.00	1.48	2.63	.73	.17	.21	.14
IN.#	.69	1.05	.65	2.26	1.33	1.16	1.65	3.04	.81	.20	.24	.16

CAL YR 1989 TOTAL 164921 MEAN 452 MAX 6060 MIN 47 MEAN# 455 CFSM# .98 IN.# 13.34
WTR YR 1990 TOTAL 163533 MEAN 448 MAX 6540 MIN 49 MEAN# 451 CFSM# .97 IN.# 13.23

* Average diversion, equivalent in cubic feet per second; provided by Hanover County Department of Public Utilities.

Adjusted for diversion.

e Estimated.

01671100 LITTLE RIVER NEAR DOSWELL, VA

LOCATION.--Lat 37°52'21", long 77°30'48", Hanover County, Hydrologic Unit 02080106, on left bank at downstream side of bridge on State Highway 685, 0.8 mi southwest of Verdon, 2.9 mi west of Doswell, and 9.6 mi upstream from mouth.

DRAINAGE AREA.--107 mi².

PERIOD OF RECORD.--October 1961 to current year.

GAGE.--Water-stage recorder. Datum of gage is 132.30 ft above National Geodetic Vertical Datum of 1929 (levels by La Prade Bros., Engineers).

REMARKS.--Records good except those for periods with ice effect, Dec. 15-18, 21, 22, and periods of doubtful or no gage-height record, Dec. 24-26, June 3, 4, and Aug. 27, 28, which are fair. Frequent quarry dewatering by the General Crushed Stone Company upstream from gage adds about 0.5 ft³/s at times. Several measurements of water temperature were made during the year.

COOPERATION.--Records were provided by the Virginia Water Control Board.

AVERAGE DISCHARGE.--29 years, 98.6 ft³/s, 12.51 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 12,000 ft³/s, Aug. 21, 1969, gage height, 11.09 ft, from rating curve extended above 7,600 ft³/s on basis of contracted-opening measurement of peak flow; minimum, 0.10 ft³/s, Sept. 25, 26, 1968.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 650 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Jan. 27	1400	685	4.41	May 30	1000	*2,610	*6.50
May 28	0800	2,160	6.14				

Minimum discharge, 4.3 ft³/s, Aug. 4.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	57	40	69	325	123	83	456	123	440	32	7.5	13
2	71	47	63	592	114	83	333	104	212	30	5.9	11
3	107	61	59	450	112	93	388	86	e138	27	4.9	9.3
4	121	84	55	230	280	105	495	72	e101	26	4.6	8.3
5	95	91	53	198	397	102	303	109	82	23	5.4	7.7
6	67	77	53	200	259	93	182	130	71	19	6.1	7.4
7	50	64	61	180	170	88	215	114	68	17	5.5	7.4
8	41	60	62	172	139	84	308	90	62	16	5.1	7.1
9	35	74	69	290	124	77	248	70	57	15	19	6.9
10	32	88	69	299	174	74	172	75	52	14	52	6.9
11	29	93	73	209	398	72	145	126	46	13	44	6.4
12	25	79	75	156	416	72	131	118	41	13	49	5.8
13	23	65	81	131	226	72	122	111	37	14	46	11
14	23	57	94	114	160	71	112	90	35	30	33	16
15	23	53	e98	105	135	69	124	75	33	30	25	12
16	21	52	e88	100	131	67	140	72	32	25	19	14
17	22	62	e86	97	136	73	138	64	31	36	15	11
18	26	132	e82	94	126	180	123	56	31	55	13	9.7
19	64	130	66	92	121	413	109	48	38	29	11	8.7
20	134	86	62	88	117	231	100	42	47	20	9.6	7.9
21	181	68	e55	87	110	155	96	46	65	15	8.3	9.3
22	153	61	e52	86	106	133	97	58	55	14	9.9	7.3
23	104	65	48	83	107	115	101	77	43	10	10	7.9
24	72	68	e42	80	106	105	99	73	35	10	33	6.6
25	56	68	e40	104	100	105	88	63	31	9.3	76	6.1
26	47	72	e42	386	91	110	79	81	28	8.8	56	6.0
27	42	82	47	655	85	109	72	938	26	8.6	e40	5.9
28	38	93	49	397	84	98	66	1840	64	8.5	e30	5.8
29	37	94	53	201	---	99	66	1310	47	8.7	24	5.7
30	36	79	58	153	---	177	96	2270	35	9.2	23	5.5
31	36	---	81	133	---	315	---	1120	---	8.3	16	---
TOTAL	1868	2245	1985	6487	4647	3723	5204	9651	2083	594.4	706.8	253.6
MEAN	60.3	74.8	64.0	209	166	120	173	311	69.4	19.2	22.8	8.45
MAX	181	132	98	655	416	413	495	2270	440	55	76	16
MIN	21	40	40	80	84	67	66	42	26	8.3	4.6	5.5
CFSM	.56	.70	.60	1.96	1.55	1.12	1.62	2.91	.65	.18	.21	.08
IN.	.65	.78	.69	2.26	1.62	1.29	1.81	3.36	.72	.21	.25	.09

CAL YR 1989 TOTAL 33160 MEAN 90.8 MAX 847 MIN 11 CFMS .85 IN. 11.53
WTR YR 1990 TOTAL 39447.8 MEAN 108 MAX 2270 MIN 4.6 CFMS 1.01 IN. 13.71

e Estimated.

01672500 SOUTH ANNA RIVER NEAR ASHLAND, VA

LOCATION.--Lat 37°47'48", long 77°32'57", Hanover County, Hydrologic Unit 02080106, on right bank at downstream side of bridge on State Highway 54, 4.5 mi northwest of Ashland, and 7.6 mi upstream from Newfound River.

DRAINAGE AREA.--394 mi².

PERIOD OF RECORD.--October 1930 to current year.

REVISED RECORDS.--WSP 801: 1935(M). WSP 1502: 1935, 1939. WSP 2103: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 83.74 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records good except those for periods of doubtful gage-height record, Nov. 12-14 and Sept. 17-26, and period with ice effect, Dec. 16-29, which are fair. Since 1966, diversion 150 ft upstream from station for town of Ashland water supply has averaged less than 0.6 ft³/s. Capacity of the diversion pickup is about 1.5 ft³/s. Small diurnal fluctuation at low flow in some years caused by gristmills upstream from station. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

AVERAGE DISCHARGE.--60 years, 367 ft³/s, 12.65 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 17,100 ft³/s, Aug. 23, 1969, gage height, 24.99 ft; minimum, 0.10 ft³/s, Sept. 12, 1966, caused by diversion upstream from station.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Aug. 15, 1928, reached a stage of about 24 ft, discharge, about 14,500 ft³/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 2,200 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Jan. 4	1430	2,510	9.18	May 30	0700	*7,190	*16.93

Minimum discharge, 26 ft³/s, Sept. 30, gage height, 1.38 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	218	204	293	1240	633	325	1290	332	3630	98	66	62
2	387	215	268	1830	504	319	1060	299	1690	178	64	59
3	936	331	255	2010	461	363	2000	261	622	136	60	55
4	822	489	241	2300	964	423	1450	238	489	114	56	53
5	445	419	230	959	1530	397	835	358	721	92	52	48
6	304	308	225	848	945	336	605	999	480	83	49	45
7	240	269	232	716	657	307	775	789	357	78	49	44
8	202	267	251	706	560	288	1150	410	300	72	50	51
9	177	439	266	1100	489	278	939	306	269	71	71	45
10	160	1060	277	1190	826	276	647	300	243	71	223	44
11	149	634	273	787	1650	281	572	588	219	93	148	41
12	143	e445	287	605	1330	280	537	822	197	110	135	39
13	136	e350	324	498	714	273	459	486	177	119	107	43
14	127	e310	365	422	566	268	406	435	162	158	90	56
15	126	290	381	379	495	259	540	584	155	134	78	66
16	122	293	e370	358	479	251	816	368	151	165	71	60
17	120	945	e310	345	511	284	824	299	147	250	70	e53
18	133	1290	e290	331	475	1210	584	265	147	160	68	e46
19	294	536	e260	324	424	1900	482	214	210	125	67	e49
20	1080	390	e275	312	418	812	409	182	316	105	65	e47
21	1400	333	e255	302	403	661	385	276	215	93	67	e44
22	792	298	e240	298	360	653	415	453	169	91	69	e47
23	464	295	e230	291	389	491	447	454	146	86	74	e55
24	338	305	e215	275	453	415	398	356	135	75	218	e49
25	277	310	e200	421	456	416	340	268	130	72	128	e44
26	244	317	e210	1460	367	447	314	247	124	69	100	e40
27	222	379	e220	1970	323	415	294	1430	110	64	123	37
28	212	468	e230	1350	322	353	272	2030	116	66	106	35
29	199	390	e240	711	---	367	273	4610	143	66	82	31
30	193	333	248	594	---	693	326	6650	108	69	73	27
31	191	---	357	759	---	1130	---	4550	---	70	70	---
TOTAL	10853	12912	8318	25691	17704	15171	19844	29859	12078	3233	2749	1415
MEAN	350	430	268	829	632	489	661	963	403	104	88.7	47.2
MAX	1400	1290	381	2300	1650	1900	2000	6650	3630	250	223	66
MIN	120	204	200	275	322	251	272	182	108	64	49	27
CFSM	.89	1.09	.68	2.10	1.60	1.24	1.68	2.44	1.02	.26	.23	.12
IN.	1.02	1.22	.79	2.43	1.67	1.43	1.87	2.82	1.14	.31	.26	.13

CAL YR 1989 TOTAL 153289 MEAN 420 MAX 3230 MIN 61 CFSM 1.07 IN. 14.47
WTR YR 1990 TOTAL 159827 MEAN 438 MAX 6650 MIN 27 CFSM 1.11 IN. 15.09

e Estimated.

YORK RIVER BASIN

01673000 PAMUNKEY RIVER NEAR HANOVER, VA
(National stream-quality accounting network station)

LOCATION.--Lat 37°46'03", long 77°19'57", Hanover County, Hydrologic Unit 02080106, on right bank 100 ft downstream from bridge on State Highway 614, 0.3 mi upstream from Mechumps Creek, 2.0 mi east of Hanover, and 7.0 mi upstream from Millpond Creek.

DRAINAGE AREA.--1,081 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1941 to current year. Monthly discharge only for some periods, published in WSP 1302.

REVISED RECORDS.--WSP 1302: 1944(M). WSP 1382: 1949. WSP 2103: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 14.72 ft above National Geodetic Vertical Datum of 1929. Prior to Oct. 15, 1976, nonrecording gage at same site and datum.

REMARKS.--Records good except those for period with ice effect, Dec. 17-29, and period of doubtful gage-height record, June 6-12, which are fair. Some regulation since January 1972 by Lake Anna, capacity, 373,000 acre-ft, and occasional diurnal fluctuation at low flow caused by mill upstream from station. Unknown amount of diversion for irrigation upstream from gage.

AVERAGE DISCHARGE.--49 years, 1,007 ft³/s, 12.65 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 40,300 ft³/s, Aug. 23, 1969, gage height, 31.12 ft, from floodmarks, from rating curve extended above 22,000 ft³/s; minimum, 12 ft³/s, Sept. 12, 1966.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in August 1928 reached a stage of 32.6 ft, from information by local residents.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 13,300 ft³/s, May 31, gage height, 23.43 ft; minimum, 79 ft³/s, Aug. 4-5, Sept. 6, gage height, 2.51 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	506	614	836	2140	1870	833	3340	1220	11100	276	138	174
2	569	630	760	4400	1570	828	3500	1180	8540	254	115	122
3	1050	727	731	5470	1290	872	3980	966	5460	328	105	113
4	1550	1240	703	5890	2190	1200	4980	674	2860	252	92	104
5	1100	1100	682	4690	e3890	1050	4270	965	2130	225	90	101
6	710	895	671	2820	e3230	904	2490	2900	e1300	200	94	98
7	541	684	672	e2230	2130	837	2030	3110	e1070	181	106	95
8	441	730	702	1960	1740	853	2890	1500	e880	178	100	103
9	386	841	766	e2960	1370	752	3140	1040	e730	174	143	96
10	343	2210	761	3540	1580	720	2190	836	e650	175	726	106
11	317	1840	776	e2610	e3770	640	1670	1630	e600	174	631	109
12	291	1120	784	1890	4080	626	1620	2240	e560	215	393	101
13	269	900	864	1400	e2760	809	1280	1530	524	246	347	109
14	255	809	1040	e1240	1860	793	1130	1220	411	294	282	225
15	243	759	1120	1090	1540	627	1290	1160	378	424	223	208
16	238	746	1120	991	1410	701	2770	970	364	346	185	186
17	245	2300	e950	951	1390	727	2540	884	362	379	160	154
18	267	3370	e800	918	1350	2100	1870	709	354	388	140	134
19	475	1980	e740	1060	1130	4100	1360	518	451	321	127	122
20	2400	1190	e760	1070	1320	3660	1110	414	771	241	123	120
21	3470	873	e720	871	e1320	1820	1040	443	840	208	121	107
22	2540	836	e690	918	989	1590	1130	1000	554	193	133	119
23	1320	824	e660	840	1070	1400	1240	1300	425	185	156	122
24	1010	915	e640	799	1170	1280	1010	1010	414	171	177	122
25	1070	832	e610	880	e1080	1380	985	679	387	156	446	123
26	735	831	e575	2660	e1020	1340	833	562	314	148	514	115
27	663	1010	e580	e4650	e881	1070	888	2900	297	139	420	109
28	629	1220	e600	e5260	837	964	834	5610	293	140	288	115
29	611	1070	e609	3680	---	908	717	8120	408	139	325	113
30	598	966	648	2150	---	1390	977	11000	361	144	355	105
31	597	---	991	2190	---	2350	---	13100	---	151	312	---
TOTAL	25439	34062	23561	74218	49837	39124	58104	71390	43788	7045	7567	3730
MEAN	821	1135	760	2394	1780	1262	1970	2303	1460	227	244	124
MAX	3470	3370	1120	5890	4080	4100	4980	13100	11100	424	726	225
MIN	238	614	575	799	837	626	717	414	293	139	90	95
CFSM	.76	1.05	.70	2.21	1.65	1.17	1.82	2.13	1.35	.21	.23	.12
IN.	.88	1.17	.81	2.55	1.72	1.35	2.03	2.46	1.51	.24	.26	.13

CAL YR 1989 TOTAL 428821 MEAN 1175 MAX 8370 MIN 130 CFSM 1.09 IN. 14.76
WTR YR 1990 TOTAL 438865 MEAN 1202 MAX 13100 MIN 90 CFSM 1.11 IN. 15.10

e Estimated.

YORK RIVER BASIN

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01673000 PAMUNKEY RIVER NEAR HANOVER, VA--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1946, 1952, 1968 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: April 1968 to January 1976.

WATER TEMPERATURE: October 1945 to September 1946, April 1968 to January 1976.

COOPERATION.--Chemical data as noted were provided by the Virginia Division of Consolidated Laboratory Services (VDCLS) and reviewed by the U.S. Geological Survey.

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	AGENCY ANA- LYZING SAMPLE (CODE NUMBER) (00028)	TUR- BID- ITY (NTU) (00076)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)
OCT											
20...	1200	2590	67	7.2	17.0	754	USGS	--	8.5	89	--
20...	1201	2590	67	7.2	17.0	754	VDCLS	50	8.5	89	--
21...	1300	3600	69	7.1	15.0	758	VDCLS	54	9.0	90	--
23...	1330	1260	82	7.7	10.5	771	VDCLS	17	8.5	75	--
NOV											
27...	1100	948	86	6.7	5.5	759	USGS	4.1	11.8	94	94
27...	1101	948	86	6.7	5.5	759	VDCLS	--	11.8	94	--
DEC											
18...	1100	810	90	6.5	0.0	768	VDCLS	--	13.9	94	--
JAN											
02...	0900	4280	64	7.7	4.0	772	VDCLS	98	12.9	97	--
03...	0930	5390	61	7.1	3.0	770	VDCLS	48	12.7	93	--
04...	1200	5980	61	7.0	3.0	764	VDCLS	39	13.6	101	--
05...	1100	4900	66	6.6	3.0	767	VDCLS	38	12.5	93	--
07...	1230	2220	66	6.9	5.5	765	VDCLS	--	11.9	94	--
26...	1345	3070	66	6.6	9.0	750	USGS	25	11.2	98	K1400
26...	1346	3070	66	6.6	9.0	750	VDCLS	--	11.2	98	--
27...	1300	4710	60	7.0	8.5	769	VDCLS	--	10.3	87	--
28...	1630	5340	62	7.3	8.5	766	VDCLS	--	9.7	82	--
30...	0900	2120	68	7.2	7.5	761	VDCLS	--	10.2	85	--
FEB											
05...	1200	4000	58	5.9	8.5	766	VDCLS	--	--	--	--
13...	1400	2590	65	6.9	10.0	763	VDCLS	--	9.8	87	--
20...	1330	1400	80	6.9	11.0	768	VDCLS	--	8.2	74	--
MAR											
06...	1100	900	80	6.5	7.0	762	USGS	2.4	11.6	96	16
06...	1101	900	80	6.5	7.0	762	VDCLS	--	11.6	96	--
19...	1230	460	154	6.8	15.5	764	VDCLS	--	9.3	93	--
20...	1115	3920	64	6.6	14.0	763	VDCLS	--	8.8	86	--
21...	1215	1720	105	7.3	11.5	775	VDCLS	--	9.6	87	--
26...	0800	1430	78	6.8	11.5	762	VDCLS	--	10.3	94	--
APR											
02...	0930	3730	68	6.6	13.0	753	VDCLS	--	9.9	95	--
03...	1000	3920	63	6.2	12.5	745	VDCLS	--	9.8	94	--
04...	1100	5010	59	6.1	12.0	741	VDCLS	--	9.4	90	--
05...	1130	4380	62	6.4	11.5	748	VDCLS	--	9.4	88	--
09...	1200	3160	75	6.1	11.0	770	VDCLS	--	9.7	87	--
10...	1100	2200	85	6.2	11.0	771	USGS	--	9.9	89	--
10...	1101	2200	85	6.2	11.0	771	VDCLS	--	9.9	89	--
16...	1300	2950	80	6.8	9.5	754	VDCLS	--	10.0	88	--
17...	1200	2510	68	6.5	15.0	749	VDCLS	--	--	--	--
18...	1030	1880	73	6.2	13.5	768	VDCLS	0.0	9.1	86	--
24...	1100	1000	78	7.1	17.0	755	USGS	6.5	8.5	89	27
24...	1101	1000	78	7.1	17.0	755	VDCLS	--	8.5	89	--
MAY											
06...	1400	2950	64	6.8	19.5	756	VDCLS	--	9.4	103	--
07...	1245	3220	68	6.7	19.0	760	USGS	--	9.6	104	--
07...	1246	3220	68	6.7	19.0	760	VDCLS	--	9.6	104	--
08...	0930	1520	70	6.8	18.0	760	VDCLS	--	8.8	93	--
24...	0845	1070	83	6.6	17.0	757	VDCLS	--	8.8	92	--
27...	1015	2870	90	7.1	18.0	763	VDCLS	--	6.2	65	--
29...	1115	8170	50	6.7	18.0	745	VDCLS	--	7.0	76	--
30...	1115	10800	47	6.8	16.5	758	VDCLS	--	7.7	79	--
31...	1000	13300	57	6.9	17.0	759	VDCLS	--	7.8	81	--

K Results based on colony count outside the acceptance range (non-ideal colony count).

YORK RIVER BASIN

01673000 PAMUNKEY RIVER NEAR HANOVER, VA--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	BARO- METRIC PRES- SURE (MM HG) (00025)	AGENCY ANA- LYZING SAMPLE (CODE NUMBER) (00028)	TUR- BID- ITY (NTU) (00076)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)
APR											
02...	0930	3730	68	6.6	13.0	753	VDCLS	--	9.9	95	--
03...	1000	3920	63	6.2	12.5	745	VDCLS	--	9.8	94	--
04...	1100	5010	59	6.1	12.0	741	VDCLS	--	9.4	90	--
05...	1130	4380	62	6.4	11.5	748	VDCLS	--	9.4	88	--
09...	1200	3160	75	6.1	11.0	770	VDCLS	--	9.7	87	--
10...	1100	2200	85	6.2	11.0	771	USGS	--	9.9	89	--
10...	1101	2200	85	6.2	11.0	771	VDCLS	--	9.9	89	--
16...	1300	2950	80	6.8	9.5	754	VDCLS	--	10.0	88	--
17...	1200	2510	68	6.5	15.0	749	VDCLS	--	--	--	--
18...	1030	1880	73	6.2	13.5	768	VDCLS	0.0	9.1	86	--
24...	1100	1000	78	7.1	17.0	755	USGS	6.5	8.5	89	27
24...	1101	1000	78	7.1	17.0	755	VDCLS	--	8.5	89	--
MAY											
06...	1400	2950	64	6.8	19.5	756	VDCLS	--	9.4	103	--
07...	1245	3220	68	6.7	19.0	760	USGS	--	9.6	104	--
07...	1246	3220	68	6.7	19.0	760	VDCLS	--	9.6	104	--
08...	0930	1520	70	6.8	18.0	760	VDCLS	--	8.8	93	--
24...	0845	1070	83	6.6	17.0	757	VDCLS	--	8.8	92	--
27...	1015	2870	90	7.1	18.0	763	VDCLS	--	6.2	65	--
29...	1115	8170	50	6.7	18.0	745	VDCLS	--	7.0	76	--
30...	1115	10800	47	6.8	16.5	758	VDCLS	--	7.7	79	--
31...	1000	13300	57	6.9	17.0	759	VDCLS	--	7.8	81	--
JUN											
01...	1200	11100	48	5.5	18.0	760	USGS	--	6.9	73	--
01...	1201	11100	48	5.5	18.0	760	VDCLS	--	6.9	73	--
03...	1000	5760	61	6.5	19.5	760	VDCLS	--	7.2	79	--
05...	1115	2030	68	6.0	21.0	758	VDCLS	--	7.8	88	--
28...	1000	274	109	7.1	24.0	756	USGS	2.0	6.9	83	29
28...	1001	274	109	7.1	24.0	756	VDCLS	--	6.9	83	--
JUL											
23...	0900	185	155	6.5	24.0	751	VDCLS	--	5.8	70	--
AUG											
10...	1530	978	99	7.1	22.5	760	VDCLS	--	7.0	81	--
28...	1200	281	110	6.8	25.0	753	VDCLS	--	6.6	81	--
SEP											
18...	0900	143	63	7.2	18.5	765	USGS	2.6	7.2	77	66
18...	0901	143	63	7.2	18.5	765	VDCLS	--	7.2	77	--
26...	1030	124	208	6.7	17.0	752	VDCLS	--	8.2	86	--

YORK RIVER BASIN

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01673000 PAMUNKEY RIVER NEAR HANOVER, VA--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	STREP- TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)	HARD- NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	ALKA- LINITY WAT DIS TOT IT FIELD (MG/L AS CACO3 HCO3 (39086)	BICAR- BONATE WATER DIS IT FIELD (MG/L AS HCO3 (00453)	ALKA- LINITY WAT WH TOT FET FIELD (MG/L AS CACO3 (00410)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)
OCT											
20...	--	--	--	--	--	--	--	--	--	--	--
20...	--	--	--	--	--	--	--	--	--	15	--
21...	--	--	--	--	--	--	--	--	--	16	--
23...	--	--	--	--	--	--	--	--	--	16	--
NOV											
27...	40	23	5.1	2.4	7.3	2.2	19	18	23	--	12
27...	--	--	--	--	--	--	--	--	--	21	--
DEC											
18...	--	--	--	--	--	--	--	--	--	19	--
JAN											
02...	--	--	--	--	--	--	--	--	--	12	--
03...	--	--	--	--	--	--	--	--	--	11	--
04...	--	--	--	--	--	--	--	--	--	10	--
05...	--	--	--	--	--	--	--	--	--	11	--
07...	--	--	--	--	--	--	--	--	--	12	--
26...	640	18	4.0	2.0	5.0	2.1	14	14	16	--	9.0
26...	--	--	--	--	--	--	--	--	--	15	--
27...	--	--	--	--	--	--	--	--	--	12	--
28...	--	--	--	--	--	--	--	--	--	12	--
30...	--	--	--	--	--	--	--	--	--	13	--
FEB											
05...	--	--	--	--	--	--	--	--	--	13	--
13...	--	--	--	--	--	--	--	--	--	13	--
20...	--	--	--	--	--	--	--	--	--	16	--
MAR											
06...	K3	22	5.0	2.3	6.9	1.7	20	18	23	--	10
06...	--	--	--	--	--	--	--	--	--	19	--
19...	--	--	--	--	--	--	--	--	--	13	--
20...	--	--	--	--	--	--	--	--	--	14	--
21...	--	--	--	--	--	--	--	--	--	15	--
26...	--	--	--	--	--	--	--	--	--	17	--
APR											
02...	--	--	--	--	--	--	--	--	--	14	--
03...	--	--	--	--	--	--	--	--	--	13	--
04...	--	--	--	--	--	--	--	--	--	12	--
05...	--	--	--	--	--	--	--	--	--	14	--
09...	--	--	--	--	--	--	--	--	--	14	--
10...	--	--	--	--	--	--	--	--	--	--	--
10...	--	--	--	--	--	--	--	--	--	14	--
16...	--	--	--	--	--	--	--	--	--	13	--
17...	--	--	--	--	--	--	--	--	--	16	--
18...	--	--	--	--	--	--	--	--	--	16	--
24...	K9	23	5.4	2.4	6.1	1.4	20	19	23	--	9.6
24...	--	--	--	--	--	--	--	--	--	21	--
MAY											
06...	--	--	--	--	--	--	--	--	--	--	--
07...	--	--	--	--	--	--	--	--	--	--	--
07...	--	--	--	--	--	--	--	--	--	16	--
08...	--	--	--	--	--	--	--	--	--	17	--
24...	--	--	--	--	--	--	--	--	--	20	--
27...	--	--	--	--	--	--	--	--	--	15	--
29...	--	--	--	--	--	--	--	--	--	10	--
30...	--	--	--	--	--	--	--	--	--	9	--
31...	--	--	--	--	--	--	--	--	--	9	--
JUN											
01...	--	--	--	--	--	--	--	--	--	--	--
01...	--	--	--	--	--	--	--	--	--	9	--
03...	--	--	--	--	--	--	--	--	--	14	--
05...	--	--	--	--	--	--	--	--	--	14	--
28...	40	27	6.6	2.5	8.9	2.1	26	25	31	--	17
28...	--	--	--	--	--	--	--	--	--	26	--
JUL											
23...	--	--	--	--	--	--	--	--	--	33	--
AUG											
10...	--	--	--	--	--	--	--	--	--	22	--
28...	--	--	--	--	--	--	--	--	--	23	--
SEP											
18...	68	36	9.2	3.2	16	3.2	32	29	36	--	30
18...	--	--	--	--	--	--	--	--	--	--	--
26...	--	--	--	--	--	--	--	--	--	--	--

K Results based on colony count outside the acceptance range (non-ideal colony count).

YORK RIVER BASIN

01673000 PAMUNKEY RIVER NEAR HANOVER, VA--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	RESIDUE TOTAL AT 105 DEG. C, SUS- PENDED (MG/L) (00530)	RESIDUE VOLA- TILE, SUS- PENDED (MG/L) (00535)	RESIDUE FIXED NON FILTER- ABLE (MG/L) (00540)	NITRO- GEN, NITRATE DIS- SOLVED (MG/L AS N) (00618)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)
OCT										
20...	--	--	11	--	--	91	24	67	--	<0.010
20...	--	--	10	--	--	84	14	70	0.130	<0.010
21...	--	--	11	--	--	85	12	73	0.090	<0.010
23...	--	--	12	--	--	18	2	16	0.130	<0.010
NOV										
27...	5.7	0.30	14	65	62	12	12	0	--	<0.010
27...	--	--	13	--	--	4	1	3	0.200	<0.010
DEC										
18...	--	--	13	--	--	3	<1	3	0.230	<0.010
JAN										
02...	--	--	9.4	--	--	106	12	94	0.340	<0.010
03...	--	--	8.8	--	--	68	7	61	0.370	<0.010
04...	--	--	8.3	--	--	32	5	27	0.390	<0.010
05...	--	--	9.4	--	--	33	3	30	0.440	0.010
07...	--	--	11	--	--	28	3	25	0.310	<0.010
26...	4.9	<0.10	11	72	47	14	14	0	--	<0.010
26...	--	--	11	--	--	70	8	62	0.230	<0.010
27...	--	--	9.9	--	--	54	4	50	0.210	<0.010
28...	--	--	9.7	--	--	38	2	36	0.230	<0.010
30...	--	--	11	--	--	20	2	18	0.290	<0.010
FEB										
05...	--	--	10	--	--	62	9	53	0.240	<0.010
13...	--	--	10	--	--	24	5	19	0.230	<0.010
20...	--	--	11	--	--	10	2	8	0.220	<0.010
MAR										
06...	5.3	<0.10	12	62	56	--	--	--	--	<0.010
06...	--	--	11	--	--	4	<1	4	0.190	<0.010
19...	--	--	8.4	--	--	105	11	94	0.190	<0.010
20...	--	--	9.3	--	--	48	9	39	0.240	0.010
21...	--	--	10	--	--	31	8	23	0.240	0.030
26...	--	--	10	--	--	7	3	4	0.230	<0.010
APR										
02...	--	--	9.5	--	--	31	6	25	0.170	<0.010
03...	--	--	6.6	--	--	101	14	87	0.130	<0.010
04...	--	--	--	--	--	39	6	33	0.210	<0.010
05...	--	--	9.5	--	--	7	4	3	0.210	0.010
09...	--	--	9.6	--	--	19	5	14	0.190	<0.010
10...	--	--	--	--	--	--	--	--	--	<0.010
10...	--	--	9.4	--	--	19	3	16	0.170	<0.010
16...	--	--	8.6	--	--	13	5	8	0.200	<0.010
17...	--	--	9.6	--	--	24	6	18	0.160	<0.010
18...	--	--	9.4	--	--	10	1	9	0.150	<0.010
24...	4.8	<0.10	11	63	53	<1	<1	--	--	<0.010
24...	--	--	11	--	--	6	4	2	0.170	<0.010
MAY										
06...	--	--	9.1	--	--	62	12	50	0.210	0.010
07...	--	--	11	--	--	59	19	40	--	<0.010
07...	--	--	9.3	--	--	114	16	98	0.230	0.020
08...	--	--	9.9	--	--	22	<1	22	0.370	0.010
24...	--	--	12	--	--	18	6	12	0.600	<0.010
27...	--	--	9.1	--	--	144	16	128	0.300	<0.010
29...	--	--	7.2	--	--	31	5	26	0.200	<0.010
30...	--	--	6.3	--	--	12	<1	12	0.260	0.010
31...	--	--	6.7	--	--	19	2	17	0.220	<0.010
JUN										
01...	--	--	7.6	--	--	2	2	0	--	<0.010
01...	--	--	7.2	--	--	11	2	9	0.190	<0.010
03...	--	--	7.3	--	--	7	<1	7	0.320	<0.010
05...	--	--	10	--	--	26	5	21	0.320	<0.010
28...	5.5	0.20	11	77	70	--	--	--	0.190	0.010
28...	--	--	12	--	--	2	2	0	0.170	<0.010
JUL										
23...	--	--	13	--	--	8	<1	8	0.360	<0.010
AUG										
10...	--	--	9.0	--	--	60	7	53	0.280	<0.010
28...	--	--	13	--	--	3	3	0	0.280	<0.010
SEP										
18...	7.6	0.10	11	104	100	1	1	0	--	<0.010
18...	--	--	11	--	--	--	--	--	0.280	0.010
26...	--	--	--	--	--	--	--	--	--	--

< Actual value is known to be less than the value shown.

01673000 PAMUNKEY RIVER NEAR HANOVER, VA--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITRO- GEN, AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	ALUM- INUM, DIS- SOLVED (UG/L AS AL) (01106)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BARIUM, DIS- SOLVED (UG/L AS BA) (01005)
OCT										
20...	0.160	0.020	--	0.30	0.110	--	0.020	--	--	--
20...	0.130	0.060	--	0.50	0.080	0.010	0.010	--	--	--
21...	0.090	<0.040	--	0.60	0.120	0.010	0.010	--	--	--
23...	0.130	0.050	--	0.50	0.050	0.010	0.010	--	--	--
NOV										
27...	0.200	0.020	0.020	0.30	0.030	0.010	0.010	30	<1	21
27...	0.200	0.040	--	0.30	0.020	0.010	0.010	--	--	--
DEC										
18...	0.230	0.060	--	0.40	0.060	0.010	0.010	--	--	--
JAN										
02...	0.340	0.110	--	0.90	0.180	0.010	0.010	--	--	--
03...	0.370	0.070	--	0.80	0.080	0.010	<0.010	--	--	--
04...	0.390	0.080	--	0.50	0.080	<0.010	0.010	--	--	--
05...	0.450	0.090	--	0.60	0.070	0.010	0.010	--	--	--
07...	0.310	0.060	--	0.50	0.070	<0.010	0.010	--	--	--
26...	0.240	0.030	0.030	0.60	0.080	<0.010	<0.010	--	--	--
26...	0.230	0.050	--	0.50	0.100	<0.010	0.010	--	--	--
27...	0.210	<0.040	--	0.60	0.110	0.010	0.010	--	--	--
28...	0.230	<0.040	--	0.50	0.080	0.010	0.010	--	--	--
30...	0.290	0.080	--	0.40	0.070	0.010	0.020	--	--	--
FEB										
05...	0.240	0.040	--	0.50	0.090	0.010	0.010	--	--	--
13...	0.230	0.040	--	0.40	0.050	0.010	<0.010	--	--	--
20...	0.220	<0.040	--	0.30	0.030	<0.010	<0.010	--	--	--
MAR										
06...	0.180	<0.010	0.020	0.50	0.030	<0.010	<0.010	20	<1	21
06...	0.190	<0.040	--	0.20	0.030	0.010	<0.010	--	--	--
19...	0.190	<0.040	--	0.80	0.130	0.010	<0.010	--	--	--
20...	--	0.050	--	0.60	0.090	0.010	0.070	--	--	--
21...	0.270	0.040	--	0.40	0.070	0.010	0.040	--	--	--
26...	0.230	0.070	--	0.20	0.030	0.010	0.010	--	--	--
APR										
02...	0.170	0.050	--	0.40	0.060	<0.010	<0.010	--	--	--
03...	0.130	0.040	--	0.40	0.060	0.010	<0.010	--	--	--
04...	0.210	0.040	--	0.50	0.100	0.020	0.010	--	--	--
05...	0.220	0.050	--	0.50	0.070	0.010	0.020	--	--	--
09...	0.190	<0.040	--	0.40	0.060	0.010	0.010	--	--	--
10...	0.200	0.010	--	0.40	0.040	--	<0.010	--	--	--
10...	0.170	<0.040	--	0.30	0.050	0.010	<0.010	--	--	--
16...	0.200	<0.040	--	0.40	0.060	<0.010	0.010	--	--	--
17...	0.160	<0.040	--	0.40	0.050	0.010	0.010	--	--	--
18...	0.150	<0.040	--	0.50	0.050	<0.010	0.010	--	--	--
24...	0.200	0.010	0.020	0.30	0.030	0.020	<0.010	40	<1	24
24...	0.170	<0.040	--	0.30	0.040	0.010	0.010	--	--	--
MAY										
06...	0.220	0.080	--	0.50	0.060	0.020	<0.010	--	--	--
07...	0.200	0.040	--	0.80	0.040	--	0.010	--	--	--
07...	0.250	0.100	--	0.70	0.130	0.030	0.010	--	--	--
08...	0.380	0.120	--	1.1	0.070	0.020	<0.010	--	--	--
24...	0.600	0.040	--	0.40	0.070	0.020	0.020	--	--	--
27...	0.300	<0.040	--	1.2	0.290	<0.010	0.010	--	--	--
29...	0.200	0.040	--	0.60	0.100	<0.010	0.020	--	--	--
30...	0.270	0.050	--	0.70	0.110	0.040	0.030	--	--	--
31...	0.220	<0.040	--	0.60	0.070	0.010	<0.010	--	--	--
JUN										
01...	0.200	0.030	--	0.70	0.050	--	<0.010	--	--	--
01...	0.190	<0.040	--	0.20	0.060	0.010	0.010	--	--	--
03...	0.320	0.040	--	0.30	0.060	0.020	0.010	--	--	--
05...	0.320	0.070	--	0.40	0.050	0.010	0.020	--	--	--
28...	0.200	0.040	0.040	<0.20	0.030	0.050	<0.010	--	--	--
28...	0.170	<0.040	--	0.30	0.020	0.010	0.020	--	--	--
JUL										
23...	0.360	<0.040	--	0.40	0.070	0.030	0.030	--	--	--
AUG										
10...	0.280	0.060	--	0.60	0.130	0.020	0.020	--	--	--
28...	0.280	0.060	--	0.30	0.060	0.040	0.020	--	--	--
SEP										
18...	0.300	0.020	0.020	0.50	0.060	0.040	0.020	20	<1	24
18...	0.290	0.040	--	0.30	0.030	0.040	0.030	--	--	--
26...	--	--	--	--	--	--	--	--	--	--

< Actual value is known to be less than the value shown.

YORK RIVER BASIN

01673000 PAMUNKEY RIVER NEAR HANOVER, VA--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	BERYL- LIUM, DIS- SOLVED (UG/L AS BE) (01010)	CADMIUM DIS- SOLVED (UG/L AS CD) (01025)	CHRO- MIUM, DIS- SOLVED (UG/L AS CR) (01030)	COBALT, DIS- SOLVED (UG/L AS CO) (01035)	COPPER, DIS- SOLVED (UG/L AS CU) (01040)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)
OCT										
20...	--	--	--	--	--	--	--	--	--	--
20...	--	--	--	--	--	--	--	--	--	--
21...	--	--	--	--	--	--	--	--	--	--
23...	--	--	--	--	--	--	--	--	--	--
NOV										
27...	<0.5	<1.0	<1	<3	2	380	1	<4	24	<0.1
27...	--	--	--	--	--	--	--	--	--	--
DEC										
18...	--	--	--	--	--	--	--	--	--	--
JAN										
02...	--	--	--	--	--	--	--	--	--	--
03...	--	--	--	--	--	--	--	--	--	--
04...	--	--	--	--	--	--	--	--	--	--
05...	--	--	--	--	--	--	--	--	--	--
07...	--	--	--	--	--	--	--	--	--	--
26...	--	--	--	--	--	--	--	--	--	--
26...	--	--	--	--	--	--	--	--	--	--
27...	--	--	--	--	--	--	--	--	--	--
28...	--	--	--	--	--	--	--	--	--	--
30...	--	--	--	--	--	--	--	--	--	--
FEB										
05...	--	--	--	--	--	--	--	--	--	--
13...	--	--	--	--	--	--	--	--	--	--
20...	--	--	--	--	--	--	--	--	--	--
MAR										
06...	<0.5	<1.0	<5*	<3	<10*	280	<10*	<4	21	<0.1
06...	--	--	--	--	--	--	--	--	--	--
19...	--	--	--	--	--	--	--	--	--	--
20...	--	--	--	--	--	--	--	--	--	--
21...	--	--	--	--	--	--	--	--	--	--
26...	--	--	--	--	--	--	--	--	--	--
APR										
02...	--	--	--	--	--	--	--	--	--	--
03...	--	--	--	--	--	--	--	--	--	--
04...	--	--	--	--	--	--	--	--	--	--
05...	--	--	--	--	--	--	--	--	--	--
09...	--	--	--	--	--	--	--	--	--	--
10...	--	--	--	--	--	--	--	--	--	--
10...	--	--	--	--	--	--	--	--	--	--
16...	--	--	--	--	--	--	--	--	--	--
17...	--	--	--	--	--	--	--	--	--	--
18...	--	--	--	--	--	--	--	--	--	--
24...	<0.5	<1.0	<1	<3	2	380	1	<4	23	<0.1
24...	--	--	--	--	--	--	--	--	--	--
MAY										
06...	--	--	--	--	--	--	--	--	--	--
07...	--	--	--	--	--	--	--	--	--	--
07...	--	--	--	--	--	--	--	--	--	--
08...	--	--	--	--	--	--	--	--	--	--
24...	--	--	--	--	--	--	--	--	--	--
27...	--	--	--	--	--	--	--	--	--	--
29...	--	--	--	--	--	--	--	--	--	--
30...	--	--	--	--	--	--	--	--	--	--
31...	--	--	--	--	--	--	--	--	--	--
JUN										
01...	--	--	--	--	--	--	--	--	--	--
01...	--	--	--	--	--	--	--	--	--	--
03...	--	--	--	--	--	--	--	--	--	--
05...	--	--	--	--	--	--	--	--	--	--
28...	--	--	--	--	--	--	--	--	--	--
28...	--	--	--	--	--	--	--	--	--	--
JUL										
23...	--	--	--	--	--	--	--	--	--	--
AUG										
10...	--	--	--	--	--	--	--	--	--	--
28...	--	--	--	--	--	--	--	--	--	--
SEP										
18...	<0.5	1.0	<1	<3	2	270	1	<4	92	<0.1
18...	--	--	--	--	--	--	--	--	--	--
26...	--	--	--	--	--	--	--	--	--	--

* An alternate analytical method resulted in a change of the minimum reporting level for these constituents.

< Actual value is known to be less than the value shown.

01673000 PAMUNKEY RIVER NEAR HANOVER, VA--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	NICKEL, DIS- SOLVED (UG/L AS NI) (01065)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	SILVER, DIS- SOLVED (UG/L AS AG) (01075)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)	VANA- DIUM, DIS- SOLVED (UG/L AS V) (01085)	ZINC, DIS- SOLVED (UG/L AS ZN) (01090)	CARBON, ORGANIC TOTAL (MG/L AS C) (00680)	SEDI- MENT, SUS- PENDED (MG/L) (80154)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
OCT										
20...	--	--	--	--	--	--	--	9.4	--	--
20...	--	--	--	--	--	--	--	5.5	--	--
21...	--	--	--	--	--	--	--	6.0	--	--
23...	--	--	--	--	--	--	--	6.7	--	--
NOV										
27...	<10	2	<1	<1.0	35	<6	6	4.2	5	95
27...	--	--	--	--	--	--	--	3.9	--	--
DEC										
18...	--	--	--	--	--	--	--	4.7	--	--
JAN										
02...	--	--	--	--	--	--	--	5.1	--	--
03...	--	--	--	--	--	--	--	6.4	--	--
04...	--	--	--	--	--	--	--	6.6	--	--
05...	--	--	--	--	--	--	--	7.7	--	--
07...	--	--	--	--	--	--	--	6.1	--	--
26...	--	--	--	--	--	--	--	7.1	79	95
26...	--	--	--	--	--	--	--	4.7	--	--
27...	--	--	--	--	--	--	--	5.7	--	--
28...	--	--	--	--	--	--	--	6.1	--	--
30...	--	--	--	--	--	--	--	4.3	--	--
FEB										
05...	--	--	--	--	--	--	--	4.8	--	--
13...	--	--	--	--	--	--	--	6.0	--	--
20...	--	--	--	--	--	--	--	4.4	--	--
MAR										
06...	<10	<10*	<1	<1.0	35	<6	5	3.6	4	99
06...	--	--	--	--	--	--	--	4.3	--	--
19...	--	--	--	--	--	--	--	6.9	--	--
20...	--	--	--	--	--	--	--	7.9	--	--
21...	--	--	--	--	--	--	--	6.5	--	--
26...	--	--	--	--	--	--	--	4.7	--	--
APR										
02...	--	--	--	--	--	--	--	5.1	--	--
03...	--	--	--	--	--	--	--	7.1	--	--
04...	--	--	--	--	--	--	--	6.5	--	--
05...	--	--	--	--	--	--	--	6.3	--	--
09...	--	--	--	--	--	--	--	4.9	--	--
10...	--	--	--	--	--	--	--	5.8	--	--
10...	--	--	--	--	--	--	--	4.3	--	--
16...	--	--	--	--	--	--	--	4.5	--	--
17...	--	--	--	--	--	--	--	4.6	--	--
18...	--	--	--	--	--	--	--	5.5	--	--
24...	<10	<1	<1	<1.0	38	<6	<3	4.3	9	96
24...	--	--	--	--	--	--	--	4.0	--	--
MAY										
06...	--	--	--	--	--	--	--	5.4	--	--
07...	--	--	--	--	--	--	--	8.9	--	--
07...	--	--	--	--	--	--	--	6.4	--	--
08...	--	--	--	--	--	--	--	6.4	--	--
24...	--	--	--	--	--	--	--	4.7	--	--
27...	--	--	--	--	--	--	--	7.7	--	--
29...	--	--	--	--	--	--	--	8.2	--	--
30...	--	--	--	--	--	--	--	12	--	--
31...	--	--	--	--	--	--	--	11	--	--
JUN										
01...	--	--	--	--	--	--	--	9.6	--	--
01...	--	--	--	--	--	--	--	7.5	--	--
03...	--	--	--	--	--	--	--	7.0	--	--
05...	--	--	--	--	--	--	--	4.9	--	--
28...	--	--	--	--	--	--	--	--	--	--
28...	--	--	--	--	--	--	--	6.1	--	--
JUL										
23...	--	--	--	--	--	--	--	5.2	--	--
AUG										
10...	--	--	--	--	--	--	--	5.1	--	--
28...	--	--	--	--	--	--	--	4.5	--	--
SEP										
18...	<10	<1	<1	<1.0	55	<6	10	4.4	3	83
18...	--	--	--	--	--	--	--	--	--	--
26...	--	--	--	--	--	--	--	--	--	--

* An alternate analytical method resulted in a change of the minimum reporting level for these constituents.

< Actual value is known to be less than the value shown.

YORK RIVER BASIN

01673550 TOTOPOTOMOY CREEK NEAR STUDLEY, VA.

LOCATION.--Lat 37°39'44", long 77°15'29", Hanover County, Hydrologic Unit 02080106, on right bank at downstream side of bridge on State Highway 606, 2.0 mi southeast of Studley, 2.4 mi downstream from Hawes millrace, and 4.1 mi upstream from mouth.

DRAINAGE AREA.--26.2 mi².

PERIOD OF RECORD.--October 1977 to current year.

GAGE.--Water-stage recorder. Datum of gage is 38.36 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records good except those for periods with ice effect, Dec. 15-17, 19-21, 25, and periods of doubtful or no gage-height record, Dec. 22-24, June 12-18, 22-25, June 30 to July 10, and Sept. 17-30, which are fair. Several measurements of water temperature were made during the year.

COOPERATION.--Records were provided by the Virginia Water Control Board.

AVERAGE DISCHARGE.--13 years, 28.0 ft³/s, 14.51 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 802 ft³/s, Aug. 19, 1985, gage height, 8.22 ft; maximum gage height, 8.77 ft, Feb. 25, 1979; minimum daily discharge, 0.35 ft³/s, Oct. 1-7, 1977.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 160 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Apr. 3	1800	207	5.70	Aug. 10	1830	192	5.55
May 30	1330	*226	*5.87				

Minimum discharge, 3.9 ft³/s, Sept. 7.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	19	16	17	79	26	21	42	27	44	e7.0	9.6	5.8
2	32	17	17	67	25	21	39	22	34	e6.7	7.3	5.3
3	37	22	17	40	26	24	159	20	30	e6.0	6.2	4.9
4	26	21	17	32	53	26	118	18	25	e5.4	5.2	4.5
5	19	19	15	31	55	24	58	22	23	e5.4	4.6	4.3
6	15	18	16	34	35	22	46	23	21	e6.0	4.8	4.3
7	13	17	16	34	32	20	52	22	18	e6.2	6.1	4.7
8	11	19	18	37	28	20	55	17	17	e5.4	5.4	5.7
9	11	27	21	47	26	19	44	15	15	e5.0	35	5.1
10	10	27	20	41	31	19	37	25	15	e5.0	145	5.3
11	10	23	19	30	45	19	38	44	14	8.7	110	4.9
12	9.7	20	21	27	36	19	36	33	e13	16	39	4.6
13	9.5	18	27	25	28	18	32	22	e12	14	22	13
14	9.5	17	28	23	26	17	29	20	e11	17	14	36
15	9.5	17	e25	22	25	17	41	19	e11	20	11	36
16	9.8	20	e24	22	27	16	55	16	e11	23	10	27
17	10	20	e22	21	30	18	40	14	e10	17	9.0	e15
18	13	20	21	21	27	28	33	12	e9.9	13	8.5	e9.0
19	32	19	e19	21	28	30	29	11	15	11	8.0	e5.2
20	55	17	e18	20	30	24	28	9.8	15	8.5	7.5	e4.6
21	46	16	e18	21	27	21	28	12	14	18	7.7	e4.6
22	28	17	e17	21	25	19	29	28	e12	21	9.4	e6.6
23	20	26	e16	19	25	18	28	43	e10	15	11	e13
24	17	29	e15	19	26	17	26	28	e8.6	9.4	13	e13
25	16	25	e17	35	24	21	24	18	e7.6	6.8	15	e10
26	15	23	19	107	22	23	23	25	7.2	5.6	13	e7.0
27	14	21	20	82	21	21	22	74	7.4	5.1	9.9	e5.5
28	13	20	19	45	22	19	20	82	7.4	5.1	8.1	e5.2
29	14	19	19	36	---	23	23	130	7.2	7.0	7.2	e5.1
30	14	18	21	31	---	39	29	203	e6.7	15	7.0	e5.0
31	15	---	33	28	---	41	---	90	---	17	6.4	---
TOTAL	573.0	608	612	1118	831	684	1263	1144.8	452.0	331.3	575.9	280.2
MEAN	18.5	20.3	19.7	36.1	29.7	22.1	42.1	36.9	15.1	10.7	18.6	9.34
MAX	55	29	33	107	55	41	159	203	44	23	145	36
MIN	9.5	16	15	19	21	16	20	9.8	6.7	5.0	4.6	4.3
CFSM	.71	.77	.75	1.38	1.13	.84	1.61	1.41	.58	.41	.71	.36
IN.	.81	.86	.87	1.59	1.18	.97	1.79	1.63	.64	.47	.82	.40

CAL YR 1989 TOTAL 9129.9 MEAN 25.0 MAX 128 MIN 4.7 CFSM .95 IN. 12.96
WTR YR 1990 TOTAL 8473.2 MEAN 23.2 MAX 203 MIN 4.3 CFSM .89 IN. 12.03

e Estimated.

01673800 PO RIVER NEAR SPOTSYLVANIA, VA

LOCATION.--Lat 38°10'17", long 77°35'42", Spotsylvania County, Hydrologic Unit 02080105, on right bank at upstream side of bridge on State Highway 208, 1.6 mi north of Snell, 2.0 mi south of Spotsylvania, 4.8 mi downstream from Gladys Run, and 4.9 mi upstream from U.S. Highway 1.

DRAINAGE AREA.--77.4 mi².

PERIOD OF RECORD.--October 1962 to current year.

REVISED RECORDS.--WSP 2103: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 183.76 ft above National Geodetic Vertical Datum of 1929. Prior to Sept. 30, 1964, nonrecording gage at same site and datum.

REMARKS.--Records good except for period with ice effect, Dec. 15-17, which is fair. Several measurements of water temperature were made during the year.

COOPERATION.--Records were provided by the Virginia Water Control Board.

AVERAGE DISCHARGE.--28 years, 74.9 ft³/s, 13.14 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 10,900 ft³/s, June 22, 1972, gage height, 19.03 ft, from rating curve extended above 3,400 ft³/s; minimum daily, 0.05 ft³/s, Oct. 11, 12, 1986.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 900 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Jan. 2	0900	*1,700	*9.73	May 30	1200	1,300	8.68

Minimum discharge, 3.2 ft³/s, Sept. 8.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	35	43	53	590	122	60	196	121	97	9.8	5.9	5.0
2	156	43	49	1370	106	58	147	77	71	9.5	4.7	4.4
3	187	90	48	247	101	66	477	60	64	8.5	4.2	4.2
4	82	82	44	148	194	73	318	52	74	7.6	4.2	3.7
5	52	54	46	150	205	66	150	487	66	8.7	5.2	3.6
6	39	44	51	129	128	59	120	539	48	9.3	3.7	3.4
7	31	41	63	111	108	53	194	120	38	7.3	4.0	3.4
8	26	70	51	122	98	50	269	81	33	6.3	6.1	4.9
9	23	318	51	272	97	50	159	64	30	7.0	10	7.4
10	20	144	53	200	136	51	122	84	28	20	48	5.5
11	19	82	51	140	179	51	111	162	24	38	44	4.0
12	18	64	54	114	135	50	101	99	19	97	31	3.4
13	17	55	63	95	112	49	84	70	17	89	18	5.0
14	16	48	69	81	95	48	80	62	16	65	12	9.5
15	16	46	e68	74	86	46	126	53	14	71	9.3	13
16	17	253	e62	72	84	45	233	46	15	40	7.8	9.4
17	16	479	e55	68	88	200	126	41	14	25	6.8	7.2
18	26	139	52	67	78	518	101	36	23	18	6.1	6.2
19	242	91	43	65	77	200	83	29	104	14	5.8	5.2
20	473	72	42	61	83	138	73	26	62	11	5.5	5.0
21	214	66	40	62	72	168	74	33	32	9.7	5.2	4.6
22	99	55	36	62	67	118	81	42	23	8.8	5.9	5.6
23	64	63	31	57	84	94	71	40	25	8.3	7.2	10
24	49	66	30	55	96	80	55	35	24	8.2	16	10
25	41	62	30	88	78	77	49	29	19	7.7	47	8.2
26	37	86	34	386	64	79	47	53	15	6.9	25	6.7
27	34	126	37	554	59	72	48	251	14	6.3	15	5.6
28	31	93	36	178	61	65	47	143	13	6.5	9.4	4.5
29	30	73	37	131	---	65	59	576	11	12	6.8	4.0
30	29	61	40	193	---	105	203	1110	9.9	12	6.2	3.9
31	30	---	66	174	---	154	---	238	---	8.3	5.8	---
TOTAL	2169	3009	1485	6116	2893	3008	4004	4859	1042.9	656.7	391.8	176.5
MEAN	70.0	100	47.9	197	103	97.0	133	157	34.8	21.2	12.6	5.88
MAX	473	479	69	1370	205	518	477	1110	104	97	48	13
MIN	16	41	30	55	59	45	47	26	9.9	6.3	3.7	3.4
CFSM	.90	1.30	.62	2.55	1.33	1.25	1.72	2.03	.45	.27	.16	.08
IN.	1.04	1.45	.71	2.94	1.39	1.45	1.92	2.34	.50	.32	.19	.08

CAL YR 1989 TOTAL 30613.6 MEAN 83.9 MAX 1400 MIN 4.7 CFSM 1.08 IN. 14.71
WTR YR 1990 TOTAL 29810.9 MEAN 81.7 MAX 1370 MIN 3.4 CFSM 1.06 IN. 14.33

e Estimated.

YORK RIVER BASIN

01674000 MATTAPONI RIVER NEAR BOWLING GREEN, VA

LOCATION.--Lat 38°03'42", long 77°23'10", Caroline County, Hydrologic Unit 02080105, on right bank 0.1 mi upstream from bridge on State Highway 605, 2.2 mi northwest of Bowling Green, 2.4 mi upstream from South River, and 7.1 mi downstream from confluence of Matta and Poni Rivers.

DRAINAGE AREA.--257 mi².

PERIOD OF RECORD.--September 1942 to current year.

REVISED RECORDS.--WSP 1382: 1943, 1945(M), 1948(M), 1949, 1953(M). WSP 2103: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 85.14 ft above National Geodetic Vertical Datum of 1929. Prior to Aug. 17, 1978, gage located on left bank at same datum.

REMARKS.--Records good except those for periods with ice effect, Dec. 16, 18, and period with backwater from debris, Sept. 11-14, which are fair. Some diurnal fluctuation from gristmill upstream on Po River. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

COOPERATION.--Records were provided by the Virginia Water Control Board.

AVERAGE DISCHARGE.--48 years, 238 ft³/s, 12.58 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 13,400 ft³/s, June 23, 1972, gage height, 18.95 ft, from high-water mark in well, from rating curve extended above 8,100 ft³/s; no flow at times in September and October 1954 and September 1966.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in August 1928 reached a stage of 19.5 ft based on relative difference in stage between this flood and flood of Oct. 17, 1942, at Milford 4 mi downstream, discharge, 15,000 ft³/s, from rating curve extended above 8,100 ft³/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 2,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Jan. 3	1900	2,410	10.31	May 31	0800	*2,780	*10.75

Minimum discharge, 13 ft³/s, Sept. 7, gage height, 1.66 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	235	166	258	431	557	227	487	342	1660	41	34	21
2	305	178	229	663	496	221	540	370	761	41	26	19
3	470	252	216	1900	418	232	596	283	419	35	21	18
4	590	335	197	1730	449	253	841	224	417	31	17	17
5	527	332	186	851	557	247	1140	392	468	29	16	16
6	316	277	188	623	655	230	770	552	375	28	15	16
7	223	228	191	538	574	212	578	988	253	26	15	15
8	173	215	201	474	454	196	587	778	e187	25	15	17
9	143	305	204	498	388	187	670	410	e154	24	28	22
10	125	432	219	622	392	186	617	305	e137	30	236	19
11	111	571	224	718	530	187	492	382	e123	51	296	e16
12	101	458	226	586	786	184	413	419	e104	132	187	e15
13	93	311	249	453	707	184	360	374	e90	184	112	e18
14	88	256	280	371	513	183	319	283	e81	188	74	e24
15	86	229	291	322	415	173	315	230	e75	240	55	30
16	89	227	e270	294	369	165	345	195	e71	209	44	32
17	89	331	261	276	360	181	407	172	e68	135	35	33
18	109	596	e260	266	342	390	417	146	e67	92	29	26
19	257	849	258	273	323	880	342	123	108	69	25	20
20	540	563	229	250	322	1110	295	109	189	57	24	18
21	853	354	209	237	309	664	269	115	168	60	23	16
22	1030	274	200	239	287	505	273	144	106	132	25	16
23	744	255	193	e227	285	431	273	154	85	76	28	20
24	438	257	165	213	296	345	254	143	81	50	31	21
25	282	252	158	241	297	306	227	125	72	38	48	25
26	222	260	151	456	267	297	205	145	63	31	73	23
27	194	297	160	815	242	284	188	468	55	27	59	20
28	177	332	166	1430	234	263	176	712	52	24	44	18
29	167	333	172	1090	---	245	174	e1160	50	23	34	16
30	156	287	184	682	---	288	249	1540	43	26	27	15
31	158	---	225	556	---	389	---	2640	---	42	22	---
TOTAL	9091	10012	6620	18325	11824	9845	12819	14423	6582	2196	1718	602
MEAN	293	334	214	591	422	318	427	465	219	70.8	55.4	20.1
MAX	1030	849	291	1900	786	1110	1140	2640	1660	240	296	33
MIN	86	166	151	213	234	165	174	109	43	23	15	15
CFSM	1.14	1.30	.83	2.30	1.64	1.24	1.66	1.81	.85	.28	.22	.08
IN.	1.32	1.45	.96	2.65	1.71	1.43	1.86	2.09	.95	.32	.25	.09

CAL YR 1989 TOTAL 105281 MEAN 288 MAX 2010 MIN 12 CFMS 1.12 IN. 15.24
WTR YR 1990 TOTAL 104057 MEAN 285 MAX 2640 MIN 15 CFMS 1.11 IN. 15.06

e Estimated.

YORK RIVER BASIN

125

01674500 MATTAPONI RIVER NEAR BEULAHVILLE, VA

LOCATION.--Lat. 37°53'02", long 77°09'55", King and Queen County, Hydrologic Unit 02080105, on upstream side of bridge on State Highway 628, 2.4 mi north of Beulahville, and 3.3 mi downstream from Maracossic Creek.

DRAINAGE AREA.--601 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--September 1941 to September 1987, October 1989 to September 1990.

REVISED RECORDS.--WSP 2103: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 12.43 ft above National Geodetic Vertical Datum of 1929 (levels by Virginia Department of Highways). Prior to Oct. 14, 1942, nonrecording gage. From Oct. 14, 1942, to Aug. 8, 1974, water-stage recorder on right bank at site 0.6 mi upstream at same datum. Aug. 8, 1974, to Sept. 8, 1987, water-stage recorder on left bank 80 ft downstream from previous site, at same datum. Sept. 8, 1987, to Aug. 31, 1989, nonrecording gage at present site and datum.

REMARKS.--Records good except for period with ice effect, Dec. 17-31, which is fair. Diurnal fluctuation at times during low flow caused by grist mill on Po River.

AVERAGE DISCHARGE.--47 years, 593 ft³/s, 13.40 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 16,900 ft³/s, June 25, 1972, gage height, 23.97 ft, from floodmarks; maximum gage height, 24.04 ft, Aug. 23, 1969; minimum discharge, 5.9 ft³/s, Sept. 14, 1966, gage height, 0.94 ft.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 4,050 ft³/s, May 31, gage height, 15.73 ft; minimum, 56 ft³/s, Sept. 8, gage height, 2.30 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1010	313	547	737	1860	629	1090	771	3660	181	176	115
2	668	343	523	1070	1560	586	1230	812	3360	175	151	98
3	633	381	488	1190	1230	604	1430	770	3030	175	120	87
4	756	452	421	1290	1190	664	1560	679	2540	160	95	77
5	814	561	397	1430	1230	671	1580	657	2090	141	82	71
6	806	577	374	1730	1240	635	1580	885	1450	134	70	65
7	653	533	368	2040	1270	585	1680	1080	1120	148	70	62
8	450	465	383	1960	1280	546	1800	1180	830	133	73	58
9	354	494	417	1680	1200	518	1700	1240	618	118	141	58
10	298	595	444	1420	1090	496	1500	1320	538	113	496	58
11	267	690	460	1280	1240	489	1400	1190	463	123	804	59
12	242	740	474	1250	1350	485	1330	997	415	214	1010	62
13	226	772	496	1260	1390	481	1140	994	373	245	795	63
14	216	630	536	1190	1440	471	934	908	339	333	444	96
15	202	501	568	974	1470	460	872	739	315	433	317	118
16	192	461	589	786	1350	452	959	591	305	517	253	134
17	192	461	e610	705	1090	445	993	503	292	560	208	133
18	217	495	e620	663	947	629	952	446	282	420	176	116
19	306	608	e580	638	892	861	922	391	349	308	156	102
20	651	777	e520	621	856	1040	842	337	410	237	137	90
21	1000	903	e460	620	824	1180	738	342	442	192	133	80
22	1140	761	e425	588	784	1340	697	378	418	295	133	78
23	1180	552	e395	574	755	1410	680	418	345	339	143	86
24	1220	497	e370	566	760	1140	662	432	271	337	161	85
25	1190	486	e350	583	748	846	629	406	236	225	176	82
26	789	498	e330	880	700	753	585	405	215	165	174	77
27	485	521	e320	1220	655	717	538	1180	195	124	174	71
28	385	555	e340	1430	638	673	499	2150	197	110	182	70
29	340	578	e350	1530	---	630	478	2630	206	109	157	68
30	317	575	e380	1680	---	716	630	3700	202	231	137	62
31	306	---	e440	1860	---	874	---	3970	---	188	126	---
TOTAL	17506	16775	13975	35445	31039	22026	31630	32501	25506	7183	7470	2481
MEAN	565	559	451	1143	1109	711	1054	1048	850	232	241	82.7
MAX	1220	903	620	2040	1860	1410	1800	3970	3660	560	1010	134
MIN	192	313	320	566	638	445	478	337	195	109	70	58
CFSM	.94	.93	.75	1.90	1.84	1.18	1.75	1.74	1.41	.39	.40	.14
IN.	1.08	1.04	.87	2.19	1.92	1.36	1.96	2.01	1.58	.44	.46	.15

WTR YR 1990 TOTAL 243537 MEAN 667 MAX 3970 MIN 58 CFSM 1.11 IN. 15.07

e Estimated.

01674500 MATTAPONI RIVER NEAR BEULAHVILLE, VA--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1968, 1969, 1979 to current year.

COOPERATION.--Chemical data as noted were provided by the Virginia Division of Consolidated Laboratory Services (VDCLS) and reviewed by the U.S. Geological Survey.

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (000061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (000095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	AGENCY ANA- LYZING SAMPLE (CODE NUMBER) (00028)	TUR- BID- ITY (NTU) (00076)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)
OCT											
20...	0930	582	47	7.7	14.5	754	VDCLS	6.4	8.4	83	--
21...	1030	994	53	7.6	13.0	758	VDCLS	9.2	8.7	83	--
23...	1130	1180	48	6.6	11.0	771	USGS	--	8.1	73	--
23...	1131	1180	48	6.6	11.0	771	VDCLS	10	8.1	73	--
NOV											
29...	1000	578	56	6.5	6.0	757	USGS	4.0	10.8	87	78
29...	1001	578	56	6.5	6.0	757	VDCLS	--	10.8	87	--
DEC											
18...	1245	588	75	8.1	0.0	768	VDCLS	--	13.6	92	--
JAN											
02...	1030	1050	52	7.2	-0.5	772	VDCLS	13	13.4	89	--
03...	1030	1190	58	6.8	0.5	770	VDCLS	15	13.7	94	--
04...	1000	1290	56	6.8	1.0	764	VDCLS	20	13.5	95	--
05...	1000	1400	48	6.3	2.0	767	VDCLS	22	12.5	89	--
07...	1400	2070	45	6.2	3.0	760	VDCLS	--	12.0	89	--
08...	1300	1960	46	7.0	3.0	754	VDCLS	--	11.4	86	--
09...	1300	1660	47	6.4	3.5	760	USGS	--	11.0	83	--
09...	1301	1660	47	6.4	3.5	760	VDCLS	--	11.0	83	--
26...	1000	849	48	6.3	8.0	750	USGS	7.6	10.9	93	130
26...	1001	849	48	6.3	8.0	750	VDCLS	--	10.9	93	--
27...	1500	1260	46	6.3	7.0	769	VDCLS	--	9.7	79	--
29...	1445	1540	--	7.1	7.5	762	VDCLS	--	13.6	--	--
FEB											
05...	1500	1240	45	6.7	8.0	766	VDCLS	--	9.1	76	--
13...	1230	1390	50	7.6	7.5	763	VDCLS	--	10.4	87	--
MAR											
07...	1000	590	48	6.4	7.0	775	USGS	3.5	11.2	91	76
07...	1001	590	48	6.4	7.0	775	VDCLS	--	11.2	91	--
21...	1100	1180	50	6.9	12.0	775	VDCLS	--	11.1	101	--
26...	1000	755	43	6.3	10.5	762	VDCLS	--	10.5	94	--
APR											
02...	1030	1220	38	6.3	14.0	753	VDCLS	--	10.0	98	--
03...	1200	1430	45	5.7	11.5	744	VDCLS	--	8.9	84	--
04...	0900	1560	44	6.1	11.0	741	VDCLS	--	9.0	84	--
05...	1000	1580	44	6.1	11.0	748	VDCLS	--	9.1	84	--
09...	1030	1720	45	6.2	10.5	770	VDCLS	--	9.6	85	--
10...	1000	1500	48	6.0	10.5	761	VDCLS	--	10.0	90	--
16...	1340	966	58	7.0	9.5	754	VDCLS	--	9.8	87	--
17...	1000	998	45	6.1	15.0	750	VDCLS	--	--	--	--
18...	1130	950	43	6.1	15.5	768	USGS	--	8.8	87	--
18...	1131	950	43	6.1	15.5	768	VDCLS	--	8.8	87	--
23...	1200	678	49	6.2	16.0	754	USGS	4.5	8.6	88	21
23...	1201	678	49	6.2	16.0	754	VDCLS	--	8.6	88	--
MAY											
24...	0945	433	60	5.7	17.5	757	VDCLS	--	8.6	90	--
27...	1045	1120	62	6.6	18.0	763	VDCLS	--	5.2	55	--
29...	1315	2570	34	5.6	17.0	745	VDCLS	--	6.9	73	--
30...	0930	3650	35	6.2	16.0	758	VDCLS	--	7.4	75	--
31...	1000	4020	37	6.3	16.0	767	VDCLS	--	7.5	76	--
JUN											
01...	1000	3680	36	5.8	16.0	760	VDCLS	--	7.3	74	--
03...	1100	3080	39	5.7	18.5	760	VDCLS	--	6.9	74	--
05...	0900	2180	48	5.5	19.5	758	VDCLS	--	6.3	69	--
22...	1100	424	48	6.7	23.5	751	USGS	1.0	6.8	81	60
22...	1101	424	48	6.7	23.5	751	VDCLS	--	6.8	81	--
JUL											
25...	0900	233	75	6.7	24.0	758	VDCLS	--	6.9	82	--
AUG											
10...	1430	520	38	6.3	21.5	760	VDCLS	--	7.0	80	--
14...	1100	444	38	6.3	--	760	VDCLS	--	7.0	--	--
22...	1100	134	53	6.7	20.5	754	USGS	4.5	7.2	81	36
22...	1101	134	53	6.7	20.5	754	VDCLS	--	7.2	81	--
SEP											
24...	1045	84	50	6.5	16.0	760	VDCLS	--	8.9	90	--

YORK RIVER BASIN

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01674500 MATTAPONI RIVER NEAR BEULAHVILLE, VA--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	STREP- TOCOCCHI FECAL, KF AGAR (COLS. PER 100 ML) (31673)	HARD- NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	ALKA- LILITY LAB (MG/L AS CACO3) (90410)	ALKA- LILITY WAT DIS TOT IT FIELD (MG/L AS CACO3) (39086)	BICAR- BONATE WATER DIS IT FIELD (MG/L AS HCO3) (00453)	ALKA- LILITY WAT WH TOT FET FIELD (MG/L AS CACO3) (00410)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)
OCT											
20...	--	--	--	--	--	--	--	--	--	9	--
21...	--	--	--	--	--	--	--	--	--	9	--
23...	--	--	--	--	--	--	--	--	--	--	--
23...	--	--	--	--	--	--	--	--	--	8	--
NOV											
29...	52	13	2.8	1.4	4.7	1.5	9.0	7	9	--	5.0
29...	--	--	--	--	--	--	--	--	--	10	--
DEC											
18...	--	--	--	--	--	--	--	--	--	9	--
JAN											
02...	--	--	--	--	--	--	--	--	--	8	--
03...	--	--	--	--	--	--	--	--	--	7	--
04...	--	--	--	--	--	--	--	--	--	6	--
05...	--	--	--	--	--	--	--	--	--	5	--
07...	--	--	--	--	--	--	--	--	--	4	--
08...	--	--	--	--	--	--	--	--	--	6	--
09...	--	--	--	--	--	--	--	--	--	--	--
09...	--	--	--	--	--	--	--	--	--	5	--
26...	390	13	2.8	1.5	3.5	1.4	7.0	5	6	--	6.0
26...	--	--	--	--	--	--	--	--	--	7	--
27...	--	--	--	--	--	--	--	--	--	6	--
29...	--	--	--	--	--	--	--	--	--	5	--
FEB											
05...	--	--	--	--	--	--	--	--	--	7	--
13...	--	--	--	--	--	--	--	--	--	8	--
MAR											
07...	K8	12	2.6	1.4	4.0	1.5	10	7	8	--	5.1
07...	--	--	--	--	--	--	--	--	--	8	--
21...	--	--	--	--	--	--	--	--	--	8	--
26...	--	--	--	--	--	--	--	--	--	9	--
APR											
02...	--	--	--	--	--	--	--	--	--	7	--
03...	--	--	--	--	--	--	--	--	--	7	--
04...	--	--	--	--	--	--	--	--	--	7	--
05...	--	--	--	--	--	--	--	--	--	7	--
09...	--	--	--	--	--	--	--	--	--	7	--
10...	--	--	--	--	--	--	--	--	--	7	--
16...	--	--	--	--	--	--	--	--	--	8	--
17...	--	--	--	--	--	--	--	--	--	7	--
18...	--	--	--	--	--	--	--	--	--	--	--
18...	--	--	--	--	--	--	--	--	--	8	--
23...	K14	13	2.7	1.5	3.5	0.90	10	8	10	--	5.3
23...	--	--	--	--	--	--	--	--	--	9	--
MAY											
24...	--	--	--	--	--	--	--	--	--	11	--
27...	--	--	--	--	--	--	--	--	--	6	--
29...	--	--	--	--	--	--	--	--	--	4	--
30...	--	--	--	--	--	--	--	--	--	4	--
31...	--	--	--	--	--	--	--	--	--	4	--
JUN											
01...	--	--	--	--	--	--	--	--	--	5	--
03...	--	--	--	--	--	--	--	--	--	5	--
05...	--	--	--	--	--	--	--	--	--	7	--
22...	65	13	2.6	1.6	3.7	1.0	10	9	11	10	3.7
22...	--	--	--	--	--	--	--	--	--	--	--
JUL											
25...	--	--	--	--	--	--	--	--	--	--	--
AUG											
10...	--	--	--	--	--	--	--	--	--	4	--
14...	--	--	--	--	--	--	--	--	--	--	--
22...	62	15	3.4	1.6	3.6	1.4	12	11	13	--	3.7
22...	--	--	--	--	--	--	--	--	--	11	--
SEP											
24...	--	--	--	--	--	--	--	--	--	--	--

K Results based on colony count outside the acceptance range (non-ideal colony count).

YORK RIVER BASIN

01674500 MATTAPONI RIVER NEAR BEULAHVILLE, VA--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SiO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	RESIDUE TOTAL AT 105 DEG. C, SUS- PENDED (MG/L) (00530)	RESIDUE VOLA- TILE, SUS- PENDED (MG/L) (00535)	RESIDUE FIXED NON FILTER- ABLE (MG/L) (00540)	NITRO- GEN, NITRATE DIS- SOLVED (MG/L AS N) (00618)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)
OCT										
20...	--	--	9.2	--	--	19	2	17	0.110	<0.010
21...	--	--	8.7	--	--	14	2	12	0.060	<0.010
23...	--	--	11	--	--	9	3	6	--	<0.010
23...	--	--	10	--	--	14	2	12	0.040	<0.010
NOV										
29...	7.2	<0.10	11	55	39	39	17	22	--	<0.010
29...	--	--	11	--	--	5	1	4	0.140	<0.010
DEC										
18...	--	--	10	--	--	2	<1	2	0.220	<0.010
JAN										
02...	--	--	9.4	--	--	11	2	9	0.280	<0.010
03...	--	--	9.3	--	--	12	1	11	0.280	<0.010
04...	--	--	8.9	--	--	19	4	15	0.320	<0.010
05...	--	--	8.3	--	--	17	2	15	0.340	0.010
07...	--	--	8.4	--	--	5	1	4	0.290	<0.010
08...	--	--	8.8	--	--	4	<1	4	0.250	<0.010
09...	--	--	9.3	--	--	<1	<1	--	--	<0.010
09...	--	--	9.0	--	--	7	<1	7	0.230	<0.010
26...	4.9	<0.10	8.0	52	32	18	12	6	--	<0.010
26...	--	--	9.6	--	--	17	1	16	0.230	<0.010
27...	--	--	6.9	--	--	18	2	16	0.180	<0.010
29...	--	--	7.9	--	--	8	1	7	0.150	<0.010
FEB										
05...	--	--	7.2	--	--	11	4	7	0.190	<0.010
13...	--	--	6.9	--	--	5	4	1	0.120	0.010
MAR										
07...	5.5	<0.10	7.0	48	32	--	--	--	--	<0.010
07...	--	--	6.8	--	--	5	2	3	0.170	<0.010
21...	--	--	7.2	--	--	20	6	14	0.160	<0.010
26...	--	--	7.0	--	--	8	4	4	0.140	<0.010
APR										
02...	--	--	6.4	--	--	6	1	5	0.130	<0.010
03...	--	--	9.5	--	--	9	4	5	0.210	<0.010
04...	--	--	--	--	--	5	2	3	0.120	<0.010
05...	--	--	6.3	--	--	11	5	6	0.110	<0.010
09...	--	--	6.3	--	--	5	4	1	0.100	<0.010
10...	--	--	5.3	--	--	8	2	6	0.190	<0.010
16...	--	--	5.5	--	--	15	6	9	0.120	<0.010
17...	--	--	5.2	--	--	12	5	7	0.110	<0.010
18...	--	--	5.9	--	--	10	10	0	--	<0.010
18...	--	--	5.5	--	--	7	5	2	0.090	<0.010
23...	4.8	<0.10	6.0	38	31	4	4	0	--	<0.010
23...	--	--	5.7	--	--	7	3	4	0.130	<0.010
MAY										
24...	--	--	8.2	--	--	12	7	5	0.260	<0.010
27...	--	--	5.4	--	--	156	16	140	0.290	<0.010
29...	--	--	4.5	--	--	19	4	15	0.110	<0.010
30...	--	--	5.0	--	--	15	2	13	0.160	<0.010
31...	--	--	5.7	--	--	<1	<1	<1	0.120	<0.010
JUN										
01...	--	--	6.4	--	--	5	1	4	0.130	<0.010
03...	--	--	7.4	--	--	2	1	1	0.120	<0.010
05...	--	--	7.8	--	--	7	4	3	0.160	<0.010
22...	4.6	0.10	8.5	48	32	--	--	--	--	<0.010
22...	--	--	8.1	--	--	6	1	5	0.240	<0.010
JUL										
25...	--	--	8.9	--	--	6	2	4	0.870	<0.010
AUG										
10...	--	--	6.0	--	--	43	6	37	0.180	<0.010
14...	--	--	6.1	--	--	--	--	--	0.170	<0.010
22...	5.8	<0.10	8.6	47	37	5	5	0	--	<0.010
22...	--	--	8.4	--	--	3	<1	3	0.230	<0.010
SEP										
24...	--	--	7.7	--	--	<1	<1	<1	0.160	0.010

< Actual value is known to be less than the value shown.

YORK RIVER BASIN

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01674500 MATTAPONI RIVER NEAR BEULAHVILLE, VA--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITRO- GEN, AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	ALUM- INUM, DIS- SOLVED (UG/L AS AL) (01106)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BARIUM, DIS- SOLVED (UG/L AS BA) (01005)
OCT										
20...	0.110	0.050	--	0.50	0.060	<0.010	0.020	--	--	--
21...	0.060	<0.040	--	0.50	0.080	0.010	0.010	--	--	--
23...	<0.100	0.020	--	0.60	0.050	--	0.020	--	--	--
23...	0.040	0.060	--	0.70	0.070	0.010	0.010	--	--	--
NOV										
29...	0.100	0.020	0.020	0.40	0.040	0.010	0.020	30	<1	21
29...	0.140	0.050	--	0.30	0.030	<0.010	0.010	--	--	--
DEC										
18...	0.220	0.050	--	0.30	0.030	0.010	0.010	--	--	--
JAN										
02...	0.280	0.090	--	0.50	0.050	<0.010	<0.010	--	--	--
03...	0.280	0.100	--	0.40	0.060	0.010	0.010	--	--	--
04...	0.320	0.080	--	0.50	0.060	0.010	0.010	--	--	--
05...	0.350	0.070	--	0.50	0.060	0.010	0.010	--	--	--
07...	0.290	<0.040	--	0.50	0.050	0.010	0.010	--	--	--
08...	0.250	0.040	--	0.40	0.040	<0.010	0.010	--	--	--
09...	0.250	0.040	--	0.30	0.050	--	0.020	--	--	--
09...	0.230	0.050	--	0.40	0.040	<0.010	<0.010	--	--	--
26...	0.250	0.050	0.050	0.50	0.040	<0.010	<0.010	--	--	--
26...	0.230	0.060	--	0.40	0.050	<0.010	0.010	--	--	--
27...	0.180	<0.040	--	0.40	0.040	<0.010	0.010	--	--	--
29...	0.150	<0.040	--	0.50	0.070	0.010	0.010	--	--	--
FEB										
05...	0.190	0.060	--	0.40	0.050	0.010	0.010	--	--	--
13...	0.130	<0.040	--	0.30	0.040	0.010	<0.010	--	--	--
MAR										
07...	0.170	<0.010	<0.010	0.40	0.070	<0.010	<0.010	30	<1	21
07...	0.170	<0.040	--	0.30	0.020	0.010	0.010	--	--	--
21...	0.160	0.080	--	0.60	0.090	0.020	0.070	--	--	--
26...	0.140	0.080	--	0.30	0.030	0.010	<0.010	--	--	--
APR										
02...	0.130	<0.040	--	0.30	0.050	0.010	<0.010	--	--	--
03...	0.210	0.100	--	0.70	0.190	0.010	<0.010	--	--	--
04...	0.120	0.060	--	0.40	0.050	0.010	0.010	--	--	--
05...	0.110	0.040	--	0.40	0.050	0.010	0.020	--	--	--
09...	0.100	<0.040	--	0.50	0.050	0.020	0.010	--	--	--
10...	0.190	<0.040	--	0.30	0.040	0.020	0.010	--	--	--
16...	0.120	0.040	--	0.40	0.040	0.010	<0.010	--	--	--
17...	0.110	<0.040	--	0.40	0.040	<0.010	0.010	--	--	--
18...	0.100	0.020	--	0.40	0.030	--	<0.010	--	--	--
18...	0.090	<0.040	--	0.40	0.040	0.010	0.010	--	--	--
23...	0.100	0.020	0.020	0.50	0.030	0.010	<0.010	60	<1	23
23...	0.130	<0.040	--	0.40	0.040	0.010	0.010	--	--	--
MAY										
24...	0.260	0.060	--	0.50	0.080	0.020	0.010	--	--	--
27...	0.290	0.040	--	0.90	0.230	0.010	0.010	--	--	--
29...	0.110	<0.040	--	0.60	0.090	0.010	0.020	--	--	--
30...	0.160	<0.040	--	0.50	0.090	0.020	0.010	--	--	--
31...	0.120	<0.040	--	0.50	0.060	0.020	0.010	--	--	--
JUN										
01...	0.130	0.140	--	0.20	0.060	0.020	0.050	--	--	--
03...	0.120	<0.040	--	0.30	0.060	0.020	0.010	--	--	--
05...	0.160	0.050	--	0.50	0.070	0.020	0.020	--	--	--
22...	0.200	0.030	0.040	0.50	0.050	0.020	<0.010	--	--	--
22...	0.240	0.040	--	0.40	0.060	0.030	0.020	--	--	--
JUL										
25...	0.870	<0.040	--	0.30	0.050	0.030	0.030	--	--	--
AUG										
10...	0.180	<0.040	--	0.60	0.100	0.010	0.010	--	--	--
14...	0.170	0.040	--	0.60	0.100	--	0.010	--	--	--
22...	0.200	0.030	0.040	0.50	0.050	0.020	<0.010	40	<1	27
22...	0.230	0.080	--	0.40	0.060	0.020	0.020	--	--	--
SEP										
24...	0.170	<0.040	--	0.40	0.050	0.020	0.010	--	--	--

< Actual value is known to be less than the value shown.

YORK RIVER BASIN

01674500 MATTAPONI RIVER NEAR BEULAHVILLE, VA--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	BERYL- LIUM, DIS- SOLVED (UG/L AS BE) (01010)	CADMIUM DIS- SOLVED (UG/L AS CD) (01025)	CHRO- MIUM, DIS- SOLVED (UG/L AS CR) (01030)	COBALT, DIS- SOLVED (UG/L AS CO) (01035)	COPPER, DIS- SOLVED (UG/L AS CU) (01040)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)
OCT										
20...	--	--	--	--	--	--	--	--	--	--
21...	--	--	--	--	--	--	--	--	--	--
23...	--	--	--	--	--	--	--	--	--	--
23...	--	--	--	--	--	--	--	--	--	--
NOV										
29...	<0.5	<1.0	<1	<3	1	530	<1	<4	32	<0.1
29...	--	--	--	--	--	--	--	--	--	--
DEC										
18...	--	--	--	--	--	--	--	--	--	--
JAN										
02...	--	--	--	--	--	--	--	--	--	--
03...	--	--	--	--	--	--	--	--	--	--
04...	--	--	--	--	--	--	--	--	--	--
05...	--	--	--	--	--	--	--	--	--	--
07...	--	--	--	--	--	--	--	--	--	--
08...	--	--	--	--	--	--	--	--	--	--
09...	--	--	--	--	--	--	--	--	--	--
09...	--	--	--	--	--	--	--	--	--	--
26...	--	--	--	--	--	--	--	--	--	--
26...	--	--	--	--	--	--	--	--	--	--
27...	--	--	--	--	--	--	--	--	--	--
29...	--	--	--	--	--	--	--	--	--	--
FEB										
05...	--	--	--	--	--	--	--	--	--	--
13...	--	--	--	--	--	--	--	--	--	--
MAR										
07...	<0.5	<1.0	<5*	<3	<10*	370	<10*	<4	40	<0.1
07...	--	--	--	--	--	--	--	--	--	--
21...	--	--	--	--	--	--	--	--	--	--
26...	--	--	--	--	--	--	--	--	--	--
APR										
02...	--	--	--	--	--	--	--	--	--	--
03...	--	--	--	--	--	--	--	--	--	--
04...	--	--	--	--	--	--	--	--	--	--
05...	--	--	--	--	--	--	--	--	--	--
09...	--	--	--	--	--	--	--	--	--	--
10...	--	--	--	--	--	--	--	--	--	--
16...	--	--	--	--	--	--	--	--	--	--
17...	--	--	--	--	--	--	--	--	--	--
18...	--	--	--	--	--	--	--	--	--	--
18...	--	--	--	--	--	--	--	--	--	--
23...	0.6	<1.0	<1	<3	1	650	1	<4	53	<0.1
23...	--	--	--	--	--	--	--	--	--	--
MAY										
24...	--	--	--	--	--	--	--	--	--	--
27...	--	--	--	--	--	--	--	--	--	--
29...	--	--	--	--	--	--	--	--	--	--
30...	--	--	--	--	--	--	--	--	--	--
31...	--	--	--	--	--	--	--	--	--	--
JUN										
01...	--	--	--	--	--	--	--	--	--	--
03...	--	--	--	--	--	--	--	--	--	--
05...	--	--	--	--	--	--	--	--	--	--
22...	--	--	--	--	--	--	--	--	--	--
22...	--	--	--	--	--	--	--	--	--	--
JUL										
25...	--	--	--	--	--	--	--	--	--	--
AUG										
10...	--	--	--	--	--	--	--	--	--	--
14...	--	--	--	--	--	--	--	--	--	--
22...	<0.5	<1.0	<1	<3	4	1100	3	<4	80	<0.1
22...	--	--	--	--	--	--	--	--	--	--
SEP										
24...	--	--	--	--	--	--	--	--	--	--

* An alternate analytical method resulted in a change of the minimum reporting level for these constituents.

< Actual value is known to be less than the value shown.

YORK RIVER BASIN

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01674500 MATTAPONI RIVER NEAR BEULAHVILLE, VA--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	NICKEL, DIS- SOLVED (UG/L AS NI) (01065)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	SILVER, DIS- SOLVED (UG/L AS AG) (01075)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)	VANA- DIUM, DIS- SOLVED (UG/L AS V) (01085)	ZINC, DIS- SOLVED (UG/L AS ZN) (01090)	CARBON, ORGANIC TOTAL (MG/L AS C) (00680)	SEDI- MENT, SUS- PENDE (MG/L) (80154)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
OCT										
20...	--	--	--	--	--	--	--	7.8	--	--
21...	--	--	--	--	--	--	--	8.5	--	--
23...	--	--	--	--	--	--	--	9.7	--	--
23...	--	--	--	--	--	--	--	9.4	--	--
NOV										
29...	<10	1	<1	<1.0	21	<6	<3	5.6	7	76
29...	--	--	--	--	--	--	--	5.4	--	--
DEC										
18...	--	--	--	--	--	--	--	4.9	--	--
JAN										
02...	--	--	--	--	--	--	--	4.9	--	--
03...	--	--	--	--	--	--	--	6.6	--	--
04...	--	--	--	--	--	--	--	5.3	--	--
05...	--	--	--	--	--	--	--	7.9	--	--
07...	--	--	--	--	--	--	--	8.1	--	--
08...	--	--	--	--	--	--	--	7.6	--	--
09...	--	--	--	--	--	--	--	7.1	--	--
09...	--	--	--	--	--	--	--	7.6	--	--
26...	--	--	--	--	--	--	--	5.9	16	98
26...	--	--	--	--	--	--	--	4.9	--	--
27...	--	--	--	--	--	--	--	5.2	--	--
29...	--	--	--	--	--	--	--	5.3	--	--
FEB										
05...	--	--	--	--	--	--	--	4.9	--	--
13...	--	--	--	--	--	--	--	6.2	--	--
MAR										
07...	<10	<10*	<1	<1.0	20	<6	4	4.0	3	66
07...	--	--	--	--	--	--	--	4.3	--	--
21...	--	--	--	--	--	--	--	9.6	--	--
26...	--	--	--	--	--	--	--	7.5	--	--
APR										
02...	--	--	--	--	--	--	--	5.8	--	--
03...	--	--	--	--	--	--	--	6.4	--	--
04...	--	--	--	--	--	--	--	6.4	--	--
05...	--	--	--	--	--	--	--	6.8	--	--
09...	--	--	--	--	--	--	--	5.7	--	--
10...	--	--	--	--	--	--	--	5.4	--	--
16...	--	--	--	--	--	--	--	6.2	--	--
17...	--	--	--	--	--	--	--	6.3	--	--
18...	--	--	--	--	--	--	--	6.4	--	--
18...	--	--	--	--	--	--	--	6.7	--	--
23...	<10	1	<1	<1.0	22	<6	6	--	--	--
23...	--	--	--	--	--	--	--	6.1	--	--
MAY										
24...	--	--	--	--	--	--	--	6.6	--	--
27...	--	--	--	--	--	--	--	9.4	--	--
29...	--	--	--	--	--	--	--	11	--	--
30...	--	--	--	--	--	--	--	13	--	--
31...	--	--	--	--	--	--	--	13	--	--
JUN										
01...	--	--	--	--	--	--	--	9.0	--	--
03...	--	--	--	--	--	--	--	13	--	--
05...	--	--	--	--	--	--	--	10	--	--
22...	--	--	--	--	--	--	--	--	6	91
22...	--	--	--	--	--	--	--	7.3	--	--
JUL										
25...	--	--	--	--	--	--	--	2.6	--	--
AUG										
10...	--	--	--	--	--	--	--	7.2	--	--
14...	--	--	--	--	--	--	--	--	--	--
22...	<10	4	<1	<1.0	28	<6	7	6.5	3	100
22...	--	--	--	--	--	--	--	5.9	--	--
SEP										
24...	--	--	--	--	--	--	--	5.3	--	--

* An alternate analytical method resulted in a change of the minimum reporting level for these constituents.

< Actual value is known to be less than the value shown.

YORK RIVER BASIN

01677000 WARE CREEK NEAR TOANO, VA

LOCATION.--Lat 37°26'17", long 76°47'12", New Kent County, Hydrologic Unit 02080107, on left bank at upstream side of bridge on State Highway 600, 0.8 mi upstream from France Swamp, and 4.9 mi north of Toano.

DRAINAGE AREA.--6.29 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1979 to October 1981, March 1982 to current year.

REVISED RECORDS.--WDR VA-83-1: 1981.

GAGE.--Water-stage recorder. Elevation of gage is 10 ft above National Geodetic Vertical Datum of 1929, from topographic map. October 1979 to October 1981, water-stage recorder at same site and datum.

REMARKS.--Records good except for period of no gage-height record, Dec. 28 to Jan. 25, which is fair.

AVERAGE DISCHARGE.--10 years, 6.22 ft³/s, 13.43 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 260 ft³/s, Sept. 27, 1985, gage height, 2.60 ft, from floodmark, from rating curve extended above 120 ft³/s; no flow at times September 1980 and July to September 1981.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 43 ft³/s, May 27, gage height, 1.35 ft; minimum, 0.93 ft³/s, July 11, gage height, 0.63 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	5.2	7.0	4.5	e19	6.4	6.7	11	6.5	6.1	2.6	3.6	2.0
2	15	5.4	4.5	e15	6.3	6.4	8.3	4.7	5.1	2.8	2.5	1.8
3	10	12	4.4	e11	6.5	11	15	3.6	4.7	2.4	2.2	1.7
4	6.3	9.1	4.0	e9.8	9.4	17	8.8	3.5	4.5	1.9	2.0	1.7
5	4.7	5.8	4.2	e8.8	11	15	5.7	6.4	3.9	1.6	2.1	1.6
6	3.6	4.9	4.5	e9.5	8.4	6.7	4.7	6.8	3.7	1.5	3.6	1.4
7	3.3	5.1	4.4	e9.9	7.7	5.1	9.5	5.0	3.6	1.5	29	1.4
8	3.1	6.1	5.6	e11	7.4	4.5	8.4	4.1	3.4	1.4	15	1.8
9	3.0	11	7.9	e13	7.0	3.6	5.6	3.5	3.9	1.5	14	2.0
10	3.0	9.8	7.5	e10	14	3.4	4.8	12	3.6	1.4	27	2.0
11	3.3	6.2	6.4	e8.7	16	3.4	5.2	24	3.1	1.3	21	1.8
12	3.5	5.0	7.5	e7.4	9.0	3.8	4.8	12	2.7	2.0	9.3	1.5
13	3.5	4.6	13	e6.6	6.7	3.7	4.2	7.6	2.5	2.3	5.6	5.3
14	3.9	4.5	10	e6.2	6.2	3.3	3.8	6.2	2.5	4.3	4.0	25
15	3.9	6.1	7.4	e5.8	6.0	3.2	5.7	5.3	2.7	5.7	3.4	12
16	3.9	6.2	7.4	e5.4	7.9	3.7	6.6	5.0	3.2	3.8	3.3	5.5
17	4.2	5.2	6.1	e5.0	12	3.8	4.8	4.2	3.1	5.2	3.2	3.1
18	4.6	4.5	4.9	e4.8	8.8	10	4.3	3.3	3.1	4.2	2.8	2.1
19	11	4.0	4.5	e4.6	9.7	7.0	5.3	2.9	5.1	3.8	2.4	2.0
20	14	4.0	4.6	e4.8	10	5.5	3.7	2.7	6.4	4.5	2.2	2.0
21	10	4.0	4.5	e5.0	8.6	3.6	4.2	3.1	4.2	4.2	2.2	2.0
22	5.6	4.3	4.1	e4.7	6.3	2.9	5.4	9.2	3.7	4.5	2.5	2.7
23	4.1	20	3.5	e4.5	6.9	2.9	4.6	12	5.2	4.0	2.8	3.3
24	3.6	12	3.3	e6.0	9.7	2.8	4.1	7.3	4.0	5.1	6.0	3.2
25	3.4	7.4	3.2	e8.1	7.1	5.2	3.9	5.1	3.0	4.2	8.3	2.8
26	3.3	5.7	3.7	15	5.6	5.5	3.9	5.6	2.4	2.4	5.4	2.7
27	3.3	5.1	4.2	13	5.9	4.0	3.7	32	2.1	1.9	3.5	3.3
28	3.4	5.0	e4.7	8.4	6.8	3.1	3.8	14	1.9	9.1	2.7	3.6
29	3.6	4.7	e6.3	6.4	---	4.9	4.8	28	1.8	8.5	2.3	3.6
30	3.9	4.6	e8.0	8.3	---	15	8.9	20	1.9	17	2.4	3.7
31	6.1	---	e10	7.9	---	14	---	9.4	---	7.2	2.3	---
TOTAL	163.3	199.3	178.8	263.6	233.3	190.7	177.5	275.0	107.1	123.8	198.6	108.6
MEAN	5.27	6.64	5.77	8.50	8.33	6.15	5.92	8.87	3.57	3.99	6.41	3.62
MAX	15	20	13	19	16	17	15	32	6.4	17	29	25
MIN	3.0	4.0	3.2	4.5	5.6	2.8	3.7	2.7	1.8	1.3	2.0	1.4
CFSM	.84	1.06	.92	1.35	1.32	.98	.94	1.41	.57	.63	1.02	.58
IN.	.97	1.18	1.06	1.56	1.38	1.13	1.05	1.63	.63	.73	1.17	.64

CAL YR 1989 TOTAL 2312.1 MEAN 6.33 MAX 48 MIN 1.6 CFSM 1.01 IN. 13.67
WTR YR 1990 TOTAL 2219.6 MEAN 6.08 MAX 32 MIN 1.3 CFSM .97 IN. 13.13

e Estimated.

YORK RIVER BASIN

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01677000 WARE CREEK NEAR TOANO, VA--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1979-81, October 1985 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	ALKA- LITY LAB (MG/L AS CACO3) (90410)
DEC 28...	1200	4.2	180	6.9	5.0	772	10.1	78	31
JAN 25...	0845	8.1	160	7.3	10.0	767	10.4	92	25
MAR 08...	1215	4.6	170	7.5	9.5	784	10.3	88	--
MAY 17...	0850	4.0	118	7.3	23.0	762	8.4	98	39
JUL 25...	0930	4.0	118	7.8	29.0	--	--	--	50
SEP 06...	0915	1.3	180	7.6	25.5	765	7.3	89	41

DATE	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN, AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	CARBON, ORGANIC TOTAL (MG/L AS C) (00680)
DEC 28...	<0.010	0.250	0.060	0.50	0.020	0.020	250	50	3.5
JAN 25...	<0.010	0.120	0.010	1.0	0.030	0.010	350	20	4.0
MAR 08...	<0.010	0.110	<0.010	0.70	0.040	<0.010	550	20	4.7
MAY 17...	<0.010	<0.100	0.030	0.50	0.060	0.020	2000	40	7.6
JUL 25...	<0.010	<0.100	0.030	1.4	0.070	<0.010	500	90	9.9
SEP 06...	<0.010	<0.100	0.030	0.80	0.020	<0.010	100	<10	9.5

< Actual value is known to be less than the value shown.

SOUTH ATLANTIC SLOPE BASINS

JAMES RIVER BASIN

02011400 JACKSON RIVER NEAR BACOVA, VA

LOCATION.--Lat 38°02'32", long 79°52'54", Bath County, Hydrologic Unit 02080201, on left bank 0.1 mi downstream from ford, 1.8 mi upstream from Back Creek, and 2.2 mi southwest of Bacova.

DRAINAGE AREA.--158 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1974 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,639.20 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records good except for period with ice effect, Dec. 15-30, which is fair. U.S. Army Corps of Engineers satellite water temperature, precipitation and gage-height telemeter at station.

AVERAGE DISCHARGE.--16 years, 169 ft³/s, 14.53 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 30,000 ft³/s, Nov. 4, 1985, gage height, 22.25 ft, from floodmark, from rating curve extended above 1,300 ft³/s on basis of slope-area measurements at gage heights 8.88 ft, 11.40 ft, 13.88 ft, and 22.25 ft; minimum, 15 ft³/s, part of each day Aug. 17-19, Sept. 16, 17, 23, 1988; minimum gage height, 2.42 ft, Aug. 18, 19, 1988.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 21, 1972, reached a stage of 11.40 ft, discharge, 4,800 ft³/s, and flood of Dec. 26, 1973, reached a stage of 13.88 ft, discharge, 7,560 ft³/s, from rating curve extended as explained above.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 1,500 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Nov. 16	1215	2,210	8.43	Dec. 31	2015	*2,410	*8.70

Minimum discharge, 26 ft³/s, Sept. 28-30, gage height, 2.64 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	237	118	125	1470	326	152	172	107	362	59	38	33
2	608	107	119	678	287	151	166	102	289	69	37	32
3	491	102	115	458	344	162	164	100	300	53	35	31
4	346	97	109	392	939	151	156	134	288	49	35	31
5	269	92	109	433	841	141	148	268	234	46	37	30
6	221	88	106	409	580	133	183	190	197	45	50	29
7	186	86	101	338	469	124	274	162	173	43	53	30
8	161	92	101	310	374	118	241	142	154	41	40	31
9	145	124	97	279	317	118	253	128	143	43	37	31
10	127	116	92	267	750	117	285	188	200	43	36	30
11	120	104	90	246	680	113	314	207	139	40	37	30
12	110	99	91	231	518	110	284	173	117	67	34	29
13	102	93	91	200	407	105	249	174	107	59	33	32
14	96	90	84	175	346	101	223	188	100	64	33	36
15	90	90	e78	168	298	98	220	163	98	429	34	43
16	86	1410	e72	161	316	114	196	156	95	178	33	34
17	454	860	e68	155	287	214	178	145	86	112	39	32
18	465	509	e66	152	243	252	163	131	86	86	33	29
19	882	364	e62	146	232	212	145	117	87	72	33	29
20	640	300	e60	147	212	203	134	109	76	67	33	31
21	441	258	e58	167	190	185	135	112	76	67	31	30
22	326	219	e57	156	186	170	136	163	72	57	42	32
23	258	200	e55	147	200	158	123	156	74	55	81	36
24	217	173	e54	140	197	158	115	122	66	52	119	32
25	189	156	e54	175	174	174	108	109	62	48	77	29
26	169	160	e53	289	152	197	104	228	58	45	61	28
27	152	164	e52	263	154	186	100	767	55	43	48	27
28	139	152	e52	242	162	181	97	517	53	41	42	26
29	129	141	e51	252	---	176	115	945	50	41	38	26
30	120	130	e50	497	---	171	121	751	48	40	37	26
31	118	---	779	395	---	183	---	495	---	39	35	---
TOTAL	8094	6694	3151	9538	10181	4828	5302	7449	3945	2193	1351	925
MEAN	261	223	102	308	364	156	177	240	131	70.7	43.6	30.8
MAX	882	1410	779	1470	939	252	314	945	362	429	119	43
MIN	86	86	50	140	152	98	97	100	48	39	31	26
CFSM	1.65	1.41	.64	1.95	2.30	.99	1.12	1.52	.83	.45	.28	.20
IN.	1.91	1.58	.74	2.25	2.40	1.14	1.25	1.75	.93	.52	.32	.22

CAL YR 1989 TOTAL 81731 MEAN 224 MAX 2160 MIN 46 CFSM 1.42 IN. 19.24
WTR YR 1990 TOTAL 63651 MEAN 174 MAX 1470 MIN 26 CFSM 1.10 IN. 14.99

e Estimated.

JAMES RIVER BASIN

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02011400 JACKSON RIVER NEAR BACOVA, VA--Continued

WATER-QUALITY RECORDS

PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: March 1978 to September 1981, October 1982 to current year.

INSTRUMENTATION.--Water-temperature recorder March 1978 to September 1981, and since October 1982.

REMARKS.--Some record in prior years fragmentary due to instrument malfunction.

EXTREMES FOR PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: Maximum recorded (water years 1978-81, 1983-90), 31.0°C, July 16, 1988; minimum recorded (water years 1978-81, 1984-90), 0.0°C on many days during winter periods.

EXTREMES FOR CURRENT YEAR.--

WATER TEMPERATURE: Maximum, 27.5°C, July 6, 10, 11, Aug. 20; minimum, 0.0°C on many days during winter period.

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
OCTOBER			NOVEMBER			DECEMBER			JANUARY			
1	15.0	14.0	14.5	13.0	11.0	12.0	4.5	2.0	3.5	3.5	.5	3.0
2	16.0	14.0	15.0	11.0	8.5	9.5	4.5	1.5	3.0	4.0	2.5	3.5
3	16.5	14.5	15.5	9.0	8.0	8.5	3.5	.5	2.5	5.0	3.0	4.0
4	14.5	12.0	13.5	8.5	5.5	7.0	1.0	.0	.5	5.0	4.0	4.5
5	13.0	10.5	12.0	8.5	5.5	7.0	3.5	1.0	2.5	6.5	5.0	5.5
6	14.0	11.0	12.5	9.5	7.0	8.0	5.5	3.0	4.0	6.0	4.5	5.5
7	15.0	12.5	13.5	10.0	8.5	9.0	5.5	4.5	5.0	4.5	4.0	4.0
8	13.0	10.5	11.5	11.0	9.0	10.0	4.5	.5	2.0	4.0	4.0	4.0
9	12.0	9.0	10.5	12.0	10.0	11.0	2.0	.5	1.5	4.5	3.0	4.0
10	11.5	8.0	10.0	9.5	7.5	8.5	2.5	.0	1.0	5.0	4.0	4.5
11	13.5	9.5	11.5	8.5	5.0	7.0	1.0	.0	.5	5.0	3.0	4.0
12	14.5	10.0	12.5	10.0	6.5	8.5	1.5	1.0	1.5	4.0	2.0	3.5
13	15.5	11.5	13.5	10.5	7.0	9.0	2.5	.5	1.5	2.5	1.0	2.0
14	16.5	13.0	15.0	10.0	7.5	9.0	.5	.0	.0	2.5	.0	1.5
15	17.0	14.0	15.5	11.5	9.5	10.5	.0	.0	.0	4.5	2.0	3.5
16	16.5	13.5	15.0	11.5	8.0	10.0	.0	.0	.0	6.5	4.0	5.0
17	16.0	15.0	15.5	7.5	6.0	6.5	.0	.0	.0	7.0	5.5	6.0
18	15.0	13.5	15.0	6.0	5.0	5.5	.0	.0	.0	9.0	6.0	7.5
19	13.0	11.0	12.0	6.0	4.0	5.0	.0	.0	.0	7.5	6.0	7.0
20	11.0	8.5	10.0	9.0	5.5	7.0	.0	.0	.0	6.5	5.5	6.0
21	10.0	8.0	9.0	8.0	5.0	7.0	.0	.0	.0	7.5	6.5	6.5
22	11.0	8.5	9.5	5.0	3.0	4.5	.0	.0	.0	6.5	4.5	5.5
23	11.0	8.5	9.5	4.5	3.0	3.5	.0	.0	.0	6.0	3.5	5.0
24	12.0	8.5	10.0	4.5	2.0	3.0	.0	.0	.0	7.0	5.5	6.0
25	12.5	9.0	10.5	4.0	1.5	3.0	.0	.0	.0	7.5	7.0	7.5
26	13.0	9.0	11.0	6.5	3.5	5.0	.0	.0	.0	7.0	4.0	6.0
27	12.5	9.0	10.5	6.5	5.5	6.0	.0	.0	.0	5.0	3.0	4.0
28	12.0	8.5	10.5	8.5	6.0	7.0	.0	.0	.0	6.0	3.5	4.5
29	12.5	9.0	11.0	7.5	4.5	6.0	.0	.0	.0	6.0	5.5	5.5
30	12.5	10.0	11.5	5.0	2.5	3.5	.0	.0	.0	5.5	4.5	5.0
31	14.0	12.0	13.0	---	---	---	.5	.0	.0	6.5	4.0	5.0
MONTH	17.0	8.0	12.5	13.0	1.5	7.0	5.5	.0	1.0	9.0	.0	5.0

JAMES RIVER BASIN

02011400 JACKSON RIVER NEAR BACOVA, VA--Continued

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	FEBRUARY			MARCH			APRIL			MAY		
1	6.5	4.0	5.5	8.0	3.5	6.0	15.0	11.0	13.0	17.5	14.0	16.0
2	8.0	6.0	7.0	6.5	5.0	6.0	13.5	10.5	12.5	17.0	15.0	16.0
3	8.5	7.5	8.0	9.0	6.0	7.5	11.5	8.5	10.0	17.0	14.0	15.5
4	8.5	7.5	8.0	8.5	4.5	6.5	9.0	6.0	7.5	17.5	15.0	16.0
5	7.5	5.0	6.0	8.5	3.5	6.5	12.0	6.0	9.0	16.5	14.0	15.0
6	6.5	4.5	5.5	9.0	5.0	7.0	10.5	6.5	9.0	13.5	12.0	12.5
7	7.5	6.5	7.0	9.5	6.0	7.5	9.0	5.0	7.0	16.0	10.0	12.5
8	9.0	6.5	7.5	8.0	4.5	6.5	10.5	4.5	7.5	18.5	11.0	15.0
9	8.5	6.5	7.5	9.0	6.0	7.5	11.0	5.5	8.5	16.5	13.5	15.0
10	9.0	7.0	8.5	12.5	7.0	9.5	10.0	8.0	9.0	17.5	14.0	15.5
11	6.5	5.0	6.0	13.0	9.5	11.5	10.5	8.5	9.5	17.0	12.0	14.0
12	7.5	5.5	6.5	14.0	10.5	12.5	9.5	7.0	8.0	14.0	11.5	13.0
13	7.5	4.5	6.0	15.5	11.0	13.0	10.5	5.5	8.0	15.5	12.0	13.5
14	9.5	6.5	8.0	16.0	12.0	14.0	12.5	7.5	9.5	18.5	12.5	15.5
15	11.0	8.5	9.5	16.5	13.0	15.0	14.0	10.5	12.0	20.0	14.0	17.0
16	11.0	10.0	10.5	15.5	14.5	15.0	15.5	10.0	12.5	21.0	16.5	18.5
17	10.0	6.0	8.5	14.5	11.5	13.5	12.5	9.5	11.0	19.5	16.5	18.0
18	6.0	4.5	5.5	12.5	9.5	11.0	13.0	7.0	10.0	19.0	14.0	16.5
19	8.0	5.0	6.5	10.0	8.0	9.0	13.5	7.0	10.5	19.0	14.0	16.5
20	8.0	5.0	6.0	8.5	6.0	7.5	13.0	10.5	11.5	19.0	15.5	17.5
21	7.5	3.5	5.5	9.5	4.0	6.5	13.0	11.0	12.0	21.0	17.0	19.0
22	6.5	4.5	5.5	11.5	5.0	8.5	17.0	11.0	13.5	19.0	14.5	16.0
23	9.0	6.5	8.0	13.5	8.5	10.5	18.5	11.5	15.5	16.0	12.5	14.5
24	8.0	3.5	6.0	11.0	7.0	8.5	19.5	13.0	16.5	17.5	12.5	15.0
25	3.5	.5	2.0	7.5	6.0	6.5	19.0	14.0	17.0	16.0	13.5	14.5
26	2.5	.0	1.0	10.0	5.0	7.0	20.0	15.0	17.5	17.0	14.5	15.5
27	4.5	1.0	2.5	10.5	5.0	7.5	20.5	15.5	18.0	16.5	14.0	15.5
28	7.5	3.5	5.5	10.0	5.0	7.5	18.5	16.0	17.5	16.0	13.0	14.5
29	---	---	---	8.0	7.5	7.5	17.0	15.0	16.0	13.5	12.5	13.0
30	---	---	---	11.0	7.0	9.0	17.5	13.0	15.0	14.5	12.0	13.0
31	---	---	---	13.5	9.5	11.5	---	---	---	15.5	12.0	14.0
MONTH	11.0	.0	6.5	16.5	3.5	9.0	20.5	4.5	12.0	21.0	10.0	15.5
	JUNE			JULY			AUGUST			SEPTEMBER		
1	17.5	14.0	15.5	25.0	22.0	23.0	25.0	21.0	23.0	24.5	20.0	22.5
2	18.5	15.5	17.0	24.5	19.5	22.0	25.0	20.0	22.5	24.0	21.0	23.0
3	18.0	16.5	17.0	25.0	19.5	22.5	26.0	20.5	23.0	25.0	21.5	23.0
4	16.5	14.5	15.5	26.0	20.0	23.0	26.5	22.0	24.0	23.5	20.5	22.0
5	18.0	13.5	15.5	26.0	22.0	24.0	25.0	23.0	24.0	24.0	20.0	22.0
6	20.5	14.5	17.0	27.5	23.0	25.0	24.5	22.5	23.0	25.0	21.0	23.0
7	21.0	16.5	18.5	24.0	21.5	23.0	24.5	20.0	22.5	24.5	22.0	23.0
8	22.0	17.0	19.5	25.0	21.0	22.5	23.0	20.0	21.5	22.5	20.5	21.5
9	22.5	18.0	20.5	26.5	22.5	24.5	23.0	20.5	21.5	21.0	19.5	20.5
10	22.0	18.0	20.0	27.5	23.0	25.5	25.0	20.0	22.5	24.0	19.5	21.5
11	22.0	17.0	19.5	27.5	23.5	25.5	24.5	21.0	23.0	23.5	19.5	21.5
12	20.5	16.0	18.5	24.5	23.5	24.0	25.0	20.5	22.5	24.0	20.5	22.0
13	21.5	16.0	19.0	23.0	21.0	22.0	26.0	21.5	23.5	22.0	21.0	21.5
14	23.5	18.0	21.0	21.5	20.0	21.0	25.0	22.0	23.5	23.5	20.5	22.0
15	22.0	20.0	20.5	20.5	18.0	19.5	26.0	21.5	23.5	22.5	20.0	21.0
16	23.0	19.0	21.0	22.5	17.5	20.0	25.5	22.0	23.5	21.0	18.0	19.0
17	25.5	20.0	22.5	23.0	18.5	20.5	26.0	22.0	23.5	19.0	15.5	17.0
18	24.5	21.5	23.0	24.5	20.0	22.0	24.5	21.5	23.0	16.5	13.5	15.0
19	23.5	20.5	22.0	24.5	21.0	23.0	26.5	22.0	24.0	16.0	15.0	15.5
20	22.5	19.0	21.0	25.0	21.5	23.0	27.5	23.0	25.0	18.0	15.5	16.5
21	24.5	20.0	22.0	25.5	22.0	23.5	25.0	23.5	24.0	18.0	15.5	17.0
22	22.0	20.0	21.0	25.5	22.0	24.0	23.0	21.0	22.0	20.5	16.5	18.0
23	23.0	19.5	21.0	24.0	22.5	23.5	22.0	20.5	21.0	17.0	14.0	15.5
24	21.5	19.0	20.5	24.5	20.5	22.5	22.0	19.5	20.5	16.0	12.5	14.0
25	22.5	17.5	20.0	25.0	20.5	22.5	24.5	20.0	22.0	16.5	12.0	14.0
26	24.0	18.5	21.0	25.5	21.0	23.5	25.5	21.5	23.5	16.0	13.0	14.5
27	24.0	20.0	22.0	25.5	20.5	23.0	26.0	22.0	24.0	18.0	14.0	16.0
28	25.0	20.0	22.5	26.5	21.5	23.5	26.5	22.5	24.5	19.0	15.0	17.0
29	25.5	21.0	23.0	27.0	21.5	24.0	24.5	22.0	23.5	19.0	16.0	17.5
30	25.5	22.5	24.0	26.0	22.0	24.0	23.5	20.5	22.0	17.5	15.5	16.5
31	---	---	---	26.5	22.5	24.5	23.5	19.5	21.5	---	---	---
MONTH	25.5	13.5	20.0	27.5	17.5	23.0	27.5	19.5	23.0	25.0	12.0	19.0
YEAR	27.5	.0	13.0									

02011460 BACK CREEK NEAR SUNRISE, VA

LOCATION.--Lat 38°14'43", long 79°46'08", Bath County, Hydrologic Unit 02080201, on right bank 900 ft upstream from bridge on State Highway 600, 0.8 mi upstream from Gap Run, and 4.8 mi northeast of Sunrise.

DRAINAGE AREA.--60.1 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--June 1974 to current year.

GAGE.--Water-stage recorder and crest-stage gage. Datum of gage is 2,200.02 ft above National Geodetic Vertical Datum of 1929 (levels by Virginia Department of Transportation). July 2 to Sept. 6, 1990, nonrecording gage at present site and datum.

REMARKS.--Records fair except those for period with ice effect, Dec. 14-30, and periods of doubtful or no gage-height record, July 4, 20, Aug. 25, 26, and Sept. 8-30, which are poor. Virginia Power gage-height transmitter at station, receiver at Back Creek Dam.

COOPERATION.--Gage readings for July 2 to Sept. 6, 1990, were provided by Virginia Power.

AVERAGE DISCHARGE.--16 years, 91.2 ft³/s, 20.61 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 17,500 ft³/s, Nov. 4, 1985, gage height, 10.01 ft, from rating curve extended above 3,800 ft³/s; minimum, 1.5 ft³/s, Sept. 13, 14, 1980; minimum gage height, 0.07 ft, July 21, 1977.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 850 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Nov. 16	1115	1,220	4.20	May 27	0030	1,800	4.78
Dec. 31	1550	*2,100	*5.03				

Minimum daily discharge, 5.0 ft³/s, Sept. 29, 30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	93	38	60	885	207	75	97	67	181	56	6.5	8.8
2	423	34	54	358	162	85	99	66	135	36	5.4	7.7
3	313	32	52	231	155	92	98	63	177	24	5.2	7.1
4	181	29	47	198	464	94	92	60	198	e20	5.2	6.5
5	122	27	47	254	472	87	85	76	152	17	7.1	5.7
6	91	26	44	257	292	77	82	74	116	15	12	5.7
7	73	25	41	204	215	67	86	63	93	14	14	5.7
8	59	27	37	171	162	62	91	55	77	13	12	e6.8
9	51	34	35	134	134	61	177	51	67	12	8.4	e7.0
10	44	33	34	122	401	57	252	111	63	12	6.8	e6.6
11	40	31	35	107	404	53	264	206	52	12	6.5	e6.3
12	35	31	34	105	266	50	223	150	45	19	5.9	e6.0
13	31	30	32	89	192	46	174	134	40	25	5.7	e7.0
14	28	29	e29	76	157	43	140	146	36	26	6.5	e8.8
15	26	30	e26	75	129	41	122	136	34	144	7.1	e12
16	25	702	e24	72	124	41	101	111	33	94	6.8	e8.0
17	131	422	e22	82	112	69	89	94	29	53	7.4	e6.8
18	245	232	e21	117	104	138	78	76	27	35	6.5	e6.0
19	374	156	e20	125	103	126	68	63	26	25	6.5	e6.0
20	314	124	e20	112	92	109	63	56	24	e20	5.9	e6.6
21	202	100	e19	114	79	92	62	54	23	18	5.9	e6.4
22	138	80	e19	107	75	89	64	56	21	17	11	e7.0
23	101	72	e18	97	77	90	57	62	22	15	20	e9.0
24	83	60	e18	89	76	90	53	59	20	13	48	e7.0
25	71	51	e17	99	62	88	52	55	19	11	e42	e6.6
26	62	55	e17	220	68	87	50	660	17	9.9	e34	e5.8
27	55	61	e16	214	58	104	49	971	17	8.8	27	e5.4
28	49	66	e16	172	68	108	46	396	16	7.1	19	e5.2
29	45	69	e15	190	---	105	54	455	15	6.8	14	e5.0
30	41	63	e15	465	---	98	64	407	15	7.1	12	e5.0
31	40	---	758	299	---	102	---	262	---	7.1	9.9	---
TOTAL	3586	2769	1642	5840	4910	2526	3032	5295	1790	792.8	390.2	203.5
MEAN	116	92.3	53.0	188	175	81.5	101	171	59.7	25.6	12.6	6.78
MAX	423	702	758	885	472	138	264	971	198	144	48	12
MIN	25	25	15	72	58	41	46	51	15	6.8	5.2	5.0
CFSM	1.92	1.54	.88	3.13	2.92	1.36	1.68	2.84	.99	.43	.21	.11
IN.	2.22	1.71	1.02	3.61	3.04	1.56	1.88	3.28	1.11	.49	.24	.13

CAL YR 1989 TOTAL 40277 MEAN 110 MAX 1670 MIN 10 CFSM 1.84 IN. 24.93
WTR YR 1990 TOTAL 32776.5 MEAN 89.8 MAX 971 MIN 5.0 CFSM 1.49 IN. 20.29

e Estimated.

JAMES RIVER BASIN

02011460 BACK CREEK NEAR SUNRISE, VA--Continued

WATER-QUALITY RECORDS

PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: October 1984 to current year.

INSTRUMENTATION.--Water-temperature recorder Oct. 1, 1984, to July 1, 1990, Sept. 7-30, 1990. Twice-daily measurements July 2 to Sept. 6, 1990.

REMARKS.--Record for July 2 to Sept. 6 was obtained from graph based on observer's two daily measurements made in morning and afternoon. Interruption in the record, Apr. 29 to May 8, was due to instrument malfunction. Observer failed to make measurements on July 4, 17, 18, 20, Aug. 1, 2, 6, 8, 13, 16, 23, 25, 26.

EXTREMES FOR PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: Maximum (water years 1985-89), 27.0°C, July 22, 1987, July 15-17, 1988; minimum (water years 1985-90), 0.0°C on many days during winter periods.

EXTREMES FOR CURRENT YEAR.--

WATER TEMPERATURE: Maximum daily, 25.0°C on several days during July; minimum, 0.0°C on many days during winter period.

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
OCTOBER				NOVEMBER			DECEMBER			JANUARY		
1	13.0	12.5	13.0	12.0	8.0	10.0	4.0	1.0	2.5	3.5	3.0	3.5
2	14.5	12.5	13.5	8.5	7.0	7.5	3.5	1.0	2.5	4.0	2.0	3.0
3	15.0	12.5	13.5	7.5	5.5	6.5	2.5	.0	1.0	4.5	2.5	3.5
4	13.5	10.5	11.5	8.0	4.5	6.0	.5	.0	.5	4.5	3.0	3.5
5	13.0	9.0	11.0	8.5	4.5	6.5	4.0	.5	2.0	5.5	4.0	4.5
6	13.0	10.0	11.5	9.0	6.5	8.0	5.0	2.0	3.5	5.0	3.5	4.5
7	13.5	11.0	12.0	10.0	7.0	8.5	4.5	2.5	3.5	3.5	2.5	3.0
8	11.0	9.0	10.0	10.0	8.0	9.0	3.0	.0	.5	3.0	2.5	3.0
9	11.5	8.0	9.5	11.5	6.5	9.5	1.5	.0	.5	4.0	2.0	3.0
10	11.0	7.0	9.0	8.0	5.5	6.5	1.5	.0	.5	3.5	2.5	3.0
11	13.0	9.0	10.5	8.0	5.0	6.5	1.5	.0	.5	4.0	1.5	3.0
12	13.5	8.5	11.5	10.0	6.5	8.0	1.5	.5	1.0	2.5	.5	2.0
13	15.0	10.5	12.5	10.0	6.0	7.5	2.0	.0	1.0	2.0	.0	.5
14	16.0	11.5	13.5	9.5	6.5	8.0	.0	.0	.0	2.0	.0	1.0
15	16.0	11.5	13.5	10.5	9.0	9.5	.0	.0	.0	4.0	1.0	2.5
16	15.0	11.5	13.5	10.5	6.5	8.5	.0	.0	.0	5.0	2.5	3.5
17	14.5	12.5	13.5	6.5	5.0	5.5	.0	.0	.0	5.0	3.0	4.0
18	13.5	10.5	12.5	6.0	4.0	5.0	.0	.0	.0	7.0	4.0	5.5
19	10.5	10.0	10.0	6.0	3.0	4.5	.0	.0	.0	5.5	3.5	4.5
20	10.0	7.5	8.5	8.5	5.5	7.0	.0	.0	.0	5.0	4.0	4.5
21	10.0	7.0	8.5	7.0	4.0	5.0	.0	.0	.0	6.0	4.0	5.0
22	11.0	7.5	9.0	4.0	2.5	3.5	.0	.0	.0	5.0	2.5	3.5
23	10.5	6.5	8.5	4.0	2.0	3.0	.0	.0	.0	4.5	2.5	3.5
24	11.5	7.5	9.5	4.0	1.5	2.5	.0	.0	.0	5.5	4.0	5.0
25	12.0	7.5	9.5	4.0	1.0	2.5	.0	.0	.0	6.0	5.0	5.5
26	12.0	8.0	9.5	6.0	3.5	4.5	.0	.0	.0	5.5	2.5	4.0
27	11.5	7.5	9.5	5.0	4.0	4.5	.0	.0	.0	4.5	1.5	3.0
28	11.5	7.5	9.5	8.0	5.0	6.0	.0	.0	.0	5.5	2.5	4.0
29	11.5	8.0	9.5	5.5	2.5	4.5	.0	.0	.0	4.5	4.0	4.5
30	12.0	8.0	10.5	3.5	1.0	2.5	.0	.0	.0	5.0	3.5	4.0
31	13.0	10.5	11.5	---	---	---	3.5	.0	.5	6.0	3.0	4.5
MONTH	16.0	6.5	11.0	12.0	1.0	6.0	5.0	.0	.5	7.0	.0	3.5

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	FEBRUARY			MARCH			APRIL			MAY		
1	6.5	2.5	4.5	6.0	1.5	3.5	12.5	8.5	10.5	---	---	---
2	7.5	4.5	6.0	5.0	3.0	4.0	11.0	8.0	9.5	---	---	---
3	7.0	6.0	6.5	7.5	4.0	5.5	8.5	5.0	7.0	---	---	---
4	7.5	5.5	7.0	6.5	2.0	4.0	7.5	4.0	5.5	---	---	---
5	6.5	4.0	5.0	7.0	2.0	4.0	11.0	5.0	7.5	---	---	---
6	6.5	3.0	5.0	7.0	3.0	5.0	8.0	3.5	6.0	---	---	---
7	6.0	5.0	5.5	7.5	3.5	5.5	7.0	3.5	4.5	---	---	---
8	8.0	5.0	6.0	6.5	2.5	4.5	9.0	2.0	5.5	---	---	---
9	7.5	4.5	6.0	8.0	4.5	6.0	9.0	3.5	6.0	15.0	11.0	12.5
10	7.0	5.0	6.5	12.0	6.0	8.5	8.5	5.0	6.5	16.0	11.5	13.0
11	6.0	4.0	5.0	12.0	7.0	9.0	8.0	5.5	7.0	14.0	8.5	11.0
12	6.5	4.0	5.0	12.0	7.5	10.0	7.5	4.5	5.5	11.5	9.0	10.0
13	7.0	3.5	5.0	13.5	8.5	11.0	9.5	3.0	6.0	12.5	10.0	11.0
14	8.5	5.0	6.5	14.5	9.0	11.5	11.0	5.0	7.5	15.5	10.0	12.5
15	9.5	6.5	8.0	14.5	10.0	12.0	12.5	7.5	9.5	16.5	11.0	13.5
16	9.0	8.0	8.5	12.5	12.0	12.5	13.5	7.0	10.0	17.0	12.5	14.5
17	8.0	4.5	6.0	12.0	9.5	11.5	10.0	7.0	8.5	17.5	13.5	15.0
18	5.0	2.5	4.0	11.0	7.0	8.5	12.0	4.5	8.0	16.0	11.0	13.5
19	7.5	4.0	5.5	8.5	5.5	7.0	12.5	5.0	8.5	17.0	11.0	14.0
20	6.5	2.5	4.5	6.5	4.0	5.0	10.5	8.5	9.5	16.5	13.0	14.5
21	6.0	1.5	4.0	8.5	2.5	5.0	11.0	8.5	9.5	18.5	14.0	15.5
22	6.0	3.5	4.5	10.0	3.5	6.5	15.5	8.0	11.0	15.5	12.0	13.5
23	8.5	6.0	7.0	11.5	6.5	8.5	15.5	8.5	11.5	15.0	10.5	12.5
24	6.0	1.5	4.0	8.0	4.5	5.5	16.0	9.0	12.0	15.0	10.5	12.5
25	1.5	.0	.5	6.5	4.5	5.0	14.0	9.0	11.5	13.5	10.5	12.5
26	2.0	.0	.5	8.5	3.5	5.5	13.5	9.0	11.5	12.5	11.0	12.0
27	4.5	.0	2.0	9.0	3.0	5.5	11.5	9.0	10.0	13.5	10.5	12.0
28	6.0	2.0	3.5	7.5	3.0	5.5	9.5	6.0	7.5	11.5	10.5	11.0
29	---	---	---	6.5	5.5	6.0	---	---	---	11.5	10.5	11.0
30	---	---	---	10.5	5.0	7.5	---	---	---	14.0	10.0	11.5
31	---	---	---	12.0	7.5	9.5	---	---	---	15.0	9.0	12.0
MONTH	9.5	.0	5.0	14.5	1.5	7.0	16.0	2.0	8.5	18.5	8.5	12.5
	JUNE			JULY			AUGUST			SEPTEMBER		
1	15.0	10.0	12.5	22.0	18.5	20.0	---	---	---	22.0	17.5	19.5
2	17.0	11.5	14.0	22.5	16.5	19.0	---	---	---	22.5	18.5	20.0
3	15.5	13.5	14.5	23.0	17.0	20.0	24.0	21.0	22.5	23.5	19.5	21.0
4	13.0	11.5	12.5	---	---	---	23.0	21.0	22.0	22.0	18.0	20.0
5	16.5	10.5	13.0	24.0	20.0	22.0	22.5	21.0	21.5	22.0	18.0	20.0
6	18.5	11.0	14.5	25.0	20.0	22.0	---	---	---	24.0	18.0	21.0
7	17.0	13.5	15.0	22.5	18.5	21.0	23.0	19.0	21.0	22.5	19.5	21.0
8	19.0	13.5	16.0	25.0	19.0	22.0	---	---	---	20.0	18.5	19.0
9	19.0	15.0	17.0	25.0	19.0	22.0	23.0	19.0	21.0	19.0	18.0	18.5
10	19.0	15.0	17.0	25.0	21.0	22.5	23.0	19.0	21.0	23.0	18.0	20.0
11	19.5	14.0	16.5	24.0	20.0	21.5	22.0	19.0	20.5	22.5	17.5	20.0
12	19.0	13.0	16.0	24.0	20.0	22.0	23.0	18.5	21.0	21.5	18.0	20.0
13	20.5	14.0	17.0	21.0	21.0	21.0	---	---	---	20.5	18.5	19.5
14	22.5	15.0	18.5	21.0	19.0	20.0	23.0	22.0	22.0	21.0	19.0	20.0
15	19.0	17.0	18.0	20.0	19.0	19.5	23.0	19.0	21.0	21.0	17.5	19.0
16	22.0	16.5	19.0	21.0	17.0	19.5	---	---	---	19.5	16.0	17.5
17	24.5	17.5	20.5	---	---	---	23.0	19.0	21.0	18.0	14.0	15.5
18	23.0	18.0	20.0	---	---	---	22.5	19.0	21.0	16.0	11.5	14.0
19	22.5	17.5	19.5	25.0	19.0	22.0	24.0	20.0	22.0	15.5	13.5	14.5
20	20.5	15.5	18.0	---	---	---	24.0	20.5	22.0	19.0	15.0	16.5
21	23.0	17.5	19.5	24.0	20.5	22.0	23.0	21.0	22.0	16.0	14.0	15.0
22	20.0	16.5	18.5	23.5	21.0	22.0	20.0	20.0	21.0	18.5	15.0	16.5
23	21.5	17.0	19.0	22.0	20.5	21.0	---	---	---	15.0	12.5	14.0
24	21.0	16.5	18.0	22.0	18.0	20.0	22.0	19.0	20.5	16.5	11.5	13.5
25	21.0	14.0	17.5	22.5	18.0	20.0	---	---	---	16.5	10.0	12.5
26	22.5	15.0	18.0	23.0	20.0	21.5	---	---	---	15.5	11.5	13.5
27	22.0	16.0	18.5	25.0	19.0	22.0	23.0	21.0	22.0	18.0	12.0	14.5
28	24.0	16.0	19.5	24.5	19.5	21.5	24.0	20.0	22.0	17.5	12.5	15.0
29	24.0	17.5	20.5	24.0	20.0	22.0	24.0	20.0	22.0	17.5	13.5	15.5
30	22.5	19.0	20.5	24.0	21.0	22.5	23.0	19.0	21.0	16.5	13.5	15.0
31	---	---	---	25.0	20.0	22.5	22.0	18.0	20.0	---	---	---
MONTH	24.5	10.0	17.5	25.0	16.5	21.0	24.0	18.0	21.5	24.0	10.0	17.5
YEAR	25.0	.0	10.5									

JAMES RIVER BASIN

02011470 BACK CREEK AT SUNRISE, VA

LOCATION.--Lat 38°11'25", long 79°48'43", Bath County, Hydrologic Unit 02080201, on left bank 75 ft upstream from bridge on State Highway 600 at Sunrise, 180 ft upstream from Beaver Run, 0.5 mi downstream from Back Creek Dam, and 7.6 mi northeast of Mountain Grove.

DRAINAGE AREA.--76.1 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1984 to current year.

GAGE.--Water-stage recorder. Concrete control since Oct. 24, 1984. Datum of gage is 1,968.52 ft above National Geodetic Vertical Datum of 1929 (Virginia Power bench mark).

REMARKS.--Records good except for period of no gage-height record, Sept. 13-28, which is fair. Flow regulated since October 1984 by Back Creek Lake 0.5 mi upstream, amount unknown. Virginia Power gage-height transmitter at station, receiver at Back Creek Dam. U.S. Army Corps of Engineers satellite precipitation and gage-height telemeter at station.

AVERAGE DISCHARGE.--6 years, 102 ft³/s, 18.20 in/yr, unadjusted.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 5,100 ft³/s, Nov. 5, 1985, gage height, 11.37 ft, from rating curve extended above 960 ft³/s on basis of release from Back Creek Lake at peak flow; minimum daily, 5.2 ft³/s, Nov. 3, 1984.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 2,740 ft³/s, Dec. 31, gage height, 8.33 ft, from rating curve extended as explained above; minimum, 12 ft³/s, June 25-27; minimum daily, 12 ft³/s, June 26; minimum gage height, 3.94 ft, June 25-27, Sept. 2.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	138	40	81	1390	209	66	124	93	224	43	15	16
2	740	41	82	540	200	90	125	81	177	45	15	16
3	329	42	69	264	182	116	135	79	183	22	15	16
4	199	42	36	185	824	118	101	80	238	16	15	16
5	122	38	37	237	781	111	95	106	166	15	16	16
6	112	24	38	298	314	95	94	110	114	15	16	18
7	114	20	35	320	244	81	125	102	80	15	15	17
8	105	18	34	308	200	54	95	100	72	15	15	17
9	45	21	50	173	216	49	193	84	73	15	15	16
10	36	35	59	140	701	48	392	123	87	15	15	15
11	23	34	63	137	583	68	281	239	86	15	15	15
12	23	33	32	109	351	73	313	183	54	20	14	15
13	22	33	24	113	260	54	193	171	39	24	15	e18
14	28	33	25	109	179	50	156	198	37	35	15	e17
15	32	32	49	94	150	38	170	210	30	203	17	e16
16	24	1280	54	85	172	40	121	136	39	128	17	e16
17	139	419	26	82	130	88	107	110	28	80	16	e17
18	340	269	26	98	131	156	86	112	29	59	16	e16
19	683	272	28	144	119	175	76	104	29	44	16	e17
20	347	153	27	147	94	60	54	77	27	30	16	e17
21	215	128	27	139	78	129	65	75	20	20	16	e16
22	178	100	27	126	82	139	81	118	19	18	17	e17
23	136	93	21	100	89	122	72	85	19	15	21	e16
24	112	75	18	88	98	108	56	108	18	15	18	e16
25	76	55	17	106	97	113	54	72	16	15	17	e16
26	79	57	17	240	75	107	44	663	12	15	40	e16
27	56	62	17	289	61	113	37	1510	14	15	26	e16
28	46	66	18	182	50	125	50	579	15	15	19	e16
29	49	77	19	241	---	139	71	705	15	15	16	15
30	46	77	19	821	---	136	89	625	15	15	16	15
31	41	---	1050	433	---	123	---	247	---	15	16	---
TOTAL	4635	3669	2125	7738	6670	2984	3655	7285	1975	1027	531	486
MEAN	150	122	68.5	250	238	96.3	122	235	65.8	33.1	17.1	16.2
MAX	740	1280	1050	1390	824	175	392	1510	238	203	40	18
MIN	22	18	17	82	50	38	37	72	12	15	14	15

CAL YR 1989 TOTAL 60048 MEAN 165 MAX 2490 MIN 12
WTR YR 1990 TOTAL 42780 MEAN 117 MAX 1510 MIN 12

e Estimated.

JAMES RIVER BASIN

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02011470 BACK CREEK AT SUNRISE, VA--Continued

WATER-QUALITY RECORDS

PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: October 1984 to current year.

INSTRUMENTATION.--Water-temperature recorder since October 1984.

REMARKS.--Interruptions in the record were due to malfunctions of the instrument.

EXTREMES FOR PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: Maximum recorded, 27.5°C, Aug. 10, 1985; minimum, 0.0°C, Jan. 20, 21, 1985.

EXTREMES FOR CURRENT YEAR.--

WATER TEMPERATURE: Maximum recorded, 25.5°C, Aug. 20, but may have been higher during instrument malfunction Aug. 23 to Sept. 6; minimum, 0.5°C, Dec. 24, 26, 27.

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	19.0	18.5	19.0	16.0	14.5	15.0	9.0	8.5	8.5	4.5	2.0	3.0
2	19.0	18.0	19.0	15.0	14.0	14.5	9.0	8.0	8.5	2.0	2.0	2.0
3	19.0	18.0	19.0	15.0	14.0	14.5	8.0	7.0	7.5	2.5	2.0	2.0
4	18.5	18.0	18.5	15.0	13.5	14.5	8.0	6.5	7.0	2.0	2.0	2.0
5	18.5	17.0	18.0	15.0	13.5	14.0	7.5	7.0	7.5	2.5	2.0	2.5
6	18.0	17.0	18.0	13.5	12.0	13.0	8.0	7.0	7.5	2.5	2.5	2.5
7	18.0	17.5	18.0	13.5	12.0	13.0	7.5	6.5	7.0	2.5	2.5	2.5
8	18.0	17.5	17.5	13.0	12.0	12.5	7.0	6.0	6.5	2.5	2.0	2.5
9	18.0	16.5	17.0	14.0	12.0	13.0	6.5	6.0	6.5	2.5	2.5	2.5
10	17.5	15.0	16.5	14.5	12.5	13.5	6.5	6.0	6.0	2.5	2.5	2.5
11	18.0	12.5	15.5	14.5	12.5	13.5	6.0	5.5	5.5	3.0	2.5	2.5
12	18.5	15.0	16.5	14.0	12.5	13.5	5.5	5.0	5.5	2.5	2.5	2.5
13	19.0	16.0	17.0	14.5	12.0	13.5	6.0	4.5	5.0	2.5	2.0	2.5
14	18.5	16.0	17.0	14.0	12.5	13.5	5.0	4.0	4.5	2.5	2.0	2.5
15	18.5	16.5	17.5	14.0	12.5	13.5	5.0	4.0	4.5	2.5	2.5	2.5
16	19.0	16.5	17.5	14.0	13.0	13.5	4.5	3.5	4.0	3.0	2.5	2.5
17	17.5	15.5	16.5	14.0	12.0	13.0	4.0	3.0	3.5	3.0	2.5	3.0
18	17.5	16.0	17.0	13.0	12.0	12.5	4.0	3.0	3.5	3.5	3.0	3.0
19	17.5	17.0	17.5	12.5	12.0	12.5	3.5	3.0	3.0	3.0	3.0	3.0
20	17.5	14.0	15.5	12.0	11.0	12.0	3.5	2.0	2.5	3.0	3.0	3.0
21	16.0	14.5	15.5	11.5	11.5	11.5	2.5	1.5	2.0	3.5	3.0	3.0
22	15.5	13.0	14.0	11.5	11.0	11.5	2.0	1.0	1.5	3.5	3.0	3.0
23	16.0	14.0	15.0	11.0	10.0	11.0	2.0	1.0	1.5	3.5	3.0	3.5
24	16.0	15.0	15.5	10.0	8.5	9.5	2.5	.5	1.0	3.5	3.5	3.5
25	16.5	15.0	15.5	10.5	9.5	10.0	1.5	1.0	1.0	3.5	3.5	3.5
26	16.5	15.5	16.0	10.0	9.0	9.5	2.5	.5	1.5	3.5	3.5	3.5
27	16.5	15.0	15.5	10.0	9.5	9.5	1.5	.5	1.0	3.5	3.5	3.5
28	16.5	15.0	15.5	10.0	9.5	10.0	2.5	1.5	2.0	4.0	3.5	3.5
29	16.5	14.5	15.5	9.5	9.0	9.5	3.0	1.0	2.0	3.5	3.5	3.5
30	16.5	15.0	15.5	9.5	8.5	9.0	2.5	2.0	2.5	3.5	3.5	3.5
31	16.5	15.5	15.5	---	---	---	5.0	2.0	3.0	4.0	3.5	4.0
MONTH	19.0	12.5	16.5	16.0	8.5	12.5	9.0	.5	4.5	4.5	2.0	3.0

JAMES RIVER BASIN

02011470 BACK CREEK AT SUNRISE, VA--Continued

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY			MARCH			APRIL			MAY			
1	4.0	3.5	4.0	7.0	6.0	6.5	8.5	8.0	8.5	11.5	11.0	11.0
2	4.5	4.0	4.0	6.5	6.5	6.5	8.5	8.0	8.5	11.5	11.0	11.5
3	4.5	4.0	4.5	7.0	6.5	6.5	---	---	---	12.0	11.0	11.5
4	4.5	4.5	4.5	7.0	6.5	6.5	---	---	---	12.0	11.5	11.5
5	4.5	4.5	4.5	7.0	6.5	6.5	---	---	---	12.0	11.5	11.5
6	4.5	4.5	4.5	7.5	6.5	7.0	---	---	---	12.0	11.5	11.5
7	5.0	4.5	4.5	7.5	6.5	7.0	---	---	---	12.0	11.5	12.0
8	5.0	4.5	5.0	7.5	7.0	7.0	---	---	---	12.5	11.5	12.0
9	5.0	5.0	5.0	7.5	7.0	7.5	---	---	---	12.5	12.0	12.0
10	5.0	5.0	5.0	8.5	7.0	7.5	---	---	---	12.5	12.0	12.5
11	5.0	5.0	5.0	8.0	7.5	7.5	---	---	---	12.5	12.0	12.5
12	5.5	5.0	5.0	8.0	7.5	7.5	---	---	---	12.5	12.0	12.5
13	5.5	5.0	5.5	8.5	7.5	8.0	---	---	---	12.5	12.0	12.5
14	5.5	5.0	5.5	9.0	7.5	8.0	---	---	---	13.0	12.0	12.5
15	6.0	5.5	5.5	9.5	8.0	8.5	---	---	---	13.0	12.5	13.0
16	6.0	6.0	6.0	8.5	8.5	8.5	---	---	---	13.5	13.0	13.0
17	6.0	6.0	6.0	8.5	8.0	8.5	---	---	---	14.0	13.0	13.5
18	6.0	6.0	6.0	8.5	8.0	8.0	---	---	---	14.0	13.0	13.5
19	6.5	6.0	6.0	8.0	8.0	8.0	9.0	8.0	8.5	14.0	13.0	13.5
20	6.5	6.0	6.0	9.0	7.5	8.0	9.0	8.5	8.5	14.5	13.0	14.0
21	6.5	6.0	6.5	8.0	7.5	8.0	9.0	8.5	9.0	15.0	13.5	14.0
22	6.5	6.0	6.5	8.5	7.5	8.0	9.5	8.5	9.0	14.0	13.5	14.0
23	6.5	6.0	6.5	8.5	8.0	8.0	10.0	9.0	9.5	14.5	13.5	14.0
24	6.5	6.0	6.5	8.0	8.0	8.0	10.5	9.0	9.5	14.5	13.5	14.0
25	6.0	5.5	6.0	8.0	8.0	8.0	10.5	9.5	10.0	14.0	13.0	14.0
26	6.5	5.5	6.0	8.0	7.5	8.0	11.5	9.5	10.5	14.0	13.5	14.0
27	6.5	6.0	6.0	8.0	7.5	8.0	11.5	10.0	11.0	14.0	13.0	13.5
28	7.0	6.0	6.5	8.0	7.5	8.0	11.5	10.5	11.0	14.0	13.5	13.5
29	---	---	---	8.0	8.0	8.0	11.0	10.5	11.0	13.5	13.5	13.5
30	---	---	---	8.0	7.5	8.0	11.5	10.5	11.0	13.5	13.5	13.5
31	---	---	---	8.5	8.0	8.0	---	---	---	14.0	13.5	13.5
MONTH	7.0	3.5	5.5	9.5	6.0	7.5	11.5	8.0	9.5	15.0	11.0	13.0
JUNE			JULY			AUGUST			SEPTEMBER			
1	14.0	13.5	13.5	22.0	18.5	19.5	25.0	21.0	22.5	---	---	---
2	14.0	13.5	14.0	21.0	19.0	20.0	25.0	20.5	22.5	---	---	---
3	14.0	14.0	14.0	22.5	18.5	20.0	25.0	21.0	22.5	---	---	---
4	14.0	14.0	14.0	23.0	18.5	20.5	24.5	21.5	22.5	---	---	---
5	14.5	13.5	14.0	23.0	19.0	20.5	23.5	21.5	22.0	---	---	---
6	15.0	13.5	14.5	23.0	19.5	21.0	23.5	21.5	22.5	---	---	---
7	15.5	14.0	14.5	22.5	18.5	20.0	25.0	20.5	22.5	24.0	21.5	22.0
8	16.0	14.0	15.0	23.0	19.5	20.5	24.0	20.5	22.0	22.0	21.0	21.5
9	16.0	14.5	15.0	23.5	20.0	21.5	23.5	21.0	22.0	22.5	21.0	21.5
10	15.5	15.0	15.5	24.0	20.0	21.5	25.0	21.0	22.5	24.5	21.0	22.0
11	16.0	15.0	15.5	24.0	20.0	21.5	24.0	21.0	22.5	24.5	20.5	22.0
12	16.5	15.0	15.5	22.0	20.5	21.0	25.0	21.0	22.5	24.0	20.5	22.0
13	17.5	15.0	16.0	21.5	20.5	21.0	25.0	21.0	22.5	23.0	21.0	21.5
14	17.5	15.0	16.5	21.5	20.5	21.0	24.5	21.0	22.5	23.5	21.5	22.0
15	16.5	15.5	16.0	22.0	21.0	21.5	24.5	21.0	22.5	23.5	20.0	21.5
16	18.5	16.0	17.0	22.0	21.5	21.5	24.0	21.0	22.0	23.0	19.0	20.5
17	20.0	16.5	18.0	22.0	21.0	21.5	25.0	20.5	22.5	22.5	18.5	20.0
18	19.0	17.0	18.0	23.0	21.0	21.5	24.0	21.0	22.0	21.0	18.0	19.5
19	19.5	17.0	18.0	23.0	21.0	22.0	25.0	21.5	22.5	20.0	19.0	19.5
20	19.5	17.0	18.0	24.0	21.5	22.0	25.5	21.5	23.0	22.0	19.0	20.0
21	20.5	17.5	18.5	24.0	21.0	22.0	23.5	21.5	22.0	20.5	18.5	19.5
22	19.5	17.0	18.0	24.0	21.0	22.0	22.0	21.0	21.5	22.0	19.0	20.0
23	20.5	17.5	18.5	22.5	21.0	22.0	---	---	---	19.5	18.0	18.5
24	20.5	17.0	18.5	24.0	20.5	22.0	---	---	---	21.0	17.5	18.5
25	21.0	17.0	18.5	24.5	20.5	22.0	---	---	---	21.5	17.5	19.0
26	21.5	16.5	18.5	25.0	20.5	22.5	---	---	---	21.0	18.0	19.0
27	21.0	17.0	19.0	24.5	20.5	22.0	---	---	---	22.5	18.0	19.5
28	22.0	17.5	19.5	25.0	21.0	22.5	---	---	---	22.0	18.0	19.5
29	22.0	17.5	19.5	25.0	21.0	22.5	---	---	---	21.5	18.5	19.5
30	21.5	18.5	20.0	24.5	21.0	22.5	---	---	---	20.0	18.5	19.0
31	---	---	---	24.5	21.5	22.5	---	---	---	---	---	---
MONTH	22.0	13.5	16.5	25.0	18.5	21.5	25.5	20.5	22.5	24.5	17.5	20.5
YEAR	25.5	.5	12.5									

JAMES RIVER BASIN

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02011490 LITTLE BACK CREEK NEAR SUNRISE, VA

LOCATION.--Lat 38°12'52", long 79°50'16", Bath County, Hydrologic Unit 02080201, in George Washington National Forest, on right bank 600 ft downstream from Long Spring Run, 1.2 mi downstream from Little Back Creek Dam, and 8.5 mi northeast of Mountain Grove.

DRAINAGE AREA.--4.91 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1984 to current year.

GAGE.--Water-stage recorder. Concrete control with rectangular weir plate. Datum of gage is 2,638.48 ft above National Geodetic Vertical Datum of 1929 (Virginia Power bench mark).

REMARKS.--Records good except those for period with ice effect, Dec. 16-30, and period of doubtful gage-height record, Aug. 21 to Sept. 28, which are fair. Flow regulated since January 1985 by Little Back Creek Lake 1.2 mi upstream, amount unknown.

AVERAGE DISCHARGE.--6 years, 5.12 ft³/s, 14.16 in/yr, unadjusted.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 580 ft³/s, Nov. 4, 1985, gage height, 4.06 ft, from rating curve extended above 30 ft³/s on basis of slope-area measurement of peak flow; minimum, 0.89 ft³/s, Oct. 12, 13, 1984, gage height, 0.66 ft; minimum daily, 0.90 ft³/s, Oct. 13, 1984.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 78 ft³/s, Dec. 31, gage height, 2.85 ft, from rating curve extended as explained above; minimum daily, 2.7 ft³/s, Dec. 29, 30, Aug. 12, Sept. 29, 30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	7.0	4.0	4.9	39	9.5	4.8	6.9	7.9	8.0	3.2	2.9	e2.9
2	21	3.8	4.6	17	7.9	5.1	6.9	7.1	6.3	3.0	2.8	e2.8
3	16	3.8	4.4	11	8.2	5.4	6.5	6.2	6.0	2.9	2.8	e2.8
4	9.0	3.7	4.3	9.6	24	5.6	5.9	6.5	5.5	3.1	2.8	e2.8
5	6.9	3.5	4.2	11	23	5.6	5.4	13	5.1	3.1	3.1	e2.8
6	5.9	3.5	3.9	12	13	5.3	5.6	11	4.9	3.1	3.6	e2.8
7	5.2	3.5	3.8	10	9.4	5.1	5.7	8.9	4.7	2.9	3.2	e2.8
8	4.9	3.8	4.0	9.1	7.6	4.8	6.1	7.3	4.4	2.8	2.8	e2.8
9	4.5	4.1	3.8	7.8	6.6	5.2	8.5	6.4	4.4	2.8	2.8	e2.8
10	4.2	4.2	3.7	7.2	18	4.4	10	9.5	5.3	2.9	2.8	e2.8
11	3.9	4.3	3.7	6.8	19	4.2	11	13	5.0	2.9	2.8	e2.8
12	3.6	4.2	3.8	6.4	12	4.1	10	11	4.7	3.1	2.7	e3.0
13	3.8	4.2	3.9	5.8	8.7	4.4	8.4	9.7	4.4	3.1	2.8	e4.0
14	3.1	4.2	3.8	5.3	7.3	4.1	7.2	12	4.2	3.6	2.9	e3.5
15	3.4	4.2	3.6	5.1	6.5	4.0	6.6	10	4.1	7.4	2.8	e2.9
16	3.0	33	e3.5	5.0	6.5	4.1	6.2	8.4	3.9	5.3	3.0	e2.8
17	14	21	e3.4	5.3	6.3	6.2	5.7	7.1	3.6	4.0	3.1	e2.8
18	20	12	e3.3	6.4	6.3	9.6	5.4	6.0	3.8	3.5	2.9	e2.8
19	18	9.0	e3.3	6.9	6.4	8.8	5.1	5.3	3.7	3.3	3.0	e2.8
20	15	7.5	e3.2	7.2	5.9	7.5	4.9	4.9	3.5	3.3	2.9	e2.8
21	10	6.5	e3.2	7.5	5.3	6.7	5.1	4.9	3.4	3.2	e2.8	e2.8
22	7.7	5.7	e3.1	7.6	5.1	7.1	5.1	5.2	3.2	3.0	e3.0	e3.0
23	6.0	5.1	e3.1	7.1	5.1	7.2	5.1	4.9	3.2	3.0	e5.0	e2.9
24	5.4	4.8	e3.0	6.6	5.1	7.2	5.1	4.7	3.1	3.1	e4.0	e2.8
25	4.9	4.5	e2.9	7.4	4.8	6.7	5.1	4.6	3.0	3.0	e3.7	e2.8
26	4.5	4.7	e2.9	11	4.5	6.4	5.0	6.9	3.1	3.0	e3.5	e2.8
27	4.3	4.9	e2.8	11	4.5	7.6	4.8	21	3.1	2.9	e3.4	e2.8
28	4.0	5.3	e2.8	9.4	4.5	7.6	4.8	14	2.9	2.9	e3.3	e2.8
29	4.0	5.4	e2.7	9.4	---	7.2	5.7	20	2.9	2.8	e3.0	2.7
30	4.0	5.2	e2.7	17	---	6.9	7.4	19	3.0	2.8	e3.0	2.7
31	4.1	---	20	13	---	6.9	---	11	---	2.9	e3.0	---
TOTAL	231.3	193.6	126.3	300.9	251.0	185.8	191.2	287.4	126.4	101.9	96.2	86.4
MEAN	7.46	6.45	4.07	9.71	8.96	5.99	6.37	9.27	4.21	3.29	3.10	2.88
MAX	21	33	20	39	24	9.6	11	21	8.0	7.4	5.0	4.0
MIN	3.0	3.5	2.7	5.0	4.5	4.0	4.8	4.6	2.9	2.8	2.7	2.7

CAL YR 1989 TOTAL 2463.1 MEAN 6.75 MAX 91 MIN 2.7
WTR YR 1990 TOTAL 2178.4 MEAN 5.97 MAX 39 MIN 2.7

e Estimated.

JAMES RIVER BASIN

02011490 LITTLE BACK CREEK NEAR SUNRISE, VA--Continued

WATER-QUALITY RECORDS

PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: October 1984 to current year.

INSTRUMENTATION.--Water-temperature recorder since October 1984.

REMARKS.--Interruption in the record was due to malfunction of the instrument.

EXTREMES FOR PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: Maximum, 25.0°C, July 18, 1986, July 24, 1987, Aug. 17, 1988; minimum, 0.0°C on many days during winter periods.

EXTREMES FOR CURRENT YEAR.--

WATER TEMPERATURE: Maximum, 23.5°C, July 10; minimum, 1.0°C, Dec. 22, 31.

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
OCTOBER			NOVEMBER			DECEMBER			JANUARY			
1	14.0	13.5	13.5	---	---	---	4.5	3.5	4.0	4.5	4.0	4.0
2	14.0	13.0	13.5	---	---	---	4.5	3.5	4.0	4.0	3.5	3.5
3	14.5	13.5	14.0	---	---	---	4.0	2.0	3.0	4.5	3.5	4.0
4	13.5	12.5	13.0	---	---	---	3.0	2.0	2.5	4.5	4.0	4.0
5	13.0	11.5	12.5	---	---	---	3.5	2.5	3.0	5.0	4.0	4.5
6	13.0	12.5	12.5	---	---	---	4.0	2.5	3.5	4.5	4.0	4.5
7	13.0	12.5	13.0	---	---	---	4.0	3.0	3.5	4.5	4.0	4.0
8	13.0	12.0	12.5	---	---	---	3.5	2.0	2.5	4.5	3.5	4.0
9	12.0	11.0	11.5	---	---	---	2.5	1.5	2.0	4.0	3.0	3.5
10	11.5	11.0	11.0	---	---	---	2.5	1.5	2.0	4.0	3.5	4.0
11	12.0	11.0	11.5	---	---	---	3.0	2.0	2.5	4.0	3.0	3.5
12	12.5	11.5	12.0	---	---	---	3.0	2.5	2.5	3.5	2.5	3.0
13	14.5	12.0	13.0	---	---	---	3.0	2.0	2.5	2.5	2.0	2.5
14	15.0	14.0	14.5	---	---	---	3.0	2.0	2.5	2.5	1.5	2.0
15	15.0	14.0	14.5	10.5	10.0	10.0	3.0	2.5	2.5	3.5	2.5	3.0
16	15.0	11.5	14.5	10.5	8.5	9.5	2.5	2.0	2.0	4.0	3.0	3.5
17	11.0	10.0	10.5	8.5	7.0	7.5	2.5	1.5	2.0	4.0	3.5	4.0
18	11.0	10.5	11.0	7.0	6.0	7.0	2.5	2.0	2.5	5.5	4.5	5.0
19	11.0	10.5	11.0	6.5	5.5	6.0	3.0	2.5	2.5	4.5	4.0	4.5
20	11.5	10.5	11.0	7.5	6.5	7.0	2.5	2.0	2.5	5.0	4.5	4.5
21	12.0	10.5	11.5	7.0	5.5	6.0	2.0	1.5	2.0	5.0	4.5	5.0
22	12.0	11.0	11.5	5.5	5.0	5.0	1.5	1.0	1.5	4.5	4.0	4.0
23	12.5	11.0	12.0	5.0	4.5	4.5	2.0	1.5	1.5	5.0	4.0	4.5
24	11.5	10.5	11.0	4.5	4.0	4.0	2.0	1.5	1.5	5.5	4.5	5.0
25	10.5	10.0	10.5	4.5	3.5	4.0	2.5	1.5	2.0	5.5	5.0	5.5
26	---	---	---	5.5	4.5	5.0	2.5	1.5	2.0	5.0	4.0	4.5
27	---	---	---	5.5	5.0	5.5	2.0	1.5	2.0	4.5	3.5	4.0
28	---	---	---	6.0	5.5	6.0	2.5	2.0	2.0	5.5	4.0	4.5
29	---	---	---	5.5	4.5	5.0	3.0	2.0	2.5	5.0	4.5	5.0
30	---	---	---	4.5	4.0	4.0	3.0	2.5	3.0	5.0	4.0	4.5
31	---	---	---	---	---	---	4.5	1.0	2.5	5.5	4.0	5.0
MONTH	15.0	10.0	12.5	10.5	3.5	6.0	4.5	1.0	2.5	5.5	1.5	4.0

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	6.0	4.5	5.0	4.5	3.0	4.0	10.5	9.0	9.5	14.0	12.5	13.5
2	6.5	5.5	6.0	4.5	4.0	4.5	10.5	9.0	9.5	13.5	12.5	13.0
3	7.0	6.5	6.5	6.0	4.5	5.0	9.0	7.5	8.5	14.0	12.5	13.0
4	7.0	6.0	6.5	5.5	4.0	4.5	8.0	6.5	7.5	13.5	12.5	13.0
5	6.0	5.5	5.5	6.0	4.0	5.0	9.0	7.0	8.0	12.5	12.0	12.5
6	6.0	5.0	5.5	7.0	5.0	6.0	8.0	6.5	7.5	12.0	11.0	11.5
7	6.5	6.0	6.0	6.5	5.0	6.0	7.5	6.0	6.5	12.5	10.5	11.5
8	7.0	5.5	6.0	6.5	5.0	5.5	8.0	5.5	6.5	13.5	11.0	12.0
9	7.0	6.0	6.5	6.5	6.0	6.5	8.5	6.5	7.5	13.5	12.0	13.0
10	7.0	6.0	6.5	8.5	6.5	7.5	8.0	7.0	7.5	13.0	11.5	12.5
11	6.5	5.5	6.0	9.5	8.0	9.0	8.0	7.0	7.5	12.0	11.0	11.5
12	6.0	5.5	5.5	10.5	9.0	10.0	7.5	6.0	6.5	11.5	11.0	11.0
13	6.5	5.0	6.0	12.0	9.5	10.5	8.0	5.5	7.0	12.5	11.5	11.5
14	7.5	6.0	6.5	13.0	11.0	12.0	9.0	7.0	8.0	13.5	11.0	12.0
15	8.0	7.0	7.5	12.5	12.0	12.5	10.0	8.0	9.0	14.0	12.0	13.0
16	8.5	8.0	8.5	12.5	12.5	12.5	11.0	8.5	9.5	14.5	13.0	14.0
17	8.0	6.0	7.0	12.5	10.0	11.5	10.0	8.5	9.5	14.5	13.5	14.0
18	6.5	5.5	6.0	10.0	8.5	9.5	10.0	7.5	8.5	14.0	12.5	13.5
19	7.0	6.0	6.5	9.0	7.0	8.0	10.5	7.5	9.0	14.5	12.5	13.5
20	6.5	5.0	5.5	7.0	6.0	6.5	10.0	9.0	9.5	15.0	14.0	14.5
21	6.5	5.0	5.5	7.5	5.5	6.5	10.5	9.5	10.0	16.0	14.5	15.0
22	6.5	5.5	6.0	8.0	6.0	7.0	12.5	9.0	10.5	15.5	13.5	14.5
23	7.0	6.0	6.5	9.0	7.0	8.0	14.0	10.5	12.0	14.0	12.5	13.5
24	6.0	4.0	5.0	7.5	6.0	7.0	14.5	12.0	13.0	14.5	12.5	13.5
25	4.0	2.5	3.5	7.0	6.0	6.5	15.5	12.5	14.0	13.5	13.0	13.5
26	3.5	2.5	3.0	7.5	5.5	6.5	16.5	13.5	15.0	13.5	12.0	13.0
27	3.5	3.0	3.5	8.0	5.5	6.5	16.0	14.5	15.5	13.5	12.0	12.5
28	4.5	3.0	3.5	7.5	6.0	7.0	15.5	14.5	15.0	13.0	12.5	13.0
29	---	---	---	7.0	6.5	6.5	15.0	13.0	14.0	12.5	11.5	12.0
30	---	---	---	9.0	6.5	7.5	14.0	12.0	13.0	12.5	11.0	12.0
31	---	---	---	9.5	8.0	8.5	---	---	---	13.0	11.0	12.0
MONTH	8.5	2.5	6.0	13.0	3.0	7.5	16.5	5.5	10.0	16.0	10.5	13.0
		JUNE			JULY			AUGUST			SEPTEMBER	
1	14.5	12.5	13.5	21.5	20.5	21.0	21.5	20.5	21.0	21.0	19.5	20.5
2	15.0	13.5	14.5	21.0	19.5	20.5	22.0	20.0	21.0	21.5	20.0	21.0
3	15.0	14.5	15.0	21.5	19.5	20.5	22.0	20.5	21.5	21.5	20.5	21.0
4	14.5	13.5	14.0	22.5	20.0	21.0	22.0	21.0	21.5	21.0	20.0	20.5
5	14.5	13.0	14.0	22.5	21.0	22.0	22.0	21.5	21.5	21.0	19.5	20.5
6	16.0	13.5	15.0	23.0	21.5	22.0	21.5	20.5	21.0	22.5	20.5	21.0
7	16.5	15.5	16.0	22.0	20.5	21.5	21.0	19.5	20.5	21.5	20.5	21.0
8	17.5	16.0	16.5	22.0	21.0	21.5	21.0	19.5	20.0	21.0	20.0	20.5
9	18.0	17.0	17.5	23.0	21.0	22.0	20.5	20.0	20.0	20.0	19.5	20.0
10	17.5	16.5	17.0	23.5	22.0	22.5	21.5	19.5	20.5	21.0	19.5	20.0
11	17.0	16.0	16.5	23.0	22.0	23.0	21.0	20.0	20.5	21.0	19.5	20.5
12	17.0	15.5	16.5	23.0	22.0	22.5	21.0	19.0	20.0	21.0	19.0	20.0
13	18.0	16.0	17.0	22.0	21.0	21.5	21.0	20.0	20.5	20.0	19.5	19.5
14	19.5	17.0	18.0	21.0	20.0	20.5	21.5	20.0	20.5	20.0	19.5	20.0
15	19.0	18.5	19.0	20.0	19.0	19.5	21.5	20.0	21.0	20.0	18.5	19.0
16	20.5	18.0	19.0	20.5	19.0	19.5	22.0	20.5	21.0	19.0	18.0	18.5
17	21.0	19.0	20.0	21.5	19.5	20.0	22.5	20.0	21.0	18.0	17.0	17.5
18	21.0	19.5	20.0	22.0	20.0	21.0	21.5	20.5	21.0	17.5	16.5	17.0
19	20.0	19.5	19.5	22.0	20.5	21.0	22.5	20.5	21.5	17.0	17.0	17.0
20	20.0	18.5	19.0	22.0	20.5	21.5	22.5	21.0	22.0	17.5	16.5	17.0
21	20.5	19.0	19.5	22.0	21.0	21.5	22.0	21.5	21.5	17.0	16.5	16.5
22	20.0	19.0	19.5	22.0	21.0	21.5	21.0	20.0	20.5	17.0	16.0	17.0
23	20.0	19.0	19.5	22.0	21.0	21.5	20.0	19.5	20.0	16.0	15.0	15.5
24	19.0	18.5	19.0	21.0	20.0	21.0	20.5	19.5	20.0	15.5	14.5	15.0
25	20.0	17.5	18.5	21.5	20.0	21.0	21.0	20.0	20.5	15.5	14.0	15.0
26	20.0	18.0	19.0	22.0	20.0	21.0	21.5	19.5	20.5	16.0	14.5	15.0
27	20.5	19.0	19.5	22.0	20.0	21.0	22.0	20.0	21.0	16.5	14.5	15.5
28	21.0	19.0	20.0	22.0	21.0	21.5	22.5	20.5	21.5	16.5	15.5	16.0
29	21.0	20.0	20.5	23.0	20.5	21.5	22.0	20.5	21.5	16.5	16.0	16.5
30	21.5	20.5	21.0	22.5	21.0	21.5	20.5	20.0	20.5	16.5	15.5	16.0
31	---	---	---	22.5	21.5	22.0	21.0	19.5	20.0	---	---	---
MONTH	21.5	12.5	18.0	23.5	19.0	21.5	22.5	19.0	21.0	22.5	14.0	18.5
YEAR	23.5	1.0	12.0									

JAMES RIVER BASIN

02011500 BACK CREEK NEAR MOUNTAIN GROVE, VA

LOCATION.--Lat 38°04'10", long 79°53'50", Bath County, Hydrologic Unit 02080201, on left bank 0.3 mi downstream from Cummings Run, 0.8 mi downstream from bridge on State Highway 39, and 2.1 mi south of Mountain Grove.

DRAINAGE AREA.--134 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1951 to current year.

REVISED RECORDS.--WSP 2104: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,701.45 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records good except for period with ice effect, Dec. 21-30, which is fair. Flow regulated since October 1984 by Back Creek Lake 11.3 mi upstream, amount unknown, and since January 1985 by Little Back Creek Lake 14.4 mi upstream, amount unknown. Diversion 10.5 mi upstream from station by Virginia Power for recreation lakes averages 0.5 ft³/s. U.S. Army Corps of Engineers satellite water temperature and gage-height telemeter at station.

AVERAGE DISCHARGE.--39 years, 182 ft³/s, 18.44 in/yr, unadjusted.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 14,200 ft³/s, Nov. 4, 1985, gage height, 11.24 ft, from rating curve extended above 4,000 ft³/s on basis of slope-area measurements at gage heights 7.39 ft, 9.05 ft, and 9.35 ft; minimum, 1.5 ft³/s, Aug. 18, 1967.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 4,250 ft³/s, Dec. 31, gage height, 7.34 ft; minimum daily, 17 ft³/s, Sept. 4, 29, 30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	174	77	143	2110	388	96	212	155	350	41	19	18
2	869	74	139	800	349	126	206	140	276	67	18	18
3	573	72	93	509	353	164	207	128	253	44	18	18
4	308	71	87	359	1240	170	171	176	292	38	18	17
5	218	69	86	422	1170	162	146	378	235	35	19	18
6	168	55	83	489	582	145	160	301	159	35	22	18
7	154	50	77	479	457	123	252	234	115	34	20	18
8	144	49	87	444	354	97	235	196	98	34	19	18
9	84	54	94	331	349	87	328	165	99	34	19	19
10	65	69	105	267	904	85	496	223	132	34	19	19
11	50	74	90	270	896	93	413	415	121	34	20	18
12	44	73	67	228	585	101	425	344	91	42	19	18
13	43	71	65	215	442	88	314	292	67	42	18	21
14	41	70	64	200	329	80	251	316	63	56	18	20
15	48	69	77	182	261	69	251	306	58	422	18	18
16	44	1720	110	162	280	72	205	224	59	227	18	18
17	339	848	79	157	243	152	173	171	54	112	19	19
18	653	493	66	165	231	304	135	152	53	68	18	18
19	1020	426	69	216	218	313	120	140	53	48	18	19
20	665	301	66	224	176	175	97	105	49	38	18	19
21	431	232	e66	225	144	216	100	101	46	29	18	18
22	318	196	e64	210	134	226	119	142	44	27	22	19
23	245	174	e54	185	149	213	113	132	43	23	28	18
24	199	147	e45	164	149	188	91	134	41	22	25	18
25	146	119	e43	188	149	201	89	109	39	21	23	18
26	133	113	e41	370	114	215	80	442	36	21	26	18
27	115	128	e42	443	101	240	70	1400	36	20	30	18
28	91	136	e43	335	91	242	73	676	36	20	22	18
29	86	143	e45	350	---	246	103	930	35	20	21	17
30	88	145	e45	920	---	239	147	865	35	19	20	17
31	80	---	1500	656	---	214	---	469	---	19	20	---
TOTAL	7636	6318	3735	12275	10838	5142	5782	9961	3068	1726	630	548
MEAN	246	211	120	396	387	166	193	321	102	55.7	20.3	18.3
MAX	1020	1720	1500	2110	1240	313	496	1400	350	422	30	21
MIN	41	49	41	157	91	69	70	101	35	19	18	17

CAL YR 1989 TOTAL 88527 MEAN 243 MAX 4220 MIN 22
WTR YR 1990 TOTAL 67659 MEAN 185 MAX 2110 MIN 17

e Estimated.

JAMES RIVER BASIN

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02011500 BACK CREEK NEAR MOUNTAIN GROVE, VA--Continued

WATER-QUALITY RECORDS

PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: June 1978 to current year.

INSTRUMENTATION.--Water-temperature recorder since June 1978.

REMARKS.--Interruption in the record was due to malfunction of the instrument. Some record in prior years fragmentary due to instrument malfunction.

EXTREMES FOR PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: Maximum recorded, 33.5°C, Aug. 14, 1988; minimum recorded, 0.0°C on many days during winter periods.

EXTREMES FOR CURRENT YEAR.--

WATER TEMPERATURE: Maximum recorded, 30.5°C, July 10, but may have been higher during instrument malfunction July 24 to Aug. 2; minimum, 0.0°C on many days during winter period.

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
OCTOBER			NOVEMBER			DECEMBER			JANUARY			
1	17.0	16.0	16.5	13.5	11.0	12.5	6.5	3.5	5.0	3.5	2.5	3.5
2	19.5	16.0	17.5	11.0	9.0	10.0	6.5	3.0	5.0	4.0	2.0	2.5
3	19.0	16.0	18.0	9.5	8.5	9.0	5.0	.0	2.5	4.5	2.0	3.0
4	17.5	14.5	16.0	10.0	6.5	8.0	2.0	.0	1.0	3.5	2.0	3.0
5	17.5	13.0	15.0	10.5	6.5	8.5	4.5	2.0	3.5	4.5	3.0	3.5
6	18.0	13.5	15.5	11.5	8.5	10.0	6.5	3.0	5.0	4.5	2.5	3.5
7	17.5	15.0	16.0	12.0	9.5	10.5	6.0	4.0	5.0	3.5	2.0	3.0
8	15.0	13.5	14.0	11.5	10.0	11.0	4.0	.0	1.0	3.0	2.5	3.0
9	14.5	11.5	13.0	13.0	9.0	11.5	3.0	.5	2.0	4.0	2.0	3.0
10	13.5	9.5	12.0	9.5	6.5	8.0	4.0	1.0	2.5	3.5	2.5	3.0
11	15.5	11.0	13.0	10.0	5.5	7.5	3.0	1.0	2.0	4.5	1.0	2.5
12	16.0	10.5	13.5	11.5	7.5	9.5	2.5	1.5	2.0	2.5	1.0	2.0
13	17.5	12.0	15.0	11.5	7.5	9.5	2.5	.0	1.5	2.0	.0	1.0
14	19.0	14.0	16.0	11.5	8.0	10.0	.0	.0	.0	2.5	.0	1.0
15	18.0	13.5	16.0	12.5	10.5	11.5	.0	.0	.0	4.0	1.5	2.5
16	17.5	13.5	16.0	12.5	10.5	11.5	.0	.0	.0	5.5	2.0	3.5
17	17.0	15.0	16.0	11.0	8.5	9.5	.0	.0	.0	5.0	3.0	4.0
18	16.5	15.0	15.5	9.0	7.5	8.5	.0	.0	.0	6.5	3.5	5.0
19	15.0	14.5	15.0	10.0	7.5	8.5	.0	.0	.0	4.5	2.5	3.5
20	15.0	12.5	13.5	11.5	8.5	9.5	.0	.0	.0	4.5	3.5	4.0
21	14.0	11.5	12.5	9.0	6.5	7.5	.0	.0	.0	5.5	3.5	4.5
22	15.0	11.0	12.5	7.0	5.0	6.5	.0	.0	.0	5.0	2.0	3.0
23	14.5	10.0	12.0	7.0	5.0	6.0	.0	.0	.0	4.5	1.5	3.0
24	15.5	11.0	13.0	6.5	4.0	5.0	.0	.0	.0	5.0	3.5	4.5
25	15.0	10.5	13.0	6.5	2.5	4.5	.0	.0	.0	5.0	4.5	5.0
26	15.5	10.5	13.0	8.0	5.5	6.5	.0	.0	.0	4.5	2.0	3.5
27	14.5	10.0	12.5	7.0	6.0	6.5	.0	.0	.0	5.0	1.5	3.0
28	14.0	9.5	12.0	9.5	7.0	8.0	.0	.0	.0	5.5	2.0	3.5
29	14.5	10.0	12.5	7.5	4.5	6.0	.0	.0	.0	4.0	3.5	3.5
30	14.5	11.0	13.0	6.0	3.0	4.5	.0	.0	.0	4.5	3.0	3.5
31	15.5	13.5	14.5	---	---	---	3.5	.0	1.0	5.5	2.5	3.5
MONTH	19.5	9.5	14.5	13.5	2.5	8.5	6.5	.0	1.5	6.5	.0	3.0

JAMES RIVER BASIN

02011500 BACK CREEK NEAR MOUNTAIN GROVE. VA--Continued

TEMPERATURE. WATER (DEG. C). WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY				MARCH			APRIL			MAY		
1	6.0	2.0	3.5	7.0	1.5	4.5	13.0	8.0	10.0	16.0	11.0	13.5
2	6.5	3.5	4.5	5.5	3.5	4.5	12.0	7.0	9.5	14.5	11.5	13.0
3	5.5	4.0	5.0	8.0	4.5	6.0	8.5	6.5	7.5	15.5	11.5	13.0
4	6.0	4.5	5.5	8.0	2.0	4.5	10.0	5.0	7.0	15.5	12.0	13.5
5	5.5	3.5	4.5	9.0	2.0	5.0	13.0	6.0	9.0	15.0	11.5	13.0
6	6.5	3.0	4.0	8.5	3.0	6.0	9.5	5.0	7.0	12.0	9.5	11.0
7	5.5	4.0	5.0	8.5	4.0	6.0	10.0	5.0	6.5	16.0	8.5	11.5
8	7.5	4.0	5.0	7.0	2.5	5.0	11.0	3.5	7.0	18.5	9.0	13.5
9	7.0	3.5	5.0	8.0	5.0	6.5	11.5	4.5	7.5	15.5	10.5	13.0
10	6.0	4.0	5.5	12.5	5.5	8.5	9.5	6.5	8.0	15.5	11.5	13.5
11	5.5	3.5	4.5	12.0	6.5	9.0	9.5	6.5	8.0	16.0	10.0	12.5
12	6.0	3.5	4.5	11.5	7.0	9.5	9.0	6.0	7.0	13.0	10.0	11.0
13	7.0	3.0	4.5	13.5	7.0	10.0	12.0	4.5	7.5	14.5	11.0	12.5
14	8.5	4.0	5.5	14.0	8.0	11.5	12.5	6.0	8.5	17.5	11.0	13.5
15	8.5	5.0	6.5	14.5	9.5	12.0	13.5	8.0	10.0	18.0	11.5	14.0
16	7.5	6.5	7.0	13.0	11.5	12.0	15.0	6.5	10.5	18.0	12.5	15.0
17	7.0	3.5	5.5	11.5	8.5	10.5	10.5	7.5	8.5	18.0	13.0	15.0
18	5.5	2.0	3.5	11.5	6.5	8.5	13.5	5.0	9.0	18.5	11.0	14.5
19	7.5	4.0	5.5	9.0	5.5	7.0	14.0	5.0	9.5	18.5	11.0	14.5
20	7.0	2.5	4.5	8.0	5.0	6.0	12.0	8.5	10.0	17.5	13.5	15.5
21	7.0	1.5	4.0	10.5	3.5	6.5	11.5	9.5	10.5	19.5	14.5	17.0
22	6.0	3.0	4.5	11.5	4.0	7.5	17.5	8.5	12.5	17.0	13.0	14.0
23	8.0	5.5	6.5	12.5	6.5	9.0	18.0	8.5	13.0	17.0	11.5	14.0
24	6.0	2.0	4.0	8.5	5.0	6.0	19.0	10.0	14.5	18.0	11.5	14.5
25	3.0	.0	1.0	7.5	5.0	6.0	17.5	11.0	14.5	14.5	11.5	13.5
26	4.0	.0	1.5	10.5	4.0	6.5	20.5	11.5	15.5	15.5	13.5	14.0
27	4.5	1.0	3.0	10.5	3.5	6.5	19.0	13.0	16.0	15.5	13.5	14.0
28	7.5	2.5	4.5	9.5	3.5	6.5	16.5	12.5	15.0	14.0	13.0	13.5
29	---	---	---	7.0	6.5	6.5	14.5	12.0	13.0	13.5	12.5	13.0
30	---	---	---	11.5	6.0	8.5	16.5	10.5	13.0	16.0	12.5	13.5
31	---	---	---	12.0	7.5	9.5	---	---	---	18.5	11.5	14.5
MONTH	8.5	.0	4.5	14.5	1.5	7.5	20.5	3.5	10.0	19.5	8.5	13.5
JUNE				JULY			AUGUST			SEPTEMBER		
1	18.5	12.0	15.0	25.0	20.0	22.0	---	---	---	25.5	18.5	22.0
2	19.5	13.0	16.0	24.5	17.0	20.5	---	---	---	25.0	20.0	22.5
3	17.5	14.5	15.5	27.0	17.0	21.5	27.0	19.0	23.0	26.5	20.5	23.0
4	15.5	13.5	14.5	28.0	18.5	23.0	27.5	20.5	24.0	24.0	19.0	21.5
5	20.0	13.0	16.0	27.0	20.5	23.5	25.0	22.0	23.0	24.5	19.0	22.0
6	22.0	12.5	17.0	27.5	22.0	24.5	24.5	21.5	23.0	26.5	20.5	23.0
7	20.5	14.5	17.5	25.0	19.0	22.0	26.5	19.0	22.0	24.5	21.0	23.0
8	22.5	15.5	18.5	26.0	19.5	22.0	23.5	18.0	21.0	22.0	20.0	21.0
9	22.0	16.5	19.0	26.5	21.5	23.0	23.5	19.5	21.0	20.5	19.0	20.0
10	22.5	16.0	19.0	30.5	22.5	26.0	27.0	19.5	22.5	25.0	19.0	21.5
11	22.0	15.0	18.0	29.0	22.5	25.0	25.0	20.0	22.5	24.5	18.5	21.5
12	20.5	13.5	17.0	25.0	21.5	23.0	26.0	19.0	22.5	24.5	19.5	22.0
13	22.5	15.0	18.5	22.5	19.5	21.0	26.0	20.0	23.0	22.0	20.5	21.5
14	24.5	16.5	20.5	21.5	18.5	20.0	25.0	20.5	23.0	23.5	20.5	22.0
15	21.0	18.5	19.5	21.0	18.0	19.5	27.0	20.0	23.0	23.0	18.5	21.0
16	24.5	17.5	20.5	23.0	18.0	20.5	26.0	21.0	23.0	21.5	16.5	18.5
17	27.0	19.0	22.5	24.5	18.5	21.5	27.5	20.5	23.5	19.5	14.5	17.0
18	24.5	20.0	22.5	25.0	20.0	22.0	24.5	20.0	22.5	16.0	12.0	14.5
19	24.0	19.0	21.0	26.5	20.5	22.5	27.5	21.0	24.0	16.0	14.0	15.0
20	22.5	17.0	20.0	26.5	18.5	22.0	27.5	22.0	24.5	19.5	16.0	17.0
21	26.0	19.0	21.5	26.0	18.5	21.5	24.5	22.5	23.5	18.0	15.0	16.5
22	21.5	18.5	20.0	27.5	19.5	23.5	22.5	20.5	21.0	21.0	16.5	18.0
23	24.5	18.0	20.5	26.5	19.5	23.0	22.0	19.5	20.5	17.0	13.5	15.0
24	21.5	17.5	19.0	---	---	---	24.0	20.0	21.5	17.0	11.5	14.0
25	23.5	15.0	19.0	---	---	---	26.0	20.5	23.0	16.5	10.5	14.0
26	25.5	15.5	20.0	---	---	---	27.5	20.5	23.5	16.5	12.0	14.5
27	24.5	17.5	21.0	---	---	---	27.5	21.0	24.0	19.0	13.0	16.0
28	26.5	17.5	21.5	---	---	---	27.5	21.5	24.5	19.5	14.5	17.0
29	26.5	18.5	22.5	---	---	---	24.0	21.5	23.0	19.5	15.0	17.5
30	26.5	20.5	23.0	---	---	---	23.5	19.0	21.0	18.0	15.0	16.5
31	---	---	---	---	---	---	24.5	18.5	21.5	---	---	---
MONTH	27.0	12.0	19.0	30.5	17.0	22.5	27.5	18.0	22.5	26.5	10.5	19.0
YEAR	30.5	.0	12.0									

JAMES RIVER BASIN

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02011795 LAKE MOOMAW NEAR HOT SPRINGS, VA

LOCATION.--Lat 37°57'04", long 79°59'21", Alleghany County, Hydrologic Unit 02080201, in control tower at Gathright Dam on Jackson River, 0.9 mi upstream from Cedar Creek, 7.6 mi southwest of Hot Springs, and 19 mi upstream from Covington.

DRAINAGE AREA.--344 mi².

PERIOD OF RECORD.--December 1979 to current year.

GAGE.--Water-stage recorder. Datum of gage is National Geodetic Vertical Datum of 1929 (U.S. Army Corps of Engineers bench mark).

REMARKS.--Lake is formed by rolled rockfill dam with an impervious compacted earth (clay) core. Spillway with crest at elevation 1,667.5 ft is in a divide about 2.5 mi south of the dam, ungated, and 2,450 ft long with a base width of 100 ft. Except for flood flows, all discharge will be through a diversion tunnel with the invert of the entrance being in an intake tower 260 ft high. Elevation of invert is 1,430.5 ft. Portals in the tower at nine levels permit oxygenated water from the surface and cold water from the bottom of the lake to be mixed for water-quality control. Sluice gates in the tower control flood flow releases. Storage began Dec. 10, 1979. Total capacity at top of dam, elevation 1,684.5 ft, is 502,600 acre-ft of which 81,100 acre-ft is above spillway crest. Capacity at maximum conservation pool, elevation 1,582.0 ft, is 123,700 acre-ft; capacity at minimum conservation pool, elevation 1,554.0 ft, is 63,000 acre-ft. Lake is used for flood control, low-water augmentation for water-quality control, and recreation.

COOPERATION.--Records were provided by the U.S. Army Corps of Engineers.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 160,300 acre-ft, Apr. 18, 1987, elevation, 1,585.6 ft; minimum, (after first filling to minimum conservation pool), 73,300 acre-ft, Nov. 17-19, 1988, elevation, 1,559.5 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 135,100 acre-ft, Jan. 2, May 30, elevation, 1,586.4 ft; minimum, 96,500 acre-ft, Sept. 30, elevation, 1,570.6 ft.

MONTHEND ELEVATION AND CONTENTS AT 2400, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

Date	Elevation (feet)	Contents (acre-feet)	Change in contents (acre-feet)
Sept. 30.....	1,582.0	123,700	-
Oct. 31.....	1,582.0	123,700	0
Nov. 30.....	1,581.8	123,500	-200
Dec. 31.....	1,581.8	123,200	-300
CAL YR 1989.....	-	-	+42,700
Jan. 31.....	1,582.6	125,300	+2,100
Feb. 28.....	1,581.2	121,700	-3,600
Mar. 31.....	1,581.6	122,700	+1,000
Apr. 30.....	1,581.8	123,200	+500
May 31.....	1,586.0	134,100	+10,900
June 30.....	1,580.5	120,000	-14,100
July 31.....	1,578.7	115,500	-4,500
Aug. 31.....	1,574.7	105,900	-9,600
Sept. 30.....	1,570.6	96,500	-9,400
WTR YR 1990.....	-	-	-27,200

02011800 JACKSON RIVER BELOW GATHRIGHT DAM, NEAR HOT SPRINGS, VA

LOCATION.--Lat 37°56'54", long 79°56'58", Alleghany County, Hydrologic Unit 02080201, on right bank 0.4 mi upstream from Cedar Creek, 0.5 mi downstream from Gathright Dam and Moomaw Lake, and 7.3 mi southwest of Hot Springs.

DRAINAGE AREA.--345 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1973 to current year.

REVISED RECORDS.--WDR VA-81-1: 1980.

GAGE.--Water-stage recorder. Datum of gage is 1,400.00 ft above National Geodetic Vertical Datum of 1929 (U.S. Army Corps of Engineers bench mark). Prior to Dec. 20, 1973, nonrecording gage at same site and datum.

REMARKS.--No estimated daily discharges. Records good. Flow regulated since December 1979 by Moomaw Lake (station 02011795) 0.5 mi upstream; since October 1984 by Back Creek Lake 28.5 mi upstream, amount unknown; and since January 1985 by Little Back Creek Lake 31.6 mi upstream, amount unknown. U.S. Army Corps of Engineers satellite and radio water-quality and gage-height transmitters at station, radio receiver at Gathright Dam.

AVERAGE DISCHARGE.--17 years, 450 ft³/s, 17.71 in/yr, unadjusted.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 29,000 ft³/s, Dec. 26, 1973, result of cofferdam failure during construction of Gathright Dam, gage height, 18.77 ft, from rating curve extended above 9,200 ft³/s on basis of slope-area measurement of peak flow; minimum, 3.0 ft³/s, July 12, 1979, result of gate closure at Gathright Dam, gage height, 7.78 ft; minimum daily, 47 ft³/s, Sept. 2, 1981.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 21, 1972, reached a stage of 17.20 ft, from floodmark.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 2,850 ft³/s, Nov. 17, gage height, 12.22 ft; minimum, 10 ft³/s, Dec. 6, gage height, 7.88 ft; minimum daily, 153 ft³/s, Dec. 26-30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	357	261	309	1290	1110	332	563	337	2570	275	270	237
2	852	261	279	2600	1110	369	524	366	2570	275	268	237
3	1150	234	279	2650	961	445	480	366	1560	275	268	237
4	1150	214	239	2670	864	420	420	442	859	275	268	237
5	1150	214	204	2040	1850	383	384	501	528	275	268	237
6	1150	214	181	1100	2520	383	385	598	373	275	268	237
7	754	214	245	1100	2510	383	638	676	318	275	268	237
8	412	214	266	1100	1630	383	789	571	323	275	268	237
9	353	214	294	1100	949	319	789	500	319	275	268	237
10	300	214	313	978	1010	264	793	574	429	275	268	237
11	237	214	313	740	1910	264	985	624	472	275	268	237
12	223	214	313	626	2460	264	936	624	328	273	268	237
13	223	214	271	579	1310	264	815	678	264	271	268	237
14	206	214	204	579	822	264	725	713	264	272	268	237
15	192	214	204	418	711	264	641	611	265	272	267	237
16	192	217	189	286	761	265	593	547	264	271	266	237
17	196	1470	178	286	700	267	527	547	264	271	268	237
18	196	2820	178	343	502	471	457	467	264	271	268	237
19	635	2800	178	383	437	716	347	359	264	271	268	237
20	1910	1580	178	385	437	796	293	345	264	271	268	237
21	2350	739	178	506	437	617	294	366	264	271	268	237
22	2330	507	178	462	437	500	296	366	265	271	268	237
23	1640	401	178	385	490	489	293	429	266	271	268	237
24	685	363	178	423	541	480	293	446	264	269	268	237
25	396	317	162	447	502	603	293	428	264	270	266	237
26	328	336	153	553	391	640	293	421	264	271	264	237
27	328	366	153	919	332	601	293	428	264	271	264	237
28	306	392	153	920	332	578	294	430	264	271	264	237
29	274	376	153	809	---	563	293	432	270	271	264	237
30	261	357	153	988	---	563	293	1510	275	271	249	198
31	261	---	155	1110	---	563	---	2530	---	271	236	---
TOTAL	20997	16365	6609	28775	28026	13713	15019	18232	15422	8446	8238	7071
MEAN	677	545	213	928	1001	442	501	588	514	272	266	236
MAX	2350	2820	313	2670	2520	796	985	2530	2570	275	270	237
MIN	192	214	153	286	332	264	293	337	264	269	236	198
(*)	0	-3	-5	+34	-65	+16	+8	+177	-237	-73	-156	-158
MEAN#	677	542	208	962	936	458	509	765	277	199	110	77.7
CFSM#	1.96	1.57	.60	2.79	2.71	1.33	1.48	2.22	.80	.58	.32	.23
IN.#	2.26	1.75	.70	3.22	2.83	1.53	1.65	2.56	.90	.67	.37	.25

CAL YR 1989 TOTAL 194579 MEAN 533 MAX 4620 MIN 150 MEAN# 592 CFSM# 1.72 IN.# 23.30
WTR YR 1990 TOTAL 186913 MEAN 512 MAX 2820 MIN 153 MEAN# 474 CFSM# 1.37 IN.# 18.66

* Change in contents, equivalent in cubic feet per second, in Moomaw Lake; provided by U.S. Army Corps of Engineers.

Adjusted for change in contents.

02011800 JACKSON RIVER BELOW GATHRIGHT DAM, NEAR HOT SPRINGS, VA--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1979 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: October 1978 to current year.

pH: October 1978 to current year.

WATER TEMPERATURE: October 1978 to current year.

DISSOLVED OXYGEN: October 1978 to current year.

INSTRUMENTATION.--Water-quality monitor since October 1978.

REMARKS.--Interruption in the record June 22-23 was due to malfunction of the instruments. The intake tower at Gathright Dam permits selective withdrawal of water from one or more reservoir depths. Some record in prior years fragmentary due to instrument malfunction.

EXTREMES FOR PERIOD OF RECORD.--

SPECIFIC CONDUCTANCE (water years 1979, 1981-90): Maximum recorded, 249 microsiemens, Nov. 5, 1985; minimum recorded, 78 microsiemens, May 14, 1979.

pH (water years 1979, 1981-90): Maximum recorded, 8.6 units, Jan. 29, 1982, Jan. 13, 1983; minimum recorded, 6.7 units, Oct. 22, 1989.

WATER TEMPERATURE (water years 1979, 1981-90): Maximum recorded, 28.0°C, Aug. 1, 2, 1979; minimum recorded, 0.0°C, Feb. 16-19, 1979.

DISSOLVED OXYGEN (water years 1979, 1981, 1984-90): Maximum recorded, 19.5 mg/L, Jan. 16, 1979; minimum recorded, 5.7 mg/L, Aug. 1, 3, 1987.

EXTREMES FOR CURRENT YEAR.--

SPECIFIC CONDUCTANCE: Maximum, 182 microsiemens, Dec. 6; minimum, 122 microsiemens, Mar. 19-21, Apr. 11.

pH: Maximum, 8.0 units, May 9, 10, 16-18; minimum, 6.7 units, Oct. 22.

WATER TEMPERATURE: Maximum, 17.5°C, Oct. 1, 3, 4; minimum, 4.0°C on many days during winter period.

DISSOLVED OXYGEN: Maximum, 14.9 mg/L, June 2; minimum, 8.3 mg/L, June 13.

SPECIFIC CONDUCTANCE, (MICROSIEMENS/CM AT 25 DEG. C), WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	137	135	136	134	132	133	140	139	140	144	135	139
2	136	132	134	134	133	133	141	140	140	135	134	135
3	135	133	134	137	133	135	141	140	140	134	132	133
4	136	134	135	138	136	138	141	140	141	133	132	133
5	136	135	135	139	137	138	142	141	142	134	133	133
6	136	133	135	140	138	139	182	141	145	133	131	132
7	137	134	135	140	139	139	141	140	140	133	131	132
8	136	134	135	140	139	140	141	140	140	134	133	133
9	135	133	134	142	140	141	140	138	139	134	133	133
10	137	134	135	143	140	141	138	138	138	133	131	131
11	138	132	136	142	140	141	138	138	138	132	131	131
12	138	134	136	144	141	142	139	138	138	132	131	131
13	146	135	141	145	141	143	141	139	140	132	132	132
14	150	146	148	146	144	145	141	141	141	132	132	132
15	151	149	150	146	144	146	141	141	141	134	132	133
16	154	151	152	147	145	146	142	141	142	134	134	134
17	158	154	156	147	140	143	142	141	142	136	133	135
18	160	158	158	140	138	139	142	141	141	136	134	135
19	160	155	158	139	138	139	141	141	141	135	134	134
20	155	137	146	138	136	137	143	141	142	135	134	135
21	137	136	137	139	136	137	142	142	142	135	133	134
22	138	137	137	137	135	136	142	142	142	134	133	134
23	144	134	139	135	134	134	142	142	142	134	134	134
24	141	138	139	135	133	134	142	142	142	134	134	134
25	138	136	137	135	134	134	143	142	143	134	134	134
26	136	131	133	134	134	134	143	142	143	133	132	133
27	132	131	131	136	134	135	143	142	143	133	132	132
28	132	131	132	138	136	137	143	142	143	132	132	132
29	133	132	132	139	138	138	143	142	142	132	132	132
30	133	132	133	139	139	139	142	142	142	132	131	131
31	133	132	133	---	---	---	143	141	142	131	131	131
MONTH	160	131	139	147	132	139	182	138	141	144	131	133

JAMES RIVER BASIN

02011800 JACKSON RIVER BELOW GATHRIGHT DAM. NEAR HOT SPRINGS. VA--Continued

SPECIFIC CONDUCTANCE. (MICROSIEMENS/CM AT 25 DEG. C). WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN			
	FEBRUARY				MARCH				APRIL				MAY		
1	131	131	131	127	126	126	124	123	124	130	128	129			
2	131	131	131	126	125	125	124	123	124	129	128	129			
3	132	131	131	125	124	124	124	124	124	129	129	129			
4	132	131	131	125	124	125	126	124	125	129	127	128			
5	131	130	130	125	125	125	126	126	126	128	128	128			
6	130	128	129	126	125	125	126	125	126	128	127	127			
7	129	128	128	125	125	125	126	124	125	127	127	127			
8	129	128	129	125	125	125	124	124	124	128	127	128			
9	129	129	129	126	125	126	124	123	124	130	128	129			
10	130	128	129	126	126	126	124	123	123	129	128	129			
11	129	127	128	126	126	126	123	122	123	129	128	128			
12	128	127	127	126	126	126	123	123	123	128	128	128			
13	163	127	130	126	126	126	123	123	123	129	128	128			
14	128	127	128	126	126	126	124	123	124	128	128	128			
15	129	127	128	126	126	126	124	124	124	129	128	128			
16	129	128	128	126	126	126	124	124	124	129	128	129			
17	128	127	127	127	126	126	125	124	125	130	128	129			
18	129	127	128	126	123	124	128	125	126	132	130	131			
19	129	128	129	123	122	123	129	127	128	132	130	131			
20	129	128	128	123	122	122	129	128	128	132	131	131			
21	129	128	128	124	122	123	129	128	129	131	130	131			
22	129	128	129	124	124	124	129	129	129	132	130	131			
23	129	126	128	124	124	124	129	129	129	131	130	130			
24	126	125	126	124	123	124	129	129	129	131	130	131			
25	125	124	125	124	123	123	129	129	129	131	130	131			
26	125	124	125	123	123	123	129	129	129	131	130	131			
27	126	125	126	123	123	123	129	129	129	131	130	131			
28	127	126	126	124	123	124	129	129	129	131	130	131			
29	---	---	---	124	124	124	130	129	129	131	131	131			
30	---	---	---	124	123	124	130	130	130	131	128	129			
31	---	---	---	124	123	124	---	---	---	128	128	128			
MONTH	163	124	128	127	122	125	130	122	126	132	127	129			
	JUNE				JULY				AUGUST				SEPTEMBER		
1	129	128	129	131	131	131	134	133	134	137	136	136			
2	129	128	129	131	131	131	135	133	134	136	136	136			
3	132	129	130	131	130	131	134	132	134	137	136	136			
4	132	131	131	131	131	131	135	129	134	137	136	136			
5	138	129	130	131	131	131	135	132	134	137	135	137			
6	136	129	131	131	131	131	135	132	134	136	135	135			
7	141	130	132	132	131	131	135	133	134	135	134	135			
8	133	131	131	132	131	131	135	134	134	136	135	135			
9	132	130	131	132	131	131	135	134	135	135	134	135			
10	133	130	131	132	131	131	135	134	135	136	135	136			
11	131	130	131	132	131	132	136	134	135	136	135	135			
12	133	131	132	133	132	132	135	134	135	136	135	136			
13	133	132	132	133	132	132	135	134	135	136	135	136			
14	133	132	132	134	132	132	136	132	135	137	136	136			
15	132	132	132	135	132	133	136	134	135	137	136	136			
16	132	131	132	133	132	133	136	133	135	137	136	136			
17	132	131	131	132	132	132	136	134	135	138	137	137			
18	132	130	131	133	132	133	136	133	135	137	136	137			
19	132	131	131	133	132	133	136	132	135	138	137	137			
20	132	131	131	133	132	133	136	134	136	138	137	138			
21	132	131	131	133	132	133	136	135	136	139	137	138			
22	---	---	---	133	133	133	137	135	136	139	138	138			
23	---	---	---	134	132	133	136	135	135	141	138	139			
24	131	130	131	134	133	133	135	135	135	140	138	139			
25	131	131	131	134	133	133	136	135	135	140	139	139			
26	131	131	131	134	133	133	136	135	136	142	140	141			
27	131	130	131	134	133	133	136	135	136	142	141	141			
28	131	131	131	134	133	133	137	136	136	143	141	142			
29	131	131	131	134	133	134	137	136	137	144	142	143			
30	131	131	131	134	133	134	137	136	136	145	143	144			
31	---	---	---	134	133	134	136	136	136	---	---	---			
MONTH	141	128	131	135	130	132	137	129	135	145	134	138			
YEAR	182	122	133												

02011800 JACKSON RIVER BELOW GATHRIGHT DAM, NEAR HOT SPRINGS, VA--Continued

PH (STANDARD UNITS), WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
OCTOBER				NOVEMBER			DECEMBER			JANUARY		
1	7.3	7.2	7.2	7.1	7.1	7.1	7.6	7.6	7.6	7.7	7.6	7.6
2	7.2	7.1	7.2	7.1	7.1	7.1	7.6	7.6	7.6	7.6	7.6	7.6
3	7.2	7.1	7.2	7.2	7.1	7.1	7.6	7.6	7.6	7.6	7.6	7.6
4	7.3	7.2	7.2	7.2	7.1	7.1	7.6	7.6	7.6	7.6	7.6	7.6
5	7.3	7.2	7.2	7.2	7.1	7.1	7.6	7.6	7.6	7.7	7.6	7.6
6	7.3	7.2	7.2	7.2	7.1	7.1	7.7	7.6	7.6	7.6	7.6	7.6
7	7.5	7.3	7.4	7.2	7.1	7.1	7.6	7.6	7.6	7.6	7.6	7.6
8	7.4	7.4	7.4	7.1	7.1	7.1	7.6	7.6	7.6	7.6	7.6	7.6
9	7.4	7.4	7.4	7.2	7.1	7.1	7.6	7.6	7.6	7.6	7.6	7.6
10	7.5	7.4	7.4	7.2	7.1	7.1	7.6	7.6	7.6	7.7	7.6	7.6
11	7.5	7.4	7.4	7.2	7.1	7.1	7.6	7.6	7.6	7.7	7.6	7.6
12	7.5	7.4	7.4	7.2	7.1	7.1	7.6	7.6	7.6	7.7	7.6	7.7
13	7.5	7.4	7.4	7.2	7.1	7.2	7.7	7.6	7.6	7.7	7.6	7.6
14	7.5	7.4	7.4	7.2	7.2	7.2	7.7	7.6	7.6	7.7	7.6	7.6
15	7.6	7.4	7.4	7.3	7.2	7.2	7.7	7.6	7.6	7.7	7.6	7.6
16	7.6	7.4	7.5	7.3	7.2	7.2	7.6	7.6	7.6	7.7	7.6	7.6
17	7.5	7.4	7.4	7.2	7.0	7.2	7.7	7.6	7.6	7.7	7.6	7.6
18	7.5	7.4	7.5	7.4	7.2	7.3	7.7	7.6	7.6	7.7	7.6	7.6
19	7.6	7.2	7.4	7.4	7.4	7.4	7.7	7.6	7.6	7.7	7.6	7.6
20	7.2	6.8	7.0	7.5	7.4	7.5	7.7	7.6	7.6	7.7	7.6	7.6
21	6.8	6.8	6.8	7.6	7.5	7.5	7.7	7.6	7.6	7.7	7.6	7.6
22	6.8	6.7	6.8	7.6	7.5	7.5	7.7	7.6	7.6	7.7	7.6	7.6
23	7.2	6.8	6.9	7.5	7.5	7.5	7.7	7.6	7.6	7.7	7.6	7.6
24	7.0	7.0	7.0	7.5	7.5	7.5	7.7	7.6	7.6	7.6	7.6	7.6
25	7.0	7.0	7.0	7.5	7.5	7.5	7.7	7.6	7.6	7.6	7.6	7.6
26	7.1	7.0	7.0	7.5	7.5	7.5	7.7	7.6	7.7	7.7	7.6	7.6
27	7.1	7.0	7.1	7.5	7.5	7.5	7.7	7.6	7.6	7.6	7.6	7.6
28	7.1	7.1	7.1	7.6	7.5	7.6	7.7	7.6	7.7	7.6	7.6	7.6
29	7.1	7.1	7.1	7.6	7.6	7.6	7.7	7.6	7.7	7.6	7.6	7.6
30	7.1	7.1	7.1	7.6	7.6	7.6	7.7	7.6	7.7	7.6	7.6	7.6
31	7.1	7.1	7.1	---	---	---	7.7	7.6	7.6	7.6	7.6	7.6
MONTH	7.6	6.7	7.2	7.6	7.0	7.3	7.7	7.6	7.6	7.7	7.6	7.6
FEBRUARY				MARCH			APRIL			MAY		
1	7.6	7.6	7.6	7.4	7.4	7.4	7.3	7.2	7.3	7.8	7.6	7.7
2	7.6	7.6	7.6	7.4	7.4	7.4	7.4	7.2	7.3	7.8	7.7	7.8
3	7.6	7.6	7.6	7.4	7.4	7.4	7.4	7.3	7.4	7.8	7.7	7.8
4	7.6	7.6	7.6	7.4	7.4	7.4	7.7	7.3	7.5	7.9	7.7	7.8
5	7.6	7.6	7.6	7.4	7.3	7.4	7.6	7.5	7.5	7.9	7.7	7.8
6	7.6	7.6	7.6	7.6	7.3	7.4	7.6	7.4	7.5	7.9	7.7	7.8
7	7.6	7.6	7.6	7.6	7.5	7.6	7.6	7.5	7.6	7.9	7.7	7.8
8	7.6	7.6	7.6	7.6	7.5	7.6	7.6	7.5	7.5	7.9	7.7	7.8
9	7.6	7.6	7.6	7.6	7.5	7.5	7.6	7.4	7.5	8.0	7.8	7.9
10	7.6	7.6	7.6	7.6	7.5	7.5	7.5	7.4	7.5	8.0	7.8	7.9
11	7.6	7.6	7.6	7.6	7.5	7.5	7.7	7.5	7.6	7.9	7.8	7.9
12	7.6	7.6	7.6	7.6	7.4	7.5	7.7	7.6	7.7	7.9	7.8	7.9
13	7.7	7.6	7.6	7.6	7.4	7.5	7.7	7.6	7.6	7.9	7.8	7.9
14	7.6	7.5	7.6	7.6	7.5	7.5	7.7	7.6	7.6	7.9	7.8	7.9
15	7.6	7.5	7.6	7.6	7.4	7.5	7.7	7.6	7.6	7.9	7.8	7.9
16	7.6	7.5	7.5	7.5	7.4	7.5	7.7	7.6	7.6	8.0	7.8	7.9
17	7.6	7.5	7.6	7.5	7.4	7.4	7.7	7.6	7.6	8.0	7.8	7.9
18	7.6	7.5	7.5	7.5	7.4	7.4	7.7	7.6	7.7	8.0	7.8	7.9
19	7.6	7.5	7.5	7.5	7.4	7.4	7.7	7.6	7.7	7.9	7.7	7.8
20	7.6	7.5	7.5	7.5	7.4	7.4	7.7	7.6	7.7	7.9	7.7	7.8
21	7.5	7.5	7.5	7.5	7.4	7.4	7.7	7.6	7.7	7.9	7.7	7.8
22	7.5	7.4	7.5	7.4	7.4	7.4	7.7	7.6	7.7	7.9	7.7	7.8
23	7.5	7.4	7.5	7.4	7.3	7.4	7.7	7.6	7.7	7.9	7.7	7.8
24	7.5	7.5	7.5	7.4	7.4	7.4	7.8	7.6	7.7	7.8	7.7	7.8
25	7.6	7.5	7.5	7.4	7.4	7.4	7.8	7.6	7.7	7.8	7.7	7.7
26	7.5	7.5	7.5	7.4	7.3	7.4	7.7	7.6	7.7	7.8	7.7	7.7
27	7.5	7.4	7.4	7.4	7.3	7.4	7.8	7.6	7.7	7.8	7.6	7.7
28	7.5	7.4	7.4	7.4	7.3	7.3	7.8	7.6	7.7	7.8	7.7	7.7
29	---	---	---	7.3	7.3	7.3	7.8	7.7	7.7	7.8	7.7	7.7
30	---	---	---	7.3	7.3	7.3	7.8	7.7	7.7	7.7	7.3	7.5
31	---	---	---	7.3	7.3	7.3	---	---	---	7.3	7.2	7.2
MONTH	7.7	7.4	7.6	7.6	7.3	7.4	7.8	7.2	7.6	8.0	7.2	7.8

02011800 JACKSON RIVER BELOW GATHRIGHT DAM, NEAR HOT SPRINGS, VA--Continued

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
OCTOBER			NOVEMBER			DECEMBER			JANUARY			
1	17.5	17.0	17.0	12.5	12.0	12.5	9.5	9.5	9.5	5.5	4.5	5.0
2	17.0	17.0	17.0	12.5	12.0	12.5	9.5	9.0	9.0	4.5	4.5	4.5
3	17.5	17.0	17.0	12.5	12.0	12.5	9.0	9.0	9.0	4.5	4.0	4.5
4	17.5	17.0	17.0	12.5	12.0	12.5	9.0	9.0	9.0	4.5	4.0	4.5
5	17.0	16.5	17.0	12.5	12.0	12.5	9.0	9.0	9.0	4.5	4.5	4.5
6	17.0	16.5	17.0	12.5	12.5	12.5	10.5	9.0	9.0	4.5	4.5	4.5
7	17.0	16.5	17.0	12.5	12.5	12.5	9.0	8.5	9.0	4.5	4.5	4.5
8	16.5	16.5	16.5	12.5	12.5	12.5	8.5	8.5	8.5	4.5	4.0	4.5
9	16.5	16.0	16.5	12.5	12.0	12.5	8.5	8.5	8.5	4.0	4.0	4.0
10	16.5	16.0	16.0	12.5	12.0	12.5	8.5	8.5	8.5	4.0	4.0	4.0
11	16.0	16.0	16.0	12.5	12.0	12.5	8.5	8.0	8.5	4.0	4.0	4.0
12	16.0	15.5	16.0	12.5	12.0	12.5	8.0	8.0	8.0	4.0	4.0	4.0
13	16.0	15.5	16.0	12.5	12.0	12.5	8.0	7.5	8.0	4.0	4.0	4.0
14	16.0	15.5	16.0	12.5	12.0	12.5	8.0	7.5	8.0	4.0	4.0	4.0
15	16.0	15.5	16.0	12.5	12.0	12.5	8.0	7.5	7.5	4.5	4.0	4.0
16	16.0	15.5	16.0	12.5	12.0	12.0	7.5	7.0	7.5	4.5	4.0	4.0
17	16.0	15.5	16.0	12.5	12.0	12.0	7.5	7.0	7.0	4.5	4.0	4.0
18	16.0	16.0	16.0	12.5	12.5	12.5	7.0	7.0	7.0	4.0	4.0	4.0
19	16.0	15.0	15.5	12.5	12.0	12.5	7.0	7.0	7.0	4.0	4.0	4.0
20	15.0	10.5	12.5	12.0	12.0	12.0	7.0	6.5	6.5	4.0	4.0	4.0
21	11.5	11.0	11.5	12.0	12.0	12.0	6.5	6.5	6.5	4.0	4.0	4.0
22	12.0	11.5	11.5	11.5	11.5	11.5	6.5	6.0	6.5	4.0	4.0	4.0
23	14.5	12.0	12.5	11.5	11.0	11.0	6.0	6.0	6.0	4.5	4.0	4.0
24	13.0	12.5	12.5	11.0	10.5	10.5	6.0	5.5	6.0	4.5	4.0	4.0
25	12.5	12.0	12.5	10.5	10.5	10.5	6.0	5.5	6.0	4.5	4.0	4.5
26	12.5	12.0	12.0	10.5	10.5	10.5	6.0	5.5	5.5	4.5	4.0	4.0
27	12.5	12.0	12.0	10.5	10.0	10.5	5.5	5.5	5.5	4.0	4.0	4.0
28	12.5	12.0	12.0	10.0	10.0	10.0	5.5	5.5	5.5	4.0	4.0	4.0
29	12.5	12.0	12.0	10.0	9.5	10.0	5.5	5.5	5.5	4.0	4.0	4.0
30	12.5	12.0	12.0	9.5	9.5	9.5	5.5	5.0	5.5	4.0	4.0	4.0
31	12.5	12.0	12.5	---	---	---	5.5	5.0	5.5	4.0	4.0	4.0
MONTH	17.5	10.5	14.5	12.5	9.5	12.0	10.5	5.0	7.5	5.5	4.0	4.0
FEBRUARY			MARCH			APRIL			MAY			
1	4.0	4.0	4.0	6.0	5.5	6.0	7.0	6.5	7.0	13.0	11.0	12.0
2	4.5	4.0	4.0	5.5	5.5	5.5	8.0	6.5	7.0	12.5	11.5	12.0
3	4.5	4.0	4.5	6.0	5.5	5.5	8.5	7.0	8.0	12.0	11.5	12.0
4	4.5	4.5	4.5	6.0	6.0	6.0	9.0	7.5	8.5	12.5	11.0	12.0
5	4.5	4.5	4.5	6.0	5.5	6.0	8.5	7.0	8.0	13.5	11.5	12.5
6	4.5	4.5	4.5	6.0	5.5	6.0	8.5	7.0	7.5	13.0	12.0	12.5
7	5.0	4.5	4.5	6.0	5.5	6.0	9.0	7.5	8.5	13.0	11.5	12.0
8	5.0	4.5	4.5	6.0	6.0	6.0	8.5	7.5	8.0	13.0	11.5	12.5
9	5.0	4.5	5.0	6.0	6.0	6.0	8.0	7.5	8.0	13.0	12.0	12.5
10	5.0	4.5	5.0	6.5	6.0	6.0	8.5	7.5	8.0	14.5	12.0	13.0
11	5.0	5.0	5.0	6.0	6.0	6.0	10.0	8.0	9.0	14.5	12.5	13.5
12	5.5	5.0	5.0	6.5	6.0	6.0	9.5	9.0	9.5	13.0	12.5	13.0
13	8.5	5.0	5.5	6.5	6.0	6.0	9.5	9.0	9.0	14.0	12.5	13.0
14	5.0	5.0	5.0	6.5	6.0	6.0	9.5	9.0	9.0	13.5	13.0	13.0
15	5.0	5.0	5.0	6.5	6.0	6.0	10.0	9.0	9.5	13.5	13.0	13.0
16	5.0	5.0	5.0	6.0	6.0	6.0	10.0	9.5	9.5	14.0	12.5	13.5
17	5.5	5.0	5.5	6.5	6.0	6.0	10.5	9.5	9.5	15.5	12.5	14.0
18	5.5	5.5	5.5	6.5	6.0	6.5	10.5	9.5	10.0	16.5	14.0	15.0
19	6.0	5.5	5.5	6.0	6.0	6.0	11.0	9.5	10.5	14.5	12.0	13.5
20	6.0	5.5	5.5	7.0	6.0	6.5	10.5	10.0	10.0	14.0	13.0	13.5
21	6.0	5.5	5.5	7.0	6.0	6.5	10.5	10.0	10.5	14.5	13.5	14.0
22	5.5	5.5	5.5	6.5	6.0	6.0	11.0	10.0	10.5	14.5	13.5	14.0
23	6.0	5.5	5.5	6.5	6.0	6.5	11.0	10.5	10.5	14.5	13.0	14.0
24	6.0	6.0	6.0	6.5	6.0	6.5	11.5	10.5	11.0	14.0	13.5	14.0
25	6.0	6.0	6.0	7.0	6.5	6.5	11.5	10.5	11.0	14.0	13.5	14.0
26	6.0	6.0	6.0	7.0	6.0	6.5	11.0	11.0	11.0	14.5	13.0	14.0
27	6.0	6.0	6.0	7.0	6.0	6.5	11.5	10.5	11.0	14.5	13.0	14.0
28	6.0	5.5	6.0	7.0	6.5	6.5	12.0	10.5	11.0	14.5	13.5	14.0
29	---	---	---	6.5	6.5	6.5	12.0	10.5	11.5	14.5	13.5	14.0
30	---	---	---	7.0	6.5	7.0	12.5	11.5	12.0	14.5	9.5	12.0
31	---	---	---	7.0	6.5	7.0	---	---	---	9.5	9.5	9.5
MONTH	8.5	4.0	5.0	7.0	5.5	6.0	12.5	6.5	9.5	16.5	9.5	13.0

02011800 JACKSON RIVER BELOW GATHRIGHT DAM, NEAR HOT SPRINGS, VA--Continued

OXYGEN, DISSOLVED (MG/L), WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
OCTOBER				NOVEMBER			DECEMBER			JANUARY		
1	9.2	9.0	9.1	9.6	9.3	9.4	10.2	10.1	10.1	12.8	10.8	11.8
2	9.6	9.0	9.3	9.6	9.4	9.5	10.1	9.9	10.0	13.1	12.7	12.9
3	9.8	9.6	9.7	9.6	9.4	9.5	10.1	10.0	10.0	13.1	12.8	13.0
4	9.7	9.4	9.5	9.6	9.4	9.5	10.1	9.8	9.9	13.1	13.0	13.0
5	9.9	9.6	9.6	9.7	9.4	9.5	10.0	9.8	9.9	13.1	12.1	12.7
6	9.9	9.6	9.7	9.7	9.5	9.6	10.1	9.3	10.0	12.2	12.1	12.1
7	9.8	9.3	9.5	9.8	9.5	9.6	10.4	10.1	10.2	12.3	12.1	12.2
8	9.3	9.2	9.3	10.0	9.6	9.7	10.3	10.1	10.2	12.3	12.1	12.1
9	9.5	9.2	9.3	9.9	9.7	9.8	10.4	10.1	10.2	12.3	12.2	12.2
10	9.5	9.2	9.4	9.9	9.8	9.9	10.3	10.2	10.2	12.4	12.2	12.2
11	9.6	9.3	9.4	10.1	9.8	9.9	10.4	10.2	10.3	12.2	11.9	12.0
12	9.8	9.3	9.5	10.0	9.8	9.9	10.5	10.3	10.4	12.1	12.0	12.1
13	9.7	9.4	9.6	9.9	9.7	9.8	10.7	10.3	10.5	12.3	12.1	12.2
14	9.8	9.4	9.6	9.8	9.6	9.7	10.7	10.5	10.5	12.3	12.2	12.3
15	9.8	9.4	9.6	9.8	9.3	9.6	10.7	10.4	10.5	12.4	12.1	12.2
16	9.9	9.4	9.6	9.4	9.2	9.3	10.6	10.5	10.5	12.3	12.1	12.2
17	9.8	9.4	9.6	11.1	9.3	10.1	10.8	10.5	10.6	12.4	12.0	12.2
18	10.0	9.5	9.7	11.5	11.2	11.3	10.9	10.6	10.7	12.2	12.0	12.1
19	10.5	9.5	9.9	11.7	11.4	11.5	10.9	10.6	10.7	12.3	12.1	12.2
20	12.0	10.4	11.3	11.4	9.9	10.5	10.9	10.1	10.5	12.1	11.9	12.0
21	12.0	11.7	11.8	10.0	9.9	9.9	10.4	10.0	10.2	12.2	11.9	12.0
22	12.0	11.3	11.7	9.9	9.6	9.8	10.6	10.2	10.3	12.2	12.0	12.1
23	11.5	10.4	10.9	9.8	9.6	9.7	10.6	10.4	10.5	12.1	11.9	12.0
24	10.4	10.0	10.2	10.0	9.8	9.9	10.7	10.4	10.5	12.1	11.9	12.0
25	10.1	9.8	10.0	9.9	9.8	9.8	10.7	10.4	10.5	12.1	12.0	12.0
26	9.9	9.2	9.7	9.9	9.8	9.8	10.8	10.4	10.6	12.3	12.0	12.2
27	9.3	9.1	9.2	10.0	9.9	9.9	11.0	10.6	10.7	12.6	12.2	12.5
28	9.3	9.2	9.2	10.0	9.9	9.9	11.1	10.7	10.9	12.7	12.5	12.6
29	9.4	9.2	9.3	10.1	10.0	10.0	11.2	10.8	11.0	12.5	12.3	12.4
30	9.4	9.3	9.3	10.1	10.0	10.1	11.2	10.9	11.0	12.7	12.4	12.5
31	9.5	9.3	9.3	---	---	---	11.1	10.8	11.0	12.9	12.6	12.7
MONTH	12.0	9.0	9.8	11.7	9.2	9.9	11.2	9.3	10.4	13.1	10.8	12.3
FEBRUARY				MARCH			APRIL			MAY		
1	12.8	12.6	12.7	11.7	11.5	11.6	11.7	11.5	11.6	10.6	10.2	10.4
2	12.7	12.6	12.7	11.7	11.5	11.6	11.6	11.2	11.4	10.6	10.3	10.5
3	12.8	12.5	12.6	11.7	11.5	11.6	11.4	11.1	11.3	10.7	10.3	10.5
4	12.5	12.4	12.5	11.7	11.5	11.6	11.3	10.5	10.9	10.7	10.4	10.5
5	13.7	12.5	13.2	11.8	11.6	11.7	11.0	10.6	10.8	10.5	10.1	10.3
6	14.0	13.7	13.9	11.8	11.1	11.5	10.9	10.6	10.8	10.7	10.3	10.5
7	14.0	13.9	13.9	11.3	11.1	11.2	11.2	10.6	10.9	10.8	10.6	10.7
8	14.0	12.8	13.3	11.2	11.0	11.1	11.4	11.1	11.2	10.8	10.5	10.7
9	12.8	12.6	12.7	11.1	10.9	11.0	11.6	11.3	11.4	11.3	10.5	10.8
10	12.8	12.5	12.7	11.2	10.9	11.0	11.5	11.1	11.3	11.1	10.6	10.9
11	13.8	12.8	13.4	11.3	10.9	11.1	11.4	11.1	11.3	11.0	10.7	10.8
12	13.9	13.8	13.8	11.3	11.0	11.1	11.4	11.1	11.3	11.1	10.9	11.0
13	14.0	11.7	13.1	11.4	11.0	11.2	11.4	11.2	11.3	11.1	10.8	11.0
14	12.7	11.9	12.4	11.3	11.0	11.1	11.3	11.2	11.2	11.3	10.9	11.1
15	11.9	11.7	11.8	11.4	11.0	11.2	11.2	10.9	11.1	11.1	10.9	11.0
16	11.9	11.7	11.8	11.3	11.0	11.1	11.2	11.0	11.1	10.9	10.7	10.8
17	11.8	11.6	11.7	11.2	11.0	11.1	11.0	10.8	10.9	10.8	10.4	10.6
18	11.7	11.3	11.5	11.4	11.0	11.2	11.0	10.5	10.7	10.7	10.2	10.4
19	11.6	11.2	11.3	11.6	11.4	11.5	10.6	10.3	10.5	11.0	10.5	10.7
20	11.8	11.3	11.5	11.5	11.2	11.4	10.5	10.2	10.4	10.7	10.5	10.6
21	11.7	11.3	11.5	11.5	11.2	11.4	10.4	10.2	10.2	10.6	10.4	10.5
22	11.5	11.0	11.1	11.4	11.2	11.3	10.5	10.2	10.3	10.5	10.2	10.4
23	11.1	11.0	11.0	11.5	11.3	11.4	10.4	10.2	10.3	10.6	10.4	10.5
24	11.1	10.9	11.0	11.4	11.2	11.3	10.5	10.2	10.3	10.6	10.4	10.5
25	11.2	11.0	11.1	11.6	11.3	11.4	10.5	10.0	10.3	10.6	10.3	10.5
26	11.4	11.2	11.3	11.6	11.4	11.5	10.6	10.1	10.3	10.5	10.2	10.4
27	11.7	11.1	11.2	11.5	11.5	11.5	10.5	10.2	10.3	10.6	10.3	10.5
28	11.7	11.5	11.6	11.6	11.4	11.5	10.5	10.2	10.3	10.6	10.3	10.4
29	---	---	---	11.6	11.5	11.5	10.5	10.2	10.4	10.5	10.1	10.3
30	---	---	---	11.6	11.4	11.5	10.4	10.1	10.3	12.6	10.1	11.4
31	---	---	---	11.6	11.5	11.5	---	---	---	12.6	12.4	12.5
MONTH	14.0	10.9	12.2	11.8	10.9	11.4	11.7	10.0	10.8	12.6	10.1	10.7

JAMES RIVER BASIN

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02012800 JACKSON RIVER AT FILTRATION PLANT, AT COVINGTON, VA

LOCATION.--Lat 37°48'39", long 79°59'19", Covington City, Hydrologic Unit 02080201, on left bank 250 ft upstream from Dry Run and 1.7 mi upstream from Dunlap Creek and bridge on U.S. Highway 60.

DRAINAGE AREA.--439 mi².

PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: June 1978 to current year.

INSTRUMENTATION.--Water-temperature recorder since June 1978.

REMARKS.--Interruption in the record was due to malfunction of the instrument. Some record in prior years fragmentary due to instrument malfunction.

EXTREMES FOR PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: Maximum recorded, 30.5°C, July 21, 1980; minimum recorded, 0.0°C on many days during winter periods.

EXTREMES FOR CURRENT YEAR.--

WATER TEMPERATURE: Maximum, 22.5°C, July 11; minimum, 0.0°C on several days during December.

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	15.5	14.5	15.0	13.5	12.0	12.5	7.0	6.0	7.0	5.0	4.0	4.5
2	16.5	14.5	15.0	12.0	10.5	11.0	7.0	5.5	6.5	4.5	3.5	4.0
3	17.0	15.0	15.5	11.0	10.0	10.5	7.0	4.0	5.5	5.0	3.5	4.0
4	16.0	14.0	15.0	10.5	9.0	9.5	5.0	3.5	4.5	4.5	3.5	4.0
5	15.5	13.5	14.5	11.0	9.0	10.0	7.0	5.0	6.0	5.0	4.0	4.5
6	16.5	13.5	15.0	12.0	10.5	11.5	7.5	6.5	7.0	5.0	4.0	5.0
7	16.0	14.5	15.5	12.0	11.0	11.5	8.0	7.0	7.5	4.5	3.5	4.0
8	15.0	13.0	13.5	12.0	11.5	12.0	7.0	3.5	5.0	4.0	4.0	4.0
9	13.5	12.0	13.0	13.0	11.5	12.5	5.5	3.5	4.5	4.5	3.5	4.0
10	13.5	12.0	13.0	11.5	9.5	10.0	6.5	5.0	5.5	4.5	4.0	4.0
11	15.0	13.0	14.0	10.5	8.5	9.5	6.0	4.5	5.0	5.0	3.0	4.0
12	15.0	13.0	14.0	12.5	10.5	11.5	6.0	5.0	5.5	4.5	3.5	4.0
13	16.0	13.5	15.0	12.0	10.0	11.0	6.0	5.0	5.5	3.5	2.5	3.0
14	17.0	15.0	16.0	12.0	10.5	11.5	4.5	2.5	3.5	4.0	2.0	3.0
15	17.5	15.0	16.0	13.0	12.0	12.5	3.0	2.0	2.5	5.0	3.5	4.5
16	17.0	14.5	16.0	13.0	9.0	11.5	1.5	.5	1.5	6.0	4.5	5.5
17	16.5	15.0	16.0	10.5	7.5	9.0	1.0	.0	.5	6.0	5.5	5.5
18	15.0	14.5	15.0	11.5	10.5	11.0	2.0	.5	1.0	7.5	5.5	6.5
19	14.0	12.5	13.0	12.0	10.5	11.0	1.5	1.0	1.5	7.0	5.0	6.0
20	13.0	10.0	12.0	12.0	11.0	11.5	3.0	1.5	2.0	5.5	5.0	5.5
21	11.5	10.0	10.5	11.0	9.0	10.0	1.5	.0	.5	6.5	5.5	6.0
22	12.0	10.5	11.0	9.0	8.0	9.0	.0	.0	.0	5.5	4.0	5.0
23	13.0	10.5	11.5	8.5	7.0	8.0	.0	.0	.0	5.5	4.0	4.5
24	13.5	11.5	12.5	8.0	7.0	7.5	.0	.0	.0	6.5	5.5	6.0
25	13.0	10.5	12.0	8.0	6.0	7.0	.5	.0	.0	6.0	5.5	6.0
26	13.0	11.0	12.0	9.5	8.0	9.0	.5	.0	.0	6.0	4.5	5.5
27	12.5	11.0	12.0	9.0	8.5	9.0	2.0	.0	.5	5.0	3.0	4.0
28	12.5	10.5	12.0	10.0	9.0	9.5	2.5	1.5	2.0	6.0	3.5	4.5
29	12.5	11.0	12.0	9.0	7.0	8.0	4.5	2.5	3.5	5.5	5.0	5.0
30	13.0	12.0	12.5	7.0	5.5	6.5	5.0	3.5	4.5	5.5	4.0	5.0
31	14.0	13.0	13.5	---	---	---	---	---	---	5.5	3.5	4.5
MONTH	17.5	10.0	13.5	13.5	5.5	10.0	8.0	.0	3.5	7.5	2.0	4.5

JAMES RIVER BASIN

02012800 JACKSON RIVER AT FILTRATION PLANT, AT COVINGTON, VA--Continued

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	FEBRUARY			MARCH			APRIL			MAY		
1	6.0	3.5	4.5	7.5	5.0	6.5	10.5	8.0	9.5	16.0	14.5	15.5
2	6.0	4.5	5.0	7.5	6.0	6.5	9.5	7.5	9.0	15.5	14.0	15.0
3	6.0	5.0	5.5	8.0	6.5	7.0	9.0	7.5	8.0	15.0	13.5	14.5
4	7.0	5.5	6.5	7.5	5.0	6.5	9.0	7.0	7.5	15.0	13.5	14.5
5	6.0	4.5	5.5	8.0	5.0	6.5	12.0	8.5	10.0	15.5	14.0	14.5
6	5.5	4.0	5.0	8.5	5.5	7.0	11.5	8.0	9.0	14.5	12.5	13.5
7	5.5	5.0	5.0	8.0	6.5	7.5	9.5	7.0	8.0	16.0	11.5	13.5
8	7.0	5.0	5.5	7.5	5.0	6.5	10.5	6.5	8.5	17.0	12.0	14.5
9	7.0	4.5	6.0	7.5	6.5	7.0	10.5	7.0	9.0	16.5	13.5	14.5
10	7.0	6.0	6.5	10.5	7.0	8.5	10.0	7.0	8.5	15.5	14.0	15.0
11	6.5	5.0	5.5	10.5	9.0	9.5	10.0	9.0	9.5	16.5	13.0	14.5
12	6.5	5.0	5.5	11.0	9.0	10.0	10.5	8.5	9.0	16.0	13.0	14.0
13	8.0	5.0	6.0	11.5	9.5	10.5	11.5	7.0	9.5	15.5	13.0	14.5
14	8.0	5.5	7.0	12.0	9.5	10.5	12.0	8.5	10.0	17.5	14.0	15.5
15	8.5	6.0	7.5	11.5	10.5	11.0	12.5	9.5	11.0	18.0	13.5	16.0
16	8.5	7.0	7.5	11.5	10.0	11.0	13.0	9.0	11.0	18.0	15.0	16.5
17	7.0	5.5	6.5	10.0	9.0	9.5	12.5	9.5	10.5	17.5	15.0	16.5
18	6.5	4.5	5.5	10.5	8.0	9.5	12.5	8.0	10.5	18.0	14.5	16.5
19	7.5	6.0	7.0	9.0	7.0	7.5	12.5	9.0	11.5	18.5	15.5	17.0
20	7.0	5.0	6.5	7.0	5.5	6.5	13.5	12.0	13.0	17.5	16.0	16.5
21	7.0	4.0	6.0	9.0	5.5	7.0	13.5	12.5	13.0	19.0	16.0	17.5
22	7.0	5.0	6.0	9.5	5.5	8.0	16.0	11.5	13.5	18.0	14.0	16.0
23	8.0	7.0	7.5	10.5	7.0	9.0	16.5	13.0	15.0	16.5	13.5	15.0
24	7.0	5.0	6.0	9.5	6.5	7.5	17.0	14.0	15.5	16.5	14.0	15.5
25	5.0	2.5	3.5	7.5	6.5	7.0	17.0	14.5	16.0	16.0	14.0	15.0
26	5.5	2.0	4.0	9.0	6.0	7.5	16.5	14.5	16.0	17.5	15.0	16.0
27	6.5	4.5	5.5	9.0	5.5	7.5	17.0	14.5	16.0	18.5	15.5	17.0
28	7.5	6.0	7.0	9.0	5.5	7.5	16.5	14.5	15.5	17.5	15.0	16.0
29	---	---	---	8.5	7.0	7.5	15.0	13.5	14.0	15.0	14.0	14.5
30	---	---	---	9.5	7.0	8.0	15.5	12.5	14.0	16.5	11.0	14.0
31	---	---	---	10.5	8.0	9.0	---	---	---	12.5	10.0	11.0
MONTH	8.5	2.0	6.0	12.0	5.0	8.0	17.0	6.5	11.5	19.0	10.0	15.0
	JUNE			JULY			AUGUST			SEPTEMBER		
1	13.0	10.0	11.5	20.5	18.5	19.5	21.5	18.5	20.0	20.5	18.0	19.0
2	13.0	9.5	11.5	21.0	17.5	19.0	20.5	18.5	19.5	20.5	18.5	19.5
3	15.5	10.5	12.0	21.5	18.5	20.0	21.0	18.5	20.0	21.0	18.5	19.5
4	16.5	14.5	15.5	21.5	18.5	20.0	21.0	19.5	20.5	19.5	18.0	19.0
5	18.0	14.5	16.0	21.5	20.0	20.5	20.5	19.0	19.5	20.5	17.5	19.0
6	19.5	14.5	17.5	22.0	20.0	21.0	19.5	18.5	19.0	21.5	18.5	19.5
7	19.5	16.5	18.0	21.0	19.5	20.0	21.5	18.0	19.5	21.5	19.0	20.0
8	20.0	18.0	19.0	21.5	19.0	20.0	19.5	18.5	19.0	19.0	17.5	18.5
9	19.5	18.0	19.0	22.0	19.5	21.0	19.5	18.5	19.0	18.5	17.0	17.5
10	19.5	17.5	19.0	22.0	20.5	21.5	21.5	18.0	19.5	21.0	17.5	19.0
11	19.0	16.0	18.0	22.5	20.5	21.0	21.0	19.5	20.0	20.0	18.5	19.0
12	19.0	16.0	17.5	21.0	20.0	20.5	21.0	19.0	20.0	20.5	18.0	19.0
13	19.5	16.5	18.0	20.0	18.0	19.0	21.0	19.5	20.0	19.0	18.0	18.5
14	21.0	18.0	19.5	19.0	17.5	18.0	20.5	19.5	20.0	20.0	17.5	18.5
15	20.5	17.5	19.0	20.5	17.5	19.0	21.0	19.0	20.0	20.0	17.0	18.5
16	19.5	17.0	18.0	21.0	17.5	19.5	20.5	19.5	20.0	19.0	17.0	18.0
17	21.5	18.5	20.0	20.0	18.5	19.5	21.0	19.0	20.0	18.0	15.5	16.5
18	21.0	20.0	20.5	21.5	19.0	20.0	20.0	19.0	19.5	16.0	14.5	15.0
19	21.0	19.0	20.0	20.5	19.5	20.0	21.0	19.0	20.0	16.0	15.0	15.5
20	20.0	18.0	19.0	21.5	19.5	20.5	21.5	19.5	20.5	16.5	15.5	16.0
21	21.0	19.0	19.5	22.0	19.5	20.5	21.0	19.0	20.0	17.0	15.5	16.0
22	20.0	19.0	19.5	21.5	19.5	20.5	19.0	18.0	18.5	18.0	16.5	17.0
23	21.0	18.5	19.5	20.5	19.5	20.0	19.5	18.0	18.5	16.5	14.0	15.5
24	20.5	18.5	19.5	21.0	18.0	19.5	18.5	18.0	18.5	16.5	13.5	14.5
25	20.0	17.5	18.5	21.0	19.0	20.0	20.5	18.0	19.0	16.5	14.0	15.0
26	20.5	17.5	19.0	21.0	19.5	20.5	21.5	19.5	20.5	17.0	15.0	16.0
27	21.0	19.0	20.0	21.0	18.5	20.0	21.5	16.5	19.5	18.0	15.5	16.5
28	21.5	18.5	20.0	21.0	19.5	20.0	22.0	19.5	20.5	18.0	16.0	17.0
29	21.5	19.0	20.5	22.0	19.0	20.5	20.5	19.0	20.0	18.0	16.0	17.0
30	21.0	20.0	20.5	21.0	19.5	20.5	19.5	18.0	18.5	17.0	16.0	16.5
31	---	---	---	21.5	20.0	20.5	20.5	17.0	19.0	---	---	---
MONTH	21.5	9.5	18.0	22.5	17.5	20.0	22.0	16.5	19.5	21.5	13.5	17.5
YEAR	22.5	.0	12.5									

02013000 DUNLAP CREEK NEAR COVINGTON, VA

LOCATION.--Lat 37°48'10", long 80°02'50", Alleghany County, Hydrologic Unit 02080201, on right bank 20 ft downstream from bridge on U.S. Highway 60, 2.2 mi downstream from Ogle Creek, and 3.0 mi west of Covington.

DRAINAGE AREA.--164 mi².

PERIOD OF RECORD.--October 1928 to current year. Monthly discharge only for some periods, published in WSP 1303.

REVISED RECORDS.--WSP 972: 1929-30, 1932-34, 1942. WSP 1303: 1929-35(M), 1937-38(M), 1941-48(M). WSP 2104:

Drainage area. WDR VA-74-1: 1969(M), 1972, 1973(P).

GAGE.--Water-stage recorder. Datum of gage is 1,294.70 ft above National Geodetic Vertical Datum of 1929. Prior to Dec. 8, 1949, nonrecording gage at same site and datum.

REMARKS.--Records good except those for period with ice effect, Dec. 14-30, and period of doubtful gage-height record, July 20-31, which are fair. Occasional diurnal fluctuation caused by dam 7.9 mi upstream from station. U.S. Army Corps of Engineers satellite precipitation and gage-height telemeter at station. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

AVERAGE DISCHARGE.--62 years, 168 ft³/s, 13.91 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 27,400 ft³/s, June 21, 1972, gage height, 15.65 ft, from rating curve extended above 4,500 ft³/s on basis of step-backwater computations and contracted-opening measurement at gage height 15.65 ft; minimum, 2.0 ft³/s, July 4, 1970; minimum daily, 7.0 ft³/s, Sept. 9, 1966; minimum gage height, 0.69 ft, June 6, July 14, 1969.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in March 1913 reached a stage of 18 ft, from information by local residents.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 2,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Oct. 1	2130	2,010	5.33	Nov. 16	1400	4,000	7.37
Oct. 17	2200	3,790	7.16	Dec. 31	1800	*5,640	*8.73
Oct. 19	0900	2,550	5.94	May 29	1330	2,440	5.82

Minimum discharge, 15 ft³/s, Sept. 5-7, part of each day Sept. 27-29; minimum daily, 15 ft³/s, Sept. 6, 7; minimum gage height, 1.32 ft, Sept. 5-7.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	891	105	165	2670	261	277	174	102	301	36	19	17
2	1480	96	149	832	237	277	157	99	222	41	18	17
3	773	90	141	512	277	339	145	96	196	38	18	16
4	447	85	127	397	1070	361	137	94	169	33	18	16
5	305	81	123	374	887	317	127	107	139	32	18	16
6	230	77	115	336	556	273	154	107	118	33	20	15
7	185	75	104	283	421	231	655	102	102	29	20	15
8	152	78	102	313	326	201	516	92	91	29	18	18
9	131	87	95	496	276	191	384	86	86	29	18	18
10	113	83	89	487	722	177	316	106	150	27	18	21
11	103	78	89	438	864	159	286	134	109	28	24	19
12	92	76	93	377	595	146	234	127	86	32	20	18
13	84	72	96	297	442	132	198	121	73	30	19	31
14	78	68	e76	241	366	125	177	110	67	48	20	28
15	73	68	e68	218	309	120	171	96	63	143	19	23
16	69	2440	e62	196	316	186	159	101	61	79	18	20
17	1400	1070	e58	176	346	662	146	95	57	51	18	19
18	1460	526	e55	166	321	624	135	85	54	40	17	17
19	1990	357	e52	155	309	417	117	77	52	36	18	18
20	940	287	e50	145	270	324	108	73	49	e33	17	18
21	536	242	e48	149	229	265	109	76	49	e30	20	18
22	367	201	e47	140	216	242	125	332	51	e27	34	19
23	271	185	e46	130	226	233	119	546	61	e25	42	19
24	221	155	e45	124	335	235	111	332	56	e24	34	18
25	189	136	e44	145	337	366	104	229	47	e23	29	17
26	166	151	e44	245	283	463	99	182	44	e22	25	17
27	147	204	e43	277	271	388	95	186	41	e21	23	16
28	132	217	e42	259	280	311	93	192	41	e20	21	16
29	121	202	e41	246	---	256	113	1580	41	e20	19	16
30	113	178	e40	290	---	217	107	925	34	e19	19	16
31	108	---	2530	294	---	199	---	462	---	e19	18	---
TOTAL	13367	7770	4879	11408	11348	8714	5571	7052	2710	1097	659	552
MEAN	431	259	157	368	405	281	186	227	90.3	35.4	21.3	18.4
MAX	1990	2440	2530	2670	1070	662	655	1580	301	143	42	31
MIN	69	68	40	124	216	120	93	73	34	19	17	15
CFSM	2.63	1.58	.96	2.24	2.47	1.71	1.13	1.39	.55	.22	.13	.11
IN.	3.03	1.76	1.11	2.59	2.57	1.98	1.26	1.60	.61	.25	.15	.13

CAL YR 1989 TOTAL 89545 MEAN 245 MAX 2620 MIN 25 CFSM 1.50 IN. 20.31
WTR YR 1990 TOTAL 75127 MEAN 206 MAX 2670 MIN 15 CFSM 1.26 IN. 17.04

e Estimated.

02013100 JACKSON RIVER BELOW DUNLAP CREEK, AT COVINGTON, VA

LOCATION.--Lat 37°47'19", long 80°00'03", Covington City, Hydrologic Unit 02080201, on left bank in city recreation park and 0.5 mi downstream from Dunlap Creek.

DRAINAGE AREA.--614 mi².

PERIOD OF RECORD.--October 1974 to current year.

REVISED RECORDS.--WDR VA-76-1: 1975(M).

GAGE.--Water-stage recorder. Datum of gage is 1,206.53 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--No estimated daily discharges. Records good. Small diurnal fluctuation at low flow caused by Westvaco plant 0.8 mi upstream and occasionally by dam on Dunlap Creek 12.7 mi upstream. Flow regulated since December 1979 by Moomaw Lake (station 02011795) 19.9 mi upstream; since October 1984 by Back Creek Lake 47.9 mi upstream, amount unknown; and since January 1985 by Little Back Creek Lake 51.0 mi upstream, amount unknown. Diversion by Westvaco plant averages 47 ft³/s for industrial use of which approximately 42 ft³/s is returned upstream from station. Diversion 2.0 mi upstream from station for city of Covington water supply averages less than 4.0 ft³/s. U.S. Army Corps of Engineers satellite gage-height telemeter at station. Several measurements of water temperature were made during the year.

AVERAGE DISCHARGE.--16 years, 721 ft³/s, 15.95 in/yr, unadjusted.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 31,300 ft³/s, Nov. 4, 1985, gage height, 23.31 ft, from rating curve extended above 19,000 ft³/s; minimum, 41 ft³/s, Jan. 5, 1981, gage height, 4.38 ft, result of freezeup; minimum daily, 67 ft³/s, Sept. 3, 27-29, 1981.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 21, 1972, reached a stage of 24.36 ft, discharge, 34,000 ft³/s, from floodmarks, and flood of Dec. 27, 1973, reached a stage of 22.09 ft, from floodmarks, discharge, 28,300 ft³/s, from rating curve extended above 19,000 ft³/s.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 7,320 ft³/s, Dec. 31, gage height, 10.85 ft; minimum, 194 ft³/s, Sept. 30; minimum daily, 241 ft³/s, Dec. 23, 29; minimum gage height, 4.65 ft, Dec. 22.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1350	420	550	4120	1450	712	847	390	2840	360	326	274
2	2530	400	469	3650	1420	734	807	420	2730	355	322	274
3	2190	386	460	3210	1400	875	744	423	2090	353	321	273
4	1760	342	429	3090	2370	924	680	452	1170	346	317	273
5	1560	335	365	2770	2690	816	602	558	794	341	318	271
6	1450	326	334	1570	3190	767	653	606	610	347	324	274
7	1170	323	364	1480	3010	726	1570	729	528	342	321	278
8	713	328	408	1520	2330	688	1520	661	453	346	315	283
9	568	344	402	1720	1420	650	1310	537	478	342	312	283
10	524	332	425	1660	1970	538	1220	623	690	340	308	281
11	424	324	424	1370	2780	514	1310	736	717	343	334	279
12	390	318	435	1170	3160	499	1310	718	541	361	318	289
13	380	313	435	996	2210	478	1050	745	402	355	316	290
14	368	308	328	920	1330	465	955	790	389	436	312	294
15	336	310	321	819	1190	459	835	708	381	889	310	289
16	330	3210	309	576	1170	510	763	597	381	516	306	283
17	1920	2340	272	543	1250	1080	672	591	371	426	310	279
18	2200	3350	295	552	998	1220	594	540	370	389	302	277
19	2970	3100	285	607	877	1230	491	426	366	372	303	280
20	2930	2260	283	600	829	1240	393	367	358	366	301	279
21	3010	1120	261	672	778	1070	394	400	361	364	309	276
22	2740	873	246	728	764	850	402	770	362	349	353	282
23	2220	681	241	582	812	831	396	1060	376	348	352	277
24	1130	614	246	593	991	823	382	821	368	345	334	274
25	745	509	247	678	972	1040	376	656	353	340	320	274
26	585	533	249	896	826	1280	369	595	347	336	312	272
27	551	621	243	1190	716	1130	362	610	344	328	308	269
28	514	677	247	1330	720	1030	362	628	341	329	302	269
29	462	649	241	1150	---	941	393	2190	337	330	301	268
30	426	589	245	1320	---	899	386	2240	345	329	299	256
31	424	---	3090	1480	---	877	---	2980	---	327	270	---
TOTAL	38870	26235	13149	43562	43623	25896	22148	24567	20193	11650	9756	8320
MEAN	1254	874	424	1405	1558	835	738	792	673	376	315	277
MAX	3010	3350	3090	4120	3190	1280	1570	2980	2840	889	353	294
MIN	330	308	241	543	716	459	362	367	337	327	270	256
(*)	0	-3	-5	+34	-65	+16	+8	+177	-237	-73	-156	-158
MEAN#	1254	872	419	1439	1493	851	746	969	436	303	159	119
CFSM#	2.04	1.42	.68	2.34	2.43	1.39	1.21	1.58	.71	.49	.26	.19
IN.#	2.35	1.58	.79	2.70	2.53	1.60	1.36	1.82	.79	.57	.30	.22

CAL YR 1989 TOTAL 322931 MEAN 885 MAX 5560 MIN 241 MEAN# 944 CFSM# 1.54 IN.# 20.87
WTR YR 1990 TOTAL 287969 MEAN 789 MAX 4120 MIN 241 MEAN# 751 CFSM# 1.22 IN.# 16.61

* Change in contents, equivalent in cubic feet per second, in Moomaw Lake; provided by U.S. Army Corps of Engineers.

Adjusted for change in contents.

02014000 POTTS CREEK NEAR COVINGTON, VA

LOCATION.--Lat 37°43'44", long 80°02'33", Alleghany County, Hydrologic Unit 02080201, on left bank at downstream side of bridge on State Highway 18, 0.8 mi downstream from Blue Spring Creek, and 5.2 mi southwest of Covington.

DRAINAGE AREA.--153 mi².

PERIOD OF RECORD.--October 1928 to September 1956, October 1965 to current year.

REVISED RECORDS.--WSP 1723: 1935, 1936(M), 1940(M), 1942(M), 1948-49(M), 1951-52(M), 1954(M). WSP 2104: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,273.93 ft above National Geodetic Vertical Datum of 1929. Prior to Sept. 30, 1956, nonrecording gage at site 1.3 mi downstream at different datum.

REMARKS.--Records good except for period with ice effect, Dec. 14-30, which is fair. U.S. Army Corps of Engineers satellite gage-height telemeter at station. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

AVERAGE DISCHARGE.--53 years, 179 ft³/s, 15.89 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 15,400 ft³/s, Nov. 4, 1985, gage height, 13.46 ft, from rating curve extended above 12,000 ft³/s; minimum observed, 13 ft³/s, Nov. 29, 1930.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 2,400 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Oct. 17	2130	*3,880	*8.32	Jan. 1	0100	2,840	7.53
Oct. 19	1000	2,460	7.20				

Minimum discharge, 24 ft³/s, Sept. 29-30, gage height, 2.47 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	927	163	189	1810	254	286	186	149	404	53	37	32
2	1540	148	175	801	235	278	173	143	310	69	36	31
3	966	140	167	531	242	318	164	137	261	57	35	31
4	626	132	152	419	661	300	156	131	229	52	35	30
5	452	125	153	367	623	274	149	192	194	49	34	29
6	352	121	144	313	515	251	157	225	167	47	39	29
7	287	119	134	275	450	229	356	201	148	46	39	30
8	244	118	131	336	377	208	299	177	132	44	36	31
9	216	127	127	516	328	202	269	158	128	44	35	31
10	190	121	119	440	492	191	249	159	129	42	34	34
11	173	113	118	394	528	176	247	157	112	42	47	31
12	156	106	121	353	477	165	228	139	101	45	41	33
13	144	101	125	296	442	154	204	132	94	46	38	52
14	135	98	e100	252	402	148	190	126	89	99	36	50
15	126	98	e86	235	364	142	185	116	85	266	37	39
16	121	1490	e80	215	394	142	174	225	88	125	34	33
17	1890	931	e76	196	437	208	163	189	84	86	34	30
18	1830	571	e72	185	384	290	154	152	78	79	33	28
19	2040	412	e68	173	371	256	140	128	77	70	33	28
20	1140	339	e66	164	333	242	132	116	72	67	32	28
21	735	291	e64	167	293	221	133	121	72	61	38	29
22	523	248	e61	157	277	204	177	493	79	55	49	32
23	397	234	e60	147	333	192	163	799	86	51	79	33
24	327	200	e59	140	603	191	156	497	80	49	76	31
25	280	180	e58	158	445	247	147	346	70	47	57	28
26	247	198	e58	209	357	286	140	278	65	44	47	27
27	221	249	e56	211	333	266	133	267	62	42	42	26
28	200	238	e55	204	320	243	129	258	59	41	39	25
29	183	221	e54	205	---	225	163	1230	56	39	36	24
30	170	201	e53	297	---	210	156	986	54	39	34	24
31	164	---	e61	286	---	201	---	588	---	39	33	---
TOTAL	17002	7833	3842	10452	11270	6946	5472	9015	3665	1935	1255	939
MEAN	548	261	124	337	402	224	182	291	122	62.4	40.5	31.3
MAX	2040	1490	861	1810	661	318	356	1230	404	266	79	52
MIN	121	98	53	140	235	142	129	116	54	39	32	24
CFSM	3.58	1.71	.81	2.20	2.63	1.46	1.19	1.90	.80	.41	.26	.20
IN.	4.13	1.90	.93	2.54	2.74	1.69	1.33	2.19	.89	.47	.31	.23

CAL YR 1989 TOTAL 91759 MEAN 251 MAX 2970 MIN 39 CFSM 1.64 IN. 22.31
WTR YR 1990 TOTAL 79626 MEAN 218 MAX 2040 MIN 24 CFSM 1.43 IN. 19.36

e Estimated.

02015700 BULLPASTURE RIVER AT WILLIAMSVILLE, VA

LOCATION.--Lat 38°11'43", long 79°34'14", Bath County, Hydrologic Unit 02080201, on left bank 15 ft downstream from bridge on State Highway 614 at Williamsville and 0.62 mi upstream from mouth.

DRAINAGE AREA.--110 mi².

PERIOD OF RECORD.--August 1960 to current year.

REVISED RECORDS.--WSP 2104: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,610.14 ft above National Geodetic Vertical Datum of 1929. Prior to July 12, 1974, at site 700 ft upstream at datum 11.84 ft higher.

REMARKS.--Records good except those for periods with ice effect, Dec. 14, 15, 23, 24, and period of no gage-height record, Dec. 16-22, which are fair. Several measurements of water temperature were made during the year.

COOPERATION.--Records were provided by the Virginia Water Control Board.

AVERAGE DISCHARGE.--30 years, 149 ft³/s, 18.39 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 22,900 ft³/s, Nov. 4, 1985, gage height, 14.39 ft, from floodmarks, from rating curve extended above 3,300 ft³/s on basis of slope-area measurement of peak flow; minimum, 19 ft³/s, Jan. 4, 1981, result of freezeup; minimum daily, 23 ft³/s, Sept. 8, 9, 1964.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 2,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Nov. 16	0800	*3,520	*5.73	Dec. 31	1700	2,760	5.20

Minimum daily discharge, 34 ft³/s, Aug. 13-15, 17-21.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	236	107	112	1170	284	136	168	93	290	66	36	42
2	624	97	107	500	248	132	160	90	237	65	35	42
3	400	93	107	340	318	138	156	86	282	52	35	40
4	269	88	95	305	822	127	148	90	237	50	35	40
5	218	84	103	319	600	120	138	129	198	48	38	39
6	183	80	101	290	420	114	146	101	173	48	59	39
7	160	80	95	242	352	110	180	95	156	47	50	38
8	138	99	88	223	281	103	214	90	138	47	39	38
9	125	134	88	200	245	103	260	86	129	48	36	38
10	112	110	84	203	742	105	281	146	132	47	35	39
11	107	99	86	188	526	99	290	143	114	45	35	39
12	99	95	86	180	388	97	248	122	101	68	35	38
13	91	90	86	153	312	91	216	143	93	58	34	42
14	88	86	e68	138	269	90	198	160	90	60	34	91
15	82	86	e68	136	234	88	196	136	88	156	34	58
16	78	1830	e65	134	237	138	178	132	88	117	35	47
17	328	698	e60	132	218	362	160	122	80	72	34	44
18	285	396	e66	132	183	322	143	112	80	58	34	42
19	1020	281	e68	127	180	242	132	101	77	51	34	42
20	520	245	e72	132	168	213	122	95	72	51	34	43
21	344	210	e60	146	153	188	127	97	70	51	34	42
22	257	180	e57	132	158	170	127	101	68	47	38	44
23	208	170	e54	125	180	158	116	105	72	48	116	47
24	180	150	e56	120	176	148	110	90	63	45	93	42
25	163	138	60	173	150	163	103	82	58	42	120	38
26	148	148	62	322	127	180	99	511	56	40	73	38
27	134	143	62	245	138	183	97	905	54	39	58	38
28	122	132	63	218	148	170	93	572	52	39	51	36
29	116	122	63	328	---	166	103	1300	51	38	47	35
30	110	114	65	532	---	160	99	700	50	36	45	35
31	110	---	927	360	---	180	---	408	---	36	43	---
TOTAL	7055	6385	3234	7945	8257	4796	4808	7143	3449	1715	1459	1276
MEAN	228	213	104	256	295	155	160	230	115	55.3	47.1	42.5
MAX	1020	1830	927	1170	822	362	290	1300	290	156	120	91
MIN	78	80	54	120	127	88	93	82	50	36	34	35
CFSM	2.07	1.93	.95	2.33	2.68	1.41	1.46	2.09	1.05	.50	.43	.39
IN.	2.39	2.16	1.09	2.69	2.79	1.62	1.63	2.42	1.17	.58	.49	.43

CAL YR 1989 TOTAL 75816 MEAN 208 MAX 1830 MIN 48 CFSM 1.89 IN. 25.64
WTR YR 1990 TOTAL 57522 MEAN 158 MAX 1830 MIN 34 CFSM 1.43 IN. 19.45

e Estimated.

02016000 COWPASTURE RIVER NEAR CLIFTON FORGE, VA

LOCATION.--Lat 37°47'30", long 79°45'35", Alleghany County, Hydrologic Unit 02080201, on left bank 100 ft downstream from bridge on State Highway 633, 2.5 mi upstream from confluence with Jackson River, and 4.0 mi southeast of Clifton Forge.

DRAINAGE AREA.--461 mi².

PERIOD OF RECORD.--March 1925 to current year. Records for May 1907 to August 1908, published in WSP 242, are unreliable and should not be used.

REVISED RECORDS.--WSP 952: 1925-41. WSP 2104: Drainage area. See also PERIOD OF RECORD.

GAGE.--Water-stage recorder. Datum of gage is 1,006.93 ft above National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers). Prior to October 1934, nonrecording gage at site 100 ft upstream at present datum.

REMARKS.--Records good except for period with ice effect, Dec. 16-30, which is fair. Low flow affected by springs and by occasional regulation from unknown source. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

AVERAGE DISCHARGE.--65 years, 531 ft³/s, 15.64 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 40,900 ft³/s, Nov. 5, 1985, gage height, 19.15 ft, from rating curve extended above 13,000 ft³/s on basis of slope-area measurements at gage heights 15.70 ft and 19.15 ft; minimum, 38 ft³/s, Sept. 2, 1932; minimum daily, 40 ft³/s, Sept. 1, 1932; minimum gage height, 1.43 ft, Jan. 31, 1981, result of freezeup.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in March 1913 reached a stage of 20.8 ft, from floodmarks, discharge, about 45,000 ft³/s, from rating curve extended above 13,000 ft³/s on basis of records for other stations in James River basin.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 5,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Oct. 2	1330	5,530	7.44	Nov. 16	2400	*10,700	*10.07
Oct. 17	1530	6,800	8.17	Jan. 1	0830	10,000	9.76
Oct. 17	2300	5,470	7.40	May 29	2330	6,460	7.98
Oct. 19	2030	5,160	7.21				

Minimum discharge, 79 ft³/s, Aug. 20; minimum gage height, 1.65 ft, Sept. 30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	772	347	399	7430	1100	603	600	368	1250	144	95	108
2	3920	329	379	2920	914	557	560	330	918	147	91	103
3	2450	304	362	1650	923	568	568	317	762	158	90	100
4	1370	285	343	1240	2960	536	536	304	753	142	87	98
5	937	273	326	1160	3030	487	506	499	616	132	90	96
6	723	420	326	1170	1930	452	546	548	514	129	96	94
7	588	550	311	1020	1450	419	1550	430	446	125	100	96
8	490	447	311	966	1150	390	1370	380	397	124	115	96
9	420	273	305	1020	938	378	1120	346	364	123	98	97
10	374	327	276	930	1970	376	1120	470	411	124	88	98
11	338	294	265	896	2730	366	1150	727	383	123	94	96
12	313	273	279	812	1770	349	1010	561	313	137	84	94
13	288	260	292	702	1280	335	839	489	279	185	84	101
14	269	249	280	588	1040	322	721	479	259	211	84	127
15	252	242	263	533	882	312	671	456	249	406	88	134
16	237	7990	e212	506	843	309	630	417	243	604	84	145
17	2940	5320	e200	473	888	458	562	438	233	366	82	117
18	2680	1990	e232	448	764	997	512	377	220	238	80	106
19	3960	1290	e245	433	705	939	459	336	213	189	80	103
20	3340	967	e260	418	659	808	415	309	207	163	79	105
21	1790	810	e205	428	589	706	403	322	199	200	84	102
22	1180	675	e188	438	553	625	411	643	200	158	95	107
23	877	607	e180	403	633	575	413	916	214	143	311	103
24	704	533	e185	384	1360	557	386	595	201	133	351	103
25	599	469	e200	468	1030	617	363	463	182	128	263	102
26	528	454	e220	1200	782	714	346	411	171	120	210	95
27	470	498	e230	1290	698	729	330	1400	163	112	183	92
28	423	494	e210	981	659	701	313	1850	157	107	144	91
29	390	463	e220	847	---	652	345	4940	150	103	127	89
30	363	424	e240	1380	---	612	422	4210	145	101	118	89
31	351	---	1770	1470	---	607	---	1930	---	101	111	---
TOTAL	34336	27857	9714	34604	34230	17056	19177	26261	10812	5376	3786	3087
MEAN	1108	929	313	1116	1222	550	639	847	360	173	122	103
MAX	3960	7990	1770	7430	3030	997	1550	4940	1250	604	351	145
MIN	237	242	180	384	553	309	313	304	145	101	79	89
CFSM	2.40	2.01	.68	2.42	2.65	1.19	1.39	1.84	.78	.38	.26	.22
IN.	2.77	2.25	.78	2.79	2.76	1.38	1.55	2.12	.87	.43	.31	.25

CAL YR 1989 TOTAL 317850 MEAN 871 MAX 10000 MIN 144 CFSM 1.89 IN. 25.65
WTR YR 1990 TOTAL 226296 MEAN 620 MAX 7990 MIN 79 CFSM 1.34 IN. 18.26

e Estimated.

JAMES RIVER BASIN

02016500 JAMES RIVER AT LICK RUN, VA

LOCATION.--Lat 37°46'25", long 79°47'05", Botetourt County, Hydrologic Unit 02080201, on right bank at community of Lick Run, 1,000 ft downstream from bridge on U.S. Highway 220, 0.9 mi downstream from confluence of Cowpasture and Jackson Rivers, 1.8 mi south of Iron Gate, and at mile 342.3.

DRAINAGE AREA.--1,373 mi².

PERIOD OF RECORD.--April 1925 to current year.

REVISED RECORDS.--WSP 852: 1936-37. WSP 972: 1927, 1930(M), 1932(M), 1935-36. WSP 1303: 1927-28(M). WSP 2104: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 978.30 ft above National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers). Prior to Oct. 26, 1928, nonrecording gage at same site and datum.

REMARKS.--Records good except for period with ice effect, Dec. 23-30, which is fair. Flow regulated since December 1979 by Moomaw Lake (station 02011795) 43.7 mi upstream from station; since October 1984 by Back Creek Lake 71.7 mi upstream; and since January 1985 by Little Back Creek Lake 74.8 mi upstream, amount unknown. National Weather Service gage-height telemeter at station. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

AVERAGE DISCHARGE.--65 years, 1,618 ft³/s, 16.00 in/yr, unadjusted.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 87,500 ft³/s, Nov. 5, 1985, gage height, 30.22 ft, from rating curve extended above 66,000 ft³/s; minimum, 133 ft³/s, Jan. 6, 1981, result of freezeup; minimum daily, 156 ft³/s, Oct. 12, 1930.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in November 1877 reached a stage of about 33 ft, discharge, about 120,000 ft³/s. Flood in March 1913 reached a stage of 30.4 ft, from floodmarks, discharge, about 98,000 ft³/s.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 20,000 ft³/s, Jan. 1, gage height, 13.23 ft; minimum, 361 ft³/s, part of each day Sept. 28-30, gage height, 1.91 ft; minimum daily, 364 ft³/s, Sept. 30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2930	1070	1290	16500	3100	1930	1930	1080	5290	680	451	404
2	10000	1000	1160	9430	2820	1860	1830	1090	4570	707	444	400
3	7110	958	1110	6660	2810	2060	1740	1080	3960	705	445	396
4	4590	884	1060	5750	6850	2140	1640	1060	2520	671	439	387
5	3460	842	972	5470	7380	1900	1500	1330	2110	650	445	382
6	2880	816	945	3650	6820	1770	1580	1530	1650	649	464	379
7	2430	791	887	3200	5840	1640	3690	1560	1400	635	462	379
8	1630	801	950	3150	4880	1530	3830	1480	1220	631	469	398
9	1340	851	940	3920	3090	1490	3210	1250	1210	631	453	394
10	1210	884	916	3640	5080	1360	3020	1420	1460	626	438	393
11	1060	830	910	3160	7220	1280	3030	1770	1520	622	480	387
12	959	786	933	2730	6580	1230	3000	1660	1270	656	457	380
13	896	750	964	2290	5240	1170	2450	1570	1030	718	447	423
14	849	727	862	1970	3120	1130	2250	1610	956	811	449	452
15	776	725	755	1820	2780	1100	2020	1550	918	1640	443	444
16	734	13700	708	1470	2620	1100	1870	1410	904	1490	438	437
17	6560	10400	597	1350	2920	1680	1700	1460	881	969	432	407
18	9770	7330	689	1290	2500	2640	1530	1320	847	764	429	388
19	11100	5820	680	1320	2290	2690	1360	1110	842	660	426	387
20	9250	4750	707	1280	2140	2600	1170	981	806	613	424	396
21	6850	2630	626	1310	1930	2390	1130	1030	805	626	442	390
22	5380	2120	567	1460	1840	1960	1180	1850	814	575	496	408
23	4430	1730	e540	1230	2020	1860	1160	3450	882	544	769	394
24	2630	1530	e640	1180	3540	1820	1100	2450	835	524	827	391
25	1900	1330	e610	1390	2950	2100	1050	1870	776	509	672	382
26	1550	1290	e570	2430	2440	2600	1020	1600	741	494	565	377
27	1400	1490	e560	2900	2150	2490	987	2490	718	477	534	371
28	1300	1540	e540	2890	2070	2360	965	3020	702	468	483	369
29	1190	1490	e550	2420	---	2170	1060	8900	684	461	458	366
30	1100	1360	e580	3160	---	2040	1150	8720	675	455	445	364
31	1070	---	4740	3620	---	2000	---	6610	---	460	417	---
TOTAL	108334	71225	28558	104040	105020	58090	55152	69311	42996	21121	15043	11825
MEAN	3495	2374	921	3356	3751	1874	1838	2236	1433	681	485	394
MAX	11100	13700	4740	16500	7380	2690	3830	8900	5290	1640	827	452
MIN	734	725	540	1180	1840	1100	965	981	675	455	417	364
(*)	0	-3	-5	+34	-65	+16	+8	+177	-237	-73	-156	-158
MEAN#	3495	2371	916	3390	3686	1890	1846	2413	1196	608	329	236
CFSM#	2.55	1.73	.67	2.47	2.68	1.38	1.34	1.76	.87	.44	.24	.17
IN.#	2.94	1.93	.77	2.85	2.80	1.59	1.50	2.03	.97	.51	.28	.19

CAL YR 1989 TOTAL 826326 MEAN 2264 MAX 19200 MIN 507 MEAN# 2323 CFSM# 1.69 IN.# 22.97
WTR YR 1990 TOTAL 690715 MEAN 1892 MAX 16500 MIN 364 MEAN# 1854 CFSM# 1.35 IN.# 18.33

* Change in contents, equivalent in cubic feet per second, in Moomaw Lake; provided by U.S. Army Corps of Engineers.

Adjusted for change in contents.

e Estimated.

02017500 JOHNS CREEK AT NEW CASTLE, VA

LOCATION.--Lat 37°30'22", long 80°06'25", Craig County, Hydrologic Unit 02080201, on right bank 20 ft downstream from bridge on State Highway 615 at New Castle and 1,700 ft upstream from mouth.

DRAINAGE AREA.--104 mi².

PERIOD OF RECORD.--April 1926 to current year.

REVISED RECORDS.--WSP 972: 1935-36(M), 1940(M). WSP 1203: 1928, 1935. WSP 1303: 1927(M), 1928, 1929-34(M), 1935. WSP 2104: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,254.30 ft above National Geodetic Vertical Datum of 1929. Prior to June 7, 1937, nonrecording gage at same site and datum.

REMARKS.--Records good except those for periods of doubtful or no gage-height record, Nov. 11-13, June 17, 18, and Sept. 6-30, and periods with ice effect, Dec. 16-18, 21-28, which are fair. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

COOPERATION.--Records were provided by the Virginia Water Control Board.

AVERAGE DISCHARGE.--64 years, 128 ft³/s, 16.71 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 8,000 ft³/s, Jan. 23, 1935, from rating curve extended above 3,200 ft³/s on basis of slope-area measurement of peak flow; maximum gage height, 12.48 ft, June 21, 1972; minimum discharge, 6.0 ft³/s, Dec. 5, 1946, result of freezeup; minimum daily, 6.6 ft³/s, Oct. 1, 1968.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 2,100 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Nov. 16	1200	*2,080	*8.33	No peak equal to or greater than base discharge.			

Minimum daily discharge, 12 ft³/s, Sept. 28.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1100	100	150	1040	259	231	165	115	453	25	16	18
2	1190	89	136	590	236	220	157	112	380	25	14	18
3	714	83	127	448	286	257	148	109	318	23	15	17
4	511	77	115	399	704	251	140	108	265	21	15	17
5	407	73	110	348	539	241	132	838	215	19	15	16
6	349	70	103	300	427	218	140	436	172	18	16	e15
7	293	68	94	254	366	197	274	336	144	18	17	e14
8	238	69	89	399	308	178	224	276	130	17	15	e16
9	199	75	86	515	265	170	202	226	113	17	15	e19
10	162	72	80	389	291	156	191	246	105	17	15	e18
11	137	e62	78	332	299	142	189	208	85	18	18	e17
12	115	e56	79	285	313	130	170	179	71	19	19	e18
13	100	e52	82	238	306	120	153	165	63	24	18	e24
14	88	49	82	204	282	113	143	147	56	58	18	e30
15	78	48	77	185	253	108	139	179	52	124	17	e23
16	68	1390	e75	166	301	110	131	340	53	79	16	e20
17	258	671	e72	151	389	177	123	195	e45	47	16	e18
18	445	476	e70	141	337	252	114	151	e38	51	15	e16
19	951	368	69	130	329	242	105	126	37	36	15	e14
20	614	306	69	121	289	228	99	111	34	30	14	e15
21	460	254	e68	121	251	201	109	117	38	27	18	e14
22	357	207	e63	112	230	183	123	727	35	23	29	e16
23	307	186	e59	105	300	167	111	700	35	21	65	e15
24	261	156	e57	100	546	156	106	472	31	20	57	e15
25	216	138	e53	126	389	197	102	380	28	19	38	e14
26	182	160	e55	193	314	215	99	317	27	17	30	e13
27	158	213	e56	183	294	203	96	275	25	17	25	e13
28	140	199	e57	176	268	191	94	371	23	16	22	e12
29	126	180	58	182	---	185	122	1340	22	16	21	e13
30	115	163	60	303	---	175	119	771	21	17	19	e15
31	107	---	634	287	---	171	---	549	---	16	19	---
TOTAL	10446	6110	3063	8523	9371	5785	4220	10622	3114	895	662	503
MEAN	337	204	98.8	275	335	187	141	343	104	28.9	21.4	16.8
MAX	1190	1390	634	1040	704	257	274	1340	453	124	65	30
MIN	68	48	53	100	230	108	94	108	21	16	14	12
CFSM	3.24	1.96	.95	2.64	3.22	1.79	1.35	3.29	1.00	.28	.21	.16
IN.	3.74	2.19	1.10	3.05	3.35	2.07	1.51	3.80	1.11	.32	.24	.18

CAL YR 1989 TOTAL 66066 MEAN 181 MAX 1470 MIN 17 CFSM 1.74 IN. 23.63
WTR YR 1990 TOTAL 63314 MEAN 173 MAX 1390 MIN 12 CFSM 1.67 IN. 22.65

e Estimated.

02018000 CRAIG CREEK AT PARR, VA

LOCATION.--Lat 37°39'57", long 79°54'42", Botetourt County, Hydrologic Unit 02080201, on right bank 12 ft upstream from Chesapeake and Ohio Railway bridge, 700 ft downstream from Stony Run, 0.2 mi northeast of Horton, 0.4 mi northwest of Parr, and 12 mi upstream from mouth.

DRAINAGE AREA.--329 mi².

PERIOD OF RECORD.--April 1925 to current year.

REVISED RECORDS.--WSP 852: 1937. WSP 892: 1935-36. WSP 1303: 1929-30(M), 1932-35(M), 1937-38(M). WSP 2104: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 992.50 ft above National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers). Prior to June 7, 1937, nonrecording gage at same site and datum.

REMARKS.--Records good except those for period with ice effect, Dec. 16-29, and periods of doubtful gage-height record, Jan. 10 and June 5, which are fair. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

AVERAGE DISCHARGE.--65 years, 387 ft³/s, 15.97 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 58,500 ft³/s, Nov. 4, 1985, gage height, 24.76 ft, from high-water mark in gage house, from rating curve extended above 11,000 ft³/s on basis of slope-area measurement of peak flow; minimum, 20 ft³/s, probably occurred Dec. 21, 25, 1980, or Jan. 4, 1981, gage height, 3.20 ft, result of freezeup; minimum daily, 25 ft³/s, Sept. 4, 1966.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 4,200 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Oct. 2	0700	5,460	9.76	Jan. 1	0630	5,650	9.89
Nov. 17	0030	*5,890	*10.05	May 29	2000	4,960	9.41

Minimum discharge, 48 ft³/s, Sept. 29, 30, gage height, 3.48 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1600	279	420	4670	813	629	654	277	1110	73	64	59
2	4780	254	386	2170	711	576	606	264	870	76	61	57
3	2530	233	352	1350	665	643	558	254	720	78	58	56
4	1420	218	321	1050	1530	704	500	247	617	73	57	54
5	989	203	298	930	1670	664	452	997	e530	69	58	53
6	790	194	285	793	1220	606	418	894	436	65	67	51
7	656	188	264	695	1000	542	922	666	360	61	65	52
8	542	188	252	724	849	480	956	556	308	60	62	52
9	464	199	249	1630	720	452	761	475	289	59	59	51
10	395	201	226	e1240	697	429	656	483	277	58	56	52
11	341	183	216	1020	774	389	617	555	246	59	59	53
12	295	168	225	876	757	356	543	456	200	59	65	56
13	259	160	248	731	775	329	465	417	176	60	67	60
14	232	152	243	611	728	306	413	381	161	109	65	104
15	211	149	228	543	661	290	397	333	150	1660	67	83
16	193	2570	e200	483	653	278	374	706	143	634	63	71
17	492	3120	e250	420	913	323	345	505	141	317	58	63
18	1480	1440	e210	386	885	514	322	376	132	350	58	57
19	2290	1010	e170	360	823	556	291	302	127	452	56	55
20	1970	818	e160	333	756	531	267	260	112	269	54	55
21	1320	699	e150	328	654	482	261	335	111	196	55	55
22	994	590	e140	310	600	433	328	1580	115	149	68	59
23	791	538	e130	287	653	400	314	3040	110	119	127	58
24	660	455	e135	268	1050	377	292	1510	113	102	244	57
25	565	395	e145	294	1070	410	276	998	101	93	154	56
26	484	382	e130	545	868	522	262	786	94	86	112	52
27	423	532	e125	665	779	529	251	689	88	79	93	51
28	374	567	e120	600	723	500	241	646	84	75	82	49
29	337	531	e130	562	---	475	268	3210	80	71	74	48
30	309	468	170	919	---	501	297	2960	75	71	67	48
31	289	---	646	991	---	538	---	1600	---	69	63	---
TOTAL	28475	17084	7224	26784	23997	14764	13307	26758	8076	5751	2358	1727
MEAN	919	569	233	864	857	476	444	863	269	186	76.1	57.6
MAX	4780	3120	646	4670	1670	704	956	3210	1110	1660	244	104
MIN	193	149	120	268	600	278	241	247	75	58	54	48
CFSM	2.79	1.73	.71	2.63	2.60	1.45	1.35	2.62	.82	.56	.23	.17
IN.	3.22	1.93	.82	3.03	2.71	1.67	1.50	3.03	.91	.65	.27	.20

CAL YR 1989 TOTAL 182082 MEAN 499 MAX 5020 MIN 45 CFSM 1.52 IN. 20.59
WTR YR 1990 TOTAL 176305 MEAN 483 MAX 4780 MIN 48 CFSM 1.47 IN. 19.93

e Estimated.

02018500 CATAWBA CREEK NEAR CATAWBA, VA

LOCATION.--Lat 37°28'05", long 80°00'20", Botetourt County, Hydrologic Unit 02080201, on right bank 80 ft upstream from bridge on State Highway 779, 1.0 mi downstream from Little Catawba Creek, 1.9 mi west of Haymarket town, and 8.2 mi northeast of Catawba.

DRAINAGE AREA.--34.3 mi².

PERIOD OF RECORD.--September 1943 to current year.

REVISED RECORDS.--WSP 1303: 1944-45(M). WSP 2104: Drainage area. WDR VA-72-1: 1954, 1955(P), 1957-58(P), 1959, 1960-62(P), 1963, 1964(M), 1965-67(P), 1968(M), 1969, 1970(M), 1971.

GAGE.--Water-stage recorder. Datum of gage is 1,299.96 ft above National Geodetic Vertical Datum of 1929. Prior to Aug. 1, 1953, nonrecording gage at site 80 ft downstream at same datum.

REMARKS.--Records good except those for periods with ice effect, Dec. 17-20, 22-28, which are fair. At a point 5.3 mi upstream from station, there is transmountain diversion through a tunnel into Roanoke River basin for municipal water supply of city of Roanoke since December 1974. Prior to October 1976, monthly means adjusted for pumpage by Citadel Cement Corporation. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

COOPERATION.--Records were provided by the Virginia Water Control Board.

AVERAGE DISCHARGE.--47 years, 36.9 ft³/s, 14.61 in/yr, adjusted for pumpage from October 1952 to September 1976, and transmountain diversion since December 1974.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 21,200 ft³/s, Nov. 4, 1985, gage height, 19.19 ft, from high-water mark, from rating curve extended above 1,700 ft³/s on basis of slope-area measurements at gage heights 10.35 ft and 19.19 ft; minimum, 0.28 ft³/s, Aug. 21, 1987, gage height, 0.99 ft, cause unknown; minimum daily, 0.67 ft³/s, Aug. 14, 1981.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in August 1940 reached a stage of 13.26 ft, from information by observer.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 1,250 ft³/s, May 22, gage height, 4.86 ft; minimum, 2.5 ft³/s, Sept. 27, gage height, 1.32 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	390	25	32	493	78	48	116	29	75	12	6.7	5.2
2	559	24	30	185	68	47	125	28	60	11	6.4	5.1
3	225	23	28	123	70	65	120	27	49	10	6.3	5.0
4	126	22	26	103	137	57	90	26	41	9.8	6.1	5.0
5	91	21	26	85	119	52	72	30	35	9.1	6.2	4.9
6	71	20	25	72	98	48	85	27	31	8.5	6.7	4.1
7	57	20	24	61	86	44	186	26	29	8.6	5.1	3.7
8	48	21	25	110	70	41	128	25	27	8.6	5.0	5.0
9	42	21	23	129	60	40	105	24	34	7.1	5.9	5.5
10	38	19	22	106	69	39	91	29	38	7.2	4.3	4.5
11	33	18	22	87	65	36	82	26	26	8.6	5.5	4.1
12	30	18	24	73	72	33	69	24	24	8.4	5.6	6.4
13	28	17	25	59	66	32	59	24	22	8.6	6.0	8.2
14	27	17	24	51	62	30	55	23	21	16	5.8	7.5
15	26	17	23	46	58	29	54	47	20	25	5.8	7.3
16	25	439	19	42	77	29	48	50	20	15	5.8	6.8
17	38	156	e19	37	85	49	45	30	18	11	6.2	6.0
18	41	95	e18	35	74	51	42	25	17	11	5.8	4.5
19	139	70	e18	32	75	43	38	23	16	14	4.1	3.3
20	95	55	e17	31	65	42	35	21	15	11	5.1	4.5
21	72	45	17	30	58	38	39	47	16	9.4	6.6	5.5
22	58	41	e17	29	57	36	37	414	16	9.5	9.2	6.1
23	46	39	e16	27	63	33	35	181	17	8.9	14	5.8
24	39	33	e16	27	78	33	34	98	14	8.3	11	5.4
25	34	31	e15	45	65	46	34	70	12	7.8	7.7	5.2
26	32	39	e15	76	58	44	33	51	11	7.9	6.5	5.1
27	30	43	e16	58	56	42	31	41	12	6.4	6.6	4.0
28	28	40	e16	52	53	40	31	75	12	5.9	5.7	2.9
29	27	37	17	70	---	53	32	374	11	7.5	5.7	4.4
30	26	33	21	129	---	60	30	187	11	7.3	5.5	5.8
31	26	---	373	95	---	119	---	108	---	6.9	5.3	---
TOTAL	2547	1499	1009	2598	2042	1399	1981	2210	750	306.3	198.2	156.8
MEAN	82.2	50.0	32.5	83.8	72.9	45.1	66.0	71.3	25.0	9.88	6.39	5.23
MAX	559	439	373	493	137	119	186	414	75	25	14	8.2
MIN	25	17	15	27	53	29	30	21	11	5.9	4.1	2.9
(*)	0	0	0	0	0	0	0	0	0	5.12	0	0
MEAN#	82.2	50.0	32.5	83.8	72.9	45.1	66.0	71.3	25.0	15.0	6.39	5.23
CFSM#	2.40	1.46	.95	2.44	2.13	1.32	1.93	2.08	.73	.44	.19	.15
IN.#	2.76	1.63	1.09	2.82	2.21	1.52	2.15	2.40	.81	.50	.21	.17

CAL YR 1989 TOTAL 15477.2 MEAN 42.4 MAX 734 MIN 4.6 MEAN# 48.4 CFSM# 1.41 IN.# 19.16
WTR YR 1990 TOTAL 16696.3 MEAN 45.7 MAX 559 MIN 2.9 MEAN# 46.1 CFSM# 1.34 IN.# 18.25

* Average diversion, equivalent in cubic feet per second, provided by city of Roanoke.

Adjusted for diversion.

e Estimated.

JAMES RIVER BASIN

02019500 JAMES RIVER AT BUCHANAN, VA

LOCATION.--Lat 37°31'50", long 79°40'45", Botetourt County, Hydrologic Unit 02080201, on left bank 300 ft upstream from bridge on U.S. Highway 11 at Buchanan, 1,000 ft upstream from Purgatory Creek, 1.5 mi downstream from Looney Creek, and at mile 306.4.

DRAINAGE AREA.--2,075 mi².

PERIOD OF RECORD.--February 1898 to current year. Monthly discharge only for some periods, published in WSP 1303.

Records for August 1895 to Feb. 11, 1898, published in WSP 11, 15, and 27 are in error and should not be used.

Gage-height records collected at this site since 1893 are contained in reports of the National Weather Service.

REVISED RECORDS.--WSP 602: 1917-24. WSP 972: 1935-36. WSP 1303: 1898-1916, 1917-20(M), 1922(M), 1924(M).

WSP 1383: 1927. WSP 2104: Drainage area. WDR VA-72-1: 1913(M). See also PERIOD OF RECORD.

GAGE.--Water-stage recorder. Datum of gage is 802.90 ft above National Geodetic Vertical Datum of 1929. Prior to July 1, 1927, nonrecording gage at same site and datum.

REMARKS.--Records good except those for periods with ice effect, Dec. 18-23, 26-30, which are fair. Flow regulated since December 1979 by Moomaw Lake (station 02011795) 79.6 mi upstream; since October 1984 by Back Creek Lake 107.6 mi upstream, amount unknown; and since January 1985 by Little Back Creek Lake 110.7 mi upstream, amount unknown. National Weather Service gage-height telemeter at station. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

AVERAGE DISCHARGE.--92 years, 2,485 ft³/s, 16.26 in/yr, unadjusted.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 179,000 ft³/s, Nov. 5, 1985, gage height, 38.84 ft, from floodmarks, from rating curve extended above 110,000 ft³/s; minimum, 202 ft³/s, Sept. 8, 1966, gage height 1.44 ft; minimum daily, 207 ft³/s, Sept. 12, 1966.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in November 1877 reached a stage of 34.9 ft, from floodmark, discharge, about 142,000 ft³/s, from rating curve extended above 110,000 ft³/s.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 29,800 ft³/s Jan. 1, gage height, 14.95 ft; minimum, 558 ft³/s, Sept. 30, gage height, 2.34 ft; minimum daily, 567 ft³/s, Sept. 30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	4160	1910	2470	24600	5030	3340	3530	1670	7840	939	708	668
2	19000	1820	2300	15200	4520	3140	3430	1600	6550	963	685	651
3	14700	1710	2130	9840	4310	3310	3310	1570	5860	967	672	642
4	8690	1610	2040	8080	8220	3520	3060	1540	4280	955	669	627
5	6190	1510	1930	7410	10800	3350	2820	2550	3500	911	670	613
6	5020	1460	1820	6070	9490	3110	2660	3570	2840	886	734	610
7	4330	1420	1720	4960	8130	2900	5320	2940	2400	872	719	611
8	3440	1410	1720	4840	7160	2680	6510	2660	2160	856	705	623
9	2780	1480	1770	6780	5190	2550	5300	2230	1990	859	706	636
10	2430	1510	1670	6270	5310	2450	4800	2380	2190	859	679	641
11	2180	1470	1640	5470	8810	2270	4630	3200	2300	856	718	628
12	1920	1390	1660	4760	8260	2150	4540	2950	2040	856	736	619
13	1750	1330	1740	4150	7380	2040	3930	2600	1730	931	708	646
14	1630	1290	1720	3590	5180	1950	3500	2470	1520	1190	709	724
15	1530	1270	1520	3270	4460	1880	3330	2360	1450	4010	726	803
16	1420	15600	1440	2950	4150	1850	3090	2610	1410	3680	698	740
17	3850	21200	1180	2610	4620	2310	2850	2720	1370	2110	683	698
18	15200	10700	e1110	2450	4440	3780	2530	2110	1330	1510	669	641
19	13600	8510	e1190	2380	4030	4110	2210	1780	1320	1500	664	622
20	14900	7160	e1140	2320	3790	3920	1900	1550	1240	1320	663	628
21	10300	4890	e990	2300	3440	3650	1760	1600	1230	1320	712	626
22	7920	3860	e920	2400	3230	3210	1810	6600	1220	1130	808	645
23	6520	3370	e900	2280	3300	2940	1860	9710	1290	1000	1620	659
24	4820	2940	1010	2080	4780	2820	1750	6070	1250	923	1630	622
25	3590	2600	1030	2250	5260	3030	1670	4300	1180	869	1410	614
26	2990	2400	e1000	3480	4330	3610	1600	3480	1100	827	1100	604
27	2620	2690	e975	4540	3770	3800	1550	3330	1050	793	979	589
28	2400	2940	e1050	4390	3570	3570	1490	4690	1010	764	876	580
29	2210	2880	e950	4010	---	3390	1560	11300	986	742	798	574
30	2040	2670	e1150	4570	---	3270	1690	16400	954	726	751	567
31	1930	---	2480	5780	---	3420	---	10100	---	720	722	---
TOTAL	176060	117000	46365	166080	154960	93320	89990	124640	66590	36844	25327	19151
MEAN	5679	3900	1496	5357	5534	3010	3000	4021	2220	1189	817	638
MAX	19000	21200	2480	24600	10800	4110	6510	16400	7840	4010	1630	803
MIN	1420	1270	900	2080	3230	1850	1490	1540	954	720	663	567
(*)	0	-3	-5	+34	-65	+16	+8	+177	-237	-73	-156	-158
MEAN#	5679	3897	1491	5391	5469	3026	3008	4198	1983	1116	661	480
CFSM#	2.74	1.88	.72	2.60	2.64	1.46	1.45	2.02	.96	.54	.32	.23
IN.#	3.16	2.10	.83	3.00	2.75	1.68	1.62	2.33	1.07	.62	.37	.26

CAL YR 1989 TOTAL 1300026 MEAN 3562 MAX 29500 MIN 786 MEAN# 3621 CFSM# 1.75 IN.# 23.69
WTR YR 1990 TOTAL 1116327 MEAN 3058 MAX 24600 MIN 567 MEAN# 3020 CFSM# 1.46 IN.# 19.76

* Change in contents, equivalent in cubic feet per second, in Moomaw Lake; provided by U.S. Army Corps of Engineers.

Adjusted for change in contents.

e Estimated.

02020500 CALFPASTURE RIVER ABOVE MILL CREEK, AT GOSHEN, VA

LOCATION.--Lat 37°59'16", long 79°29'38", Rockbridge County, Hydrologic Unit 02080202, on left bank 20 ft upstream from bridge on State Highway 42 at Goshen and 400 ft upstream from Mill Creek.

DRAINAGE AREA.--144 mi².

PERIOD OF RECORD.--October 1938 to current year. Monthly discharge only for some periods, published in WSP 1303.

REVISED RECORDS.--WSP 2104: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,384.84 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records good except those for periods with ice effect, Dec. 10, 11, 14-22, 28, 29, and period of no gage-height record, Dec. 23-27, which are fair. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

COOPERATION.--Records were provided by the Virginia Water Control Board.

AVERAGE DISCHARGE.--52 years, 166 ft³/s, 15.65 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 56,300 ft³/s, Nov. 4, 1985, gage height, 20.23 ft, from rating curve extended above 9,200 ft³/s on basis of slope-area measurements at gage heights 12.78 ft and 20.23 ft; no flow Sept. 5, 6, 1957, Sept. 28, 1959, result of diversion.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 2,500 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Nov. 16	1330	*4,380	*7.23	May 29	1700	2,900	5.32
Dec. 31	2230	3,690	6.12				

Minimum daily discharge, 7.9 ft³/s, Aug. 20.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	170	86	107	2530	474	203	177	68	424	18	12	29
2	1070	78	102	1240	349	177	171	63	262	18	11	25
3	951	71	97	727	329	167	167	60	206	16	10	23
4	492	67	95	484	1230	147	156	59	169	16	10	20
5	309	63	88	426	1230	130	145	129	136	15	14	18
6	215	60	86	355	820	117	163	124	114	15	15	17
7	165	57	81	287	550	106	340	112	98	14	13	15
8	131	56	82	260	375	96	404	101	87	14	12	17
9	111	60	78	244	282	90	681	91	81	14	12	15
10	95	58	e74	232	713	87	758	142	82	15	12	13
11	84	54	e79	227	1100	84	672	274	66	19	13	13
12	75	51	69	216	750	79	482	224	57	26	12	11
13	68	48	71	186	474	74	354	191	51	21	15	19
14	62	47	e78	156	347	71	272	191	45	34	15	23
15	56	46	e76	140	266	68	238	153	42	67	11	24
16	52	2550	e68	129	250	67	197	141	40	75	9.8	19
17	335	1450	e60	117	224	98	168	126	36	46	8.9	17
18	523	712	e66	108	191	172	149	108	33	34	8.4	14
19	1090	409	e68	101	183	209	129	92	38	29	8.3	13
20	986	296	e70	95	173	207	117	82	37	26	7.9	14
21	552	233	e62	102	154	179	113	90	34	23	8.4	13
22	347	187	e59	95	145	164	111	116	33	18	13	14
23	245	169	e58	90	185	164	101	142	39	21	511	13
24	192	143	e54	86	703	167	91	133	33	19	418	12
25	162	126	e50	110	534	172	83	117	28	16	141	11
26	140	121	e47	407	362	190	78	176	26	15	91	10
27	123	124	e46	480	294	221	73	1090	23	14	69	9.6
28	109	121	e54	373	249	245	70	1060	21	14	56	9.1
29	99	118	e70	317	---	223	77	2460	20	13	47	8.8
30	90	112	89	779	---	201	72	1670	18	12	40	8.3
31	87	---	1120	726	---	194	---	825	---	12	33	---
TOTAL	9186	7773	3304	11825	12936	4569	6809	10410	2379	709	1657.7	467.8
MEAN	296	259	107	381	462	147	227	336	79.3	22.9	53.5	15.6
MAX	1090	2550	1120	2530	1230	245	758	2460	424	75	511	29
MIN	52	46	46	86	145	67	70	59	18	12	7.9	8.3
CFSM	2.06	1.80	.74	2.65	3.21	1.02	1.58	2.33	.55	.16	.37	.11
IN.	2.37	2.01	.85	3.05	3.34	1.18	1.76	2.69	.61	.18	.43	.12

CAL YR 1989 TOTAL 92411 MEAN 253 MAX 2550 MIN 22 CFSM 1.76 IN. 23.87
WTR YR 1990 TOTAL 72025.5 MEAN 197 MAX 2550 MIN 7.9 CFSM 1.37 IN. 18.61

e Estimated.

JAMES RIVER BASIN

02021500 MAURY RIVER AT ROCKBRIDGE BATHS, VA

LOCATION.--Lat 37°54'26", long 79°25'20", Rockbridge County, Hydrologic Unit 02080202, on right bank at Rockbridge Baths, 1,200 ft upstream from bridge on State Highway 39, and 1.0 mi upstream from Hays Creek.

DRAINAGE AREA.--329 mi².

PERIOD OF RECORD.--October 1928 to current year. Monthly discharge only for some periods, published in WSP 1303. Prior to October 1945, published as North River at Rockbridge Baths.

REVISED RECORDS.--WSP 972: 1929-40, 1941(M). WSP 1002: 1930(m). WSP 1553: 1931(m).

GAGE.--Water-stage recorder. Datum of gage is 1,100.33 ft above National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers).

REMARKS.--Records good except for period with ice effect, Dec. 16-30, which is fair. Since 1966, some regulation at times by Lake Merriweather on Little Calpasture River. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

AVERAGE DISCHARGE.--62 years, 379 ft³/s, 15.64 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 87,700 ft³/s, Nov. 5, 1985, gage height, 19.19 ft, from floodmark, from rating curve extended above 16,000 ft³/s on basis of slope-area measurement at peak flow; minimum, 5.8 ft³/s, Sept. 10, 1966, gage height, 0.79 ft.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 4,500 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Nov. 16	1430	*9,450	*8.47	May 29	1800	5,410	6.90
Dec. 31	2330	7,700	7.89				

Minimum discharge, 28 ft³/s, Aug. 21, gage height, 1.12 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	482	245	293	5260	857	531	508	148	920	62	34	52
2	2390	218	276	2190	717	478	490	138	683	61	33	48
3	2140	201	263	1370	716	483	503	135	564	47	32	45
4	1190	185	236	1040	2260	415	459	130	475	44	31	42
5	813	174	231	955	2010	356	420	237	354	41	34	40
6	634	166	223	821	1390	321	447	236	300	39	41	39
7	475	163	206	686	1070	288	893	202	261	38	37	38
8	381	164	211	656	815	263	1140	182	229	38	34	38
9	342	181	202	687	703	256	1210	165	195	38	32	39
10	342	172	182	668	1430	251	1210	294	218	40	32	38
11	308	152	179	625	1870	237	1140	528	175	38	36	36
12	272	143	185	579	1320	225	932	454	148	60	34	35
13	256	137	192	498	968	212	731	469	135	56	33	54
14	254	131	168	426	792	204	588	457	125	73	41	149
15	199	130	157	395	663	195	559	378	116	182	41	110
16	175	5730	e150	366	647	196	491	342	111	195	34	81
17	1480	3200	e156	332	603	317	350	301	103	127	32	67
18	2290	1560	e150	311	502	561	287	246	96	92	31	57
19	2860	1020	e145	289	480	524	247	208	95	77	31	58
20	2310	791	e148	273	447	525	232	189	95	68	31	56
21	1400	646	e140	292	397	473	227	217	87	120	30	53
22	945	527	e129	275	385	420	224	423	87	78	36	53
23	701	486	e144	250	486	424	204	594	105	66	510	52
24	604	407	e128	236	1560	432	187	484	93	60	846	57
25	496	353	e115	336	1110	470	173	382	82	53	326	73
26	406	357	e121	1080	804	552	163	349	75	48	182	76
27	351	388	e116	1030	704	620	154	1340	73	45	124	64
28	309	368	e111	814	628	591	145	1640	70	42	93	60
29	278	340	e120	716	---	533	168	4580	66	40	77	84
30	253	310	e135	1160	---	503	165	3130	63	38	66	86
31	241	---	2180	1100	---	519	---	1480	---	37	57	---
TOTAL	25577	19045	7392	25716	26334	12375	14647	20058	6199	2043	3031	1780
MEAN	825	635	238	830	940	399	488	647	207	65.9	97.8	59.3
MAX	2860	5730	2180	5260	2260	620	1210	4580	920	195	846	149
MIN	175	130	111	236	385	195	145	130	63	37	30	35
CFSM	2.51	1.93	.72	2.52	2.86	1.21	1.48	1.97	.63	.20	.30	.18
IN.	2.89	2.15	.84	2.91	2.98	1.40	1.66	2.27	.70	.23	.34	.20

CAL YR 1989 TOTAL 212941 MEAN 583 MAX 6480 MIN 65 CFSM 1.77 IN. 24.08
WTR YR 1990 TOTAL 164197 MEAN 450 MAX 5730 MIN 30 CFSM 1.37 IN. 18.57

e Estimated.

02022500 KERRS CREEK NEAR LEXINGTON, VA

LOCATION.--Lat 37°49'32", long 79°26'36", Rockbridge County, Hydrologic Unit 02080202, on right bank 100 ft upstream from bridge on Interstate Highway 64, 1.4 mi upstream from mouth, and 2.9 mi north of Lexington.

DRAINAGE AREA.--35.0 mi².

PERIOD OF RECORD.--October 1926 to current year. Monthly discharge only for some periods, published in WSP 1303.

REVISED RECORDS.--WSP 1203: 1927-29, 1930-34(M), 1935-40, 1941(M), 1942, 1943-48(M), 1949. WSP 2104: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 980.32 ft above National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers). Jan. 27, 1927, to Sept. 30, 1953, nonrecording gage at site 1,000 ft downstream at different datum.

REMARKS.--Records good except for period of no gage-height record, Nov. 30 to Jan. 16, which is fair. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

COOPERATION.--Records were provided by the Virginia Water Control Board.

AVERAGE DISCHARGE.--64 years, 36.0 ft³/s, 13.97 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 23,000 ft³/s, Sept. 10, 1950, gage height, 13.8 ft, from floodmarks, site and datum then in use, from rating curve extended above 800 ft³/s on basis of contracted-opening and slope-area measurements of peak flow; minimum, 0.90 ft³/s, July 22, 1966 (result of temporary dam upstream); minimum daily, 4.0 ft³/s many days in August and September 1932, Nov. 21, 1938, July 22, 1966.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 600 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Oct. 2	0345	1,230	6.01	Dec. 31	Unknown	1,320	b6.13
Oct. 17	a1330	*4,860	*8.93	July 20	1745	650	5.06
Nov. 16	a0415	4,520	8.73				

a About.

b From high-water mark.

Minimum discharge, 8.4 ft³/s, Sept. 12, gage height, 2.29 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	124	31	e29	e260	66	44	45	23	59	13	10	10
2	489	29	e27	e160	59	44	49	22	49	13	10	9.8
3	150	28	e26	e110	146	45	48	21	44	12	10	9.6
4	91	26	e26	e85	248	40	43	22	38	11	9.9	9.3
5	69	25	e25	e70	143	37	39	25	34	11	10	9.3
6	57	25	e24	e59	103	36	71	20	31	11	11	9.2
7	48	25	e23	e54	87	34	117	20	29	11	10	9.0
8	43	25	e23	e54	72	33	90	19	26	11	9.5	9.0
9	40	26	e23	e57	64	33	72	19	32	11	9.5	9.5
10	39	24	e21	e52	106	32	65	45	35	11	9.6	9.3
11	36	23	e21	e48	92	30	59	34	25	11	12	8.7
12	34	22	e20	e44	76	29	51	29	22	11	9.8	8.6
13	31	21	e20	e40	66	28	46	28	21	12	9.5	37
14	29	20	e19	e37	60	27	43	25	20	21	11	95
15	28	20	e18	e36	54	26	46	23	21	60	11	23
16	27	777	e18	e36	60	27	39	22	19	20	9.9	16
17	896	147	e17	35	52	70	37	21	18	15	9.7	14
18	252	87	e18	33	48	63	34	19	18	14	9.4	13
19	381	66	e18	31	48	49	32	18	17	13	9.5	13
20	169	55	e17	31	43	48	31	18	16	70	9.1	12
21	108	47	e17	31	40	44	32	24	16	41	9.3	11
22	80	43	e16	28	44	41	30	94	19	21	11	12
23	65	41	e15	27	55	39	28	58	19	17	79	11
24	55	36	e14	26	91	41	27	41	15	14	26	10
25	49	34	e14	72	60	47	26	34	14	13	17	10
26	44	38	e14	137	52	48	26	33	14	12	14	9.8
27	40	38	e15	81	51	44	25	38	13	12	12	9.6
28	37	36	e15	65	48	42	24	146	13	11	12	9.5
29	35	33	e16	82	---	41	27	357	13	11	11	9.5
30	33	e32	e18	114	---	39	25	136	12	11	11	9.4
31	32	---	e500	78	---	50	---	79	---	11	10	---
TOTAL	3611	1880	1087	2073	2134	1251	1327	1513	722	536	412.7	436.1
MEAN	116	62.7	35.1	66.9	76.2	40.4	44.2	48.8	24.1	17.3	13.3	14.5
MAX	896	777	500	260	248	70	117	357	59	70	79	95
MIN	27	20	14	26	40	26	24	18	12	11	9.1	8.6
CFSM	3.33	1.79	1.00	1.91	2.18	1.15	1.26	1.39	.69	.49	.38	.42
IN.	3.84	2.00	1.16	2.20	2.27	1.33	1.41	1.61	.77	.57	.44	.46

CAL YR 1989 TOTAL 20736 MEAN 56.8 MAX 964 MIN 11 CFSM 1.62 IN. 22.04
WTR YR 1990 TOTAL 16982.8 MEAN 46.5 MAX 896 MIN 8.6 CFSM 1.33 IN. 18.05

e Estimated.

JAMES RIVER BASIN

02024000 MAURY RIVER NEAR BUENA VISTA, VA

LOCATION.--Lat 37°45'45", long 79°23'30", Rockbridge County, Hydrologic Unit 02080202, on right bank 0.5 mi downstream from South River and 2.8 mi northwest of Buena Vista.

DRAINAGE AREA.--646 mi².

PERIOD OF RECORD.--October 1938 to current year. Monthly discharge only for some periods, published in WSP 1303. Prior to October 1945, published as North River near Buena Vista.

REVISED RECORDS.--WSP 952: 1940-41. WSP 2104: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 846.58 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records good except for period with ice effect, Dec. 16-30, which is fair. Since 1966, some regulation at times by Lake Merriweather on Little Calpasture River. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

AVERAGE DISCHARGE.--52 years, 663 ft³/s, 13.94 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 105,000 ft³/s, Aug. 20, 1969, gage height, 31.23 ft, from floodmarks, from rating curve extended above 17,000 ft³/s on basis of slope-area measurement of peak flow; minimum, 20 ft³/s, Oct. 10, 1941, occurred during filling of a small reservoir 2 mi upstream; unqualified minimum, 37 ft³/s, Sept. 9, 1966; minimum gage height, 0.98 ft, Jan. 5, 1981.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Mar. 18, 1936, reached a stage of about 22 ft, from information by local residents.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 6,200 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Nov. 16	1900	*9,520	*9.88	Jan. 1	0330	9,510	9.87

Minimum discharge, 105 ft³/s, Sept. 12-13, gage height, 1.24 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	865	542	528	7330	1380	903	902	395	1440	203	137	151
2	3590	506	508	3250	1190	830	876	375	1120	199	131	143
3	3290	477	489	2060	1290	840	940	362	956	180	127	137
4	1950	446	458	1610	2880	762	874	358	863	164	124	130
5	1390	425	448	1440	2810	687	801	726	693	157	125	122
6	1150	409	441	1270	2100	637	816	633	611	148	140	120
7	920	395	421	1100	1710	593	1370	529	551	143	149	116
8	775	401	422	1100	1410	556	1620	469	502	144	133	116
9	681	427	421	1190	1190	544	1610	432	485	146	129	120
10	663	407	375	1110	1620	533	1610	834	592	146	127	119
11	594	377	375	1060	2390	513	1570	1140	463	144	131	112
12	578	360	391	998	1860	494	1370	899	398	144	133	108
13	494	345	392	900	1480	473	1130	836	364	202	129	149
14	526	334	359	797	1260	459	973	782	342	399	135	514
15	458	331	343	744	1100	444	962	686	327	488	182	300
16	410	5530	e333	700	1060	444	890	628	324	453	146	217
17	2160	4430	e312	654	1030	1260	741	577	307	333	134	182
18	3540	2100	e354	620	888	1610	650	504	292	266	131	159
19	3860	1460	e337	584	854	1250	590	451	292	231	131	149
20	3410	1160	e329	557	807	1130	555	420	279	228	143	156
21	2170	981	e304	565	741	1010	547	450	269	341	131	145
22	1580	842	e297	548	735	921	542	779	265	254	140	147
23	1240	793	e266	511	875	871	507	931	313	213	505	143
24	1030	693	e304	487	1740	869	473	787	271	197	1250	132
25	947	621	e265	642	1600	908	449	659	246	182	580	140
26	799	609	e255	1480	1240	928	431	589	230	171	370	153
27	718	646	e245	1580	1100	961	411	1260	221	161	280	150
28	654	623	e235	1290	1010	967	395	1850	214	153	230	137
29	604	590	e320	1170	---	904	432	5050	203	147	199	143
30	564	554	e310	1670	---	850	429	4250	196	144	179	165
31	545	---	2030	1660	---	919	---	2180	---	143	161	---
TOTAL	42155	27814	12867	40677	39350	25070	25466	30821	13629	6624	6742	4775
MEAN	1360	927	415	1312	1405	809	849	994	454	214	217	159
MAX	3860	5530	2030	7330	2880	1610	1620	5050	1440	488	1250	514
MIN	410	331	235	487	735	444	395	358	196	143	124	108
CFSM	2.11	1.44	.64	2.03	2.18	1.25	1.31	1.54	.70	.33	.34	.25
IN.	2.43	1.60	.74	2.34	2.27	1.44	1.47	1.77	.78	.38	.39	.27

CAL YR 1989 TOTAL 328731 MEAN 901 MAX 9830 MIN 185 CFSM 1.39 IN. 18.93
WTR YR 1990 TOTAL 275990 MEAN 756 MAX 7330 MIN 108 CFSM 1.17 IN. 15.89

e Estimated.

02025500 JAMES RIVER AT HOLCOMBS ROCK, VA

LOCATION.--Lat 37°30'04", long 79°15'46", Bedford County, Hydrologic Unit 02080203, on right bank at Holcombs Rock, 0.9 mi downstream from Pedlar River, and at mile 268.6.

DRAINAGE AREA.--3,259 mi².

PERIOD OF RECORD.--January 1900 to September 1915 (gage heights only), October 1926 to current year. Monthly discharge only for some periods, published in WSP 1303. Published as "at Salt Creek" December 1926 to June 1931.

REVISED RECORDS.--WSP 972: 1913(M), 1932-33, 1935(M), 1936. WSP 1303: 1928(M). WSP 2104: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 548.53 ft above National Geodetic Vertical Datum of 1929. January 1900 to September 1915, nonrecording gage in powerhouse of Owens Illinois Glass Company 1,000 ft upstream at different datum. December 1926 to June 1931, water-stage recorder at site 2 mi downstream at different datum.

REMARKS.--Records fair except those for period with ice effect, Dec. 18-30, and period of no gage-height record, Apr. 19 to May 3, which are poor. Some diurnal fluctuation caused by powerplants upstream from station. Flow regulated since December 1979 by Moomaw Lake (station 02011795) 117.4 mi upstream; since October 1984 by Back Creek Lake 145.4 mi upstream; and since January 1985 by Little Back Creek Lake 148.5 mi upstream, amount unknown. National Weather Service gage-height telemeter at station. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

AVERAGE DISCHARGE.--64 years, 3,593 ft³/s, 14.97 in/yr, unadjusted.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 207,000 ft³/s, Nov. 5, 1985, gage height, 42.15 ft, from high-water mark in gage house, from rating curve extended above 73,000 ft³/s on basis of records for other stations in James River basin; minimum, 20 ft³/s, Oct. 29, 1987, gage height, 2.80 ft; minimum daily, 223 ft³/s, July 28, 1930.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in March 1913 reached a stage of 31.3 ft, from floodmarks, discharge, 118,000 ft³/s, from rating curve extended as explained above.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 25,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Oct. 2	1745	29,800	15.70	Jan. 1	1615	*35,600	*17.16
Nov. 17	0500	32,900	16.50	May 30	0645	27,200	15.01

Minimum discharge, 62 ft³/s, Sept. 4, gage height, 2.99 ft; minimum daily, 710 ft³/s, Sept. 4.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	4430	2430	2870	28700	6700	4320	4860	e2600	10300	1230	1030	1000
2	21500	2360	2730	22200	5850	4090	4670	e2500	8180	1230	1010	983
3	21100	2230	2550	13400	5470	4110	4580	e2450	7010	1290	995	895
4	12300	2110	2420	10200	9510	4200	4240	2430	5890	1310	988	710
5	8370	2020	2340	9000	14700	4080	3920	3250	4450	1130	944	929
6	6550	1920	2230	7940	12300	3760	3660	4120	3720	992	1020	847
7	5410	1780	2100	6180	10600	3500	5310	3740	3160	1130	1090	815
8	4490	1890	2100	5830	9060	3240	8440	3440	2780	1010	956	886
9	3610	1940	2160	7600	7300	3090	7390	3160	2570	1160	953	885
10	3100	1950	2070	7790	6210	3000	6690	4760	2820	1090	965	883
11	2860	1950	2000	6830	10600	2810	6440	4970	2740	1060	996	876
12	2580	1870	2050	5970	10500	2680	6030	4450	2540	1140	967	878
13	2360	1720	2100	5230	9140	2560	5420	4000	2210	1160	975	943
14	2220	1710	2080	4490	7320	2450	4640	3770	2050	2030	981	1130
15	2130	1710	1940	4010	5850	2370	4770	3590	1960	2860	986	1360
16	1970	12300	1800	3740	5400	2330	4430	3640	1910	5260	1050	944
17	2400	27800	1550	3300	5470	4200	4110	3750	1820	2970	1020	1030
18	17700	13400	e1500	3060	5540	6920	3820	3280	1680	2220	879	925
19	16200	10000	e1550	2920	5040	6190	e3600	2900	1780	1810	899	891
20	19400	8100	e1600	2850	4620	5610	e3100	2600	1720	1860	939	893
21	13100	6310	e1450	2760	4260	5080	e2750	2830	1630	1740	956	893
22	9750	4670	e1350	2750	4080	4550	e2800	6140	1620	1800	1260	916
23	7770	4110	e1150	2790	4590	4050	e2900	11600	1630	1660	1210	900
24	6210	3560	e1160	2550	5690	3860	e2800	8290	1650	1090	2870	918
25	4650	3160	e1200	2660	7390	4000	e2550	5710	1590	1300	2130	924
26	3800	2910	e1350	4340	6030	4270	e2500	4540	1450	1160	1700	908
27	3300	3010	e1300	6120	5140	4760	e2450	4390	1380	1230	1460	785
28	3010	3300	e1450	5760	4700	4580	e2350	6540	1390	1120	1160	878
29	2820	3250	e1400	5370	---	4440	e2400	16600	1350	1110	1150	856
30	2560	3080	e1500	5950	---	4270	e2550	23900	1230	1000	1070	820
31	2440	---	2720	7270	---	4630	---	14400	---	1080	993	---
TOTAL	220090	138550	57770	209560	199060	124000	126170	174340	86210	48232	35602	27501
MEAN	7100	4618	1864	6760	7109	4000	4206	5624	2874	1556	1148	917
MAX	21500	27800	2870	28700	14700	6920	8440	23900	10300	5260	2870	1360
MIN	1970	1710	1150	2550	4080	2330	2350	2430	1230	992	879	710
(*)	0	-3	-5	+34	-65	+16	+8	+177	-237	-73	-156	-158
MEAN#	7100	4615	1859	6794	7044	4016	4214	5801	2637	1483	992	759
CFSM#	2.18	1.42	.57	2.08	2.16	1.23	1.29	1.78	.81	.46	.30	.23
IN.#	2.51	1.58	.66	2.40	2.25	1.42	1.44	2.05	.90	.52	.35	.26

CAL YR 1989 TOTAL 1656290 MEAN 4538 MAX 40200 MIN 1030 MEAN# 4597 CFSM# 1.41 IN.# 19.15
WTR YR 1990 TOTAL 1447085 MEAN 3965 MAX 28700 MIN 710 MEAN# 3927 CFSM# 1.20 IN.# 16.36

* Change in contents, equivalent in cubic feet per second, in Moomaw Lake; provided by U.S. Army Corps of Engineers.

Adjusted for change in contents.

e Estimated.

02026000 JAMES RIVER AT BENT CREEK, VA

LOCATION.--Lat 37°32'10", long 78°49'30", Nelson County, Hydrologic Unit 02080203, on left bank at town of Bent Creek, 150 ft downstream from Bent Creek, 525 ft upstream from bridge on U.S. Highway 60, 1.3 mi southeast of Gladstone, and at milg 227.8.

DRAINAGE AREA.--3,683 mi².

PERIOD OF RECORD.--October 1924 to current year. Monthly discharge only for some periods, published in WSP 1303. Prior to 1926, published as "at Bent Creek, near Gladstone."

REVISED RECORDS.--WSP 742: 1931(m). WSP 972: 1935-36. WSP 1066: 1940. WSP 1203: 1942. WSP 2104: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 381.39 ft above National Geodetic Vertical Datum of 1929. Prior to Sept. 12, 1930, nonrecording gage at same site and datum.

REMARKS.--Records good except those for period with ice effect, Dec. 18-29, and periods of no gage-height record, Mar. 5 to Apr. 24 and June 6-13, which are fair. Large diurnal fluctuation caused by powerplants upstream from station. Flow regulated since December 1979 by Moomaw Lake (station 02011795) 158.3 mi upstream; since October 1984 by Back Creek Lake 186.3 mi upstream; and since January 1985 by Little Back Creek Lake 189.4 mi upstream, amount unknown. National Weather Service gage-height telemeter at station. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

AVERAGE DISCHARGE.--66 years, 4,197 ft³/s, 15.48 in/yr, unadjusted.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 226,000 ft³/s, Nov. 5, 1985, gage height, 30.76 ft, from floodmarks, from rating curve extended above 177,000 ft³/s on basis of slope-area measurement of peak flow; minimum, 222 ft³/s, Oct. 13, 14, 1930, gage height, 2.21 ft.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 26,500 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Oct. 3	0100	30,900	11.13	Jan. 1	2400	*35,600	*11.95
Nov. 17	1300	32,000	11.34	May 30	1500	27,900	10.60

Minimum daily discharge, 834 ft³/s, Sept. 5.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	6060	3290	3920	20700	8470	6030	e6900	3090	12500	1540	1420	1090
2	17300	3150	3310	28100	7580	5550	e8200	3120	10000	1520	1130	1210
3	25900	3300	3510	16000	6890	5720	e7000	3460	8710	1520	1260	1290
4	15400	2750	3560	12400	9040	5570	e6200	2640	7710	1710	1140	1190
5	10500	2730	3170	10700	15200	e5200	e5400	3500	6130	1560	1250	834
6	8300	2840	3530	9750	13900	e4700	e6700	4570	e5200	1260	1190	1670
7	7030	2580	2330	7920	12200	e4200	e7600	5080	e4600	1250	1320	1120
8	6210	2720	2970	7480	10600	e4300	e9500	4070	e4200	1400	1500	874
9	5080	2800	2750	8780	9340	e4200	e8500	3900	e5100	1270	1060	895
10	4320	2550	2990	9680	9440	e3700	e8000	5390	e4600	1420	1270	1180
11	3810	2600	2750	8530	11300	e3600	e7700	7380	e4100	1300	1280	1250
12	3380	2580	2810	7660	12200	e3700	e7200	6110	e3700	1400	1180	1110
13	3370	2720	3160	6850	10900	e3500	e6800	5360	e3200	1540	1890	1000
14	2910	2570	2640	6190	9590	e3300	e7500	4590	2900	2910	1260	1740
15	2850	2080	2780	5380	7300	e3000	e8200	4410	2800	3150	1220	1670
16	2900	3090	2770	4850	7030	e3800	e6400	4230	2940	6020	1200	1580
17	2770	28500	2320	4580	6860	e9600	e5700	4570	2580	4630	908	1080
18	11900	16700	e2150	4520	6850	e8500	e5200	4030	2200	3130	1240	1280
19	18700	12000	e2200	3600	6780	e7700	e4800	3710	2170	2560	906	1110
20	21200	9810	e2250	3970	6200	e7300	e4500	3260	2380	2450	1910	1100
21	15700	8360	e2050	3720	5430	e6800	e4500	3280	2700	2100	1150	1170
22	11900	6240	e1800	3590	5610	e6200	e4200	4780	1830	2260	1220	1330
23	9630	5900	e1750	3920	6220	e5600	e3900	12300	3130	2230	1990	1020
24	8170	4430	e1600	3450	6130	e5200	e3600	10900	2190	1820	2550	1120
25	6710	4340	e1800	4460	8620	e5300	3450	7610	2040	1250	3410	1160
26	5190	3960	e2000	6010	7850	e5600	3370	6270	1880	1610	2300	1100
27	4750	3730	e2310	6980	6900	e5900	3270	6500	1810	1470	2070	1200
28	3820	4440	e2090	7630	6150	e5800	2970	6200	1770	1510	1900	848
29	3710	4060	e2590	6860	---	e6600	3210	16900	1730	1290	1410	1120
30	3860	4340	2330	7220	---	e5800	3270	23800	1670	1400	1350	1090
31	3450	---	2860	8430	---	e7200	---	17200	---	1130	1490	---
TOTAL	256780	161160	81050	249910	240580	169170	173740	202210	118470	61610	46374	35431
MEAN	8283	5372	2615	8062	8592	5457	5791	6523	3949	1987	1496	1181
MAX	25900	28500	3920	28100	15200	9600	9500	23800	12500	6020	3410	1740
MIN	2770	2080	1600	3450	5430	3000	2970	2640	1670	1130	906	834
(*)	0	-3	-5	+34	-65	+16	+8	+177	-237	-73	-156	-158
MEAN#	8283	5369	2610	8096	8527	5473	5799	6700	3712	1914	1340	1023
CFSM#	2.25	1.46	.71	2.20	2.32	1.49	1.57	1.82	1.01	.52	.36	.28
IN.#	2.59	1.63	.82	2.53	2.41	1.71	1.76	2.10	1.12	.60	.42	.31

CAL YR 1989 TOTAL 2009260 MEAN 5505 MAX 45000 MIN 1270 MEAN# 5564 CFSM# 1.51 IN.# 20.51
WTR YR 1990 TOTAL 1796485 MEAN 4922 MAX 28500 MIN 834 MEAN# 4884 CFSM# 1.33 IN.# 18.01

* Change in contents, equivalent in cubic feet per second, in Moomaw Lake; provided by U.S. Army Corps of Engineers.

Adjusted for change in contents.

e Estimated.

02027000 TYE RIVER NEAR LOVINGSTON, VA

LOCATION.--Lat 37°42'55", long 78°58'55", Nelson County, Hydrologic Unit 02080203, on right bank at downstream side of bridge on State Highway 158, 3.5 mi downstream from Hat Creek, 4.8 mi upstream from Piney River, and 6.8 mi southwest of Lovingston.

DRAINAGE AREA.--92.8 mi².

PERIOD OF RECORD.--August 1938 to current year.

REVISED RECORDS.--WSP 892: 1938. WSP 2104: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 578.39 ft above National Geodetic Vertical Datum of 1929. Sept. 15, 1969, to Oct. 15, 1970, nonrecording gage at same site and datum.

REMARKS.--Records good except those for period with ice effect, Dec. 17-24, and periods of no gage-height record, Dec. 25 to Jan. 11 and Apr. 2 to May 3, which are fair. Several measurements of water temperature were made during the year.

COOPERATION.--Records were provided by the Virginia Water Control Board.

AVERAGE DISCHARGE.--52 years, 155 ft³/s, 22.68 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 80,000 ft³/s, Aug. 20, 1969, gage height, 29.0 ft, from floodmarks, from rating curve extended above 7,600 ft³/s on basis of slope-area measurement of peak flow; minimum, 0.50 ft³/s, Sept. 10, 11, 1966.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 1,600 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
May 10	1200	*4,380	*8.57	No other peak equal to or greater than base discharge.			

Minimum daily discharge, 16 ft³/s, Sept. 28-30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	321	164	121	e650	240	224	247	e130	344	63	34	23
2	966	146	119	e480	229	219	e240	e129	298	64	30	23
3	667	146	115	e410	273	219	e235	e124	272	56	28	22
4	473	139	106	e350	340	201	e230	128	258	54	27	20
5	378	132	108	e300	306	186	e228	238	224	50	26	20
6	322	132	108	e270	292	174	e225	181	201	47	34	20
7	278	128	106	e250	275	164	e250	162	188	44	34	20
8	247	137	106	e290	256	155	e235	148	172	47	28	20
9	229	146	104	e260	240	155	e230	139	195	50	26	24
10	206	128	97	e240	281	148	e220	1300	232	56	29	25
11	191	121	97	e225	258	141	e240	770	167	48	32	20
12	174	117	83	214	242	137	e230	527	148	45	29	20
13	162	113	85	198	232	132	e220	435	141	47	25	22
14	152	110	92	186	224	128	e260	354	130	190	27	69
15	146	110	90	181	216	126	e400	315	132	237	48	45
16	137	293	83	174	227	128	e285	286	128	152	86	30
17	192	256	e115	167	214	388	e250	261	117	101	58	24
18	220	214	e120	162	198	451	e235	237	113	85	42	21
19	530	188	e110	150	196	351	e220	211	110	72	37	22
20	388	176	e100	148	188	315	e210	198	99	69	41	25
21	325	164	e94	146	179	281	e205	276	97	63	39	25
22	284	155	e82	139	324	264	e200	443	97	57	59	24
23	250	157	e74	132	334	250	e190	328	102	54	118	23
24	229	143	e68	130	309	234	e180	295	85	49	72	22
25	208	137	e71	188	284	232	e170	250	78	46	51	18
26	193	146	e72	242	261	219	e165	245	75	44	48	17
27	184	148	e76	206	250	206	e155	264	71	41	38	17
28	174	139	e79	196	240	196	e145	388	68	36	34	16
29	167	130	e85	211	---	211	e150	870	66	37	29	16
30	160	126	e95	275	---	214	e140	588	63	35	27	16
31	164	---	e270	253	---	267	---	424	---	37	23	---
TOTAL	8717	4541	3131	7423	7108	6716	6590	10644	4471	2076	1259	709
MEAN	281	151	101	239	254	217	220	343	149	67.0	40.6	23.6
MAX	966	293	270	650	340	451	400	1300	344	237	118	69
MIN	137	110	68	130	179	126	140	124	63	35	23	16
CFSM	3.03	1.63	1.09	2.58	2.74	2.33	2.37	3.70	1.61	.72	.44	.25
IN.	3.49	1.82	1.26	2.98	2.85	2.69	2.64	4.27	1.79	.83	.50	.28

CAL YR 1989 TOTAL 73742 MEAN 202 MAX 1600 MIN 55 CFSM 2.18 IN. 29.56
WTR YR 1990 TOTAL 63385 MEAN 174 MAX 1300 MIN 16 CFSM 1.87 IN. 25.41

e Estimated.

JAMES RIVER BASIN

02027500 PINEY RIVER AT PINEY RIVER, VA

LOCATION.--Lat 37°42'08", long 79°01'40", Nelson County, Hydrologic Unit 02080203, on left bank at upstream side of bridge on State Highway 151, 0.2 mi southwest of Piney River post office, 1.7 mi downstream from Indian Creek, and 2.5 mi southeast of Lowesville.

DRAINAGE AREA.--47.6 mi².

PERIOD OF RECORD.--July 1949 to current year.

REVISED RECORDS.--WSP 2104: Drainage area. WDR VA-72-1: 1971(M).

GAGE.--Water-stage recorder. Datum of gage is 633.58 ft above National Geodetic Vertical Datum of 1929. Prior to May 27, 1969, water-stage recorder, and Nov. 4, 1969, to Feb. 26, 1970, nonrecording gage at site 20 ft downstream from former highway bridge at same datum. Feb. 26, 1970, to Sept. 20, 1973, on right bank 20 ft upstream from bridge at same datum.

REMARKS.--Records good except those for periods of doubtful gage-height record, Nov. 18-23, Apr. 16-19, and June 19-21, and periods with ice effect, Dec. 19, 22-29, which are fair. Periodic dewatering of upstream quarries adds small amount of inflow. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

COOPERATION.--Records were provided by the Virginia Water Control Board.

AVERAGE DISCHARGE.--41 years, 94.7 ft³/s, 27.02 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 38,000 ft³/s, Aug. 20, 1969, gage height, 13.8 ft, from floodmarks, from rating curve extended above 6,000 ft³/s on basis of slope-area measurement of peak flow; minimum, 1.1 ft³/s, Sept. 13, 1966.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in June 1949 reached a stage of 9.9 ft, from floodmarks.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 650 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Oct. 2	0900	820	3.11	May 29	0630	692	2.85
May 10	0945	*1,860	*4.79				

Minimum discharge, 7.0 ft³/s, Sept. 29.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	249	78	63	450	134	158	163	81	307	30	22	18
2	704	71	60	322	130	154	167	78	258	31	21	18
3	536	68	59	254	160	148	164	74	224	27	20	17
4	398	64	56	218	221	132	156	73	195	25	20	16
5	315	62	56	185	212	122	148	98	170	24	19	16
6	258	59	53	162	206	114	150	76	150	23	23	15
7	214	57	51	141	197	107	163	72	134	22	21	15
8	184	62	55	159	180	102	146	69	125	24	18	16
9	159	63	50	147	165	99	140	69	117	24	18	19
10	139	56	47	135	185	93	139	697	123	24	18	18
11	123	53	46	127	169	89	151	488	99	22	18	15
12	108	51	48	118	163	84	138	343	89	21	16	14
13	97	50	47	109	156	80	134	278	83	24	16	17
14	89	49	44	101	149	77	142	226	78	96	17	42
15	81	49	41	96	143	74	250	193	75	150	20	20
16	75	133	38	90	155	77	e190	180	74	117	26	14
17	109	118	58	85	141	208	e170	154	70	85	21	13
18	121	e105	58	80	132	294	e160	135	67	70	17	12
19	298	e100	e55	75	135	259	e156	134	e62	59	20	12
20	258	e94	52	72	125	235	156	125	e54	50	23	12
21	218	e85	48	69	119	203	147	165	e48	45	20	11
22	189	e82	e40	64	165	183	134	274	52	40	27	12
23	163	e81	e35	61	216	167	124	216	49	36	41	11
24	143	80	e31	58	222	156	115	186	42	33	65	10
25	128	76	e33	91	216	154	108	169	40	31	50	9.6
26	115	79	e34	105	203	140	102	168	37	28	34	9.2
27	103	77	e35	94	191	131	96	177	35	27	28	9.0
28	95	72	e37	94	175	125	91	252	34	26	25	9.0
29	89	68	e40	110	---	133	92	633	32	25	22	9.1
30	82	64	41	136	---	130	86	492	30	23	21	9.6
31	85	---	161	132	---	172	---	379	---	24	20	---
TOTAL	5925	2206	1572	4140	4765	4400	4278	6754	2953	1286	747	438.5
MEAN	191	73.5	50.7	134	170	142	143	218	98.4	41.5	24.1	14.6
MAX	704	133	161	450	222	294	250	697	307	150	65	42
MIN	75	49	31	58	119	74	86	69	30	21	16	9.0
CFSM	4.02	1.54	1.07	2.81	3.58	2.98	3.00	4.58	2.07	.87	.51	.31
IN.	4.63	1.72	1.23	3.24	3.72	3.44	3.34	5.28	2.31	1.01	.58	.34

CAL YR 1989 TOTAL 48823 MEAN 134 MAX 1300 MIN 31 CFSM 2.81 IN. 38.16
WTR YR 1990 TOTAL 39464.5 MEAN 108 MAX 704 MIN 9.0 CFSM 2.27 IN. 30.84

e Estimated.

JAMES RIVER BASIN

179

02027800 BUFFALO RIVER NEAR TYE RIVER, VA

LOCATION.--Lat 37°36'20", long 78°55'25", Nelson County, Hydrologic Unit 02080203, on right bank 35 ft upstream from bridge on State Highway 657, 2.1 mi upstream from mouth, and 3.5 mi southeast of town of Tye River.

DRAINAGE AREA.--147 mi².

PERIOD OF RECORD.--August 1960 to current year.

REVISED RECORDS.--WSP 2104: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 444.39 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records good except for period with ice effect, Dec. 17-29, which is fair. Several measurements of water temperature were made during the year.

AVERAGE DISCHARGE.--30 years, 170 ft³/s, 15.70 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 45,000 ft³/s, Aug. 20, 1969, gage height, 27.95 ft, from floodmark, from rating curve extended above 1,800 ft³/s on basis of computation of flow over dam at gage height 11.03 ft and slope-area measurement at gage height 27.95 ft; minimum, 3.2 ft³/s, Sept. 8-13, 1966; minimum gage height, 0.28 ft, Sept. 9-13, 1964.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 1,400 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Oct. 2	0815	2,060	6.60	May 10	1745	1,960	6.45
Jan. 1	0145	*2,930	*7.81	May 29	1030	2,120	6.69

Minimum discharge, 30 ft³/s, Sept. 30, gage height, 0.85 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	351	161	139	1400	193	211	288	189	372	100	56	44
2	1380	147	137	471	187	207	263	188	323	109	52	43
3	612	150	136	313	186	222	263	186	291	97	50	42
4	411	141	130	284	323	205	229	186	272	91	49	41
5	336	137	133	271	276	197	215	266	236	88	48	40
6	278	136	131	237	238	190	210	198	229	84	54	40
7	232	136	129	212	224	182	300	186	214	88	59	39
8	210	164	133	272	205	178	245	186	194	85	52	40
9	194	180	141	330	194	178	223	186	186	89	48	44
10	183	151	131	248	316	175	214	777	200	87	51	50
11	177	141	130	216	293	171	230	653	171	82	51	44
12	169	138	134	199	246	168	213	394	160	80	47	39
13	162	133	143	185	225	166	202	329	154	81	44	41
14	158	132	135	176	216	164	198	292	150	154	43	67
15	154	133	137	172	208	163	474	262	150	164	74	66
16	150	196	128	166	223	164	365	255	150	170	72	47
17	156	182	e130	161	230	273	310	291	142	120	61	41
18	197	162	e136	158	210	381	275	235	152	105	52	37
19	835	153	e125	153	218	279	254	214	167	96	49	37
20	434	149	e120	150	209	278	243	206	136	91	49	40
21	290	145	e122	150	200	265	238	292	135	86	52	40
22	234	142	e122	147	215	241	234	535	135	82	95	42
23	206	159	e120	147	338	221	221	511	160	77	93	45
24	190	148	e130	147	288	208	211	350	132	74	97	37
25	179	142	e140	183	255	238	205	294	120	71	82	34
26	169	149	e125	286	235	219	200	292	115	69	69	33
27	162	160	e115	214	229	203	195	497	113	65	61	32
28	156	152	e120	189	222	194	190	447	110	64	55	31
29	152	146	e140	183	---	218	192	1590	107	63	52	31
30	149	141	169	239	---	248	193	767	102	60	50	31
31	154	---	312	206	---	297	---	476	---	58	47	---
TOTAL	8820	4506	4273	7865	6602	6704	7293	11730	5278	2830	1814	1238
MEAN	285	150	138	254	236	216	243	378	176	91.3	58.5	41.3
MAX	1380	196	312	1400	338	381	474	1590	372	170	97	67
MIN	149	132	115	147	186	163	190	186	102	58	43	31
CFSM	1.94	1.02	.94	1.73	1.60	1.47	1.65	2.57	1.20	.62	.40	.28
IN.	2.23	1.14	1.08	1.99	1.67	1.70	1.85	2.97	1.34	.72	.46	.31

CAL YR 1989 TOTAL 85279 MEAN 234 MAX 3880 MIN 65 CFSM 1.59 IN. 21.58
WTR YR 1990 TOTAL 68953 MEAN 189 MAX 1590 MIN 31 CFSM 1.29 IN. 17.45

e Estimated.

JAMES RIVER BASIN

02028500 ROCKFISH RIVER NEAR GREENFIELD, VA

LOCATION.--Lat 37°52'10", long 78°49'25", Nelson County, Hydrologic Unit 02080203, on left bank 50 ft downstream from bridge on State Highway 634, 2.8 mi downstream from confluence of North and South Forks, and 4.1 mi south of Greenfield.

DRAINAGE AREA.--94.6 mi².

PERIOD OF RECORD.--April 1943 to current year.

REVISED RECORDS.--WSP 2104: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 530.29 ft above National Geodetic Vertical Datum of 1929. Prior to Aug. 21, 1943, nonrecording gage at same site and datum.

REMARKS.--Records good except those for periods with ice effect, Dec. 14-17, 19-29, and period of doubtful gage-height record, Dec. 31 to Jan. 2, which are fair. Several measurements of water temperature were made during the year.

COOPERATION.--Records were provided by the Virginia Water Control Board.

AVERAGE DISCHARGE.--47 years, 140 ft³/s, 20.10 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 70,000 ft³/s, Aug. 20, 1969, gage height, 31.2 ft, from floodmarks, from rating curve extended above 8,500 ft³/s on basis of contracted-opening measurement at gage height 18.11 ft, slope-area measurements at gage heights 17.2 ft, 23.4 ft, and 31.2 ft, and peak runoff comparison with nearby stations; minimum, 0.20 ft³/s, Sept. 8-12, 1966.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Oct. 15, 1942, reached a stage of 23.4 ft, from floodmarks, discharge, about 30,000 ft³/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 1,500 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Oct. 2	0700	2,130	6.12	May 10	1130	*5,670	*9.72
Oct. 19	0900	1,510	5.23	May 29	0530	1,660	5.47

Minimum discharge, 12 ft³/s, Sept. 28-30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	357	154	120	e500	209	170	216	125	400	48	22	18
2	1240	139	115	e400	194	162	214	117	330	46	19	17
3	697	140	113	313	234	160	209	112	302	42	17	17
4	477	131	107	276	324	146	192	112	258	40	16	16
5	372	128	107	242	260	140	181	239	214	38	16	16
6	307	126	110	216	239	137	190	137	188	36	20	16
7	247	125	109	190	224	129	250	125	168	35	22	15
8	211	140	112	222	204	125	221	115	154	38	17	15
9	185	144	107	226	192	125	206	110	144	44	17	20
10	166	128	102	211	234	125	202	1690	144	43	32	22
11	156	123	105	194	204	123	209	883	123	38	31	18
12	140	121	107	192	185	121	185	593	112	36	27	15
13	131	120	109	172	177	118	170	477	104	40	23	32
14	126	115	e98	162	172	117	170	400	101	152	36	52
15	121	115	e90	150	164	115	370	341	99	126	43	34
16	117	206	e80	154	166	118	258	304	97	77	30	23
17	156	166	e92	146	156	293	234	271	88	56	27	20
18	186	154	97	144	142	282	211	239	83	51	23	16
19	1000	146	e98	137	142	226	194	214	80	46	23	17
20	472	142	e95	133	139	237	188	202	73	48	46	19
21	352	137	e92	133	131	211	185	229	72	46	32	20
22	285	131	e84	128	226	197	174	324	75	42	43	18
23	237	139	e76	123	318	190	162	242	81	40	99	17
24	211	128	e70	121	255	181	154	211	64	36	70	14
25	188	125	e72	150	211	179	146	190	58	34	48	14
26	174	137	e73	194	192	168	140	192	57	32	38	13
27	162	137	e77	160	188	156	135	324	54	30	31	13
28	154	131	e80	152	181	148	128	416	53	28	27	12
29	144	126	e88	178	---	160	133	1220	50	27	23	12
30	139	123	91	293	---	168	129	758	47	27	21	12
31	162	---	e200	229	---	226	---	522	---	26	18	---
TOTAL	9072	4077	3076	6241	5663	5153	5756	11434	3873	1448	957	563
MEAN	293	136	99.2	201	202	166	192	369	129	46.7	30.9	18.8
MAX	1240	206	200	500	324	293	370	1690	400	152	99	52
MIN	117	115	70	121	131	115	128	110	47	26	16	12
CFSM	3.09	1.44	1.05	2.13	2.14	1.76	2.03	3.90	1.36	.49	.33	.20
IN.	3.57	1.60	1.21	2.45	2.23	2.03	2.26	4.50	1.52	.57	.38	.22

CAL YR 1989 TOTAL 62014 MEAN 170 MAX 1450 MIN 36 CFSM 1.80 IN. 24.39
WTR YR 1990 TOTAL 57313 MEAN 157 MAX 1690 MIN 12 CFSM 1.66 IN. 22.54

e Estimated.

02029000 JAMES RIVER AT SCOTTSVILLE, VA

LOCATION.--Lat 37°47'50", long 78°29'30", Albemarle County, Hydrologic Unit 02080203, on left bank 900 ft downstream from bridge on State Highway 20 at Scottsville, 6.8 mi upstream from Hardware River, and at mile 188.6.

DRAINAGE AREA.--4,584 mi².

PERIOD OF RECORD.--October 1924 to current year. Monthly discharge only for some periods, published in WSP 1303.

REVISED RECORDS.--WSP 727: 1931(M). WSP 972: 1936(M), 1940(M). WSP 2104: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 253.18 ft above National Geodetic Vertical Datum of 1929. Prior to Nov. 28, 1928, nonrecording gage at same site and datum.

REMARKS.--Records good except for period with ice effect, Dec. 18-30, which is fair. Large diurnal fluctuation caused by powerplants upstream from station. Flow regulated since December 1979 by Moomaw Lake (station 02011795) 197.5 mi upstream; since October 1984 by Back Creek Lake 225.5 mi upstream; and since January 1985 by Little Back Creek Lake 228.6 mi upstream, amount unknown. National Weather Service gage-height telemeter at station. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

AVERAGE DISCHARGE.--66 years, 5,177 ft³/s, 15.34 in/yr, unadjusted.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 301,000 ft³/s, June 22, 1972, gage height, 34.02 ft, from floodmarks, from rating curve extended above 120,000 ft³/s on basis of slope-conveyance study; minimum daily, 300 ft³/s, Sept. 13, 1966.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in October 1870 reached a stage of 30.7 ft, discharge, about 215,000 ft³/s, and flood in November 1877 reached a stage of 27.9 ft, discharge, about 160,000 ft³/s, from information by local resident. Flood in March 1913 reached a stage of 25.16 ft, from floodmarks, discharge, 121,000 ft³/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 35,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Oct. 3	0845	35,700	14.54	Jan. 2	0545	*38,800	*15.20

Minimum discharge, 960 ft³/s, Sept. 29; minimum daily, 989 ft³/s, Sept. 29.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	7690	4430	4330	21700	10100	7280	8820	3860	17000	2120	1520	1600
2	17800	3920	4000	34800	9010	6330	8400	4070	13500	1970	1510	1340
3	32900	3780	3740	21200	8160	6570	9850	4050	11200	1940	1440	1470
4	22600	3390	3760	15500	9950	6650	8150	3630	10100	1900	1470	1490
5	15300	3210	3560	13400	15300	6440	7040	4320	8720	2070	1440	1430
6	11700	3110	3700	11900	16800	6100	6580	5320	7270	1860	1500	1180
7	9660	3360	2950	10600	14200	5710	7820	5830	6200	1530	1590	1840
8	8470	3200	2930	8940	12400	4890	9640	5210	5330	1560	1710	1380
9	7220	3830	3390	10900	11000	5030	11500	4870	5150	1740	1640	1090
10	6320	3600	2980	11400	10800	4940	10000	7390	6310	1710	1440	1120
11	5080	3170	3140	10400	12600	4350	9680	13800	5470	1620	1530	1440
12	5070	2890	2980	9300	14100	4490	9300	9080	4740	1680	1590	1450
13	4190	3070	3250	8220	12800	4420	8450	7890	4520	1610	1480	1350
14	4190	3060	3320	7520	11100	4180	8020	6660	3860	2760	2250	1420
15	3420	2660	2880	6620	9080	4120	9380	6030	3740	4740	1570	2290
16	3870	3120	2850	6130	8240	3670	9350	5660	4060	5500	1600	1930
17	3380	21800	2750	5490	8150	4720	7720	5840	3860	7240	1630	1730
18	5470	23600	e2250	5210	7730	11700	6880	5440	2880	4620	1250	1360
19	25000	14000	e2380	5000	7830	10400	6240	4910	3550	3610	1550	1390
20	24500	10900	e2500	4490	7600	9350	5730	4460	2990	3090	1220	1320
21	20900	9300	e2200	4530	6330	8870	5300	4840	3400	3040	2320	1300
22	14900	7570	e1750	4360	6430	8030	5410	6660	2850	2690	1620	1370
23	11400	6730	e1800	4240	7720	7460	4920	12500	3810	2810	2140	1550
24	9670	5580	e2000	4400	8020	6600	4840	14300	3230	2690	3170	1200
25	8080	4750	e2250	4720	8520	6300	4650	10200	2810	2020	4120	1280
26	6550	4600	e2500	7800	9680	6560	4440	7980	2680	1810	3410	1320
27	5640	4440	e2850	8410	8370	6720	4310	8860	2470	1790	2810	1260
28	4830	4680	e2600	8570	7370	7170	4170	7920	2350	1860	2250	1330
29	4470	4800	e2900	8110	---	7030	3820	23300	2180	1860	2260	989
30	4110	4440	e3200	8860	---	8040	4400	29600	2190	1540	1590	1270
31	4210	---	4020	9040	---	7660	---	24900	---	1800	1780	---
TOTAL	318590	180990	91710	301760	279390	201780	214810	269380	158420	78780	58400	42489
MEAN	10280	6033	2958	9734	9978	6509	7160	8690	5281	2541	1884	1416
MAX	32900	23600	4330	34800	16800	11700	11500	29600	17000	7240	4120	2290
MIN	3380	2660	1750	4240	6330	3670	3820	3630	2180	1530	1220	989
(*)	0	-3	-5	+34	-65	+16	+8	+177	-237	-73	-156	-158
MEAN#	10280	6030	2953	9768	9913	6525	7168	8867	5044	2468	1728	1258
CFSM#	2.24	1.32	.64	2.13	2.16	1.42	1.56	1.93	1.10	.54	.38	.27
IN.#	2.59	1.47	.74	2.46	2.25	1.64	1.75	2.23	1.23	.62	.43	.31

CAL YR 1989 TOTAL 2528110 MEAN 6926 MAX 63600 MIN 1620 MEAN# 6985 CFSM# 1.52 IN.# 20.69
WTR YR 1990 TOTAL 2196499 MEAN 6018 MAX 34800 MIN 989 MEAN# 5980 CFSM# 1.30 IN.# 17.71

* Change in contents, equivalent in cubic feet per second, in Moomaw Lake; provided by U.S. Army Corps of Engineers.

Adjusted for change in contents.

e Estimated.

JAMES RIVER BASIN

02030000 HARDWARE RIVER BELOW BRIERY RUN, NEAR SCOTTSVILLE, VA

LOCATION.--Lat 37°48'45", long 78°27'20", Fluvanna County, Hydrologic Unit 02080203, on left bank 75 ft upstream from bridge on State Highway 637, 0.8 mi downstream from Briery Run, 2.4 mi northeast of Scottsville, and 10.8 mi upstream from mouth.

DRAINAGE AREA.--116 mi².

PERIOD OF RECORD.--October 1938 to current year. Monthly discharge only for some periods, published in WSP 1303.

REVISED RECORDS.--WSP 952: 1941(M). WSP 1002: 1940, 1943. WSP 1032: 1940, 1944.

GAGE.--Water-stage recorder. Datum of gage is 294.96 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records good except those for period with ice effect, Dec. 16-27, and period of doubtful gage-height record, Feb. 25 to Mar. 8, which are fair. Several measurements of water temperature were made during the year.

AVERAGE DISCHARGE.--52 years, 128 ft³/s, 14.98 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 52,000 ft³/s, Aug. 20, 1969, gage height, 31.0 ft, from floodmarks, from rating curve extended above 18,000 ft³/s on basis of slope-area measurements at gage heights 23.8 ft and 31.0 ft; minimum, 0.10 ft³/s, Sept. 5-8, 1966; minimum gage height, 0.81 ft, Sept. 8, 1966.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 1,500 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Oct. 2	1530	1,740	9.24	Jan. 1	1000	*2,460	*10.92
Oct. 19	1500	1,900	9.63	May 29	1630	2,130	10.18

Minimum discharge, 32 ft³/s, Sept. 27, 28, 29, 30, gage height, 1.69 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	181	142	100	1740	176	e110	253	112	289	58	43	39
2	1230	118	98	489	159	e111	240	104	235	55	41	38
3	485	173	96	309	240	e116	239	99	206	52	39	37
4	268	126	90	259	577	e108	184	96	308	51	38	35
5	187	115	93	254	335	e103	154	372	195	49	37	35
6	148	112	93	210	249	e100	144	198	168	47	41	35
7	122	108	90	177	216	e94	354	136	147	47	44	35
8	109	298	95	259	185	e94	292	115	130	50	38	37
9	103	339	104	352	169	98	209	104	122	52	37	43
10	95	190	96	245	278	98	183	591	118	51	64	41
11	92	144	94	191	263	95	195	549	107	48	52	36
12	88	128	98	175	196	94	162	283	99	45	44	34
13	83	121	108	152	168	92	141	224	95	51	41	58
14	84	111	103	133	155	91	129	192	93	128	43	92
15	81	111	97	128	146	88	525	152	91	256	160	58
16	77	220	e92	118	152	90	340	147	91	121	58	44
17	89	178	e87	114	142	235	249	132	84	69	49	39
18	133	132	e105	113	120	263	207	112	85	59	45	36
19	1350	117	e95	106	127	136	173	102	102	55	44	37
20	607	115	e100	103	122	158	162	102	81	55	47	41
21	355	106	e95	106	114	180	174	190	79	133	46	40
22	252	102	e94	103	140	144	227	274	75	221	58	40
23	207	118	e97	95	283	125	165	227	100	81	70	41
24	175	109	e103	95	186	116	139	144	78	63	158	36
25	154	107	e97	218	e130	127	125	116	70	56	80	34
26	137	126	e100	455	e114	122	126	135	67	53	80	33
27	125	139	e98	248	e117	110	118	571	66	50	59	32
28	121	122	107	174	e117	103	108	365	65	48	51	32
29	116	111	110	165	---	139	114	1710	61	47	46	32
30	111	103	110	361	---	223	140	707	58	47	44	32
31	127	---	350	221	---	268	---	387	---	47	40	---
TOTAL	7492	4241	3295	7868	5376	4031	5971	8748	3565	2245	1737	1202
MEAN	242	141	106	254	192	130	199	282	119	72.4	56.0	40.1
MAX	1350	339	350	1740	577	268	525	1710	308	256	160	92
MIN	77	102	87	95	114	88	108	96	58	45	37	32
CFSM	2.08	1.22	.92	2.19	1.66	1.12	1.72	2.43	1.02	.62	.48	.35
IN.	2.40	1.36	1.06	2.52	1.72	1.29	1.91	2.81	1.14	.72	.56	.39

CAL YR 1989 TOTAL 58766 MEAN 161 MAX 3950 MIN 36 CFSM 1.39 IN. 18.85
WTR YR 1990 TOTAL 55771 MEAN 153 MAX 1740 MIN 32 CFSM 1.32 IN. 17.89

e Estimated.

02030500 SLATE RIVER NEAR ARVONIA, VA

LOCATION.--Lat 37°42'10", long 78°22'40", Buckingham County, Hydrologic Unit 02080203, on left bank 250 ft upstream from bridge on State Highway 676, 1.8 mi northwest of Arvonias, 2.9 mi upstream from Hunts Creek, and 3.8 mi upstream from mouth.

DRAINAGE AREA.--226 mi².

PERIOD OF RECORD.--April 1926 to current year. Monthly discharge only for some periods, published in WSP 1303.

REVISED RECORDS.--WSP 972: 1928-29, 1932, 1933-34(M), 1935. WSP 2104: 1928(M), 1935-37(M), 1940(M), 1944(M), 1949(M), 1955(M), drainage area. WDR VA-72-1: 1935, 1937, 1944, 1949, 1971(M).

GAGE.--Water-stage recorder. Datum of gage is 238.78 ft above National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers). Prior to Feb. 15, 1936, nonrecording gage at same site and datum.

REMARKS.--Records good except for period with ice effect, Dec. 16-28, which is fair. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

AVERAGE DISCHARGE.--64 years, 229 ft³/s, 13.76 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 42,200 ft³/s, June 22, 1972, gage height, 25.10 ft, from high-water mark in gage house, from rating curve extended above 5,900 ft³/s on basis of slope-area measurement of peak flow; minimum, 2.0 ft³/s, Sept. 28 to Oct. 2, 1930; minimum gage height, 1.35 ft, Sept. 12, 1966.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 2,100 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Oct. 2	1400	2,300	8.83	May 27	1600	2,280	8.18
Jan. 1	0400	3,390	10.39	May 29	1200	*3,450	*10.46
Mar. 17	2230	3,240	10.19				

Minimum discharge, 44 ft³/s, Sept. 30, gage height, 2.48 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	332	203	197	2840	302	223	687	206	333	92	58	62
2	1920	192	189	1210	280	222	715	198	260	92	56	60
3	878	428	188	499	276	258	1390	192	230	84	53	60
4	408	346	179	458	487	276	585	190	212	80	52	58
5	289	241	176	579	443	234	399	322	191	76	51	55
6	234	212	179	441	327	220	343	265	177	74	54	55
7	205	207	177	392	298	211	872	202	171	72	63	56
8	182	243	181	518	285	202	711	184	164	73	67	61
9	174	364	203	965	261	205	439	174	159	80	61	74
10	166	274	184	504	640	207	361	469	261	78	87	70
11	161	219	179	372	1010	203	361	702	210	70	89	68
12	157	204	189	320	467	201	325	308	159	71	82	61
13	151	194	226	279	349	199	286	237	147	85	99	63
14	150	188	223	253	307	195	269	215	142	166	78	82
15	150	191	213	242	284	190	448	193	146	272	80	91
16	146	851	e195	235	286	192	468	193	156	201	66	75
17	143	751	e173	228	333	1320	339	199	142	144	136	61
18	186	356	e205	226	274	2650	299	172	140	113	93	54
19	1310	269	e195	221	266	721	267	156	172	102	74	52
20	905	236	e188	211	273	432	256	150	153	96	85	55
21	418	219	e192	219	243	393	261	311	134	97	82	57
22	292	201	e195	211	241	320	300	529	140	87	136	57
23	236	227	e185	200	324	285	268	533	190	81	298	63
24	209	239	e190	197	299	263	245	289	153	75	621	61
25	197	223	e185	505	250	319	232	218	125	70	235	53
26	186	263	e180	1670	225	341	225	201	112	67	138	50
27	179	298	e175	764	222	281	217	1550	106	63	108	47
28	174	256	e180	423	229	254	208	730	102	63	88	46
29	171	230	189	340	---	311	204	2640	98	65	78	45
30	168	209	194	430	---	657	213	1810	94	63	72	44
31	179	---	394	365	---	764	---	543	---	62	67	---
TOTAL	10656	8534	6098	16317	9481	12749	12193	14281	4979	2914	3407	1796
MEAN	344	284	197	526	339	411	406	461	166	94.0	110	59.9
MAX	1920	851	394	2840	1010	2650	1390	2640	333	272	621	91
MIN	143	188	173	197	222	190	204	150	94	62	51	44
CFSM	1.52	1.26	.87	2.33	1.50	1.82	1.80	2.04	.73	.42	.49	.26
IN.	1.75	1.40	1.00	2.69	1.56	2.10	2.01	2.35	.82	.48	.56	.30

CAL YR 1989 TOTAL 108618 MEAN 298 MAX 3820 MIN 62 CFSM 1.32 IN. 17.88
WTR YR 1990 TOTAL 103405 MEAN 283 MAX 2840 MIN 44 CFSM 1.25 IN. 17.02

e Estimated.

02031000 MECHUMS RIVER NEAR WHITE HALL, VA

LOCATION.--Lat 38°06'09", long 78°35'35", Albemarle County, Hydrologic Unit 02080204, on right bank 20 ft downstream from bridge on State Highway 614, 1.5 mi downstream from Rocky Run, 4.0 mi southeast of White Hall, and 4.9 mi upstream from confluence with Moormans River.

DRAINAGE AREA.--95.4 mi².

PERIOD OF RECORD.--October 1942 to September 1951, October 1979 to current year. Prior to September 1951, published as Mechum River near Ivy.

GAGE.--Water-stage recorder. Datum of gage is 429.75 ft above National Geodetic Vertical Datum of 1929. Oct. 1, 1942, to Sept. 30, 1951, on right bank 20 ft downstream from former highway bridge at different datum.

REMARKS.--Records good except those for periods with ice effect, Dec. 15-19, 21, 26, and period of no gage-height record, June 7 to Aug. 9, which are fair. Several measurements of water temperature were made during the year.

COOPERATION.--Records were provided by the Virginia Water Control Board.

AVERAGE DISCHARGE.--20 years, 107 ft³/s, 15.23 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 20,000 ft³/s, Oct. 15, 1942, gage height, 30.3 ft, datum then in use, from floodmarks, from rating curve extended above 8,000 ft³/s; minimum, 0.6 ft³/s, Sept. 9, 1944.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Sept. 6, 1979, reached a stage of 24.5 ft, from floodmarks, discharge, about 13,500 ft³/s, from rating curve extended above 8,300 ft³/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 1,200 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Oct. 2	0900	1,840	10.08	May 26	2300	1,380	9.16
Oct. 19	0930	1,790	9.98	May 29	0900	1,390	9.18
May 10	1400	*2,320	*11.05				

Minimum discharge, 16 ft³/s, Sept. 27, gage height, 4.35 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	150	120	80	546	147	118	144	87	238	e35	e21	22
2	874	98	78	254	135	112	137	80	195	e31	e19	22
3	356	108	78	191	138	112	144	76	179	e29	e19	25
4	240	96	73	165	254	102	127	80	165	e28	e18	21
5	179	93	75	156	189	98	120	128	135	e27	e18	19
6	149	90	75	144	161	96	120	91	122	e26	e23	20
7	127	90	74	125	149	93	185	81	e100	e25	e21	20
8	110	93	80	137	135	90	183	75	e88	e24	e19	22
9	101	116	86	167	125	91	158	72	e80	e23	e19	24
10	92	98	81	158	133	90	145	781	e78	e23	39	25
11	88	91	85	142	135	87	144	326	e70	e24	30	22
12	82	88	78	130	118	87	125	195	e60	e28	24	20
13	79	85	84	115	108	85	115	184	e55	e40	22	65
14	74	85	78	107	106	84	110	171	e54	e84	22	60
15	72	86	e76	106	100	84	214	135	e53	e120	58	36
16	68	144	e72	100	101	86	216	118	e52	e78	30	26
17	92	120	e82	94	97	145	133	106	e50	e62	26	23
18	134	102	e94	92	88	165	122	92	e47	e54	23	21
19	1150	96	e85	87	92	130	110	82	e73	e48	28	21
20	436	93	80	86	86	138	107	79	e50	e44	37	24
21	284	88	e75	87	82	133	110	101	e46	e46	28	23
22	212	81	68	82	121	125	118	123	e43	e44	37	24
23	173	93	60	80	248	118	104	108	e63	e42	56	23
24	149	85	57	79	173	110	97	90	e45	e38	74	20
25	135	81	58	97	142	112	92	80	e39	e35	47	18
26	123	86	e60	156	128	107	88	293	e36	e32	66	18
27	113	93	62	130	127	101	86	467	e33	e30	37	17
28	106	91	63	116	125	94	81	325	e32	e28	31	17
29	101	86	65	122	---	98	90	971	e30	e26	27	17
30	98	81	67	236	---	113	97	458	e28	e25	25	17
31	113	---	142	165	---	149	---	313	---	e22	23	---
TOTAL	6260	2857	2371	4452	3743	3353	3822	6368	2339	1221	967	732
MEAN	202	95.2	76.5	144	134	108	127	205	78.0	39.4	31.2	24.4
MAX	1150	144	142	546	254	165	216	971	238	120	74	65
MIN	68	81	57	79	82	84	81	72	28	22	18	17
CFSM	2.12	1.00	.80	1.51	1.40	1.13	1.34	2.15	.82	.41	.33	.26
IN.	2.44	1.11	.92	1.74	1.46	1.31	1.49	2.48	.91	.48	.38	.29

CAL YR 1989 TOTAL 42534 MEAN 117 MAX 1400 MIN 29 CFSM 1.22 IN. 16.59
WTR YR 1990 TOTAL 38485 MEAN 105 MAX 1150 MIN 17 CFSM 1.11 IN. 15.01

e Estimated.

02032250 MOORMANS RIVER NEAR FREE UNION, VA

LOCATION.--Lat 38°08'26", long 78°33'22", Albemarle County, Hydrologic Unit 02080204, on right bank 130 ft upstream from bridge on State Highway 601, 0.4 mi upstream from confluence with Mechums River, 0.8 mi downstream from Wards Creek, and 1.1 mi southeast of Free Union.

DRAINAGE AREA.--74.6 mi².

PERIOD OF RECORD.--October 1979 to current year.

GAGE.--Water-stage recorder. Datum of gage is 403.11 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records good except those for periods of doubtful gage-height record, Oct. 5, Nov. 23 to Jan. 18, and Sept. 17-30, which are fair. Flow regulated by Rivanna Water and Sewer Authority at Sugar Hollow Reservoir 12.0 mi upstream from station, capacity, 1,320 acre-ft, from which an average of 5.6 ft³/s is diverted for industrial use. Several measurements of water temperature were made during the year.

COOPERATION.--Records were provided by the Virginia Water Control Board.

AVERAGE DISCHARGE.--11 years, 99.2 ft³/s, 18.06 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 15,500 ft³/s, Nov. 4, 1985, gage height, 20.41 ft, from high-water mark, from rating curve extended above 5,600 ft³/s on basis of slope-area measurement of peak flow; minimum, 0.58 ft³/s, Sept. 5, 1987.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 21, 1972, reached a stage of 20.2 ft, from floodmarks, discharge, 15,100 ft³/s, and flood of Sept. 6, 1979, reached a stage of 21.55 ft, from floodmarks, discharge, about 16,500 ft³/s, from rating curve extended as explained above.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 700 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Oct. 2	1300	1,520	7.00	May 26	2130	1,420	6.82
Oct. 19	2200	1,480	6.93	May 29	1300	1,340	6.68
May 10	1100	*1,580	*7.12				

Minimum discharge, 2.2 ft³/s, Aug. 5.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	114	68	e60	e480	185	95	138	63	254	12	3.5	8.8
2	1040	69	e59	e220	164	90	158	56	191	11	2.6	7.4
3	794	63	e58	e170	164	90	197	51	155	10	2.4	7.0
4	445	58	e55	e140	277	83	179	53	132	8.8	2.4	6.4
5	e223	53	e58	e125	224	76	161	81	107	6.7	2.6	5.5
6	170	49	e59	e115	194	70	155	60	92	5.8	2.8	5.5
7	107	48	e55	e105	176	69	221	53	80	5.5	4.3	5.8
8	83	48	e60	e125	149	64	215	49	69	5.5	4.3	6.1
9	75	56	e64	e165	128	64	191	47	63	7.0	3.6	9.2
10	72	72	e60	e140	149	62	185	508	60	7.0	7.4	11
11	63	74	e63	e128	140	60	176	248	49	5.5	7.9	9.2
12	55	63	e61	e110	120	59	152	164	43	20	5.8	7.0
13	49	50	e60	e98	111	54	130	132	41	14	4.3	20
14	46	43	e58	e90	107	53	118	115	39	41	4.6	25
15	43	42	e57	e87	101	53	158	95	38	69	5.8	17
16	41	55	e54	e83	99	54	122	90	38	49	5.8	12
17	67	95	e59	e80	92	191	107	83	34	31	5.5	e11
18	341	113	e62	e78	81	227	97	68	32	24	4.6	e10
19	1090	111	e59	76	80	188	90	60	32	20	3.8	e11
20	925	97	e54	74	75	185	86	56	27	16	16	e12
21	605	78	e50	75	69	155	90	63	26	16	10	e11
22	396	66	e45	68	104	143	97	60	26	14	14	e12
23	248	e76	e42	64	152	138	85	63	29	12	30	e11
24	182	e70	e39	64	130	132	78	49	24	9.2	56	e8.5
25	125	e65	e38	93	115	130	74	43	22	7.9	29	e7.5
26	92	e70	e43	172	103	120	70	196	18	6.4	31	e6.2
27	78	e78	e44	152	103	107	66	291	17	5.5	21	e5.5
28	76	e70	e47	140	103	97	63	320	16	4.6	16	e5.0
29	75	e64	e49	136	---	99	76	1060	14	4.3	13	e4.8
30	72	e63	e50	258	---	109	75	719	12	4.3	12	e4.7
31	68	---	e52	203	---	130	---	405	---	4.0	9.7	---
TOTAL	7860	2027	1674	4114	3695	3247	3810	5401	1780	457.0	341.7	283.1
MEAN	254	67.6	54.0	133	132	105	127	174	59.3	14.7	11.0	9.44
MAX	1090	113	64	480	277	227	221	1060	254	69	56	25
MIN	41	42	38	64	69	53	63	43	12	4.0	2.4	4.7
CFSM	3.40	.91	.72	1.78	1.77	1.40	1.70	2.34	.80	.20	.15	.13
IN.	3.92	1.01	.83	2.05	1.84	1.62	1.90	2.69	.89	.23	.17	.14

CAL YR 1989 TOTAL 45045 MEAN 123 MAX 1890 MIN 14 CFSM 1.65 IN. 22.46
WTR YR 1990 TOTAL 34689.8 MEAN 95.0 MAX 1090 MIN 2.4 CFSM 1.27 IN. 17.30

e Estimated.

JAMES RIVER BASIN

02032400 BUCK MOUNTAIN CREEK NEAR FREE UNION, VA

LOCATION.--Lat 38°09'16", long 78°32'22", Albemarle County, Hydrologic Unit 02080204, on left bank at downstream side of bridge on State Highway 665, 0.2 mi downstream from Piney Creek, 1.6 mi east of Free Union, and 2.0 mi upstream from mouth.

DRAINAGE AREA.--37.0 mi².

PERIOD OF RECORD.--October 1979 to current year.

GAGE.--Water-stage recorder. Datum of gage is 408.71 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records good except those for periods of doubtful or no gage-height record, Oct. 5, 21-30, Nov. 2, 4-8, 10, 13-15, 17, 18, 20-22, 24-26, Nov. 28 to Dec. 5, Dec. 13 to Jan. 11, June 9-11, Aug. 2-5, 9, 12, 13, 25, 27, 28, Aug. 30 to Sept. 8, and Sept. 11, 12, 15-30, which are fair. Several measurements of water temperature were made during the year.

COOPERATION.--Records were provided by the Virginia Water Control Board.

AVERAGE DISCHARGE.--11 years, 42.9 ft³/s, 15.75 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 6,200 ft³/s, Sept. 8, 1987, gage height, 9.50 ft, from rating curve extended above 1,500 ft³/s on basis of contracted-opening measurement of peak flow; minimum, 0.35 ft³/s, Aug. 21, 1987.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Aug. 22, 1979, reached a stage of 11.12 ft, from floodmarks, discharge, about 6,600 ft³/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 500 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Oct. 2	0600	*1,170	*6.20	May 10	1100	1,100	6.03
Oct. 19	0245	853	5.46	May 29	0830	540	4.41

Minimum daily discharge, 3.8 ft³/s, Sept. 30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	110	53	e31	e200	58	42	54	28	76	8.8	4.4	e6.8
2	533	e40	e30	e120	53	42	57	25	63	7.8	e4.2	e6.5
3	220	53	e30	e80	64	42	62	23	56	6.9	e4.0	e11
4	131	e34	e28	e67	105	38	56	25	51	6.6	e4.0	e7.5
5	e70	e33	e25	e62	72	35	51	40	44	6.3	e3.9	e5.5
6	60	e31	25	e56	62	34	55	27	39	6.4	8.3	e6.2
7	51	e32	24	e50	55	32	90	23	35	6.6	11	e6.4
8	46	e40	26	e53	49	31	78	21	32	8.2	11	e7.2
9	42	58	27	e64	46	32	66	20	e29	11	e5.5	18
10	38	e44	26	e55	57	31	61	295	e26	12	27	22
11	37	36	25	e47	52	30	57	114	e22	57	29	e19
12	34	35	25	43	47	29	51	72	20	30	e14	e17
13	28	e32	e26	37	43	29	47	61	20	14	e8.0	48
14	28	e31	e24	33	41	28	45	52	19	53	4.2	56
15	27	e34	e23	32	38	27	63	44	19	67	4.4	e23
16	27	73	e23	30	38	28	48	41	19	42	13	e11
17	122	e48	e25	29	34	78	43	37	17	21	9.1	e9.0
18	137	e43	e32	28	30	74	38	29	16	14	6.5	e8.2
19	610	38	e31	26	31	60	34	25	19	11	11	e7.4
20	307	e34	e28	26	28	65	34	25	14	9.4	26	e11
21	e135	e30	e26	26	25	58	43	32	14	9.4	18	e10
22	e95	e28	e24	24	66	53	44	36	15	7.8	27	e9.5
23	e75	45	e22	22	82	51	36	35	17	7.0	41	e11
24	e64	e36	e21	22	62	50	32	27	13	6.0	53	e8.0
25	e55	e30	e22	44	52	50	31	22	11	5.5	e20	e6.6
26	e49	e33	e23	74	47	46	29	55	10	5.2	25	e6.2
27	e46	37	e25	58	47	43	27	66	9.6	5.3	e17	e4.7
28	e43	e35	e25	51	46	40	26	109	9.0	5.0	e13	e4.3
29	e41	e33	e26	56	---	43	35	357	8.4	5.0	17	e3.9
30	e38	e31	e26	92	---	49	35	159	7.9	5.1	e11	e3.8
31	56	---	e56	67	---	57	---	97	---	5.0	e9.0	---
TOTAL	3355	1160	830	1674	1430	1347	1428	2022	750.9	465.3	459.5	374.7
MEAN	108	38.7	26.8	54.0	51.1	43.5	47.6	65.2	25.0	15.0	14.8	12.5
MAX	610	73	56	200	105	78	90	357	76	67	53	56
MIN	27	28	21	22	25	27	26	20	7.9	5.0	3.9	3.8
CFSM	2.93	1.05	.72	1.46	1.38	1.17	1.29	1.76	.68	.41	.40	.34
IN.	3.37	1.17	.83	1.68	1.44	1.35	1.44	2.03	.75	.47	.46	.38

CAL YR 1989 TOTAL 21743.4 MEAN 59.6 MAX 849 MIN 8.0 CFSM 1.61 IN. 21.86
WTR YR 1990 TOTAL 15296.4 MEAN 41.9 MAX 610 MIN 3.8 CFSM 1.13 IN. 15.38

e Estimated.

02032515 SOUTH FORK RIVANNA RIVER NEAR CHARLOTTESVILLE, VA

LOCATION.--Lat 38°06'06", long 78°27'39", Albemarle County, Hydrologic Unit 02080204, on left bank at downstream side of bridge on U.S. Highway 29, 0.4 mi downstream from South Fork Rivanna River dam, 2.5 mi northeast of Charlottesville city limits, and 2.9 mi upstream from mouth.

DRAINAGE AREA.--260 mi².

PERIOD OF RECORD.--August 1979 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 330 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Records good except those for periods with ice effect, Dec. 18-26, 29, which are fair. Flow regulated by Rivanna Water and Sewer Authority at South Fork Rivanna and Sugar Hollow Reservoirs, combined capacity, 6,540 acre-ft, from which an average of 15.6 ft³/s is diverted for industrial and municipal use. Several measurements of water temperature were made during the year.

COOPERATION.--Records were provided by the Virginia Water Control Board.

AVERAGE DISCHARGE.--11 years, 283 ft³/s, 14.78 in/yr, unadjusted.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 15,200 ft³/s, Sept. 6, 1979, gage height, 23.50 ft, from floodmarks, from rating curve extended above 12,000 ft³/s; minimum, 1.1 ft³/s, Sept. 5, 1990, gage height, 1.74 ft, result of regulation; minimum daily, 3.6 ft³/s, Aug. 31, 1987.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 4,260 ft³/s, Oct. 2, gage height, 11.16 ft; minimum, 1.1 ft³/s, Sept. 5, gage height, 1.74 ft, result of regulation; minimum daily, 7.5 ft³/s, Sept. 5.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	443	368	186	837	496	322	422	148	738	77	34	12
2	2620	251	171	1060	447	306	447	254	577	68	30	13
3	1630	275	280	672	432	271	421	125	476	62	28	49
4	943	244	277	543	708	330	450	276	469	55	27	9.6
5	634	290	165	418	651	259	359	266	419	52	27	7.5
6	498	206	137	373	546	245	450	264	225	48	35	39
7	431	253	177	450	494	280	486	175	341	45	39	20
8	271	318	243	428	443	261	596	172	252	48	35	11
9	275	298	244	475	416	236	510	209	194	54	34	12
10	268	289	242	454	379	248	467	477	239	56	118	55
11	216	236	219	430	443	201	412	1130	266	59	125	60
12	237	209	188	422	418	241	445	621	101	104	19	35
13	201	248	190	353	335	229	361	511	139	73	19	166
14	125	237	191	283	337	188	298	538	206	220	16	140
15	217	239	190	310	243	200	532	425	130	417	65	99
16	137	226	190	297	381	209	505	364	181	281	92	9.8
17	269	445	188	271	218	293	450	331	132	158	75	55
18	753	318	e180	255	284	540	276	235	186	114	44	64
19	791	317	e170	278	277	432	265	181	256	92	11	27
20	1060	250	e160	256	260	446	425	240	102	82	54	49
21	1150	231	e150	209	252	446	319	323	61	120	55	47
22	819	281	e145	245	284	356	296	246	90	101	35	52
23	622	290	e140	239	597	370	319	180	227	81	101	45
24	526	275	e135	232	474	439	249	175	116	139	182	31
25	439	237	e110	239	422	308	308	165	100	52	44	34
26	403	252	e105	446	336	375	186	294	46	35	83	49
27	338	278	77	467	344	317	293	1270	69	13	112	14
28	318	305	66	421	341	307	81	893	81	35	49	58
29	274	233	e150	358	---	385	263	2330	77	40	48	8.6
30	309	275	167	654	---	427	403	1720	71	41	39	9.1
31	293	---	236	583	---	406	---	1030	---	42	37	---
TOTAL	17510	8174	5469	12958	11258	9873	11294	15568	6567	2864	1712	1280.6
MEAN	565	272	176	418	402	318	376	502	219	92.4	55.2	42.7
MAX	2620	445	280	1060	708	540	596	2330	738	417	182	166
MIN	125	206	66	209	218	188	81	125	46	13	11	7.5
*FT ³ /S	16.6	15.1	14.0	14.0	14.4	14.4	15.6	15.4	16.3	17.6	17.1	17.7

CAL YR 1989 TOTAL 121492.6 MEAN 333 MAX 3380 MIN 8.6 CFSM 1.28 IN. 17.38 *FT³/S 15.6
WTR YR 1990 TOTAL 104527.6 MEAN 286 MAX 2620 MIN 7.5 CFSM 1.10 IN. 14.96 *FT³/S 15.7

* Average diversion in cubic feet per second at South Fork Rivanna and Sugar Hollow Reservoirs; provided by Rivanna Water and Sewer Authority.

e Estimated.

02032680 NORTH FORK RIVANNA RIVER NEAR PROFFIT, VA

LOCATION.--Lat 38°05'16", long 78°24'44", Albemarle County, Hydrologic Unit 02080204, on left bank 50 ft downstream from bridge on State Highway 649, 1.9 mi southeast of Proffit, and 2.2 mi upstream from confluence with South Fork.

DRAINAGE AREA.--176 mi².

PERIOD OF RECORD.--April 1970 to current year.

GAGE.--Water-stage recorder. Datum of gage is 323.43 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records good except those for periods of doubtful or no gage-height record, Nov. 20, Jan. 1-12, 21-24, June 3, 8, 10, 12, July 18-21, July 23 to Aug. 8, Aug. 13-15, 18, 19, 21, 22, 25, Aug. 27 to Sept. 13, and Sept. 15-30, and period with ice effect, Dec. 19-31, which are fair. Rivanna Water and Sewer Authority diverts about 0.3 ft³/s daily for municipal water supply 7.8 mi upstream from station. Several measurements of water temperature were made during the year.

COOPERATION.--Records were provided by the Virginia Water Control Board.

AVERAGE DISCHARGE.--20 years, 239 ft³/s, 18.44 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 31,800 ft³/s, June 21, 1972, gage height, 30.4 ft, from floodmarks, from rating curve extended above 9,000 ft³/s; minimum, 1.8 ft³/s, Oct. 6, 1977.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 1,500 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Oct. 2	1200	2,890	9.26	May 26	2130	*4,180	*12.21
Oct. 19	1330	3,170	9.90	May 29	1330	2,830	9.11
Jan. 1	Unknown	1,780	a6.63	July 12	0200	3,520	10.71
May 10	1800	3,810	11.37	July 15	0130	1,550	6.09

a From high-water mark.

Minimum daily discharge, 28 ft³/s, Sept. 28, 29.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	241	182	131	e1300	316	212	303	163	384	63	e42	e40
2	1690	158	131	e680	278	203	287	144	317	57	e37	e40
3	792	177	125	e440	270	210	391	134	e235	54	e35	e45
4	468	155	118	e350	550	193	317	135	265	52	e34	e38
5	341	145	119	e320	400	175	277	254	218	51	e35	e33
6	280	141	117	e290	326	173	256	178	194	51	e37	e34
7	239	142	115	e275	290	159	468	145	179	50	e39	e35
8	188	174	130	e315	255	153	448	130	e170	50	e38	e37
9	170	252	117	e380	232	155	338	121	150	50	63	e39
10	148	200	128	e330	280	155	299	1770	e125	51	76	e40
11	139	174	119	e300	296	151	284	1060	118	271	81	e38
12	127	163	125	e247	256	150	247	477	e111	1180	79	e35
13	119	153	120	218	228	146	218	354	107	217	e55	e55
14	115	145	105	188	217	141	204	296	105	293	e37	103
15	110	150	109	171	203	139	700	239	102	812	e50	e70
16	105	290	112	164	201	138	343	214	103	390	92	e50
17	287	267	105	158	188	272	272	196	94	220	63	e42
18	583	220	98	136	162	377	235	162	95	e120	e48	e37
19	2380	187	e97	137	163	289	208	139	122	e82	e40	e36
20	1280	e179	e94	133	152	401	198	133	93	e70	87	e40
21	726	166	e90	e120	138	394	203	169	88	e71	e66	e39
22	503	154	e89	e115	161	327	223	153	85	86	e54	e41
23	377	168	e86	e119	456	300	194	157	107	e69	74	e40
24	320	159	e84	e110	326	279	178	130	84	e60	105	e36
25	302	146	e88	176	269	278	167	118	75	e52	e80	e33
26	291	158	e95	445	234	251	162	713	71	e45	88	e30
27	231	179	e100	330	230	224	147	819	67	e40	e75	e30
28	201	159	e110	265	228	202	142	464	64	e35	e62	e28
29	177	150	e120	252	---	206	164	2130	61	e36	e52	e28
30	163	137	e130	486	---	243	216	882	61	e37	e48	e31
31	170	---	e280	377	---	330	---	510	---	e40	e43	---
TOTAL	13263	5230	3587	9327	7305	7026	8089	12689	4050	4755	1815	1223
MEAN	428	174	116	301	261	227	270	409	135	153	58.5	40.8
MAX	2380	290	280	1300	550	401	700	2130	384	1180	105	103
MIN	105	137	84	110	138	138	142	118	61	35	34	28
CFSM	2.43	.99	.66	1.71	1.48	1.29	1.53	2.33	.77	.87	.33	.23
IN.	2.80	1.11	.76	1.97	1.54	1.49	1.71	2.68	.86	1.01	.38	.26

CAL YR 1989 TOTAL 91340 MEAN 250 MAX 4500 MIN 54 CFSM 1.42 IN. 19.31
WTR YR 1990 TOTAL 78359 MEAN 215 MAX 2380 MIN 28 CFSM 1.22 IN. 16.56

e Estimated.

02034000 RIVANNA RIVER AT PALMYRA, VA

LOCATION.--Lat 37°51'28", long 78°15'58", Fluvanna County, Hydrologic Unit 02080204, on left bank 10 ft upstream from bridge on U.S. Highway 15 at Palmyra, 0.5 mi upstream from Cunningham Creek, and 15 mi upstream from mouth.

DRAINAGE AREA.--664 mi².

PERIOD OF RECORD.--October 1933 to current year. Monthly discharge only for some periods, published in WSP 1303.

REVISED RECORDS.--WSP 802: 1936(M). WSP 852: 1937. WSP 892: 1934-35. WSP 1303: 1945-46(M). WSP 1503: 1956. WSP 2104: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 210.39 ft above National Geodetic Vertical Datum of 1929. Prior to Oct. 24, 1942, water-stage recorder at site 200 ft downstream at same datum. Oct. 24, 1942, to Dec. 18, 1947, nonrecording gage 10 ft downstream at same datum.

REMARKS.--Records good except for period with ice effect, Dec. 17-30, which is fair. Some diurnal fluctuation at times mostly at low and medium flow by South Fork Rivanna River Reservoir. Combined diversion of water supply and discharge from waste-water treatment plant upstream at Charlottesville resulted in an average gain of about 1.3 ft³/s upstream from the gage. National Weather Service gage-height telemeter at station. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

AVERAGE DISCHARGE.--57 years, 722 ft³/s, 14.77 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 86,000 ft³/s, Aug. 20, 1969, gage height, 39.85 ft, from rating curve extended above 76,000 ft³/s on basis of contracted-opening measurement of peak flow and velocity-area study; minimum, 5.2 ft³/s, Sept. 9-11, 1966, gage height, 2.13 ft.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 6,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Oct. 2	1930	7,400	13.29	May 11	0230	7,570	13.54
Oct. 19	1845	8,430	14.70	May 27	1130	*12,700	*18.73
Jan. 1	0730	7,090	12.83	May 29	1800	9,950	16.53

Minimum discharge, 66 ft³/s, Sept. 30, gage height, 2.53 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	753	795	555	5540	1260	663	1310	674	1650	291	159	136
2	4860	670	481	2720	1140	625	1300	482	1340	218	139	108
3	3830	848	512	1700	1120	650	1340	555	1170	177	121	93
4	1950	733	554	1410	2170	610	1260	429	1390	163	119	138
5	1370	570	523	1320	1750	605	1110	1420	1020	148	111	108
6	1110	581	440	1200	1380	527	1020	945	761	138	121	82
7	886	549	432	1100	1250	531	1550	653	607	132	138	112
8	661	954	505	1180	1130	514	1690	503	624	125	135	94
9	565	1570	557	1520	1010	476	1380	494	556	129	128	107
10	510	1040	513	1340	1130	517	1240	2190	513	132	258	105
11	493	834	532	1200	1260	502	1210	4640	491	136	331	147
12	465	625	557	1110	1100	457	1100	1800	493	1300	300	135
13	458	565	557	921	935	483	989	1420	335	603	153	149
14	417	572	552	698	759	466	729	1560	393	481	123	453
15	389	555	510	688	734	422	2220	1200	395	1730	129	276
16	410	1120	496	667	853	439	1640	914	363	1120	156	204
17	377	1390	e420	644	760	767	1290	820	382	625	252	108
18	1420	1050	e430	576	565	1530	994	689	351	434	191	125
19	5700	850	e380	593	654	1170	812	493	434	348	138	126
20	4930	727	e390	563	613	1190	780	500	470	298	148	107
21	2560	599	e350	514	553	1400	873	697	301	309	290	124
22	1750	600	e365	498	569	1070	971	839	242	362	234	133
23	1360	689	e360	515	1380	1010	851	743	384	285	233	146
24	1160	666	e350	482	1220	981	724	663	399	249	512	127
25	975	571	e340	641	994	871	624	501	263	288	556	103
26	889	587	e360	1730	807	839	661	576	250	193	215	109
27	724	771	e400	1460	648	774	543	7490	197	169	306	103
28	651	735	e380	1180	706	659	630	2280	220	133	250	93
29	610	680	e450	989	---	679	466	7160	209	146	171	100
30	579	620	e600	1700	---	995	825	4850	196	152	151	85
31	660	---	819	1470	---	1340	---	2390	---	155	139	---
TOTAL	43472	23116	14670	37869	28450	23762	32132	50570	16399	11169	6407	4036
MEAN	1402	771	473	1222	1016	767	1071	1631	547	360	207	135
MAX	5700	1570	819	5540	2170	1530	2220	7490	1650	1730	556	453
MIN	377	549	340	482	553	422	466	429	196	125	111	82
CFSM	2.11	1.16	.71	1.84	1.53	1.15	1.61	2.46	.82	.54	.31	.20
IN.	2.44	1.30	.82	2.12	1.59	1.33	1.80	2.83	.92	.63	.36	.23

CAL YR 1989 TOTAL 324057 MEAN 888 MAX 22900 MIN 146 CFSM 1.34 IN. 18.15
WTR YR 1990 TOTAL 292052 MEAN 800 MAX 7490 MIN 82 CFSM 1.21 IN. 16.36

e Estimated.

JAMES RIVER BASIN

02035000 JAMES RIVER AT CARTERSVILLE, VA
(National stream-quality accounting network station)

LOCATION.--Lat 37°40'15", long 78°05'10", Goochland County, Hydrologic Unit 02080205, on left bank 200 ft downstream from bridge on State Highway 45 at Cartersville, 1.8 mi downstream from Willis River, and at mile 156.4.

DRAINAGE AREA.--6,257 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1898 to current year. Monthly discharge only for some periods, published in WSP 1303.

REVISED RECORDS.--WSP 972: 1936(M). WSP 1203: 1901-2(M), 1923-25(M), 1928(M). WSP 2104: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 163.90 ft above National Geodetic Vertical Datum of 1929. Prior to June 4, 1927, nonrecording gage at same site and datum.

REMARKS.--Records good except those for periods of doubtful or no gage-height record, Oct. 24-26 and Dec. 27 to Jan. 1, and period with ice effect, Dec. 21, 22, which are fair. Moderate diurnal fluctuation caused by powerplants upstream from station. National Weather Service gage-height telemeter at station.

AVERAGE DISCHARGE.--92 years, 7,079 ft³/s, 15.36 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 362,000 ft³/s, June 22, 1972, gage height, 37.87 ft, from floodmarks, from rating curve extended above 160,000 ft³/s on basis of slope-conveyance study; minimum, 316 ft³/s, Sept. 13, 14, 1966, gage height, 0.02 ft; minimum daily, 330 ft³/s, Sept. 14, 1966.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 40,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Oct. 3	1600	43,400	14.70	Jan. 2	1200	48,900	15.87
Oct. 20	0130	41,500	14.28	May 30	0030	*52,300	*16.57

Minimum discharge, 1,120 ft³/s, Sept. 7, gage height, 0.65 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	9460	6430	6970	e26800	13400	9600	13900	6550	24100	2930	2030	2040
2	20000	6550	6500	46500	12700	9220	13300	5810	18200	2880	1870	1600
3	40500	6700	5920	32000	11600	8970	17200	5910	14900	2680	1620	1590
4	31400	6840	6020	22200	14900	9250	14400	6090	13600	2630	1710	1620
5	20400	5940	5910	19200	18400	8770	11800	6330	11800	2580	1630	1600
6	15200	5640	5590	16800	21700	8460	10100	7960	9800	2520	1680	1470
7	12400	5460	5990	15100	18900	8100	12300	7710	8260	2310	1800	1550
8	10700	5610	4630	13100	16700	7530	14700	7800	7520	2040	1880	1680
9	9410	8200	5490	16600	14700	6670	15900	6680	6820	2110	2060	1510
10	8090	7030	5430	15900	15300	7130	14300	7340	6890	2230	1820	1300
11	7100	6020	5330	15000	19600	6680	13300	23200	8160	2320	2260	1370
12	6500	5610	5290	13100	18700	6820	12900	14900	6510	2540	2010	1680
13	6060	5300	5480	11700	17600	6340	11800	11600	5940	3330	1950	1570
14	5780	5310	5880	10400	15300	6170	10900	10400	5470	2690	1880	1870
15	5290	5310	5430	9420	13300	6040	12100	8840	5130	7070	2530	2350
16	4980	6410	5380	8640	11300	5820	15600	8210	4970	7160	1940	2640
17	5070	16200	4820	8000	11400	8130	11900	7970	5230	8570	1920	2060
18	5540	32600	4770	7650	10600	20000	10400	7880	5000	6620	1980	1760
19	25700	18900	4610	7450	10500	16300	9100	6960	4320	4970	1510	1660
20	36700	15000	4740	6580	10500	13400	8420	6340	4850	4220	1800	1560
21	29800	12700	e5000	6770	9460	13200	7980	6830	4170	3740	1800	1530
22	21300	11100	e3600	6540	8610	11800	8280	8740	4690	4060	2600	1550
23	16700	9270	2730	6310	10200	10600	7700	13400	3660	3790	2510	1580
24	e12900	8870	3170	6470	11700	9510	7450	17900	5380	3290	4870	1740
25	e10800	7390	3620	7130	10500	8910	7030	14000	4110	3160	5000	1420
26	e9600	7280	3430	15100	12700	9360	6750	10900	3740	2320	5420	1520
27	8230	7360	e4400	15100	11400	9210	6400	20000	3460	2350	3870	1490
28	7640	7090	e5200	13000	10300	9460	6370	16200	3270	1990	3250	1520
29	6710	7420	e4850	12400	---	9490	5730	33000	3130	2160	2650	1420
30	6480	6930	e5000	12600	---	11800	6210	46400	2990	2160	2430	1280
31	6490	---	e6000	13200	---	12500	---	36700	---	1820	1870	---
TOTAL	422930	266470	157180	436760	381970	295240	324220	398550	216070	105240	74150	49530
MEAN	13640	8882	5070	14090	13640	9524	10810	12860	7202	3395	2392	1651
MAX	40500	32600	6970	46500	21700	20000	17200	46400	24100	8570	5420	2640
MIN	4980	5300	2730	6310	8610	5820	5730	5810	2990	1820	1510	1280
CFSM	2.18	1.42	.81	2.25	2.18	1.52	1.73	2.05	1.15	.54	.38	.26
IN.	2.51	1.58	.93	2.60	2.27	1.76	1.93	2.37	1.28	.63	.44	.29

CAL YR 1989 TOTAL 3409550 MEAN 9341 MAX 87200 MIN 2310 CFSM 1.49 IN. 20.27
WTR YR 1990 TOTAL 3128310 MEAN 8571 MAX 46500 MIN 1280 CFSM 1.37 IN. 18.60

e Estimated.

02035000 JAMES RIVER AT CARTERSVILLE, VA--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1930, 1948, 1967 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: April 1968 to January 1976, October 1980 to May 1981.

WATER TEMPERATURE: April 1968 to January 1976, October 1980 to May 1981.

SUSPENDED-SEDIMENT DISCHARGE: October 1980 to May 1981.

COOPERATION.--Chemical data as noted were provided by the Virginia Division of Consolidated Laboratory Services (VDCLS) and reviewed by the U.S. Geological Survey.

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	PH (STAND-ARD UNITS) (00400)	TEMPER-ATURE WATER (DEG C) (00010)	BARO-METRIC PRES-SURE (MM HG) (00025)	AGENCY ANA-LYZING SAMPLE (CODE NUMBER) (00028)	TUR-BID-ITY (NTU) (00076)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./100 ML) (31625)	STREP-TOCOCCI, FECAL, KF AGAR (COLS. PER 100 ML) (31673)
OCT												
02...	1130	16000	118	7.7	17.0	752	USGS	--	7.6	80	--	--
02...	1131	16000	118	7.7	17.0	752	VDCLS	19	7.6	80	--	--
03...	1100	42100	100	6.4	18.0	753	VDCLS	120	8.5	91	--	--
04...	1000	32500	140	7.5	17.0	756	VDCLS	130	7.8	81	--	--
06...	1130	15000	120	7.7	17.5	757	VDCLS	27	7.9	83	--	--
19...	1200	28200	200	7.7	14.0	749	VDCLS	40	9.7	96	--	--
21...	1200	30100	125	7.0	13.0	748	VDCLS	55	10.9	105	--	--
22...	0900	21700	115	6.8	13.5	757	VDCLS	41	9.5	92	--	--
26...	1030	9750	124	7.3	11.5	760	VDCLS	8.4	10.2	94	--	--
NOV												
18...	1030	35100	166	7.8	11.0	760	VDCLS	--	10.0	91	--	--
28...	1230	6770	130	7.4	7.0	742	USGS	3.1	11.9	101	36	28
28...	1231	6770	130	7.4	7.0	742	VDCLS	--	11.9	101	--	--
DEC												
26...	1100	3290	92	7.8	1.0	750	VDCLS	--	14.3	103	--	--
JAN												
02...	0930	47500	200	7.0	2.5	760	VDCLS	210	14.3	105	--	--
03...	0900	33200	119	6.1	2.5	760	VDCLS	--	13.4	98	--	--
04...	0900	22500	100	7.1	4.5	755	VDCLS	87	14.5	113	--	--
05...	1230	18700	300	6.7	4.0	758	VDCLS	--	15.5	119	--	--
30...	1000	12200	175	7.5	5.5	751	USGS	6.3	11.9	96	66	22
30...	1001	12200	175	7.5	5.5	751	VDCLS	--	11.9	96	--	--
FEB												
05...	0900	17500	128	6.7	7.0	758	VDCLS	--	10.5	87	--	--
06...	1100	22100	163	6.5	7.5	757	VDCLS	--	10.1	85	--	--
07...	1000	18300	143	6.8	9.5	751	VDCLS	--	10.7	95	--	--
13...	1400	17500	116	7.4	9.0	764	VDCLS	--	10.5	90	--	--
26...	1030	13100	131	7.3	5.0	772	USGS	11	12.5	97	100	K12
26...	1031	13100	131	7.3	5.0	772	VDCLS	--	12.5	97	--	--
MAR												
18...	1300	21200	82	7.2	17.0	752	VDCLS	--	7.2	75	--	--
19...	1200	16100	110	7.1	14.5	750	VDCLS	--	9.1	91	--	--
28...	1000	9350	132	7.2	10.0	761	VDCLS	--	10.8	96	--	--
APR												
25...	0930	6390	129	7.7	19.0	752	USGS	2.7	8.7	95	20	K8
25...	0931	6390	129	7.7	19.0	752	VDCLS	--	8.7	95	--	--
MAY												
11...	0830	27800	65	7.0	18.0	755	USGS	--	7.9	84	--	--
11...	0831	27800	65	7.0	18.0	755	VDCLS	--	7.9	84	--	--
12...	0715	16100	120	7.0	17.5	758	USGS	--	8.6	90	--	--
12...	0716	16100	120	7.0	17.5	758	VDCLS	--	8.6	90	--	--
13...	1400	11400	110	7.4	17.0	745	USGS	--	8.9	94	--	--
13...	1401	11400	110	7.4	17.0	745	VDCLS	--	8.9	94	--	--
23...	1145	12500	128	7.1	18.5	751	VDCLS	--	8.4	91	--	--
24...	0930	17800	165	7.5	18.5	750	USGS	--	8.4	91	--	--
24...	0931	17800	165	7.5	18.5	750	VDCLS	--	8.4	91	--	--
25...	1000	13800	220	7.6	18.0	765	USGS	--	7.0	74	--	--
25...	1001	13800	220	7.6	18.0	765	VDCLS	--	7.0	74	--	--
27...	1300	22700	98	7.2	19.0	752	USGS	--	9.3	101	--	--
27...	1301	22700	98	7.2	19.0	752	VDCLS	--	9.3	101	--	--
28...	1100	15300	97	7.4	18.0	760	USGS	--	9.3	99	--	--
28...	1101	15300	97	7.4	18.0	760	VDCLS	--	9.3	99	--	--
29...	1300	37100	86	7.4	16.5	746	USGS	--	9.6	100	--	--
29...	1301	37100	86	7.4	16.5	746	VDCLS	--	9.6	100	--	--
30...	1330	44700	105	7.0	17.0	747	USGS	--	9.2	97	--	--
30...	1331	44700	105	7.0	17.0	747	VDCLS	--	9.2	97	--	--
31...	0930	39700	127	7.2	17.0	757	USGS	--	9.1	95	--	--
31...	0931	39700	127	7.2	17.0	757	VDCLS	--	9.1	95	--	--

K Results based on colony count outside the acceptance range (non-ideal colony count).

JAMES RIVER BASIN

02035000 JAMES RIVER AT CARTERSVILLE, VA--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	AGENCY ANA- LYZING SAMPLE (CODE NUMBER) (00028)	TUR- BID- ITY (NTU) (00076)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	STREP- TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)
JUN												
01...	1010	24100	123	6.8	17.5	757	USGS	--	9.4	99	--	--
01...	1011	24100	123	6.8	17.5	757	VDCLS	--	9.4	99	--	--
02...	0800	18800	108	7.0	18.5	757	USGS	--	9.5	102	--	--
02...	0801	18800	108	7.0	18.5	757	VDCLS	--	9.5	102	--	--
03...	0815	15600	115	6.9	19.5	752	USGS	--	8.9	98	--	--
03...	0816	15600	115	6.9	19.5	752	VDCLS	--	8.9	98	--	--
27...	0930	3620	162	8.2	26.0	760	USGS	2.8	7.9	98	13	K11
27...	0931	3620	162	8.2	26.0	760	VDCLS	--	7.9	98	--	--
JUL												
16...	0930	7210	87	7.3	24.0	761	VDCLS	--	7.3	87	--	--
25...	1000	3430	153	7.5	28.0	752	USGS	--	7.4	96	--	--
25...	1001	3430	153	7.5	28.0	752	VDCLS	--	7.4	96	--	--
AUG												
29...	1200	2600	260	8.3	29.0	744	USGS	--	7.2	96	--	--
29...	1201	2600	260	8.3	29.0	744	VDCLS	--	7.2	96	--	--
29...	1215	2600	260	8.3	29.0	744	USGS	1.4	7.2	96	21	57
SEP												
26...	1000	1560	275	8.3	18.5	745	USGS	--	8.9	97	--	--
26...	1001	1560	275	8.3	18.5	745	VDCLS	--	9.0	98	--	--

K Results based on colony count outside the acceptance range (non-ideal colony count).

JAMES RIVER BASIN

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02035000 JAMES RIVER AT CARTERSVILLE, VA--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	HARD- NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	ALKA- LINITY WAT DIS TOT IT FIELD (MG/L AS CACO3 (39086)	BICAR- BONATE WATER DIS IT FIELD (MG/L AS HCO3 (00453)	ALKA- LINITY WAT WH TOT FET FIELD (MG/L AS CACO3 (00410)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)
OCT												
02...	--	--	--	--	--	--	--	--	--	--	--	--
02...	--	--	--	--	--	--	--	--	40	--	--	--
03...	--	--	--	--	--	--	--	--	28	--	--	--
04...	--	--	--	--	--	--	--	--	47	--	--	--
06...	--	--	--	--	--	--	--	--	40	--	--	--
19...	--	--	--	--	--	--	--	--	63	--	--	--
21...	--	--	--	--	--	--	--	--	44	--	--	--
22...	--	--	--	--	--	--	--	--	36	--	--	--
26...	--	--	--	--	--	--	--	--	--	--	--	--
NOV												
18...	--	--	--	--	--	--	--	--	--	--	--	--
28...	52	15	3.4	5.8	1.3	46	46	56	--	10	5.7	0.10
28...	--	--	--	--	--	--	--	--	47	--	--	--
DEC												
26...	--	--	--	--	--	--	--	--	64	--	--	--
JAN												
02...	--	--	--	--	--	--	--	--	58	--	--	--
03...	--	--	--	--	--	--	--	--	32	--	--	--
04...	--	--	--	--	--	--	--	--	30	--	--	--
05...	--	--	--	--	--	--	--	--	33	--	--	--
30...	67	20	4.2	6.8	1.3	57	59	71	--	14	7.1	0.10
30...	--	--	--	--	--	--	--	--	57	--	--	--
FEB												
05...	--	--	--	--	--	--	--	--	29	--	--	--
06...	--	--	--	--	--	--	--	--	54	--	--	--
07...	--	--	--	--	--	--	--	--	47	--	--	--
13...	--	--	--	--	--	--	--	--	--	--	--	--
26...	54	16	3.5	5.4	1.3	47	47	58	--	11	11	0.30
26...	--	--	--	--	--	--	--	--	47	--	--	--
MAR												
18...	--	--	--	--	--	--	--	--	--	--	--	--
19...	--	--	--	--	--	--	--	--	--	--	--	--
28...	--	--	--	--	--	--	--	--	49	--	--	--
APR												
25...	47	13	3.6	5.9	1.2	46	47	57	--	10	7.0	0.10
25...	--	--	--	--	--	--	--	--	47	--	--	--
MAY												
11...	--	--	--	--	--	--	--	--	--	--	--	--
11...	--	--	--	--	--	--	--	--	36	--	--	--
12...	--	--	--	--	--	--	--	--	--	--	--	--
12...	--	--	--	--	--	--	--	--	34	--	--	--
13...	--	--	--	--	--	--	--	--	--	--	--	--
13...	--	--	--	--	--	--	--	--	35	--	--	--
23...	--	--	--	--	--	--	--	--	39	--	--	--
24...	--	--	--	--	--	--	--	--	--	--	--	--
24...	--	--	--	--	--	--	--	--	48	--	--	--
25...	--	--	--	--	--	--	--	--	--	--	--	--
25...	--	--	--	--	--	--	--	--	54	--	--	--
27...	--	--	--	--	--	--	--	--	--	--	--	--
27...	--	--	--	--	--	--	--	--	24	--	--	--
28...	--	--	--	--	--	--	--	--	--	--	--	--
28...	--	--	--	--	--	--	--	--	25	--	--	--
29...	--	--	--	--	--	--	--	--	--	--	--	--
29...	--	--	--	--	--	--	--	--	27	--	--	--
30...	--	--	--	--	--	--	--	--	--	--	--	--
30...	--	--	--	--	--	--	--	--	33	--	--	--
31...	--	--	--	--	--	--	--	--	--	--	--	--
31...	--	--	--	--	--	--	--	--	44	--	--	--
JUN												
01...	--	--	--	--	--	--	--	--	--	--	--	--
01...	--	--	--	--	--	--	--	--	36	--	--	--
02...	--	--	--	--	--	--	--	--	--	--	--	--
02...	--	--	--	--	--	--	--	--	35	--	--	--
03...	--	--	--	--	--	--	--	--	--	--	--	--
03...	--	--	--	--	--	--	--	--	39	--	--	--
27...	57	16	4.2	7.9	1.9	53	50	61	--	9.2	9.8	0.20
27...	--	--	--	--	--	--	--	--	52	--	--	--

02035000 JAMES RIVER AT CARTERSVILLE, VA--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

[illegible]

02035000 JAMES RIVER AT CARTERSVILLE, VA--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L) (70301)	RESIDUE TOTAL AT 105 DEG. C, SUS- PENDE (MG/L) (00530)	RESIDUE VOLATILE, SUS- PENDE (MG/L) (00535)	RESIDUE FIXED NON FILTER- ABLE (MG/L) (00540)	NITRO- GEN, NITRATE DIS- SOLVED (MG/L AS N) (00618)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)
OCT												
02...	10	--	--	34	3	31	--	<0.010	0.230	0.020	--	0.50
02...	9.7	--	--	26	5	21	0.290	<0.010	0.290	0.040	--	0.30
03...	8.6	--	--	134	14	120	0.320	<0.010	0.320	0.040	--	0.90
04...	8.3	--	--	--	--	--	0.300	0.010	0.310	0.050	--	0.80
06...	8.8	--	--	41	7	34	0.330	0.010	0.340	0.050	--	0.60
19...	7.7	--	--	112	16	96	0.240	<0.010	0.240	0.090	--	0.40
21...	7.6	--	--	75	9	66	0.280	<0.010	0.280	0.050	--	0.60
22...	7.7	--	--	45	6	39	0.230	<0.010	0.230	<0.040	--	0.40
26...	8.8	--	--	6	1	5	0.340	<0.010	0.340	<0.040	--	0.10
NOV												
18...	5.2	--	--	--	--	--	0.310	<0.010	0.310	0.120	--	0.40
28...	9.4	87	80	10	10	0	--	<0.010	0.250	<0.010	<0.010	<0.20
28...	9.2	--	--	5	1	4	0.270	<0.010	0.270	0.210	--	0.20
DEC												
26...	8.1	--	--	1	<1	1	0.310	<0.010	0.310	<0.040	--	0.30
JAN												
02...	5.8	--	--	234	23	211	0.420	<0.010	0.420	0.100	--	1.2
03...	6.3	--	--	210	18	192	0.430	<0.010	0.430	0.050	--	0.90
04...	6.6	--	--	88	6	82	0.450	<0.010	0.450	0.050	--	0.50
05...	7.9	--	--	32	3	29	0.440	<0.010	0.440	0.050	--	0.30
30...	8.2	101	99	11	11	0	0.370	0.010	0.380	0.030	0.030	<0.20
30...	8.0	--	--	16	1	15	0.330	0.010	0.340	0.060	--	0.20
FEB												
05...	7.4	--	--	27	5	22	0.300	<0.010	0.300	0.040	--	0.30
06...	6.4	--	--	212	31	181	0.330	<0.010	0.330	0.050	--	0.40
07...	6.9	--	--	41	6	35	0.370	0.010	0.380	0.070	--	0.30
13...	7.1	--	--	20	<1	20	0.340	<0.010	0.340	<0.040	--	0.20
26...	7.6	84	86	11	11	0	--	<0.010	0.290	<0.010	<0.010	0.40
26...	7.2	--	--	14	1	13	0.290	<0.010	0.290	<0.040	--	0.20
MAR												
18...	6.0	--	--	--	--	--	0.220	<0.010	0.220	0.040	--	0.90
19...	7.0	--	--	--	--	--	0.310	<0.010	0.310	0.070	--	1.1
28...	7.0	--	--	13	5	8	0.270	<0.010	0.270	0.050	--	0.20
APR												
25...	6.9	71	77	15	15	0	--	<0.010	0.200	0.010	0.010	0.20
25...	7.2	--	--	8	6	2	0.310	<0.010	0.310	<0.040	--	0.20
MAY												
11...	--	--	--	--	--	--	--	--	--	--	--	--
11...	7.6	--	--	288	40	248	0.340	0.050	0.390	0.050	--	1.1
12...	--	--	--	--	--	--	--	--	--	--	--	--
12...	7.9	--	--	106	16	90	0.040	0.020	0.060	0.040	--	0.60
13...	--	--	--	--	--	--	--	--	--	--	--	--
13...	8.7	--	--	64	8	56	0.410	<0.010	0.410	0.040	--	0.40
23...	8.0	--	--	64	13	51	0.380	<0.010	0.380	<0.040	--	0.50
24...	--	--	--	--	--	--	--	--	--	--	--	--
24...	8.2	--	--	90	15	75	0.410	0.020	0.430	<0.040	--	0.60
25...	--	--	--	--	--	--	--	--	--	--	--	--
25...	7.6	--	--	82	10	72	0.340	0.030	0.370	<0.040	--	0.40
27...	--	--	--	--	--	--	--	--	--	--	--	--
27...	7.4	--	--	512	48	464	0.360	<0.010	0.360	<0.040	--	1.5
28...	--	--	--	--	--	--	--	--	--	--	--	--
28...	8.4	--	--	148	16	132	0.330	<0.010	0.330	<0.040	--	0.60
29...	8.7	--	--	186	37	149	--	<0.010	0.300	0.030	--	1.2
29...	8.3	--	--	50	10	40	0.360	<0.010	0.360	<0.040	--	0.60
30...	--	--	--	--	--	--	--	--	--	--	--	--
30...	7.8	--	--	127	24	103	0.320	<0.010	0.320	<0.040	--	0.30
31...	--	--	--	--	--	--	--	--	--	--	--	--
31...	7.7	--	--	50	12	38	0.360	<0.010	0.360	<0.040	--	0.50
JUN												
01...	--	--	--	--	--	--	--	--	--	--	--	--
01...	7.5	--	--	92	16	76	0.340	<0.010	0.340	<0.040	--	0.50
02...	--	--	--	--	--	--	--	--	--	--	--	--
02...	7.8	--	--	62	15	47	0.340	<0.010	0.340	<0.040	--	0.10
03...	--	--	--	--	--	--	--	--	--	--	--	--
03...	8.0	--	--	44	13	31	0.400	<0.010	0.400	<0.040	--	<0.10
27...	3.6	83	84	14	9	5	--	<0.010	0.200	<0.010	0.010	2.3
27...	3.5	--	--	11	6	5	0.160	<0.010	0.160	<0.040	--	0.30

< Actual value is known to be less than the value shown.

JAMES RIVER BASIN

02035000 JAMES RIVER AT CARTERSVILLE, VA--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L) (70301)	RESIDUE TOTAL AT 105 DEG. C, SUS- PENDED (MG/L) (00530)	RESIDUE VOLATILE, SUS- PENDED (MG/L) (00535)	RESIDUE FIXED NON FILTER- ABLE (MG/L) (00540)	NITRO- GEN, NITRATE DIS- SOLVED (MG/L AS N) (00618)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)
JUL												
16...	8.7	--	--	100	13	87	0.480	<0.010	0.470	0.060	--	0.50
25...	--	--	--	--	--	--	--	--	--	--	--	--
25...	8.8	--	--	11	6	5	0.640	<0.010	0.640	<0.040	--	0.20
AUG												
29...	--	--	--	--	--	--	--	--	--	--	--	--
29...	9.1	--	--	--	--	--	0.330	<0.010	0.330	0.040	--	0.30
29...	9.1	151	151	5	<1	--	--	<0.010	0.400	0.040	<0.010	0.20
SEP												
26...	--	--	--	--	--	--	--	--	--	--	--	--
26...	6.5	--	--	6	2	4	0.050	0.020	0.070	<0.040	--	0.20

< Actual value is known to be less than the value shown.

JAMES RIVER BASIN

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02035000 JAMES RIVER AT CARTERSVILLE, VA--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	ALUM- INUM, DIS- SOLVED (UG/L AS AL) (01106)	ARSENIC TOTAL (UG/L AS AS) (01002)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BARIUM, DIS- SOLVED (UG/L AS BA) (01005)	BERYL- LIUM, DIS- SOLVED (UG/L AS BE) (01010)	CADMIUM TOTAL RECOV- ERABLE (UG/L AS CD) (01027)	CADMIUM DIS- SOLVED (UG/L AS CD) (01025)	CHRO- MIUM, TOTAL RECOV- ERABLE (UG/L AS CR) (01034)	CHRO- MIUM, DIS- SOLVED (UG/L AS CR) (01030)
OCT												
02...	0.110	--	0.050	--	--	--	--	--	--	--	--	--
02...	0.100	0.050	0.050	--	--	--	--	--	--	--	--	--
03...	0.320	0.040	0.050	--	--	--	--	--	--	--	--	--
04...	0.150	0.050	0.120	--	--	--	--	--	--	--	--	--
06...	0.070	0.030	0.040	--	--	--	--	--	--	--	--	--
19...	0.150	0.060	<0.040	--	--	--	--	--	--	--	--	--
21...	0.090	0.040	0.040	--	--	--	--	--	--	--	--	--
22...	0.130	0.030	0.030	--	--	--	--	--	--	--	--	--
26...	0.070	0.040	0.030	--	--	--	--	--	--	--	--	--
NOV												
18...	0.480	0.050	--	--	--	--	--	--	--	--	--	--
28...	0.040	0.030	0.030	20	--	<1	26	<0.5	--	<1.0	--	<1
28...	0.030	0.030	0.030	--	--	--	--	--	--	--	--	--
DEC												
26...	0.090	0.080	0.080	--	--	--	--	--	--	--	--	--
JAN												
02...	0.700	0.160	0.150	--	--	--	--	--	--	--	--	--
03...	0.270	0.040	0.030	--	--	--	--	--	--	--	--	--
04...	0.130	0.030	0.030	--	--	--	--	--	--	--	--	--
05...	0.090	0.030	0.030	--	--	--	--	--	--	--	--	--
30...	0.080	0.060	0.070	--	--	--	--	--	--	--	--	--
30...	0.100	0.070	0.060	--	--	--	--	--	--	--	--	--
FEB												
05...	0.110	0.040	0.040	--	--	--	--	--	--	--	--	--
06...	0.200	0.070	0.060	--	--	--	--	--	--	--	--	--
07...	0.100	0.060	0.060	--	--	--	--	--	--	--	--	--
13...	0.100	0.050	0.050	--	--	--	--	--	--	--	--	--
26...	0.080	0.050	0.050	40	--	<1	26	<0.5	--	<1.0	--	<5*
26...	0.100	0.060	0.060	--	--	--	--	--	--	--	--	--
MAR												
18...	0.220	0.040	0.030	--	--	--	--	--	--	--	--	--
19...	0.330	0.040	0.030	--	--	--	--	--	--	--	--	--
28...	0.060	0.030	0.030	--	--	--	--	--	--	--	--	--
APR												
25...	0.060	0.040	0.040	30	<1	<1	25	<0.5	<1	<1.0	<1	<1
25...	0.080	0.050	0.050	--	--	--	--	--	--	--	--	--
MAY												
11...	--	--	--	120	<1	--	--	--	<1	--	10	<1
11...	0.480	0.030	0.030	--	--	--	--	--	--	--	--	--
12...	--	--	--	60	<1	--	--	--	<1	--	4	<1
12...	0.250	0.050	0.040	--	--	--	--	--	--	--	--	--
13...	--	--	--	40	<1	--	--	--	<1	--	2	<1
13...	0.170	0.040	0.040	--	--	--	--	--	--	--	--	--
23...	0.200	0.050	0.050	--	--	--	--	--	--	--	--	--
24...	--	--	--	40	<1	--	--	--	<1	--	4	<1
24...	0.270	0.050	0.050	--	--	--	--	--	--	--	--	--
25...	--	--	--	70	<1	--	--	--	<1	--	2	<1
25...	0.150	0.040	0.050	--	--	--	--	--	--	--	--	--
27...	--	--	--	190	<1	--	--	--	<1	--	18	1
27...	0.500	0.010	0.020	--	--	--	--	--	--	--	--	--
28...	--	--	--	70	<1	--	--	--	<1	--	6	<1
28...	0.220	0.020	0.020	--	--	--	--	--	--	--	--	--
29...	0.160	--	0.020	170	<1	--	--	--	<1	--	10	<1
29...	0.170	0.030	0.030	--	--	--	--	--	--	--	--	--
30...	--	--	--	190	<1	--	--	--	<1	--	6	<1
30...	0.230	0.020	0.030	--	--	--	--	--	--	--	--	--
31...	--	--	--	70	<1	--	--	--	<1	--	6	<1
31...	0.170	0.030	0.030	--	--	--	--	--	--	--	--	--
JUN												
01...	--	--	--	40	<1	--	--	--	<1	--	3	<1
01...	0.150	0.030	0.030	--	--	--	--	--	--	--	--	--
02...	--	--	--	40	<1	--	--	--	<1	--	3	<1
02...	0.140	0.030	0.030	--	--	--	--	--	--	--	--	--
03...	--	--	--	50	<1	--	--	--	<1	--	3	<1
03...	0.170	0.030	0.030	--	--	--	--	--	--	--	--	--
27...	0.020	0.030	<0.010	60	<1	--	--	--	<1	--	1	<1
27...	0.050	0.020	0.010	--	--	--	--	--	--	--	--	--

* An alternate analytical method resulted in a change of the minimum reporting level for these constituents.
 < Actual value is known to be less than the value shown.

JAMES RIVER BASIN

02035000 JAMES RIVER AT CARTERSVILLE, VA--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	ALUM- INUM, DIS- SOLVED (UG/L AS AL) (01106)	ARSENIC TOTAL (UG/L AS AS) (01002)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BARIUM, DIS- SOLVED (UG/L AS BA) (01005)	BERYL- LIUM, DIS- SOLVED (UG/L AS BE) (01010)	CADMIUM TOTAL RECOV- ERABLE (UG/L AS CD) (01027)	CADMIUM DIS- SOLVED (UG/L AS CD) (01025)	CHRO- MIUM, TOTAL RECOV- ERABLE (UG/L AS CR) (01034)	CHRO- MIUM, DIS- SOLVED (UG/L AS CR) (01030)
JUL												
16...	0.190	0.050	0.060	--	--	--	--	--	--	--	--	--
25...	--	--	--	20	<1	--	--	--	<1	--	<1	<1
25...	0.090	0.080	0.060	--	--	--	--	--	--	--	--	--
AUG												
29...	--	--	--	--	--	--	--	--	--	--	--	--
29...	0.130	0.110	0.030	--	--	--	--	--	--	--	--	--
29...	0.110	0.100	0.100	30	1	<1	39	<0.5	1	<1.0	<1	<1
SEP												
26...	--	--	--	20	<1	--	--	--	<1	--	<1	<1
26...	0.130	0.130	0.120	--	--	--	--	--	--	--	--	--

< Actual value is known to be less than the value shown.

JAMES RIVER BASIN

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02035000 JAMES RIVER AT CARTERSVILLE, VA--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	COBALT, DIS- SOLVED (UG/L AS CO) (01035)	COPPER, TOTAL RECOV- ERABLE (UG/L AS CU) (01042)	COPPER, DIS- SOLVED (UG/L AS CU) (01040)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, TOTAL RECOV- ERABLE (UG/L AS PB) (01051)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	NICKEL, TOTAL RECOV- ERABLE (UG/L AS NI) (01067)
OCT											
02...	--	--	--	--	--	--	--	--	--	--	--
02...	--	--	--	--	--	--	--	--	--	--	--
03...	--	--	--	--	--	--	--	--	--	--	--
04...	--	--	--	--	--	--	--	--	--	--	--
06...	--	--	--	--	--	--	--	--	--	--	--
19...	--	--	--	--	--	--	--	--	--	--	--
21...	--	--	--	--	--	--	--	--	--	--	--
22...	--	--	--	--	--	--	--	--	--	--	--
26...	--	--	--	--	--	--	--	--	--	--	--
NOV											
18...	--	--	--	--	--	--	--	--	--	--	--
28...	<3	--	1	130	--	<1	<4	9	<0.1	<10	--
28...	--	--	--	--	--	--	--	--	--	--	--
DEC											
26...	--	--	--	--	--	--	--	--	--	--	--
JAN											
02...	--	--	--	--	--	--	--	--	--	--	--
03...	--	--	--	--	--	--	--	--	--	--	--
04...	--	--	--	--	--	--	--	--	--	--	--
05...	--	--	--	--	--	--	--	--	--	--	--
30...	--	--	--	--	--	--	--	--	--	--	--
30...	--	--	--	--	--	--	--	--	--	--	--
FEB											
05...	--	--	--	--	--	--	--	--	--	--	--
06...	--	--	--	--	--	--	--	--	--	--	--
07...	--	--	--	--	--	--	--	--	--	--	--
13...	--	--	--	--	--	--	--	--	--	--	--
26...	<3	--	<10*	90	--	<10*	<4	5	<0.1	<10	--
26...	--	--	--	--	--	--	--	--	--	--	--
MAR											
18...	--	--	--	--	--	--	--	--	--	--	--
19...	--	--	--	--	--	--	--	--	--	--	--
28...	--	--	--	--	--	--	--	--	--	--	--
APR											
25...	<3	4	1	99	1	<1	<4	6	<0.1	<10	<1
25...	--	--	--	--	--	--	--	--	--	--	--
MAY											
11...	--	16	3	--	22	1	--	--	--	--	6
11...	--	--	--	--	--	--	--	--	--	--	--
12...	--	3	2	--	6	<1	--	--	--	--	4
12...	--	--	--	--	--	--	--	--	--	--	--
13...	--	3	1	--	3	<1	--	--	--	--	1
13...	--	--	--	--	--	--	--	--	--	--	--
23...	--	--	--	--	--	--	--	--	--	--	--
24...	--	5	2	--	9	1	--	--	--	--	3
24...	--	--	--	--	--	--	--	--	--	--	--
25...	--	3	1	--	3	<1	--	--	--	--	2
25...	--	--	--	--	--	--	--	--	--	--	--
27...	--	24	3	--	27	1	--	--	--	--	18
27...	--	--	--	--	--	--	--	--	--	--	--
28...	--	8	<1	--	12	<1	--	--	--	--	6
28...	--	--	--	--	--	--	--	--	--	--	--
29...	--	12	3	--	21	<1	--	--	--	--	7
29...	--	--	--	--	--	--	--	--	--	--	--
30...	--	10	4	--	96	10	--	--	--	--	4
30...	--	--	--	--	--	--	--	--	--	--	--
31...	--	13	3	--	28	2	--	--	--	--	5
31...	--	--	--	--	--	--	--	--	--	--	--
JUN											
01...	--	4	1	--	4	1	--	--	--	--	4
01...	--	--	--	--	--	--	--	--	--	--	--
02...	--	4	2	--	5	1	--	--	--	--	4
02...	--	--	--	--	--	--	--	--	--	--	--
03...	--	3	<1	--	3	<1	--	--	--	--	3
03...	--	--	--	--	--	--	--	--	--	--	--
27...	--	5	2	--	2	<1	--	--	--	--	2
27...	--	--	--	--	--	--	--	--	--	--	--

* An alternate analytical method resulted in a change of the minimum reporting level for these constituents.
 < Actual value is known to be less than the value shown.

JAMES RIVER BASIN

02035000 JAMES RIVER AT CARTERSVILLE, VA--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	COBALT, DIS- SOLVED (UG/L AS CO) (01035)	COPPER, TOTAL RECOV- ERABLE (UG/L AS CU) (01042)	COPPER, DIS- SOLVED (UG/L AS CU) (01040)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, TOTAL RECOV- ERABLE (UG/L AS PB) (01051)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	NICKEL, TOTAL RECOV- ERABLE (UG/L AS NI) (01067)
JUL											
16...	--	--	--	--	--	--	--	--	--	--	--
25...	--	3	2	--	1	1	--	--	--	--	1
25...	--	--	--	--	--	--	--	--	--	--	--
AUG											
29...	--	--	--	--	--	--	--	--	--	--	--
29...	--	--	--	--	--	--	--	--	--	--	--
29...	<3	4	2	50	3	<1	<4	8	<0.1	<10	1
SEP											
26...	--	3	2	--	2	1	--	--	--	--	3
26...	--	--	--	--	--	--	--	--	--	--	--

< Actual value is known to be less than the value shown.

JAMES RIVER BASIN

201

02035000 JAMES RIVER AT CARTERSVILLE, VA--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	NICKEL, DIS- SOLVED (UG/L AS NI) (01065)	SELE- NIUM, TOTAL (UG/L AS SE) (01147)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	SILVER, TOTAL RECOV- ERABLE (UG/L AS AG) (01077)	SILVER, DIS- SOLVED (UG/L AS AG) (01075)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)	VANA- DIUM, DIS- SOLVED (UG/L AS V) (01085)	ZINC, TOTAL RECOV- ERABLE (UG/L AS ZN) (01092)	ZINC, DIS- SOLVED (UG/L AS ZN) (01090)	CARBON, ORGANIC TOTAL (MG/L AS C) (00680)	MERCURY TOTAL RECOV- ERABLE (UG/L AS HG) (71900)
OCT											
02...	--	--	--	--	--	--	--	--	--	4.3	--
02...	--	--	--	--	--	--	--	--	--	4.1	--
03...	--	--	--	--	--	--	--	--	--	4.9	--
04...	--	--	--	--	--	--	--	--	--	4.5	--
06...	--	--	--	--	--	--	--	--	--	2.9	--
19...	--	--	--	--	--	--	--	--	--	3.8	--
21...	--	--	--	--	--	--	--	--	--	3.8	--
22...	--	--	--	--	--	--	--	--	--	3.2	--
26...	--	--	--	--	--	--	--	--	--	2.1	--
NOV											
18...	--	--	--	--	--	--	--	--	--	--	--
28...	1	--	<1	--	<1.0	63	<6	--	<3	2.4	--
28...	--	--	--	--	--	--	--	--	--	2.1	--
DEC											
26...	--	--	--	--	--	--	--	--	--	3.9	--
JAN											
02...	--	--	--	--	--	--	--	--	--	5.4	--
03...	--	--	--	--	--	--	--	--	--	3.4	--
04...	--	--	--	--	--	--	--	--	--	4.9	--
05...	--	--	--	--	--	--	--	--	--	4.6	--
30...	--	--	--	--	--	--	--	--	--	3.2	--
30...	--	--	--	--	--	--	--	--	--	2.3	--
FEB											
05...	--	--	--	--	--	--	--	--	--	2.7	--
06...	--	--	--	--	--	--	--	--	--	2.1	--
07...	--	--	--	--	--	--	--	--	--	2.4	--
13...	--	--	--	--	--	--	--	--	--	2.5	--
26...	10	--	<1	--	<1.0	65	<6	--	4	3.0	--
26...	--	--	--	--	--	--	--	--	--	2.7	--
MAR											
18...	--	--	--	--	--	--	--	--	--	--	--
19...	--	--	--	--	--	--	--	--	--	--	--
28...	--	--	--	--	--	--	--	--	--	1.8	--
APR											
25...	<1	<1	<1	<1	<1.0	60	<6	<10	<3	2.3	<0.10
25...	--	--	--	--	--	--	--	--	--	2.2	--
MAY											
11...	<1	<1	--	<1	--	--	--	60	<10	11	<0.10
11...	--	--	--	--	--	--	--	--	--	4.6	--
12...	1	<1	--	<1	--	--	--	30	<10	19	<0.10
12...	--	--	--	--	--	--	--	--	--	3.4	--
13...	<1	<1	--	<1	--	--	--	10	<10	5.2	<0.10
13...	--	--	--	--	--	--	--	--	--	2.6	--
23...	--	--	--	--	--	--	--	--	--	3.3	--
24...	<1	<1	--	<1	--	--	--	20	<10	5.5	<0.10
24...	--	--	--	--	--	--	--	--	--	2.7	--
25...	<1	<1	--	<1	--	--	--	20	<10	5.6	<0.10
25...	--	--	--	--	--	--	--	--	--	3.6	--
27...	5	<2	--	<1	--	--	--	90	<10	30	<0.10
27...	--	--	--	--	--	--	--	--	--	5.3	--
28...	1	<1	--	<1	--	--	--	40	<10	10	<0.10
28...	--	--	--	--	--	--	--	--	--	5.2	--
29...	1	<1	--	<1	--	--	--	80	<10	12	0.10
29...	--	--	--	--	--	--	--	--	--	--	--
30...	1	<1	--	<1	--	--	--	40	<10	8.6	<0.10
30...	--	--	--	--	--	--	--	--	--	4.0	--
31...	1	<1	--	<1	--	--	--	40	<10	6.1	<0.10
31...	--	--	--	--	--	--	--	--	--	4.6	--
JUN											
01...	<1	<1	--	<1	--	--	--	30	<10	7.7	<0.10
01...	--	--	--	--	--	--	--	--	--	2.7	--
02...	<1	<1	--	<1	--	--	--	30	<10	5.1	<0.10
02...	--	--	--	--	--	--	--	--	--	2.4	--
03...	<1	<1	--	<1	--	--	--	20	<10	2.9	<0.10
03...	--	--	--	--	--	--	--	--	--	2.4	--
27...	<1	<1	--	<1	--	--	--	<10	6	2.6	<0.10
27...	--	--	--	--	--	--	--	--	--	4.0	--

< Actual value is known to be less than the value shown.

JAMES RIVER BASIN

02035000 JAMES RIVER AT CARTERSVILLE, VA--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	NICKEL, DIS- SOLVED (UG/L AS NI) (01065)	SELE- NIUM, TOTAL (UG/L AS SE) (01147)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	SILVER, TOTAL RECOV- ERABLE (UG/L AS AG) (01077)	SILVER, DIS- SOLVED (UG/L AS AG) (01075)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)	VANA- DIUM, DIS- SOLVED (UG/L AS V) (01085)	ZINC, TOTAL RECOV- ERABLE (UG/L AS ZN) (01092)	ZINC, DIS- SOLVED (UG/L AS ZN) (01090)	CARBON, ORGANIC TOTAL (MG/L AS C) (00680)	MERCURY TOTAL RECOV- ERABLE (UG/L AS HG) (71900)
JUL											
16...	--	--	--	--	--	--	--	--	--	4.8	--
25...	2	<1	--	<1	--	--	--	<10	<10	3.8	<0.10
25...	--	--	--	--	--	--	--	--	--	2.9	--
AUG											
29...	--	--	--	--	--	--	--	--	--	--	--
29...	--	--	--	--	--	--	--	--	--	--	--
29...	1	<1	<1	<1	<1.0	120	<6	<10	<3	4.1	<0.10
SEP											
26...	2	<1	--	<1	--	--	--	20	<10	4.0	<0.10
26...	--	--	--	--	--	--	--	--	--	3.5	--

< Actual value is known to be less than the value shown.

JAMES RIVER BASIN

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02035000 JAMES RIVER AT CARTERSVILLE, VA--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	DI- SYSTON TOTAL (UG/L) (39011)	PHORATE OTAL (UG/L) (39023)	PRO- PAZINE TOTAL (UG/L) (39024)	TRI- FLURA- LIN TOTAL RECOVER (UG/L) (39030)	PER- THANE TOTAL (UG/L) (39034)	DEF TOTAL (UG/L) (39040)	METHO- MYL TOTAL (UG/L) (39051)	PROPHAM TOTAL (UG/L) (39052)	SIME- TRYNE TOTAL (UG/L) (39054)	SIMA- ZINE TOTAL (UG/L) (39055)	PROME- TONE TOTAL (UG/L) (39056)
OCT											
02...	--	--	--	--	--	--	--	--	--	--	--
02...	--	--	--	--	--	--	--	--	--	--	--
03...	--	--	--	--	--	--	--	--	--	--	--
04...	--	--	--	--	--	--	--	--	--	--	--
06...	--	--	--	--	--	--	--	--	--	--	--
19...	--	--	--	--	--	--	--	--	--	--	--
21...	--	--	--	--	--	--	--	--	--	--	--
22...	--	--	--	--	--	--	--	--	--	--	--
26...	--	--	--	--	--	--	--	--	--	--	--
NOV											
18...	--	--	--	--	--	--	--	--	--	--	--
28...	--	--	--	--	--	--	--	--	--	--	--
28...	--	--	--	--	--	--	--	--	--	--	--
DEC											
26...	--	--	--	--	--	--	--	--	--	--	--
JAN											
02...	--	--	--	--	--	--	--	--	--	--	--
03...	--	--	--	--	--	--	--	--	--	--	--
04...	--	--	--	--	--	--	--	--	--	--	--
05...	--	--	--	--	--	--	--	--	--	--	--
30...	--	--	--	--	--	--	--	--	--	--	--
30...	--	--	--	--	--	--	--	--	--	--	--
FEB											
05...	--	--	--	--	--	--	--	--	--	--	--
06...	--	--	--	--	--	--	--	--	--	--	--
07...	--	--	--	--	--	--	--	--	--	--	--
13...	--	--	--	--	--	--	--	--	--	--	--
26...	--	--	--	--	--	--	--	--	--	--	--
26...	--	--	--	--	--	--	--	--	--	--	--
MAR											
18...	--	--	--	--	--	--	--	--	--	--	--
19...	--	--	--	--	--	--	--	--	--	--	--
28...	--	--	--	--	--	--	--	--	--	--	--
APR											
25...	<0.01	<0.01	<0.10	<0.10	<0.1	<0.01	<0.5	<0.5	<0.1	<0.10	<0.1
25...	--	--	--	--	--	--	--	--	--	--	--
MAY											
11...	<0.01	<0.01	<0.10	<0.10	<0.1	<0.01	<0.5	<0.5	<0.1	<0.10	<0.1
11...	--	--	--	--	--	--	--	--	--	--	--
12...	<0.01	<0.01	<0.10	<0.10	<0.1	<0.01	--	--	<0.1	0.10	<0.1
12...	--	--	--	--	--	--	--	--	--	--	--
13...	<0.01	<0.01	<0.10	<0.10	<0.1	<0.01	--	--	<0.1	0.10	<0.1
13...	--	--	--	--	--	--	--	--	--	--	--
23...	--	--	--	--	--	--	--	--	--	--	--
24...	<0.01	<0.01	<0.10	<0.10	<0.1	<0.01	<0.5	<0.5	<0.1	0.10	<0.1
24...	--	--	--	--	--	--	--	--	--	--	--
25...	<0.01	<0.01	<0.10	<0.10	<0.1	<0.01	<0.5	<0.5	<0.1	0.10	<0.1
25...	--	--	--	--	--	--	--	--	--	--	--
27...	<0.01	<0.01	<0.10	<0.10	<0.1	<0.01	<0.5	<0.5	<0.1	0.10	<0.1
27...	--	--	--	--	--	--	--	--	--	--	--
28...	<0.01	<0.01	<0.10	<0.10	<0.1	<0.01	--	--	<0.1	0.10	<0.1
28...	--	--	--	--	--	--	--	--	--	--	--
29...	<0.01	<0.01	<0.10	<0.10	<0.1	<0.01	<0.5	<0.5	<0.1	<0.10	<0.1
29...	--	--	--	--	--	--	--	--	--	--	--
30...	<0.01	<0.01	<0.10	<0.10	<0.1	<0.01	--	--	<0.1	0.10	<0.1
30...	--	--	--	--	--	--	--	--	--	--	--
31...	<0.01	<0.01	<0.10	<0.10	<0.1	<0.01	<0.5	<0.5	<0.1	<0.10	<0.1
31...	--	--	--	--	--	--	--	--	--	--	--
JUN											
01...	<0.01	<0.01	<0.10	<0.10	<0.1	<0.01	<0.5	<0.5	<0.1	0.10	<0.1
01...	--	--	--	--	--	--	--	--	--	--	--
02...	<0.01	<0.01	<0.10	<0.10	<0.1	<0.01	<0.5	<0.5	<0.1	0.10	<0.1
02...	--	--	--	--	--	--	--	--	--	--	--
03...	<0.01	<0.01	<0.10	<0.10	<0.1	<0.01	<0.5	<0.5	<0.1	<0.10	<0.1
03...	--	--	--	--	--	--	--	--	--	--	--
27...	<0.01	<0.01	<0.10	<0.10	<0.1	<0.01	<0.5	<0.5	<0.1	<0.10	<0.1
27...	--	--	--	--	--	--	--	--	--	--	--

< Actual value is known to be less than the value shown.

JAMES RIVER BASIN

02035000 JAMES RIVER AT CARTERSVILLE, VA--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	DI- SYSTON TOTAL (UG/L) (39011)	PHORATE OTAL (UG/L) (39023)	PRO- PAZINE TOTAL (UG/L) (39024)	TRI- FLURA- LIN TOTAL RECOVER (UG/L) (39030)	PER- THANE TOTAL (UG/L) (39034)	DEF TOTAL (UG/L) (39040)	METHO- MYL TOTAL (UG/L) (39051)	PROPHAM TOTAL (UG/L) (39052)	SIME- TRYNE TOTAL (UG/L) (39054)	SIMA- ZINE TOTAL (UG/L) (39055)	PROME- TONE TOTAL (UG/L) (39056)
JUL											
16...	--	--	--	--	--	--	--	--	--	--	--
25...	<0.01	<0.01	<0.10	<0.10	<0.1	<0.01	<0.5	<0.5	<0.1	<0.10	0.1
25...	--	--	--	--	--	--	--	--	--	--	--
AUG											
29...	<0.01	<0.01	<0.10	<0.10	<0.1	<0.01	--	--	<0.1	<0.10	<0.1
29...	--	--	--	--	--	--	--	--	--	--	--
29...	<0.01	<0.01	<0.10	<0.10	<0.1	<0.01	<0.5	<0.5	<0.1	<0.10	<0.1
SEP											
26...	--	--	<0.10	<0.10	--	--	<0.5	<0.5	<0.1	<0.10	<0.1
26...	--	--	--	--	--	--	--	--	--	--	--

< Actual value is known to be less than the value shown.

02035000 JAMES RIVER AT CARTERSVILLE, VA--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	PROMETHYL- TRYNE TOTAL (UG/L) (39057)	NAPH- THA- LENES, POLY- CHLOR. TOTAL (UG/L) (39250)	ALDRIN, TOTAL (UG/L) (39330)	LINDANE TOTAL (UG/L) (39340)	CHLOR- DANE, TOTAL (UG/L) (39350)	DDD, TOTAL (UG/L) (39360)	DDE, TOTAL (UG/L) (39365)	DDT, TOTAL (UG/L) (39370)	DI- ELDRIN TOTAL (UG/L) (39380)	ENDO- SULFAN, TOTAL (UG/L) (39388)	ENDRIN, TOTAL (UG/L) (39390)
OCT											
02...	--	--	--	--	--	--	--	--	--	--	--
02...	--	--	--	--	--	--	--	--	--	--	--
03...	--	--	--	--	--	--	--	--	--	--	--
04...	--	--	--	--	--	--	--	--	--	--	--
06...	--	--	--	--	--	--	--	--	--	--	--
19...	--	--	--	--	--	--	--	--	--	--	--
21...	--	--	--	--	--	--	--	--	--	--	--
22...	--	--	--	--	--	--	--	--	--	--	--
26...	--	--	--	--	--	--	--	--	--	--	--
NOV											
18...	--	--	--	--	--	--	--	--	--	--	--
28...	--	--	--	--	--	--	--	--	--	--	--
28...	--	--	--	--	--	--	--	--	--	--	--
DEC											
26...	--	--	--	--	--	--	--	--	--	--	--
JAN											
02...	--	--	--	--	--	--	--	--	--	--	--
03...	--	--	--	--	--	--	--	--	--	--	--
04...	--	--	--	--	--	--	--	--	--	--	--
05...	--	--	--	--	--	--	--	--	--	--	--
30...	--	--	--	--	--	--	--	--	--	--	--
30...	--	--	--	--	--	--	--	--	--	--	--
FEB											
05...	--	--	--	--	--	--	--	--	--	--	--
06...	--	--	--	--	--	--	--	--	--	--	--
07...	--	--	--	--	--	--	--	--	--	--	--
13...	--	--	--	--	--	--	--	--	--	--	--
26...	--	--	--	--	--	--	--	--	--	--	--
26...	--	--	--	--	--	--	--	--	--	--	--
MAR											
18...	--	--	--	--	--	--	--	--	--	--	--
19...	--	--	--	--	--	--	--	--	--	--	--
28...	--	--	--	--	--	--	--	--	--	--	--
APR											
25...	<0.1	<0.10	<0.010	<0.010	<0.1	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
25...	--	--	--	--	--	--	--	--	--	--	--
MAY											
11...	<0.1	<0.10	<0.010	<0.010	<0.1	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
11...	--	--	--	--	--	--	--	--	--	--	--
12...	<0.1	<0.10	<0.010	<0.010	<0.1	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
12...	--	--	--	--	--	--	--	--	--	--	--
13...	<0.1	<0.10	<0.010	<0.010	<0.1	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
13...	--	--	--	--	--	--	--	--	--	--	--
23...	--	--	--	--	--	--	--	--	--	--	--
24...	<0.1	<0.10	<0.010	<0.010	<0.1	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
24...	--	--	--	--	--	--	--	--	--	--	--
25...	<0.1	<0.10	<0.010	<0.010	<0.1	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
25...	--	--	--	--	--	--	--	--	--	--	--
27...	<0.1	<0.10	0.010	<0.010	<0.1	<0.010	<0.010	0.010	<0.010	<0.010	<0.010
27...	--	--	--	--	--	--	--	--	--	--	--
28...	<0.1	<0.10	<0.010	<0.010	<0.1	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
28...	--	--	--	--	--	--	--	--	--	--	--
29...	<0.1	<0.10	<0.010	<0.010	<0.1	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
29...	--	--	--	--	--	--	--	--	--	--	--
30...	<0.1	<0.10	<0.010	<0.010	<0.1	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
30...	--	--	--	--	--	--	--	--	--	--	--
31...	<0.1	<0.10	<0.010	<0.010	<0.1	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
31...	--	--	--	--	--	--	--	--	--	--	--
JUN											
01...	<0.1	<0.10	<0.010	<0.010	<0.1	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
01...	--	--	--	--	--	--	--	--	--	--	--
02...	<0.1	<0.10	<0.010	<0.010	<0.1	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
02...	--	--	--	--	--	--	--	--	--	--	--
03...	<0.1	<0.10	<0.010	<0.010	<0.1	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
03...	--	--	--	--	--	--	--	--	--	--	--
27...	<0.1	<0.10	<0.010	<0.010	<0.1	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
27...	--	--	--	--	--	--	--	--	--	--	--

< Actual value is known to be less than the value shown.

JAMES RIVER BASIN

02035000 JAMES RIVER AT CARTERSVILLE, VA--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	PROMETHYNE TOTAL (UG/L) (39057)	NAPHTHALENES, POLYCHLOR. TOTAL (UG/L) (39250)	ALDRIN, TOTAL (UG/L) (39330)	LINDANE TOTAL (UG/L) (39340)	CHLORDANE, TOTAL (UG/L) (39350)	DDD, TOTAL (UG/L) (39360)	DDE, TOTAL (UG/L) (39365)	DDT, TOTAL (UG/L) (39370)	DI-ELDRIN TOTAL (UG/L) (39380)	ENDO-SULFAN, TOTAL (UG/L) (39388)	ENDRIN, TOTAL (UG/L) (39390)
JUL											
16...	--	--	--	--	--	--	--	--	--	--	--
25...	<0.1	<0.10	<0.010	<0.010	<0.1	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
25...	--	--	--	--	--	--	--	--	--	--	--
AUG											
29...	<0.1	<0.10	<0.010	<0.010	<0.1	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
29...	--	--	--	--	--	--	--	--	--	--	--
29...	<0.1	<0.10	<0.010	<0.010	<0.1	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
SEP											
26...	<0.1	--	--	--	--	--	--	--	--	--	--
26...	--	--	--	--	--	--	--	--	--	--	--

< Actual value is known to be less than the value shown.

JAMES RIVER BASIN

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02035000 JAMES RIVER AT CARTERSVILLE, VA--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	ETHION, TOTAL (UG/L) (39398)	TOX- APHENE, TOTAL (UG/L) (39400)	HEPTA- CHLOR, TOTAL (UG/L) (39410)	HEPTA- CHLOR EPOXIDE TOTAL (UG/L) (39420)	METH- OXY- CHLOR, TOTAL (UG/L) (39480)	PCB, TOTAL (UG/L) (39516)	MALA- THION, TOTAL (UG/L) (39530)	PARA- THION, TOTAL (UG/L) (39540)	DI- AZINON, TOTAL (UG/L) (39570)	METHYL PARA- THION, TOTAL (UG/L) (39600)	ATRA- ZINE, TOTAL (UG/L) (39630)
OCT											
02...	--	--	--	--	--	--	--	--	--	--	--
02...	--	--	--	--	--	--	--	--	--	--	--
03...	--	--	--	--	--	--	--	--	--	--	--
04...	--	--	--	--	--	--	--	--	--	--	--
06...	--	--	--	--	--	--	--	--	--	--	--
19...	--	--	--	--	--	--	--	--	--	--	--
21...	--	--	--	--	--	--	--	--	--	--	--
22...	--	--	--	--	--	--	--	--	--	--	--
26...	--	--	--	--	--	--	--	--	--	--	--
NOV											
18...	--	--	--	--	--	--	--	--	--	--	--
28...	--	--	--	--	--	--	--	--	--	--	--
28...	--	--	--	--	--	--	--	--	--	--	--
DEC											
26...	--	--	--	--	--	--	--	--	--	--	--
JAN											
02...	--	--	--	--	--	--	--	--	--	--	--
03...	--	--	--	--	--	--	--	--	--	--	--
04...	--	--	--	--	--	--	--	--	--	--	--
05...	--	--	--	--	--	--	--	--	--	--	--
30...	--	--	--	--	--	--	--	--	--	--	--
30...	--	--	--	--	--	--	--	--	--	--	--
FEB											
05...	--	--	--	--	--	--	--	--	--	--	--
06...	--	--	--	--	--	--	--	--	--	--	--
07...	--	--	--	--	--	--	--	--	--	--	--
13...	--	--	--	--	--	--	--	--	--	--	--
26...	--	--	--	--	--	--	--	--	--	--	--
26...	--	--	--	--	--	--	--	--	--	--	--
MAR											
18...	--	--	--	--	--	--	--	--	--	--	--
19...	--	--	--	--	--	--	--	--	--	--	--
28...	--	--	--	--	--	--	--	--	--	--	--
APR											
25...	<0.01	<1	<0.010	<0.010	<0.01	<0.1	<0.01	<0.01	<0.01	<0.01	<0.10
25...	--	--	--	--	--	--	--	--	--	--	--
MAY											
11...	<0.01	<1	<0.010	<0.010	<0.01	<0.1	<0.01	<0.01	<0.01	<0.01	0.10
11...	--	--	--	--	--	--	--	--	--	--	--
12...	<0.01	<1	<0.010	<0.010	<0.01	<0.1	<0.01	<0.01	<0.01	<0.01	0.20
12...	--	--	--	--	--	--	--	--	--	--	--
13...	<0.01	<1	<0.010	<0.010	<0.01	<0.1	<0.01	<0.01	<0.01	<0.01	0.10
13...	--	--	--	--	--	--	--	--	--	--	--
23...	--	--	--	--	--	--	--	--	--	--	--
24...	<0.01	<1	<0.010	<0.010	<0.01	<0.1	<0.01	<0.01	<0.01	<0.01	0.10
24...	--	--	--	--	--	--	--	--	--	--	--
25...	<0.01	<1	<0.010	<0.010	<0.01	<0.1	<0.01	<0.01	<0.01	<0.01	0.20
25...	--	--	--	--	--	--	--	--	--	--	--
27...	<0.01	<1	<0.010	<0.010	<0.01	<0.1	0.01	<0.01	0.01	<0.01	1.0
27...	--	--	--	--	--	--	--	--	--	--	--
28...	<0.01	<1	<0.010	<0.010	<0.01	<0.1	<0.01	<0.01	<0.01	<0.01	0.20
28...	--	--	--	--	--	--	--	--	--	--	--
29...	<0.01	<1	<0.010	<0.010	<0.01	<0.1	<0.01	<0.01	<0.01	<0.01	0.30
29...	--	--	--	--	--	--	--	--	--	--	--
30...	<0.01	<1	<0.010	<0.010	<0.01	<0.1	<0.01	<0.01	<0.01	<0.01	0.20
30...	--	--	--	--	--	--	--	--	--	--	--
31...	<0.01	<1	<0.010	<0.010	<0.01	<0.1	<0.01	<0.01	<0.01	<0.01	0.10
31...	--	--	--	--	--	--	--	--	--	--	--
JUN											
01...	<0.01	<1	<0.010	<0.010	<0.01	<0.1	<0.01	<0.01	<0.01	<0.01	0.20
01...	--	--	--	--	--	--	--	--	--	--	--
02...	<0.01	<1	<0.010	<0.010	<0.01	<0.1	<0.01	<0.01	<0.01	<0.01	0.10
02...	--	--	--	--	--	--	--	--	--	--	--
03...	<0.01	<1	<0.010	<0.010	<0.01	<0.1	<0.01	<0.01	<0.01	<0.01	0.10
03...	--	--	--	--	--	--	--	--	--	--	--
27...	<0.01	<1	<0.010	<0.010	<0.01	<0.1	<0.01	<0.01	<0.01	<0.01	<0.10
27...	--	--	--	--	--	--	--	--	--	--	--

< Actual value is known to be less than the value shown.

JAMES RIVER BASIN

02035000 JAMES RIVER AT CARTERSVILLE, VA--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	ETHION, TOTAL (UG/L) (39398)	TOX- APHENE, TOTAL (UG/L) (39400)	HEPTA- CHLOR, TOTAL (UG/L) (39410)	HEPTA- CHLOR EPOXIDE TOTAL (UG/L) (39420)	METH- OXY- CHLOR, TOTAL (UG/L) (39480)	PCB, TOTAL (UG/L) (39516)	MALA- THION, TOTAL (UG/L) (39530)	PARA- THION, TOTAL (UG/L) (39540)	DI- AZINON, TOTAL (UG/L) (39570)	METHYL PARA- THION, TOTAL (UG/L) (39600)	ATRA- ZINE, TOTAL (UG/L) (39630)
JUL											
16...	--	--	--	--	--	--	--	--	--	--	--
25...	<0.01	<1	<0.010	<0.010	<0.01	<0.1	<0.01	<0.01	<0.01	<0.01	<0.10
25...	--	--	--	--	--	--	--	--	--	--	--
AUG											
29...	<0.01	<1	<0.010	<0.010	<0.01	<0.1	<0.01	<0.01	<0.01	<0.01	<0.10
29...	--	--	--	--	--	--	--	--	--	--	--
29...	<0.01	<1	<0.010	<0.010	<0.01	<0.1	<0.01	<0.01	<0.01	<0.01	<0.10
SEP											
26...	--	--	--	--	--	--	--	--	--	--	<0.10
26...	--	--	--	--	--	--	--	--	--	--	--

< Actual value is known to be less than the value shown.

JAMES RIVER BASIN

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02035000 JAMES RIVER AT CARTERSVILLE, VA--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	SEVIN, TOTAL (UG/L) (39750)	MIREX, TOTAL (UG/L) (39755)	TOTAL TRI- THION (UG/L) (39786)	METHYL TRI- THION, TOTAL (UG/L) (39790)	ALA- CHLOR TOTAL RECOVER (UG/L) (77825)	CYAN- AZINE TOTAL (UG/L) (81757)	AME- TRYNE TOTAL (82184)	METRI- BUZIN WATER WHOLE TOT.REC (UG/L) (82611)	METOLA- CHLOR WATER WHOLE TOT.REC (UG/L) (82612)	SEDI- MENT, SUS- PENDE (MG/L) (80154)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
OCT											
02...	--	--	--	--	--	--	--	--	--	--	--
02...	--	--	--	--	--	--	--	--	--	--	--
03...	--	--	--	--	--	--	--	--	--	--	--
04...	--	--	--	--	--	--	--	--	--	--	--
06...	--	--	--	--	--	--	--	--	--	--	--
19...	--	--	--	--	--	--	--	--	--	--	--
21...	--	--	--	--	--	--	--	--	--	--	--
22...	--	--	--	--	--	--	--	--	--	--	--
26...	--	--	--	--	--	--	--	--	--	--	--
NOV											
18...	--	--	--	--	--	--	--	--	--	--	--
28...	--	--	--	--	--	--	--	--	--	4	97
28...	--	--	--	--	--	--	--	--	--	--	--
DEC											
26...	--	--	--	--	--	--	--	--	--	--	--
JAN											
02...	--	--	--	--	--	--	--	--	--	--	--
03...	--	--	--	--	--	--	--	--	--	--	--
04...	--	--	--	--	--	--	--	--	--	--	--
05...	--	--	--	--	--	--	--	--	--	--	--
30...	--	--	--	--	--	--	--	--	--	14	92
30...	--	--	--	--	--	--	--	--	--	--	--
FEB											
05...	--	--	--	--	--	--	--	--	--	--	--
06...	--	--	--	--	--	--	--	--	--	--	--
07...	--	--	--	--	--	--	--	--	--	--	--
13...	--	--	--	--	--	--	--	--	--	--	--
26...	--	--	--	--	--	--	--	--	--	21	94
26...	--	--	--	--	--	--	--	--	--	--	--
MAR											
18...	--	--	--	--	--	--	--	--	--	--	--
19...	--	--	--	--	--	--	--	--	--	--	--
28...	--	--	--	--	--	--	--	--	--	--	--
APR											
25...	<0.50	<0.01	<0.01	<0.01	<0.10	<0.10	<0.10	<0.1	<0.1	11	97
25...	--	--	--	--	--	--	--	--	--	--	--
MAY											
11...	<0.50	<0.01	<0.01	<0.01	<0.10	<0.10	<0.10	<0.1	<0.1	472	87
11...	--	--	--	--	--	--	--	--	--	--	--
12...	--	<0.01	<0.01	<0.01	<0.10	<0.10	<0.10	<0.1	<0.1	159	94
12...	--	--	--	--	--	--	--	--	--	--	--
13...	--	<0.01	<0.01	<0.01	<0.10	<0.10	<0.10	<0.1	<0.1	56	97
13...	--	--	--	--	--	--	--	--	--	--	--
23...	--	--	--	--	--	--	--	--	--	--	--
24...	<0.50	<0.01	<0.01	<0.01	<0.10	<0.10	<0.10	<0.1	<0.1	146	92
24...	--	--	--	--	--	--	--	--	--	--	--
25...	<0.50	<0.01	<0.01	<0.01	<0.10	<0.10	<0.10	<0.1	0.1	89	98
25...	--	--	--	--	--	--	--	--	--	--	--
27...	<0.50	<0.01	<0.01	<0.01	1.00	<0.10	<0.10	<0.1	0.1	748	90
27...	--	--	--	--	--	--	--	--	--	--	--
28...	--	<0.01	<0.01	<0.01	<0.10	<0.10	<0.10	<0.1	<0.1	142	94
28...	--	--	--	--	--	--	--	--	--	--	--
29...	<0.50	<0.01	<0.01	<0.01	<0.10	<0.10	<0.10	<0.1	0.1	246	97
29...	--	--	--	--	--	--	--	--	--	--	--
30...	--	<0.01	<0.01	<0.01	<0.10	<0.10	<0.10	<0.1	<0.1	182	99
30...	--	--	--	--	--	--	--	--	--	--	--
31...	<0.50	<0.01	<0.01	<0.01	<0.10	<0.10	<0.10	<0.1	<0.1	197	85
31...	--	--	--	--	--	--	--	--	--	--	--
JUN											
01...	<0.50	<0.01	<0.01	<0.01	<0.10	<0.10	<0.10	<0.1	<0.1	133	92
01...	--	--	--	--	--	--	--	--	--	--	--
02...	<0.50	<0.01	<0.01	<0.01	<0.10	<0.10	<0.10	<0.1	<0.1	83	83
02...	--	--	--	--	--	--	--	--	--	--	--
03...	<0.50	<0.01	<0.01	<0.01	<0.10	<0.10	<0.10	<0.1	<0.1	87	77
03...	--	--	--	--	--	--	--	--	--	--	--
27...	<0.50	<0.01	<0.01	<0.01	<0.10	<0.10	<0.10	<0.1	<0.1	7	96
27...	--	--	--	--	--	--	--	--	--	--	--

< Actual value is known to be less than the value shown.

JAMES RIVER BASIN

02035000 JAMES RIVER AT CARTERSVILLE, VA--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	SEVIN, TOTAL (UG/L) (39750)	MIREX, TOTAL (UG/L) (39755)	TOTAL TRI- THION (UG/L) (39786)	METHYL TRI- THION, TOTAL (UG/L) (39790)	ALA- CHLOR TOTAL RECOVER (UG/L) (77825)	CYAN- AZINE TOTAL (UG/L) (81757)	AME- TRYNE TOTAL (82184)	METRI- BUZIN WATER WHOLE TOT.REC (UG/L) (82611)	METOLA- CHLOR WATER WHOLE TOT.REC (UG/L) (82612)	SEDI- MENT, SUS- PENDED (MG/L) (80154)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
JUL											
16...	--	--	--	--	--	--	--	--	--	--	--
25...	<0.50	<0.01	<0.01	<0.01	<0.10	<0.10	<0.10	<0.1	<0.1	7	96
25...	--	--	--	--	--	--	--	--	--	--	--
AUG											
29...	--	<0.01	<0.01	<0.01	<0.10	<0.10	<0.10	<0.1	<0.1	--	--
29...	--	--	--	--	--	--	--	--	--	--	--
29...	<0.50	<0.01	<0.01	<0.01	<0.10	<0.10	<0.10	<0.1	<0.1	5	91
SEP											
26...	<0.50	--	--	--	<0.10	<0.10	<0.10	<0.1	<0.1	1	83
26...	--	--	--	--	--	--	--	--	--	--	--

< Actual value is known to be less than the value shown.

02036500 FINE CREEK AT FINE CREEK MILLS, VA

LOCATION.--Lat 37°35'52", long 77°49'12", Powhatan County, Hydrologic Unit 02080205, on right bank 75 ft downstream from bridge on State Highway 711 at Fine Creek Mills, 0.8 mi upstream from mouth, and 6.7 mi northeast of Powhatan.

DRAINAGE AREA.--22.1 mi².

PERIOD OF RECORD.--July 1944 to current year.

REVISED RECORDS.--WSP 1203: 1948. WSP 1303: 1945(M). WSP 1383: 1954. WSP 2104: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 156.59 ft above National Geodetic Vertical Datum of 1929. Prior to Oct. 28, 1953, nonrecording gage and crest-stage gage at site 75 ft upstream at same datum.

REMARKS.--Records good except those for periods of no gage-height record, Oct. 1, 2 and July 9 to Aug. 13, and periods with ice effect, Dec. 17, 20-25, which are fair. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

COOPERATION.--Records were provided by the Virginia Water Control Board.

AVERAGE DISCHARGE.--46 years, 20.1 ft³/s, 12.35 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 4,180 ft³/s, Oct. 6, 1972, gage height, 9.02 ft, from rating curve extended above 2,600 ft³/s; minimum daily, 0.08 ft³/s, Oct. 1, 1968; minimum gage height, 1.53 ft, Sept. 30, Oct. 1, 1970.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 200 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Apr. 3	0645	960	4.51	May 29	1715	*1,090	*4.74

Minimum daily discharge, 0.45 ft³/s, Sept. 19, 21.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e15	8.4	10	116	21	16	71	14	35	5.2	e2.3	1.5
2	e35	10	10	89	20	16	70	12	27	6.0	e2.2	1.5
3	32	21	10	42	22	22	507	11	22	5.8	e2.1	1.4
4	21	23	10	34	41	24	139	11	20	4.9	e2.0	1.4
5	14	15	9.8	36	39	19	62	15	17	4.4	e2.0	1.4
6	10	12	10	36	27	17	42	14	13	4.1	e2.5	1.4
7	8.9	11	10	34	24	15	75	11	12	4.0	e2.7	1.4
8	7.7	12	11	36	23	14	60	9.3	11	3.9	e6.5	1.7
9	7.3	14	13	70	20	14	37	8.5	10	e3.8	e11	1.7
10	6.8	14	14	48	67	14	29	15	10	e3.7	e8.0	1.8
11	6.4	12	13	31	143	14	29	29	9.2	e5.5	e7.8	1.8
12	6.1	11	14	24	63	16	26	17	8.2	e8.0	e7.0	1.7
13	6.0	11	17	20	37	14	21	12	7.4	e8.4	e6.7	1.8
14	5.9	9.9	21	18	28	13	20	11	7.5	e22	5.2	3.8
15	6.2	11	19	17	25	13	44	10	7.9	e12	4.9	2.1
16	5.9	11	19	16	27	13	51	9.4	8.0	e7.0	4.9	1.5
17	6.8	12	e16	16	30	18	29	8.2	7.8	e5.0	5.6	.70
18	10	11	12	16	24	52	25	6.8	10	e4.7	5.9	.53
19	28	9.0	11	15	25	31	21	5.5	18	e10	5.0	.45
20	43	8.2	e10	14	27	25	19	4.8	16	e6.0	4.7	.46
21	27	7.8	e9.5	15	22	24	21	9.2	10	e4.3	4.8	.45
22	16	7.8	e8.6	14	20	20	24	24	9.1	e3.8	10	.62
23	11	14	e8.0	14	23	17	21	32	8.2	e3.3	15	.70
24	9.4	16	e7.8	13	22	16	18	17	7.6	e3.0	9.4	.68
25	7.8	15	e7.4	28	19	22	16	11	6.6	e2.8	6.1	.60
26	7.0	15	8.9	104	16	24	16	16	5.9	e2.6	4.1	.58
27	6.7	15	10	109	15	19	14	70	5.3	e3.7	2.7	.54
28	6.3	14	11	48	17	17	13	50	5.0	e2.8	2.1	.50
29	6.1	12	12	33	---	24	13	416	5.4	e3.2	1.9	.52
30	5.8	11	14	28	---	55	15	262	6.4	e2.8	1.8	.62
31	6.5	---	29	25	---	67	---	68	---	e2.6	1.6	---
TOTAL	391.6	374.1	386.0	1159	887	685	1548	1209.7	346.5	169.3	158.5	35.85
MEAN	12.6	12.5	12.5	37.4	31.7	22.1	51.6	39.0	11.5	5.46	5.11	1.19
MAX	43	23	29	116	143	67	507	416	35	22	15	3.8
MIN	5.8	7.8	7.4	13	15	13	13	4.8	5.0	2.6	1.6	.45
CFSM	.57	.56	.56	1.69	1.43	1.00	2.33	1.77	.52	.25	.23	.05
IN.	.66	.63	.65	1.95	1.49	1.15	2.61	2.04	.58	.28	.27	.06

CAL YR 1989 TOTAL 6416.3 MEAN 17.6 MAX 190 MIN 1.4 CFSM .80 IN. 10.80
WTR YR 1990 TOTAL 7350.55 MEAN 20.1 MAX 507 MIN .45 CFSM .91 IN. 12.37

e Estimated.

JAMES RIVER BASIN

02037000 JAMES RIVER AND KANAWHA CANAL NEAR RICHMOND, VA

LOCATION.--Lat 37°33'52", long 77°34'28", Henrico County, Hydrologic Unit 02080205, on left bank 75 ft downstream from Canal bridge, 400 ft downstream from head gates, 1,200 ft north of north end of Boshier Dam on James River, 1.6 mi upstream from Huguenot Memorial Bridge, and 2.0 mi west of Richmond city limits.

PERIOD OF RECORD.--September 1936 to current year.

GAGE.--Water-stage recorder. Datum of gage is 106.07 ft above National Geodetic Vertical Datum of 1929. Prior to Oct. 1, 1938, at datum 3.06 ft higher.

REMARKS.--Records good except those for periods with ice effect, Dec. 19, 20, 23-26, which are fair. Canal diverts from James River 1,200 ft upstream from Boshier Dam and discharges into river at several points downstream from gaging station near Richmond. Above 2,540 ft³/s, gage height, 14.5 ft, there is interchange of flow with James River; discharge above 2,540 ft³/s included in discharge for James River near Richmond (station 02037500). Figures given show flow in canal only. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

COOPERATION.--Records were provided by the Virginia Water Control Board.

AVERAGE DISCHARGE.--54 years, 712 ft³/s.

EXTREMES FOR PERIOD OF RECORD.--Maximum gage height, 29.1 ft, June 23, 1972, from floodmarks, interchange of flow with James River makes maximum discharge indeterminate; no flow at times when head gates were closed.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 988 ft³/s, Apr. 2, gage height, 8.59 ft; minimum, 1.4 ft³/s, Nov. 18, 19, result of head gates being closed.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	239	219	143	10	3.8	25	221	309	259	291	4.0	2.1
2	235	252	264	2.6	4.2	34	320	306	274	290	4.3	2.1
3	154	263	275	2.1	6.3	37	168	305	273	287	4.0	2.1
4	11	264	274	1.9	18	32	24	300	113	285	4.9	1.9
5	7.2	304	276	1.8	8.8	16	16	296	7.0	284	5.3	1.9
6	147	287	279	2.5	5.9	167	16	308	5.3	285	5.5	1.9
7	241	287	290	1.8	6.2	282	23	306	4.8	285	5.9	2.0
8	242	289	296	6.9	5.5	269	15	306	4.7	283	6.0	2.1
9	237	296	292	4.1	5.3	265	13	302	4.6	282	34	1.9
10	227	301	296	2.1	16	265	15	289	4.0	203	21	1.8
11	253	286	293	2.0	9.4	268	181	282	67	4.0	5.8	137
12	241	281	297	2.5	5.1	263	297	292	298	2.7	4.4	277
13	252	101	303	2.2	4.3	257	308	281	297	3.9	3.3	278
14	268	1.5	307	2.3	4.0	268	304	289	247	7.2	3.4	291
15	280	1.5	156	3.0	4.1	268	302	304	251	2.4	3.7	246
16	138	1.6	6.0	3.3	7.2	262	294	307	300	2.8	5.8	247
17	5.5	1.5	4.1	3.2	6.4	262	297	307	281	4.2	7.3	250
18	5.0	1.4	3.0	2.9	6.9	260	294	309	191	3.9	3.0	256
19	30	1.5	e2.6	3.6	14	255	311	310	14	3.8	2.4	248
20	13	1.8	e2.3	3.6	13	261	311	302	9.9	3.8	2.1	250
21	4.3	2.0	2.1	5.2	13	257	305	302	194	4.0	2.4	271
22	3.6	2.7	1.8	7.6	14	260	307	303	277	4.1	7.7	281
23	1.9	7.7	e1.7	8.0	17	257	306	304	281	3.6	6.8	281
24	1.8	2.2	e1.6	8.3	19	254	301	311	270	2.9	48	281
25	1.7	1.8	e1.5	16	19	248	298	310	260	2.8	6.9	280
26	1.7	1.8	e1.6	19	19	255	300	319	281	3.3	4.1	281
27	1.8	1.9	1.7	8.1	20	255	298	306	288	4.1	3.1	285
28	1.9	2.1	1.7	4.5	20	254	295	288	286	3.8	2.5	283
29	1.9	2.5	1.7	4.0	---	249	299	293	285	3.5	2.6	277
30	1.9	2.6	1.7	4.1	---	238	301	281	284	3.4	3.1	271
31	46	---	4.1	3.8	---	233	---	346	---	3.5	2.6	---
TOTAL	3294.2	3468.1	4080.2	153.0	295.4	6776	6740	9373	5591.3	2852.7	225.9	5290.8
MEAN	106	116	132	4.94	10.5	219	225	302	186	92.0	7.29	176
MAX	280	304	307	19	20	282	320	346	300	291	48	291
MIN	1.7	1.4	1.5	1.8	3.8	16	13	281	4.0	2.4	2.1	1.8

CAL YR 1989 TOTAL 70708.5 MEAN 194 MAX 826 MIN 1.4
WTR YR 1990 TOTAL 48140.6 MEAN 132 MAX 346 MIN 1.4

e Estimated.

02037500 JAMES RIVER NEAR RICHMOND, VA

LOCATION.--Lat 37°33'47", long 77°32'50", Henrico County, Hydrologic Unit 02080205, on left bank 0.2 mi upstream from Huguenot Memorial Bridge, 0.5 mi southwest of Richmond city limits, 1.7 mi downstream from Boshier Dam, 3.3 mi upstream from Powhite Creek, and at mile 116.6.

DRAINAGE AREA.--6,758 mi².

PERIOD OF RECORD.--October 1934 to current year. Gage-height records collected in vicinity of Mayo's Bridge, at mile 109.5, 1876-1956, and at mile 108.7 since 1957, are contained in reports of the National Weather Service.

REVISED RECORDS.--WSP 972: 1936(M). WSP 1433: 1951(M). WSP 2104: Drainage area.

GAGE.--Water-stage recorder. Control is Williams Island dams which divert flow for city of Richmond water supply. Datum of gage is 98.82 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records good except for period with ice effect, Dec. 22, 23, which is fair. City of Richmond takes from 40 ft³/s to 90 ft³/s for water supply from river downstream from gage except during periods of low flow when supply is obtained from James River and Kanawha Canal. Flow regulated by powerplants upstream from station. Above 18.2 ft stage, there is interchange of flow with James River and Kanawha Canal. Records of daily discharge include diversion by city of Richmond but do not include flow in James River and Kanawha Canal (station 02037000) which diverts around station. National Weather Service gage-height telemeter at station. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

COOPERATION.--Records were provided by the Virginia Water Control Board.

AVERAGE DISCHARGE.--56 years, 7,536 ft³/s, 15.14 in/yr, includes flow in James River and Kanawha Canal.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 313,000 ft³/s, includes canal flow, June 23, 1972, gage height, 28.62 ft; minimum daily, about 10 ft³/s, Sept. 8-15, 1966, Sept. 30, Oct. 5, 6, 1968, Oct. 8-10, 1970; minimum daily discharge of James River and James River and Kanawha Canal combined, 214 ft³/s, Oct. 5, 1941, caused by recharging of the pool above Boshier Dam after the canal gates were closed.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 50,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
May 30	1000	*57,100	*14.01	No other peak equal to or greater than base discharge.			

Minimum discharge, 983 ft³/s, Sept. 30, gage height, 3.51 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	10100	5910	6420	14000	12700	9510	13900	5920	26800	2730	1940	1970
2	11300	6100	6210	14500	13100	9250	14000	5420	19300	2880	2000	2110
3	35300	5950	5840	39200	11900	8720	22100	5270	15300	2650	1980	1680
4	35700	6480	5410	24400	13100	9060	18200	5270	13000	2460	1680	1690
5	22900	5810	5490	20200	16900	8900	13200	5300	12100	2390	1810	1720
6	16300	5260	5350	18000	20400	8350	10900	6860	10000	2410	1750	1690
7	12800	4990	5160	16100	19600	7790	11000	6970	8470	2290	1820	1500
8	10800	5080	5210	14300	17400	7450	14800	6980	7510	2090	1920	1750
9	9560	6030	4560	15700	15300	6900	15200	6300	6610	1910	2260	1730
10	8490	7230	5130	16800	15000	6500	15100	6080	6390	2040	2730	1560
11	7500	6020	4840	15700	20400	6570	13100	15000	7170	2250	2150	1310
12	6640	5210	4960	13900	18700	6090	12500	17400	6210	2410	2520	1250
13	6250	4970	5030	12300	18300	6250	11800	11500	5470	3010	2190	1550
14	5760	5040	5270	10900	16300	6010	10600	9910	5090	3030	2000	1820
15	5450	5030	5820	9940	14200	5830	10500	8910	4610	3850	2280	2100
16	5080	4900	5490	9080	12000	5710	15200	7600	4430	6900	2320	2370
17	4990	8230	5240	8470	11400	5510	12800	7180	4560	6730	2070	2340
18	5110	28800	4860	7880	11000	13900	10600	7110	4540	7320	2090	1880
19	11700	22400	4730	7580	10400	18300	9350	6600	4180	5160	1980	1560
20	37400	16000	4480	7300	10500	13500	8630	6040	4430	4180	1700	1530
21	31300	13000	4360	6620	10000	12500	8050	5860	4000	3710	1870	1410
22	22900	11300	e4200	6670	8790	11700	7720	7050	3890	3730	2360	1400
23	17600	9830	e3800	6530	8890	10200	7760	10000	3830	3690	2580	1430
24	14000	9100	3440	6390	11000	9290	7010	15500	3980	3440	3570	1450
25	11900	8170	3090	7010	10800	8590	6750	14900	4140	3130	5210	1480
26	10100	7230	3640	12200	10900	8550	6450	11300	3450	2820	5060	1250
27	8530	7130	4170	18100	11600	8610	6280	14400	3220	2270	4310	1360
28	7450	7000	4820	14200	10400	8470	5810	20900	2990	2470	3460	1290
29	6720	6960	5170	13000	---	8820	5750	26200	2860	2100	2990	1350
30	6250	7030	4930	11900	---	10300	5340	53800	2740	2250	2640	1180
31	5930	---	5360	13200	---	12600	---	40600	---	2180	2350	---
TOTAL	411810	252190	152480	442970	380980	279730	330400	378130	211270	100480	77590	48710
MEAN	13280	8406	4919	14290	13610	9024	11010	12200	7042	3241	2503	1624
MAX	37400	28800	6420	45400	20400	18300	22100	53800	26800	7320	5210	2370
MIN	4990	4900	3090	6390	8790	5510	5340	5270	2740	1910	1680	1180
(*)	106	116	132	4.94	10.5	219	225	302	186	92.0	7.29	176
MEAN#	13390	8522	5051	14300	13620	9243	11240	12500	7228	3333	2510	1800
CFSM#	1.98	1.26	.75	2.12	2.02	1.37	1.66	1.85	1.07	.49	.37	.27
IN.#	2.28	1.41	.86	2.44	2.10	1.58	1.86	2.13	1.19	.57	.43	.30

CAL YR 1989 TOTAL 3353110 MEAN 9187 MAX 87500 MIN 2400 MEAN# 9381 CFSM# 1.39 IN.# 18.85
WTR YR 1990 TOTAL 3066740 MEAN 8402 MAX 53800 MIN 1180 MEAN# 8534 CFSM# 1.26 IN.# 17.15

* Average diversion, in cubic feet per second, by James River & Kanawha Canal.

Adjusted for diversion.

e Estimated.

02038000 FALLING CREEK NEAR CHESTERFIELD, VA

LOCATION.--Lat 37°26'37", long 77°31'21", Chesterfield County, Hydrologic Unit 02080206, on left bank 50 ft upstream from bridge on State Highway 651, 0.8 mi downstream from Licking Creek, 2.8 mi upstream from Pocoshock Creek, and 4.7 mi northwest of Chesterfield.

DRAINAGE AREA.--32.8 mi².

PERIOD OF RECORD.--October 1955 to current year.

REVISED RECORDS.--WSP 1904: 1957(M), 1958-60.

GAGE.--Water-stage recorder. Datum of gage is 126.39 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--No estimated daily discharges. Records good. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

AVERAGE DISCHARGE.--35 years, 33.0 ft³/s, 13.66 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 5,930 ft³/s, Oct. 1, 1979, gage height, 15.32 ft, from floodmarks, from rating curve extended above 3,200 ft³/s on basis of slope-conveyance study; minimum, 0.01 ft³/s, Sept. 20, Oct. 3, 1968.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 220 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Jan. 1	1200	227	6.24	May 29	1500	306	6.89
Apr. 3	1530	*491	*8.03	Aug. 10	0015	388	7.44

Minimum discharge, 1.7 ft³/s, July 7, 8, Aug. 5-6, Sept. 30, gage height, 2.72 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	18	11	12	174	26	22	58	28	24	2.3	4.1	4.2
2	87	12	11	73	25	22	64	22	19	3.3	3.0	3.8
3	46	24	12	42	24	32	403	19	16	2.7	2.3	3.4
4	18	24	11	37	55	38	118	19	15	2.2	2.1	2.9
5	12	14	11	40	64	26	62	22	13	2.0	1.8	2.6
6	9.7	13	11	43	38	23	47	20	12	2.0	9.9	2.4
7	8.3	14	10	46	32	21	93	18	11	1.9	31	2.3
8	7.3	12	12	50	32	20	72	16	11	1.9	13	2.3
9	6.7	45	15	89	27	21	48	15	11	2.1	119	2.2
10	6.3	43	15	50	52	20	41	43	10	2.5	214	2.1
11	5.8	24	15	37	78	20	44	82	8.9	2.3	43	2.1
12	5.6	18	24	33	42	21	40	30	7.9	3.1	24	1.9
13	5.5	13	39	28	33	19	32	21	7.7	5.8	15	2.7
14	5.1	11	32	25	29	19	29	18	7.2	28	9.3	5.6
15	4.9	11	26	23	27	18	79	17	6.3	23	7.1	10
16	5.0	17	28	23	47	18	74	16	5.8	12	6.3	11
17	8.1	19	23	21	61	19	44	14	5.6	7.8	5.8	6.2
18	22	15	17	21	35	39	36	13	6.5	5.4	5.0	4.1
19	97	12	16	20	44	32	30	12	14	13	4.3	3.1
20	131	11	15	20	46	23	28	11	17	19	4.1	2.8
21	45	11	14	21	32	20	30	11	11	15	4.0	2.5
22	21	10	13	20	29	19	40	32	8.0	13	3.9	2.6
23	15	38	12	19	32	17	31	41	8.3	8.3	4.4	2.9
24	12	35	12	18	39	17	26	23	6.4	6.5	69	2.3
25	11	21	11	46	30	30	24	16	5.5	4.8	42	2.1
26	10	17	12	140	24	33	22	16	5.0	4.0	16	2.0
27	9.6	16	12	73	22	23	21	96	4.1	5.2	11	2.1
28	9.2	15	12	44	23	20	19	56	3.7	7.4	8.4	1.9
29	9.0	13	12	36	---	27	24	188	3.3	10	6.8	1.9
30	8.6	13	16	34	---	62	43	129	2.7	8.1	6.0	1.9
31	8.8	---	38	30	---	56	---	37	---	5.8	5.2	---
TOTAL	668.5	552	519	1376	1048	797	1722	1101	286.9	230.4	700.8	99.9
MEAN	21.6	18.4	16.7	44.4	37.4	25.7	57.4	35.5	9.56	7.43	22.6	3.33
MAX	131	45	39	174	78	62	403	188	24	28	214	11
MIN	4.9	10	10	18	22	17	19	11	2.7	1.9	1.8	1.9
CFSM	.66	.56	.51	1.35	1.14	.78	1.75	1.08	.29	.23	.69	.10
IN.	.76	.63	.59	1.56	1.19	.90	1.95	1.25	.33	.26	.79	.11

CAL YR 1989 TOTAL 11705.7 MEAN 32.1 MAX 371 MIN 3.2 CFSM .98 IN. 13.28
WTR YR 1990 TOTAL 9101.5 MEAN 24.9 MAX 403 MIN 1.8 CFSM .76 IN. 10.32

02038850 HOLIDAY CREEK NEAR ANDERSONVILLE, VA
(Hydrologic Bench-Mark Station)

LOCATION.--Lat 37°24'55", long 78°38'10", Appomattox County, Hydrologic Unit 02080207, on right bank 350 ft downstream from culvert on State Highway 614, 1.0 mi upstream from Holiday Lake, and 5.2 mi southwest of Andersonville.

DRAINAGE AREA.--8.53 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--April 1966 to current year.

REVISED RECORDS.--WDR VA-72-1: 1967-71(M), 1966-69(P), 1971(P).

GAGE.--Water-stage recorder. Datum of gage is 472.97 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records good except for period with ice effect, Dec. 16-28, which is fair. Recording rain gage at station.

AVERAGE DISCHARGE.--24 years, 8.58 ft³/s, 13.66 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 9,640 ft³/s, June 21, 1972, gage height, 14.64 ft, from high-water mark in gage house, from rating curve extended above 4,200 ft³/s on basis of slope-area measurement of peak flow; minimum, 0.10 ft³/s, Sept. 11, 12, 1966; minimum gage height, 0.73 ft, Aug. 12, 14, 15, 1987.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 150 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Jan. 1	0145	204	2.79	May 29	0800	171	2.60
Mar. 17	1515	*556	*4.58				

Minimum discharge, 1.6 ft³/s, Sept. 7, gage height, 0.91 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	21	7.3	6.6	83	10	8.5	19	8.3	11	4.1	2.1	2.0
2	56	7.8	6.5	20	9.9	8.9	25	8.0	9.9	4.1	2.0	2.0
3	15	15	6.5	15	10	12	26	7.9	9.3	3.7	2.1	1.9
4	8.8	8.4	6.2	16	18	10	16	8.2	8.6	3.6	2.0	1.8
5	7.0	7.2	6.4	16	13	9.1	13	11	7.9	3.5	2.0	1.8
6	6.3	6.9	6.4	15	11	8.7	15	8.2	7.7	3.5	3.8	1.8
7	5.8	6.8	6.1	13	11	8.2	31	7.6	7.6	3.8	3.5	1.8
8	5.4	8.4	6.9	27	9.9	8.2	19	7.2	7.3	4.0	2.7	2.1
9	5.9	8.7	6.7	23	9.5	8.6	15	7.2	7.3	3.9	2.6	2.4
10	5.8	7.2	6.3	16	44	8.4	13	19	10	3.5	3.4	2.5
11	5.5	6.7	6.4	13	23	8.2	13	12	7.4	3.4	3.2	2.1
12	5.4	6.4	8.0	12	15	8.0	11	8.9	6.7	3.7	2.9	2.1
13	5.4	6.1	8.9	10	12	7.9	10	8.4	6.6	4.6	2.5	2.8
14	7.9	6.1	8.2	9.9	11	7.7	10	7.7	6.6	13	2.3	4.4
15	5.0	6.4	7.7	9.9	10	7.6	21	7.3	7.4	6.6	2.4	2.8
16	4.9	44	e8.0	9.5	14	8.1	15	7.2	7.0	5.0	3.1	2.3
17	8.2	15	e8.7	9.5	13	142	13	6.9	6.5	4.3	3.2	2.0
18	9.0	9.8	e7.3	9.5	10	48	11	6.3	6.4	3.9	2.6	1.9
19	64	8.2	e7.0	9.2	12	21	10	6.1	6.3	3.8	2.5	2.1
20	16	7.7	e7.3	9.1	10	18	10	6.1	5.5	3.7	2.8	2.3
21	9.9	7.0	e8.0	9.4	9.4	16	11	7.5	6.5	3.4	2.9	2.2
22	8.0	7.0	e7.3	8.8	10	14	11	22	5.6	3.2	7.4	2.4
23	7.0	9.1	e6.8	8.7	12	12	10	13	5.7	3.0	4.7	2.2
24	6.7	8.0	e6.5	8.7	10	12	9.4	9.1	5.1	2.7	5.1	2.0
25	6.4	8.0	e8.5	33	8.9	16	9.0	7.9	4.7	2.6	3.8	1.9
26	6.1	9.3	e8.1	51	8.5	14	8.9	11	4.5	2.4	3.2	1.8
27	6.1	8.8	e7.7	18	8.9	12	8.7	23	4.5	2.3	2.9	1.7
28	6.0	8.0	e7.4	13	8.8	12	8.1	27	4.4	2.6	2.7	1.7
29	5.9	7.3	8.7	12	---	17	8.7	96	4.3	2.4	2.6	1.7
30	6.1	6.9	8.8	15	---	20	8.6	24	4.1	2.4	2.4	1.7
31	7.3	---	23	11	---	23	---	14	---	2.3	2.2	---
TOTAL	343.8	279.5	242.9	534.2	352.8	535.1	409.4	424.0	202.4	119.0	93.6	64.2
MEAN	11.1	9.32	7.84	17.2	12.6	17.3	13.6	13.7	6.75	3.84	3.02	2.14
MAX	64	44	23	83	44	142	31	96	11	13	7.4	4.4
MIN	4.9	6.1	6.1	8.7	8.5	7.6	8.1	6.1	4.1	2.3	2.0	1.7
CFSM	1.30	1.09	.92	2.02	1.48	2.02	1.60	1.60	.79	.45	.35	.25
IN.	1.50	1.22	1.06	2.33	1.54	2.33	1.79	1.85	.88	.52	.41	.28

CAL YR 1989 TOTAL 3163.8 MEAN 8.67 MAX 156 MIN 1.9 CFSM 1.02 IN. 13.80
WTR YR 1990 TOTAL 3600.9 MEAN 9.87 MAX 142 MIN 1.7 CFSM 1.16 IN. 15.70

e Estimated.

JAMES RIVER BASIN

02038850 HOLIDAY CREEK NEAR ANDERSONVILLE, VA--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1968 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	PH (STAND-ARD UNITS) (00400)	TEMPER-ATURE WATER (DEG C) (00010)	TUR-BID-ITY (NTU) (00076)	BARO-METRIC PRES-SURE (MM OF HG) (00025)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./100 ML) (31625)	STREP-TOCOCCHI, KF AGAR (COLS. PER 100 ML) (31673)	HARD-NESS TOTAL (MG/L AS CaCO3) (00900)
DEC 06...	0930	6.4	29	7.1	4.0	2.5	745	12.8	100	27	20	9
APR 18...	1100	11	29	7.2	11.5	2.7	765	9.8	89	K5	K10	9
JUN 05...	1230	8.0	32	7.3	16.0	5.7	750	10.4	107	80	340	10
AUG 22...	1000	6.7	36	7.3	19.0	6.8	750	8.8	96	1500	4100	13

DATE	CALCIUM DIS-SOLVED (MG/L AS Ca) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS Mg) (00925)	SODIUM, DIS-SOLVED (MG/L AS Na) (00930)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	CAR-BONATE WATER FIELD (MG/L AS CO3) (00452)	BICAR-BONATE WATER FIELD (MG/L AS HCO3) (00453)	ALKA-LINITY WAT DIS TOT IT FIELD (MG/L AS CaCO3) (39086)	ALKA-LINITY LAB AS (MG/L AS CaCO3) (90410)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS Cl) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)
DEC 06...	2.1	1.0	2.6	0.50	0	13	11	12	2.0	1.8	<0.10
APR 18...	2.1	1.0	2.3	0.50	0	11	9	10	2.5	2.3	0.10
JUN 05...	2.2	1.1	2.4	0.50	0	15	12	12	1.5	2.0	<0.10
AUG 22...	3.3	1.2	2.9	0.60	0	17	14	15	2.1	2.0	<0.10

DATE	SILICA, DIS-SOLVED (MG/L AS SiO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N) (00608)	NITRO-GEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITRO-GEN, AMMONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS-PHORUS TOTAL (MG/L AS P) (00665)	PHOS-PHORUS DIS-SOLVED (MG/L AS P) (00666)	PHOS-PHORUS ORTHO, DIS-SOLVED (MG/L AS P) (00671)
DEC 06...	12	31	29	<0.010	<0.100	0.010	<0.010	0.20	0.020	<0.010	0.010
APR 18...	11	18	28	<0.010	<0.100	<0.010	<0.010	0.20	0.020	<0.010	<0.010
JUN 05...	12	35	30	<0.010	<0.100	0.010	<0.010	0.30	<0.010	0.020	0.010
AUG 22...	12	35	34	<0.010	0.200	0.030	0.050	0.40	0.040	0.020	<0.010

< Actual value is known to be less than the value shown.

K Results based on colony count outside the acceptance range (non-ideal colony count).

JAMES RIVER BASIN

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02038850 HOLIDAY CREEK NEAR ANDERSONVILLE, VA--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	ALUM- INUM, DIS- SOLVED (UG/L AS AL) (01106)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BARIUM, DIS- SOLVED (UG/L AS BA) (01005)	BERYL- LIUM, DIS- SOLVED (UG/L AS BE) (01010)	CADMIUM DIS- SOLVED (UG/L AS CD) (01025)	CHRO- MIUM, DIS- SOLVED (UG/L AS CR) (01030)	COBALT, DIS- SOLVED (UG/L AS CO) (01035)	COPPER, DIS- SOLVED (UG/L AS CU) (01040)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)
DEC 06...	40	<1	15	<0.5	<1.0	<1	<3	1	530	<1	<4
APR 18...	60	<1	14	<0.5	<1.0	<1	<3	1	270	<1	<4
JUN 05...	50	<1	14	<0.5	<1.0	<1	<3	1	430	1	<4
AUG 22...	40	<1	78	<0.5	<1.0	<1	<3	2	490	1	<4

DATE	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	NICKEL, DIS- SOLVED (UG/L AS NI) (01065)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	SILVER, DIS- SOLVED (UG/L AS AG) (01075)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)	VANA- DIUM, DIS- SOLVED (UG/L AS V) (01085)	ZINC, DIS- SOLVED (UG/L AS ZN) (01090)	SEDI- MENT, SUS- PENDED (MG/L) (80154)	SED. SUSP. SIEVE DIAM. 7 FINER THAN (70331)
DEC 06...	18	<0.1	<10	1	<1	<1.0	19	<6	<3	7	86
APR 18...	15	0.5	<10	1	<1	<1.0	17	<6	<3	8	78
JUN 05...	15	<0.1	<10	1	<1	<1.0	19	<6	4	12	71
AUG 22...	23	0.8	<10	2	<1	<1.0	23	<6	32	27	83

< Actual value is known to be less than the value shown.

JAMES RIVER BASIN

02039000 BUFFALO CREEK NEAR HAMPDEN SYDNEY, VA

LOCATION.--Lat 37°15'25", long 78°29'12", Prince Edward County, Hydrologic Unit 02080207, on left bank 100 ft upstream from bridge on State Highway 658, 0.8 mi upstream from Locket Creek, 2.0 mi northwest of Hampden Sydney, and 6.0 mi southwest of Farmville.

DRAINAGE AREA.--69.7 mi².

PERIOD OF RECORD.--August 1946 to current year.

REVISED RECORDS.--WSP 1303: 1948-50(M). WSP 2104: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 339.19 ft above National Geodetic Vertical Datum of 1929 (levels by Virginia Department of Transportation). Prior to Aug. 19, 1953, nonrecording gage at same site and datum.

REMARKS.--Records good except those for periods with ice effect, Dec. 17, 19-28, which are fair. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

COOPERATION.--Records were provided by the Virginia Water Control Board.

AVERAGE DISCHARGE.--44 years, 67.4 ft³/s, 13.13 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 9,160 ft³/s, June 21, 1972, gage height, 12.38 ft, from rating curve extended above 1,600 ft³/s on basis of slope-area measurement at gage height 11.96 ft; minimum daily, 2.7 ft³/s, Oct. 7, 8, 1970.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in August 1940 reached a stage of about 15 ft, from information by local resident.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 500 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Jan. 1	1430	705	6.01	May 29	1530	*1,360	*7.15
Jan. 26	1630	558	5.68				

Minimum discharge, 16 ft³/s, Aug. 5.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	87	51	57	508	85	70	166	64	145	37	19	24
2	192	54	55	322	79	70	332	60	98	36	18	23
3	131	172	55	179	75	86	358	58	79	35	17	22
4	88	105	66	139	123	84	237	61	67	34	17	22
5	66	79	62	157	125	75	152	89	59	34	17	21
6	57	67	56	139	99	71	121	85	55	33	18	20
7	53	63	52	125	90	67	254	71	53	33	20	20
8	49	63	55	165	82	65	190	62	51	33	18	20
9	47	73	60	261	75	65	129	63	57	33	19	24
10	46	68	55	159	197	65	107	92	216	33	25	26
11	45	60	55	113	344	64	109	108	126	37	24	24
12	44	57	68	94	213	64	97	84	79	36	24	22
13	44	69	89	81	141	62	87	71	61	37	22	22
14	44	62	82	72	108	61	81	64	55	58	20	30
15	44	56	73	69	93	60	146	59	52	50	24	30
16	44	126	74	65	122	60	142	57	51	42	30	25
17	57	126	e70	63	161	107	108	55	50	37	67	22
18	65	91	60	62	116	204	92	52	49	34	46	20
19	156	74	e54	60	125	120	82	50	49	32	35	20
20	139	66	e51	58	115	98	77	49	46	31	30	21
21	98	65	e49	61	97	87	79	50	46	29	30	20
22	75	64	e47	59	90	76	83	92	45	28	36	22
23	63	92	e45	58	100	70	77	107	45	26	54	23
24	57	91	e44	57	93	66	71	79	43	24	95	21
25	53	81	e43	126	82	81	70	65	41	23	53	20
26	51	78	e42	427	74	78	66	61	40	22	41	19
27	50	71	e44	321	73	71	63	96	39	21	36	18
28	49	67	e47	176	73	66	61	100	39	22	33	18
29	49	63	49	119	---	83	60	700	38	21	30	18
30	49	59	71	118	---	106	64	483	37	21	28	18
31	50	---	126	98	---	145	---	255	---	20	25	---
TOTAL	2142	2313	1856	4511	3250	2547	3761	3442	1911	992	971	655
MEAN	69.1	77.1	59.9	146	116	82.2	125	111	63.7	32.0	31.3	21.8
MAX	192	172	126	508	344	204	358	700	216	58	95	30
MIN	44	51	42	57	73	60	60	49	37	20	17	18
CFSM	.99	1.11	.86	2.09	1.67	1.18	1.80	1.59	.91	.46	.45	.31
IN.	1.14	1.23	.99	2.41	1.73	1.36	2.01	1.84	1.02	.53	.52	.35

CAL YR 1989 TOTAL 32202 MEAN 88.2 MAX 1160 MIN 28 CFMS 1.27 IN. 17.19
WTR YR 1990 TOTAL 28351 MEAN 77.7 MAX 700 MIN 17 CFMS 1.11 IN. 15.13

e Estimated.

02039500 APPOMATTOX RIVER AT FARMVILLE, VA

LOCATION.--Lat 37°18'25", long 78°23'20", Cumberland County, Hydrologic Unit 02080207, on left bank at downstream side of bridge on State Highway 45 at north town limits of Farmville and 1.1 mi downstream from Buffalo Creek.

DRAINAGE AREA.--303 mi².

PERIOD OF RECORD.--March 1926 to current year.

REVISED RECORDS.--WSP 972: 1927-37, 1938(M). WSP 1303: 1927(M). WSP 2104: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 281.93 ft above National Geodetic Vertical Datum of 1929. Prior to Nov. 29, 1928, nonrecording gage at same site and datum.

REMARKS.--Records good except for period with ice effect, Dec. 18-28, which is fair. Diurnal fluctuation at low flow caused by Prince Edward Mill 0.2 mi upstream. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

COOPERATION.--Records were provided by the Virginia Water Control Board.

AVERAGE DISCHARGE.--64 years, 287 ft³/s, 12.86 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 33,100 ft³/s, June 22, 1972, gage height, 29.70 ft, from floodmarks, from rating curve extended above 12,000 ft³/s on basis of contracted-opening measurement of peak flow; minimum, 3.8 ft³/s, Sept. 25, 1941.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 1,900 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Oct. 20	0600	2,070	12.28	Mar. 18	2030	3,440	14.53
Jan. 2	0300	3,200	14.24	Apr. 3	1430	2,550	13.29
Jan. 26	2230	2,460	13.11	May 30	0830	*3,500	*14.60
Feb. 11	0930	3,350	14.42				

Minimum discharge, 62 ft³/s, Sept. 27, 29, 30, gage height, 3.53 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	286	193	215	1930	395	285	914	237	540	137	89	84
2	1150	205	204	2240	359	272	887	225	362	132	84	80
3	1080	533	201	792	342	335	2360	212	298	127	82	78
4	431	472	195	559	485	380	1190	217	336	121	82	76
5	285	303	195	665	682	311	692	286	258	117	81	73
6	230	255	196	600	474	282	527	327	215	114	85	72
7	199	245	187	570	405	262	1130	242	199	112	101	72
8	176	238	186	620	385	245	1070	212	189	113	106	71
9	160	314	221	1240	345	245	661	199	203	117	100	78
10	149	306	200	826	1340	249	497	290	830	115	110	87
11	141	250	189	541	2890	241	520	546	587	114	116	87
12	139	225	217	431	1030	237	474	328	321	119	113	79
13	134	214	303	368	635	230	381	258	250	136	106	76
14	134	217	308	322	475	227	347	232	227	228	96	107
15	136	211	275	303	396	220	595	208	216	279	100	128
16	136	529	279	290	452	217	794	197	217	199	100	102
17	146	1300	222	278	705	384	520	188	210	166	186	83
18	262	507	e215	272	509	2290	411	172	199	145	179	73
19	990	342	e205	267	474	1320	347	156	231	135	133	71
20	1550	285	e195	253	481	541	321	148	200	135	117	74
21	567	259	e180	257	381	471	326	156	190	127	113	76
22	344	232	e170	257	347	383	378	272	191	118	148	79
23	271	306	e168	242	428	335	338	500	183	114	266	81
24	232	360	e165	236	427	306	299	316	176	108	720	77
25	210	311	e162	468	352	357	277	232	163	103	325	71
26	195	298	e158	1950	298	400	265	211	154	99	180	67
27	185	299	e170	1760	288	330	250	310	149	95	143	65
28	180	277	e190	780	294	294	235	389	144	96	120	65
29	173	256	201	529	---	354	229	1760	141	96	105	65
30	171	229	225	539	---	640	249	2820	137	94	97	65
31	178	---	455	497	---	767	---	935	---	92	89	---
TOTAL	10620	9971	6652	20882	16074	13410	17484	12781	7716	4003	4472	2362
MEAN	343	332	215	674	574	433	583	412	257	129	144	78.7
MAX	1550	1300	455	2240	2890	2290	2360	2820	830	279	720	128
MIN	134	193	158	236	288	217	229	148	137	92	81	65
CFSM	1.13	1.10	.71	2.22	1.89	1.43	1.92	1.36	.85	.43	.48	.26
IN.	1.30	1.22	.82	2.56	1.97	1.65	2.15	1.57	.95	.49	.55	.29

CAL YR 1989 TOTAL 129739 MEAN 355 MAX 4490 MIN 65 CFSM 1.17 IN. 15.93
WTR YR 1990 TOTAL 126427 MEAN 346 MAX 2890 MIN 65 CFSM 1.14 IN. 15.52

e Estimated.

02040000 APPOMATTOX RIVER AT MATTOAX, VA

LOCATION.--Lat 37°25'17", long 77°51'33", Amelia County, Hydrologic Unit 02080207, on right bank 75 ft upstream from Norfolk Southern Railway bridge at Mattoax, 0.3 mi upstream from Skinquarter Creek, and 3.7 mi upstream from Flat Creek.

DRAINAGE AREA.--726 mi².

PERIOD OF RECORD.--August 1900 to December 1905, March 1926 to current year.

REVISED RECORDS.--WSP 892: 1938. WSP 972: 1928, 1932, 1934-38. WSP 1303: 1901(M). WSP 2104: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 174.51 ft above National Geodetic Vertical Datum of 1929.

August 1900 to December 1905, nonrecording gage at same site, different datum. March 1926 to October 1936, nonrecording gage at same site and datum.

REMARKS.--Records good except for period with ice effect, Dec. 17-29, which is fair. National Weather Service gage-height telemeter at station. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

COOPERATION.--Records were provided by the Virginia Water Control Board.

AVERAGE DISCHARGE.--69 years, 722 ft³/s, 13.51 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 35,000 ft³/s, Aug. 18, 1940, gage height, 35.3 ft, from floodmark in gage house, from rating curve extended above 20,000 ft³/s on basis of records for stations at Farmville and near Petersburg; minimum, 11 ft³/s, Oct. 2, 1930, gage height, 3.52 ft.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 4,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
May 30	0630	*4,420	*19.47	No other peak equal to or greater than base discharge.			

Minimum discharge, 84 ft³/s, Aug. 6, gage height, 6.10 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	646	412	544	2390	1070	685	1880	595	4160	194	111	165
2	1150	427	507	3220	912	660	2020	562	4080	191	103	148
3	1890	691	484	3310	838	684	3650	520	1540	180	97	137
4	1650	1430	467	3340	930	779	3670	494	948	167	89	128
5	883	1090	450	1680	1270	801	3580	519	844	156	87	121
6	663	758	447	1510	1350	704	2590	668	724	147	87	116
7	556	652	444	1430	1050	647	1990	760	608	140	88	112
8	490	615	444	1440	923	605	2660	596	547	137	90	111
9	437	623	465	2260	854	579	2600	511	508	135	122	114
10	390	692	487	2580	1140	573	1560	510	483	134	167	112
11	361	682	477	2070	2760	571	1230	635	889	134	165	118
12	343	582	470	1260	3130	559	1190	934	903	130	172	126
13	329	524	552	1030	3150	547	1060	700	588	147	164	127
14	321	495	717	874	1470	535	917	574	468	170	146	148
15	314	492	752	787	1070	522	1090	514	415	208	136	191
16	307	510	706	743	984	518	1570	467	393	388	140	197
17	307	1100	e620	707	1220	532	1530	437	378	319	141	183
18	383	1720	e575	677	1530	1010	1120	409	374	258	135	147
19	821	961	e525	655	1210	2070	931	371	388	225	238	123
20	2120	711	e470	628	1230	2160	825	342	381	215	197	113
21	2380	617	e440	611	1160	1070	792	330	366	198	158	110
22	1220	555	e420	602	955	905	850	376	320	185	168	113
23	773	574	e400	587	914	777	887	530	310	167	240	116
24	628	699	e390	554	977	700	793	879	292	150	534	118
25	549	812	e380	664	921	705	721	664	270	139	1400	116
26	502	742	e370	2310	789	802	672	526	250	126	730	110
27	470	708	e410	3170	712	799	637	1410	232	120	409	105
28	438	674	e450	3340	689	702	622	1170	219	118	300	99
29	419	633	e490	3220	---	691	636	2850	209	117	245	96
30	405	589	509	1400	---	1060	609	4380	202	119	208	95
31	403	---	672	1200	---	1470	---	4260	---	115	183	---
TOTAL	22548	21770	15534	50249	35208	25422	44882	28493	22289	5329	7250	3815
MEAN	727	726	501	1621	1257	820	1496	919	743	172	234	127
MAX	2380	1720	752	3340	3150	2160	3670	4380	4160	388	1400	197
MIN	307	412	370	554	689	518	609	330	202	115	87	95
CFSM	1.00	1.00	.69	2.23	1.73	1.13	2.06	1.27	1.02	.24	.32	.18
IN.	1.16	1.12	.80	2.57	1.80	1.30	2.30	1.46	1.14	.27	.37	.20

CAL YR 1989 TOTAL 314401 MEAN 861 MAX 4950 MIN 135 CFSM 1.19 IN. 16.11
WTR YR 1990 TOTAL 282789 MEAN 775 MAX 4380 MIN 87 CFSM 1.07 IN. 14.49

e Estimated.

02041000 DEEP CREEK NEAR MANNBORO, VA

LOCATION.--Lat 37°16'59", long 77°52'12", Amelia County, Hydrologic Unit 02080207, on left bank 300 ft upstream from bridge on State Highway 153, 0.9 mi upstream from Sweathouse Creek, 3.4 mi northwest of Mannboro, and 7.5 mi southeast of Amelia.

DRAINAGE AREA.--158 mi².

PERIOD OF RECORD.--September 1946 to current year.

REVISED RECORDS.--WSP 1203: 1948 (calendar year figures only). WSP 2104: Drainage area. WDR VA-79-1: 1973-76(P), 1978.

GAGE.--Water-stage recorder. Datum of gage is 177.20 ft above National Geodetic Vertical Datum of 1929. Prior to Sept. 2, 1949, nonrecording gage at same site and datum.

REMARKS.--Records good except those for periods with ice effect, Dec. 17, 18, 21-23, 25, which are fair. Several measurements of water temperature were made during the year.

COOPERATION.--Records were provided by the Virginia Water Control Board.

AVERAGE DISCHARGE.--44 years, 149 ft³/s, 12.81 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 15,000 ft³/s, Oct. 6, 1972, gage height, 24.04 ft, from high-water mark, from rating curve extended above 3,900 ft³/s; minimum, 0.03 ft³/s, Oct. 4, 5, 1968; minimum gage height, 0.29 ft, Aug. 9-12, 1957.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in August 1940 reached a stage of 14.8 ft, from information by local resident.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 1,200 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Jan. 2	1230	1,300	7.47	May 30	1730	*1,830	*8.26

Minimum discharge, 2.9 ft³/s, Sept. 30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	53	47	71	555	157	120	250	90	303	16	18	19
2	130	49	66	1180	141	116	271	84	152	15	17	18
3	217	98	63	685	135	135	484	72	116	15	16	16
4	180	145	59	296	153	184	624	68	96	14	15	15
5	98	141	57	242	187	179	299	128	79	13	15	13
6	63	99	58	237	179	147	198	200	67	13	15	12
7	48	78	58	238	152	128	279	146	57	12	15	11
8	40	73	60	269	140	118	460	94	51	11	15	10
9	36	84	74	530	131	113	317	73	47	11	18	10
10	33	101	87	728	154	111	205	85	45	11	42	9.5
11	30	100	85	324	263	109	181	161	41	12	65	8.7
12	29	87	97	224	263	108	165	175	36	13	64	7.9
13	28	75	163	180	190	106	143	115	33	23	45	7.4
14	28	66	231	152	155	104	126	86	30	30	34	9.2
15	28	67	237	136	139	98	193	72	29	33	32	15
16	28	75	172	128	150	95	352	65	29	37	33	13
17	27	79	e155	120	242	95	274	58	28	34	33	13
18	29	78	e130	113	250	123	181	51	27	30	33	13
19	63	72	113	110	223	142	146	45	26	49	31	10
20	153	66	96	104	266	123	129	41	25	62	29	8.7
21	194	60	e90	105	227	116	122	39	24	42	27	7.1
22	138	56	e80	107	180	108	142	61	23	37	28	6.2
23	90	93	e68	105	181	101	139	143	23	32	29	5.7
24	66	151	59	97	188	92	123	174	22	28	44	5.1
25	56	165	e57	136	165	101	107	103	20	25	93	4.4
26	49	131	52	354	138	117	96	72	19	23	154	4.0
27	46	110	59	658	126	112	88	90	18	21	71	3.7
28	44	97	63	431	124	99	79	129	18	20	39	3.2
29	43	89	70	235	---	106	73	380	17	20	29	3.1
30	42	79	83	197	---	167	82	1390	16	19	26	3.0
31	45	---	155	178	---	219	---	1160	---	18	22	---
TOTAL	2154	2711	2968	9154	4999	3792	6328	5650	1517	739	1147	284.9
MEAN	69.5	90.4	95.7	295	179	122	211	182	50.6	23.8	37.0	9.50
MAX	217	165	237	1180	266	219	624	1390	303	62	154	19
MIN	27	47	52	97	124	92	73	39	16	11	15	3.0
CFSM	.44	.57	.61	1.87	1.13	.77	1.34	1.15	.32	.15	.23	.06
IN.	.51	.64	.70	2.16	1.18	.89	1.49	1.33	.36	.17	.27	.07

CAL YR 1989 TOTAL 57981 MEAN 159 MAX 1880 MIN 24 CFSM 1.01 IN. 13.65
WTR YR 1990 TOTAL 41443.9 MEAN 114 MAX 1390 MIN 3.0 CFSM .72 IN. 9.76

e Estimated.

JAMES RIVER BASIN

02041650 APPOMATTOX RIVER AT MATOACA, VA
(National stream-quality accounting network station)

LOCATION.--Lat 37°13'28", long 77°28'32", Chesterfield County, Hydrologic Unit 02080207, on left bank at upstream side of bridge on State Highway 600, 0.2 mi south of Matoaca, 2.0 mi upstream from Roheic Creek, 2.8 mi downstream from Lake Chesdin, 3.5 mi west of Petersburg, and at mile 15.9.

DRAINAGE AREA.--1,344 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1969 to current year.

GAGE.--Water-stage recorder. Datum of gage is 68.30 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records good except for period of no gage-height record, Dec. 22-28, which is fair. Flow regulated by Appomattox Water Authority at Lake Chesdin, capacity, 36,000 acre-ft, 2.8 mi upstream from which an average of 12.4 ft³/s is diverted for industrial and municipal use. Records do not include flow of Upper Appomattox Canal of city of Petersburg which diverts around station. National Weather Service gage-height telemeter at station.

COOPERATION.--Records were provided by the Virginia Water Control Board.

AVERAGE DISCHARGE.--21 years, 1,429 ft³/s, 14.44 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 40,800 ft³/s, Oct. 7, 1972, gage height, 18.39 ft; minimum, 41 ft³/s, Oct. 4, 1981.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 7,780 ft³/s, June 1, gage height, 8.52 ft; minimum, 119 ft³/s, Sept. 12, gage height, 1.67 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1180	488	842	2700	1740	1160	2790	1020	7660	274	166	227
2	1340	504	765	5500	1520	1150	3350	960	7000	268	163	208
3	1930	717	852	6090	1360	1260	4850	876	5520	245	160	194
4	2390	1090	608	5520	1440	1430	6310	855	2200	237	158	177
5	1820	1600	635	4540	1690	1490	6370	1180	1240	232	157	174
6	1220	1360	626	2810	1970	1410	5560	1260	1030	225	160	156
7	916	1050	626	2480	1900	1230	4020	1310	903	222	157	131
8	710	904	710	2490	1550	1140	4040	1180	750	218	155	126
9	608	1060	758	3580	1400	1090	4360	947	714	208	437	124
10	524	1090	722	4560	1420	1030	3610	1180	661	178	673	123
11	506	1060	753	4380	2530	1030	2430	1630	630	172	494	122
12	462	998	843	3020	4100	1020	1840	1610	908	176	412	121
13	444	817	1100	1880	4320	996	1650	1550	897	192	340	121
14	423	729	1220	1500	3750	972	1480	1190	683	305	294	123
15	423	695	1360	1320	2020	932	1710	948	565	319	246	125
16	411	786	1390	1200	1660	902	2530	823	528	353	234	129
17	394	781	1150	1130	1920	928	2950	746	496	460	226	145
18	418	1350	1070	1090	2200	1140	2290	674	482	507	220	144
19	722	1610	962	1030	2340	1630	1680	563	477	420	212	141
20	1570	1210	890	996	2150	2720	1450	515	480	399	235	139
21	2600	996	796	1020	2070	2240	1350	502	491	360	236	135
22	2550	758	e700	974	1790	1500	1370	632	460	326	220	133
23	1460	1020	e660	931	1660	1320	1440	792	460	294	238	142
24	1020	1070	e620	915	1700	1120	1400	1020	423	260	493	137
25	785	1200	e600	1060	1620	1120	1260	1200	376	221	803	130
26	657	1250	e570	2360	1370	1190	1150	1040	352	201	1290	128
27	587	1140	e600	4670	1270	1250	1050	1920	334	193	917	129
28	541	1080	e640	5330	1210	1190	968	2720	314	183	549	128
29	511	1000	693	5130	---	1150	993	3560	303	180	414	129
30	499	907	739	4030	---	1430	1030	6500	280	174	339	130
31	505	---	956	2180	---	2060	---	7440	---	167	263	---
TOTAL	30126	30320	25456	86416	55670	40230	77281	48343	37617	8169	11061	4271
MEAN	972	1011	821	2788	1988	1298	2576	1559	1254	264	357	142
MAX	2600	1610	1390	6090	4320	2720	6370	7440	7660	507	1290	227
MIN	394	488	570	915	1210	902	968	502	280	167	155	121
CFSM	.72	.75	.61	2.07	1.48	.97	1.92	1.16	.93	.20	.27	.11
IN.	.83	.84	.70	2.39	1.54	1.11	2.14	1.34	1.04	.23	.31	.12

CAL YR 1989 TOTAL 524602 MEAN 1437 MAX 8780 MIN 170 CFSM 1.07 IN. 14.52
WTR YR 1990 TOTAL 454960 MEAN 1246 MAX 7660 MIN 121 CFSM .93 IN. 12.59

e Estimated.

02041650 APPOMATTOX RIVER AT MATOACA, VA--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1978 to current year.

COOPERATION.--Chemical data as noted were provided by the Virginia Division of Consolidated Laboratory Services (VDCLS) and reviewed by the U.S. Geological Survey.

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	BARO- METRIC PRES- SURE (MM HG) (00025)	AGENCY ANA- LYZING SAMPLE (CODE NUMBER) (00028)	TUR- BID- ITY (NTU) (00076)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)
OCT											
12...	1000	466	83	7.3	17.5	766	VDCLS	--	9.0	93	--
27...	1400	572	77	8.1	16.0	767	VDCLS	--	10.7	108	--
NOV											
07...	1000	1050	74	7.3	14.5	760	VDCLS	--	10.1	99	--
20...	1030	1220	86	7.1	12.0	746	USGS	5.5	10.8	102	K4
20...	1031	1220	86	7.1	12.0	746	VDCLS	--	10.8	102	--
DEC											
11...	1300	752	90	7.1	5.0	753	VDCLS	--	11.8	93	--
26...	1300	710	44	7.8	3.5	750	VDCLS	--	14.8	113	--
JAN											
02...	1200	5520	135	7.6	2.5	759	USGS	--	13.6	100	--
02...	1201	5520	135	7.6	2.5	759	VDCLS	15	13.6	100	--
03...	1130	6100	105	6.7	3.0	760	VDCLS	--	13.2	98	--
04...	1300	5470	70	7.2	1.0	760	VDCLS	--	13.2	93	--
05...	1130	4770	75	6.8	3.5	760	VDCLS	57	13.5	102	--
06...	1000	2760	--	6.8	1.0	758	VDCLS	--	--	--	--
27...	0815	4560	78	7.5	6.0	765	VDCLS	--	10.2	82	--
29...	1230	5120	78	6.9	8.0	748	USGS	15	11.9	102	540
29...	1231	5120	78	6.9	8.0	748	VDCLS	--	11.9	102	--
FEB											
05...	1400	1700	52	7.1	6.5	762	VDCLS	--	9.8	80	--
12...	1300	4260	76	7.2	10.5	761	VDCLS	--	10.6	95	--
14...	1100	4050	90	6.9	11.0	757	VDCLS	24	10.1	92	--
27...	1230	1270	75	7.1	8.5	765	USGS	12	12.0	102	K7
27...	1231	1270	75	7.1	8.5	765	VDCLS	--	12.0	102	--
MAR											
07...	1400	1210	76	6.5	8.0	773	VDCLS	--	--	--	--
20...	0930	2720	79	6.8	14.0	754	VDCLS	--	10.2	100	--
21...	0900	2450	85	7.1	13.0	762	USGS	--	10.2	97	--
21...	0901	2450	85	7.1	13.0	762	VDCLS	--	10.2	97	--
27...	0930	1270	85	7.2	11.0	760	VDCLS	--	10.5	95	--
APR											
02...	1215	3360	83	6.8	11.5	748	VDCLS	--	11.0	103	--
03...	0900	4510	85	7.0	11.5	745	VDCLS	--	10.7	100	--
04...	0930	6390	85	7.2	11.5	743	VDCLS	--	11.2	105	--
05...	1100	6490	79	7.5	13.5	755	VDCLS	--	10.9	106	--
06...	1030	5560	75	6.3	14.0	753	VDCLS	--	10.2	100	--
09...	1315	4350	66	6.8	12.5	763	VDCLS	--	10.9	102	--
10...	1100	3780	67	6.7	12.5	756	VDCLS	--	10.7	101	--
17...	1015	3010	105	6.9	14.5	751	VDCLS	--	10.3	102	--
19...	1030	1690	80	6.8	13.0	771	VDCLS	--	10.0	94	--
30...	1200	1020	75	8.1	19.5	750	USGS	--	10.0	111	K2
30...	1201	1020	75	8.1	19.5	750	VDCLS	--	10.0	111	--
MAY											
15...	0900	962	90	6.8	17.5	760	VDCLS	--	10.5	110	--
28...	0930	2890	83	7.4	20.5	757	VDCLS	--	9.5	106	--
30...	1000	6610	83	6.4	20.0	749	USGS	--	9.4	105	--
30...	1001	6610	83	6.4	20.0	749	VDCLS	--	9.4	105	--
31...	1245	7490	75	6.5	19.0	760	VDCLS	--	9.7	105	--
JUN											
01...	1400	7650	56	6.8	18.5	761	VDCLS	--	10.3	110	--
13...	0915	941	73	6.3	21.0	755	VDCLS	--	9.2	104	--
25...	1300	382	66	7.5	25.0	760	USGS	1.7	9.1	111	24
25...	1301	382	66	7.5	25.0	760	VDCLS	--	9.1	111	--
JUL											
12...	1330	167	84	7.2	27.0	750	VDCLS	--	7.5	96	--
24...	0930	266	90	6.7	26.0	755	VDCLS	--	6.4	80	--
AUG											
10...	0900	692	88	6.8	24.0	755	VDCLS	--	10.2	122	--
27...	1230	906	84	7.6	28.5	751	USGS	4.4	7.1	93	K2
27...	1231	906	84	7.6	28.5	751	VDCLS	--	7.1	93	--
SEP											
11...	0845	123	105	6.7	23.5	758	VDCLS	--	6.3	74	--
26...	0830	129	90	6.9	19.5	752	VDCLS	--	7.1	78	--

K Results based on colony count outside the acceptance range (non-ideal colony count).

02041650 APPOMATTOX RIVER AT MATOACA, VA--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	STREP- TOCOCCHI FECAL, KF AGAR (COLS. PER 100 ML) (31673)	HARD- NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	ALKA- LINITY WAT DIS TOT IT FIELD (MG/L AS CACO3 (39086)	BICAR- BONATE WATER DIS IT FIELD (MG/L AS HCO3 (00453)	ALKA- LINITY WAT WH TOT FET FIELD (MG/L AS CACO3 (00410)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)
OCT											
12...	--	--	--	--	--	--	--	--	--	21	--
27...	--	--	--	--	--	--	--	--	--	28	--
NOV											
07...	--	--	--	--	--	--	--	--	--	27	--
20...	K6	29	6.7	3.0	5.3	2.6	29	29	35	--	6.0
20...	--	--	--	--	--	--	--	--	--	29	--
DEC											
11...	--	--	--	--	--	--	--	--	--	28	--
26...	--	--	--	--	--	--	--	--	--	30	--
JAN											
02...	--	--	--	--	--	--	--	--	--	--	--
02...	--	--	--	--	--	--	--	--	--	30	--
03...	--	--	--	--	--	--	--	--	--	32	--
04...	--	--	--	--	--	--	--	--	--	23	--
05...	--	--	--	--	--	--	--	--	--	19	--
06...	--	--	--	--	--	--	--	--	--	17	--
27...	--	--	--	--	--	--	--	--	--	20	--
29...	210	25	5.7	2.5	5.0	1.8	23	23	28	--	7.0
29...	--	--	--	--	--	--	--	--	--	23	--
FEB											
05...	--	--	--	--	--	--	--	--	--	18	--
12...	--	--	--	--	--	--	--	--	--	24	--
14...	--	--	--	--	--	--	--	--	--	25	--
27...	K4	24	5.8	2.4	4.6	1.8	23	23	28	--	7.0
27...	--	--	--	--	--	--	--	--	--	23	--
MAR											
07...	--	--	--	--	--	--	--	--	--	25	--
20...	--	--	--	--	--	--	--	--	--	27	--
21...	--	--	--	--	--	--	--	--	--	--	--
21...	--	--	--	--	--	--	--	--	--	28	--
27...	--	--	--	--	--	--	--	--	--	29	--
APR											
02...	--	--	--	--	--	--	--	--	--	28	--
03...	--	--	--	--	--	--	--	--	--	27	--
04...	--	--	--	--	--	--	--	--	--	27	--
05...	--	--	--	--	--	--	--	--	--	25	--
06...	--	--	--	--	--	--	--	--	--	41	--
09...	--	--	--	--	--	--	--	--	--	18	--
10...	--	--	--	--	--	--	--	--	--	19	--
17...	--	--	--	--	--	--	--	--	--	21	--
19...	--	--	--	--	--	--	--	--	--	--	--
30...	25	--	--	--	--	--	--	23	28	--	--
30...	--	--	--	--	--	--	--	--	--	24	--
MAY											
15...	--	--	--	--	--	--	--	--	--	30	--
28...	--	--	--	--	--	--	--	--	--	30	--
30...	--	--	--	--	--	--	--	--	--	--	--
30...	--	--	--	--	--	--	--	--	--	31	--
31...	--	--	--	--	--	--	--	--	--	25	--
JUN											
01...	--	--	--	--	--	--	--	--	--	17	--
13...	--	--	--	--	--	--	--	--	--	19	--
25...	55	24	5.9	2.3	4.3	2.3	22	20	24	--	4.8
25...	--	--	--	--	--	--	--	--	--	21	--
JUL											
12...	--	--	--	--	--	--	--	--	--	30	--
24...	--	--	--	--	--	--	--	--	--	36	--
AUG											
10...	--	--	--	--	--	--	--	--	--	28	--
27...	150	29	6.6	3.1	5.4	0.60	32	32	38	--	3.4
27...	--	--	--	--	--	--	--	--	--	30	--
SEP											
11...	--	--	--	--	--	--	--	--	--	36	--
26...	--	--	--	--	--	--	--	--	--	--	--

K Results based on colony count outside the acceptance range (non-ideal colony count).

JAMES RIVER BASIN

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02041650 APPOMATTOX RIVER AT MATOACA, VA--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L) (70301)	RESIDUE TOTAL AT 105 DEG. C, SUS- PENDED (MG/L) (00530)	RESIDUE VOLA- TILE, SUS- PENDED (MG/L) (00535)	RESIDUE FIXED NON FILTER- ABLE (MG/L) (00540)	NITRO- GEN, NITRATE DIS- SOLVED (MG/L AS N) (00618)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)
OCT										
12...	--	--	14	--	--	2	1	1	0.180	0.010
27...	--	--	18	--	--	4	1	3	0.130	<0.010
NOV										
07...	--	--	17	--	--	6	3	3	0.070	<0.010
20...	4.5	0.10	18	63	64	14	12	2	--	<0.010
20...	--	--	18	--	--	6	1	5	0.090	<0.010
DEC										
11...	--	--	17	--	--	3	1	2	0.140	<0.010
26...	--	--	17	--	--	5	1	4	0.200	<0.010
JAN										
02...	--	--	18	--	--	15	13	2	--	<0.010
02...	--	--	18	--	--	14	2	12	0.230	<0.010
03...	--	--	18	--	--	6	<1	6	0.280	<0.010
04...	--	--	14	--	--	24	3	21	0.330	0.010
05...	--	--	13	--	--	31	3	28	0.370	0.010
06...	--	--	12	--	--	24	2	22	0.400	0.010
27...	--	--	16	--	--	10	2	8	0.250	<0.010
29...	4.1	0.10	15	60	56	17	17	0	0.250	0.010
29...	--	--	15	--	--	15	2	13	0.260	<0.010
FEB										
05...	--	--	13	--	--	3	1	2	0.230	<0.010
12...	--	--	14	--	--	<1	<1	<1	0.220	<0.010
14...	--	--	15	--	--	11	<1	11	0.220	<0.010
27...	4.1	<0.10	15	64	56	4	4	0	--	<0.010
27...	--	--	13	--	--	6	2	4	0.190	<0.010
MAR										
07...	--	--	13	--	--	7	2	5	0.150	<0.010
20...	--	--	13	--	--	10	5	5	0.060	<0.010
21...	--	--	14	--	--	6	6	0	--	<0.010
21...	--	--	13	--	--	5	1	4	0.070	<0.010
27...	--	--	13	--	--	6	3	3	0.130	<0.010
APR										
02...	--	--	13	--	--	7	4	3	0.180	<0.010
03...	--	--	13	--	--	6	4	2	0.170	<0.010
04...	--	--	--	--	--	12	4	8	0.160	<0.010
05...	--	--	13	--	--	11	7	4	0.140	0.020
06...	--	--	11	--	--	47	12	35	0.150	<0.010
09...	--	--	12	--	--	15	2	13	0.160	<0.010
10...	--	--	12	--	--	7	4	3	0.160	<0.010
17...	--	--	13	--	--	12	5	7	0.130	<0.010
19...	--	--	13	--	--	12	4	8	0.130	<0.010
30...	--	--	--	--	--	--	--	--	--	<0.010
30...	--	--	13	--	--	2	<1	2	0.060	<0.010
MAY										
15...	--	--	14	--	--	1	1	0	0.150	<0.010
28...	--	--	15	--	--	13	4	9	0.110	<0.010
30...	--	--	17	--	--	18	18	0	--	<0.010
30...	--	--	16	--	--	12	3	9	0.220	<0.010
31...	--	--	12	--	--	23	8	15	0.330	<0.010
JUN										
01...	--	--	10	--	--	50	7	43	0.360	<0.010
13...	--	--	12	--	--	12	<1	12	0.110	0.010
25...	5.7	0.10	9.8	51	48	--	--	--	0.290	0.010
25...	--	--	12	--	--	3	<1	3	0.230	0.020
JUL										
12...	--	--	18	--	--	3	3	0	0.00	0.390
24...	--	--	16	--	--	3	3	0	0.220	<0.010
AUG										
10...	--	--	15	--	--	23	4	19	0.150	<0.010
27...	4.5	<0.10	17	68	60	5	5	0	--	<0.010
27...	--	--	17	--	--	17	3	14	0.050	<0.010
SEP										
11...	--	--	18	--	--	3	3	0	0.420	0.020
26...	--	--	15	--	--	1	1	0	<0.040	0.010

< Actual value is known to be less than the value shown.

02041650 APPOMATTOX RIVER AT MATOACA, VA--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	ALUM- INUM, DIS- SOLVED (UG/L AS AL) (01106)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BARIUM, DIS- SOLVED (UG/L AS BA) (01005)
OCT										
12...	0.190	0.050	--	0.40	0.030	0.010	0.020	--	--	--
27...	0.130	0.060	--	0.40	0.030	0.020	0.020	--	--	--
NOV										
07...	0.070	0.050	--	0.40	0.020	<0.010	0.010	--	--	--
20...	0.100	0.040	0.050	0.30	0.030	<0.010	0.010	20	<1	18
20...	0.090	0.060	--	0.30	0.020	0.020	0.030	--	--	--
DEC										
11...	0.140	0.080	--	0.30	0.030	0.010	<0.010	--	--	--
26...	0.200	<0.040	--	0.30	0.030	<0.010	0.010	--	--	--
JAN										
02...	0.220	0.050	--	0.40	0.050	--	0.030	--	--	--
02...	0.230	0.180	--	0.40	0.040	<0.010	0.010	--	--	--
03...	0.280	0.040	--	0.40	0.040	<0.010	<0.010	--	--	--
04...	0.340	0.100	--	0.60	0.080	<0.010	0.010	--	--	--
05...	0.380	0.080	--	0.60	0.090	0.010	0.010	--	--	--
06...	0.410	0.090	--	0.70	0.100	<0.010	0.010	--	--	--
27...	0.250	0.080	--	0.40	0.050	<0.010	0.010	--	--	--
29...	0.260	0.030	0.040	0.20	0.050	0.020	0.010	--	--	--
29...	0.260	0.070	--	0.40	0.070	0.010	0.010	--	--	--
FEB										
05...	0.230	0.050	--	0.50	0.050	0.030	0.020	--	--	--
12...	0.220	0.050	--	0.30	0.050	0.020	<0.010	--	--	--
14...	0.220	0.050	--	0.30	0.050	0.010	<0.010	--	--	--
27...	0.210	0.030	0.030	0.30	0.040	0.020	0.010	100	<1	18
27...	0.190	0.060	--	0.30	0.040	<0.010	0.030	--	--	--
MAR										
07...	0.150	0.060	--	0.30	0.030	0.010	0.030	--	--	--
20...	0.060	0.050	--	0.30	0.030	0.010	0.020	--	--	--
21...	<0.100	0.010	--	0.50	0.050	--	<0.010	--	--	--
21...	0.070	<0.040	--	0.20	0.020	<0.010	0.010	--	--	--
27...	0.130	0.040	--	0.03	0.030	0.010	<0.010	--	--	--
APR										
02...	0.180	0.040	--	0.30	0.030	<0.010	<0.010	--	--	--
03...	0.170	<0.040	--	0.40	0.050	<0.010	0.010	--	--	--
04...	0.160	<0.040	--	0.40	0.060	0.010	<0.010	--	--	--
05...	0.160	0.040	--	0.40	0.080	0.010	0.010	--	--	--
06...	0.150	<0.040	--	0.50	0.100	0.010	0.010	--	--	--
09...	0.160	0.060	--	0.50	0.080	0.010	0.010	--	--	--
10...	0.160	0.040	--	0.50	0.060	--	0.010	--	--	--
17...	0.130	<0.040	--	0.40	0.040	<0.010	<0.010	--	--	--
19...	0.130	<0.040	--	0.40	0.070	<0.010	<0.010	--	--	--
30...	<0.100	0.020	<0.010	0.30	0.020	<0.010	<0.010	--	--	--
30...	0.060	0.110	--	0.30	0.030	0.010	0.010	--	--	--
MAY										
15...	0.150	0.040	--	0.40	0.020	0.010	0.010	--	--	--
28...	0.110	0.040	--	0.50	0.030	<0.010	<0.010	--	--	--
30...	0.200	0.060	--	0.50	0.050	--	<0.010	--	--	--
30...	0.220	0.090	--	0.10	0.040	0.010	0.010	--	--	--
31...	0.330	0.090	--	0.60	0.080	0.020	0.010	--	--	--
JUN										
01...	0.360	0.080	--	0.60	0.140	0.020	0.020	--	--	--
13...	0.120	0.100	--	0.50	0.050	0.010	0.020	--	--	--
25...	0.300	0.020	0.030	0.80	0.030	0.020	<0.010	--	--	--
25...	0.250	<0.040	--	0.40	0.050	0.020	0.010	--	--	--
JUL										
12...	0.380	<0.040	--	0.40	0.040	0.020	0.020	--	--	--
24...	0.220	<0.040	--	0.40	0.030	0.020	0.020	--	--	--
AUG										
10...	0.150	0.080	--	0.40	0.040	0.020	0.020	--	--	--
27...	<0.100	0.050	0.040	0.40	0.020	0.020	0.020	<10	<1	16
27...	0.050	0.100	--	0.40	0.040	0.020	<0.010	--	--	--
SEP										
11...	0.440	<0.040	--	0.30	0.040	0.040	0.020	--	--	--
26...	<0.040	<0.040	--	0.30	0.020	0.010	0.010	--	--	--

< Actual value is known to be less than the value shown.

JAMES RIVER BASIN

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02041650 APPOMATTOX RIVER AT MATOACA, VA--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	BERYL- LIUM, DIS- SOLVED (UG/L AS BE) (01010)	CADMIUM DIS- SOLVED (UG/L AS CD) (01025)	CHRO- MIUM, DIS- SOLVED (UG/L AS CR) (01030)	COBALT, DIS- SOLVED (UG/L AS CO) (01035)	COPPER, DIS- SOLVED (UG/L AS CU) (01040)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)
OCT										
12...	--	--	--	--	--	--	--	--	--	--
27...	--	--	--	--	--	--	--	--	--	--
NOV										
07...	--	--	--	--	--	--	--	--	--	--
20...	<0.5	<1.0	<1	<3	1	230	<1	<4	24	<0.1
20...	--	--	--	--	--	--	--	--	--	--
DEC										
11...	--	--	--	--	--	--	--	--	--	--
26...	--	--	--	--	--	--	--	--	--	--
JAN										
02...	--	--	--	--	--	--	--	--	--	--
02...	--	--	--	--	--	--	--	--	--	--
03...	--	--	--	--	--	--	--	--	--	--
04...	--	--	--	--	--	--	--	--	--	--
05...	--	--	--	--	--	--	--	--	--	--
06...	--	--	--	--	--	--	--	--	--	--
27...	--	--	--	--	--	--	--	--	--	--
29...	--	--	--	--	--	--	--	--	--	--
29...	--	--	--	--	--	--	--	--	--	--
FEB										
05...	--	--	--	--	--	--	--	--	--	--
12...	--	--	--	--	--	--	--	--	--	--
14...	--	--	--	--	--	--	--	--	--	--
27...	<0.5	2.0	<5*	<3	<10*	270	<10*	<4	55	<0.1
27...	--	--	--	--	--	--	--	--	--	--
MAR										
07...	--	--	--	--	--	--	--	--	--	--
20...	--	--	--	--	--	--	--	--	--	--
21...	--	--	--	--	--	--	--	--	--	--
21...	--	--	--	--	--	--	--	--	--	--
27...	--	--	--	--	--	--	--	--	--	--
APR										
02...	--	--	--	--	--	--	--	--	--	--
03...	--	--	--	--	--	--	--	--	--	--
04...	--	--	--	--	--	--	--	--	--	--
05...	--	--	--	--	--	--	--	--	--	--
06...	--	--	--	--	--	--	--	--	--	--
09...	--	--	--	--	--	--	--	--	--	--
10...	--	--	--	--	--	--	--	--	--	--
17...	--	--	--	--	--	--	--	--	--	--
19...	--	--	--	--	--	--	--	--	--	--
30...	--	--	--	--	--	--	--	--	--	--
30...	--	--	--	--	--	--	--	--	--	--
MAY										
15...	--	--	--	--	--	--	--	--	--	--
28...	--	--	--	--	--	--	--	--	--	--
30...	--	--	--	--	--	--	--	--	--	--
30...	--	--	--	--	--	--	--	--	--	--
31...	--	--	--	--	--	--	--	--	--	--
JUN										
01...	--	--	--	--	--	--	--	--	--	--
13...	--	--	--	--	--	--	--	--	--	--
25...	--	--	--	--	--	--	--	--	--	--
25...	--	--	--	--	--	--	--	--	--	--
JUL										
12...	--	--	--	--	--	--	--	--	--	--
24...	--	--	--	--	--	--	--	--	--	--
AUG										
10...	--	--	--	--	--	--	--	--	--	--
27...	<0.5	<1.0	<1	<3	2	190	1	<4	120	<0.1
27...	--	--	--	--	--	--	--	--	--	--
SEP										
11...	--	--	--	--	--	--	--	--	--	--
26...	--	--	--	--	--	--	--	--	--	--

< Actual value is known to be less than the value shown.

JAMES RIVER BASIN

02041650 APPOMATTOX RIVER AT MATOACA, VA--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	NICKEL, DIS- SOLVED (UG/L AS NI) (01065)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	SILVER, DIS- SOLVED (UG/L AS AG) (01075)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)	VANA- DIUM, DIS- SOLVED (UG/L AS V) (01085)	ZINC, DIS- SOLVED (UG/L AS ZN) (01090)	CARBON, ORGANIC TOTAL (MG/L AS C) (00680)	SEDI- MENT, SUS- PENDED (MG/L) (80154)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
OCT										
12...	--	--	--	--	--	--	--	8.1	--	--
27...	--	--	--	--	--	--	--	5.2	--	--
NOV										
07...	--	--	--	--	--	--	--	5.9	--	--
20...	<10	<1	<1	<1.0	48	<6	7	5.2	7	98
20...	--	--	--	--	--	--	--	5.0	--	--
DEC										
11...	--	--	--	--	--	--	--	5.0	--	--
26...	--	--	--	--	--	--	--	4.9	--	--
JAN										
02...	--	--	--	--	--	--	--	3.7	--	--
02...	--	--	--	--	--	--	--	3.4	--	--
03...	--	--	--	--	--	--	--	3.1	--	--
04...	--	--	--	--	--	--	--	6.5	--	--
05...	--	--	--	--	--	--	--	7.5	--	--
06...	--	--	--	--	--	--	--	8.4	--	--
27...	--	--	--	--	--	--	--	3.1	--	--
29...	--	--	--	--	--	--	--	5.5	16	100
29...	--	--	--	--	--	--	--	4.2	--	--
FEB										
05...	--	--	--	--	--	--	--	6.1	--	--
12...	--	--	--	--	--	--	--	4.9	--	--
14...	--	--	--	--	--	--	--	4.6	--	--
27...	<10	20	<1	<1.0	42	<6	<3	5.8	20	91
27...	--	--	--	--	--	--	--	5.1	--	--
MAR										
07...	--	--	--	--	--	--	--	4.4	--	--
20...	--	--	--	--	--	--	--	3.7	--	--
21...	--	--	--	--	--	--	--	3.5	--	--
21...	--	--	--	--	--	--	--	3.5	--	--
27...	--	--	--	--	--	--	--	4.4	--	--
APR										
02...	--	--	--	--	--	--	--	4.2	--	--
03...	--	--	--	--	--	--	--	4.3	--	--
04...	--	--	--	--	--	--	--	4.4	--	--
05...	--	--	--	--	--	--	--	4.9	--	--
06...	--	--	--	--	--	--	--	5.5	--	--
09...	--	--	--	--	--	--	--	6.5	--	--
10...	--	--	--	--	--	--	--	6.6	--	--
17...	--	--	--	--	--	--	--	5.3	--	--
19...	--	--	--	--	--	--	--	5.1	--	--
30...	--	--	--	--	--	--	--	4.9	--	--
30...	--	--	--	--	--	--	--	4.7	--	--
MAY										
15...	--	--	--	--	--	--	--	4.3	--	--
28...	--	--	--	--	--	--	--	5.8	--	--
30...	--	--	--	--	--	--	--	4.8	--	--
30...	--	--	--	--	--	--	--	3.9	--	--
31...	--	--	--	--	--	--	--	8.3	--	--
JUN										
01...	--	--	--	--	--	--	--	11	--	--
13...	--	--	--	--	--	--	--	7.3	--	--
25...	--	--	--	--	--	--	--	--	8	86
25...	--	--	--	--	--	--	--	7.2	--	--
JUL										
12...	--	--	--	--	--	--	--	6.4	--	--
24...	--	--	--	--	--	--	--	5.6	--	--
AUG										
10...	--	--	--	--	--	--	--	4.5	--	--
27...	<10	1	<1	<1.0	55	<6	3	4.7	11	98
27...	--	--	--	--	--	--	--	--	--	--
SEP										
11...	--	--	--	--	--	--	--	--	--	--
26...	--	--	--	--	--	--	--	4.0	--	--

* An alternate analytical method resulted in a change of the minimum reporting level for these constituents.

< Actual value is known to be less than the value shown.

JAMES RIVER BASIN

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02042287 CHICKAHOMINY RIVER NEAR ATLEE, VA

LOCATION.--Lat 37°38'30", long 77°25'19", Hanover County, Hydrologic Unit 02080206, on left bank at upstream side of bridge on U.S. Highway 301, 1.3 mi southwest of Atlee, and 2.5 mi upstream from Upham Brook.

DRAINAGE AREA.--62.2 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--January to September 1990.

GAGE.--Water-stage recorder. Elevation of gage is 95 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Records fair.

EXTREMES FOR CURRENT YEAR.--Maximum discharge during period January to September 1990, 2,200 ft³/s, May 30, gage height, 7.39 ft; minimum discharge, 0.82 ft³/s, Aug. 8-9; minimum gage height, 1.59 ft, June 30.

DISCHARGE, CUBIC FEET PER SECOND, JANUARY TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	---	---	81	50	244	112	162	2.4	4.8	2.0
2	---	---	---	---	70	48	203	58	78	2.8	3.5	1.8
3	---	---	---	---	67	61	574	38	50	3.3	2.5	1.7
4	---	---	---	---	184	100	929	30	49	4.1	1.9	1.6
5	---	---	---	---	301	85	297	47	35	3.4	1.3	1.5
6	---	---	---	---	191	61	165	124	26	3.5	1.1	1.5
7	---	---	---	---	118	49	171	70	22	3.0	1.1	1.4
8	---	---	---	---	100	42	252	35	30	2.6	1.1	1.7
9	---	---	---	---	86	40	177	24	18	2.3	2.3	1.8
10	---	---	---	---	111	40	110	39	14	2.4	1.59	1.6
11	---	---	---	---	404	39	101	101	11	2.2	2.28	1.4
12	---	---	---	---	384	38	107	97	9.2	4.9	4.0	1.1
13	---	---	---	---	180	36	85	44	7.9	6.7	8.4	1.0
14	---	---	---	---	120	34	65	38	6.6	11	3.9	3.1
15	---	---	---	---	96	31	106	37	6.3	23	2.6	e38
16	---	---	---	---	97	30	254	25	6.2	15	1.8	e22
17	---	---	---	---	133	36	206	19	5.8	9.6	1.5	e13
18	---	---	---	55	118	119	108	14	7.3	7.5	1.4	e6.7
19	---	---	---	53	101	183	78	11	19	6.3	1.3	e3.6
20	---	---	---	48	130	93	62	9.3	16	5.0	1.5	2.4
21	---	---	---	48	104	62	58	13	11	4.6	1.7	2.1
22	---	---	---	48	78	54	63	82	8.1	5.8	2.3	2.2
23	---	---	---	45	80	45	60	148	6.8	12	4.2	2.4
24	---	---	---	41	95	38	50	104	5.1	7.1	8.1	2.1
25	---	---	---	79	76	48	43	41	4.2	4.9	3.7	2.2
26	---	---	---	267	58	78	37	33	3.6	3.7	2.2	2.0
27	---	---	---	475	50	67	32	197	2.7	3.1	7.2	1.8
28	---	---	---	282	51	48	29	421	2.2	3.0	4.2	1.5
29	---	---	---	153	---	52	30	408	2.0	2.9	3.1	1.4
30	---	---	---	115	---	147	90	1530	2.1	3.9	2.4	1.4
31	---	---	---	100	---	236	---	506	---	4.9	1.7	---
TOTAL	---	---	---	---	3664	2090	4786	4455.3	627.1	176.9	583.6	155.9
MEAN	---	---	---	---	131	67.4	160	144	20.9	5.71	18.8	5.20
MAX	---	---	---	---	404	236	929	1530	162	23	228	38
MIN	---	---	---	---	50	30	29	9.3	2.0	2.2	1.1	1.0
CFSM	---	---	---	---	2.10	1.08	2.56	2.31	.34	.09	.30	.08
IN.	---	---	---	---	2.19	1.25	2.86	2.66	.38	.11	.35	.09

e Estimated.

JAMES RIVER BASIN

02042287 CHICKAHOMINY RIVER NEAR ATLEE, VA--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--October 1989 to September 1990.

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE AIR (DEG C) (00020)	TEMPER- ATURE WATER (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	COLOR (PLAT- INUM- COBALT UNITS) (00080)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)
OCT												
31...	0900	30	110	6.9	13.0	15.0	755	50	8.4	84	19	10
JAN												
25...	1100	67	150	6.2	12.0	9.0	755	55	7.2	63	15	12
APR												
27...	1115	32	133	6.4	28.0	21.0	755	110	4.5	51	27	6.6
MAY												
10...	2230	81	125	6.6	22.0	17.5	754	170	6.1	64	22	7.9
11...	1030	95	138	6.6	22.0	17.5	754	90	6.1	64	20	7.7
11...	1300	101	138	6.4	22.0	17.5	754	110	6.1	64	20	7.8
11...	2230	125	90	5.9	--	--	760	140	--	--	20	6.9
12...	1030	104	85	5.7	--	--	--	120	--	--	24	9.4
29...	0945	374	62	6.7	14.0	15.0	746	110	6.3	64	10	8.1
30...	1030	2180	41	6.7	--	--	757	110	--	--	8.0	6.7
JUL												
11...	1215	2.1	158	5.6	31.5	27.0	760	50	3.4	43	38	17
SEP												
12...	1100	1.2	370	6.6	28.0	22.0	762	55	3.4	39	34	19
14...	1400	55	65	--	24.0	22.0	756	55	5.6	64	20	--
15...	1200	43	142	--	26.0	22.0	752	80	5.2	60	15	24

DATE	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	NITRO- GEN, NO2+NO3 TOTAL (MG/L AS N) (00630)	NITRO- GEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS ORTHO TOTAL (MG/L AS P) (70507)	ARSENIC TOTAL (UG/L AS AS) (01002)	CADMIUM TOTAL RECOV- ERABLE (UG/L AS CD) (01027)	CHRO- MIUM, TOTAL RECOV- ERABLE (UG/L AS CR) (01034)	COPPER, TOTAL RECOV- ERABLE (UG/L AS CU) (01042)	IRON, TOTAL RECOV- ERABLE (UG/L AS FE) (01045)	IRON, DIS- SOLVED (UG/L AS FE) (01046)
OCT												
31...	14	0.141	0.042	0.50	0.058	0.037	<1	<1	<1	2	1500	250
JAN												
25...	27	0.300	0.083	0.50	0.037	0.020	<1	<1	<1	1	1200	450
APR												
27...	15	0.204	0.108	0.80	0.057	0.045	<1	<1	7	27	2700	1300
MAY												
10...	18	0.170	0.086	0.60	0.123	0.061	<1	1	<1	12	3400	1500
11...	15	0.182	0.092	0.50	0.124	0.061	45	<1	<1	6	2900	1700
11...	15	0.167	0.077	1.6	0.098	0.053	<1	<1	<1	2	3200	1900
11...	10	0.234	0.060	0.80	0.088	0.049	<1	<1	1	6	3200	1800
12...	12	0.200	0.058	0.60	0.079	0.051	<1	<1	<1	3	3200	1700
29...	10	0.120	0.063	0.80	0.102	0.025	<1	2	<1	2	1800	790
30...	6.1	0.185	0.059	1.0	0.076	0.073	<1	<1	1	5	1700	740
JUL												
11...	23	0.184	0.092	0.60	0.060	0.021	<1	<1	1	2	1800	860
SEP												
12...	18	0.147	0.070	0.50	0.049	0.033	<1	<1	<1	3	1400	640
14...	--	0.287	0.101	0.80	0.106	0.087	<1	2	1	5	3000	460
15...	16	0.222	0.040	0.60	0.100	0.065	<1	<1	1	5	1600	300

< Actual value is known to be less than the value shown.

JAMES RIVER BASIN

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02042287 CHICKAHOMINY RIVER NEAR ATLEE, VA--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	LEAD, TOTAL RECOV- ERABLE (UG/L AS PB) (01051)	MANGA- NESE, TOTAL RECOV- ERABLE (UG/L AS MN) (01055)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY TOTAL RECOV- ERABLE (UG/L AS HG) (71900)	NICKEL, TOTAL RECOV- ERABLE (UG/L AS NI) (01067)	ZINC, TOTAL RECOV- ERABLE (UG/L AS ZN) (01092)	CARBON, ORGANIC TOTAL (MG/L AS C) (00680)	CYANIDE TOTAL (MG/L AS CN) (00720)	PHENOLS TOTAL (UG/L) (32730)	OIL AND GREASE, TOTAL RECOV. GRAVI- METRIC (MG/L) (00556)	SEDI- MENT, SUS- PENDE (MG/L) (80154)
OCT											
31...	1	210	180	<0.10	1	30	11	<0.010	<1	<1	7
JAN											
25...	2	110	100	<0.10	1	30	7.5	<0.010	<1	3	12
APR											
27...	2	650	600	<0.10	6	40	14	<0.010	<1	<1	9
MAY											
10...	3	330	250	<0.10	2	20	13	<0.010	<1	<1	20
11...	3	250	220	<0.10	2	20	13	<0.010	<1	<1	17
11...	3	250	220	<0.10	1	20	12	<0.010	<1	<1	11
11...	3	180	110	<0.10	2	30	14	<0.010	<1	<1	18
12...	3	160	120	<0.10	1	20	14	<0.010	<1	<1	7
29...	2	50	50	<0.10	1	20	12	<0.010	2	<1	11
30...	2	70	50	<0.10	1	30	15	<0.010	5	<1	21
JUL											
11...	<1	1300	1400	<0.10	1	<10	8.8	<0.010	2	<1	--
SEP											
12...	2	790	740	<0.10	2	20	9.8	<0.010	1	<1	12
14...	6	770	490	0.50	7	80	9.8	<0.010	2	<1	44
15...	3	350	250	0.90	3	90	8.7	<0.010	<1	<1	24

< Actual value is known to be greater than the value shown.

JAMES RIVER BASIN

02042426 UPHAM BROOK NEAR RICHMOND, VA

LOCATION.--Lat 37°36'47", long 77°25'28", Henrico County, Hydrologic Unit 02080206, on left bank at downstream side of culvert on Wilkinson Road, 1.6 mi northeast of Richmond, and 1.2 mi upstream from mouth.

DRAINAGE AREA.--38.6 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--December 1989 to September 1990.

GAGE.--Water-stage recorder. Elevation of gage is 90 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Records fair except for period with ice effect, Dec. 17-29, which is poor.

EXTREMES FOR CURRENT YEAR.--Maximum discharge during period December 1989 to September 1990, 1,730 ft³/s, Apr. 3, gage height, 7.98 ft; minimum discharge, 0.31 ft³/s, Aug. 6, gage height, 4.37 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	---	316	27	14	69	22	18	13	1.2	2.5
2	---	---	---	101	26	15	53	12	13	51	.69	1.8
3	---	---	---	57	27	54	853	8.5	10	4.7	.48	1.6
4	---	---	---	59	242	28	122	10	27	2.3	.44	1.4
5	---	---	---	69	86	17	61	23	9.0	1.7	.37	1.3
6	---	---	---	96	44	15	41	11	6.9	1.5	.39	1.3
7	---	---	---	68	46	13	182	6.6	6.0	1.2	8.0	1.6
8	---	---	5.3	114	37	12	72	5.6	5.0	1.1	.72	1.9
9	---	---	5.4	175	30	12	38	4.9	4.5	1.1	317	1.7
10	---	---	5.4	68	137	15	31	105	3.9	.94	738	1.5
11	---	---	5.6	47	130	12	61	103	3.2	.99	39	1.3
12	---	---	5.7	39	45	16	30	14	2.7	6.2	9.0	1.2
13	---	---	5.8	32	31	11	21	8.2	2.7	16	5.2	25
14	---	---	5.8	28	27	10	18	13	2.3	45	3.8	e583
15	---	---	5.7	27	24	9.4	171	7.0	2.5	20	6.7	e65
16	---	---	5.9	26	56	8.4	75	5.6	2.3	4.0	7.1	10
17	---	---	e5.6	25	67	31	33	4.8	2.1	3.2	3.0	4.7
18	---	---	e5.3	25	29	139	28	4.0	12	2.1	2.3	3.5
19	---	---	e4.9	24	61	28	18	3.5	52	12	2.0	3.1
20	---	---	e4.6	22	54	22	16	3.3	5.3	5.5	1.8	2.8
21	---	---	e4.9	25	26	16	18	13	3.5	1.6	1.9	2.3
22	---	---	e4.8	22	22	12	30	124	2.8	7.8	39	11
23	---	---	e4.7	20	32	10	16	48	2.8	2.3	17	6.6
24	---	---	e4.5	19	30	9.8	13	9.0	2.0	1.4	126	2.2
25	---	---	e4.4	132	23	52	11	5.6	1.7	.93	17	2.0
26	---	---	e4.3	308	15	23	10	32	1.3	.65	6.1	8.7
27	---	---	e4.6	114	16	14	8.8	478	1.4	.50	4.2	18
28	---	---	e4.8	55	16	10	7.9	54	1.2	4.2	3.1	2.6
29	---	---	e5.2	42	---	54	60	698	1.1	8.1	3.1	2.1
30	---	---	5.6	41	---	125	152	204	.94	8.6	18	1.9
31	---	---	6.0	31	---	105	---	36	---	3.6	3.7	---
TOTAL	---	---	---	2227	1406	912.6	2319.7	2076.6	209.14	233.21	1386.29	773.6
MEAN	---	---	---	71.8	50.2	29.4	77.3	67.0	6.97	7.52	44.7	25.8
MAX	---	---	---	316	242	139	853	698	52	51	738	583
MIN	---	---	---	19	15	8.4	7.9	3.3	.94	.50	.37	1.2
CFSM	---	---	---	1.86	1.30	.76	2.00	1.74	.18	.19	1.16	.67
IN.	---	---	---	2.15	1.36	.88	2.24	2.00	.20	.22	1.34	.75

e Estimated.

JAMES RIVER BASIN

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02042426 UPHAM BROOK NEAR RICHMOND, VA--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--October 1989 to September 1990.

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE AIR (DEG C) (00020)	TEMPER- ATURE WATER (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	COLOR (PLAT- INUM- COBALT UNITS) (00080)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	ALKA- LITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)
OCT												
31...	1215	7.9	218	6.6	14.5	15.5	755	25	5.5	55	36	14
JAN												
25...	1230	156	216	6.8	12.5	10.0	761	43	8.9	79	23	14
APR												
27...	1200	9.1	220	6.6	29.0	22.0	754	12	5.3	61	32	12
MAY												
10...	1200	28	223	6.7	21.5	17.5	754	55	6.6	69	29	11
11...	1000	76	110	6.5	21.0	17.5	754	45	6.6	69	17	8.1
11...	1200	56	98	6.2	--	--	760	75	--	--	19	8.3
11...	1750	28	98	6.2	--	--	760	65	--	--	20	7.8
29...	0830	395	80	6.9	17.0	15.0	747	90	8.3	84	14	9.2
29...	1739	1260	55	6.6	21.0	--	757	110	--	--	11	6.3
JUL												
11...	1300	0.98	162	6.3	30.0	26.5	760	30	3.0	37	38	9.0
SEP												
14...	1330	987	60	--	24.0	21.0	756	84	7.1	80	8.2	9.4
15...	1045	63	105	--	25.0	22.0	752	75	6.8	79	14	15

DATE	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	NITRO- GEN, NO2+NO3 TOTAL (MG/L AS N) (00630)	NITRO- GEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS ORTHO TOTAL (MG/L AS P) (70507)	ARSENIC TOTAL (UG/L AS AS) (01002)	CADMIUM TOTAL RECOV- ERABLE (UG/L AS CD) (01027)	CHRO- MIUM, TOTAL RECOV- ERABLE (UG/L AS CR) (01034)	COPPER, TOTAL RECOV- ERABLE (UG/L AS CU) (01042)	IRON, TOTAL RECOV- ERABLE (UG/L AS FE) (01045)	IRON, DIS- SOLVED (UG/L AS FE) (01046)
OCT												
31...	27	0.904	0.053	0.50	0.048	0.033	<1	<1	<1	3	1200	560
JAN												
25...	41	0.700	0.297	0.90	0.107	0.071	1	<1	<1	9	3000	540
APR												
27...	34	0.649	0.108	0.60	0.036	0.046	2	<1	<1	5	2100	1000
MAY												
10...	32	--	--	--	--	0.050	2	<1	2	6	3200	1300
11...	15	0.376	0.135	1.0	0.153	0.043	2	<1	3	9	2700	530
11...	16	0.372	0.160	0.70	0.158	0.058	2	<1	2	7	2400	550
11...	16	0.426	0.159	0.90	0.114	0.062	2	<1	1	6	2500	720
29...	13	0.420	0.173	0.90	0.124	0.114	3	2	5	7	3800	420
29...	6.6	0.278	0.101	1.0	0.106	0.104	2	<1	4	5	2100	420
JUL												
11...	37	0.261	0.131	0.50	0.108	0.070	2	5	2	5	1600	720
SEP												
14...	7.1	0.410	0.106	0.80	0.108	0.102	2	2	3	10	2400	120
15...	13	0.404	0.110	0.70	0.082	0.117	2	<1	<1	12	1300	310

< Actual value is known to be less than the value shown.

JAMES RIVER BASIN

02042426 UPHAM BROOK NEAR RICHMOND, VA--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	LEAD, TOTAL RECOV- ERABLE (UG/L AS PB) (01051)	MANGA- NESE, TOTAL RECOV- ERABLE (UG/L AS MN) (01055)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY TOTAL RECOV- ERABLE (UG/L AS HG) (71900)	NICKEL, TOTAL RECOV- ERABLE (UG/L AS NI) (01067)	ZINC, TOTAL RECOV- ERABLE (UG/L AS ZN) (01092)	CARBON, ORGANIC TOTAL (MG/L AS C) (00680)	CYANIDE TOTAL (MG/L AS CN) (00720)	PHENOLS TOTAL (UG/L) (32730)	OIL AND GREASE, TOTAL RECOV. GRAVI- METRIC (MG/L) (00556)	SEDI- MENT, SUS- PENDE (MG/L) (80154)
OCT											
31...	3	90	110	<0.10	2	20	5.3	<0.010	<1	<1	871
JAN											
25...	14	180	120	<0.10	3	60	7.7	<0.010	<1	<1	78
APR											
27...	6	130	120	<0.10	3	20	8.7	<0.010	<1	<1	49
MAY											
10...	12	170	110	<0.10	2	30	8.2	<0.010	<1	<1	101
11...	17	80	40	<0.10	2	40	8.7	<0.010	<1	<1	12
11...	13	100	50	<0.10	2	30	9.7	<0.010	14	<1	31
11...	8	100	60	<0.10	2	30	9.8	<0.010	<1	<1	29
29...	20	80	40	<0.10	4	60	11	<0.010	2	<1	121
29...	12	50	40	<0.10	2	40	13	<0.010	2	<1	58
JUL											
11...	11	220	260	<0.10	3	<10	7.3	<0.010	<1	<1	--
SEP											
14...	17	80	50	0.10	4	50	9.0	<0.010	1	<1	107
15...	6	70	60	<0.10	6	40	8.9	<0.010	<1	<1	26

< Actual value is known to be less than the value shown.

JAMES RIVER BASIN

235

02042440 CHICKAHOMINY RIVER AT RT. 156, NEAR SEVEN PINES, VA

LOCATION.--Lat 37°33'07", long 77°16'17", Henrico County, Hydrologic Unit 02080206, at bridge on State Highway 156, 0.7 mi upstream from Elder Swamp, 2.4 mi northeast of Seven Pines, and 8.5 mi downstream from Upham Brook.

DRAINAGE AREA.--149.3 mi².

PERIOD OF RECORD.--September 1984, April 1987 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE AIR (DEG C) (00020)	TEMPER- ATURE WATER (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	COLOR (PLAT- INUM- COBALT UNITS) (00080)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED CENT SATUR- ATION (00301)	ALKA- LITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)
OCT												
31...	1030	58	105	7.0	13.5	15.5	755	30	7.0	71	19	8.0
JAN												
25...	0900	95	162	6.8	12.0	9.5	757	50	7.7	68	17	11
APR												
06...	1500	--	87	7.3	20.0	15.5	757	--	10.6	107	--	--
07...	1000	--	70	6.8	21.0	11.0	761	--	8.8	80	--	--
27...	0815	98	141	6.5	27.0	22.5	755	24	3.3	38	34	3.6
MAY												
11...	0930	116	62	7.8	14.5	16.5	757	80	8.4	86	28	3.4
14...	0830	181	118	6.5	20.0	18.0	759	65	5.6	59	22	5.5
15...	1500	185	88	5.5	30.5	22.5	764	65	8.7	100	32	1.8
30...	0930	996	55	6.8	18.0	16.5	757	90	7.0	72	10	5.6
31...	0820	1370	48	7.8	14.0	17.0	764	90	6.6	68	11	6.2
JUL												
11...	1115	13	158	6.2	31.0	28.0	760	45	3.6	46	33	7.5
SEP												
12...	1000	13	145	6.6	27.0	22.0	762	60	4.8	55	30	3.1
15...	1300	132	119	7.6	28.0	23.0	752	65	5.2	62	7.3	25
16...	1830	141	112	6.6	23.0	22.0	754	75	4.4	51	5.0	27
17...	1300	230	103	6.6	22.0	20.5	765	27	5.2	57	5.6	22
19...	1000	145	100	6.4	20.5	16.5	762	48	5.8	59	7.8	22

DATE	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	NITRO- GEN, NO2+NO3 TOTAL (MG/L AS N) (00630)	NITRO- GEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS ORTHO TOTAL (MG/L AS P) (70507)	ARSENIC TOTAL (UG/L AS AS) (01002)	CADMIUM TOTAL RECOV- ERABLE (UG/L AS CD) (01027)	CHRO- MIUM, TOTAL RECOV- ERABLE (UG/L AS CR) (01034)	COPPER, TOTAL RECOV- ERABLE (UG/L AS CU) (01042)	IRON, TOTAL RECOV- ERABLE (UG/L AS FE) (01045)	IRON, DIS- SOLVED (UG/L AS FE) (01046)
OCT												
31...	14	0.084	0.033	0.50	0.034	0.039	<1	<1	<1	3	1700	560
JAN												
25...	32	0.169	0.055	0.40	0.037	0.021	<1	<1	<1	2	1300	460
APR												
06...	--	--	--	--	--	--	--	3	2	--	--	--
07...	--	--	--	--	--	--	--	21	2	--	--	--
27...	18	0.081	0.054	0.70	0.034	0.051	<1	<1	<1	7	2700	1600
MAY												
11...	14	0.111	0.056	0.70	0.117	0.060	<1	<1	2	2	3200	1100
14...	15	0.051	0.025	0.60	0.092	0.065	<1	<1	<1	4	2300	1300
15...	12	0.077	0.038	0.50	0.087	0.061	1	1	<1	4	2800	870
30...	6.8	0.060	0.046	0.90	0.076	0.058	<1	2	2	18	1900	630
31...	7.7	0.072	0.031	0.50	0.100	0.050	1	<1	5	3	2000	430
JUL												
11...	19	0.210	0.308	0.60	0.079	0.049	1	6	5	3	1600	380
SEP												
12...	15	0.168	0.084	0.50	0.083	0.071	<1	<1	<1	2	1800	1000
15...	12	0.076	0.039	1.0	0.086	0.067	<1	3	<1	3	1500	560
16...	12	0.045	0.033	1.1	0.172	0.073	1	2	2	2	3000	540
17...	11	0.018	0.038	0.80	0.078	0.055	1	<1	2	3	1700	750
19...	14	0.020	0.033	0.60	0.078	0.056	1	<1	3	6	4100	540

< Actual value is known to be less than the value shown.

JAMES RIVER BASIN

02042440 CHICKAHOMINY RIVER AT RT. 156, NEAR SEVEN PINES, VA--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	LEAD, TOTAL RECOV- ERABLE (UG/L AS PB) (01051)	MANGA- NESE, TOTAL RECOV- ERABLE (UG/L AS MN) (01055)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY TOTAL RECOV- ERABLE (UG/L AS HG) (71900)	NICKEL, TOTAL RECOV- ERABLE (UG/L AS NI) (01067)	ZINC, TOTAL RECOV- ERABLE (UG/L AS ZN) (01092)	CARBON, ORGANIC TOTAL (MG/L AS C) (00680)	CYANIDE TOTAL (MG/L AS CN) (00720)	PHENOLS TOTAL (UG/L) (32730)	OIL AND GREASE, TOTAL RECOV. GRAVI- METRIC (MG/L) (00556)	SEDI- MENT, SUS- PENDE (MG/L) (80154)
OCT											
31...	1	300	250	<0.10	3	30	8.6	<0.010	<1	<1	17
JAN											
25...	2	140	120	<0.10	2	20	6.4	<0.010	<1	<1	9
APR											
06...	--	--	--	--	3	--	--	--	--	--	--
07...	--	--	--	--	4	--	--	--	--	--	--
27...	2	440	370	<0.10	3	20	13	<0.010	<1	<1	24
MAY											
11...	2	170	100	<0.10	2	10	9.9	<0.010	<1	<1	--
14...	2	90	70	<0.10	12	<10	11	<0.010	2	<1	5
15...	3	80	50	<0.10	1	<10	10	<0.010	2	<1	55
30...	5	70	40	<0.10	1	40	11	<0.010	1	<1	16
31...	2	80	40	<0.10	2	20	12	<0.010	2	<1	15
JUL											
11...	10	1600	1600	<0.10	7	<10	8.2	<0.010	4	<1	--
SEP											
12...	1	530	510	<0.10	3	<10	8.1	<0.010	1	<1	14
15...	4	460	450	<0.10	5	120	8.5	<0.010	<1	<1	14
16...	3	620	470	<0.10	20	140	9.7	<0.010	5	<1	53
17...	3	330	280	<0.10	3	90	11	<0.010	<1	<1	21
19...	5	450	360	<0.10	7	110	12	<0.010	3	<1	91

< Actual value is known to be less than the value shown.

JAMES RIVER BASIN

237

02042500 CHICKAHOMINY RIVER NEAR PROVIDENCE FORGE, VA

LOCATION.--Lat 37°26'10", long 77°03'40", New Kent County, Hydrologic Unit 02080206, on left bank 100 ft downstream from bridge on State Highway 618, 1.1 mi southwest of Providence Forge, and 1.7 mi downstream from Schiminee Creek.

DRAINAGE AREA.--248 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--January 1942 to current year.

REVISED RECORDS.--WSP 1553: 1956. WSP 2104: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 6.07 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records good except those for periods with ice effect, Dec. 10, 17-25, which are fair.

AVERAGE DISCHARGE.--48 years, 263 ft³/s, 14.40 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 7,710 ft³/s, Aug. 15, 1955, gage height, 11.67 ft; minimum, 0.70 ft³/s, July 7, 1977; minimum gage height, 1.53 ft, Sept. 13, 1965.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 1,820 ft³/s, May 30, gage height, 9.15 ft; minimum, 3.7 ft³/s, July 11, gage height, 1.94 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	341	222	270	366	659	276	406	154	1330	15	28	82
2	424	180	249	441	551	260	417	148	1240	22	29	70
3	526	202	233	554	444	264	504	140	1280	22	25	61
4	580	202	217	601	406	279	602	141	1130	24	17	52
5	564	189	205	617	412	273	793	221	855	23	10	41
6	470	194	193	726	386	271	1140	237	600	23	7.1	32
7	382	193	182	753	400	258	1310	208	438	20	62	26
8	323	193	178	702	445	253	1130	176	317	13	103	23
9	298	252	193	691	500	250	855	145	243	8.9	156	21
10	291	344	e200	616	502	244	623	162	202	6.3	259	18
11	275	407	211	603	474	239	512	314	151	4.8	338	19
12	247	448	222	582	434	229	461	361	117	9.0	635	18
13	210	413	260	554	420	211	416	403	95	52	575	22
14	163	363	289	523	398	200	374	323	79	98	486	128
15	119	336	305	491	446	191	341	249	69	151	604	174
16	90	322	331	438	544	182	339	240	62	142	867	188
17	73	300	e292	393	551	179	335	234	56	151	653	185
18	68	275	e272	357	469	235	335	197	51	113	455	177
19	113	254	e250	344	424	240	317	151	55	119	305	178
20	200	235	e233	306	397	239	337	118	56	153	165	213
21	238	219	e240	279	382	233	360	98	53	117	106	251
22	257	211	e220	264	382	240	366	121	54	131	86	248
23	282	284	e198	238	375	281	332	158	66	135	74	158
24	277	326	e190	223	365	292	290	172	61	168	87	82
25	290	324	e180	248	356	287	254	210	51	134	91	64
26	362	330	175	326	336	273	222	211	43	72	91	55
27	415	310	170	427	313	256	197	334	34	40	95	63
28	409	293	163	572	292	245	178	496	27	59	99	55
29	372	293	169	670	---	234	162	1070	21	39	106	48
30	323	288	191	743	---	290	163	1620	16	30	116	44
31	271	---	247	739	---	334	---	1710	---	25	104	---
TOTAL	9253	8402	6928	15387	12063	7738	14071	10522	8852	2120.0	6834.1	2796
MEAN	298	280	223	496	431	250	469	339	295	68.4	220	93.2
MAX	580	448	331	753	659	334	1310	1710	1330	168	867	251
MIN	68	180	163	223	292	179	162	98	16	4.8	7.1	18
CFSM	1.20	1.13	.90	2.00	1.74	1.01	1.89	1.37	1.19	.28	.89	.38
IN.	1.39	1.26	1.04	2.31	1.81	1.16	2.11	1.58	1.33	.32	1.03	.42

CAL YR 1989 TOTAL 120716 MEAN 331 MAX 1150 MIN 17 CFSM 1.33 IN. 18.11
WTR YR 1990 TOTAL 104966.1 MEAN 288 MAX 1710 MIN 4.8 CFSM 1.16 IN. 15.74

e Estimated.

JAMES RIVER BASIN

02042500 CHICKAHOMINY RIVER NEAR PROVIDENCE FORGE, VA--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1969-70, 1972 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE AIR (DEG C) (00020)	TEMPER- ATURE WATER (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	COLOR (PLAT- INUM- COBALT UNITS) (00080)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)
NOV											
01...	0930	227	110	6.4	13.0	14.0	764	55	7.2	70	6.0
JAN											
24...	0930	224	137	7.2	7.0	9.0	762	55	8.8	76	6.9
APR											
25...	0830	258	110	6.4	18.5	19.0	760	70	6.2	67	7.8
MAY											
11...	1130	327	80	6.3	18.0	16.0	760	90	6.7	68	--
14...	1100	326	88	6.4	21.5	18.5	759	75	6.7	72	--
15...	1730	239	90	5.5	27.0	19.0	763	84	6.8	73	--
31...	1000	1770	38	7.2	20.5	17.0	764	100	7.7	79	--
JUN											
01...	0830	1360	45	6.8	18.5	16.5	760	90	6.4	66	--
JUL											
11...	1000	3.9	130	6.5	27.0	26.0	761	55	4.8	59	9.3
SEP											
12...	0930	18	122	6.7	26.5	21.5	762	65	5.3	60	9.9
16...	1730	189	90	6.4	25.0	21.5	754	18	6.7	76	--
17...	1200	184	90	6.8	20.0	19.5	765	25	6.9	75	--
19...	1230	176	110	6.6	18.5	16.0	762	27	8.3	84	--

DATE	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	NITRO- GEN, NO2+NO3 TOTAL (MG/L AS N) (00630)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA TOTAL (MG/L AS N) (00610)
NOV											
01...	1.5	8.2	4.0	15	9.0	13	0.10	10	0.146	<0.010	<0.010
JAN											
24...	1.7	16	2.6	14	9.0	27	<0.10	2.7	0.020	0.013	0.030
APR											
25...	1.8	9.2	2.0	23	4.2	14	0.20	0.90	0.013	0.017	0.050
MAY											
11...	--	--	--	18	4.0	8.8	--	--	0.099	--	0.070
14...	--	--	--	19	3.5	9.9	--	--	0.074	--	0.063
15...	--	--	--	22	3.4	12	--	--	0.321	--	0.069
31...	--	--	--	10	5.0	6.3	--	--	0.103	--	0.050
JUN											
01...	--	--	--	10	5.6	7.0	--	--	0.049	--	0.037
JUL											
11...	2.3	11	2.2	28	6.6	16	<0.10	5.5	0.144	0.143	0.050
SEP											
12...	2.2	9.9	1.9	33	3.5	13	<0.10	9.4	0.199	0.209	0.030
16...	--	--	--	13	15	9.0	--	--	0.044	--	0.017
17...	--	--	--	11	20	9.8	--	--	0.026	--	0.022
19...	--	--	--	8.6	25	11	--	--	0.015	--	0.014

< Actual value is known to be less than the value shown.

JAMES RIVER BASIN

239

02042500 CHICKAHOMINY RIVER NEAR PROVIDENCE FORGE, VA--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO- GEN,AM- MONIA + ORGANIC DIS. (MG/L AS N) (00623)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS ORTHO TOTAL (MG/L AS P) (70507)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	ARSENIC TOTAL (UG/L AS AS) (01002)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	CADMIUM TOTAL RECOV- ERABLE (UG/L AS CD) (01027)	CADMIUM DIS- SOLVED (UG/L AS CD) (01025)
NOV 01...	0.007	0.90	0.60	0.041	0.033	0.027	0.020	--	<1	<1	<1.0
JAN 24...	0.025	0.40	0.70	0.030	0.014	0.016	0.009	--	<1	<1	<1.0
APR 25...	0.040	0.50	0.50	0.008	0.039	0.009	0.015	--	<1	<1	<1.0
MAY 11...	--	0.70	--	0.094	--	0.048	--	<1	--	<1	--
14...	--	0.70	--	0.092	--	0.061	--	<1	--	<1	--
15...	--	0.50	--	0.110	--	0.073	--	1	--	4	--
31...	--	0.50	--	0.095	--	0.056	--	<1	--	<1	--
JUN 01...	--	1.6	--	0.072	--	0.044	--	<1	--	1	--
JUL 11...	0.053	0.80	0.50	0.077	0.040	0.049	0.031	--	<1	6	4.0
SEP 12...	0.025	0.50	0.50	0.065	--	0.055	0.040	--	<1	<1	2.0
16...	--	0.50	--	0.065	--	0.038	--	<1	--	<1	--
17...	--	0.50	--	0.046	--	0.034	--	<1	--	<1	--
19...	--	0.50	--	0.045	--	0.029	--	<1	--	<1	--

DATE	CHRO- MIUM, TOTAL RECOV- ERABLE (UG/L AS CR) (01034)	CHRO- MIUM, DIS- SOLVED (UG/L AS CR) (01030)	COPPER, TOTAL RECOV- ERABLE (UG/L AS CU) (01042)	COPPER, DIS- SOLVED (UG/L AS CU) (01040)	IRON, TOTAL RECOV- ERABLE (UG/L AS FE) (01045)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, TOTAL RECOV- ERABLE (UG/L AS PB) (01051)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	MANGA- NESE, TOTAL RECOV- ERABLE (UG/L AS MN) (01055)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)
NOV 01...	<1	<1	2	<1	750	520	1	<1	80	70
JAN 24...	<1	<1	3	<10*	830	580	1	<10*	90	69
APR 25...	<1	<1	4	1	1600	1100	1	1	160	120
MAY 11...	2	--	14	--	2300	910	3	--	200	140
14...	<1	--	4	--	2500	1400	2	--	150	120
15...	<1	--	4	--	2600	780	3	--	180	120
31...	1	--	3	--	1600	780	2	--	80	40
JUN 01...	<1	--	3	--	1700	850	3	--	100	40
JUL 11...	2	<1	1	2	1200	620	4	<1	480	470
SEP 12...	<1	<1	3	2	1400	1200	2	<1	150	140
16...	<1	--	1	--	1200	700	1	--	100	80
17...	<1	--	2	--	1000	620	2	--	110	70
19...	2	--	3	--	970	560	2	--	150	80

* An alternate analytical method resulted in a change of the minimum reporting level for these constituents.

< Actual value is known to be less than the value shown.

JAMES RIVER BASIN

02042500 CHICKAHOMINY RIVER NEAR PROVIDENCE FORGE, VA--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	MERCURY TOTAL RECOV- ERABLE (UG/L AS HG) (71900)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	NICKEL, TOTAL RECOV- ERABLE (UG/L AS NI) (01067)	ZINC, TOTAL RECOV- ERABLE (UG/L AS ZN) (01092)	ZINC, DIS- SOLVED (UG/L AS ZN) (01090)	CARBON, ORGANIC TOTAL (MG/L AS C) (00680)	CYANIDE TOTAL (MG/L AS CN) (00720)	PHENOLS TOTAL (UG/L) (32730)	OIL AND GREASE, TOTAL RECOV. GRAVI- METRIC (MG/L) (00556)	SEDI- MENT, SUS- PENDED (MG/L) (80154)
NOV 01...	--	<0.1	1	--	11	9.7	<0.010	<1	<1	3
JAN 24...	--	<0.1	1	--	11	6.0	<0.010	<1	<1	--
APR 25...	--	<0.1	1	--	5	10	<0.010	<1	<1	9
MAY 11...	<0.10	--	2	<10	--	11	<0.010	<1	<1	--
14...	<0.10	--	1	<10	--	11	<0.010	<1	<1	6
15...	0.10	--	2	<10	--	11	<0.010	3	<1	19
31...	<0.10	--	2	10	--	11	<0.010	2	<1	8
JUN 01...	<0.10	--	2	20	--	11	<0.010	1	<1	6
JUL 11...	--	<0.1	2	--	8	8.2	<0.010	7	<1	--
SEP 12...	--	<0.1	2	--	7	8.7	<0.010	3	<1	4
16...	<0.10	--	3	10	--	7.8	<0.010	1	<1	6
17...	<0.10	--	1	10	--	7.0	<0.010	<1	<1	5
19...	<0.10	--	1	20	--	7.2	<0.010	<1	<1	9

< Actual value is known to be less than the value shown.

02042720 CHICKAHOMINY RIVER ABOVE WALKERS DAM, AT WALKERS, VA

LOCATION.--Lat 37°24'31", long 76°56'18", New Kent County, Hydrologic Unit 02080206, on left bank 600 ft upstream from Walkers Dam at city of Newport News pumping station, 0.7 mi south of Walkers, and 8.0 mi upstream from Diascund Creek.

DRAINAGE AREA.--301 mi².

PERIOD OF RECORD.--Water years 1983 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	TIME	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE AIR (DEG C) (00020)	TEMPER- ATURE WATER (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	COLOR (PLAT- INUM- COBALT UNITS) (00080)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)
NOV											
01...	1030	130	7.0	15.0	13.5	765	50	5.8	55	5.9	1.4
DEC											
14...	1330	105	7.5	3.5	3.0	759	50	--	--	6.2	1.5
JAN											
24...	1000	135	7.3	7.0	10.0	762	17	9.2	81	7.2	1.5
APR											
25...	1000	100	6.1	26.0	18.5	760	55	7.9	85	7.2	1.5
MAY											
11...	1215	100	6.1	20.0	21.0	760	52	8.1	91	--	--
14...	1200	100	6.7	23.5	21.0	760	55	9.8	110	--	--
15...	1830	55	5.3	20.0	19.5	764	65	5.7	62	--	--
31...	1115	40	5.7	22.5	18.5	764	70	6.4	68	--	--
JUN											
01...	1015	48	5.9	19.0	16.0	760	70	6.0	61	--	--
03...	1945	60	6.3	25.5	23.0	757	70	6.3	74	--	--
13...	1415	61	6.2	25.5	24.0	766	22	4.7	55	5.5	1.2
JUL											
10...	1000	85	6.3	27.0	30.0	762	45	6.2	82	7.2	1.6
SEP											
12...	0900	99	6.2	23.0	24.5	762	50	4.5	54	8.6	1.7
16...	1615	100	5.4	27.5	25.0	754	55	4.8	59	--	--
17...	1100	98	6.6	20.0	25.0	765	23	6.1	73	--	--
19...	1400	100	6.4	20.5	22.5	762	27	7.0	81	--	--

DATE	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	NITRO- GEN, NO2+NO3 TOTAL (MG/L AS N) (00630)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)
NOV											
01...	7.3	3.2	12	9.0	12	0.10	9.6	0.350	<0.010	0.010	0.010
DEC											
14...	8.9	3.4	13	7.0	16	0.10	7.5	--	0.020	0.020	0.011
JAN											
24...	16	2.5	12	11	27	<0.10	5.3	<0.010	<0.010	0.030	0.015
APR											
25...	8.4	1.7	19	4.8	12	<0.10	0.50	0.042	<0.010	<0.010	0.011
MAY											
11...	--	--	26	3.1	13	--	--	0.029	--	0.042	--
14...	--	--	123	3.2	12	--	--	0.024	--	0.035	--
15...	--	--	23	3.4	9.9	--	--	0.034	--	0.064	--
31...	--	--	13	4.7	7.1	--	--	0.053	--	0.057	--
JUN											
01...	--	--	12	5.0	6.9	--	--	0.158	--	0.046	--
03...	--	--	11	5.3	7.0	--	--	0.015	--	0.014	--
13...	5.8	1.3	15	5.0	7.2	0.20	5.3	<0.010	0.012	0.020	0.031
JUL											
10...	6.7	1.7	21	4.3	9.0	<0.10	6.4	<0.010	0.027	0.020	0.019
SEP											
12...	7.6	1.3	19	9.5	9.4	<0.10	9.1	<0.010	0.029	<0.010	0.016
16...	--	--	22	10	10	--	--	<0.010	--	0.014	--
17...	--	--	21	10	11	--	--	<0.010	--	0.024	--
19...	--	--	21	9.4	10	--	--	<0.010	--	0.015	--

< Actual value is known to be less than the value shown.

JAMES RIVER BASIN

02042720 CHICKAHOMINY RIVER ABOVE WALKERS DAM, AT WALKERS, VA--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	NITRO- GEN, AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO- GEN, AM- MONIA + ORGANIC DIS. (MG/L AS N) (00623)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS ORTHO TOTAL (MG/L AS P) (70507)	PHOS- PHORUS ORTHO DIS- SOLVED (MG/L AS P) (00671)	ARSENIC TOTAL (UG/L AS AS) (01002)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	CADMIUM TOTAL RECOV- ERABLE (UG/L AS CD) (01027)	CADMIUM DIS- SOLVED (UG/L AS CD) (01025)
NOV										
01...	0.80	0.50	0.033	0.023	0.018	0.009	--	<1	<1	<1.0
DEC										
14...	0.50	0.40	0.037	--	0.018	0.008	--	<1	--	<1.0
JAN										
24...	0.30	0.50	0.033	0.017	0.014	0.006	--	<1	<1	<1.0
APR										
25...	1.0	0.60	0.017	0.052	0.011	0.005	--	<1	<1	<1.0
MAY										
11...	0.80	--	0.031	--	0.010	--	<1	--	<1	--
14...	0.60	--	0.052	--	0.021	--	<1	--	<1	--
15...	0.60	--	0.064	--	0.001	--	<1	--	<1	--
31...	0.60	--	0.077	--	--	--	<1	--	<1	--
JUN										
01...	1.1	--	0.063	--	0.044	--	<1	--	<1	--
03...	0.60	--	0.070	--	0.036	--	1	--	<1	--
13...	0.70	0.30	0.045	--	0.023	0.012	--	<1	--	<1.0
JUL										
10...	0.70	0.60	0.031	0.015	0.007	0.003	--	<1	<1	2.0
SEP										
12...	0.80	0.70	0.027	--	0.012	0.017	--	<1	<1	2.0
16...	0.60	--	0.047	--	0.009	--	<1	--	<1	--
17...	0.60	--	0.021	--	0.011	--	<1	--	<1	--
19...	0.80	--	0.064	--	0.007	--	<1	--	<1	--

DATE	CHRO- MIUM, TOTAL RECOV- ERABLE (UG/L AS CR) (01034)	CHRO- MIUM, DIS- SOLVED (UG/L AS CR) (01030)	COPPER, TOTAL RECOV- ERABLE (UG/L AS CU) (01042)	COPPER, DIS- SOLVED (UG/L AS CU) (01040)	IRON, TOTAL RECOV- ERABLE (UG/L AS FE) (01045)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, TOTAL RECOV- ERABLE (UG/L AS PB) (01051)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	MANGA- NESE, TOTAL RECOV- ERABLE (UG/L AS MN) (01055)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)
NOV										
01...	<1	<1	1	<1	910	390	1	<1	80	45
DEC										
14...	--	<1	--	1	920	310	--	<1	40	23
JAN										
24...	<1	<1	2	<10*	770	480	1	<10*	160	49
APR										
25...	--	<1	3	3	1400	690	1	1	60	17
MAY										
11...	<1	--	3	--	1300	660	2	--	90	20
14...	<1	--	3	--	2100	900	2	--	90	10
15...	<1	--	21	--	2000	790	6	--	160	30
31...	2	--	2	--	1800	780	2	--	90	60
JUN										
01...	<1	--	4	--	1500	620	2	--	110	50
03...	2	--	3	--	1300	260	1	--	60	50
13...	--	<1	--	4	1500	910	--	1	120	9
JUL										
10...	1	<1	4	5	640	350	9	<1	80	10
SEP										
12...	<1	<1	2	3	820	410	1	<1	180	23
16...	<1	--	3	--	730	330	1	--	250	80
17...	<1	--	2	--	920	300	2	--	280	20
19...	1	--	3	--	680	300	7	--	120	10

* An alternate analytical method resulted in a change of the minimum reporting level for these constituents.

< Actual value is known to be less than the value shown.

JAMES RIVER BASIN

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02042720 CHICKAHOMINY RIVER ABOVE WALKERS DAM, AT WALKERS, VA--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	MERCURY TOTAL RECOV- ERABLE (UG/L AS HG) (71900)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	NICKEL, TOTAL RECOV- ERABLE (UG/L AS NI) (01067)	ZINC, TOTAL RECOV- ERABLE (UG/L AS ZN) (01092)	ZINC, DIS- SOLVED (UG/L AS ZN) (01090)	CARBON, ORGANIC TOTAL (MG/L AS C) (00680)	CYANIDE TOTAL (MG/L AS CN) (00720)	PHENOLS TOTAL (UG/L) (32730)	OIL AND GREASE, TOTAL RECOV. GRAVI- METRIC (MG/L) (00556)	SEDI- MENT, SUS- PENDED (MG/L) (80154)
NOV 01...	--	<0.1	<1	--	11	9.3	<0.010	<1	<1	4
DEC 14...	--	<0.1	1	--	4	6.7	--	--	--	4
JAN 24...	--	<0.1	1	--	11	5.3	<0.010	<1	<1	--
APR 25...	--	<0.1	2	<10	4	9.9	<0.010	<1	<1	5
MAY 11...	<0.10	--	<1	<10	--	10	<0.010	<1	<1	--
14...	<0.10	--	1	20	--	11	<0.010	2	<1	--
15...	0.10	--	2	<10	--	11	<0.010	1	<1	--
31...	<0.10	--	2	10	--	9.1	<0.010	<1	--	5
JUN 01...	<0.10	--	2	10	--	11	<0.010	1	<1	4
03...	<0.10	--	2	<10	--	10	<0.010	2	<1	5
13...	--	--	2	--	6	13	--	--	--	--
JUL 10...	--	<0.1	4	--	6	11	<0.010	2	<1	--
SEP 12...	--	<0.1	2	--	9	11	<0.010	2	<1	8
16...	<0.10	--	2	<10	--	9.6	<0.010	1	<1	6
17...	<0.10	--	2	10	--	10	<0.010	2	<1	7
19...	<0.10	--	2	<10	--	9.7	<0.010	<1	<1	6

< Actual value is known to be less than the value shown.

JAMES RIVER BASIN

02042726 DIASCUND CREEK AT RT. 628, NEAR NEW KENT, VA

LOCATION.--Lat 37°28'52", long 76°58'21", New Kent County, Hydrologic Unit 02080206, at bridge on State Highway 628, 2.4 mi south of New Kent, and 6.0 mi upstream from Timber Swamp.

DRAINAGE AREA.--9.25 mi².

PERIOD OF RECORD.--October 1985 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	TIME	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE AIR (DEG C) (00020)	TEMPER- ATURE WATER (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	COLOR (PLAT- INUM- COBALT UNITS) (00080)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	ALKA- LITY LAB (MG/L AS CACO3) (90410)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)
NOV											
01...	1330	65	7.0	15.0	16.0	764	70	6.6	67	21	6.1
DEC											
14...	1230	80	7.3	5.0	2.0	769	30	--	--	16	13
JAN											
24...	1230	61	7.5	9.0	8.5	760	55	10.3	89	20	5.2
APR											
25...	1245	76	6.7	27.5	22.5	759	130	7.5	87	28	4.9
JUN											
13...	0915	69	6.5	22.0	18.0	766	120	6.6	70	27	4.7
JUL											
10...	1400	74	6.7	35.0	31.5	761	90	8.3	113	31	5.2
SEP											
11...	1800	70	7.2	29.0	25.5	765	80	8.5	103	30	5.3

DATE	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	IRON, TOTAL RECOV- ERABLE (UG/L AS FE) (01045)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	MANGA- NESE, TOTAL RECOV- ERABLE (UG/L AS MN) (01055)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	CARBON, ORGANIC TOTAL (MG/L AS C) (00680)
NOV											
01...	7.4	<0.010	0.007	0.30	0.076	0.009	--	430	--	42	7.1
DEC											
14...	6.7	0.025	0.014	0.20	0.031	0.011	630	190	50	29	3.5
JAN											
24...	5.5	<0.010	0.009	0.20	0.042	0.005	840	390	120	26	4.2
APR											
25...	1.8	0.010	0.011	0.40	0.052	0.013	2900	1100	80	70	--
JUN											
13...	5.9	0.044	0.050	0.40	0.113	0.035	3600	270	110	80	11
JUL											
10...	5.3	0.040	0.056	0.40	0.125	0.016	4400	130	150	110	8.1
SEP											
11...	6.9	0.029	0.034	0.50	0.091	0.025	4800	2400	260	230	7.2

< Actual value is known to be less than the value shown.

02042734 DIASCUND CREEK RESERVOIR OFF TIMBER SWAMP, NEAR WALKERS, VA

LOCATION.--Lat 37°25'48", long 76°54'19", New Kent County, Hydrologic Unit 02080206, in Diascund Creek Reservoir at mouth of Timber Swamp, 0.3 mi west of bridge on State Highway 603, and 2.1 mi east of Walkers.

PERIOD OF RECORD.--Water years 1983 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	TIME	SAM- FLING DEPTH (FEET) (000003)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE AIR (DEG C) (00020)	TEMPER- ATURE WATER (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)
NOV									
02...	1100	3.00	71	7.3	14.0	16.5	767	9.6	98
02...	1115	10.0	71	7.1	14.0	16.5	767	8.1	82
02...	1130	18.0	74	6.6	14.0	16.5	767	2.2	23
JAN									
23...	1000	3.00	61	7.6	5.5	7.5	766	11.4	95
23...	1015	10.0	63	7.5	5.5	7.5	766	11.2	93
23...	1030	18.0	61	7.3	5.5	7.5	766	10.4	86
APR									
26...	0815	3.00	67	7.8	24.0	20.5	762	10.1	112
26...	0830	10.0	67	7.6	24.0	16.5	762	9.6	98
26...	0845	18.0	75	6.8	24.0	14.0	762	1.8	17
JUN									
12...	0900	3.00	65	7.2	22.5	24.5	766	8.4	100
12...	0915	10.0	65	7.2	22.5	24.5	766	8.3	99
12...	0930	18.0	88	6.5	22.5	18.5	766	0.1	1
JUL									
09...	1000	3.00	60	7.6	34.0	28.0	764	7.6	97
09...	1015	10.0	60	7.0	34.0	27.5	764	5.3	67
09...	1030	18.0	133	6.7	34.0	19.0	764	0.1	1
SEP									
10...	1000	3.00	64	7.0	27.0	26.0	763	6.5	80
10...	1015	10.0	65	6.9	27.0	26.0	763	5.2	64
10...	1030	18.0	229	6.9	21.5	21.5	763	0.1	1

DATE	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS P) (00625)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	CARBON, ORGANIC TOTAL (MG/L AS C) (00680)	CHLORO- PHYLL A FLUORO- METRIC METHOD CORR. (UG/L) (32209)	PHEOPHY- TIN A FLUORO- METRIC METHOD (UG/L) (32213)
NOV									
02...	23	0.013	0.060	0.80	0.039	<0.001	8.3	70.4	8.80
02...	24	0.015	0.137	0.90	0.042	0.003	8.2	24.8	8.20
02...	--	0.022	0.515	1.2	0.039	0.019	8.8	18.4	2.70
JAN									
23...	17	0.015	0.069	0.70	0.036	0.002	--	79.8	9.30
23...	17	<0.010	0.026	0.70	0.037	0.001	--	81.1	4.70
23...	--	0.010	0.038	0.70	0.038	0.001	--	85.3	8.80
APR									
26...	18	0.064	0.046	0.60	0.099	0.057	--	18.4	8.30
26...	18	<0.010	0.009	0.70	0.092	0.008	--	14.9	22.1
26...	--	<0.010	0.038	0.50	0.035	0.002	--	9.90	11.2
JUN									
12...	21	0.032	0.055	0.70	0.034	0.035	--	7.20	6.40
12...	21	<0.010	0.022	0.70	0.018	0.006	8.3	4.40	4.80
12...	--	<0.010	0.231	1.4	0.021	0.006	--	3.30	9.90
JUL									
09...	20	<0.010	0.026	0.90	0.028	<0.001	--	31.1	6.90
09...	22	0.013	0.125	0.80	0.029	0.002	9.6	30.0	9.00
09...	--	0.010	1.40	2.5	0.025	0.006	--	5.00	12.9
SEP									
10...	23	<0.010	0.052	0.60	0.021	0.001	--	37.4	20.0
10...	24	<0.010	0.085	0.60	0.015	<0.001	8.7	40.7	5.50
10...	--	<0.010	4.40	5.6	0.023	0.006	--	28.1	17.5

< Actual value is known to be less than the value shown.

JAMES RIVER BASIN

02042736 BEAVERDAM CREEK AT RT. 632, NEAR BARHAMSVILLE, VA

LOCATION.--Lat 37°28'58", long 76°54'23", New Kent County, Hydrologic Unit 02080206, on State Highway 632, 4.0 mi northwest of Barhamsville, and 4.1 mi upstream from mouth.

DRAINAGE AREA.--4.82 mi².

PERIOD OF RECORD.--October 1985 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	TIME	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE AIR (DEG C) (00020)	TEMPER- ATURE WATER (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	COLOR (PLAT- INUM- COBALT UNITS) (00080)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (MG/L) (00301)	ALKA- LILITY LAB (MG/L AS CACO3) (90410)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)
NOV											
01...	1230	150	7.1	15.5	16.5	764	60	7.0	71	58	10
DEC											
14...	1130	295	7.0	1.0	3.5	769	30	--	--	42	75
JAN											
24...	1145	145	7.5	8.0	8.5	761	80	10.0	85	53	10
APR											
25...	1200	170	7.3	25.0	21.5	759	90	12.2	139	66	10
JUN											
13...	1100	98	6.4	23.0	24.0	766	45	11.5	136	70	9.0
JUL											
10...	1300	143	6.6	31.5	34.0	761	65	0.2	3	65	6.5
SEP											
11...	1700	161	7.4	29.5	27.5	765	90	3.7	47	77	9.3

DATE	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	IRON, TOTAL RECOV- ERABLE (UG/L AS FE) (01045)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	MANGA- NESE, TOTAL RECOV- ERABLE (UG/L AS MN) (01055)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	CARBON, ORGANIC TOTAL (MG/L AS C) (00680)
NOV											
01...	10	<0.010	0.012	0.80	0.065	0.008	--	350	--	60	10
DEC											
14...	7.8	0.058	0.025	0.30	0.029	0.009	940	370	110	90	5.0
JAN											
24...	6.4	<0.010	0.011	0.90	0.031	0.003	1000	300	70	63	4.5
APR											
25...	5.9	<0.010	0.012	0.40	0.020	0.006	2400	900	160	140	--
JUN											
13...	8.7	0.035	0.040	1.6	0.130	0.013	4600	20	220	110	12
JUL											
10...	11	0.067	0.111	0.90	0.166	0.011	4900	840	310	290	10
SEP											
11...	10	0.028	0.107	1.5	0.086	0.059	4200	2400	420	300	11

< Actual value is known to be less than the value shown.

JAMES RIVER BASIN

247

02042742 WAHRANI SWAMP AT RT. 632, NEAR BARHAMSVILLE, VA

LOCATION.--Lat 37°27'30", long 76°51'57", New Kent County, Hydrologic Unit 02080206, on State Highway 632, 1.3 mi west of Barhamsville, and 1.8 mi upstream from Barnes Swamp.

DRAINAGE AREA.--4.02 mi².

PERIOD OF RECORD.--October 1985 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	TIME	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE AIR (DEG C) (00020)	TEMPER- ATURE WATER (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	COLOR (PLAT- INUM- COBALT UNITS) (00080)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	ALKA- LITY LAB (MG/L AS CACO3) (90410)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)
NOV 01...	1130	110	6.9	17.0	15.0	763	200	3.8	38	34	9.0
DEC 14...	1100	78	7.0	8.0	1.5	769	70	--	--	21	8.0
JAN 24...	1100	84	7.3	7.0	8.0	761	65	8.3	70	24	8.5
APR 25...	1100	116	6.4	21.0	21.0	760	65	4.1	46	38	6.3
JUN 13...	1315	64	5.5	24.0	26.0	766	130	2.9	36	46	7.6
JUL 10...	1130	146	6.2	30.0	24.5	761	230	0.1	1	55	11
SEP 11...	1600	137	6.5	29.0	23.5	765	400	0.2	2	50	11

DATE	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS P) (00625)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	IRON, TOTAL RECOV- ERABLE (UG/L AS FE) (01045)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	MANGA- NESE, TOTAL RECOV- ERABLE (UG/L AS MN) (01055)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	CARBON, ORGANIC TOTAL (MG/L AS C) (00680)
NOV 01...	10	<0.010	0.019	1.1	--	0.010	--	400	--	79	13
DEC 14...	8.3	0.138	0.015	0.30	0.070	0.016	2100	870	40	20	6.6
JAN 24...	5.8	0.101	0.026	0.50	0.056	0.012	1700	880	100	21	7.7
APR 25...	1.8	<0.010	0.016	0.90	0.128	0.007	4100	620	230	210	--
JUN 13...	6.3	0.024	0.065	0.80	0.112	0.069	6300	620	970	890	14
JUL 10...	7.0	0.011	0.211	3.8	0.208	0.005	46000	1400	1700	1400	43
SEP 11...	7.9	0.016	0.182	1.0	0.177	0.026	38000	410	930	720	36

< Actual value is known to be less than the value shown.

JAMES RIVER BASIN

02042746 DIASCUND CREEK RESERVOIR OFF PUMP STATION, NEAR WALKERS, VA

LOCATION.--Lat 37°25'51", long 76°53'38", New Kent County, Hydrologic Unit 02080206, in Diascund Creek Reservoir 0.1 mi northwest of city of Newport News pumping station, 0.4 mi east of bridge on State Highway 603, and 2.8 mi east of Walkers.

PERIOD OF RECORD.--Water years 1983 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	TIME	SAM- PLING DEPTH (FEET) (000003)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (000095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE AIR (DEG C) (00020)	TEMPER- ATURE WATER (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	COLOR (PLAT- INUM- COBALT UNITS) (00080)	OXYGEN, DIS- SOLVED (MG/L) (00300)
NOV									
02...	1145	3.00	78	7.3	14.0	16.5	767	26	9.7
02...	1200	10.0	78	7.3	14.0	16.5	767	23	9.3
02...	1215	18.0	79	7.1	14.0	16.0	767	23	8.3
JAN									
23...	1045	3.00	82	7.5	6.0	7.5	766	47	10.4
23...	1100	10.0	82	7.5	6.0	7.5	766	50	11.1
23...	1115	18.0	82	7.4	6.0	7.0	766	45	11.0
APR									
26...	0900	3.00	78	7.9	24.0	19.5	762	18	10.7
26...	0915	10.0	79	7.5	24.0	16.0	762	17	9.6
26...	0930	18.0	80	6.9	24.0	14.5	762	25	4.9
JUN									
12...	1000	3.00	75	6.9	25.0	24.5	766	28	8.7
12...	1015	10.0	75	7.1	25.0	24.5	766	50	8.4
12...	1030	18.0	95	6.4	25.0	19.5	766	25	0.1
JUL									
09...	1045	3.00	68	8.1	36.0	28.0	764	25	8.1
09...	1100	10.0	68	6.8	36.0	27.5	764	20	4.1
09...	1115	18.0	133	6.8	36.0	19.5	764	330	0.1
SEP									
10...	1045	3.00	69	7.1	28.5	26.0	763	28	6.8
10...	1100	10.0	69	7.0	28.0	26.0	763	25	6.1
10...	1115	18.0	201	6.9	28.5	22.0	763	500	0.1

DATE	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	ALKA- LINIT LAB (MG/L AS CACO3) (90410)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)
NOV								
02...	98	26	6.1	3.1	<0.010	0.040	0.80	0.040
02...	95	25	6.1	3.1	<0.010	0.052	0.80	0.040
02...	84	--	--	3.1	<0.010	0.060	0.80	0.028
JAN								
23...	86	22	8.6	3.2	0.028	0.053	0.80	0.035
23...	92	22	8.6	3.2	0.038	0.070	0.60	0.032
23...	90	--	8.5	3.2	0.031	0.054	0.70	0.038
APR								
26...	117	--	7.9	<0.50	<0.010	0.006	0.90	0.022
26...	96	--	8.0	<0.10	<0.010	0.006	0.60	0.013
26...	48	--	8.0	1.1	<0.010	0.015	0.50	0.018
JUN								
12...	103	24	7.3	0.50	<0.010	0.018	0.70	0.017
12...	100	27	7.2	2.2	<0.010	0.134	0.80	0.023
12...	1	--	7.1	<0.50	<0.010	0.017	1.0	0.026
JUL								
09...	103	23	7.0	1.6	0.029	0.018	0.90	0.024
09...	52	23	6.9	1.7	0.038	0.081	1.0	0.024
09...	1	--	7.7	5.1	0.048	1.50	2.1	0.028
SEP								
10...	84	26	6.2	2.7	0.014	0.059	0.60	0.018
10...	75	26	6.5	2.7	0.131	0.053	0.60	0.016
10...	1	--	7.5	8.2	<0.010	4.20	4.9	0.034

< Actual value is known to be less than the value shown.

JAMES RIVER BASIN

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02042746 DIASCUND CREEK RESERVOIR OFF PUMP STATION, NEAR WALKERS, VA--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	IRON, TOTAL RECOV- ERABLE (UG/L AS FE) (01045)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	MANGA- NESE, TOTAL RECOV- ERABLE (UG/L AS MN) (01055)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	CARBON, ORGANIC TOTAL (MG/L AS C) (00680)	CHLORO- PHYLL A FLUORO- METRIC METHOD CORR. (UG/L) (32209)	PHEOPHY -TIN A FLUORO- METRIC METHOD (UG/L) (32213)
NOV								
02...	0.002	--	200	--	17	9.1	76.4	0.00
02...	0.002	--	150	--	4	9.7	72.6	0.00
02...	0.002	--	130	--	28	9.1	39.9	12.9
JAN								
23...	0.001	690	180	100	23	--	41.3	11.5
23...	0.001	710	150	110	22	7.3	41.3	7.00
23...	0.002	670	88	100	21	--	41.8	7.00
APR								
26...	0.003	320	70	60	<10	--	15.4	10.3
26...	0.004	360	60	70	<10	7.4	37.7	17.8
26...	0.001	720	140	280	140	--	17.1	12.0
JUN								
12...	0.003	400	110	130	30	--	1.90	4.00
12...	0.004	1900	1400	930	980	8.7	6.30	9.20
12...	0.008	380	100	60	20	--	0.300	8.00
JUL								
09...	0.002	320	180	70	30	--	12.1	5.10
09...	0.004	390	130	160	80	9.6	25.9	7.50
09...	0.006	12000	950	1600	1600	--	7.20	8.40
SEP								
10...	<0.001	530	750	120	110	--	30.8	20.7
10...	0.002	470	180	130	10	8.6	34.7	5.60
10...	0.011	28000	26000	2500	2500	--	25.9	21.0

< Actual value is known to be less than the value shown.

JAMES RIVER BASIN

0204275430 LITTLE CREEK RESERVOIR (NORTH CENTRAL) NEAR NORGE, VA

LOCATION.--Lat 37°21'43", long 76°49'42", James City County, Hydrologic Unit 02080206, near city of Newport News pumping station in north-central arm of Little Creek Reservoir, 1.8 mi south of Toano, and 3.3 mi west of Norge.

PERIOD OF RECORD.--Water years 1983 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	TIME	SAM- PLING DEPTH (FEET) (000003)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (000095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE AIR (DEG C) (00020)	TEMPER- ATURE WATER (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	COLOR (PLAT- INUM- COBALT UNITS) (00080)	OXYGEN, DIS- SOLVED (MG/L) (00300)
NOV									
02...	1345	3.00	98	7.1	17.0	17.0	762	15	8.7
02...	1400	10.0	98	7.0	17.0	17.0	762	15	8.5
02...	1415	20.0	95	6.8	17.0	16.5	762	22	6.9
02...	1430	30.0	147	6.6	17.0	13.5	762	110	0.8
02...	1445	40.0	185	6.9	17.0	11.0	762	200	0.6
JAN									
23...	1300	3.00	108	7.3	10.0	7.0	766	27	11.2
23...	1315	10.0	108	7.3	10.0	6.5	766	30	11.0
23...	1330	20.0	104	7.3	10.0	6.0	766	30	10.9
23...	1345	30.0	104	7.3	10.0	6.0	766	27	10.9
23...	1400	40.0	110	7.2	10.0	5.5	766	36	10.5
APR									
26...	1200	3.00	97	7.8	27.0	20.0	761	12	11.1
26...	1215	10.0	96	7.9	27.0	16.5	761	13	11.5
26...	1230	20.0	98	7.3	27.0	13.5	761	14	9.0
26...	1245	30.0	106	7.0	27.0	11.5	761	14	5.9
26...	1300	40.0	102	6.8	27.0	11.0	761	30	4.4
JUN									
12...	1315	3.00	90	7.6	34.0	25.0	766	12	9.7
12...	1330	10.0	91	7.7	34.0	24.5	766	9	9.5
12...	1345	20.0	93	6.4	34.0	18.0	766	8	1.6
12...	1350	30.0	98	6.3	34.0	13.5	766	28	0.2
12...	1400	40.0	107	6.2	34.0	12.0	766	39	0.1
JUL									
09...	1430	3.00	83	7.6	36.0	29.5	763	12	8.7
09...	1445	10.0	83	7.5	36.0	28.0	763	25	8.5
09...	1500	20.0	93	6.2	36.0	18.5	763	55	0.3
09...	1515	30.0	110	6.6	36.0	12.5	763	110	0.3
09...	1530	40.0	113	6.7	36.0	12.0	763	120	0.2
SEP									
10...	1400	3.00	83	7.3	32.0	27.5	763	12	8.3
10...	1415	10.0	83	7.2	32.0	26.5	763	22	7.0
10...	1430	20.0	83	6.9	32.0	25.5	763	32	0.3
10...	1445	30.0	125	6.9	32.0	14.0	763	170	0.2
10...	1500	40.0	130	6.9	32.0	12.0	263	230	0.1

JAMES RIVER BASIN

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0204275430 LITTLE CREEK RESERVOIR (NORTH CENTRAL) NEAR NORGE, VA--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)
NOV								
02...	90	21	11	4.3	<0.010	0.012	0.40	0.005
02...	88	21	11	4.2	<0.010	0.008	0.30	0.006
02...	70	--	--	4.8	0.025	0.043	0.50	0.013
02...	7	--	--	5.6	<0.010	0.505	1.0	0.014
02...	6	--	--	6.4	<0.010	1.00	1.4	0.008
JAN								
23...	91	19	14	4.5	0.075	0.058	0.40	0.012
23...	89	18	16	4.4	0.072	0.065	0.50	0.031
23...	87	--	15	3.0	0.067	0.048	0.50	0.012
23...	87	--	14	4.2	0.090	0.061	0.40	0.008
23...	83	--	13	4.4	0.064	0.078	0.50	0.010
APR								
26...	121	20	12	1.7	<0.010	0.010	0.50	0.016
26...	118	20	12	1.5	0.027	0.014	0.40	0.013
26...	87	--	13	2.1	0.025	0.025	0.50	0.005
26...	55	--	13	3.5	0.051	0.176	0.60	0.013
26...	39	--	13	3.7	0.057	0.227	0.70	0.006
JUN								
12...	116	22	12	1.5	<0.010	0.011	0.60	0.011
12...	113	22	12	1.2	<0.010	0.015	1.1	0.007
12...	17	--	13	1.9	<0.010	0.015	0.40	0.006
12...	2	--	13	3.6	<0.010	0.290	0.90	0.007
12...	1	--	14	3.8	<0.010	0.461	1.6	0.006
JUL								
09...	114	22	11	2.0	<0.010	0.008	0.30	0.004
09...	109	23	11	2.5	0.016	0.016	0.50	0.009
09...	3	--	13	2.6	<0.010	0.060	0.60	0.008
09...	2	--	14	4.2	<0.010	0.487	1.1	0.005
09...	2	--	14	4.4	<0.010	0.564	0.80	0.006
SEP								
10...	105	21	8.9	3.9	0.019	0.014	0.70	0.008
10...	87	22	9.7	4.0	<0.010	0.009	0.40	0.006
10...	4	--	10	4.2	<0.010	0.013	0.50	0.008
10...	2	--	1.8	4.3	0.012	0.735	1.0	0.003
10...	3	--	13	5.3	0.013	1.10	1.4	0.008

< Actual value is known to be less than the value shown.

JAMES RIVER BASIN

0204275430 LITTLE CREEK RESERVOIR (NORTH CENTRAL) NEAR NORGE, VA--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	IRON, TOTAL RECOV- ERABLE (UG/L AS FE) (01045)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	MANGA- NESE, TOTAL RECOV- ERABLE (UG/L AS MN) (01055)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	CARBON, ORGANIC TOTAL (MG/L AS C) (00680)	CHLORO- PHYLL A FLUORO- METRIC CORR. (UG/L) (32209)	PHEOPHY -TIN A FLUORO- METRIC METHOD (UG/L) (32213)
NOV								
02...	<0.001	--	410	--	100	6.4	12.9	7.90
02...	<0.001	--	110	--	17	7.1	12.9	5.20
02...	<0.001	--	200	--	9	7.1	8.00	6.20
02...	<0.001	--	5200	--	2100	9.4	18.5	9.90
02...	0.004	--	11000	--	1500	9.0	18.4	11.6
JAN								
23...	<0.001	440	230	50	6	6.5	10.7	2.80
23...	0.001	450	220	60	4	5.9	8.00	1.90
23...	<0.001	440	140	50	3	--	11.5	1.60
23...	<0.001	450	180	50	3	--	11.0	1.90
23...	<0.001	400	180	60	8	--	10.4	0.00
APR								
26...	0.002	130	40	20	10	--	6.30	3.90
26...	0.002	150	40	20	<10	6.5	9.90	6.30
26...	0.002	140	20	30	<10	--	13.8	8.00
26...	0.001	410	80	350	290	--	4.10	4.50
26...	0.001	750	110	500	460	--	5.80	4.50
JUN								
12...	0.002	260	60	30	10	--	10.7	6.10
12...	0.003	220	50	30	<10	7.8	17.9	7.20
12...	0.002	200	20	110	40	--	6.10	2.90
12...	0.002	1500	960	910	960	--	1.80	2.20
12...	0.003	2400	2000	1000	960	--	0.00	0.200
JUL								
09...	0.005	180	70	10	<10	--	10.7	1.20
09...	0.005	320	110	30	<10	8.3	--	--
09...	0.006	1200	670	720	730	--	24.5	15.8
09...	<0.001	4800	4700	1100	1100	--	3.30	3.60
09...	<0.001	5900	5700	1100	1100	--	1.70	2.00
SEP								
10...	<0.001	190	110	20	50	--	15.4	5.10
10...	<0.001	260	80	30	20	7.5	10.2	8.00
10...	<0.001	530	230	650	610	--	12.4	17.7
10...	0.008	27000	7200	1300	1300	--	17.9	12.8
10...	0.009	12000	11000	1300	1300	--	12.9	10.5

< Actual value is known to be less than the value shown.

JAMES RIVER BASIN

253

0204275470 LITTLE CREEK RESERVOIR (SOUTH CENTRAL) NEAR NORGE, VA

LOCATION.--Lat 37°21'17", long 76°50'27", James City County, Hydrologic Unit 02080206, 0.3 mi north of Little Creek Reservoir dam, 0.9 mi southwest of city of Newport News pumping station, 2.7 mi southwest of Toano, and 4.0 mi west of Norge.

PERIOD OF RECORD.--Water years 1983 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	TIME	SAM- PLING DEPTH (FEET) (00003)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE AIR (DEG C) (00020)	TEMPER- ATURE WATER (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)
NOV									
02...	1230	3.00	98	--	18.0	17.0	764	8.6	89
02...	1245	10.0	98	7.1	18.0	17.0	764	8.5	87
02...	1300	20.0	97	6.7	18.0	16.5	764	5.7	58
02...	1315	35.0	140	6.7	18.0	11.5	764	0.1	1
02...	1330	50.0	153	6.8	18.0	10.5	764	0.4	4
JAN									
23...	1145	3.00	95	7.4	9.5	6.0	766	11.0	88
23...	1200	10.0	95	7.4	9.5	6.0	766	10.9	86
23...	1215	20.0	96	7.4	9.5	6.0	766	10.9	86
23...	1230	35.0	97	7.3	9.5	5.5	766	10.7	84
23...	1245	50.0	97	7.3	9.5	5.5	766	10.5	83
APR									
26...	1030	3.00	97	8.0	27.0	20.0	761	10.8	119
26...	1045	10.0	97	7.8	27.0	14.5	761	9.3	91
26...	1100	20.0	97	8.0	27.0	14.5	761	9.3	91
26...	1115	35.0	99	7.2	27.0	11.5	761	5.9	54
26...	1130	50.0	102	7.0	27.0	10.5	761	4.9	44
JUN									
12...	1200	3.00	90	7.8	29.0	25.0	766	9.4	113
12...	1215	10.0	90	7.8	29.0	25.0	766	9.4	113
12...	1230	20.0	92	6.6	29.0	18.0	766	2.1	22
12...	1245	35.0	99	6.4	29.0	12.0	766	0.2	2
12...	1300	50.0	104	6.3	29.0	11.5	766	0.3	3
JUL									
09...	1315	3.00	83	8.0	36.0	29.5	763	8.7	114
09...	1330	10.0	83	8.0	36.0	28.0	763	8.5	109
09...	1345	20.0	90	6.4	36.0	19.0	763	0.1	1
09...	1400	35.0	101	6.5	36.0	12.5	763	0.5	4
09...	1415	50.0	108	6.6	36.0	12.0	763	0.4	4
SEP									
10...	1245	3.00	82	7.4	32.0	27.0	763	8.0	100
10...	1300	10.0	82	7.4	32.0	26.5	763	7.8	97
10...	1315	20.0	87	6.9	32.0	23.5	763	0.2	2
10...	1330	35.0	110	6.7	32.0	12.5	763	0.2	2
10...	1345	50.0	120	6.7	32.0	12.0	763	0.2	2

JAMES RIVER BASIN

0204275470 LITTLE CREEK RESERVOIR (SOUTH CENTRAL) NEAR NORGE, VA--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	CARBON, ORGANIC TOTAL (MG/L AS C) (00680)	CHLORO- PHYLL A FLUORO- METRIC CORR. (UG/L) (32209)	PHEOPHY- TIN A FLUORO- METRIC METHOD (UG/L) (32213)
NOV									
02...	21	<0.010	0.009	0.30	0.008	<0.001	6.8	14.6	2.60
02...	21	<0.010	0.009	0.50	0.006	<0.001	6.7	12.9	3.20
02...	--	0.012	0.054	0.40	0.006	<0.001	6.6	21.2	1.30
02...	--	0.085	0.560	1.0	0.008	<0.001	7.0	13.2	7.90
02...	--	0.018	0.650	1.1	0.019	0.008	8.0	8.50	7.60
JAN									
23...	20	0.094	0.206	0.60	0.009	0.001	--	4.70	4.90
23...	20	0.057	0.120	0.50	0.064	<0.001	--	5.50	4.70
23...	--	0.059	0.118	0.50	0.009	<0.001	--	6.30	1.90
23...	--	0.057	0.113	0.50	0.008	0.002	--	2.50	3.50
23...	--	0.056	0.122	0.50	0.008	0.003	--	5.80	2.10
APR									
26...	20	0.024	0.056	0.60	0.096	0.001	--	5.80	3.50
26...	20	0.018	0.012	0.50	0.057	<0.001	--	7.20	5.10
26...	--	0.078	0.025	0.60	0.015	0.001	--	--	--
26...	--	0.050	0.113	0.70	0.019	0.002	--	15.7	6.80
26...	--	0.107	0.196	0.70	0.014	0.007	--	--	--
JUN									
12...	22	0.040	0.119	0.90	0.010	0.008	--	4.00	2.80
12...	22	<0.010	0.030	1.5	0.007	0.004	7.2	6.30	3.60
12...	22	<0.044	0.050	0.40	0.113	0.035	8.7	4.80	3.40
12...	--	0.016	0.242	0.80	0.008	0.005	--	5.00	4.00
12...	--	<0.010	0.440	1.1	0.008	0.005	--	0.400	2.20
JUL									
09...	22	<0.010	0.032	0.40	0.005	0.006	--	5.00	3.00
09...	22	<0.010	0.039	0.70	0.009	0.005	7.8	23.9	6.10
09...	--	<0.010	0.015	0.60	0.009	0.005	--	6.30	7.20
09...	--	<0.010	0.398	0.60	0.007	<0.001	--	1.00	3.00
09...	--	<0.010	0.493	0.90	0.007	0.001	--	0.600	1.90
SEP									
10...	23	<0.010	0.016	0.50	0.006	<0.001	--	9.40	6.80
10...	22	<0.010	0.019	0.50	0.006	0.001	7.6	11.8	5.30
10...	--	<0.010	0.022	0.60	0.017	<0.001	--	70.4	18.7
10...	--	0.013	0.570	1.1	0.005	0.027	--	56.1	39.6
10...	--	0.018	0.830	1.3	0.005	0.019	--	6.30	7.90

< Actual value is known to be less than the value shown.

GREAT DISMAL SWAMP BASIN

255

02043500 CYPRESS SWAMP AT CYPRESS CHAPEL, VA

LOCATION.--Lat 36°37'24", long 76°36'07", Suffolk City, Hydrologic Unit 03010205, near center of span on downstream side of bridge on State Highway 32, 0.5 mi downstream from Dragon Swamp, 0.8 mi northwest of Cypress Chapel, and 6.5 mi south of downtown Suffolk.

DRAINAGE AREA.--23.8 mi².

PERIOD OF RECORD.--October 1953 to September 1971, March 1978 to current year.

GAGE.--Water-stage recorder. Datum of gage is 28.65 ft above National Geodetic Vertical Datum of 1929. October 1953 to September 1971, recording gage on right bank 30 ft upstream at same datum.

REMARKS.--Records good except for period with ice effect, Dec. 17-31, which is fair. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

AVERAGE DISCHARGE.--30 years, 26.6 ft³/s, 15.18 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,330 ft³/s, Aug. 11, 1967, gage height, 6.85 ft; no flow at times each year.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 200 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Oct. 3	0230	265	4.50	Dec. 14	0130	222	4.36
Nov. 24	0030	*309	*4.68	Apr. 4	0030	229	4.36
Dec. 10	1330	262	4.52				

No flow part or all of June to September.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	11	15	27	39	20	24	55	13	18	.00	.00	.00
2	84	15	22	52	16	20	58	9.7	8.3	.00	.00	.00
3	223	45	19	45	14	33	162	5.5	3.7	.00	.00	.00
4	101	77	17	33	15	56	197	4.2	8.0	.00	.00	.00
5	45	52	17	29	28	44	114	4.0	14	.00	.00	.00
6	27	30	16	34	30	31	69	9.4	3.8	.00	.00	.00
7	17	22	12	55	29	24	55	7.5	1.3	.00	.00	.00
8	11	18	23	72	34	20	52	4.5	.53	.00	.00	.00
9	7.3	22	141	135	30	15	43	2.6	.23	.00	.00	.00
10	5.2	44	249	102	84	14	36	6.3	.05	.00	.00	.00
11	3.6	43	199	64	137	13	32	30	.02	.00	.00	.00
12	2.4	32	145	49	77	12	29	24	.00	.00	.00	.00
13	1.6	23	181	39	46	10	24	11	.00	.00	.00	.00
14	1.1	18	205	29	35	9.1	21	11	.00	.00	.00	.00
15	1.0	18	134	24	27	7.3	19	19	.00	.00	.00	.00
16	.76	38	83	22	26	6.2	18	9.5	.00	.00	.00	.00
17	.57	60	e62	20	63	5.8	15	13	.00	.00	.00	.00
18	.93	47	e48	18	65	68	16	1.5	.00	.00	.00	.00
19	17	30	e41	17	65	88	16	.38	.00	.00	.00	.00
20	41	23	e37	14	104	54	13	.08	.00	.00	.00	.00
21	42	19	e34	20	70	49	13	.06	.00	.00	.00	.00
22	36	17	e31	31	43	34	57	1.3	.00	.00	.00	.00
23	23	175	e29	27	67	25	54	11	.00	.00	.00	.00
24	13	261	e26	21	89	20	34	16	.00	.00	.00	.00
25	9.7	129	e24	18	78	17	24	8.0	.00	.00	.00	.00
26	7.3	73	e22	26	46	17	16	4.5	.00	.00	.00	.00
27	5.6	55	e20	40	33	16	11	43	.00	.00	.00	.00
28	4.3	45	e19	33	28	12	7.2	78	.00	.00	.00	.00
29	3.9	38	e21	25	---	10	5.4	54	.00	.00	.00	.00
30	3.5	32	e23	25	---	42	7.0	84	.00	.00	.00	.00
31	7.8	---	e26	24	---	58	---	39	---	.00	.00	---
TOTAL	757.56	1516	1953	1182	1399	854.4	1272.6	525.02	57.93	0.00	0.00	0.00
MEAN	24.4	50.5	63.0	38.1	50.0	27.6	42.4	16.9	1.93	.000	.000	.000
MAX	223	261	249	135	137	88	197	84	18	.00	.00	.00
MIN	.57	15	12	14	14	5.8	5.4	.06	.00	.00	.00	.00
CFSM	1.03	2.12	2.65	1.60	2.10	1.16	1.78	.71	.08	.00	.00	.00
IN.	1.18	2.37	3.05	1.85	2.19	1.34	1.99	.82	.09	.00	.00	.00

CAL YR 1989 TOTAL 15297.60 MEAN 41.9 MAX 414 MIN .00 CFSM 1.76 IN. 23.91
WTR YR 1990 TOTAL 9517.51 MEAN 26.1 MAX 261 MIN .00 CFSM 1.10 IN. 14.88

e Estimated.

LOCATION.--Lat 36°35'42", long 76°26'23", Chesapeake City, Hydrologic Unit 03010205, on right bank in outlet canal, 200 ft upstream from dam and gates, 0.5 mi downstream from Lake Drummond, 3.1 mi north of North Carolina State line, and 20 mi southwest of Norfolk.

REVISÉD RECORDS.--WSP 1032: 1934-43.

REMARKS.--Mean daily gage heights are shown in table below.

EXTREMES FOR CURRENT YEAR.--Maximum gage height. 5.30 ft. Mar. 18; minimum. 4.17 ft. Sept. 30.

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	5.16	5.20	5.07	5.14	5.02	5.20	5.20	5.18	5.18	5.02	4.64	4.55
2	5.16	5.13	5.18	5.20	5.02	5.20	5.26	5.10	5.24	5.06	4.64	4.50
3	5.17	5.18	5.20	5.20	5.02	5.22	5.26	5.06	5.28	5.04	4.60	4.50
4	5.16	5.18	5.14	5.22	5.02	5.22	5.26	5.08	5.24	5.03	4.60	4.47
5	5.16	5.16	5.08	5.18	5.02	5.22	5.26	5.08	5.28	5.00	4.54	4.43
6	5.16	5.14	5.08	5.18	5.04	5.18	5.26	5.20	5.22	4.93	4.51	4.41
7	5.20	5.10	5.00	5.18	5.06	5.18	5.26	5.20	5.20	4.93	4.50	4.41
8	5.20	5.12	5.00	5.10	5.09	5.14	5.14	5.24	5.20	4.91	4.50	4.40
9	5.20	5.16	5.08	5.09	5.07	5.14	5.20	5.25	5.18	4.92	4.58	4.35
10	5.15	5.16	5.09	5.10	5.20	5.11	5.18	5.15	5.16	4.91	4.56	4.35
11	5.16	5.14	5.00	5.08	5.16	5.08	5.18	5.20	5.15	4.83	4.58	4.35
12	5.20	5.14	5.00	5.06	5.18	5.04	5.20	5.15	5.12	4.95	4.56	4.31
13	5.20	5.10	5.16	5.10	5.18	5.10	5.20	5.18	5.14	4.90	4.51	4.29
14	5.20	5.11	5.20	5.08	5.18	5.14	5.19	5.20	5.14	4.86	4.49	4.46
15	5.20	5.15	5.20	5.08	5.20	5.18	5.19	5.24	5.10	4.93	4.57	4.47
16	5.20	5.10	5.20	5.10	5.20	5.18	5.15	5.28	5.10	4.88	4.60	4.44
17	5.11	5.19	5.25	5.08	5.20	5.16	5.16	5.19	5.10	4.80	4.60	4.44
18	5.15	5.18	5.17	5.08	5.05	5.30	5.16	5.19	5.10	4.83	4.52	4.39
19	5.20	5.11	5.14	5.04	5.22	5.26	5.09	5.14	5.16	4.82	4.60	4.36
20	5.19	5.12	5.12	5.02	5.24	5.26	5.20	5.15	5.14	4.82	4.60	4.31
21	5.10	5.20	5.10	5.02	5.25	5.26	5.28	5.20	5.16	4.80	4.60	4.34
22	5.07	5.12	5.05	5.06	5.21	5.22	5.29	5.18	5.14	4.80	4.56	4.31
23	5.10	5.25	4.88	5.03	5.23	5.24	5.29	5.28	5.18	4.73	4.59	4.34
24	5.10	5.10	5.00	5.09	5.20	5.20	5.26	5.25	5.16	4.73	4.63	4.29
25	5.21	5.00	5.00	5.00	5.19	5.22	5.20	5.24	5.13	4.71	4.64	4.26
26	5.24	5.18	4.88	5.15	5.09	5.20	5.18	5.19	5.10	4.65	4.64	4.23
27	5.20	5.19	4.80	5.10	5.10	5.18	5.16	5.26	5.08	4.63	4.66	4.24
28	5.20	5.25	4.85	5.10	5.19	5.18	5.17	5.26	5.04	4.61	4.66	4.22
29	5.18	5.16	4.94	5.04	---	5.14	5.20	5.20	5.02	4.61	4.61	4.20
30	5.14	5.16	5.00	5.03	---	5.20	5.25	5.20	5.00	4.61	4.64	4.17
31	5.20	---	5.00	5.07	---	5.20	---	5.14	---	4.60	4.59	---
MEAN	5.17	5.15	5.06	5.10	5.14	5.19	5.21	5.19	5.15	4.83	4.58	4.36
MAX	5.24	5.25	5.25	5.22	5.25	5.30	5.29	5.28	5.28	5.06	4.66	4.55
MIN	5.07	5.00	4.80	5.00	5.02	5.04	5.09					

02044500 NOTTOWAY RIVER NEAR RAWLINGS, VA

LOCATION.--Lat 36°59'00", long 77°48'00", Brunswick County, Hydrologic Unit 03010201, on right bank at downstream side of bridge on State Highway 612 at Harpers Bridge, 0.1 mi upstream from Beaver Pond Creek, and 2.6 mi northwest of Rawlings.

DRAINAGE AREA.--309 mi².

PERIOD OF RECORD.--October 1950 to current year.

REVISED RECORDS.--WSP 2104: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 184.88 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records good except those for period with ice effect, Dec. 17-22, and periods of no gage-height record, Dec. 23-26 and Apr. 9 to May 7, which are fair. Several measurements of water temperature were made during the year.

COOPERATION.--Records were provided by the Virginia Water Control Board.

AVERAGE DISCHARGE.--40 years, 310 ft³/s, 13.62 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 29,900 ft³/s, Oct. 6, 1972, gage height, 23.25 ft, from rating curve extended above 16,000 ft³/s on basis of slope-area measurement of peak flow; minimum, 0.40 ft³/s, Oct. 14, 15, 1954; minimum gage height, 1.83 ft, Oct. 15, 1954.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in August 1940 reached a stage of 20.8 ft, discharge, about 19,000 ft³/s, from information by local resident.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 2,500 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
May 31	0530	*3,210	*8.38	Aug. 25	0800	2,970	8.04

Minimum discharge, 16 ft³/s, Aug. 5, 6, gage height, 2.31 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	165	142	206	1370	323	290	585	e315	633	61	23	73
2	581	145	197	2280	297	279	1020	e270	407	59	22	61
3	791	267	193	1210	286	333	1700	e240	335	54	19	56
4	411	437	181	564	372	540	702	e220	302	50	18	51
5	253	316	175	494	559	480	500	e290	268	47	16	45
6	193	240	177	500	447	361	654	e470	238	44	16	42
7	163	206	178	538	359	313	970	e308	219	40	18	40
8	142	191	187	548	325	284	645	245	211	37	29	41
9	132	258	228	1070	302	273	e560	215	208	37	52	41
10	126	324	231	1160	343	270	e500	416	200	39	177	43
11	116	285	217	610	614	263	e450	851	190	38	216	45
12	111	241	260	456	603	255	e415	648	174	50	136	43
13	105	210	593	370	409	251	e390	391	157	76	89	39
14	105	193	669	318	340	245	e380	313	146	141	71	43
15	105	184	471	295	309	237	e365	274	143	163	68	52
16	103	196	402	282	467	233	e760	253	139	155	62	54
17	100	215	e365	270	1150	238	e575	238	139	113	60	49
18	104	226	e315	262	831	289	e415	220	133	114	56	41
19	230	203	e275	256	609	334	e350	200	135	116	51	35
20	495	187	e250	245	737	287	e300	189	129	87	46	33
21	412	180	e220	259	573	259	e320	186	124	67	44	32
22	277	176	e200	276	446	259	e390	231	123	56	46	32
23	210	313	e190	260	489	243	e350	508	129	48	59	35
24	177	466	e178	241	501	227	e300	505	120	40	1190	36
25	159	405	e170	286	399	220	e275	315	107	34	2420	33
26	148	320	e175	738	328	224	e260	262	91	29	464	32
27	140	278	178	1300	302	228	e245	335	81	25	245	29
28	138	254	181	764	299	217	e235	482	74	25	167	26
29	137	234	188	480	---	233	e230	821	70	24	136	25
30	136	219	211	407	---	367	e380	1970	65	25	104	24
31	141	---	329	367	---	497	---	2600	---	24	87	---
TOTAL	6606	7511	7990	18476	13019	9029	15221	14781	5490	1918	6207	1231
MEAN	213	250	258	596	465	291	507	477	183	61.9	200	41.0
MAX	791	466	669	2280	1150	540	1700	2600	633	163	2420	73
MIN	100	142	170	241	286	217	230	186	65	24	16	24
CFSM	.68	.81	.83	1.93	1.50	.94	1.64	1.54	.59	.20	.65	.13
IN.	.80	.90	.96	2.22	1.57	1.09	1.83	1.78	.66	.23	.75	.15

CAL YR 1989 TOTAL 122471 MEAN 336 MAX 2770 MIN 56 CFSM 1.09 IN. 14.74
WTR YR 1990 TOTAL 107479 MEAN 294 MAX 2600 MIN 16 CFSM .95 IN. 12.94

e Estimated.

CHOWAN RIVER BASIN

02045500 NOTTOWAY RIVER NEAR STONY CREEK, VA

LOCATION.--Lat 36°54'00", long 77°24'00", Sussex County, Hydrologic Unit 03010201, on left bank 15 ft downstream from bridge on U.S. Highway 301, 1.8 mi upstream from Island Swamp, 3.3 mi south of town of Stony Creek, and 4.4 mi upstream from Stony Creek.

DRAINAGE AREA.--579 mi².

PERIOD OF RECORD.--October 1929 to current year. Monthly discharge only for some periods, published in WSP 1303.

REVISED RECORDS.--WSP 802: 1935(M). WSP 972: 1931(M), 1932, 1934-35, 1939. WSP 2104: Drainage area. WDR VA-74-1: 1972.

GAGE.--Water-stage recorder. Datum of gage is 58.42 ft above National Geodetic Vertical Datum of 1929. Prior to Oct. 11, 1934, nonrecording gage at same site and datum.

REMARKS.--Records good except those for period with ice effect, Dec. 18-29, and periods of doubtful gage-height record, Jan. 12-17, Jan. 28 to Feb. 3, Feb. 8, 9, 15, 16, 19, 21, 22, Feb. 26 to Mar. 2, Mar. 6-13, Apr. 6, 11-16, 19-21, 23-30, May 2-4, 7, 8, June 24-26, July 5-9, 16-18, July 26 to Aug. 6, Aug. 17-21, and Sept. 28-30, which are fair. Diurnal fluctuation at low flow caused by Baskerville Mill, 33 mi upstream. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

COOPERATION.--Records were provided by the Virginia Water Control Board.

AVERAGE DISCHARGE.--61 years, 564 ft³/s, 13.23 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 25,200 ft³/s, Aug. 17, 1940, gage height, 23.66 ft, from rating curve extended above 13,000 ft³/s; minimum 3.4 ft³/s, Aug. 15, 16, 1977; minimum gage height, 0.62 ft, Sept. 2, 5, 1932.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 3,500 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Jan. 2	1000	*4,560	*14.56	Aug. 10	0545	4,050	13.91

Minimum daily discharge, 26 ft³/s, Aug. 6.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	274	247	402	2510	e720	e590	1580	631	2590	93	e37	120
2	547	252	379	4460	e650	e570	1600	e580	838	88	e34	103
3	1160	432	372	3930	e610	718	2860	e500	613	82	e32	90
4	976	708	360	1990	783	912	3280	e430	555	79	e28	81
5	564	695	336	1230	1080	1030	2380	572	492	e75	e27	73
6	386	523	333	1130	1090	e810	e1100	793	427	e70	e26	67
7	303	420	331	1200	933	e700	1310	e700	381	e64	198	63
8	256	375	346	1240	e820	e650	1530	e582	350	e60	155	60
9	223	574	412	1980	e760	e610	1520	481	340	e54	1050	58
10	203	1310	459	2120	918	e595	1150	459	323	66	3100	60
11	196	776	471	1610	1530	e590	e900	1440	305	57	881	60
12	185	584	580	e1110	1380	e575	e760	1340	284	63	418	59
13	178	482	1290	e880	1130	e559	e720	954	258	69	273	57
14	173	419	1430	e760	930	543	e700	723	234	129	209	57
15	170	386	1120	e700	e830	527	e680	612	218	209	169	57
16	168	371	950	e660	e770	515	e860	545	208	e210	142	63
17	165	391	831	e603	1460	525	1310	502	201	e175	e125	65
18	174	397	e640	583	1770	863	1010	461	198	e125	e120	62
19	345	394	e550	573	e1400	846	e780	424	197	125	e110	56
20	992	361	e500	550	1560	710	e540	398	196	135	e105	51
21	963	339	e450	548	e1360	621	e510	379	187	102	e105	49
22	670	328	e420	600	e1100	575	753	414	173	81	103	49
23	474	757	e380	586	1020	559	e700	859	181	67	117	49
24	364	1110	e350	547	1080	529	e580	910	e160	56	654	50
25	309	884	e320	575	1010	507	e510	679	e139	49	2310	50
26	278	707	e340	1250	e800	509	e475	506	e130	e47	2060	51
27	258	586	e355	1830	e660	511	e450	787	125	e43	509	48
28	245	514	e365	e1810	e620	497	e435	982	112	e42	305	e46
29	237	475	e400	e1100	---	501	e420	1860	104	e38	218	e44
30	235	434	470	e930	---	756	e470	2780	98	e35	184	e42
31	238	---	639	e800	---	1260	---	2900	---	e36	144	---
TOTAL	11909	16231	16581	40395	28774	20263	31873	26183	10617	2624	13948	1840
MEAN	384	541	535	1303	1028	654	1062	845	354	84.6	450	61.3
MAX	1160	1310	1430	4460	1770	1260	3280	2900	2590	210	3100	120
MIN	165	247	320	547	610	497	420	379	98	35	26	42
CFSM	.66	.93	.92	2.25	1.77	1.13	1.83	1.46	.61	.15	.78	.11
IN.	.77	1.04	1.07	2.60	1.85	1.30	2.05	1.68	.68	.17	.90	.12

CAL YR 1989 TOTAL 245084 MEAN 671 MAX 4360 MIN 95 CFSM 1.16 IN. 15.75
WTR YR 1990 TOTAL 221238 MEAN 606 MAX 4460 MIN 26 CFSM 1.05 IN. 14.21

e Estimated.

02046000 STONY CREEK NEAR DINWIDDIE, VA

LOCATION.--Lat 37°04'01", long 77°36'10", Dinwiddie County, Hydrologic Unit 03010201, on right bank at upstream side of upstream bridge on U.S. Highway 1, 1.2 mi southwest of Dinwiddie, 1.7 mi downstream from Chamberlains Bed Creek, and 5.7 mi downstream from confluence of White Oak and Butterwood Creeks.

DRAINAGE AREA.--112 mi².

PERIOD OF RECORD.--September 1946 to current year. Published as "at Dinwiddie" September 1946 to September 1947 and October 1949 to September 1950.

REVISED RECORDS.--WSP 1303: 1947(M). WSP 1433: 1951(M). WSP 2104: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 129.94 ft above National Geodetic Vertical Datum of 1929. Prior to June 12, 1957, nonrecording gage and crest-stage gage at same site and datum.

REMARKS.--Records good except those for periods of doubtful gage-height record, July 3-10, Aug. 4-7, and Sept. 10-30, which are fair. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

COOPERATION.--Records were provided by the Virginia Water Control Board.

AVERAGE DISCHARGE.--44 years, 112 ft³/s, 13.58 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 11,400 ft³/s, Oct. 6, 1972, gage height, 20.84 ft, from rating curve extended above 5,800 ft³/s on basis of contracted-opening measurement of peak flow; no flow for part of Oct. 13, 1954.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 1,200 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Jan. 1	1730	*1,150	*8.06	No peak equal to or greater than base discharge.			

Minimum daily discharge, 2.0 ft³/s, Sept. 29, 30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	96	49	82	900	120	111	245	89	131	6.3	5.8	14
2	535	50	78	862	112	105	294	78	92	6.0	4.8	12
3	481	160	76	401	108	167	619	65	76	e5.7	4.3	11
4	244	158	71	250	179	274	399	60	66	e5.5	e4.0	9.5
5	129	122	69	217	261	187	208	64	56	e5.3	e3.8	8.8
6	94	96	69	229	175	144	146	100	49	e5.1	e3.6	8.4
7	77	83	68	256	144	122	232	88	44	e4.7	e7.5	8.0
8	64	78	71	281	132	107	238	68	39	e4.6	12	7.3
9	55	283	90	496	117	107	165	56	37	e4.5	147	7.0
10	49	327	89	361	158	109	133	361	36	e4.5	184	e6.5
11	44	190	90	244	241	100	123	571	34	15	86	e6.0
12	42	132	142	192	175	94	110	322	28	18	59	e5.5
13	39	104	369	158	137	89	98	151	24	26	39	e5.0
14	38	92	295	136	119	85	90	105	22	93	27	e10
15	38	87	205	126	108	83	154	85	20	55	20	e9.5
16	37	88	214	121	242	80	268	73	19	46	17	e8.5
17	34	92	157	115	595	81	178	64	18	33	15	e8.2
18	34	86	125	116	329	121	126	56	17	33	14	e7.8
19	103	78	104	110	279	112	101	48	17	45	13	e7.2
20	199	73	98	102	287	97	91	43	16	67	12	e6.0
21	194	69	89	109	197	88	89	40	15	40	12	e5.0
22	129	67	80	120	161	80	108	60	14	25	12	e4.3
23	93	335	75	110	206	75	102	105	15	17	13	e3.6
24	75	291	68	103	220	70	91	97	16	14	97	e3.3
25	65	191	63	161	170	68	81	77	14	11	131	e3.0
26	58	147	66	491	131	71	75	64	12	9.5	84	e2.6
27	54	121	71	354	118	71	69	126	11	7.8	46	e2.3
28	51	105	71	223	115	68	63	134	9.3	7.2	29	e2.2
29	50	97	76	170	---	72	61	392	8.1	6.0	21	e2.0
30	48	89	96	157	---	129	99	438	6.8	5.4	18	e2.0
31	48	---	226	138	---	196	---	254	---	5.7	16	---
TOTAL	3297	3940	3543	7809	5336	3363	4856	4334	962.2	631.8	1157.8	196.5
MEAN	106	131	114	252	191	108	162	140	32.1	20.4	37.3	6.55
MAX	535	335	369	900	595	274	619	571	131	93	184	14
MIN	34	49	63	102	108	68	61	40	6.8	4.5	3.6	2.0
CFSM	.95	1.17	1.02	2.25	1.70	.97	1.45	1.25	.29	.18	.33	.06
IN.	1.10	1.31	1.18	2.59	1.77	1.12	1.61	1.44	.32	.21	.38	.07

CAL YR 1989 TOTAL 56278.7 MEAN 154 MAX 1240 MIN 8.5 CFSM 1.38 IN. 18.69
WTR YR 1990 TOTAL 39426.3 MEAN 108 MAX 900 MIN 2.0 CFSM .96 IN. 13.10

e Estimated.

CHOWAN RIVER BASIN

02047000 NOTTOWAY RIVER NEAR SEBRELL, VA
(National stream-quality accounting network station)

LOCATION.--Lat 36°46'13", long 77°09'59", Southampton County, Hydrologic Unit 03010201, on right bank 1,000 ft upstream from bridge on State Highway 653, 1 mi downstream from Three Creek, 2.5 mi southwest of Sebrell, and 5.5 mi upstream from Assamoosick Swamp.

DRAINAGE AREA.--1,421 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--September 1941 to current year.

REVISED RECORDS.--WSP 1333: 1942, 1944, 1948-49. WSP 2104: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 5.94 ft above National Geodetic Vertical Datum of 1929. Prior to Aug. 23, 1950, nonrecording gage at same site and datum.

REMARKS.--Records good except for period with ice effect, Dec. 16-26, which is fair.

AVERAGE DISCHARGE.--49 years, 1,374 ft³/s, 13.13 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 26,000 ft³/s, July 19, 1975, gage height, 24.43 ft; minimum, 4.0 ft³/s, Oct. 25, 1981; minimum gage height, 2.82 ft, Oct. 24-25, 1981.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 6,570 ft³/s, Jan. 6, gage height, 16.30 ft; minimum, 70 ft³/s, Aug. 6, gage height, 3.11 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	826	445	1180	1780	2760	1980	2370	893	4010	161	89	675
2	738	441	1040	2690	2300	1810	3040	988	4600	150	83	485
3	993	589	940	3410	1960	1720	3650	943	4780	136	81	377
4	1710	826	876	4310	1790	1770	4340	852	3820	126	82	305
5	1990	1320	826	5780	1850	2060	5000	779	2260	118	77	256
6	1630	1410	777	6500	2190	2310	5410	881	1340	112	72	222
7	1060	1220	743	5870	2450	2240	5680	1250	976	113	282	201
8	771	1020	764	4720	2360	1950	5170	1360	802	111	1050	183
9	614	944	908	4030	2140	1690	4260	1100	956	106	1040	169
10	512	1090	1080	3930	2020	1520	3750	948	954	99	2270	153
11	442	1900	1250	4170	2310	1430	3400	1100	803	94	3330	142
12	394	2220	1380	4490	2900	1340	2860	1840	643	114	4410	135
13	359	1930	1820	4560	3300	1270	2320	2440	550	120	5760	128
14	332	1450	2520	3950	3470	1210	1930	2460	482	125	5830	128
15	311	1130	3030	3060	3190	1150	1660	1740	426	216	4110	131
16	295	980	e3200	2370	2710	1090	1540	1130	385	518	2090	130
17	285	907	e3000	1980	2840	1040	1810	859	354	576	1050	125
18	289	872	e2500	1770	3310	1250	2180	714	331	447	636	121
19	472	857	e2050	1630	3990	1820	2090	612	323	344	499	116
20	650	818	e1670	1530	4650	2220	1660	528	312	270	427	113
21	1410	761	e1330	1470	4790	2070	1390	467	292	277	379	107
22	1700	706	e1150	1450	4540	1830	1320	475	284	343	348	99
23	1520	913	e1100	1490	4100	1610	1360	700	275	301	334	96
24	1170	1520	e1170	1470	3540	1370	1380	1230	269	221	796	90
25	925	2310	e1320	1460	3190	1200	1310	1490	257	168	2750	88
26	767	2560	e1400	1590	2960	1100	1170	1300	247	134	4440	85
27	647	2360	1340	2160	2610	1060	1040	1270	227	118	5100	85
28	560	1970	1220	2770	2230	1030	933	1580	208	111	4830	83
29	503	1630	1170	3140	---	1020	861	2240	187	105	3490	81
30	464	1360	1150	3380	---	1190	879	2830	169	121	1930	77
31	447	---	1240	3220	---	1640	---	3400	---	99	1070	---
TOTAL	24786	38459	45144	96130	82450	47990	75763	40399	31522	6054	58735	5186
MEAN	800	1282	1456	3101	2945	1548	2525	1303	1051	195	1895	173
MAX	1990	2560	3200	6500	4790	2310	5680	3400	4780	576	5830	675
MIN	285	441	743	1450	1790	1020	861	467	169	94	72	77
CFSM	.56	.90	1.02	2.18	2.07	1.09	1.78	.92	.74	.14	1.33	.12
IN.	.65	1.01	1.18	2.52	2.16	1.26	1.98	1.06	.83	.16	1.54	.14

CAL YR 1989 TOTAL 697331 MEAN 1910 MAX 8350 MIN 161 CFSM 1.34 IN. 18.26
WTR YR 1990 TOTAL 552618 MEAN 1514 MAX 6500 MIN 72 CFSM 1.07 IN. 14.47

e Estimated.

02047000 NOTTOWAY RIVER NEAR SEBRELL, VA--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1947, 1978 to current year.

PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: October 1946 to September 1947.

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	PH (STAND-ARD UNITS) (00400)	TEMPER-ATURE WATER (DEG C) (00010)	BARO-METRIC PRES-SURE (MM OF HG) (00025)	TUR-BID-ITY (NTU) (00076)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	STREP-TOCOCOCCI, FECAL, KF AGAR (COLS. PER 100 ML) (31673)
NOV 16...	1000	963	69	6.6	15.0	739	5.0	8.0	82	64	48
FEB 22...	1500	4220	55	6.4	8.5	753	8.6	10.0	86	120	200
MAY 16...	1100	1090	64	6.9	19.5	755	4.5	7.2	79	56	90
AUG 24...	0900	280	80	6.8	23.0	753	4.6	6.4	76	230	580

DATE	HARD-NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	ALKA-LINITY LAB (MG/L AS CACO3) (90410)	ALKA-LINITY WAT DIS TOT IT FIELD (MG/L AS CACO3) (39086)	BICAR-BONATE WATER DIS IT FIELD (MG/L AS HCO3) (00453)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)
NOV 16...	19	4.8	1.8	4.9	2.6	17	16	20	5.0	6.8	0.10
FEB 22...	16	4.1	1.4	3.9	1.6	12	10	12	5.0	5.1	0.10
MAY 16...	23	6.2	1.9	4.6	1.3	19	18	23	3.3	3.5	<0.10
AUG 24...	27	7.3	2.0	5.2	1.7	21	20	24	6.1	7.1	<0.10

DATE	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N) (00608)	NITRO-GEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITRO-GEN, AM-MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS-PHORUS TOTAL (MG/L AS P) (00665)	PHOS-PHORUS DIS-SOLVED (MG/L AS P) (00666)	PHOS-PHORUS ORTHO, DIS-SOLVED (MG/L AS P) (00671)
NOV 16...	15	59	52	<0.010	<0.100	0.020	0.020	0.40	0.060	0.030	0.030
FEB 22...	8.7	46	37	<0.010	<0.100	0.010	0.030	0.50	0.040	<0.010	<0.010
MAY 16...	12	56	46	<0.010	0.200	0.030	0.040	0.40	0.060	0.040	0.020
AUG 24...	14	70	58	<0.010	0.300	0.040	0.040	0.50	0.060	0.040	0.020

< Actual value is known to be less than the value shown.

CHOWAN RIVER BASIN

02047000 NOTTOWAY RIVER NEAR SEBRELL, VA--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	ALUM- INUM, DIS- SOLVED (UG/L AS AL) (01106)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BARIUM, DIS- SOLVED (UG/L AS BA) (01005)	BERYL- LIUM, DIS- SOLVED (UG/L AS BE) (01010)	CADMIUM DIS- SOLVED (UG/L AS CD) (01025)	CHRO- MIUM, DIS- SOLVED (UG/L AS CR) (01030)	COBALT, DIS- SOLVED (UG/L AS CO) (01035)	COPPER, DIS- SOLVED (UG/L AS CU) (01040)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)
NOV 16...	60	<1	27	<0.5	1.0	<1	<3	<1	640	<1	<4
FEB 22...	170	<1	27	<0.5	1.0	<5*	<3	<10*	510	<10*	<4
MAY 16...	50	<1	24	0.7	<1.0	<1	6	1	970	1	<4
AUG 24...	50	<1	37	<0.5	<1.0	<1	<3	1	760	1	<4

DATE	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	NICKEL, DIS- SOLVED (UG/L AS NI) (01065)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	SILVER, DIS- SOLVED (UG/L AS AG) (01075)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)	VANA- DIUM, DIS- SOLVED (UG/L AS V) (01085)	ZINC, DIS- SOLVED (UG/L AS ZN) (01090)	SEDI- MENT, SUS- PENDED (MG/L) (80154)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
NOV 16...	33	<0.1	<10	<1	<1	<1.0	37	<6	<3	8	80
FEB 22...	24	<0.1	<10	<10*	<1	<1.0	31	<6	11	9	87
MAY 16...	45	<0.1	<10	1	<1	<1.0	44	<6	4	12	95
AUG 24...	120	<0.1	<10	1	<1	<1.0	55	<6	6	12	93

* An alternate analytical method resulted in a change of the minimum reporting level for these constituents.
 < Actual value is known to be less than the value shown.

02047500 BLACKWATER RIVER NEAR DENDRON, VA

LOCATION.--Lat 37°01'30", long 76°52'30", Surry County, Hydrologic Unit 03010202, on left bank 10 ft upstream from Walls Bridge on State Highway 617, 1.2 mi downstream from Cypress Swamp, and 3.5 mi southeast of Dendron.

DRAINAGE AREA.--294 mi².

PERIOD OF RECORD.--October 1941 to December 1986, July 1988 to current year.

REVISED RECORDS.--WSP 2104: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 30.99 ft above National Geodetic Vertical Datum of 1929 (U.S. Army Corps of Engineers bench mark). Prior to Aug. 13, 1980, at site 25 ft upstream at same datum.

REMARKS.--Records good except those for periods of doubtful or no gage-height record, Nov. 26 to Dec. 9 and Dec. 17-25, and period with ice effect, Dec. 26-29, which are fair. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

COOPERATION.--Records were provided by the Virginia Water Control Board.

AVERAGE DISCHARGE.--47 years, 314 ft³/s, 14.50 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 5,850 ft³/s, Sept. 28, 1985, gage height, 9.11 ft, from rating curve extended above 4,900 ft³/s; no flow at times most years.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in August 1940 reached a stage of 13.1 ft, from U.S. Army Corps of Engineers floodmarks, discharge, 10,000 ft³/s, from rating curve extended above 4,900 ft³/s.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 5,360 ft³/s, Aug. 8, gage height, 8.76 ft; minimum, 0.13 ft³/s, July 11.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	188	108	e330	651	548	412	480	201	780	67	43	168
2	267	111	e310	1160	560	407	608	173	1060	74	37	118
3	352	151	e290	1420	521	401	843	147	1020	63	24	85
4	392	177	e270	1320	483	387	1130	168	823	49	12	63
5	333	223	e250	1190	480	380	1360	150	619	32	6.8	51
6	235	204	e235	1070	484	377	1220	151	427	17	14	45
7	179	174	e220	956	440	362	1140	177	318	6.8	2580	45
8	150	188	e210	875	418	350	1060	203	215	2.9	5010	46
9	140	158	e270	879	422	350	945	207	180	1.7	3090	50
10	129	173	350	911	451	348	834	195	121	1.9	1750	47
11	113	206	381	924	597	315	739	216	91	1.2	1620	48
12	96	180	422	866	860	283	660	223	72	131	1940	45
13	79	184	548	821	899	268	611	205	58	1020	1540	47
14	67	229	579	782	777	251	556	194	47	822	1100	89
15	61	186	647	717	679	235	487	199	35	600	821	87
16	59	208	691	629	645	221	412	274	27	402	631	72
17	65	288	e620	537	733	222	359	300	22	303	471	58
18	90	275	e580	491	693	276	341	260	22	277	359	46
19	122	242	e540	454	677	293	337	192	44	273	210	36
20	160	215	e510	407	704	360	274	144	39	348	147	29
21	229	187	e460	361	738	380	252	122	34	269	117	22
22	250	167	e430	346	723	347	285	134	29	155	97	18
23	241	262	e400	343	693	328	328	173	29	95	92	19
24	247	346	e370	348	683	312	308	209	22	62	115	16
25	203	455	e320	338	644	298	262	191	12	45	161	14
26	162	e600	e290	365	574	293	229	156	7.3	31	230	15
27	151	e530	e280	450	514	258	212	172	5.6	22	262	19
28	138	e470	e270	476	449	215	197	209	4.3	17	235	19
29	126	e410	e265	490	---	202	185	337	3.7	13	353	19
30	118	e360	362	494	---	250	189	454	3.2	14	308	19
31	111	---	389	500	---	338	---	588	---	25	238	---
TOTAL	5253	7667	12089	21571	17089	9719	16843	6724	6170.1	5240.5	23613.8	1455
MEAN	169	256	390	696	610	314	561	217	206	169	762	48.5
MAX	392	600	691	1420	899	412	1360	588	1060	1020	5010	168
MIN	59	108	210	338	418	202	185	122	3.2	1.2	6.8	14
CFSM	.58	.87	1.33	2.37	2.08	1.07	1.91	.74	.70	.57	2.59	.16
IN.	.66	.97	1.53	2.73	2.16	1.23	2.13	.85	.78	.66	2.99	.18

CAL YR 1989 TOTAL 164958.9 MEAN 452 MAX 2350 MIN 4.5 CFSM 1.54 IN. 20.87
WTR YR 1990 TOTAL 133434.4 MEAN 366 MAX 5010 MIN 1.2 CFSM 1.24 IN. 16.88

e Estimated.

CHOWAN RIVER BASIN

02049500 BLACKWATER RIVER NEAR FRANKLIN, VA
(National stream-quality accounting network station)

LOCATION.--Lat 36°45'45", long 76°53'55", Southampton County, Hydrologic Unit 03010202, on right bank 0.4 mi south of Burdette, 0.5 mi upstream from Black Creek, 3.3 mi downstream from Corrowaugh Swamp, and 6.0 mi north of Franklin.

DRAINAGE AREA.--617 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--August 1944 to current year.

REVISED RECORDS.--WSP 2104: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1.56 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records good except those for period with ice effect, Dec. 17-25, which is fair, and periods of tidal effect below 20 ft³/s June to September, which are poor. Low flow reversed by tide some years. Diversion upstream from station by city of Norfolk for municipal water supply most years.

AVERAGE DISCHARGE.--46 years, 645 ft³/s, 14.20 in/yr, adjusted for diversion. The figure published in the 1989 report was in error; the correct figure is 45 years, 643 ft³/s, 14.15 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 9,420 ft³/s, Sept. 14, 1960, gage height, 17.14 ft, from floodmarks; minimum daily, 0.07 ft³/s, Oct. 16, 1981.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in August 1940 reached a stage of about 22 ft, discharge, 21,000 ft³/s, from rating curve extended above 9,400 ft³/s.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 2,980 ft³/s, Aug. 11, gage height, 10.77 ft; minimum daily, 0.27 ft³/s, Sept. 27.

CORRECTIONS.--The water year adjusted figures published in the 1989 report were in error; the correct figures are listed below:

WATER YEAR 1989 MEAN# 894 CFSM# 1.45 IN.# 19.67

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	708	228	833	723	1140	1290	738	379	769	6.4	5.9	371
2	687	225	757	920	1090	1130	893	366	734	27	6.9	354
3	744	299	712	1290	1040	1010	1260	343	700	126	9.4	329
4	881	446	666	1740	1020	962	1750	318	739	223	9.7	285
5	963	537	616	2050	1040	928	2040	299	868	184	11	225
6	907	582	570	2160	1050	900	2140	300	1000	110	13	156
7	739	591	531	2170	1040	854	2130	300	1010	62	14	95
8	589	580	514	2140	1020	797	2040	309	862	27	17	73
9	485	614	590	2190	988	744	1910	296	762	10	405	46
10	405	841	756	2250	983	705	1780	271	704	5.2	2120	31
11	328	866	966	2250	1120	672	1640	364	708	3.5	2940	19
12	273	724	1110	2160	1260	649	1480	449	774	6.1	2720	11
13	235	629	1340	2000	1330	630	1300	490	713	43	2290	8.7
14	208	575	1650	1830	1410	606	1130	460	541	148	2050	35
15	186	545	1820	1660	1500	576	979	394	357	240	1900	211
16	166	561	1840	1510	1520	546	872	333	228	529	1650	303
17	136	644	e1740	1380	1630	521	786	282	141	736	1360	226
18	98	668	e1580	1260	1940	569	724	242	91	742	1080	144
19	160	646	e1430	1140	2370	666	665	223	85	642	849	86
20	290	625	e1320	1010	2580	727	611	231	64	531	703	59
21	449	605	e1220	918	2520	761	571	238	50	438	637	37
22	526	576	e1080	861	2320	748	564	233	47	379	566	21
23	535	735	e1010	808	2100	718	572	249	43	364	488	11
24	502	1130	e910	756	1960	685	572	250	37	356	494	3.4
25	448	1310	e816	745	1850	644	556	241	21	307	558	.62
26	392	1370	712	810	1740	611	533	236	11	225	887	.47
27	345	1320	647	939	1610	577	502	306	6.0	123	1020	.27
28	308	1200	613	1050	1460	566	462	428	4.2	65	773	.43
29	278	1060	601	1110	---	553	419	532	3.6	30	584	1.9
30	250	937	606	1160	---	587	395	693	5.3	11	487	3.7
31	234	---	636	1170	---	642	---	769	---	4.7	421	---
TOTAL	13455	21669	30192	44160	42631	22574	32014	10824	12078.1	6703.9	27068.9	3147.49
MEAN	434	722	974	1425	1523	728	1067	349	403	216	873	105
MAX	963	1370	1840	2250	2580	1290	2140	769	1010	742	2940	371
MIN	98	225	514	723	983	521	395	223	3.6	3.5	5.9	.27
(*)	13.8	0	0	0	0	0	0	26.8	20.9	29.6	20.4	32.0
MEAN#	448	722	974	1425	1523	728	1067	376	424	246	893	137
CFSM#	.73	1.17	1.58	2.31	2.47	1.18	1.73	.61	.69	.40	1.45	.22
IN.#	.84	1.31	1.82	2.66	2.57	1.36	1.93	.70	.77	.46	1.67	.25

CAL YR 1989 TOTAL 368311.0 MEAN 1009 MAX 5580 MIN 8.5 MEAN# 1025 CFSM# 1.66 IN.# 22.56
WTR YR 1990 TOTAL 266517.39 MEAN 730 MAX 2940 MIN .27 MEAN# 742 CFSM# 1.20 IN.# 16.33

* Average diversion, in cubic feet per second, by city of Norfolk.

Adjusted for diversion.

e Estimated.

CHOWAN RIVER BASIN

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02049500 BLACKWATER RIVER NEAR FRANKLIN, VA--Continued

WATER-QUALITY RECORDS

LOCATION.--Samples taken at bridge 2.0 mi upstream from discharge station.

PERIOD OF RECORD.--Water years 1947, 1952, 1975 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	TUR- BID- ITY (NTU) (00076)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	STREP- TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)
NOV 15...	1200	540	103	6.4	14.0	752	4.0	6.4	63	110	100
FEB 23...	1000	2100	75	6.4	9.0	748	5.0	9.8	86	190	290
MAY 15...	1300	374	91	6.8	18.5	758	8.0	5.6	60	62	60
AUG 23...	1300	482	73	6.6	21.5	753	4.5	5.4	62	290	210

DATE	HARD- NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	ALKA- LINITY WAT DIS TOT IT FIELD MG/L AS CACO3 (39086)	BICAR- BONATE WATER DIS IT FIELD MG/L AS HCO3 (00453)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)
NOV 15...	37	11	2.3	3.7	3.1	21	19	23	9.0	11	0.10
FEB 23...	25	7.7	1.5	3.0	2.0	12	11	13	9.0	7.1	0.10
MAY 15...	33	10	1.9	3.7	2.2	23	22	27	4.9	8.7	<0.10
AUG 23...	28	9.3	1.2	2.3	1.9	17	16	19	7.7	6.2	<0.10

DATE	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L) (70301)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITRO- GEN, AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)
NOV 15...	8.5	83	62	<0.010	0.160	0.020	0.030	0.50	0.040	0.020	0.030
FEB 23...	3.6	59	43	<0.010	0.500	0.030	0.040	0.60	0.030	<0.010	<0.010
MAY 15...	4.6	73	52	0.010	0.300	0.060	0.060	0.60	0.060	0.030	0.020
AUG 23...	6.5	68	47	<0.010	0.200	0.060	0.050	0.80	0.060	0.040	0.020

< Actual value is known to be less than the value shown.

CHOWAN RIVER BASIN

02049500 BLACKWATER RIVER NEAR FRANKLIN, VA--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	ALUM- INUM, DIS- SOLVED (UG/L AS AL) (01106)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BARIUM, DIS- SOLVED (UG/L AS BA) (01005)	BERYL- LIUM, DIS- SOLVED (UG/L AS BE) (01010)	CADMIUM DIS- SOLVED (UG/L AS CD) (01025)	CHRO- MIUM, DIS- SOLVED (UG/L AS CR) (01030)	COBALT, DIS- SOLVED (UG/L AS CO) (01035)	COPPER, DIS- SOLVED (UG/L AS CU) (01040)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)
NOV 15...	90	<1	43	<0.5	<1.0	<1	<3	<1	810	<1	<4
FEB 23...	160	<1	33	<0.5	<1.0	<5*	<3	<10*	530	<10*	<4
MAY 15...	80	<1	38	<0.5	<1.0	<1	8	1	1300	1	<4
AUG 23...	100	<1	45	<0.5	<1.0	<1	<3	2	1000	1	<4

DATE	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	NICKEL, DIS- SOLVED (UG/L AS NI) (01065)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	SILVER, DIS- SOLVED (UG/L AS AG) (01075)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)	VANA- DIUM, DIS- SOLVED (UG/L AS V) (01085)	ZINC, DIS- SOLVED (UG/L AS ZN) (01090)	SEDI- MENT, SUS- PENDE (MG/L) (80154)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
NOV 15...	37	<0.1	<10	<1	<1	<1.0	58	<6	9	6	74
FEB 23...	22	<0.1	<10	<10*	<1	<1.0	42	<6	<3	8	78
MAY 15...	80	<0.1	<10	1	<1	<1.0	59	<6	9	6	92
AUG 23...	98	<0.1	<10	1	<1	<1.0	50	<6	8	5	100

* An alternate analytical method resulted in a change of the minimum reporting level for these constituents.
 < Actual value is known to be less than the value shown.

02051000 NORTH MEHERRIN RIVER NEAR LUNENBURG, VA

LOCATION.--Lat 36°59'53", long 78°21'03", Lunenburg County, Hydrologic Unit 03010204, on right bank at upstream side of bridge on State Highway 40, 0.5 mi downstream from Tusekiah Creek, 4.6 mi upstream from Juniper Creek, and 5.2 mi northwest of Lunenburg.

DRAINAGE AREA.--55.6 mi².

PERIOD OF RECORD.--August 1946 to September 1980, October 1981 to current year.

REVISED RECORDS.--WSP 1303: 1947(M), 1949(M). WSP 2104: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 333.7 ft above National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers). Prior to July 5, 1951, nonrecording gage at same site and datum. July 5, 1951, to July 11, 1980, water-stage recorder at site 20 ft downstream at same datum.

REMARKS.--Records good except for period with ice effect, Dec. 20-24, which is fair. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

COOPERATION.--Records were provided by the Virginia Water Control Board.

AVERAGE DISCHARGE.--43 years, 52.4 ft³/s, 12.80 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 14,400 ft³/s, Oct. 23, 1971, gage height, 28.30 ft, from rating curve extended above 1,700 ft³/s on basis of slope-area measurement of peak flow; no flow Sept. 5-21, Oct. 8-14, 1954.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in August 1940 reached a stage of 48 ft, from information by local resident.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 2,200 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
May 29	1530	*1,840	*11.59	No peak equal to or greater than base discharge.			

Minimum discharge, 2.5 ft³/s, Aug. 4.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	64	18	28	415	50	42	153	39	50	7.2	3.6	5.4
2	178	19	26	125	48	40	324	31	39	7.0	3.1	5.0
3	54	158	26	77	47	106	290	27	36	7.0	3.0	4.9
4	29	53	24	69	98	90	109	29	33	6.2	3.0	4.5
5	22	35	24	88	81	58	74	61	27	6.0	2.7	4.5
6	19	30	24	104	57	50	63	48	25	5.4	2.8	4.3
7	17	28	24	86	56	43	376	31	25	5.2	3.5	4.3
8	15	28	26	286	54	40	128	26	22	5.0	3.6	6.4
9	15	37	31	198	48	40	80	23	22	5.2	7.7	6.4
10	14	36	26	95	225	40	66	98	37	5.8	13	6.2
11	14	28	26	66	138	38	69	95	22	11	8.0	5.2
12	14	25	94	56	79	37	56	40	18	13	6.4	4.7
13	13	24	150	47	62	35	50	32	16	18	5.4	4.5
14	13	24	82	41	56	33	46	28	16	17	4.7	6.0
15	13	53	62	40	50	31	232	24	15	18	4.3	6.8
16	12	108	95	37	200	30	104	24	16	13	4.7	5.2
17	12	64	57	36	166	34	69	21	16	10	7.0	4.3
18	15	41	42	36	74	98	56	18	14	11	6.4	3.6
19	92	32	38	35	162	46	48	16	16	8.9	5.0	3.5
20	69	30	e34	32	98	45	45	15	14	7.8	4.5	3.8
21	40	26	e30	42	66	50	47	16	13	7.2	4.3	3.9
22	26	26	e26	39	62	38	60	79	13	6.8	4.5	3.9
23	22	104	e23	34	113	35	47	77	13	6.2	165	4.3
24	20	82	e21	32	71	31	42	32	12	5.6	208	3.8
25	18	56	22	233	56	34	37	24	9.8	4.9	30	3.3
26	17	48	26	451	47	35	35	22	8.9	4.7	20	3.3
27	17	40	26	136	46	31	31	70	8.6	4.3	12	3.1
28	17	36	26	84	45	29	29	45	8.3	4.3	8.9	2.8
29	17	33	28	66	---	66	29	499	8.0	4.5	7.4	2.8
30	17	29	48	71	---	92	55	171	7.8	4.1	6.8	2.8
31	17	---	242	59	---	124	---	73	---	3.9	6.0	---
TOTAL	922	1351	1457	3216	2355	1541	2850	1834	581.4	244.2	575.3	133.5
MEAN	29.7	45.0	47.0	104	84.1	49.7	95.0	59.2	19.4	7.88	18.6	4.45
MAX	178	158	242	451	225	124	376	499	50	18	208	6.8
MIN	12	18	21	32	45	29	29	15	7.8	3.9	2.7	2.8
CFSM	.53	.81	.85	1.87	1.51	.89	1.71	1.06	.35	.14	.33	.08
IN.	.62	.90	.97	2.15	1.58	1.03	1.91	1.23	.39	.16	.38	.09

CAL YR 1989 TOTAL 19625.5 MEAN 53.8 MAX 608 MIN 7.2 CFSM .97 IN. 13.13
WTR YR 1990 TOTAL 17060.4 MEAN 46.7 MAX 499 MIN 2.7 CFSM .84 IN. 11.41

e Estimated.

CHOWAN RIVER BASIN

02051500 MEHERRIN RIVER NEAR LAWRENCEVILLE, VA

LOCATION.--Lat 36°43'00", long 77°49'55", Brunswick County, Hydrologic Unit 03010204, on right bank 50 ft upstream from Gholson Bridge on State Highway 715, 0.6 mi upstream from Allen Creek, and 3.0 mi southeast of Lawrenceville.

DRAINAGE AREA.--552 mi².

PERIOD OF RECORD.--October 1928 to current year. Monthly discharge only for some periods, published in WSP 1303.

REVISED RECORDS.--WSP 972: 1932(M), 1935. WSP 2104: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 136.56 ft above National Geodetic Vertical Datum of 1929. Prior to Nov. 17, 1931, nonrecording gage at same site and datum.

REMARKS.--Records good except for period with ice effect, Dec. 19-23, which is fair. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

AVERAGE DISCHARGE.--62 years, 503 ft³/s, 12.37 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 38,000 ft³/s, Aug. 17, 1940, gage height, 42.0 ft, from floodmark, from rating curve extended above 13,000 ft³/s on basis of velocity-area studies and records for Nottoway River near Stony Creek; minimum, 4.2 ft³/s, Oct. 7, 8, 1954; minimum gage height, 0.72 ft, Sept. 23, 24, 1932.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 4,500 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Jan. 2	2100	*6,210	*18.80	May 31	0130	5,250	16.99

Minimum discharge, 56 ft³/s, Aug. 5-6; minimum gage height, 1.75 ft, Aug. 5-6, Sept. 28-30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	219	221	319	3250	660	560	1470	591	752	120	70	142
2	1250	222	301	5800	602	534	2820	503	547	117	66	124
3	1810	463	288	3350	579	575	3330	405	461	111	62	113
4	639	1100	276	1050	680	1280	1840	397	449	107	60	106
5	383	560	266	945	1950	1050	1010	439	384	104	57	100
6	279	405	261	1020	1100	746	780	911	334	100	57	98
7	239	348	259	1230	805	653	1040	563	304	96	114	94
8	204	321	272	1210	732	588	2160	426	284	93	111	93
9	187	651	354	3050	668	559	1100	362	271	93	110	95
10	174	828	363	1870	838	554	802	569	274	93	413	96
11	166	529	345	1060	2060	540	712	2140	390	89	305	96
12	161	404	447	836	1330	524	671	1090	315	157	160	89
13	157	348	2080	714	904	507	593	612	255	242	113	85
14	155	315	1650	612	755	493	539	495	226	294	111	87
15	153	298	921	568	678	478	632	431	214	263	339	93
16	151	303	831	549	680	466	1900	388	209	215	290	89
17	145	395	903	529	3560	485	1010	357	205	236	159	84
18	407	464	579	514	2020	657	733	328	198	195	127	79
19	985	329	e480	504	1280	812	610	294	193	334	110	74
20	1860	289	e420	492	1940	607	546	273	202	184	100	73
21	947	270	e380	503	1140	531	534	267	185	129	96	72
22	569	258	e340	592	853	543	572	318	170	111	100	72
23	393	635	e315	571	902	496	552	706	171	100	98	73
24	317	1220	344	502	1120	466	501	710	167	93	1690	72
25	278	788	400	563	803	450	464	429	161	85	2200	68
26	257	556	439	2300	652	454	436	349	146	80	747	65
27	238	474	426	3340	581	452	414	610	139	76	519	63
28	225	424	385	1270	572	432	392	980	132	77	288	61
29	215	383	357	908	---	473	369	1670	128	80	212	60
30	212	353	374	803	---	878	447	4600	124	76	187	60
31	216	---	587	753	---	1250	---	3260	---	74	170	---
TOTAL	13591	14154	15962	41258	30444	19093	28979	25473	7990	4224	9241	2576
MEAN	438	472	515	1331	1087	616	966	822	266	136	298	85.9
MAX	1860	1220	2080	5800	3560	1280	3330	4600	752	334	2200	142
MIN	145	221	259	492	572	432	369	267	124	74	57	60
CFSM	.79	.85	.93	2.41	1.97	1.12	1.75	1.49	.48	.25	.54	.16
IN.	.92	.95	1.08	2.78	2.05	1.29	1.95	1.72	.54	.28	.62	.17

CAL YR 1989 TOTAL 245029 MEAN 671 MAX 6300 MIN 101 CFSM 1.22 IN. 16.51
WTR YR 1990 TOTAL 212985 MEAN 584 MAX 5800 MIN 57 CFSM 1.06 IN. 14.35

e Estimated.

02052000 MEHERRIN RIVER AT EMPORIA, VA
(National stream-quality accounting network station)

LOCATION.--Lat 36°41'24", long 77°32'27", Emporia City, Hydrologic Unit 03010204, on left bank at downstream side of bridge on U.S. Highway 301 and 1.2 mi upstream from Falling Run.

DRAINAGE AREA.--747 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--January 1951 to current year.

REVISED RECORDS.--WSP 2104: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 67.17 ft above National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers).

REMARKS.--No estimated daily discharges. Records good. Prior to November 1965 and since April 1986, low and medium flow regulated by powerplant 0.8 mi upstream from station.

COOPERATION.--Records were provided by the Virginia Water Control Board.

AVERAGE DISCHARGE.--39 years, 706 ft³/s, 12.83 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 21,100 ft³/s, Oct. 8, 1972, gage height, 27.38 ft; minimum, 5.0 ft³/s, Nov. 11, 1954, gage height, 1.00 ft; minimum daily, 7.1 ft³/s, July 20, 1986.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in August 1940 reached a stage of 31.5 ft, from floodmarks, discharge, about 40,000 ft³/s, from rating curve extended above 18,000 ft³/s on basis of record for station near Lawrenceville.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 7,060 ft³/s, Jan. 3, gage height, 19.36 ft; minimum, 31 ft³/s, Sept. 10, 24; minimum daily, 58 ft³/s, Sept. 23.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	125	198	434	2570	856	741	2310	685	2520	126	96	199
2	713	312	411	6170	851	750	2900	785	1150	148	92	213
3	2450	511	336	6650	738	731	5230	522	643	135	86	212
4	1380	1060	333	2950	698	1090	4190	447	697	141	85	136
5	524	973	309	1530	1710	1680	2100	507	671	131	84	121
6	353	621	299	1440	2010	982	1330	992	551	125	96	109
7	190	500	326	1630	1230	1060	1390	1150	514	114	357	116
8	203	289	348	1880	1040	662	2520	642	409	123	271	161
9	427	453	427	3160	841	605	2140	483	405	109	674	60
10	202	1470	555	3940	1090	602	1330	460	345	111	1220	114
11	159	934	477	2050	2260	606	1080	1840	294	119	685	115
12	65	589	656	1400	2540	600	912	2130	602	132	358	128
13	144	424	1920	1140	1510	654	866	1190	338	354	131	120
14	145	438	3140	932	1140	522	696	599	302	373	170	129
15	145	396	1870	741	1010	524	631	577	200	443	164	90
16	292	356	1360	759	996	502	1750	456	209	233	581	91
17	131	482	1380	734	2830	459	1880	413	244	281	257	101
18	212	608	1060	638	4230	1030	1120	384	345	298	190	139
19	894	425	773	680	2350	1030	848	331	314	334	173	89
20	2340	494	694	607	2580	872	679	228	234	485	88	112
21	1830	420	501	514	2170	747	578	311	210	164	101	107
22	1050	314	445	754	1450	461	750	274	282	181	134	105
23	551	862	321	589	1260	694	732	787	202	153	149	58
24	378	1700	294	677	1550	521	629	937	201	105	886	76
25	295	1510	336	628	1360	410	528	720	201	117	3850	93
26	290	1110	410	1520	1020	558	435	433	200	106	1930	90
27	280	592	446	4150	923	472	436	552	197	106	1180	82
28	234	593	437	3010	635	490	325	1340	191	106	444	78
29	208	459	419	1480	---	643	392	2180	156	106	461	78
30	210	426	477	1200	---	942	609	4600	146	98	358	76
31	252	---	695	1080	---	1750	---	5710	---	100	220	---
TOTAL	16672	19519	21889	57203	42878	23390	41316	32665	12973	5657	15571	3398
MEAN	538	651	706	1845	1531	755	1377	1054	432	182	502	113
MAX	2450	1700	3140	6650	4230	1750	5230	5710	2520	485	3850	213
MIN	65	198	294	514	635	410	325	228	146	98	84	58
CFSM	.72	.87	.95	2.47	2.05	1.01	1.84	1.41	.58	.24	.67	.15
IN.	.83	.97	1.09	2.85	2.14	1.16	2.06	1.63	.65	.28	.78	.17

CAL YR 1989 TOTAL 345091 MEAN 945 MAX 7050 MIN 43 CFSM 1.27 IN. 17.19
WTR YR 1990 TOTAL 293131 MEAN 803 MAX 6650 MIN 58 CFSM 1.08 IN. 14.60

CHOWAN RIVER BASIN

02052000 MEHERRIN RIVER AT EMPORIA, VA--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1968 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: April 1968 to September 1971, October 1972 to September 1978.

WATER TEMPERATURE: April 1968 to September 1971, October 1972 to September 1978.

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	TUR- BID- ITY (NTU) (00076)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED CENT SATUR- ATION (00301)	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	STREP- TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)
NOV 14...	1200	719	78	6.6	11.5	756	13	9.4	87	120	65
FEB 20...	1230	2630	59	6.6	9.0	764	25	11.7	101	1000	610
MAY 17...	1100	426	72	7.0	20.0	748	17	6.7	75	62	21
AUG 15...	0845	161	70	6.4	24.0	757	17	4.4	53	160	170

DATE	HARD- NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	ALKA- LINITY WAT DIS TOT IT FIELD (MG/L AS CACO3 (39086)	BICAR- BONATE WATER DIS IT FIELD (MG/L AS HCO3 (00453)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)
NOV 14...	24	5.5	2.5	5.0	2.1	26	25	31	4.0	5.1	0.10
FEB 20...	18	4.1	1.8	4.5	1.4	16	15	19	6.0	3.9	0.10
MAY 17...	26	6.5	2.3	5.2	1.3	24	23	28	3.4	3.0	<0.10
AUG 15...	21	4.9	2.1	5.1	2.2	23	21	26	3.8	4.5	<0.10

DATE	SILICA, DIS- SOLVED (MG/L SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L) (70301)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)
NOV 14...	18	55	58	<0.010	<0.100	0.040	0.040	0.30	0.040	0.010	0.020
FEB 20...	14	58	47	0.010	0.200	0.030	0.050	0.20	0.040	<0.010	<0.010
MAY 17...	18	55	56	<0.010	0.200	0.090	0.110	0.50	0.050	0.020	0.010
AUG 15...	16	58	53	<0.010	0.100	0.090	0.110	1.0	0.050	0.040	<0.010

< Actual value is known to be less than the value shown.

CHOWAN RIVER BASIN

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02052000 MEHERRIN RIVER AT EMPORIA, VA--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	ALUM- INUM, DIS- SOLVED (UG/L AS AL) (01106)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BARIUM, DIS- SOLVED (UG/L AS BA) (01005)	BERYL- LIUM, DIS- SOLVED (UG/L AS BE) (01010)	CADMIUM DIS- SOLVED (UG/L AS CD) (01025)	CHRO- MIUM, DIS- SOLVED (UG/L AS CR) (01030)	COBALT, DIS- SOLVED (UG/L AS CO) (01035)	COPPER, DIS- SOLVED (UG/L AS CU) (01040)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)
NOV 14...	50	<1	21	<0.5	<1.0	<1	<3	<1	560	<1	<4
FEB 20...	120	<1	21	<0.5	<1.0	<5*	<3	<10*	410	<10*	<4
MAY 17...	70	<1	20	0.7	<1.0	<1	5	1	700	<1	<4
AUG 15...	120	1	25	<0.5	<1.0	<1	<3	2	450	<1	<4

DATE	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	NICKEL, DIS- SOLVED (UG/L AS NI) (01065)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	SILVER, DIS- SOLVED (UG/L AS AG) (01075)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)	VANA- DIUM, DIS- SOLVED (UG/L AS V) (01085)	ZINC, DIS- SOLVED (UG/L AS ZN) (01090)	SEDI- MENT, SUS- PENDE (MG/L) (80154)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
NOV 14...	91	<0.1	<10	<1	<1	<1.0	41	<6	6	16	95
FEB 20...	30	<0.1	<10	<10*	<1	<1.0	33	<6	15	29	91
MAY 17...	230	<0.1	<10	<1	<1	<1.0	42	<6	4	38	100
AUG 15...	210	<0.1	<10	2	<1	<1.0	42	<6	4	29	96

* An alternate analytical method resulted in a change of the minimum reporting level for these constituents.
 < Actual value is known to be less than the value shown.

02052500 FOUNTAINS CREEK NEAR BRINK, VA

LOCATION.--Lat 36°36'55", long 77°42'00", Greensville County, Hydrologic Unit 03010204, on left bank 30 ft upstream from bridge on State Highway 603, 0.3 mi downstream from Quarrel Creek, 3.6 mi west of Brink, and 10 mi southwest of Emporia.

DRAINAGE AREA.--65.2 mi².

PERIOD OF RECORD.--October 1953 to current year. Prior to October 1980, published as Fontaine Creek near Brink.

REVISED RECORDS.--WSP 2104: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 152.59 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records good except for period with ice effect, Dec. 20-23, which is fair. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

COOPERATION.--Records were provided by the Virginia Water Control Board.

AVERAGE DISCHARGE.--37 years, 68.9 ft³/s, 14.35 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 16,000 ft³/s, Oct. 6, 1972, gage height, 24.14 ft, from floodmark, from rating curve extended above 3,000 ft³/s; no flow at times.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 850 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Feb. 17	1045	*1,340	*12.60	May 30	0415	891	10.79

Minimum discharge, 1.1 ft³/s, Sept. 29-30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	19	17	35	306	67	67	486	87	71	4.4	2.1	9.0
2	83	17	35	311	59	66	528	60	46	4.1	1.9	6.0
3	52	93	34	186	57	86	567	51	38	3.7	1.8	4.8
4	31	65	32	104	61	112	317	44	57	3.5	1.7	4.2
5	19	43	27	88	88	82	152	49	46	3.3	1.6	3.7
6	14	34	26	105	74	72	97	150	32	3.1	1.8	3.4
7	11	29	24	127	62	56	165	85	25	2.9	1.26	3.1
8	9.6	26	32	235	59	51	157	53	21	2.8	65	2.9
9	8.5	60	73	427	54	51	103	49	19	2.8	98	2.8
10	7.7	62	60	273	155	50	81	63	20	2.7	355	2.7
11	7.3	42	66	142	304	49	76	80	19	2.6	141	2.7
12	7.0	35	124	95	207	49	73	48	16	4.6	43	2.4
13	7.0	30	291	82	121	48	71	41	13	8.1	22	2.2
14	7.0	26	224	68	90	48	70	37	12	11	14	2.3
15	7.0	26	132	59	86	49	75	27	11	18	69	2.3
16	7.1	29	130	57	244	49	80	22	10	18	141	2.2
17	7.1	31	94	56	1120	57	71	20	9.8	12	80	2.0
18	8.4	27	68	56	380	244	69	17	9.1	8.4	36	1.7
19	75	23	56	53	327	171	68	16	9.1	6.5	22	1.6
20	137	22	e50	50	320	97	67	14	9.3	5.3	15	1.6
21	95	21	e45	55	191	73	67	12	8.6	4.5	12	1.5
22	50	22	e40	63	127	69	103	35	8.8	4.0	11	1.5
23	32	185	e35	55	129	64	75	111	11	3.4	11	1.5
24	23	147	33	50	144	64	53	58	9.1	3.1	36	1.6
25	19	79	30	55	103	64	52	35	8.0	2.9	47	1.5
26	16	56	31	138	71	65	52	26	7.1	2.6	117	1.4
27	15	45	34	152	68	65	47	235	6.2	2.4	140	1.3
28	14	40	34	100	68	65	40	215	5.7	2.3	66	1.2
29	14	37	36	78	---	118	42	511	5.2	2.3	31	1.2
30	14	36	48	88	---	306	101	671	4.7	2.2	19	1.1
31	17	---	91	85	---	345	---	212	---	2.1	13	---
TOTAL	833.7	1405	2070	3799	4836	2852	4005	3134	567.7	159.6	1740.9	77.4
MEAN	26.9	46.8	66.8	123	173	92.0	133	101	18.9	5.15	56.2	2.58
MAX	137	185	291	427	1120	345	567	671	71	18	355	9.0
MIN	7.0	17	24	50	54	48	40	12	4.7	2.1	1.6	1.1
CFSM	.41	.72	1.02	1.88	2.65	1.41	2.05	1.55	.29	.08	.86	.04
IN.	.48	.80	1.18	2.17	2.76	1.63	2.29	1.79	.32	.09	.99	.04

CAL YR 1989 TOTAL 32556.9 MEAN 89.2 MAX 1010 MIN 3.2 CFSM 1.37 IN. 18.58
WTR YR 1990 TOTAL 25480.3 MEAN 69.8 MAX 1120 MIN 1.1 CFSM 1.07 IN. 14.54

e Estimated.

ROANOKE RIVER BASIN

273

02053800 SOUTH FORK ROANOKE RIVER NEAR SHAWSVILLE, VA

LOCATION.--Lat 37°08'24", long 80°16'00", Montgomery County, Hydrologic Unit 03010101, on right bank 95 ft downstream from bridge on State Highway 637, 0.3 mi downstream from Georges Run, 1.3 mi downstream from Elliott Creek, and 2.0 mi southwest of Shawsville.

DRAINAGE AREA.--110 mi².

PERIOD OF RECORD.--October 1960 to current year.

REVISED RECORDS.--WSP 2104: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,361.87 ft above National Geodetic Vertical Datum of 1929. Prior to Aug. 26, 1974, water-stage recorder, and Aug. 26, 1974, to July 24, 1975, nonrecording gage at site 95 ft upstream at same datum.

REMARKS.--Records good except for period with ice effect, Dec. 15-28, which is fair. Several measurements of water temperature were made during the year.

COOPERATION.--Records were provided by the Virginia Water Control Board.

AVERAGE DISCHARGE.--30 years, 111 ft³/s, 13.70 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 14,200 ft³/s, June 21, 1972, gage height, 11.12 ft, from high-water mark in well, from rating curve extended above 3,700 ft³/s on basis of slope-area measurement of peak flow; minimum, 7.5 ft³/s, July 27-29, 1966.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Sept. 30, 1959, reached a stage of 9.89 ft, from information by local resident.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 800 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Oct. 2	0500	1,320	3.18	May 29	0500	944	2.79
Nov. 16	0630	*2,960	*4.66	July 14	2200	2,890	4.60
Jan. 1	0030	1,300	3.16	Aug. 6	1130	896	2.72

Minimum daily discharge, 38 ft³/s, Sept. 27-30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	569	104	124	842	175	168	258	113	213	44	59	49
2	1060	97	119	392	168	176	256	115	179	44	57	47
3	530	95	116	286	170	244	251	104	159	42	55	46
4	360	92	104	255	299	227	229	110	142	41	54	45
5	286	90	112	233	297	211	205	152	123	40	88	44
6	244	90	108	222	257	195	212	139	112	40	491	43
7	213	90	101	200	235	177	371	129	102	39	244	42
8	192	95	106	254	204	165	314	113	95	39	151	41
9	175	96	99	296	187	165	268	105	92	39	129	41
10	161	85	95	272	248	155	240	152	90	39	108	47
11	152	79	96	237	257	146	230	139	85	53	186	44
12	141	77	110	212	245	138	198	123	80	51	120	43
13	133	73	112	181	218	131	178	115	76	62	98	47
14	128	73	102	164	202	126	167	104	73	570	82	67
15	122	75	e100	157	187	122	180	94	69	815	81	47
16	117	1300	e94	149	241	124	159	92	72	263	85	43
17	143	458	e90	139	285	242	150	89	67	184	157	41
18	152	297	e86	137	254	269	139	79	62	162	103	40
19	271	234	e80	128	260	228	129	72	62	139	80	41
20	209	203	e74	126	231	213	125	76	57	129	65	42
21	182	180	e70	131	211	189	132	147	58	119	59	40
22	161	163	e65	118	220	176	134	311	72	111	63	45
23	145	165	e68	111	234	166	119	268	80	98	214	43
24	136	139	e76	108	234	159	113	193	56	87	155	40
25	128	132	e85	167	208	197	108	155	52	80	119	39
26	122	152	e87	217	190	180	104	134	49	73	99	39
27	116	155	e82	198	190	172	101	117	48	68	83	38
28	113	147	e83	185	183	163	104	226	47	67	68	38
29	109	137	78	185	---	182	126	746	46	67	60	38
30	107	128	92	203	---	181	122	401	45	63	55	38
31	109	---	391	186	---	239	---	270	---	61	52	---
TOTAL	6786	5301	3205	6691	6290	5626	5422	5183	2563	3729	3520	1298
MEAN	219	177	103	216	225	181	181	167	85.4	120	114	43.3
MAX	1060	1300	391	842	299	269	371	746	213	815	491	67
MIN	107	73	65	108	168	122	101	72	45	39	52	38
CFSM	1.99	1.61	.94	1.96	2.04	1.65	1.64	1.52	.78	1.09	1.03	.39
IN.	2.29	1.79	1.08	2.26	2.13	1.90	1.83	1.75	.87	1.26	1.19	.44

CAL YR 1989 TOTAL 55099 MEAN 151 MAX 3440 MIN 40 CFSM 1.37 IN. 18.63
WTR YR 1990 TOTAL 55614 MEAN 152 MAX 1300 MIN 38 CFSM 1.39 IN. 18.81

e Estimated.

ROANOKE RIVER BASIN

02054500 ROANOKE RIVER AT LAFAYETTE, VA

LOCATION.--Lat 37°14'11", long 80°12'34", Montgomery County, Hydrologic Unit 03010101, on right bank 120 ft upstream from bridge on State Highway 603 at Lafayette, 0.4 mi downstream from confluence of North and South Forks, and 1.1 mi upstream from Cove Hollow.

DRAINAGE AREA.--257 mi².

PERIOD OF RECORD.--September 1943 to current year.

REVISED RECORDS.--WSP 1333: 1944-47(M), 1948-49.

GAGE.--Water-stage recorder. Datum of gage is 1,174.47 ft above National Geodetic Vertical Datum of 1929. Prior to July 30, 1949, nonrecording gage at same site and datum.

REMARKS.--Records good except those for periods with ice effect, Dec. 15, 16, 18-26, which are fair. Occasional diurnal fluctuation caused by meat-processing plant upstream from station. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

COOPERATION.--Records were provided by the Virginia Water Control Board.

AVERAGE DISCHARGE.--47 years, 240 ft³/s, 12.68 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 24,500 ft³/s, June 21, 1972, gage height, 15.60 ft, from floodmarks, from rating curve extended above 12,000 ft³/s on basis of slope-area measurement of peak flow; minimum daily, 10 ft³/s, Jan. 14, 15, 18, 19, 1959.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in August 1940 reached a stage of 12.2 ft, from information by local residents, discharge, 19,000 ft³/s, from rating curve extended above 12,000 ft³/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 3,500 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Nov. 16	0830	*5,290	*7.84	No other peak equal to or greater than base discharge.			
Minimum discharge, 57 ft ³ /s, Sept. 27.							

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1380	161	247	2190	449	369	623	231	489	84	76	78
2	1930	153	231	921	411	371	660	242	405	83	69	75
3	1070	149	219	643	412	572	597	221	352	78	67	72
4	698	141	193	559	844	526	519	227	309	74	66	69
5	547	138	205	517	751	476	455	406	266	72	67	68
6	454	137	194	478	609	433	446	330	237	70	543	67
7	387	138	183	432	544	391	883	294	212	68	322	64
8	339	143	186	609	470	359	686	261	195	68	178	63
9	304	154	178	746	425	351	578	241	182	69	138	64
10	272	135	167	631	521	328	519	288	176	67	122	85
11	249	126	178	534	551	305	497	273	159	92	216	71
12	228	123	201	470	522	285	435	244	147	89	150	66
13	210	120	219	399	471	267	393	231	140	102	125	79
14	198	119	191	354	437	255	366	214	135	336	112	97
15	186	120	e170	332	405	244	379	196	132	1120	116	83
16	178	2780	e150	311	516	241	344	185	134	337	131	69
17	217	1090	146	287	654	405	329	179	126	202	192	65
18	243	645	e140	276	563	507	307	164	122	259	134	62
19	470	491	e130	258	579	431	283	153	119	173	113	64
20	383	416	e120	247	520	404	271	153	112	141	101	68
21	320	362	e110	255	469	361	280	292	117	128	106	64
22	277	322	e98	229	468	334	290	705	123	121	143	73
23	249	323	e100	214	515	313	261	656	153	109	275	79
24	230	271	e110	205	586	299	250	429	115	99	219	66
25	209	252	e120	344	503	366	237	331	104	93	165	62
26	197	285	e134	531	444	349	229	279	99	88	138	60
27	186	338	136	452	431	334	220	241	96	83	118	59
28	177	314	139	408	406	317	220	586	92	81	105	60
29	170	288	132	432	---	353	261	2120	88	81	95	60
30	165	262	149	661	---	377	246	1040	85	77	88	59
31	164	---	1110	517	---	589	---	639	---	74	84	---
TOTAL	12287	10496	5986	15443	14476	11512	12064	12051	5221	4618	4574	2071
MEAN	396	350	193	498	517	371	402	389	174	149	148	69.0
MAX	1930	2780	1110	2190	844	589	883	2120	489	1120	543	97
MIN	164	119	98	205	405	241	220	153	85	67	66	59
CFSM	1.54	1.36	.75	1.94	2.01	1.44	1.56	1.51	.68	.58	.57	.27
IN.	1.78	1.52	.87	2.24	2.10	1.67	1.75	1.74	.76	.67	.66	.30

CAL YR 1989 TOTAL 104394 MEAN 286 MAX 4900 MIN 52 CFMS 1.11 IN. 15.11
WTR YR 1990 TOTAL 110799 MEAN 304 MAX 2780 MIN 59 CFMS 1.18 IN. 16.04

e Estimated.

02055000 ROANOKE RIVER AT ROANOKE, VA

LOCATION.--Lat 37°15'30", long 79°56'20", Roanoke City, Hydrologic Unit 03010101, on left bank 50 ft downstream from Walnut Avenue Bridge, 3.2 mi upstream from Tinker Creek, and at mile 360.6.

DRAINAGE AREA.--395 mi².

PERIOD OF RECORD.--February 1899 to current year. Monthly discharge only for some periods, published in WSP 1303. Records for July 1896 to January 1899 published in WSP 11, 15, 27, and 20th Annual Report, Part 4, are unreliable, due to doubtful gage-height record, and should not be used.

REVISED RECORDS.--WSP 972: 1928, 1930, 1933. WSP 1433: 1899-1904, 1914-17(M), 1918-24, 1925-27(M), 1929-34(M), 1935, 1936-39(M). WSP 2104: Drainage area. WDR VA-72-1: 1928(M), 1940(M). See also PERIOD OF RECORD.

GAGE.--Water-stage recorder. Datum of gage is 906.84 ft above National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers). Prior to June 7, 1937, nonrecording gage on downstream side of highway bridge 50 ft upstream at same datum.

REMARKS.--Records fair except those for periods with ice effect, Dec. 14-16, 18-29, which are poor. Prior to 1949, diurnal fluctuation at low flow caused by powerplants upstream from station. Appalachian Power Company gage-height telemeter at station. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

AVERAGE DISCHARGE.--91 years, 372 ft³/s, 12.79 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 32,300 ft³/s, Nov. 4, 1985, gage height, 23.35 ft, from floodmark, from rating curve extended above 26,000 ft³/s; practically no flow Dec. 23, 1909, Dec. 19, 1963, when flow was retarded by freezing, gage height, 0.0 ft; minimum daily discharge, 19 ft³/s, Aug. 29, 1981.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 2,500 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Oct. 2	0430	5,760	7.36	Jan. 1	0630	4,490	6.34
Nov. 16	0430	3,130	5.11	May 29	1130	4,300	6.18
Nov. 16	1300	*6,250	*7.74	July 15	0630	3,350	5.32

Minimum discharge, 69 ft³/s, part of each day Sept. 27-29, gage height, 0.57 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2090	260	338	3660	618	495	1010	329	799	170	119	123
2	4230	249	318	1710	584	484	1040	328	680	136	121	116
3	2090	243	302	1080	565	705	967	318	591	130	112	112
4	1250	236	283	867	1120	714	808	298	519	123	109	105
5	883	230	273	786	1190	639	678	511	457	118	192	102
6	691	225	268	694	911	591	677	459	413	113	513	100
7	575	225	257	630	778	529	1410	387	378	109	551	95
8	491	229	258	818	650	475	1210	350	350	108	257	92
9	435	238	260	1210	580	457	964	321	329	107	179	95
10	390	227	242	1000	663	436	818	413	316	181	145	97
11	360	208	244	824	733	401	772	378	291	124	276	113
12	332	207	278	708	714	377	667	325	273	140	207	96
13	309	205	309	608	635	357	589	308	257	155	159	110
14	295	194	e250	520	593	345	538	293	248	695	175	190
15	282	198	e230	477	546	332	550	273	245	1980	149	132
16	271	3630	e210	442	641	333	504	264	244	694	138	104
17	318	1970	197	409	884	531	471	251	234	418	246	90
18	423	1060	e190	388	770	735	444	237	220	377	189	84
19	724	742	e180	371	781	606	410	219	213	340	138	84
20	665	600	e170	354	705	570	389	212	201	278	117	85
21	572	511	e165	356	625	502	399	355	211	240	183	85
22	476	445	e160	336	633	456	416	966	289	222	231	108
23	412	461	e155	317	681	424	378	1110	259	199	433	98
24	370	386	e150	305	774	398	358	674	226	178	375	90
25	341	353	e150	426	694	478	344	514	186	160	285	80
26	322	363	e150	736	598	467	333	440	170	150	240	77
27	301	430	e145	648	582	444	323	395	160	142	203	75
28	286	420	e145	591	545	423	316	963	153	138	173	74
29	276	389	e145	577	---	480	366	3520	146	134	152	73
30	267	356	200	881	---	527	336	2020	139	131	139	74
31	270	---	1150	725	---	821	---	1140	---	125	128	---
TOTAL	20997	15490	7772	23454	19793	15532	18485	18571	9197	8315	6634	2959
MEAN	677	516	251	757	707	501	616	599	307	268	214	98.6
MAX	4230	3630	1150	3660	1190	821	1410	3520	799	1980	551	190
MIN	267	194	145	305	545	332	316	212	139	107	109	73
CFSM	1.71	1.31	.63	1.92	1.79	1.27	1.56	1.52	.78	.68	.54	.25
IN.	1.98	1.46	.73	2.21	1.86	1.46	1.74	1.75	.87	.78	.62	.28

CAL YR 1989 TOTAL 162464 MEAN 445 MAX 5100 MIN 83 CFMS 1.13 IN. 15.30
WTR YR 1990 TOTAL 167199 MEAN 458 MAX 4230 MIN 73 CFMS 1.16 IN. 15.75

e Estimated.

ROANOKE RIVER BASIN

02055100 TINKER CREEK NEAR DALEVILLE, VA

LOCATION.--Lat 37°25'03", long 79°56'08", Botetourt County, Hydrologic Unit 03010101, on left bank 1,100 ft downstream from Norfolk Southern Railway bridge, 0.2 mi downstream from unnamed tributary, 0.5 mi south of Glebe Mills, and 1.3 mi northwest of Daleville.

DRAINAGE AREA.--11.7 mi².

PERIOD OF RECORD.--April 1956 to current year.

REVISED RECORDS.--WSP 1904: 1958-60(P). WSP 2104: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,217.47 ft above National Geodetic Vertical Datum of 1929 (Norfolk Southern Railway bench mark).

REMARKS.--Records good except those for period with ice effect, Dec. 14-30, and period of no gage-height record, Jan. 19 to Feb. 9, which are fair. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

AVERAGE DISCHARGE.--34 years, 12.0 ft³/s, 13.93 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 10,400 ft³/s, Nov. 4, 1985, gage height, 13.36 ft, from floodmark, from rating curve extended above 130 ft³/s on basis of contracted-opening measurement at gage height 9.82 ft and slope-area measurements at gage heights 8.52 ft, 9.82 ft, and 13.36 ft; minimum, 0.20 ft³/s, Jan. 24, 1961, result of freezeup; minimum daily, 0.90 ft³/s, July 26, 1966; minimum gage height, 0.99 ft, June 12, 24, 1970.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in 1940 reached a stage of 9.0 ft, from information by local resident.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 250 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Oct. 2	0300	635	5.40	May 15	2315	833	5.97
Nov. 16	0345	*2,290	*8.48	May 22	0145	1,670	7.65

Minimum discharge, 3.0 ft³/s, Sept. 7, 11-12, 17-18, 26, gage height, 1.15 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	90	13	14	56	e14	15	23	8.9	27	8.1	4.3	3.9
2	146	12	13	34	e14	16	25	8.5	24	7.9	4.2	3.8
3	54	12	13	28	e14	20	24	8.3	22	7.4	4.2	3.7
4	43	12	12	25	e30	17	21	8.3	20	7.0	4.2	3.6
5	38	12	12	22	e25	16	19	11	19	6.7	4.3	3.6
6	35	11	12	21	e22	15	25	8.5	18	6.4	5.1	3.5
7	31	11	11	19	e20	14	38	7.7	17	6.0	4.3	3.4
8	27	13	13	33	e19	14	26	7.3	16	6.1	4.0	3.6
9	25	12	12	29	e18	14	23	7.1	24	5.9	4.0	3.8
10	23	11	11	25	21	13	22	11	26	6.6	3.9	3.7
11	22	11	11	23	19	13	21	8.2	18	6.9	7.7	3.4
12	21	11	13	21	20	12	18	7.4	15	6.6	4.5	4.3
13	19	10	13	19	18	12	17	7.2	14	6.9	4.4	5.6
14	18	10	e10	18	17	11	16	6.7	13	22	4.1	5.3
15	17	10	e9.0	17	17	11	18	47	13	30	4.5	4.4
16	17	266	e8.0	16	22	12	15	47	13	15	4.0	3.7
17	26	40	e7.6	15	20	24	15	17	12	10	4.1	3.5
18	26	31	e7.2	14	19	20	13	11	12	8.7	3.9	3.5
19	48	27	e7.0	e13	20	16	13	9.6	11	8.2	3.7	3.8
20	30	24	e6.6	e13	18	16	12	9.2	10	7.6	5.5	3.8
21	24	20	e6.4	e14	17	14	14	18	10	7.0	8.9	3.7
22	21	19	e6.2	e13	18	13	13	229	11	6.5	11	4.5
23	19	19	e6.0	e12	19	12	12	47	11	6.2	12	3.8
24	18	16	e5.9	e11	19	12	11	31	9.7	5.8	8.6	3.5
25	17	16	e5.8	e17	17	16	10	25	9.1	5.6	6.8	3.5
26	16	19	e5.8	e21	16	14	10	22	8.7	5.4	5.6	3.4
27	15	17	e5.8	e18	16	13	9.5	20	8.5	5.2	5.0	3.4
28	14	16	e5.7	e16	15	12	9.5	42	8.2	5.3	4.6	3.4
29	13	15	e5.6	e15	---	15	11	87	8.0	4.9	4.2	3.5
30	13	14	e8.0	e17	---	15	9.5	42	7.8	4.7	4.1	3.6
31	14	---	76	e15	---	27	---	33	---	4.5	4.0	---
TOTAL	940	730	352.6	630	524	464	513.5	852.9	436.0	251.1	163.7	114.2
MEAN	30.3	24.3	11.4	20.3	18.7	15.0	17.1	27.5	14.5	8.10	5.28	3.81
MAX	146	266	76	56	30	27	38	229	27	30	12	5.6
MIN	13	10	5.6	11	14	11	9.5	6.7	7.8	4.5	3.7	3.4
CFSM	2.59	2.08	.97	1.74	1.60	1.28	1.46	2.35	1.24	.69	.45	.33
IN.	2.99	2.32	1.12	2.00	1.67	1.48	1.63	2.71	1.39	.80	.52	.36

CAL YR 1989 TOTAL 5988.2 MEAN 16.4 MAX 287 MIN 3.0 CFSM 1.40 IN. 19.04
WTR YR 1990 TOTAL 5972.0 MEAN 16.4 MAX 266 MIN 3.4 CFSM 1.40 IN. 18.99

e Estimated.

02056000 ROANOKE RIVER AT NIAGARA, VA

LOCATION.--Lat 37°15'18", long 79°52'18", Roanoke County, Hydrologic Unit 03010101, on right bank 200 ft downstream from powerplant of Appalachian Power Company at Niagara, 2 mi downstream from Tinker Creek, 2.1 mi southeast of Vinton, and at mile 355.3.

DRAINAGE AREA.--512 mi².

PERIOD OF RECORD.--July 1926 to current year.

REVISED RECORDS.--WSP 972: 1927(M), 1929(M), 1934(M), 1937(M). WSP 1303: 1928, 1930, 1933-38, 1940. WSP 2104: Drainage area. WDR VA-72-1: 1928(M), 1930(M), 1933(M), 1935-36(M), 1938(M), 1940, 1944-45(M), 1948-49(M), 1951(M), 1955(M), 1960(M), 1967(M), 1969(M).

GAGE.--Water-stage recorder. Datum of gage is 820.15 ft above National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers).

REMARKS.--Records good except those for periods with ice effect, Dec. 16, 18-29, and period of no gage-height record, Jan. 19 to Feb. 8, which are fair. Flow regulated by dam and powerplant 200 ft upstream from station. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

AVERAGE DISCHARGE.--64 years, 514 ft³/s, 13.63 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 52,300 ft³/s, Nov. 4, 1985, gage height, 25.30 ft, from floodmark, from rating curve extended above 12,000 ft³/s on basis of slope-area measurements at gage heights 18.98 ft and 25.30 ft; minimum, 1.0 ft³/s, Oct. 16, 20, 1956; minimum daily, 8 ft³/s, Oct. 9, 1954; minimum gage height, 0.17 ft, Aug. 25, 1971.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 3,500 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Oct. 2	0545	*8,710	*11.37	May 29	1215	5,870	9.61
Nov. 16	1400	7,670	10.78	July 15	0030	4,480	8.56
Jan. 1	0500	5,450	9.31	July 15	0730	4,060	8.20

Minimum discharge, 4.0 ft³/s, Nov. 15, gage height, 0.81 ft; minimum daily, 114 ft³/s, Sept. 29, 30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2650	371	475	4440	e800	659	1210	403	1020	266	120	179
2	6130	339	466	1950	e760	650	1260	429	855	212	161	167
3	2840	313	448	1250	e730	858	1190	429	675	210	155	163
4	1620	306	435	1040	e1400	890	1020	378	675	195	149	158
5	1140	306	389	966	e1500	830	888	634	551	180	260	154
6	924	295	403	877	e1200	760	896	552	516	180	629	152
7	811	311	380	819	e1000	677	1760	464	474	165	634	146
8	630	325	382	993	e860	621	1460	436	429	154	342	140
9	657	301	396	1410	787	612	1150	399	425	164	261	145
10	513	286	392	1190	851	577	987	610	456	268	224	149
11	504	283	341	1000	934	545	940	473	376	279	476	165
12	478	279	407	884	931	522	826	431	352	211	347	151
13	445	238	491	795	838	493	725	389	330	302	304	185
14	435	326	430	616	786	470	650	387	311	1010	307	325
15	425	221	373	657	719	460	675	353	327	2690	311	196
16	362	5000	e330	592	816	486	630	411	314	886	284	157
17	448	2340	310	539	1050	829	576	349	291	525	381	142
18	644	1260	e300	500	950	961	550	310	294	463	338	133
19	1070	930	e285	e480	976	820	499	302	282	442	283	135
20	815	763	e270	e460	910	779	492	282	274	381	260	135
21	706	683	e260	e450	823	684	501	458	289	312	377	134
22	640	585	e250	e430	815	614	510	1750	404	302	452	184
23	470	638	e245	e410	895	580	482	1400	363	267	621	148
24	490	549	e240	e390	953	560	441	870	340	256	488	141
25	464	499	e240	e540	898	664	437	666	257	227	385	126
26	434	501	e235	e940	786	621	412	581	250	225	324	123
27	419	586	e235	e840	748	594	407	518	232	210	281	118
28	412	581	e235	e760	709	566	395	1340	231	198	248	116
29	342	546	e230	e740	---	666	433	4860	214	187	222	114
30	363	504	307	e1120	---	673	439	2690	213	190	204	114
31	368	---	1310	e960	---	1030	---	1450	---	187	189	---
TOTAL	28649	20465	11490	29038	25425	20751	22841	25004	12020	11744	10017	4595
MEAN	924	682	371	937	808	669	761	807	401	379	323	153
MAX	6130	5000	1310	4440	1500	1030	1760	4860	1020	2690	634	325
MIN	342	221	230	390	709	460	395	282	213	154	120	114
CFSM	1.81	1.33	.72	1.83	1.77	1.31	1.49	1.58	.78	.74	.63	.30
IN.	2.08	1.49	.83	2.11	1.85	1.51	1.66	1.82	.87	.85	.73	.33

CAL YR 1989 TOTAL 228852 MEAN 627 MAX 6150 MIN 157 CFSM 1.22 IN. 16.63
WTR YR 1990 TOTAL 222039 MEAN 608 MAX 6130 MIN 114 CFSM 1.19 IN. 16.13

e Estimated.

ROANOKE RIVER BASIN

02056650 BACK CREEK NEAR DUNDEE, VA

LOCATION.--Lat 37°13'39", long 79°52'06", Roanoke County, Hydrologic Unit 03010101, on right bank 65 ft upstream from bridge on State Highway 660, 0.9 mi upstream from Horseshoe Branch, 1.1 mi southeast of Dundee, 2.8 mi west of Hardy post office, and at mile 2.4.

DRAINAGE AREA.--56.8 mi².

PERIOD OF RECORD.--July 1974 to current year.

GAGE.--Water-stage recorder and crest-stage gage. Datum of gage is 822.67 ft above National Geodetic Vertical Datum of 1929. Prior to Apr. 4, 1975, nonrecording gage, and Apr. 4, 1975, to Nov. 4, 1985, water-stage recorder, at site 80 ft downstream at same datum.

REMARKS.--Records good except those for period with ice effect, Dec. 14-30, and period of no gage-height record, Apr. 11 to May 14, which are fair. Several measurements of water temperature were made during the year.

AVERAGE DISCHARGE.--16 years, 60.2 ft³/s, 14.39 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 20,000 ft³/s, Nov. 4, 1985, gage height, 25.1 ft, from floodmark, present site, from rating curve extended above 5,900 ft³/s on basis of slope-area measurement of peak flow; minimum daily, 0.90 ft³/s, Aug. 30, 1981.

EXTREMES OUTSIDE PERIOD OF RECORD.--Floods of May 30, 1971, and June 21, 1972, reached a stage of 17.5 ft and 20.0 ft, respectively, from information by local resident.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 600 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Oct. 2	0530	*1,100	*7.34	July 14	2345	911	6.84
Nov. 16	0705	1,030	7.16				

Minimum discharge, 6.9 ft³/s, July 7-8, part of each day Sept. 27-29, gage height, 2.60 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	242	47	50	324	54	61	128	e44	96	16	16	17
2	603	44	48	166	54	60	132	e44	81	14	14	16
3	262	44	47	118	57	84	128	e42	71	13	14	15
4	162	43	44	102	127	71	109	e40	64	11	13	13
5	118	42	46	95	104	65	97	e70	56	10	20	13
6	96	42	45	86	86	63	96	e64	54	9.1	164	13
7	80	42	43	74	80	59	204	e58	50	7.7	60	11
8	69	45	45	129	69	57	145	e52	46	8.5	31	10
9	64	46	45	143	65	57	120	e50	44	11	26	12
10	58	41	42	113	95	56	107	e62	41	13	24	15
11	55	39	43	93	86	54	e100	e58	37	23	28	13
12	51	39	51	82	81	52	e86	e50	35	21	22	11
13	49	38	57	69	72	50	e76	e47	34	76	19	13
14	47	37	e45	63	68	50	e70	e44	34	207	20	40
15	45	39	e40	60	65	48	e72	41	33	337	25	20
16	43	289	e37	57	78	49	e66	40	36	93	23	13
17	51	148	e34	55	79	175	e60	40	34	68	74	10
18	70	101	e33	54	67	163	e58	38	31	55	36	8.0
19	248	81	e31	52	75	111	e54	35	29	42	28	8.7
20	133	71	e30	50	68	98	e52	36	26	41	23	11
21	97	63	e29	52	63	84	e54	51	29	42	27	9.5
22	80	59	e28	49	74	77	e56	168	30	32	32	12
23	68	63	e27	46	95	72	e50	108	45	29	79	13
24	63	55	e27	46	88	67	e48	71	27	25	62	8.6
25	58	52	e27	66	74	78	e46	58	24	23	45	7.7
26	55	58	e27	81	66	69	e44	56	22	21	38	7.9
27	52	63	e26	65	66	64	e43	53	22	20	31	7.4
28	50	59	e26	60	65	62	e42	103	20	20	26	7.1
29	48	55	e26	58	---	73	e49	393	18	19	22	7.2
30	47	52	e36	64	---	83	e45	205	16	19	19	7.4
31	48	---	168	57	---	131	---	128	---	18	18	---
TOTAL	3212	1897	1303	2629	2121	2343	2437	2349	1185	1344.3	1079	370.5
MEAN	104	63.2	42.0	84.8	75.7	75.6	81.2	75.8	39.5	43.4	34.8	12.3
MAX	603	289	168	324	127	175	204	393	96	337	164	40
MIN	43	37	26	46	54	48	42	35	16	7.7	13	7.1
CFSM	1.82	1.11	.74	1.49	1.33	1.33	1.43	1.33	.70	.76	.61	.22
IN.	2.10	1.24	.85	1.72	1.39	1.53	1.60	1.54	.78	.88	.71	.24

CAL YR 1989 TOTAL 21486.5 MEAN 58.9 MAX 771 MIN 9.5 CFSM 1.04 IN. 14.07
WTR YR 1990 TOTAL 22269.8 MEAN 61.0 MAX 603 MIN 7.1 CFSM 1.07 IN. 14.59

e Estimated.

02056900 BLACKWATER RIVER NEAR ROCKY MOUNT, VA

LOCATION.--Lat 37°02'42", long 79°50'40", Franklin County, Hydrologic Unit 03010101, on right bank 45 ft downstream from bridge on State Highway 122, 3.0 mi northeast of Rocky Mount, and 4.1 mi upstream from Maggodee Creek.

DRAINAGE AREA.--115 mi².

PERIOD OF RECORD.--October 1976 to current year.

GAGE.--Water-stage recorder. Datum of gage is 876.45 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records good except those for periods with ice effect, Dec. 15, 16, 18-28, which are fair. Several measurements of water temperature were made during the year.

COOPERATION.--Records were provided by the Virginia Water Control Board.

AVERAGE DISCHARGE.--14 years, 137 ft³/s, 16.18 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 20,800 ft³/s, Nov. 5, 1985, gage height, 21.92 ft, from rating curve extended above 7,000 ft³/s on basis of slope-area measurement of peak flow; minimum, 6.6 ft³/s, July 21, 1986, gage height, 1.13 ft.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 1,500 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Oct. 2	0500	2,550	7.81	July 15	0200	*4,400	*10.85
Mar. 17	1730	1,600	6.09				

Minimum discharge, 35 ft³/s, July 7, gage height, 1.64 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	945	133	125	810	136	167	267	141	156	52	63	63
2	1640	116	123	304	135	164	225	136	141	51	61	62
3	612	115	122	227	135	195	215	133	131	48	60	60
4	390	111	116	202	229	176	196	133	124	46	59	57
5	292	110	119	194	220	162	185	150	114	43	64	58
6	245	111	118	184	186	157	181	133	112	41	281	56
7	214	114	115	173	177	150	310	124	107	39	156	53
8	194	112	121	256	164	145	227	119	101	40	92	51
9	181	114	126	285	156	146	205	116	103	45	81	54
10	169	104	115	218	471	143	196	375	100	43	77	63
11	160	101	120	196	329	140	213	169	90	95	77	59
12	152	101	138	183	237	136	186	129	85	162	73	54
13	145	100	155	166	207	132	172	124	83	143	67	58
14	140	100	135	157	192	130	171	116	83	1050	69	113
15	136	99	e125	152	181	128	323	110	81	1700	73	76
16	130	370	e115	147	202	133	203	107	87	269	84	61
17	134	249	104	143	244	714	183	105	84	166	112	54
18	171	189	e100	140	196	464	171	99	79	259	78	50
19	415	165	e96	137	210	251	164	94	76	152	69	51
20	234	152	e90	133	193	220	161	96	71	129	64	55
21	186	142	e84	137	177	195	159	105	73	122	66	53
22	163	138	e78	129	238	179	163	182	73	109	77	55
23	149	157	e81	126	350	169	150	159	104	96	205	58
24	142	143	e90	124	234	161	146	120	75	87	163	49
25	136	136	e100	152	204	205	142	109	66	82	114	47
26	131	139	e115	184	185	180	139	110	64	78	98	47
27	127	142	e110	155	182	163	139	112	62	75	86	46
28	124	137	e120	146	178	156	136	128	61	72	77	45
29	122	132	125	143	---	172	146	573	58	73	71	46
30	121	127	127	162	---	191	152	290	55	69	67	46
31	123	---	276	144	---	390	---	190	---	68	65	---
TOTAL	8223	4159	3684	6009	5948	6214	5626	4787	2699	5504	2849	1700
MEAN	265	139	119	194	212	200	188	154	90.0	178	91.9	56.7
MAX	1640	370	276	810	471	714	323	573	156	1700	281	113
MIN	121	99	78	124	135	128	136	94	55	39	59	45
CFSM	2.31	1.21	1.03	1.69	1.85	1.74	1.63	1.34	.78	1.54	.80	.49
IN.	2.66	1.35	1.19	1.94	1.92	2.01	1.82	1.55	.87	1.78	.92	.55

CAL YR 1989 TOTAL 56723 MEAN 155 MAX 1850 MIN 43 CFSM 1.35 IN. 18.35
WTR YR 1990 TOTAL 57402 MEAN 157 MAX 1700 MIN 39 CFSM 1.37 IN. 18.57

e Estimated.

ROANOKE RIVER BASIN

02057400 SMITH MOUNTAIN LAKE NEAR PENHOOK, VA

LOCATION.--Lat 37°02'28", long 79°32'09", Pittsylvania County, Hydrologic Unit 03010101, at dam on Roanoke (Staunton) River 6.5 mi northeast of Penhook and at mile 314.0.

DRAINAGE AREA.--1,024 mi².

PERIOD OF RECORD.--September 1963 to current year.

GAGE.--Water-stage recorder. Datum of gage is National Geodetic Vertical Datum of 1929. Prior to July 19, 1965, nonrecording gage at same site and datum.

REMARKS.--Reservoir is formed by concrete dam. Two ungated spillways, one near each end of dam, with crests at elevation 795 ft, are each 105 ft long. Initial filling began in September 1963 during construction; water in reservoir first reached minimum power pool, elevation, 787 ft, in May 1965. Total capacity at maximum pool elevation, 811 ft, is 1,517,000 acre-ft of which 375,000 acre-ft is above the spillway crest; 157,800 acre-ft is normally used for power between elevation 787 ft, minimum power pool, and the spillway crest. Capacity at invert of lowest penstock, elevation, 601 ft, is 100 acre-ft. Figures given herein represent total contents. Reservoir is part of the Smith Mountain Combination Project (pumped storage) which is used for hydroelectric power, flood control, low-water regulation for pollution abatement and water supply, water releases for downstream fish spawning, and recreation.

COOPERATION.--Records were provided by the Appalachian Power Company.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 1,250,200 acre-ft, Apr. 27, 1978, elevation, 799.8 ft; minimum (after first filling to minimum power pool), 995,400 acre-ft, Jan. 23, 1970, elevation, 787.6 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 1,144,200 acre-ft, July 14, 15, elevation, 795.1 ft; minimum, 1,107,300 acre-ft, July 6, elevation, 793.3 ft.

MONTHEND ELEVATION AND CONTENTS AT 2400, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

Date	Elevation (feet)	Contents (acre-feet)	Change in contents (acre-feet)
Sept. 30.....	794.6	1,133,800	-
Oct. 31.....	794.5	1,131,800	-2,000
Nov. 30.....	794.0	1,121,600	-10,200
Dec. 31.....	794.3	1,127,700	+6,100
CAL YR 1989.....	-	-	+44,900
Jan. 31.....	794.8	1,137,900	+10,200
Feb. 28.....	794.4	1,129,800	-8,100
Mar. 31.....	794.9	1,140,000	+10,200
Apr. 30.....	794.5	1,131,800	-8,200
May 31.....	794.7	1,135,900	+4,100
June 30.....	793.9	1,119,600	-16,300
July 31.....	794.4	1,129,800	+10,200
Aug. 31.....	794.2	1,125,700	-4,100
Sept. 30.....	794.1	1,123,600	-2,100
WTR YR 1990.....	-	-	-10,200

02058400 PIGG RIVER NEAR SANDY LEVEL, VA

LOCATION.--Lat 36°56'45", long 79°31'30", Pittsylvania County, Hydrologic Unit 03010101, on left bank 300 ft downstream from Harpen Creek, 0.5 mi upstream from bridge on State Highway 40, and 1.1 mi south of Sandy Level.

DRAINAGE AREA.--350 mi².

PERIOD OF RECORD.--May 1963 to current year.

REVISED RECORDS.--WSP 2104: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 617.00 ft above National Geodetic Vertical Datum of 1929 (U.S. Army Corps of Engineers bench mark). Prior to Nov. 18, 1963, nonrecording gage at same site and datum.

REMARKS.--Records good except for period with ice effect, Dec. 16-30, which is fair. Appalachian Power Company gage-height transmitter at station, recorder at Roanoke. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

AVERAGE DISCHARGE.--27 years, 378 ft³/s, 14.67 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 65,600 ft³/s, Sept. 8, 1987, gage height, 31.12 ft, from high-water marks, from rating curve extended above 25,500 ft³/s on basis of slope-area measurement of peak flow; minimum, 24 ft³/s, Aug. 29, 30, 1981, gage height, 1.95 ft.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 4,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Oct. 2	1600	7,050	12.64	Mar. 18	0330	*7,260	*12.94
Jan. 1	0700	4,580	8.97	May 29	1200	4,220	8.37
Feb. 10	1930	4,410	8.69	July 15	1700	6,790	12.27

Minimum discharge, 171 ft³/s, Sept. 27, 28, 29, 30, gage height, 2.59 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2280	340	295	3380	431	461	968	428	523	213	215	196
2	6370	327	290	1050	405	448	789	393	461	209	208	193
3	1990	325	287	635	399	532	599	373	430	199	207	190
4	876	310	278	536	982	515	515	414	423	191	204	186
5	625	299	280	526	772	450	473	442	384	186	205	185
6	521	302	283	511	537	430	457	422	370	181	339	186
7	456	318	278	505	490	413	809	362	358	177	309	184
8	413	318	297	1180	455	397	640	344	344	176	234	185
9	390	331	323	1460	415	400	512	332	349	188	217	208
10	371	307	289	724	2400	400	474	1170	384	197	221	233
11	359	290	289	555	2070	395	567	1400	335	203	222	212
12	348	288	387	486	810	382	515	564	307	332	224	197
13	337	285	540	431	609	378	450	478	299	352	206	200
14	333	284	427	400	525	373	430	445	300	1580	204	679
15	327	288	369	388	481	370	1410	403	297	4090	339	365
16	315	470	e330	379	794	386	942	386	310	1110	295	240
17	345	565	e272	369	1190	3080	618	379	304	506	418	205
18	612	369	e355	362	682	4030	520	359	292	813	259	191
19	2400	325	e320	355	873	1030	468	334	286	480	232	190
20	948	312	e288	342	771	760	448	332	269	354	492	199
21	572	296	e258	354	586	651	445	381	280	315	245	197
22	456	288	e222	345	652	549	546	561	281	312	241	200
23	401	380	e227	328	1500	499	456	683	291	298	334	206
24	376	387	e237	326	816	466	422	432	265	266	572	188
25	358	339	e250	477	610	499	402	376	245	251	309	178
26	342	342	e270	789	523	507	388	372	238	241	263	177
27	332	346	e284	557	500	450	376	445	234	232	241	175
28	325	334	e275	444	484	425	363	841	241	232	224	173
29	319	321	e271	417	---	468	368	3320	230	229	213	173
30	315	304	e288	672	---	536	447	1370	221	224	205	174
31	319	---	645	510	---	960	---	681	---	224	200	---
TOTAL	24731	9990	9704	19793	21762	21640	16817	19222	9551	14561	8297	6465
MEAN	798	333	313	638	777	698	561	620	318	470	268	215
MAX	6370	565	645	3380	2400	4030	1410	3320	523	4090	572	679
MIN	315	284	222	326	399	370	363	332	221	176	200	173
CFSM	2.28	.95	.89	1.82	2.22	1.99	1.60	1.77	.91	1.34	.76	.62
IN.	2.63	1.06	1.03	2.10	2.31	2.30	1.79	2.04	1.02	1.55	.88	.69

CAL YR 1989 TOTAL 165051 MEAN 452 MAX 6370 MIN 151 CFSM 1.29 IN. 17.54
WTR YR 1990 TOTAL 182533 MEAN 500 MAX 6370 MIN 173 CFSM 1.43 IN. 19.40

e Estimated.

ROANOKE RIVER BASIN

02059400 LEESVILLE LAKE NEAR LEESVILLE, VA

LOCATION.--Lat 37°05'35", long 79°24'09", Campbell County, Hydrologic Unit 03010101, at Leesville Dam on Roanoke (Staunton) River, 2.0 mi south of Leesville, 3.5 mi upstream from Goose Creek, and at mile 296.

DRAINAGE AREA.--1,505 mi².

PERIOD OF RECORD.--September 1962 to current year.

GAGE.--Water-stage recorder. Datum of gage is National Geodetic Vertical Datum of 1929. Prior to June 6, 1963, nonrecording gage at same site and datum.

REMARKS.--Reservoir is formed by concrete dam. Spillway, with crest at elevation 578.0 ft, is equipped with 4 radial gates 35 ft high by 50 ft wide. Storage began on Sept. 29, 1962, during construction, and water in reservoir first reached minimum power pool, elevation, 600.0 ft, on Mar. 5, 1963. Total capacity at maximum pool elevation, 613 ft, is 94,960 acre-ft of which 75,960 acre-ft is above the spillway crest elevation; 38,200 acre-ft is normally used for power between elevations 600.0 ft, minimum power pool, and 613.0 ft. Capacity at invert of lowest penstock, elevation, 579.75 ft, is 21,010 acre-ft. Figures given herein represent total contents. Reservoir is part of the Smith Mountain Combination Project (see station 02057400).

COOPERATION.--Records were provided by the Appalachian Power Company.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 98,180 acre-ft, Feb. 1, 1965, elevation, 614.0 ft; minimum (after first filling to minimum power pool), 39,880 acre-ft, Mar. 19, 1963, elevation, 592.0 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 94,640 acre-ft, July 6, elevation, 612.9 ft; minimum, 57,200 acre-ft, Dec. 26, elevation, 600.0 ft.

MONTHEND ELEVATION AND CONTENTS AT 2400, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

Date	Elevation (feet)	Contents (acre-feet)	Change in contents (acre-feet)
Sept. 30.....	602.9	64,970	-
Oct. 31.....	604.8	70,060	+5,090
Nov. 30.....	608.3	80,300	+10,240
Dec. 31.....	607.6	78,240	-2,060
CAL YR 1989.....	-	-	+16,220
Jan. 31.....	601.9	62,290	-15,950
Feb. 28.....	606.1	73,830	+11,540
Mar. 31.....	603.2	65,780	-8,050
Apr. 30.....	606.8	75,890	+10,110
May 31.....	604.1	68,190	-7,700
June 30.....	610.2	85,940	+17,750
July 31.....	606.6	75,300	-10,640
Aug. 31.....	606.7	75,600	+300
Sept. 30.....	606.1	73,830	-1,770
WTR YR 1990.....	-	-	+8,860

ROANOKE RIVER BASIN

283

02059500 GOOSE CREEK NEAR HUDDLESTON, VA

LOCATION.--Lat 37°10'23", long 79°31'14", Bedford County, Hydrologic Unit 03010101, on left bank 0.3 mi upstream from Haden Bridge on State Highway 732, 0.4 mi upstream from Rockcastle Creek, and 3.5 mi northwest of Huddleston.

DRAINAGE AREA.--188 mi².

PERIOD OF RECORD.--March 1925 to August 1928 (gage heights only), September 1930 to current year.

REVISED RECORDS.--WSP 892: 1933, 1935(M), 1939. WSP 972: 1931-32(M), 1934(M), 1935-38, 1940, 1941(M). WSP 1082: 1940(P). WSP 1142: 1938-40(M). WSP 2104: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 592.91 ft above National Geodetic Vertical Datum of 1929. Mar. 15, 1925, to Aug. 4, 1928, nonrecording gage at site 1,300 ft downstream at different datum.

REMARKS.--Records good except those for periods of doubtful gage-height record, Oct. 7-18, 30, 31, Jan. 2-8, 13-25, Mar. 6-16, 19-24, Apr. 1, 29, 30, and June 17, 18, and period with ice effect, Dec. 17-30, which are fair. Prior to October 1954, diurnal fluctuation at low flow caused by mill upstream from station. Appalachian Power Company gage-height transmitter at station, recorder at Roanoke. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

COOPERATION.--Records were provided by the Virginia Water Control Board.

AVERAGE DISCHARGE.--60 years, 182 ft³/s, 13.15 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 53,200 ft³/s, Sept. 8, 1987, gage height, 37.49 ft, from floodmarks, from rating curve extended above 11,000 ft³/s on basis of slope-area measurements at gage heights 19.25 ft, 24.1 ft, 24.89 ft, and 37.49 ft; minimum, 3 ft³/s, Aug. 31, 1932, Jan. 30, 1934.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 2,300 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Oct. 2	1030	2,640	*8.56	May 29	0330	2,410	7.47
Jan. 1	0300	*2,800	8.48	July 14	0645	2,410	7.47
Mar. 17	1745	2,740	8.33	July 15	0900	2,730	8.17
May 10	1215	2,500	7.67				

Minimum discharge, 79 ft³/s, Sept. 27-30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	820	170	177	1680	249	240	e520	190	493	104	143	105
2	1950	138	170	e750	234	223	756	187	419	104	139	104
3	917	134	168	e470	230	363	579	188	349	99	139	104
4	506	120	150	e365	425	308	410	182	295	95	136	100
5	354	120	167	e380	479	256	340	239	254	93	144	100
6	316	129	171	e360	385	e245	307	191	227	89	302	97
7	e290	140	173	e320	352	e235	617	174	221	86	215	118
8	e270	148	188	e343	316	e230	449	165	224	87	158	105
9	e240	195	205	610	291	e228	368	162	210	96	147	107
10	e220	146	183	433	1090	e225	318	1080	408	95	143	111
11	e210	130	191	335	749	e240	347	648	216	115	139	102
12	e200	129	224	277	561	e230	262	438	191	183	137	95
13	e190	128	263	e270	473	e220	213	362	174	299	130	99
14	e185	129	234	e260	418	e210	191	297	186	1390	136	209
15	e180	138	220	e255	385	e200	755	245	162	1630	133	143
16	e175	715	184	e245	433	e210	367	233	182	869	132	104
17	e210	505	e170	e235	512	1100	284	222	e170	509	165	93
18	e275	308	e155	e230	415	1190	237	185	e140	391	130	86
19	1310	238	e140	e225	437	e600	209	157	179	334	126	88
20	631	204	e135	e220	413	e410	199	149	142	303	135	98
21	414	178	e125	e240	356	e360	197	177	141	293	116	92
22	324	167	e120	e225	387	e330	232	745	152	270	231	101
23	274	215	e122	e215	669	e315	185	668	231	229	218	102
24	235	187	e140	e210	489	e300	172	390	144	204	200	88
25	216	171	e165	e245	374	399	168	261	127	187	167	83
26	201	190	e190	603	307	354	162	217	118	175	146	82
27	186	217	e185	439	296	310	154	245	114	166	132	81
28	171	211	e190	332	278	280	152	472	114	159	123	79
29	159	200	e200	288	---	299	e180	1910	109	158	118	81
30	e150	184	e250	346	---	317	e203	978	104	155	113	80
31	e135	---	710	289	---	642	---	632	---	153	108	---
TOTAL	11914	5984	6065	11695	12003	11069	9533	12389	6196	9120	4701	3037
MEAN	384	199	196	377	429	357	318	400	207	294	152	101
MAX	1950	715	710	1680	1090	1190	756	1910	493	1630	302	209
MIN	135	120	120	210	230	200	152	149	104	86	108	79
CFSM	2.04	1.06	1.04	2.01	2.28	1.90	1.69	2.13	1.10	1.56	.81	.54
IN.	2.36	1.18	1.20	2.31	2.38	2.19	1.89	2.45	1.23	1.80	.93	.60

CAL YR 1989 TOTAL 103043 MEAN 282 MAX 8600 MIN 59 CFMS 1.50 IN. 20.39
WTR YR 1990 TOTAL 103706 MEAN 284 MAX 1950 MIN 79 CFMS 1.51 IN. 20.52

e Estimated.

02060500 ROANOKE (STAUNTON) RIVER AT ALTAVISTA, VA

LOCATION.--Lat 37°06'16", long 79°17'44", Pittsylvania County, Hydrologic Unit 03010101, on right bank 12 ft upstream from bridge on alternate U.S. Highway 29, 0.3 mi south of Altavista, 0.3 mi downstream from Sycamore Creek, 3.5 mi upstream from Big Otter River, and at mile 286.5.

DRAINAGE AREA.--1,789 mi².

PERIOD OF RECORD.--August 1930 to current year.

REVISED RECORDS.--WSP 892: 1938(M). WSP 972: 1931-33. WSP 2104: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 503.10 ft above National Geodetic Vertical Datum of 1929. Prior to Feb. 21, 1951, on left bank 50 ft downstream at same datum.

REMARKS.--No estimated daily discharges. Records good. Flow regulated since 1962 by Leesville Lake (station 02059400) 9.5 mi upstream and since 1963 by Smith Mountain Lake (station 02057400) 27.5 mi upstream. U.S. Army Corps of Engineers satellite gage-height telemeter at station. Appalachian Power Company gage-height transmitter at station, recorder at Roanoke. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

AVERAGE DISCHARGE.--60 years, 1,795 ft³/s, 13.63 in/yr, unadjusted.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 105,000 ft³/s, Aug. 15, 1940, gage height, 40.08 ft, from floodmark, from rating curve extended above 52,000 ft³/s on basis of unit hydrograph and flood-routing studies by U.S. Army Corps of Engineers and records for other stations in Roanoke River basin; minimum, 13 ft³/s, Jan. 30, 1966; minimum daily, 39 ft³/s, July 10, 1966; minimum gage height, 1.53 ft, Jan. 2, 1977, result of freezeup.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 14,900 ft³/s, Jan. 1, gage height, 15.88 ft; minimum daily, 773 ft³/s, June 28.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	6960	1070	1790	12900	2590	1960	4520	1740	2600	1040	888	884
2	12300	1210	1350	9200	2200	2120	5390	1770	2250	1030	880	888
3	10200	1170	1340	4270	2010	2270	5700	1790	2210	931	836	881
4	10200	1100	975	2440	3280	3070	3250	1800	2050	915	813	867
5	5870	1100	883	2040	4800	2320	2430	1980	1810	904	800	861
6	2860	1110	918	2220	3050	1800	2110	2200	1490	879	2510	844
7	2190	1150	1360	2540	2430	1620	4570	1810	1310	878	2240	860
8	2070	1800	1710	3730	2300	1570	4110	1710	1210	871	1230	860
9	1700	2450	1710	5840	2110	1610	3360	1560	1070	884	1160	860
10	1520	1490	1650	5130	6140	1730	2670	3290	1380	945	1040	847
11	1480	1040	1510	3320	7590	1700	2640	5900	1740	930	907	850
12	1390	991	1480	2530	3540	1680	2550	2650	1650	983	898	834
13	1290	913	2190	2020	3240	1760	2250	1930	1400	1210	896	840
14	1020	899	2200	1960	2560	1670	2240	1820	1260	10200	931	1070
15	1300	901	1490	1680	2470	1630	4570	1730	1200	11300	932	1020
16	1710	6510	1310	1400	3800	3370	4610	1620	1170	10800	930	866
17	3370	6410	1160	1400	4470	8740	2410	1490	1160	4350	953	868
18	2340	2720	1160	1550	2690	11900	1950	1460	1150	1790	957	878
19	9320	1640	1080	1610	2280	7310	1930	1400	1090	1790	945	830
20	3760	1010	943	1650	2650	2300	1900	1340	1080	1720	1190	843
21	1910	1150	948	1650	2980	1710	1860	1420	1080	1530	2150	1030
22	1460	1360	958	1680	3120	1750	1880	4300	1030	1370	1910	1230
23	995	1410	916	1700	4580	1830	1890	5580	1100	1160	1060	855
24	1040	969	914	1620	3760	2090	2070	2680	1100	1210	1440	828
25	942	1460	914	2300	2970	2270	1890	2090	888	1160	1690	820
26	929	1440	921	3930	1230	2300	1710	1930	1240	975	1660	819
27	895	1420	939	3330	1270	2130	1680	1920	1310	915	1320	821
28	921	1390	1000	2710	1530	2100	1660	7040	773	916	952	857
29	937	1710	1150	2020	---	2370	1630	13000	1040	904	915	860
30	1150	2080	1290	2290	---	2910	1660	10200	1050	886	885	843
31	4100	---	2480	3370	---	4640	---	3920	---	891	879	---
TOTAL	98129	51073	40639	96030	87640	88230	83090	95070	40891	66267	36797	26514
MEAN	3165	1702	1311	3098	3130	2846	2770	3067	1363	2138	1187	884
MAX	12300	6510	2480	12900	7590	11900	5700	13000	2600	11300	2510	1230
MIN	895	899	883	1400	1230	1570	1630	1340	773	871	800	819
(*)	+50	+1	+65	-93	+62	+35	+32	-58	+24	-7	-62	-65
MEAN#	3215	1703	1376	3005	3192	2881	2802	3009	1387	2131	1125	819
CFSM#	1.80	.95	.77	1.68	1.78	1.61	1.57	1.68	.78	1.19	.63	.46
IN.#	2.07	1.06	.89	1.94	1.86	1.86	1.75	1.94	.87	1.37	.73	.51

CAL YR 1989 TOTAL 762605 MEAN 2089 MAX 16800 MIN 423 MEAN# 2173 CFSM# 1.21 IN.# 16.49
WTR YR 1990 TOTAL 810370 MEAN 2220 MAX 13000 MIN 773 MEAN# 2218 CFSM# 1.24 IN.# 16.83

* Change in contents, equivalent in cubic feet per second, in Smith Mountain and Leesville Lakes; provided by Appalachian Power Company.

Adjusted for change in contents.

02061500 BIG OTTER RIVER NEAR EVINGTON, VA

LOCATION.--Lat 37°12'30", long 79°18'14", Campbell County, Hydrologic Unit 03010101, on right bank 60 ft upstream from bridge on State Highway 682, 2.0 mi southwest of Evington, and 2.1 mi upstream from Flat Creek.

DRAINAGE AREA.--320 mi².

PERIOD OF RECORD.--October 1936 to current year. Monthly discharge only for some periods, published in WSP 1303. Prior to October 1965, published as Otter River near Evington.

REVISED RECORDS.--WSP 852: 1937. WSP 892: 1938-39(M). WSP 972: 1937-39. WSP 1032: 1940. WSP 2104: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 544.02 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records good except those for periods of doubtful or no gage-height record, Oct. 6-11, Jan. 19 to Mar. 5, Apr. 6, 9, 10, 12-14, 16-21, Apr. 23 to May 3, and May 13, 14, 16, and periods with ice effect, Dec. 15, 16, 18-24, 26, 27, which are fair. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

COOPERATION.--Records were provided by the Virginia Water Control Board.

AVERAGE DISCHARGE.--54 years, 335 ft³/s, 14.22 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 41,900 ft³/s, Sept. 8, 1987, gage height, 24.96 ft, from rating curve extended above 24,000 ft³/s on basis of slope-area measurement of peak flow; minimum, 7.5 ft³/s, Sept. 14, 1966.

EXTREMES OUTSIDE PERIOD OF RECORD.--Floods in October 1937 and August 1939 reached a stage of 23.1 ft, discharge, 27,500 ft³/s, from rating curve extended above 7,000 ft³/s on basis of unit hydrograph and flood-routing studies by U.S. Army Corps of Engineers, and records for other stations in Roanoke River basin.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 4,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Jan. 1	0400	*5,630	*12.58	May 29	0900	4,680	10.79
May 10	1830	4,160	9.74				

Minimum discharge, 105 ft³/s, Sept. 28-29.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1020	319	259	3250	e400	e480	813	e355	645	176	174	125
2	2780	285	253	883	e380	e470	1230	e345	567	170	166	124
3	1170	272	248	643	e370	e600	983	e335	519	163	165	120
4	679	250	234	594	e600	e550	620	372	482	157	162	118
5	540	244	241	610	e700	e505	555	423	435	151	163	118
6	e470	247	239	588	e600	484	e490	429	418	145	311	118
7	e430	256	232	557	e540	460	843	362	403	139	276	114
8	e400	266	242	878	e500	439	611	338	407	143	196	115
9	e360	320	263	1010	e470	442	e520	325	417	163	181	125
10	e340	275	233	670	e1650	435	e480	1900	733	150	180	135
11	e320	256	249	572	e1450	447	570	1240	388	142	175	125
12	303	254	282	521	e900	413	e510	652	321	177	167	116
13	291	245	322	469	e780	393	e460	e520	299	183	161	120
14	282	244	290	443	e700	392	e440	e480	278	1050	163	341
15	272	251	e280	432	e630	378	1280	433	403	805	167	232
16	261	559	e265	416	e705	377	e570	e415	423	914	178	153
17	316	457	255	395	e800	1320	e510	403	309	470	244	130
18	451	342	e240	387	e690	1440	e480	364	305	371	189	119
19	1650	306	e220	e380	e710	714	e465	337	349	330	172	119
20	702	292	e205	e365	e650	659	e455	327	273	306	378	128
21	490	273	e185	e385	e610	599	e450	396	266	301	232	123
22	419	260	e170	e360	e590	545	536	896	386	271	426	125
23	380	318	e180	e350	e950	522	e460	749	475	249	412	138
24	359	308	e190	e348	e690	494	e430	515	278	233	349	118
25	340	292	198	e420	e590	536	e415	447	234	221	217	111
26	328	312	e205	e950	e530	534	e400	436	219	212	183	111
27	311	334	e200	e700	e510	515	e385	564	210	202	165	108
28	301	314	208	e570	e505	489	e370	1180	201	197	152	107
29	290	297	227	e450	---	464	e390	3550	191	194	141	106
30	283	269	257	e500	---	533	e367	1320	185	188	135	107
31	286	---	661	e450	---	944	---	802	---	187	129	---
TOTAL	16824	8917	7733	19546	19200	17573	17088	21210	11019	8760	6509	3949
MEAN	543	297	249	631	686	567	570	684	367	283	210	132
MAX	2780	559	661	3250	1650	1440	1280	3550	733	1050	426	341
MIN	261	244	170	348	370	377	367	325	185	139	129	106
CFSM	1.70	.93	.78	1.97	2.14	1.77	1.78	2.14	1.15	.88	.66	.41
IN.	1.96	1.04	.90	2.27	2.23	2.04	1.99	2.47	1.28	1.02	.76	.46

CAL YR 1989 TOTAL 166643 MEAN 457 MAX 12400 MIN 122 CFSM 1.43 IN. 19.37
WTR YR 1990 TOTAL 158328 MEAN 434 MAX 3550 MIN 106 CFSM 1.36 IN. 18.41

e Estimated.

02062500 ROANOKE (STAUNTON) RIVER AT BROOKNEAL, VA

LOCATION.--Lat 37°02'28", long 78°57'02", Campbell County, Hydrologic Unit 03010102, on left bank 1,600 ft upstream from bridge on U.S. Highway 501 at Brookneal, 2.9 mi upstream from Falling River, and at mile 255.9.

DRAINAGE AREA.--2,415 mi².

PERIOD OF RECORD.--April 1923 to current year.

REVISED RECORDS.--WSP 892: 1928(M). WSP 972: 1928-34. WSP 1303: 1924-27(M), 1929(M), 1941(M). WSP 2104: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 351.96 ft above National Geodetic Vertical Datum of 1929. Apr. 30, 1923, to Aug. 29, 1929, nonrecording gage, Aug. 30, 1929, to Aug. 15, 1940, water-stage recorder, and Aug. 16 to Oct. 1, 1940, nonrecording gage at site 1,800 ft downstream at same datum. Oct. 2, 1940, to Sept. 30, 1941, nonrecording gage at site 1,600 ft downstream at same datum.

REMARKS.--Records good except those for period with ice effect, Dec. 26, 27, and period of no gage-height record, May 26 to June 12, which are fair. Flow regulated since 1962 by Leesville Lake (station 02059400) 40.1 mi upstream and since 1963 by Smith Mountain Lake (station 02057400) 58.1 mi upstream. Gage-height and U.S. Army Corps of Engineers satellite telemeters at station. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

AVERAGE DISCHARGE.--67 years, 2,402 ft³/s, 13.51 in/yr, unadjusted.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 130,000 ft³/s, Aug. 15, 1940, gage height, 46.5 ft, at present site, from gage-height relation curve, from rating curve extended above 55,000 ft³/s on basis of slope-area measurement by Geological Survey, unit hydrograph and flood-routing studies by U.S. Army Corps of Engineers, and records for other stations in Roanoke River basin; minimum daily, 140 ft³/s, July 25, 1966.

EXTREMES FOR CURRENT YEAR.--Maximum recorded discharge, 24,900 ft³/s, Mar. 18, gage height, 23.98 ft, but may have been higher during period of no gage-height record, May 26 to June 12; minimum daily, 1,080 ft³/s, Sept. 27.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	7400	2760	2670	18000	4140	2400	7810	2550	e3850	1400	1230	1200
2	19800	1830	2040	15200	3290	3010	8650	2540	e3350	1360	1200	1200
3	15200	1920	1890	7750	3060	3300	9980	2560	e3250	1330	1170	1200
4	12500	1770	1760	4560	3520	4230	6430	2590	e3050	1210	1140	1180
5	10200	1700	1400	3710	7230	3930	4700	2890	e2700	1200	1120	1160
6	4360	1690	1380	3470	5270	2890	3940	3320	e2200	1180	1230	1150
7	3340	1760	1460	3930	3870	2590	5710	2820	e1900	1140	4180	1140
8	3010	1820	2110	4800	3490	2390	6810	2500	e1800	1140	1980	1160
9	2540	3290	2260	9240	3310	2440	5630	2320	e1600	1150	1610	1210
10	2190	3050	2190	7640	7330	2520	4680	2790	e2050	1230	1540	1220
11	2050	1800	2150	5690	14800	2530	4310	9710	e2550	1370	1300	1190
12	1990	1650	2010	4190	6040	2500	4330	5440	e2400	1470	1240	1160
13	1790	1540	2420	3240	5240	2510	3780	3130	2160	1440	1210	1130
14	1550	1470	3390	2950	4180	2420	3610	2900	1870	9580	1220	1500
15	1590	1460	2410	2820	3860	2380	5350	2620	2140	13300	1250	1860
16	1750	4160	2040	2290	4380	2630	7760	2510	2270	13600	1250	1410
17	3100	9780	1810	2210	7570	10200	4720	2320	1860	8790	1360	1170
18	3950	4950	1730	2240	4740	21000	3260	2210	1780	3100	1370	1230
19	10300	3280	1750	2350	3980	12500	3070	2070	1890	2520	1280	1150
20	9470	1650	1500	2380	3880	5690	3010	1990	1690	2540	1470	1140
21	3350	1550	1390	2420	4330	3670	2930	2080	1580	2310	1850	1150
22	2790	1820	1400	2410	4310	3400	3000	5050	1590	2140	3340	1590
23	1800	2040	1380	2430	5950	3290	2930	8160	1940	1750	2120	1370
24	1600	1850	1310	2370	6280	3520	3010	5110	1760	1670	2460	1150
25	1590	1890	1330	2750	4840	3710	2980	3280	1530	1680	2440	1100
26	1490	2060	e1300	6830	3120	4030	2630	e3000	1450	1510	2270	1090
27	1480	2070	e1350	5640	2110	3680	2550	e2900	1730	1350	2150	1080
28	1450	2030	1430	4500	2810	3580	2480	e3400	1540	1300	1450	1090
29	1480	1990	1600	3590	---	3580	2440	e17500	1230	1280	1330	1110
30	1470	2620	1800	3210	---	4510	2470	e15000	1410	1260	1250	1110
31	4010	---	2190	4590	---	5670	---	e6000	---	1240	1220	---
TOTAL	140590	73250	56850	149400	136930	136700	134960	133260	62120	87540	51230	36600
MEAN	4535	2442	1834	4819	4890	4410	4499	4299	2071	2824	1653	1220
MAX	19800	9780	3390	18000	14800	21000	9980	17500	3850	13600	4180	1860
MIN	1450	1460	1300	2210	2110	2380	2440	1990	1230	1140	1120	1080
(*)	+50	+1	+65	-93	+62	+35	+32	-58	+24	-7	-62	-65
MEAN#	4585	2443	1899	4726	4952	4445	4531	4241	2095	2817	1591	1155
CFSM#	1.90	1.01	.79	1.96	2.05	1.84	1.88	1.76	.87	1.17	.66	.48
IN.#	2.18	1.13	.91	2.26	2.14	2.12	2.09	2.03	.97	1.35	.76	.53

CAL YR 1989 TOTAL 1126148 MEAN 3085 MAX 27200 MIN 712 MEAN# 3169 CFSM# 1.31 IN.# 17.82
WTR YR 1990 TOTAL 1199430 MEAN 3286 MAX 21000 MIN 1080 MEAN# 3284 CFSM# 1.36 IN.# 18.46

* Change in contents, equivalent in cubic feet per second, in Smith Mountain and Leesville Lakes; provided by Appalachian Power Company.

Adjusted for change in contents.

e Estimated.

02064000 FALLING RIVER NEAR NARUNA, VA

LOCATION.--Lat 37°07'36", long 78°57'36", Campbell County, Hydrologic Unit 03010102, on left bank at upstream side of bridge on State Highway 643, 2.7 mi northeast of Naruna, and 3.2 mi upstream from Little Falling River.

DRAINAGE AREA.--173 mi².

PERIOD OF RECORD.--July 1929 to January 1935, September 1941 to current year.

REVISED RECORDS.--WSP 1333: 1930, 1931-34(M), 1935. WSP 2104: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 412.32 ft above National Geodetic Vertical Datum of 1929. Prior to Jan. 15, 1935, nonrecording gage at same site and datum.

REMARKS.--Records good except those for period with ice effect, Dec. 16-29, and period of doubtful gage-height record, May 1, 2, which are fair. Small diurnal fluctuation caused by gristmill at Spring Mills. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

COOPERATION.--Records were provided by the Virginia Water Control Board.

AVERAGE DISCHARGE.--54 years (water years 1930-34, 1942-90), 151 ft³/s, 11.85 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 32,600 ft³/s, June 22, 1972, gage height, 29.21 ft, from rating curve extended above 7,100 ft³/s on basis of slope-area measurement of peak flow; minimum, 3.0 ft³/s, Oct. 9, 1932, gage height, 2.18 ft.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in August 1940 reached a stage of 26.5 ft, from floodmarks, discharge, 22,000 ft³/s, by slope-area measurement.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 2,300 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Oct. 2	0045	2,450	9.43	Mar. 18	0145	*6,290	*16.15
Jan. 1	0600	2,890	10.43	May 29	1145	2,650	9.90
Feb. 10	1600	2,880	10.41				

Minimum discharge, 49 ft³/s, Sept. 29, 30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	719	149	148	1680	255	200	525	e175	214	85	69	64
2	1520	142	144	505	242	200	744	e169	188	83	66	63
3	450	223	143	342	235	269	914	166	175	80	66	62
4	267	160	136	374	484	238	381	171	206	77	65	61
5	209	144	138	449	424	208	293	264	158	74	66	61
6	184	142	138	380	301	200	277	198	148	72	97	61
7	167	145	136	325	289	188	768	174	141	71	114	60
8	154	182	145	695	264	182	380	163	136	75	83	62
9	147	214	151	658	244	185	291	157	164	76	75	73
10	140	166	136	390	1550	182	263	484	341	71	79	77
11	137	148	138	305	714	178	299	342	171	86	80	68
12	134	142	173	270	369	176	247	209	135	88	75	65
13	131	136	199	239	280	173	226	183	125	151	69	93
14	129	135	180	223	248	170	218	167	121	535	66	178
15	127	139	167	219	228	168	552	155	167	230	65	109
16	123	580	e160	212	445	179	351	153	154	156	164	73
17	143	314	e150	207	452	2040	273	145	129	122	183	61
18	221	214	e140	206	286	2500	240	136	138	110	96	55
19	1220	185	e130	201	313	495	220	131	154	104	82	57
20	421	175	e120	194	268	363	213	128	118	104	86	61
21	249	160	e108	203	233	316	221	146	117	100	89	59
22	198	153	e102	193	250	260	236	509	119	95	116	64
23	172	217	e100	185	397	237	210	314	148	90	117	64
24	159	209	e95	185	283	219	201	190	118	86	113	55
25	152	185	e93	487	234	274	194	162	107	83	98	53
26	144	190	e108	947	211	247	191	158	101	79	87	53
27	139	185	e118	462	210	219	187	251	97	76	80	52
28	136	177	e120	323	208	208	178	317	95	77	74	51
29	133	165	e135	281	---	273	192	1970	91	76	70	51
30	131	154	151	380	---	307	186	599	88	75	68	50
31	142	---	309	288	---	484	---	284	---	73	65	---
TOTAL	8498	5630	4411	12008	9917	11538	9671	8770	4364	3360	2723	2016
MEAN	274	188	142	387	354	372	322	283	145	108	87.8	67.2
MAX	1520	580	309	1680	1550	2500	914	1970	341	535	183	178
MIN	123	135	93	185	208	168	178	128	88	71	65	50
CFSM	1.58	1.08	.82	2.24	2.05	2.15	1.86	1.64	.84	.63	.51	.39
IN.	1.83	1.21	.95	2.58	2.13	2.48	2.08	1.89	.94	.72	.59	.43

CAL YR 1989 TOTAL 80112 MEAN 219 MAX 4000 MIN 64 CFSM 1.27 IN. 17.23
WTR YR 1990 TOTAL 82906 MEAN 227 MAX 2500 MIN 50 CFSM 1.31 IN. 17.83

e Estimated.

02065500 CUB CREEK AT PHENIX, VA

LOCATION.--Lat 37°04'45", long 78°45'50", Charlotte County, Hydrologic Unit 03010102, on right bank 5 ft (revised) upstream from bridge on State Highway 40, 0.9 mi west of Phenix, 1.9 mi downstream from Rough Creek, and 6.4 mi upstream from Louse Creek.

DRAINAGE AREA.--98.0 mi².

PERIOD OF RECORD.--August 1946 to current year.

REVISED RECORDS.--WSP 1333: 1947(M), 1948, 1949(M). WSP 2104: Drainage area. WDR VA-76-1: 1975.

GAGE.--Water-stage recorder. Datum of gage is 370.19 ft above National Geodetic Vertical Datum of 1929. Prior to July 14, 1950, nonrecording gage at same site and datum.

REMARKS.--Records good except those for periods of no gage-height record, Dec. 15-31 and July 28, 29, which are fair. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

COOPERATION.--Records were provided by the Virginia Water Control Board.

AVERAGE DISCHARGE.--44 years, 98.5 ft³/s, 13.65 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 10,600 ft³/s, Sept. 8, 1987, gage height, 19.31 ft, from floodmark, from rating curve extended above 5,400 ft³/s on basis of contracted-opening measurement of peak flow; maximum gage height, 20.37 ft, June 22, 1972; minimum discharge, 2.6 ft³/s, Oct. 6, 1970, gage height, 0.74 ft.

EXTREMES OUTSIDE PERIOD OF RECORD.--Floods in August 1940 and June 1972 reached stages of 17.5 ft and 20.37 ft, respectively, from floodmarks.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 1,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Feb. 11	0700	*2,010	*9.58	May 30	0730	1,080	7.33

Minimum discharge, 32 ft³/s, Aug. 4-5.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	166	103	109	449	138	122	305	105	137	54	35	43
2	381	104	107	653	130	120	417	98	118	52	33	42
3	480	195	106	212	130	157	522	94	111	50	33	43
4	174	144	100	175	202	153	383	101	121	49	33	41
5	129	117	103	230	234	127	191	157	101	48	34	40
6	115	110	104	196	164	120	167	153	93	46	44	40
7	107	111	101	189	151	113	317	104	89	46	48	39
8	101	117	105	199	144	109	383	94	85	50	40	39
9	97	151	118	354	130	112	194	91	91	50	36	48
10	92	126	106	268	257	112	164	180	267	52	41	55
11	91	110	105	167	1360	109	196	271	198	58	45	48
12	89	105	130	146	384	108	180	132	98	63	42	43
13	88	101	160	128	192	105	147	112	86	65	37	44
14	88	100	143	118	162	103	139	104	84	135	34	64
15	88	103	e125	116	148	102	238	95	87	100	33	64
16	86	216	e120	113	183	105	301	94	98	72	47	49
17	89	520	e110	110	287	139	180	88	84	55	170	44
18	139	237	e100	109	184	527	153	81	79	50	71	41
19	259	150	e95	107	187	358	136	76	89	47	57	42
20	484	134	e90	102	181	168	130	76	78	47	52	44
21	193	123	e83	109	148	158	134	88	75	44	52	45
22	134	116	e79	105	144	134	153	183	75	40	69	46
23	118	159	e75	99	193	123	131	252	77	39	76	50
24	109	170	e72	98	169	116	122	124	70	38	88	44
25	105	144	e70	169	141	143	116	100	65	36	70	41
26	102	139	e76	429	124	147	111	98	62	34	61	40
27	100	134	e86	528	125	124	106	162	61	33	60	39
28	98	126	e84	208	127	114	101	177	60	e35	54	38
29	100	121	e83	159	---	137	102	428	58	e34	50	38
30	97	113	e92	191	---	197	110	884	56	33	48	38
31	100	---	e135	163	---	224	---	284	---	34	46	---
TOTAL	4599	4399	3172	6399	6119	4686	6029	5086	2853	1589	1639	1332
MEAN	148	147	102	206	219	151	201	164	95.1	51.3	52.9	44.4
MAX	484	520	160	653	1360	527	522	884	267	135	170	64
MIN	86	100	70	98	124	102	101	76	56	33	33	38
CFSM	1.51	1.50	1.04	2.11	2.23	1.54	2.05	1.67	.97	.52	.54	.45
IN.	1.75	1.67	1.20	2.43	2.32	1.78	2.29	1.93	1.08	.60	.62	.51

CAL YR 1989 TOTAL 48118 MEAN 132 MAX 1340 MIN 37 CFSM 1.35 IN. 18.27
WTR YR 1990 TOTAL 47902 MEAN 131 MAX 1360 MIN 33 CFSM 1.34 IN. 18.18

e Estimated.

02066000 ROANOKE (STAUNTON) RIVER AT RANDOLPH, VA

LOCATION.--Lat 36°54'54", long 78°44'28", Halifax County, Hydrologic Unit 03010102, on right bank 6 ft downstream from bridge on State Highway 746, 2.8 mi northwest of Randolph, 3.6 mi upstream from Roanoke Creek, and at mile 227.3.

DRAINAGE AREA.--2,977 mi².

PERIOD OF RECORD.--August 1900 to September 1906, October 1927 to September 1930, October 1950 to current year.

Monthly discharge only for some periods, published in WSP 1303. Prior to October 1902, published as Staunton River at Randolph. Gage heights collected since 1905 at this site or at former site are contained in reports of the National Weather Service.

REVISED RECORDS.--WSP 1203: 1928-30. WSP 1303: 1901-6. WSP 2104: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 307.59 ft above National Geodetic Vertical Datum of 1929. Aug. 27, 1900, to Oct. 13, 1902, nonrecording gage at site 3.2 mi downstream at datum about 5.9 ft lower. Oct. 14, 1902, to Aug. 11, 1906, and Oct. 1, 1927, to Mar. 31, 1930, nonrecording gage at site of original gage at datum 3.93 ft lower than present datum.

REMARKS.--Records good except for period with ice effect, Dec. 24-30, which is fair. Flow regulated since 1962 by Leesville Lake (station 02059400) 68.7 mi upstream and since 1963 by Smith Mountain Lake (station 02057400) 86.7 mi upstream. Gage-height and U.S. Army Corps of Engineers satellite telemeters at station. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

AVERAGE DISCHARGE.--49 years, 3,081 ft³/s, 14.05 in/yr, unadjusted.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 97,000 ft³/s, Dec. 31, 1901, gage height, 35.0 ft, from graph based on gage readings, site and datum then in use; minimum daily, 179 ft³/s, Sept. 8, 1965, July 7, 1970.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Aug. 16, 1940, reached a stage of 41.6 ft, present site and datum, discharge, 150,000 ft³/s, from information by U.S. Army Corps of Engineers.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 24,500 ft³/s, May 30, gage height, 24.51 ft; minimum daily, 1,190 ft³/s, Sept. 29, 30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	5420	4990	3500	10800	5010	3160	8530	3320	6810	1730	1360	1290
2	15400	2440	3120	20000	4190	3550	10500	3290	4610	1690	1320	1280
3	19900	2960	2520	12500	3880	3950	11600	3240	4070	1650	1290	1280
4	14400	2830	2440	6150	4330	4530	9090	3280	3980	1550	1270	1270
5	12100	2410	2060	5040	6950	4790	5730	3530	3750	1470	1260	1270
6	6280	2290	1870	4510	6590	3920	4480	4060	3380	1450	1270	1270
7	4500	2300	1880	4710	4890	3410	6030	3820	2930	1400	1180	1270
8	3880	2370	2380	5090	4310	3100	8330	3290	2620	1380	1110	1270
9	3690	3200	3040	9860	4060	3010	6450	3080	2500	1420	1840	1270
10	3250	3980	2950	8880	5350	3080	5310	3260	3870	1480	1700	1350
11	2960	3050	2830	6970	16700	3200	4720	8460	3940	1670	1620	1290
12	2860	2210	2930	5120	11500	3160	4780	7720	3360	1920	1390	1270
13	2710	2130	3500	4200	6280	3100	4310	4280	2960	1770	1350	1270
14	2530	1980	3950	3700	5240	3130	4020	3790	2570	4630	1300	1350
15	2170	1990	3730	3580	4470	3000	4740	3530	2400	13100	1330	2080
16	2480	2870	3040	3230	4570	2960	8770	3320	3140	13300	1380	1840
17	2960	10500	2520	2820	8090	5870	6480	3140	2650	11500	1690	1410
18	4900	7270	2360	2790	6670	18100	4390	2870	2310	4750	1680	1270
19	7190	4310	2340	2960	5180	19300	3900	2730	2600	2990	1520	1280
20	14000	3200	2180	2970	4920	9220	3820	2590	2360	2860	1420	1260
21	6170	2330	1900	3050	4790	4700	3780	2600	2100	2730	1890	1250
22	3960	2340	1840	3070	4820	4000	3790	3630	2030	2450	2950	1330
23	3320	3020	1850	2990	5700	3860	3810	9050	2190	2210	2980	1800
24	2510	3400	e1800	2970	7170	3830	3720	7180	2500	1870	2760	1320
25	2440	2570	e1750	3310	5650	3960	3790	4260	2060	1860	2870	1260
26	2280	3000	e1750	8210	4580	4230	3580	3800	1740	1800	2630	1230
27	2180	2970	e1800	8580	2960	4080	3330	3830	2050	1580	2450	1220
28	2110	2920	e1950	6070	2930	3910	3230	4000	2140	1450	2090	1200
29	2080	2820	e2200	4620	---	3910	3200	15600	1580	1440	1500	1190
30	2080	3080	e2550	4110	---	4570	3260	23500	1720	1420	1430	1190
31	2450	---	3110	4620	---	5270	---	16900	---	1380	1330	---
TOTAL	165160	97730	77640	177480	161780	153860	161470	170950	86920	93900	57160	40130
MEAN	5328	3258	2505	5725	5778	4963	5382	5515	2897	3029	1844	1338
MAX	19900	10500	3950	20000	16700	19300	11600	23500	6810	13300	3180	2080
MIN	2080	1980	1750	2790	2930	2960	3200	2590	1580	1380	1260	1190
(*)	+50	+1	+65	-93	+62	+35	+32	-58	+24	-7	-62	-65
MEAN#	5378	3259	2570	5632	5840	4998	5414	5457	2921	3022	1782	1273
CFSM#	1.81	1.09	.86	1.89	1.96	1.68	1.82	1.83	.98	1.02	.60	.43
IN.#	2.08	1.22	1.00	2.18	2.04	1.94	2.03	2.11	1.10	1.17	.69	.48

CAL YR 1989 TOTAL 1374680 MEAN 3766 MAX 30800 MIN 1020 MEAN# 3850 CFSM# 1.29 IN.# 17.56
WTR YR 1990 TOTAL 1444180 MEAN 3957 MAX 23500 MIN 1190 MEAN# 3955 CFSM# 1.33 IN.# 18.04

* Change in contents, equivalent in cubic feet per second, in Smith Mountain and Leesville Lakes; provided by Appalachian Power Company.

Adjusted for change in contents.

e Estimated.

ROANOKE RIVER BASIN

02067800; 02067820 TALBOTT AND TOWNES RESERVOIRS NEAR KIBLER, VA

LOCATION.--Talbot Dam: Lat 36°40'39", long 80°23'52", Patrick County, Hydrologic Unit 03010103, on Dan River 4.5 mi northeast of Kibler. Townes Dam: Lat 36°41'10", long 80°25'50", Patrick County, Hydrologic Unit 03010103, on Dan River about 4 mi north of Kibler.

DRAINAGE AREA.--Talbot Dam, 20.2 mi²; Townes Dam, 32.9 mi².

PERIOD OF RECORD.--February 1939 to December 1945, January 1948 to September 1960 (published in WSP 1723), and October 1960 to current year.

REMARKS.--The two reservoirs are operated as a unit for storage of water for Pinnacles hydroelectric plant. Total capacity of Talbot Reservoir, 8,035 acre-ft, and Townes Reservoir, 1,377 acre-ft. Storage began in Talbot Reservoir on Feb. 13, 1939, and in Townes Reservoir several months earlier.

COOPERATION.--Records were provided by the city of Danville.

COMBINED MONTHEND CONTENTS AT 2400, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

Date	Contents (acre-feet)	Change in contents (acre-feet)
Sept. 30.....	7,530	-
Oct. 31.....	7,650	+120
Nov. 30.....	5,990	-1,660
Dec. 31.....	5,350	-640
CAL YR 1989.....	-	-2,000
Jan. 31.....	7,510	+2,160
Feb. 28.....	7,900	+390
Mar. 31.....	7,620	-280
Apr. 30.....	7,530	-90
May 31.....	7,760	+230
June 30.....	7,050	-710
July 31.....	7,620	+570
Aug. 31.....	7,320	-300
Sept. 30.....	6,380	-940
WTR YR 1990.....	-	-1,150

02069700 SOUTH MAYO RIVER NEAR NETTLERIDGE, VA

LOCATION.--Lat 36°34'15", long 80°07'47", Patrick County, Hydrologic Unit 03010103, on right bank 60 ft downstream from bridge on State Highway 700, 1.2 mi southeast of Nettleridge, 1.4 mi downstream from Russell Creek, and 3.6 mi upstream from Spoon Creek.

DRAINAGE AREA.--84.6 mi².

PERIOD OF RECORD.--October 1962 to current year.

REVISED RECORDS.--WSP 2104: Drainage area. WDR VA-74-1: 1972(M).

GAGE.--Water-stage recorder. Datum of gage is 871.60 ft above National Geodetic Vertical Datum of 1929. Prior to Oct. 9, 1964, nonrecording gage and crest-stage gage at same site and datum.

REMARKS.--Records good except those for period with ice effect, Dec. 18-27, and periods of doubtful or no gage-height record, Jan. 4, 5, 9, Mar. 4-6, May 2, and Sept. 14, 15, 23-30, which are fair. Several measurements of water temperature were made during the year.

COOPERATION.--Records were provided by the Virginia Water Control Board.

AVERAGE DISCHARGE.--28 years, 130 ft³/s, 20.87 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 20,600 ft³/s, Sept. 22, 1979, gage height, 22.00 ft, from rating curve extended above 2,900 ft³/s on basis of contracted-opening measurements at gage heights 18.32 ft and 22.00 ft; minimum, 20 ft³/s, Aug. 29, 30, 1981.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 1,300 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Oct. 1	2000	2,330	9.23	Mar. 17	1600	*2,660	*9.83
Feb. 10	1430	1,740	8.07	May 10	1230	1,530	7.61

Minimum daily discharge, 67 ft³/s, Sept. 28.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1360	147	126	584	179	238	274	223	275	111	102	79
2	1450	143	125	304	172	233	255	e235	244	110	100	78
3	748	142	123	222	172	295	247	199	227	106	98	76
4	499	139	120	e180	424	e250	227	233	216	104	96	74
5	382	137	121	e190	281	e230	219	233	201	102	94	74
6	323	139	120	199	225	e215	215	203	193	100	112	73
7	280	142	118	187	210	215	273	189	186	98	102	72
8	249	143	131	366	193	208	227	180	186	99	94	75
9	230	144	129	e290	184	207	215	177	191	103	94	85
10	217	135	121	253	933	202	215	796	187	103	93	83
11	206	131	126	215	634	197	313	520	168	161	98	80
12	197	130	219	197	392	192	246	326	161	140	90	77
13	189	128	219	181	309	188	226	273	157	135	87	91
14	184	127	168	171	266	185	218	241	155	556	87	e175
15	178	131	152	166	241	182	531	219	153	854	86	e95
16	172	215	144	161	568	183	341	207	152	373	131	76
17	183	166	139	156	541	1210	283	199	148	218	129	72
18	192	146	e130	155	369	881	251	187	145	193	98	71
19	245	137	e120	150	454	474	232	179	140	180	92	75
20	197	135	e110	147	366	355	223	176	135	155	90	74
21	181	128	e108	158	312	308	219	183	135	146	95	73
22	172	130	e102	147	403	279	214	276	132	146	97	73
23	165	186	e98	141	515	259	206	225	137	138	129	e80
24	162	152	e110	140	380	244	200	189	125	126	128	e76
25	159	144	e120	247	318	234	194	178	121	120	103	e72
26	155	142	e130	268	283	224	190	180	119	116	96	e71
27	153	139	e125	198	266	239	186	211	123	112	92	e70
28	151	137	124	177	252	220	184	706	127	110	86	e67
29	149	132	124	174	---	232	209	991	117	109	84	e68
30	147	128	121	258	---	223	213	491	112	107	83	e70
31	147	---	170	195	---	319	---	335	---	106	81	---
TOTAL	9422	4275	4093	6577	9842	9121	7246	9160	4868	5337	3047	2375
MEAN	304	142	132	212	351	294	242	295	162	172	98.3	79.2
MAX	1450	215	219	584	933	1210	531	991	275	854	131	175
MIN	147	127	98	140	172	182	184	176	112	98	81	67
CFSM	3.59	1.68	1.56	2.51	4.15	3.48	2.86	3.49	1.92	2.04	1.16	.94
IN.	4.14	1.88	1.80	2.89	4.33	4.01	3.19	4.03	2.14	2.35	1.34	1.04

CAL YR 1989 TOTAL 67295 MEAN 184 MAX 1460 MIN 66 CFSM 2.18 IN. 29.59
WTR YR 1990 TOTAL 75363 MEAN 206 MAX 1450 MIN 67 CFSM 2.44 IN. 33.14

e Estimated.

ROANOKE RIVER BASIN

02070000 NORTH MAYO RIVER NEAR SPENCER, VA

LOCATION.--Lat 36°34'05", long 79°59'15", Henry County, Hydrologic Unit 03010103, on left bank 800 ft downstream from bridge on State Highway 629 at Moores Mill, 2.1 mi downstream from Horse Pasture Creek, and 3.8 mi southeast of Spencer.

DRAINAGE AREA.--108 mi².

PERIOD OF RECORD.--October 1928 to current year. Monthly discharge only for some periods, published in WSP 1303. REVISED RECORDS.--WSP 1303: 1929-32(M), 1934(M).

GAGE.--Water-stage recorder. Datum of gage is 730.94 ft above National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers). Prior to Jan. 23, 1936, nonrecording gage at site 800 ft upstream at datum 1.50 ft higher. July 25 to Sept. 27, 1936, nonrecording gage at present site and datum.

REMARKS.--Records good except for period with ice effect, Dec. 18-29, which is fair. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

COOPERATION.--Records were provided by the Virginia Water Control Board.

AVERAGE DISCHARGE.--62 years, 129 ft³/s, 16.22 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 17,200 ft³/s, Oct. 9, 1947, gage height, 15.80 ft, from rating curve extended above 7,200 ft³/s on basis of slope-area measurement at gage height 13.41 ft and velocity-area study; minimum, 14 ft³/s, Aug. 11, 1956; minimum gage height, 1.08 ft, Oct. 8, 1954.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 1,400 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Oct. 2	0100	3,260	7.22	May 28	0330	2,120	5.79
Feb. 10	1730	2,750	6.61	May 29	0630	1,720	5.17
Mar. 17	2030	*4,000	*7.96	July 15	0630	1,570	4.94
May 10	1800	1,470	4.76				

Minimum discharge, 68 ft³/s, Sept. 7, gage height, 1.59 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1730	131	120	788	163	186	250	174	209	114	94	76
2	1980	128	118	279	155	184	290	187	190	114	93	75
3	555	130	117	197	156	230	226	163	180	109	92	74
4	331	125	115	186	592	212	200	210	177	107	90	73
5	264	124	117	186	289	187	188	197	162	104	89	73
6	232	126	117	192	208	179	185	171	158	102	102	72
7	209	129	115	177	189	170	271	158	153	99	98	70
8	193	130	129	545	170	165	207	152	150	100	88	71
9	182	136	130	425	161	167	190	150	189	106	89	79
10	173	124	118	239	1500	165	186	620	691	102	89	85
11	167	120	123	193	601	162	265	349	237	140	121	92
12	160	120	325	173	297	159	202	217	177	130	94	81
13	155	118	305	157	233	156	186	193	164	157	87	105
14	153	118	190	149	208	153	181	177	159	436	89	211
15	149	123	161	145	191	153	614	165	156	1060	91	106
16	144	198	150	141	552	158	316	160	156	340	108	86
17	146	158	135	136	425	1770	239	155	150	196	101	80
18	159	133	e125	136	258	1120	211	146	147	164	90	77
19	262	125	e118	132	405	402	195	141	144	145	87	78
20	182	123	e112	129	294	281	189	141	137	135	85	81
21	158	117	e108	137	234	239	186	152	137	129	83	79
22	149	121	e105	128	377	218	191	281	133	125	91	82
23	144	211	e100	123	559	205	177	208	144	117	108	81
24	141	158	e104	124	298	194	172	159	129	112	121	74
25	138	143	e118	323	236	189	168	150	124	108	97	73
26	136	140	e125	345	211	184	164	152	122	105	92	73
27	134	135	e120	202	203	177	160	284	121	102	87	72
28	133	131	e121	169	195	171	158	1090	131	101	83	71
29	132	126	e122	166	---	197	171	1200	122	101	80	72
30	130	121	123	261	---	195	175	396	116	99	80	72
31	132	---	222	184	---	309	---	249	---	98	78	---
TOTAL	9053	4022	4308	6867	9360	8637	6513	8347	5165	5157	2877	2494
MEAN	292	134	139	222	334	279	217	269	172	166	92.8	83.1
MAX	1980	211	325	788	1500	1770	614	1200	691	1060	121	211
MIN	130	117	100	123	155	153	158	141	116	98	78	70
CFSM	2.70	1.24	1.29	2.05	3.10	2.58	2.01	2.49	1.59	1.54	.86	.77
IN.	3.12	1.39	1.48	2.37	3.22	2.97	2.24	2.88	1.78	1.78	.99	.86

CAL YR 1989 TOTAL 66821 MEAN 183 MAX 3870 MIN 56 CFSM 1.70 IN. 23.02
WTR YR 1990 TOTAL 72800 MEAN 199 MAX 1980 MIN 70 CFSM 1.85 IN. 25.08

e Estimated.

ROANOKE RIVER BASIN

293

02071900 PHILPOTT LAKE NEAR PHILPOTT, VA

LOCATION.--Lat 36°46'52", long 80°01'40", Henry County, Hydrologic Unit 03010103, at Philpott Dam on Smith River, 1.5 mi west of Philpott, 12.0 mi upstream from Reed Creek, and at mile 44.3.

DRAINAGE AREA.--216 mi².

PERIOD OF RECORD.--August 1950 to current year.

GAGE.--Water-stage recorder. Datum of gage is National Geodetic Vertical Datum of 1929.

REMARKS.--Reservoir is formed by concrete dam. Spillway, with crest at elevation 985 ft, is ungated and 120 ft long. Storage began August 1950 during construction; initial filling started in December 1951; water in reservoir first reached rule-curve elevation in July 1953. Total capacity at maximum flood-control pool elevation, 998 ft, is 247,400 acre-ft of which 47,000 acre-ft is upstream from the spillway crest; 34,200 acre-ft is controlled flood storage between elevations 974 ft, maximum power pool, and 985 ft; 57,800 acre-ft is available for power between elevations 951 ft, minimum power pool, and 974 ft; and 108,400 acre-ft is inactive and dead storage below elevation 951 ft. Usable capacity is 92,000 acre-ft between elevations 951 ft and 985 ft. Figures given herein represent total contents. Reservoir is used for flood control, hydroelectric power, low-water regulation for pollution abatement and industrial water supply, and recreation.

COOPERATION.--Records were provided by the U.S. Army Corps of Engineers.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 191,700 acre-ft, June 22, 1972, elevation, 983.06 ft; minimum (after first filling to rule curve), 64,540 acre-ft, Sept. 26, 1956, elevation, 927.59 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 178,990 acre-ft, Oct. 2, elevation, 978.29 ft; minimum, 156,710 acre-ft, Sept. 28, elevation, 970.67 ft.

MONTHEND ELEVATION AND CONTENTS AT 2400, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

Date	Elevation (feet)	Contents (acre-feet)	Change in contents (acre-feet)
Sept. 30.....	974.35	167,210	-
Oct. 31.....	972.78	162,670	-4,540
Nov. 30.....	972.20	161,010	-1,660
Dec. 31.....	972.12	160,780	-230
CAL YR 1989.....	-	-	+18,340
Jan. 31.....	972.43	161,670	+890
Feb. 28.....	973.55	164,890	+3,220
Mar. 31.....	974.87	168,730	+3,840
Apr. 30.....	973.77	165,520	-3,210
May 31.....	974.55	167,800	+2,280
June 30.....	973.41	164,480	-3,320
July 31.....	973.67	165,240	+760
Aug. 31.....	972.15	160,870	-4,370
Sept. 30.....	970.70	156,790	-4,080
WTR YR 1990.....	-	-	-10,420

ROANOKE RIVER BASIN

02072000 SMITH RIVER NEAR PHILPOTT, VA

LOCATION.--Lat 36°46'50", long 80°01'30", Franklin County, Hydrologic Unit 03010103, on left bank 900 ft downstream from Philpott Dam, 3.1 mi west of Philpott, 11.6 mi upstream from Reed Creek, and at mile 44.1.

DRAINAGE AREA.--216 mi².

PERIOD OF RECORD.--August 1946 to current year.

REVISED RECORDS.--WSP 1553: 1953(M), 1955-56(M). WSP 2104: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 804.27 ft above National Geodetic Vertical Datum of 1929 (U.S. Army Corps of Engineers bench mark). Prior to Oct. 8, 1952, at site 1.9 mi downstream at different datum.

REMARKS.--No estimated daily discharges. Records good. Since August 1950, flow regulated by Philpott Lake (station 02071900) 0.2 mi upstream. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

AVERAGE DISCHARGE.--44 years, 279 ft³/s, 17.54 in/yr, unadjusted.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 17,000 ft³/s, June 29, 1949, gage height, 20.3 ft, site and datum then in use, from rating curve extended above 9,700 ft³/s on basis of slope-area measurements at gage heights 18.2 ft and 20.3 ft; minimum observed, 2.3 ft³/s, Dec. 16, 1985 (result of repairs at dam), but may have been less during periods of estimated record; minimum daily, 20 ft³/s, Mar. 24, 1984, caused by turbines being shut down for repair at Philpott Dam.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 4,960 ft³/s, Oct. 3, gage height, 8.46 ft; minimum, 8.2 ft³/s, Sept. 20; minimum daily, 47 ft³/s, Sept. 22, 23.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	246	661	455	199	301	661	49	346	760	52	300	50
2	1530	657	50	199	300	661	888	346	54	360	296	50
3	4120	661	50	547	50	49	1200	345	50	360	296	254
4	2660	50	507	548	50	49	746	345	656	52	51	253
5	1260	50	502	549	336	558	749	50	657	359	51	256
6	1120	457	361	50	286	556	751	50	660	412	297	257
7	49	457	346	50	347	556	49	495	661	52	301	255
8	49	457	348	652	336	553	49	494	662	52	304	50
9	731	457	50	657	347	554	498	496	51	307	301	50
10	735	460	50	655	50	50	498	495	50	307	301	256
11	733	50	398	657	50	50	752	494	253	308	50	256
12	735	50	250	658	444	297	753	747	253	306	50	256
13	838	461	249	49	750	296	756	50	253	308	302	256
14	49	671	454	49	756	296	49	747	253	54	302	256
15	49	455	401	656	758	296	50	749	253	53	309	50
16	641	458	145	659	748	295	499	753	50	686	303	50
17	652	456	50	658	50	51	750	596	50	1390	303	247
18	643	50	551	659	50	50	751	806	253	1070	50	247
19	640	50	353	661	756	933	751	50	253	302	50	245
20	642	352	349	49	757	1360	752	50	254	301	303	247
21	49	352	555	49	760	1140	49	300	254	51	304	242
22	49	352	557	48	759	753	49	300	245	51	305	47
23	752	49	148	404	758	753	600	299	52	301	304	47
24	753	402	50	404	49	49	600	299	52	300	306	248
25	750	49	252	408	149	49	601	299	359	300	50	246
26	757	49	554	351	759	295	603	50	358	300	50	250
27	761	452	302	49	759	296	605	51	359	301	303	247
28	50	451	251	49	864	296	50	351	359	51	304	248
29	49	453	303	560	---	296	50	604	359	52	304	50
30	656	454	50	561	---	295	349	756	52	297	305	50
31	662	---	50	506	---	49	---	754	---	284	305	---
TOTAL	23410	10483	8991	12250	12379	12442	14896	12567	8835	9379	7360	5516
MEAN	755	349	290	395	442	401	497	405	294	303	237	184
MAX	4120	671	557	661	864	1360	1200	806	760	1390	309	257
MIN	49	49	50	48	49	49	49	50	50	51	50	47
(*)	-74	-28	-4	+14	+58	+62	-54	+37	-56	+12	-71	-69
MEAN#	681	321	286	409	500	463	443	442	238	315	166	115
CFSM#	3.15	1.49	1.32	1.89	2.31	2.14	2.05	2.05	1.10	1.46	.77	.53
IN.#	3.64	1.66	1.53	2.18	2.41	2.47	2.29	2.36	1.23	1.68	.89	.59

CAL YR 1989 TOTAL 121970 MEAN 334 MAX 4120 MIN 46 MEAN# 359 CFSM# 1.66 IN.# 22.57
WTR YR 1990 TOTAL 138508 MEAN 379 MAX 4120 MIN 47 MEAN# 365 CFSM# 1.69 IN.# 22.94

* Change in contents, equivalent in cubic feet per second, in Philpott Lake; provided by U.S. Army Corps of Engineers.

Adjusted for change in contents.

ROANOKE RIVER BASIN

295

02072500 SMITH RIVER AT BASSETT, VA

LOCATION.--Lat 36°46'12", long 80°00'04", Henry County, Hydrologic Unit 03010103, on left bank 25 ft upstream from bridge on State Highway 666 at north edge of North Bassett, 1.0 mi northwest of Bassett, 3.0 mi downstream from Town Creek, 5.6 mi upstream from Reed Creek, 6.2 mi downstream from Philpott Dam, and at mile 38.1.

DRAINAGE AREA.--259 mi².

PERIOD OF RECORD.--April 1939 to current year.

REVISED RECORDS.--WSP 2104: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 753.09 ft above National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers).

REMARKS.--Records good except for period with sluggish intakes, Oct. 1 to Nov. 1, which is fair. Since August 1950, flow regulated by Philpott Lake (station 02071900) 6.2 mi upstream. Diversion upstream from station by Henry County Public Service Authority, since 1985, has averaged less than 1.0 ft³/s. Gage-height and U.S. Army Corps of Engineers satellite telemeters at station. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

AVERAGE DISCHARGE.--51 years, 334 ft³/s, 17.51 in/yr, unadjusted.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 26,600 ft³/s, Aug. 14, 1940, gage height, 18.28 ft; minimum, 19 ft³/s, July 19, 1956; minimum daily, 44 ft³/s, Aug. 23, 1964; minimum gage height, 1.06 ft, Sept. 18, 26, 1953.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Oct. 19, 1937, reached a stage of about 22.9 ft, from information by local residents, discharge, 38,000 ft³/s, from rating curve extended above 23,000 ft³/s on basis of backwater studies and records for station at Martinsville.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 5,210 ft³/s, Oct. 3, gage height, 8.11 ft; minimum, 57 ft³/s, Dec. 22; minimum daily, 68 ft³/s, Sept. 23, 29, 30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1100	749	533	592	366	793	125	428	884	86	350	73
2	2090	760	80	285	361	774	939	423	135	412	347	72
3	4480	764	78	651	94	107	1530	426	113	412	346	287
4	3140	84	585	650	166	96	892	437	756	85	80	289
5	1510	82	583	645	440	654	893	95	761	410	79	289
6	1450	534	423	96	366	656	901	88	763	465	362	291
7	e88	532	405	89	417	653	145	569	761	84	350	287
8	e86	536	415	884	412	655	106	588	769	83	354	70
9	893	534	81	831	408	656	608	590	126	354	351	75
10	968	532	78	786	342	88	608	1180	117	352	350	291
11	967	80	463	776	160	85	903	652	315	365	85	288
12	966	80	329	770	548	362	892	910	313	375	77	286
13	1060	530	320	87	879	362	889	123	313	377	349	289
14	e84	762	540	84	886	360	101	812	312	373	352	315
15	e82	533	478	758	885	361	372	879	312	869	361	75
16	e775	584	186	760	973	364	646	885	100	724	392	71
17	e820	546	79	760	157	573	801	704	97	1540	368	273
18	e850	86	632	761	111	225	994	936	309	1380	81	272
19	862	82	422	760	933	1000	877	170	309	369	78	271
20	787	418	414	80	911	1590	900	107	307	362	349	271
21	e82	415	632	81	898	1470	105	382	310	138	350	267
22	e80	421	637	77	1020	895	98	407	304	115	355	72
23	858	94	180	464	1010	898	711	385	94	361	363	68
24	872	482	75	461	131	104	710	378	91	357	359	271
25	869	84	297	497	214	98	710	376	416	354	79	270
26	873	85	641	440	887	374	711	109	414	352	77	274
27	877	535	353	92	891	372	711	113	417	352	346	274
28	e84	533	297	86	990	370	91	477	418	84	346	272
29	e82	532	355	664	---	383	95	429	416	82	346	68
30	757	531	81	694	---	378	428	914	88	348	347	68
31	763	---	201	603	---	179	---	888	---	353	346	---
TOTAL	29255	12520	10873	15264	15856	15935	18492	16360	10840	12373	8775	6339
MEAN	944	417	351	492	566	514	616	528	361	399	283	211
MAX	4480	764	641	884	1020	1590	1530	1180	884	1540	392	315
MIN	80	80	75	77	94	85	91	88	88	82	77	68
(*)	-74	-28	-4	+14	+58	+62	-54	+37	-56	+12	-71	-69
MEAN#	870	389	347	506	624	576	562	565	305	411	212	142
CFSM#	3.36	1.50	1.34	1.95	2.41	2.22	2.17	2.18	1.18	1.59	.82	.55
IN.#	3.87	1.68	1.54	2.25	2.51	2.56	2.42	2.52	1.31	1.83	.94	.61

CAL YR 1989 TOTAL 158570 MEAN 434 MAX 4480 MIN 65 MEAN# 459 CFSM# 1.77 IN.# 24.06
WTR YR 1990 TOTAL 172882 MEAN 474 MAX 4480 MIN 68 MEAN# 460 CFSM# 1.78 IN.# 24.12

* Change in contents, equivalent in cubic feet per second, in Philpott Lake; provided by U.S. Army Corps of Engineers.

Adjusted for change in contents.

e Estimated.

ROANOKE RIVER BASIN

02073000 SMITH RIVER AT MARTINSVILLE, VA

LOCATION.--Lat 36°39'40", long 79°52'51", Henry County, Hydrologic Unit 03010103, on right bank at south edge of Martinsville, 800 ft downstream from bridge on U.S. Highways 58 and 220, and 5.0 mi downstream from Beaver Creek.

DRAINAGE AREA.--380 mi².

PERIOD OF RECORD.--August 1929 to current year.

REVISED RECORDS.--WSP 1032: 1933-35(M), 1936-39, 1940-41(P). WSP 2104: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 657.22 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--No estimated daily discharges. Records good. Flow regulated since August 1950 by Philpott Lake (station 02071900) 19.6 mi upstream from station. Some additional regulation by powerplant 1,000 ft upstream from station. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

COOPERATION.--Records were provided by the Virginia Water Control Board.

AVERAGE DISCHARGE.--61 years, 467 ft³/s, 16.69 in/yr, unadjusted.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 39,000 ft³/s, Oct. 19, 1937, gage height, 21.50 ft, from rating curve extended above 17,000 ft³/s on basis of computations of flow over dam at gage heights 16.76 ft and 21.50 ft; minimum, 3.8 ft³/s, Mar. 19, 1955; minimum daily, 19 ft³/s, Oct. 6, 1935; minimum gage height, 0.69 ft, Sept. 8, 1969.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 7,550 ft³/s, Mar. 17, gage height, 7.86 ft; minimum, 5.0 ft³/s, July 2; minimum daily, 132 ft³/s, Sept. 16.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3440	1070	749	1790	631	1290	526	725	1370	142	522	301
2	3800	1070	215	640	632	1090	1230	709	700	503	516	196
3	4760	1070	243	780	261	601	2060	720	378	674	513	322
4	3700	453	612	950	1030	274	1270	820	910	286	340	423
5	2150	257	768	926	709	910	1240	494	1160	586	189	422
6	2040	840	660	536	626	928	1260	295	1150	569	490	422
7	611	780	571	315	693	920	769	657	1140	399	527	415
8	327	791	599	1670	628	918	439	916	1150	151	523	273
9	1160	796	313	1460	605	920	876	922	1200	489	518	214
10	1260	716	246	1200	2240	363	904	2110	866	527	517	367
11	1250	287	546	1120	928	240	1180	1160	621	547	350	449
12	1250	199	936	1080	831	622	1260	1430	576	581	139	429
13	1390	814	713	405	1130	565	1240	640	561	690	456	486
14	418	1040	792	275	1250	552	540	907	557	1400	558	537
15	278	781	755	937	1230	553	1420	1300	560	2990	606	295
16	950	1000	346	1060	1810	599	1100	1300	314	992	649	132
17	1120	839	251	1030	912	3110	935	1090	340	2150	600	368
18	1220	219	631	1030	435	1510	1480	1350	478	2170	345	395
19	1460	255	880	1030	1420	1150	1210	726	552	626	218	409
20	1190	631	608	322	1380	2140	1310	239	528	593	382	407
21	449	590	697	270	1300	2070	568	678	542	590	513	398
22	302	659	945	255	1660	1180	362	1050	536	516	535	301
23	959	363	380	542	1790	1240	1020	756	347	526	691	194
24	1210	785	209	641	730	587	1040	675	275	573	570	291
25	1210	226	476	899	509	343	1030	655	468	560	302	386
26	1210	273	850	970	990	652	1030	442	642	548	274	401
27	1220	654	606	463	1250	603	1030	627	643	555	375	379
28	531	922	404	321	1310	590	392	1540	648	342	498	396
29	270	759	631	804	---	693	288	2530	636	239	502	177
30	933	752	162	1270	---	642	675	1650	400	411	499	243
31	989	---	572	939	---	568	---	1410	---	529	493	---
TOTAL	43057	19891	17366	25930	28920	28423	29684	30523	20248	22454	14210	10428
MEAN	1389	663	560	836	1033	917	989	985	675	724	458	348
MAX	4760	1070	945	1790	2240	3110	2060	2530	1370	2990	691	537
MIN	270	199	162	255	261	240	288	239	275	142	139	132
(*)	-74	-28	-4	+14	+58	+62	-54	+37	-56	+12	-71	-69
MEAN#	1315	635	556	850	1091	979	935	1022	619	736	387	279
CFSM#	3.46	1.67	1.46	2.24	2.87	2.58	2.46	2.69	1.63	1.94	1.02	.73
IN.#	3.99	1.86	1.69	2.58	2.99	2.97	2.75	3.10	1.82	2.23	1.17	.82

CAL YR 1989 TOTAL 262032 MEAN 718 MAX 4760 MIN 116 MEAN# 743 CFSM# 1.96 IN.# 26.55
WTR YR 1990 TOTAL 291134 MEAN 798 MAX 4760 MIN 132 MEAN# 784 CFSM# 2.06 IN.# 28.01

* Change in contents, equivalent in cubic feet per second, in Philpott Lake; provided by U. S. Army Corps of Engineers.

Adjusted for change in contents.

ROANOKE RIVER BASIN

297

02074000 SMITH RIVER AT EDEN, NC

LOCATION.--Lat 36°31'31", long 79°45'57", Rockingham County, Hydrologic Unit 03010103, on right bank at Eden, 0.3 mi downstream from bridge on State Highway 14, 0.8 mi upstream from bridge on Secondary Road 1714, 1.2 mi south of Virginia-North Carolina State line, 1.3 mi downstream from Stuart Creek, and 3.9 mi upstream from mouth.

DRAINAGE AREA.--538 mi².

PERIOD OF RECORD.--October 1939 to current year. Prior to October 1970, published as "at Spray".

REVISED RECORDS.--WSP 1433: 1946.

GAGE.--Water-stage recorder. Datum of gage is 539.56 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Flow regulated since August 1950 by Philpott Lake (station 02071900) 40 mi upstream, usable capacity, 6,325,000 ft³. Additional regulation by hydroelectric plant at Martinsville, VA, 18 mi upstream. Water-quality records for some prior periods have been collected at this location.

AVERAGE DISCHARGE.--51 years, 632 ft³/s, 15.95 in/yr, adjusted for storage.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 45,600 ft³/s, Aug. 15, 1940, gage height, 19.28 ft, from rating curve extended above 12,000 ft³/s on basis of computation of peak flow over dam 1.5 mi downstream; minimum, 38 ft³/s, Aug. 7, 1967; minimum daily, 46 ft³/s, Aug. 14, 1967.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 10,400 ft³/s, Mar. 17, gage height, 10.22 ft; minimum, 126 ft³/s, Aug. 13, gage height, 1.62 ft; minimum daily, 212 ft³/s, Sept. 2, 17.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	4140	1070	827	2450	e980	1440	962	936	1650	376	585	593
2	6070	1060	655	1130	e900	1260	1200	948	1490	333	578	212
3	5310	1080	402	811	e500	1220	2190	905	723	667	574	266
4	4740	980	453	1170	e700	721	1540	1030	702	608	612	452
5	2330	369	877	1130	e900	684	1430	1020	1290	346	252	478
6	2020	499	841	1090	e880	1120	1420	653	1280	671	365	483
7	1250	839	683	611	e950	1110	1690	521	1280	705	643	474
8	504	842	730	1670	e940	1100	681	1030	1220	378	595	533
9	712	852	598	2070	e940	1100	815	1060	1230	269	572	267
10	1260	823	292	1490	e620	909	1130	2010	1720	628	583	238
11	1230	643	530	1330	e500	567	1360	1670	550	622	639	533
12	1210	284	1330	1250	e1600	579	1480	1360	729	695	320	511
13	1310	546	1270	1050	e1500	767	1430	1240	699	708	220	570
14	1020	1030	941	461	e1400	775	1250	687	716	1490	576	623
15	322	830	1000	593	e1450	764	1780	1370	699	3520	676	627
16	478	1110	798	1130	e1450	806	1350	1380	712	1110	675	268
17	1080	956	492	1120	e1100	4060	1190	1370	457	1860	799	212
18	1140	652	506	e1200	e700	3530	1600	1220	419	2070	665	459
19	1620	352	1020	e1150	e1400	1460	1490	1320	718	1020	290	456
20	1280	529	740	e550	e1450	2420	1380	481	661	691	356	470
21	1080	693	697	e500	1570	2330	1240	531	672	747	578	e500
22	440	701	946	e450	1750	1550	689	1170	671	795	607	e400
23	459	854	851	e1050	2340	1520	741	1220	670	456	721	e230
24	1200	676	405	e1070	1590	1300	1220	902	445	680	916	e520
25	1180	667	463	e1200	777	653	1210	853	347	646	709	e510
26	1180	397	669	e1150	792	704	1190	830	738	631	353	e520
27	1190	455	899	e500	1420	851	1180	1170	734	580	297	e530
28	1120	1000	622	e360	1460	828	996	4400	760	695	563	e540
29	376	850	596	e1100	---	933	592	4830	738	242	567	e350
30	449	831	440	e1200	---	926	592	2300	742	352	564	e230
31	1040	---	592	e1150	---	1090	---	1810	---	586	555	---
TOTAL	48740	22470	22165	33186	32559	39077	37018	42227	25462	25177	17005	13055
MEAN	1572	749	715	1071	1163	1261	1234	1362	849	812	549	435
MAX	6070	1110	1330	2450	2340	4060	2190	4830	1720	3520	916	627
MIN	322	284	292	360	500	567	592	481	347	242	220	212
(*)	-74	-28	-4	+14	+58	+62	-54	+37	-56	+12	-71	-69

CAL YR 1989 TOTAL 309340 MEAN 848 MAX 7940 MIN 133 MEAN# 873 CFSM# 1.62 IN.# 21.39
WTR YR 1990 TOTAL 358141 MEAN 981 MAX 6070 MIN 212 MEAN# 967 CFSM# 1.80 IN.# 24.76

* Change in contents, equivalent in cubic feet per second, in Philpott Lake; provided by U. S. Army Corps of Engineers.

Adjusted for change in contents.

e Estimated.

ROANOKE RIVER BASIN

02074500 SANDY RIVER NEAR DANVILLE, VA

LOCATION.--Lat 36°37'10", long 79°30'16", Pittsylvania County, Hydrologic Unit 03010103, on right bank 200 ft downstream from Hickory Forest Creek, 400 ft upstream from bridge on State Highway 863 between Callahans Store and Mount Cross, 5.5 mi northwest of western city limits of Danville, and 5.8 mi upstream from mouth.

DRAINAGE AREA.--112 mi².

PERIOD OF RECORD.--October 1929 to current year. Monthly discharge only for some periods, published in WSP 1303.

REVISED RECORDS.--WSP 972: 1930-41. WSP 2104: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 460.38 ft above National Geodetic Vertical Datum of 1929. Prior to June 26, 1942, at site 1,200 ft downstream at datum 5.57 ft lower.

REMARKS.--Records good except those for periods of doubtful or no gage-height record, Dec. 9-12, Jan. 3, 10, 11, 29, Feb. 15, 16, 18, 20-22, 25-28, Mar. 7, 17, 20, 22, 23, 26, 27, 29, Apr. 6, 12, 13, and May 2, and period with ice effect, Dec. 20-26, which are fair. Diurnal fluctuation at low flow caused by small mill upstream from station. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

COOPERATION.--Records were provided by the Virginia Water Control Board.

AVERAGE DISCHARGE.--61 years, 108 ft³/s, 13.10 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 23,000 ft³/s, Aug. 14, 1940, gage height, 14.8 ft, present datum, from floodmarks, from rating curve extended above 11,000 ft³/s; minimum, 3 ft³/s, Sept. 29, 1930, gage height, 0.40 ft, site and datum then in use; minimum daily, 8 ft³/s, Aug. 29, 31, Sept. 1, 2, 1932.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 1,500 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Oct. 1	2100	*4,300	*6.62	Mar. 18	Unknown	3,280	5.97
Feb. 10	Unknown	3,040	5.80	May 29	0800	2,980	5.76

Minimum discharge, 48 ft³/s, Aug. 13-14, Sept. 18, 26-30, gage height, 1.25 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1670	86	91	611	139	151	224	142	165	67	52	58
2	1970	87	90	190	132	142	219	e139	149	66	51	57
3	512	94	89	e170	132	183	165	133	140	64	51	56
4	220	85	86	161	417	188	144	160	132	63	53	55
5	158	84	85	153	250	154	137	160	123	61	51	55
6	135	85	90	196	171	143	e130	137	120	59	62	56
7	120	89	88	174	158	e134	259	128	116	58	67	54
8	111	92	91	751	141	132	176	124	115	59	53	52
9	105	95	e96	297	144	133	150	123	112	62	52	55
10	100	87	e92	e218	1650	130	156	234	113	57	53	62
11	98	84	e90	e190	378	127	166	191	104	57	61	57
12	94	84	e120	171	221	126	e160	144	99	68	54	53
13	92	83	354	150	174	123	e150	136	98	176	51	54
14	90	83	194	126	156	121	143	130	98	378	51	66
15	89	86	151	120	e150	122	488	124	98	189	142	64
16	86	215	140	117	e250	139	241	122	100	106	105	53
17	87	131	121	114	560	e900	190	118	96	80	132	50
18	108	104	114	115	e230	1160	169	111	94	90	70	48
19	361	95	107	111	270	431	158	106	92	77	62	50
20	172	93	e92	108	e230	e250	155	107	86	71	253	52
21	127	88	e88	121	e190	195	182	130	86	68	90	52
22	112	92	e84	110	e220	e174	187	165	86	76	77	55
23	103	203	e79	105	442	e160	158	185	86	67	132	58
24	100	151	e80	109	205	143	152	130	80	63	381	51
25	98	125	e85	326	e200	141	146	121	78	61	109	49
26	96	115	e92	500	e170	e160	141	128	76	59	87	48
27	93	107	102	191	e160	e140	136	214	74	57	76	48
28	91	103	102	157	e155	128	133	853	73	58	69	48
29	88	98	101	e140	---	e145	133	1820	71	57	65	48
30	88	93	104	192	---	153	148	395	69	55	62	48
31	88	---	212	160	---	227	---	207	---	55	59	---
TOTAL	7462	3117	3510	6354	7695	6755	5296	7117	3029	2593	2733	1612
MEAN	241	104	113	205	275	218	177	230	101	83.6	88.2	53.7
MAX	1970	215	354	751	1650	1160	488	1820	165	378	381	66
MIN	86	83	79	105	132	121	130	106	69	55	51	48
CFSM	2.15	.93	1.01	1.83	2.45	1.95	1.58	2.05	.90	.75	.79	.48
IN.	2.48	1.04	1.17	2.11	2.56	2.24	1.76	2.36	1.01	.86	.91	.54

CAL YR 1989 TOTAL 56285 MEAN 154 MAX 2050 MIN 49 CFSM 1.38 IN. 18.69
WTR YR 1990 TOTAL 57273 MEAN 157 MAX 1970 MIN 48 CFSM 1.40 IN. 19.02

e Estimated.

02075000 DAN RIVER AT DANVILLE, VA

LOCATION.--Lat 36°35'15", long 79°22'55", Danville City, Hydrologic Unit 03010104, on left bank 50 ft downstream from Norfolk Southern Railway bridge, 1,000 ft upstream from Fall Creek, and at mile 62.7.

DRAINAGE AREA.--2,050 mi², approximately.

PERIOD OF RECORD.--August 1934 to current year. Gage-height records collected in this vicinity 1890-1934, at same site 1934-49, and at Main Street bridge, 0.25 mi upstream 1949-68, are contained in reports of the National Weather Service.

REVISED RECORDS.--WSP 972: 1936.

GAGE.--Water-stage recorder. Datum of gage is 379.29 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records good except those for periods of backwater from debris, Oct. 4-19 and Mar. 19-29, which are fair.

Diurnal fluctuation caused by mills and hydroelectric generating facility at Schoolfield Dam 3.3 mi upstream.

Since August 1950, flow regulated by Philpott Lake (station 02071900) 74.7 mi upstream. Gage-height and U.S.

Army Corps of Engineers satellite telemeters at station. Several measurements of water temperature were made

during the year. Water-quality records for some prior periods have been collected at this location.

AVERAGE DISCHARGE.--56 years, 2,315 ft³/s, 15.34 in/yr, unadjusted.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 75,000 ft³/s, Aug. 15, 1940, gage height, 20.96 ft; maximum gage height, 21.34 ft, June 22, 1972, backwater from debris; minimum discharge, 11 ft³/s, Sept. 5, 1966, gage height, 1.18 ft; minimum daily, 110 ft³/s, Sept. 5, 1966.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 34,300 ft³/s, Oct. 3, gage height, 14.90 ft; minimum, 460 ft³/s, Sept. 4, gage height, 1.94 ft, result of temporary storage at Schoolfield Dam 3.3 mi upstream; minimum daily, 742 ft³/s, Sept. 4.

CORRECTIONS.--The water year adjusted figures published in the 1989 report were in error; the correct figures are listed below:

WATER YEAR 1989 MEAN# 2456 CFSM# 1.20 IN.# 16.27

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	7320	2270	2280	6900	3280	3540	3650	2850	4290	1300	1380	1150
2	29900	2340	2230	8190	2780	3410	3750	3120	3660	1120	1260	1100
3	33600	2350	1740	4080	2830	3920	3850	3420	2800	1250	1240	1020
4	13800	2320	1770	3240	4230	4700	4040	3170	2540	1370	1240	742
5	6600	1710	2030	3220	6440	3670	3620	4350	2780	1120	1140	847
6	5140	1640	2090	3410	4430	3460	3420	4520	2720	1220	1020	e961
7	4550	2050	1900	3550	3470	3310	4660	3290	2660	1330	1260	988
8	2960	2100	1950	4600	3200	3160	4120	2960	2590	1140	1450	997
9	2760	2130	2300	8720	2890	3110	3100	2830	2620	970	1220	949
10	2910	2110	1890	6030	5620	3170	3180	3750	3020	1150	1050	863
11	2830	1940	1800	e4700	15400	2840	3340	9170	2580	1330	1270	968
12	2910	1610	3690	3450	7800	2470	4040	4760	2120	1420	1290	1120
13	2620	1460	9430	3080	5100	2520	3510	3910	1910	1650	1170	1150
14	2680	1970	5580	2250	4390	2590	3350	2950	1880	3040	1080	1270
15	2040	2160	3710	2120	3810	2490	5080	3010	1860	6440	1350	1450
16	1890	3810	3230	2550	5280	2580	7120	3120	1860	6260	1440	1110
17	2490	3530	2490	2560	12800	4380	4550	2970	1660	3330	1740	911
18	2620	2740	2150	2520	6130	19400	3960	2720	1640	3210	1630	907
19	5700	1920	2470	2560	5750	12400	3720	2500	1750	2900	1410	936
20	5500	1840	2340	2540	7020	5960	3480	2110	1740	2040	1240	970
21	3890	2070	2130	2070	5180	5750	3450	1790	1670	1830	1300	1000
22	2890	2080	2030	2250	4690	4890	2980	2180	1690	1810	1340	1000
23	2400	3520	2050	2060	8370	4100	2660	3370	1730	1690	1420	956
24	2330	3770	1630	2210	6930	3800	2950	2780	1470	1570	1900	829
25	2610	3130	1550	3460	4260	3020	2880	2350	1340	1530	1750	837
26	2670	2390	1810	8500	3580	2860	2820	2280	1460	1480	1460	926
27	2660	2300	2230	5870	3680	3010	2750	3060	1550	1420	1210	926
28	2610	2560	2030	3490	3650	2960	2760	9660	1550	1410	1200	902
29	1980	2580	1860	2930	---	3010	2240	17600	1570	1280	1270	914
30	1680	2400	1920	3520	---	3800	2500	16300	1520	1160	1360	850
31	2170	---	1850	4110	---	3360	---	5630	---	1240	1420	---
TOTAL	168710	70800	78160	120740	152990	133640	107530	138480	64230	60010	41510	29549
MEAN	5442	2360	2521	3895	5464	4311	3584	4467	2141	1936	1339	985
MAX	33600	3810	9430	8720	15400	19400	7120	17600	4290	6440	1900	1450
MIN	1680	1460	1550	2060	2780	2470	2240	1790	1340	970	1020	742
(*)	-74	-28	-4	+14	+58	+62	-54	+37	-56	+12	-71	-69
MEAN#	5368	2332	2517	3909	5522	4373	3530	4504	2085	1948	1268	916
CFSM#	2.62	1.14	1.23	1.91	2.69	2.13	1.72	2.20	1.00	.85	.62	.45
IN.#	3.02	1.27	1.42	2.20	2.81	2.46	1.92	2.53	1.14	1.10	.71	.50

CAL YR 1989 TOTAL 1106151 MEAN 3031 MAX 33600 MIN 808 MEAN# 3056 CFSM# 1.49 IN.# 20.24
WTR YR 1990 TOTAL 1166349 MEAN 3195 MAX 33600 MIN 742 MEAN# 3181 CFSM# 1.55 IN.# 21.07

* Change in contents, equivalent in cubic feet per second, in Philpott Lake; provided by U.S. Army Corps of Engineers.

Adjusted for change in contents.

e Estimated.

ROANOKE RIVER BASIN

02075500 DAN RIVER AT PACES, VA
(National stream-quality accounting network station)

LOCATION.--Lat 36°38'32", long 79°05'23", Halifax County, Hydrologic Unit 03010104, on right bank 100 ft upstream from bridge on State Highway 658, 0.5 mi southeast of Paces, 0.5 mi upstream from Big Toby Creek, 2.7 mi upstream from Birch Creek, and at mile 36.0.
DRAINAGE AREA.--2,550 mi², approximately.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--November 1950 to current year.

GAGE.--Water-stage recorder. Datum of gage is 322.48 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records good. Diurnal fluctuation by mills 23 mi upstream at Danville. Since August 1950, flow regulated by Philpott Lake (station 02071900) 101.4 mi upstream. Gage-height and U.S. Army Corps of Engineers satellite telemeters at station.

AVERAGE DISCHARGE.--39 years (water years 1952-90), 2,735 ft³/s, 14.56 in/yr, unadjusted.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 64,800 ft³/s, June 23, 1972, gage height, 33.15 ft, from rating curve extended above 32,000 ft³/s; minimum, 193 ft³/s, Sept. 4, 1956, gage height, 1.71 ft; minimum daily, 244 ft³/s, Sept. 4, 1956.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Aug. 16, 1940, reached a stage of 32.3 ft, from floodmark.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 33,000 ft³/s, Oct. 4, gage height, 25.58 ft, from high-water mark; minimum, 393 ft³/s, Sept. 4, gage height, 2.30 ft, result of temporary storage at Schoolfield Dam in Danville; minimum daily, 650 ft³/s, Sept. 4.

CORRECTIONS.--The water year adjusted figures published in the 1989 report were in error; the correct figures are listed below:

WATER YEAR 1989 MEAN# 3206 CFSM# 1.26 IN.# 17.07

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	6880	2530	2610	8750	4420	4300	5140	e3300	5740	1800	1530	1310
2	18600	2570	2480	13600	3780	4160	4860	e3400	4630	1440	1590	1240
3	28200	2810	2340	7400	3460	4560	5230	4340	3950	1370	1490	1210
4	31700	2670	2010	4390	4910	6050	5660	4150	3250	1560	1240	650
5	16900	2500	2010	4230	9650	4910	4510	4820	3150	1540	1440	932
6	5920	1880	2390	4510	6480	4130	4190	5850	3290	1250	1120	983
7	5030	2000	2280	5160	4740	4040	5430	5140	3170	1500	1280	1100
8	3840	2380	2190	5980	4210	3830	6130	3560	3070	1580	1470	1110
9	3000	2410	2540	14300	3790	3710	4320	3460	3040	1220	1750	1250
10	3060	2420	2560	11700	4710	3700	3900	3780	3980	1190	1040	1030
11	3310	2260	2110	5930	15200	3500	3970	8910	3910	1530	1410	996
12	3200	2040	3410	4670	16500	3040	4540	7160	2600	1760	1470	1190
13	3030	1710	11200	3990	6440	3030	4330	4770	2420	1780	1230	1280
14	3100	1870	10200	3380	5330	3070	4000	3940	2300	3390	1100	1400
15	2770	2330	5500	2800	4780	3010	5310	3370	2290	5120	1440	1510
16	2120	3460	4500	2810	6000	3060	9680	3620	2260	9010	1630	1630
17	2220	4570	3720	3140	13700	3530	6470	3450	2260	4400	2050	1060
18	2760	3510	2960	3070	12300	12300	4890	3240	1990	3890	1890	973
19	5650	2620	2770	3080	7920	18200	4680	3020	1930	3630	1700	1060
20	6710	2140	3080	3070	9390	7800	4230	2900	2140	2710	1210	1030
21	4610	2180	2670	2970	7160	6410	4090	2270	2050	2270	1480	1090
22	3480	2300	2460	2820	5810	5700	4150	2450	2080	2150	1490	1120
23	2710	3540	2440	2730	8660	4610	3480	3590	2140	2130	1560	1140
24	2570	4810	2280	2530	9780	4310	3320	3780	2030	1830	2010	942
25	3030	3820	1870	3720	6100	3870	3460	2980	1680	1840	2150	897
26	2950	3100	1940	11600	4640	3360	3360	2780	1570	1740	1890	975
27	2900	2680	2360	11100	4270	3340	3270	3930	1820	1680	1400	1010
28	2860	2640	2540	6160	4450	3350	3200	8680	1860	1630	1390	1010
29	2630	2970	2250	4210	---	3450	3020	16900	1830	1640	1420	975
30	1950	2740	2180	4330	---	4180	2840	21400	1830	1290	1420	997
31	2030	---	2320	5460	---	4480	---	14600	---	1360	1680	---
TOTAL	189720	81460	98170	173590	198580	150990	135660	169540	80260	71230	46970	33100
MEAN	6120	2715	3167	5600	7092	4871	4522	5469	2675	2298	1515	1103
MAX	31700	4810	11200	14300	16500	18200	9680	21400	5740	9010	2150	1630
MIN	1950	1710	1870	2530	3460	3010	2840	2270	1570	1190	1040	650
(*)	-74	-28	-4	+14	+58	+62	-54	+37	-56	+12	-71	-69
MEAN#	6046	2687	3163	5614	7150	4933	4468	5506	2619	2310	1444	1034
CFSM#	2.37	1.05	1.24	2.20	2.80	1.93	1.75	2.16	1.03	.91	.57	.41
IN.#	2.73	1.18	1.43	2.54	2.92	2.23	1.96	2.49	1.15	1.04	.65	.45

CAL YR 1989 TOTAL 1401930 MEAN 3841 MAX 31700 MIN 1070 MEAN# 3866 CFSM# 1.52 IN.# 20.58
WTR YR 1990 TOTAL 1429270 MEAN 3916 MAX 31700 MIN 650 MEAN# 3902 CFSM# 1.53 IN.# 20.78

* Change in contents, equivalent in cubic feet per second, in Philpott Lake; provided by U.S. Army Corps of Engineers.

Adjusted for change in contents.

e Estimated.

ROANOKE RIVER BASIN

301

02075500 DAN RIVER AT PACES, VA--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1954 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: January 1954 to September 1956.

WATER TEMPERATURE: January 1954 to September 1956.

SUSPENDED-SEDIMENT DISCHARGE: January 1954 to September 1981.

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	TUR- BID- ITY (NTU) (00076)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	STREP- TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)
NOV											
07...	1300	1770	102	7.0	11.0	743	5.9	10.1	94	52	36
JAN											
10...	1405	10100	180	7.2	6.0	755	82	10.4	84	150	4500
MAR											
27...	0840	2410	150	7.4	10.5	758	17	10.0	90	K120	20
MAY											
02...	1315	3310	235	7.3	18.0	760	20	8.0	85	340	370
JUN											
26...	1300	1600	152	7.4	25.0	760	5.8	6.2	75	130	45
SEP											
05...	1115	1000	150	7.5	24.0	750	13	6.6	80	130	330

DATE	HARD- NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	ALKA- LINITY WAT DIS TOT IT FIELD (MG/L AS CACO3 (39086)	BICAR- BONATE WATER DIS IT FIELD (MG/L AS HCO3 (00453)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)
NOV											
07...	25	6.0	2.3	10	1.8	29	29	35	8.0	8.4	0.10
JAN											
10...	19	4.5	1.8	5.9	1.7	14	--	--	10	4.8	0.10
MAR											
27...	22	5.4	2.0	12	1.7	24	25	31	8.7	12	0.20
MAY											
02...	25	6.3	2.3	14	1.6	28	27	33	7.1	16	<0.10
JUN											
26...	24	5.9	2.3	17	1.8	31	29	35	9.0	16	0.10
SEP											
05...	26	6.5	2.3	20	2.2	33	32	39	7.7	20	<0.10

< Actual value is known to be less than the value shown.

K Results based on colony count outside the acceptance range (non-ideal colony count).

ROANOKE RIVER BASIN

02075500 DAN RIVER AT PACES, VA--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)
NOV 07...	17	59	73	<0.010	0.280	0.050	0.060	0.30	0.060	0.030	0.060
JAN 10...	12	58	51	<0.010	0.370	0.040	0.070	0.70	0.150	0.030	0.020
MAR 27...	16	84	76	<0.010	0.500	0.050	0.060	0.50	0.050	0.020	0.030
MAY 02...	15	57	80	<0.010	0.300	0.050	0.030	0.40	0.070	0.050	0.040
JUN 26...	17	90	89	0.010	0.500	0.020	0.020	0.30	0.110	0.080	0.070
SEP 05...	17	93	100	0.020	0.900	0.110	0.110	0.50	0.100	0.070	0.080

DATE	ALUM- INUM, DIS- SOLVED (UG/L AS AL) (01106)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BARIUM, DIS- SOLVED (UG/L AS BA) (01005)	BERYL- LIUM, DIS- SOLVED (UG/L AS BE) (01010)	CADMIUM DIS- SOLVED (UG/L AS CD) (01025)	CHRO- MIUM, DIS- SOLVED (UG/L AS CR) (01030)	COBALT, DIS- SOLVED (UG/L AS CO) (01035)	COPPER, DIS- SOLVED (UG/L AS CU) (01040)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)
NOV 07...	20	<1	16	<0.5	<1.0	<1	<3	2	250	1	<4
JAN 10...	--	--	--	--	--	--	--	--	--	--	--
MAR 27...	80	1	19	<0.5	<1.0	<5*	<3	<10*	220	<10*	<4
MAY 02...	20	<1	19	<0.5	<1.0	<1	<3	5	110	1	<4
JUN 26...	--	--	--	--	--	--	--	--	--	--	--
SEP 05...	30	1	18	<0.5	<1.0	<1	<3	5	180	<1	<4

DATE	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	NICKEL, DIS- SOLVED (UG/L AS NI) (01065)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	SILVER, DIS- SOLVED (UG/L AS AG) (01075)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)	VANA- DIUM, DIS- SOLVED (UG/L AS V) (01085)	ZINC, DIS- SOLVED (UG/L AS ZN) (01090)	SEDI- MENT, SUS- PENDE (MG/L) (80154)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
NOV 07...	15	0.1	<10	1	<1	<1.0	46	<6	10	13	79
JAN 10...	--	--	--	--	--	--	--	--	--	208	92
MAR 27...	13	<0.1	<10	<10*	<1	<1.0	41	<6	9	50	91
MAY 02...	7	<0.1	<10	1	<1	<1.0	47	<6	6	31	78
JUN 26...	--	--	--	--	--	--	--	--	--	41	77
SEP 05...	11	<0.1	<10	1	<1	<1.0	30	<6	7	34	97

* An alternate analytical method resulted in a change of the minimum reporting level for these constituents.
 < Actual value is known to be less than the value shown.

02076500 GEORGES CREEK NEAR GRETN, VA

LOCATION.--Lat 36°56'11", long 79°18'42", Pittsylvania County, Hydrologic Unit 03010105, on left bank 15 ft downstream from bridge on State Highway 40, 2.8 mi southeast of Gretna, and 5.8 mi upstream from Whitethorn Creek.

DRAINAGE AREA.--9.24 mi².

PERIOD OF RECORD.--September 1949 to current year.

REVISED RECORDS.--WSP 1703: 1950-52. WSP 2104: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 629.54 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records good except for period with ice effect, Dec. 15-27, which is fair. Occasional regulation at low flow from unknown source. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

COOPERATION.--Records were provided by the Virginia Water Control Board.

AVERAGE DISCHARGE.--41 years, 9.74 ft³/s, 14.31 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,480 ft³/s, Sept. 22, 1979, gage height, 8.50 ft, from rating curve extended above 640 ft³/s on basis of slope-area measurements at gage heights 4.93 ft and 6.22 ft and contracted-opening measurements at gage heights 7.75 ft and 8.50 ft; minimum daily, 1.0 ft³/s, Mar. 12, Apr. 5, 1956, July 28, 1966.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 150 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Oct. 1	2130	161	2.76	May 22	1400	193	2.99
Feb. 10	1130	*460	*4.60	May 29	0930	230	3.26
Mar. 17	1600	392	4.26	July 13	2100	386	4.23
May 22	0300	269	3.53				

Minimum discharge, 5.2 ft³/s, July 4, Aug. 4.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	69	9.3	9.1	42	10	12	23	13	16	6.9	6.4	5.9
2	65	8.9	9.0	18	9.7	13	25	13	14	6.8	6.6	5.9
3	22	10	9.0	14	11	17	19	12	14	6.5	6.3	5.8
4	16	8.2	8.9	14	23	14	17	13	13	6.1	6.1	5.5
5	13	8.2	8.8	13	15	12	16	20	12	6.1	7.3	5.6
6	12	9.0	8.8	14	12	12	17	14	12	6.2	15	5.6
7	11	9.5	8.8	13	12	11	27	12	11	6.2	8.9	5.6
8	10	10	9.7	35	11	11	19	11	11	6.3	7.4	5.4
9	11	11	10	26	10	11	17	11	12	7.2	7.4	8.0
10	10	9.0	9.4	17	155	10	17	25	13	18	7.6	7.2
11	9.9	8.6	9.4	14	34	10	20	16	11	11	7.6	6.5
12	9.6	8.2	16	12	22	11	17	13	10	9.8	7.5	6.0
13	9.5	8.2	17	10	17	11	16	13	9.9	76	7.0	6.4
14	9.3	8.2	13	9.8	15	11	15	12	9.9	46	6.9	13
15	9.3	7.8	e10	9.8	14	11	29	11	11	18	7.1	7.7
16	9.8	18	e9.8	9.4	31	12	20	11	10	13	7.8	6.8
17	15	10	e9.2	9.4	24	112	17	10	10	11	8.4	6.6
18	18	9.2	e8.4	9.5	17	40	16	10	9.6	9.8	7.3	6.3
19	50	8.8	e7.8	8.6	25	22	15	9.8	9.3	9.5	7.3	6.5
20	17	8.8	e7.2	7.9	18	21	15	10	8.8	9.0	11	6.6
21	13	8.5	e6.8	9.2	15	19	15	14	8.9	8.8	7.5	6.5
22	11	8.6	e6.4	8.6	20	18	16	115	11	8.4	7.7	6.6
23	9.8	17	e6.2	8.2	22	16	14	27	10	8.0	12	6.5
24	8.5	13	e6.1	8.2	17	16	13	18	9.1	7.8	13	6.4
25	7.7	12	e6.0	20	14	17	13	15	8.6	7.9	9.0	5.8
26	8.0	12	e6.8	26	13	16	12	15	8.5	7.4	8.0	6.0
27	8.0	11	e7.8	15	13	15	12	23	8.3	7.1	7.3	6.2
28	7.7	10	8.0	13	13	14	12	49	8.2	6.6	6.9	6.1
29	7.6	9.7	7.9	13	---	17	12	114	7.7	6.8	6.5	5.7
30	8.0	9.4	9.9	16	---	17	14	27	7.1	7.0	6.1	5.7
31	8.5	---	19	12	---	23	---	19	---	6.7	5.9	---
TOTAL	494.2	300.1	290.2	455.6	612.7	572	510	695.8	314.9	371.9	246.8	194.4
MEAN	15.9	10.0	9.36	14.7	21.9	18.5	17.0	22.4	10.5	12.0	7.96	6.48
MAX	69	18	19	42	155	112	29	115	16	76	15	13
MIN	7.6	7.8	6.0	7.9	9.7	10	12	9.8	7.1	6.1	5.9	5.4
CFSM	1.73	1.08	1.01	1.59	2.37	2.00	1.84	2.43	1.14	1.30	.86	.70
IN.	1.99	1.21	1.17	1.83	2.47	2.30	2.05	2.80	1.27	1.50	.99	.78

CAL YR 1989 TOTAL 4297.2 MEAN 11.8 MAX 152 MIN 4.2 CFSM 1.27 IN. 17.30
WTR YR 1990 TOTAL 5058.6 MEAN 13.9 MAX 155 MIN 5.4 CFSM 1.50 IN. 20.37

e Estimated.

ROANOKE RIVER BASIN

02077000 BANISTER RIVER AT HALIFAX, VA

LOCATION.--Lat 36°46'35", long 78°54'58", Halifax County, Hydrologic Unit 03010105, on left bank 10 ft downstream from bridge on State Highway 360, 1,700 ft downstream from Terrible Creek, 1 mi northeast of Halifax, and 10 mi upstream from mouth.

DRAINAGE AREA.--547 mi².

PERIOD OF RECORD.--September 1904 to December 1905, October 1928 to current year. Monthly discharge only for some periods, published in WSP 1303.

REVISED RECORDS.--WSP 892: 1929-30, 1932-35. WSP 972: 1938(M), 1940. WSP 1112: 1943(M). WSP 2104: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 318.54 ft above National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers). Sept. 28, 1904, to Dec. 31, 1905, nonrecording gage at site 400 ft upstream at different datum. Dec. 9, 1928, to Sept. 20, 1950, water-stage recorder at site 400 ft upstream at present datum.

REMARKS.--Records fair except those for September, which are poor. Flow regulated by a reservoir and hydroelectric generating facility 0.5 mi upstream from station. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

AVERAGE DISCHARGE.--63 years, 506 ft³/s, 12.56 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 50,000 ft³/s, Sept. 20, 1944, gage height, 40.8 ft, from floodmarks, from rating curve extended above 13,000 ft³/s on basis of slope-area measurement of peak flow and velocity-area study; minimum, 6.0 ft³/s many days in August and September 1932.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 6,310 ft³/s, Oct. 3, gage height, 18.27 ft; minimum daily, 70 ft³/s, Sept. 28.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	988	365	411	1840	713	650	1080	469	1180	253	122	197
2	4090	387	448	2180	610	554	1220	442	669	231	181	180
3	5910	518	418	1180	634	724	1090	473	606	222	215	167
4	3360	460	330	823	940	915	724	373	548	219	170	e100
5	1040	390	331	861	1660	883	679	488	492	203	169	e96
6	630	390	425	889	1150	700	559	569	430	197	185	219
7	550	384	356	972	822	508	1040	480	433	195	247	e134
8	479	369	347	1000	727	527	1250	389	374	195	227	e165
9	537	402	508	2290	689	580	825	379	360	185	202	e125
10	358	426	346	1990	837	478	661	499	1160	e210	222	214
11	352	357	427	1080	2750	520	677	1070	650	351	173	187
12	325	345	549	760	2950	484	694	881	463	480	183	181
13	341	423	1280	758	1450	486	591	552	373	372	196	168
14	485	339	1310	499	931	482	503	468	322	830	168	e160
15	193	309	823	550	713	476	844	425	326	2040	171	e175
16	351	634	744	527	880	471	1530	368	484	858	205	205
17	300	1420	637	492	2060	590	1070	347	417	519	565	175
18	851	1020	474	503	1890	1530	683	372	358	381	648	145
19	1380	585	554	492	1340	1970	619	306	338	327	355	e140
20	3430	470	442	436	1670	1080	575	286	274	307	e300	e145
21	1620	427	388	491	1210	812	578	310	335	233	e330	e143
22	863	506	401	493	920	702	603	832	316	224	371	e150
23	503	634	305	481	1150	639	577	2710	384	337	313	e138
24	578	1020	229	443	1430	588	527	1610	330	296	365	e110
25	419	776	411	634	1010	566	432	625	379	e195	321	e160
26	465	587	305	2070	752	456	455	537	231	231	325	e130
27	396	563	464	2190	627	549	438	529	248	206	201	176
28	389	582	333	1130	652	497	373	676	272	221	211	e70
29	458	386	394	853	---	504	391	3020	271	227	225	e140
30	345	477	389	789	---	677	533	5040	260	211	e175	168
31	354	---	656	904	---	736	---	3420	---	193	e170	---
TOTAL	32340	15951	15435	30600	33167	21334	21821	28945	13283	11149	7911	4663
MEAN	1043	532	498	987	1185	688	727	934	443	360	255	155
MAX	5910	1420	1310	2290	2950	1970	1530	5040	1180	2040	648	219
MIN	193	309	229	436	610	456	373	286	231	185	122	70
CFSM	1.91	.97	.91	1.80	2.17	1.26	1.33	1.71	.81	.66	.47	.28
IN.	2.20	1.08	1.05	2.08	2.26	1.45	1.48	1.97	.90	.76	.54	.32

CAL YR 1989 TOTAL 226972 MEAN 622 MAX 5910 MIN 90 CFSM 1.14 IN. 15.44
WTR YR 1990 TOTAL 236599 MEAN 648 MAX 5910 MIN 70 CFSM 1.19 IN. 16.09

e Estimated.

02077500 HYCO RIVER NEAR DENNISTON, VA

LOCATION.--Lat 36°35'16", long 78°53'56", Halifax County, Hydrologic Unit 03010104, on left bank 60 ft upstream from bridge on U.S. Highway 501, 0.8 mi upstream from Mayo Creek, 2.5 mi northeast of Denniston, and 7.3 mi south of South Boston.

DRAINAGE AREA.--289 mi².

PERIOD OF RECORD.--October 1928 to September 1934, October 1950 to current year. Monthly discharge only for some periods, published in WSP 1303.

REVISED RECORDS.--WSP 1383: Drainage area, 1930. WSP 1503: 1930(M). WDR VA-75-1: 1974.

GAGE.--Water-stage recorder. Datum of gage is 315.24 ft above National Geodetic Vertical Datum of 1929. July 10, 1929, to Mar. 14, 1934, nonrecording gage at same site and datum.

REMARKS.--No estimated daily discharges. Records good. Small diurnal fluctuation at low flow in some years caused by mill upstream from station. Since 1964, flow regulated by Hyco Lake 15.7 mi upstream, capacity 75,480 acre-ft, and since Apr. 26, 1974, by Roxboro Steam-Electric Generating Plant afterbay Reservoir, capacity 12,000 acre-ft. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

AVERAGE DISCHARGE.--46 years, 254 ft³/s, 11.94 in/yr, unadjusted.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 10,800 ft³/s, July 15, 1975, gage height, 24.27 ft, from rating curve extended above 8,200 ft³/s; minimum, 0.004 ft³/s, Sept. 14, 1932, gage height, 3.58 ft.

EXTREMES OUTSIDE PERIOD OF RECORD.--Floods in August 1928 and September 1945 reached stages of 26.4 ft and 25.6 ft, respectively, from floodmarks.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 2,240 ft³/s, Oct. 4, gage height, 15.18 ft; minimum, 20 ft³/s, Aug. 13, 14, 20; minimum gage height, 4.48 ft, Aug. 20.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	488	135	55	1350	381	198	299	130	1110	83	23	26
2	1280	138	52	1810	365	189	302	202	243	80	23	30
3	1880	232	50	1870	355	247	993	252	195	79	23	28
4	2170	178	49	915	643	293	980	793	208	78	24	27
5	1310	154	50	566	875	229	817	986	187	77	22	29
6	693	147	50	345	1110	230	491	688	179	77	22	29
7	290	140	49	346	1070	216	759	527	173	76	25	28
8	263	138	54	711	877	207	610	500	169	75	24	36
9	225	213	73	1570	224	206	524	469	165	71	22	32
10	149	166	62	1800	377	203	497	393	411	29	24	28
11	144	143	75	1520	546	198	484	372	512	52	23	29
12	132	95	443	314	817	194	468	208	595	46	22	29
13	56	57	1350	252	837	166	447	195	416	46	20	29
14	52	52	1670	264	630	161	331	186	618	37	21	30
15	50	53	1750	260	604	159	607	184	541	63	26	29
16	49	58	1030	241	874	159	531	179	191	38	26	29
17	52	65	551	225	1370	166	396	174	174	37	25	27
18	62	52	484	211	820	212	361	170	167	32	23	28
19	337	47	403	198	1270	176	344	152	163	30	21	29
20	211	46	346	184	1410	172	333	108	160	29	20	29
21	100	47	278	204	1340	178	329	106	158	28	25	28
22	76	46	184	212	1150	164	362	129	158	27	27	28
23	140	234	170	209	1270	158	319	180	166	26	28	29
24	146	168	166	204	1130	155	139	130	153	25	34	27
25	142	95	162	475	926	150	123	118	102	25	31	27
26	140	77	166	1670	252	154	116	120	90	24	32	28
27	139	68	166	2100	217	153	111	416	87	24	28	27
28	136	65	165	2050	207	148	108	157	98	24	27	27
29	134	62	165	1290	---	178	107	981	88	23	27	28
30	133	57	171	495	---	260	118	1210	85	22	26	27
31	137	---	227	411	---	280	---	1270	---	23	26	---
TOTAL	11316	3228	10666	24272	21947	5959	12406	11685	7762	1406	770	857
MEAN	365	108	344	783	784	192	414	377	259	45.4	24.8	28.6
MAX	2170	234	1750	2100	1410	293	993	1270	1110	83	34	36
MIN	49	46	49	184	207	148	107	106	85	22	20	26

CAL YR 1989 TOTAL 136352 MEAN 374 MAX 3790 MIN 30
WTR YR 1990 TOTAL 112274 MEAN 308 MAX 2170 MIN 20

ROANOKE RIVER BASIN

02079000 ROANOKE (STAUNTON) RIVER AT CLARKSVILLE, VA

LOCATION.--Lat 36°37'40", long 78°33'04", Mecklenburg County, Hydrologic Unit 03010102, at water treatment plant intake, in Clarksville.

DRAINAGE AREA.--7,320 mi².

PERIOD OF RECORD.--August 1987 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	TIME	CARBON, ORGANIC TOTAL (MG/L AS C) (00680)	PHENOLS TOTAL (UG/L) (32730)
OCT			
18...	1230	3.3	1
NOV			
16...	0930	3.8	2
JAN			
10...	1000	5.6	<1
FEB			
06...	0930	4.1	3
MAR			
06...	0930	2.9	3
APR			
11...	1225	4.9	<1
MAY			
01...	0900	5.4	2
JUN			
05...	0930	6.3	3
JUL			
10...	0930	5.0	2
31...	0930	5.4	2
SEP			
04...	0930	3.4	1

< Actual value is known to be less than the value shown.

ROANOKE RIVER BASIN

307

02079490 JOHN H. KERR RESERVOIR NEAR BOYDTON, VA

LOCATION.--Lat 36°35'56", long 78°18'06", Mecklenburg County, Hydrologic Unit 03010102, at John H. Kerr Dam on Roanoke River, 2.7 mi upstream from Allen Creek, 6.7 mi southeast of Boydton, 18 mi upstream from the Virginia-North Carolina State line, and at mile 178.7.

DRAINAGE AREA.--7,780 mi², approximately.

PERIOD OF RECORD.--July 1950 to current year.

GAGE.--Water-stage recorder. Datum of gage is National Geodetic Vertical Datum of 1929.

REMARKS.--Reservoir is formed by concrete dam with earth embankments. Spillway, with crest at elevation 288.0 ft, is equipped with 22 radial gates 32 ft high by 42 ft wide. Storage began in September 1950 during construction; initial filling started June 30, 1952; water in reservoir first reached rule-curve elevation in March 1953. Total capacity at top of gates, elevation, 320 ft, is 2,770,000 acre-ft of which 1,281,400 acre-ft is controlled flood storage between elevations 300 ft, top of power pool, and 320 ft; 316,900 acre-ft is available for power between elevations 293.0 ft, bottom of power pool, and 300 ft; 1,171,700 acre-ft is inactive and dead storage below elevation 293.0 ft. Figures given herein represent total contents. Reservoir is used for flood control, hydroelectric power, low-water regulation for navigation and pollution abatement, release of water for downstream fish spawning, and recreation.

COOPERATION.--Records were provided by the U.S. Army Corps of Engineers.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 2,736,460 acre-ft, Apr. 29, 1987, elevation, 319.61 ft; minimum (after first filling to rule curve), 724,700 acre-ft, Feb. 3, 1956, elevation, 280.23 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 1,850,430 acre-ft, June 2, elevation, 306.73 ft; minimum, 1,297,700 acre-ft, Dec. 25, elevation, 295.95 ft.

MONTHEND ELEVATION AND CONTENTS AT 2400, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

Date	Elevation (feet)	Contents (acre-feet)	Change in contents (acre-feet)
Sept. 30.....	301.55	1,567,480	-
Oct. 31.....	298.12	1,397,440	-170,040
Nov. 30.....	298.49	1,415,120	+17,680
Dec. 31.....	296.81	1,336,510	-78,610
CAL YR 1989.....	-	-	+60,370
Jan. 31.....	299.05	1,441,960	+105,450
Feb. 28.....	301.48	1,563,870	+121,910
Mar. 31.....	302.35	1,609,180	+45,310
Apr. 30.....	302.44	1,613,930	+4,750
May 31.....	306.31	1,826,360	+212,430
June 30.....	299.63	1,470,430	-355,930
July 31.....	299.17	1,447,850	-22,580
Aug. 31.....	299.27	1,452,760	+4,910
Sept. 30.....	298.22	1,402,220	-50,540
WTR YR 1990.....	-	-	-165,260

02079640 ALLEN CREEK NEAR BOYDTON, VA

LOCATION.--Lat 36°40'46", long 78°19'37", Mecklenburg County, Hydrologic Unit 03010106, on left bank at upstream side of bridge on U.S. Highway 58, 0.8 mi upstream from Coleman Creek, 2.3 mi downstream from Layton Creek, 3.7 mi east of Boydton, and 11.8 mi southwest of South Hill.

DRAINAGE AREA.--53.4 mi².

PERIOD OF RECORD.--October 1961 to current year.

REVISED RECORDS.--WSP 2104: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 216.50 ft above National Geodetic Vertical Datum of 1929 (levels by Virginia Department of Transportation).

REMARKS.--Records good except those for period of doubtful gage-height record, Nov. 23-30, and period with ice effect, Dec. 20-23, which are fair. Several measurements of water temperature were made during the year.

COOPERATION.--Records were provided by the Virginia Water Control Board.

AVERAGE DISCHARGE.--29 years, 46.3 ft³/s, 11.77 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 5,620 ft³/s, Oct. 23, 1971, gage height, 21.80 ft, from rating curve extended above 3,100 ft³/s; no flow many days in August, September, and October 1968, September and October 1970.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 850 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Oct. 2	0730	993	12.52	Apr. 2	0400	1,160	13.48
Oct. 18	0300	921	12.07	May 10	1600	1,000	12.57
Oct. 19	1330	2,030	16.37	May 29	1530	1,960	16.16
Jan. 1	1300	*2,140	*16.66	Aug. 24	0330	1,030	12.74

Minimum discharge, 2.3 ft³/s, Sept. 30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	129	23	32	1270	43	39	127	61	41	8.7	3.4	6.5
2	519	27	30	183	41	37	530	39	33	8.1	3.1	5.8
3	86	314	30	93	40	79	159	32	30	7.4	3.0	5.5
4	41	105	28	73	201	101	81	34	28	7.0	2.8	5.3
5	30	60	28	77	168	55	57	45	24	6.7	2.8	4.8
6	22	45	28	121	76	45	46	57	22	6.4	5.0	4.7
7	19	43	27	106	64	40	226	33	21	6.1	20	4.8
8	15	40	31	239	56	36	106	28	20	5.8	7.7	4.6
9	13	90	38	218	48	36	65	25	19	6.0	52	4.5
10	11	88	34	102	211	35	52	395	37	5.8	32	5.2
11	11	50	43	77	173	33	49	184	23	6.3	13	4.9
12	10	40	247	67	83	32	40	59	18	21	8.9	4.2
13	9.6	33	389	56	63	31	35	41	17	12	7.2	3.9
14	9.5	31	130	50	53	29	33	34	16	17	7.7	4.9
15	9.5	30	86	48	47	29	216	29	16	13	27	5.4
16	9.5	33	134	46	242	28	109	27	16	10	13	4.6
17	10	34	74	45	305	29	61	24	15	25	11	3.8
18	314	27	54	44	92	52	46	22	14	16	9.2	3.3
19	939	24	47	42	233	35	38	20	16	9.6	7.3	3.1
20	273	23	e41	40	131	30	35	20	14	8.3	6.7	3.4
21	120	23	e38	52	77	29	36	20	13	7.6	7.5	3.5
22	67	24	e35	53	67	26	46	53	13	7.0	9.4	3.5
23	44	e400	e33	43	108	26	35	103	16	6.4	60	3.6
24	34	e182	31	41	74	24	31	34	13	5.8	353	3.1
25	29	e88	29	124	54	24	28	25	12	5.2	34	2.9
26	25	e65	31	465	44	25	26	24	11	4.7	18	2.7
27	23	e49	30	137	43	24	24	115	10	4.3	13	2.6
28	22	e40	29	80	42	22	23	54	10	4.6	10	2.5
29	21	e36	30	64	---	40	33	1010	9.7	4.6	9.0	2.5
30	20	e34	38	59	---	79	144	192	9.2	4.4	7.9	2.5
31	21	---	97	49	---	123	---	64	---	4.1	7.0	---
TOTAL	2906.1	2101	1972	4164	2879	1273	2537	2903	556.9	264.9	771.6	122.6
MEAN	93.7	70.0	63.6	134	103	41.1	84.6	93.6	18.6	8.55	24.9	4.09
MAX	939	400	389	1270	305	123	530	1010	41	25	353	6.5
MIN	9.5	23	27	40	40	22	23	20	9.2	4.1	2.8	2.5
CFSM	1.76	1.31	1.19	2.52	1.93	.77	1.58	1.75	.35	.16	.47	.08
IN.	2.02	1.46	1.37	2.90	2.01	.89	1.77	2.02	.39	.18	.54	.09

CAL YR 1989 TOTAL 29617.0 MEAN 81.1 MAX 972 MIN 6.7 CFMS 1.52 IN. 20.63
WTR YR 1990 TOTAL 22451.1 MEAN 61.5 MAX 1270 MIN 2.5 CFMS 1.15 IN. 15.64

e Estimated.

0207987950 LAKE GASTON (LITTLE RIVER CHANNEL) NEAR HENRICO, NC

LOCATION.--Lat 36°30'34", long 77°51'49", Northampton County, Hydrologic Unit 03010106, in Lake Gaston, 2.0 mi southwest of Henrico.

PERIOD OF RECORD.--August 1987 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	TIME	SAM- PLING DEPTH (FEET) (000003)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (000095)	SPE- CIFIC CON- DUCT- ANCE LAB (US/CM) (90095)	PH (STAND- ARD UNITS) (00400)	PH LAB (STAND- ARD UNITS) (00403)	TEMPER- ATURE WATER (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	TUR- BID- ITY (NTU) (00076)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	OXYGEN DEMAND, BIO- CHEM- ICAL, 5 DAY (MG/L) (00310)
OCT												
19...	1000	3.00	86	96	7.3	7.5	19.5	752	6.4	7.6	84	1.0
19...	1015	12.0	86	95	7.3	7.2	20.0	752	6.0	7.5	83	2.0
19...	1030	21.0	86	96	7.3	7.5	20.0	752	6.0	7.5	83	1.0
19...	1045	39.0	85	96	7.2	7.5	20.0	752	7.5	7.5	83	1.0
19...	1100	57.0	87	98	7.1	7.4	19.5	752	10	6.5	72	3.0
NOV												
17...	0900	3.00	86	98	7.4	7.5	15.5	757	3.2	9.2	93	<1.0
17...	0915	12.0	86	98	7.4	7.5	15.5	757	3.5	9.2	93	<1.0
17...	0930	21.0	86	98	7.4	7.5	15.5	757	3.3	9.2	93	1.0
17...	0945	39.0	86	98	7.4	7.5	15.5	757	3.5	9.2	93	<1.0
17...	1000	56.0	86	100	7.4	7.6	15.5	757	3.5	9.6	97	<1.0
JAN												
11...	0830	3.00	100	106	7.6	7.4	5.0	754	1.3	10.9	86	3.0
11...	0845	12.0	100	104	7.6	7.4	4.5	754	3.5	11.1	87	2.0
11...	0900	21.0	100	103	7.6	7.4	4.5	754	2.8	11.1	87	3.0
11...	0915	39.0	100	103	7.6	7.6	4.5	754	3.7	11.2	88	2.0
11...	0930	56.0	100	103	7.6	7.5	4.5	754	4.5	11.3	89	2.0
FEB												
07...	0900	3.00	91	95	7.1	7.4	8.0	758	12	10.6	90	2.0
07...	0915	12.0	91	96	7.1	7.6	7.5	758	11	10.8	91	1.0
07...	0930	21.0	91	96	7.1	7.6	7.5	758	10	10.8	91	1.0
07...	0945	39.0	92	98	7.1	7.8	7.5	758	12	10.7	90	2.0
07...	1000	57.0	91	97	7.1	7.7	7.5	758	10	10.7	90	2.0
MAR												
07...	0830	3.00	91	92	7.4	7.9	9.5	775	21	11.3	97	2.0
07...	0845	12.0	91	89	7.3	7.9	9.5	775	19	11.2	96	1.0
07...	0900	21.0	94	92	7.3	7.9	9.5	775	19	11.1	95	1.0
07...	0915	39.0	92	93	7.3	7.9	9.5	775	20	11.1	95	1.0
07...	0930	58.0	91	90	7.3	7.9	9.5	775	22	11.5	99	1.0
APR												
12...	0830	3.00	85	91	7.5	8.0	13.5	760	10	13.9	134	1.0
12...	0845	12.0	85	89	7.4	7.5	13.5	760	10	13.9	133	1.0
12...	0900	21.0	85	89	7.4	7.8	13.5	760	10	13.8	132	2.0
12...	0915	39.0	85	89	7.4	7.7	13.5	760	10	13.8	132	2.0
12...	0930	55.0	85	88	7.3	7.6	13.0	760	10	14.3	137	1.0
MAY												
02...	0830	3.00	88	89	7.7	7.7	20.5	758	3.4	10.7	119	1.0
02...	0845	12.0	88	90	7.7	7.6	20.0	758	4.0	10.6	118	1.0
02...	0900	21.0	88	91	7.3	7.5	16.5	758	5.6	10.3	106	1.0
02...	0915	39.0	89	92	7.1	7.6	15.0	758	8.0	8.8	88	<1.0
02...	0930	54.0	89	92	7.0	7.3	14.5	758	10	8.0	79	1.0
JUN												
06...	0830	3.00	86	89	7.4	7.8	21.0	760	3.5	10.6	120	1.0
06...	0845	12.0	86	89	7.4	7.9	21.0	760	1.9	10.3	116	1.0
06...	0900	21.0	86	90	7.1	7.7	20.5	760	3.4	9.3	104	1.0
06...	0915	39.0	86	89	6.8	7.5	19.5	760	6.3	7.4	81	1.0
06...	0930	57.0	86	90	6.6	7.5	18.5	760	5.8	6.2	66	1.0
JUL												
11...	0830	3.00	89	92	7.3	7.9	27.5	756	22	7.3	94	1.0
11...	0845	12.0	89	91	7.2	7.6	27.5	756	2.5	7.2	92	1.0
11...	0900	21.0	89	90	7.1	7.8	27.5	756	20	6.8	87	1.0
11...	0915	39.0	90	95	6.5	7.4	22.0	756	5.3	0.5	6	<1.0
11...	0930	58.0	97	97	6.6	7.1	20.0	756	4.6	0.2	2	1.0
AUG												
01...	0830	3.00	82	93	8.1	7.5	27.5	758	1.5	8.3	106	1.0
01...	0845	12.0	82	92	8.0	7.4	27.5	758	1.0	8.2	105	1.0
01...	0900	21.0	84	95	6.8	6.9	25.5	758	1.6	1.7	21	2.0
01...	0915	39.0	87	98	6.6	7.0	24.0	758	3.0	0	0	2.0
01...	0930	55.0	96	109	6.8	7.2	20.5	758	3.0	0	0	2.0
SEP												
05...	0830	3.00	86	93	7.2	7.4	26.5	760	1.4	6.0	75	1.0
05...	0845	12.0	85	92	7.1	7.3	26.5	760	1.3	5.9	74	<1.0
05...	0900	21.0	86	96	7.0	7.1	26.5	760	1.8	3.9	49	<1.0
05...	0915	39.0	95	104	6.7	7.1	24.5	760	2.6	0	0	1.0
05...	0930	56.0	110	115	6.9	7.1	20.5	760	3.0	0	0	4.0

< Actual value is known to be less than the value shown.

0207987950 LAKE GASTON (LITTLE RIVER CHANNEL) NEAR HENRICO, NC--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	COLI-FORM, TOTAL, IMMED. (COLS. PER 100 ML) (31501)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./100 ML) (31625)	HARDNESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNESIUM, DIS-SOLVED (MG/L AS MG) (00925)	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)	POTASSIUM, DIS-SOLVED (MG/L AS K) (00935)	ALKALINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLORIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUORIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)
OCT												
19...	77	K1	28	6.9	2.7	6.7	2.4	27	8.0	6.2	0.10	9.2
19...	--	--	28	6.8	2.7	6.7	2.4	27	8.0	6.2	0.10	9.1
19...	--	--	28	6.8	2.7	6.9	2.4	27	8.0	6.2	0.10	9.1
19...	--	--	28	6.8	2.7	6.5	2.5	27	8.0	6.3	0.10	9.2
19...	--	--	29	7.0	2.8	6.8	2.5	27	8.0	6.3	0.10	9.8
NOV												
17...	K27	K3	29	7.0	2.7	6.3	2.5	27	8.0	6.1	0.10	7.8
17...	--	--	29	7.1	2.7	6.2	2.5	27	8.0	6.2	0.10	8.1
17...	--	--	29	7.2	2.7	6.2	2.5	28	8.0	6.2	0.10	7.8
17...	--	--	29	7.1	2.7	6.2	2.5	27	8.0	6.2	0.10	7.7
17...	--	--	28	7.0	2.6	6.4	2.4	27	8.0	6.1	0.10	7.6
JAN												
11...	K1300	K120	30	7.3	2.8	7.3	2.0	29	9.0	6.6	0.10	11
11...	--	--	30	7.2	2.9	7.3	2.2	30	8.0	2.6	0.10	11
11...	--	--	30	7.2	2.9	7.2	2.2	29	8.0	2.5	0.10	11
11...	--	--	31	7.3	3.0	7.4	2.1	29	8.0	6.6	0.10	11
11...	--	--	30	7.3	2.9	7.4	2.1	29	8.0	6.8	0.10	11
FEB												
07...	58	20	31	7.3	3.0	7.2	2.8	25	9.0	5.9	0.10	11
07...	--	--	30	7.1	2.9	6.3	2.0	25	9.0	5.9	0.10	11
07...	--	--	30	7.1	3.0	6.3	1.9	25	9.0	5.9	0.10	11
07...	--	--	29	6.8	2.8	5.8	2.1	26	9.0	5.8	0.10	11
07...	--	--	29	7.0	2.9	6.3	2.1	25	9.0	6.0	0.10	11
MAR												
07...	37	31	--	6.5	2.7	5.8	2.2	24	8.0	6.7	<0.10	11
07...	--	--	--	6.5	2.7	5.8	1.9	23	8.1	6.5	<0.10	11
07...	--	--	--	6.4	2.7	5.7	2.0	24	8.2	6.5	<0.10	11
07...	--	--	--	6.4	2.7	5.7	2.0	24	8.1	6.7	<0.10	11
07...	--	--	--	6.5	2.6	5.7	2.1	24	8.1	6.7	<0.10	11
APR												
12...	K14	K6	26	6.2	2.5	5.8	1.7	25	7.3	5.7	<0.10	11
12...	--	--	26	6.3	2.6	5.8	1.8	25	7.3	6.1	0.10	11
12...	--	--	26	6.3	2.6	5.8	1.8	25	7.7	6.2	<0.10	11
12...	--	--	26	6.3	2.6	5.7	1.8	25	7.3	6.0	<0.10	11
12...	--	--	26	6.2	2.6	5.7	1.8	24	7.2	5.9	<0.10	11
MAY												
02...	K23	K4	26	6.3	2.6	5.8	1.8	26	7.7	5.8	0.20	11
02...	--	--	27	6.4	2.6	5.8	1.7	26	7.0	5.9	0.20	11
02...	--	--	27	6.5	2.6	5.9	1.7	26	7.7	5.9	0.20	12
02...	--	--	27	6.5	2.7	5.9	1.8	25	7.9	6.1	0.30	12
02...	--	--	28	6.6	2.7	5.9	1.8	26	7.4	4.9	<0.10	12
JUN												
06...	K14	--	28	6.6	2.7	6.1	1.7	27	7.2	7.0	<0.10	9.7
06...	--	--	27	6.4	2.7	6.0	1.7	27	7.2	7.0	<0.10	10
06...	--	--	28	6.7	2.7	6.2	1.6	27	7.2	7.1	<0.10	9.8
06...	--	--	28	6.6	2.7	6.1	1.7	27	7.1	7.0	<0.10	10
06...	--	--	28	6.6	2.7	6.1	1.7	27	6.9	6.5	<0.10	10
JUL												
11...	K4	K4	27	6.5	2.7	5.9	1.9	27	6.5	6.4	<0.10	9.4
11...	--	--	27	6.5	2.7	5.7	1.8	27	6.2	6.1	<0.10	9.3
11...	--	--	27	6.5	2.7	5.9	1.8	27	6.3	6.1	<0.10	9.4
11...	--	--	29	7.0	2.7	6.1	1.9	28	6.5	6.4	<0.10	11
11...	--	--	31	7.3	3.0	5.9	1.9	29	6.2	6.4	0.10	12
AUG												
01...	K7	K4	29	6.9	2.8	6.1	1.9	32	6.9	6.5	<0.10	10
01...	--	--	29	7.0	2.8	6.2	1.9	24	7.1	6.5	<0.10	11
01...	--	--	29	7.1	2.8	6.2	1.9	30	7.0	6.6	<0.10	11
01...	--	--	30	7.3	2.8	6.1	1.9	30	6.8	6.5	<0.10	12
01...	--	--	31	7.8	2.9	6.0	2.0	34	6.4	6.5	<0.10	13
SEP												
05...	K2	K1	28	6.6	2.9	6.2	1.8	29	6.4	6.7	<0.10	10
05...	--	--	28	6.6	2.8	6.2	1.9	29	6.5	6.7	<0.10	10
05...	--	--	29	6.9	2.9	6.3	1.9	30	6.3	6.9	<0.10	11
05...	--	--	31	7.5	2.9	6.4	2.0	32	6.0	6.8	<0.10	12
05...	--	--	32	7.9	2.9	6.1	2.1	40	4.8	6.7	<0.10	14

< Actual value is known to be less than the value shown.

K Results based on colony count outside the acceptance range (non-ideal colony count).

ROANOKE RIVER BASIN

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0207987950 LAKE GASTON (LITTLE RIVER CHANNEL) NEAR HENRICO, NC--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L) (70301)	NITRO- GEN, AM- MONIA + ORGANIC TOTAL (MG/L) AS N (00625)	PHOS- PHORUS TOTAL (MG/L) AS P (00665)	IRON, TOTAL RECOV- ERABLE (UG/L) AS FE (01045)	IRON, DIS- SOLVED (UG/L) AS FE (01046)	MANGA- NESE, TOTAL RECOV- ERABLE (UG/L) AS MN (01055)	MANGA- NESE, DIS- SOLVED (UG/L) AS MN (01056)	CARBON, ORGANIC TOTAL (MG/L) AS C (00680)	CHLORO- PHYLL A FLUORO- METRIC METHOD CORR. (UG/L) (32209)	PHEOPHY- TIN A FLUORO- METRIC METHOD (UG/L) (32213)	PHENOLS TOTAL (UG/L) (32730)
OCT											
19...	59	0.40	0.017	760	170	40	3	--	11.7	3.00	--
19...	58	0.30	0.016	550	160	40	3	4.1	9.60	5.60	<1
19...	59	0.40	0.017	720	120	40	2	--	10.7	3.80	--
19...	58	0.50	0.017	510	180	40	23	--	10.7	3.10	--
19...	60	0.50	0.020	710	270	90	67	4.3	6.90	3.00	<1
NOV											
17...	57	0.40	0.013	280	81	50	2	--	6.30	9.20	--
17...	57	0.40	0.018	350	78	40	1	3.8	4.70	7.20	8
17...	58	0.30	0.014	290	78	60	1	--	4.90	7.60	--
17...	57	0.30	0.015	340	62	40	<1	--	9.90	5.30	--
17...	56	0.30	0.019	390	68	40	2	3.7	5.50	7.00	3
JAN											
11...	64	0.30	0.017	290	130	60	12	--	5.40	2.40	--
11...	59	0.20	0.016	320	130	40	12	3.3	6.00	1.50	<1
11...	59	0.30	0.017	300	110	30	11	--	6.60	1.30	--
11...	63	0.30	0.021	300	110	80	12	--	6.70	2.00	--
11...	63	0.30	0.016	320	98	80	12	3.6	6.00	1.20	3
FEB											
07...	62	0.30	0.028	540	210	40	15	--	8.30	2.30	--
07...	60	0.40	0.030	650	220	40	13	4.1	6.00	3.20	1
07...	60	0.30	0.027	710	210	40	12	--	7.10	3.40	--
07...	59	0.30	0.026	820	160	40	12	--	7.40	2.10	--
07...	60	0.60	0.036	650	140	40	13	3.7	5.80	3.10	7
MAR											
07...	--	0.80	0.020	940	200	30	6	--	21.4	4.90	--
07...	--	0.30	0.038	1500	40	30	3	3.8	22.0	7.00	3
07...	--	0.90	0.037	950	210	30	4	--	14.3	6.50	--
07...	--	0.70	0.037	1200	120	30	3	--	12.4	1.80	--
07...	--	0.40	0.035	1400	200	30	5	3.7	11.5	7.60	15
APR											
12...	55	0.60	0.028	860	170	40	3	--	10.2	8.00	--
12...	56	0.40	0.026	680	120	40	1	3.9	10.2	7.60	<1
12...	57	0.30	0.028	820	170	40	3	--	9.60	9.80	--
12...	56	0.30	0.038	830	150	40	2	--	9.30	10.4	--
12...	55	0.30	0.030	840	170	40	2	4.0	9.60	11.2	<1
MAY											
02...	57	<0.20	0.017	250	82	10	1	--	2.20	5.70	--
02...	56	0.30	0.010	270	86	10	1	3.7	3.30	5.90	5
02...	58	0.30	0.013	420	130	20	<1	--	1.60	4.60	--
02...	58	0.30	0.014	570	140	30	1	--	0.800	5.10	--
02...	57	0.30	0.019	620	97	50	21	3.3	0.500	5.40	2
JUN											
06...	57	1.1	0.014	210	57	20	2	--	9.90	4.30	--
06...	57	<0.20	0.013	240	51	20	1	3.6	10.2	2.70	5
06...	58	<0.20	0.012	310	69	30	<1	--	7.70	4.20	--
06...	57	<0.20	0.015	440	71	40	2	--	6.90	4.00	--
06...	57	<0.20	0.013	440	65	40	2	3.6	3.80	4.40	2
JUL											
11...	56	0.90	0.011	140	21	40	8	--	7.30	3.30	--
11...	55	0.30	0.006	160	22	40	3	3.8	6.30	6.20	4
11...	55	0.50	0.008	140	19	40	1	--	5.50	5.10	--
11...	59	0.30	0.012	270	80	360	270	--	1.10	3.80	--
11...	62	0.30	0.010	220	53	1200	1300	4.1	2.30	0.800	3
AUG											
01...	60	0.50	0.012	30	13	40	10	--	9.20	4.20	--
01...	57	0.50	0.009	20	10	40	3	4.0	10.4	5.40	3
01...	61	0.40	0.011	80	32	170	74	--	2.80	3.80	--
01...	62	0.50	0.009	230	34	1100	960	--	1.20	3.70	--
01...	69	0.50	0.011	170	40	3700	4000	4.2	0.400	2.70	3
SEP											
05...	58	0.30	0.001	90	23	100	6	--	4.70	1.60	--
05...	58	0.60	0.008	80	22	100	3	3.4	4.40	2.50	4
05...	60	0.30	0.001	190	62	270	130	--	2.80	1.20	--
05...	65	0.30	0.001	340	41	1600	1700	--	1.10	1.50	--
05...	75	0.90	0.011	2000	1800	4800	4600	4.4	1.10	1.20	7

< Actual value is known to be less than the value shown.

ROANOKE RIVER BASIN

02079880 PEA HILL CREEK AT ROUTE 665, NEAR GASBURG, VA

LOCATION.--Lat 36°34'57", long 77°53'20", Brunswick County, Hydrologic Unit 03010106, at bridge on State Highway 665, 1.0 mi north of Gasburg, and 3.3 mi west of Valentines.

PERIOD OF RECORD.--August 1987 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	SPE- CIFIC CON- DUCT- ANCE LAB (US/CM) (90095)	PH (STAND- ARD UNITS) (00400)	PH LAB (STAND- ARD UNITS) (00403)	TEMPER- ATURE WATER (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	TUR- BID- ITY (NTU) (00076)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)
OCT											
18...	1030	1.1	92	88	7.2	7.4	18.5	754	2.1	8.8	95
NOV											
16...	1130	2.2	75	81	7.1	6.2	16.0	739	5.8	7.9	83
JAN											
10...	1230	12	51	51	6.2	6.7	6.0	742	1.2	11.2	92
FEB											
06...	1100	5.4	63	66	6.2	7.3	4.5	757	10	10.1	79
MAR											
06...	1200	5.6	68	64	6.4	7.9	11.0	760	6.0	11.0	100
APR											
11...	1225	6.9	59	57	7.0	7.4	18.0	755	83	9.2	98
MAY											
01...	1200	4.3	70	92	6.9	7.4	16.5	748	10	9.7	101
JUN											
05...	1200	3.8	64	62	6.4	7.2	16.5	750	16	11.0	114
JUL											
10...	1200	0.60	85	84	6.8	7.6	24.0	752	47	5.2	63
31...	1200	0.59	92	--	7.0	--	24.5	753	--	--	--
SEP											
04...	1230	1.5	79	77	7.0	7.4	20.0	757	6.0	7.7	85

DATE	OXYGEN DEMAND, BIO- CHEM- ICAL, 5 DAY (MG/L) (00310)	COLI- FORM, TOTAL, IMMED. (COLS. PER 100 ML) (31501)	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	HARD- NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	ALKA- LITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)
OCT											
18...	1.0	2300	K130	26	6.1	2.7	7.1	2.2	36	2.0	4.2
NOV											
16...	1.0	3300	K72	22	5.4	2.0	6.1	1.7	30	2.0	4.6
JAN											
10...	1.0	K640	K27	13	2.8	1.5	4.4	1.2	17	6.0	3.5
FEB											
06...	1.0	730	K90	17	4.0	1.8	5.6	1.1	20	4.0	3.8
MAR											
06...	1.0	360	K72	--	3.6	1.8	5.2	1.2	20	3.3	4.7
APR											
11...	--	2600	K90	15	3.3	1.6	4.8	0.10	18	3.2	3.3
MAY											
01...	1.0	3500	270	30	7.3	2.9	6.9	1.8	38	1.3	4.5
JUN											
05...	2.0	K1500	K820	18	4.2	1.9	5.3	1.4	24	2.2	1.9
JUL											
10...	1.0	2100	420	25	5.7	2.5	6.7	1.6	33	1.6	4.2
31...	2.0	K730	200	--	--	--	--	--	--	--	--
SEP											
04...	<1.0	K1200	K290	23	5.5	2.3	6.3	1.4	31	1.3	4.3

< Actual value is known to be less than the value shown.

K Results based on colony count outside the acceptance range (non-ideal colony count).

ROANOKE RIVER BASIN

313

02079880 PEA HILL CREEK AT ROUTE 665, NEAR GASBURG, VA--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	IRON, TOTAL RECOV- ERABLE (UG/L AS FE) (01045)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	MANGA- NESE, TOTAL RECOV- ERABLE (UG/L AS MN) (01055)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	CARBON, ORGANIC TOTAL (MG/L AS C) (00680)	PHENOLS TOTAL (UG/L) (32730)
OCT 18...	0.10	24	70	0.30	0.029	1000	310	80	81	3.9	5
NOV 16...	0.10	20	61	1.0	0.033	2000	630	100	88	5.1	2
JAN 10...	<0.10	15	45	0.30	0.025	1200	440	60	53	6.2	<1
FEB 06...	0.10	19	52	<0.20	0.021	1400	410	80	71	5.1	3
MAR 06...	<0.10	19	--	0.20	0.019	880	140	60	68	3.4	3
APR 11...	0.10	18	45	0.30	0.022	1100	84	60	59	--	<1
MAY 01...	<0.10	23	72	0.60	0.037	2100	1100	130	130	9.7	<3
JUN 05...	<0.10	20	52	0.60	0.037	2300	770	80	74	8.0	3
JUL 10...	<0.10	23	66	0.30	0.061	3800	300	140	140	5.0	3
JUL 31...	--	--	--	--	--	--	--	--	--	--	--
SEP 04...	<0.10	24	65	0.20	0.019	1600	960	120	98	4.5	1

< Actual value is known to be less than the value shown.

ROANOKE RIVER BASIN

0207988050 PEA HILL CREEK ABOVE ROUTE 667, NEAR GASBURG, VA

LOCATION.--Lat 36°34'33", long 77°52'15", Brunswick County, Hydrologic Unit 03010106, 1.5 mi northeast of Gasburg.

PERIOD OF RECORD.--October 1988 to September 1990 (discontinued).

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	TIME	SAM- PLING DEPTH (FEET) (00003)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)
OCT								
18...	0945	3.00	74	7.7	21.5	756	8.7	100
NOV								
16...	1300	3.00	79	7.3	16.5	745	9.6	101
JAN								
10...	1300	3.00	67	6.8	6.0	752	10.3	83
FEB								
06...	1315	3.00	90	6.5	10.0	764	--	--
MAR								
06...	1300	3.00	57	6.9	10.5	765	12.2	109
APR								
11...	1300	3.00	50	6.9	15.0	750	13.3	134
MAY								
01...	1300	3.00	60	7.2	22.5	756	10.0	116
JUN								
05...	1300	3.00	55	6.9	24.5	759	10.4	125
JUL								
10...	1300	3.00	72	7.7	30.5	758	8.3	111
31...	1300	3.00	65	8.2	30.0	755	9.0	120
SEP								
04...	1300	3.00	59	6.8	28.0	765	6.9	88

DATE	COLI- FORM, TOTAL, IMMED. (COLS. PER 100 ML) (31501)	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	NITRO- GEN, AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	CARBON, ORGANIC TOTAL (MG/L AS C) (00680)	CHLORO- PHYLL A FLUORO- METRIC METHOD CORR. (UG/L) (32209)	PHEOPHY- TIN A FLUORO- METRIC METHOD (UG/L) (32213)
OCT							
18...	26	K10	0.50	0.018	4.9	17.0	3.70
NOV							
16...	30	K4	0.50	0.027	5.2	12.9	12.8
JAN							
10...	K1900	53	0.50	0.025	6.3	11.3	4.20
FEB							
06...	K230	K4	0.40	0.020	6.4	20.6	7.40
MAR							
06...	240	K4	0.60	0.036	5.6	20.6	9.10
APR							
11...	K22	K5	0.50	0.042	8.1	23.9	14.0
MAY							
01...	240	K6	0.40	0.014	6.6	11.0	8.10
JUN							
05...	35	14	0.60	0.043	8.4	9.50	6.50
JUL							
10...	28	K2	1.0	0.033	7.9	7.40	31.5
31...	K36	K1	1.1	0.019	7.5	12.4	7.40
SEP							
04...	24	<1	0.60	0.017	8.1	18.7	6.00

< Actual value is known to be less than the value shown.

K Results based on colony count outside the acceptance range (non-ideal colony count).

ROANOKE RIVER BASIN

315

02079881 PEA HILL CREEK TRIBUTARY NO. 1, NEAR GASBURG, VA

LOCATION.--Lat 36°34'14", long 77°52'13", Brunswick County, Hydrologic Unit 03010106, 1.4 mi east of Gasburg.

PERIOD OF RECORD.--October 1988 to September 1990 (discontinued).

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	TIME	SAM- PLING DEPTH (FEET) (00003)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)
OCT								
18...	1000	3.00	75	7.8	22.0	756	9.0	103
NOV								
16...	1245	3.00	81	7.4	17.0	745	10.0	105
JAN								
10...	1245	3.00	55	6.6	15.0	752	9.8	98
FEB								
06...	1300	3.00	89	6.6	10.0	764	--	--
MAR								
06...	1245	3.00	61	7.0	10.0	765	12.0	106
APR								
11...	1245	3.00	56	7.0	15.0	750	13.8	139
MAY								
01...	1245	3.00	62	7.3	23.0	756	10.3	121
JUN								
05...	1245	3.00	60	6.9	24.0	760	10.5	125
JUL								
10...	1245	3.00	73	7.3	30.0	758	8.2	110
31...	1245	3.00	68	7.9	29.5	755	8.8	116
SEP								
04...	1245	3.00	61	6.8	27.5	765	6.9	87

DATE	COLI- FORM, TOTAL, IMMED. (COLS. PER 100 ML) (31501)	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	CARBON, ORGANIC TOTAL (MG/L AS C) (00680)	CHLORO- PHYLL A FLUORO- METRIC METHOD CORR. (UG/L) (32209)	PHEOPHY -TIN A FLUORO- METRIC METHOD (UG/L) (32213)
OCT							
18...	54	22	0.50	0.014	5.3	12.4	3.50
NOV							
16...	K180	K4	0.50	0.022	5.0	15.1	11.9
JAN							
10...	K900	K88	0.80	0.045	8.8	5.60	3.90
FEB							
06...	K120	K5	0.40	0.020	5.8	14.8	9.90
MAR							
06...	28	K4	0.50	0.032	6.1	22.8	10.2
APR							
11...	250	K5	0.60	0.031	7.4	22.5	24.6
MAY							
01...	34	K13	0.90	0.018	6.0	13.5	11.3
JUN							
05...	35	30	0.50	0.020	8.1	13.9	9.70
JUL							
10...	K65	K1	0.80	0.024	6.1	7.40	31.5
31...	K27	K2	0.70	0.016	6.9	1.40	--
SEP							
04...	K70	K19	0.70	0.009	7.1	18.4	7.30

K Results based on colony count outside the acceptance range (non-ideal colony count).

ROANOKE RIVER BASIN

0207988130 PEA HILL CREEK TRIBUTARY NO. 2, NEAR VALENTINES, VA

LOCATION.--Lat 36°34'08", long 77°51'37", Brunswick County, Hydrologic Unit 03010106, 2.0 mi southwest of Valentines.

PERIOD OF RECORD.--October 1988 to September 1990 (discontinued).

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	TIME	SAM- PLING DEPTH (FEET) (00003)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)
OCT								
18...	1015	3.00	78	7.6	21.5	756	8.8	100
NOV								
16...	1230	3.00	82	7.4	17.0	745	10.0	106
JAN								
10...	1230	3.00	72	6.7	5.5	752	10.8	87
FEB								
06...	1245	3.00	83	6.6	9.5	764	--	--
MAR								
06...	1230	3.00	64	7.0	10.5	765	11.6	104
APR								
11...	1230	3.00	60	7.1	15.0	750	14.0	141
MAY								
01...	1230	3.00	63	7.3	24.0	756	10.4	124
JUN								
05...	1230	3.00	64	6.7	23.5	760	10.0	118
JUL								
10...	1230	3.00	76	7.4	30.0	758	8.4	112
31...	1230	3.00	70	7.6	29.5	755	8.5	112
SEP								
04...	1230	3.00	65	6.8	27.5	765	6.9	87

DATE	COLI- FORM, TOTAL, IMMED. (COLS. PER 100 ML) (31501)	COLI- FORM, FECAL, 0.7 UM-MF (COLS. / 100 ML) (31625)	NITRO- GEN, AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	CARBON, ORGANIC TOTAL (MG/L AS C) (00680)	CHLORO- PHYLL A FLUORO- METRIC METHOD CORR. (UG/L) (32209)	PHEOPHY- TIN A FLUORO- METRIC METHOD (UG/L) (32213)
OCT							
18...	K1100	K1	0.50	0.013	5.9	17.3	7.40
NOV							
16...	K170	K17	0.40	0.024	4.7	13.8	15.6
JAN							
10...	2100	59	0.40	0.023	7.3	11.0	3.80
FEB							
06...	K91	K5	0.40	0.016	5.6	14.3	8.50
MAR							
06...	28	K3	0.60	0.034	5.9	25.6	4.10
APR							
11...	50	K4	0.50	0.031	7.5	27.2	16.3
MAY							
01...	33	K11	0.40	0.036	5.9	10.4	5.70
JUN							
05...	K150	33	0.60	0.018	7.1	23.9	7.10
JUL							
10...	K5	K4	0.60	0.016	6.6	16.5	3.30
31...	K13	K2	0.50	0.012	6.5	17.0	5.40
SEP							
04...	K24	K7	0.60	0.005	6.5	16.8	6.00

K Results based on colony count outside the acceptance range (non-ideal colony count).

ROANOKE RIVER BASIN

317

0207988160 PEA HILL CREEK TRIBUTARY NO. 3, NEAR VALENTINES, VA

LOCATION.--Lat 36°33'55", long 77°51'16", Brunswick County, Hydrologic Unit 03010106, 2.0 mi southwest of Valentines.

PERIOD OF RECORD.--October 1988 to September 1990 (discontinued).

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	TIME	SAM- PLING DEPTH (FEET) (00003)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)
OCT								
18...	1030	3.00	78	7.7	21.5	756	9.1	104
NOV								
16...	1215	3.00	81	7.3	17.0	745	9.9	105
JAN								
10...	1215	3.00	65	6.5	5.5	752	9.9	80
FEB								
06...	1230	3.00	69	6.6	9.5	764	--	--
MAR								
06...	1215	3.00	64	7.0	11.0	765	11.9	107
APR								
11...	1215	3.00	60	7.2	15.5	750	14.0	143
MAY								
01...	1215	3.00	65	7.3	24.0	756	10.3	123
JUN								
05...	1215	3.00	62	6.7	23.5	760	9.8	116
JUL								
10...	1215	3.00	78	7.3	31.0	758	8.1	109
31...	1215	3.00	70	7.4	29.5	755	8.3	110
SEP								
04...	1215	3.00	64	6.8	27.5	765	7.0	89

DATE	COLI- FORM, TOTAL, IMMED. (COLS. PER 100 ML) (31501)	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	CARBON, ORGANIC TOTAL (MG/L AS C) (00680)	CHLORO- PHYLL A FLUORO- METRIC METHOD CORR. (UG/L) (32209)	PHEOPHY- TIN A FLUORO- METRIC METHOD (UG/L) (32213)
OCT							
18...	46	K9	0.60	0.012	5.2	17.3	12.4
NOV							
16...	220	40	0.40	0.029	5.9	30.3	6.70
JAN							
10...	5700	310	0.50	0.034	8.1	7.10	1.80
FEB							
06...	K91	K4	0.60	0.020	5.5	19.5	6.50
MAR							
06...	K130	K13	0.50	0.031	5.8	14.6	6.90
APR							
11...	230	29	0.40	0.026	6.7	22.0	15.6
MAY							
01...	34	K12	0.50	0.036	5.5	9.60	6.90
JUN							
05...	96	K11	0.80	0.019	8.2	13.8	9.70
JUL							
10...	43	K9	0.70	0.016	6.2	12.9	4.60
31...	K5	K2	0.50	0.013	6.5	17.9	1.90
SEP							
04...	22	K13	0.50	0.003	6.2	14.6	10.2

K Results based on colony count outside the acceptance range (non-ideal colony count).

ROANOKE RIVER BASIN

02079883 PEA HILL CREEK TRIBUTARY NO. 4, NEAR VALENTINES, VA

LOCATION.--Lat 36°33'15", long 77°50'41", Brunswick County, Hydrologic Unit 03010106, 2.4 mi southwest of Valentines.

PERIOD OF RECORD.--October 1988 to September 1990 (discontinued).

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	TIME	SAM- PLING DEPTH (FEET) (00003)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)
OCT								
18...	1045	3.00	79	7.8	22.0	756	9.2	106
NOV								
16...	1200	3.00	86	7.7	17.0	745	10.1	107
JAN								
10...	1200	3.00	52	6.6	6.0	752	10.3	84
FEB								
06...	1215	3.00	71	6.7	9.5	764	--	--
MAR								
06...	1200	3.00	65	7.2	10.5	765	11.5	102
APR								
11...	1200	3.00	65	7.3	15.5	750	14.2	145
MAY								
01...	1200	3.00	68	7.0	24.5	756	10.1	122
JUN								
05...	1200	3.00	67	6.7	23.5	760	9.4	111
JUL								
10...	1200	3.00	83	7.3	30.5	758	8.0	108
31...	1200	3.00	75	7.2	30.0	755	8.1	108
SEP								
04...	1200	3.00	69	6.8	27.5	765	7.0	88

DATE	COLI- FORM, TOTAL, IMMED. (COLS. PER 100 ML) (31501)	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	CARBON, ORGANIC TOTAL (MG/L AS C) (00680)	CHLORO- PHYLL A FLUORO- METRIC METHOD CORR. (UG/L) (32209)	PHEOPHY- TIN A FLUORO- METRIC METHOD (UG/L) (32213)
OCT							
18...	24	K4	0.40	0.010	4.8	14.8	6.30
NOV							
16...	K73	K18	0.50	0.022	4.4	14.0	13.0
JAN							
10...	3300	K82	0.30	0.027	8.4	6.00	2.50
FEB							
06...	K73	K5	0.50	0.014	5.2	16.5	7.30
MAR							
06...	K170	K14	0.60	0.026	5.1	4.90	3.30
APR							
11...	K39	K5	0.40	0.022	5.8	19.5	15.5
MAY							
01...	41	K16	0.30	0.038	5.4	2.80	6.20
JUN							
05...	50	38	0.50	0.017	6.2	8.00	11.5
JUL							
10...	61	K4	0.40	0.009	5.8	9.90	5.30
31...	K14	K3	0.50	0.012	5.9	9.60	5.20
SEP							
04...	K23	K8	1.4	0.001	6.3	8.00	6.20

K Results based on colony count outside the acceptance range (non-ideal colony count).

ROANOKE RIVER BASIN

319

0207988430 PEA HILL CREEK TRIBUTARY NO. 4 TRIBUTARY, NEAR VALENTINES, VA

LOCATION.--Lat 36°32'48", long 77°50'58", Brunswick County, Hydrologic Unit 03010106, 3.0 mi southwest of Valentines.

PERIOD OF RECORD.--October 1988 to September 1990 (discontinued).

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	TIME	SAM- PLING DEPTH (FEET) (00003)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)
OCT								
18...	1100	3.00	79	8.0	22.0	756	9.4	108
NOV								
16...	1145	3.00	86	7.4	16.5	745	9.7	102
JAN								
10...	1145	3.00	66	6.9	5.5	752	10.4	84
FEB								
06...	1200	3.00	69	6.7	9.0	764	--	--
MAR								
06...	1145	3.00	67	7.1	9.5	765	11.6	101
APR								
11...	1145	3.00	65	7.3	15.0	750	14.0	141
MAY								
01...	1145	3.00	68	7.2	22.5	756	10.0	117
JUN								
05...	1145	3.00	68	7.0	24.5	760	9.0	109
JUL								
10...	1145	3.00	82	7.2	30.0	758	8.2	109
31...	1145	3.00	74	7.3	29.5	755	8.2	109
SEP								
04...	1145	3.00	69	6.9	27.5	765	7.0	88

DATE	COLI- FORM, TOTAL, IMMED. (COLS. PER 100 ML) (31501)	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	CARBON, ORGANIC TOTAL (MG/L AS C) (00680)	CHLORO- PHYLL A FLUORO- METRIC METHOD CORR. (UG/L) (32209)	PHEOPHY- TIN A FLUORO- METRIC METHOD (UG/L) (32213)
OCT							
18...	K21	K8	0.40	0.010	5.1	15.1	4.70
NOV							
16...	K130	K9	0.40	0.017	4.3	12.9	13.1
JAN							
10...	K700	K16	0.40	0.024	6.2	5.50	14.3
FEB							
06...	K130	K10	0.30	0.015	5.2	17.9	3.60
MAR							
06...	K190	K8	0.40	0.029	5.5	6.00	3.20
APR							
11...	K30	K14	0.30	0.022	6.1	24.5	17.4
MAY							
01...	34	28	0.40	0.012	5.8	7.70	10.4
JUN							
05...	--	--	0.40	0.023	6.7	5.80	6.10
JUL							
10...	K3	--	0.40	0.009	5.9	8.30	8.20
31...	K9	K5	0.60	0.011	6.2	4.10	5.80
SEP							
04...	K14	K13	1.4	0.001	5.7	14.6	2.60

K Results based on colony count outside the acceptance range (non-ideal colony count).

ROANOKE RIVER BASIN

0207988440 COLD SPRING BRANCH NEAR GASBURG, VA

LOCATION.--Lat 36°33'22", long 77°52'52", Brunswick County, Hydrologic Unit 03010106, 1.1 mi southeast of Gasburg.

PERIOD OF RECORD.--October 1988 to September 1990 (discontinued).

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	TIME	SAM- PLING DEPTH (FEET) (00003)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)
OCT								
18...	1115	3.00	82	7.8	22.0	756	9.2	106
NOV								
16...	1130	3.00	88	7.7	17.5	745	9.8	105
JAN								
10...	1130	3.00	75	7.0	5.5	752	10.3	83
FEB								
06...	1130	3.00	68	6.7	8.5	764	--	--
MAR								
06...	1130	3.00	81	7.2	11.0	765	11.5	104
APR								
11...	1130	3.00	74	7.4	15.5	750	14.6	149
MAY								
01...	1130	3.00	75	7.4	23.0	756	10.2	120
JUN								
05...	1130	3.00	75	7.2	22.5	760	10.0	116
JUL								
10...	1130	3.00	85	7.3	30.0	758	8.0	107
31...	1130	3.00	74	7.2	29.0	755	7.9	104
SEP								
04...	1130	3.00	73	6.9	27.5	765	6.6	83

DATE	COLI- FORM, TOTAL, IMMED. (COLS. PER 100 ML) (31501)	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	NITRO- GEN, AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	CARBON, ORGANIC TOTAL (MG/L AS C) (00680)	CHLORO- PHYLL A FLUORO- METRIC CORR. (UG/L) (32209)	PHEOPHY- TIN A FLUORO- METRIC METHOD (UG/L) (32213)
OCT							
18...	510	K3	0.40	0.011	4.4	16.2	1.30
NOV							
16...	K82	K12	0.50	0.020	4.5	8.00	12.2
JAN							
10...	K1400	49	0.40	0.024	6.8	8.70	1.90
FEB							
06...	K110	K5	0.30	0.012	4.2	7.10	10.7
MAR							
06...	39	K4	0.40	0.029	4.5	5.50	6.00
APR							
11...	72	K2	0.50	0.021	5.1	22.3	9.10
MAY							
01...	35	K13	0.50	0.060	4.7	7.10	7.40
JUN							
05...	K15	--	0.50	0.015	5.8	11.5	12.5
JUL							
10...	51	K4	0.40	0.012	5.6	15.9	3.80
31...	K6	K4	0.50	0.012	5.9	10.4	4.70
SEP							
04...	260	K4	0.50	<0.001	4.2	16.5	5.90

< Actual value is known to be less than the value shown.

K Results based on colony count outside the acceptance range (non-ideal colony count).

ROANOKE RIVER BASIN

321

0207988450 PEA HILL CREEK ABOVE NC STATELINE, NEAR GASBURG, VA

LOCATION.--Lat 36°32'43", long 77°51'52", Brunswick County, Hydrologic Unit 03010106, in Pea Hill Creek Arm of Lake Gaston, 0.1 mi north of North Carolina stateline, and 2.3 mi southeast of Gasburg.

PERIOD OF RECORD.--August 1987 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	TIME	SAM- PLING DEPTH (FEET) (000003)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (000095)	SPE- CIFIC CON- DUCT- ANCE LAB (US/CM) (900095)	PH (STAND- ARD UNITS) (000400)	PH LAB (STAND- ARD UNITS) (000403)	TEMPER- ATURE WATER (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (000025)	TUR- BID- ITY (NTU) (000076)	OXYGEN, DIS- SOLVED (MG/L) (000300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (000301)	OXYGEN DEMAND, BIO- CHEM- ICAL, 5 DAY (MG/L) (000310)
OCT												
19...	1115	3.00	82	93	7.2	7.7	20.0	752	1.8	7.5	84	1.0
19...	1130	12.0	81	92	7.2	7.5	20.0	752	2.0	7.3	81	1.0
19...	1145	21.0	81	91	7.1	7.8	20.0	752	2.1	7.0	78	1.0
19...	1200	27.0	82	91	7.0	7.6	20.0	752	3.2	6.4	71	1.0
NOV												
17...	1015	3.00	90	92	7.3	7.5	15.5	759	3.5	9.4	95	1.0
17...	1030	12.0	90	92	7.3	7.6	15.5	759	3.8	9.3	94	1.0
17...	1045	21.0	90	92	7.3	7.7	15.5	759	4.0	9.7	98	1.0
17...	1100	30.0	90	92	7.3	8.1	15.5	759	4.0	9.6	97	1.0
JAN												
11...	0945	3.00	82	84	7.3	7.5	5.0	752	1.8	10.7	84	2.0
11...	1000	12.0	82	83	7.3	7.3	5.0	752	2.5	10.8	85	2.0
11...	1015	21.0	82	84	7.3	7.4	5.0	752	4.1	10.8	85	2.0
11...	1030	25.0	82	85	7.3	7.4	5.0	752	3.0	10.8	85	2.0
FEB												
07...	1015	3.00	83	91	7.1	7.9	9.0	758	3.0	10.5	91	1.0
07...	1030	12.0	84	89	7.1	7.8	8.5	758	3.9	10.5	91	2.0
07...	1045	21.0	84	88	7.1	7.6	8.5	758	3.5	10.5	90	1.0
07...	1100	27.0	84	89	7.1	7.5	8.5	758	4.5	10.5	90	1.0
MAR												
07...	0945	3.00	83	81	7.1	7.7	9.5	775	7.1	11.0	95	1.0
07...	1000	12.0	82	80	7.1	7.6	9.5	775	6.1	10.9	94	2.0
07...	1015	21.0	83	84	7.1	7.4	9.5	775	6.9	10.9	94	2.0
07...	1030	28.0	86	83	7.1	7.8	9.5	775	7.0	11.0	94	1.0
APR												
12...	0945	3.00	75	78	7.2	7.6	14.0	760	3.8	14.0	137	2.0
12...	1000	12.0	74	78	7.2	7.4	14.0	760	4.4	13.9	136	2.0
12...	1015	21.0	74	79	7.2	7.3	14.0	760	5.4	13.6	133	2.0
12...	1030	25.0	77	80	7.0	7.3	14.0	760	7.8	12.7	124	2.0
MAY												
02...	0945	3.00	75	76	7.7	7.6	22.5	758	2.1	10.3	120	2.0
02...	1000	12.0	83	85	7.4	7.6	19.0	758	3.0	10.3	111	2.0
02...	1015	21.0	80	83	6.9	7.3	16.0	758	2.4	7.3	75	1.0
02...	1030	25.0	82	84	6.8	7.2	16.0	758	3.5	6.0	61	1.0
JUN												
06...	0945	3.00	77	79	7.5	7.8	23.0	760	2.9	10.4	121	2.0
06...	1000	12.0	76	79	7.6	8.0	23.0	760	2.4	10.3	120	2.0
06...	1015	21.0	77	77	6.5	7.5	20.5	760	4.5	4.4	49	1.0
06...	1030	27.0	78	82	6.4	7.7	20.0	760	4.5	2.7	30	1.0
JUL												
11...	0945	3.00	85	83	7.5	7.6	29.5	756	3.4	7.9	105	1.0
11...	1000	12.0	83	84	7.1	7.6	28.0	756	3.7	4.2	54	1.0
11...	1015	21.0	91	91	6.5	7.5	24.5	756	5.8	0	0	1.0
11...	1030	25.0	102	93	6.6	7.5	23.0	756	7.3	0	0	5.0
AUG												
01...	0945	3.00	75	86	7.2	7.8	28.0	758	2.0	7.2	92	1.0
01...	1000	12.0	77	85	7.1	7.6	27.5	758	2.3	5.4	69	2.0
01...	1015	21.0	78	104	6.6	7.3	26.5	758	5.4	0.5	6	2.0
01...	1030	25.0	94	89	6.7	7.0	25.5	758	2.3	0	0	4.0
SEP												
05...	0945	3.00	74	81	6.9	7.7	27.0	760	1.7	6.0	76	1.0
05...	1000	12.0	74	83	7.0	8.0	27.0	760	2.5	5.9	74	1.0
05...	1015	21.0	77	83	6.8	7.1	26.5	760	2.7	1.8	23	1.0
05...	1030	26.0	78	85	6.6	6.9	26.5	760	3.1	1.0	12	2.0

ROANOKE RIVER BASIN

0207988450 PEA HILL CREEK ABOVE NC STATELINE, NEAR GASBURG, VA--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	COLI-FORM, TOTAL, IMMEDIATE (COLS. PER 100 ML) (31501)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./100 ML) (31625)	HARDNESS TOTAL (MG/L AS CaCO3) (00900)	CALCIUM DIS-SOLVED (MG/L AS Ca) (00915)	MAGNESIUM DIS-SOLVED (MG/L AS Mg) (00925)	SODIUM DIS-SOLVED (MG/L AS Na) (00930)	POTASSIUM DIS-SOLVED (MG/L AS K) (00935)	ALKALINITY LAB (MG/L AS CaCO3) (90410)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLORIDE DIS-SOLVED (MG/L AS Cl) (00940)	FLUORIDE DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SiO2) (00955)
OCT												
19...	340	K5	27	6.4	2.7	6.3	2.2	26	8.0	5.8	0.10	7.5
19...	--	--	29	7.0	2.8	6.4	2.2	26	7.0	5.8	0.10	7.2
19...	--	--	26	6.2	2.6	6.2	2.2	26	8.0	5.7	0.10	7.1
19...	--	--	26	6.2	2.5	6.2	2.1	26	7.0	5.7	0.10	7.1
NOV												
17...	220	K2	26	6.4	2.5	6.2	2.2	26	8.0	6.2	0.10	6.4
17...	--	--	26	6.4	2.4	6.2	2.3	26	8.0	6.0	0.10	6.3
17...	--	--	26	6.3	2.4	6.2	2.4	26	8.0	5.7	0.10	6.1
17...	--	--	26	6.3	2.4	6.3	2.3	26	8.0	5.7	0.10	6.1
JAN												
11...	K100	K4	24	5.6	2.4	5.8	2.1	24	8.0	5.4	0.10	7.1
11...	--	--	24	5.7	2.3	5.8	2.1	23	7.0	5.3	0.10	7.1
11...	--	--	24	5.7	2.3	5.9	2.2	23	8.0	5.3	0.10	7.1
11...	--	--	23	5.6	2.3	5.9	2.2	23	8.0	5.4	0.10	7.1
FEB												
07...	23	K5	24	5.9	2.3	6.0	2.1	24	8.0	5.4	0.10	8.4
07...	--	--	25	6.1	2.4	6.5	2.0	22	8.0	5.4	0.10	8.4
07...	--	--	24	5.7	2.4	5.9	1.6	24	8.0	5.4	0.10	8.0
07...	--	--	25	5.9	2.4	6.2	1.7	24	8.0	5.3	0.10	8.1
MAR												
07...	K11	K3	--	5.5	2.1	5.8	1.9	20	7.2	6.4	<0.10	8.7
07...	--	--	--	6.3	2.4	6.1	2.1	21	7.1	6.3	<0.10	8.8
07...	--	--	23	5.4	2.2	5.6	2.1	22	7.1	6.5	<0.10	8.7
07...	--	--	--	5.8	2.3	5.8	1.9	22	7.2	6.5	<0.10	8.6
APR												
12...	K120	K4	22	5.3	2.2	5.4	1.8	22	6.7	5.5	0.10	9.0
12...	--	--	22	5.4	2.1	5.3	1.8	22	6.8	5.5	0.10	9.0
12...	--	--	23	5.4	2.2	5.3	1.8	22	6.7	5.3	<0.10	9.2
12...	--	--	23	5.5	2.3	5.4	1.8	22	6.9	5.3	<0.10	9.2
MAY												
02...	K260	K3	21	5.1	2.1	5.2	1.7	22	6.8	5.3	0.20	8.4
02...	--	--	25	5.9	2.4	5.5	1.7	26	6.9	6.1	0.20	9.5
02...	--	--	24	5.8	2.3	5.5	1.7	24	7.3	5.6	0.20	9.4
02...	--	--	24	5.8	2.4	5.4	1.8	23	7.2	5.5	0.20	9.5
JUN												
06...	26	K8	24	5.8	2.3	5.4	1.7	25	6.4	6.0	<0.10	7.8
06...	--	--	24	5.8	2.3	5.4	1.7	25	6.7	6.2	<0.10	8.1
06...	--	--	25	5.9	2.4	5.4	1.8	25	6.3	6.1	<0.10	9.2
06...	--	--	24	5.8	2.3	5.3	1.7	25	6.2	6.1	<0.10	9.8
JUL												
11...	21	K2	24	5.9	2.3	5.6	1.8	26	6.2	5.9	<0.10	7.3
11...	--	--	25	5.9	2.4	5.5	1.8	27	6.1	6.1	<0.10	7.4
11...	--	--	27	6.7	2.6	5.7	1.8	29	5.3	6.4	0.30	9.4
11...	--	--	28	6.8	2.6	5.7	1.9	33	3.9	6.3	0.10	11
AUG												
01...	K8	K2	25	5.9	2.6	5.7	1.9	27	6.2	5.9	0.30	7.9
01...	--	--	25	5.9	2.5	5.6	1.8	27	6.0	5.7	0.30	7.7
01...	--	--	31	7.9	2.7	5.8	2.0	36	6.1	6.1	0.30	10
01...	--	--	25	5.8	2.6	5.7	2.0	26	4.6	6.0	0.30	9.4
SEP												
05...	K5	K1	24	5.6	2.4	5.7	1.8	26	5.7	5.9	<0.10	8.1
05...	--	--	24	5.5	2.5	5.7	1.9	26	5.7	5.8	<0.10	7.9
05...	--	--	24	5.5	2.6	5.6	1.8	25	5.7	5.8	<0.10	8.2
05...	--	--	25	5.7	2.5	5.5	1.8	26	5.3	5.9	<0.10	9.0

< Actual value is known to be less than the value shown.

K Results based on colony count outside the acceptance range (non-ideal colony count).

ROANOKE RIVER BASIN

323

0207988450 PEA HILL CREEK ABOVE NC STATELINE, NEAR GASBURG, VA--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L) (70301)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L) AS N (00625)	PHOS- PHORUS TOTAL (MG/L) AS P (00665)	IRON, TOTAL RECOV- ERABLE (UG/L) AS FE (01045)	IRON, DIS- SOLVED (UG/L) AS FE (01046)	MANGA- NESE, TOTAL RECOV- ERABLE (UG/L) AS MN (01055)	MANGA- NESE, DIS- SOLVED (UG/L) AS MN (01056)	CARBON, ORGANIC TOTAL (MG/L) AS C (00680)	CHLORO- PHYLL A FLUORO- METRIC METHOD CORR. (UG/L) (32209)	PHEOPHY -TIN A FLUORO- METRIC METHOD (UG/L) (32213)	PHENOLS TOTAL (UG/L) (32730)
OCT											
19...	55	0.40	0.013	180	100	50	6	--	8.00	2.60	--
19...	54	0.50	0.010	180	62	50	3	4.2	14.6	3.60	1
19...	54	0.50	0.010	190	33	50	3	--	15.1	3.70	--
19...	53	0.50	0.010	250	41	60	8	4.1	14.3	3.20	1
NOV											
17...	54	0.40	0.017	250	35	60	3	--	10.2	14.6	--
17...	53	0.40	0.018	210	37	50	2	4.2	14.3	15.1	2
17...	53	0.40	0.018	310	31	50	1	--	12.1	22.2	--
17...	53	0.40	0.018	340	34	50	2	4.5	12.9	21.7	3
JAN											
11...	51	0.30	0.012	300	79	50	26	--	10.7	6.10	--
11...	49	0.50	0.012	350	76	60	25	4.3	11.0	5.50	<1
11...	50	0.50	0.011	330	73	60	26	--	10.9	5.80	--
11...	50	0.50	0.019	350	76	60	26	4.5	11.8	5.30	<1
FEB											
07...	53	0.30	0.015	280	100	40	3	--	13.2	10.6	--
07...	52	0.20	0.014	290	67	30	<1	4.2	14.3	4.80	1
07...	52	0.30	0.013	290	51	40	<1	--	11.0	11.4	--
07...	52	0.30	0.017	340	53	40	2	4.1	11.8	8.60	12
MAR											
07...	--	0.40	0.022	390	99	40	3	--	17.0	7.00	--
07...	--	0.50	0.024	500	68	40	11	4.8	17.9	7.90	<1
07...	51	1.0	0.027	400	130	40	3	--	19.3	5.50	--
07...	--	0.50	0.025	490	100	40	5	4.1	18.7	6.00	7
APR											
12...	49	0.40	0.021	340	90	40	<1	--	25.0	8.60	--
12...	49	1.0	0.018	440	78	50	1	4.7	25.6	9.70	<1
12...	49	0.40	0.020	510	110	50	6	--	26.9	9.30	--
12...	50	0.50	0.023	640	100	60	12	4.6	24.2	9.10	1
MAY											
02...	48	0.40	0.014	170	26	20	<1	--	11.8	3.00	--
02...	54	0.40	0.023	200	28	20	<1	3.9	23.4	14.6	1
02...	52	0.50	0.010	230	29	40	8	--	7.40	11.1	--
02...	52	0.30	0.018	330	28	90	23	4.2	6.90	10.3	3
JUN											
06...	50	<0.20	0.007	140	17	30	<1	--	19.8	9.20	--
06...	51	<0.20	0.015	220	42	40	<1	5.1	23.4	10.6	2
06...	52	0.90	0.012	350	49	120	11	--	15.4	9.70	--
06...	52	0.30	0.018	600	91	240	160	4.6	10.2	10.3	2
JUL											
11...	51	0.40	0.008	160	17	140	11	--	16.5	4.90	--
11...	51	0.30	0.010	210	20	70	6	5.1	33.8	6.40	2
11...	58	0.60	0.011	1000	1100	800	840	--	3.30	6.90	--
11...	63	0.80	0.016	4000	3900	1000	1100	5.5	4.40	8.80	3
AUG											
01...	53	0.20	0.009	130	16	80	18	--	16.5	7.60	--
01...	52	0.20	0.012	140	14	60	5	4.7	18.7	6.00	5
01...	64	0.30	0.009	280	28	410	420	--	4.40	5.20	--
01...	54	0.70	0.008	2000	1600	1300	1400	5.5	2.60	6.30	5
SEP											
05...	51	0.50	0.001	170	25	100	28	--	11.3	4.20	--
05...	51	0.40	0.004	140	27	70	5	4.7	12.9	6.20	3
05...	50	0.40	0.001	340	42	240	170	--	8.80	3.70	--
05...	52	0.80	<0.001	780	150	570	600	4.9	5.50	2.70	2

< Actual value is known to be less than the value shown.

ROANOKE RIVER BASIN

0207988490 LAKE GASTON (PEA HILL CREEK) NEAR HENRICO, NC

LOCATION.--Lat 36°31'38", long 77°52'11", Northampton County, Hydrologic Unit 03010106, 1.1 mi southwest of Henrico.

PERIOD OF RECORD.--October 1988 to September 1990 (discontinued).

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	TIME	SAM- PLING DEPTH (FEET) (000003)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	SPE- CIFIC CON- DUCT- ANCE LAB (US/CM) (90095)	PH (STAND- ARD UNITS) (00400)	PH LAB (STAND- ARD UNITS) (00403)	TEMPER- ATURE WATER (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	TUR- BID- ITY (NTU) (00076)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	COLI- FORM, TOTAL, IMMED. PER (COLS. 100 ML) (31501)
OCT												
18...	1200	3.00	84	95	7.7	7.5	21.0	756	1.6	8.7	99	K26
18...	1215	12.0	85	96	7.3	7.7	20.5	756	2.1	7.5	84	--
18...	1230	21.0	85	96	7.1	7.8	20.0	756	2.0	6.8	76	--
18...	1245	40.0	82	93	6.8	8.0	19.5	756	5.7	3.7	41	--
NOV												
17...	1115	3.00	91	94	7.1	7.5	15.0	757	4.1	8.8	88	K150
17...	1130	12.0	92	94	7.2	7.5	15.0	757	4.4	8.7	87	--
17...	1145	21.0	92	93	7.2	7.5	15.0	757	4.2	8.7	87	--
17...	1200	40.0	92	81	7.2	7.2	15.0	757	5.8	9.0	90	--
JAN												
10...	1000	3.00	89	93	7.4	7.7	5.0	752	1.4	11.2	89	23
10...	1015	12.0	90	92	7.5	7.4	5.0	752	2.2	11.3	90	--
10...	1030	21.0	90	92	7.5	7.4	5.0	752	1.0	11.4	90	--
10...	1045	40.0	90	92	7.6	7.5	5.0	752	1.8	11.7	92	--
FEB												
06...	1000	3.00	88	94	6.8	7.9	8.5	765	3.0	13.6	115	20
06...	1015	12.0	89	95	7.0	7.8	8.5	765	3.6	13.7	116	--
06...	1030	21.0	89	96	7.1	7.9	8.5	765	2.6	14.3	122	--
06...	1045	39.0	90	96	7.0	7.8	8.0	765	4.1	14.4	121	--
MAR												
06...	1000	3.00	87	89	7.7	8.0	10.5	765	5.8	11.7	104	27
06...	1015	12.0	87	91	7.6	8.0	10.0	765	6.4	11.6	102	--
06...	1030	21.0	87	89	7.6	8.1	10.0	765	5.7	11.3	99	--
06...	1045	42.0	90	88	7.4	7.8	9.5	765	13	10.9	95	--
APR												
11...	1000	3.00	78	82	7.6	7.5	14.5	750	5.0	13.8	138	230
11...	1015	12.0	78	82	7.6	7.8	14.5	750	3.4	13.7	137	--
11...	1030	21.0	78	82	7.6	7.5	14.5	750	5.0	13.7	137	--
11...	1045	38.0	78	82	7.4	7.6	14.0	750	5.8	13.6	134	--
MAY												
01...	1000	3.00	79	80	8.2	8.0	21.5	756	3.0	10.7	122	200
01...	1015	12.0	83	84	7.8	7.8	19.5	756	1.5	10.5	115	--
01...	1030	21.0	82	85	7.3	7.3	16.5	756	2.4	8.4	87	--
01...	1045	40.0	86	88	7.0	7.2	15.0	756	2.5	5.2	52	--
JUN												
05...	1000	3.00	79	83	7.3	7.3	22.5	759	2.4	10.4	121	K14
05...	1015	12.0	79	89	7.4	6.9	22.5	759	6.3	10.1	118	--
05...	1030	21.0	80	82	6.8	8.0	21.0	759	2.9	7.5	84	--
05...	1045	40.0	85	82	6.4	8.1	18.5	759	3.1	0.6	6	--
JUL												
10...	1000	3.00	84	93	7.6	7.4	28.5	757	4.8	7.7	100	230
10...	1015	12.0	86	99	7.0	7.1	27.0	757	9.3	4.2	53	--
10...	1030	21.0	89	87	6.5	7.5	24.0	757	3.1	0	0	--
10...	1045	40.0	107	89	6.8	7.4	19.5	757	2.0	0	0	--
31...	1000	3.00	77	87	7.8	7.6	28.5	750	1.0	8.1	107	--
31...	1015	12.0	78	88	7.1	7.4	27.5	750	1.9	6.0	78	--
31...	1030	21.0	79	90	6.6	7.0	26.5	750	1.9	1.8	23	--
31...	1045	40.0	103	101	6.7	6.8	20.0	750	5.7	0	0	--
SEP												
04...	1000	3.00	77	84	7.7	7.6	27.5	765	2.0	7.0	88	K10
04...	1015	12.0	77	84	7.5	7.5	27.5	765	2.0	6.8	86	--
04...	1030	21.0	78	85	7.2	7.1	27.0	765	2.0	3.7	46	--
04...	1045	39.0	122	117	7.0	6.9	22.5	765	5.5	0	0	--

K Results based on colony count outside the acceptance range (non-ideal colony count).

ROANOKE RIVER BASIN

325

0207988490 LAKE GASTON (PEA HILL CREEK) NEAR HENRICO, NC--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	COLI-FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	HARD- NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)
OCT											
18...	K1	28	6.6	2.7	7.3	2.3	28	8.0	5.6	0.10	7.6
18...	--	28	6.6	2.7	7.1	2.2	27	8.0	5.6	0.10	7.8
18...	--	28	6.7	2.7	7.2	2.3	27	8.0	5.6	0.10	7.8
18...	--	26	6.2	2.6	6.9	2.1	26	8.0	5.4	0.10	7.5
NOV											
17...	K17	26	6.4	2.4	6.3	2.4	26	8.0	5.9	0.10	6.5
17...	--	26	6.6	2.4	6.5	2.5	26	8.0	5.9	0.10	6.6
17...	--	27	6.4	2.6	6.2	2.2	26	8.0	5.8	0.10	7.2
17...	--	27	6.4	2.6	6.1	2.2	26	8.0	5.7	0.10	7.2
JAN											
10...	K2	28	6.6	2.7	6.4	2.1	26	8.0	5.8	0.10	7.8
10...	--	28	6.6	2.7	6.3	2.3	26	8.0	5.8	0.10	7.8
10...	--	28	6.6	2.7	6.3	2.3	26	8.0	5.7	0.10	7.8
10...	--	28	6.6	2.7	6.3	2.3	26	8.0	5.8	0.10	7.8
FEB											
06...	K4	27	6.5	2.6	6.4	2.5	25	8.0	6.1	0.10	8.9
06...	--	27	6.5	2.6	6.4	2.2	25	8.0	6.0	0.10	8.9
06...	--	27	6.5	2.6	6.3	2.2	25	8.0	5.8	0.10	9.0
06...	--	28	6.6	2.7	6.4	2.2	26	8.0	5.9	0.10	9.2
MAR											
06...	K1	--	5.9	2.4	5.8	2.0	23	7.7	6.8	<0.10	8.8
06...	--	--	6.0	2.5	5.9	1.9	23	7.5	6.5	<0.10	8.8
06...	--	--	5.9	2.4	5.9	2.1	22	7.5	6.6	<0.10	8.6
06...	--	--	--	--	--	--	24	7.8	6.7	<0.10	--
APR											
11...	<1	23	5.5	2.3	5.4	1.8	22	7.1	5.2	0.10	8.3
11...	--	23	5.5	2.3	5.5	1.8	23	7.1	5.1	0.10	8.2
11...	--	24	5.6	2.4	5.5	1.8	22	7.3	5.8	0.10	8.3
11...	--	24	5.7	2.3	5.4	1.8	22	7.2	5.0	<0.10	8.3
MAY											
01...	K10	23	5.5	2.3	5.4	1.6	23	7.2	5.3	<0.10	8.4
01...	--	25	6.0	2.5	5.6	1.7	24	7.0	4.5	<0.10	9.4
01...	--	25	6.0	2.5	5.6	1.7	24	6.9	6.1	<0.10	9.4
01...	--	25	6.1	2.4	5.5	1.6	24	7.5	5.6	0.10	9.9
JUN											
05...	K3	25	6.0	2.4	5.6	1.7	26	6.5	6.3	<0.10	8.9
05...	--	26	6.4	2.5	5.5	1.9	26	6.2	6.2	<0.10	11
05...	--	25	5.9	2.4	5.5	1.6	25	6.1	6.0	0.10	7.9
05...	--	24	5.9	2.3	5.5	1.7	25	6.1	5.8	0.10	8.1
JUL											
10...	K12	27	6.5	2.5	5.7	1.8	28	6.1	5.9	<0.10	9.4
10...	--	27	6.7	2.6	5.6	1.9	33	3.8	5.9	<0.10	12
10...	--	25	6.0	2.4	5.7	1.8	26	6.3	5.9	0.10	7.2
10...	--	26	6.2	2.6	5.7	1.8	27	6.2	6.1	<0.10	8.3
31...	--	27	6.3	2.7	5.8	1.9	28	6.1	5.6	0.30	7.8
31...	--	27	6.4	2.7	5.8	1.9	27	6.5	6.0	0.30	8.2
31...	--	28	6.5	2.8	5.9	1.9	27	6.2	6.0	<0.10	9.2
31...	--	30	7.4	2.8	5.8	2.0	37	2.9	6.0	<0.10	12
SEP											
04...	K1	25	5.7	2.6	5.7	1.9	26	6.0	6.4	<0.10	8.0
04...	--	25	5.7	2.5	5.8	1.8	26	6.0	6.2	<0.10	7.9
04...	--	25	5.8	2.6	5.8	2.0	27	5.8	6.2	<0.10	8.6
04...	--	35	9.2	2.8	5.8	2.3	48	1.5	6.4	<0.10	13

< Actual value is known to be less than the value shown.

K Results based on colony count outside the acceptance range (non-ideal colony count).

ROANOKE RIVER BASIN

0207988490 LAKE GASTON (PEA HILL CREEK) NEAR HENRICO, NC--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L) (70301)	NITRO- GEN, AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	IRON, TOTAL RECOV- ERABLE (UG/L AS FE) (01045)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	MANGA- NESE, TOTAL RECOV- ERABLE (UG/L AS MN) (01055)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	CARBON, ORGANIC TOTAL (MG/L AS C) (00680)	CHLORO- PHYLL A FLUORO- METRIC METHOD CORR. (UG/L) (32209)	PHEOPHY- TIN A FLUORO- METRIC METHOD (UG/L) (32213)	PHENOLS TOTAL (UG/L) (32730)
OCT											
18...	57	0.40	0.014	150	26	30	2	--	23.4	11.3	--
18...	56	0.50	0.010	230	37	40	<1	4.4	9.30	3.50	<1
18...	57	0.50	0.010	240	27	40	<1	--	8.30	5.60	--
18...	54	0.50	0.017	470	27	120	46	4.6	8.00	8.50	<1
NOV											
17...	54	0.30	0.022	300	41	50	2	--	8.50	8.60	--
17...	54	0.40	0.018	370	55	60	5	4.4	11.3	5.90	3
17...	54	0.40	0.017	400	31	60	3	--	10.2	9.00	--
17...	54	0.60	0.018	520	50	70	12	4.7	15.4	6.00	3
JAN											
10...	55	0.30	0.014	150	39	60	5	--	7.10	2.70	--
10...	55	0.50	0.012	170	37	70	4	4.3	7.80	4.00	<1
10...	55	0.70	0.012	160	35	60	4	--	5.60	8.40	--
10...	55	0.30	0.013	170	36	60	4	4.2	8.50	3.40	<1
FEB											
06...	56	0.40	0.017	250	74	40	<1	--	7.40	3.50	--
06...	56	0.40	0.013	270	77	40	<1	4.8	8.30	9.90	1
06...	56	0.40	0.015	290	79	40	1	--	9.30	3.20	--
06...	57	0.20	0.016	360	68	40	2	3.8	10.4	3.40	3
MAR											
06...	--	0.90	0.026	300	130	30	2	--	10.2	9.00	--
06...	--	0.40	0.022	300	100	20	<1	3.9	9.60	7.90	5
06...	--	0.40	0.126	310	48	30	<1	--	11.0	7.10	--
06...	--	0.40	0.028	860	--	40	--	3.9	8.30	6.60	13
APR											
11...	49	0.50	0.019	470	98	40	2	--	18.1	7.60	--
11...	49	0.40	0.018	410	80	30	<1	--	16.8	7.60	<1
11...	50	0.40	0.016	420	48	40	<1	--	17.9	7.90	--
11...	49	0.60	0.022	500	98	40	2	4.4	16.2	11.5	<1
MAY											
01...	50	0.40	0.013	180	32	20	1	--	1.90	4.00	--
01...	51	0.70	0.014	200	50	20	<1	4.2	9.60	12.8	1
01...	53	0.30	0.012	230	39	20	1	--	1.90	5.70	--
01...	53	0.30	0.018	380	35	100	42	4.0	1.40	6.90	3
JUN											
05...	53	0.40	0.011	180	20	70	2	--	2.50	6.40	--
05...	56	0.70	0.013	510	77	710	700	5.0	7.10	7.00	4
05...	51	0.50	0.012	130	15	30	1	--	6.90	9.30	--
05...	51	0.40	0.013	110	14	30	1	4.8	0.800	5.80	3
JUL											
10...	56	0.60	0.010	250	110	780	800	--	1.60	3.10	--
10...	63	1.3	0.014	3800	3800	1400	1400	5.5	6.90	3.40	3
10...	51	0.50	0.006	80	17	30	3	--	0.500	5.70	--
10...	53	0.50	0.008	120	29	50	4	4.3	1.40	9.20	2
31...	53	0.30	0.008	90	22	50	3	--	2.60	3.30	--
31...	54	0.30	0.006	120	19	70	2	4.6	6.00	5.20	1
31...	55	0.60	0.009	230	39	290	140	--	1.00	4.80	--
31...	68	1.1	0.010	5400	5000	1600	1600	6.2	0.800	11.1	2
SEP											
04...	52	0.50	0.003	120	19	60	4	--	11.0	8.80	--
04...	52	0.30	<0.001	180	10	60	2	4.8	3.80	5.40	1
04...	53	0.50	0.009	150	16	110	21	--	2.80	1.50	--
04...	79	1.8	0.013	7100	6700	2700	2700	7.4	11.8	2.00	2

< Actual value is known to be less than the value shown.

ROANOKE RIVER BASIN

327

0207988510 LAKE GASTON TRIBUTARY NEAR TILLANS CHAPEL, NEAR ELAMS, NC

LOCATION.--Lat 36°32'03", long 77°53'15", Northampton County, Hydrologic Unit 03010106, 0.5 mi north of Tillans Chapel.

PERIOD OF RECORD.--October 1988 to September 1990 (discontinued).

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	TIME	SAM- PLING DEPTH (FEET) (000003)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (000095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)
OCT								
18...	1130	3.00	84	7.9	21.5	756	9.2	105
NOV								
16...	1100	3.00	90	7.7	17.5	745	9.8	105
JAN								
10...	1115	3.00	80	7.3	5.5	752	11.3	91
FEB								
06...	1115	3.00	64	6.8	8.5	764	--	--
MAR								
06...	1115	3.00	83	7.4	10.5	765	11.9	106
APR								
11...	1115	3.00	76	7.5	15.0	750	14.6	147
MAY								
01...	1115	3.00	78	7.7	22.0	756	10.8	125
JUN								
05...	1115	3.00	77	7.6	23.0	759	10.7	125
JUL								
10...	1115	3.00	87	7.2	28.5	758	7.3	95
31...	1115	3.00	75	7.4	29.0	755	8.0	105
SEP								
04...	1115	3.00	79	7.2	27.5	765	7.2	91

DATE	COLI- FORM, TOTAL, IMMED. (COLS. 100 ML) (31501)	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	NITRO- GEN, AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	CARBON, ORGANIC TOTAL (MG/L AS C) (00680)	CHLORO- PHYLL A FLUORO- METRIC METHOD CORR. (UG/L) (32209)	PHEOPHY- -TIN A FLUORO- METRIC METHOD (UG/L) (32213)
OCT							
18...	310	K2	0.40	0.012	4.2	12.6	4.50
NOV							
16...	K130	K4	0.40	0.015	4.2	7.10	10.0
JAN							
10...	K1900	21	0.40	0.019	4.2	8.30	2.60
FEB							
06...	K150	K2	0.50	0.014	4.0	8.00	8.20
MAR							
06...	220	K1	0.50	0.022	4.3	6.00	1.50
APR							
11...	650	K3	0.50	0.022	4.9	21.4	9.20
MAY							
01...	46	K13	0.40	0.014	4.5	3.80	5.70
JUN							
05...	K14	K7	0.40	0.010	4.9	5.50	6.70
JUL							
10...	39	K4	0.60	0.011	4.9	10.4	6.00
31...	K4	K3	0.90	0.010	5.1	6.70	4.80
SEP							
04...	K73	K14	0.90	0.001	4.8	10.2	5.70

K Results based on colony count outside the acceptance range (non-ideal colony count).

ROANOKE RIVER BASIN

0207988550 PEA HILL CREEK TRIBUTARY NO. 5, NEAR HENRICO, NC

LOCATION.--Lat 36°31'38", long 77°51'11", Northampton County, Hydrologic Unit 03010106, 1.2 mi west of Henrico.

PERIOD OF RECORD.--October 1988 to September 1990 (discontinued).

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	TIME	SAM- PLING DEPTH (FEET) (00003)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)
OCT								
18...	1145	3.00	87	7.6	21.5	756	8.6	98
NOV								
16...	1045	3.00	90	7.5	17.5	745	9.2	99
JAN								
10...	1100	3.00	87	7.3	5.0	752	11.4	90
FEB								
06...	1100	3.00	61	6.8	8.5	764	--	--
MAR								
06...	1100	3.00	89	7.3	10.0	765	11.9	105
APR								
11...	1100	3.00	78	7.6	15.5	750	14.5	148
MAY								
01...	1100	3.00	80	7.4	21.0	756	10.3	117
JUN								
05...	1100	3.00	80	7.4	22.0	759	10.7	123
JUL								
10...	1100	3.00	84	7.5	30.0	758	8.0	107
31...	1100	3.00	77	7.4	29.0	755	8.1	107
SEP								
04...	1100	3.00	76	7.2	27.5	765	7.4	94

DATE	COLI- FORM, TOTAL, IMMED. (COLS. PER 100 ML) (31501)	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	CARBON, ORGANIC TOTAL (MG/L AS C) (00680)	CHLORO- PHYLL A FLUORO- METRIC METHOD CORR. (UG/L) (32209)	PHEOPHY- TIN A FLUORO- METRIC METHOD (UG/L) (32213)
OCT							
18...	K900	K11	0.50	0.011	4.4	22.0	2.70
NOV							
16...	K180	K9	0.40	0.017	4.2	9.60	12.8
JAN							
10...	600	K14	0.30	0.012	4.2	7.80	2.60
FEB							
06...	K82	K4	0.30	0.014	3.9	8.30	9.90
MAR							
06...	40	K3	0.40	0.024	3.8	6.30	1.90
APR							
11...	430	K2	0.40	0.019	4.9	19.5	12.8
MAY							
01...	29	K7	0.90	0.012	4.6	4.10	5.40
JUN							
05...	22	K4	0.40	0.018	4.3	10.2	12.3
JUL							
10...	35	K1	0.30	0.008	4.9	8.30	2.60
31...	K2	--	0.70	0.006	5.0	8.30	2.60
SEP							
04...	24	K11	0.60	0.005	4.1	9.10	3.10

K Results based on colony count outside the acceptance range (non-ideal colony count).

KANAWHA RIVER BASIN

03161000 SOUTH FORK NEW RIVER NEAR JEFFERSON, NC

LOCATION.--Lat 36°23'35", long 81°24'26", Ashe County, Hydrologic Unit 05050001, on right bank 600 ft upstream from bridge on State Highways 16 and 88, 0.2 mi downstream from Bear Creek, and 4 mi southeast of Jefferson.

DRAINAGE AREA.--205 mi².

PERIOD OF RECORD.--October 1924 to current year. Monthly discharge only for some periods, published in WSP 1305.

REVISED RECORDS.--WSP 1275: 1925-26(M), 1928-30(M), 1931-32, 1933-35(M), 1941-42(m), 1944(m). WDR NC-81-1:

Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 2,657.04 ft above National Geodetic Vertical Datum of 1929. Prior to Oct. 14, 1934, nonrecording gage on bridge 400 ft downstream at same datum. Oct. 14, 1934, to Mar. 25, 1935, nonrecording gage at present site and datum.

REMARKS.--Records good except those for estimated daily discharges, which are fair. U.S. Army Corps of Engineers satellite gage-height telemeter at station. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

AVERAGE DISCHARGE.--66 years, 427 ft³/s, 28.29 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 52,800 ft³/s, Aug. 14, 1940, gage height, 22.50 ft, from rating curve extended above 5,100 ft³/s on basis of slope-area measurement of peak flow; minimum, 52 ft³/s, Dec. 24, 1943, result of freezeup; minimum daily, 65 ft³/s, Sept. 9, 1925.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of July 15, 1916, reached a stage of 18.0 ft, from floodmarks witnessed by local resident, discharge, 35,200 ft³/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 2,600 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Oct. 1	2300	2,700	5.41	Mar. 17	1600	4,200	6.54
Nov. 16	0630	*5,680	*7.51	July 14	1930	2,610	5.33

Minimum discharge, 165 ft³/s, Sept. 27, 28, 29, 30, gage height, 1.82 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1800	509	512	1490	549	604	621	507	429	231	185	236
2	2180	488	497	793	519	608	579	527	408	418	178	229
3	1450	479	495	621	503	707	566	869	398	327	175	220
4	1090	465	482	588	686	790	550	756	387	247	175	208
5	927	455	488	622	667	660	531	711	366	231	178	203
6	828	455	469	616	570	619	521	602	354	218	457	198
7	754	485	453	635	551	587	541	544	343	212	581	193
8	701	472	492	670	531	565	502	503	335	209	269	188
9	659	461	514	724	502	573	484	488	332	214	255	210
10	624	447	471	631	908	564	483	685	346	221	308	310
11	602	430	472	590	1010	538	539	638	337	204	480	243
12	576	420	570	553	706	521	509	537	303	203	360	300
13	558	411	672	530	625	508	474	510	296	228	265	335
14	545	405	538	504	583	498	462	487	291	1270	249	273
15	529	472	494	499	557	496	461	457	327	1360	240	247
16	516	3730	e470	480	987	666	450	447	390	592	215	235
17	650	1340	e446	462	1380	3230	442	495	346	415	209	203
18	801	868	e456	454	862	2290	434	467	313	396	207	191
19	1670	728	e470	447	967	1270	418	406	348	369	221	188
20	1050	665	e451	435	861	996	413	399	299	353	198	193
21	803	628	e408	509	718	844	422	452	278	319	202	189
22	704	601	e350	487	764	761	481	458	296	318	223	192
23	649	895	e272	436	1040	701	440	481	282	329	407	198
24	619	728	e485	430	896	665	416	408	263	280	497	184
25	596	640	e547	571	774	680	402	386	254	250	506	173
26	568	613	e587	601	680	633	393	382	248	236	601	172
27	551	592	e562	511	647	603	386	376	244	224	423	169
28	535	571	e508	479	634	582	401	439	238	216	328	166
29	521	556	e465	513	---	609	801	850	231	213	284	167
30	514	529	e485	812	---	648	562	582	224	213	263	168
31	515	---	796	614	---	651	---	473	---	203	248	---
TOTAL	25085	20538	15377	18307	20677	24667	14684	16322	9506	10719	9387	6381
MEAN	809	685	496	591	738	796	489	527	317	346	303	213
MAX	2180	3730	796	1490	1380	3230	801	869	429	1360	601	335
MIN	514	405	272	430	502	496	386	376	224	203	175	166
CFSM	3.95	3.34	2.42	2.88	3.60	3.88	2.39	2.57	1.55	1.69	1.48	1.04
IN.	4.55	3.73	2.79	3.32	3.75	4.48	2.66	2.96	1.72	1.95	1.70	1.16

CAL YR 1989 TOTAL 193024 MEAN 529 MAX 5300 MIN 128 CFSM 2.58 IN. 35.03
WTR YR 1990 TOTAL 191650 MEAN 525 MAX 3730 MIN 166 CFSM 2.56 IN. 34.78

e Estimated.

KANAWHA RIVER BASIN

03164000 NEW RIVER NEAR GALAX, VA

LOCATION.--Lat 36°38'50", long 80°58'45", Grayson County, Hydrologic Unit 05050001, on left bank at upstream side of bridge on State Highway 94, 500 ft downstream from Meadow Creek, 1.2 mi southwest of Old Town, 3.1 mi southwest of Galax, and 3.6 mi downstream from Elk Creek.

DRAINAGE AREA.--1,131 mi².

PERIOD OF RECORD.--October 1929 to current year. Monthly discharge only for some periods, published in WSP 1305. REVISED RECORDS.--WSP 758: Drainage area, 1933(M). WSP 893: 1930(M), 1935(M).

GAGE.--Water-stage recorder. Datum of gage is 2,208.04 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records good except those for period with ice effect, Dec. 14 to Jan. 1, and period of doubtful gage-height record, Aug. 25, 26, which are fair. Appalachian Power Company gage-height transmitter at station, recorder at Roanoke. U.S. Army Corps of Engineers satellite precipitation and gage-height telemeter at station. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

AVERAGE DISCHARGE.--61 years, 1,893 ft³/s, 22.73 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 141,000 ft³/s, Aug. 14, 1940, gage height, 25.7 ft, from floodmark, from rating curve extended above 32,000 ft³/s on basis of computation of peak flow over dam at Fries 6 mi downstream and slope-area measurement of peak flow; minimum, 193 ft³/s, Jan. 9, 1956, gage height, 0.52 ft, result of freezeup; minimum daily, 265 ft³/s, Sept. 19, 1954.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 9,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Oct. 2	0300	13,400	4.97	Jan. 1	0540	*39,800	*a10.24
Nov. 16	1530	21,400	6.70	Mar. 17	2400	14,000	5.11

a Ice jam.

Minimum discharge, 638 ft³/s, Sept. 7, gage height, 0.93 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	9170	1880	2020	e11000	3010	2600	2780	2240	2430	912	765	795
2	12300	1800	1950	6110	2610	2520	2590	2350	2160	964	739	757
3	8320	1750	1910	3980	2430	3520	2470	2320	1990	1410	728	735
4	5950	1710	1810	3190	3240	3810	2360	3100	1900	1100	735	710
5	4700	1670	1800	3160	3800	3220	2240	3520	1770	903	744	687
6	4010	1670	1860	3020	3230	2840	2180	3140	1660	832	1260	676
7	3490	1740	1780	3010	2860	2610	2360	2720	1570	794	1760	653
8	3100	1740	1840	3260	2640	2440	2190	2420	1510	760	1300	722
9	2810	1710	1910	3990	2390	2390	2040	2190	1480	767	982	1010
10	2570	1660	1830	3590	4540	2370	2000	2700	1410	744	1120	880
11	2420	1580	1780	3050	6770	2280	2190	3020	1410	734	1300	975
12	2310	1530	1940	2720	4750	2180	2240	2560	1330	741	1180	1170
13	2210	1510	2440	2400	3680	2110	2050	2330	1270	764	1040	1320
14	2140	1500	e2000	2210	3100	2050	1960	2200	1230	2430	906	1280
15	2090	1490	e1800	2180	2760	1970	1970	2040	1240	5750	887	1110
16	1980	15200	e1700	2110	3570	2200	1930	1960	1570	2830	869	957
17	2100	8850	e1650	2030	6720	8130	1880	1970	1510	1750	1070	847
18	2480	4840	e1600	1980	5080	11400	1840	1970	1320	1550	843	750
19	5100	3630	e1550	1940	4630	6470	1790	1790	1220	1430	763	718
20	4810	3060	e1550	1880	4520	4820	1730	1670	1230	1310	731	738
21	3260	2750	e1500	1970	3770	3960	1740	1760	1230	1340	738	752
22	2670	2520	e1500	2020	3530	3410	2040	2330	1340	1260	785	767
23	2410	3310	e1450	1880	4240	3050	2070	2710	1350	1160	1300	1040
24	2270	3390	e1450	1790	4340	2820	1910	2180	1260	1090	1740	966
25	2180	2770	e1400	2060	3700	3080	1810	1910	1130	1000	e1900	833
26	2090	2580	e1400	2610	3090	2960	1750	1800	1040	944	e2200	762
27	2020	2480	e1400	2390	2900	2690	1720	1740	990	897	1580	716
28	1960	2370	e1350	2180	2770	2520	1710	1990	966	844	1180	690
29	1910	2270	e1350	2210	---	2550	2380	4710	923	821	1020	665
30	1860	2120	e1350	4330	---	2760	2700	4450	901	839	893	652
31	1860	---	e3300	4000	---	2870	---	3100	---	802	844	---
TOTAL	108550	87080	54170	94250	104670	104600	62620	76890	42340	39472	33902	25333
MEAN	3502	2903	1747	3040	3738	3374	2087	2480	1411	1273	1094	844
MAX	12300	15200	3300	11000	6770	11400	2780	4710	2430	5750	2200	1320
MIN	1860	1490	1350	1790	2390	1970	1710	1670	901	734	728	652
CFSM	3.10	2.57	1.55	2.69	3.31	2.98	1.85	2.19	1.25	1.13	.97	.75
IN.	3.57	2.86	1.78	3.10	3.44	3.44	2.06	2.53	1.39	1.30	1.12	.83

CAL YR 1989 TOTAL 864371 MEAN 2368 MAX 32100 MIN 600 CFSM 2.09 IN. 28.43
WTR YR 1990 TOTAL 833877 MEAN 2285 MAX 15200 MIN 652 CFSM 2.02 IN. 27.43

e Estimated.

03165000 CHESTNUT CREEK AT GALAX, VA

LOCATION.--Lat 36°38'45", long 80°55'10", Galax City, Hydrologic Unit 05050001, on right bank 200 ft upstream from bridge on State Highway 89 and 1.7 mi downstream from Wards Mill Branch.

DRAINAGE AREA.--39.4 mi².

PERIOD OF RECORD.--September 1944 to current year.

REVISED RECORDS.--WSP 1385: 1953.

GAGE.--Water-stage recorder. Concrete control since Aug. 30, 1979. Datum of gage is 2,344.17 ft above National Geodetic Vertical Datum of 1929. Prior to June 25, 1948, nonrecording gage, and June 25, 1948, to May 28, 1953, water-stage recorder, at site 200 ft upstream at datum 0.86 ft higher.

REMARKS.--Records good except those for period with ice effect, Dec. 15-30, and period of no gage-height record, Jan. 31 to Feb. 2, which are fair. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

AVERAGE DISCHARGE.--46 years, 67.4 ft³/s, 23.23 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 6,980 ft³/s, Oct. 17, 1947, gage height, 14.4 ft, from floodmark, site and datum then in use, from rating curve extended above 2,200 ft³/s on basis of two slope-area and one contracted-opening measurements at gage heights 9.5 ft, 14.4 ft, and 17.4 ft, respectively, site and datum then in use; minimum, 12 ft³/s, part or all of each day Aug. 25-30, 1981.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Aug. 14, 1940, reached a stage of 17.4 ft, at site and datum used 1944-53, discharge, 11,000 ft³/s, by contracted-opening measurement.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 850 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Nov. 16	0600	*3,510	*8.44	No other peak equal to or greater than base discharge.			

Minimum discharge, 27 ft³/s, Sept. 2, 6, 7, gage height, 1.40 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	635	95	87	299	e95	98	104	78	79	44	37	31
2	511	90	86	124	e90	112	104	86	75	45	36	31
3	252	89	83	106	100	178	105	87	73	39	36	30
4	190	86	95	112	173	126	93	113	69	37	36	29
5	164	84	83	105	111	110	87	92	64	35	36	29
6	152	90	82	111	98	103	104	77	62	34	56	28
7	140	88	80	99	99	98	131	72	60	33	42	27
8	133	89	90	185	90	94	95	68	58	34	38	31
9	127	87	84	138	88	96	89	68	57	36	40	31
10	121	81	82	114	336	93	91	106	55	34	39	32
11	117	78	82	102	156	90	119	76	52	32	57	52
12	113	77	144	95	121	88	92	69	52	36	41	173
13	111	76	112	91	106	87	86	68	51	99	38	52
14	109	76	93	86	99	86	84	65	50	274	37	49
15	105	79	e82	87	95	88	100	63	54	122	37	46
16	103	1300	e78	86	213	132	85	62	56	63	36	40
17	134	233	e75	84	150	378	82	64	52	65	40	38
18	138	154	e74	85	117	176	79	58	50	70	34	36
19	330	128	e72	81	169	122	75	56	47	53	33	38
20	155	118	e70	81	124	120	75	58	45	66	35	39
21	125	106	e69	91	109	112	78	66	48	69	41	37
22	113	111	e68	80	192	105	79	113	48	55	42	44
23	107	147	e66	77	181	96	74	76	48	50	146	38
24	105	108	e65	78	137	93	72	64	44	45	69	35
25	101	106	e65	137	113	97	70	62	42	42	50	34
26	99	105	e64	109	106	90	69	61	42	42	47	34
27	96	99	e64	89	106	86	68	62	41	40	41	33
28	94	97	e63	86	103	84	77	158	40	39	37	33
29	92	91	e63	117	---	111	99	401	39	40	34	33
30	92	88	e62	131	---	102	77	121	38	43	34	33
31	96	---	250	e110	---	136	---	89	---	39	32	---
TOTAL	4960	4256	2633	3376	3677	3587	2643	2759	1591	1755	1357	1216
MEAN	160	142	84.9	109	131	116	88.1	89.0	53.0	56.6	43.8	40.5
MAX	635	1300	250	299	336	378	131	401	79	274	146	173
MIN	92	76	62	77	88	84	68	56	38	32	32	27
CFSM	4.06	3.60	2.16	2.76	3.33	2.94	2.24	2.26	1.35	1.44	1.11	1.03
IN.	4.68	4.02	2.49	3.19	3.47	3.39	2.50	2.60	1.50	1.66	1.28	1.15

CAL YR 1989 TOTAL 36787 MEAN 101 MAX 1720 MIN 15 CFSM 2.56 IN. 34.73
WTR YR 1990 TOTAL 33810 MEAN 92.6 MAX 1300 MIN 27 CFSM 2.35 IN. 31.92

e Estimated.

03166800 GLADE CREEK AT GRAHAMS FORGE, VA

LOCATION.--Lat 36°55'51", long 80°54'02", Wythe County, Hydrologic Unit 05050001, on left bank 30 ft downstream from bridge on State Highway 629, 1.0 mi southwest of Grahams Forge, and at mile 0.4.

DRAINAGE AREA.--7.15 mi².

PERIOD OF RECORD.--May 1976 to current year.

GAGE.--Water-stage recorder and crest-stage gage. Concrete control since June 1, 1979. Elevation of gage is 1,972 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Records fair except those for periods of doubtful or no gage-height record, Oct. 1-13, Feb. 4-7, Apr. 22 to July 5, and July 9-26, and period with ice effect, Dec. 15-31, which are poor. Several measurements of water temperature were made during the year.

AVERAGE DISCHARGE.--14 years, 1.29 ft³/s, 2.45 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 3,210 ft³/s, Sept. 16, 1989, gage height, 6.75 ft, from rating curve extended above 30 ft³/s on basis of slope-area measurement at gage height 5.11 ft; minimum, 0.01 ft³/s, July 8, 9, 1988, result of temporary pumpage, and Oct. 14, Dec. 5, 13, 1988; minimum daily, 0.01 ft³/s, July 8, 1988; minimum gage height, 1.36 ft, Sept. 7, 1976, Sept. 11, 1985.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 100 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Oct. 1	Unknown	Unknown	Unknown	Nov. 16	0300	*125	*3.18

Minimum discharge, 0.04 ft³/s, Sept. 28-30; minimum gage height, 1.41 ft, Aug. 31, Sept. 1, 2, 3.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e20	.52	.58	4.5	1.0	1.0	.71	e1.0	e.70	e.16	.08	.09
2	e8.0	.52	.58	1.5	.91	1.2	.70	e3.0	e.56	e.17	.08	.09
3	e3.5	.49	.67	1.1	.94	2.0	.70	e1.5	e.50	e.17	.89	.08
4	e2.3	.46	.54	1.0	e1.0	1.4	.64	e.80	e.46	e.16	.19	.09
5	e1.6	.46	.52	1.0	e3.0	1.2	.64	e1.4	e.43	e.16	.21	.08
6	e1.1	.46	.52	.91	e1.2	.93	.61	e2.2	e.40	.15	.28	.08
7	e.90	.46	.52	.85	e.92	.93	.58	e1.0	e.37	.15	.17	.12
8	e.80	.48	.52	3.1	.95	.92	.54	e.35	e.34	.15	.15	.12
9	e.70	.48	.52	2.1	.87	.85	.52	e.17	e.32	e.14	.15	.09
10	e.62	.44	.52	1.3	6.7	.83	.52	e.33	e.31	e.14	.15	.09
11	e.56	.41	.52	1.0	2.8	.77	.52	e1.6	e.30	e.13	.15	.21
12	e.50	.41	.54	.86	2.0	.71	.46	e.74	e.28	e.13	.15	.10
13	e.46	.41	.56	.86	1.6	.71	.46	e.56	e.26	e.13	.14	.08
14	.46	.41	.52	.72	1.3	.71	.46	e.47	e.25	e.21	.12	.08
15	.46	.42	e.50	.71	1.2	.71	.45	e.42	e.24	e2.0	.12	.08
16	.45	23	e.47	.64	4.5	.83	.41	e.39	e.25	e.50	.12	.07
17	.98	2.4	e.45	.63	3.1	1.2	.41	e.36	e.25	e.21	.11	.06
18	2.4	1.4	e.42	.56	1.9	1.1	.41	e.35	e.24	e.16	.12	.06
19	12	1.2	e.39	.52	2.6	.86	.38	e.33	e.22	e.14	.12	.05
20	2.5	.99	e.37	.52	1.8	.78	.36	e.33	e.21	e.13	.12	.06
21	1.5	.82	e.35	.50	1.4	.75	.36	e.45	e.21	e.12	.19	.06
22	1.2	.90	e.34	.46	1.7	.68	e.40	e1.0	e.21	e.11	.15	.09
23	.93	1.1	e.33	.45	3.3	.62	e.39	e5.0	e.21	e.10	.54	.06
24	.77	.87	e.32	.42	3.7	.61	e.38	e1.2	e.21	e.10	.27	.06
25	.71	.85	e.30	.80	1.7	1.3	e.36	e.72	e.20	e.09	.17	.06
26	.69	.81	e.29	.64	1.3	.90	e.35	e.60	e.19	e.08	.15	.07
27	.64	.78	e.28	.58	1.2	.81	e.35	e.52	e.18	.08	.15	.06
28	.60	.75	e.27	.58	1.1	.74	e.34	e8.0	e.18	.08	.14	.05
29	.58	.67	e.27	2.6	---	.76	e.40	e13	e.17	.08	.11	.04
30	.58	.63	e.50	2.6	---	.79	e.42	e3.5	e.16	.08	.10	.04
31	.56	---	e2.0	1.2	---	.85	---	e1.5	---	.08	.09	---
TOTAL	69.05	44.00	15.48	35.21	55.69	28.45	14.23	52.79	8.81	6.29	5.68	2.37
MEAN	2.23	1.47	.50	1.14	1.99	.92	.47	1.70	.29	.20	.18	.079
MAX	20	23	2.0	4.5	6.7	2.0	.71	13	.70	2.0	.89	.21
MIN	.45	.41	.27	.42	.87	.61	.34	.17	.16	.08	.08	.04
CFSM	.31	.21	.07	.16	.28	.13	.07	.24	.04	.03	.03	.01
IN.	.36	.23	.08	.18	.29	.15	.07	.27	.05	.03	.03	.01

CAL YR 1989 TOTAL 1805.09 MEAN 4.95 MAX 1400 MIN .02 CFSM .69 IN. 9.39
WTR YR 1990 TOTAL 338.05 MEAN .93 MAX 23 MIN .04 CFSM .13 IN. 1.76

e Estimated.

03167000 REED CREEK AT GRAHAMS FORGE, VA

LOCATION.--Lat 36°56'22", long 80°53'13", Wythe County, Hydrologic Unit 05050001, on left bank 20 ft downstream from bridge on State Highway 619 at Grahams Forge, 2.2 mi downstream from Glade Creek, and at mile 7.3.

DRAINAGE AREA.--247 mi².

PERIOD OF RECORD.--July 1908 to September 1916, January 1927 to current year. Monthly discharge only for some periods, published in WSP 1305.

REVISED RECORDS.--WSP 1235: 1912-13, 1915-16. WSP 1275: 1911, 1927-28(M), 1930-34(M). WSP 1705: 1913(M), 1916(M), 1957 calendar year runoff. WSP 1725: 1915 calendar year runoff.

GAGE.--Water-stage recorder. Datum of gage is 1,924.65 ft above National Geodetic Vertical Datum of 1929. Prior to Oct. 1, 1916, nonrecording gage at same site at datum 0.68 ft lower. Feb. 3, 1927, to Oct. 28, 1934, and June 11, 1974, to July 22, 1975, nonrecording gage, at present site and datum.

REMARKS.--Records good except those for periods with ice effect, Dec. 14, 15, 17-29, which are fair. Occasional diurnal fluctuation at low flow caused by mills upstream from station. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

AVERAGE DISCHARGE.--71 years, 268 ft³/s, 14.73 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 17,500 ft³/s, July 16, 1916, gage height, 11.4 ft, present datum, from floodmarks, from rating curve extended above 7,600 ft³/s on basis of velocity-area study and slope-area measurement at gage heights 11.4 ft and 10.01 ft, respectively; minimum observed, about 5 ft³/s, Dec. 22, 1909, gage height, 0.49 ft, present datum, result of freezeup; minimum daily, 22 ft³/s, Jan. 30, 1934.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 2,300 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Oct. 2	0130	*4,690	*5.59	Feb. 17	0615	3,370	4.79
Nov. 16	0830	2,320	4.08	May 28	1400	2,620	4.29
Jan. 1	0645	3,970	5.17	May 29	1630	3,770	5.05

Minimum discharge, 60 ft³/s, Sept. 29, gage height, 1.40 ft; minimum daily, 75 ft³/s, Sept. 30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3300	220	241	2890	532	368	380	314	641	139	106	97
2	3330	211	230	1030	451	358	358	1050	521	147	105	95
3	1480	204	218	719	416	458	346	607	457	141	115	93
4	895	199	202	609	656	477	331	471	422	134	106	92
5	662	192	211	587	881	441	316	685	369	132	106	90
6	534	190	203	558	688	405	305	759	333	127	149	90
7	452	186	195	504	593	374	323	526	305	126	136	89
8	396	189	204	705	500	348	316	404	286	124	116	102
9	361	204	193	1040	435	341	305	348	267	122	114	105
10	325	190	186	755	941	330	292	402	265	119	112	102
11	300	181	187	616	1300	314	309	545	254	117	115	101
12	278	173	200	526	824	299	298	430	232	118	114	96
13	259	170	200	449	672	284	276	364	221	135	107	170
14	245	166	e170	396	588	274	266	323	214	230	104	133
15	231	166	e160	367	514	267	263	277	209	489	105	104
16	219	1400	152	344	966	314	260	255	220	250	101	94
17	244	806	e150	322	2270	1310	251	233	213	187	100	87
18	317	507	e145	307	952	1280	250	228	198	162	97	81
19	792	400	e140	291	794	727	231	206	188	151	96	83
20	693	345	e135	276	701	581	222	201	179	158	95	83
21	520	314	e135	274	626	486	221	221	177	148	101	82
22	424	288	e130	263	581	426	246	783	179	147	108	90
23	367	307	e130	250	583	393	237	1240	188	140	185	110
24	329	271	e125	243	566	375	226	630	174	130	223	98
25	302	248	e125	288	484	583	222	446	164	125	195	85
26	282	252	e125	367	422	745	217	375	158	121	147	81
27	266	275	e125	379	407	596	211	346	154	117	130	78
28	251	284	e120	359	392	496	210	1420	149	114	116	77
29	241	270	e120	388	---	454	266	3270	143	113	108	76
30	233	251	169	952	---	420	260	1700	142	112	106	75
31	226	---	1030	700	---	403	---	872	---	109	102	---
TOTAL	18754	9059	6056	17754	19735	14927	8214	19931	7622	4684	3720	2839
MEAN	605	302	195	573	705	482	274	643	254	151	120	94.6
MAX	3330	1400	1030	2890	2270	1310	380	3270	641	489	223	170
MIN	219	166	120	243	392	267	210	201	142	109	95	75
CFSM	2.45	1.22	.79	2.32	2.85	1.95	1.11	2.60	1.03	.61	.49	.38
IN.	2.82	1.36	.91	2.67	2.97	2.25	1.24	3.00	1.15	.71	.56	.43

CAL YR 1989 TOTAL 106359 MEAN 291 MAX 3330 MIN 75 CFMS 1.18 IN. 16.02
WTR YR 1990 TOTAL 133295 MEAN 365 MAX 3330 MIN 75 CFMS 1.48 IN. 20.08

e Estimated.

KANAWHA RIVER BASIN

03167500 BIG REED ISLAND CREEK NEAR ALLISONIA, VA

LOCATION.--Lat 36°53'20", long 80°43'40", Pulaski County, Hydrologic Unit 05050001, on left bank 700 ft downstream from bridge on State Highway 693, 3.5 mi southeast of Allisonia, 4 mi upstream from Little Reed Island Creek, and at mile 4.5.

DRAINAGE AREA.--278 mi².

PERIOD OF RECORD.--August 1908 to September 1916, April 1939 to current year.

REVISED RECORDS.--WSP 1033: 1939(P), 1940, 1941-43(P). WSP 1305: 1912(M). WSP 1625: 1940, 1945(M), 1947, 1951, 1952(M).

GAGE.--Water-stage recorder. Datum of gage is 1,902.74 ft above National Geodetic Vertical Datum of 1929. Prior to Sept. 30, 1916, nonrecording gage at site 4 mi downstream at different datum.

REMARKS.--Records good except those for periods with ice effect, Dec. 14-16, 18-31, which are fair. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

AVERAGE DISCHARGE.--59 years, 400 ft³/s, 19.54 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 14,500 ft³/s, Sept. 30, 1959, gage height, 12.54 ft, from rating curve extended above 6,000 ft³/s on basis of slope-area measurement of peak flow; minimum, 57 ft³/s, Jan. 28, 1986, gage height, 1.58 ft, result of freezeup; minimum daily, 75 ft³/s, Jan. 5, 1981, Jan. 28, 1986.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 3,500 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Nov. 16	0500	*10,100	*10.17	Aug. 23	1330	6,120	7.75

Minimum discharge, 172 ft³/s, part or all of each day Sept. 28-30, gage height, 2.13 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2340	509	504	2170	546	595	707	601	524	251	233	241
2	2640	465	494	905	520	597	615	652	488	373	222	234
3	1350	457	489	689	514	817	651	687	477	265	219	229
4	963	441	457	637	816	777	563	687	466	238	215	219
5	833	430	498	657	743	669	528	842	430	226	221	217
6	760	437	479	637	621	624	524	638	415	218	492	211
7	707	474	473	620	591	590	854	567	402	210	416	213
8	668	448	489	756	556	568	669	512	394	207	258	218
9	645	468	488	869	523	581	581	483	393	220	242	215
10	618	434	461	705	1380	557	546	1010	386	213	239	232
11	602	409	465	628	1160	537	825	853	358	306	574	221
12	583	404	522	588	808	526	691	597	341	408	310	243
13	568	397	607	542	692	515	602	551	331	410	254	226
14	560	393	e450	545	632	508	566	529	329	1260	255	264
15	548	404	e420	516	595	500	755	488	328	1970	240	253
16	535	4720	e400	509	891	532	662	482	348	692	273	207
17	611	1170	381	495	1110	1420	590	489	334	466	307	191
18	825	800	e380	498	790	1420	554	457	318	409	258	183
19	1210	685	e370	491	855	803	523	424	309	425	230	188
20	832	636	e360	471	792	709	510	422	292	355	285	202
21	669	598	e350	513	691	637	517	486	304	339	237	195
22	596	577	e350	482	744	629	537	655	309	445	265	230
23	557	692	e340	455	1100	571	497	689	327	344	2710	256
24	538	597	e340	448	836	542	482	503	283	300	961	196
25	519	575	e340	570	719	668	468	458	268	278	525	184
26	504	589	e330	702	641	616	458	455	260	269	410	181
27	493	579	e330	580	634	554	453	437	253	255	343	177
28	483	560	e330	534	626	523	456	630	246	248	303	174
29	476	540	e320	530	---	567	772	1500	239	245	277	173
30	470	512	e500	721	---	599	610	840	233	246	265	172
31	479	---	e1200	606	---	718	---	608	---	251	254	---
TOTAL	24182	20400	13917	20069	21126	20469	17766	19232	10385	12342	12273	6345
MEAN	780	680	449	647	754	660	592	620	346	398	396	211
MAX	2640	4720	1200	2170	1380	1420	854	1500	524	1970	2710	264
MIN	470	393	320	448	514	500	453	422	233	207	215	172
CFSM	2.81	2.45	1.61	2.33	2.71	2.38	2.13	2.23	1.25	1.43	1.42	.76
IN.	3.24	2.73	1.86	2.69	2.83	2.74	2.38	2.57	1.39	1.65	1.64	.85

CAL YR 1989 TOTAL 202350 MEAN 554 MAX 5840 MIN 110 CFSM 1.99 IN. 27.08
WTR YR 1990 TOTAL 198506 MEAN 544 MAX 4720 MIN 172 CFSM 1.96 IN. 26.56

e Estimated.

03168000 NEW RIVER AT ALLISONIA, VA

LOCATION.--Lat 36°56'15", long 80°44'45", Pulaski County, Hydrologic Unit 05050001, on left bank on State Highway 653, 0.2 mi downstream from Big Reed Island Creek, and 0.5 mi upstream from Allisonia.

DRAINAGE AREA.--2,202 mi².

PERIOD OF RECORD.--September 1929 to current year.

REVISED RECORDS.--WSP 783: Drainage area. WSP 823: 1936. WSP 1305: 1933(M).

GAGE.--Water-stage recorder. Datum of gage is 1,848.36 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records good except those for periods with ice effect, Dec. 15, 18-31, and periods of no gage-height record, Jan. 29 to Feb. 8 and Aug. 19-24, which are fair. Large diurnal fluctuation and some regulation by powerplant 25 mi upstream from station. U.S. Army Corps of Engineers satellite gage-height telemeter at station. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

AVERAGE DISCHARGE.--61 years, 3,192 ft³/s, 19.69 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 185,000 ft³/s, Aug. 14, 1940, gage height, 23.42 ft, from rating curve extended above 52,000 ft³/s on basis of flood records for other stations on New River; minimum, 412 ft³/s, Sept. 7, 1930, gage height, 0.47 ft; minimum daily, 453 ft³/s, Sept. 6, 1930.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 17,500 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Oct. 2	0500	28,700	7.29	Jan. 1	1415	36,100	8.41
Nov. 16	1230	*45,800	*9.75	Mar. 18	0400	22,400	6.34

Minimum discharge, 787 ft³/s, Sept. 29, gage height, 1.02 ft; minimum daily, 826 ft³/s, Sept. 29.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	18700	3470	3030	20800	e5400	4760	4900	4000	5300	1600	1220	1340
2	26000	3230	3320	12700	e4800	4830	5200	5410	4290	1920	1570	1420
3	16200	3230	3400	7690	e4500	5320	4720	4950	3870	1880	1040	1370
4	11000	2830	3100	5980	e5600	6740	4660	4950	3790	1640	982	1440
5	8470	2940	3340	5550	e6600	5650	4100	6190	3560	1940	1410	1370
6	7060	3120	3300	5360	e5600	5350	4150	6290	3300	1140	2300	1500
7	6140	3110	3250	5190	e5100	4860	4830	5320	2790	1250	2670	1190
8	5480	3070	3320	5610	e4800	4270	4250	4320	2650	1320	2670	1060
9	5040	3370	3030	7700	4440	4480	3970	3990	1930	1400	1210	1280
10	4700	3070	3240	6860	7370	4110	3890	4620	2480	1420	1740	1820
11	4450	2550	3340	5800	12600	4070	4150	5420	2580	1910	2120	1410
12	4070	2630	3330	5070	9260	3900	4360	4280	2410	1490	2050	1760
13	3650	2980	4010	4480	6860	3880	4000	4040	2130	1510	1970	2060
14	3750	2640	3800	4070	5830	3720	3430	3950	2100	3280	1680	2430
15	3620	2670	e3200	3960	5010	3520	3830	3480	2080	9170	1670	1540
16	3860	30200	2710	3730	6180	4020	4090	3340	2000	6050	1240	1620
17	3840	16600	2410	3330	11900	8980	3560	2900	2450	3140	1840	1810
18	4480	8850	e2400	3440	9860	19100	3220	3450	2470	2680	1400	1450
19	7920	6360	e2300	3410	8090	11400	3260	2610	2140	2530	e1200	1390
20	9020	5490	e2250	3240	8040	8490	3290	2750	1960	2590	e1100	945
21	6520	4980	e2200	3320	6740	6730	3150	3240	2000	1910	e1000	1440
22	5260	4460	e2200	3260	6160	5880	3240	3860	1840	2350	e1000	1310
23	4610	4860	e2150	3260	7680	5620	3650	5950	2700	2640	e1100	1380
24	4370	5190	e2100	3210	7450	4800	3350	4320	1360	2150	e1700	1960
25	3770	4880	e2100	3320	6540	5450	3320	3820	2170	1780	2360	1870
26	3800	4470	e2050	4270	5530	5900	2990	2970	1750	1660	2570	1380
27	3700	4400	e2050	4350	5110	5370	3090	3000	1730	1370	2700	1290
28	3550	4280	e2050	3940	4990	4790	2840	5220	1540	1320	2110	926
29	3500	3960	e2000	e4000	---	4830	4120	11900	1590	1370	1480	826
30	3460	3900	e2000	e7600	---	5300	4480	10500	1200	2000	1830	1220
31	3410	---	e5000	e7000	---	5460	---	6820	---	1770	1390	---
TOTAL	203400	157790	87980	171500	188040	181580	116090	147860	74160	70180	52322	43807
MEAN	6561	5260	2838	5532	6716	5857	3870	4770	2472	2264	1688	1460
MAX	26000	30200	5000	20800	12600	19100	5200	11900	5300	9170	2700	2430
MIN	3410	2550	2000	3210	4440	3520	2840	2610	1200	1140	982	826
CFSM	2.98	2.39	1.29	2.51	3.05	2.66	1.76	2.17	1.12	1.03	.77	.66
IN.	3.44	2.67	1.49	2.90	3.18	3.07	1.96	2.50	1.25	1.19	.88	.74

CAL YR 1989 TOTAL 1441564 MEAN 3949 MAX 59200 MIN 850 CFSM 1.79 IN. 24.35
WTR YR 1990 TOTAL 1494709 MEAN 4095 MAX 30200 MIN 826 CFSM 1.86 IN. 25.25

e Estimated.

KANAWHA RIVER BASIN

03169000 CLAYTOR RESERVOIR NEAR RADFORD, VA

LOCATION.--Lat 37°04'28", long 80°35'05", Pulaski County, Hydrologic Unit 05050001, at Claytor Dam on New River, 0.5 mi upstream from Little River, and 5.5 mi upstream from Radford.

DRAINAGE AREA.--2,382 mi².

PERIOD OF RECORD.--May 1939 to current year (monthly figures only).

REVISED RECORDS.--WSP 2108: 1961-65 monthend contents and change in contents.

GAGE.--Water-stage recorder. Datum of gage is approximately National Geodetic Vertical Datum of 1929 (levels by Appalachian Power Company). Prior to Sept. 11, 1943, nonrecording gage at same site and datum.

REMARKS.--Reservoir is formed by gravity overflow concrete dam. Spillway with crest at elevation 1,818.5 ft is equipped with 9 lift gates 30 ft high by 50 ft wide. Dam completed and storage began May 22, 1939; water in reservoir reached minimum pool elevation in January 1940. Total level-pool capacity at elevation 1,847.0 ft, 1.5 ft below top of gates, is 230,100 acre-ft of which about 100,000 acre-ft is controlled storage above minimum pool elevation of 1,820.0 ft. Reservoir is used for hydroelectric power and recreation. U.S. Army Corps of Engineers satellite elevation telemeter at station.

COOPERATION.--Records were provided by the Appalachian Power Company.

MONTHEND ELEVATION AND CONTENTS AT 2400, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

Date	Elevation (feet)	Contents (acre-feet)	Change in contents (acre-feet)
Sept. 30.....	1,844.15	217,600	-
Oct. 31.....	1,844.93	220,900	+3,300
Nov. 30.....	1,840.50	202,000	-18,900
Dec. 31.....	1,843.89	216,500	+14,500
CAL YR 1989.....	-	-	-7,200
Jan. 31.....	1,845.36	222,800	+6,300
Feb. 28.....	1,844.84	220,500	-2,300
Mar. 31.....	1,843.37	214,200	-6,300
Apr. 30.....	1,844.33	218,400	+4,200
May 31.....	1,846.29	226,800	+8,400
June 30.....	1,845.22	222,200	-4,600
July 31.....	1,844.78	220,300	-1,900
Aug. 31.....	1,844.68	219,900	-400
Sept. 30.....	1,845.08	221,600	+1,700
WTR YR 1990.....	-	-	+4,000

03170000 LITTLE RIVER AT GRAYSONTON, VA

LOCATION.--Lat 37°02'15", long 80°33'25", Pulaski County, Hydrologic Unit 05050001, on left bank at upstream side of bridge on State Highway 693 at Snowville, 0.5 mi southeast of Graysonton, 7 mi south of Radford, and at mile 8.6.

DRAINAGE AREA.--300 mi².

PERIOD OF RECORD.--October 1928 to current year.

REVISED RECORDS.--WSP 823: 1929-36. WSP 1143: 1945. WSP 1305: 1929(M). WSP 1555: Drainage area (at site used 1928-41). WSP 1625: 1951(M). WSP 1725: 1936(M).

GAGE.--Water-stage recorder. Datum of gage is 1,816.04 ft above National Geodetic Vertical Datum of 1929. Prior to Nov. 20, 1931, nonrecording gage at bridge 1.0 mi downstream at datum 17.99 ft lower. Nov. 20, 1931, to Nov. 12, 1941, water-stage recorder 1.2 mi downstream at datum 20.58 ft lower.

REMARKS.--Records good except those for periods with ice effect, Dec. 14, 15, 18-29, which are fair. U.S. Army Corps of Engineers satellite gage-height telemeter at station. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

AVERAGE DISCHARGE.--62 years, 362 ft³/s, 16.39 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 22,800 ft³/s, June 21, 1972, gage height, 13.40 ft, from rating curve extended above 16,000 ft³/s on basis of slope-area measurements at gage heights 12.76 ft and 13.40 ft; minimum, 21 ft³/s, Feb. 22, 1942, result of freezeup; minimum daily, 50 ft³/s, Sept. 21, 1932.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 3,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Oct. 2	1300	3,100	4.15	Jan. 1	0600	3,970	4.73
Nov. 16	0530	*5,650	*5.73	July 15	0930	4,500	5.06

Minimum discharge, 148 ft³/s, part of each day Sept. 28-30, gage height, 1.02 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2210	449	375	2350	420	460	665	500	462	199	190	193
2	2740	415	366	903	402	440	561	503	412	213	179	188
3	1430	407	363	620	395	584	602	492	385	206	176	184
4	939	400	322	541	713	653	524	478	372	191	174	179
5	752	390	362	522	759	537	477	567	347	181	179	174
6	658	390	355	489	564	489	449	538	330	174	589	175
7	590	402	351	483	507	459	799	467	319	169	587	170
8	542	397	351	550	478	431	708	433	309	167	271	180
9	517	407	362	827	442	424	579	407	306	171	223	183
10	490	391	336	620	787	424	536	441	300	174	211	190
11	472	371	343	525	1100	408	555	504	293	169	216	200
12	458	368	367	481	694	394	542	418	274	233	232	199
13	445	362	410	423	571	383	493	392	266	349	199	194
14	435	358	e320	380	507	376	475	379	262	555	215	263
15	425	363	e300	417	472	367	497	364	262	2490	204	267
16	412	3650	282	398	601	365	526	352	259	615	195	203
17	455	1270	270	385	1140	508	474	374	264	353	197	177
18	602	688	e270	382	713	1270	456	359	259	322	198	166
19	1030	543	e260	380	644	662	436	329	253	334	186	165
20	774	490	e255	363	650	557	418	318	244	482	180	174
21	578	459	e250	380	543	521	416	349	238	319	176	177
22	513	428	e245	368	518	493	471	431	245	278	205	178
23	480	465	e240	346	740	460	452	568	270	257	617	197
24	462	424	e240	341	671	438	420	443	261	229	583	177
25	450	406	e240	396	585	593	404	379	232	216	323	162
26	441	438	e235	537	493	626	390	358	222	207	272	158
27	432	465	e235	466	497	519	379	353	216	202	246	155
28	426	433	e230	418	485	473	373	394	213	196	226	151
29	418	412	e230	414	---	470	475	1230	209	195	211	150
30	413	386	339	514	---	527	482	829	203	202	202	150
31	414	---	932	466	---	577	---	543	---	204	197	---
TOTAL	21403	16827	10036	16685	17091	15888	15034	14492	8487	10252	8059	5479
MEAN	690	561	324	538	610	513	501	467	283	331	260	183
MAX	2740	3650	932	2350	1140	1270	799	1230	462	2490	617	267
MIN	412	358	230	341	395	365	373	318	203	167	174	150
CFSM	2.30	1.87	1.08	1.79	2.03	1.71	1.67	1.56	.94	1.10	.87	.61
IN.	2.65	2.09	1.24	2.07	2.12	1.97	1.86	1.80	1.05	1.27	1.00	.68

CAL YR 1989 TOTAL 162838 MEAN 446 MAX 5760 MIN 90 CFSM 1.49 IN. 20.19
WTR YR 1990 TOTAL 159733 MEAN 438 MAX 3650 MIN 150 CFSM 1.46 IN. 19.81

e Estimated.

KANAWHA RIVER BASIN

03171000 NEW RIVER AT RADFORD, VA

LOCATION.--Lat 37°08'30", long 80°34'10", Pulaski County, Hydrologic Unit 05050001, on left bank 2,000 ft downstream from bridge on U.S. Highway 11 at Radford, 5 mi downstream from Little River, and 5.5 mi downstream from Claytor Dam.

DRAINAGE AREA.--2,748 mi².

PERIOD OF RECORD.--October 1907 to September 1915, August 1939 to current year. Records for August 1898 to September 1907, published in WSP 27, 36, 48, 65, 83, 98, 128, 169, 205, 243, and 536, are unreliable and should not be used. Gage-height records collected at same site since 1895 are contained in reports of the National Weather Service.

REVISED RECORDS.--WSP 873: Drainage area. WSP 953: 1940-41. WSP 1305: 1908-12. See also PERIOD OF RECORD.

GAGE.--Water-stage recorder. Datum of gage is 1,712.16 ft above National Geodetic Vertical Datum of 1929. Prior to Aug. 30, 1939, nonrecording gage at highway bridge 2,000 ft upstream at datum 0.85 ft lower.

REMARKS.--No estimated daily discharges. Records good. Flow regulated since 1939 by Claytor Reservoir (station 03169000). Some additional regulation at low flow by dam and powerplant on Little River. U.S. Army Corps of Engineers satellite precipitation and gage-height telemeter at station. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

AVERAGE DISCHARGE.--59 years, 3,853 ft³/s, 19.04 in/yr, unadjusted.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 218,000 ft³/s, Aug. 14, 1940, gage height, 35.96 ft, from rating curve extended above 76,000 ft³/s on basis of records for other stations on New River and flow over Claytor Dam, computed by Appalachian Power Company; minimum, 165 ft³/s, Aug. 25, 27, 1944, gage height, 1.08 ft; minimum daily, 550 ft³/s, Aug. 22, 1911.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of July 16, 1916, reached a stage of 35.7 ft, discharge, 200,000 ft³/s, at site and datum used by Geological Survey 1907-15, from reports of the National Weather Service.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 38,600 ft³/s, Nov. 16, gage height, 11.79 ft; minimum, 910 ft³/s, Dec. 23, gage height, 1.87 ft; minimum daily, 1,030 ft³/s, Sept. 9.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	15900	5080	3700	16100	8060	5820	3400	4960	8440	1130	1880	1120
2	29300	5190	3990	14300	6910	7800	5910	5570	7040	2420	1540	1090
3	18500	3860	3540	11300	4930	3790	5470	7180	4490	2300	1960	1080
4	13000	2370	1360	10600	8130	6770	6550	5130	3810	2240	1110	1620
5	11900	1290	1360	7180	6710	7050	5070	7480	4510	3200	1120	1780
6	9730	4670	1960	7010	7150	5880	5920	6830	4430	1850	2940	1640
7	6820	4440	3050	4780	6770	7750	6210	5730	4870	1640	3690	1660
8	6500	4370	4180	7330	6490	6050	4090	6490	4450	1090	5100	1170
9	6110	4400	2950	7870	7510	5650	4790	5220	2060	1930	2370	1030
10	6680	4590	1340	9240	7960	4940	5060	6120	1290	1960	1190	1860
11	3450	3350	5880	6840	12600	1370	4800	6330	3640	2170	1100	2100
12	5920	1780	4860	6830	11000	6440	4950	4370	3800	2520	1200	2160
13	5910	5680	6020	6390	9080	5420	5030	2860	3430	2600	1940	2380
14	3730	4960	5100	3430	7900	5210	4970	4780	3340	5310	2550	3380
15	1470	5530	5040	4980	7060	5040	3440	3440	3160	11400	2910	2970
16	7740	24300	1320	4720	9280	8320	4730	4590	3150	7920	2640	1530
17	7250	18600	1170	5000	12700	11400	4980	5180	1340	3730	1810	1720
18	4690	11700	4150	5120	10700	12600	5160	5120	3090	3790	1160	2050
19	11200	10800	3220	4700	8950	11700	4690	3380	2800	3700	1170	1760
20	6500	10500	3820	1370	7050	10800	4490	1280	3610	2600	1710	1660
21	6060	10400	4360	1810	8610	8250	3220	4270	3220	1420	2740	1700
22	5590	6340	3670	5480	11400	7810	1370	6740	2650	1290	2640	1090
23	5490	6750	2630	4200	7060	6650	4870	7820	1300	2560	2640	1120
24	5850	5980	1220	6610	5550	6060	5270	4950	1290	3420	6510	1740
25	5200	5800	1230	8050	7480	4080	4690	4930	2160	3610	3780	2160
26	5660	5390	3910	5040	6670	6020	3760	5040	2750	2810	1390	1860
27	4960	5150	3070	1550	6470	6520	2560	1910	2950	1770	2350	2000
28	2840	5580	3460	1390	5710	5460	5020	6850	2600	1140	3140	1540
29	1390	4380	3850	5750	---	8860	3140	12200	2240	1150	2960	1060
30	5420	5390	2860	7980	---	6580	7530	11300	1130	2320	2650	1060
31	5420	---	7420	7510	---	7420	---	9320	---	2590	2280	---
TOTAL	236180	198620	105690	200460	225890	213510	141140	177370	99040	89580	74170	51090
MEAN	7619	6621	3409	6466	8067	6887	4705	5722	3301	2890	2393	1703
MAX	29300	24300	7420	16100	12700	12600	7530	12200	8440	11400	6510	3380
MIN	1390	1290	1170	1370	4930	1370	1370	1280	1130	1090	1100	1030
(*)	+54	-318	+236	+102	-41	-102	+71	+137	-77	-31	-7	+29
MEAN#	7673	6303	3645	6568	8026	6785	4776	5859	3224	2859	2386	1732
CFSM#	2.79	2.29	1.33	2.39	2.92	2.47	1.74	2.13	1.17	1.04	.87	.63
IN.#	3.22	2.56	1.53	2.76	3.04	2.85	1.94	2.46	1.31	1.20	1.00	.70

CAL YR 1989 TOTAL 1782310 MEAN 4883 MAX 65600 MIN 1040 MEAN# 4873 CFSM# 1.77 IN.# 24.08
WTR YR 1990 TOTAL 1812740 MEAN 4966 MAX 29300 MIN 1030 MEAN# 4972 CFSM# 1.81 IN.# 24.57

* Change in contents, equivalent in cubic feet per second, in Claytor Reservoir; provided by Appalachian Power Company.

Adjusted for change in contents.

03173000 WALKER CREEK AT BANE, VA

LOCATION.--Lat 37°16'05", long 80°42'35", Giles County, Hydrologic Unit 05050002, on left bank at Bane, 0.2 mi downstream from bridge on State Highway 100, 0.2 mi downstream from Sugar Run, and at mile 7.9.

DRAINAGE AREA.--305 mi².

PERIOD OF RECORD.--March 1938 to current year.

REVISED RECORDS.--WSP 1143: 1939(M), 1940, 1944, 1946. WSP 1305: 1938(M).

GAGE.--Water-stage recorder. Datum of gage is 1,665.92 ft above National Geodetic Vertical Datum of 1929. Prior to Aug. 1, 1938, nonrecording gage at same site and datum.

REMARKS.--Records good except those for periods with ice effect, Dec. 14-16, 18-22, 25-29, which are fair. U.S. Army Corps of Engineers satellite gage-height telemeter at station. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

AVERAGE DISCHARGE.--52 years, 323 ft³/s, 14.38 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 16,900 ft³/s, Apr. 5, 1977, gage height, 16.69 ft, from rating curve extended above 7,200 ft³/s on basis of slope-area measurement at gage height 16.50 ft; minimum, 15 ft³/s, Dec. 21, 1958, gage height, 2.42 ft, result of freezeup; minimum daily, 24 ft³/s, Sept. 27, 28, 1964.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in September 1878 reached a stage of about 23.5 ft.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 4,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Oct. 1	2300	*6,560	*10.92	May 29	0900	5,460	10.21
Jan. 1	0630	5,700	10.38				

Minimum discharge, 49 ft³/s, part or all of each day Sept. 6-9, gage height, 2.92 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3310	216	324	4640	935	455	471	262	836	106	69	56
2	4180	201	295	1790	744	457	475	326	641	128	67	55
3	1800	191	274	1110	649	641	457	359	540	126	66	53
4	1080	183	240	847	1160	758	441	372	465	107	65	51
5	765	173	249	747	1310	666	423	1910	400	99	67	50
6	590	166	230	667	1020	581	397	1670	348	94	78	49
7	481	162	216	592	841	508	530	999	307	91	86	49
8	407	163	212	751	693	453	558	720	277	89	78	51
9	356	170	205	1580	592	433	492	571	255	86	70	52
10	311	169	187	1110	874	407	450	557	277	83	73	66
11	280	155	185	848	1350	371	445	595	261	85	75	97
12	256	143	191	702	1050	343	414	491	221	83	124	180
13	234	137	200	581	832	320	366	449	203	86	86	263
14	219	132	e170	484	714	302	336	408	190	124	74	248
15	205	133	e150	447	622	287	325	357	185	366	69	169
16	192	2240	e145	407	678	386	316	319	183	259	67	119
17	203	1450	139	370	1350	1860	298	290	176	167	65	92
18	413	851	e135	346	1070	2160	287	271	162	131	62	77
19	1330	614	e135	326	919	1240	267	244	152	139	61	72
20	1290	499	e130	305	812	945	249	229	142	178	58	69
21	878	434	e130	296	698	752	247	240	144	137	64	67
22	649	382	e125	284	639	653	290	666	147	118	68	72
23	509	362	119	266	637	599	277	1310	175	116	127	69
24	427	308	120	253	684	552	266	832	200	103	131	72
25	373	273	e120	272	598	908	258	595	151	95	102	66
26	330	278	e120	355	495	1170	249	482	134	89	96	61
27	297	420	e120	380	490	907	241	430	125	84	80	58
28	270	467	e115	374	469	732	235	1320	118	81	73	56
29	249	420	e115	534	---	627	260	4710	112	78	66	55
30	234	363	147	2330	---	558	266	2350	107	75	62	54
31	224	---	1070	1340	---	510	---	1220	---	72	59	---
TOTAL	22342	11855	6313	25334	22925	21541	10586	25554	7634	3675	2388	2548
MEAN	721	395	204	817	819	695	353	824	254	119	77.0	84.9
MAX	4180	2240	1070	4640	1350	2160	558	4710	836	366	131	263
MIN	192	132	115	253	469	287	235	229	107	72	58	49
CFSM	2.36	1.30	.67	2.68	2.68	2.28	1.16	2.70	.83	.39	.25	.28
IN.	2.72	1.45	.77	3.09	2.80	2.63	1.29	3.12	.93	.45	.29	.31

CAL YR 1989 TOTAL 130583 MEAN 358 MAX 4180 MIN 61 CFSM 1.17 IN. 15.93
WTR YR 1990 TOTAL 162695 MEAN 446 MAX 4710 MIN 49 CFSM 1.46 IN. 19.84

e Estimated.

KANAWHA RIVER BASIN

03175100 COX BRANCH ABOVE TAZEWEILL RESERVOIR, NEAR GRATTON, VA

LOCATION.--Lat 37°09'12", long 81°24'51", Tazewell County, Hydrologic Unit 06010205, in Jefferson National Forest, 200 ft upstream from town of Tazewell Reservoir, 1.2 mi north of Gratton, 1.6 mi upstream from bridge on State Highway 61, and 1.8 mi upstream from Clear Fork.

DRAINAGE AREA.--2.06 mi².

PERIOD OF RECORD.--June 1988 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 2,990 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Records good except those for periods of no gage-height record, Dec. 16-18, 22-27, which are fair. Several measurements of water temperature were made during the year.

COOPERATION.--Records were provided by the Virginia Water Control Board.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 104 ft³/s, Sept. 22, 1989, gage height, 2.81 ft; minimum, 0.24 ft³/s, Aug 18-19, 1988, gage height, 0.57 ft.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 64 ft³/s, Dec. 31, gage height, 2.47 ft; minimum daily, 0.49 ft³/s, Sept. 28, 29.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	35	3.3	4.3	38	9.7	4.4	5.1	5.9	9.4	1.7	.87	.62
2	27	3.1	4.0	17	7.9	5.5	4.9	6.9	7.1	1.2	.82	.61
3	16	2.9	3.8	11	8.0	7.1	4.6	7.4	5.8	1.0	.80	.60
4	10	2.8	3.5	9.4	11	7.3	4.7	9.7	4.7	.90	.78	.57
5	7.4	2.7	3.4	8.5	11	6.8	5.2	26	4.1	.86	1.8	.56
6	5.6	2.5	3.2	8.0	9.6	5.8	9.2	18	3.6	.98	4.2	.56
7	4.6	2.5	2.9	6.9	8.2	5.0	14	12	3.3	.85	1.3	.57
8	4.0	2.7	2.9	11	6.8	4.6	12	9.6	2.9	.80	1.1	.68
9	3.6	5.1	2.7	13	6.4	4.4	9.6	7.9	2.6	.79	1.1	.60
10	3.3	4.8	2.6	11	29	4.1	8.4	7.3	3.3	.74	.99	.58
11	3.0	4.4	2.5	8.9	22	3.9	8.7	5.9	2.6	.75	.96	.88
12	2.7	4.1	2.6	7.5	14	3.6	8.1	5.2	2.3	.80	.86	.78
13	2.6	3.8	2.4	6.2	11	3.4	7.7	4.7	2.1	3.6	.81	.75
14	2.4	3.6	2.3	5.4	8.8	3.2	7.5	4.3	2.0	18	.85	.74
15	2.3	3.5	2.3	4.9	7.6	3.1	7.4	3.9	3.3	17	.84	.64
16	2.1	6.9	e2.1	4.5	11	4.7	6.7	3.7	2.2	7.8	.78	.57
17	11	6.6	e2.0	4.2	13	26	6.8	4.0	1.9	4.6	.75	.52
18	12	6.0	e2.0	4.1	11	19	6.2	3.4	1.8	3.4	.72	.50
19	20	5.4	2.0	3.9	10	12	5.8	3.1	1.7	2.7	.70	.70
20	15	5.3	1.9	3.8	8.2	9.3	5.5	3.5	1.5	2.3	.67	.66
21	10	5.1	1.9	3.8	7.2	7.8	7.8	4.6	1.6	2.1	.77	.57
22	8.3	4.7	e1.8	3.5	6.8	7.1	9.6	18	1.9	1.8	1.2	1.2
23	6.8	4.4	e1.8	3.3	6.1	6.3	8.8	21	2.1	1.7	1.3	.71
24	5.8	4.0	e1.8	3.2	5.3	7.8	7.5	13	1.5	1.5	1.9	.61
25	5.2	4.0	e1.7	4.1	4.6	17	6.4	9.2	1.4	1.3	.96	.55
26	4.7	5.2	e1.7	4.6	4.3	14	5.4	7.9	1.3	1.2	.81	.52
27	4.3	5.6	e1.7	4.7	4.3	11	4.8	8.8	1.2	1.1	.75	.50
28	4.0	5.7	1.7	5.5	4.5	8.7	4.9	12	1.1	1.0	.71	.49
29	3.7	5.1	1.7	13	---	7.3	5.0	23	1.0	.99	.70	.49
30	3.5	4.7	3.7	21	---	6.2	5.0	19	1.0	.93	.70	.50
31	3.6	---	29	13	---	5.4	---	13	---	.91	.65	---
TOTAL	249.5	130.5	103.9	266.9	267.3	241.8	213.3	301.9	82.3	85.30	32.15	18.83
MEAN	8.05	4.35	3.35	8.61	9.55	7.80	7.11	9.74	2.74	2.75	1.04	.63
MAX	35	6.9	29	38	29	26	14	26	9.4	18	4.2	1.2
MIN	2.1	2.5	1.7	3.2	4.3	3.1	4.6	3.1	1.0	.74	.65	.49

CAL YR 1989 TOTAL 1838.22 MEAN 5.04 MAX 47 MIN .82
WTR YR 1990 TOTAL 1993.68 MEAN 5.46 MAX 38 MIN .49

e Estimated.

03175500 WOLF CREEK NEAR NARROWS, VA

LOCATION.--Lat 37°18'20", long 80°51'00", Giles County, Hydrologic Unit 05050002, on right bank at downstream side of bridge on State Highway 724, 2.8 mi southwest of Narrows, and at mile 3.5.

DRAINAGE AREA.--223 mi².

PERIOD OF RECORD.--July 1908 to September 1916, March 1938 to current year.

REVISED RECORDS.--WSP 973: 1940-41(M). WSP 1235: 1912-13, 1915-16. WSP 1505: 1940, monthly and yearly runoff. WSP 1725: 1913(M), 1915-16(M), 1941 calendar year runoff.

GAGE.--Water-stage recorder. Datum of gage is 1,583.83 ft above National Geodetic Vertical Datum of 1929. July 22, 1908, to Sept. 30, 1916, and Mar. 31 to Nov. 7, 1938, nonrecording gage at same site and datum.

REMARKS.--Records good except those for periods with ice effect, Dec. 14-16, 18-30, which are fair. U.S. Army Corps of Engineers satellite gage-height telemeter at station. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

AVERAGE DISCHARGE.--60 years, 299 ft³/s, 18.21 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 12,900 ft³/s, Jan. 29, 1957, gage height, 12.55 ft, from floodmark in gage well, 13.8 ft, from floodmark at downstream side of bridge, from rating curve extended above 5,700 ft³/s on basis of contracted-opening measurement of peak flow; minimum, 8.8 ft³/s, Dec. 25, 1953, result of freezeup; minimum daily, 16 ft³/s, Sept. 17, 18, 26-28, 1964; minimum gage height, 2.19 ft, Dec. 24, 1943.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 2,200 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Oct. 1	2100	4,400	8.60	Mar. 17	2245	2,450	6.92
Jan. 1	0700	*6,340	*9.82	May 29	1300	2,770	7.22

Minimum discharge, 38 ft³/s, Sept. 7, gage height, 2.57 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2700	204	308	4810	774	383	386	218	680	68	60	48
2	2910	186	277	1740	636	393	363	259	527	81	58	47
3	1440	178	258	1040	581	564	363	269	424	78	57	45
4	948	168	221	806	964	604	340	336	356	67	56	42
5	707	157	232	745	1040	548	329	1070	287	61	57	40
6	567	150	210	684	844	485	350	1120	240	58	105	39
7	463	147	194	614	712	423	818	845	203	57	124	39
8	386	147	189	806	595	372	747	681	179	58	78	39
9	332	170	185	1260	511	356	615	571	158	58	67	44
10	287	196	166	969	1110	325	527	546	162	56	70	48
11	259	178	168	764	1490	294	517	493	152	56	76	138
12	229	166	174	643	1080	268	456	421	126	63	65	114
13	207	155	182	530	834	245	398	390	116	62	58	168
14	192	148	e150	445	701	230	362	355	108	549	56	156
15	176	146	e130	398	603	219	356	311	115	1020	53	100
16	164	410	e120	359	702	286	327	281	127	538	53	75
17	302	610	112	324	1180	1450	298	265	109	309	51	63
18	679	488	e105	298	926	1770	296	262	98	216	48	55
19	1080	415	e100	277	811	1050	258	223	91	202	48	53
20	1020	367	e100	255	690	791	240	211	85	171	46	56
21	778	330	e98	250	592	620	242	250	90	137	49	54
22	612	293	e96	232	541	537	300	450	92	125	69	59
23	496	288	e96	214	519	469	270	922	146	116	111	71
24	419	244	e94	202	469	450	254	693	143	104	121	62
25	364	219	e94	223	407	1170	239	539	102	98	118	55
26	320	259	e92	338	336	1230	223	451	89	90	92	49
27	286	442	e92	382	341	909	211	455	81	83	81	47
28	257	444	e90	390	374	720	199	891	76	77	68	45
29	235	397	e90	498	---	591	222	2220	71	73	60	43
30	219	346	e115	1580	---	501	219	1540	67	68	55	41
31	209	---	1500	1060	---	437	---	965	---	65	52	---
TOTAL	19243	8048	6038	23136	20363	18690	10725	18503	5300	4864	2162	1935
MEAN	621	268	195	746	727	603	357	597	177	157	69.7	64.5
MAX	2910	610	1500	4810	1490	1770	818	2220	680	1020	124	168
MIN	164	146	90	202	336	219	199	211	67	56	46	39
CFSM	2.78	1.20	.87	3.35	3.26	2.70	1.60	2.68	.79	.70	.31	.29
IN.	3.21	1.34	1.01	3.86	3.40	3.12	1.79	3.09	.88	.81	.36	.32

CAL YR 1989 TOTAL 131141 MEAN 359 MAX 3400 MIN 63 CFSM 1.61 IN. 21.88
WTR YR 1990 TOTAL 139007 MEAN 381 MAX 4810 MIN 39 CFSM 1.71 IN. 23.19

e Estimated.

KANAWHA RIVER BASIN

03176500 NEW RIVER AT GLEN LYN, VA
(National stream-quality accounting network station)

LOCATION.--Lat 37°22'22", long 80°51'39", Giles County, Hydrologic Unit 05050002, on right bank 90 ft upstream from bridge on U.S. Highway 460 at Glen Lyn, 0.3 mi upstream from East River, and 6.3 mi downstream from Wolf Creek.

DRAINAGE AREA.--3,768 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--August 1927 to current year.

REVISED RECORDS.--WSP 758: Drainage area. WSP 1305: 1928(M), 1930(M).

GAGE.--Water-stage recorder. Datum of gage is 1,490.11 ft above National Geodetic Vertical Datum of 1929. Aug. 11, 1927, to Oct. 16, 1934, on left bank opposite present site at same datum, and Oct. 17, 1934, to June 16, 1939, on left bank at site 200 ft upstream at same datum.

REMARKS.--Records good except for period of no gage-height record, Aug. 13-23, which is fair. Flow regulated since 1939 by Claytor Reservoir (station 03169000) 55 mi upstream from station. U.S. Army Corps of Engineers satellite gage-height telemeter at station.

AVERAGE DISCHARGE.--63 years, 4,982 ft³/s, 17.96 in/yr, unadjusted.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 226,000 ft³/s, Aug. 14, 1940, gage height, 27.50 ft, from rating curve extended above 89,000 ft³/s on basis of slope-area measurement of peak flow; minimum, 697 ft³/s, July 5, 1988; minimum daily, 787 ft³/s, July 8, 1988; minimum gage height, 2.10 ft, Sept. 8, 1930.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 44,300 ft³/s, Nov. 17, gage height, 11.38 ft; minimum, 1,120 ft³/s, Sept. 4, gage height, 2.53 ft; minimum daily, 1,250 ft³/s, Sept. 4.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	18800	6060	5880	26400	10500	7230	8880	7000	11800	1590	2820	2450
2	38200	5730	4670	22500	10300	8550	3900	5800	9790	1530	2060	1580
3	27900	5720	4870	15100	8010	8380	8040	8270	7620	2630	1780	1460
4	17500	4510	4110	12900	10800	7480	7640	6260	5590	2530	2150	1250
5	14300	2990	2380	10600	10600	8790	6600	10600	5850	2370	1450	1700
6	11900	2040	2350	9160	10700	8640	6340	11100	5740	3430	1670	1910
7	9410	5240	2790	7780	9920	8530	8470	8600	5610	2500	3710	1770
8	8090	4890	4000	7920	9000	7740	8710	8570	5690	1880	3700	1830
9	7560	4970	4670	12700	9020	7220	4940	6530	5290	1480	5260	1450
10	7090	4960	3620	12500	9790	7130	7160	8670	2600	2060	2350	1320
11	8190	5060	2700	10100	16200	5950	6060	7040	2300	2230	1740	2130
12	3660	4170	6110	9060	14500	3340	6360	7090	4370	2470	1580	2400
13	7240	2400	5500	8780	11800	7370	6430	5220	4510	2930	e1650	2690
14	6060	5930	6630	7290	11000	6460	6270	3950	3800	3450	e2300	3080
15	4530	5670	5560	5050	9200	5820	5970	5840	4060	10500	e2900	3790
16	2730	20100	5540	6150	9970	6890	4520	4610	3720	10800	e3200	3140
17	10500	30600	1960	6250	15600	14900	6010	5460	3680	6350	e2900	1730
18	8380	15400	2120	6260	14700	17600	6030	5980	1930	3920	e2050	1930
19	12800	12400	4590	6270	12000	15100	5830	5920	3350	4450	e1550	2230
20	11800	11800	4080	5310	9780	13200	5390	3800	3130	3940	e1550	2040
21	9230	11400	4260	2610	9410	11300	5340	2460	4340	3140	e2100	1890
22	7910	9760	4830	3370	13100	9780	4300	7180	3180	2090	e3100	2030
23	7210	7480	4260	6220	9950	8500	2580	12600	3150	1770	e3000	1480
24	7130	6940	3630	5250	9690	7990	6040	8530	1950	3090	4350	1410
25	6980	6880	2580	9970	7800	8870	5970	6820	1780	3800	6210	1930
26	6690	6630	2030	6870	9250	7800	5110	6780	2460	3630	3540	2280
27	6600	6440	4790	6620	8570	9670	4510	6280	2940	2810	1760	2090
28	5690	6790	3830	3170	8260	8500	4910	5690	3130	2230	2680	2190
29	3780	6720	4060	3390	---	8590	4420	21400	2820	1650	3310	1790
30	2640	6080	4410	12000	---	10200	5750	19900	2470	1480	2980	1340
31	5830	---	6530	11400	---	7730	---	13400	---	2470	2690	---
TOTAL	306330	235760	129340	278950	299420	275250	178480	247350	128650	101200	84090	60310
MEAN	9882	7859	4172	8998	10690	8879	5949	7979	4288	3265	2713	2010
MAX	38200	30600	6630	26400	16200	17600	8880	21400	11800	10800	6210	3790
MIN	2640	2040	1960	2610	7800	3340	2580	2460	1780	1480	1450	1250
(*)	+54	-318	+236	+102	-41	-102	+71	+137	-77	-31	-7	+29
MEAN#	9936	7541	4408	9100	10650	8777	6020	816	4211	3234	2706	2039
CFSM#	2.64	2.00	1.17	2.42	2.83	2.33	1.60	2.15	1.12	.86	.72	.54
IN.#	3.04	2.23	1.35	2.79	2.94	2.69	1.78	2.48	1.25	.99	.83	.60

CAL YR 1989 TOTAL 2190640 MEAN 6002 MAX 74800 MIN 1400 MEAN# 5992 CFSM# 1.59 IN.# 21.59
WTR YR 1990 TOTAL 2325130 MEAN 6370 MAX 38200 MIN 1250 MEAN# 6376 CFSM# 1.69 IN.# 22.98

* Change in contents, equivalent in cubic feet per second, in Claytor Reservoir; provided by Appalachian Power Company.

Adjusted for change in contents.

e Estimated.

KANAWHA RIVER BASIN

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03176500 NEW RIVER AT GLEN LYN, VA--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1931, 1950, 1952, 1955-56, 1965 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: April 1968 to September 1988 (discontinued).

WATER TEMPERATURE: October 1964 to September 1988 (discontinued).

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	TUR- BID- ITY (NTU) (00076)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	STREP- TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)
NOV 28...	0930	6690	130	7.2	7.0	719	16	11.6	101	150	77
JAN 09...	1015	13700	125	7.6	3.0	723	17	12.2	96	610	1100
MAR 07...	0930	8330	135	7.7	7.0	738	5.0	11.3	96	63	K18
MAY 16...	1045	4860	121	8.1	19.5	722	0.50	8.8	101	45	K8
JUL 25...	1045	5430	168	7.3	24.0	729	3.2	7.5	93	69	130
AUG 28...	1030	2940	170	7.5	25.0	725	1.5	7.4	94	360	130

DATE	HARD- NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	ALKA- LINITY WAT DIS TOT IT FIELD (MG/L AS CACO3 (39086)	BICAR- BONATE WATER DIS IT FIELD (MG/L AS HCO3 (00453)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)
NOV 28...	54	13	5.2	3.0	1.8	46	45	55	10	4.1	0.30
JAN 09...	54	14	4.7	3.8	1.4	45	43	53	9.0	5.0	<0.10
MAR 07...	61	15	5.7	3.5	1.2	49	46	56	9.3	4.1	<0.10
MAY 16...	51	12	5.2	3.3	1.1	46	47	57	8.1	4.4	<0.10
JUL 25...	63	13	7.5	4.9	1.7	61	56	68	15	6.1	<0.10
AUG 28...	64	13	7.6	4.7	1.8	60	55	67	16	6.1	<0.10

< Actual value is known to be less than the value shown.

K Results based on colony count outside the acceptance range (non-ideal colony count).

KANAWHA RIVER BASIN

03176500 NEW RIVER AT GLEN LYN, VA--Continued

DATE	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)
NOV 28...	7.1	71	49	<0.010	0.660	0.030	0.040	0.30	0.060	0.030	0.020
JAN 09...	7.8	77	75	<0.010	0.750	0.060	0.050	0.50	0.050	0.040	0.020
MAR 07...	7.8	80	78	0.030	0.840	0.020	0.020	0.20	0.440	0.020	0.010
MAY 16...	5.1	60	69	0.010	0.400	0.020	0.020	0.30	0.030	0.020	0.020
JUL 25...	7.4	101	92	0.010	0.700	0.050	0.030	0.80	0.060	0.060	0.040
AUG 28...	7.4	100	93	<0.010	0.800	0.020	0.010	0.40	0.060	0.050	0.020

DATE	ALUM- INUM, DIS- SOLVED (UG/L AS AL) (01106)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BARIUM, DIS- SOLVED (UG/L AS BA) (01005)	BERYL- LIUM, DIS- SOLVED (UG/L AS BE) (01010)	CADMIUM DIS- SOLVED (UG/L AS CD) (01025)	CHRO- MIUM, DIS- SOLVED (UG/L AS CR) (01030)	COBALT, DIS- SOLVED (UG/L AS CO) (01035)	COPPER, DIS- SOLVED (UG/L AS CU) (01040)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)
NOV 28...	50	<1	30	<0.5	<1.0	<1	4	10	89	<1	<4
JAN 09...	--	--	--	--	--	--	--	--	--	--	--
MAR 07...	10	<1	28	<0.5	<1.0	<5*	<3	<10*	42	<10*	<4
MAY 16...	10	<1	24	<0.5	<1.0	<1	<3	2	26	1	<4
JUL 25...	--	--	--	--	--	--	--	--	--	--	--
AUG 28...	20	<1	33	<0.5	<1.0	<1	<3	2	18	1	<4

DATE	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	NICKEL, DIS- SOLVED (UG/L AS NI) (01065)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	SILVER, DIS- SOLVED (UG/L AS AG) (01075)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)	VANA- DIUM, DIS- SOLVED (UG/L AS V) (01085)	ZINC, DIS- SOLVED (UG/L AS ZN) (01090)	SEDI- MENT, SUS- PENDE (MG/L) (80154)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
NOV 28...	4	<0.1	<10	2	<1	<1.0	56	<6	10	21	78
JAN 09...	--	--	--	--	--	--	--	--	--	59	56
MAR 07...	5	<0.1	<10	<10*	<1	<1.0	58	<6	4	10	71
MAY 16...	4	<0.1	<10	1	<1	<1.0	52	<6	49	5	60
JUL 25...	--	--	--	--	--	--	--	--	--	13	88
AUG 28...	6	<0.1	<10	1	<3	<1.0	76	<6	20	6	84

* An alternate analytical method resulted in a change of the minimum reporting level for these constituents.
 < Actual value is known to be less than the value shown.

03177710 BLUESTONE RIVER AT FALLS MILLS, VA

LOCATION.--Lat 37°16'17", long 81°18'18", Tazewell County, Hydrologic Unit 05050002, on right bank at upstream side of bridge on State Highway 717, 0.3 mi upstream from Brush Fork, and 0.4 mi southeast of Falls Mills.

DRAINAGE AREA.--44.2 mi².

PERIOD OF RECORD.--October 1980 to current year.

GAGE.--Water-stage recorder. Datum of gage is 2,310.41 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records good except those for periods with ice effect, Dec. 13-27, 29, 30, which are fair. Some diurnal fluctuation caused by discharge from sewage treatment plant 2.3 mi upstream. About 65 percent of water discharged from the treatment plant was diverted from another drainage basin for municipal supply. Several measurements of water temperature were made during the year.

AVERAGE DISCHARGE.--10 years, 58.8 ft³/s, 18.07 in/yr, unadjusted.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,050 ft³/s, May 7, 1984, gage height, 8.37 ft, from rating curve extended above 670 ft³/s; minimum, 1.0 ft³/s, Jan. 18, 1981, gage height, 0.92 ft, result of freezeup; minimum daily, 3.9 ft³/s, Jan. 19, 1981.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 450 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Oct. 1	1600	483	4.52	Feb. 10	1245	564	5.08
Jan. 1	0245	*677	*5.85				

Minimum discharge, 12 ft³/s, Sept. 27-28, gage height, 1.08 ft; minimum daily, 13 ft³/s, Dec. 25-29.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	394	34	41	525	127	97	82	50	105	23	16	16
2	321	31	34	247	105	106	79	49	90	25	16	16
3	209	30	33	172	125	123	74	47	78	21	16	15
4	153	28	31	141	214	112	74	59	67	19	16	15
5	119	24	31	116	191	99	68	99	58	19	44	15
6	98	24	28	108	150	88	125	89	53	21	87	15
7	85	24	26	94	125	78	207	81	49	19	35	17
8	75	30	27	217	104	73	144	68	48	18	24	17
9	66	64	24	239	93	70	115	68	45	18	21	21
10	59	51	27	178	410	63	103	79	53	18	19	19
11	54	41	26	141	293	59	106	64	43	27	19	28
12	50	37	28	117	217	57	89	58	38	23	18	65
13	49	34	e25	97	171	51	79	55	35	49	17	54
14	46	33	e22	85	140	48	74	52	34	201	17	61
15	44	32	e19	79	117	46	81	50	46	128	16	34
16	43	105	e17	70	175	97	70	49	41	67	16	26
17	164	92	e16	64	178	299	73	55	33	50	16	22
18	144	74	e15	61	147	236	70	46	31	41	20	17
19	279	61	e15	55	147	169	62	43	27	38	16	28
20	206	54	e15	53	119	136	60	45	26	36	16	20
21	156	47	e14	52	106	108	70	77	48	34	24	17
22	115	43	e14	45	99	95	63	128	45	31	86	45
23	89	55	e14	43	94	87	56	130	42	29	98	30
24	76	41	e14	41	91	122	53	94	29	26	71	23
25	66	41	e13	62	81	300	50	76	26	23	45	19
26	58	56	e13	104	72	215	48	71	23	22	32	18
27	49	59	e13	88	78	167	46	88	23	21	26	16
28	45	59	13	93	102	130	45	168	23	20	22	16
29	41	50	e13	144	---	109	54	260	21	19	20	15
30	38	45	e30	229	---	97	48	186	22	18	18	15
31	36	---	414	168	---	86	---	137	---	18	17	---
TOTAL	3427	1399	1065	3928	4071	3623	2368	2621	1302	1122	924	735
MEAN	111	46.6	34.4	127	145	117	78.9	84.5	43.4	36.2	29.8	24.5
MAX	394	105	414	525	410	300	207	260	105	201	98	65
MIN	36	24	13	41	72	46	45	43	21	18	16	15
(*)	5.75	4.97	4.33	6.14	6.85	6.29	5.47	5.34	4.01	3.51	3.70	3.55

CAL YR 1989 TOTAL 27760 MEAN 76.1 MAX 463 MIN 13 (*) 5.11
WTR YR 1990 TOTAL 26585 MEAN 72.8 MAX 525 MIN 13 (*) 4.99

* Discharge from sewage treatment plant, equivalent in cubic feet per second; provided by the Sanitary Board of Bluefield.

e Estimated.

BIG SANDY RIVER BASIN

03207800 LEVISA FORK AT BIG ROCK, VA

LOCATION.--Lat 37°21'13", long 82°11'45", Buchanan County, Hydrologic Unit 05070202, on left bank at Big Rock, 2,000 ft downstream from Rocklick Creek, and 2,500 ft downstream from bridge on State Highway 645.

DRAINAGE AREA.--297 mi².

PERIOD OF RECORD.--October 1967 to current year.

GAGE.--Water-stage recorder. Datum of gage is 866.37 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records good except those for period with ice effect, Dec. 15-29, and periods of doubtful gage-height record, Apr. 3-5, July 25 to Aug. 4, Aug. 8, 9, 13, 15-20, Aug. 25 to Sept. 5, and Sept. 30, which are fair. U.S. Army Corps of Engineers satellite precipitation and gage-height telemeter at station. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

AVERAGE DISCHARGE.--23 years, 373 ft³/s, 17.06 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 56,000 ft³/s, Apr. 4, 1977, gage height, 27.38 ft, from rating curve extended above 7,000 ft³/s on basis of slope-area measurement of peak flow; minimum, 5.0 ft³/s, Oct. 1, 13, 14, 17, 18, 19, 20, 1969.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Jan. 29, 1957, reached a stage of about 23.0 ft, information from local resident.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 4,500 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Oct. 17	1315	*10,600	*12.14	Feb. 10	1330	7,870	10.57
Oct. 19	0400	5,270	8.88				

Minimum discharge, 21 ft³/s, Sept. 6-7, gage height, 2.65 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	984	253	333	2550	697	408	417	598	498	119	e50	e29
2	949	208	312	1300	570	475	401	531	415	146	e44	e27
3	569	197	297	843	912	737	e380	475	422	109	e43	e25
4	388	183	265	678	2710	793	e370	449	386	95	e42	e24
5	288	174	259	573	2150	664	e360	655	307	88	e68	e24
6	235	168	245	513	1240	554	539	691	264	101	94	23
7	201	166	222	458	913	474	1710	627	240	95	88	23
8	170	240	251	730	701	422	1270	526	284	79	e48	68
9	149	850	278	1410	593	406	914	460	243	73	e47	88
10	136	947	251	1070	4560	369	750	488	256	67	77	90
11	127	623	243	807	2710	340	873	409	206	73	157	67
12	115	477	250	662	1480	313	798	343	174	90	77	98
13	107	385	251	529	1060	288	700	317	158	108	e66	167
14	101	338	232	444	854	274	625	277	146	108	75	91
15	98	319	e200	405	720	261	669	244	296	223	e70	117
16	97	889	e175	358	1780	268	596	280	323	189	e60	79
17	4520	1160	e155	325	1570	785	585	329	223	112	e54	55
18	1970	857	e145	312	1120	1260	554	301	178	87	e50	41
19	3790	637	e135	281	920	877	493	245	168	80	e47	53
20	1690	534	e130	276	722	693	467	231	137	75	e45	63
21	1060	467	e125	285	602	563	500	330	241	73	70	50
22	728	409	e125	254	550	505	620	1700	216	116	109	172
23	543	445	e120	234	524	462	596	1800	507	100	128	170
24	446	363	e120	225	501	449	536	908	339	73	68	88
25	381	340	e115	260	427	910	472	598	231	e62	e52	61
26	333	360	e115	389	351	1170	426	481	178	e58	e43	51
27	295	359	e115	417	361	889	389	602	149	e53	e37	45
28	265	388	e110	422	408	698	372	1330	131	e50	e33	40
29	246	372	e110	491	---	585	523	1070	117	e48	e32	37
30	229	350	250	1240	---	508	465	852	108	e47	e36	e35
31	244	---	1520	953	---	462	---	649	---	e48	e33	---
TOTAL	21454	13458	7454	19694	31706	17862	18370	18796	7541	2845	1943	2001
MEAN	692	449	240	635	1132	576	612	606	251	91.8	62.7	66.7
MAX	4520	1160	1520	2550	4560	1260	1710	1800	507	223	157	172
MIN	97	166	110	225	351	261	360	231	108	47	32	23
CFSM	2.33	1.51	.81	2.14	3.81	1.94	2.06	2.04	.85	.31	.21	.22
IN.	2.69	1.69	.93	2.47	3.97	2.24	2.30	2.35	.94	.36	.24	.25

CAL YR 1989 TOTAL 177846 MEAN 487 MAX 5300 MIN 56 CFSM 1.64 IN. 22.28
WTR YR 1990 TOTAL 163124 MEAN 447 MAX 4560 MIN 23 CFSM 1.50 IN. 20.43

e Estimated.

BIG SANDY RIVER BASIN

347

03208000 LEVISA FORK BELOW FISHTRAP DAM, NEAR MILLARD, KY

LOCATION.--Lat 37°25'33", long 82°24'45", Pike County, Hydrologic Unit 05070202, on right bank, 0.4 mi downstream from Fishtrap Dam, 1.1 mi upstream from Lower Pompey Branch, 1.9 mi northeast of Millard, 2.4 mi upstream from confluence with Russell Fork, and at mile 129.6.

DRAINAGE AREA.--392 mi².

PERIOD OF RECORD.--February 1938 to current year. Prior to April 1968, published as "Levisa Fork at Fishtrap."

REVISED RECORDS.--WSP 953. Drainage area. WSP 1335: 1938(M), 1939, 1940(M), 1942-43, 1944-45(M), 1946, 1948.

GAGE.--Water-stage recorder. Datum of gage is 600.00 ft above National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers). Prior to Apr. 19, 1968, nonrecording gage at site 3.7 mi upstream at different datum. Apr. 19, 1968, to June 18, 1973, water-stage recorder at site 1.0 mi downstream at datum 59.96 ft higher.

REMARKS.--Records good except for period of estimated record, Dec. 25-28, which is fair. Flow regulated by Fishtrap Lake beginning October 1968. Water-quality records for some prior periods have been collected at this location.

AVERAGE DISCHARGE.--52 years, 475 ft³/s, 16.46 in/yr, unadjusted.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 33,000 ft³/s, Jan. 29, 1957, gage height, 33.9 ft, from floodmark, site and datum then in use, from rating curve extended above 15,000 ft³/s on basis of slope-area measurement of peak flow; maximum gage height, 107.55 ft, Apr. 5, 1977, from floodmark, backwater from Russell Fork; no flow Apr. 5, 1977, all gates on Fishtrap Dam closed; minimum observed discharge prior to Fishtrap Lake, 0.1 ft³/s, Nov. 8, 9, 1939, site then in use.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 7,880 ft³/s, Oct. 20, gage height, 84.79 ft; minimum daily, 16 ft³/s, Feb. 27.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	847	471	389	1920	914	626	125	614	606	132	95	94
2	1460	466	412	2110	711	622	125	612	519	132	94	94
3	996	448	374	1900	701	623	123	611	562	132	94	94
4	513	421	327	1400	1640	633	122	609	423	112	94	94
5	361	418	283	909	2380	1010	123	680	320	104	94	94
6	250	408	300	619	2840	785	124	845	324	126	94	94
7	265	406	266	620	2790	846	125	881	331	127	94	94
8	217	406	272	635	1340	893	127	684	332	122	94	89
9	172	586	257	1230	654	761	392	610	332	116	94	89
10	169	456	302	1560	2300	586	596	610	265	107	95	93
11	226	457	337	1120	3510	581	982	455	233	97	94	96
12	242	454	294	597	3960	487	941	332	233	97	94	97
13	242	1180	291	347	3600	326	857	379	179	98	94	97
14	238	1330	240	485	1730	319	866	332	119	115	92	98
15	229	884	244	777	857	399	866	246	257	136	90	101
16	322	1120	209	653	1100	349	866	168	377	202	90	101
17	1230	1280	129	425	1750	494	704	392	482	230	90	104
18	1770	1150	200	341	2020	874	594	360	174	230	90	101
19	2540	1410	286	407	1650	1750	594	329	77	184	90	101
20	4620	1170	267	319	1000	1510	688	290	165	118	92	260
21	7550	752	189	305	742	916	678	200	435	100	92	368
22	4670	511	78	345	704	801	752	1140	261	101	90	430
23	2250	689	29	303	647	726	796	2250	238	102	133	544
24	1240	546	29	272	580	690	796	1450	577	102	136	700
25	458	446	29	290	578	708	711	820	337	102	90	422
26	469	562	44	301	233	335	620	580	192	102	92	239
27	584	525	74	325	16	128	498	808	144	102	92	177
28	550	574	115	326	407	125	476	1380	132	102	92	171
29	473	518	214	682	---	125	539	1300	132	97	93	191
30	473	474	194	1220	---	127	612	1080	132	96	94	193
31	471	---	530	1230	---	127	---	715	---	96	94	---
TOTAL	36097	20518	7204	23983	41354	19282	16418	21762	8890	3819	2956	5520
MEAN	1164	684	232	774	1477	622	547	702	296	123	95.4	184
MAX	7550	1410	530	2110	3960	1750	982	2250	606	230	136	700
MIN	169	406	29	272	16	125	122	168	77	96	90	89

CAL YR 1989 TOTAL 241584 MEAN 662 MAX 7550 MIN 29
WTR YR 1990 TOTAL 207803 MEAN 569 MAX 7550 MIN 16

BIG SANDY RIVER BASIN

03208500 RUSSELL FORK AT HAYSI, VA

LOCATION.--Lat 37°12'25", long 82°17'45", Dickenson County, Hydrologic Unit 05070202, on right bank 180 ft downstream from bridge on State Highway 63, at Haysi, and 700 ft downstream from McClure River.

DRAINAGE AREA.--286 mi².

PERIOD OF RECORD.--July 1926 to current year. Monthly discharge only for some periods, published in WSP 1305.

REVISED RECORDS.--WSP 1003: 1926-43. WSP 1385: 1928(M), 1929, 1933(M), 1935(M), 1937-38(M).

GAGE.--Water-stage recorder. Datum of gage is 1,237.61 ft above National Geodetic Vertical Datum of 1929. Prior to Dec. 21, 1939, nonrecording gage at highway bridge 180 ft upstream at same datum.

REMARKS.--Records good except for period with ice effect, Dec. 15-29, which is fair. U.S. Army Corps of Engineers satellite precipitation and gage-height telemeter at station. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

AVERAGE DISCHARGE.--64 years, 330 ft³/s, 15.67 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 59,000 ft³/s, Apr. 4, 1977, gage height, 28.24 ft, from rating curve extended above 32,000 ft³/s on basis of slope-area measurement of peak flow; minimum observed, 0.2 ft³/s, June 27, 28, 1936.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 4,500 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Oct. 17	1315	10,100	10.22	Feb. 10	1300	10,600	10.51
Oct. 19	0545	*10,700	*10.53				

Minimum discharge, 21 ft³/s, Sept. 6-7, gage height, 1.92 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2310	226	256	2150	654	303	365	530	420	77	35	30
2	1620	191	240	1080	526	346	342	1100	346	79	30	27
3	835	181	232	713	982	473	321	791	332	70	29	26
4	562	169	206	580	2800	487	302	727	299	62	28	24
5	421	156	205	487	1980	438	272	1870	235	59	30	23
6	344	155	197	431	1090	392	387	1350	201	69	43	22
7	282	157	179	383	793	347	1290	895	189	68	51	23
8	232	257	199	639	602	310	964	665	213	56	34	44
9	201	955	225	1260	510	302	703	535	175	52	31	60
10	178	919	206	930	6010	277	587	531	250	51	138	54
11	168	593	200	701	2790	257	641	435	204	53	363	55
12	150	449	208	572	1320	236	571	365	163	63	105	65
13	136	367	204	447	885	222	510	334	143	65	64	168
14	129	325	186	371	703	211	470	286	136	75	50	74
15	124	304	e170	341	580	206	503	247	340	124	65	70
16	119	800	e150	300	1140	209	455	231	276	123	54	50
17	4090	942	e140	269	1310	953	455	317	197	69	42	39
18	1450	704	e125	262	959	1390	452	286	156	56	37	32
19	6190	530	e115	239	799	837	421	221	138	58	34	40
20	1890	452	e110	228	629	635	408	211	126	52	32	50
21	1040	399	e110	239	524	506	453	317	145	47	55	42
22	688	348	e105	215	490	471	1000	777	145	105	153	197
23	513	405	e105	200	476	443	846	878	276	77	141	177
24	424	341	e100	195	433	431	645	546	173	56	76	85
25	363	331	e100	221	366	1380	514	391	145	46	55	58
26	320	344	e98	293	298	1380	436	340	117	40	46	47
27	284	335	e97	282	307	887	384	501	102	37	40	42
28	252	332	e96	282	319	659	356	1370	89	34	35	36
29	233	300	e94	428	---	533	470	963	81	33	34	33
30	217	269	337	1590	---	456	419	779	75	32	39	31
31	226	---	1460	934	---	411	---	566	---	33	34	---
TOTAL	25991	12236	6455	17262	30275	16388	15942	19355	5887	1922	2003	1724
MEAN	838	408	208	557	1081	529	531	624	196	62.0	64.6	57.5
MAX	6190	955	1460	2150	6010	1390	1290	1870	420	124	363	197
MIN	119	155	94	195	298	206	272	211	75	32	28	22
CFSM	2.93	1.43	.73	1.95	3.78	1.85	1.86	2.18	.69	.22	.23	.20
IN.	3.38	1.59	.84	2.25	3.94	2.13	2.07	2.52	.77	.25	.26	.22

CAL YR 1989 TOTAL 182213 MEAN 499 MAX 6610 MIN 56 CFSM 1.75 IN. 23.70
WTR YR 1990 TOTAL 155440 MEAN 426 MAX 6190 MIN 22 CFSM 1.49 IN. 20.22

e Estimated.

BIG SANDY RIVER BASIN

349

03208680 NORTH FORK POUND RIVER LAKE AT POUND, VA

LOCATION.--Lat 37°07'27", long 82°37'52", Wise County, Hydrologic Unit 05070202, in control tower of North Fork Pound Dam at Pound, 1,200 ft upstream from Stacy Branch, and 1.2 mi upstream from South Fork Pound River.

DRAINAGE AREA.--17.2 mi².

PERIOD OF RECORD.--July 1966 to current year.

GAGE.--Water-stage recorder. Datum of gage is National Geodetic Vertical datum of 1929 (U.S. Army Corps of Engineers bench mark). Prior to Aug. 29, 1966, nonrecording gage at same site and datum.

REMARKS.--Lake is formed by rockfill dam. Spillway with crest at elevation 1,644.0 ft is in a saddle 350 ft southeast of dam. Except during major floods, all discharge will be through a diversion tunnel, the invert of the entrance of which is at elevation 1,556.5 ft. Storage began in September 1964 during construction with peak discharge affected thereafter; initial filling for regular operation started July 13, 1966. Total capacity at elevation 1,644.0 ft, top of spillway, is 11,290 acre-ft of which 8,110 acre-ft is flood-control storage for summer operations between elevations 1,611.0 ft, top of summer conservation pool, and 1,644.0 ft; an additional 1,290 acre-ft is available for flood control during the period December to March between elevations 1,601.0 ft, top of winter conservation pool, and 1,611.0 ft; contents at established minimum pool, 1,601.0 ft, is 1,900 acre-ft; dead storage is 7 acre-ft below elevation 1,556.5 ft. Figures given herein represent total contents. Lake is used for flood control, low-water augmentation for water-quality control, and recreation. U.S. Army Corps of Engineers satellite elevation telemeter at station.

COOPERATION.--Records were provided by the U.S. Army Corps of Engineers.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 6,920 acre-ft, Apr. 8, 1977, elevation, 1,629.41 ft; minimum (after initial filling for regular operation), 1,660 acre-ft, Jan. 23, 1969, elevation, 1,598.62 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 4,160 acre-ft, Oct. 18, elevation, 1,616.81 ft; minimum, 1,960 acre-ft, Dec. 24, elevation, 1,601.58 ft.

MONTHEND ELEVATION AND CONTENTS AT 2400, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

Date	Elevation (feet)	Contents (acre-feet)	Change in contents (acre-feet)
Sept. 30.....	1,611.48	3,259	-
Oct. 31.....	1,606.96	2,605	-654
Nov. 30.....	1,601.89	1,990	-615
Dec. 31.....	1,602.01	2,003	+13
CAL YR 1989.....	-	-	-59
Jan. 31.....	1,602.01	2,003	0
Feb. 28.....	1,601.82	1,983	-20
Mar. 31.....	1,605.31	2,392	+409
Apr. 30.....	1,611.57	3,273	+881
May 31.....	1,611.53	3,267	-6
June 30.....	1,611.56	3,273	+5
July 31.....	1,611.24	3,222	-50
Aug. 31.....	1,611.32	3,234	+12
Sept. 30.....	1,611.10	3,200	-34
WTR YR 1990.....	-	-	-59

BIG SANDY RIVER BASIN

03208950 CRANES NEST RIVER NEAR CLINTWOOD, VA

LOCATION.--Lat 37°07'26", long 82°26'20", Dickenson County, Hydrologic Unit 05070202, on left bank on State Highway 649, 500 ft downstream from Clinchfield Railway bridge, 1,000 ft downstream from Rush Creek, and 2.1 mi southeast of Clintwood.

DRAINAGE AREA.--66.5 mi².

PERIOD OF RECORD.--October 1963 to current year.

REVISED RECORDS.--WDR VA-77-1: 1967(M).

GAGE.--Water-stage recorder. Datum of gage is 1,440.30 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records good except for period with ice effect, Dec. 15-29, which is fair. U.S. Army Corps of Engineers satellite precipitation and gage-height telemeter at station. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

AVERAGE DISCHARGE.--27 years, 79.1 ft³/s, 16.15 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 18,000 ft³/s, Apr. 4, 1977, gage height, 26.09 ft, from floodmark, from rating curve extended above 3,100 ft³/s on basis of slope-area measurement of peak flow; minimum, 0.48 ft³/s, Sept. 28, 1964, gage height, 0.91 ft.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Jan. 29, 1957, reached a stage of about 20.0 ft.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 1,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Oct. 17	1215	*2,950	*11.99	Feb. 10	1100	2,530	11.08
Oct. 19	0615	1,560	8.48				

Minimum discharge, 9.2 ft³/s, Sept. 6-7, gage height, 1.38 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	527	63	60	343	144	72	87	155	52	22	15	12
2	299	56	58	197	119	82	82	268	51	21	14	11
3	173	54	56	145	337	104	76	188	58	19	13	11
4	121	51	52	125	653	93	72	198	54	19	13	10
5	93	49	53	108	396	87	67	558	45	18	13	9.7
6	78	47	50	95	242	80	115	300	40	28	16	9.4
7	68	49	46	85	188	74	248	209	40	22	14	9.6
8	60	80	58	153	149	71	180	157	51	18	12	39
9	54	140	59	219	129	70	142	126	40	17	13	18
10	51	125	53	177	1420	67	125	136	97	16	28	15
11	50	95	52	142	546	64	156	110	53	16	37	14
12	45	79	54	120	303	59	139	91	41	16	18	17
13	42	70	52	94	215	57	123	84	36	20	14	19
14	41	65	49	81	175	55	113	73	33	27	13	15
15	39	63	e41	75	147	54	121	66	60	41	14	14
16	38	232	e38	70	295	57	103	61	74	26	13	13
17	1140	192	e35	66	298	328	103	109	45	20	12	11
18	381	144	e33	66	215	287	104	80	41	17	12	10
19	1030	112	e32	60	186	182	93	65	37	28	11	13
20	401	98	e30	58	151	149	89	62	32	20	11	14
21	238	87	e29	61	128	126	106	85	39	26	22	12
22	168	79	e28	54	121	124	193	106	35	49	46	76
23	130	106	e28	52	117	113	151	85	49	27	28	30
24	107	86	e27	51	105	109	123	68	33	21	18	18
25	92	82	e27	60	89	291	103	58	33	18	15	14
26	82	83	e26	69	77	249	90	55	27	16	14	13
27	97	78	e26	59	77	184	80	91	25	15	13	12
28	79	76	e25	57	78	148	75	80	24	15	12	11
29	68	69	e25	185	---	123	91	77	23	14	13	10
30	64	63	76	356	---	108	82	69	22	14	16	10
31	71	---	322	197	---	98	---	58	---	18	14	---
TOTAL	5927	2673	1600	3680	7100	3765	3432	3928	1290	664	517	490.7
MEAN	191	89.1	51.6	119	254	121	114	127	43.0	21.4	16.7	16.4
MAX	1140	232	322	356	1420	328	248	558	97	49	46	76
MIN	38	47	25	51	77	54	67	55	22	14	11	9.4
CFSM	2.88	1.34	.78	1.79	3.81	1.83	1.72	1.91	.65	.32	.25	.25
IN.	3.32	1.50	.90	2.06	3.97	2.11	1.92	2.20	.72	.37	.29	.27

CAL YR 1989 TOTAL 44768 MEAN 123 MAX 1140 MIN 25 CFSM 1.84 IN. 25.04
WTR YR 1990 TOTAL 35066.7 MEAN 96.1 MAX 1420 MIN 9.4 CFSM 1.44 IN. 19.62

e Estimated.

BIG SANDY RIVER BASIN

351

03208990 JOHN W. FLANNAGAN RESERVOIR NEAR HAYSI, VA

LOCATION.--Lat 37°14'00", long 82°20'56", Dickenson County, Hydrologic Unit 05070202, in control tower of John W. Flannagan Dam on Pound River, 1.3 mi upstream from Blacklog Branch, and 3.7 mi northwest of Haysi.

DRAINAGE AREA.--221 mi².

PERIOD OF RECORD.--September 1964 to current year.

GAGE.--Water-stage recorder. Datum of gage is National Geodetic Vertical Datum of 1929 (U.S. Army Corps of Engineers bench mark). Prior to Mar. 31, 1965, nonrecording gage at same site and datum.

REMARKS.--Reservoir is formed by rockfill dam. Spillway with crest at elevation 1,410.0 ft is in a saddle 0.3 mi upstream from dam and is equipped with 6 radial gates 36 ft high by 42 ft wide. Except during major floods, all discharge will be through a diversion tunnel, the invert of the entrance of which is at elevation 1,230.0 ft. Storage began in September 1961 during construction with peak discharge affected thereafter; initial filling for regular operations started in March 1965. Total capacity at elevation 1,446.0 ft, top of gates, is 145,700 acre-ft of which 78,600 acre-ft is controlled flood storage for summer operations between elevations 1,396.0 ft, top of summer conservation pool, and 1,446.0 ft; an additional 16,500 acre-ft is available for flood control during the period December to March between elevations 1,380.0 ft, top of winter conservation pool, and 1,396.0 ft; contents at established minimum pool, 1,314.0 ft, is 12,000 acre-ft; dead storage is 300 acre-ft below elevation 1,230.0 ft. Figures given herein represent total contents. Reservoir is used for flood control, low-water augmentation for water-quality control, and recreation. U.S. Army Corps of Engineers satellite elevation telemeter at station.

COOPERATION.--Records were provided by the U.S. Army Corps of Engineers.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 116,500 acre-ft, Apr. 7, 1977, elevation, 1,430.80 ft; minimum (after initial filling for regular operation), 11,800 acre-ft, Apr. 1, 1965, elevation, 1,313.42 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 80,400 acre-ft, Oct. 20, elevation, 1,406.88 ft; minimum, 50,800 acre-ft, Feb. 26, elevation, 1,380.20 ft.

MONTHEND ELEVATION AND CONTENTS AT 2400, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

Date	Elevation (feet)	Contents (acre-feet)	Change in contents (acre-feet)
Sept. 30.....	1,396.62	67,800	-
Oct. 31.....	1,387.73	58,100	-9,700
Nov. 30.....	1,380.57	51,100	-7,000
Dec. 31.....	1,380.57	51,100	0
CAL YR 1989.....	-	-	-400
Jan. 31.....	1,380.91	51,400	+300
Feb. 28.....	1,380.93	51,400	0
Mar. 31.....	1,386.12	56,500	+5,100
Apr. 30.....	1,396.37	67,500	+11,000
May 31.....	1,396.21	67,300	-200
June 30.....	1,396.34	67,500	+200
July 31.....	1,396.13	67,200	-300
Aug. 31.....	1,396.19	67,300	+100
Sept. 30.....	1,396.13	67,200	-100
WTR YR 1990.....	-	-	-600

BIG SANDY RIVER BASIN

03209000 POUND RIVER BELOW FLANNAGAN DAM, NEAR HAYSI, VA

LOCATION.--Lat 37°14'13", long 82°20'36", Dickenson County, Hydrologic Unit 05070202, on right bank 1,100 ft upstream from Blacklog Branch, 1,700 ft downstream from John W. Flannagan Dam, 1.4 mi upstream from mouth, and 3.4 mi northwest of Haysi.

DRAINAGE AREA.--221 mi².

PERIOD OF RECORD.--July 1926 to current year. Monthly discharge only for some periods, published in WSP 1305. Prior to October 1963, published as Pound River near Haysi.

REVISED RECORDS.--WSP 953: 1940-41. WSP 1003: 1942, 1943(P). WSP 1275: 1927-30, 1931(M), 1932-39.

GAGE.--Water-stage recorder. Datum of gage is 1,200.00 ft above National Geodetic Vertical Datum of 1929 (U.S. Army Corps of Engineers bench mark). Prior to Dec. 20, 1939, nonrecording gage at site 3.8 mi upstream at different datum. Dec. 20, 1939, to Sept. 30, 1963, water-stage recorder at site 4.6 mi upstream at datum 79.91 ft higher.

REMARKS.--Records good except those for periods of no gage-height record, Jan. 3-5, 12-16, which are fair. Flow regulated since March 1965 by John W. Flannagan Reservoir (station 03208990) 1,700 ft upstream and since August 1966 by North Fork Pound River Lake (station 03208680) 33 mi upstream. U.S. Army Corps of Engineers satellite precipitation and gage-height telemeter at station. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

AVERAGE DISCHARGE.--64 years, 274 ft³/s, 16.84 in/yr, unadjusted.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, about 30,000 ft³/s, Mar. 23, 1929, gage height, 16.5 ft, from floodmarks, site and datum then in use; minimum, less than 0.1 ft³/s on several days in September 1932. Maximum discharge since construction of John W. Flannagan Dam in 1965, 4,540 ft³/s, Apr. 8, 1977, gage height, 8.20 ft; minimum, 1.2 ft³/s, Feb. 16, 1968, Aug. 26, 1986; minimum daily, 2.3 ft³/s, June 26-29, 1965; minimum gage height, 1.42 ft, Feb. 16, 1968.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 4,100 ft³/s, Oct. 20, gage height, 7.84 ft; minimum, 32 ft³/s, Oct. 1, gage height, 1.99 ft; minimum daily, 33 ft³/s, Nov. 2, 3.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	500	93	197	1160	481	351	83	245	221	45	48	54
2	1620	33	197	865	351	351	83	705	252	45	48	55
3	1550	33	197	e540	829	351	83	530	215	71	48	56
4	989	200	156	e280	2500	408	132	495	215	129	49	56
5	492	374	129	e230	2350	446	180	1000	215	43	49	71
6	343	268	129	221	1290	446	129	750	215	43	50	74
7	524	270	129	316	788	316	56	659	162	43	50	74
8	446	271	184	428	464	247	56	588	136	43	50	74
9	105	236	215	702	456	265	52	390	136	43	50	66
10	179	298	215	696	254	218	50	308	198	43	51	60
11	241	372	176	611	1390	218	51	310	247	43	51	60
12	241	441	158	e350	2820	218	51	311	249	45	51	60
13	282	441	158	e160	2780	218	51	270	248	56	51	56
14	566	573	158	e110	1360	186	51	251	247	105	51	51
15	495	425	158	e100	437	167	51	195	248	278	53	51
16	124	781	158	e100	1050	235	51	153	278	201	53	51
17	119	884	158	115	1290	393	183	277	215	63	53	51
18	2530	664	81	171	828	1200	333	257	54	66	53	51
19	870	663	79	200	544	1080	442	174	104	67	53	51
20	2970	570	94	200	533	572	408	174	104	67	53	51
21	4010	425	94	200	394	425	335	267	106	67	53	51
22	2850	424	94	200	356	359	642	539	106	67	127	59
23	2030	424	94	200	357	325	673	539	319	96	166	111
24	1140	424	94	136	359	271	547	433	174	114	91	110
25	340	424	94	113	359	271	425	326	174	98	52	108
26	364	424	94	156	158	168	331	242	136	62	53	108
27	523	424	94	174	89	83	271	251	81	50	53	108
28	799	424	136	174	276	83	271	304	85	50	53	108
29	947	424	169	225	---	83	271	473	77	50	53	70
30	418	272	124	811	---	83	249	561	43	50	54	50
31	124	---	359	865	---	83	---	312	---	51	54	---
TOTAL	28731	11979	4572	10809	25143	10120	6591	12289	5260	2294	1824	2056
MEAN	927	399	147	349	898	326	220	396	175	74.0	58.8	68.5
MAX	4010	884	359	1160	2820	1200	673	1000	319	278	166	111
MIN	105	33	79	100	89	83	50	153	43	43	48	50
(*)	-169	-128	0	+5	0	+90	+200	-3	+3	-6	+2	-3
MEAN#	758	271	147	354	898	416	420	393	178	68.0	60.8	65.5
CFSM#	3.43	1.23	.67	1.60	4.06	1.88	1.90	1.78	.81	.31	.28	.30
IN.#	3.95	1.37	.77	1.85	4.23	2.17	2.12	2.05	.90	.35	.32	.33

CAL YR 1989 TOTAL 165121 MEAN 452 MAX 4010 MIN 33 MEAN# 451 CFSM# 2.04 IN.# 27.73
WTR YR 1990 TOTAL 121668 MEAN 333 MAX 4010 MIN 33 MEAN# 332 CFSM# 1.50 IN.# 20.42

* Change in contents, equivalent in cubic feet per second, in North Fork Pound River Lake and John W. Flannagan Reservoir; provided by U.S. Army Corps of Engineers.

Adjusted for change in contents.

e Estimated.

BIG SANDY RIVER BASIN

353

03209300 RUSSELL FORK AT ELKHORN CITY, KY

LOCATION.--Lat 37°18'14", long 82°20'35", Pike County, Hydrologic Unit 05070202, on left bank 10 ft downstream from steel highway bridge on abandoned section of State Highway 80, at Elkhorn City, 0.9 mi upstream from Elkhorn Creek, and at mile 13.2.

DRAINAGE AREA.--554 mi².

PERIOD OF RECORD.--Annual maximum, water years 1957-60 and occasional low-flow measurements, 1958-60. October 1960 to current year.

GAGE.--Water-stage recorder. Datum of gage is 773.00 ft above National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers). Mar. 12, 1957, to Jan. 4, 1961, nonrecording gage at site 10 ft upstream at same datum.

REMARKS.--Records good except for period of estimated record, Dec. 12-30, which is poor. Flow regulated since August 1966 by North Fork Pound River Lake (station 03208680) and since March 1965 by John W. Flannagan Lake (station 03208990). Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

AVERAGE DISCHARGE.--30 years, 710 ft³/s, 17.40 in/yr, unadjusted.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 54,200 ft³/s, Apr. 4, 1977, gage height, 24.80 ft; minimum, 4.2 ft³/s, Sept. 20, 1967.

EXTREMES OUTSIDE PERIOD OF RECORD.--A discharge of 2.4 ft³/s was measured on Oct. 18, 1930 (exact location unknown).

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 14,100 ft³/s, Oct. 17, gage height, 13.74 ft; minimum daily, 77 ft³/s, Sept. 4.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2770	484	549	4170	1140	673	529	775	680	132	89	85
2	3350	566	533	2290	872	711	493	1740	639	137	87	81
3	2430	556	523	1270	1670	867	474	1340	596	129	84	78
4	1580	551	466	1030	5970	929	480	1210	576	227	82	77
5	990	637	414	912	4970	913	518	2800	506	115	85	81
6	751	527	409	674	2590	859	570	2130	427	119	97	92
7	854	528	392	705	1550	713	1420	1530	369	122	103	93
8	770	567	441	922	1090	591	1170	1250	453	113	94	118
9	377	1220	531	1840	941	602	888	975	468	107	87	124
10	402	1420	509	1620	6470	536	748	887	527	113	97	137
11	483	1110	472	1300	4750	514	843	793	455	118	419	121
12	466	1030	440	1010	4600	494	782	709	312	117	188	110
13	469	926	415	758	3890	479	701	647	285	155	130	216
14	766	969	390	665	2310	442	640	582	264	186	110	143
15	715	880	375	632	1040	411	688	503	458	359	109	148
16	312	1580	355	545	2270	457	633	429	579	405	115	112
17	6240	2050	335	408	2710	1240	721	568	497	169	102	96
18	4780	1530	320	439	1870	2730	862	608	243	141	95	87
19	7940	1310	305	464	1340	2010	929	430	272	163	90	92
20	5710	1160	295	449	1180	1300	893	419	251	139	88	103
21	5990	934	285	461	953	1030	846	577	291	128	96	100
22	4070	861	275	439	869	924	1600	1260	280	160	262	185
23	2660	912	265	420	859	870	1560	1490	571	190	321	338
24	1810	843	255	374	816	785	1240	1040	421	185	217	218
25	835	822	245	342	743	1580	1020	788	348	156	116	180
26	778	839	235	435	527	1680	849	637	300	114	103	166
27	910	833	225	464	417	1110	725	787	201	98	95	158
28	1080	834	220	461	585	861	689	1580	192	94	90	153
29	1230	806	210	519	---	727	802	1420	181	92	87	130
30	825	671	205	2130	---	635	737	1340	139	91	89	86
31	446	---	1490	1810	---	582	---	944	---	92	90	---
TOTAL	62789	27956	12379	29958	58992	28255	25050	32188	11781	4666	3917	3908
MEAN	2025	932	399	966	2107	911	835	1038	393	151	126	130
MAX	7940	2050	1490	4170	6470	2730	1600	2800	680	405	419	338
MIN	312	484	205	342	417	411	474	419	139	91	82	77

CAL YR 1989 TOTAL 375369 MEAN 1028 MAX 7940 MIN 124
WTR YR 1990 TOTAL 301839 MEAN 827 MAX 7940 MIN 77

TENNESSEE RIVER BASIN

03471500 SOUTH FORK HOLSTON RIVER AT RIVERSIDE, NEAR CHILHOWIE, VA

LOCATION.--Lat 36°45'37", long 81°37'53", Smyth County, Hydrologic Unit 06010102, on right bank 400 ft upstream from highway bridge at Riverside, 900 ft upstream from Spring Branch, 3.2 mi downstream from Redstone Branch, 4.0 mi southeast of Chilhowie, and at mile 97.2.

DRAINAGE AREA.--76.1 mi².

PERIOD OF RECORD.--October 1920 to December 1931, July 1942 to current year. Monthly discharge only for some periods, published in WSP 1306. Prior to October 1924, published as "near Chilhowie." June 1907 to December 1909, at site 4.5 mi downstream also published as "near Chilhowie"; records not equivalent.

REVISED RECORDS.--WSP 1033: 1943-44(m). WSP 1306: Drainage area, 1921-31(M).

GAGE.--Water-stage recorder. Datum of gage is 2,106.77 ft above National Geodetic Vertical Datum of 1929. Nov. 1, 1920, to Nov. 14, 1931, nonrecording gage at site 400 ft downstream at same datum.

REMARKS.--Records fair except for period with ice effect, Dec. 14-29, which is poor. Prior to August 1951, diurnal fluctuation at low flow caused by mill 500 ft upstream from station. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

AVERAGE DISCHARGE.--59 years, 112 ft³/s, 19.99 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 9,600 ft³/s, Nov. 6, 1977, gage height, 10.20 ft, from rating curve extended above 3,700 ft³/s on basis of slope-area measurement of peak flow; minimum recorded, 2 ft³/s, Aug. 26, Oct. 15, 1943, Aug. 9, 11, 1944, Oct. 19, 1945, but may have been less in 1925 and 1926 before installation of water-stage recorder; minimum daily, 8 ft³/s, July 19, 1926.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 650 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Oct. 1	2030	761	3.73	Feb. 10	1715	976	4.11
Jan. 1	0200	*1,740	*5.19	Mar. 17	1745	1,150	4.39
Jan. 30	0200	932	4.04				

Minimum discharge, 25 ft³/s, part or all of each day Sept. 5-7; minimum gage height, 1.40 ft, Aug. 4.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	630	75	109	1260	251	118	146	163	176	48	33	29
2	648	72	103	555	196	121	138	265	148	57	33	28
3	425	71	98	324	174	147	134	230	142	47	33	28
4	282	68	90	244	229	155	127	223	128	45	33	26
5	208	66	88	208	329	150	119	512	112	43	35	26
6	172	66	84	194	273	140	119	463	101	43	48	26
7	155	64	78	178	224	131	135	315	93	42	43	25
8	135	64	81	230	184	122	132	227	86	41	39	31
9	122	69	76	356	164	117	128	187	82	41	39	35
10	111	65	74	303	641	110	125	195	82	39	39	36
11	103	61	72	231	684	103	137	168	76	39	38	32
12	95	59	76	193	427	97	131	151	72	40	36	33
13	89	59	76	165	289	92	127	142	69	42	36	35
14	85	56	e64	144	223	88	122	130	68	85	38	34
15	81	57	e58	132	186	85	119	119	72	84	38	33
16	78	212	e54	122	315	140	111	114	67	58	36	31
17	81	239	e51	112	482	833	110	117	63	51	38	30
18	84	182	e48	108	354	729	111	104	60	46	37	28
19	157	156	e47	102	309	420	100	95	58	45	37	30
20	165	144	e46	96	255	285	97	91	55	43	37	30
21	155	141	e46	96	222	213	121	96	61	44	41	28
22	136	137	e45	91	201	179	254	125	63	44	54	40
23	119	153	e44	86	187	158	231	150	63	43	69	38
24	108	144	e43	85	173	162	182	140	56	40	53	33
25	101	135	e43	95	149	403	154	125	53	39	49	31
26	95	133	e43	110	133	426	136	114	51	37	57	30
27	88	124	e42	115	129	304	123	114	49	36	46	29
28	85	124	e42	117	124	231	120	111	48	35	34	29
29	81	119	e42	245	---	196	157	362	46	34	33	28
30	78	113	61	727	---	173	148	336	47	34	32	27
31	76	---	583	392	---	158	---	232	---	33	30	---
TOTAL	5028	3228	2507	7416	7507	6786	4094	5916	2347	1398	1244	919
MEAN	162	108	80.9	239	268	219	136	191	78.2	45.1	40.1	30.6
MAX	648	239	583	1260	684	833	254	512	176	85	69	40
MIN	76	56	42	85	124	85	97	91	46	33	30	25
CFSM	2.13	1.41	1.06	3.14	3.52	2.88	1.79	2.51	1.03	.59	.53	.40
IN.	2.46	1.58	1.23	3.63	3.67	3.32	2.00	2.89	1.15	.68	.61	.45

CAL YR 1989 TOTAL 48808 MEAN 134 MAX 1940 MIN 42 CFSM 1.76 IN. 23.86
WTR YR 1990 TOTAL 48390 MEAN 133 MAX 1260 MIN 25 CFSM 1.74 IN. 23.65

e Estimated.

03473000 SOUTH FORK HOLSTON RIVER NEAR DAMASCUS, VA

LOCATION.--Lat 36°39'06", long 81°50'39", Washington County, Hydrologic Unit 06010102, on right bank 500 ft upstream from bridge on U.S. Highway 58, 0.7 mi downstream from Laurel Creek, 3.2 mi northwest of Damascus, 4.9 mi upstream from Middle Fork, and at mile 77.2.

DRAINAGE AREA.--301 mi².

PERIOD OF RECORD.--October 1931 to current year. Monthly discharge only for some periods, published in WSP 1306. Published as "at Vestal" prior to October 1978.

REVISED RECORDS.--WSP 823: Drainage area. WSP 1306: 1932-33(M).

GAGE.--Water-stage recorder. Datum of gage is 1,792.30 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records good except those for periods with ice effect, Dec. 15-22, 24-29, which are fair. Prior to 1980, some diurnal fluctuation at low flow caused by powerplant upstream from station. Tennessee Valley Authority satellite gage-height telemeter at station. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

AVERAGE DISCHARGE.--59 years, 475 ft³/s, 21.43 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 22,000 ft³/s, Apr. 5, 1977, gage height, 17.11 ft, from rating curve extended above 10,000 ft³/s on basis of slope-area measurement of peak flow; minimum, 30 ft³/s, Oct. 14, 1941, Dec. 24, 1943; minimum daily, 40 ft³/s, Dec. 27, 1983; minimum gage height, 2.07 ft, Aug. 19, 1988.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 3,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Jan. 1	0230	5,780	9.62	Feb. 10	1615	4,140	8.28
Jan. 30	0330	3,080	7.28	Mar. 17	1445	*5,810	*9.64

Minimum discharge, 122 ft³/s, Sept. 7, gage height, 2.45 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1470	262	436	4330	1050	487	609	823	838	387	145	158
2	1540	249	411	1880	853	509	582	944	680	679	136	149
3	1110	245	391	1190	777	684	552	880	628	368	132	145
4	833	236	354	958	1240	674	527	1150	570	290	127	136
5	668	227	347	841	1580	647	496	2210	493	252	135	130
6	562	229	332	839	1210	597	493	1750	441	242	528	127
7	495	235	312	812	1010	549	584	1250	414	225	319	128
8	439	231	351	1010	822	508	543	955	407	207	228	210
9	398	294	357	1270	724	495	532	803	384	195	280	181
10	361	271	328	1130	2770	470	521	985	424	186	289	175
11	337	247	320	914	2540	444	607	900	362	181	295	169
12	314	240	371	780	1530	422	573	786	324	178	223	213
13	295	230	400	662	1120	401	552	703	308	234	193	222
14	281	225	378	574	911	386	525	621	286	368	198	199
15	271	230	e350	529	777	373	511	551	381	472	212	195
16	257	914	e320	489	1670	859	478	506	395	310	177	170
17	272	1000	e290	451	2160	4410	464	568	301	251	161	150
18	294	753	e270	439	1480	2940	500	488	279	245	153	138
19	518	615	e260	418	1310	1620	447	443	296	251	148	143
20	472	547	e250	396	1120	1190	443	442	257	214	139	164
21	449	510	e240	428	988	935	563	461	435	211	197	143
22	422	481	e235	396	888	801	1260	637	357	231	389	342
23	389	683	228	376	819	710	1040	895	429	217	493	314
24	366	656	e225	367	745	707	827	758	360	195	442	234
25	345	601	e220	484	638	1370	689	628	320	176	355	201
26	326	562	e220	686	557	1420	600	548	280	165	303	184
27	309	511	e220	657	539	1130	539	576	257	158	254	169
28	292	506	e215	627	518	925	526	567	239	150	216	157
29	281	483	e215	1020	---	821	1110	1580	223	147	197	150
30	272	455	295	2560	---	728	899	1540	215	142	191	146
31	267	---	1900	1500	---	666	---	1120	---	141	173	---
TOTAL	14905	12928	11041	29013	32326	28878	18592	27068	11583	7668	7428	5342
MEAN	481	431	356	936	1154	932	620	873	386	247	240	178
MAX	1540	1000	1900	4330	2770	4410	1260	2210	838	679	528	342
MIN	257	225	215	367	518	373	443	442	215	141	127	127
CFSM	1.60	1.43	1.18	3.11	3.84	3.09	2.06	2.90	1.28	.82	.80	.59
IN.	1.84	1.60	1.36	3.59	4.00	3.57	2.30	3.35	1.43	.95	.92	.66

CAL YR 1989 TOTAL 196396 MEAN 538 MAX 6000 MIN 133 CFSM 1.79 IN. 24.27
WTR YR 1990 TOTAL 206772 MEAN 566 MAX 4410 MIN 127 CFSM 1.88 IN. 25.55

e Estimated.

TENNESSEE RIVER BASIN

03475000 MIDDLE FORK HOLSTON RIVER NEAR MEADOWVIEW, VA

LOCATION.--Lat 36°42'47", long 81°49'08", Washington County, Hydrologic Unit 06010102, on left bank 48 ft downstream from bridge on State Highway 803, 0.9 mi upstream from Cedar Creek, 4.1 mi southeast of Meadowview, and at mile 13.2.

DRAINAGE AREA.--211 mi².

PERIOD OF RECORD.--October 1931 to September 1953, May 1976 to current year. Monthly discharge only for October 1931, published in WSP 1306.

REVISED RECORDS.--WSP 823: Drainage area. WSP 1276: 1932-34.

GAGE.--Water-stage recorder. Datum of gage is 1,820.22 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records good except for period with ice effect, Dec. 14-29, which is fair. Prior to 1954, flow regulated by powerplant 0.9 mi upstream from station. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

AVERAGE DISCHARGE.--36 years, 241 ft³/s, 15.51 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 12,500 ft³/s, Nov. 7, 1977, gage height, 13.41 ft; minimum, 6 ft³/s, Nov. 10, 1933, Dec. 4, 1936, Jan. 21, 22, Feb. 1, 1940, Jan. 8, 1942, Oct. 15, 16, 31, 1943; minimum daily, 7 ft³/s, Nov. 19, 1950.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Jan. 29, 1957, reached a stage of 11.8 ft, from floodmark, discharge, 10,000 ft³/s, and flood of Dec. 10, 1972, reached a stage of 11.0 ft, from floodmark, discharge, 8,540 ft³/s, from information by Tennessee Valley Authority. Flood of Mar. 30, 1975, reached a stage of 10.37 ft, discharge, 7,410 ft³/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 2,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Oct. 1	2100	2,040	5.69	Mar. 17	0745	2,920	6.81
Jan. 1	0830	*5,010	*8.74	May 2	0700	2,030	5.68
Feb. 10	2015	2,300	6.04	May 22	2230	3,320	7.28
Feb. 17	0415	2,520	6.32	May 29	1500	2,010	5.65

Minimum discharge, 79 ft³/s, Sept. 18, gage height, 2.01 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1520	155	188	3750	518	377	414	719	527	145	108	96
2	1410	148	180	1250	460	381	396	1490	438	179	106	95
3	775	144	177	747	435	469	373	756	408	145	105	92
4	523	141	170	577	689	469	353	791	386	131	102	89
5	396	135	169	528	924	429	334	1290	328	123	115	86
6	337	135	167	510	676	394	337	1050	293	123	151	86
7	298	136	162	473	573	367	449	693	270	121	133	86
8	268	138	174	562	485	344	444	527	254	115	115	94
9	246	149	176	943	440	336	396	445	238	111	115	93
10	229	150	163	735	1340	316	365	591	326	108	127	90
11	215	139	162	558	1430	297	381	673	265	107	170	86
12	202	132	175	474	924	284	344	534	227	112	124	102
13	191	127	191	414	706	273	321	454	211	188	113	141
14	182	122	e175	370	607	264	306	396	203	316	129	115
15	173	125	e160	348	539	249	304	346	229	473	126	101
16	173	464	e150	326	1080	399	289	315	238	256	112	96
17	184	599	e140	304	1880	2210	278	336	202	186	105	88
18	248	357	e130	297	999	1680	287	316	190	179	102	82
19	469	273	e125	280	842	926	257	273	184	197	100	89
20	467	232	e125	267	727	712	244	262	174	158	97	101
21	345	212	e120	270	644	585	280	263	215	181	102	89
22	281	198	e120	256	589	516	426	1230	201	227	150	152
23	239	252	e115	243	564	467	396	1510	211	177	276	168
24	216	227	e115	237	517	438	343	679	179	153	183	117
25	199	207	e110	296	468	1350	307	481	165	140	151	100
26	187	204	e110	511	423	1180	279	397	155	130	142	94
27	176	202	e110	476	411	800	260	416	149	123	127	89
28	170	208	e105	429	395	631	255	415	144	119	113	86
29	163	204	e105	453	---	547	466	1500	137	116	109	84
30	157	193	158	948	---	489	426	1130	138	114	108	83
31	155	---	792	693	---	451	---	704	---	111	102	---
TOTAL	10794	6108	5219	18525	20285	18630	10310	20982	7285	5064	3918	2970
MEAN	348	204	168	598	724	601	344	677	243	163	126	99.0
MAX	1520	599	792	3750	1880	2210	466	1510	527	473	276	168
MIN	155	122	105	237	395	249	244	262	137	107	97	82
CFSM	1.65	.96	.80	2.83	3.43	2.85	1.63	3.21	1.15	.77	.60	.47
IN.	1.90	1.08	.92	3.27	3.58	3.28	1.82	3.70	1.28	.89	.69	.52

CAL YR 1989 TOTAL 99083 MEAN 271 MAX 2380 MIN 90 CFSM 1.29 IN. 17.47
WTR YR 1990 TOTAL 130090 MEAN 356 MAX 3750 MIN 82 CFSM 1.69 IN. 22.94

e Estimated.

TENNESSEE RIVER BASIN

357

03478400 BEAVER CREEK AT BRISTOL, VA

LOCATION.--Lat 36°37'54", long 82°08'02", Bristol City, Hydrologic Unit 06010102, on right bank 50 ft upstream from bridge on State Highway 1405, 75 ft downstream from Goose Creek, 0.9 mi downstream from Clear Creek, 3.7 mi northeast of Bristol, VA post office, and at mile 20.6.

DRAINAGE AREA.--27.7 mi².

PERIOD OF RECORD.--July 1957 to current year. Published as "near Bristol" prior to October 1974.

GAGE.--Water-stage recorder. Datum of gage is 1,780.98 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records good except for period of no gage-height record, Aug. 21, 22, which is fair. Small diurnal fluctuation at low flow caused by withdrawal of water, which is returned to stream 600 ft upstream from station, for car-washing operation. Since September 1965, some regulation at high flow by flood-control reservoirs, capacity, 7,600 acre-ft. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

AVERAGE DISCHARGE.--33 years, 34.4 ft³/s, 16.86 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,600 ft³/s, Oct. 2, 1977, gage height, 9.94 ft, from rating curve extended above 390 ft³/s on basis of slope-area measurement of peak flow; minimum, 3.4 ft³/s, Dec. 30, 1963; minimum daily, 7.4 ft³/s, Sept. 28, 29, Oct. 5, 15, 18, 19, 23, 24, 1969.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in 1936 reached a stage of about 12 ft.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 221 ft³/s, Mar. 17, gage height, 4.94 ft; minimum, 13 ft³/s, Sept. 29, gage height, 2.72 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	78	23	24	140	55	51	56	41	43	26	20	17
2	61	22	24	79	54	57	55	40	42	25	20	16
3	52	22	24	65	58	60	53	41	44	24	19	16
4	45	21	23	59	100	54	51	69	43	23	20	16
5	44	21	23	54	82	51	50	71	39	22	22	15
6	43	22	23	52	71	50	55	58	37	23	20	15
7	40	22	23	49	67	49	55	53	37	22	20	15
8	37	23	26	65	61	48	50	49	36	21	20	20
9	35	24	25	64	59	48	49	48	35	21	19	21
10	34	21	24	58	124	47	48	58	35	20	22	16
11	33	21	23	54	92	46	49	47	34	20	19	15
12	32	20	26	52	78	44	46	44	33	27	18	16
13	31	20	26	49	70	44	44	43	32	34	23	16
14	30	20	25	47	65	43	44	42	32	43	23	16
15	29	22	26	45	61	43	44	42	35	36	20	15
16	28	51	26	44	138	64	41	41	34	30	20	14
17	29	31	25	42	112	177	42	60	31	27	19	14
18	29	27	25	42	90	117	41	44	30	30	18	14
19	37	25	25	40	91	89	39	40	29	32	18	15
20	30	25	25	39	77	80	38	40	28	27	18	15
21	28	24	24	41	71	71	63	40	34	25	e32	14
22	26	27	23	38	71	66	65	46	32	25	e25	29
23	25	33	22	36	68	62	48	41	29	23	23	18
24	25	28	22	36	63	65	43	38	27	23	20	16
25	25	27	22	57	58	97	40	37	27	22	19	15
26	24	27	22	65	56	76	38	38	26	22	19	15
27	23	26	22	56	54	69	37	42	26	21	18	14
28	23	27	22	52	52	64	44	54	26	21	18	14
29	23	26	21	63	---	63	49	73	25	21	18	14
30	23	25	27	66	---	60	42	52	25	21	18	14
31	23	---	114	59	---	58	---	46	---	20	17	---
TOTAL	1045	753	832	1708	2098	2013	1419	1478	986	777	625	480
MEAN	33.7	25.1	26.8	55.1	74.9	64.9	47.3	47.7	32.9	25.1	20.2	16.0
MAX	78	51	114	140	138	177	65	73	44	43	32	29
MIN	23	20	21	36	52	43	37	37	25	20	17	14
CFSM	1.22	.91	.97	1.99	2.71	2.34	1.71	1.72	1.19	.90	.73	.58
IN.	1.40	1.01	1.12	2.29	2.82	2.70	1.91	1.98	1.32	1.04	.84	.64

CAL YR 1989 TOTAL 12020 MEAN 32.9 MAX 114 MIN 15 CFSM 1.19 IN. 16.14
WTR YR 1990 TOTAL 14214 MEAN 38.9 MAX 177 MIN 14 CFSM 1.41 IN. 19.09

e Estimated.

TENNESSEE RIVER BASIN

03488000 NORTH FORK HOLSTON RIVER NEAR SALTVILLE, VA

LOCATION.--Lat 36°53'48", long 81°44'47", Smyth County, Hydrologic Unit 06010101, on right bank 0.5 mi upstream from Cedar Branch bridge, 1.5 mi northeast of Saltville, 7.8 mi downstream from Laurel Creek, and at mile 85.0.

DRAINAGE AREA.--222 mi².

PERIOD OF RECORD.--June 1907 to December 1908 (published as "at Saltville"), October 1920 to current year. Monthly discharge only for some periods, published in WSP 1306.

REVISED RECORDS.--WSP 758: Drainage area. WSP 1113: 1944-47. WSP 1306: 1907(M), 1921-22(M), 1924-30(M), 1932-34(M), drainage area at site used 1907-8. WSP 1726: 1947, monthly and yearly runoff.

GAGE.--Water-stage recorder. Datum of gage is 1,703.53 ft above National Geodetic Vertical Datum of 1929. June 11, 1907, to Nov. 12, 1908, nonrecording gage on highway bridge 2.1 mi downstream at different datum. Nov. 2, 1920, to May 23, 1934, nonrecording gage on highway bridge 0.5 mi downstream at datum 7.74 ft lower.

REMARKS.--Records good except for period with ice effect, Dec. 14-30, which is fair. National Weather Service gage-height telemeter at station. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

AVERAGE DISCHARGE.--71 years, 299 ft³/s, 18.29 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 16,500 ft³/s, Jan. 29, 1957, gage height, 13.20 ft; maximum gage height, 13.57 ft, Nov. 6, 1977; minimum discharge, 1.0 ft³/s, Oct. 15, 16, 1947, gage height, 0.13 ft, flow retarded by mine cave-in; minimum daily, 2.0 ft³/s, Oct. 15, 1947.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 3,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Oct. 1	2230	3,610	5.95	Mar. 17	1700	5,740	7.70
Jan. 1	0700	*8,860	*9.80	May 2	0200	3,240	5.61
Feb. 10	1830	3,310	5.42	May 29	1130	3,300	5.66
Feb. 17	0100	5,860	7.79				

Minimum discharge, 47 ft³/s, part or all of each day Sept. 6-8, 30, gage height, 0.58 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2370	167	222	6230	832	275	338	1400	661	86	76	59
2	2340	155	207	1860	648	288	310	2270	503	118	72	56
3	1120	151	196	1050	572	505	293	1010	414	98	69	53
4	721	145	174	779	1110	543	274	905	359	82	66	51
5	522	135	178	704	1330	467	255	1820	303	75	80	49
6	404	130	169	680	935	396	274	1470	263	75	109	48
7	331	129	157	637	730	341	565	922	233	77	105	48
8	276	134	162	840	577	301	547	664	210	70	82	49
9	241	163	165	1450	482	287	450	529	201	65	79	56
10	211	193	147	1030	2010	268	391	573	260	62	98	52
11	194	175	144	750	2000	249	416	546	214	61	138	51
12	175	161	150	608	1160	230	380	458	171	70	102	55
13	160	150	158	479	821	215	348	413	153	102	79	95
14	150	141	e130	384	665	204	326	358	143	687	76	79
15	140	144	e120	348	557	195	323	306	157	1240	76	73
16	131	520	e110	311	2200	353	294	274	211	576	70	67
17	189	739	e105	282	3350	3900	274	294	160	330	65	59
18	459	508	e100	269	1290	2330	272	283	135	260	61	51
19	994	379	e98	255	946	1090	239	235	125	271	58	51
20	910	313	e96	237	737	755	226	224	115	213	56	55
21	675	278	e94	241	608	570	243	236	118	186	61	54
22	509	248	e90	226	534	468	345	1240	119	195	82	93
23	395	311	e90	208	502	401	334	1550	203	174	136	129
24	330	271	e90	201	437	393	303	836	194	143	142	88
25	285	245	e88	280	372	1220	274	571	141	122	131	68
26	252	244	e88	804	303	1160	250	441	120	108	129	59
27	227	262	e86	750	302	795	232	501	106	98	105	55
28	205	278	e86	643	289	608	224	934	98	91	83	52
29	180	267	e86	778	---	499	366	2720	91	85	72	49
30	179	240	e150	2220	---	426	449	1650	89	82	69	47
31	172	---	1900	1260	---	380	---	960	---	78	64	---
TOTAL	15457	7376	5836	26794	26299	20112	9815	26593	6270	5980	2691	1851
MEAN	499	246	188	864	939	649	327	858	209	193	86.8	61.7
MAX	2370	739	1900	6230	3350	3900	565	2720	661	1240	142	129
MIN	131	129	86	201	289	195	224	224	89	61	56	47
CFSM	2.25	1.11	.85	3.89	4.23	2.92	1.47	3.86	.94	.87	.39	.28
IN.	2.59	1.24	.98	4.49	4.41	3.37	1.64	4.46	1.05	1.00	.45	.31

CAL YR 1989 TOTAL 119478 MEAN 327 MAX 3090 MIN 58 CFSM 1.47 IN. 20.02
WTR YR 1990 TOTAL 155074 MEAN 425 MAX 6230 MIN 47 CFSM 1.91 IN. 25.99

e Estimated.

03524000 CLINCH RIVER AT CLEVELAND, VA

LOCATION.--Lat 36°56'41", long 82°09'18", Russell County, Hydrologic Unit 06010205, on right bank 500 ft upstream from highway bridge at Cleveland, 0.5 mi downstream from Muddy Hollow, 2.3 mi downstream from Weaver Creek, 4.4 mi downstream from Thompson Creek, and at mile 271.6.

DRAINAGE AREA.--528 mi².

PERIOD OF RECORD.--October 1920 to current year. Monthly discharge only for some periods, published in WSP 1306.

REVISED RECORDS.--WSP 823: Drainage area. WSP 1306: 1921-23(M), 1926(M), 1929-31(M). WSP 1706: 1927(M).

GAGE.--Water-stage recorder. Datum of gage is 1,500.24 ft above National Geodetic Vertical Datum of 1929. Prior to Nov. 1, 1931, nonrecording gage on highway bridge 500 ft downstream at datum 1.0 ft lower.

REMARKS.--Records good except for period with ice effect, Dec. 14-31, which is fair. National Weather Service gage-height telemeter at station. Tennessee Valley Authority gage-height Automatic Data Acquisition System at station, called at 6-hour intervals by computer at Knoxville, TN. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

AVERAGE DISCHARGE.--70 years, 706 ft³/s, 18.16 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 34,500 ft³/s, Apr. 5, 1977, gage height, 26.40 ft; minimum, 35 ft³/s, Sept. 28, 1964; minimum gage height, 0.96 ft, Feb. 10, 1934.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 5,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Jan. 1	0730	6,810	10.61	May 23	0300	5,730	9.46
Feb. 10	2200	*7,590	*11.40				

Minimum discharge, 99 ft³/s, Sept. 6-7, gage height, 1.41 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3240	471	603	6400	1820	720	881	2120	1630	268	159	128
2	3660	437	567	3750	1420	719	836	3290	1290	295	152	121
3	2310	413	536	2190	1370	970	816	1980	1090	353	145	116
4	1590	395	497	1630	2700	1160	783	1960	960	284	140	109
5	1200	372	465	1360	2800	1040	728	3580	815	251	136	103
6	974	362	457	1190	2080	913	759	3360	710	240	150	100
7	824	356	432	1090	1640	805	1940	2280	634	244	252	101
8	711	405	437	1660	1340	726	1890	1710	580	229	246	117
9	619	800	524	3320	1130	693	1410	1380	571	212	191	113
10	550	1120	485	2430	4800	653	1210	1340	880	202	205	122
11	510	849	438	1770	5700	604	1180	1250	653	205	242	132
12	470	685	449	1430	3030	560	1110	1020	511	190	268	213
13	423	588	470	1170	2120	526	983	921	450	204	213	346
14	395	526	e380	971	1670	497	896	827	418	246	196	263
15	375	506	e350	857	1390	475	923	719	570	769	215	197
16	354	1350	e330	772	1870	479	873	648	759	787	179	175
17	570	2000	e310	694	2940	2280	825	716	598	489	158	152
18	1470	1450	e300	652	2230	4160	982	755	469	366	145	131
19	2820	1100	e290	616	1860	2360	899	596	553	299	137	129
20	2890	910	e280	573	1580	1710	829	540	407	274	128	141
21	1970	800	e275	569	1320	1350	827	601	437	262	156	139
22	1440	720	e270	539	1180	1150	1180	2030	433	290	241	207
23	1120	1000	e270	492	1110	1010	1050	4760	863	306	379	304
24	932	932	e265	469	1030	946	930	2470	612	245	377	234
25	803	796	e265	556	924	2460	829	1630	459	218	265	185
26	707	756	e265	1180	781	3070	742	1260	384	198	235	155
27	633	753	e260	1410	740	2130	676	1700	345	180	216	137
28	574	739	e260	1230	726	1620	636	3420	314	167	175	123
29	524	709	e260	1410	---	1320	1120	3590	292	163	159	116
30	490	646	e450	3420	---	1130	1030	3030	278	158	155	109
31	474	---	e2500	2660	---	997	---	2200	---	157	140	---
TOTAL	35622	22946	13940	48460	53301	39233	29773	57683	18965	8751	6155	4718
MEAN	1149	765	450	1563	1804	1266	992	1861	632	282	199	157
MAX	3660	2000	2500	6400	5700	4160	1940	4760	1630	787	379	346
MIN	354	356	260	469	726	475	636	540	278	157	128	100
CFSM	2.18	1.45	.85	2.96	3.61	2.40	1.88	3.52	1.20	.53	.38	.30
IN.	2.51	1.62	.98	3.41	3.76	2.76	2.10	4.06	1.34	.62	.43	.33

CAL YR 1989 TOTAL 311390 MEAN 853 MAX 8530 MIN 175 CFSM 1.62 IN. 21.94
WTR YR 1990 TOTAL 339547 MEAN 930 MAX 6400 MIN 100 CFSM 1.76 IN. 23.92

e Estimated.

TENNESSEE RIVER BASIN

03528000 CLINCH RIVER ABOVE TAZEWEILL, TN

LOCATION.--Lat 36°25'30", long 83°23'54", Claiborne County, Hydrologic Unit 06010205, on right bank 0.4 mi upstream from Grissom Island, 4.6 mi downstream from Big War Creek, 10 mi east of Tazewell, and at mile 159.8.

DRAINAGE AREA.--1,474 mi².

PERIOD OF RECORD.--October 1918 to current year. Published as "near Lone Mountain" October 1918 to September 1927; as "near Tazewell" August 1927 to December 1936; and as "above Tazewell" July 1935 to current year. Prior to April 1919 monthly discharge only, published in WSP 1306. Gage-height record "near Tazewell" January 1937 to July 1941.

REVISED RECORDS.--WSP 803: Drainage area at site "near Tazewell". WSP 1306: Drainage area at site "near Lone Mountain". WSP 1336: 1928.

GAGE.--Water-stage recorder. Datum of gage is 1,060.7 ft above National Geodetic Vertical Datum of 1929. Apr. 1, 1919, to Sept. 30, 1927, nonrecording gage on railroad bridge 23.3 mi downstream at datum 102.7 ft lower. Aug. 8, 1927, to July 16, 1941, water-stage recorder at site 8.0 mi downstream at datum 47.2 ft lower. Water-stage recorder at present site and datum since July 29, 1935.

REMARKS.--No estimated daily discharges. Records good. Several measurements of water temperature were made during the year.

AVERAGE DISCHARGE.--72 years, 2,074 ft³/s, 19.11 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 98,100 ft³/s, Apr. 5, 1977, gage height, 29.32 ft, from floodmarks; minimum, 108 ft³/s, Sept. 11, 1925; minimum gage height, at present site and datum, 0.33 ft, Sept. 20, 1955.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in February 1862 reached a stage of about 24 ft, present site and datum, from information by local resident, discharge, about 66,000 ft³/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 14,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage Height (ft)	Date	Time	Discharge (ft ³ /s)	Gage Height (ft)
Jan. 1	2230	16,300	10.44	Feb. 11	1430	*21,900	*12.46

Minimum discharge, 249 ft³/s, Sept. 7.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	5450	1110	1860	12700	6770	2080	2510	2450	3730	620	377	342
2	9470	1080	1720	14600	4730	2080	2290	3810	2910	606	365	326
3	8320	1030	1600	8930	4590	2690	2130	6350	2400	570	361	303
4	5190	960	1490	5350	9590	2930	2010	5880	2100	563	350	282
5	3630	907	1400	4270	12300	2980	1890	8900	1880	589	349	266
6	2810	902	1320	3700	8700	2730	1860	12500	1630	557	408	256
7	2310	901	1260	3300	5980	2440	2600	8680	1440	514	380	249
8	1950	1210	1330	3770	4590	2190	3920	5510	1300	553	339	365
9	1690	3500	1750	6010	3750	2020	4060	4120	1200	516	339	310
10	1490	4920	1830	7420	8720	1980	3290	4050	1180	473	571	431
11	1330	3790	1720	5680	20700	2120	3050	4890	1740	444	608	385
12	1210	2800	1610	4330	15600	1900	3060	4070	1600	456	532	322
13	1120	2180	1590	3520	7970	1750	2910	3280	1210	532	679	362
14	1050	1830	1530	2920	5480	1630	2630	2790	1020	1180	582	375
15	966	1660	1450	2510	4280	1530	2450	2400	939	2010	621	497
16	906	4290	1400	2240	6350	1660	2340	2080	973	1340	522	530
17	938	6590	1220	2030	12400	5160	2220	2270	1200	1550	490	412
18	1420	5660	1160	1930	9940	9440	2130	2680	1250	1200	433	347
19	3380	4060	1230	1870	6630	9470	2190	2360	1050	1110	376	324
20	7620	3130	1290	1750	5240	5810	2150	1940	930	862	343	317
21	6260	2620	1220	2280	4320	4240	2050	1730	986	684	324	301
22	4200	2300	900	2300	3740	3440	2710	1710	1220	788	1300	318
23	3120	2900	716	2050	3520	2950	2960	2810	1320	905	855	365
24	2490	3200	949	1860	3210	2640	2780	6390	1650	827	882	417
25	2090	2960	1000	2130	2910	3160	2430	4130	1530	706	800	561
26	1820	2590	1030	3600	2580	5180	2160	2910	1160	581	699	485
27	1610	2330	1080	4080	2310	6070	1950	2460	938	511	567	406
28	1450	2260	1030	3920	2150	4590	1800	3000	810	469	479	350
29	1330	2220	1120	4170	---	3700	1850	5200	724	429	436	313
30	1230	2010	1170	8940	---	3180	2290	6080	666	401	423	289
31	1160	---	3570	9830	---	2790	---	5030	---	396	368	---
TOTAL	89010	77900	43545	143990	189050	106530	74670	132460	42686	22942	16158	10806
MEAN	2871	2597	1405	4645	6752	3436	2489	4273	1423	740	521	360
MAX	9470	6590	3570	14600	20700	9470	4060	12500	3730	2010	1300	561
MIN	906	901	716	1750	2150	1530	1800	1710	666	396	324	249
CFSM	1.95	1.76	.95	3.15	4.58	2.33	1.69	2.90	.97	.50	.35	.24
IN.	2.25	1.97	1.10	3.63	4.77	2.69	1.88	3.34	1.08	.58	.41	.27

CAL YR 1989 TOTAL 994587 MEAN 2725 MAX 23600 MIN 502 CFMS 1.85 IN. 25.10
WTR YR 1990 TOTAL 949747 MEAN 2602 MAX 20700 MIN 249 CFMS 1.77 IN. 23.97

03531500 POWELL RIVER NEAR JONESVILLE, VA

LOCATION.--Lat 36°39'43", long 83°05'42", Lee County, Hydrologic Unit 06010206, on right bank 175 ft downstream from highway bridge, 2 mi southeast of Jonesville, 10 mi upstream from Wallen Creek, and at mile 143.1.

DRAINAGE AREA.--319 mi².

PERIOD OF RECORD.--October 1931 to current year. Monthly discharge only for some periods, published in WSP 1306.

REVISED RECORDS.--WSP 823: Drainage area. WSP 1033: 1932-44. WSP 1436: 1946(M), 1948(M).

GAGE.--Water-stage recorder. Datum of gage is 1,259.08 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records good except those for periods with ice effect, Dec. 15, 16, 18-21, 23, 24, 26-29, which are fair. National Weather Service gage-height telemeter at station. Tennessee Valley Authority gage-height Automatic Data Acquisition System at station, called at 6-hour intervals by computer at Knoxville, TN. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

AVERAGE DISCHARGE.--59 years, 534 ft³/s, 22.73 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 57,000 ft³/s, Apr. 5, 1977, gage height, 44.32 ft, from floodmark, from rating curve extended above 20,000 ft³/s on basis of slope-area measurement of peak flow; minimum, 17 ft³/s, Sept. 19, 20, 1954, and as result of storage behind temporary dam Oct. 18, 1961; minimum gage height, 0.68 ft, Oct. 18, 1961.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 5,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Feb. 4	0330	5,410	10.78	May 5	1400	6,480	12.43
Feb. 10	1930	*9,090	*16.28				

Minimum discharge, 54 ft³/s, Sept. 19, gage height, 1.17 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2240	276	423	3470	1150	512	508	595	509	149	117	78
2	2110	245	397	1690	918	544	477	1410	431	153	96	72
3	1170	223	378	1120	1890	945	432	1140	432	149	88	67
4	779	211	345	941	5290	881	402	1480	492	132	81	63
5	558	198	328	956	3410	769	376	4770	384	123	83	60
6	443	197	317	855	1890	662	384	2750	328	117	123	58
7	365	206	295	772	1400	580	855	1570	299	182	112	61
8	302	438	332	821	1110	516	801	1140	286	130	89	91
9	259	1380	456	1080	934	513	695	917	256	109	77	100
10	228	1100	389	988	5580	472	622	1060	248	102	103	82
11	210	782	356	849	4620	445	800	1090	304	102	198	83
12	188	590	348	753	2120	421	845	935	231	104	189	122
13	171	470	339	623	1430	389	781	832	209	139	152	83
14	158	405	307	525	1140	369	681	717	189	570	123	85
15	151	391	e270	480	955	360	673	604	260	890	125	78
16	141	3230	e240	442	2320	383	595	541	355	625	106	68
17	814	2250	226	401	3540	2040	543	737	289	305	89	62
18	1670	1350	e215	405	1890	2660	577	892	232	209	79	56
19	1720	990	e205	390	1420	1460	525	660	239	272	75	57
20	1540	804	e200	360	1120	1080	500	565	225	194	71	64
21	1050	692	e195	486	930	867	510	632	477	161	70	71
22	783	605	191	481	851	742	670	569	532	161	553	85
23	609	950	e185	438	876	649	644	581	400	175	345	177
24	510	847	e185	421	783	586	587	531	321	164	195	124
25	442	755	179	469	705	887	531	471	253	129	143	86
26	389	690	e175	656	600	993	476	424	223	112	115	74
27	350	618	e175	622	564	895	437	647	189	101	96	66
28	315	573	e170	560	545	774	409	851	175	95	86	62
29	291	514	e170	1010	---	676	592	929	162	90	86	59
30	271	456	223	3300	---	605	565	792	154	88	92	58
31	258	---	1940	1700	---	563	---	634	---	93	86	---
TOTAL	20485	22436	10154	28064	49981	24238	17493	31466	9084	6125	4043	2352
MEAN	661	748	328	905	1785	782	583	1015	303	198	130	78.4
MAX	2240	3230	1940	3470	5580	2660	855	4770	532	890	553	177
MIN	141	197	170	360	545	360	376	424	154	88	70	56
CFSM	2.07	2.34	1.03	2.84	5.60	2.45	1.83	3.18	.95	.62	.41	.25
IN.	2.39	2.62	1.18	3.27	5.83	2.83	2.04	3.67	1.06	.71	.47	.27

CAL YR 1989 TOTAL 277730 MEAN 761 MAX 7970 MIN 97 CFSM 2.39 IN. 32.39
WTR YR 1990 TOTAL 225921 MEAN 619 MAX 5580 MIN 56 CFSM 1.94 IN. 26.35

e Estimated.

DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

As the number of streams on which streamflow information is likely to be desired far exceeds the number of stream-gaging stations feasible to operate at one time, the Geological Survey collects limited streamflow data at sites other than stream-gaging stations. When limited streamflow data are collected on a systematic basis over a period of years for use in hydrologic analyses, the site at which the data are collected is called a partial-record station. Data collected at these partial-record stations are usable in low-flow or floodflow analyses, depending on the type of data collected. In addition, discharge measurements are made at other sites not included in the partial-record program. These measurements are generally made in times of drought or flood to give better areal coverage to these events. Those measurements and others collected for some special reason are called measurements at miscellaneous sites.

Records collected at crest-stage partial-record stations are presented in the following table. Discharge measurements made at low-flow partial-record sites and at miscellaneous sites and for special studies are given in separate tables.

Crest-stage partial-record stations

The following table contains annual maximum discharges for crest-stage stations. A crest-stage gage is a device which will register the peak stage occurring between inspections of the gage. A stage-discharge relation for each gage is developed from discharge measurements made by indirect measurements of peak flow or by current meter. The date of the maximum discharge is not always certain but is usually determined by comparison with nearby continuous-record stations, weather records, or local inquiry. Only the maximum discharge for each water year is given. Information on some lower floods may have been obtained but is not published herein. The years given in the period of record represent water years for which the annual maximum has been determined.

DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Annual maximum discharge at crest-stage partial-record stations during water year 1990							
Station No.	Station Name	Location	Drainage area (mi ²)	Period of record	Annual Maximum		
					Date	Gage height (ft)	Dis-charge (ft ³ /s)
POTOMAC RIVER BASIN							
01613900	Hogue Creek near Hayfield, Va.	Lat 39°12'52", long 78°17'18", Frederick County, on right bank 15 ft upstream from bridge on State Highway 614, 0.8 mi upstream from Gap Run, 1.3 mi south-southeast of Hayfield, and opposite mouth of small unnamed branch from southwest. Datum of gage is 668.60 ft above National Geodetic Vertical Datum of 1929.	15.0	1961-86 ^a , 1987-90	7-13-90	2.57	172
01622400	Buffalo Branch tributary near Christian, Va.	Lat 38°11'55", long 79°13'10", Augusta County, on left upstream wingwall of culvert on State Highway 42, 0.8 mi upstream from mouth, and 1.3 mi north of Christian. Datum of gage is 1,622.53 ft above National Geodetic Vertical Datum of 1929.	.49	1967-90	10-10-79 2-20-81 3-20-82 3-19-83 1985 11- 4-85 5- 2-89 10-19-89	4.81 3.18 4.36 2.92 <a2.78 6.96 3.26 3.57	a104 a35 a81 a28 <a23 a211 a38 50
01629945	Chub Run near Stanley, Va.	Lat 38°34'31", long 78°27'32", Page County, at culvert on State Highway 689, 2.2 mi east of Stanley, and 3.1 mi upstream from mouth. Datum of gage is 1,023.05 ft above National Geodetic Vertical Datum of 1929.	3.16	1959-69 ^b , 1970-90	10-19-89	1.81	139
01632970	Crooked Run near Mt. Jackson, Va.	Lat 38°45'44", long 78°41'06", Shenandoah County, on right upstream wingwall of culvert on State Highway 263, 0.4 mi upstream from mouth, and 2.3 mi west of Mt. Jackson. Datum of gage is 962.84 ft above National Geodetic Vertical Datum of 1929.	6.49	1972-90	4- 7-90	3.83	408

< Less than.

^a Operated as a continuous-record gaging station.

^a Revised.

^b Records provided by U.S. Department of Agriculture, Soil Conservation Service.

DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

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Annual maximum discharge at crest-stage partial-record stations during water year 1990--Continued							
Station No.	Station Name	Location	Drainage area (mi ²)	Period of record	Annual Maximum		
					Date	Gage height (ft)	Dis-charge (ft ³ /s)
POTOMAC RIVER BASIN--Continued							
01633650	Pughs Run near Woodstock, Va.	Lat 38°55'48", long 78°32'43", Shenandoah County, on left upstream wingwall of culvert on State Highway 623, 4.0 mi northwest of Woodstock, and 5.4 mi upstream from mouth. Datum of gage is 1,027.27 ft above National Geodetic Vertical Datum of 1929.	3.66	1972-90	7-13-90	3.65	42
01645784	Snakeden Branch at Reston, Va.	Lat 38°55'48", long 77°20'43", Fairfax County, on right bank at upstream side of culvert on Soapstone Drive, 1.1 mi upstream from Lake Elsa Dam, in Reston.	0.79	1973-78 [#] , 1985-90 ^c	8-20-90	3.85	340
01652500	Fourmile Run at Alexandria, Va.	Lat 38°50'35", long 77°05'09", Arlington County, on left upstream wingwall of bridge on Shirlington Road, at Arlington County-Alexandria City line, 0.1 mi upstream from Interstate Highway 395, and 2.5 mi upstream from mouth. Datum of gage is 28.57 ft above National Geodetic Vertical Datum of 1929.	13.8	1951-69 [#] , 1970-73, 1974-75 [#] , 1976-77 ^e , 1979-82 [#] , 1983-90	3-29-84 5- 5-89 5- 9-90	7.90 8.25 8.38	d2,760 a3,000 3,090
01655500	Cedar Run near Warrenton, Va.	Lat 38°44'25", long 77°47'16", Fauquier County, on right bank at bridge on State Highway 672, 1.9 mi north of Warrenton. Datum of gage is 419.40 ft above National Geodetic Vertical Datum of 1929.	12.3	1951-86 [#] , 1987-90	5-29-90	5.61	365
01656200	Broad Run near Warrenton, Va.	Lat 38°48'25", long 77°48'47", Fauquier County, on left downstream wingwall of culvert on State Highway 17, 7 mi north of Warrenton, and 8.6 mi upstream from Mill Run.	2.94	1950-78, 1983-90	7-30-90	3.41	(*)
01659000	North Branch Chopawamsic Creek near Independent Hill, Va.	Lat 38°33'58", long 77°25'48", Prince William County, on left bank 1.0 mi upstream from junction with South Branch Chopawamsic Creek, and 4.8 mi south of Independent Hill.	5.79	1951-57 [#] , 1990	1- 1-90	5.86	(*)
01659500	Middle Fork Chopawamsic Creek near Garrisonville, Va.	Lat 38°33'26", long 77°25'32", Stafford County, on left bank 300 ft upstream from bridge on Marine Road 1, 0.4 mi upstream from confluence with North Branch Chopawamsic Creek, and 5.6 mi north of Garrisonville.	4.51	1951-57 [#] , 1990	1- 1-90	3.81	80

* Discharge not determined.

[#] Operated as a continuous-record gaging station.

a Revised.

c Operated as a stage-only station.

d Not previously published.

e Prior to Sept. 28, 1973, at site 0.4 mi downstream at datum 6.02 ft lower.

DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Annual maximum discharge at crest-stage partial-record stations during water year 1990--Continued

Annual maximum discharge at crest stage partial record stations during water year 1990 continued					Annual Maximum		
Station No.	Station Name	Location	Drainage area (mi ²)	Period of record	Date	Gage height (ft)	Dis-charge (ft ³ /s)
POTOMAC RIVER BASIN--Continued							
01660000	South Branch Chopawamsic Creek near Garrisonville, Va.	Lat 38°32'22", long 77°25'30", Stafford County, on right bank 300 ft below Marine Road 1, 1.8 mi upstream from junction with North Branch Chopawamsic Creek, and 4.3 mi north of Garrisonville.	2.56	1951-57 [‡] , 1990	5-10-90	6.52	(*)
01660500	Beaverdam Run near Garrisonville, Va.	Lat 38°30'25", long 77°25'45", Stafford County, on left bank 250 ft upstream from Marine Road 2, 2.2 mi north of Garrisonville, 2.6 mi downstream from Lunga Reservoir, and 3.4 mi upstream from mouth.	12.7	1951-57 [‡] , 1990	7-16-90	3.47	110
GREAT WICOMICO RIVER BASIN							
01661600	Great Wicomico River near Horse Head, Va.	Lat 37°53'15", long 76°27'00", Northumberland County, on right upstream wingwall of culvert on State Highway 604, 1.5 mi upstream from Bush Mill Stream, and 1.7 mi west of Horse Head.	6.98	1969-90	10-19-89	4.81	662
01661800	Bush Mill Stream near Heathsville, Va.	Lat 37°52'36", long 76°29'42", Northumberland County, on right bank 12 ft upstream from bridge on State Highway 601, 2.2 mi northwest of Howland, and 3.0 mi southwest of Heathsville. Datum of gage is 22.22 ft above National Geodetic Vertical Datum of 1929.	6.82	1964-69 [‡] , 1970-86 [‡] , 1987-90	5-29-90	6.34	258
RAPPAHANNOCK RIVER BASIN							
01661900	Carter Run near Marshall, Va.	Lat 38°47'57", long 77°52'09", Fauquier County, on left bank 50 ft upstream from farm road, 1.2 mi downstream from Horner Run, 4.7 mi south of Marshall, 6.7 mi southwest of The Plains, and 9 mi upstream from mouth. Datum of gage is 388.39 ft above National Geodetic Vertical Datum of 1929.	19.5	1976-82 [‡] , 1983-90	5-10-90	6.13	919

* Discharge not determined.

‡ Operated as a continuous-record gaging station.

Annual maximum discharge at crest-stage partial-record stations during water year 1990--Continued

Annual maximum discharge at crest-stage partial-record stations during water year 1990--Continued							
Station No.	Station Name	Location	Drainage area (mi ²)	Period of record	Annual Maximum		
					Date	Gage height (ft)	Dis-charge (ft ³ /s)
RAPPAHANNOCK RIVER BASIN--Continued							
01662000	Rappahannock River near Warrenton, Va.	Lat 38°41'05", long 77°54'15", Fauquier County, on left bank 50 ft downstream from west-bound bridge on U.S. Highway 211, 0.9 mi downstream from Carter Run, 6.2 mi southwest of Warrenton, and 15 mi upstream from Hazel River. Datum of gage is 312.57 ft above National Geodetic Vertical Datum of 1929.	195	1942-86 ^a , 1987-90	5-10-90	8.68	2,410
01665050	Pony Mountain Branch near Culpeper, Va.	Lat 38°27'04", long 77°57'24", Culpeper County, at culvert on State Highway 3, 0.3 mi upstream from mouth, and 2.7 mi southeast of Culpeper.	.30	1958-69 ^b , 1970-90	7-14-90	3.38	158
01668300	Farmers Hall Creek near Champlain, Va.	Lat 38°00'05", long 76°58'40", Essex County, on left upstream wingwall of culvert on U.S. Highway 17, 1.0 mi upstream from Rouzie Swamp, and 1.2 mi southeast of Champlain. Datum of gage is 42.10 ft above National Geodetic Vertical Datum of 1929.	2.18	1966-90	8- 9-90	4.09	47
01668800	Hoskins Creek near Tappahannock, Va.	Lat 37°55'38", long 76°57'16", Essex County, at bridge on State Highway 717, 0.4 mi upstream from Criddlin Swamp, and 5.0 mi west of Tappahannock. Datum of gage is 36.28 ft above National Geodetic Vertical Datum of 1929.	15.5	1965-69 ^a , 1971-86 ^a , 1987-90	5-29-90	5.27	300
PIANKATANK RIVER BASIN							
01669800	My Ladys Swamp near Saluda, Va.	Lat 37°34'34", long 76°31'30", Middlesex County, on left upstream wingwall of culvert on State Highway 629, 1.45 mi upstream from mouth, and 4.4 mi southeast of Saluda. Datum of gage is 4.16 ft above National Geodetic Vertical Datum of 1929.	4.81	1969-90	5-29-90	5.43	174
YORK RIVER BASIN							
01670300	Contrary Creek near Mineral, Va.	Lat 38°03'53", long 77°52'45", Louisa County, on left bank 400 ft downstream from bridge on U.S. Highway 522, 4.0 mi northeast of Mineral.	5.53	1976-86 ^a , 1987-90	5-29-90	3.88	1,220

^a Operated as a continuous-record gaging station.^b Records provided by U.S. Department of Agriculture, Soil Conservation Service.

DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Annual maximum discharge at crest-stage partial-record stations during water year 1990--Continued							
Station No.	Station Name	Location	Drainage area (mi ²)	Period of record	Annual Maximum		
					Date	Gage height (ft)	Dis-charge (ft ³ /s)
YORK RIVER BASIN--Continued							
01671615	Foster Creek near Ferncliff, Va.	Lat 37°57'35", long 78°11'20", Louisa County, at culvert on U.S. Highway 250, 1.9 mi southeast of Zion Crossroads, 4.6 mi northwest of Ferncliff, and 5.0 mi upstream from mouth. Datum of gage is 424.22 ft above National Geodetic Vertical Datum of 1929.	0.61	1960-68b, 1969-90	2-18-61	f5.17	92
					10-20-61	f8.89	296
					3-12-63	f4.35	54
					1-25-64	f4.04	40
					3- 4-65	f4.99	83
					2-28-66	f4.21	47
					8-24-67	f4.03	39
					3-12-68	f6.32	152
					8-20-69	f10.55	1,000
					3-20-70	f5.00	83
					5-30-71	f4.72	69
					6-21-72	f9.01	306
					10- 5-72	f9.91	458
					9- 7-74	5.04	g85
					6-25-75	6.58	g162
					8-15-76	4.60	g63
					10-20-76	6.61	g164
					10-26-77	6.17	g142
					9- 6-79	6.21	g144
					11-26-79	4.12	g39
					7- 6-81	3.98	g32
					6-13-82	5.95	g130
4-24-83	4.89	g78					
2-14-84	6.43	g154					
8-18-85	9.04	g308					
11- 4-85	5.71	g118					
9- 8-87	9.36	g327					
5-21-88	4.26	g46					
5-27-90	7.15	195					
01671650	Waldrop Creek near Louisa, Va.	Lat 38°00'08", long 78°04'22", Louisa County, on left upstream wingwall of culvert on State Highway 632, 2.3 mi upstream from mouth, and 4.2 mi southwest of Louisa. Datum of gage is 361.41 ft above National Geodetic Vertical Datum of 1929.	2.85	1969-90	5-27-90	10.05	707
01671750	Harris Creek near Trevilians, Va.	Lat 38°01'02", long 78°03'06", Louisa County, on right upstream wingwall of culvert on State Highway 632, 2.7 mi southeast of Trevilians, and 6 mi upstream from mouth.	3.43	1969-90	5-27-90	6.34	601
01674200	Reedy Creek near Dawn, Va.	Lat 37°52'55", long 77°21'35", Caroline County, at bridge on U.S. Highway 301, 3.3 mi north of Dawn, and 11 mi south of Bowling Green.	16.8	1950-69, 1972-90	5-29-90	5.43	(*)
01674700	Aylett Creek at Aylett, Va.	Lat 37°47'05", long 77°06'23", King William County, on right upstream wingwall of culvert on U.S. Highway 360 at Aylett and 2.8 mi upstream from mouth. Datum of gage is 26.72 ft above National Geodetic Vertical Datum of 1929.	6.17	1969-90	5-29-90	4.26	(*)

* Discharge not determined.

b Records provided by U.S. Department of Agriculture, Soil Conservation Service.

f Revised gage height.

g Revised discharge.

DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

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Annual maximum discharge at crest-stage partial-record stations during water year 1990--Continued							
Station No.	Station Name	Location	Drainage area (mi ²)	Period of record	Annual Maximum		
					Date	Gage height (ft)	Dis-charge (ft ³ /s)
JAMES RIVER BASIN							
02012500	Jackson River at Falling Spring, Va.	Lat 37°52'36", long 79°58'39", Alleghany County, on right bank 20 ft upstream from Smith Bridge, 0.8 mi south of Falling Spring, and 5.5 mi north of Covington. Datum of gage is 1,333.49 ft above National Geodetic Vertical Datum of 1929.	411	1925-84 [‡] , 1987-90	11-17-89	7.74	2,930
02012950	Sweet Springs Creek tributary at Sweet Chalybeate, Va.	Lat 37°39'25", long 80°14'10", Alleghany County, on left bank 20 ft upstream from culvert on State Highway 311, 0.1 mi upstream from mouth, and 0.9 mi north of Sweet Chalybeate. Datum of gage is 1,926.94 ft above National Geodetic Vertical Datum of 1929.	.66	1966-75, 1978-90	-	<4.14	<36
02015600	Cowpasture River near Head Waters, Va.	Lat 38°19'30", long 79°26'14", Highland County, on left downstream wingwall of bridge on U.S. Highway 250, 1.2 mi west of Head Waters, and 3 mi upstream from Shaw Fork. Datum of gage is 1,985.65 ft above National Geodetic Vertical Datum of 1929.	11.3	1949-90	11-16-89	4.05	305
02017300	Craig Creek at New Castle, Va.	Lat 37°30'06", long 80°06'18", Craig County, on left upstream pier of old bridge, about 20 ft downstream from new bridge on State Highway 616, 800 ft upstream from Johns Creek, and 0.3 mi southeast of New Castle. Datum of gage is 1,245.69 ft above National Geodetic Vertical Datum of 1929.	112	1967-90	11-16-89	10.09	3,190
02017700	Craig Creek tributary near New Castle, Va.	Lat 37°33'21", long 79°59'52", Craig County, on right upstream wingwall of culvert on State Highway 606, 0.4 mi upstream from mouth, and 7.1 mi northeast of New Castle.	2.05	1968-90	11-16-89	4.76	126
02018800	North Fork near Fincastle, Va.	Lat 37°32'07", long 79°56'03", Botetourt County, on left upstream wingwall of culvert on State Highway 606, 3.5 mi upstream from mouth, and 3.9 mi northwest of Fincastle. Datum of gage is 1,248.65 ft above National Geodetic Vertical Datum of 1929.	4.17	1968-90	11-16-89	4.88	309

< Less than.

‡ Operated as a continuous-record gaging station.

DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Annual maximum discharge at crest-stage partial-record stations during water year 1990--Continued							
Station No.	Station Name	Location	Drainage area (mi ²)	Period of record	Annual Maximum		
					Date	Gage height (ft)	Dis-charge (ft ³ /s)
JAMES RIVER BASIN--Continued							
02020100	Renick Run near Buchanan, Va.	Lat 37°35'27", long 79°38'04", Botetourt County, on left upstream wingwall of culvert on Frontage Road of Interstate Highway 81 between exits 48 and 49, 2.2 mi upstream from mouth, and 4.8 mi northeast of Buchanan. Datum of gage is 1,261.85 ft above National Geodetic Vertical Datum of 1929.	2.06	1967-90	11-16-89	6.06	500
02021700	Cedar Grove Branch near Rockbridge Baths, Va.	Lat 37°53'00", long 79°23'10", Rockbridge County, on right upstream wingwall of culvert on State Highway 39, 0.1 mi upstream from mouth, and 1.8 mi southeast of Rockbridge Baths. Datum of gage is 1,041.22 ft above National Geodetic Vertical Datum of 1929.	12.3	1967-90	11-16-89	5.51	211
02023300	South River near Steeles Tavern, Va.	Lat 37°55'50", long 79°09'55", Augusta County, at bridge on State Highway 608, 2.5 mi northeast of Vesuvius, 3 mi east of Steeles Tavern, and 5 mi south of Greenville.	15.7	1951-90	-	<3.68	<690
02024750	James River at Major, Va.	Lat 37°34'40", long 79°22'36", Amherst County, on left bank 10 ft upstream from headgates on headrace to city of Bedford hydroelectric plant, 1.2 mi north of Major, and 1.4 mi upstream from Blue Ridge Parkway.	3,070	1988-90	1-21-88 5- 6-89 1- 1-90	7.54 9.09 8.51	d14,910 d45,160 32,100
02027700	Buffalo River tributary near Amherst, Va.	Lat 37°33'45", long 78°57'35", Amherst County, on left bank just upstream from culvert on U.S. Highway 60, 0.8 mi upstream from mouth, and 5.2 mi southeast of Amherst. Datum of gage is 583.66 ft above National Geodetic Vertical Datum of 1929.	.46	1966-90	-	<2.78	(*)
02030800	Stockton Creek near Afton, Va.	Lat 38°01'48", long 78°48'30", Albemarle County, on left upstream wingwall of culvert on State Highway 6, 1.7 mi east of Afton, and 4.3 mi upstream from Stony Run. Datum of gage is 835.27 ft above National Geodetic Vertical Datum of 1929.	2.80	1967-90	-	<4.29	<51

* Discharge not determined.

< Less than.

d Not previously published.

Annual maximum discharge at crest-stage partial-record stations during water year 1990--Continued							
Station No.	Station Name	Location	Drainage area (mi ²)	Period of record	Annual Maximum		
					Date	Gage height (ft)	Dis-charge (ft ³ /s)
JAMES RIVER BASIN--Continued							
02032200	Doyles River near White Hall, Va.	Lat 38°12'10", long 78°40'17", Albemarle County, on right downstream abutment of bridge on State Highway 810, 5.5 mi upstream from mouth, and 5.9 mi north of White Hall. Datum of gage is 928.08 ft above National Geodetic Vertical Datum of 1929.	6.70	1967-90	5-30-71	12.04	d954
					6-21-72	12.90	d1,580
					10- 5-72	10.99	d461
					1974	<10.10	<d220
					9-26-75	11.84	d844
					1976	<10.10	<d220
					10- 9-76	11.35	d598
					1-26-78	12.09	d984
					9-22-79	13.73	d2,560
					1980	<10.10	<d220
					1981	<10.10	<d220
					1982	<10.10	<d220
					8-10-83	10.21	d242
					1984	<a10.10	<d220
					1985	<10.10	<d220
					1988	<a10.10	<220
					1989	<a10.10	<d220
					1990	<10.10	<220
02032300	Muddy Run near Stanardsville, Va.	Lat 38°14'05", long 78°37'02", Albemarle County, on right downstream abutment of bridge on State Highway 810, 0.7 mi upstream from mouth, and 11 mi southwest of Stanardsville. Datum of gage is 756.79 ft above National Geodetic Vertical Datum of 1929.	3.36	1967-90	-	<6.06	(*)
02032540	Haneytown Creek near Stanardsville, Va.	Lat 38°16'48", long 78°30'50", Greene County, on left downstream wingwall of bridge on State Highway 810, 0.2 mi on upstream from mouth, and 4.5 mi west of Stanardsville. Datum of gage is 616.34 ft above National Geodetic Vertical Datum of 1929.	4.45	1967-90	1974	<a12.33	<a389
					1976	<a12.33	<a389
					1981	<a12.33	<d389
					6-13-82	12.61	d484
					1983	<12.33	<d389
					2-14-84	12.55	d460
					1985	<12.33	<d389
					1988	<12.33	<a389
					1989	<12.33	<a389
1990	<12.33	<389					
02032550	Lynch River at Nortonsville, Va.	Lat 38°14'16", long 78°32'32", Albemarle County, on right downstream abutment of bridge on State Highway 810, 4 mi upstream from mouth, and 7 mi southwest of Stanardsville. Datum of gage is 591.70 ft above National Geodetic Vertical Datum of 1929.	13.6	1967-90	-	<12.01	<1,100
02032700	Schenks Branch at Charlottesville, Va.	Lat 38°02'32", long 78°28'30", Charlottesville City, on right downstream retaining wall of small road culvert, 25 ft upstream from U.S. Highway 250 bypass culvert, 200 ft southeast of intersection of U.S. Highway 250 bypass and McIntire Road, and 1.2 mi upstream from mouth. Datum of gage is 371.63 ft above National Geodetic Vertical Datum of 1929.	1.34	1950-77, 1979-90	5-10-90	6.32	(*)

* Discharge not determined.
 < Less than.
 a Revised.
 d Not previously published.

DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Annual maximum discharge at crest-stage partial-record stations during water year 1990--Continued							
Station No.	Station Name	Location	Drainage area (mi ²)	Period of record	Annual Maximum		
					Date	Gage height (ft)	Dis-charge (ft ³ /s)
JAMES RIVER BASIN--Continued							
02033300	Moores Creek near Charlottesville, Va.	Lat 38°00'25", long 78°34'25", Albemarle County, on right downstream wingwall of culvert on access road, 30 ft north of U.S. Highway 29, 2.8 mi upstream from Morey Creek, and 4 mi southwest of Charlottesville.	3.52	1967-90	7-14-67	14.85	d235
					7- 2-68	14.96	d255
					9-11-71	15.04	d292
					6-21-72	16.30	a900
					10- 5-72	14.47	d165
					1974	<a13.82	<a80
					3-19-75	a15.66	d499
					1976	<a13.82	<a80
					10- 9-76	a15.78	d561
					5-13-78	d15.03	d289
					6- 2-79	a18.74	(*)
					1980	<a13.82	<d80
					7- 4-81	13.97	a95
					1982	<a13.82	<a80
					4- 3-83	(i)	a(*)
					2-14-84	a14.09	a109
					1985	<a13.82	<d80
					11- 4-85	a14.38	a152
					9- 8-87	h18.05	a(*)
					1988	<a13.82	<a80
					5- 5-89	a14.24	a131
					1990	<13.82	<80
02034500	Willis River at Lakeside Village, Va.	Lat 37°40'00", long 78°10'00", Cumberland County, on left bank 15 ft upstream from bridge on State Highway 690, 0.4 mi east of Lakeside Village, 6.9 mi upstream from mouth, and 7.7 mi downstream from Reynolds Creek. Datum of gage is 178.98 ft above National Geodetic Vertical Datum of 1929.	262	1927-86 ^h , 1987-90	10-19-89	16.16	3,690
02037800	Falling Creek near Midlothian, Va.	Lat 37°27'15", long 77°35'20", Chesterfield County, at bridge on State Highway 653, 2.25 mi upstream from Horners Run, and 4 mi southeast of Midlothian. Datum of gage is 170.06 ft above National Geodetic Vertical Datum of 1929.	18.1	1951-90	4-30-90	5.17	434
02038840	Holiday Creek near Toga, Va.	Lat 37°25'58", long 78°41'12", Buckingham County, 40 ft downstream from State Forest Road 2307, 5.9 mi southwest of Toga.	1.68	1967-90	3-17-90	2.92	202
02038845	North Holiday Creek near Toga, Va.	Lat 37°26'09", long 78°40'04", Buckingham County, 18 ft upstream from State Forest Road 2307, 4.5 mi southwest of Toga.	1.31	1967-90	3-17-90	2.83	61
02040500	Flat Creek near Amelia, Va.	Lat 37°23'27", long 78°03'45", Amelia County, at bridge on State Highway 681, 0.5 mi downstream from Horsepen Creek, and 6.0 mi northwest of Amelia.	73.0	1946-70, 1972-90	5-29-90	8.74	1,790

* Discharge not determined.

< Less than.

* Operated as a continuous-record gaging station.

a Revised.

d Not previously published.

h Suspected backwater from unknown source.

i Partial year; peak for year probably occurred during period of missing record caused by insect damage between February and June. Peaks for remainder of year less than 13.82 ft and 80 ft³/s.

DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

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Annual maximum discharge at crest-stage partial-record stations during water year 1990--Continued							
Station No.	Station Name	Location	Drainage area (mi ²)	Period of record	Annual Maximum		
					Date	Gage height (ft)	Dis-charge (ft ³ /s)
JAMES RIVER BASIN--Continued							
02042250	Bailey Branch tributary at Spring Grove, Va.	Lat 37°10'29", long 76°59'13", Surry County, on right upstream wingwall of culvert on State Highway 10, 1.0 mi northwest of Spring Grove. Datum of gage is 61.39 ft above National Geodetic Vertical Datum of 1929.	0.71	1967-90	10-31-89	2.50	12
02042300	Horsepen Branch at Richmond, Va.	Lat 37°35'45", long 77°30'40", Henrico County, on left downstream retaining wall at culverts on U.S. Highway 250 (Broad Street), at Richmond, and 0.9 mi upstream from mouth.	1.35	1965-90	5-29-90	6.22	1,810
02042400	Jordans Branch at Richmond, Va.	Lat 37°35'10", long 77°29'55", Henrico County, on left downstream wall of bridge on U.S. Highway 250 (Broad Street), at Richmond, and 2.0 mi upstream from mouth.	2.41	1965-90	5- 5-89 5-29-90	8.70 9.06	a710 820
02042780	West Branch Long Hill Swamp near Lightfoot, Va.	Lat 37°18'50", long 77°46'01", James City County, on left upstream wingwall of culvert on State Highway 612, 1.1 mi upstream from mouth, and 2.0 mi south of Lightfoot.	2.47	1970-76, 1978-90	2-10-90 5-29-90	j6.25 j6.18	95 115
CHOWAN RIVER BASIN							
02044000	Nottoway River near Burkeville, Va.	Lat 37°04'40", long 78°11'52", Lunenburg County, on right bank at downstream side of bridge on State Highway 723, 4.0 mi upstream from Modest Creek, 5.6 mi north of Victoria, and 7.5 mi south of Burkeville. Datum of gage is 354.58 ft above National Geodetic Vertical Datum of 1929.	38.7	1947-86 [#] , 1987-90	8-24-90	16.81	2,960
02044200	Falls Creek tributary near Victoria, Va.	Lat 37°02'04", long 78°10'26", Lunenburg County, at upstream end of culvert on State Highway 49, 3.6 mi northeast of Victoria.	.73	1962-90	8-24-90	8.73	318
02050050	Blackwater River tributary near Holland, Va.	Lat 36°38'44", long 76°51'29", Suffolk City, on left upstream wingwall of culvert on State Highway 189, 3.0 mi upstream from mouth, and 4.9 mi southwest of Holland. Datum of gage is 29.25 ft above National Geodetic Vertical Datum of 1929.	2.76	1967-90	8-24-90	5.20	124

Operated as a continuous-record gaging station.

a Revised.

j Affected by backwater from beaverdams in culvert.

Annual maximum discharge at crest-stage partial-record stations during water year 1990--Continued

Annual Maximum Discharge at Crest Stage Partial Record Stations during water year 1990 - Continued							
Station No.	Station Name	Location	Drainage area (mi ²)	Period of record	Annual Maximum		
					Date	Gage height (ft)	Dis-charge (ft ³ /s)
CHOWAN RIVER BASIN--Continued							
02051600	Great Creek near Cochran, Va.	Lat 36°48'46", long 77°55'19", Brunswick County, on left bank at upstream side of bridge on State Highway 763, 1.4 mi southwest of Cochran. Datum of gage is 215.72 ft above National Geodetic Vertical Datum of 1929.	30.7	1958-86 ^a , 1987-90	1- 1-90	8.42	702
ROANOKE RIVER BASIN							
02057700	Powder Mill Creek at Rocky Mount, Va.	Lat 37°00'26", long 79°52'25", Franklin County, on right upstream wingwall of western-most culvert in the interchange between U.S. Highway 220 bypass and State Highways 40 and 122 at Rocky Mount, 3.5 mi upstream from mouth.	.64	1967-90	7-14-90	17.84	(*)
02065100	Snake Creek near Brookneal, Va.	Lat 37°00'42", long 78°57'52", Halifax County, on left upstream wingwall of culvert on U.S. Highway 501, 0.5 mi upstream from mouth, and 2.1 mi south of Brookneal.	1.68	1967-90	7-14-90	3.36	62
02065300	Right Hand Fork near Appomattox, Va.	Lat 37°16'12", long 78°49'14", Appomattox County, on right upstream wingwall of culvert on State Highway 727, 0.5 mi upstream from Maple Spring Branch, and 5.2 mi south of Appomattox.	2.08	1967-90	3-18-90	6.98	229
02075350	Powells Creek near Turbeville, Va.	Lat 36°34'50", long 79°11'20", Halifax County, at culvert on U.S. Highway 58, 0.8 mi upstream from mouth, 1.1 mi east of Halifax-Pittsylvania County line, and 8.8 mi southwest of Turbeville. Datum of gage is 383.95 ft above National Geodetic Vertical Datum of 1929.	.28	1958-69b, 1970-90	5- 2-90	3.97	30
02075900	Lawson Creek at Turbeville, Va.	Lat 36°36'41", long 79°01'28", Halifax County, on left downstream wingwall of culvert on State Highway 658, 1 mi southeast of Turbeville.	8.58	1951-76	7-14-75 12-31-75	a11.31 a7.05	(*) (*)
02076000	Dan River at South Boston, Va.	Lat 36°41'37", long 78°54'09", South Boston City, on left bank 100 ft upstream from Norfolk and Western Railroad bridge at South Boston.	2,730	1900-07 ^a , 1923-52 ^a , 1953-62c, 1980-90c	10- 4-89	27.33	(*)

* Discharge not determined.

^a Operated as a continuous-record gaging station.

a Revised.

b Records provided by U.S. Department of Agriculture, Soil Conservation Service.

c Operated as a stage-only station.

Annual maximum discharge at crest-stage partial-record stations during water year 1990--Continued

Annual Maximum Discharge at First Stage Partial Station during Water Year 1990 Continued					Annual Maximum		
Station No.	Station Name	Location	Drainage area (mi ²)	Period of record	Date	Gage height (ft)	Dis-charge (ft ³ /s)
ROANOKE RIVER BASIN--Continued							
02076200	Bearskin Creek near Chatham, Va.	Lat 36°50'30", long 79°29'05", Pittsylvania County, on left upstream wingwall of culvert on State Highway 57, 4.5 mi west of Chatham, and 6 mi upstream from mouth.	4.06	1967-90	3-18-90	5.11	335
02076700	Blacks Creek near Mt. Airy, Va.	Lat 36°56'40", long 79°09'56", Pittsylvania County, on left upstream wingwall of culvert on State Highway 40, 1.5 mi east of Mt. Airy, and 3.5 mi upstream from mouth.	3.44	1966-90	5-13-71 9-22-79 1980 8-18-85 11-11-87 3-18-90	10.45 >k10.51 <a2.22 >m3.79 2.76 4.59	d870 (*) <a24 <d235 a48 173
02079500	Roanoke River at Buggs Island, Va.	Lat 36°36'06", long 78°17'56", Mecklenburg County, on left bank 1,200 ft downstream from John H. Kerr dam, 5.3 mi upstream from bridge on U.S. Highway 1, and 6.7 mi south-east of Boydton.	7,780	1947-62 [‡] , 1963-90	8-27-90	10.80	(*)
KANAWHA RIVER BASIN							
03165700	Cripple Creek at Cedar Springs, Va.	Lat 36°49'31", long 81°16'45", Wythe County, on right downstream wingwall of bridge on State Highway 749, 0.6 mi southeast of Cedar Springs.	11.3	1967-90	1967 1968 7-21-69 12-30-69 1971 6-21-72 7- 3-73 6-27-74 1975 1976 4- 4-77 1980 1981 1982 1983 1985 1986 1987 1988 1990	<13.88 <13.88 14.05 a14.10 <13.88 14.49 13.86 14.32 <13.88 <13.88 15.08 <13.88 <13.88 <13.88 <13.88 <13.88 <13.88 <13.88 <13.88	<360 <360 a390 a400 <360 a478 a353 a444 <360 <360 a598 <a360 <a360 <a360 <a360 <a360 <a360 <a360 <a357 <357
03167300	Mira Fork tributary near Dugspur, Va.	Lat 36°50'16", long 80°35'47", Carroll County, on left upstream wingwall of culvert on U.S. Highway 221, 1.3 mi upstream from mouth, and 2.2 mi northeast of Dugspur. Datum of gage is 2,602.96 ft above National Geodetic Vertical Datum of 1929.	.62	1967-90	1- 1-90	n6.98	(*)

* Discharge not determined.

< Less than.

> Greater than.

‡ Operated as a continuous-record gaging station.

a Revised.

d Not previously published.

k Affected by backwater.

m Gage height of annual peak unknown; high-water mark was destroyed by flood of Nov. 4, 1985. Gage height listed as second highest of year resulting from runoff from storm of Feb. 12, 1985. Peak discharge for Aug. 18, 1985, is more than 110 ft³/s but less than 235 ft³/s.

n Affected by backwater from ice jam.

Annual maximum discharge at crest-stage partial-record stations during water year 1990--Continued							
Station No.	Station Name	Location	Drainage area (mi ²)	Period of record	Annual Maximum		
					Date	Gage height (ft)	Dis-charge (ft ³ /s)
KANAWHA RIVER BASIN--Continued							
03167700	Beaverdam Creek at Hillsville, Va.	Lat 36°46'05", long 80°43'33", Carroll County, at bridge on private road to Burlington Industries, 0.2 mi east of Hillsville corporate limits, and 3.0 mi upstream from mouth. Datum of gage is 2,373.04 ft above National Geodetic Vertical Datum of 1929.	4.75	1968-90	1- 1-90	n8.50	(*)
03168750	Thorne Springs Branch near Dublin, Va.	Lat 37°05'30", long 80°44'34", Pulaski County, at pond dam just upstream from U.S. Highway 11, 3.3 mi southwest of Dublin, and 4.3 mi upstream from mouth.	4.77	1957-69b, 1970-90	5-29-90	1.88	73
BIG SANDY RIVER BASIN							
03207500	Levisa Fork near Grundy, Va.	Lat 37°17'52", long 82°07'34", Buchanan County, on right bank 200 ft upstream from Six and Twenty Mile Creek, 2.4 mi northwest of Grundy.	p235	1942-74#, 1986-87#, 1988-90	10-17-89	13.04	8,370
03208040	Russell Fork at Council, Va.	Lat 37°04'41", long 82°03'56", Buchanan County, on left bank 50 ft upstream from bridge on State Highway 80, 750 ft downstream from Ball Creek, 0.6 mi southeast of Council, and 4.7 mi upstream from Hurricane Creek.	10.2	1981-83#, 1984-90	5- 5-90	4.36	806
03208100	Russell Fork near Birchleaf, Va.	Lat 37°09'50", long 82°15'20", Dickenson County, on right bank 125 ft upstream from bridge on State Highway 80, 150 ft upstream from Frypan Creek, 1.3 mi southeast of Birchleaf, and 3.5 mi southeast of Haysi.	87.4	1981-83#, 1984-90	10-17-89	9.92	4,460
03208700	North Fork Pound River at Pound, Va.	Lat 37°07'32", long 82°37'36", Wise County, on right bank 700 ft downstream from Stacy Branch, 1,600 ft downstream from North Fork Pound River dam, at Pound. Datum of gage is 1,500.00 ft above National Geodetic Vertical Datum of 1929.	18.5	1962-87#, 1988-90	10-17-89	52.25	453
03208800	Pound River above Indian Creek, at Pound, Va.	Lat 37°07'26", long 82°36'29", Wise County, on left bank at Pound, 1,600 ft downstream from confluence of North and South Forks, 0.5 mi upstream from bridge on U.S. Highway 23, and 0.7 mi upstream from Indian Creek. Datum of gage is 1,535.64 ft above National Geodetic Vertical Datum of 1929.	36.7	1966-78#, 1979-90	10-17-89	13.80	2,050

* Discharge not determined.

Operated as a continuous-record gaging station.

b Records provided by U.S. Department of Agriculture, Soil Conservation Service.

n Affected by backwater from ice jam.

p Includes drainage area of Six and Twenty Mile Creek.

Annual maximum discharge at crest-stage partial-record stations during water year 1990--Continued

Annual Maximum Discharge at Creek Stage Partial Record Stations during water year 1988 continued					Annual Maximum		
Station No.	Station Name	Location	Drainage area (mi ²)	Period of record	Date	Gage height (ft)	Dis-charge (ft ³ /s)
BIG SANDY RIVER BASIN--Continued							
03208850	Pound River below Bold Camp Creek, at Pound, Va.	Lat 37°07'19", long 82°35'55", Wise County, at Pound, on left bank 1,000 ft upstream from bridge on State Highway 83, 0.3 mi downstream from Bold Camp Creek, and 0.5 mi downstream from Indian Creek. Datum of gage is 1,527.36 ft above National Geodetic Vertical Datum of 1929.	61.2	1966-78#, 1979-90	10-17-89	17.79	3,160
03208900	Pound River near Georges Fork, Va.	Lat 37°09'51", long 82°31'30", Dickenson County, on right bank 50 ft upstream from bridge on State Highway 624, 150 ft upstream from Camp Creek, and 2.6 mi northwest of Georges Fork. Datum of gage is 1,470.39 ft above National Geodetic Vertical Datum of 1929.	82.5	1964-82#, 1983-90	10-17-89	10.55	4,560
03209200	Russell Fork at Bartlick, Va.	Lat 37°14'45", long 82°19'25", Dickenson County, on left bank at Bartlick just upstream from bridge on State Highway 611, 0.2 mi downstream from Pound River, and 1.1 mi upstream from Fall Branch. Datum of gage is 1,165.00 ft above National Geodetic Vertical Datum of 1929.	526	1963-82#, 1983-90	10-19-89	14.91	8,690
03213590	Knox Creek at Kelsa, Va.	Lat 37°27'02", long 82°03'34", Buchanan County, on downstream end of center bridge pier on State Highway 697, 0.3 mi downstream from Pawpaw Creek, 0.8 mi northeast of Kelsa, and 10.0 mi upstream from mouth.	84.3	1980-81#, 1982-90	10-17-89	16.40	9,230
TENNESSEE RIVER BASIN							
03471200	South Fork Holston River at Teas, Va.	Lat 36°46'22", long 81°27'08", Smyth County, at Teas, on right downstream pier of bridge on State Highway 601, and 0.1 mi downstream from Mullins Branch. Datum of gage is 2,496.98 ft above National Geodetic Vertical Datum of 1929.	31.1	1967-90	1- 1-90	11.75	500
03472500	Beaverdam Creek at Damascus, Va.	Lat 36°37'40", long 81°47'28", Washington County, at Damascus, on right bank 350 ft west of State Highway 716, in old plant area of Mobay Chemical Corporation, and 0.6 mi upstream from mouth. Datum of gage is 1,946.66 ft above National Geodetic Vertical Datum of 1929.	56.0	1948-59#, 1960-90	3-17-90	4.33	1,910

[#] Operated as a continuous-record gaging station.

Annual maximum discharge at crest-stage partial-record stations during water year 1990--Continued							
Station No.	Station Name	Location	Drainage area (mi ²)	Period of record	Annual Maximum		
					Date	Gage height (ft)	Dis-charge (ft ³ /s)
TENNESSEE RIVER BASIN--Continued							
03473500	Middle Fork Holston River at Groseclose, Va.	Lat 36°53'19", long 81°20'51", Smyth County, 10 ft downstream from culverts on State Highway 679 at Groseclose, 0.2 mi upstream from Rocky Spring Branch, and 10 mi northeast of Marion. Datum of gage is 2,442.86 ft above National Geodetic Vertical Datum of 1929.	7.39	1948-57 [‡] , 1958-87, 1988-89 [‡] , 1990	1- 1-90	3.43	112
03474000	Middle Fork Holston River at Seven Mile Ford, Va.	Lat 36°48'26", long 81°37'20", Smyth County, on right bank at downstream side of bridge on U.S. Highway 11 at Seven Mile Ford, 0.3 mi upstream from Meade Creek, 3.3 mi downstream from Walker Creek, and 32.1 mi upstream from mouth. Datum of gage is 1,960.00 ft above National Geodetic Vertical Datum of 1929.	132	1942-81 [‡] , 1982-87 [‡] q, 1988-89 [‡] , 1990 [‡] q	1- 1-90	4.65	4,070
03474700	Hutton Creek near Chilhowie, Va.	Lat 36°47'00", long 81°44'05", Washington County, on left downstream wingwall of bridge on U.S. Highway 11, 3.3 mi southwest of Chilhowie, and 1.4 mi upstream from mouth.	8.32	1967-90	3-17-90	10.92	274
03474800	Hall Creek near Glade Spring, Va.	Lat 36°45'47", long 81°48'15", Washington County, on right downstream wingwall of bridge on U.S. Highway 11, 2.0 mi upstream from Tattle Branch, and 2.5 mi southwest of Glade Spring.	7.90	1967-90	1967 1968 1969 4-28-70 1971 11- 7-77 3-17-90	<9.60 <9.60 <9.60 10.07 <9.60 11.37 9.81	<200 <200 <200 360 <200 1,220 264
03475600	Cedar Creek near Meadowview, Va.	Lat 36°44'50", long 81°51'20", Washington County, on left downstream wingwall of culvert on U.S. Highway 11, 1.2 mi south of Meadowview, and 2.5 mi upstream from mouth. Datum of gage is 2,034.66 ft above National Geodetic Vertical Datum of 1929.	3.38	1967-90	3-17-90	6.17	40
03475700	Spring Creek near Abingdon, Va.	Lat 36°40'43", long 82°02'29", Washington County, on right upstream and left downstream wingwall of culvert on U.S. Highway 11, 1.5 mi upstream from Sinking Creek, and 3.8 mi southwest of Abingdon. Datum of gage is 1,977.54 ft above National Geodetic Vertical Datum of 1929.	2.99	1967-90	1- 1-90	3.84	114
03487800	Lick Creek near Chatham Hill, Va.	Lat 36°57'44", long 81°28'21", Smyth County, on left bank 270 ft upstream from bridge on State Highway 42, 2.9 mi northeast of Chatham Hill, and 1.6 mi upstream from mouth. Datum of gage is 2,076.97 ft above National Geodetic Vertical Datum of 1929.	25.5	1966-68 [‡] , 1969-90	1- 1-90	6.30	1,590

< Less than.

‡ Operated as a continuous-record gaging station.

q Records provided by Tennessee Valley Authority.

Annual maximum discharge at crest-stage partial-record stations during water year 1990--Continued

Annual maximum discharge at crest stage partial record stations during water year 1990					Continued		
Station No.	Station Name	Location	Drainage area (mi ²)	Period of record	Annual Maximum		
					Date	Gage height (ft)	Dis-charge (ft ³ /s)
TENNESSEE RIVER BASIN--Continued							
03488450	Brumley Creek at Brumley Gap, Va.	Lat 36°47'30", long 82°01'10", Washington County, on left downstream wingwall of bridge on State Highway 611, 0.2 mi upstream from mouth, 0.8 mi southeast of Brumley Gap, and 2.7 mi downstream from Lee Creek. Datum of gage is 1,489.16 ft above National Geodetic Vertical Datum of 1929.	21.1	1979-81 [#] , 1982-90	1- 1-90	4.76	622
03489800	Cove Creek near Shelleys, Va.	Lat 36°39'13", long 82°21'16", Scott County, on right downstream wingwall of bridge on U.S. Highways 58 and 421, 1.5 mi northwest of Shelleys. Datum of gage is 1,381.53 ft above National Geodetic Vertical Datum of 1929.	17.3	1951-90	12- 7-50	3.13	a190
					5-19-53	6.03	a940
					3-18-55	6.15	a1,000
					5- 5-58	h5.85	a440
					3-27-59	5.58	a710
					11-28-59	5.25	a600
					2-25-61	5.90	a870
					12-18-61	5.94	a890
					3- 5-64	5.70	a770
					4- 9-65	5.95	a900
					4-13-66	5.73	a780
					7-21-69	5.00	a520
					4-28-70	6.33	a1,080
					5- 7-71	6.20	a1,020
					4-12-72	6.55	a1,200
					12-10-72	7.00	a1,470
					4- 4-74	6.20	a1,020
					3-14-75	6.40	a1,120
					6- 2-76	5.93	a885
					1- 1-90	5.20	580
03489870	Big Moccasin Creek at Collinwood, near Hansonville, Va.	Lat 36°44'16", long 82°19'25", Russell County, at Collinwood, on left downstream wingwall of bridge on State Highway 612, and 50 ft downstream from Meade Branch. Datum of gage is 1,796.34 ft above National Geodetic Vertical Datum of 1929.	41.9	1967-68 [#] , 1969-90	1- 1-90	3.81	1,220
03490000	North Fork Holston River near Gate City, Va.	Lat 36°36'31", long 82°34'05", Scott County, on left bank 75 ft upstream from bridge on U.S. Highway 23, 1.6 mi downstream from Big Moccasin Creek, 2.1 mi southeast of Gate City, and 8.8 mi upstream from mouth. Datum of gage is 1,197.56 ft above National Geodetic Vertical Datum of 1929.	672	1931-81 [#] , 1982-90 ^r	1- 1-90	11.35	15,100
03521500	Clinch River at Richlands, Va.	Lat 37°05'10", long 81°46'52", Tazewell County, on right bank 1.0 mi southeast of Richlands, 1.7 mi downstream from Indian Creek. Datum of gage is 1,924.08 ft above National Geodetic Vertical Datum of 1929.	137	1945-89 [#] , 1990	2-10-90	8.86	3,050

[#] Operated as a continuous-record gaging station.

^a Revised.

^h Suspected backwater from unknown source.

^r Records provided by Tennessee Valley Authority since Jan. 1, 1982.

DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Annual maximum discharge at crest-stage partial-record stations during water year 1990--Continued							
Station No.	Station Name	Location	Drainage area (mi ²)	Period of record	Annual Maximum		
					Date	Gage height (ft)	Dis-charge (ft ³ /s)
TENNESSEE RIVER BASIN--Continued							
03524500	Guest River at Coeburn, Va.	Lat 36°55'45", long 82°27'23", Wise County, on right bank 30 ft downstream from bridge on State Highway 72, 1.0 mi southeast of Coeburn, 1.4 mi upstream from Jaybird Branch, 1.8 mi downstream from Pine Camp Creek, and 6.3 mi upstream from mouth. Datum of gage is 1,925.80 ft above National Geodetic Vertical Datum of 1929.	87.3	1949-59#, 1960-78, 1979-81#, 1982-90	2-10-90	8.93	2,680
03524900	Stony Creek at Ka, Va.	Lat 36°48'57", long 82°37'02", Scott County, at Ka, on left bank 300 ft upstream from bridge on State Highway 619, 600 ft downstream from Straight Fork, and 4.2 mi upstream from mouth.	30.9	1980-81#, 1982-90	2-10-90	6.00	3,200
03526000	Copper Creek near Gate City, Va.	Lat 36°40'26", long 82°33'57", Scott County, on right bank 50 ft upstream from bridge on State Highway 619, 0.2 mi upstream from Plank Camp Creek, 1.1 mi downstream from Obeys Creek, and 2.6 mi northeast of Gate City. Datum of gage is 1,301.95 ft above National Geodetic Vertical Datum of 1929.	106	1948-72#, 1973-90	3-17-90	8.68	2,220
03527000	Clinch River at Speers Ferry, Va.	Lat 36°38'55", long 82°45'02", Scott County, on right bank 200 ft downstream from bridge on U.S. Highway 58, 0.5 mi downstream from Copper Creek, 0.8 mi northwest of Speers Ferry, 1.8 mi south of Clinchport, and 211.0 mi upstream from mouth. Datum of gage is 1,196.54 ft above National Geodetic Vertical Datum of 1929.	1,126	1920-76#, 1977-78, 1979-81#, 1982-90	2-10-90	17.65	17,900
03529500	Powell River at Big Stone Gap, Va.	Lat 36°52'08", long 82°46'32", Wise County, on right bank 10 ft upstream from bridge on U.S. Highway 23, at Big Stone Gap, 1.0 mi upstream from South Fork Powell River, 2.5 mi downstream from Pigeon Creek, and 179.2 mi upstream from mouth. Datum of gage is 1,459.07 ft above National Geodetic Vertical Datum of 1929.	112	1945-59#, 1960-77, 1979-81#, 1982-90	1- 7-46 1-15-47 2-13-48 12-15-51 2-21-53 4-15-56 1-29-57 5- 6-58 1-21-59 3-30-60 2-25-61 2-28-62 3-15-64 3-26-65 2-13-66 3-12-68 1-20-69 5- 7-71 1-20-72 3-16-73 11-27-73 3-30-75 2-10-90	9.8 7.0 9.34 6.97 7.04 7.95 9.67 5.70 6.71 5.98 6.27 6.88 5.67 6.94 8.92 5.18 3.68 6.24 5.74 7.83 7.86 6.83 6.87	a9,200 a5,300 a8,510 a5,260 a5,350 a6,540 a9,000 a3,770 a4,950 a4,080 a4,420 a5,160 a3,740 a5,230 a7,890 a3,200 a1,680 a4,390 a3,810 a6,340 a6,420 a5,100 4,640

* Operated as a continuous-record gaging station.
a Revised.

DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

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Annual maximum discharge at crest-stage partial-record stations during water year 1990--Continued

Annual maximum discharge at crest-stage partial-record stations during water year 1950--Continued							
Station No.	Station Name	Location	Drainage area (mi ²)	Period of record	Annual Maximum		
					Date	Gage height (ft)	Dis-charge (ft ³ /s)
TENNESSEE RIVER BASIN--Continued							
03530500	North Fork Powell River at Pennington Gap, Va.	Lat 36°46'26", long 83°01'59", Lee County, near right bank on downstream side of bridge on State Highway 621, 0.8 mi north of Pennington Gap, 1.3 mi downstream from Straight Creek, and 4.7 mi upstream from mouth. Datum of gage is 1,363.02 ft above National Geodetic Vertical Datum of 1929.	71.4	1945-51*, 1952-77, 1979-81*, 1982-90	2-10-90	6.56	2,550

* Operated as a continuous-record gaging station.

DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Special study and miscellaneous sites

Discharge measurements in the following table were made at special study and miscellaneous sites throughout the State. Data for miscellaneous sites provided by the Virginia Water Control Board are noted by an "[a]".

Discharge measurements made at special study and miscellaneous sites during water year 1990						
Stream	Tributary to	Location	Drainage area (mi ²)	Measured previously (water years)	Measurements	
					Date	Discharge (ft ³ /s)
NASSAWADOX CREEK BASIN						
Nassawadox Creek [a]	Chesapeake Bay	Lat 37°31'31", long 75°52'37", Northampton County, at culvert on State Highway 606, 2.7 mi upstream from Kelly Cove, and 3.5 mi north of Nassawadox.	b4.2	1968-89	10- 2-89 2-28-90 6-19-90	3.69 8.88 1.23
POTOMAC RIVER BASIN						
01633500 Stony Creek [a]	North Fork Shenandoah River	Lat 38°51'55", long 78°37'45", Shenandoah County, on right bank, 0.8 mi south of Columbia Furnace, 3.6 mi downstream from Little Stony Creek, 4.7 mi northwest of Edinburg, and 6.4 mi upstream from mouth. Datum of gage is 895.29 ft above National Geodetic Vertical Datum of 1929.	79.4	1948-56#, 1957-76, 1989	7- 9-90	10.1
South Fork Shenandoah River [a]	Shenandoah River	Lat 38°23'15", long 78°38'40", Rockingham County, 1.7 mi southwest of Elkton, 2.6 mi upstream from bridge on U.S. Highway 33 bypass.	-	1964-65, 1967, 1977, 1983-84	7-12-90	448
01645784 Snakeden Branch	Difficult Run	Lat 38°55'48", long 77°20'43", Fairfax County, at culvert on Soapstone Drive, 1.1 mi upstream from Lake Elsa Dam in Reston.	.79	1973-78#, 1984-87*	12-18-89 8-20-90 9-26-90	.39 340 .14
01659000 North Branch Chopawamsic Creek	Chopawamsic Creek	Lat 38°33'58", long 77°25'48", Prince William County, on left bank 0.3 mi upstream from State Highway 618, on Quantico Marine Corps Base, and 4.8 mi south of Independent Hill.	5.79	1951-57#, 1989	3- 6-90 7-16-90	2.82 1.84
01659500 Middle Fork Chopawamsic Creek	North Branch Chopawamsic Creek	Lat 38°33'26", long 77°25'32", Stafford County, on left bank 300 ft upstream from State Highway 618, on Quantico Marine Corps Base, 0.4 mi upstream from mouth, and 5.6 mi north of Garrisonville.	4.51	1951-57#, 1989	3- 6-90 7-17-90	2.89 1.32
01660000 South Branch Chopawamsic Creek	Chopawamsic Creek	Lat 38°32'22", long 77°25'30", Stafford County, on right bank 300 ft downstream from State Highway 618, on Quantico Marine Corps Base, 1.8 mi upstream from mouth, and 4.3 mi north of Garrisonville.	2.56	1951-57#, 1989	3- 7-90 7-16-90	1.27 .86

Operated as a continuous-record gaging station.

* Operated as a stage-only station.

a Provided by the Virginia Water Control Board.

b Approximately.

DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

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Discharge measurements made at special study and miscellaneous sites during water year 1990--Continued						
Stream	Tributary to	Location	Drainage area (mi ²)	Measured previously (water years)	Measurements	
					Date	Discharge (ft ³ /s)
POTOMAC RIVER BASIN--Continued						
01660500 Beaverdam Run	Aquia Creek	Lat 38°30'25", long 77°25'45", Stafford County, on left bank 600 ft upstream from Military Road 2, on Quantico Marine Corps Base, 2.2 mi north of Garrisonville, and 3.4 mi upstream from mouth.	12.7	1951-57 [‡] , 1989	3- 7-90 7-16-90	7.41 6.73
GREAT WICOMICO RIVER BASIN						
01661800 Bush Mill Stream	Great Wicomico River	Lat 37°52'36", long 76°29'42", Northumberland County, at bridge on State Highway 601, 2.2 mi northwest of Howland, 3.0 mi southwest of Heaths- ville, and 3.5 mi upstream from mouth.	6.82	1964-69 [‡] , 1970-86 [‡] , 1987-89	6-28-90	3.24
RAPPAHANNOCK RIVER BASIN						
01665500 Marsh Run	Rapidan River	Lat 38°13'33", long 78°15'30", Orange County, at bridge on State Highway 609, 0.5 mi upstream from mouth, and 2.9 mi northwest of Somerset.	16.0	1963, 1989	11- 6-89	9.35
01665570 Blue Run	Rapidan River	Lat 38°10'01", long 78°16'33", Orange County, at bridge on State Highway 678, at Barboursville.	4.83	1989	11- 8-89	3.49
01665580 Blue Run	Rapidan River	Lat 38°14'15", long 78°11'57", Orange County, at bridge on State Highway 641, 0.7 mi upstream from mouth, and 2.3 mi northeast of Somerset.	32.3	1989	11- 6-89	19.2
01665600 Poplar Run	Rapidan River	Lat 38°15'53", long 78°09'25", Orange County, at culvert on State Highway 633, 0.1 mi upstream from mouth, and 1.3 mi southwest of Madison Mills.	8.75	1989	11- 6-89	.09
01667670 Long Branch	Rapidan River	Lat 38°21'01", long 77°58'31", Orange County, at bridge on State Highway 636, 0.65 mi upstream from mouth, and 1.7 mi southwest of Raccoon Ford.	1.74	1989	11- 8-89	2.40
01667840 Black Walnut Run	Mine Run	Lat 38°18'22", long 77°52'56", Orange County, at bridge on State Highway 602, 3.5 mi northeast of Rhoadesville, and 3.8 mi upstream from mouth.	6.88	1989	11- 8-89	4.05

[‡] Operated as a continuous-record gaging station.

Discharge measurements made at special study and miscellaneous sites during water year 1990--Continued

Discharge measurements made at special study and miscellaneous sites during water year 1990						
Stream	Tributary to	Location	Drainage area (mi ²)	Measured	Measurements	
				previously (water years)	Date	Discharge (ft ³ /s)
RAPPAHANNOCK RIVER BASIN--Continued						
01667850 Mine Run	Rapidan River	Lat 38°20'36", long 77°51'33", Orange County, at bridge on State Highway 611, at Burr Hill, and 4.3 mi upstream from mouth.	31.8	1943, 1952-53, 1963, 1981-85, 1989	11- 6-89	10.6
01667860 Mountain Run	Mine Run	Lat 38°18'16", long 77°57'58", Orange County, at bridge on State Highway 617, 3.1 mi north of Unionville, and 10.3 mi upstream from mouth.	12.3	1989	11- 8-89	6.48
01667870 Mountain Run	Mine Run	Lat 38°21'13", long 77°53'38", Orange County, at bridge on State Highway 611, 2.1 mi northwest of Burr Hill, and 4.9 mi upstream from mouth.	28.8	1943, 1952-54, 1963, 1989	11- 7-89	12.9
01667880 Russell Run	Rapidan River	Lat 38°22'10", long 77°47'58", Orange County, at culvert on State Highway 603, 0.3 mi upstream from mouth, and 1.8 mi west of Flat Run.	5.22	1989	11- 6-89	1.89
01667890 Flat Run	Rapidan River	Lat 38°21'11", long 77°45'13", Orange County, at culvert on State Highway 3, 0.2 mi downstream from Lake of the Woods dam, 1.1 mi southeast of Flat Run, and 3.0 mi upstream from mouth.	7.30	1989	11- 6-89	1.29
01667910 Wilderness Run	Rapidan River	Lat 38°19'32", long 77°43'33", Orange-Spotsylvania County line, at bridge on State Highway 3, at Wilderness, and 4.1 mi upstream from mouth.	10.7	1952-54, 1963, 1989	11- 6-89	3.37
01668800 Hoskins Creek	Rappahannock River	Lat 37°55'38", long 76°57'16", Essex County, at bridge on State Highway 717, 0.4 mi upstream from Criddlin Swamp, 2.9 mi downstream from former site of Hutchinson Mill Pond, and 5.0 mi west of Tappahannock.	15.5	1965-69 [#] , 1970-86 [#] , 1987-89	10-10-89 1-26-90 5- 1-90 6-28-90	11.4 88.1 28.8 11.1
YORK RIVER BASIN						
01670120 Mountain Run	North Anna River	Lat 38°09'39", long 78°06'06", Orange County, at bridge on State Highway 643, 0.9 mi upstream from confluence with Negro Run, and 4.4 mi north- east of Gordonsville.	14.2	1981-85, 1989	11- 7-89	6.58
01670130 Negro Run	North Anna River	Lat 38°09'05", long 78°05'36", Orange-Louisa County line, 300 ft upstream from confluence with Mountain Run, 5.1 mi northeast of Gordonsville.	13.4	1989	11- 8-89	7.98

[#] Operated as a continuous-record gaging station.

Discharge measurements made at special study and miscellaneous sites during water year 1990--Continued						
Stream	Tributary to	Location	Drainage area (mi ²)	Measured previously (water years)	Measurements	
					Date	Discharge (ft ³ /s)
YORK RIVER BASIN--Continued						
01670140 Beaver Creek	North Anna River	Lat 38°09'43", long 78°02'17", Orange County, at bridge on State Highway 638, 1.3 mi southwest of Daniel, and 2.0 mi upstream from mouth.	7.58	1989	11- 7-89	3.48
01670150 Church Run	Pamunkey Creek	Lat 38°13'31", long 78°04'16", Orange County, at bridge on State Highway 631, 0.1 mi upstream from confluence with Tomahawk Creek, and 1.7 mi southeast of Orange.	6.13	1989	11- 8-89	5.08
01670160 Tomahawk Creek	Pamunkey Creek	Lat 38°13'29", long 78°04'22", Orange County, at culvert on State Highway 612, 0.1 mi upstream from confluence with Church Run, and 1.7 mi southeast of Orange.	7.60	1989	11- 8-89	6.08
01670165 Pamunkey Creek	North Anna River	Lat 38°11'36", long 77°59'05", Orange County, at bridge on State Highway 630, 1.2 mi southwest of Lahore.	26.2	1989	11- 7-89	13.9
01670170 Clear Creek	Pamunkey Creek	Lat 38°12'07", long 77°58'51", Orange County, at culvert on State Highway 629, at Lahore, 0.1 mi upstream from Berry Run, 0.8 mi upstream from mouth, and 2.4 mi downstream from Lake Orange dam.	6.56	1989	11- 7-89	2.73
01670180 Pamunkey Creek	North Anna River	Lat 38°11'33", long 77°58'09", Orange County, at bridge on State Highway 669, at Lahore, and 0.8 mi downstream from Clear Creek.	40.5	1989	11- 7-89	24.4
01670220 Rocky Run	Terrys Run	Lat 38°14'03", long 77°53'35", Orange County, at culvert on State Highway 619, 0.2 mi upstream from mouth, and 3.3 mi southwest of Mine Run.	3.43	1989	11- 7-89	1.11
01670230 Terrys Run	Pamunkey Creek	Lat 38°11'13", long 77°55'39", Orange County, at bridge on State Highway 629, 0.3 mi downstream from Riga Run, 1.6 mi upstream from Lake Anna, and 2.5 mi southwest of Tatum.	26.9	1989	11- 7-89	11.2
01670235 Pleasant Run	Terrys Run	Lat 38°10'38", long 77°54'23", Orange County, at culvert on State Highway 653, 0.9 mi upstream from Lake Anna, 1.4 mi upstream from former mouth, and 2.5 mi south of Tatum.	2.71	1989	11- 7-89	1.44
01670300 Contrary Creek	North Anna River	Lat 38°03'53", long 77°52'45", Louisa County, at bridge on U.S. Highway 522, 1.2 mi upstream from Lake Anna, 4.0 mi northeast of Mineral, and 5.1 mi upstream from former mouth.	5.53	1976-87 [#] , 1989	11- 6-89	3.02

[#] Operated as a continuous-record gaging station.

DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Discharge measurements made at special study and miscellaneous sites during water year 1990--Continued						
Stream	Tributary to	Location	Drainage area (mi ²)	Measured previously (water years)	Measurements	
					Date	Discharge (ft ³ /s)
YORK RIVER BASIN--Continued						
01671500 Bunch Creek	Hudson Creek	Lat 38°01'54", long 78°11'30", Louisa County, at culvert on U.S. Highway 15, 1.5 mi up- stream from confluence with Fielding Creek, and 2.7 mi south of Boswells Tavern.	4.37	1949-79#, 1989	11- 8-89	3.51
01674200 Reedy Creek	Mattaponi River	Lat 37°52'55", long 77°21'35", Caroline County, at bridge on U.S. Highway 301, 3.3 mi north of Dawn, and 11 mi south of Bowling Green.	16.8	1964, 1969, 1973-75	4-16-90 5-30-90 6- 1-90 6-27-90	37.2 142 44.8 5.44
JAMES RIVER BASIN						
Jackson River [a]	James River	Lat 37°48'40", long 79°59'20", Covington City, at Covington filtration plant, at Covington.	-	-	9-25-90	247
Dunlap Creek [a]	Jackson River	Lat 37°47'44", long 79°59'51", Alleghany County, on U.S. Highway 60, 900 ft upstream from mouth, and at Covington.	-	-	9-25-90	20.0
Potts Creek [a]	Jackson River	Lat 37°45'06", long 79°59'50", Covington City, 75 ft below bridge on State Highway 18, 700 ft upstream from mouth, and at Covington.	-	-	9-25-90	30.7
J. W. Smith Spring [a]	Mill Creek	Lat 37°24'18", long 80°12'54", Craig County, 10 ft down- stream from upstream reservoir dam, 0.1 mi upstream from mouth, and 0.5 mi northwest of Webbs Mill.	-	-	5-31-90	1.92
James River	Chesapeake Bay	Lat 37°33'10", long 79°22'03", Amherst-Bedford County line, at bridge on Blue Ridge Parkway, 1.5 mi north of Big Island.	-	-	10-20-89 1- 2-90 5- 9-90 8-14-90	19,100 19,100 3,450 989
02025000 Pedlar River	James River	Lat 37°32'35", long 79°15'10", Amherst County, at bridge on State Highway 635, 1.2 mi south of Pedlar Mills, and 3.7 mi upstream from mouth.	91.0	1942-56#, 1963, 1978, 1981-84	1- 2-90	394
North Creek [a]	South Creek	Lat 37°45'32", long 78°14'50", Fluvanna County, 1,000 ft downstream from Fork Union Military Academy's sewage treatment plant, 1,100 ft downstream from bridge on State Highway 652, and 0.8 mi southeast of Fork Union.	-	-	8-15-90	.165
02033300 Moore's Creek	Rivanna River	Lat 38°00'25", long 78°34'25", Albemarle County, at culvert on access road, 30 ft north of U.S. Highway 29, 2.8 mi upstream from Morey Creek, and 4 mi southwest of Charlottesville.	3.52	1969	5-10-90	27.9

* Operated as a continuous-record gaging station.

a Provided by the Virginia Water Control Board.

DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

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Discharge measurements made at special study and miscellaneous sites during water year 1990--Continued

Discharge measurements made at special study and miscellaneous sites during water year 1990--Continued						
Stream	Tributary to	Location	Drainage area (mi ²)	Measured previously (water years)	Measurements	
					Date	Discharge (ft ³ /s)
JAMES RIVER BASIN--Continued						
02038840 Holiday Creek	Appomattox River	Lat 37°25'58", long 78°41'12", Buckingham County, at State Forest Road 2307, 5.9 mi southwest of Toga.	1.68	1972	5-10-90	6.59
02038850 North Holiday Creek	Holiday Creek	Lat 37°26'09", long 78°40'04", Buckingham County, at State Forest Road 2307, 4.5 mi southwest of Toga.	1.31	1972-73	5-10-90	4.85
02042400 Jordans Branch	Upham Brook	Lat 37°35'10", long 77°29'55", Henrico County, on left down- stream wingwall of bridge on U.S. Highway 250 (Broad Street) at Richmond and 2.0 mi up- stream from mouth.	2.41	1984-85, 1989	3-28-84 8-18-85 3-24-89 3- 3-90	60.3 2,300 15.0 5.67
02042440 Chicka- hominy River	James River	Lat 37°33'07", long 77°16'17", Hanover-Henrico County line, at bridge on State Highway 156, 2.7 mi northeast of Seven Pines.	149	1953-54, 1984-85, 1987-89	10-31-89 1-25-90 4-27-90 5-11-90 5-29-90 6- 1-90 6-29-90 7-11-90 9-12-90 9-15-90 9-16-90	57.9 94.8 97.8 116 799 1,050 11.9 13.4 12.9 132 141
02042726 Diascund Creek	Chickahominy River	Lat 37°28'52", long 76°58'21", New Kent County, at bridge on State Highway 628, 2.4 mi south of New Kent, and 6.0 mi upstream from Timber Swamp.	9.25	1985, 1987-89	11- 1-89 12-14-89 1-24-90 4-25-90 6-13-90 7-10-90 9-11-90	3.38 7.09 8.50 2.71 1.67 .32 .31
02042736 Beaverdam Creek	Diascund Reservoir	Lat 37°28'53", long 76°54'23", New Kent County, at bridge on State Highway 632, 4.0 mi northwest of Barhamsville, and 4.1 mi upstream from mouth.	4.82	1985, 1987-89	11- 1-89 12-14-89 1-24-90 4-25-90 6-13-90 7-10-90 9-11-90	8.15 10.1 3.85 5.07 3.87 2.38 2.84
02042742 Wahrani Swamp	Diascund Reservoir	Lat 37°27'30", long 76°51'57", New Kent County, at culvert on State Highway 632, 1.3 mi west of Barhamsville, and 1.8 mi upstream from Barnes Swamp.	4.02	1985, 1987-89	11- 1-89 1-24-90 4-25-90 6-13-90 7-10-90 9-11-90	5.21 4.98 1.10 .95 .05 .18
02042780 West Branch Long Hill Swamp	Powhatan Creek	Lat 37°18'50", long 77°46'01", James City County, on left upstream wingwall of culvert on State Highway 612, 1.1 mi upstream from mouth, and 2.0 mi south of Lightfoot.	2.47	1970, 1989	8-21-89 7- 2-90	19.8 1.82
CHOWAN RIVER BASIN						
Little Nottoway River	Nottoway River	Lat 37°05'16", long 78°03'25", Nottoway County, at bridge on State Highway 603, 2.3 mi west of Blackstone.	-	1989	5- 2-89 8-24-90 8-24-90	737 721 470

DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Discharge measurements made at special study and miscellaneous sites during water year 1990--Continued

Discharge measurements made at special study and miscellaneous sites during water year 1990--Continued						
Stream	Tributary to	Location	Drainage area (mi ²)	Measured	Measurements	
				previously (water years)	Date	Discharge (ft ³ /s)
CHOWAN RIVER BASIN--Continued						
Bush River	Sandy River	Lat 37°16'40", long 78°21'03", Prince Edward County, at bridge of U.S. Highway 460, 1.3 mi east of Farmville, and 3.1 mi west of Rice.	-	1943, 1951-54, 1963	5-29-90 5-29-90	340 539
ROANOKE RIVER BASIN						
Roanoke River	Albemarle Sound	Lat 37°05'46", long 79°23'06", Campbell and Pittsylvania County line, 1.1 mi down- stream from Leesville Dam, 1.5 mi south of Leesville, and 2.3 mi upstream from Goose Creek.	-	-	10-31-89	4,610
Roanoke River	Albemarle Sound	Lat 37°06'58", long 79°23'00", Campbell and Pittsylvania County line, at Leesville, 500 ft upstream from Goose Creek, and 3.4 mi downstream from Leesville Dam.	-	-	10-31-89	4,590
Goose Creek [a]	Roanoke River	Lat 37°07'07", long 79°23'42", Campbell County, along State Highway 43, 0.5 mi upstream from bridge on State High- way 630, and 0.5 mi west of Leesville.	-	-	10-31-89	173
Roanoke River	Albemarle Sound	Lat 37°08'13", long 79°20'33", Campbell and Pittsylvania County line, 3.4 mi down- stream from Goose Creek, and 6.8 mi downstream from Leesville Dam.	-	-	10-31-89	4,730
Sycamore Creek [a]	Roanoke River	Lat 37°06'23", long 79°18'22", Pittsylvania County, 0.2 mi upstream from mouth, 75 ft downstream from bridge on State Highway 924, and 0.8 mi southwest of Altavista.	-	-	10-31-89	23.2
Unnamed trib- utary [a]	Sycamore Creek	Lat 37°06'13", long 79°18'19", Pittsylvania County, 800 ft upstream from mouth, 5 ft upstream from culvert on State Highway 924, and 0.9 mi southwest of Altavista.	-	-	10-31-89	.63
Roanoke River	Albemarle Sound	Lat 37°06'17", long 79°17'48", Campbell and Pittsylvania County line, at Altavista, 0.1 mi upstream from U.S. Highway 29 (BR) and stream- gaging station (02060500), and 10.4 mi downstream from Leesville Dam.	1,789	1930-90	10-31-89	4,830
Dan River	Roanoke River	Lat 36°34'42", long 79°25'53", Danville City, at Robertson Bridge, 0.1 mi downstream from Schoolfield Dam, and 1.0 mi upstream from Sandy River.	-	1987-88	8- 3-90 8- 3-90	801 258

a Provided by the Virginia Water Control Board.

DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

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Discharge measurements made at special study and miscellaneous sites during water year 1990--Continued						
Stream	Tributary to	Location	Drainage area (mi ²)	Measured previously (water years)	Measurements	
					Date	Discharge (ft ³ /s)
ROANOKE RIVER BASIN--Continued						
02079880 Pea Hill Creek	Lake Gaston	Lat 36°34'57", long 77°53'20", Brunswick County, at bridge on State Highway 665, 1.1 mi north of Gasburg.	-	1987-89	10-18-89 11-16-89 1-10-90 2- 6-90 3- 6-90 4-11-90 5- 1-90 6- 5-90 7-10-90 7-31-90 9- 4-90	1.11 2.16 12.4 5.43 5.57 6.88 4.27 3.81 .60 .59 1.60
TENNESSEE RIVER BASIN						
03471200 South Fork Holston River	Holston River	Lat 36°46'22", long 81°27'08", Smyth County, at Teas, at bridge on State Highway 601, and 0.1 mi downstream from Mullins Branch.	31.1	1967, 1969, 1977	6- 5-90	37.1
03474700 Hutton Creek	Middle Fork Holston River	Lat 36°47'00", long 81°44'05", Washington County, on left downstream wingwall of bridge on U.S. Highway 11, 3.3 mi southwest of Chilhowie, and 1.4 mi upstream from mouth.	8.32	1969, 1972	6- 4-90	8.74
03474800 Hall Creek	Middle Fork Holston River	Lat 36°45'47", long 81°48'15", Washington County, at bridge on U.S. Highway 11, 2.0 mi upstream from Tattle Branch, and 2.5 mi southwest of Glade Spring.	7.90	1969, 1972	6- 4-90	15.9
03475600 Cedar Creek	Middle Fork Holston River	Lat 36°44'50", long 81°51'20", Washington County, at culvert on U.S. Highway 11, 1.2 mi south of Meadowview, and 2.5 mi upstream from mouth.	3.38	1969	6- 4-90	7.95
03475700 Spring Creek	South Fork Holston River	Lat 36°40'43", long 82°02'29", Washington County, at culvert on U.S. Highway 11, 1.5 mi upstream from Sinking Creek, and 3.8 mi southwest of Abingdon.	2.99	1969	6- 4-90	3.82
03487800 Lick Creek	North Fork Holston River	Lat 36°57'44", long 81°28'21", Smyth County, 350 ft upstream from bridge on State High- way 42, 2.9 mi northeast of Chatham Hill, and 1.6 mi upstream from mouth.	25.5	-	6- 6-90	20.7
North Fork Holston River	Holston River	Lat 36°54'29", long 81°42'08", Smyth County, at bridge on State Highway 633, at North Holston.	-	-	5-29-90	3,500

ANALYSES OF SAMPLES COLLECTED AT PARTIAL-RECORD, SPECIAL STUDY, AND MISCELLANEOUS SITES

Samples are collected at partial-record, special study, and miscellaneous sites to give better areal coverage. The results of these samples are given herein.

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (MG/L) (00301)	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	HARD- NESS TOTAL (MG/L AS CaCO3) (00900)
RAPPAHANNOCK RIVER BASIN										
01665550 MARSH RUN NEAR SOMERSET, VA (LAT 38 14 03N LONG 078 15 30W)										
NOV 1989 06...	1055	9.3	43	6.8	9.0	745	9.1	80	150	19
01665570 BLUE RUN AT BARBOURSVILLE, VA (LAT 38 10 01N LONG 078 16 33W)										
NOV 1989 08...	--	3.5	78	7.3	12.5	--	13.3	--	--	--
01665580 BLUE RUN NEAR SOMERSET, VA (LAT 38 14 15N LONG 078 11 57W)										
NOV 1989 06...	1300	19	82	7.7	10.0	750	10.4	94	420	42
01665600 POPLAR RUN NR MADISON MILLS, VA (LAT 38 15 53N LONG 078 09 25W)										
NOV 1989 06...	1520	0.09	78	7.4	12.0	750	9.2	87	600	29
01667670 LONG BRANCH NR RACCOON FORD, VA (LAT 38 21 02N LONG 077 58 11W)										
NOV 1989 08...	1500	2.4	92	7.3	12.0	751	9.8	92	--	--
01667840 BLACK WALNUT RUN NR RHOADESVILLE, VA (LAT 38 18 22N LONG 077 52 56W)										
NOV 1989 08...	1320	4.1	46	7.1	11.0	750	10.2	94	--	--
01667850 MINE RUN AT BURR HILL, VA (LAT 38 20 36N LONG 077 51 33W)										
NOV 1989 06...	1645	11	55	7.3	10.0	756	10.8	96	130	18
01667860 MOUNTAIN RUN NR UNIONVILLE, VA (LAT 38 18 16N LONG 077 57 58W)										
NOV 1989 08...	1205	6.5	121	7.5	11.0	751	10.4	96	--	--
01667870 MOUNTAIN RUN NEAR BURR HILL, VA (LAT 38 21 13N LONG 077 53 38W)										
NOV 1989 07...	0830	13	122	7.6	10.5	757	10.2	92	270	54
01667880 RUSSELL RUN NEAR FLAT RUN, VA (LAT 38 22 10N LONG 077 47 58W)										
NOV 1989 06...	1450	1.9	43	7.2	9.5	756	11.1	98	K260	14
01667890 FLAT RUN NEAR FLAT RUN, VA (LAT 38 21 11N LONG 077 45 13W)										
NOV 1989 06...	1330	1.3	57	7.5	13.5	755	10.0	97	K10	19
01667910 WILDERNESS RUN AT WILDERNESS, VA (LAT 38 19 32N LONG 077 43 33W)										
NOV 1989 06...	1115	3.4	63	6.9	11.0	759	9.4	86	K320	19

K Results based on colony count outside the acceptance range (non-ideal colony count).

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)
RAPPAHANNOCK RIVER BASIN--Continued										
	01665550	MARSH RUN NEAR SOMERSET, VA (LAT 38 14 03N LONG 078 15 30W)								
NOV 1989 06...	4.7	1.8	3.5	1.3	21	3.0	2.8	0.10	16	34
	01665570	BLUE RUN AT BARBOURSVILLE, VA (LAT 38 10 01N LONG 078 16 33W)								
NOV 1989 08...	--	--	--	--	--	--	--	--	--	--
	01665580	BLUE RUN NEAR SOMERSET, VA (LAT 38 14 15N LONG 078 11 57W)								
NOV 1989 06...	11	3.6	4.0	1.5	36	7.0	4.9	0.10	14	62
	01665600	POPLAR RUN NR MADISON MILLS, VA (LAT 38 15 53N LONG 078 09 25W)								
NOV 1989 06...	6.7	3.0	3.5	1.2	26	3.0	4.9	<0.10	16	46
	01667670	LONG BRANCH NR RACCOON FORD, VA (LAT 38 21 02N LONG 077 58 11W)								
NOV 1989 08...	--	--	--	--	--	--	--	--	--	--
	01667840	BLACK WALNUT RUN NR RHOADESVILLE, VA (LAT 38 18 22N LONG 077 52 56W)								
NOV 1989 08...	--	--	--	--	--	--	--	--	--	--
	01667850	MINE RUN AT BURR HILL, VA (LAT 38 20 36N LONG 077 51 33W)								
NOV 1989 06...	3.8	2.0	3.7	1.4	19	3.0	3.5	0.10	13	44
	01667860	MOUNTAIN RUN NR UNIONVILLE, VA (LAT 38 18 16N LONG 077 57 58W)								
NOV 1989 08...	--	--	--	--	--	--	--	--	--	--
	01667870	MOUNTAIN RUN NEAR BURR HILL, VA (LAT 38 21 13N LONG 077 53 38W)								
NOV 1989 07...	16	3.3	3.2	1.6	47	4.0	4.9	0.10	10	70
	01667880	RUSSELL RUN NEAR FLAT RUN, VA (LAT 38 22 10N LONG 077 47 58W)								
NOV 1989 06...	2.6	1.8	2.9	1.1	15	2.0	2.4	0.10	11	38
	01667890	FLAT RUN NEAR FLAT RUN, VA (LAT 38 21 11N LONG 077 45 13W)								
NOV 1989 06...	4.1	2.2	2.9	1.3	15	7.0	2.9	0.10	4.6	39
	01667910	WILDERNESS RUN AT WILDERNESS, VA (LAT 38 19 32N LONG 077 43 33W)								
NOV 1989 06...	3.8	2.2	3.6	2.1	19	4.0	3.9	0.10	14	48

< Actual value is known to be less than the value shown.

ANALYSES OF SAMPLES COLLECTED AT PARTIAL-RECORD, SPECIAL STUDY, AND MISCELLANEOUS SITES

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L) (70301)	NITRO- GEN, NO ₂ +NO ₃ TOTAL (MG/L) AS N) (00630)	NITRO- GEN, AMMONIA TOTAL (MG/L) AS N) (00610)	NITRO- GEN, AM- MONIA + ORGANIC TOTAL (MG/L) AS N) (00625)	PHOS- PHORUS TOTAL (MG/L) AS P) (00665)	PHOS- PHORUS ORTHO TOTAL (MG/L) AS P) (70507)	CADMIUM TOTAL RECOVERABLE (UG/L) AS CD) (01027)	CHROMIUM, TOTAL RECOVERABLE (UG/L) AS CR) (01034)	COPPER, TOTAL RECOVERABLE (UG/L) AS CU) (01042)	IRON, TOTAL RECOVERABLE (UG/L) AS FE) (01045)
RAPPAHANNOCK RIVER BASIN--Continued										
	01665550	MARSH RUN NEAR SOMERSET, VA (LAT 38 14 03N LONG 078 15 30W)								
NOV 1989 06...	46	0.100	0.020	<0.20	0.030	0.010	<1	<1	1	820
	01665570	BLUE RUN AT BARBOURSVILLE, VA (LAT 38 10 01N LONG 078 16 33W)								
NOV 1989 08...	--	--	--	--	--	--	--	--	--	--
	01665580	BLUE RUN NEAR SOMERSET, VA (LAT 38 14 15N LONG 078 11 57W)								
NOV 1989 06...	68	0.700	0.010	0.20	0.030	<0.010	<1	<1	1	760
	01665600	POPLAR RUN NR MADISON MILLS, VA (LAT 38 15 53N LONG 078 09 25W)								
NOV 1989 06...	54	0.400	0.010	<0.20	0.030	0.020	<1	<1	1	880
	01667670	LONG BRANCH NR RACCOON FORD, VA (LAT 38 21 02N LONG 077 58 11W)								
NOV 1989 08...	--	--	--	--	--	--	--	--	--	--
	01667840	BLACK WALNUT RUN NR RHOADESVILLE, VA (LAT 38 18 22N LONG 077 52 56W)								
NOV 1989 08...	--	--	--	--	--	--	--	--	--	--
	01667850	MINE RUN AT BURR HILL, VA (LAT 38 20 36N LONG 077 51 33W)								
NOV 1989 06...	42	0.100	0.010	<0.20	0.010	0.020	6	<1	1	1100
	01667860	MOUNTAIN RUN NR UNIONVILLE, VA (LAT 38 18 16N LONG 077 57 58W)								
NOV 1989 08...	--	--	--	--	--	--	--	--	--	--
	01667870	MOUNTAIN RUN NEAR BURR HILL, VA (LAT 38 21 13N LONG 077 53 38W)								
NOV 1989 07...	72	0.500	0.010	0.20	0.010	0.020	<1	<1	1	680
	01667880	RUSSELL RUN NEAR FLAT RUN, VA (LAT 38 22 10N LONG 077 47 58W)								
NOV 1989 06...	33	<0.100	0.020	0.20	0.010	0.020	<1	<1	1	1400
	01667890	FLAT RUN NEAR FLAT RUN, VA (LAT 38 21 11N LONG 077 45 13W)								
NOV 1989 06...	34	<0.100	0.040	0.30	<0.010	<0.010	<1	<1	1	330
	01667910	WILDERNESS RUN AT WILDERNESS, VA (LAT 38 19 32N LONG 077 43 33W)								
NOV 1989 06...	46	0.400	0.040	0.50	0.040	0.030	<1	<1	1	960

< Actual value is known to be less than the value shown.

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, TOTAL RECOV- ERABLE (UG/L AS PB) (01051)	MANGA- NESE, TOTAL RECOV- ERABLE (UG/L AS MN) (01055)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY TOTAL RECOV- ERABLE (UG/L AS HG) (71900)	NICKEL, TOTAL RECOV- ERABLE (UG/L AS NI) (01067)	ZINC, TOTAL RECOV- ERABLE (UG/L AS ZN) (01092)	CARBON, ORGANIC TOTAL (MG/L AS C) (00680)	PHENOLS TOTAL (UG/L) (32730)
RAPPAHANNOCK RIVER BASIN--Continued									
01665550	MARSH RUN NEAR SOMERSET, VA (LAT 38 14 03N LONG 078 15 30W)								
NOV 1989 06...	160	1	70	71	<0.10	1	<10	2.0	3
01665570	BLUE RUN AT BARBOURSVILLE, VA (LAT 38 10 01N LONG 078 16 33W)								
NOV 1989 08...	--	--	--	--	--	--	--	--	--
01665580	BLUE RUN NEAR SOMERSET, VA (LAT 38 14 15N LONG 078 11 57W)								
NOV 1989 06...	160	<1	60	49	<0.10	2	10	2.1	<1
01665600	POPLAR RUN NR MADISON MILLS, VA (LAT 38 15 53N LONG 078 09 25W)								
NOV 1989 06...	150	<1	30	17	<0.10	1	<10	3.2	1
01667670	LONG BRANCH NR RACCOON FORD, VA (LAT 38 21 02N LONG 077 58 11W)								
NOV 1989 08...	--	--	--	--	--	--	--	--	--
01667840	BLACK WALNUT RUN NR RHOADESVILLE, VA (LAT 38 18 22N LONG 077 52 56W)								
NOV 1989 08...	--	--	--	--	--	--	--	--	--
01667850	MINE RUN AT BURR HILL, VA (LAT 38 20 36N LONG 077 51 33W)								
NOV 1989 06...	280	2	50	35	<0.10	2	20	3.6	4
01667860	MOUNTAIN RUN NR UNIONVILLE, VA (LAT 38 18 16N LONG 077 57 58W)								
NOV 1989 08...	--	--	--	--	--	--	--	--	--
01667870	MOUNTAIN RUN NEAR BURR HILL, VA (LAT 38 21 13N LONG 077 53 38W)								
NOV 1989 07...	220	1	40	34	0.30	1	<10	2.7	<1
01667880	RUSSELL RUN NEAR FLAT RUN, VA (LAT 38 22 10N LONG 077 47 58W)								
NOV 1989 06...	510	2	60	49	<0.10	3	<10	4.1	3
01667890	FLAT RUN NEAR FLAT RUN, VA (LAT 38 21 11N LONG 077 45 13W)								
NOV 1989 06...	130	1	150	110	1.2	2	<10	4.6	<1
01667910	WILDERNESS RUN AT WILDERNESS, VA (LAT 38 19 32N LONG 077 43 33W)								
NOV 1989 06...	420	1	100	75	<0.10	<1	<10	4.7	<1

< Actual value is known to be less than the value shown.

ANALYSES OF SAMPLES COLLECTED AT PARTIAL-RECORD, SPECIAL STUDY, AND MISCELLANEOUS SITES

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	HARD- NESS TOTAL (MG/L AS CACO3) (00900)
YORK RIVER BASIN										
01670120	MOUNTAIN RUN AT RT 643 NEAR GORDONSVILLE, VA (LAT 38 09 39N LONG 078 06 06W)									
NOV 1989 07...	0805	6.6	121	7.5	11.5	750	10.2	95	230	66
01670122	NEGRO RUN AT GORDONSVILLE, VA (LAT 38 07 48N LONG 078 10 22W)									
NOV 1989 08...	1000	8.0	34	7.5	11.0	750	10.8	99	--	--
01670140	BEAVER CREEK NEAR DANIEL, VA (LAT 38 09 43N LONG 078 02 17W)									
NOV 1989 07...	1000	3.5	41	6.9	11.0	750	9.9	91	180	11
01670150	CHURCH RUN NEAR ORANGE, VA (LAT 38 13 31N LONG 078 04 16W)									
NOV 1989 08...	1250	5.1	117	6.9	13.0	--	10.4	--	--	--
01670160	TOMAHAWK CREEK NR ORANGE, VA (LAT 38 13 29N LONG 078 04 22W)									
NOV 1989 08...	1335	6.1	147	7.4	13.5	--	9.9	--	--	--
01670165	PAMUNKEY CREEK NEAR LAHORE, VA (LAT 38 11 36N LONG 077 59 05W)									
NOV 1989 07...	1200	14	96	7.4	11.5	756	10.1	93	110	37
01670170	CLEAR CREEK AT LAHORE, VA (LAT 38 12 07N LONG 077 58 51W)									
NOV 1989 07...	1025	2.7	55	7.1	12.0	757	10.5	98	220	18
01670180	PAMUNKEY CREEK AT LAHORE, VA (LAT 38 11 33N LONG 077 58 09W)									
NOV 1989 07...	1335	24	82	7.4	11.5	757	10.5	97	200	31
01670220	ROCKY RUN NEAR MINE RUN, VA (LAT 38 14 03N LONG 077 53 35W)									
NOV 1989 07...	1430	1.1	64	6.8	12.0	--	8.5	--	--	--
01670230	TERRYS RUN NEAR TATUM, VA (LAT 38 11 13N LONG 077 55 39W)									
NOV 1989 07...	1245	11	71	7.1	11.0	750	10.4	96	110	25

K Results based on colony count outside the acceptance range (non-ideal colony count).

ANALYSES OF SAMPLES COLLECTED AT PARTIAL-RECORD, SPECIAL STUDY, AND MISCELLANEOUS SITES

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WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	ALKA- LINIT LAB (MG/L AS CACO3) (90410)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)
YORK RIVER BASIN--Continued										
01670120	MOUNTAIN RUN AT RT 643 NEAR GORDONSVILLE, VA (LAT 38 09 39N LONG 078 06 06W)									
NOV 1989 07...	19	4.4	4.6	1.6	58	6.0	6.0	0.10	11	77
01670122	NEGRO RUN AT GORDONSVILLE, VA (LAT 38 07 48N LONG 078 10 22W)									
NOV 1989 08...	--	--	--	--	--	--	--	--	--	--
01670140	BEAVER CREEK NEAR DANIEL, VA (LAT 38 09 43N LONG 078 02 17W)									
NOV 1989 07...	2.6	1.2	3.4	0.70	14	2.0	2.1	0.10	14	41
01670150	CHURCH RUN NEAR ORANGE, VA (LAT 38 13 31N LONG 078 04 16W)									
NOV 1989 08...	--	--	--	--	--	--	--	--	--	--
01670160	TOMAHAWK CREEK NR ORANGE, VA (LAT 38 13 29N LONG 078 04 22W)									
NOV 1989 08...	--	--	--	--	--	--	--	--	--	--
01670165	PAMUNKEY CREEK NEAR LAHORE, VA (LAT 38 11 36N LONG 077 59 05W)									
NOV 1989 07...	9.4	3.4	4.2	1.4	34	5.0	5.3	0.10	12	64
01670170	CLEAR CREEK AT LAHORE, VA (LAT 38 12 07N LONG 077 58 51W)									
NOV 1989 07...	4.9	1.5	2.8	1.1	20	2.0	2.4	0.10	8.1	36
01670180	PAMUNKEY CREEK AT LAHORE, VA (LAT 38 11 33N LONG 077 58 09W)									
NOV 1989 07...	7.7	2.9	3.9	1.4	29	4.0	4.5	0.10	12	58
01670220	ROCKY RUN NEAR MINE RUN, VA (LAT 38 14 03N LONG 077 53 35W)									
NOV 1989 07...	--	--	--	--	--	--	--	--	--	--
01670230	TERRYS RUN NEAR TATUM, VA (LAT 38 11 13N LONG 077 55 39W)									
NOV 1989 07...	4.8	3.1	4.0	1.3	26	4.0	3.6	0.10	16	42

ANALYSES OF SAMPLES COLLECTED AT PARTIAL-RECORD, SPECIAL STUDY, AND MISCELLANEOUS SITES

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L) (70301)	NITRO- GEN, NO2+NO3 TOTAL (MG/L) AS N) (00630)	NITRO- GEN, AMMONIA TOTAL (MG/L) AS N) (00610)	NITRO- GEN, AM- MONIA + ORGANIC TOTAL (MG/L) AS N) (00625)	PHOS- PHORUS TOTAL (MG/L) AS P) (00665)	PHOS- PHORUS TOTAL (MG/L) AS P) (70507)	CADMIUM TOTAL RECOV- ERABLE (UG/L) AS CD) (01027)	CHRO- MIUM, TOTAL RECOV- ERABLE (UG/L) AS CR) (01034)	COPPER, TOTAL RECOV- ERABLE (UG/L) AS CU) (01042)	IRON, TOTAL RECOV- ERABLE (UG/L) AS FE) (01045)
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YORK RIVER BASIN--Continued

01670120	MOUNTAIN RUN AT RT 643 NEAR GORDONSVILLE, VA (LAT 38 09 39N LONG 078 06 06W)									
NOV 1989 07...	88	0.800	<0.010	<0.20	0.010	<0.010	<1	<1	1	430
01670122	NEGRO RUN AT GORDONSVILLE, VA (LAT 38 07 48N LONG 078 10 22W)									
NOV 1989 08...	--	--	--	--	--	--	--	--	--	--
01670140	BEAVER CREEK NEAR DANIEL, VA (LAT 38 09 43N LONG 078 02 17W)									
NOV 1989 07...	35	<0.100	<0.010	<0.20	0.020	0.010	<1	<1	1	1200
01670150	CHURCH RUN NEAR ORANGE, VA (LAT 38 13 31N LONG 078 04 16W)									
NOV 1989 08...	--	--	--	--	--	--	--	--	--	--
01670160	TOMAHAWK CREEK NR ORANGE, VA (LAT 38 13 29N LONG 078 04 22W)									
NOV 1989 08...	--	--	--	--	--	--	--	--	--	--
01670165	PAMUNKEY CREEK NEAR LAHORE, VA (LAT 38 11 36N LONG 077 59 05W)									
NOV 1989 07...	61	0.400	<0.010	0.20	<0.010	0.010	<1	<1	3	840
01670170	CLEAR CREEK AT LAHORE, VA (LAT 38 12 07N LONG 077 58 51W)									
NOV 1989 07...	35	0.400	0.080	0.70	0.030	0.030	<1	<1	<1	890
01670180	PAMUNKEY CREEK AT LAHORE, VA (LAT 38 11 33N LONG 077 58 09W)									
NOV 1989 07...	54	0.400	0.010	<0.20	0.010	0.010	<1	<1	1	900
01670220	ROCKY RUN NEAR MINE RUN, VA (LAT 38 14 03N LONG 077 53 35W)									
NOV 1989 07...	--	--	--	--	--	--	--	--	--	--
01670230	TERRYS RUN NEAR TATUM, VA (LAT 38 11 13N LONG 077 55 39W)									
NOV 1989 07...	53	0.100	<0.010	<0.20	0.020	<0.010	<1	<1	2	1600

< Actual value is known to be less than the value shown.

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, TOTAL RECOV- ERABLE (UG/L AS PB) (01051)	MANGA- NESE, TOTAL RECOV- ERABLE (UG/L AS MN) (01055)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY TOTAL RECOV- ERABLE (UG/L AS HG) (71900)	NICKEL, TOTAL RECOV- ERABLE (UG/L AS NI) (01067)	ZINC, TOTAL RECOV- ERABLE (UG/L AS ZN) (01092)	CARBON, ORGANIC TOTAL (MG/L AS C) (00680)	PHENOLS TOTAL (UG/L) (32730)
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YORK RIVER BASIN--Continued

01670120 MOUNTAIN RUN AT RT 643 NEAR GORDONSVILLE, VA (LAT 38 09 39N LONG 078 06 06W)

NOV 1989 07...	150	1	40	37	<0.10	1	10	1.9	4
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01670122 NEGRO RUN AT GORDONSVILLE, VA (LAT 38 07 48N LONG 078 10 22W)

NOV 1989 08...	--	--	--	--	--	--	--	--	--
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01670140 BEAVER CREEK NEAR DANIEL, VA (LAT 38 09 43N LONG 078 02 17W)

NOV 1989 07...	160	2	40	42	<0.10	2	10	3.7	<1
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01670150 CHURCH RUN NEAR ORANGE, VA (LAT 38 13 31N LONG 078 04 16W)

NOV 1989 08...	--	--	--	--	--	--	--	--	--
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01670160 TOMAHAWK CREEK NR ORANGE, VA (LAT 38 13 29N LONG 078 04 22W)

NOV 1989 08...	--	--	--	--	--	--	--	--	--
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01670165 PAMUNKEY CREEK NEAR LAHORE, VA (LAT 38 11 36N LONG 077 59 05W)

NOV 1989 07...	190	3	70	50	<0.10	1	<10	2.5	1
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01670170 CLEAR CREEK AT LAHORE, VA (LAT 38 12 07N LONG 077 58 51W)

NOV 1989 07...	570	<1	40	28	<0.10	1	10	3.6	1
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01670180 PAMUNKEY CREEK AT LAHORE, VA (LAT 38 11 33N LONG 077 58 09W)

NOV 1989 07...	230	<1	60	42	<0.10	2	30	3.0	2
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01670220 ROCKY RUN NEAR MINE RUN, VA (LAT 38 14 03N LONG 077 53 35W)

NOV 1989 07...	--	--	--	--	--	--	--	--	--
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01670230 TERRYS RUN NEAR TATUM, VA (LAT 38 11 13N LONG 077 55 39W)

NOV 1989 07...	410	2	60	52	<0.10	2	10	2.8	3
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< Actual value is known to be less than the value shown.

ANALYSES OF SAMPLES COLLECTED AT PARTIAL-RECORD, SPECIAL STUDY, AND MISCELLANEOUS SITES

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE-CIFIC CON-DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	HARD- NESS TOTAL (MG/L AS CACO3) (00900)
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YORK RIVER BASIN--Continued

01670235		PLEASANT RUN NEAR TATUM, VA (LAT 38 10 38N LONG 077 54 23W)								
NOV 1989	07...	1.4	51	6.8	12.0	--	9.8	--	--	--
01670300		CONTRARY CREEK NEAR MINERAL, VA (LAT 38 03 53N LONG 077 52 45W)								
NOV 1989	06...	3.0	232	4.8	12.0	760	9.2	86	--	64
01671500		BUNCH CREEK NEAR BOSWELLS TAVERN, VA (LAT 38 01 54N LONG 078 11 30W)								
NOV 1989	08...	0955	3.5	41	6.6	11.5	--	10.0	--	--

DATE	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)
01670235		PLEASANT RUN NEAR TATUM, VA (LAT 38 10 38N LONG 077 54 23W)								
NOV 1989	07...	--	--	--	--	--	--	--	--	--
01670300		CONTRARY CREEK NEAR MINERAL, VA (LAT 38 03 53N LONG 077 52 45W)								
NOV 1989	06...	12	8.3	4.5	1.4	<1.0	110	3.9	0.10	19
01671500		BUNCH CREEK NEAR BOSWELLS TAVERN, VA (LAT 38 01 54N LONG 078 11 30W)								
NOV 1989	08...	--	--	--	--	--	--	--	--	--

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ANALYSES OF SAMPLES COLLECTED AT PARTIAL-RECORD, SPECIAL STUDY, AND MISCELLANEOUS SITES

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WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L) (70301)	NITRO- GEN, NO2+NO3 TOTAL (MG/L) AS N) (00630)	NITRO- GEN, AMMONIA TOTAL (MG/L) AS N) (00610)	NITRO- GEN, AM- MONIA + ORGANIC TOTAL (MG/L) AS N) (00625)	PHOS- PHORUS TOTAL (MG/L) AS P) (00665)	PHOS- PHORUS TOTAL (MG/L) AS P) (70507)	CADMIUM TOTAL RECOV- ERABLE (UG/L) AS CD) (01027)	CHRO- MIUM, TOTAL RECOV- ERABLE (UG/L) AS CR) (01034)	COPPER, TOTAL RECOV- ERABLE (UG/L) AS CU) (01042)	IRON, TOTAL RECOV- ERABLE (UG/L) AS FE) (01045)
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YORK RIVER BASIN--Continued

01670235	PLEASANT RUN NEAR TATUM, VA (LAT 38 10 38N LONG 077 54 23W)									
NOV 1989 07...	--	--	--	--	--	--	--	--	--	--
01670300	CONTRARY CREEK NEAR MINERAL, VA (LAT 38 03 53N LONG 077 52 45W)									
NOV 1989 06...	--	<0.100	0.060	<0.20	<0.010	<0.010	5	<1	320	15000
01671500	BUNCH CREEK NEAR BOSWELLS TAVERN, VA (LAT 38 01 54N LONG 078 11 30W)									
NOV 1989 08...	--	--	--	--	--	--	--	--	--	--

DATE	IRON, DIS- SOLVED (UG/L) AS FE) (01046)	LEAD, TOTAL RECOV- ERABLE (UG/L) AS PB) (01051)	MANGA- NESE, TOTAL RECOV- ERABLE (UG/L) AS MN) (01055)	MANGA- NESE, DIS- SOLVED (UG/L) AS MN) (01056)	MERCURY TOTAL RECOV- ERABLE (UG/L) AS HG) (71900)	NICKEL, TOTAL RECOV- ERABLE (UG/L) AS NI) (01067)	ZINC, TOTAL RECOV- ERABLE (UG/L) AS ZN) (01092)	CARBON, ORGANIC TOTAL (MG/L) AS C) (00680)	PHENOLS TOTAL (UG/L) (32730)
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01670235	PLEASANT RUN NEAR TATUM, VA (LAT 38 10 38N LONG 077 54 23W)								
NOV 1989 07...	--	--	--	--	--	--	--	--	--
01670300	CONTRARY CREEK NEAR MINERAL, VA (LAT 38 03 53N LONG 077 52 45W)								
NOV 1989 06...	11000	8	860	870	<0.10	6	1900	3.5	1
01671500	BUNCH CREEK NEAR BOSWELLS TAVERN, VA (LAT 38 01 54N LONG 078 11 30W)								
NOV 1989 08...	--	--	--	--	--	--	--	--	--

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

The following factors may be used to convert the inch-pound units published herein to the International System of Units (SI).

Multiply inch-pound units	By	To obtain SI units
<i>Length</i>		
inches (in)	2.54×10^1	millimeters (mm)
	2.54×10^{-2}	meters (m)
feet (ft)	3.048×10^{-1}	meters (m)
miles (mi)	1.609×10^0	kilometers (km)
<i>Area</i>		
acres	4.047×10^3	square meters (m ²)
	4.047×10^{-1}	square hectometers (hm ²)
	4.047×10^{-3}	square kilometers (km ²)
square miles (mi ²)	2.590×10^0	square kilometers (km ²)
<i>Volume</i>		
gallons (gal)	3.785×10^0	liters (L)
	3.785×10^0	cubic decimeters (dm ³)
	3.785×10^{-3}	cubic meters (m ³)
million gallons	3.785×10^3	cubic meters (m ³)
	3.785×10^{-3}	cubic hectometers (hm ³)
cubic feet (ft ³)	2.832×10^1	cubic decimeters (dm ³)
	2.832×10^{-2}	cubic meters (m ³)
cfs-days	2.447×10^3	cubic meters (m ³)
	2.447×10^{-3}	cubic hectometers (hm ³)
acre-feet (acre-ft)	1.233×10^3	cubic meters (m ³)
	1.233×10^{-3}	cubic hectometers (hm ³)
	1.233×10^{-6}	cubic kilometers (km ³)
<i>Flow</i>		
cubic feet per second (ft ³ /s)	2.832×10^1	liters per second (L/s)
	2.832×10^1	cubic decimeters per second (dm ³ /s)
	2.832×10^{-2}	cubic meters per second (m ³ /s)
gallons per minute (gal/min)	6.309×10^{-2}	liters per second (L/s)
	6.309×10^{-2}	cubic decimeters per second (dm ³ /s)
	6.309×10^{-5}	cubic meters per second (m ³ /s)
million gallons per day	4.381×10^1	cubic decimeters per second (dm ³ /s)
	4.381×10^{-2}	cubic meters per second (m ³ /s)
<i>Mass</i>		
tons (short)	9.072×10^{-1}	megagrams (Mg) or metric tons

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