

U.S. DEPARTMENT OF THE INTERIOR

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U.S. GEOLOGICAL SURVEY

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2000

## 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-Discharge and Surface-Water-Quality Records

Volume 2. Ground-Water-Level 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 Department of Environmental Quality who collected, compiled, analyzed, verified, and organized the data, and who typed, edited, and assembled the report. In addition to the authors, 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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This report was prepared in cooperation with the State of Virginia and with other agencies under the general supervision of Ward W. Staubitz, District Chief.

# REPORT DOCUMENTATION PAGE

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Annual - Oct. 1, 1998, to Sept. 30, 1999

Water Resources Data - Virginia - Water Year 1999

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

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Prepared in cooperation with the Virginia Department of Environmental Quality and with other agencies

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Water-resources data for the 1999 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 157 gaging stations; stage only at 1 gaging station; stage and contents at 9 lakes and reservoirs; and water quality at 23 gaging stations. Also included are data for 54 crest-stage partial-record stations. Locations of these sites are shown on figures 4 and 5. Miscellaneous hydrologic data were collected at 197 measuring sites and 84 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.

\*Virginia, \*Hydrologic data, \*Surface water, \*Water quality  
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## WATER RESOURCES DATA - VIRGINIA, 1999

## DISCONTINUED SURFACE-WATER-DISCHARGE OR STAGE-ONLY STATIONS

The following continuous-record surface-water-discharge or stage-only stations (gaging stations) in Virginia have been discontinued. Daily streamflow or stage records were collected and published for the period of record, expressed in water years, shown for each station. Those stations with an asterisk (\*) after the station number are currently operated as crest-stage partial-record stations. Discontinued project stations with less than 3 years of record have not been included. Information regarding these stations may be obtained from the District Office at the address given on the back side of the title page of this report.

[Letters after station name designate type of data collected: (d) discharge, (e) elevation]

## Discontinued surface-water-discharge or stage-only stations

Station name	Station number	Drainage area (mi <sup>2</sup> )	Period of record (water years)
NASSAWADOX CREEK BASIN			
Guy Creek (head of Holly Grove Cove) near Nassawadox, VA (d)	01484800	1.72	1963-96
POTOMAC RIVER BASIN			
Opequon Creek near Berryville, VA (d)	01615000	57.4	1943-97
Abrams Creek at Winchester, VA (d)	01615500	5.6	1946-49
Abrams Creek near Winchester, VA (d)	01616000	16.5	1949-60, 1979-94
Dry River at Rawley Springs, VA (d)	01621000	72.6	1946-48
Cooks Creek at Mt. Crawford, VA (d)	01621500	42	1905-06
Castle Spring near Churchville, VA (d)	01622500	-	1949-56
Bell Creek at St. Pauls Chapel, near Staunton, VA (d)	01623000	.61	1948-55
Bell Creek near Staunton, VA (d)	01623500	3.8	1948-55
Bell Creek at Franks Mill, near Staunton, VA (d)	01624000	9.6	1948-56
Middle River near Verona, VA (d)	01624300	178	1967-86
Lewis Creek near Staunton, VA (d)	01624500	18	1905-06
Christians Creek near Fishersville, VA (d)	01624800	70.1	1967-97
North River at Port Republic, VA (d)	01625500	804	1895-99
Back Creek near Lyndhurst, VA (d)	01625900	41.2	1974-77
South River at Waynesboro, VA (d)	01626500	133	1905-06, 1928-52
South River near Dooms, VA (d)	01626850	149	1974-95
South River at Port Republic, VA (d)	01628000	248	1895-99
White Oak Run near Grottoes, VA (d)	01628060	1.94	1979-96
Elk Run at Elkton, VA (d)	01629000	17	1901-06
Yagers Spring near Luray, VA (d)	01629990	-	1949-56
Hawksbill Creek near Luray, VA (d)	01630000	52	1905-06
Plains Mill Spring near New Market, VA (d)	01632500	-	1949-56
Stony Creek at Columbia Furnace, VA (d)	01633500	79.4	1947-56
Marlboro Spring at Marlboro, VA (d)	01635000	-	1949-56
North Fork Shenandoah River near Riverton, VA (d)	01636000	1,040	1899-1906
Happy Creek at Front Royal, VA (d)	01636210	14.0	1948-77
Big Spring near Leesburg, VA (d)	01643610	.03	1968-69, 1980-81
Goose Creek near Middleburg, VA (d)	01643700	123	1965-67, 1969-95

Discontinued surface-water-discharge or stage-only stations--Continued

Station name	Station number	Drainage area (mi <sup>2</sup> )	Period of record (water years)
POTOMAC RIVER BASIN--Continued			
Stave Run at Reston, VA (d)	01644290	.05	1966-71, 1973
Stave Run near Reston, VA (d)	01644291	.08	1971-82
Smilax Branch at Reston, VA (d)	01644295	.32	1967-78
Snakeden Branch at Reston, VA (d)	01645784	.79	1973-78
Long Branch near Annandale, VA (d)	01654500	3.71	1947-57
Accotink Creek near Accotink Station, VA (d)	01655000	37.0	1949-57
Cedar Run near Warrenton, VA (d)	01655500	12.3	1950-87
Broad Run at Buckland, VA (d)	01656500	50.5	1950-79, 1981-87
Broad Run near Bristow, VA (d)	01656650	89.6	1975-87
Occoquan River near Manassas, VA (d)	01656700	343	1968-81
Bull Run near Catharpin, VA (d)	01656725	25.8	1969-87
Cub Run near Bull Run, VA (d)	01656960	49.9	1973-87
Bull Run near Manassas, VA (d)	01657000	147	1950-81
Bull Run near Manassas Park, VA (d)	01657020	148	1984-87
Bull Run near Clifton, VA (d)	01657415	185	1972-84
Occoquan River (Creek) near Occoquan, VA (d)	01657500	570	1913-16, 1921-23, 1937-56
Hooes Run near Occoquan, VA (d)	01657655	3.97	1975-82
Neabsco Creek at Dale City, VA (d)	01657850	6.11	1994-96
Neabsco Creek Tributary at Telegraph Road near Dale City, VA (d)	01657885	.91	1995-96
Powells Creek near Dale City, VA (d)	01657895	7.93	1994-96
Quantico Creek near Dumfries, VA (d)	01658480	6.90	1983-85
South Fork Quantico Creek near Joplin, VA (d)	01658550	9.62	1983-85
South Fork Quantico Creek near Dumfries, VA (d)	01658650	16.6	1983-85
North Branch Chopawamsic Creek near Independent Hill, VA (d)	01659000	5.79	1951-57, 1990
Middle Fork Chopawamsic Creek near Garrisonville, VA (d)	01659500	4.51	1951-57, 1960-67
South Branch Chopawamsic Creek near Garrisonville, VA (d)	01660000	2.56	1951-57
Cannon Creek near Garrisonville, VA (d)	01660380	10.2	1994-96
Aquia Creek near Garrisonville, VA (d)	01660400	34.9	1971-97
Upper Machodoc Creek at Dahlgren, VA (e)	01660810	-	1992-98
GREAT WICOMICO RIVER BASIN			
Bush Mill Stream near Heathsville, VA (d)	01661800*	6.82	1964-87

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

## WATER RESOURCES DATA - VIRGINIA, 1999

Discontinued surface-water-discharge or stage-only stations--Continued

Station name	Station number	Drainage area (mi <sup>2</sup> )	Period of record (water years)
RAPPAHANNOCK RIVER BASIN			
Carter Run near Marshall, VA (d)	01661900	19.5	1977-82
Rappahannock River near Warrenton, VA (d)	01662000	195	1943-86
Rush River at Washington, VA (d)	01662500	14.7	1953-77
Thornton River near Laurel Mills, VA (d)	01663000	142	1943-56
Hazel River at Rixeyville, VA (d)	01663500	287	1942-92
Rappahannock River at Kellys Ford, VA (d)	01664500	641	1925-52
Mountain Run near Culpeper, VA (d)	01665000	15.9	1949-97
Robinson River at Locust Dale, VA (d)	01666000	148	1942
Rapidan River at Rapidan, VA (d)	01667000	446	1924-31
Mountain Run near Burr Hill, VA (d)	01667870	28.8	1990-92
Hoskins Creek near Tappahannock, VA (d)	01668800	15.5	1965-86
PIANKATANK RIVER BASIN			
Dragon Swamp near Church View, VA (d)	01669500	84.9	1943-81
YORK RIVER BASIN			
Beaverdam Swamp near Ark, VA (d)	01670000	6.63	1950-89
Pamunkey Creek at Lahore, VA (d)	01670180*	40.5	1989-92
Contrary Creek near Mineral, VA (d)	01670300*	5.53	1976-86
North Anna River near Partlow, VA (d)	01670400	344	1978-95
North Anna River near Hewlett, VA (d)	01670500	424	1926-28
North Anna River near Doswell, VA (d)	01671000	441	1926-86
Bunch Creek near Boswells Tavern, VA (d)	01671500	4.37	1949-79
South Anna River at Vontay, VA (d)	01672000	332	1927-30
South Anna River near Ashland, VA (d)	01672500	394	1930-97
Totopotomoy Creek near Atlee, VA (d)	01673500	5.89	1949-77
Ware Creek near Toano, VA (d)	01677000	6.29	1979-95
JAMES RIVER BASIN			
Bolar Spring at Bolar, VA (d)	02010000	-	1950-56
Muddy Run Spring near Warm Springs, VA (d)	02010500	-	1946-56
Warm Spring at Warm Springs, VA (d)	02011000	-	1928-44
Back Creek on Rt. 600, near Mountain Grove, VA (d)	02011480	85.8	1974-84
Falling Spring Creek near Falling Spring, VA (d)	02012000	11.5	1948-52
Jackson River at Falling Spring, VA (d)	02012500*	411	1925-84
Jackson River at Covington, VA (d)	02012900	440	1907-08

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



Discontinued surface-water-discharge or stage-only stations--Continued

Station name	Station number	Drainage area (mi <sup>2</sup> )	Period of record (water years)
JAMES RIVER BASIN--Continued			
Smith Creek above old dam, near Clifton Forge, VA (d)	02014500	12.4	1947-56
Smith Creek near Clifton Forge, VA (d)	02015000	12.5	1944-47
Stuart Spring near McDowell, VA (d)	02015500	-	1950-56
Meadow Creek at New Castle, VA (d)	02017000	13.8	1929-52
Catawba Creek near Fincastle, VA (d)	02019000	104	1928-37
Karnes Spring near Buchanan, VA (d)	02020000	-	1950-56
Calfpasture River at Goshen, VA (d)	02021000	190	1925-39
Big Spring at Kerrs Creek, VA (d)	02022000	-	1950-56
Maury River near Lexington, VA (d)	02023000	487	1925-60
South River near Riverside, VA (d)	02023500	111	1950-62
Buffalo Creek near Glasgow, VA (d)	02024300	123	1963-64
Maury River at Glasgow, VA (d)	02024500	831	1895-1906
Pedlar River near Pedlar Mills, VA (d)	02025000	91	1942-56
Tye River at Roseland, VA (d)	02026500	68	1927-38
Buffalo river near Tye River, VA (d)	02027800	147	1960-95
Tye (Buffalo) River near Norwood, VA (d)	02028000	360	1940-60
Hardware River near Scottsville, VA (d)	02029500	104	1925-39
Slate River near Arvonnia (d)	02030500	226	1926-95
Mechums River near White Hall (Ivy), VA (d)	02031000	95.4	1942-51
North Fork Moormans River near White Hall, VA (d)	02031500	11.4	1952-63, 1982-84
Moormans River near White Hall, VA (d)	02032000	18	1943-46
Moormans River near Free Union, VA (d)	02032250	74.6	1979-97
Buck Mountain Creek near Free Union, VA (d)	02032400	37	1979-97
South Fork Rivanna River near Earlysville, VA (d)	02032500	216	1951-66
South Fork Rivanna River near Charlottesville, VA (d)	02032515	260	1979-97
North Fork Rivanna River near Proffit, VA (d)	02032680	176	1970-92
Rivanna River near Charlottesville, VA (d)	02033000	473	1925
Rivanna River below Moores Creek, near Charlottesville, VA (d)	02033500	507	1925-34
Willis River at Lakeside Village (Flanagan Mills), VA (d)	02034500*	262	1927-86
(Big) Lickinghole Creek near Goochland, VA (d)	02035500	70	1944-46
Beaverdam Creek at State Farm, VA (d)	02036000	42	1944-47, 1957-64, 1955-94
Falling Creek near Chesterfield, Va. (d)	02038000*	32.8	1955-94
Falling Creek near Drewrys Bluff, VA (d)	02038500	54	1942-56, 1957-64
Vaughans Creek near Hixburg, VA (d)	02038880	23.2	1980-81

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

## WATER RESOURCES DATA - VIRGINIA, 1999

Discontinued surface-water-discharge or stage-only stations--Continued

Station name	Station number	Drainage area (mi <sup>2</sup> )	Period of record (water years)
JAMES RIVER BASIN--Continued			
Fishpond Creek near Hixburg, VA (d)	02038830	14	1980-81
Flat Creek near Amelia, VA (d)	02040500*	73	1946-48
Appomattox River near Petersburg, VA (d)	02041500	1,335	1927-66
Swift Creek near Chester, VA (d)	02042000	143	1943-49
Chickahominy River near Atlee, VA (d)	02042287	62.2	1990-97
GREAT DISMAL SWAMP BASIN			
Cypress Swamp at Cypress Chapel, VA (d)	02043500	23.8	1953-71, 1978-96
Washington Ditch near Cypress Chapel, VA (d)	02043550	41	1979-81
CHOWAN RIVER BASIN			
Nottoway River near Burkeville, VA (d)	02044000	38.7	1946-86
Nottoway River near McKenney, VA (d)	02045000	362	1946-50
Waqua Creek near Alberta, VA (d)	02045200	15.0	1966-67
Anderson Branch at Sussex, VA (d)	02046500	5.35	1949-56
Assamoosick Swamp near Sebrell, VA (d)	02047100	86.4	1982-88
Blackwater River at Zuni, VA (d)	02048000	456	1943-88
Seacock Creek at Unity, VA (d)	02048500	102	1943-49
Blackwater River near Burdette, VA (d)	02049000	576	1942-44
North Meherrin River near Keysville, VA (d)	02050500	9.2	1949-61
Great Creek near Cochran, VA (d)	02051600	30.7	1958-86
Fountains Creek near Brink, VA (d)	02052500	65.2	1953-95
Fontaine (Fountains) Creek near Emporia, VA (d)	02053000	96	1944-53
ROANOKE RIVER BASIN			
Big Springs at Elliston, VA (d)	02054000	-	1948-56
Tinker Creek at Roanoke, VA (d)	02055500	70	1907-08
Back Creek near Roanoke, VA (d)	02056500	43	1907-08
Blackwater River near Union Hall, VA (d)	02057000	208	1925-64
Roanoke River near Toshes, VA (d)	02057500	1,020	1925-63
Snow Creek at Sago, VA (d)	02058000	60	1935-44
Pigg River near Toshes, VA (d)	02058500	394	1930-63
Roanoke River near Gretna, VA (d)	02059000	1,430	1925-30
Goose Creek at Huddleston, VA (d)	02060000	218	1929-32
Big Otter River near Bedford, VA (d)	02061000	116	1944-60
Big Otter River near Altavista, VA (d)	02062000	372	1929-37
Caldwells Creek near Appomattox, VA (d)	02063000	5.13	1954-60

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

## Discontinued surface-water-discharge or stage-only stations--Continued

Station name	Station number	Drainage area (mi <sup>2</sup> )	Period of record (water years)
ROANOKE RIVER BASIN--Continued			
Falling River at Spring Mills, VA (d)	02063500	52.2	1954-60
Little Falling River at Hat Creek, VA (d)	02064500	43	1929-36
Falling River near Brookneal, VA (d)	02065000	228	1936-41
Roanoke River at Clarkton, VA (d)	02065200	2,691	1963-76
Roanoke Creek at Saxe, VA (d)	02066500	135	1946-72
Roanoke River near Clover, VA (d)	02067000	3,230	1929-52
Roanoke River above Dan River, at Clarksville, VA (d)	02067500	-	1895-98
Leatherwood Creek near Martinsville (Old Liberty), VA (d)	02073500	68	1926-34
Dan River at Danville, VA (d)	02075000	2,050	1934-95
Dan River at South Boston, VA (d)	02076000*	2,730	1900-07, 1923-52
Georges Creek near Gretna, VA (d)	02076500	9.24	1949-97
Hyc0 River near Omega, VA (d)	02078000	413	1934-50
Dan River at Clarksville, VA (d)	02078500	-	1896-98
Roanoke River at Clarksville, VA (d)	02079000	7,320	1935-52
Roanoke River at Buggs Island, VA (d)	02079500*	7,780	1947-62
Allen Creek near Boydton, VA (d)	02079640	53.4	1961-96
KANAWHA RIVER BASIN			
New River near Baywood, VA (d)	03163000	1,000	1928-30
New River near Grayson, VA (d)	03164500	1,160	1908-12
New River at Ivanhoe, VA (d)	03165500	1,340	1927, 1930-78
Cripple Creek near Ivanhoe, VA (d)	03166000	148	1930-34
Neff-Litz Spring near Rural Retreat, VA (d)	03166500	-	1947-56
Glade Creek at Grahams Forge, VA (d)	03166800	7.15	1976-93
Big Reed Island Creek near Allisonia, VA (d)	03167500	278	1908-16, 1939-95
Peak Creek at Pulaski, VA (d)	03168500	58.3 60.9	1927-33, 1951-57
Little River near Copper Valley, VA (d)	03169500	239	1908-16
New River at Eggleston, VA (d)	03171500	2,941	1915-76
Wabash Spring near Poplar Hill, VA (d)	03172000	-	1950-51
Walker Creek at Staffordsville, VA (d)	03172500	277	1908-16
Francis Spring near Bane, VA (d)	03173500	-	1952-56
Wolf Creek near Shawver Mill (Burkes Garden), VA (d)	03174500	36	1927-28
West Fork Cove Creek near Bluefield, VA (d)	03175000	5.5	1929-32

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

## WATER RESOURCES DATA - VIRGINIA, 1999

Discontinued surface-water-discharge or stage-only stations--Continued

Station name	Station number	Drainage area (mi <sup>2</sup> )	Period of record (water years)
KANAWHA RIVER BASIN--Continued			
Cox Branch above Tazewell Reservoir, near Gratton, VA (d)	03175100	2.06	1988-92
Bluestone River at Bluefield, VA (d)	03177700	39.8	1965-80
Bluestone River at Falls Mills, VA (d)	03177710	44.2	1980-97
BIG SANDY RIVER BASIN			
Levisa Fork near Grundy, VA (d)	03207500	235	1942-74, 1986-87
Grissom Creek near Council, VA (d)	03208034	2.82	1981-83
Barton Fork near Council, VA (d)	03208036	1.23	1981-83
Russell Fork at Council, VA (d)	03208040*	10.2	1981-83
Russell Fork near Birchleaf, VA (d)	03208100	87.4	1981-83
North Fork Pound River at Pound, VA (d)	03208700*	18.5	1962-87
Pound River above Indian Creek, at Pound, VA (d)	03208800*	36.7	1966-78
Pound River below Bold Camp Creek, at Pound, VA (d)	03208850*	61.2	1966-78
Pound River near Georges Fork, VA (d)	03208900*	82.5	1964-82
Russell Fork at Bartlick, VA (d)	03209200*	526	1963-82
Kersaw Branch near Hurley, VA (d)	03213577	.60	1981-82
Knox Creek at Kelsa, VA (d)	03213590*	84.3	1980-81
Steve Keesling Spring at Sugar Grove, VA (d)	03471000	-	1928, 1948-56
TENNESSEE RIVER BASIN			
South Fork Holston River near Chilhowie, VA (d)	03472000	89.5	1907-10
Beaverdam Creek at Damascus, VA (d)	03472500	56.0	1947-59
Middle Fork Holston River at Groseclose, VA (d)	03473500	7.39	1948-57, 1988-89
Middle Fork Holston River at Chilhowie, VA (d)	03474500	155	1907-10, 1921-32
Cedarville Spring at Cedarville, VA (d)	03475500	-	1950-53
Beaver Creek near Wallace, VA (d)	03477500	13.7	1946-57
Percy Preston Spring near Wallace, VA (d)	03478000	-	1950-56
Lick Creek near Chatham Hill, VA (d)	03487800*	25.5	1966-68
North Fork Holston River near Plasterco, VA (d)	03488100	259	1963-66
Brumley Creek near Hansonville, VA (d)	03488445	4.29	1979-82
Brumley Creek at Brumley Gap, VA (d)	03488450*	21.1	1979-82
North Fork Holston River at Holston, VA (d)	03488500	402	1951-59
North Fork Holston River near Mendota, VA (d)	03489500	493	1921-32
Cove Creek near Hilton, VA (d)	03489850	17.6	1966-68

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

## Discontinued surface-water-discharge or stage-only stations--Continued

Station name	Station number	Drainage area (mi <sup>2</sup> )	Period of record (water years)
TENNESSEE RIVER BASIN --Continued			
Big Moccasin Creek at Collinwood, near Hansonville, VA (d)	03489870	41.9	1966-68
Big Moccasin Creek near Gate City, VA (d)	03489900	79.6	1953-59, 1966-68
North Fork Holston River near Gate City, VA (d)	03490000*	672	1932-82
Taylor Springs at Cedar Bluff, VA (d)	03520500	-	1953
Clinch River at Cedar Bluff, VA (d)	03521000	125	1944-46
Clinch River at Richlands, VA (d)	03521500*	137	1946-89
Little River at Wardell, VA (d)	03522000	103	1949-52
Will Brooks Spring at Wardell, VA (d)	03522500	-	1950-52
(Big) Cedar Creek near Lebanon, VA (d)	03523000	51.5	1953-59
Thompson Creek near Coulwood, VA (d)	03523500	14.0	1942-49
Guest River at Coeburn, VA (d)	03524500*	87.3	1949-59, 1979-81
Guest River at Miller Yard, VA (d)	03524550	100	1997-98
Stony Creek at Ka, VA (d)	03524900*	30.9	1980-81
Stony Creek at Fort Blackmore, VA (d)	03525000	41.4	1949-52
Clinch River at Clinchport, VA (d)	03525500	986	1907-10
Copper Creek near Gate City, VA (d)	03526000	106	1948-72, 1996-98
Quillen Springs near Gate City, VA (d)	03526500	-	1954-56
Clinch River at Speers Ferry, VA (d)	03527000	1,126	1920-76, 1979-81
North Fork Clinch River at Duffield, VA (d)	03527500	23.1	1953-59
Powell River at Big Stone Gap, VA (d)	03529500	112	1945-59, 1979-81
South Fork Powell River at Big Stone Gap, VA (d)	03530000	40	1945-47, 1951-77
North Fork Powell River at Pennington Gap, VA (d)	03530500	71.4	1944-51, 1978-81, 1993-95
Powell River near Pennington Gap, VA (d)	03531000	290	1921-32

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

## WATER RESOURCES DATA - VIRGINIA, 1999

## DISCONTINUED SURFACE-WATER-QUALITY STATIONS

The following surface-water-quality stations in Virginia have been discontinued. Water-quality data (daily or periodic samples with collection frequency not less than quarterly) were collected and published for the period of record, expressed in water years, shown for each station. For each station entry, a period of record is provided for each type of record listed. Those stations with an asterisk (\*) after the station number are currently operated as partial-record water-quality sampling stations.

[Type of record: C (chemical), T (water temperature), SC (specific conductance), SED (sediment)]

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 Discontinued surface-water-quality stations
 

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Station name	Station number	Drainage area (mi <sup>2</sup> )	Type of record	Period of record (water years)
POTOMAC RIVER BASIN				
North River near Burketown, VA	01622000	379	C, T, SC	1994
Middle River near Grottoes, VA	01625000	375	C, T, SC	1994
South River at Harriston, VA	01627500	212	SC C, T, SC	1949 1994
South Fork Shenandoah River near Luray, VA	01629500	1,377	SC C, T, SC	1949 1994
South Fork Shenandoah River at Front Royal, VA	01631000	1,642	T, SC  SED C  C, T, SC	1953-56, 1968-77, 1980 1953-56 1949, 1953-56, 1968-86 1994
North Fork Shenandoah River near Strasburg, VA	01634000	768	T, SC  SED C  C, T, SC	1949, 1956, 1969-71 1956 1930, 1949, 1952, 1956, 1970-86 1994
Catoctin Creek at Taylorstown, VA	01638480	89.6	C	1993-95
Goose Creek near Leesburg, VA	01644000	332	T, SC C, T, SC	1969-71 1994
Stave Run near Reston, VA	01644291	.08	SED	1971-74
Smilax Branch at Reston, VA	01644295	.32	SED	1971-75
Snakeden Branch at Reston, VA	01645784	.79	SED	1973-78
Accotink Creek near Annandale, VA	01654000	23.5	C	1993-95
Cedar Run near Aden, VA	01656100*	155	SED	1996-98
Bull Run near Catharpin, VA	01656725	25.8	SED	1974
Cub Run near Bull Run, VA	01656960	49.9	SED	1972-74
Bull Run near Clifton, VA	01657415	185	SED	1973-74
Neabsco Creek Tributary at Telegraph Road near Dale City, VA	01657885	.91	C, S	1995-96
Quantico Creek near Dumfries, VA	01658480	6.90	C	1983-85
South Fork Quantico Creek near Independent Hill, VA	01658500*	7.64	C	1951, 1953, 1955-56, 1969, 1973-75, 1983-85
South Fork Quantico Creek at Camp 5, near Joplin, VA	01658550	9.62	C	1983-85
South Fork Quantico Creek near Dumfries, VA	01658650	16.6	C	1983-85
South Fork Quantico Creek near Triangle, VA	01658620	15.7	T, SC	1973

## WATER RESOURCES DATA - VIRGINIA, 1999

## Discontinued surface-water-quality stations--Continued

Station name	Station number	Drainage area (mi <sup>2</sup> )	Type of record	Period of record (water years)
RAPPAHANNOCK RIVER BASIN				
Carter Run near Marshall, VA	01661900	19.5	SED	1977-78
Hazel River at Rixeyville, VA	01663500	287	T SC SED	1951-55 1953-55 1952-55
Rappahannock River at Remington, VA	01664000	620	SC, T SED	1951-56, 1965-86 1951-93
Rapidan River near Culpeper, VA	01667500	472	T SC SED	1946, 1951-56 1953-56 1951-56
Mountain Run near Burr Hill, VA	01667870	28.8	C, T, SC	1990-92
Rappahannock River near Fredericksburg, VA	01668000*	1,596	T, SC	1956, 1968-74
Rappahannock River at VEPCO Dam, at Fredericksburg, VA	01668020	-	T, SC	1971-72
YORK RIVER BASIN				
North Anna River below Lake Anna, near Hewlett, VA	01670600	-	T, SC	1972-73
Pamunkey Creek at Lahore, VA	01670180	40.5	C, T, SC	1989-92
Bunch Creek near Boswells Tavern, VA	01671500	4.37	T	1954-56
Pamunkey River near Hanover, VA	01673000*	1,081	T SC	1946, 1968-76 1968-76
Mattaponi River near Bowling Green, VA	01674000	257	T	1946
Mattaponi River near Beulahville, VA	01674500*	601	T	1946
Ware Creek near Toano, VA	01677000	6.29	C	1979-81, 1985-95
JAMES RIVER BASIN				
Back Creek near Sunrise, VA	02011460	60.1	T	1984-95
Back Creek at Sunrise, VA	02011470	76.1	T	1984-92, 1993-95
Little Back Creek near Sunrise, VA	02011490	4.91	T	1984-92, 1993-95
Jackson River at Falling Spring, VA	02012500	411	T, SC C	1969-86 1930, 1948, 1968-86
James River at Buchanan, VA	02019500	2,075	T SC SED C	1948, 1951-56, 1968-86 1953-56, 1968-86 1951-56 1930, 1948, 1951-56, 1968-86
James River at Bent Creek, VA	02026000	3,683	T	1948

TYPE OF RECORD: C (chemical), T (water temperature), SC (specific conductance), SED (sediment)  
 \* Presently active periodic sampling station.

## WATER RESOURCES DATA - VIRGINIA, 1999

## Discontinued surface-water-quality stations--Continued

Station name	Station number	Drainage area (mi <sup>2</sup> )	Type of record	Period of record (water years)
JAMES RIVER BASIN--Continued				
James River at Scottsville, VA	02029000	4,584	T, SC SED	1951-56,1987 1951-56
James River at Cartersville, VA	02035000*	6,257	T, SC SED	1968-76, 1979,1981 1981
James River and Kanawha Canal, near Richmond, VA	02037000	-	C, T, SC	1972-73
James River near Richmond, VA	02037500	6,758	T, SC	1948-51, 1953-56
Fishpond Creek near Hixsburg, VA	02038830	14.0	SC	1981
Holiday Creek near Andersonville, VA	02038850	8.53	C, M, S	1968-96
Vaughans Creek near Hixsburg, VA	02038880	23.2	SC	1981
Chickahominy River tributary at Atlee Exit, near Greenwood, VA	0204228301	-	C, T, SC,	1994
Chickahominy River near Atlee, VA	02042287	62.2	C, SED	1989-91
Upham Brook near Richmond, VA	02042428	38.6	C, SED	1989-91
Chickahominy River at Rt. 156, near Seven Pines, VA	02042440	149.3	C SED	1984,1987-91 1988-91
Chickahominy River near Providence Forge, VA	02042500*	248	C, T, SC SED	1969-70, 1972-91 1995-98 1990-91
Chickahominy River above Walkers Dam, at Walkers, VA	02042720	301	C, T, SC SED	1983-91 1990-91
Diascund Creek at Rt. 628, near New Kent, VA	02042726	9.25	C, T, SC SED	1986-91 1991
Diascund Creek Reservoir off Timber Swamp, near Walkers, VA	02042734	-	C, T, SC	1983-91
Beaverdam Creek at Rt. 632, near Barhamsville, VA	02042736	4.82	C, T, SC SED	1986-91 1991
Wahrani Swamp at Rt. 632, near Barhamsville, VA	02042742	4.02	C, T, SC	1986-91
Diascund Creek Reservoir off pump station, near Walkers, VA	02042746	-	C, T, SC	1983-91
Little Creek Reservoir Infall near Norge, VA	0204275415	-	C, T, SC	1983-85
Little Creek Reservoir (North) near Norge, VA	0204275420	-	C, T, SC	1983-85
Little Creek Reservoir (North Central) near Norge, VA	0204275430	-	C, T, SC	1983-91
Little Creek Reservoir (Northeast) near Norge, VA	0204275440	-	C, T, SC	1983-85
Little Creek Reservoir (South Central) near Norge, VA	0204275470	-	C, T, SC	1983-91
Little Creek Reservoir (West) near Norge, VA	0204275490	-	C, T, SC	1983-91
CHOWAN RIVER BASIN				
Nottoway River near Burkeville, VA	02044000	38.7	T	1947
Nottoway River near Sebrell, VA	02047000	1,421	T C, T, S	1947 1978-96

TYPE OF RECORD: C (chemical), T (water temperature), SC (specific conductance), SED (sediment)

\* Presently active periodic sampling station.



## WATER RESOURCES DATA - VIRGINIA, 1999

## Discontinued surface-water-quality stations--Continued

Station name	Station number	Drainage area (mi <sup>2</sup> )	Type of record	Period of record (water years)
CHOWAN RIVER BASIN--Continued				
Blackwater River at Zuni, VA	02048000	456	T	1947
Blackwater River near Franklin, VA	02049500	617	C, M, S	1947, 1952, 1975-96
North Meherrin River near Lunenburg, VA	02051000	55.6	T	1947
Meherrin River at Emporia, VA	02052000	747	T, SC C	1968-80 1968-93
ROANOKE RIVER BASIN				
Roanoke River at Lafayette, VA	02054500	257	T, SC	1951
Roanoke River at Altavista, VA	02060500	1,789	T SC SED C	1951,1953-56, 1968-86 1953-56, 1968-86 1953-56 1951,1953-56, 1968-86
Roanoke River at Randolph, VA	02066000	2,977	T, SC SED C	1951-56, 1968-62 1954-81 1930,1951-86
Smith River above Route 615, near Woolwine, VA	02071510	-	C, T, SC	1994-95
Smith River at Rt 8 near Woolwine, VA	02071520	-	C, T, SC	1994
Smith River near Philpott, VA	02072000	216	C, T, SC	1994-95
Smith River near Irisburg, VA	02073600	-	C, T, SC	1994-95
Dan River at Sewage Treatment Plant, near Danville, VA	02075045	2,105	C, T, SC	1993-94
Dan River at Sewage Treatment Plant effluent, near Danville, VA	02075046	-	C, T, SC	1993-94
Dan River at Paces, VA	02075500	2,550	T, SC SED C	1954-56 1954-81 1954-93
Dan River at South Boston, VA	02076000	2,730	T SC	1952 1951-52
Roanoke River at Clarksville, VA	02079000	7,320	C	1987-91
Lake Gaston near Elams, NC	02079785	-	T, SC SED	1988 1988
Lake Gaston (Little River Channel) near Henrico, VA	0207987950	-	C, T, SC	1987-92
Pea Hill Creek at Route 665, near Gasburg, VA	02079880	-	C, T, SC	1987-92
Pea Hill Creek above Rt. 667, near Gasburg, VA	0207988050	-	C, T, SC	1989-90
Pea Hill Creek tributary No. 1, near Gasburg, VA	02079881	-	C, T, SC	1989-90
Pea Hill Creek tributary No. 2, near Valentines, VA	0207988130	-	C, T, SC	1989-90
Pea Hill Creek tributary No. 3, near Valentines, VA	0207988160	-	C, T, SC	1989-90
Pea Hill Creek tributary No. 4, near Valentines, VA	02079883	-	C, T, SC	1989-90

TYPE OF RECORD: C (chemical), T (water temperature), SC (specific conductance), SED (sediment)  
 \* Presently active periodic sampling station.

## WATER RESOURCES DATA - VIRGINIA, 1999

## Discontinued surface-water-quality stations--Continued

Station name	Station number	Drainage area (mi <sup>2</sup> )	Type of record	Period of record (water years)
ROANOKE RIVER BASIN--Continued				
Pea Hill Creek tributary No. 4 tributary, near Valentines, VA	0207988430	-	C, T, SC	1989-90
Cold Spring Branch near Gasburg, VA	0207988440	-	C, T, SC	1989-90
Pea Hill Creek above North Carolina State line, near Gasburg, VA	0207988450	-	C, T, SC	1987-92
Lake Gaston (Pea Hill Creek) near Henrico, NC	0207988490	-	C, T, SC	1989-90
Lake Gaston tributary near Tillans Chapel, near Elams, NC	0207988510	-	C, T, SC	1989-90
Pea Hill Creek tributary No. 5, near Henrico, NC	02079888550	-	C, T, SC	1989-90
Pea Hill Creek near Bowens Corner, near Valentines, VA	02079882	-	C, T, SC	1988
KANAWHA RIVER BASIN				
New River near Galax, VA	03164000	1,131	T, SC C	1950,1968-83 1931,1950, 1952,1968-86
New River at Radford, VA	03171000	2,748	T, SC	1950,1956
New River at Eggleston, VA	03171500	2,941	T, SC	1953-55
New River at Glen Lyn, VA	03176500	3,768	SC T C,T,SC,SED	1968-88 1964-88 1931,1950, 1952,1955-56, 1965-95
BIG SANDY RIVER BASIN				
Levisa Fork near Grundy, VA	03207500	235	T, SC SED	1950 1986
Levisa Fork at Big Rock, VA	03207800	297	T, SC SED	1970-81 1970-81
Grissom Creek near Council, VA	03208034	2.82	T,SC,C,SED	1982-83
Barton Fork near Council, VA	03208036	10.2	T,SC,C,SED	1981-83
Russell Fork at Council, VA	03208040	1.23	T, SC C	1981-83 1982-83
Russell Fork near Birchleaf, VA	03208100	87.4	T, SC, C	1982-83
TENNESSEE RIVER BASIN				
South Fork Holston River near Damascus, VA	03473000	301	T SC C	1950,1968-73 1950 1950,1952, 1968-86
Middle Fork Holston River at Chilhowie, VA	03474500	155	T	1962
Brumley Creek near Hansonville, VA	03488445	4.29	T	1980-81
Brumley Creek at Brumley Gap, VA	03488450	21.1	T	1979-81
North Fork Holston River at Holston, VA	03488500	402	T, SC	1952-56

TYPE OF RECORD: C (chemical), T (water temperature), SC (specific conductance), SED (sediment)  
 \* Presently active periodic sampling station.

## Discontinued surface-water-quality stations--Continued

Station name	Station number	Drainage area (mi <sup>2</sup> )	Type of record	Period of record (water years)
TENNESSEE RIVER BASIN --Continued				
North Fork Holston River near Gate City, VA	03490000	672	T SC SED	1950-51, 1968-78 1950-51 1935-38, 1963-65
Clinch River at Speers Ferry, VA	03527000	1,126	T SC SED	1950,1965-67 1950 1935-38, 1963-65
Powell River at Big Stone Gap, VA	03529500	112	T, SC	1950
Powell River near Jonesville, VA	03531500	319	T	1964-67

TYPE OF RECORD: C (chemical), T (water temperature), SC (specific conductance), SED (sediment)  
 \* Presently active periodic sampling station.

# WATER RESOURCES DATA - VIRGINIA, 1999

## VOLUME 1. SURFACE-WATER-DISCHARGE 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 157 gaging stations; stage only at 1 gaging station; stage and contents at 9 lakes and reservoirs; and water quality at 23 gaging stations. Also included are data for 54 crest-stage partial-record stations. Locations of these sites are shown on figures 4 and 5. Miscellaneous hydrologic data were collected at 197 measuring sites and 84 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-discharge and surface-water-quality data and Volume 2 contains ground-water-level and ground-water-quality data.

Prior to the 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 the U.S. Geological Survey, Branch of Information Services, Federal Center, Bldg. 41, Box 25286, Denver, Colorado 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-99-1." 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, Virginia 22161.

Additional information, including current prices, for ordering specific reports may be obtained from the District Office at the address given on the back of the title page or by telephone (804) 261-2600.

Water resources data, including those provided in water data reports, are available through the World Wide Web on the Internet. The Universal Resource Location (URL) to the Virginia District's home page is:

<http://va.usgs.gov>

### 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 DEPARTMENT OF ENVIRONMENTAL QUALITY, Dennis H. Treacy, executive director.

VIRGINIA DEPARTMENT OF TRANSPORTATION, Charles D. Nottingham, commissioner.

CITY OF ALEXANDRIA, Vola Lawson, city manager.

CITY OF DANVILLE, Barry Dunkley, director, Water and Wastewater.

CITY OF NEWPORT NEWS, Brian Ramaley, 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.

WEST PIEDMONT PLANNING DISTRICT COMMISSION, Robert W. Dowd, executive director.

CITY OF NORFOLK, Regina V. K. Williams, city manager.

HAMPTON ROADS PLANNING DISTRICT COMMISSION, Arthur L. Collins, executive director.

WASHINGTON COUNTY SERVICE AUTHORITY, David S. Dawson, general manager.

## WATER RESOURCES DATA - VIRGINIA, 1999

Assistance with funds or services was given by the U.S. Army Corps of Engineers in collecting records for gaging stations and 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 gaging stations, the records for which are published herein. Similar financial assistance for water-quality studies was provided by the U.S. Marine Corps Base, Quantico, VA, for the Quantico, Cannon, and Aquia Creek Basins. Other cooperators that provided funds for the collection of records are the American Electric Power, Virginia Power, City of Danville, City of Radford, City of Bedford, Multitrade of Pittsylvania County, LG & E, Synergics Incorporated, and Georgia Pacific Corporation.

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 69 gaging stations operated by the Virginia Department of Environmental Quality. These records are published as provided and are acknowledged in the "COOPERATION" paragraph of each individual station. The Virginia Department of Environmental Quality is under the direction of Dennis H. Treacy, executive director. Published material for the gaging-station records is supplied through the Division of Water Program Coordination, Larry G. Lawson, P.E., director.

## SUMMARY OF HYDROLOGIC CONDITIONS

Surface-Water Discharge

Annual mean discharges for the 1999 water year were below the normal range of flow (below the 25<sup>th</sup> percentile of annual mean flows) based on streamflow data at the farthest downstream gaged location in the Shenandoah, Rappahannock, York, James, Roanoke, Kanawha, Big Sandy, and Tennessee River Basins. Annual mean discharge for the Chowan River Basin was in the normal range of flow (between the 25<sup>th</sup> and 75<sup>th</sup> percentile of annual mean flows) based on streamflow data at the Nottoway River near Sebrell, Va., and the Meherrin River at Emporia, Va., stream-gaging stations. The only stream-gaging station in the State with an annual mean discharge above normal (above the 75<sup>th</sup> percentile of annual mean flows) was the Blackwater River near Franklin, Va., gage in the Chowan River Basin. Figure 1 shows a comparison of annual mean discharges with the long-term mean discharges at selected stations throughout the State.

Drought conditions that existed during the fall of 1998 continued into the 1999 water year. Streamflows across the State continued to decrease during October, November, and December, 1998, to levels below the normal range for that time of year. Normal precipitation during the winter months, January, February, and March, 1999, increased streamflows at some gages to levels that were in the normal range, but below the median monthly flow. During base-flow conditions (non-storm runoff), streamflows were about one-third of the levels recorded during the winter of 1998. During the spring and summer of 1999, streamflows across the State continued to decline to levels observed in past droughts. Figure 2 shows the distribution of monthly and annual mean discharges for selected stream-gaging stations throughout the State.

There have been four major statewide droughts since the early 1900's. The drought of 1930-32 was one of the most severe droughts recorded in the State. Recurrence intervals ranged from 30 years to greater than 80 years. The droughts of 1938-42 and 1962-71 were less severe; however, the cumulative streamflow deficit for the 1962-71 drought was the largest of the four droughts because of the duration of this drought. The drought of 1980-82 was the least severe and had the shortest duration. Recurrence intervals in the 1980-82 drought ranged from 15 years across most of the State to greater than 80 years in the James River Basin.

Statewide, streamflows during the summer of 1999 were generally less than the minimum summer flows observed during the 1980-82 and 1938-42 droughts. Streamflows were at or less than minimum summer flows observed during the 1962-71 drought. Statewide, streamflows did not decline to levels observed in the 1930-32 drought. Table 1 lists the new annual minimum instantaneous discharges recorded at 21 stream-gaging stations in the State.

Table 1. Minimum, period of record, instantaneous discharges recorded during 1999 water year

Gaging Station	Minimum instantaneous discharge, in cubic feet per second	Length of record, in years
Linville Creek at Broadway, Va.	1.0	15
Smith Creek near New Market, Va.	4.0	40
North Fork Shenandoah River at Mt. Jackson, Va.	1.5	56
Catoctin Creek at Taylorstown, Va.	0.08	29
Accotink Creek near Annandale, Va.	.00	52
Piscataway Creek near Tappahannock, Va.	.00	48
North Anna River at Hart Corner, near Doswell, Va.	35.0	20
Mattaponi River near Beulahville, Va.	.70	59
Jackson River near Bacova, Va.	13.0	26
Back Creek near Sunrise, Va.	.73	26
Back Creek at Sunrise, Va.	1.7	15
Little Back Creek near Sunrise, Va.	.74	15
Back Creek near Mountain Grove, Va.	5.3	15 <sup>a</sup>
Johns Creek at New Castle, Va.	5.6	73
James River at Scottsville, Va.	536.	75
North Fork Rivanna River near Earlysville, Va.	.54	6
Roanoke River at Glenvar, Va.	27.0	8
Blackwater River near Rocky Mount, Va.	4.6	23
Big Otter River near Evington, Va.	5.7	63
South Mayo River near Mettleridge, Va.	18.0	37
Smith River at Smith River Church near Woolwine, Va.	4.5	5

<sup>a</sup> Regulated since 1984

Streamflows across much of the State increased during September, 1999, because of precipitation from two hurricanes and a cold front. Hurricane Dennis, during the first week of September, and Hurricane Floyd, during mid-September, caused extensive flooding in eastern North Carolina and southeastern Virginia. Table 2 lists new annual maximum instantaneous discharges that were recorded at five stream-gaging stations as a result of flooding from Hurricane Floyd. The central Piedmont and northern Virginia regions experienced some precipitation from Hurricane Floyd, but the precipitation caused very little flooding. There was minor flooding throughout the State on September 28-30, the result of precipitation from a cold front. Drought conditions were severe enough that many of the annual peaks for the 1999 water year at stream-gaging stations throughout the State occurred during this late September storm event.

Table 2. Maximum, period of record, instantaneous peak discharges recorded during 1999 water year [--, not determined; &gt;, greater than]

Gaging Station	Maximum instantaneous discharge, in cubic feet per second	Recurrence interval, in years	Length of record, in years
Dragon Swamp at Mascot, Va.	6,600	--	19
Totopotomoy Creek near Studley, Va.	1,620	>100	22
Nottoway River near Sebrell, Va.	26,000	25	59
Blackwater River near Dendron, Va.	12,300	500	58
Blackwater River near Franklin, Va.	23,000	>500	56

## WATER RESOURCES DATA - VIRGINIA, 1999

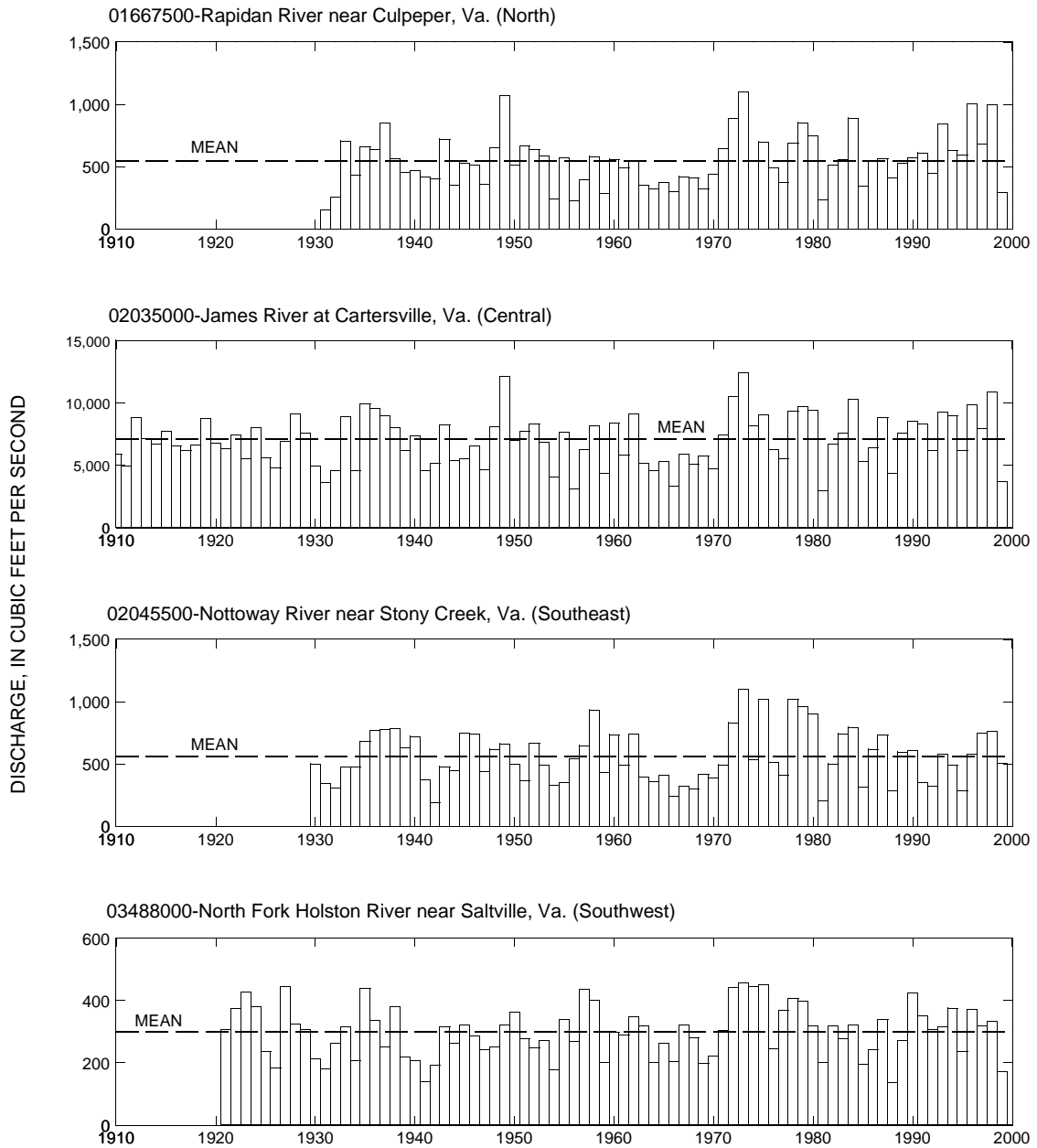


Figure 1. Annual mean discharge at four selected stream-gaging stations.

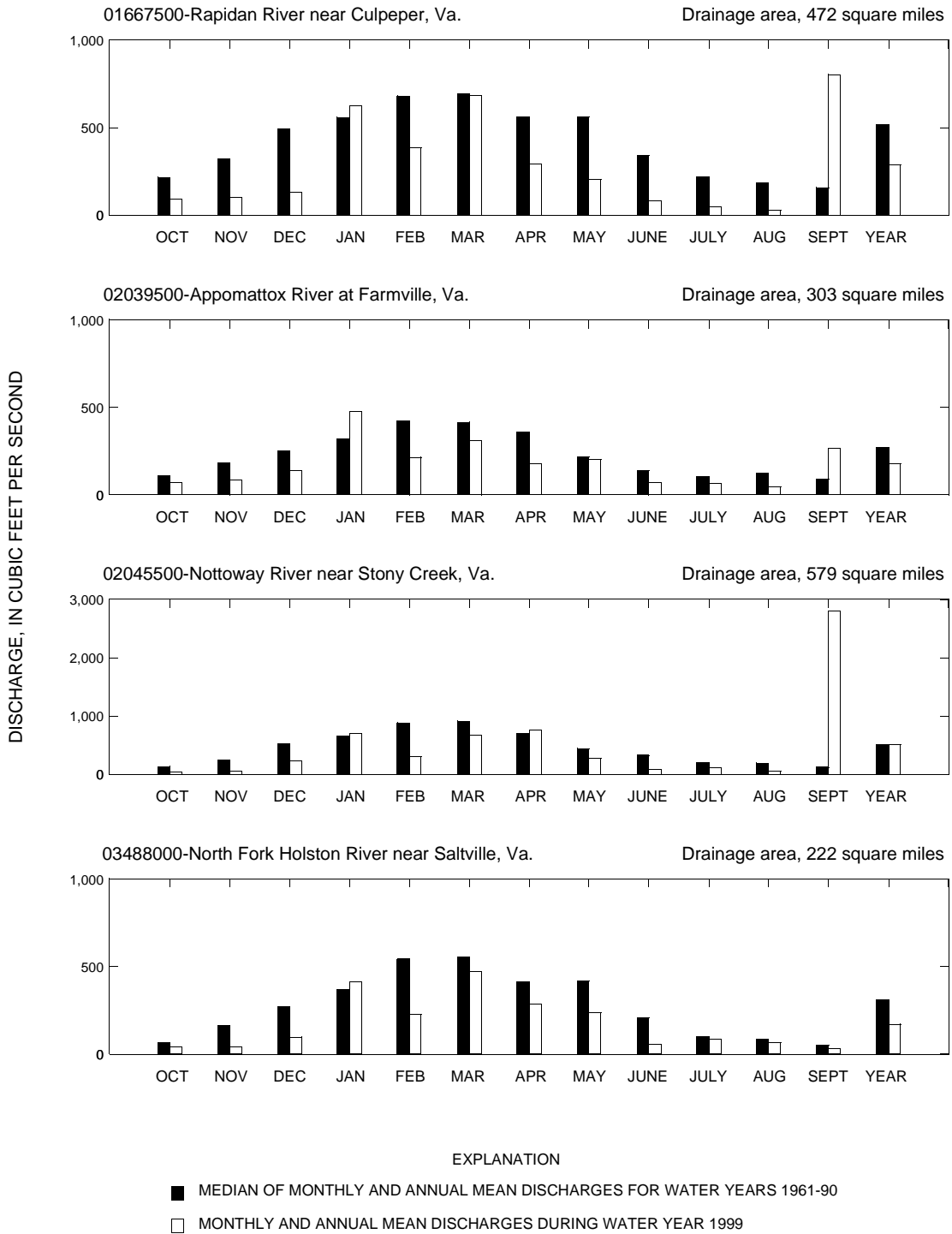


Figure 2. Monthly and annual mean discharges during 1999 water year and median of monthly and annual mean discharges for 1961-90 water years at four representative stream-gaging stations.



## WATER RESOURCES DATA - VIRGINIA, 1999

## SPECIAL NETWORKS AND PROGRAMS

Hydrologic Benchmark Network is a network of 50 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 human activities.

National Stream-Quality Accounting Network (NASQAN) monitors the water quality of large rivers within four of the Nation's largest river basins--the Mississippi, Columbia, Colorado, and Rio Grande. The network consists of 39 stations. Samples are collected with sufficient frequency that the flux of a wide range of constituents can be estimated. The objective of NASQAN is to characterize the water quality of these large rivers by measuring concentration and mass transport of a wide range of dissolved and suspended constituents, including nutrients, major ions, dissolved and sediment-bound heavy metals, common pesticides, and inorganic and organic forms of carbon. This information will be used (1) to describe the long-term trends and changes in concentration and transport of these constituents; (2) to test findings of the National Water-Quality Assessment Program (NAWQA); (3) to characterize processes unique to large-river systems such as storage and re-mobilization of sediments and associated contaminants; and (4) to refine existing estimates of off-continent transport of water, sediment, and chemicals for assessing human effects on the world's oceans and for determining global cycles of carbon, nutrients, and other chemicals.

The National Atmospheric Deposition Program/National Trends Network (NADP/NTN) provides continuous measurement and assessment of the chemical climate of precipitation throughout the United States. As the lead federal agency, the USGS works together with over 100 organizations to accomplish the following objectives; (1) Provide a long-term, spatial and temporal record of atmospheric deposition generated from a network of 191 precipitation chemistry monitoring sites. (2) Provide the mechanism to evaluate the effectiveness of the significant reduction in SO<sub>2</sub> emissions that began in 1995 as implementation of the Clean Air Act Amendments (CAAA) occurred. (3) Provide the scientific basis and nationwide evaluation mechanism for implementation of the Phase II CAAA emission reductions for SO<sub>2</sub> and NO<sub>x</sub> scheduled to begin in 2000.

Data from the network, as well as information about individual sites, are available through the world wide web at:

<http://nadp.nrel.colostate.edu/NADP>

The National Water-Quality Assessment (NAWQA) Program of the U.S. Geological Survey is a long-term program with goals to describe the status and trends of water-quality conditions for a large, representative part of the Nation's ground- and surface-water resources; provide an improved understanding of the primary natural and human factors affecting these observed conditions and trends; and provide information that supports development and evaluation of management, regulatory, and monitoring decisions by other agencies.

Assessment activities are being conducted in 53 study units (major watersheds and aquifer systems) that represent a wide range of environmental settings nationwide and that account for a large percentage of the Nation's water use. A wide array of chemical constituents will be measured in ground water, surface water, streambed sediments, and fish tissues. The coordinated application of comparative hydrologic studies at a wide range of spatial and temporal scales will provide information for decision making by water-resources managers and a foundation for aggregation and comparison of findings to address water-quality issues of regional and national interest.

Communication and coordination between USGS personnel and other local, State, and federal interests are critical components of the NAWQA Program. Each study unit has a local liaison committee consisting of representatives from key federal, State, and local water resources agencies, Indian nations, and universities in the study unit. Liaison committees typically meet semiannually to discuss their information needs, monitoring plans and progress, desired information products, and opportunities to collaborate efforts among the agencies.

Additional information about the NAWQA Program is available through the world wide web at:

[http://wwwrvares.er.usgs.gov/nawqa/nawqa\\_home.html](http://wwwrvares.er.usgs.gov/nawqa/nawqa_home.html)

## EXPLANATION OF THE RECORDS

The surface-water-discharge and surface-water-quality records published in this report are for the 1999 water year that began October 1, 1998, and ended September 30, 1999. 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 4 and 5. 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 some miscellaneous surface-water and water-quality 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.

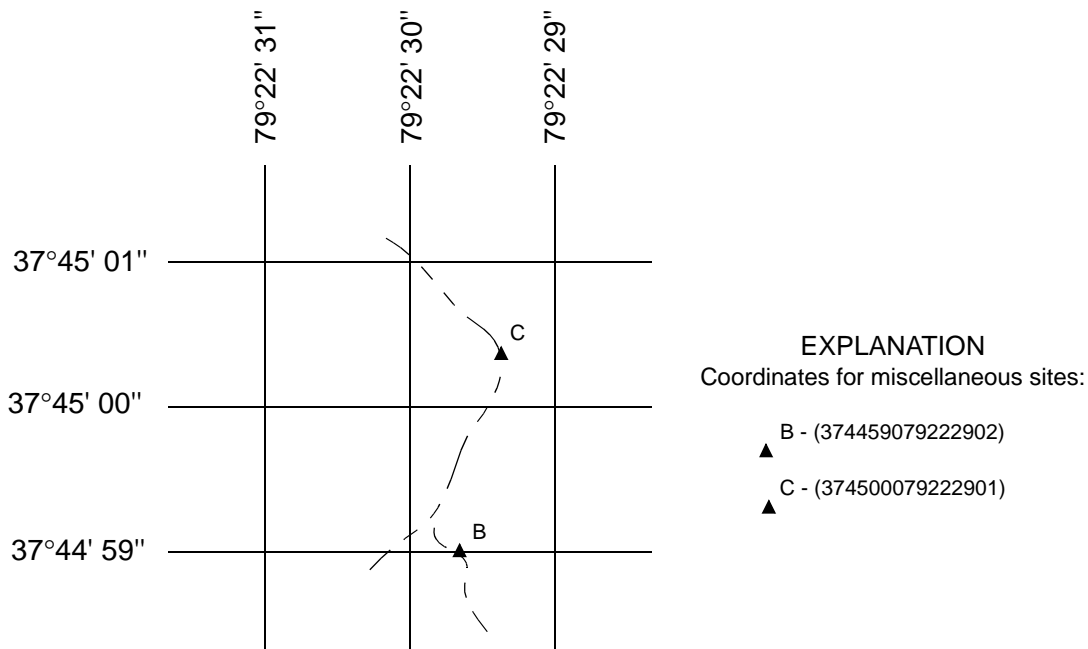


Figure 3. System for numbering selected miscellaneous sites.

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 4 and 5.

## 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 (TWRI's), Book 3, Chapter A1 through A19 and Book 8, Chapters A2 to B2. The methods are consistent with the American Society for Testing and Materials (ASTM) standards and generally follow the standards of the International Organization for Standards (ISO).

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

Streamflow data in this report are presented in a new format that is considerably different from the format in data reports prior to the 1991 water year. The major changes are that statistical characteristics of discharge now appear in tabular summaries following the water-year data table and less information is provided in the text or station manuscript above the table. These changes represent the results of a pilot program to reformat the annual water-data report to meet current user needs and data preferences.

The records published for each continuous-record surface-water-discharge station (gaging station) now consist of four parts: the manuscript or station description; the data table of daily mean values of discharge for the current water year with summary data; a tabular statistical summary of monthly mean flow data for a designated period, by water year; and a summary statistics table that includes statistical data of annual, daily, and instantaneous flows as well as data pertaining to annual runoff, 7-day low-flow minimums, and flow duration.

### Station manuscript

The manuscript provides, under various headings, descriptive information, such as station location; period of record; historical extremes outside the period of record; extremes for the current year; 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 gaging station 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. The latitudes and longitudes in this book are currently North American datum of 1927.

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 records have been published 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 flow at it can reasonably be considered equivalent to flow at the present station.

REVISED RECORDS.--Because of new information, published records 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 sea level (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 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 paragraph 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, and to conditions that affect natural flow at the station. In addition, information may be presented pertaining to average discharge data for the period of record; to extremes data for the period of record and the current year; 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 U.S. Geological Survey by a cooperating organization are identified here.

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 District Office (address 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 for a discontinued station 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.

Headings for AVERAGE DISCHARGE and EXTREMES FOR PERIOD OF RECORD have been deleted and the information contained in these paragraphs is now presented in the tabular summaries following the discharge table or in the REMARKS paragraph, as appropriate. No changes have been made to the data presentation of lake contents.

### Data table of daily mean values

The daily table of discharge records for stream-gaging stations gives mean discharge for each day of the water year. In the monthly summary for the table, the line headed "TOTAL" gives the sum of the daily figures for each month; the line headed "MEAN" gives the average flow in cubic feet per second for the month; and the lines headed "MAX" and "MIN" give the maximum and minimum daily mean discharges, respectively, for each 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 or in acre-feet may be omitted if there is extensive regulation or diversion or if the drainage area includes large noncontributing areas. At some stations, monthly and (or) yearly observed discharges are adjusted for reservoir storage or diversion, or diversion data or reservoir contents are given. These figures are identified by a symbol and corresponding footnote.

Statistics of monthly mean data

A tabular summary of the mean (line headed "MEAN"), maximum (line headed "MAX"), and minimum (line headed "MIN") of monthly mean flows for each month for a designated period is provided below the mean values table. The water years of the first occurrence of the maximum and minimum monthly flows are provided immediately below those figures. The designated period will be expressed as "FOR WATER YEARS \_\_\_\_\_, BY WATER YEAR (WY)," and will list the first and last water years of the range of years selected from the PERIOD OF RECORD paragraph in the station manuscript. It will consist of all of the station record within the specified water years, inclusive, including complete months of record for partial water years, if any, and may coincide with the period of record for the station. The water years for which the statistics are computed will be consecutive, unless a break in the station record is indicated in the manuscript.

Summary statistics

A table titled "SUMMARY STATISTICS" follows the statistics of monthly mean data tabulation. This table consists of four columns, with the first column containing the line headings of the statistics being reported. The table provides a statistical summary of yearly, daily, and instantaneous flows, not only for the current water year but also for the previous calendar year and for a designated period, as appropriate. The designated period selected, "WATER YEARS \_\_\_\_\_," will consist of all of the station record within the specified water years, inclusive, including complete months of record for partial water years, if any, and may coincide with the period of record for the station. The water years for which the statistics are computed will be consecutive, unless a break in the station record is indicated in the manuscript. All of the calculations for the statistical characteristics designated ANNUAL (See line headings below.), except for the "ANNUAL 7-DAY MINIMUM" statistic, are calculated for the designated period using complete water years. The other statistical characteristics may be calculated using partial water years.

The date or water year, as appropriate, of the first occurrence of each statistic reporting extreme values of discharge is provided adjacent to the statistic. Repeated occurrences may be noted in the REMARKS paragraph of the manuscript or in footnotes. Because the designated period may not be the same as the station period of record published in the manuscript, occasionally the dates of occurrence listed for the daily and instantaneous extremes in the designated-period column may not be within the selected water years listed in the heading. When this occurs, it will be noted in the REMARKS paragraph or in footnotes. Selected streamflow duration curve statistics and runoff data are also given. Runoff data may be omitted if there is extensive regulation or diversion of flow in the drainage basin.

The following summary statistics data, as appropriate, are provided with each continuous record of discharge. Comments to follow clarify information presented under the various line headings of the summary statistics table.

ANNUAL TOTAL.--The sum of the daily mean values of discharge for the year. At some stations, the annual total discharge is adjusted for reservoir storage or diversion. The adjusted figures are identified by a symbol and corresponding footnotes.

ANNUAL MEAN.--The arithmetic mean of the individual daily mean discharges for the year noted or for the designated period. At some stations the yearly mean discharge is adjusted for reservoir storage or diversion. The adjusted figures are identified by a symbol and corresponding footnotes.

HIGHEST ANNUAL MEAN.--The maximum annual mean discharge occurring for the designated period.

LOWEST ANNUAL MEAN.--The minimum annual mean discharge occurring for the designated period.

HIGHEST DAILY MEAN.--The maximum daily mean discharge for the year or for the designated period.

LOWEST DAILY MEAN.--The minimum daily mean discharge for the year or for the designated period.

ANNUAL 7-DAY MINIMUM.--The lowest mean discharge for 7 consecutive days for a calendar year or a water year. Note that most low-flow frequency analyses of annual 7-day minimum flows use a climatic year (April 1-March 31). The date shown in the summary statistics table is the initial date of the 7-day period. (This value should not be confused with the 7-day 10-year low-flow statistic.)

INSTANTANEOUS PEAK FLOW.--The maximum instantaneous discharge occurring for the water year or for the designated period. Note that secondary instantaneous peak discharges above a selected base discharge are stored in District computer files for stations meeting certain criteria. Those discharge values may be obtained by writing to the District Office. (See address on back of title page of this report.)

INSTANTANEOUS PEAK STAGE.--The maximum instantaneous stage occurring for the water year or for the designated period. If the dates of occurrence for the instantaneous peak flow and instantaneous peak stage differ, the REMARKS paragraph in the manuscript or a footnote may be used to provide further information.

INSTANTANEOUS LOW FLOW.--The minimum instantaneous discharge occurring for the water year or for the designated period.

ANNUAL RUNOFF.--Indicates the total quantity of water in runoff for a drainage area for the year. Data reports may use any of the following units of measurement in presenting annual runoff data:

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

Cubic feet per second per square mile (CFSM) is the average number of cubic feet of water flowing per second from each square mile area drained, assuming the runoff is distributed uniformly in time and area.

Inches (INCHES) indicates the depth to which the drainage area would be covered if all of the runoff for a given time period were uniformly distributed on it.

## WATER RESOURCES DATA - VIRGINIA, 1999

10 PERCENT EXCEEDS--The discharge that has been exceeded 10 percent of the time for the designated period.

50 PERCENT EXCEEDS--The discharge that has been exceeded 50 percent of the time for the designated period.

90 PERCENT EXCEEDS--The discharge that has been exceeded 90 percent of the time for the designated period.

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 ft<sup>3</sup>/s to the nearest tenth between 1.0 and 10 ft<sup>3</sup>/s; to whole numbers between 10 and 1,000 ft<sup>3</sup>/s; and to 3 significant figures for more than 1,000 ft<sup>3</sup>/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 District Office. 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 Virginia District Office. (See address on back of 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 detailed in the "Techniques of Water-Resources Investigations," Book 1, Chapter D2; Book 3, Chapter C2; Book 5, Chapters A1, A3, and A4. These references are listed in the "PUBLICATIONS ON TECHNIQUES OF WATER-RESOURCES INVESTIGATIONS" section of this report which appears at the end of the introductory text. These methods are consistent with American Society for Testing and Materials (ASTM) standards and generally follow the standards of the International Organization for Standards (ISO). Detailed information on collecting, treating, and shipping samples may be obtained from the Virginia District Office. (Address on back of title page.)

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 District Office 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 District Office. (Address on back of title page.)

### 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. Methods used in the computation of sediment records are described in the TWRI Book 3, Chapters C1 and C3. These methods are consistent with American Society for Testing and Materials (ASTM) standards and generally follow the standards of the International Organization for Standards (ISO).

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.

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## 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 to analyze sediment samples and to compute sediment records are given in TWRI Book 5, Chapter C1. Methods used by the Geological Survey laboratories are given in TWRI Book 1, Chapter D2; Book 3, Chapter C2; Book 5, Chapters A1, A3, A4, and A5. These methods are consistent with American Society for Testing and Materials (ASTM) standards and generally follow the standards of the International Organization for Standards (ISO).

## 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).
V	Analyte was detected in both the environmental sample and the associated blanks.
&	Biological organism estimated as dominant.



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## WATER QUALITY-CONTROL DATA

Data generated from quality-control (QC) samples are a requisite for evaluating the quality of the sampling and processing techniques as well as data from the actual samples themselves. Without QC data, environmental sample data cannot be adequately interpreted because the errors associated with the sample data are unknown. The various types of QC samples collected by this district are described in the following section. Procedures have been established for the storage of water-quality-control data within the USGS. These procedures allow for storage of all derived QC data and are identified so that they can be related to corresponding environmental samples.

## Blank Samples

Blank samples are collected and analyzed to ensure that environmental samples have not been contaminated by the overall data-collection process. The blank solution used to develop specific types of blank samples is a solution that is free of the analytes of interest. Any measured value signal in a blank sample for an analyte (a specific component measured in a chemical analysis) that was absent in the blank solution is believed to be due to contamination. There are many types of blank samples possible, each designed to segregate a different part of the overall data-collection process. The types of blank samples collect in this district are:

Field blank - a blank solution that is subjected to all aspects of sample collection, field processing preservation, transportation, and laboratory handling as an environmental sample.

Trip blank - a blank solution that is put in the same type of bottle used for an environmental sample and kept with the set of sample bottles before and after sample collection.

Equipment blank - a blank solution that is processed through all equipment used for collecting and processing an environmental sample (similar to a field blank but normally done in the more controlled conditions of the office).

Sampler blank - a blank solution that is poured or pumped through the same field sampler used for collecting an environmental sample.

Filter blank - a blank solution that is filtered in the same manner and through the same filter apparatus used for an environmental sample.

Splitter blank - a blank solution that is mixed and separated using a field splitter in the same manner and through the same apparatus used for an environmental sample.

Preservation blank - a blank solution that is treated with the sampler preservatives used for an environmental sample.

## Reference Samples

Reference material is a solution or material prepared by a laboratory whose composition is certified for one or more properties so that it can be used to assess a measurement method. Samples of reference material are submitted for analysis to ensure that an analytical method is accurate for the known properties of the reference material. Generally, the selected reference material properties are similar to the environmental sample properties.

## Replicate Samples

Replicate samples are a set of environmental samples collected in a manner such that the samples are thought to be essentially identical in composition. Replicate is the general case for which a duplicate is the special case consisting of two samples. Replicate samples are collected and analyzed to establish the amount of variability in the data contributed by some part of the collection and analytical process. There are many types of replicate samples possible, each of which may yield slightly different results in a dynamic hydrologic setting, such as a flowing stream. The types of replicate samples collected in this district are:

Sequential samples - a type of replicate sample in which the samples are collected one after the other, typically over a short time.

Split sample - a type of replicate sample in which a sample is split into subsamples contemporaneous in time and space.

## Spike Samples

Spike samples are samples to which known quantities of a solution with one or more well-established analyte concentrations have been added. These samples are analyzed to determine the extent of matrix interference or degradation on the analyte concentration during sample processing and analysis.

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## ACCESS TO USGS WATER DATA

The USGS provides near real-time stage and discharge data for many of the gaging stations equipped with the necessary telemetry and historic daily-mean and peak-flow discharge data for most current or discontinued gaging stations through the world wide web (WWW). These data may be accessed at:

<http://va.water.usgs.gov>

Some water-quality and ground-water data also are available through the WWW. In addition, data can be provided in various machine-readable formats on magnetic tape or 3-1/2 inch floppy disk. Information about the availability of specific types of data or products, and user charges, can be obtained locally from each of the Water Resources Division District Offices (See address on the back of the title page.).

## DEFINITION OF TERMS

Terms related to 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.

*Acid neutralizing capacity* (ANC) is the equivalent sum of all bases or base-producing materials, solutes plus particulates, in an aqueous system that can be titrated with acid to an equivalence point.

*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 measurement 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.

*Alkalinity* is the capacity of solutes in an aqueous system to neutralize acid.

*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. This group includes coliforms that inhabit the intestine of warm-blooded animals and those that inhabit soils. 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 plus or minus 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 plus or minus 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 plus or minus 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.

*Enterococcus bacteria* are commonly found in the feces of humans and other warm-blooded animals. Although some strains are ubiquitous and not related to fecal pollution, the presence of enterococci in water is an indication of fecal pollution and the possible presence of enteric pathogens. Enterococcus bacteria are those bacteria which produce pink to red colonies with black or reddish-brown precipitate after incubation at 41-C on mE agar and subsequent transfer to EIA medium. Enterococci include *Streptococcus faecalis*, *Streptococcus faecium*, *Streptococcus avium*, and their variants.

*Bedload* is the sediment which moves along in essentially continuous contact with the streambed by rolling, sliding, and making brief excursions into the flow a few diameters above the bed.

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

*Benthic invertebrates* are invertebrate animals inhabiting the bottoms of lakes, streams, and other water bodies. They are useful as indicators of water quality.

*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/m<sup>3</sup>), and periphyton and benthic organisms in grams per square mile (g/m<sup>2</sup>).

*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).

*Cfs-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 2,447 cubic meters.

*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 BOD 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.

*Continuing-record station* is a specified site which meets one or all conditions listed:

1. When chemical samples are collected daily or monthly for 10 or more months during the water year.
2. When water temperature records include observations taken one or more times daily.
3. When sediment discharge records include periods for which sediment loads are computed and are considered to be representative of the runoff for the water year.

*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.

*Cubic foot per second* (FT<sup>3</sup>/S, ft<sup>3</sup>/s) is the rate of discharge representing a volume of 1 cubic foot passing a given point during 1 second and is equivalent to approximately 7.48 gallons per second or 448.8 gallons per minute.

*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.

*Annual 7-day minimum* is the lowest mean discharge for 7 consecutive days for a calendar year or a water year. Note that most low-flow frequency analyses of annual 7-day minimum flows use a climatic year (April 1-March 31). The date shown in the summary statistics table is the initial date of the 7-day period. (This value should not be confused with the 7-day 10-year low-flow statistic.)

*Dissolved* refers to that material in a representative water sample which passes through a 0.45 um 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 specific 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.

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*Extractable organic halides (EOX)* are organic compounds which contain halogen atoms such as chlorine. These organic compounds are semi-volatile and extractable by ethyl acetate from air-dried stream bottom sediments. The ethyl acetate extract is combusted, and the concentration is determined by microcoulometric determination of the halides formed. The concentration is reported as micrograms of chlorine per gram of the dry weight of the stream bottom sediments.

*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 (CaCO<sub>3</sub>).

*High tide* is the maximum height reached by each rising tide.

*Hydrologic Benchmark Network* is a network of 50 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 human activities.

*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 8-digit number.

*Low tide* is the minimum height reached by each falling tide.

*Mean high tide* is the average of all high tides over a specified period.

*Mean low tide* is the average of all low tides over a specified period.

*Mean water level* is the average of all tides over a specified period.

*Membrane filter* is a thin microporous material of specific pore size used to filter bacteria, algae, and other very small particles from water.

*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 (mg/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 (UG/L, mg/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.

*Microsiemens per centimeter ( $\mu$ S/cm, US/CM)* is a unit expressing the amount of electrical conductivity of a solution as measured between opposite faces of a centimeter cube of solution at a specified temperature. Siemens is the International System of units nomenclature. It is synonymous with mhos and is the reciprocal of resistance in ohms.

*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.

*Most probable number (MPN)* is an index of the number of coliform bacteria that, more probably than any other number, would give the results shown by the laboratory examination; it is not an actual enumeration. It is determined from the distribution of gas-positive cultures among multiple inoculated tubes.

*Multiple-plate samplers* are artificial substrates of known surface area used for obtaining benthic-invertebrate samples. They consist of a series of spaced, hardboard plates on an eyebolt. *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)* monitors the water quality of large rivers within four of the Nation's largest river basins--the Mississippi, Columbia, Colorado, and Rio Grande. The network consists of 39 stations. Samples are collected with sufficient frequency that the flux of a wide range of constituents can be estimated. The objective of NASQAN is to characterize the water quality of these large rivers by measuring concentration and mass transport of a wide range of dissolved and suspended constituents, including nutrients, major ions, dissolved and sediment-bound heavy metals, common pesticides, and inorganic and organic forms of carbon. This information will be used (1) to describe the long-term trends and changes in concentration and transport of these constituents; (2) to test findings of the National Water-Quality Assessment Program (NAWQA); (3) to characterize processes unique to large-river systems such as storage and re-mobilization of sediments and associated contaminants; and (4) to refine existing estimates of off-continent transport of water, sediment, and chemicals for assessing human effects on the world's oceans and for determining global cycles of carbon, nutrients, and other chemicals.

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The *National Atmospheric Deposition Program/ National Trends Network (NADP/NTN)* provides continuous measurement and assessment of the chemical climate of precipitation throughout the United States. As the lead federal agency, the USGS works together with over 100 organizations to accomplish the following objectives; (1) Provide a long-term, spatial and temporal record of atmospheric deposition generated from a network of 191 precipitation chemistry monitoring sites. (2) Provide the mechanism to evaluate the effectiveness of the significant reduction in SO<sub>2</sub> emissions that began in 1995 as implementation of the Clean Air Act Amendments (CAAA) occurred. (3) Provide the scientific basis and nationwide evaluation mechanism for implementation of the Phase II CAAA emission reductions for SO<sub>2</sub> and NO<sub>x</sub> scheduled to begin in 2000.

The *National Water-Quality Assessment (NAWQA) Program* of the U.S. Geological Survey is a long-term program with goals to describe the status and trends of water-quality conditions for a large, representative part of the Nation's ground- and surface-water resources; provide an improved understanding of the primary natural and human factors affecting these observed conditions and trends; and provide information that supports development and evaluation of management, regulatory, and monitoring decisions by other agencies.

*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<sup>2</sup>), 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, National Water Information System (NWIS), to uniquely identify a specific constituent. The codes used in NWIS 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:

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

The partial-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 ( $1 \times 10^{-12}$ ) of the amount of radioactivity represented by a curie (Ci). A curie is the amount of radioactivity that yields  $3.7 \times 10^{10}$  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.

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*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.

*Polychlorinated biphenyls* (PCB's) are industrial chemicals that are mixtures of chlorinated biphenyl compounds having various percentages of chlorine. They are similar in structure to organochlorine insecticides.

*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* [ $\text{mg C}/(\text{m}^2/\text{time})$ ] for periphyton and macrophytes and [ $\text{mg C}/(\text{m}^3/\text{time})$ ] 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* [ $\text{mg O}/(\text{m}^2/\text{time})$ ] for periphyton and macrophytes and [ $\text{mg O}/(\text{m}^3/\text{time})$ ] 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.

*River mile* as used herein, is the distance above the mouth of Delaware Bay, measured along the center line of the navigation channel or the main stem of the Delaware River. River mile data were furnished by the Delaware River Basin Commission.

*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.

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

*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). The entire sample is used for the analysis.

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

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*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 (ft<sup>3</sup>/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.

*Suspended total residue* at 105 Deg. C concentration is the concentration of suspended sediment in the sampled zone expressed as milligrams of dry sediment per liter of water-sediment mixture (mg/L). A small aliquot of the sample is used for the analysis.

*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.

*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 from 55 to 75 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 immersed 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 or 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 USGS 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 um 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 um 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.

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*Synoptic Studies* Short-term investigations of specific water-quality conditions during selected seasonal or hydrologic periods to provide improved spatial resolution for critical water-quality conditions. For the period and conditions sampled, they assess the spatial distribution of selected water-quality conditions in relation to causative factors, such as land use and contaminant sources.

*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:	Hexagenia
Species:	Hexagenia Limbata

*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.

*Volatile Organic Compounds (VOCs)* are organic compounds that can be isolated from the water phase of a sample by purging the water sample with inert gas, such as helium, and subsequently analyzed by gas chromatography. Many VOCs are man-made chemicals that are used and produced in the manufacture of paints, adhesives, petroleum products, pharmaceuticals, and refrigerants. They are often components of fuels, solvents, hydraulic fluids, paint thinners, and dry cleaning agents commonly used in urban settings. VOC contamination of drinking-water supplies is a human health concern because many are toxic and are known or suspected human carcinogens (U.S. Environmental Protection Agency, 1996).

*Water year* in U.S. 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, 1985, is called the "1985 water year."

*WDR* 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, Branch of Information Services, Box 25286, Federal Center, 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."

## Book 1. Collection of Water Data by Direct Measurement

*Section D. Water Quality*

- 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.

## Book 2. Collection of Environmental Data

*Section D. Surface Geophysical Methods*

- 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.

*Section E. Subsurface Geophysical Methods*

- 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-E2. *Borehole geophysics applied to ground-water investigations*, by W.S. Keys: USGS-TWRI Book 2, Chapter E2. 1990. 150 pages.

*Section F. Drilling and Sampling Methods*

- 2-F1. *Application of drilling, coring, and sampling techniques to test holes and wells*, by Eugene Shuter and W.E. Teasdale: USGS-TWRI Book 2, Chapter F1. 1989. 97 pages.

## Book 3. Applications of Hydraulics

*Section A. Surface-Water Techniques*

- 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.F. 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 measurement 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 in streams by dye tracing*, by F.A. Kilpatrick and J.F. Wilson, Jr.: USGS-TWRI Book 3, Chapter A9. 1989. 27 pages.

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## PUBLICATIONS ON TECHNIQUES OF WATER-RESOURCES INVESTIGATIONS--Continued

- 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 the 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*, Revised, 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 A15. 1984. 48 pages.
- 3-A16. *Measurement of discharge using tracers*, by F.A. Kilpatrick and E.D. Cobb: USGS-TWRI Book 3, Chapter A16. 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 reaeration coefficients by use of tracers*, by F.A. Kilpatrick, R.E. Rathbun, Nobuhiro Yotsukura, G.W. Parker, and L.L. DeLong: USGS-TWRI Book 3, Chapter A18. 1989. 52 pages.
- 3-A19. *Levels at streamflow gaging stations*, by E.J. Kennedy: USGS-TWRI Book 3, Chapter A19. 1990. 31 pages.
- 3-A20. *Simulation of soluble waste transport and buildup in surface waters using tracers*, by F.A. Kilpatrick: USGS-TWRI Book 3, Chapter A20. 1993. 38 pages.
- 3-A21. *Stream-gaging cableways*, by C. Russell Wagner: USGS-TWRI Book 3, Chapter A21. 1995. 56 pages.

*Section B. Ground-Water Techniques*

- 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 text 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 R.L. Cooley and R.L. Naff: USGS-TWRI Book 3, Chapter B4. 1990. 232 pages.
- 3-B4. *Supplement 1. Regression modeling of ground-water flow --Modifications to the computer code for nonlinear regression solution of steady-state ground-water flow problems*, by R.L. Cooley: USGS-TWRI Book 3, Chapter B4. 1993. 8 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-B7. *Analytical solutions for one-, two-, and three-dimensional solute transport in ground-water systems with uniform flow*, by E.J. Wexler: USGS-TWRI Book 3, Chapter B7. 1992. 190 pages.

*Section C. Sedimentation and Erosion Techniques*

- 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 Thomas K. Edwards and G. Douglas Glysson: USGS-TWRI Book 3, Chapter C2. 1988. 80 pages.
- 3-C3. *Computation of fluvial-sediment discharge*, by George Porterfield: USGS-TWRI Book 3, Chapter C3. 1972. 66 pages.

## Book 4. Hydrologic Analysis and Interpretation

*Section A. Statistical Analysis*

- 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.

## PUBLICATIONS ON TECHNIQUES OF WATER-RESOURCES INVESTIGATIONS--Continued

## Section B. Surface Water

- 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.

## Section D. Interrelated Phases of the Hydrologic Cycle

- 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.

## Book 5. Laboratory Analysis

## Section A. Water Analysis

- 5-A1. *Methods for determination of inorganic substances in water and fluvial sediments*, by M.J. Fishman and L.C. Friedman, editors: USGS-TWRI Book 5, Chapter A1. 1989. 545 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 the determination of organic substances in water and fluvial sediments*, edited by R.L. Wershaw, M.J. Fishman, R.R. Grabbe, and L.E. Lowe: USGS-TWRI Book 5, Chapter A3. 1987. 80 pages.
- 5-A4. *Methods for collection and analysis of aquatic biological and microbiological samples*, by L.J. Britton and P.E. Greeson, editors: USGS-TWRI Book 5, Chapter A4. 1989. 363 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.

## Section C. Sediment Analysis

- 5-C1. *Laboratory theory and methods for sediment analysis*, by H.P. Guy: USGS-TWRI Book 5, Chapter C1. 1969. 58 pages.

## Book 6. Modeling Techniques

## Section A. Ground Water

- 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.
- 6-A2. *Documentation of a computer program to simulate aquifer-system compaction using the modular finite-difference ground-water flow model*, by S.A. Leake and D.E. Prudic: USGS-TWRI Book 6, Chapter A2. 1991. 68 pages.
- 6-A3. *A modular finite-element model (MODFE) for areal and axisymmetric ground-water-flow problems, Part 1: Model Description and User's Manual*, by L.J. Torak: USGS-TWRI Book 6, Chapter A3. 1993. 136 pages.
- 6-A4. *A modular finite-element model (MODFE) for areal and axisymmetric ground-water-flow problems, Part 2: Derivation of finite-element equations and comparisons with analytical solutions*, by R.L. Cooley: USGS-TWRI Book 6, Chapter A4. 1992. 108 pages.
- 6-A5. *A modular finite-element model (MODFE) for areal and axisymmetric ground-water-flow problems, Part 3: Design philosophy and programming details*, by L.J. Torak: USGS-TWRI Book 6, Chapter A5. 1993. 243 pages.
- 6-A6. *A coupled surface-water and ground-water flow model (MODBRANCH) for simulation of stream-aquifer interaction*, by Eric D. Swain and Eliezer J. Wexler. 1996. 125 pages.

## Book 7. Automated Data Processing and Computations

## PUBLICATIONS ON TECHNIQUES OF WATER-RESOURCES INVESTIGATIONS--Continued

*Section C. Computer Programs*

- 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.

## Book 8. Instrumentation

*Section A. Instruments for Measurement of Water Level*

- 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.

*Section B. Instruments for Measurement of Discharge*

- 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.

## Book 9. Handbooks for Water-Resources Investigations

*Section A. National Field Manual for the Collection of Water-Quality Data*

- 9-A6. *National Field Manual for the Collection of Water-Quality Data: Field Measurements*, edited by F.D. Wilde and D.B. Radtke: USGS-TWRI Book 9, Chapter A6. 1998. Variously paginated.
- 9-A7. *National Field Manual for the Collection of Water-Quality Data: Biological Indicators*, by D.N. Myers and F.D. Wilde: USGS-TWRI Book 9, Chapter A7. 1997. 49 pages.
- 9-A8. *National Field Manual for the Collection of Water-Quality Data: Bottom-material samples*, by D.B. Radtke: USGS-TWRI Book 9, Chapter A8. 1998. 48 pages.
- 9-A9. *National Field Manual for the Collection of Water-Quality Data: Safety in Field Activities*, by S.L. Lane and R.G. Fay: USGS-TWRI Book 9, Chapter A9. 1998. 60 pages.

## WATER RESOURCES DATA - VIRGINIA, 1999

## 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 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 M. P. Mulheren, J. D. Larson, and H. T. Hopkins: U.S. Geological Survey Open-File Report 82-432. 1982. 34 pages.

Annual maximum stages and discharges of selected streams in Virginia through 1990, by B. J. Prugh, Jr., E. H. Nuckels, and C. G. Humphrey: U.S. Geological Survey Open-File Report 90-587. 1991. 442 pages.

Assessment of ground-water contamination from a leaking underground storage tank at a Defense Supply Center near Richmond, Virginia, by W. G. Wright and J. D. Powell: U.S. Geological Survey Water-Resources Investigations Report 90-4091. 1990. 38 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.  
Base-flow characteristics of streams in the Valley and Ridge, the Blue Ridge, and the Piedmont Physiographic Provinces of Virginia, by D.L. Nelms, G.E. Harlow, Jr., and D.C. Hayes: U.S. Geological Survey Water Supply Paper 2457. 1997. 48 pages.

Compilation of surface-water and water-quality data-collection sites on selected streams in Virginia, by B. J. Prugh, Jr. and C. G. Humphrey: U.S. Geological Survey Open-File Report 93-462. 1994. 645 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. Laczniak: U.S. Geological Survey Professional Paper 1404-F. 1990. 100 pages.

Design, revisions, and considerations for continued use of a ground-water-flow model of the Coastal Plain aquifer system in Virginia, by R. McFarland: U. S. Geological Survey Water-resources Investigations Report 98-4085. 1998. 49 pages.

Documentation of a multiple-technique computer program for plotting major-ion composition of natural waters, by L. I. Briel: U.S. Geological Survey Open-File Report 93-74. 1994.

Documentation of geographic-information-system coverages and data-input files used for analysis of the geohydrology of the Virginia Coastal Plain, by M. J. Focazio and T. B. Samsel, III: U.S. Geological Survey Water-Resources Investigations Report 93-4015. 1994. 53 pages.

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.

Estimating net drawdown resulting from episodic withdrawals at six well fields in the Coastal Plain physiographic province of Virginia, by M. J. Focazio and G. K. Speiran: U.S. Geological Survey Water-Resources Investigations Report 93-4159. 1994. 21 pages.

Evaluation of municipal withdrawals from the confined aquifers of southeastern Virginia, by D. L. Richardson, R. J. Laczniak, and P. A. Hamilton: U.S. Geological Survey Open-File Report 88-723. 1988. 50 pages

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

Floods in West Virginia, Virginia, Pennsylvania, and Maryland, November 1985, by D. H. Carpenter: U.S. Geological Survey Water-Resources Investigations Report 88-4213. 1990. 86 pages.

Geohydrology and Geochemistry near coastal ground-water-discharge areas of the Eastern Shore, Virginia, by G.K. Speiran: U.S. Geological Survey Water Supply Paper. 1996. 73 pages.

Geohydrology and the occurrence of volatile organic compounds in ground water, Culpeper basin of Prince William County, Virginia, by D. L. Nelms and D. L. Richardson: U.S. Geological Survey Water-Resources Investigations Report 90-4032. 1991. 94 pages.

Geohydrology of the shallow aquifer system, Naval Weapons Station Yorktown, Yorktown, Virginia, by A.R. Brockman, D.L. Nelms, G.E. Harlow, Jr., and J.J. Gildea: U.S. Geological Survey Water-Resources Investigations Report 97-4188. 61 pages.

Ground-water availability along the Blue Ridge Parkway, Virginia, by H. T. Hopkins: U.S. Geological Survey Water-Resources Investigations Report 84-4168. 1985. 154 pages.

## WATER RESOURCES DATA - VIRGINIA, 1999

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

- Ground-water contamination and movement at the Defense General Supply Center, Richmond, Virginia, by J. D. Powell, W. G. Wright, D. L. Nelms, and R. J. Ahlin: U.S. Geological Survey Water-Resources Investigations Report 90-4113. 1991. 36 pages.
- Ground-water concerns for the Eastern Shore, Virginia, by D. L. Richardson: U.S. Geological Survey Open-File Report 93-93. 1994. 4 pages (Water-Resources Notes).
- Ground-water discharge from the Coastal Plain of Virginia, by D. L. Richardson: U.S. Geological Survey Water-Resources Investigations Report 93-4191. 1995.
- Ground-water hydrology and quality in the Valley and Ridge and Blue Ridge physiographic provinces of Clarke County, Virginia, by W. G. Wright: U.S. Geological Survey Water-Resources Investigations Report 90-4134. 1991. 61 pages.
- Ground-water in Virginia: Use during 1990, availability, and resource information needs, by McFarland, E. R. and Focazio, M. J.: U.S. Geological Survey Open-File Report 94-114. 1 page.
- Ground-water use and levels in the southern Coastal Plain of Virginia, by J. D. Larson and R. J. Laczniak: U.S. Geological Survey Open-File Report 91-187. 1991. 165 pages.
- Ground-water withdrawals from the confined aquifers in the Coastal Plain of Virginia, 1891-1983, by T. K. Kull and R. J. Laczniak: U.S. Geological Survey Water-Resources Investigations Report 87-4049. 1987. 37 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.
- Hydraulic characteristics of, and ground-water flow in, coal-bearing rocks of southwestern Virginia, by G. E. Harlow, Jr. and G. D. LeCain: U.S. Geological Survey Water Supply Paper 2388. 1994. 36 pages.
- Hydrogeologic and water-quality data for the Explosive Experimental Area, Naval Surface Warfare Center, Dahlgren Site, Dahlgren, Virginia, by E. C. Hammond and C. F. Bell: U.S. Geological Survey Open-File Report 95-386. 1995. 67 pages.
- Hydrogeologic and water-quality data for the Main Site, Naval Surface Warfare Center, Dahlgren Laboratory, Dahlgren, Virginia, by C. F. Bell, T. P. Bolles, and G. E. Harlow, Jr.: U.S. Geological Survey Open-File Report 94-301. 1995. 81 pages.
- Hydrogeologic framework, analysis of ground-water flow, and relations to regional flow in the Fall Zone near Richmond, Virginia, by E.R. McFarland: U.S. Geological Survey Water-Resources Investigations Report 97-4021. 1997. 56 pages.
- Hydrogeologic framework of the shallow aquifer system of York County, Virginia, by A. R. Brockman and D. L. Richardson: U.S. Geological Survey Water-Resources Investigations Report 92-4111. 1992. 36 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.
- Hydrogeology and analysis of the ground-water-flow system of the Eastern Shore, Virginia, by D. L. Richardson: U.S. Geological Survey Water-Supply Paper 2401. 1994. 108 pages.
- Hydrogeology and water quality of the shallow aquifer system at the Explosive Experimental Area, Naval Surface Warfare Center, Dahlgren Site, Dahlgren, Virginia, by C.F. Bell: U.S. Geological Survey Water Resources Investigations Report 96-4209. 1996. 37 pages.
- Hydrogeology and water quality of the shallow ground-water system in Eastern York County, Virginia, by D. L. Richardson and A. R. Brockman: U.S. Geological Survey Water-Resources Investigations Report 92-4090. 1992. 41 pages.
- Hydrogeology of, and quality and recharge ages of ground water in, Prince William County, Virginia 1990-91, by D.L. Nelms and A. R. Brockman: U.S. Geological Survey Water-Resources Investigations Report 97-4009. 1997. 58 pages.
- Hydrologic characteristics and water budget for Swift Creek Reservoir, by S.C. Skrobialowski and M.J. Focazio: U.S. Geological Survey Water-Resources Investigations Report 97-229. 41 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.

## WATER RESOURCES DATA - VIRGINIA, 1999

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

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.

Land use in, and water quality of, the Pea Hill Arm of Lake Gaston, Virginia and North Carolina, 1988-90, by M. D. Woodside: U.S. Geological Survey Water-Resources Investigations Report 94-4140. 54 pages.

Low-flow characteristics of streams in Virginia, by D. C. Hayes: U.S. Geological Survey Water-Supply Paper 2374. 1990. 69 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.

Measuring streams in Virginia, by R. M. Moberg, E. D. Powell, and K. C. Rice: U.S. Geological Survey Open-File Report 95-713. 1995. Pamphlet.

Methods for estimating the magnitude and frequency of peak discharges of rural, unregulated streams in Virginia, by J. A. Bisese: U.S. Geological Survey Water-Resources Investigations Report 94-4148. 70 pages.

National water summary, 1988-89, floods and droughts in Virginia, by E. H. Nuckels and B. J. Prugh, Jr.: U.S. Geological Survey Water-Supply Paper 2375. 1991. p. 543-550.

Natural processes for managing nitrate in ground water discharge to Chesapeake Bay and other surface waters--more than forested buffers, by G.K. Speiran, M.D. Woodside, and P. A. Hamilton: U.S. Geological Survey Fact Sheet 178-97.

Nutrient and suspended solids loads, yields, and trends in the non-tidal part of five major river basins in Virginia, 1985-96, by H. M. Johnson and D. L. Belval: U.S. Geological Survey Water-Resources Investigations Report 98-4025. 1998. 36 pages.

Plan of study for the regional aquifer-system analyses of the Appalachian Valley and Ridge, Piedmont, and Blue Ridge physiographic provinces of the eastern and southeastern United States with a description of study-area geology and hydrogeology, by L. A. Swain, E. F. Hollyday, C. C. Daniel, III, and O. S. Zapezca. 1991. 44 pages.

Potentiometric surface of the Brightseat-upper Potomac aquifer in Virginia, 1994, by E. C. Hammond, E. R. McFarland, and M. J. Focazio: U.S. Geological Survey Open-File Report 94-370. 1995. 1 page.

Potentiometric surface of the lower Potomac aquifer in Virginia, 1994, by E. C. Hammond, E. R. McFarland, and M. J. Focazio: U.S. Geological Survey Open-File Report 94-373. 1995. 1 page.

Potentiometric surface of the middle Potomac aquifer in Virginia, 1994, by E. C. Hammond, E. R. McFarland, and M. J. Focazio: U.S. Geological Survey Open-File Report 94-372. 1995. 1 page.

Preliminary estimates of residence times and apparent ages of ground water in the Chesapeake Bay watershed and water-quality data from a survey of springs, by M.J. Focazio, L. N. Plummer, J. K. Bohlke, E. Busenberg, L. J. Bachman, and D. S. Powars: U.S. Geological Survey Water-Resources Investigations Report 97-4225. 1998. 75 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. 28 pages.

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.

Quality of ground water in the Coastal Plain physiographic province of Virginia, by M. J. Focazio, G. K. Speiran, and M. E. Rowan: U.S. Geological Survey Water-Resources Investigations Report 92-4175. 1994. 20 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.

Relation of stream quality to streamflow, and estimated loads of selected water-quality constituents in the James and Rappahannock Rivers near the Fall Line of Virginia, July 1988 through 1990, by D. L. Belval, M. D. Woodside, and J. P. Campbell: U.S. Geological Survey Water-Resources Investigations Report 94-4042. 1995. 85 pages.

## WATER RESOURCES DATA - VIRGINIA, 1999

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

Scour at bridge sites in Delaware, Maryland, and Virginia, by D.C. Hayes: U.S. Geological Survey Water Resources Investigations Report 96-4089. 1996. 35 pages.20

Selected characteristics of stormflow and base flow affected by land use and cover in the Chickahominy River Basin, Virginia, 1989-91, by M. J. Focazio and R. E. Cooper: U.S. Geological Survey Water-Resources Investigations Report 94-4225. 1995. 37 pages.

Selected heavy metals and other constituents in soil and stormwater runoff at the Interstate 95 Interchange near Atlee, Virginia, April 1993-May 1997, by G. K. Speiran: USGS WRI 98-4115. 1998. 39 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 U.S. Geological Survey publications on the water resources of Virginia, 1910-94, by J. A. McFarland: supersedes U.S. Geological Survey Open-File Report 92-69. 1995. 15 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.

Site selection and collection of bridge-scour data in Delaware, Maryland, and Virginia, by D. C. Hayes: U.S. Geological Survey Water-Resources Investigations Report 93-4017. 1994. 23 pages.

Technique for estimating the magnitude and frequency of Virginia floods, by E. M. Miller: U.S. Geological Survey Water-Resources Investigations Report 78-5. 1978. 83 pages.

Trends in nutrients and suspended solids at the Fall Line of five tributaries to the Chesapeake Bay, July 1988 through June 1995, by C.F. Bell, D.L. Belval, J.P. Campbell: U.S. Geological Survey Water Resources Investigations Report 96-4191. 1996. 37 pages.

Use during 1990, availability, and resource-information needs, by E. R. McFarland and M. J. Focazio: U.S. Geological Survey Open-File Report 94-114. 1995. 2 pages.

Use of fathometers and electrical-conductivity probes to monitor riverbed scour at bridge piers, by D. C. Hayes and F. E. Drummond: U.S. Geological Survey Water-Resources Investigations Report 94-4164. 1995. 17 pages.

Virginia ground-water quality, by J. D. Powell and P. A. Hamilton: U.S. Geological Survey Open-File Report 87-759. 1987. 7 pages.

Water-level hydrographs for observation wells in Virginia, by S. T. Farrington, N. R. Carrington, and W. V. Daniels: U.S. Geological Survey Open-File Report 83-134. 1984. 167 pages.

Water-quality and evaluation of raw-water-routing scenarios, Chickahominy, Diascund Creek, and Little Creek Reservoirs, southeastern Virginia, 1983-86, by D. D. Lynch: U.S. Geological Survey Water-Resources Investigations Report 92-4034. 1992. 104 pages.

Water-quality assessment of the Albemarle-Pamlico Basin, North Carolina and Virginia-Chemical analyses of organic compounds and inorganic constituents in streambed sediment, 1992-93, by M.D. Woodside and B.R. Simerl: U.S. Geological Survey Open-File Report 96-103. 1996. 25 pages.

Water-quality assessment of the Delmarva Peninsula, Delaware, Maryland, and Virginia--Effects of agricultural activities on, and distribution of, nitrate and other inorganic constituents in the surficial aquifer, by P. A. Hamilton, J. M. Denver, P. J. Phillips, and R. J. Shedlock: U.S. Geological Survey Open-File Report 93-40. 1994. 87 pages.

Water-quality characteristics of five tributaries to the Chesapeake Bay at the Fall Line, Virginia, July 1988 through June 1993, by D.L. Belval, J.P. Campbell, S.W. Phillips, and C.F. Bell: U.S. Geological Survey Water Resources Investigations Report 95-4258. 1995. 71 pages.

Water-quality data and estimated loads of selected constituents in five tributaries to the Chesapeake Bay at the Fall Line, Virginia, July 1993 through June 1995, by D.L. Belval and J.P. Campbell: U.S. Geological Survey Open-File Report 96-220. 1996. 79 pages.

Water-Quality in the Appalachian Valley and Ridge, the Blue Ridge, and the Piedmont Physiographic Provinces, Eastern United States, by L.I. Briel: U.S. Geological Survey Professional Paper 1422-D. [in press].

Water-resources activities of the U.S. Geological Survey Mid-Atlantic Programs 1987-91, by J. A. McFarland, L. S. Weiss, A. J. Chen, D. R. Lowry, K. A. Boudier, W. R. Caughron, and G. J. Hyatt: U.S. Geological Survey Open-File Report 91-505. 1991. 154 pages.

Water use in Virginia: Surface-water and ground-water withdrawals during 1992, by E. C. Hammond and M. J. Focazio: U.S. Geological Survey Fact Sheet 94-057. 1995. 2 pages.

Well-construction, water-level, and ground-water-quality data for Prince William County, Virginia, 1992, by D. L. Nelms and A. R. Brockman: U.S. Geological Survey Open-File Report 93-443. 1994. 73 pages.



Figure 4.--Location of surface-water-discharge and  
surface-water-quality data-collection station

(Left side of map)

Figure 4.--Location of surface-water-discharge and  
surface-water-quality data-collection stations

(Right side of map)

Figure 5.--Location of surface-water partial-record stations  
(Left side of map)

Figure 5.--Location of surface-water partial-record stations

(Right side of map)

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## SURFACE-WATER-DISCHARGE AND SURFACE-WATER-QUALITY RECORDS

## Remarks Codes

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

PRINT 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).
V	Analyte was detected in both the environmental sample and the associated blanks.
&	Biological organism estimated as dominant.

## Dissolved Trace-Element Concentrations

NOTE.-- Traditionally, dissolved trace-element concentrations have been reported at the microgram per liter (ug/L) level. Recent evidence, mostly from large rivers, indicates that actual dissolved-phase concentrations for a number of trace elements are within the range of 10's to 100's of nanograms per liter (ng/L). Data above the ug/L level should be viewed with caution. Such data may actually represent elevated environmental concentrations from natural or human causes; however, these data could reflect contamination introduced during sampling, processing, or analysis. To confidently produce dissolved trace-element data with insignificant contamination, the U.S. Geological Survey began using new trace-element protocols at some stations in water year 1994.

## Change in National Trends Network Procedures

NOTE.-- Sample handling procedures at all National Trends Network stations were changed substantially on January 11, 1994, in order to reduce contamination from the sample shipping container. The data for samples before and after that date are different and not directly comparable. A tabular summary of the differences based on a special intercomparison study, is available from the NADP/NTN Coordination Office, Colorado State University, Fort Collins, CO 80523 (Telephone: 303-491-5643).

## SURFACE-WATER STATIONS, IN DOWNSTREAM ORDER, FOR WHICH RECORDS ARE PUBLISHED IN THIS VOLUME

NOTE.--Data for partial-record stations and miscellaneous sites for both surface-water discharge and quality are published in separate sections of the data report. See references at the end of this list for page numbers for these sections.

[Letters after station name designate type of data collected: (d) discharge, (c) chemical, (b) biological, (m) microbiological, (t) water temperature, (s) sediment, (e) elevation, gage heights, or contents]

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## SURFACE-WATER STATIONS, IN DOWNSTREAM ORDER, FOR WHICH RECORDS ARE PUBLISHED IN THIS VOLUME

[Letters after station name designate type of data collected: (d) discharge, (c) chemical, (b) biological, (m) microbiological, (t) water temperature, (s) sediment, (e) elevation, gage heights, or contents]

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[Letters after station name designate type of data collected: (d) discharge, (c) chemical, (b) biological, (m) microbiological, (t) water temperature, (s) sediment, (e) elevation, gage heights, or contents]

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[Letters after station name designate type of data collected: (d) discharge, (c) chemical, (b) biological, (m) microbiological, (t) water temperature, (s) sediment, (e) elevation, gage heights, or contents]

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## POTOMAC RIVER BASIN

01613900 HOGUE CREEK NEAR HAYFIELD, VA

LOCATION.--Lat 39°12'52", long 78°17'18", Frederick County, Hydrologic Unit 02070004, on right bank 15 ft upstream from bridge on State Highway 614, 0.8 mi upstream from Gap Run, and 1.3 mi southeast of Hayfield.

DRAINAGE AREA.--15.0 mi<sup>2</sup>.

PERIOD OF RECORD.--August 1960 to December 1986, October 1992 to current year.

REVISED RECORDS.--WSP 2103: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 668.60 ft above sea level.

REMARKS.--Records good except those for periods with ice effect, Dec. 24-27, Dec. 31 to Jan. 3, 5-9, 12, which are fair. Maximum discharge, 4,090 ft<sup>3</sup>/s, from rating curve extended above 870 ft<sup>3</sup>/s. Several measurements of water temperature were made during the year.

COOPERATION.--Records were provided by the Virginia Department of Environmental Quality - Water Division.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 400 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Mar 17	1845	*161	*2.25	No peak greater than base discharge.			

Minimum discharge, 0.08 ft<sup>3</sup>/s, Aug 7-8.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.6	1.6	1.5	e1.1	2.7	2.7	8.2	7.3	1.6	1.0	.39	.28
2	1.5	1.7	1.4	e1.0	3.3	2.8	9.2	6.6	1.6	5.9	.41	.23
3	1.7	1.6	1.5	e2.8	3.1	11	8.0	6.0	1.6	5.6	.24	.19
4	2.3	1.6	1.5	3.8	2.8	37	15	5.8	1.7	1.9	.19	.56
5	1.9	1.6	1.5	e2.5	2.5	16	24	5.3	1.7	1.1	.22	11
6	1.9	1.7	1.4	e2.2	2.4	13	19	5.0	1.5	.76	.19	16
7	2.0	1.7	1.5	e2.1	2.5	11	15	4.9	1.5	.60	.12	17
8	3.8	1.7	1.7	e1.9	2.8	7.8	12	12	1.1	.54	.24	22
9	2.8	1.7	1.9	e4.5	2.5	7.1	15	10	.97	.43	.35	7.3
10	2.1	1.8	1.4	7.2	2.4	8.5	21	7.2	.95	.47	.17	4.7
11	1.9	1.8	1.2	3.0	2.2	6.9	44	6.0	1.0	.50	.16	2.6
12	1.9	1.7	1.0	e2.8	2.2	7.3	44	5.2	.89	.45	.13	1.8
13	1.7	1.7	1.1	4.3	2.1	9.7	28	5.2	.94	.53	.17	1.3
14	1.7	1.7	1.1	3.6	2.1	12	21	4.5	1.0	.47	.66	1.5
15	1.7	1.7	1.1	3.8	1.8	14	18	4.0	.84	.36	.50	1.6
16	1.7	1.6	1.0	3.1	1.8	24	15	3.6	.48	.37	.32	26
17	1.7	1.6	1.0	4.5	2.5	85	11	3.3	1.4	.33	.26	15
18	1.7	1.6	1.0	6.9	4.0	100	9.0	3.4	1.4	.30	.19	7.5
19	1.7	1.6	.95	6.5	5.8	44	7.9	3.1	1.0	.30	.16	4.9
20	1.6	1.7	1.0	5.9	5.5	24	7.7	2.8	.90	.33	.18	3.8
21	1.6	1.6	1.0	6.0	5.1	31	8.1	2.4	.73	.40	.40	3.9
22	1.7	1.6	1.0	7.0	4.2	53	9.0	2.8	1.0	.71	.34	3.4
23	1.7	1.6	.93	7.2	2.5	30	23	4.9	1.2	.48	.25	2.4
24	1.6	1.6	e.91	27	2.2	22	43	3.8	.63	.39	.31	2.0
25	1.5	1.5	e.89	13	2.1	16	23	3.2	.69	.39	.54	1.6
26	1.6	1.6	e.98	7.6	2.2	15	17	2.6	.66	.26	.78	1.4
27	1.5	1.4	e.92	5.7	2.0	13	13	2.4	.49	.20	.72	1.3
28	1.6	1.5	1.1	4.8	2.6	11	11	2.1	1.4	.48	.49	2.4
29	1.5	1.7	1.3	4.0	---	9.2	9.2	1.9	1.2	.75	.31	5.9
30	1.6	1.5	1.3	3.4	---	7.0	8.0	1.8	.72	.42	.22	70
31	1.6	---	e1.2	2.9	---	6.1	---	1.7	---	.31	.15	---
TOTAL	56.4	49.0	37.28	162.1	79.9	657.1	516.3	140.8	32.79	27.03	9.76	239.56
MEAN	1.82	1.63	1.20	5.23	2.85	21.2	17.2	4.54	1.09	.87	.31	7.99
MAX	3.8	1.8	1.9	27	5.8	100	44	12	1.7	5.9	.78	70
MIN	1.5	1.4	.89	1.0	1.8	2.7	7.7	1.7	.48	.20	.12	.19
CFM	.12	.11	.08	.35	.19	1.41	1.15	.30	.07	.06	.02	.53
IN.	.14	.12	.09	.40	.20	1.63	1.28	.35	.08	.07	.02	.59

POTOMAC RIVER BASIN

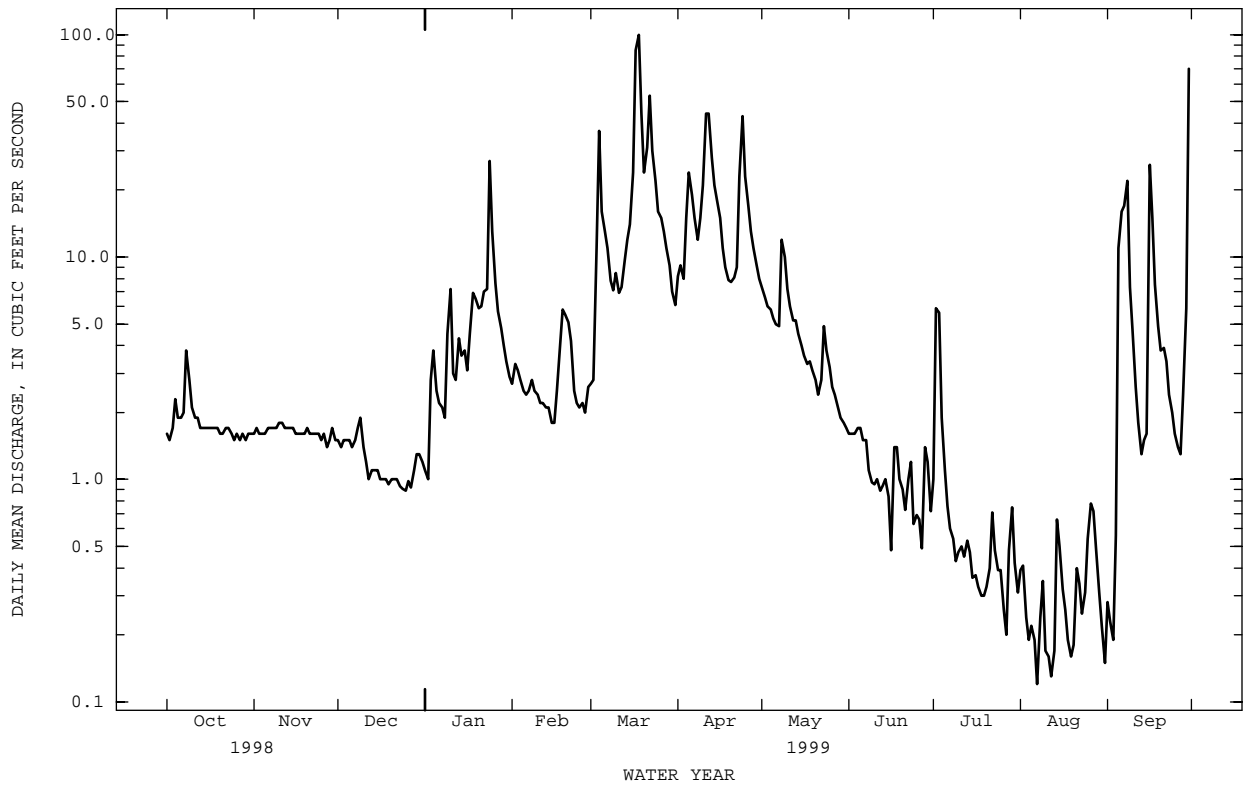
01613900 HOGUE CREEK NEAR HAYFIELD, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1960 - 1986, 1993 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	7.03	12.8	16.0	19.8	26.5	38.4	26.0	16.6	11.8	4.93	5.02	5.61
MAX	53.6	52.5	51.2	81.0	75.9	114	89.7	47.4	94.2	30.6	54.2	65.8
(WY)	1980	1986	1973	1996	1998	1993	1983	1978	1972	1978	1978	1996
MIN	.52	1.08	1.06	1.72	2.85	5.81	6.31	2.17	.98	.81	.31	.78
(WY)	1964	1966	1966	1966	1999	1981	1963	1969	1969	1964	1999	1963

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR		FOR 1999 WATER YEAR		WATER YEARS 1960 - 1986 1993 - 1999	
ANNUAL TOTAL	8555.08		2008.02			
ANNUAL MEAN	23.4		5.50		15.9	
HIGHEST ANNUAL MEAN					32.2	
LOWEST ANNUAL MEAN					3.84	
HIGHEST DAILY MEAN	351		Mar 21		1060	
LOWEST DAILY MEAN	e.89		Dec 25		.06	
ANNUAL SEVEN-DAY MINIMUM	.95		Dec 21		.19	
INSTANTANEOUS PEAK FLOW			161		Mar 17	
INSTANTANEOUS PEAK STAGE			2.25		Mar 17	
INSTANTANEOUS LOW FLOW			.08		aAug 7	
ANNUAL RUNOFF (CFSM)	1.56		.37		1.06	
ANNUAL RUNOFF (INCHES)	21.22		4.98		14.36	
10 PERCENT EXCEEDS	64		14		35	
50 PERCENT EXCEEDS	4.3		1.8		5.3	
90 PERCENT EXCEEDS	1.5		.39		1.1	

a Also Aug 8, 1999.  
 b No flow part of Sep 14, 1968, cause unknown.  
 e Estimated.



POTOMAC RIVER BASIN

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 mi<sup>2</sup>.

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 2,051.37 ft above sea level. Prior to Jun. 10, 1958, at site 575 ft downstream at datum 6.0 ft lower. Prior to Oct. 25, 1996, at site 400 ft upstream at datum 3.2 ft higher.

REMARKS.--Records fair except those for periods of doubtful or no gage-height record, Dec. 8-31, Jan. 1, 2, 4-8, 10, 11, 14-22, 25-31, Feb. 1-8, 18, and Sep. 9-30, which are poor. Maximum discharge, 9,530 ft<sup>3</sup>/s, from rating curve extended above 900 ft<sup>3</sup>/s on basis of computation of peak flow over dam at site 2.8 mi downstream. Maximum gage height, 19.8 ft, from floodmarks, backwater from Elkhorn Lake. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

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 greater than base discharge of 200 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Jan 24	1445	*145	*3.28	No peak greater than base discharge.			

Minimum daily discharge, 0.27 ft<sup>3</sup>/s, Oct 2-3.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.28	.37	.57	e.53	e23	14	19	6.2	4.0	1.0	1.1	1.3
2	.27	.38	.57	e.53	e25	13	18	5.9	3.5	.99	1.0	1.2
3	.27	.44	.56	2.4	e23	13	17	5.7	3.2	.94	.98	e1.0
4	.29	.43	.54	e1.6	e22	15	16	5.7	2.8	.86	1.1	e1.2
5	.28	.43	.53	e1.3	e21	16	16	5.7	2.5	.75	1.1	e3.2
6	.28	.43	.53	e1.0	e20	17	15	5.7	2.1	.64	1.0	e12
7	.30	.43	.53	e.90	e19	20	14	5.7	1.8	.58	.92	e37
8	.49	.43	e.70	e.80	e17	21	13	9.6	1.5	.51	.82	e28
9	.39	.42	e.80	1.8	16	21	13	13	1.3	.45	.74	e25
10	.40	.42	e.70	e1.5	15	21	13	12	1.3	.42	.62	e23
11	.40	.52	e.55	e1.0	15	19	12	12	1.3	.38	.54	e18
12	.37	.50	e.70	5.9	15	18	12	11	1.3	.39	.47	e17
13	.37	.52	e1.0	8.4	15	18	11	11	1.2	.37	.57	e16
14	.35	.53	e.95	e12	14	18	11	17	1.2	.36	.68	e14
15	.35	.53	e.90	e19	13	19	10	24	1.3	.35	.60	e13
16	.37	.52	e.90	e31	13	19	10	31	1.3	.33	.54	e16
17	.37	.53	e.88	e17	12	47	10	30	1.4	.51	.47	e15
18	.40	.53	e.87	e25	e18	122	9.8	27	1.3	.69	.41	e13
19	.44	.53	e.86	e29	19	117	9.1	23	1.3	.73	.45	e11
20	.46	.54	e.85	e26	21	78	8.7	20	1.4	.67	.74	e10
21	.48	.55	e.83	e22	20	67	8.8	17	1.5	.64	.78	e15
22	.50	.57	e.80	e18	19	85	8.7	15	1.4	.57	.70	e13
23	.50	.57	e.77	21	17	75	8.5	14	1.3	.50	.64	e11
24	.50	.57	e.75	78	16	57	8.2	13	1.3	.87	.63	e9.0
25	.46	.58	e.70	e45	15	47	7.4	11	1.2	1.3	.67	e8.5
26	.45	.64	e.68	e40	15	41	7.1	10	1.3	1.3	.71	e8.0
27	.43	.62	e.67	e35	14	35	6.8	8.9	1.2	1.3	.87	e7.0
28	.40	.62	e.62	e31	14	30	6.6	7.5	1.2	1.3	1.1	e9.0
29	.41	.62	e.60	e28	---	25	6.4	6.4	1.1	1.3	1.2	e18
30	.40	.59	e.58	e26	---	21	6.4	5.4	1.1	1.3	1.3	e37
31	.39	---	e.57	e25	---	20	---	4.4	---	1.2	1.3	---
TOTAL	12.05	15.36	22.06	555.66	486	1149	332.5	393.8	49.6	23.50	24.75	411.4
MEAN	.39	.51	.71	17.9	17.4	37.1	11.1	12.7	1.65	.76	.80	13.7
MAX	.50	.64	1.0	78	25	122	19	31	4.0	1.3	1.3	37
MIN	.27	.37	.53	.53	12	13	6.4	4.4	1.1	.33	.41	1.0
CFSM	.02	.03	.04	1.04	1.01	2.15	.64	.74	.10	.04	.05	.80
IN.	.03	.03	.05	1.20	1.05	2.49	.72	.85	.11	.05	.05	.89

01620500 NORTH RIVER NEAR STOKESVILLE, VA--Continued

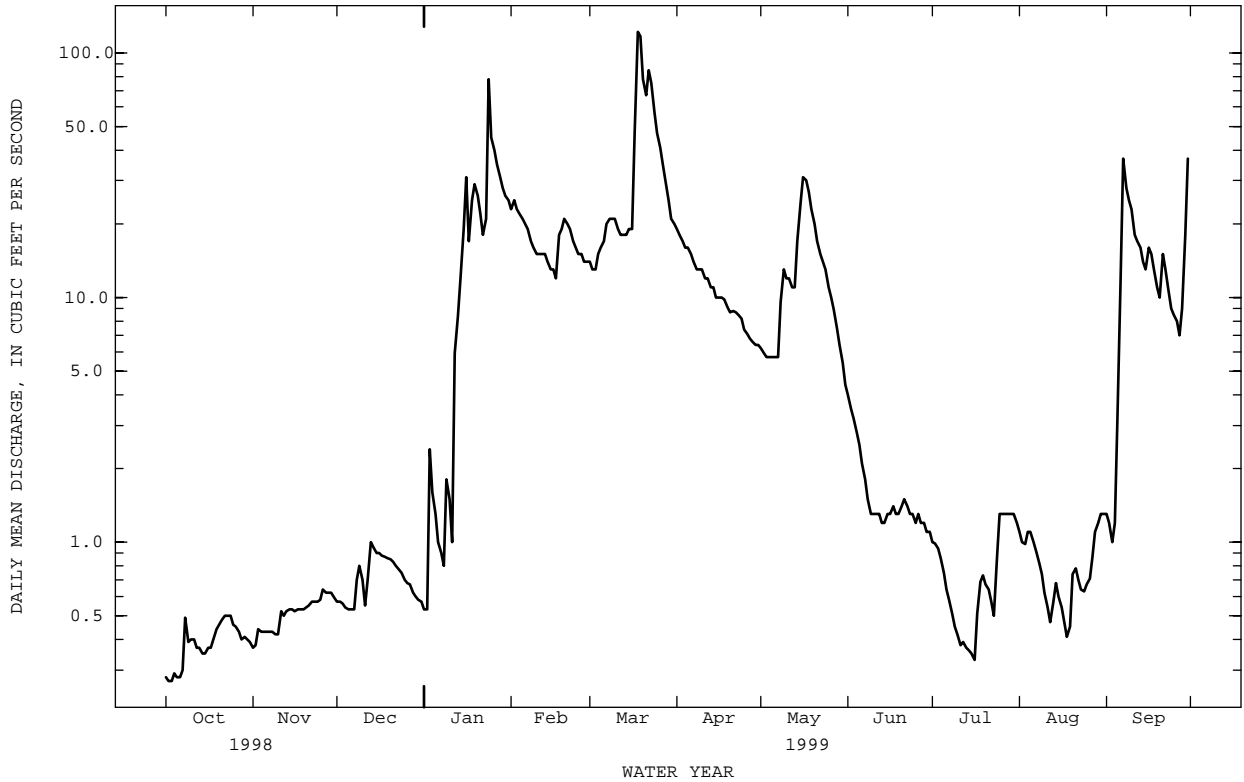
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1947 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	13.8	25.3	27.2	35.1	37.1	57.9	46.8	34.7	24.1	7.08	8.51	10.1
MAX	90.7	257	99.5	152	99.9	230	196	86.4	177	53.1	66.8	157
(WY)	1980	1986	1974	1995	1998	1993	1992	1960	1949	1995	1989	1996
MIN	.21	.41	.71	.74	4.64	8.21	11.1	5.32	1.65	.76	.26	.25
(WY)	1964	1954	1999	1981	1977	1981	1999	1977	1999	1999	1987	1963

SUMMARY STATISTICS FOR 1998 CALENDAR YEAR FOR 1999 WATER YEAR WATER YEARS 1947 - 1999

ANNUAL TOTAL	12997.23	3475.68	
ANNUAL MEAN	35.6	9.52	27.2
HIGHEST ANNUAL MEAN			49.0 1949
LOWEST ANNUAL MEAN			9.52 1999
HIGHEST DAILY MEAN	528 Mar 9	122 Mar 18	3300 Nov 5 1985
LOWEST DAILY MEAN	.26 Sep 18	.27 aOct 2	.10 bSep 15 1962
ANNUAL SEVEN-DAY MINIMUM	.28 Sep 30	.28 Oct 1	.12 Sep 29 1968
INSTANTANEOUS PEAK FLOW		145 Jan 24	9530 Jun 17 1949
INSTANTANEOUS PEAK STAGE		3.28 Jan 24	c19.80 Nov 5 1985
INSTANTANEOUS LOW FLOW		.26 aOct 2	.10 Sep 15 1962
ANNUAL RUNOFF (CFSM)	2.07	.55	1.58
ANNUAL RUNOFF (INCHES)	28.11	7.52	21.52
10 PERCENT EXCEEDS	87	23	60
50 PERCENT EXCEEDS	6.7	1.3	12
90 PERCENT EXCEEDS	.37	.43	1.0

- a Also Oct 3, 1999.
- b Also Sep 16, 19-22, and Sep 7-13, 1966.
- c From floodmarks, backwater from Elkhorn Lake.
- e Estimated.



## POTOMAC RIVER BASIN

01621050 MUDDY CREEK AT MOUNT CLINTON, VA

LOCATION.--Lat 38°29'12", long 78°57'40", Rockingham County, Hydrologic Unit 02070005, on right downstream side of bridge on State Highway 726, at Mount Clinton.

DRAINAGE AREA.--14.2 mi<sup>2</sup>.

PERIOD OF RECORD.--April 1993 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 1,320 ft above sea level, from topographic map.

REMARKS.--Records good except for period of doubtful gage-height record, Dec. 16 to Jan. 1, which is fair, and for period Jun. 10 to Sep. 3, which is poor. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 150 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Sep 6	1345	*157	*4.07	No other peak greater than base discharge.			

Minimum discharge, 0.29 ft<sup>3</sup>/s, Jun 24-29, Jul 18, gage height, 2.41 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.9	1.7	1.6	e1.0	4.0	3.1	4.9	1.6	1.4	1.1	1.4	1.1
2	1.9	1.6	1.4	1.2	4.7	2.9	4.5	1.6	1.4	1.3	1.3	1.1
3	1.8	1.8	1.6	5.9	3.9	2.9	4.1	1.6	1.4	1.2	1.2	1.0
4	2.1	1.7	1.5	2.1	3.6	3.2	4.0	1.6	1.0	1.2	1.1	1.1
5	1.9	1.5	1.4	1.3	3.3	2.9	3.6	1.6	1.1	1.0	1.1	1.1
6	1.9	1.5	1.4	1.2	3.3	2.9	3.4	1.5	1.3	.92	1.1	3.7
7	2.0	1.6	1.4	1.2	3.3	2.7	3.1	1.7	.95	1.2	1.0	1.1
8	3.3	1.6	2.1	1.2	3.2	2.4	2.9	14	.91	1.2	1.0	6.1
9	2.3	1.7	2.6	2.7	2.9	2.9	2.8	3.3	1.2	1.2	1.3	4.7
10	2.0	1.6	1.5	2.3	2.8	3.0	2.8	2.2	.67	1.1	1.1	4.2
11	1.9	1.7	1.3	1.3	2.7	3.0	2.9	2.1	1.2	.99	1.1	3.8
12	1.8	1.7	1.3	1.3	3.2	3.2	2.6	2.0	.94	.97	1.1	3.6
13	1.8	1.9	1.9	1.7	3.6	3.2	2.3	1.9	1.1	1.3	1.1	3.4
14	1.8	1.7	1.7	7.9	3.2	4.4	2.2	3.2	.96	1.2	2.0	3.3
15	1.8	1.7	1.3	26	3.2	5.8	2.4	2.8	.85	1.2	1.5	3.2
16	1.8	1.6	e1.2	8.0	3.2	7.5	2.4	2.1	.71	.98	1.3	3.7
17	1.7	1.6	e1.2	6.4	3.1	21	2.2	2.0	1.0	.57	1.2	3.1
18	1.7	1.8	e1.1	6.2	5.6	28	2.2	2.0	1.1	.88	1.0	2.7
19	1.7	1.7	e1.0	5.5	4.5	14	2.1	2.0	1.0	1.2	1.2	2.6
20	1.8	1.7	e1.0	4.6	4.0	8.9	2.2	1.8	1.2	1.3	1.9	2.6
21	1.8	1.6	e1.1	4.4	3.8	12	2.1	1.8	1.2	2.7	1.4	4.0
22	1.9	1.5	e1.0	4.3	3.6	13	2.1	1.8	1.0	2.2	1.2	3.4
23	1.8	1.7	e.95	6.0	3.3	9.0	2.1	2.0	.74	.90	1.1	2.9
24	1.8	1.4	e1.1	23	3.2	8.2	2.4	2.0	.70	.98	1.4	2.6
25	1.8	1.4	e1.0	9.4	3.2	7.2	1.9	1.8	.88	1.1	1.7	2.5
26	1.7	1.6	e.95	7.4	3.2	6.5	1.9	1.7	.59	1.2	1.7	2.4
27	1.7	1.7	e1.0	6.4	3.0	6.0	1.8	1.6	1.0	1.0	1.6	2.4
28	1.7	1.8	e1.1	5.9	3.3	5.7	1.8	1.6	.77	.99	1.6	5.8
29	1.7	1.7	e1.1	5.1	---	5.3	1.7	1.5	1.0	1.5	1.4	6.2
30	1.7	1.7	e1.0	4.6	---	4.9	1.7	1.5	.95	1.3	1.2	3.1
31	1.8	---	e.95	4.0	---	4.6	---	1.4	---	1.4	1.1	---
TOTAL	58.3	49.5	40.75	196.5	97.9	210.3	79.1	71.3	30.22	37.28	40.4	173.5
MEAN	1.88	1.65	1.31	6.34	3.50	6.78	2.64	2.30	1.01	1.20	1.30	5.78
MAX	3.3	1.9	2.6	26	5.6	28	4.9	14	1.4	2.7	2.0	37
MIN	1.7	1.4	.95	1.0	2.7	2.4	1.7	1.4	.59	.57	1.0	1.0
CFSM	.13	.12	.09	.45	.25	.48	.19	.16	.07	.08	.09	.41
IN.	.15	.13	.11	.51	.26	.55	.21	.19	.08	.10	.11	.45

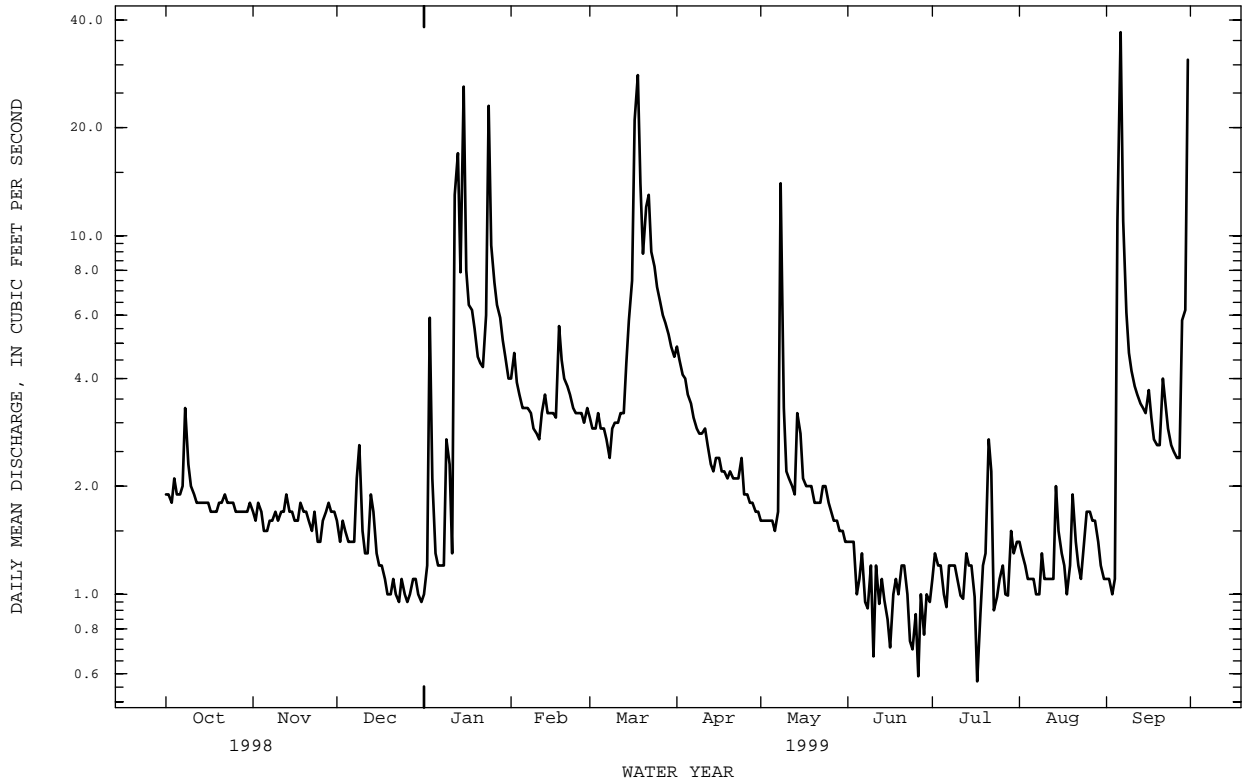
01621050 MUDDY CREEK AT MOUNT CLINTON, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1993 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	7.95	7.18	10.5	23.7	23.0	24.3	12.0	11.1	9.49	6.89	9.15	17.9
MAX	22.1	19.3	37.5	66.9	63.5	44.0	19.9	22.7	29.9	16.1	33.8	105
(WY)	1996	1997	1997	1996	1998	1998	1998	1998	1996	1995	1996	1996
MIN	1.88	1.65	1.31	6.34	3.50	6.64	2.64	2.30	1.01	1.20	1.30	1.85
(WY)	1999	1999	1999	1999	1999	1995	1999	1999	1999	1999	1999	1993

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR	WATER YEARS 1993 - 1999
ANNUAL TOTAL	6129.45	1085.05	
ANNUAL MEAN	16.8	2.97	14.0
HIGHEST ANNUAL MEAN			30.0
LOWEST ANNUAL MEAN			2.97
HIGHEST DAILY MEAN	272	Feb 17	1760
LOWEST DAILY MEAN	.95	Dec 23	.57
ANNUAL SEVEN-DAY MINIMUM	1.0	Dec 20	.81
INSTANTANEOUS PEAK FLOW			157
INSTANTANEOUS PEAK STAGE			4.07
INSTANTANEOUS LOW FLOW			a.29
ANNUAL RUNOFF (CFSM)	1.18		.21
ANNUAL RUNOFF (INCHES)	16.06		2.84
10 PERCENT EXCEEDS	40		5.6
50 PERCENT EXCEEDS	6.8		1.8
90 PERCENT EXCEEDS	1.6		1.0

a Possibly a result of nearby pumpage.  
 b Also Jun 25-29, and Jul 18, 1999.  
 e Estimated.





## POTOMAC RIVER BASIN

01621470 BLACKS RUN AT ROUTE 704 NEAR MOUNT CRAWFORD, VA

LOCATION.--Lat 38°22'43", long 78°55'42", Rockingham County, Hydrologic unit 02070005, on right bank at downstream side of bridge on State Highway 704, 2.5 mi upstream from North River and 2 mi north of Mount Crawford.

DRAINAGE AREA.--19.4 mi<sup>2</sup>

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--February 1999 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 1,170 ft above sea level, from topographic map.

REMARKS.--Records fair. Diurnal fluctuations at low flow caused by irrigation upstream. Several measurements of water temperature were made during the year.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 412 ft<sup>3</sup>/s, Sep 30, gage height, 6.96 ft; minimum discharge, 0.28 ft<sup>3</sup>/s, Jul 7, gage height, 1.49 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

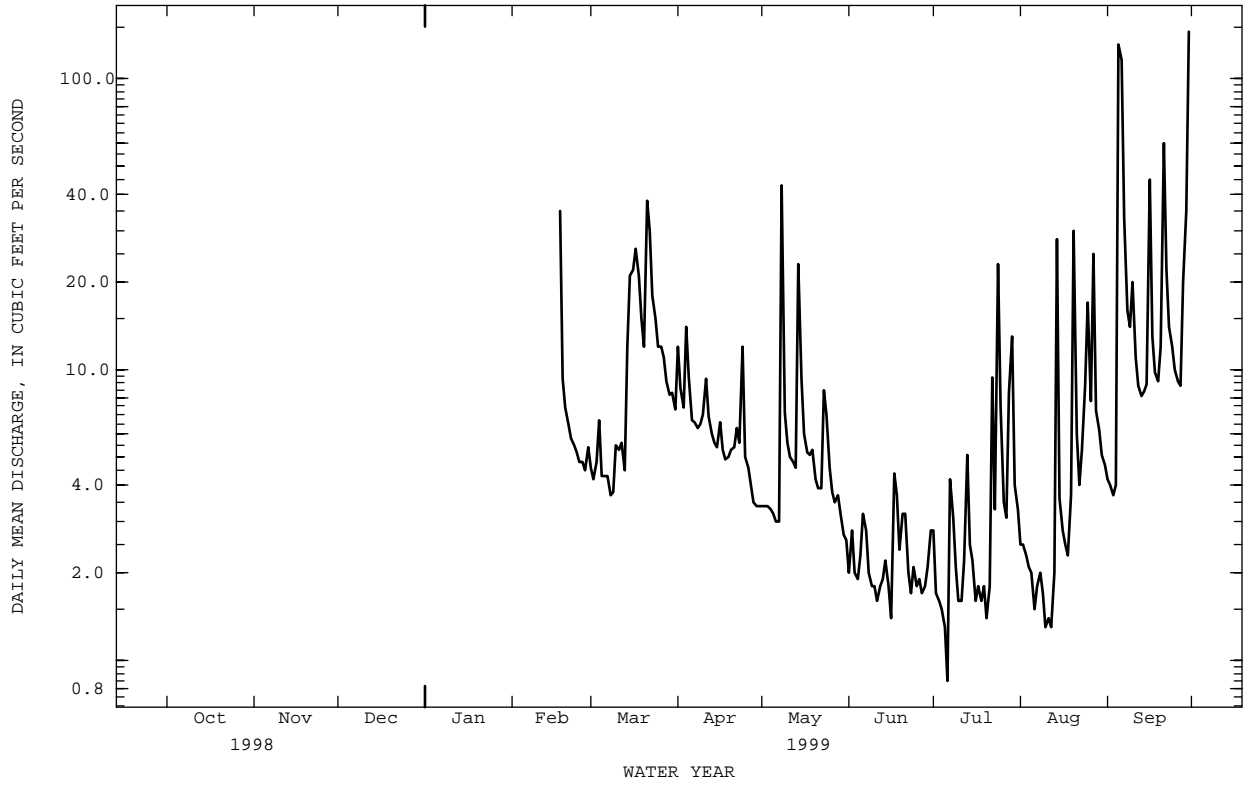
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	---	---	---	4.6	12	3.4	2.0	2.8	2.5	4.2
2	---	---	---	---	---	4.2	8.6	3.4	2.8	1.7	2.5	4.0
3	---	---	---	---	---	4.8	7.4	3.4	2.0	1.6	2.3	3.7
4	---	---	---	---	---	6.7	14	3.3	1.9	1.5	2.1	4.0
5	---	---	---	---	---	4.3	9.4	3.2	2.3	1.3	2.0	131
6	---	---	---	---	---	4.3	6.7	3.0	3.2	.85	1.5	116
7	---	---	---	---	---	4.3	6.6	3.0	2.8	4.2	1.8	33
8	---	---	---	---	---	3.7	6.3	43	2.0	3.1	2.0	16
9	---	---	---	---	---	3.8	6.5	7.1	1.8	2.1	1.7	14
10	---	---	---	---	---	5.5	7.0	5.6	1.8	1.6	1.3	20
11	---	---	---	---	---	5.3	9.3	5.0	1.6	1.6	1.4	11
12	---	---	---	---	---	5.6	6.9	4.8	1.8	2.2	1.3	8.8
13	---	---	---	---	---	4.5	6.0	4.6	1.9	5.1	2.0	8.1
14	---	---	---	---	---	12	5.6	23	2.2	2.5	28	8.4
15	---	---	---	---	---	21	5.4	9.3	1.8	2.2	3.6	8.9
16	---	---	---	---	---	22	6.6	6.0	1.4	1.6	2.8	45
17	---	---	---	---	---	26	5.3	5.2	4.4	1.8	2.5	13
18	---	---	---	---	e35	21	4.9	5.1	3.7	1.6	2.3	9.8
19	---	---	---	---	9.3	15	5.0	5.3	2.4	1.8	3.7	9.1
20	---	---	---	---	7.4	12	5.3	4.2	3.2	1.4	30	12
21	---	---	---	---	6.5	38	5.4	3.9	3.2	1.8	6.0	60
22	---	---	---	---	5.8	30	6.3	3.9	2.0	9.4	4.0	22
23	---	---	---	---	5.5	18	5.6	8.5	1.7	3.3	5.3	14
24	---	---	---	---	5.2	15	12	7.0	2.1	23	8.8	12
25	---	---	---	---	4.8	12	5.0	4.6	1.8	7.4	17	10
26	---	---	---	---	4.8	12	4.6	3.8	1.9	3.5	7.8	9.1
27	---	---	---	---	4.5	11	4.0	3.5	1.7	3.1	25	8.8
28	---	---	---	---	5.4	9.1	3.5	3.7	1.8	8.3	7.2	20
29	---	---	---	---	---	8.2	3.4	3.2	2.1	13	6.2	35
30	---	---	---	---	---	8.3	3.4	2.7	2.8	4.0	5.1	145
31	---	---	---	---	---	7.3	---	2.6	---	3.3	4.7	---
TOTAL	---	---	---	---	---	359.5	198.0	198.3	68.1	122.65	194.4	815.9
MEAN	---	---	---	---	---	11.6	6.60	6.40	2.27	3.96	6.27	27.2
MAX	---	---	---	---	---	38	14	43	4.4	23	30	145
MIN	---	---	---	---	---	3.7	3.4	2.6	1.4	.85	1.3	3.7
CFSM	---	---	---	---	---	.60	.34	.33	.12	.20	.32	1.40
IN.	---	---	---	---	---	.69	.38	.38	.13	.24	.37	1.56

01621470 BLACKS RUN AT ROUTE 704 NEAR MOUNT CRAWFORD, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1999 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	---	---	---	---	---	11.6	6.60	6.40	2.27	3.96	6.27	27.2
MAX	---	---	---	---	---	11.6	6.60	6.40	2.27	3.96	6.27	27.2
(WY)	---	---	---	---	---	1999	1999	1999	1999	1999	1999	1999
MIN	---	---	---	---	---	11.6	6.60	6.40	2.27	3.96	6.27	27.2
(WY)	---	---	---	---	---	1999	1999	1999	1999	1999	1999	1999

e Estimated.



## POTOMAC RIVER BASIN

01621470 BLACKS RUN AT ROUTE 704 NEAR MOUNT CRAWFORD, VA--Continued

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--March 1999 to current year.

## WATER-QUALITY DATA, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DATE	TIME	SAMPLE TYPE	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	TEMPER- ATURE AIR (DEG C) (00020)	TEMPER- ATURE WATER (DEG C) (00010)	TUR- BID- ITY (NTU) (00076)	OXYGEN, DIS- SOLVED (MG/L) (00300)	COLI- FORM, FECAL, UM-MF (COLS./ 100 ML) (31625)
MAR											
22...	1020	ENVIRONMENTAL	23.5	596	7.80	720	9.5	7.7	49	11.49	2200
APR											
27...	1430	ENVIRONMENTAL	4.5	580	8.38	723	27.5	21.1	14	13.54	350
27...	1435	ENVIRONMENTAL	4.5	--	--	--	--	--	14	--	370
27...	1440	ENVIRONMENTAL	4.3	--	--	--	--	--	14	--	350
27...	1445	ENVIRONMENTAL	4.3	--	--	--	--	--	14	--	310
27...	1450	ENVIRONMENTAL	4.3	--	--	--	--	--	14	--	K760
27...	1455	ENVIRONMENTAL	4.5	--	--	--	--	--	14	--	K820
27...	1500	ENVIRONMENTAL	4.5	--	--	--	--	--	14	--	K730
27...	1505	ENVIRONMENTAL	4.5	--	--	--	--	--	14	--	360
MAY											
08...	0300	ENVIRONMENTAL	7.1	563	6.81	718	17.5	19.2	58	5.65	K150000
08...	0345	ENVIRONMENTAL	20	551	7.85	718	17.5	19.2	149	4.77	K110000
08...	0445	ENVIRONMENTAL	50	500	7.94	718	15.5	18.4	357	5.28	K90000
08...	0545	ENVIRONMENTAL	95	484	7.76	718	15.5	17.8	575	6.30	24000
08...	0745	ENVIRONMENTAL	95	427	7.86	718	15.0	17.6	427	6.58	K54000
08...	1015	ENVIRONMENTAL	127	394	7.79	721	22.0	18.4	599	6.87	38000
08...	1115	ENVIRONMENTAL	97	382	7.91	721	21.5	18.4	531	7.08	30000
08...	1345	ENVIRONMENTAL	38	287	7.92	720	24.5	19.4	--	7.01	28000
08...	1445	ENVIRONMENTAL	30	313	7.92	720	25.5	20.0	209	6.85	25000
08...	1645	ENVIRONMENTAL	20	362	7.89	720	24.5	20.5	133	6.23	16000
JUN											
09...	1425	ENVIRONMENTAL	2.3	497	8.00	726	33.0	29.7	15	11.11	3800
09...	1430	ENVIRONMENTAL	2.3	--	--	--	--	--	15	--	3000
09...	1435	ENVIRONMENTAL	2.3	--	--	--	--	--	15	--	3400
09...	1440	ENVIRONMENTAL	2.3	--	--	--	--	--	15	--	2900
09...	1445	ENVIRONMENTAL	2.3	--	--	--	--	--	15	--	3500
09...	1450	ENVIRONMENTAL	2.3	--	--	--	--	--	15	--	2800
09...	1455	ENVIRONMENTAL	2.3	--	--	--	--	--	15	--	3300
09...	1500	ENVIRONMENTAL	2.3	--	--	--	--	--	15	--	2200
JUL											
20...	0920	REPLICATE	1.9	--	--	--	--	--	88	--	2100
20...	0920	ENVIRONMENTAL	1.9	--	--	--	--	--	88	--	3000
20...	0921	REPLICATE	1.9	--	--	--	--	--	88	--	3300
20...	0925	ENVIRONMENTAL	2.0	507	7.97	747	24.5	23.6	88	5.35	K2600
20...	0930	ENVIRONMENTAL	2.0	--	--	--	--	--	88	--	3300
20...	0935	ENVIRONMENTAL	2.0	--	--	--	--	--	88	--	3600
20...	0940	ENVIRONMENTAL	1.9	--	--	--	--	--	88	--	3000
20...	0945	ENVIRONMENTAL	1.9	--	--	--	--	--	88	--	2400
20...	0950	ENVIRONMENTAL	1.8	--	--	--	--	--	88	--	2000
20...	0955	ENVIRONMENTAL	1.8	--	--	--	--	--	88	--	K4000
22...	0825	ENVIRONMENTAL	8.8	538	7.96	726	27.0	23.5	72	6.40	K7200
AUG											
19...	1025	ENVIRONMENTAL	2.1	518	8.11	725	25.0	23.3	31	6.87	22000
25...	1250	ENVIRONMENTAL	6.9	461	8.05	726	23.0	21.9	52	6.76	K91000
25...	1255	ENVIRONMENTAL	6.9	--	--	--	--	--	52	--	K91000
25...	1300	ENVIRONMENTAL	7.1	--	--	--	--	--	52	--	K97000
25...	1305	ENVIRONMENTAL	7.1	--	--	--	--	--	52	--	K76000
25...	1310	ENVIRONMENTAL	7.3	--	--	--	--	--	52	--	K71000
25...	1315	ENVIRONMENTAL	7.3	--	--	--	--	--	52	--	K64000
25...	1320	ENVIRONMENTAL	7.6	--	--	--	--	--	52	--	K68000
25...	1325	ENVIRONMENTAL	7.9	--	--	--	--	--	52	--	K67000
SEP											
15...	1845	ENVIRONMENTAL	7.1	608	8.12	729	14.5	17.8	15	8.40	3400
15...	2127	ENVIRONMENTAL	21.1	579	8.10	728	14.0	17.2	68	8.10	39000
16...	0542	ENVIRONMENTAL	44.4	541	8.07	722	13.5	15.9	146	7.90	24000
16...	0610	ENVIRONMENTAL	69.3	456	7.97	721	13.5	15.9	319	7.70	34000
16...	0745	ENVIRONMENTAL	92	423	7.92	719	13.5	16.2	251	7.80	31000
16...	0916	ENVIRONMENTAL	81.7	344	7.88	719	14.0	16.2	203	7.75	K19000
16...	1045	ENVIRONMENTAL	90	278	7.85	719	14.5	15.9	158	7.90	51000
16...	1340	ENVIRONMENTAL	61.4	290	7.92	720	18.5	16.6	117	8.20	32000
16...	1830	ENVIRONMENTAL	26	324	7.99	724	15.0	16.3	88	8.57	28000
17...	0730	ENVIRONMENTAL	13	396	7.94	729	12.5	14.3	54	8.45	9000

K Result based on colony count outside optimal range.

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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 mi<sup>2</sup>.

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 sea level. Prior to Dec. 12, 1938, nonrecording gage at site 3.0 mi downstream at different datum.

REMARKS.--No estimated daily discharges. Records good. At a point 26.8 mi upstream from station, there is an aqueduct tunnel diversion of about 2.2 ft<sup>3</sup>/s from Staunton Dam Reservoir by city of Staunton for industrial and municipal use. Diurnal fluctuation at low and medium flow caused by wastewater treatment plant and diversions for industrial, municipal, and irrigation at points upstream. Maximum discharge, 70,400 ft<sup>3</sup>/s, from rating curve extended above 16,000 ft<sup>3</sup>/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. Minimum discharge, 16 ft<sup>3</sup>/s, result of temporary dam 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 Department of Environmental Quality - Water Division.

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

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,500 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Sep 6	1830	*1,880	*5.38	No peak greater than base discharge.			
Minimum discharge, 24 ft <sup>3</sup> /s, Jul 19.							

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	74	65	64	53	170	144	259	109	106	50	38	48
2	70	68	64	54	184	134	242	110	105	46	44	45
3	73	70	64	93	169	135	222	112	101	40	40	42
4	77	72	66	100	169	140	218	109	97	40	38	43
5	79	67	64	74	167	130	211	109	90	39	37	311
6	76	66	63	68	163	133	193	110	94	40	36	902
7	77	66	64	67	163	133	182	110	94	47	33	1270
8	129	65	79	70	163	148	171	371	85	49	33	913
9	92	67	105	142	152	183	168	372	82	40	39	613
10	81	62	71	139	146	206	162	293	76	35	36	410
11	79	63	67	89	141	200	162	245	76	33	34	259
12	78	63	62	110	140	194	159	221	73	37	34	195
13	73	66	81	170	134	183	147	204	70	48	36	162
14	75	65	75	141	129	207	143	254	78	40	80	142
15	74	64	68	176	127	276	142	283	71	36	33	134
16	73	63	66	164	123	310	142	304	66	35	36	215
17	70	60	63	129	120	504	134	326	80	31	35	177
18	71	59	62	129	187	1140	129	304	75	30	34	134
19	71	61	59	133	182	1260	127	280	64	32	34	127
20	66	64	58	121	193	992	124	240	69	30	86	128
21	67	63	59	116	182	858	123	210	78	32	46	210
22	69	62	56	113	178	841	123	193	68	45	41	162
23	67	64	57	123	176	765	125	192	61	41	46	134
24	67	60	60	377	174	685	129	188	58	60	52	126
25	67	58	59	508	166	582	121	164	53	48	68	122
26	69	62	55	526	159	498	120	151	52	44	62	117
27	66	59	54	403	146	433	116	137	52	40	76	117
28	66	62	58	317	148	383	114	129	58	44	54	146
29	64	63	57	258	---	339	116	120	49	66	53	165
30	66	67	57	215	---	296	114	113	50	46	49	1010
31	65	---	55	183	---	266	---	111	---	43	48	---
TOTAL	2291	1916	1992	5361	4451	12698	4638	6174	2227	1287	1411	8579
MEAN	73.9	63.9	64.3	173	159	410	155	199	74.2	41.5	45.5	286
MAX	129	72	105	526	193	1260	259	372	106	66	86	1270
MIN	64	58	54	53	120	130	114	109	49	30	33	42
CFSM	.19	.17	.17	.46	.42	1.08	.41	.53	.20	.11	.12	.75
IN.	.22	.19	.20	.53	.44	1.25	.46	.61	.22	.13	.14	.84

01622000 NORTH RIVER NEAR BURKETOWN, VA--Continued

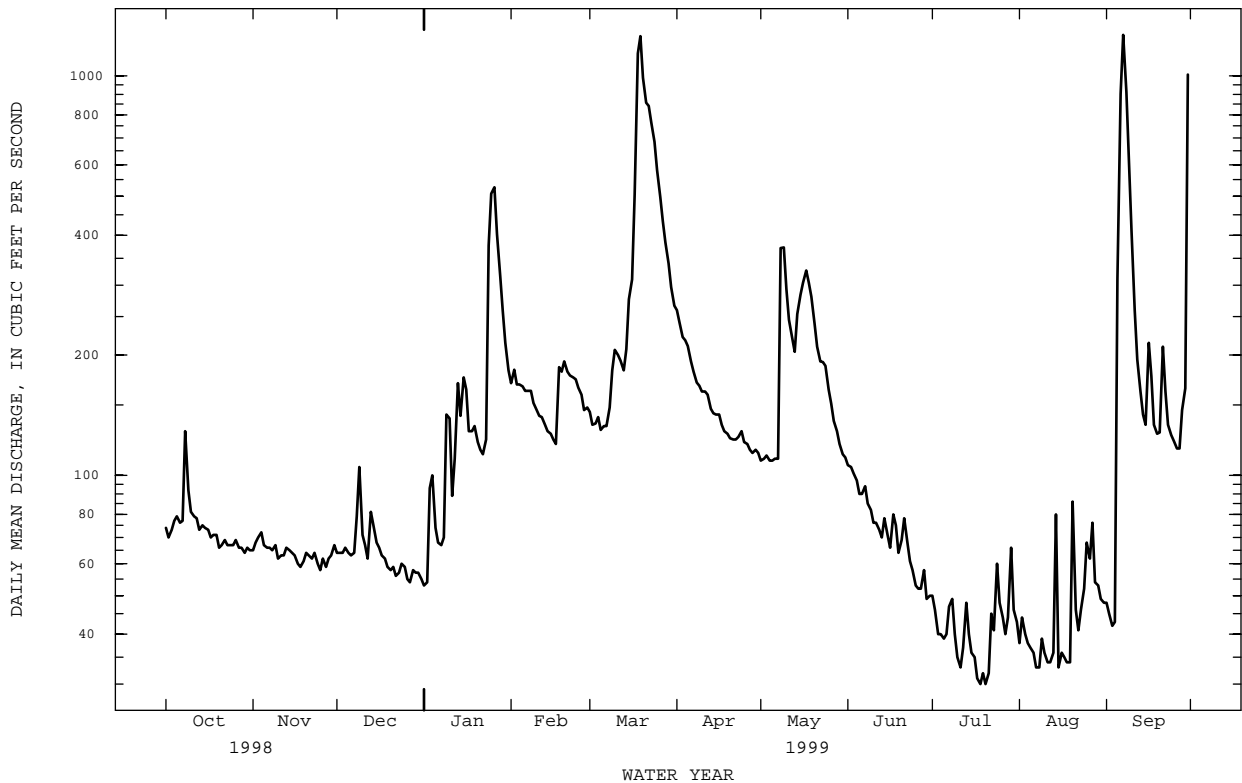
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1926 - 1973, 1976 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	247	282	331	444	526	716	608	490	331	198	238	226
MAX	1500	2080	1087	1777	1841	1932	1831	1486	1704	809	1102	3130
(WY)	1943	1986	1935	1996	1998	1936	1987	1942	1949	1949	1949	1996
MIN	38.1	36.5	39.2	53.5	47.9	136	107	106	72.7	41.5	41.0	34.2
(WY)	1931	1931	1966	1966	1931	1981	1981	1930	1977	1999	1964	1930

SUMMARY STATISTICS FOR 1998 CALENDAR YEAR FOR 1999 WATER YEAR WATER YEARS 1926 - 1973 1976 - 1999

ANNUAL TOTAL		218393		53025								
ANNUAL MEAN		598		145						385		
HIGHEST ANNUAL MEAN										871		1996
LOWEST ANNUAL MEAN										145		1999
HIGHEST DAILY MEAN				6120	Mar 21	1270	Sep 7		e32000		Sep 7	1996
LOWEST DAILY MEAN				54	Dec 27	30	aJul 18			22	Sep 24	1930
ANNUAL SEVEN-DAY MINIMUM				56	Dec 25	32	Jul 15			30	Dec 20	1930
INSTANTANEOUS PEAK FLOW						1880	Sep 6		70400		Sep 6	1996
INSTANTANEOUS PEAK STAGE						5.38	Sep 6		b36.70		Sep 6	1996
INSTANTANEOUS LOW FLOW						24	Jul 19		c16		Nov 23	1965
ANNUAL RUNOFF (CFSM)		1.58				.38				1.02		
ANNUAL RUNOFF (INCHES)		21.44				5.20				13.80		
10 PERCENT EXCEEDS			1580			270				825		
50 PERCENT EXCEEDS			176			85				204		
90 PERCENT EXCEEDS			64			42				64		

- a Also Jul 20, 1999.
- b From high-water mark in gage house.
- c Result of temporary dam upstream.
- 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 mi<sup>2</sup>.

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 sea level. Prior to Sep. 1, 1938, nonrecording gage at same site and datum.

REMARKS.--Records good except those for periods with ice effect, Jan. 5-7 and Jan. 12, which are fair. There are discharges of about 6.9 ft<sup>3</sup>/s from wastewater treatment plants upstream from station. Most of water discharged from treatment plants was diverted from another drainage basin for industrial and municipal supply. Small diurnal fluctuation at low flow caused by mills and irrigation upstream from station. Maximum discharge, 44,300 ft<sup>3</sup>/s, from rating curve extended above 15,000 ft<sup>3</sup>/s on basis of slope-area measurement at gage height 33.09 ft. Minimum discharge, 18 ft<sup>3</sup>/s, result of freezeup. 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 Department of Environmental Quality - Water Division.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage since at least 1877, that of Sep. 7, 1996.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 3,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Sep 30	1730	*1,350	*6.68	No peak greater than base discharge.			

Minimum discharge, 32 ft<sup>3</sup>/s, Aug 13.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	103	104	93	84	192	177	242	123	100	56	95	46
2	102	105	90	83	209	162	273	120	97	58	64	44
3	100	115	88	129	233	153	237	117	94	59	57	45
4	105	130	89	265	240	169	218	116	90	57	51	45
5	110	118	87	e170	230	168	208	115	87	56	45	196
6	112	111	88	e154	212	162	196	114	82	53	44	584
7	109	108	90	e145	200	167	186	113	83	57	42	514
8	133	107	95	132	206	164	180	142	81	76	42	338
9	164	106	155	169	193	160	175	318	73	67	45	209
10	131	107	136	659	179	173	173	289	69	62	43	167
11	115	111	111	306	170	174	169	230	68	66	40	140
12	110	121	98	e220	166	168	171	193	70	70	37	124
13	108	116	106	238	162	164	164	172	72	98	37	111
14	107	109	135	235	156	176	153	340	75	84	46	103
15	104	106	120	286	151	290	150	527	72	70	62	99
16	103	106	105	360	148	383	158	406	66	59	49	131
17	103	105	98	295	145	776	150	304	72	54	47	157
18	104	103	95	257	266	1200	143	244	91	50	41	113
19	105	102	91	260	360	924	138	207	81	57	38	99
20	102	101	91	245	338	643	138	183	79	48	49	95
21	102	104	90	218	293	609	137	161	85	45	156	190
22	101	100	91	206	256	886	138	150	84	64	91	250
23	101	97	90	199	222	655	139	184	77	70	70	193
24	100	99	90	535	206	539	150	183	71	57	62	148
25	101	96	92	884	192	457	136	181	65	82	65	126
26	103	96	90	516	183	386	129	148	64	66	65	113
27	105	101	89	362	173	338	129	133	63	56	63	105
28	102	96	95	293	172	310	124	121	63	49	60	165
29	104	96	91	253	---	281	128	115	60	79	56	178
30	102	92	92	222	---	261	129	110	56	73	52	942
31	105	---	90	202	---	239	---	105	---	58	49	---
TOTAL	3356	3168	3061	8582	5853	11514	4961	5964	2290	1956	1763	5770
MEAN	108	106	98.7	277	209	371	165	192	76.3	63.1	56.9	192
MAX	164	130	155	884	360	1200	273	527	100	98	156	942
MIN	100	92	87	83	145	153	124	105	56	45	37	44
CFSM	.29	.28	.26	.74	.56	.99	.44	.51	.20	.17	.15	.51
IN.	.33	.31	.30	.85	.58	1.14	.49	.59	.23	.19	.17	.57

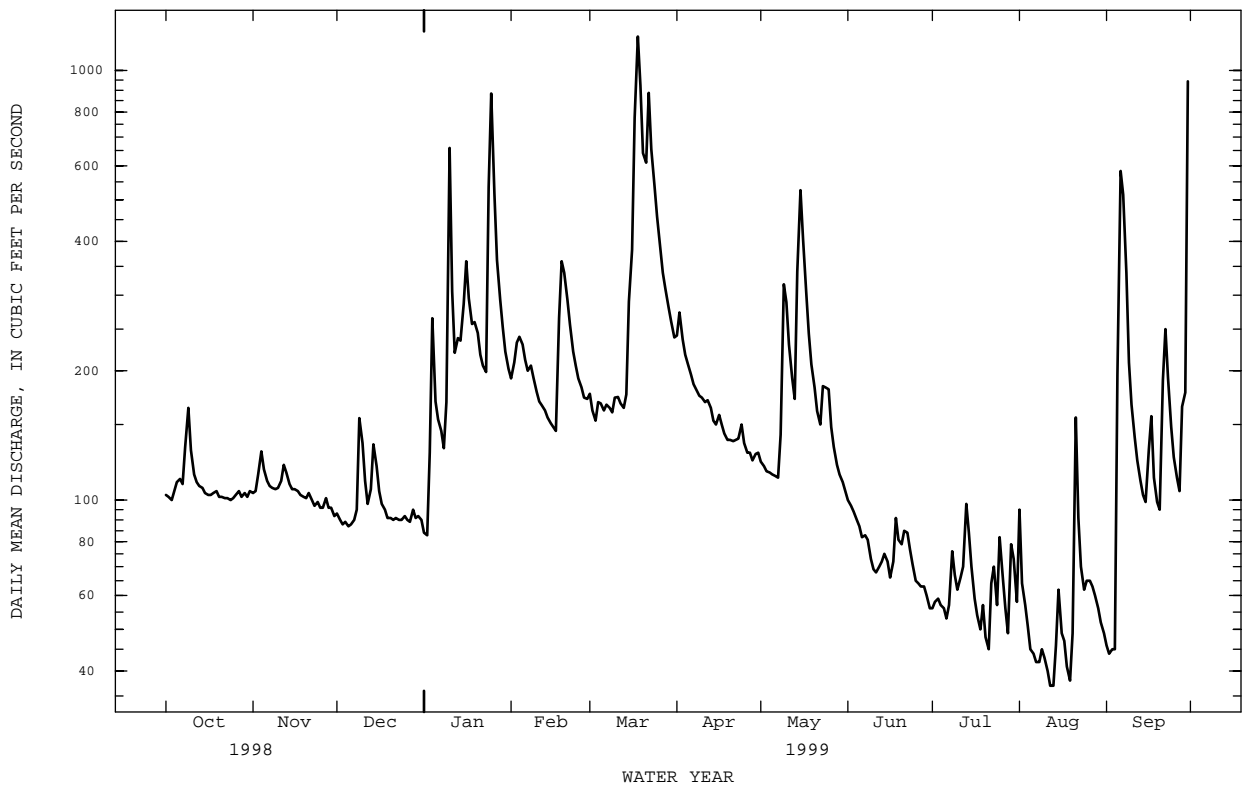
01625000 MIDDLE RIVER NEAR GROTTOS, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1928 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	234	235	303	410	473	589	463	344	255	178	195	201
MAX	1138	2019	1111	1436	2288	1704	1674	963	993	705	1017	1887
(WY)	1980	1986	1949	1996	1998	1936	1987	1989	1972	1972	1940	1996
MIN	64.8	58.9	55.8	66.9	91.3	106	95.8	89.7	76.3	47.2	55.6	64.4
(WY)	1964	1931	1966	1981	1931	1981	1981	1969	1999	1966	1977	1932

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR	WATER YEARS 1928 - 1999
ANNUAL TOTAL	220344	58238	
ANNUAL MEAN	604	160	323
HIGHEST ANNUAL MEAN			623
LOWEST ANNUAL MEAN			105
HIGHEST DAILY MEAN	6640	Feb 18	1200
LOWEST DAILY MEAN	87	Dec 5	37
ANNUAL SEVEN-DAY MINIMUM	89	Dec 1	41
INSTANTANEOUS PEAK FLOW			1350
INSTANTANEOUS PEAK STAGE			6.68
INSTANTANEOUS LOW FLOW			32
ANNUAL RUNOFF (CFSM)	1.61	.43	.86
ANNUAL RUNOFF (INCHES)	21.86	5.78	11.69
10 PERCENT EXCEEDS	1550	287	637
50 PERCENT EXCEEDS	261	111	190
90 PERCENT EXCEEDS	101	57	83

- a Also Aug 13, 1999.
- b From high-water mark in gage house.
- c Result of freezeup.
- e Estimated.





POTOMAC RIVER BASIN

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 mi<sup>2</sup>, of which 41 mi<sup>2</sup> 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 sea level.

REMARKS.--Records good except for period with ice effect, Jan. 5-7, which is fair. There is discharge of about 1.1 ft<sup>3</sup>/s from a wastewater treatment plant upstream from station, originating from well fields. Flow from 41 mi<sup>2</sup> upstream from station slightly regulated by flood-detention reservoirs (sixteen of which were built by Soil Conservation Service between 1954 and 1961). National Weather Service gage-height telemeter and Virginia Department of Emergency Services gage-height radio transmitter at station. Maximum discharge, 17,500 ft<sup>3</sup>/s, from rating curve extended above 4,200 ft<sup>3</sup>/s on basis of contracted-opening measurement at gage height 13.95 ft. 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 Department of Environmental Quality - Water Division.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in October 1942 reached a stage of 14.3 ft, from floodmarks, discharge, 14,500 ft<sup>3</sup>/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Sep 6	1800	1,190	5.43	Sep 30	0130	*2,250	*6.90

Minimum discharge, 21 ft<sup>3</sup>/s, Sep 2, 3.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	35	39	35	32	76	77	121	60	42	29	31	23
2	35	40	36	31	236	70	126	59	41	28	29	22
3	36	42	35	89	238	69	112	59	41	28	29	22
4	36	43	37	87	189	81	107	59	39	28	29	24
5	36	40	36	e47	154	74	101	58	37	28	28	591
6	37	38	35	e42	131	70	95	58	36	27	28	976
7	37	39	35	e41	119	71	91	57	35	29	28	732
8	43	39	37	40	110	66	89	84	35	29	28	385
9	43	39	44	82	96	67	88	84	34	28	28	278
10	38	39	42	128	86	72	86	71	34	29	27	221
11	37	41	37	80	79	70	87	66	34	29	26	146
12	37	40	36	66	76	68	89	63	35	30	26	106
13	36	39	39	64	73	66	81	63	34	32	26	82
14	37	39	45	65	67	71	77	74	33	31	28	69
15	37	39	42	103	64	113	77	76	33	29	27	69
16	37	39	38	119	62	135	88	66	33	28	26	308
17	37	39	36	93	62	220	79	62	36	28	25	289
18	37	39	36	97	111	287	72	61	38	28	24	198
19	37	39	33	112	136	247	70	59	35	27	25	154
20	37	39	33	96	120	210	70	57	35	28	28	126
21	37	39	33	84	108	208	72	54	36	31	27	134
22	37	38	33	74	98	243	71	54	36	49	26	124
23	37	37	33	76	91	223	69	72	35	33	25	99
24	37	37	33	262	85	208	75	67	34	31	24	82
25	38	37	33	292	82	193	64	63	33	35	25	70
26	39	39	33	197	78	173	62	56	33	32	25	63
27	38	39	33	142	74	157	61	53	32	28	25	65
28	37	38	33	111	75	144	64	52	30	30	24	218
29	40	37	32	94	---	132	66	49	30	33	24	367
30	39	36	33	83	---	121	61	45	30	32	23	1380
31	40	---	32	77	---	114	---	43	---	31	23	---
TOTAL	1164	1168	1108	3006	2976	4120	2471	1904	1049	938	817	7423
MEAN	37.5	38.9	35.7	97.0	106	133	82.4	61.4	35.0	30.3	26.4	247
MAX	43	43	45	292	238	287	126	84	42	49	31	1380
MIN	35	36	32	31	62	66	61	43	30	27	23	22
CFSM	.30	.31	.28	.76	.84	1.05	.65	.48	.28	.24	.21	1.95
IN.	.34	.34	.32	.88	.87	1.21	.72	.56	.31	.27	.24	2.17

01626000 SOUTH RIVER NEAR WAYNESBORO, VA--Continued

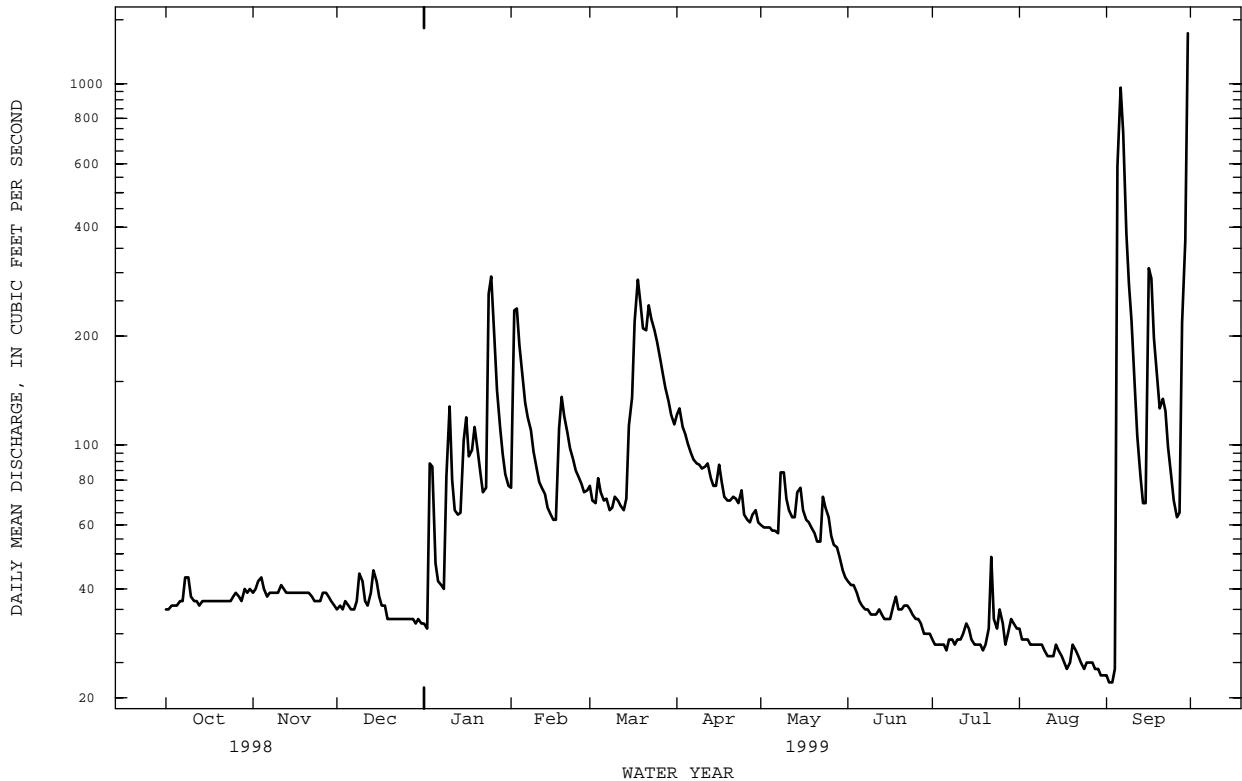
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1953 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	112	132	135	183	212	283	241	168	119	66.3	80.9	83.0
MAX	549	1214	355	767	1312	748	1062	485	875	305	700	546
(WY)	1973	1986	1997	1996	1998	1993	1987	1989	1972	1972	1955	1996
MIN	25.5	25.1	24.2	23.6	64.5	49.0	44.0	50.4	35.0	26.1	26.3	27.0
(WY)	1966	1966	1966	1966	1959	1981	1981	1981	1999	1966	1966	1970

SUMMARY STATISTICS FOR 1998 CALENDAR YEAR FOR 1999 WATER YEAR WATER YEARS 1953 - 1999

ANNUAL TOTAL	109403	28144	
ANNUAL MEAN	300	77.1	151
HIGHEST ANNUAL MEAN			312
LOWEST ANNUAL MEAN			47.5
HIGHEST DAILY MEAN	3930	Feb 18	1380
LOWEST DAILY MEAN	32	aDec 29	22
ANNUAL SEVEN-DAY MINIMUM	33	Dec 25	23
INSTANTANEOUS PEAK FLOW			2250
INSTANTANEOUS PEAK STAGE			6.90
INSTANTANEOUS LOW FLOW			21
ANNUAL RUNOFF (CFSM)	2.36	.61	1.19
ANNUAL RUNOFF (INCHES)	32.05	8.24	16.14
10 PERCENT EXCEEDS	755	134	300
50 PERCENT EXCEEDS	103	42	84
90 PERCENT EXCEEDS	37	28	33

- a Also Dec 31, 1998.
- b Also Sep 3, 1999.
- c Also Aug 29, 1999.
- d Also Feb 2, 1966.
- e Estimated.
- f Result of regulation from unknown source upstream from gage.



POTOMAC RIVER BASIN

01627500 SOUTH RIVER AT HARRISTON, VA

LOCATION.--Lat 38°13'07", long 78°50'13", Augusta County, Hydrologic Unit 02070005, on left bank 200 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 mi<sup>2</sup>.

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 sea level. Prior to Sep. 1, 1938, nonrecording gage at same site and datum.

REMARKS.--No estimated daily discharges. Records good. There are discharges of about 5.8 ft<sup>3</sup>/s from industrial and municipal wastewater treatment plants upstream from station, originating from well fields. Maximum discharge, 28,900 ft<sup>3</sup>/s, from rating curve extended above 10,000 ft<sup>3</sup>/s on basis of slope-area measurement at gage height 15.47 ft. 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 Department of Environmental Quality - Water Division.

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 greater than base discharge of 1,200 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Sep 6	2330	1,220	4.74	Sep 30	0700	*3,470	*7.33

Minimum discharge, 41 ft<sup>3</sup>/s, Aug 19.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	72	76	74	68	135	126	190	105	78	57	59	45
2	71	77	72	66	215	118	197	103	76	55	61	46
3	72	86	74	151	301	113	181	100	75	55	52	45
4	75	85	74	177	240	127	173	101	72	55	52	46
5	76	81	77	118	203	124	167	101	70	52	50	427
6	73	78	74	98	179	115	159	98	69	51	50	916
7	76	76	74	90	167	116	153	96	66	54	49	883
8	114	77	89	88	157	112	149	141	62	61	49	470
9	88	77	117	120	144	111	149	145	61	53	50	372
10	77	77	86	178	133	116	148	126	66	57	49	372
11	72	83	80	144	124	117	144	114	63	61	48	204
12	71	79	75	120	118	113	146	108	62	61	48	156
13	72	79	95	115	115	110	139	106	64	68	47	129
14	71	79	89	119	109	117	133	155	64	59	62	113
15	69	79	87	161	104	171	132	153	62	58	51	110
16	70	78	80	194	101	194	142	140	60	54	49	297
17	71	78	76	166	100	308	136	128	67	53	46	353
18	72	79	74	159	158	514	127	119	69	52	46	243
19	72	78	72	179	196	425	123	114	65	53	45	194
20	73	80	72	167	185	346	122	105	69	50	61	170
21	72	81	71	152	171	341	123	98	68	68	61	172
22	73	79	72	141	157	402	120	97	66	57	53	167
23	73	77	70	141	145	361	120	121	65	70	49	144
24	74	76	73	487	138	327	123	122	62	58	49	129
25	74	77	72	535	132	299	116	107	61	64	54	116
26	75	82	71	339	128	267	109	99	62	59	55	106
27	74	77	69	250	122	243	108	92	60	55	53	104
28	76	76	70	207	122	225	110	88	61	57	51	181
29	77	74	70	181	---	210	113	85	57	72	50	313
30	74	75	69	160	---	195	109	82	56	57	48	2390
31	76	---	68	145	---	183	---	80	---	55	47	---
TOTAL	2325	2356	2386	5416	4299	6646	4161	3429	1958	1791	1594	9413
MEAN	75.0	78.5	77.0	175	154	214	139	111	65.3	57.8	51.4	314
MAX	114	86	117	535	301	514	197	155	78	72	62	2390
MIN	69	74	68	66	100	110	108	80	56	50	45	45
CFSM	.35	.37	.36	.82	.72	1.01	.65	.52	.31	.27	.24	1.48
IN.	.41	.41	.42	.95	.75	1.17	.73	.60	.34	.31	.28	1.65

01627500 SOUTH RIVER AT HARRISTON, VA--Continued

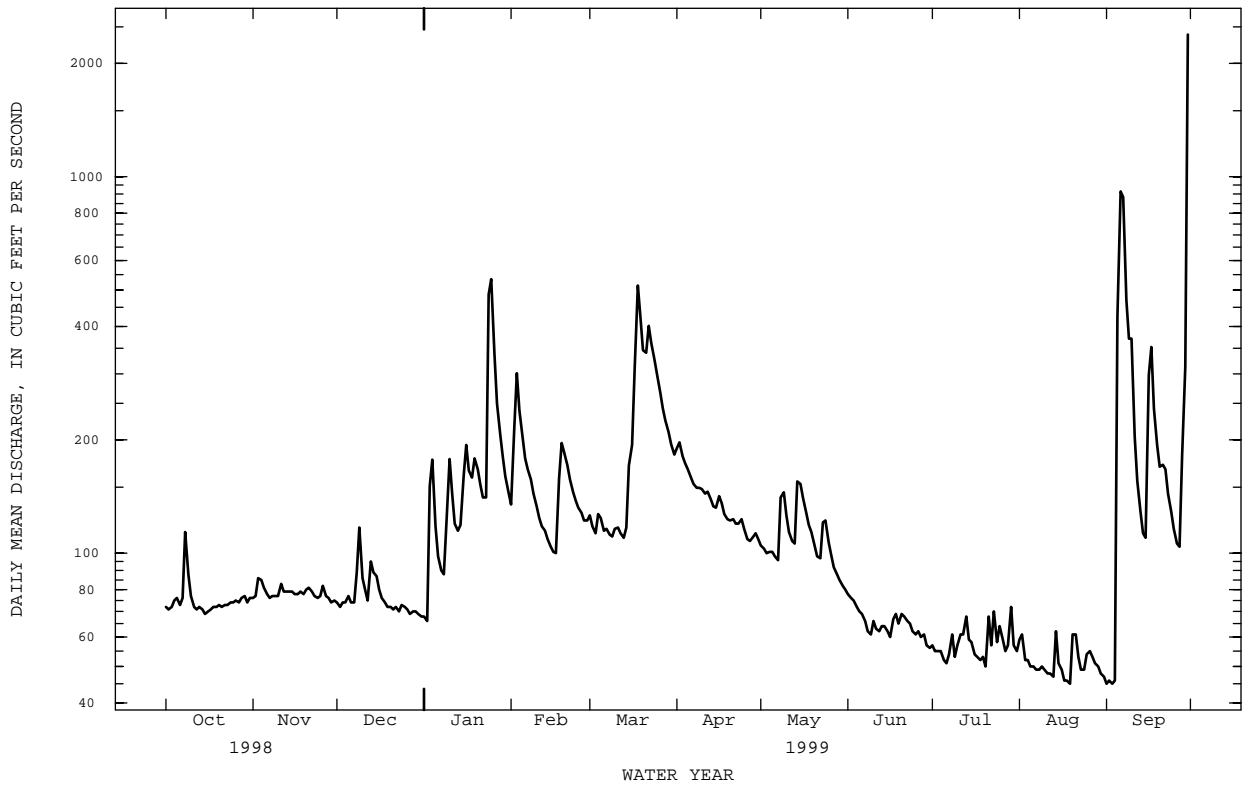
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1925 - 1951, 1969 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	224	234	254	320	360	409	395	286	208	133	150	182
MAX	1048	1988	802	1252	2160	1407	1414	819	1454	520	925	1047
(WY)	1943	1986	1949	1996	1998	1936	1987	1989	1972	1972	1940	1996
MIN	46.5	54.0	53.8	64.9	57.0	102	93.1	83.2	65.3	47.3	42.1	41.0
(WY)	1931	1931	1932	1981	1931	1981	1981	1930	1999	1930	1930	1930

SUMMARY STATISTICS FOR 1998 CALENDAR YEAR FOR 1999 WATER YEAR WATER YEARS 1926 - 1951 1969 - 1999

ANNUAL TOTAL	181181	45774		
ANNUAL MEAN	496	125	264	
HIGHEST ANNUAL MEAN			516	1998
LOWEST ANNUAL MEAN			97.5	1981
HIGHEST DAILY MEAN	e6200	Feb 18	2390	Sep 30
LOWEST DAILY MEAN	68	Dec 31	45	aAug 19
ANNUAL SEVEN-DAY MINIMUM	70	Dec 25	47	Aug 29
INSTANTANEOUS PEAK FLOW			3470	Sep 30
INSTANTANEOUS PEAK STAGE			7.33	Sep 30
INSTANTANEOUS LOW FLOW			41	Aug 19
ANNUAL RUNOFF (CFSM)	2.34	.59	1.24	
ANNUAL RUNOFF (INCHES)	31.79	8.03	16.90	
10 PERCENT EXCEEDS	1210	195	492	
50 PERCENT EXCEEDS	169	85	157	
90 PERCENT EXCEEDS	74	54	69	

- a Also Sep 1, 3, 1999.
- b Probably result of regulation by mill then in existence upstream from station.
- c Peak discharge, 23,100 ft<sup>3</sup>/s.
- e Estimated.



POTOMAC RIVER BASIN

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 north- east of Lynnwood and 3.3 mi downstream from confluence of North and South Rivers.

DRAINAGE AREA.--1,084 mi<sup>2</sup>.

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 sea level.

REMARKS.--Records good except for period with ice effect, Jan. 6, which is fair. Diurnal fluctuation at low flow prior to 1960 caused by mill at Lynnwood and since by irrigation. National Weather Service rain gage and gage-height telemeters and Virginia Department of Emergency Services gage-height radio transmitter at station. Maximum discharge, 107,000 ft<sup>3</sup>/s, from rating curve extended above 22,000 ft<sup>3</sup>/s on basis of computations of flow over dam at gage heights 23.60 ft and 27.2 ft. Minimum gage height, 1.63 ft, Sep. 20, 1932. 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 Department of Environmental Quality - Water Division.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage since at least 1870, that of Sep. 7, 1996.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 7,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Sep 30	1130	*6.040	*8.21	No peak greater than base discharge.			

Minimum discharge, 121 ft<sup>3</sup>/s, Jul 7.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	279	263	241	212	553	502	763	380	354	159	247	139
2	272	262	236	213	617	472	798	373	350	155	222	138
3	270	280	230	318	764	456	718	368	343	147	199	136
4	283	299	231	542	712	480	675	368	324	140	182	136
5	289	281	234	408	659	475	661	363	313	137	171	516
6	290	270	235	e330	612	460	615	362	301	131	164	2100
7	289	263	230	315	581	463	588	360	297	147	152	2990
8	347	265	248	298	579	460	563	543	290	184	147	1970
9	414	262	381	329	549	485	549	911	271	158	157	1270
10	333	262	332	904	518	535	536	815	259	140	155	1170
11	306	263	277	552	490	539	523	689	248	145	149	737
12	296	269	250	427	477	522	529	612	242	159	137	568
13	291	266	269	537	463	507	503	570	241	204	132	476
14	286	265	324	511	444	530	477	720	249	205	204	419
15	282	261	292	571	434	750	469	1060	244	183	207	398
16	283	255	270	757	425	905	488	940	225	163	163	589
17	280	254	252	620	419	1490	467	873	236	152	159	822
18	274	247	243	542	598	2790	443	789	273	145	148	593
19	273	244	235	578	801	2810	428	718	246	151	135	490
20	272	248	234	542	774	2190	424	648	229	158	193	454
21	265	253	229	495	706	1930	421	574	257	162	279	634
22	265	248	230	457	647	2420	424	550	248	188	226	683
23	264	243	225	449	599	1980	423	594	227	224	177	544
24	264	245	233	1210	571	1710	444	605	211	198	177	464
25	265	236	234	2030	548	1470	414	570	194	264	183	417
26	264	238	230	1520	525	1260	394	500	184	224	211	391
27	264	247	218	1100	498	1110	391	452	181	197	200	370
28	262	236	233	895	494	1010	386	427	179	189	190	470
29	261	239	233	768	---	914	391	404	175	271	168	659
30	259	239	229	670	---	848	394	384	155	258	154	4040
31	263	---	226	597	---	771	---	372	---	210	144	---
TOTAL	8805	7703	7764	19697	16057	33244	15299	17894	7546	5548	5532	24783
MEAN	284	257	250	635	573	1072	510	577	252	179	178	826
MAX	414	299	381	2030	801	2810	798	1060	354	271	279	4040
MIN	259	236	218	212	419	456	386	360	155	131	132	136
CFSM	.26	.24	.23	.59	.53	.99	.47	.53	.23	.17	.16	.76
IN.	.30	.26	.27	.68	.55	1.14	.53	.61	.26	.19	.19	.85

01628500 SOUTH FORK SHENANDOAH RIVER NEAR LYNNWOOD, VA--Continued

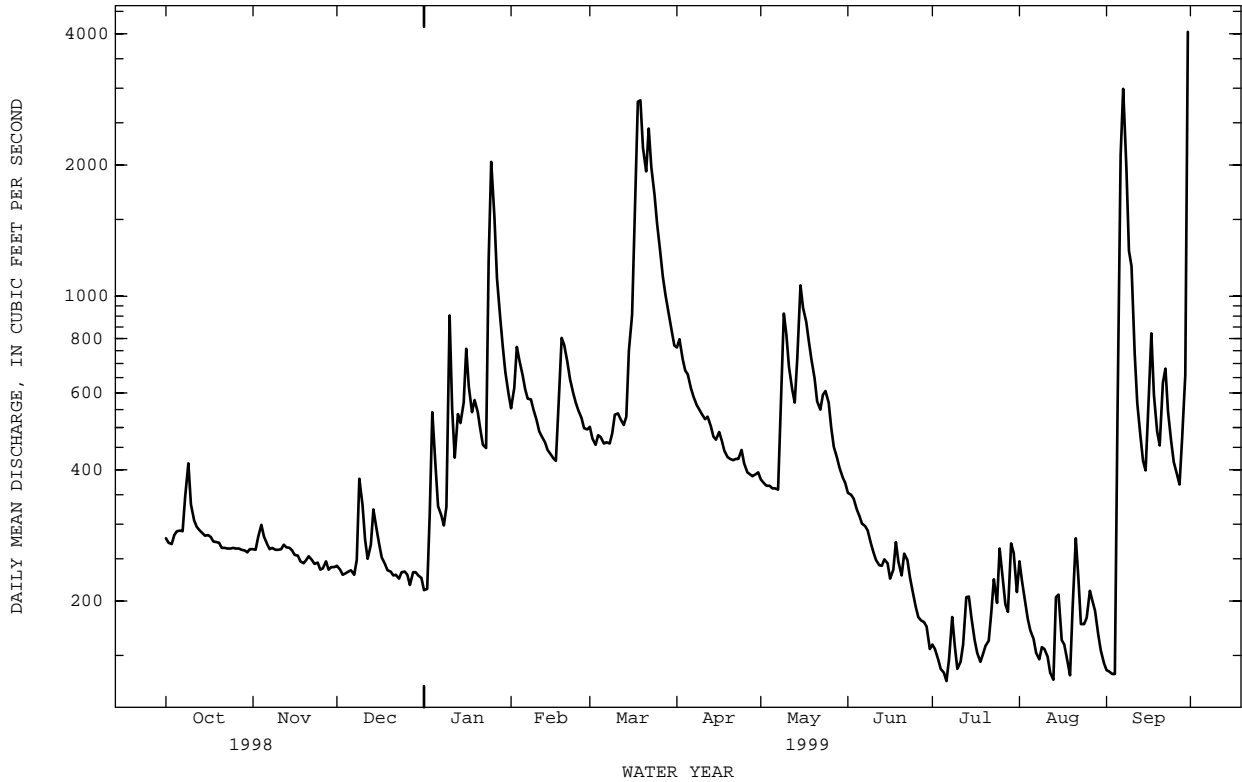
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1931 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	726	779	952	1266	1464	1891	1572	1205	864	547	616	624
MAX	4172	6886	3302	4904	6939	5785	5454	3086	3656	2013	2895	5822
(WY)	1943	1986	1949	1996	1998	1936	1987	1989	1972	1949	1940	1996
MIN	122	150	156	154	203	360	317	362	245	162	166	173
(WY)	1931	1931	1966	1966	1931	1981	1981	1977	1956	1966	1932	1964

SUMMARY STATISTICS FOR 1998 CALENDAR YEAR FOR 1999 WATER YEAR WATER YEARS 1931 - 1999

ANNUAL TOTAL	673366	169872	
ANNUAL MEAN	1845	465	1040
HIGHEST ANNUAL MEAN			2020
LOWEST ANNUAL MEAN			397
HIGHEST DAILY MEAN	21100	Feb 18	4040 Sep 30
LOWEST DAILY MEAN	218	Dec 27	100 Oct 13 1930
ANNUAL SEVEN-DAY MINIMUM	228	Dec 21	145 Aug 29
INSTANTANEOUS PEAK FLOW			6040 Sep 30
INSTANTANEOUS PEAK STAGE			8.21 Sep 30
INSTANTANEOUS LOW FLOW			121 Jul 7
ANNUAL RUNOFF (CFSM)	1.70	.43	.96
ANNUAL RUNOFF (INCHES)	23.11	5.83	13.03
10 PERCENT EXCEEDS	4790	780	2130
50 PERCENT EXCEEDS	675	318	600
90 PERCENT EXCEEDS	253	166	238

- a From high-water mark in gage house.
- b Result of regulation.
- 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 mi<sup>2</sup>.

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 sea level. April 1925 to September 1930, nonrecording gage at same site and datum.

REMARKS.--Records good except for period with ice effect, Jan. 6, which is fair. Diurnal fluctuation at low and medium flow caused by powerplant 10 mi upstream from station. Virginia Department of Emergency Services and National Weather Service gage-height transmitters at station. Maximum discharge, 112,000 ft<sup>3</sup>/s, from rating curve extended above 86,300 ft<sup>3</sup>/s. Minimum gage height, 1.88 ft, Sep. 2, 1999. 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 Department of Environmental Quality - Water Division.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Mar. 18, 1936, reached a stage of 23.6 ft, from floodmarks, discharge, 81,600 ft<sup>3</sup>/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 8,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Sep 30	2000	*9,760	*8.26	No other peak greater than base discharge.			

Minimum discharge, 155 ft<sup>3</sup>/s, Sep 2.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	359	341	350	315	693	600	979	515	460	251	258	283
2	350	355	355	301	685	587	1040	496	437	246	249	291
3	340	367	335	416	806	559	1010	489	416	256	277	253
4	346	377	319	612	882	652	934	487	405	257	243	274
5	354	384	313	678	790	665	902	486	392	233	227	530
6	360	373	324	e430	743	646	861	482	387	227	219	2560
7	364	346	332	418	697	626	809	474	376	205	205	4790
8	404	353	349	427	679	606	770	520	372	212	204	3530
9	453	358	412	409	657	616	746	726	368	234	209	2380
10	505	352	511	491	613	629	748	985	358	235	207	1940
11	430	359	447	1040	582	659	734	840	352	209	207	1420
12	401	367	374	588	553	664	724	736	344	216	204	957
13	383	358	375	522	542	647	711	655	308	228	205	748
14	374	348	389	632	520	658	674	701	304	241	212	653
15	368	360	435	633	500	810	647	957	296	268	225	631
16	357	361	396	759	501	1110	642	1060	298	246	293	1260
17	356	349	372	856	485	1660	645	985	302	228	247	1440
18	365	351	350	732	601	3500	627	904	301	216	231	1240
19	365	341	335	683	967	4270	604	807	312	212	233	909
20	354	345	332	691	1010	3360	590	753	312	205	256	818
21	350	338	333	647	941	2800	584	666	306	226	255	1650
22	345	351	331	596	856	3720	581	644	314	257	343	1590
23	342	358	321	577	756	3160	582	665	316	240	368	1310
24	335	349	320	1650	698	2610	601	679	302	251	296	951
25	345	347	326	3130	673	2200	598	662	285	262	298	757
26	352	340	327	2480	635	1820	566	611	275	270	320	679
27	347	350	322	1700	610	1570	539	569	265	276	369	634
28	352	347	315	1280	596	1400	528	517	266	250	361	623
29	346	350	322	1030	---	1280	519	500	261	251	348	893
30	343	362	328	878	---	1140	516	479	260	265	311	7030
31	332	---	319	769	---	1050	---	465	---	300	283	---
TOTAL	11377	10637	10969	26370	19271	46274	21011	20515	9950	7473	8163	43024
MEAN	367	355	354	851	688	1493	700	662	332	241	263	1434
MAX	505	384	511	3130	1010	4270	1040	1060	460	300	369	7030
MIN	332	338	313	301	485	559	516	465	260	205	204	253
CFSM	.27	.26	.26	.62	.50	1.08	.51	.48	.24	.18	.19	1.04
IN.	.31	.29	.30	.71	.52	1.25	.57	.55	.27	.20	.22	1.16

01629500 SOUTH FORK SHENANDOAH RIVER NEAR LURAY, VA--Continued

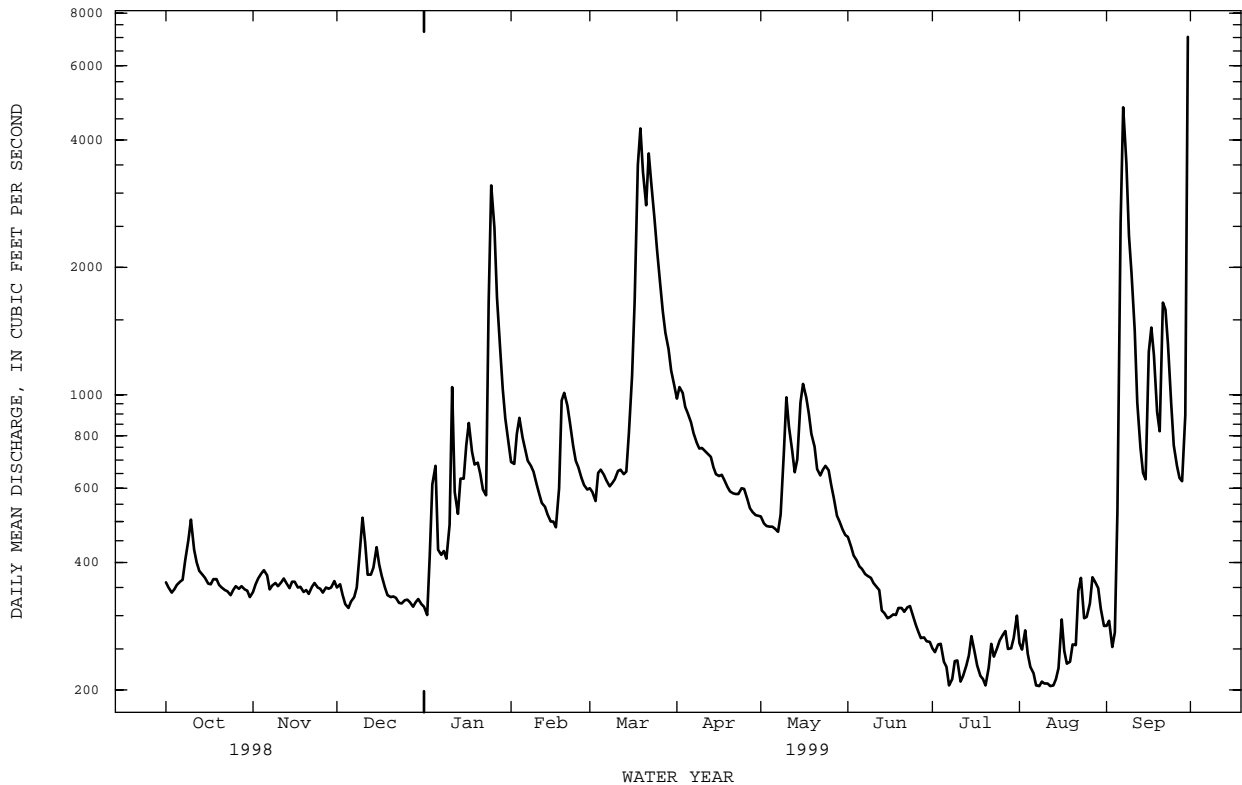
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1926 - 1930, 1939 - 1951, 1980 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	1029	1144	1329	1647	2056	2292	2158	1674	1222	757	859	1018
MAX	6332	8783	3821	6490	9892	7143	7412	4449	3418	2460	3637	8043
(WY)	1943	1986	1949	1996	1998	1993	1987	1989	1949	1949	1940	1996
MIN	271	254	351	260	574	548	452	499	332	241	258	257
(WY)	1942	1942	1944	1981	1944	1981	1981	1930	1999	1999	1930	1930

SUMMARY STATISTICS FOR 1998 CALENDAR YEAR FOR 1999 WATER YEAR WATER YEARS 1926 - 1930  
1939 - 1951  
1980 - 1999

ANNUAL TOTAL	917941	235034										
ANNUAL MEAN	2515	644							1420			
HIGHEST ANNUAL MEAN									2707			1996
LOWEST ANNUAL MEAN									580			1981
HIGHEST DAILY MEAN	31600	Feb 18				7030	Sep 30		84400		Sep 7	1996
LOWEST DAILY MEAN	313	Dec 5				204	aAug 8		b135		cSep 28	1930
ANNUAL SEVEN-DAY MINIMUM	322	Dec 23				206	Aug 7		195		Sep 24	1930
INSTANTANEOUS PEAK FLOW						9760	Sep 30		112000		Sep 7	1996
INSTANTANEOUS PEAK STAGE						8.26	Sep 30		26.95		Sep 7	1996
INSTANTANEOUS LOW FLOW						b155	Sep 2		b70		Sep 27	1941
ANNUAL RUNOFF (CFSM)		1.83				.47			1.03			
ANNUAL RUNOFF (INCHES)		24.80				6.35			14.01			
10 PERCENT EXCEEDS		6940				1040			2820			
50 PERCENT EXCEEDS		831				416			850			
90 PERCENT EXCEEDS		348				251			360			

- a Also Aug 12, 1999.
- b Result of regulation.
- c Also Sep 16, 1925; data were collected for only part of the 1925 water year.
- e Estimated.





## POTOMAC RIVER BASIN

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 mi<sup>2</sup>.

## WATER-DISCHARGE RECORDS

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 sea level. Jun. 1899 to Jul. 1906, nonrecording gage at site 1.0 mi upstream at different datum.

REMARKS.--Records good. 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. Maximum discharge, 130,000 ft<sup>3</sup>/s, from rating curve extended above 92,000 ft<sup>3</sup>/s on basis of slope-area measurement of peak flow. Minimum gage height, 0.56 ft, Jan. 30, 1934. Water-quality records for some prior periods have been collected at this location.

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

EXTREMES FOR CURRENT YEAR.-- Maximum discharge, 6,950 ft<sup>3</sup>/s, Sep 30, gage height, 5.72 ft, peak occurred Oct 1, 1999; peak discharges greater than base discharge of 8,500 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Mar 19	1300	*4,900	*4.58	No peak greater than base discharge.			

Minimum discharge, 197 ft<sup>3</sup>/s, Aug 12, gage height, 0.91 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	470	482	408	352	1010	802	1270	595	483	340	364	336
2	448	493	386	363	973	792	1230	608	468	348	342	289
3	423	525	384	363	940	823	1270	599	451	370	311	252
4	405	506	390	567	1050	1030	1220	608	432	366	304	286
5	410	510	382	1260	1100	1030	1140	605	414	358	302	409
6	442	515	374	e1400	1010	1030	1090	597	386	356	267	915
7	435	517	389	933	966	991	1030	596	392	328	257	2670
8	498	457	433	487	923	939	977	629	395	320	232	3500
9	531	464	501	744	903	944	949	660	371	304	228	2410
10	586	489	519	801	857	967	971	824	363	314	220	1880
11	692	507	601	759	815	923	967	1080	353	335	221	1570
12	562	463	604	1690	785	956	943	875	348	330	212	1220
13	488	499	475	1060	752	986	902	792	348	328	216	973
14	420	469	479	803	723	1000	870	700	334	339	252	842
15	392	453	471	933	710	1080	838	756	353	344	233	795
16	377	460	515	979	692	1310	803	1030	333	384	215	1170
17	371	470	495	1000	696	1870	772	1090	365	389	250	1690
18	354	434	456	1160	755	3080	769	1020	370	364	296	1480
19	374	418	413	1080	888	4660	738	909	353	355	242	1240
20	390	427	392	920	1250	4250	718	813	358	349	256	1020
21	381	414	391	1000	1230	3460	695	769	389	352	297	1160
22	392	375	392	1180	1150	3920	704	701	370	412	271	2010
23	394	392	385	959	1050	4160	694	736	369	414	289	1640
24	411	423	379	1760	966	3340	686	715	378	373	387	1350
25	412	395	367	3370	903	2860	689	706	367	353	372	1090
26	458	395	353	3470	872	2460	681	679	363	380	327	926
27	517	368	365	2620	817	2090	656	634	349	352	322	851
28	530	397	365	1960	819	1890	623	579	353	390	361	846
29	551	368	374	1570	---	1700	609	538	358	385	381	834
30	535	398	358	1250	---	1550	597	522	342	363	343	3670
31	518	---	364	1120	---	1360	---	501	---	322	323	---
TOTAL	14167	13483	13160	37913	25605	58253	26101	22466	11308	11017	8893	39324
MEAN	457	449	425	1223	914	1879	870	725	377	355	287	1311
MAX	692	525	604	3470	1250	4660	1270	1090	483	414	387	3670
MIN	354	368	353	352	692	792	597	501	333	304	212	252
CFSM	.28	.27	.26	.74	.56	1.14	.53	.44	.23	.22	.17	.80
IN.	.32	.31	.30	.86	.58	1.32	.59	.51	.26	.25	.20	.89

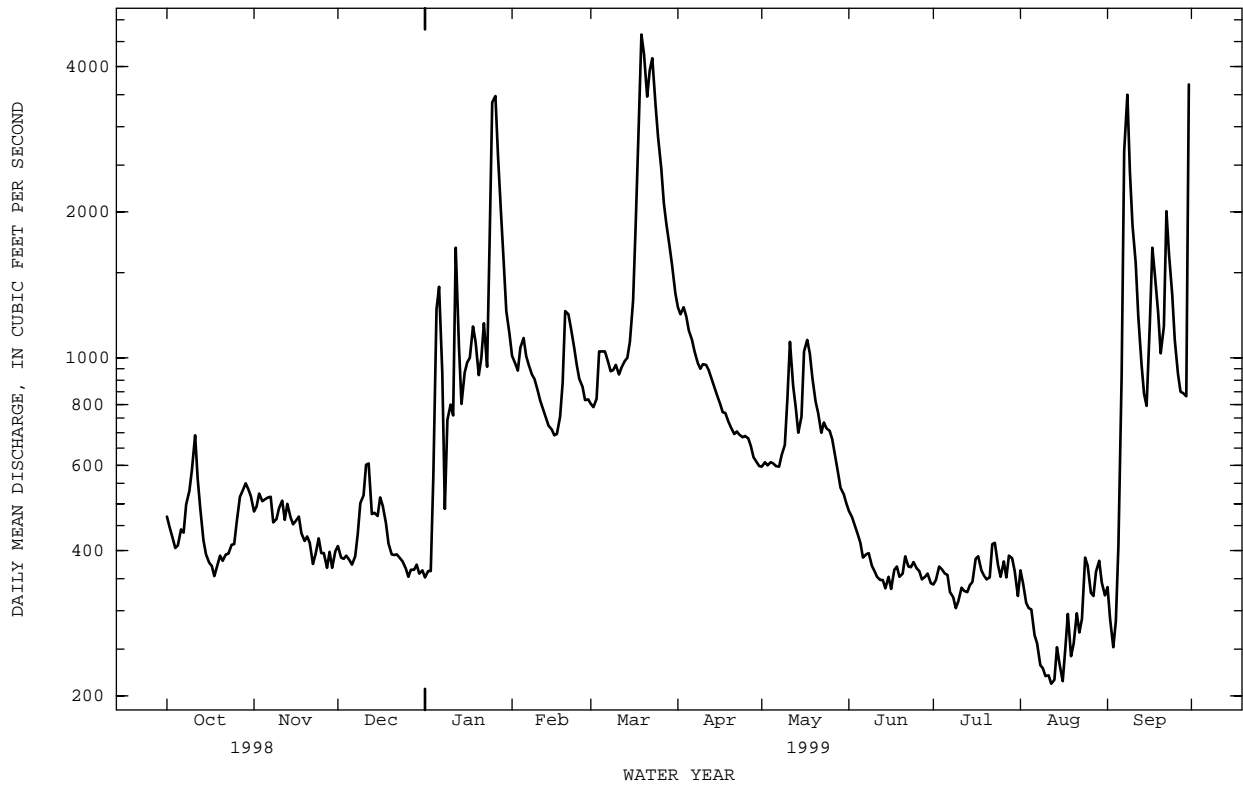
01631000 SOUTH FORK SHENANDOAH RIVER AT FRONT ROYAL, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1931 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	1155	1225	1480	1942	2240	2882	2453	1851	1333	801	940	962
MAX	8678	10130	4795	7876	10600	10300	7963	4807	6586	2876	6807	9631
(WY)	1943	1986	1973	1996	1998	1936	1987	1989	1972	1949	1955	1996
MIN	225	242	268	285	348	632	516	578	377	252	281	314
(WY)	1931	1931	1966	1966	1931	1981	1981	1977	1999	1966	1932	1965

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR	WATER YEARS 1931 - 1999
ANNUAL TOTAL	996822	281690	
ANNUAL MEAN	2731	772	1602
HIGHEST ANNUAL MEAN			3189
LOWEST ANNUAL MEAN			680
HIGHEST DAILY MEAN	32500	Jan 9	114000
LOWEST DAILY MEAN	353	Dec 26	107
ANNUAL SEVEN-DAY MINIMUM	364	Dec 25	152
INSTANTANEOUS PEAK FLOW			6950
INSTANTANEOUS PEAK STAGE			5.72
INSTANTANEOUS LOW FLOW			197
ANNUAL RUNOFF (CFSM)	1.66	.47	.98
ANNUAL RUNOFF (INCHES)	22.58	6.38	13.25
10 PERCENT EXCEEDS	7040	1270	3210
50 PERCENT EXCEEDS	967	518	950
90 PERCENT EXCEEDS	407	335	388

a From floodmarks.  
e Estimated.



## POTOMAC RIVER BASIN

01631000 SOUTH FORK SHENANDOAH RIVER AT FRONT ROYAL, VA--Continued

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--July 1996 to current year.

## WATER-QUALITY DATA, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DATE	TIME	SAMPLE TYPE	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	TEMPER- ATURE AIR (DEG C) (00020)	TEMPER- ATURE WATER (DEG C) (00010)	OXYGEN, DIS- SOLVED (MG/L) (00300)
OCT									
15...	1045	ENVIRONMENTAL	396	369	8.2	751	10.4	15.4	11.4
NOV									
16...	1315	ENVIRONMENTAL	475	375	8.8	744	14.1	9.4	11.8
DEC									
16...	1030	ENVIRONMENTAL	598	358	9.0	746	5.0	5.2	14.0
JAN									
05...	1330	ENVIRONMENTAL	865	395	8.8	756	-.5	.1	16.0
13...	1115	ENVIRONMENTAL	978	344	7.5	748	8.2	.2	17.5
25...	1330	ENVIRONMENTAL	3600	289	7.6	748	6.9	7.4	10.4
26...	1200	ENVIRONMENTAL	3540	299	7.6	755	8.3	7.8	11.1
FEB									
17...	1045	ENVIRONMENTAL	706	320	8.2	738	11.0	6.9	13.0
MAR									
01...	1015	ENVIRONMENTAL	820	301	8.6	727	7.0	5.7	13.8
04...	1630	ENVIRONMENTAL	997	258	8.6	743	3.0	7.9	13.7
12...	1000	ENVIRONMENTAL	1050	277	8.5	741	4.0	4.6	14.5
16...	1300	ENVIRONMENTAL	1280	268	8.4	745	6.9	6.4	15.3
16...	1305	REPLICATE	598	268	8.4	745	6.9	6.4	15.3
17...	1145	ENVIRONMENTAL	1810	260	8.8	743	18.0	7.1	14.4
19...	0930	ENVIRONMENTAL	4660	246	7.7	750	6.6	8.9	10.3
21...	1115	ENVIRONMENTAL	3420	214	6.2	729	12.0	9.5	9.4
APR									
26...	1030	ENVIRONMENTAL	723	300	8.0	748	19.0	16.5	13.4
MAY									
20...	1630	ENVIRONMENTAL	802	258	9.2	749	25.0	23.4	16.0
20...	1645	REPLICATE	186	258	9.2	749	25.0	23.4	16.0
JUN									
25...	1215	ENVIRONMENTAL	410	349	8.4	745	28.0	25.7	11.4
JUL									
15...	1530	ENVIRONMENTAL	348	365	8.8	749	28.1	29.3	11.7
AUG									
12...	1200	ENVIRONMENTAL	242	360	8.4	745	26.5	26.4	8.2
SEP									
07...	1130	ENVIRONMENTAL	2770	328	6.8	737	24.0	22.5	6.9
09...	1100	ENVIRONMENTAL	2410	222	7.7	740	28.0	23.0	7.3
10...	1230	ENVIRONMENTAL	1820	206	7.8	758	21.4	23.6	7.5
13...	1200	ENVIRONMENTAL	949	211	6.6	745	23.0	22.5	8.1
30...	1045	ENVIRONMENTAL	2010	189	7.7	740	16.0	17.9	9.0

POTOMAC RIVER BASIN

01631000 SOUTH FORK SHENANDOAH RIVER AT FRONT ROYAL, VA--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

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 WAT DIS TOT IT FIELD (MG/L AS CACO3 (39086)	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)
OCT										
15...	41	16	14	3.8	138	11	18	.2	1.2	202
NOV										
16...	--	--	--	--	--	--	--	--	--	--
DEC										
16...	--	--	--	--	--	--	--	--	--	--
JAN										
05...	--	--	--	--	--	--	--	--	--	--
13...	38	13	12	3.8	132	12	15	.1	2.7	195
25...	--	--	--	--	--	--	--	--	--	--
26...	--	--	--	--	--	--	--	--	--	--
FEB										
17...	--	--	--	--	--	--	--	--	--	--
MAR										
01...	--	--	--	--	--	--	--	--	--	--
04...	--	--	--	--	--	--	--	--	--	--
12...	--	--	--	--	--	--	--	--	--	--
16...	--	--	--	--	--	--	--	--	--	--
16...	--	--	--	--	--	--	--	--	.4	--
17...	--	--	--	--	--	--	--	--	--	--
19...	--	--	--	--	--	--	--	--	--	--
21...	--	--	--	--	--	--	--	--	--	--
APR										
26...	33	11	10	2.4	--	11	14	<.1	.84	168
MAY										
20...	--	--	--	--	--	--	--	--	--	--
20...	--	--	--	--	--	--	--	--	6.2	--
JUN										
25...	--	--	--	--	--	--	--	--	--	--
JUL										
15...	33	15	19	3.7	--	12	23	.1	18	224
AUG										
12...	--	--	--	--	--	--	--	--	--	--
SEP										
07...	--	--	--	--	--	--	--	--	--	--
09...	--	--	--	--	--	--	--	--	--	--
10...	--	--	--	--	--	--	--	--	--	--
13...	--	--	--	--	--	--	--	--	--	--
30...	--	--	--	--	--	--	--	--	--	--

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

## POTOMAC RIVER BASIN

01631000 SOUTH FORK SHENANDOAH RIVER AT FRONT ROYAL, VA--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DATE	RESIDUE TOTAL AT 105 DEG. C, SUS- PENDEDED (MG/L) (00530)	RESIDUE FIXED NON FILTER- ABLE (MG/L) (00540)	RESIDUE VOLA- TILE, SUS- PENDEDED (MG/L) (00535)	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,AM- MONIA + ORGANIC TOTAL (MG/L) AS N) (00625)	NITRO- GEN,AM- MONIA + ORGANIC DIS. (MG/L) AS N) (00623)	NITROGN TOTAL SEDIMNT SUSP TOTAL AS N (MG/L) (00601)
OCT										
15...	--	--	--	--	<.01	1.0	.03	.3	.2	--
NOV										
16...	--	--	--	--	<.01	.66	.02	.2	.2	--
DEC										
16...	--	--	--	.833	.01	.85	.02	.2	.2	--
JAN										
05...	--	--	--	--	<.01	1.5	<.02	.2	.2	--
13...	--	--	--	1.72	.01	1.7	<.02	.4	.3	--
25...	--	--	--	1.78	.02	1.8	.10	.3	.4	--
26...	--	--	--	1.87	.02	1.9	.06	.5	.3	--
FEB										
17...	--	--	--	.992	.01	1.0	<.02	.3	.2	--
MAR										
01...	--	--	--	1.05	.02	1.1	<.02	.2	.2	--
04...	--	--	--	.906	.01	.92	<.02	.3	.2	--
12...	--	--	--	--	<.01	1.0	<.02	.2	.2	--
16...	--	--	--	.974	.01	.99	<.02	.3	.2	--
16...	--	--	--	1.01	.01	1.02	.00	--	--	.017
17...	--	--	--	1.05	.01	1.1	<.02	.3	.2	--
19...	--	--	--	1.31	.02	1.3	<.02	.8	.2	--
21...	--	--	--	1.13	.03	1.2	.10	.5	.4	--
APR										
26...	--	--	--	.502	.01	.51	.02	.4	.3	--
MAY										
20...	--	--	--	.668	.01	.68	.03	.4	.3	--
20...	3	<3	<3	.534	.01	.55	.00	--	--	.027
JUN										
25...	--	--	--	.682	.04	.72	.06	.4	.5	--
JUL										
15...	--	--	--	.229	.01	.24	.04	.6	.5	--
AUG										
12...	--	--	--	.159	.02	.17	.02	.4	.4	--
SEP										
07...	--	--	--	.831	.02	.85	.17	1.2	.5	--
09...	--	--	--	1.10	.03	1.1	.12	1.1	.4	--
10...	--	--	--	1.27	.04	1.3	.09	1.1	.5	--
13...	--	--	--	1.11	.02	1.1	.03	.6	.3	--
30...	--	--	--	--	<.01	.85	<.02	.9	.2	--

&lt; Actual value is known to be less than the value shown.

POTOMAC RIVER BASIN

01631000 SOUTH FORK SHENANDOAH RIVER AT FRONT ROYAL, VA--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DATE	NITRO- GEN DIS- SOLVED (MG/L AS N) (00602)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS TOTAL SEDIMNT SUSP TOTAL (MG/L AS P) (00667)	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	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, INORG + ORGANIC SUSP. TOTAL (MG/L AS C) (00694)	SEDI- MENT, SUS- PENDE (MG/L) (80154)
OCT									
15...	1.2	.10	--	.09	.09	E6	<3	--	1
NOV									
16...	.86	.15	--	.15	.14	--	--	--	1
DEC									
16...	1.0	.09	--	.11	.09	--	--	--	5
JAN									
05...	1.6	.24	--	.22	.20	--	--	--	6
13...	2.0	.21	--	.20	.15	25	E3	--	8
25...	2.2	.13	--	.18	.14	--	--	--	35
26...	2.2	.21	--	.18	.16	--	--	--	23
FEB									
17...	1.2	--	--	.16	.14	--	--	--	2
MAR									
01...	1.2	.11	--	.1	.08	--	--	--	2
04...	1.1	.094	--	.08	.07	--	--	--	7
12...	1.2	.14	--	.12	.10	--	--	--	1
16...	1.2	.13	--	.12	.10	--	--	--	1
16...	.99	--	.008	.12	.10	--	--	.16	--
17...	1.3	.12	--	.11	.09	--	--	--	3
19...	1.5	.24	--	.14	.12	--	--	--	34
21...	1.5	.13	--	.095	.08	--	--	--	12
APR									
26...	.82	.16	--	.15	.13	30	7	--	--
MAY									
20...	1.0	.22	--	.21	.18	--	--	--	38
20...	.96	--	.015	.18	.13	--	--	.31	--
JUN									
25...	1.2	.29	--	.26	.20	--	--	--	46
JUL									
15...	.71	.29	--	.27	.23	38	18	--	5
AUG									
12...	.56	.23	--	.2	.20	--	--	--	5
SEP									
07...	1.3	.42	--	.12	.11	--	--	--	140
09...	1.6	.28	--	.14	.12	--	--	--	100
10...	1.8	.26	--	.13	.11	--	--	--	67
13...	1.4	.17	--	.13	.10	--	--	--	20
30...	1.1	.19	--	.088	.06	--	--	--	55

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

POTOMAC RIVER BASIN

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 mi<sup>2</sup>.

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 mean sea level (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 of no gage-height record, Jan. 8-11, which is fair. National Weather Service gage-height telemeter and Virginia Department of Emergency Services gage-height radio transmitter at station. Maximum discharge, 63,400 ft<sup>3</sup>/s, from rating curve extended above 9,000 ft<sup>3</sup>/s on basis of indirect measurement of peak flow. Minimum gage height, 1.74 ft, Sep. 7-10, 1966. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

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

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 3,500 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Sep 6	1815	*2,430	*6.87	No peak greater than base discharge.			

Minimum discharge, 0.35 ft<sup>3</sup>/s, Aug 7, 11-13, gage height, 1.73 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.6	2.4	3.8	5.4	54	39	89	38	22	2.7	.64	18
2	1.3	2.7	3.8	5.3	52	36	86	35	21	3.0	.54	16
3	1.3	3.7	3.9	10	45	34	77	34	18	2.7	.75	14
4	1.6	3.3	3.9	11	41	36	71	33	17	2.4	.45	14
5	1.8	3.0	4.0	8.6	37	36	66	31	15	2.1	.44	388
6	1.9	2.9	4.0	6.5	35	39	61	30	14	1.7	.42	1710
7	2.2	2.9	4.1	7.9	33	48	56	29	13	1.4	.39	1240
8	3.3	3.0	5.6	e9.0	33	66	52	191	12	1.2	.42	535
9	3.0	3.2	8.0	e14	31	79	52	178	11	1.0	.43	281
10	2.6	3.2	6.3	e18	29	81	53	118	9.8	.95	.42	194
11	2.4	3.4	5.3	e9.0	28	74	53	86	9.6	1.0	.40	124
12	2.3	3.3	4.9	9.5	28	73	52	69	9.4	.99	.37	85
13	2.2	3.2	7.0	16	28	87	49	58	8.5	1.2	.38	64
14	2.2	3.3	7.1	34	26	116	46	83	8.1	1.1	1.0	51
15	2.1	3.2	6.4	52	25	141	46	123	7.5	.92	.60	45
16	2.3	3.2	6.2	55	24	203	46	99	6.5	.81	.52	74
17	2.3	3.3	6.0	47	23	581	43	86	7.0	.72	.48	81
18	2.3	3.2	5.9	65	44	1220	41	73	7.3	.67	.45	80
19	2.1	3.4	5.9	100	72	817	39	64	7.4	.67	16	69
20	2.1	3.4	6.0	72	75	477	37	56	7.5	.60	44	69
21	1.9	3.4	6.0	99	71	380	36	49	7.4	.67	53	154
22	1.9	3.4	5.8	368	65	436	36	46	6.9	.75	18	215
23	2.1	3.5	5.8	255	62	395	36	88	6.3	.68	12	161
24	2.1	3.5	6.1	548	59	327	46	75	5.6	.67	10	112
25	2.4	3.6	5.9	422	53	265	44	59	5.1	.70	61	83
26	2.3	3.8	5.6	259	49	215	43	48	4.7	.59	65	64
27	2.5	3.7	5.5	177	44	188	43	41	4.0	.55	61	52
28	2.3	3.9	5.5	125	42	155	42	35	2.7	.60	39	50
29	2.3	4.0	5.7	94	---	130	41	31	2.5	.69	29	53
30	2.5	3.8	5.6	75	---	110	39	27	2.3	.65	24	490
31	2.5	---	5.5	62	---	93	---	24	---	.61	20	---
TOTAL	67.7	99.8	171.1	3039.2	1208	6977	1521	2037	279.1	34.99	461.10	6586
MEAN	2.18	3.33	5.52	98.0	43.1	225	50.7	65.7	9.30	1.13	14.9	220
MAX	3.3	4.0	8.0	548	75	1220	89	191	22	3.0	65	1710
MIN	1.3	2.4	3.8	5.3	23	34	36	24	2.3	.55	.37	14
CFSM	.01	.02	.03	.47	.21	1.07	.24	.31	.04	.01	.07	1.05
IN.	.01	.02	.03	.54	.21	1.24	.27	.36	.05	.01	.08	1.17

01632000 NORTH FORK SHENANDOAH RIVER AT COOTES STORE, VA--Continued

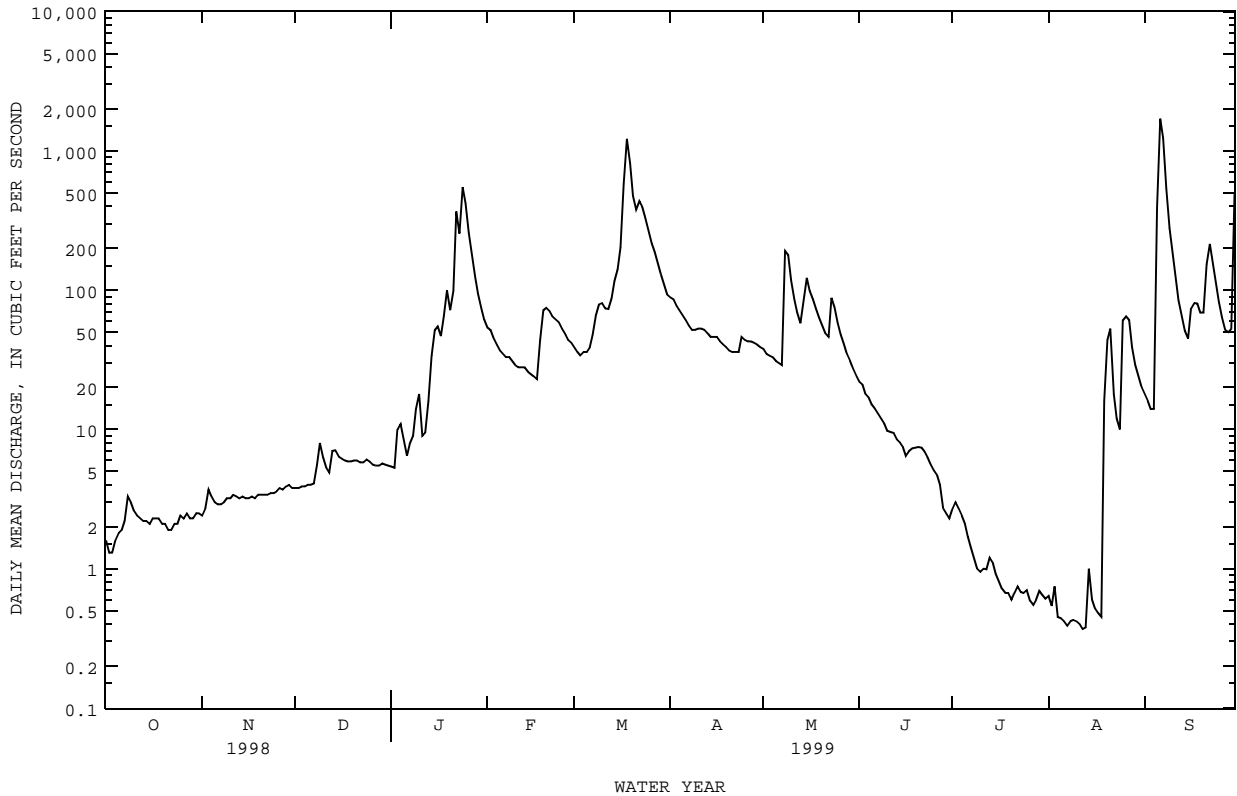
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1925 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	126	145	184	222	290	414	344	272	128	64.0	87.2	88.3
MAX	1401	1883	850	1114	1155	1536	1156	964	906	552	697	1582
(WY)	1943	1986	1974	1996	1998	1936	1987	1942	1972	1949	1955	1996
MIN	.76	3.26	3.04	5.13	11.3	38.4	27.7	24.3	6.10	1.13	.52	.66
(WY)	1931	1931	1966	1966	1934	1981	1981	1977	1977	1999	1930	1930

SUMMARY STATISTICS FOR 1998 CALENDAR YEAR FOR 1999 WATER YEAR WATER YEARS 1925 - 1999

ANNUAL TOTAL	101693.8	22481.99	
ANNUAL MEAN	279	61.6	197
HIGHEST ANNUAL MEAN			463
LOWEST ANNUAL MEAN			58.1
HIGHEST DAILY MEAN	4030	Jan 8	1710
LOWEST DAILY MEAN	1.3	aSep 16	.37
ANNUAL SEVEN-DAY MINIMUM	1.5	Sep 27	.40
INSTANTANEOUS PEAK FLOW			2430
INSTANTANEOUS PEAK STAGE			6.87
INSTANTANEOUS LOW FLOW			.35
ANNUAL RUNOFF (CFSM)	1.33		.29
ANNUAL RUNOFF (INCHES)	18.01		3.98
10 PERCENT EXCEEDS	849		120
50 PERCENT EXCEEDS	24		16
90 PERCENT EXCEEDS	2.1		1.0

- a Also Sep 17, and Oct 2-3, 1998.
- b Also Aug 29, Sep 4, 1957, and Sep 7-10, 1966.
- c From floodmarks.
- d Also Aug 11-13, 1999.
- e Estimated.





POTOMAC RIVER BASIN

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 mi<sup>2</sup>.

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

GAGE.--Water-stage recorder. Datum of gage is 1,029.90 ft above sea level.

REMARKS.--Records good except for period of no gage-height record, Dec. 31 to Jan. 28, which is fair. Maximum discharge, 17,800 ft<sup>3</sup>/s, from rating curve extended above 1,860 ft<sup>3</sup>/s on basis of slope-area measurement at gage height 12.58 ft. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location by the Virginia Department of Environmental Quality - Water Division.

COOPERATION.--Records were provided by the Virginia Department of Environmental Quality - Water Division.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 500 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Sep 30	0215	*712	*3.97	No other peak greater than base discharge.			
Minimum discharge, 1.0 ft <sup>3</sup> /s, Aug. 8, 13.							

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	7.1	6.8	6.0	e6.4	21	15	23	9.4	9.1	4.6	3.3	4.6
2	6.6	7.0	5.8	e6.7	24	14	22	9.3	9.0	3.8	3.7	4.3
3	7.1	8.7	6.0	e9.3	22	14	20	9.3	8.3	3.5	2.6	4.2
4	7.5	8.3	6.0	e11	20	14	19	9.3	8.0	3.4	2.3	4.7
5	7.2	7.2	6.0	e9.1	19	13	18	9.7	7.9	3.0	2.7	92
6	7.4	7.2	6.0	e6.6	18	13	17	9.9	7.6	2.7	2.2	137
7	7.5	7.4	6.2	e6.6	17	12	16	10	7.6	3.1	2.2	78
8	11	7.4	8.7	e7.1	17	11	16	22	7.4	4.3	2.3	39
9	9.4	7.6	12	e20	16	12	16	15	7.1	2.8	2.8	29
10	8.4	7.6	7.9	e25	15	12	15	13	6.8	2.4	2.3	26
11	8.0	8.2	7.0	e18	14	12	16	12	7.3	3.8	1.7	20
12	7.7	7.7	6.7	e29	14	13	15	12	6.8	3.9	2.6	17
13	7.6	7.9	9.9	e40	13	14	13	12	6.7	4.0	2.1	15
14	7.5	7.9	8.9	e31	13	18	13	20	6.6	3.0	4.1	14
15	6.8	7.9	7.3	e26	12	27	13	19	6.6	3.8	3.5	15
16	6.9	7.4	7.5	e27	12	43	13	16	6.1	3.4	3.5	41
17	6.9	7.3	7.5	e24	12	94	12	15	6.9	3.4	2.8	31
18	6.8	7.2	6.9	e28	28	91	11	16	6.4	2.7	2.5	23
19	7.0	7.2	6.4	e35	29	59	11	15	5.9	3.4	3.0	19
20	6.9	7.3	6.4	e32	26	46	11	13	6.5	3.0	5.8	18
21	6.7	7.3	6.5	e30	22	55	11	13	6.7	2.6	5.0	51
22	6.6	6.9	6.4	e37	20	81	11	14	6.4	3.5	4.4	54
23	6.7	6.9	6.1	e31	18	59	11	17	5.9	3.4	4.4	36
24	6.8	6.9	6.7	e81	18	50	12	16	5.4	3.7	4.3	28
25	6.9	6.7	6.2	e56	16	41	11	14	5.2	7.0	7.9	25
26	6.4	7.0	6.2	e40	16	36	11	12	5.1	4.2	11	21
27	6.4	6.2	6.2	e34	15	32	10	11	4.7	3.3	12	20
28	6.4	6.0	6.7	e30	16	30	10	11	4.5	3.4	9.5	37
29	6.5	6.0	6.9	27	---	27	10	10	4.4	5.8	6.8	47
30	6.6	6.0	6.2	24	---	24	9.7	9.9	4.4	4.1	5.3	284
31	6.8	---	e6.2	22	---	23	---	9.3	---	3.1	4.9	---
TOTAL	224.1	217.1	215.4	809.8	503	1005	416.7	404.1	197.3	112.1	133.5	1234.8
MEAN	7.23	7.24	6.95	26.1	18.0	32.4	13.9	13.0	6.58	3.62	4.31	41.2
MAX	11	8.7	12	81	29	94	23	22	9.1	7.0	12	284
MIN	6.4	6.0	5.8	6.4	12	11	9.7	9.3	4.4	2.4	1.7	4.2
CFSM	.16	.16	.15	.57	.39	.71	.31	.29	.14	.08	.09	.90
IN.	.18	.18	.18	.66	.41	.82	.34	.33	.16	.09	.11	1.01

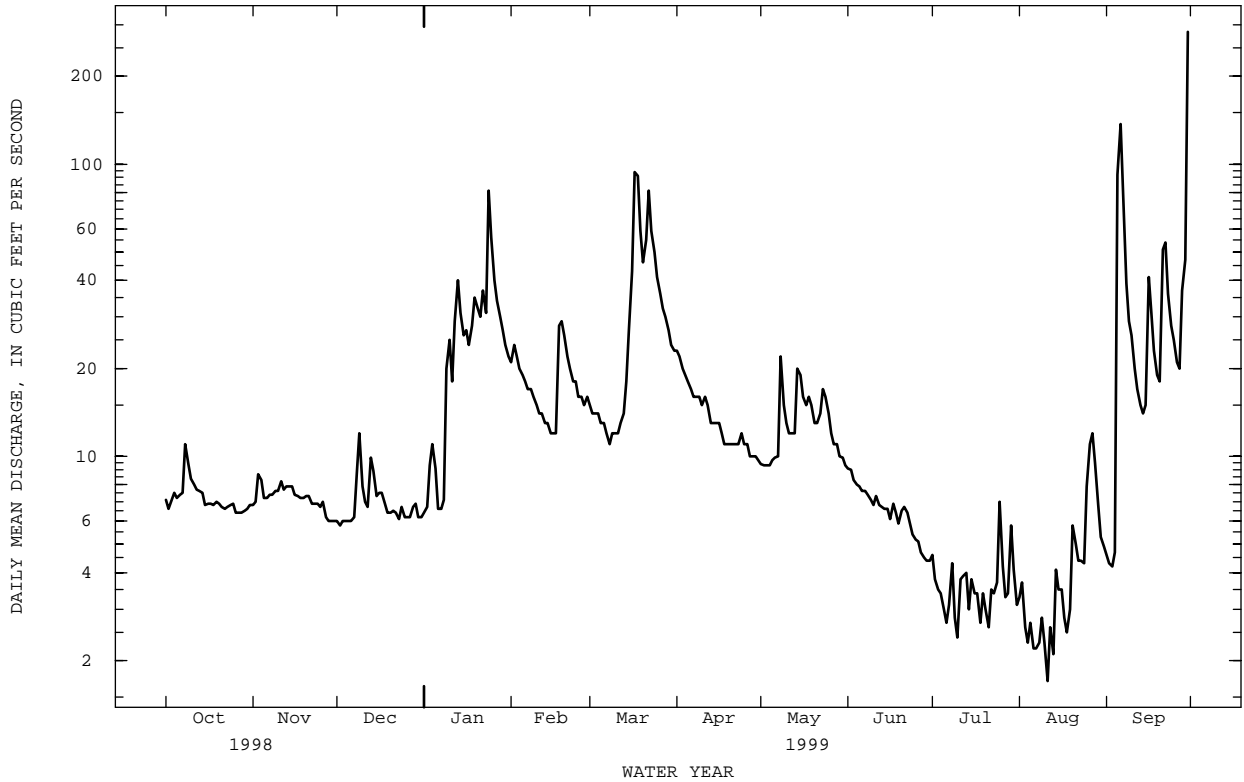
01632082 LINVILLE CREEK AT BROADWAY, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1985 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	23.9	30.7	33.2	63.6	54.1	75.9	50.0	38.3	23.2	18.1	25.6	35.6
MAX	108	144	115	213	195	206	135	91.0	49.6	68.5	138	275
(WY)	1991	1986	1997	1996	1998	1994	1993	1989	1996	1995	1996	1996
MIN	6.66	7.24	6.95	9.75	10.1	17.1	11.5	12.9	6.58	3.62	4.31	5.21
(WY)	1989	1999	1999	1989	1989	1989	1995	1986	1999	1999	1999	1986

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR	WATER YEARS 1985 - 1999
ANNUAL TOTAL	20035.8	5472.9	
ANNUAL MEAN	54.9	15.0	39.5
HIGHEST ANNUAL MEAN			85.5 1996
LOWEST ANNUAL MEAN			15.0 1999
HIGHEST DAILY MEAN	640 Jan 8	284 Sep 30	e4700 Sep 6 1996
LOWEST DAILY MEAN	5.8 Dec 2	1.7 Aug 11	1.7 Aug 11 1999
ANNUAL SEVEN-DAY MINIMUM	6.0 aNov 28	2.3 Aug 7	2.3 Aug 7 1999
INSTANTANEOUS PEAK FLOW		712 Sep 30	17800 Sep 6 1996
INSTANTANEOUS PEAK STAGE		3.97 Sep 30	13.23 Sep 6 1996
INSTANTANEOUS LOW FLOW		1.0 bAug 8	1.0 bAug 8 1999
ANNUAL RUNOFF (CFSM)	1.21	.33	.87
ANNUAL RUNOFF (INCHES)	16.38	4.47	11.78
10 PERCENT EXCEEDS	136	30	78
50 PERCENT EXCEEDS	21	8.7	19
90 PERCENT EXCEEDS	6.8	3.6	7.1

a Also Nov 29, 30, 1998.  
 b Also Aug 13, 1999.  
 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, 3.6 mi north of New Market, and 4.4 mi upstream from mouth.

DRAINAGE AREA.--93.2 mi<sup>2</sup>.

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 sea level. 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, Jan. 1, 2, and 5, 6 which are fair. Maximum discharge, 12,400 ft<sup>3</sup>/s, from rating curve extended above 2,300 ft<sup>3</sup>/s on basis of contracted-opening measurement at gage height 16.38 ft. 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 Department of Environmental Quality - Water Division.

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 greater than base discharge of 650 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Sep 30	0930	*917	*5.91	No other peak greater than base discharge.			

Minimum discharge, 4.0 ft<sup>3</sup>/s, Aug 12, 13.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	14	15	13	e15	33	27	51	23	16	9.9	8.6	11
2	13	15	13	e16	35	23	50	22	16	9.0	8.5	11
3	14	16	13	22	34	26	47	22	16	14	7.5	10
4	16	18	14	25	32	55	45	22	15	9.7	5.9	10
5	16	17	14	e20	30	46	44	20	15	9.4	6.3	40
6	16	16	14	e15	29	39	41	19	14	8.4	6.0	233
7	16	16	14	15	28	36	38	19	14	6.8	6.1	195
8	19	16	15	16	28	31	36	33	14	9.2	6.0	78
9	20	17	23	32	26	30	37	27	12	9.0	7.0	51
10	18	17	19	88	25	35	42	23	12	8.4	5.8	50
11	17	18	16	35	24	33	38	21	12	8.0	6.0	42
12	16	18	15	55	24	34	36	20	13	8.4	4.6	37
13	16	17	17	112	25	39	34	19	12	9.3	5.1	32
14	15	17	19	59	23	42	31	24	12	9.0	8.0	29
15	15	17	17	50	22	59	31	43	11	8.5	7.5	39
16	16	17	15	53	22	84	32	34	11	8.6	7.3	304
17	15	16	15	48	22	153	30	28	12	7.8	6.3	167
18	15	15	15	44	51	229	28	25	14	7.6	5.7	92
19	15	15	15	45	58	150	28	24	13	7.4	6.6	70
20	14	16	14	38	46	100	28	22	13	7.2	18	70
21	14	16	14	37	39	127	28	21	13	7.8	11	295
22	15	16	14	44	35	257	28	21	13	11	10	209
23	15	15	14	38	32	150	27	28	12	8.0	9.3	127
24	15	15	14	156	30	115	32	24	10	8.0	9.0	97
25	16	15	14	110	30	96	28	22	9.3	8.4	11	79
26	17	15	14	65	29	81	26	20	9.5	8.0	15	66
27	15	15	16	52	27	72	25	19	9.5	7.6	21	58
28	14	15	14	46	27	65	25	18	9.4	6.9	21	66
29	14	15	14	41	---	59	24	18	8.6	11	17	67
30	15	14	14	37	---	54	23	17	8.8	9.4	13	566
31	15	---	14	35	---	50	---	16	---	8.8	10	---
TOTAL	481	480	466	1464	866	2397	1013	714	370.1	270.5	290.1	3201
MEAN	15.5	16.0	15.0	47.2	30.9	77.3	33.8	23.0	12.3	8.73	9.36	107
MAX	20	18	23	156	58	257	51	43	16	14	21	566
MIN	13	14	13	15	22	23	23	16	8.6	6.8	4.6	10
CFSM	.17	.17	.16	.51	.33	.83	.36	.25	.13	.09	.10	1.14
IN.	.19	.19	.19	.58	.35	.96	.40	.28	.15	.11	.12	1.28

01632900 SMITH CREEK NEAR NEW MARKET, VA--Continued

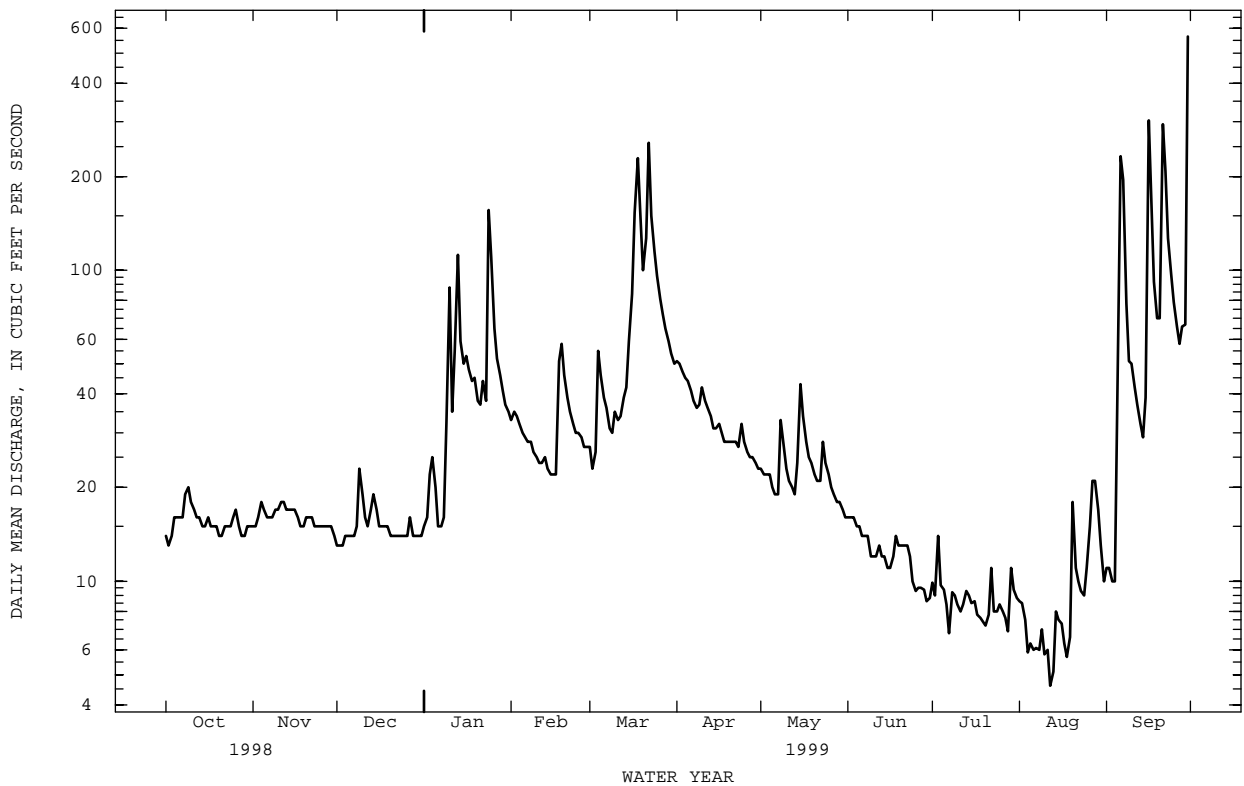
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1960 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	52.9	57.7	69.1	104	117	156	116	84.5	58.5	35.9	35.7	40.5
MAX	297	324	240	423	447	530	372	238	294	121	139	408
(WY)	1973	1986	1997	1996	1998	1994	1987	1988	1972	1972	1996	1996
MIN	8.56	11.0	8.86	10.1	21.1	26.4	19.4	20.0	12.3	8.73	9.36	9.36
(WY)	1987	1966	1966	1966	1989	1981	1981	1969	1999	1999	1999	1986

SUMMARY STATISTICS FOR 1998 CALENDAR YEAR FOR 1999 WATER YEAR WATER YEARS 1960 - 1999

ANNUAL TOTAL	43982	12012.7	
ANNUAL MEAN	120	32.9	77.1
HIGHEST ANNUAL MEAN			152
LOWEST ANNUAL MEAN			27.8
HIGHEST DAILY MEAN	1510	Jan 8	5190
LOWEST DAILY MEAN	13	aOct 2	4.6
ANNUAL SEVEN-DAY MINIMUM	14	bNov 30	5.8
INSTANTANEOUS PEAK FLOW			917
INSTANTANEOUS PEAK STAGE			5.91
INSTANTANEOUS LOW FLOW			4.0
ANNUAL RUNOFF (CFSM)	1.29		.35
ANNUAL RUNOFF (INCHES)	17.56		4.79
10 PERCENT EXCEEDS	321		59
50 PERCENT EXCEEDS	39		17
90 PERCENT EXCEEDS	15		8.6

- a Also Dec 1-3, 1998.
- b Also Dec 1, 1998.
- c Also Aug 13, 1999.
- e Estimated.



## POTOMAC RIVER BASIN

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 mi<sup>2</sup>.

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 sea level. Prior to Jul. 1, 1976, nonrecording gage, and Jul. 1, 1976, to Oct. 23, 1981, water-stage recorder, at site 400 ft upstream at same datum.

REMARKS.--Records good except for period with backwater from beaver dam, Oct. 24 to Nov. 10, which is fair. Some diversion during low flow for irrigation at points upstream from station. Virginia Department of Emergency Services gage-height radio transmitter at station. Maximum discharge, 103,000 ft<sup>3</sup>/s, Sep. 6, 1996, from rating curve extended above 19,000 ft<sup>3</sup>/s on basis of peak runoff for stations at Cootes Store and near Strasburg. Minimum gage height, 1.70 ft, Aug. 12-13, 1999. 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 Department of Environmental Quality - Water Division.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in October 1942 reached a stage of 20.2 ft, from floodmarks, discharge, about 80,000 ft<sup>3</sup>/s, from rating curve extended above 18,000 ft<sup>3</sup>/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 greater than base discharge of 5,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Sep 6	2300	*4,260	*7.95	No peak greater than base discharge.			

Minimum discharge, 1.5 ft<sup>3</sup>/s, Aug 12-13.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	36	e34	32	32	149	105	233	107	65	12	9.3	31
2	35	e35	32	35	150	92	233	104	62	13	9.0	27
3	34	e37	31	56	142	94	216	101	56	22	7.2	23
4	39	e40	33	74	128	138	203	98	49	17	6.0	23
5	41	e37	34	57	117	122	194	95	46	13	5.0	72
6	43	e35	34	49	109	111	183	92	44	10	4.1	2410
7	40	e35	34	46	105	110	171	92	42	7.6	3.1	2630
8	48	e35	40	47	104	112	160	196	38	7.4	2.4	1010
9	50	e36	60	75	97	137	159	326	34	8.3	3.2	517
10	45	e37	57	190	92	156	171	220	30	6.6	4.3	366
11	40	33	45	98	88	146	160	173	26	6.1	2.9	260
12	39	34	40	141	86	143	160	144	27	5.7	2.2	196
13	38	33	44	323	85	157	148	126	30	7.8	1.8	157
14	37	34	52	212	81	199	140	134	30	8.2	5.5	132
15	36	34	49	193	78	278	138	214	27	6.9	7.8	127
16	37	34	43	233	75	343	142	198	24	7.7	5.1	431
17	37	32	41	198	73	778	135	171	28	6.8	5.6	369
18	37	33	39	179	123	2170	129	152	35	6.4	3.6	247
19	35	33	38	219	186	1720	124	137	31	5.3	3.6	208
20	36	34	38	194	186	971	122	123	27	4.5	64	185
21	34	35	37	185	169	744	120	113	28	15	54	499
22	34	35	38	491	151	1020	121	109	29	12	56	575
23	37	35	36	409	139	832	118	143	23	8.5	29	421
24	e36	34	37	995	132	673	129	167	18	5.4	21	314
25	e38	34	37	906	124	551	125	138	17	5.7	22	249
26	e39	34	36	530	117	457	121	116	15	5.4	91	207
27	e36	34	33	366	108	395	117	102	14	5.0	107	178
28	e33	34	36	286	106	348	116	93	14	9.1	91	206
29	e33	32	37	233	---	306	114	84	12	9.3	65	195
30	e35	32	36	193	---	271	110	77	12	7.7	46	1470
31	e33	---	35	166	---	242	---	71	---	7.3	35	---
TOTAL	1171	1034	1214	7411	3300	13921	4512	4216	933	272.7	772.7	13735
MEAN	37.8	34.5	39.2	239	118	449	150	136	31.1	8.80	24.9	458
MAX	50	40	60	995	186	2170	233	326	65	22	107	2630
MIN	33	32	31	32	73	92	110	71	12	4.5	1.8	23
CFSM	.07	.07	.08	.47	.23	.89	.30	.27	.06	.02	.05	.90
IN.	.09	.08	.09	.54	.24	1.02	.33	.31	.07	.02	.06	1.01

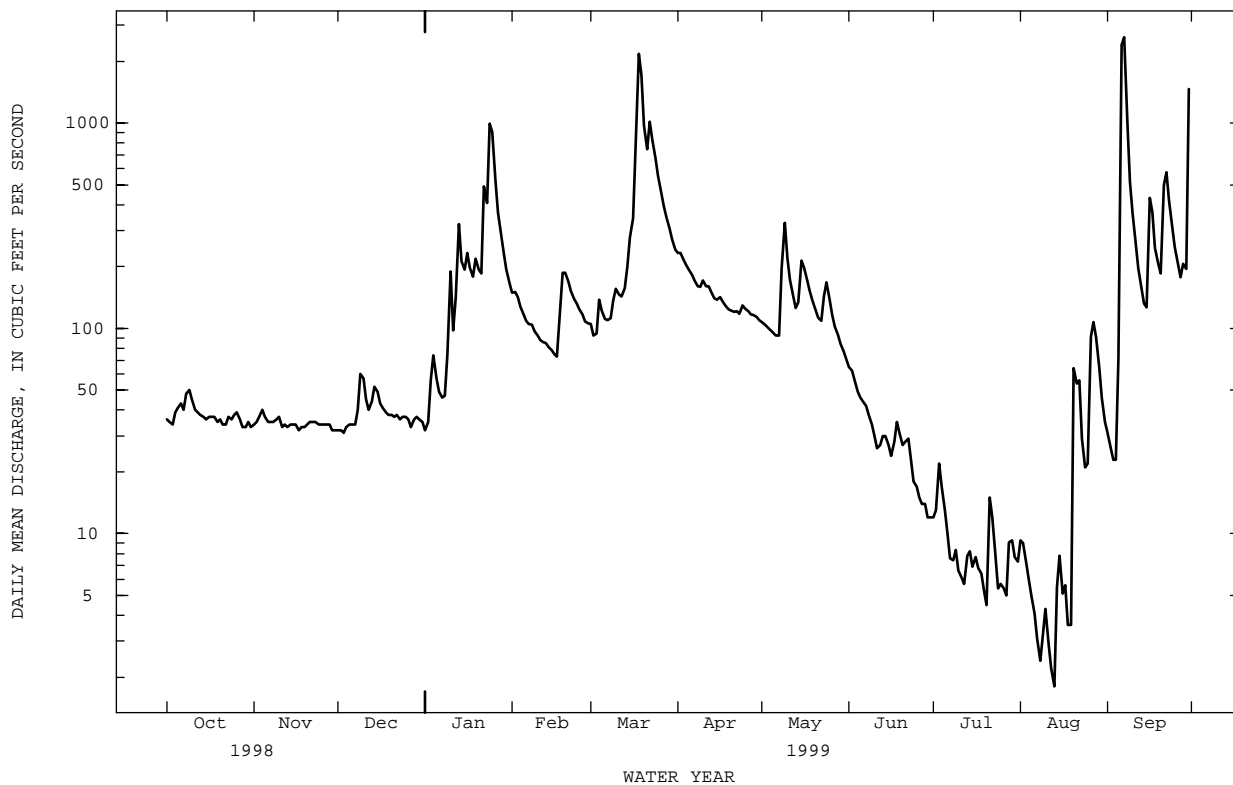
01633000 NORTH FORK SHENANDOAH RIVER AT MOUNT JACKSON, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1944 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	235	290	378	493	587	844	636	519	303	166	217	221
MAX	1580	2371	1272	2283	2445	2387	2193	1418	1483	834	1403	2804
(WY)	1980	1986	1973	1996	1998	1994	1987	1988	1972	1949	1955	1996
MIN	22.2	26.3	22.7	30.1	62.7	119	79.2	84.3	31.1	8.80	19.9	26.2
(WY)	1987	1966	1966	1966	1959	1981	1981	1969	1999	1999	1964	1954

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR	WATER YEARS 1944 - 1999
ANNUAL TOTAL	234502	52492.4	
ANNUAL MEAN	642	144	407
HIGHEST ANNUAL MEAN			935 1996
LOWEST ANNUAL MEAN			136 1981
HIGHEST DAILY MEAN	8590 Feb 18	2630 Sep 7	32200 Sep 6 1996
LOWEST DAILY MEAN	31 Dec 3	1.8 Aug 13	1.8 Aug 13 1999
ANNUAL SEVEN-DAY MINIMUM	32 aNov 28	2.8 Aug 7	2.8 Aug 7 1999
INSTANTANEOUS PEAK FLOW		4260 Sep 6	103000 Sep 6 1996
INSTANTANEOUS PEAK STAGE		7.95 Sep 6	22.17 Sep 6 1996
INSTANTANEOUS LOW FLOW		1.5 bAug 12	1.5 bAug 12 1999
ANNUAL RUNOFF (CFSM)	1.27	.28	.80
ANNUAL RUNOFF (INCHES)	17.24	3.86	10.92
10 PERCENT EXCEEDS	1840	274	864
50 PERCENT EXCEEDS	165	56	188
90 PERCENT EXCEEDS	35	8.3	44

a Also Nov 29, 1998.  
 b Also Aug 13, 1998.  
 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 mi<sup>2</sup>.

## WATER-DISCHARGE RECORDS

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 sea level. Prior to Sep. 21, 1930, nonrecording gage at same site and datum.

REMARKS.--Records good. Large diurnal fluctuation at low and medium flow from unknown cause. Water-level elevations at the site were affected during the 1992-93 water years by construction of a new bridge about 50 ft downstream from the gage. National Weather Service gage-height telemeter at station. Maximum discharge, 114,000 ft<sup>3</sup>/s, from rating curve extended above 46,000 ft<sup>3</sup>/s. Minimum gage height, 1.52 ft, Feb. 9, 1934. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage since at least 1870, that of Sep. 7, 1996.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 6,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Sep 7	1730	*3,700	*6.69	No peak greater than base discharge.			

Minimum discharge, 48 ft<sup>3</sup>/s, Jul 4-6, 11, 13, 15, 16, 17-21, gage height, 1.56 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	127	101	99	101	284	206	405	200	149	73	55	126
2	123	100	97	147	272	201	394	195	125	73	55	108
3	121	102	96	178	261	204	394	191	105	66	55	102
4	131	104	99	146	260	237	368	192	101	53	55	100
5	127	101	99	142	246	257	348	183	113	50	55	170
6	126	102	98	e150	231	269	332	187	110	53	54	422
7	113	102	100	149	222	247	310	185	108	61	54	2950
8	83	102	104	115	217	234	295	209	105	58	54	2440
9	91	102	118	135	209	241	286	246	88	54	55	1190
10	87	102	107	150	205	264	282	518	86	54	55	714
11	113	104	99	130	198	275	309	377	78	52	53	495
12	126	105	118	249	194	274	308	308	73	52	51	380
13	115	102	124	185	189	279	306	267	73	52	53	296
14	112	102	106	388	184	303	285	238	73	53	62	247
15	105	101	97	376	181	381	273	226	73	52	70	223
16	103	101	99	359	167	502	266	260	73	52	73	521
17	104	102	107	302	175	669	263	309	81	51	63	622
18	96	106	113	298	197	1870	255	269	82	51	60	558
19	93	107	110	277	200	2800	242	246	74	50	58	376
20	91	102	92	286	276	1850	235	225	72	50	65	322
21	89	99	84	309	291	1300	233	207	72	50	78	329
22	93	98	85	421	273	1390	236	203	71	55	75	566
23	103	96	84	747	253	1480	240	244	68	70	132	721
24	103	97	87	833	237	1180	238	264	65	76	135	563
25	103	98	86	1590	230	964	227	284	65	62	142	438
26	103	98	95	1110	224	796	231	253	66	59	123	358
27	101	98	108	714	215	676	223	219	68	55	106	308
28	98	98	94	532	213	597	215	194	74	55	154	280
29	98	98	95	431	---	535	208	179	73	54	204	293
30	99	99	94	365	---	477	204	176	73	55	184	675
31	100	---	94	316	---	431	---	167	---	55	148	---
TOTAL	3277	3029	3088	11631	6304	21389	8411	7421	2537	1756	2636	16893
MEAN	106	101	99.6	375	225	690	280	239	84.6	56.6	85.0	563
MAX	131	107	124	1590	291	2800	405	518	149	76	204	2950
MIN	83	96	84	101	167	201	204	167	65	50	51	100
CFSM	.14	.13	.13	.49	.29	.90	.37	.31	.11	.07	.11	.73
IN.	.16	.15	.15	.56	.31	1.04	.41	.36	.12	.09	.13	.82

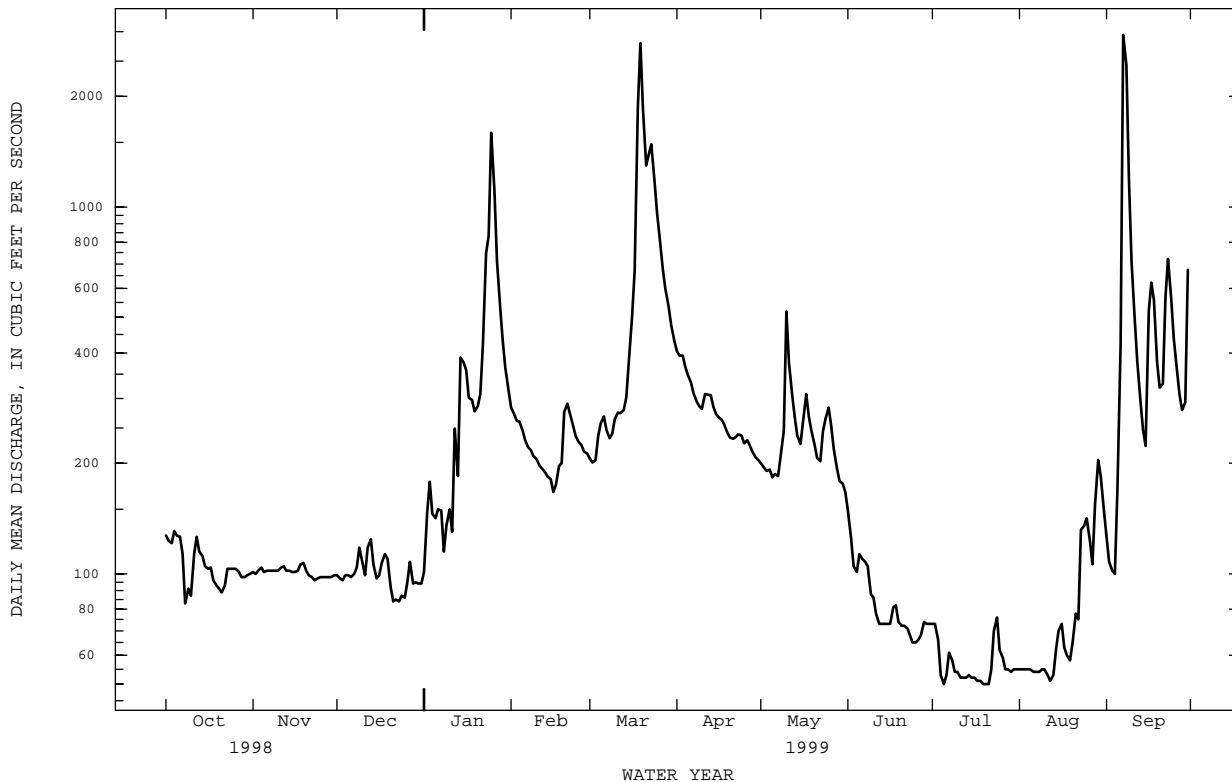
01634000 NORTH FORK SHENANDOAH RIVER NEAR STRASBURG, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1925 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	402	420	536	702	879	1155	975	762	469	296	355	324
MAX	3488	2813	1955	3394	3466	5017	2876	1821	2234	1169	2510	3838
(WY)	1943	1986	1973	1996	1998	1936	1993	1988	1972	1949	1955	1996
MIN	58.9	75.8	82.0	86.4	94.0	183	182	154	84.6	56.6	66.7	67.1
(WY)	1931	1931	1932	1966	1931	1931	1981	1969	1999	1999	1930	1986

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR	WATER YEARS 1925 - 1999
ANNUAL TOTAL	357064	88372	
ANNUAL MEAN	978	242	606
HIGHEST ANNUAL MEAN			1360
LOWEST ANNUAL MEAN			226
HIGHEST DAILY MEAN	10300	Jan 9	2950
LOWEST DAILY MEAN	83	Oct 8	50
ANNUAL SEVEN-DAY MINIMUM	88	Dec 20	51
INSTANTANEOUS PEAK FLOW			3700
INSTANTANEOUS PEAK STAGE			6.69
INSTANTANEOUS LOW FLOW			48
ANNUAL RUNOFF (CFSM)	1.27		.32
ANNUAL RUNOFF (INCHES)	17.30		4.28
10 PERCENT EXCEEDS	2680		431
50 PERCENT EXCEEDS	298		131
90 PERCENT EXCEEDS	99		58

- a Also Jul 19-21, 1999.
- b Also Sep 14, 18, 1986.
- c Also Jul 5-6, 11, 13, 15-21, 1999.
- e Estimated.





## POTOMAC RIVER BASIN

01634000 NORTH FORK SHENANDOAH RIVER AT STRASBURG, VA--Continued

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--July 1996 to current year.

## WATER-QUALITY DATA, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DATE	TIME	SAMPLE TYPE	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	TEMPER- ATURE AIR (DEG C) (00020)	TEMPER- ATURE WATER (DEG C) (00010)	TUR- BID- ITY (NTU) (00076)
OCT									
15...	1400	ENVIRONMENTAL	106	452	8.5	--	--	15.5	--
NOV									
16...	1100	ENVIRONMENTAL	102	475	8.7	744	13.0	9.5	--
DEC									
16...	1130	ENVIRONMENTAL	96	465	8.2	745	4.5	4.3	--
JAN									
13...	1445	ENVIRONMENTAL	172	465	8.1	746	9.2	.2	--
25...	1115	ENVIRONMENTAL	1740	316	7.0	749	7.3	6.8	--
26...	1400	ENVIRONMENTAL	1050	272	7.8	754	9.6	7.3	--
FEB									
17...	1145	ENVIRONMENTAL	175	445	8.4	736	17.0	7.4	--
MAR									
01...	1200	ENVIRONMENTAL	207	411	8.6	727	7.0	5.7	--
04...	1400	ENVIRONMENTAL	245	396	8.4	743	4.1	7.5	--
12...	1200	ENVIRONMENTAL	272	390	8.3	740	8.0	5.4	--
16...	1500	ENVIRONMENTAL	510	386	8.4	743	7.0	9.0	--
16...	1505	REPLICATE	492	386	8.4	743	7.0	9.0	3.8
17...	1445	ENVIRONMENTAL	626	346	8.5	743	14.2	8.6	--
19...	1245	ENVIRONMENTAL	2840	209	7.8	750	7.8	9.2	--
21...	1300	ENVIRONMENTAL	1250	195	5.9	729	6.0	8.1	--
APR									
26...	1330	ENVIRONMENTAL	228	350	7.2	747	21.5	17.0	--
MAY									
20...	1400	ENVIRONMENTAL	224	337	8.6	749	23.0	21.8	--
20...	1415	REPLICATE	209	337	8.6	749	23.0	21.8	--
JUN									
25...	1530	ENVIRONMENTAL	65	414	9.1	745	28.2	26.6	--
JUL									
15...	1300	ENVIRONMENTAL	48	418	9.0	749	26.2	27.1	--
27...	0440	ENVIRONMENTAL	53	413	9.1	--	22.0	26.4	--
27...	1621	ENVIRONMENTAL	50	405	9.4	737	34.5	29.6	--
AUG									
12...	1030	ENVIRONMENTAL	52	376	9.1	745	26.0	25.6	--
SEP									
07...	1330	ENVIRONMENTAL	2770	364	6.8	737	31.0	22.0	--
09...	1300	ENVIRONMENTAL	1140	203	7.9	739	27.0	21.8	--
10...	1445	ENVIRONMENTAL	667	218	8.2	758	22.4	23.6	--
13...	1330	ENVIRONMENTAL	290	281	6.6	744	26.0	22.2	--
30...	1230	ENVIRONMENTAL	698	364	8.1	740	19.0	19.0	--

POTOMAC RIVER BASIN

01634000 NORTH FORK SHENANDOAH RIVER AT STRASBURG, VA--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DATE	OXYGEN, DIS- SOLVED (MG/L) (00300)	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 WAT DIS TOT IT FIELD MG/L AS CACO3 (39086)	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										
15...	13.8	57	22	10	3.1	200	19	16	.1	.52
NOV										
16...	13.3	--	--	--	--	--	--	--	--	--
DEC										
16...	13.8	--	--	--	--	--	--	--	--	--
JAN										
13...	17.1	60	20	9.7	2.9	180	20	17	.1	1.9
25...	10.6	--	--	--	--	--	--	--	--	--
26...	11.7	--	--	--	--	--	--	--	--	--
FEB										
17...	15.2	--	--	--	--	--	--	--	--	--
MAR										
01...	14.9	--	--	--	--	--	--	--	--	--
04...	14.3	--	--	--	--	--	--	--	--	--
12...	15.1	--	--	--	--	--	--	--	--	--
16...	14.4	--	--	--	--	--	--	--	--	--
16...	14.4	--	--	--	--	--	--	--	--	.6
17...	13.9	--	--	--	--	--	--	--	--	--
19...	11.1	--	--	--	--	--	--	--	--	--
21...	11.3	--	--	--	--	--	--	--	--	--
APR										
26...	15.4	47	15	8.2	2.3	--	19	14	<.1	.39
MAY										
20...	11.0	--	--	--	--	--	--	--	--	--
20...	11.0	--	--	--	--	--	--	--	--	3.6
JUN										
25...	11.0	--	--	--	--	--	--	--	--	--
JUL										
15...	14.6	47	21	12	2.6	168	18	20	.1	13
27...	4.74	--	--	--	--	--	--	--	--	--
27...	14.01	--	--	--	--	--	--	--	--	--
AUG										
12...	10.7	--	--	--	--	--	--	--	--	--
SEP										
07...	7.2	--	--	--	--	--	--	--	--	--
09...	8.0	--	--	--	--	--	--	--	--	--
10...	8.7	--	--	--	--	--	--	--	--	--
13...	9.1	--	--	--	--	--	--	--	--	--
30...	9.0	--	--	--	--	--	--	--	--	--

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

## POTOMAC RIVER BASIN

01634000 NORTH FORK SHENANDOAH RIVER AT STRASBURG, VA--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DATE	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	RESIDUE TOTAL AT 105 DEG. C, SUS- PENDED (MG/L) (00530)	RESIDUE FIXED NON FILTER- ABLE (MG/L) (00540)	RESIDUE VOLA- TILE, SUS- PENDED (MG/L) (00535)	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,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO- GEN,AM- MONIA + ORGANIC DIS. (MG/L AS N) (00623)
OCT										
15...	262	--	--	--	--	<.01	1.6	.03	.3	.2
NOV										
16...	--	--	--	--	--	<.01	2.3	.02	.2	.2
DEC										
16...	--	--	--	--	2.28	.02	2.3	.03	.2	.2
JAN										
13...	267	--	--	--	2.92	.01	2.9	.03	.3	.2
25...	--	--	--	--	2.53	.04	2.6	.08	1.4	.3
26...	--	--	--	--	2.58	.03	2.6	.11	.6	.4
FEB										
17...	--	--	--	--	--	<.01	2.5	<.02	.2	.2
MAR										
01...	--	--	--	--	2.18	.02	2.2	<.02	.2	.2
04...	--	--	--	--	2.00	.01	2.0	<.02	.3	.2
12...	--	--	--	--	--	<.01	1.8	<.02	.3	.2
16...	--	--	--	--	1.77	.01	1.8	.02	.3	.2
16...	--	4	3	<3	1.86	.01	1.9	.01	--	--
17...	--	--	--	--	1.60	.03	1.6	.02	.5	.2
19...	--	--	--	--	1.82	.02	1.8	.05	.9	.3
21...	--	--	--	--	1.72	.01	1.7	.03	.3	.3
APR										
26...	211	--	--	--	.871	.01	.88	.03	.4	.3
MAY										
20...	--	--	--	--	1.01	.02	1.0	.07	.6	.4
20...	--	18	11	7	1.09	.02	1.1	.02	--	--
JUN										
25...	--	--	--	--	.647	.02	.67	.04	.6	.5
JUL										
15...	269	--	--	--	.442	.02	.46	<.02	.5	.5
27...	--	--	--	--	--	--	--	--	--	--
27...	--	--	--	--	--	--	--	--	--	--
AUG										
12...	--	--	--	--	--	<.01	.19	<.02	.4	.3
SEP										
07...	--	--	--	--	2.11	.03	2.1	.14	1.2	.4
09...	--	--	--	--	2.36	.03	2.4	.06	.6	.4
10...	--	--	--	--	2.52	.03	2.5	.04	.5	.4
13...	--	--	--	--	2.66	.02	2.7	<.02	.4	.3
30...	--	--	--	--	2.41	.01	2.4	<.02	.5	.3

&lt; Actual value is known to be less than the value shown.

POTOMAC RIVER BASIN

01634000 NORTH FORK SHENANDOAH RIVER AT STRASBURG, VA--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DATE	NITROGN TOTAL SEDIMNT SUSP AS N (MG/L) (00601)	NITRO- GEN DIS- SOLVED AS N) (MG/L) (00602)	PHOS- PHORUS TOTAL AS P) (MG/L) (00665)	PHOS TOTAL SEDIMNT SUSP AS P (MG/L) (00667)	PHOS- PHORUS DIS- SOLVED AS P) (MG/L) (00666)	PHOS- PHORUS ORTHO, DIS- SOLVED AS P) (MG/L) (00671)	IRON, DIS- SOLVED AS FE) (UG/L) (01046)	MANGA- NESE, DIS- SOLVED AS MN) (UG/L) (01056)	CARBON, INORG + ORGANIC SUSP. TOTAL AS C) (MG/L) (00694)	SEDI- MENT, SUS- PENDEED (MG/L) (80154)
OCT										
15...	--	1.9	.23	--	.23	.19	E7	E2	--	1
NOV										
16...	--	2.4	.28	--	.26	.25	--	--	--	1
DEC										
16...	--	2.5	.36	--	.32	.30	--	--	--	36
JAN										
13...	--	3.1	.33	--	.31	.26	E9	E2	--	10
25...	--	2.8	.60	--	.15	.14	--	--	--	318
26...	--	3.0	.19	--	.13	.11	--	--	--	47
FEB										
17...	--	2.7	--	--	.22	.19	--	--	--	.7
MAR										
01...	--	2.4	.20	--	.19	.16	--	--	--	.6
04...	--	2.2	.21	--	.20	.18	--	--	--	4
12...	--	2.0	.20	--	.18	.16	--	--	--	4
16...	--	2.0	.19	--	.17	.14	--	--	--	--
16...	.07	1.9	--	.018	.16	.10	--	--	.499	3
17...	--	1.8	.18	--	.15	.12	--	--	--	7
19...	--	2.1	.26	--	.074	.05	--	--	--	98
21...	--	2.0	.10	--	.076	.06	--	--	--	14
APR										
26...	--	1.2	.21	--	.21	.19	26	4	--	--
MAY										
20...	--	1.4	.38	--	<.05	.28	--	--	--	60
20...	.139	1.7	--	.058	.25	.28	--	--	1.30	530
JUN										
25...	--	1.2	.35	--	.32	.25	--	--	--	87
JUL										
15...	--	.93	.38	--	.39	.34	10	9	--	8
27...	--	--	--	--	--	--	--	--	--	--
27...	--	--	--	--	--	--	--	--	--	--
AUG										
12...	--	.50	.25	--	.18	.22	--	--	--	5
SEP										
07...	--	2.6	.59	--	.36	.41	--	--	--	--
09...	--	2.8	.17	--	.13	.11	--	--	--	22
10...	--	2.9	.18	--	.16	.13	--	--	--	11
13...	--	3.0	.21	--	.20	.18	--	--	--	2
30...	--	2.8	.20	--	.18	.14	--	--	--	8

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

## POTOMAC RIVER BASIN

01634500 CEDAR CREEK NEAR WINCHESTER, VA

LOCATION.--Lat 39°04'52", long 7°819'47", 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 mi<sup>2</sup>.

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 sea level.

REMARKS.--Records good except those for periods with ice effect, Dec. 25, 27, Jan. 1, 2, 6, and periods of no gage-height record, Jan. 24-26, and May 10 to Jun. 23, which are fair. Maximum discharge, 22,000 ft<sup>3</sup>/s, from rating curve extended above 15,000 ft<sup>3</sup>/s. Minimum discharge, 1.5 ft<sup>3</sup>/s, result of freezeup. Minimum gage height, 1.04 ft, Feb. 19, 1941, result of freezeup. 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 Department of Environmental Quality - Water Division.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Mar. 17, 1936, reached a stage of about 25 ft, discharge, about 18,000 ft<sup>3</sup>/s, from information by local residents.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Mar 17	2300	*711	*4.06	No peak greater than base discharge.			

Minimum discharge, 2.6 ft<sup>3</sup>/s, Aug 5-6.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	10	14	12	e13	23	23	66	42	e16	8.7	9.4	4.8
2	9.1	13	12	e12	26	21	72	40	e15	18	5.9	5.0
3	9.6	14	12	23	27	21	62	38	e14	22	5.2	4.6
4	13	14	12	42	23	159	60	38	e13	12	4.5	5.7
5	14	13	12	26	21	95	66	36	e13	9.3	4.5	36
6	13	13	12	e22	20	80	60	35	e12	7.5	4.1	188
7	14	12	12	19	20	85	54	35	e11	6.8	4.2	154
8	20	13	13	17	22	67	50	72	e11	6.3	4.0	93
9	23	13	18	25	22	62	50	73	e10	6.1	4.7	42
10	16	13	18	50	22	72	60	e53	e9.8	6.1	4.5	30
11	14	13	14	28	19	58	99	e45	e9.4	6.3	4.2	21
12	13	13	13	24	19	55	153	e42	e9.3	6.2	3.9	17
13	12	13	13	34	20	67	112	e38	e9.9	6.1	3.7	14
14	13	12	14	47	19	83	93	e35	e11	6.2	4.4	13
15	12	13	14	37	17	86	85	e39	e10	6.0	4.1	14
16	12	12	13	29	18	121	82	e40	e10	5.7	4.8	148
17	13	12	13	33	18	339	70	e35	e12	5.0	4.0	105
18	12	12	13	49	26	537	62	e32	e13	4.9	3.7	53
19	12	11	12	67	36	329	56	e28	e12	5.0	3.4	38
20	12	12	12	37	30	204	55	e24	e11	4.6	3.6	32
21	11	12	12	36	26	199	55	e23	e10	4.5	8.1	39
22	12	11	12	76	23	331	62	e22	e11	6.6	7.2	46
23	13	11	12	52	21	212	57	e50	e11	7.4	5.1	35
24	13	11	12	e185	23	167	76	e54	9.9	5.3	5.1	29
25	13	11	e11	e116	22	136	65	e41	9.3	5.3	16	24
26	12	12	12	e60	21	111	59	e31	8.9	4.9	10	21
27	12	13	e12	49	20	95	55	e23	8.5	4.1	13	19
28	12	12	13	40	22	84	51	e20	8.7	5.1	12	20
29	13	12	14	33	---	75	48	e18	9.3	6.5	7.9	23
30	13	12	14	28	---	67	45	e17	8.7	6.5	5.9	247
31	13	---	14	25	---	60	---	e16	---	9.5	5.1	---
TOTAL	403.7	372	402	1334	626	4101	2040	1135	327.7	224.5	186.2	1521.1
MEAN	13.0	12.4	13.0	43.0	22.4	132	68.0	36.6	10.9	7.24	6.01	50.7
MAX	23	14	18	185	36	537	153	73	16	22	16	247
MIN	9.1	11	11	12	17	21	45	16	8.5	4.1	3.4	4.6
CFSM	.13	.12	.13	.42	.22	1.28	.66	.36	.11	.07	.06	.49
IN.	.15	.13	.15	.48	.23	1.48	.74	.41	.12	.08	.07	.55

01634500 CEDAR CREEK NEAR WINCHESTER, VA--Continued

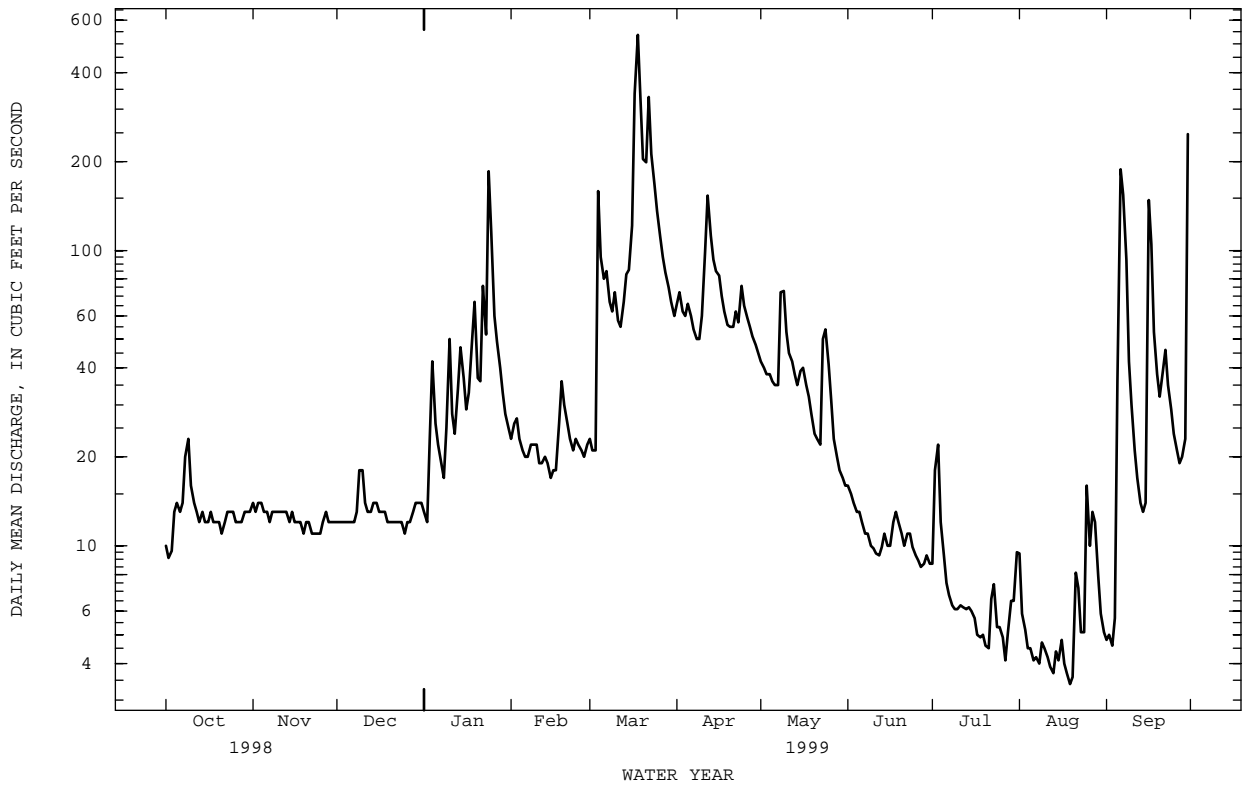
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1938 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	60.6	69.1	90.6	115	146	206	174	128	83.8	32.7	39.0	39.6
MAX	777	500	320	545	520	708	600	382	664	181	420	523
(WY)	1943	1986	1973	1996	1998	1993	1983	1988	1972	1978	1955	1996
MIN	6.01	8.64	7.95	10.2	21.5	38.2	37.0	24.5	10.5	6.06	4.52	6.95
(WY)	1964	1966	1966	1966	1959	1981	1947	1969	1969	1966	1957	1986

SUMMARY STATISTICS FOR 1998 CALENDAR YEAR FOR 1999 WATER YEAR WATER YEARS 1938 - 1999

ANNUAL TOTAL	56743.3		12673.2		98.4		
ANNUAL MEAN	155		34.7		214		1996
HIGHEST ANNUAL MEAN					28.3		1969
LOWEST ANNUAL MEAN					e13900		Oct 15 1942
HIGHEST DAILY MEAN	2330	Mar 21	537	Mar 18			
LOWEST DAILY MEAN	9.1	Oct 2	3.4	Aug 19	2.8		aSep 7 1964
ANNUAL SEVEN-DAY MINIMUM	9.9	Sep 1	4.0	Aug 14	3.0		bSep 2 1966
INSTANTANEOUS PEAK FLOW			711	Mar 17	22000		Oct 15 1942
INSTANTANEOUS PEAK STAGE			4.06	Mar 17	c27.00		Oct 15 1942
INSTANTANEOUS LOW FLOW			2.6	dAug 5	f1.5		Feb 2 1992
ANNUAL RUNOFF (CFSM)	1.51		.34		.96		
ANNUAL RUNOFF (INCHES)	20.49		4.58		12.98		
10 PERCENT EXCEEDS	415		74		211		
50 PERCENT EXCEEDS	33		14		42		
90 PERCENT EXCEEDS	12		5.8		10		

- a Also Sep 3, 4, 7, 8, 1966.
- b Also Sep 3, 1966.
- c From floodmarks.
- d Also Aug 6, 1999.
- e Estimated.
- f Result of freezeup.



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 mi<sup>2</sup>.

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 sea level. 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. 25-27, Dec. 31 to Jan. 2, Jan. 4, 17, and periods of no gage-height record, Jan. 5-8, 10-12, 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 has been a diversion in some years from Strasburg Reservoir, capacity, 54.6 acre-ft, by town of Strasburg for municipal water supply. There was no diversion during the year. Maximum discharge, 23,000 ft<sup>3</sup>/s, from rating curve extended above 5,200 ft<sup>3</sup>/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 Department of Environmental Quality - Water Division.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Sep 30	1130	*964	*5.96	No peak greater than base discharge.			

Minimum daily discharge, 1.7 ft<sup>3</sup>/s, Aug 10,11.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	4.7	6.3	6.9	e8.1	20	22	58	27	8.4	4.1	3.8	3.5
2	4.2	6.1	6.6	e7.8	23	20	61	25	8.0	4.2	3.1	3.3
3	4.3	6.7	6.7	23	27	28	53	24	8.0	3.6	2.8	3.1
4	5.0	7.7	6.9	e47	23	80	50	24	7.4	5.1	2.6	3.3
5	5.2	7.3	7.1	e31	20	79	48	23	6.5	4.9	2.3	30
6	6.2	7.3	7.2	e23	19	66	45	22	6.0	4.1	2.0	167
7	6.4	6.8	7.3	e20	18	62	41	22	5.8	3.7	1.8	113
8	7.9	6.6	8.3	e17	18	51	38	37	5.7	3.2	1.8	57
9	10	6.6	16	28	17	49	37	56	5.4	2.6	1.9	25
10	9.5	6.8	21	e55	16	50	67	36	5.0	2.5	1.7	35
11	7.5	7.4	13	e35	15	45	69	29	4.7	2.4	1.7	30
12	6.5	7.4	9.7	e26	15	51	85	26	4.7	2.6	1.9	16
13	6.2	7.8	9.5	40	16	69	68	24	4.7	3.1	1.9	11
14	6.2	8.3	11	50	15	82	59	22	4.9	3.4	2.2	8.3
15	5.7	7.7	12	39	14	91	55	24	4.9	3.4	2.9	7.9
16	5.5	7.2	10	29	14	128	57	24	4.8	3.5	2.4	203
17	5.8	7.2	9.1	e34	14	343	51	21	6.3	3.1	2.8	165
18	5.7	7.2	8.3	38	33	635	46	20	6.8	2.8	2.2	65
19	5.5	7.0	7.9	45	74	330	42	18	6.7	2.7	1.9	41
20	5.3	7.2	7.4	28	49	183	41	15	6.1	2.5	2.1	31
21	5.2	7.4	7.6	30	38	209	40	14	5.8	3.3	4.5	101
22	5.1	7.2	8.0	166	30	576	45	13	5.9	22	7.0	236
23	5.6	7.0	7.7	71	26	251	42	36	5.9	13	4.9	87
24	5.8	6.9	7.9	305	25	178	44	36	5.5	6.8	3.6	56
25	6.1	6.9	e8.8	162	24	139	38	26	4.8	4.6	3.9	40
26	6.1	7.1	e9.0	70	22	112	36	19	3.9	3.3	4.8	29
27	6.3	6.9	e7.8	49	20	94	35	14	3.6	2.7	4.8	23
28	6.2	6.6	8.0	39	21	82	32	12	4.2	2.9	4.1	23
29	5.9	6.9	8.4	31	---	73	30	11	3.8	3.0	3.5	35
30	5.8	6.9	9.3	26	---	64	29	10	3.6	6.7	3.8	559
31	5.7	---	e8.9	23	---	57	---	9.1	---	5.3	3.9	---
TOTAL	187.1	212.4	283.3	1595.9	666	4299	1442	719.1	167.8	141.1	94.6	2207.4
MEAN	6.04	7.08	9.14	51.5	23.8	139	48.1	23.2	5.59	4.55	3.05	73.6
MAX	10	8.3	21	305	74	635	85	56	8.4	22	7.0	559
MIN	4.2	6.1	6.6	7.8	14	20	29	9.1	3.6	2.4	1.7	3.1
CFSM	.07	.08	.10	.59	.27	1.58	.55	.26	.06	.05	.03	.84
IN.	.08	.09	.12	.68	.28	1.82	.61	.30	.07	.06	.04	.94

01635500 PASSAGE CREEK NEAR BUCKTON, VA--Continued

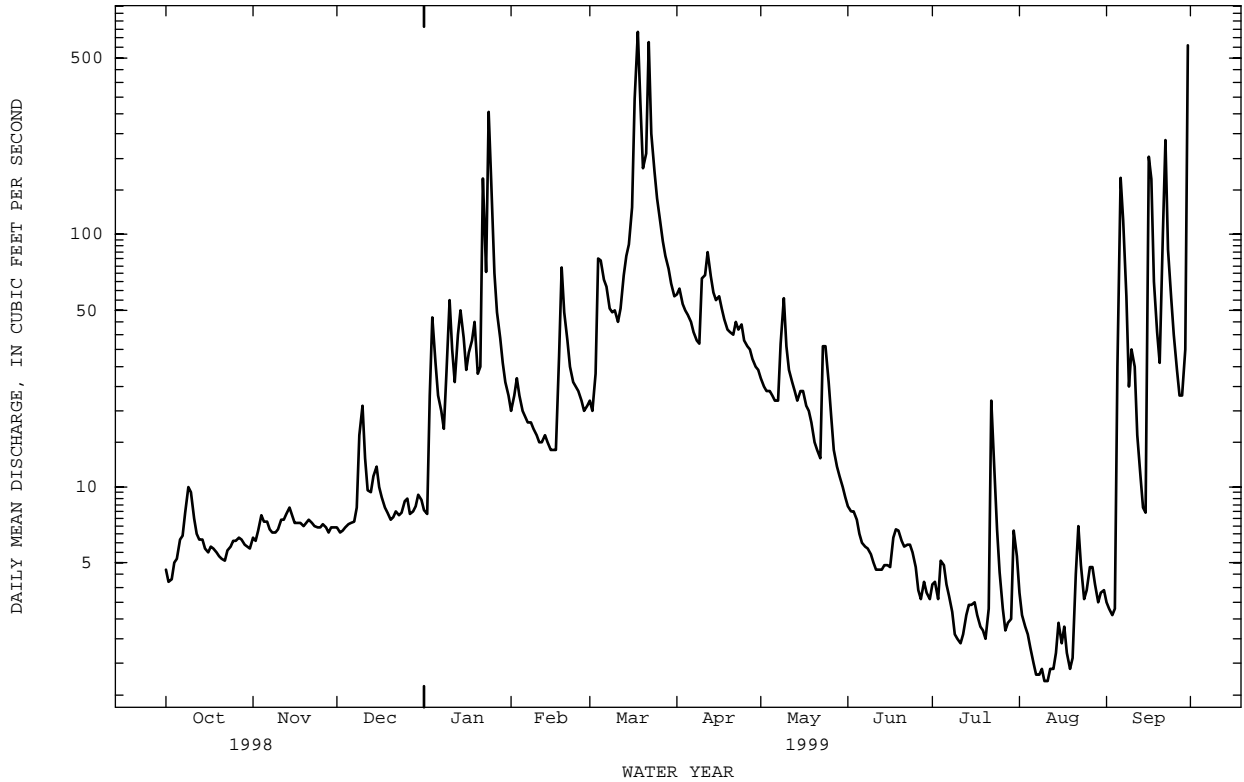
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1933 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	39.3	43.3	67.3	99.3	120	157	135	94.3	51.2	18.1	25.3	27.7
MAX	581	276	235	431	506	573	377	339	609	87.3	437	432
(WY)	1943	1986	1973	1996	1998	1994	1952	1989	1972	1941	1955	1996
MIN	2.85	4.48	4.60	6.25	5.79	20.5	20.9	14.6	5.59	1.87	1.94	2.37
(WY)	1964	1966	1966	1966	1934	1959	1981	1963	1999	1934	1963	1936

SUMMARY STATISTICS FOR 1998 CALENDAR YEAR FOR 1999 WATER YEAR WATER YEARS 1933 - 1999

ANNUAL TOTAL	48960.0	12015.7	
ANNUAL MEAN	134	32.9	72.9
HIGHEST ANNUAL MEAN			161 1996
LOWEST ANNUAL MEAN			20.0 1934
HIGHEST DAILY MEAN	2090	Feb 5	635 Mar 18 9290 Oct 15 1942
LOWEST DAILY MEAN	3.1	Sep 6	1.7 aAug 10 .40 Jul 20 1934
ANNUAL SEVEN-DAY MINIMUM	3.7	Sep 1	1.8 Aug 7 .50 Jul 15 1934
INSTANTANEOUS PEAK FLOW			964 Sep 30 23000 Sep 6 1996
INSTANTANEOUS PEAK STAGE			5.96 Sep 30 15.89 Sep 6 1996
INSTANTANEOUS LOW FLOW			1.7 bAug 7 c.10 Aug 5 1932
ANNUAL RUNOFF (CFSM)	1.53	.37	.83
ANNUAL RUNOFF (INCHES)	20.74	5.09	11.27
10 PERCENT EXCEEDS	370	67	157
50 PERCENT EXCEEDS	17	9.5	26
90 PERCENT EXCEEDS	5.1	3.3	4.4

- a Also Aug 11, 1999.
- b Also Aug 8-13, 1999.
- c Observed.
- e Estimated.





## POTOMAC RIVER BASIN

## 01636500 SHENANDOAH RIVER AT MILLVILLE, WV

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 4.7.

DRAINAGE AREA.--3,022 mi<sup>2</sup>.

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, 1901-02, 1905, 1907-08, 1932(M), 1935(M). WDR WV-97-1: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 293.00 ft above sea level. 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 daily discharges (ice effect), which are fair. Some regulation by upstream hydroelectric plants, including 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.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of 1870 reached practically same stage as flood of Mar. 18, 1936, 26.36 ft, discharge, 151,000 ft<sup>3</sup>/s.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 15,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)
Sept. 8	1500	*12,100	*7.98	No peak greater than base discharge.			

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	693	652	643	e590	1780	1360	2360	1190	1020	463	493	483
2	665	650	652	e600	1710	1330	2260	1160	990	448	435	390
3	660	639	658	760	1640	1320	2180	1160	940	479	418	342
4	668	653	646	712	1580	1750	2190	1190	939	481	448	311
5	678	684	649	924	1630	2130	2170	1120	852	519	410	401
6	669	688	636	1200	1660	1940	2040	1120	844	511	389	436
7	679	684	628	1280	1580	1870	1950	1080	821	469	378	1890
8	768	696	631	1480	1520	1770	1860	1180	824	433	379	9650
9	791	696	708	1220	1440	1690	1800	1240	860	405	328	6720
10	768	665	800	1080	1430	1700	1800	1360	799	376	295	4270
11	771	687	832	1330	1390	1690	1870	1700	729	378	248	3070
12	804	719	841	1240	1340	1640	1980	1920	658	340	253	2310
13	881	672	937	1890	1300	1690	2050	1640	620	397	251	1890
14	816	683	874	1790	1240	1850	1900	1500	629	412	269	1530
15	779	719	833	1770	1170	1960	1800	1360	609	410	280	1420
16	734	700	804	1810	1130	2230	1730	1370	559	411	337	1750
17	709	678	832	1670	1180	3050	1680	1600	545	399	353	3840
18	696	693	875	2030	1230	4600	1610	1820	550	394	299	3960
19	684	689	844	2250	1370	7670	1540	1740	551	448	294	3130
20	665	682	804	1950	1520	8110	1500	1590	539	424	397	2440
21	659	661	746	1710	1820	6270	1460	1440	516	410	393	2010
22	657	652	716	1900	1860	5970	1460	1370	477	380	330	2460
23	646	643	680	2240	1790	6890	1470	1320	463	386	372	4190
24	643	627	679	3080	1650	6050	1580	1410	422	389	378	3460
25	652	654	687	4330	1540	4990	1490	1420	361	844	408	2700
26	651	671	669	5340	1470	4370	1460	1420	362	527	628	2050
27	641	666	647	4440	1430	3810	1440	1360	345	385	649	1640
28	646	657	635	3450	1400	3300	1400	1240	498	382	556	1560
29	661	639	e620	2730	---	3010	1320	1120	487	460	466	1520
30	653	652	e610	2290	---	2760	1250	1040	478	454	478	4830
31	652	---	e600	1960	---	2500	---	1020	---	447	532	---
TOTAL	21739	20151	22416	61046	41800	101270	52600	42200	19287	13661	12144	76653
MEAN	701	672	723	1969	1493	3267	1753	1361	643	441	392	2555
MAX	881	719	937	5340	1860	8110	2360	1920	1020	844	649	9650
MIN	641	627	600	590	1130	1320	1250	1020	345	340	248	311
CFSM	.23	.22	.24	.65	.49	1.08	.58	.45	.21	.15	.13	.85
IN.	.27	.25	.28	.75	.51	1.25	.65	.52	.24	.17	.15	.94

e Estimated

POTOMAC RIVER BASIN

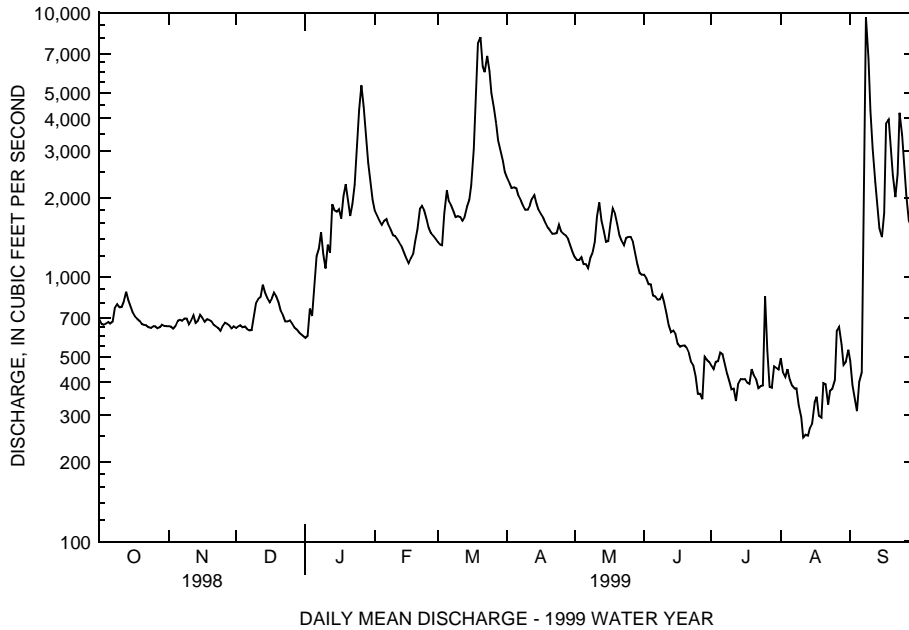
01636500 SHENANDOAH RIVER AT MILLVILLE, WV--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1895 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	1939	1868	2490	3277	3959	5080	4378	3363	2397	1447	1632	1471
MAX	16250	13350	8164	13470	18100	17540	12840	8701	10380	4809	10390	14780
(WY)	1943	1986	1973	1996	1998	1936	1901	1901	1972	1972	1955	1996
MIN	343	388	410	503	542	929	992	1001	643	402	388	411
(WY)	1931	1932	1966	1966	1931	1931	1981	1969	1999	1966	1930	1963

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR	WATER YEARS 1895 - 1999
ANNUAL TOTAL	1773486	484967	
ANNUAL MEAN	4859	1329	2769
HIGHEST ANNUAL MEAN			5618
LOWEST ANNUAL MEAN			1111
HIGHEST DAILY MEAN	44400	Feb 19	9650
LOWEST DAILY MEAN	(e)600	Dec 31	248
ANNUAL SEVEN-DAY MINIMUM	638	Dec 25	275
INSTANTANEOUS PEAK FLOW			12100
INSTANTANEOUS PEAK STAGE			7.98
INSTANTANEOUS LOW FLOW			233
ANNUAL RUNOFF (CFSM)	1.61	.44	.92
ANNUAL RUNOFF (INCHES)	21.83	5.97	12.45
10 PERCENT EXCEEDS	12300	2300	5600
50 PERCENT EXCEEDS	1810	844	1620
90 PERCENT EXCEEDS	661	400	610

- a From floodmarks.
- b Aug. 12-14.
- e Estimated.



## 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 mi<sup>2</sup>.

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

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

REMARKS.--Records good except those for period with backwater from leaves, Oct. 17 to Nov. 10, periods with ice effect, Dec. 26-28, Dec. 31 to Jan. 1, 5, 6, and period of doubtful gage-height record, Jan. 25, which are fair. Maximum discharge, 23,800 ft<sup>3</sup>/s, from rating curve extended above 7,400 ft<sup>3</sup>/s on basis of contracted-opening measurement of peak flow. 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 Department of Environmental Quality - Water Division.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,200 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Sep 30	0500	*3,180	*9.40	No other peak greater than base discharge.			

Minimum discharge, 0.08 ft<sup>3</sup>/s, Aug 14.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.1	e5.2	4.2	e3.0	16	32	88	34	12	3.2	1.9	.50
2	1.2	e5.2	3.6	2.4	26	26	129	32	12	3.0	1.1	.36
3	.87	e6.0	3.5	59	35	22	81	31	11	3.4	.73	.26
4	.95	e8.7	3.2	80	25	106	70	33	9.4	7.0	.62	.59
5	1.1	e4.0	3.1	e35	20	91	122	31	8.1	4.6	.44	16
6	1.1	e4.1	3.3	e15	17	66	108	30	7.3	3.0	.33	25
7	1.6	e4.2	3.5	8.6	16	72	82	31	7.0	1.9	.22	40
8	13	e4.4	3.8	5.9	17	53	71	56	7.4	1.4	.15	66
9	29	e4.6	5.7	7.3	16	44	71	59	6.4	1.0	.13	19
10	9.3	e6.0	11	10	15	56	108	35	5.1	.85	.11	13
11	4.6	16	7.9	7.7	13	47	145	29	4.8	.71	.10	8.1
12	3.0	19	5.1	6.1	12	48	195	27	4.9	.60	.10	4.0
13	2.6	9.8	4.7	29	13	61	120	26	5.0	.56	.10	2.4
14	2.3	5.4	4.2	77	13	82	98	25	6.6	.48	.09	1.7
15	2.2	3.8	4.3	66	11	99	86	23	8.3	.43	.10	1.5
16	2.4	3.4	4.1	78	11	169	89	22	8.5	.43	.10	127
17	e2.3	3.3	3.7	99	12	230	79	21	7.5	.43	.10	162
18	e2.4	3.2	3.5	190	50	228	68	21	8.4	.42	.10	46
19	e2.3	2.5	3.4	145	69	137	62	21	7.7	.36	.09	24
20	e2.3	3.1	3.1	62	39	101	60	20	6.9	.42	.09	16
21	e2.4	3.0	2.9	50	29	115	57	18	7.6	.47	.20	18
22	e3.0	3.0	2.7	44	23	216	64	18	8.4	.37	.16	40
23	e2.9	3.0	2.7	44	19	124	58	30	7.5	.24	.11	21
24	e2.7	3.0	2.8	173	18	105	78	32	5.8	.22	.11	13
25	e2.5	2.7	2.7	e100	17	95	58	25	4.7	.21	.25	9.9
26	e2.5	3.5	e2.6	59	19	79	50	20	3.9	.22	1.9	7.5
27	e3.0	4.0	e2.5	41	18	70	45	17	3.3	.19	9.5	7.2
28	e3.6	4.4	e2.5	33	22	64	41	16	2.9	.29	13	62
29	e5.0	4.4	2.9	26	---	59	39	14	2.7	.68	4.2	86
30	e6.2	4.0	3.8	21	---	52	36	14	3.6	1.2	1.7	1460
31	e5.7	---	e3.4	18	---	47	---	13	---	3.6	.88	---
TOTAL	125.12	156.9	120.4	1595.0	611	2796	2458	824	204.7	41.88	38.71	2298.01
MEAN	4.04	5.23	3.88	51.5	21.8	90.2	81.9	26.6	6.82	1.35	1.25	76.6
MAX	29	19	11	190	69	230	195	59	12	7.0	13	1460
MIN	.87	2.5	2.5	2.4	11	22	36	13	2.7	.19	.09	.26
CFSM	.05	.06	.04	.57	.24	1.01	.91	.30	.08	.02	.01	.85
IN.	.05	.07	.05	.66	.25	1.16	1.02	.34	.08	.02	.02	.95

01638480 CATOCTIN CREEK AT TAYLORSTOWN, VA--Continued

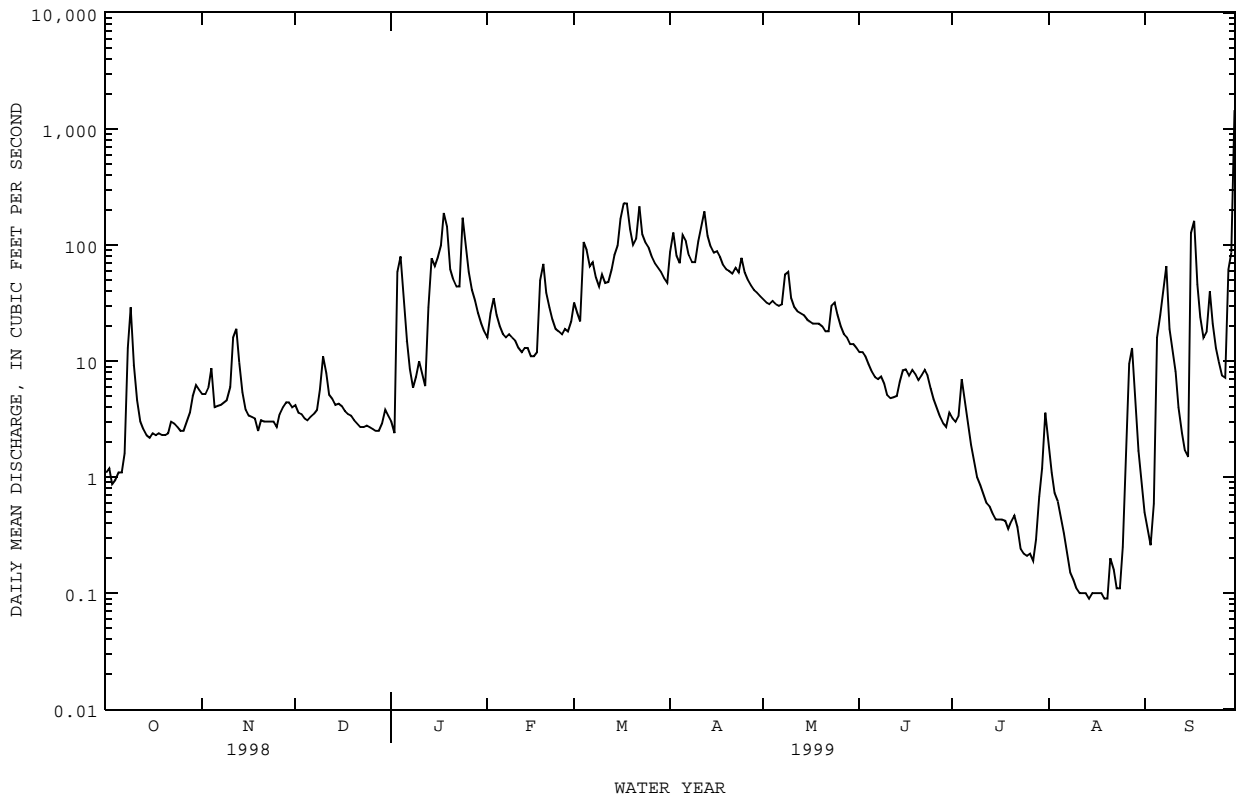
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1971 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	66.3	61.7	115	139	149	192	162	123	91.8	47.8	31.9	47.8
MAX	414	148	358	488	382	580	476	445	706	284	186	281
(WY)	1977	1997	1997	1998	1998	1993	1983	1989	1972	1987	1984	1979
MIN	2.07	5.16	3.88	10.2	21.8	43.7	48.6	26.6	6.82	1.35	1.25	1.05
(WY)	1987	1992	1999	1981	1999	1981	1985	1999	1999	1999	1999	1986

SUMMARY STATISTICS FOR 1998 CALENDAR YEAR FOR 1999 WATER YEAR WATER YEARS 1971 - 1999

ANNUAL TOTAL	54933.12	11269.72	
ANNUAL MEAN	151	30.9	102
HIGHEST ANNUAL MEAN			196
LOWEST ANNUAL MEAN			30.9
HIGHEST DAILY MEAN	4160	Mar 21	1460
LOWEST DAILY MEAN	.87	Oct 3	.09
ANNUAL SEVEN-DAY MINIMUM	1.1	Sep 30	.10
INSTANTANEOUS PEAK FLOW			3180
INSTANTANEOUS PEAK STAGE			9.40
INSTANTANEOUS LOW FLOW			.08
ANNUAL RUNOFF (CFSM)	1.68		.34
ANNUAL RUNOFF (INCHES)	22.81		4.68
10 PERCENT EXCEEDS	322		80
50 PERCENT EXCEEDS	42		8.1
90 PERCENT EXCEEDS	2.5		.46

- a Also Aug 19, 20, 1999.
- b From floodmarks, site and datum then in use.
- e Estimated.



POTOMAC RIVER BASIN

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 mi<sup>2</sup>.

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 sea level. 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 estimated daily discharges (backwater, ice effect), which are fair. Low flow affected slightly from 1913 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. Low flow affected extensively at times by run-of-the-river hydroelectric plants. 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.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 2, 1889, reached a stage of 40.2 ft, from floodmarks, discharge, about 460,000 ft<sup>3</sup>/s from rating curve extended as explained in footnotes.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 35,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Mar 20	0130	*40,600	*9.42	No other peak greater than base discharge.			

Minimum discharge, 695 ft<sup>3</sup>/s, Aug 14.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1750	1500	e1700	e1700	6300	3430	9270	6090	2860	1370	e1150	1710
2	1700	1820	e1650	e1600	5990	3550	8960	5610	2950	1530	e1150	1460
3	1730	1850	e1650	2940	5580	3640	8410	5250	2940	2060	e1100	1350
4	1600	1690	e1630	2340	5540	4520	8260	5100	2780	1720	e1150	1300
5	1780	1680	e1700	e2800	5290	11600	8180	4880	2630	1630	e1100	1650
6	1960	1870	e1640	e2500	5280	10200	8540	4550	2500	1570	e1150	2190
7	2520	1690	e1600	e2400	4990	9410	8140	4340	2300	1440	1170	2950
8	2560	1750	e1700	e2500	4910	8820	7370	4410	2300	1290	1070	e7000
9	2310	1580	e1750	e2800	4890	8290	6780	8030	2030	1160	1040	e12000
10	2180	1900	e1850	e2700	5060	8150	7050	8290	1950	1060	1020	e10000
11	2070	1980	e1950	e2600	5770	7570	16900	6890	1920	930	976	e8500
12	2090	1880	e1900	e2700	5730	7030	22600	6350	1810	973	814	e6000
13	2260	1810	e1800	e2900	5320	6600	27400	5660	1720	978	762	e4500
14	2080	1820	e1900	e3300	5000	6770	21200	5740	1620	1040	721	e3800
15	1950	1720	e1800	e5000	4620	7440	16400	4990	1760	969	1030	e3500
16	1800	e1650	e1700	5200	4230	8140	13300	4630	1800	e1100	967	e5000
17	1850	e1550	e1750	4860	4160	9540	12100	4580	1790	e1300	e1020	7310
18	1660	e1700	e1800	6270	4230	16200	11000	5400	1750	e1200	e1080	8960
19	1750	e1780	e1850	9920	4300	33400	9660	5010	1800	e1100	e1040	e6500
20	1770	1800	e1850	6910	4170	37300	8530	4570	1910	e1000	1010	e5500
21	1710	1800	e1830	6400	4210	27000	7980	4140	1840	e1050	1070	e4800
22	1660	1760	e1800	6600	4340	24500	7980	3890	1690	e1050	987	e4800
23	1680	1760	e1780	7030	4040	29400	8210	3820	1680	e1100	1010	e5200
24	1670	1810	e1760	11700	3900	25400	9030	3800	1680	e1100	1030	e5000
25	1670	1750	e1750	23900	3640	20500	10400	3690	1590	e1200	986	e4500
26	1670	1850	e1730	21900	3510	17500	11200	3840	1480	e1500	1230	e4000
27	1660	1840	e1700	16900	3330	15200	9940	3860	1450	1360	1890	3530
28	1670	1850	e1600	12700	3340	13300	8750	3820	1420	1220	1870	3470
29	1740	1820	e1500	9780	---	12000	7560	3480	1590	1300	1790	3460
30	1760	e1750	e1550	8310	---	10700	6780	3230	1620	e1200	1660	11300
31	1790	---	e1700	7370	---	9720	---	2960	---	e1150	1850	---
TOTAL	58050	53010	53870	206530	131670	416820	327880	150900	59160	38650	35893	151240
MEAN	1873	1767	1738	6662	4702	13450	10930	4868	1972	1247	1158	5041
MAX	2560	1980	1950	23900	6300	37300	27400	8290	2950	2060	1890	12000
MIN	1600	1500	1500	1600	3330	3430	6780	2960	1420	930	721	1300
CFSM	.19	.18	.18	.69	.49	1.39	1.13	.50	.20	.13	.12	.52
IN.	.22	.20	.21	.80	.51	1.61	1.26	.58	.23	.15	.14	.58

e Estimated

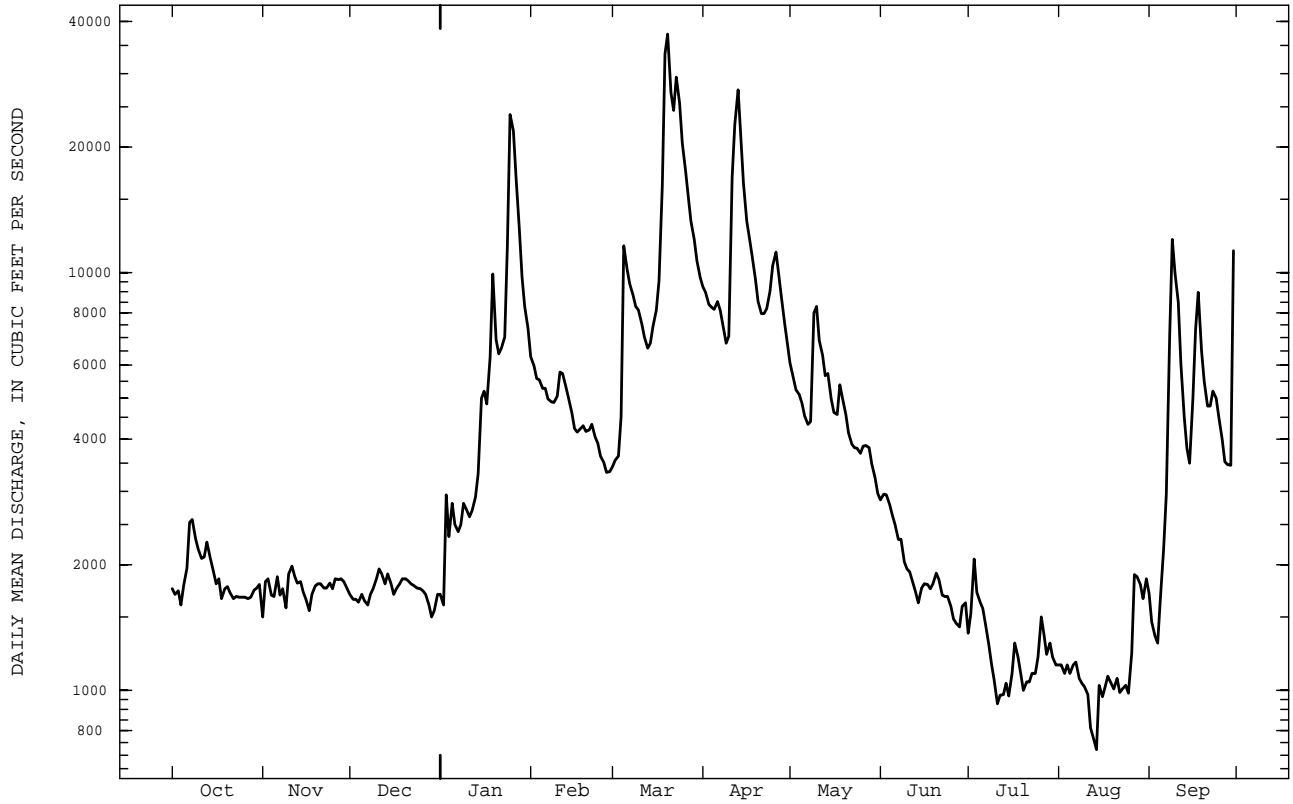
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1895 - 1999, BY WATER YEAR (WY)

	1895	1896	1897	1898	1899	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
MEAN	5025	5684	8585	11600	14500	19840	16490	12330	7965	4514	4269	3786																																																																																													
MAX	37030	39000	32610	42160	47870	68360	43840	41970	40400	16000	23580	38300																																																																																													
(WY)	1943	1986	1973	1996	1998	1936	1993	1924	1972	1949	1955	1996																																																																																													
MIN	706	840	1253	1703	2661	5400	4368	3276	1932	1056	771	834																																																																																													
(WY)	1931	1931	1966	1981	1934	1931	1915	1930	1969	1966	1930	1930																																																																																													

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

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR		FOR 1999 WATER YEAR		WATER YEARS 1895 - 1999	
ANNUAL TOTAL	5305290		1683673		9535	
ANNUAL MEAN	14540		4613		18750	
HIGHEST ANNUAL MEAN					4366	
LOWEST ANNUAL MEAN					1996	
HIGHEST DAILY MEAN	113000	Mar 22	37300	Mar 20	434000	Mar 19 1936
LOWEST DAILY MEAN	1500	Nov 1	721	Aug 14	540	Sep 10 1914
ANNUAL SEVEN-DAY MINIMUM	1650	Dec 25	899	Aug 10	593	Sep 6 1966
INSTANTANEOUS PEAK FLOW			40600		Mar 20	(s)480000
INSTANTANEOUS PEAK STAGE			9.42		Mar 20	41.03
INSTANTANEOUS LOW FLOW			695		Aug 14	530
ANNUAL RUNOFF (CFSM)	1.51		.48		.99	
ANNUAL RUNOFF (INCHES)	20.45		6.49		13.42	
10 PERCENT EXCEEDS	38800		9740		20800	
50 PERCENT EXCEEDS	5150		2300		5380	
90 PERCENT EXCEEDS	1700		1150		1680	

a From rating curve extended above 300,000 ft<sup>3</sup>/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.  
 b Sept. 11, 12, 1966.



POTOMAC RIVER BASIN

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 mi<sup>2</sup>.

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 sea level. Jul. 12, 1909, to Dec. 31, 1912, nonrecording gage at site 1,000 ft downstream at different datum. Jan. 21, 1930, to Nov. 28, 1938, non-recording gage at site 400 ft downstream at datum 4.20 ft lower than present datum.

REMARKS.--Records good except those for periods with backwater from beaver dams, Oct. 19 to Dec. 1, and Dec. 14 to Jan. 2, which are poor, and period with ice effect, Feb. 24, 25, which is fair. National Weather Service gage-height telemeter at station. Maximum discharge, 78,100 ft<sup>3</sup>/s, from rating curve extended above 11,000 ft<sup>3</sup>/s on basis of slope-area measurement of peak flow. 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 Department of Environmental Quality - Water Division.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in May or June 1889 reached a stage of about 29 ft, discharge, about 45,000 ft<sup>3</sup>/s, site and datum in use 1930-38, from information by local residents.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Sep 30	1530	*7,240	*10.95	No other peak greater than base discharge.			

Minimum discharge, 0.48 ft<sup>3</sup>/s, Aug 13.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	4.4	e19	e14	e13	96	162	231	152	52	16	3.4	2.9
2	3.9	e19	13	e12	135	134	334	142	50	13	2.8	2.3
3	3.6	e21	12	149	186	130	259	135	45	13	2.0	2.0
4	3.6	e24	11	359	141	395	225	137	40	14	1.4	2.6
5	3.6	e17	13	115	116	345	283	132	36	10	1.0	9.9
6	3.5	e18	14	67	99	267	287	124	33	8.9	.90	34
7	4.6	e19	14	56	94	253	241	124	29	7.1	.78	52
8	26	e21	15	40	94	197	216	214	27	6.0	.82	100
9	46	e23	23	40	88	175	209	259	23	4.8	.79	82
10	30	e35	28	55	80	212	316	158	21	4.6	.66	145
11	18	e64	33	46	75	205	341	127	18	4.3	.61	67
12	12	e40	28	41	72	190	503	114	17	3.4	.58	37
13	8.5	e25	24	59	82	243	364	105	16	3.4	.55	20
14	6.7	e19	e21	192	78	331	307	100	18	3.0	1.4	13
15	5.7	e17	e19	198	68	505	281	97	26	2.9	3.1	10
16	6.2	e15	e17	396	64	744	288	91	22	3.2	2.4	406
17	6.7	e14	e15	255	67	931	258	86	19	2.9	2.5	564
18	6.8	e13	e14	452	187	915	222	84	20	2.6	1.9	173
19	e6.7	e11	e14	520	292	686	200	82	19	2.3	2.7	93
20	e6.6	e10	e13	237	196	518	192	78	20	2.2	2.5	66
21	e7.4	e11	e13	187	153	519	188	72	24	2.4	2.0	159
22	e8.2	e11	e12	372	125	794	219	71	26	5.4	1.7	251
23	e7.6	e11	e13	306	99	526	236	128	23	3.7	1.7	144
24	e7.2	e12	e15	1180	e92	450	462	172	20	4.3	1.7	92
25	e7.0	e11	e14	782	e85	413	292	136	17	14	2.0	67
26	e7.0	e13	e13	363	99	346	237	94	15	17	2.5	54
27	e8.0	e16	e13	251	97	305	209	78	13	8.6	33	46
28	e10	e15	e12	198	113	280	191	69	13	5.1	16	155
29	e15	e14	e13	160	---	254	175	63	20	3.3	7.2	342
30	e21	e15	e16	129	---	226	164	59	23	4.1	5.1	4870
31	e20	---	e14	109	---	200	---	55	---	4.8	3.8	---
TOTAL	331.5	573	503	7339	3173	11851	7930	3538	745	200.3	109.49	8061.7
MEAN	10.7	19.1	16.2	237	113	382	264	114	24.8	6.46	3.53	269
MAX	46	64	33	1180	292	931	503	259	52	17	33	4870
MIN	3.5	10	11	12	64	130	164	55	13	2.2	.55	2.0
CFSM	.03	.06	.05	.71	.34	1.15	.80	.34	.07	.02	.01	.81
IN.	.04	.06	.06	.82	.36	1.33	.89	.40	.08	.02	.01	.90

01644000 GOOSE CREEK NEAR LEESBURG, VA--Continued

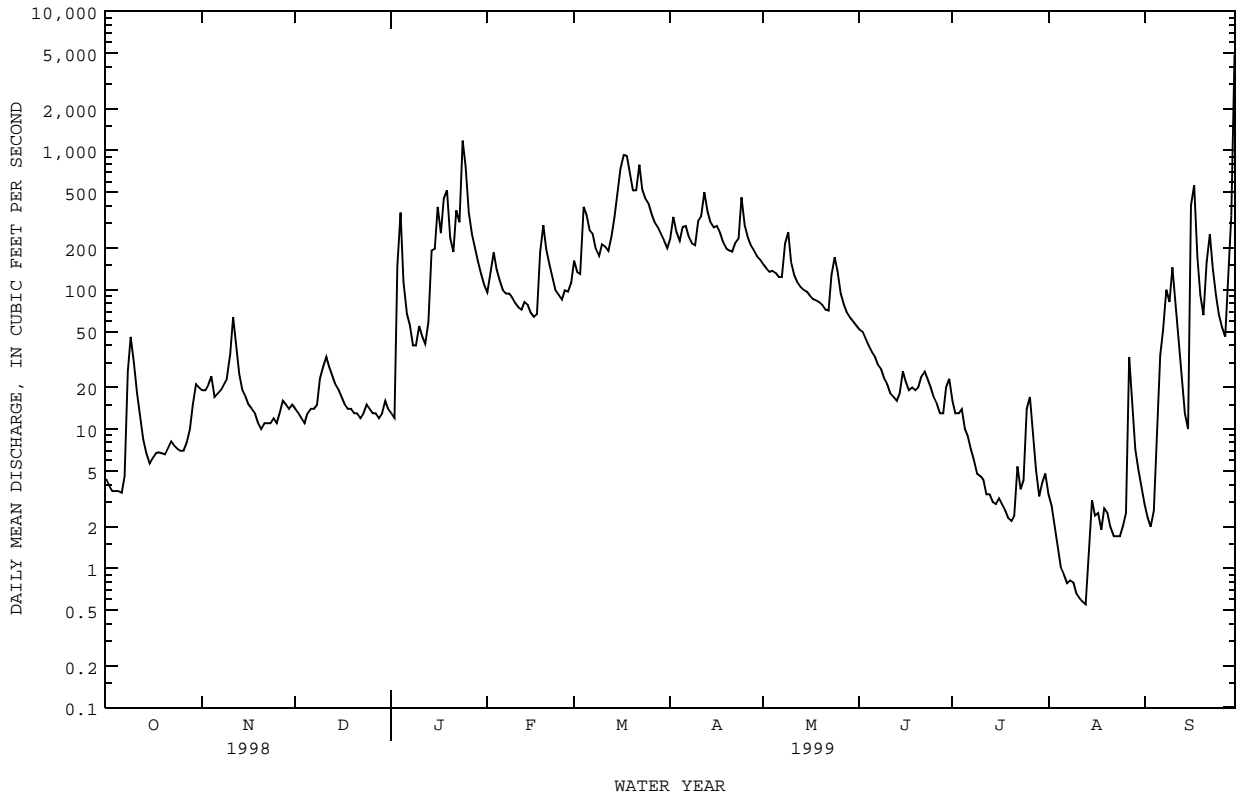
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1909 - 1913, 1930 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	194	220	330	419	515	596	516	368	259	139	155	136
MAX	2265	1155	1316	1499	1621	1892	1766	1322	2887	1207	1188	1054
(WY)	1943	1933	1993	1996	1998	1993	1983	1989	1972	1956	1937	1945
MIN	2.12	3.83	14.8	25.8	26.3	83.6	141	85.5	24.8	6.46	1.86	1.38
(WY)	1931	1931	1966	1966	1931	1931	1981	1969	1999	1999	1930	1985

SUMMARY STATISTICS FOR 1998 CALENDAR YEAR FOR 1999 WATER YEAR WATER YEARS 1910 - 1912 1930 - 1999

ANNUAL TOTAL	189005.4	44354.99		
ANNUAL MEAN	518	122	323	
HIGHEST ANNUAL MEAN			664	1972
LOWEST ANNUAL MEAN			55.2	1931
HIGHEST DAILY MEAN	11800	Mar 21	e53600	Jun 22 1972
LOWEST DAILY MEAN	3.4	Sep 16	.40	aSep 27 1941
ANNUAL SEVEN-DAY MINIMUM	3.9	Sep 30	.68	Aug 7
INSTANTANEOUS PEAK FLOW			7240	Sep 30
INSTANTANEOUS PEAK STAGE			10.95	Sep 30
INSTANTANEOUS LOW FLOW			.48	Aug 13
ANNUAL RUNOFF (CFSM)	1.56		.37	.97
ANNUAL RUNOFF (INCHES)	21.18		4.97	13.21
10 PERCENT EXCEEDS	1240		297	700
50 PERCENT EXCEEDS	147		33	160
90 PERCENT EXCEEDS	6.9		3.2	17

- a Also Sep 28-30, 1941.
- b From high-water mark in gage house.
- c Not determined.
- d Probably occurred Sep 27-30, 1941.
- 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 mi<sup>2</sup>.

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 sea level.

REMARKS.--Records good except for period with backwater from beaver dam, Oct. 11 to Nov. 25, which is poor, and those for periods with ice effect, Dec. 26-29, and Dec. 31 to Jan. 2, and periods of doubtful gage-height record, Jan. 5-23, 25, which are fair. Maximum discharge, 32,200 ft<sup>3</sup>/s, from rating curve extended above 1,600 ft<sup>3</sup>/s on basis of contracted-opening measurement at gage height 13.18 ft and slope-area measurement at gage height 21.40 ft. Minimum gage height, 1.65 ft, Sep. 9, 10, 1966. 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 Department of Environmental Quality - Water Division.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Sep 10	0130	1,380	7.84	Sep 21	1930	1,030	7.07
Sep 16	1800	*1,680	*8.42	Sep 30	0730	1,160	7.37

Minimum discharge, 0.60 ft<sup>3</sup>/s, Aug 13.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	6.2	e12	11	e13	27	95	49	33	16	27	3.6	6.0
2	4.7	e11	11	e12	100	46	53	31	16	38	2.9	5.9
3	4.1	e17	12	342	51	44	41	31	15	17	3.0	5.6
4	5.0	e15	12	87	37	174	49	32	14	12	2.3	100
5	5.8	e9.5	12	e44	36	57	94	28	12	10	2.1	245
6	6.5	e9.9	12	e27	33	51	49	28	12	7.8	1.9	56
7	7.9	e10	12	e22	32	63	42	36	12	11	1.3	100
8	111	e11	19	e19	30	40	38	216	12	6.2	1.3	49
9	51	e12	67	e50	29	43	44	64	10	5.5	1.5	222
10	16	e13	26	e61	29	53	78	46	9.7	5.0	1.8	342
11	e10	e45	17	e40	27	54	97	27	11	6.0	1.4	36
12	e7.0	e19	15	e26	51	58	70	25	11	4.7	1.2	17
13	e7.2	e12	41	e41	92	65	47	24	17	8.6	.93	13
14	e7.8	e10	33	e45	38	93	42	23	54	5.8	29	11
15	e9.0	e9.4	19	e150	33	432	39	22	61	4.9	33	29
16	e8.0	e9.0	16	e90	31	226	50	22	18	4.4	7.2	1060
17	e8.2	e9.2	16	e52	36	157	39	22	15	4.0	4.6	175
18	e7.6	e11	15	e189	241	112	36	22	17	3.9	3.6	40
19	e8.0	e10	18	e88	85	67	35	22	13	3.4	2.8	25
20	e8.5	e9.8	14	e70	49	54	35	20	69	3.3	8.8	21
21	e9.4	e14	16	e105	40	97	41	19	41	3.3	6.5	392
22	e8.6	e11	17	e108	35	161	49	19	22	3.3	12	204
23	e9.6	e10	17	e65	32	67	58	54	17	3.3	4.8	49
24	e10	e9.5	17	513	32	56	92	110	14	3.0	21	30
25	e9.4	e17	18	e138	32	51	44	48	11	6.8	138	24
26	e9.0	69	e15	62	32	45	39	25	12	45	129	21
27	e9.2	26	e13	48	30	43	36	21	10	7.2	131	20
28	e10	14	e16	43	98	42	35	19	18	4.5	43	38
29	e12	12	e17	39	---	40	35	19	51	3.9	16	27
30	e14	11	22	36	---	38	33	18	29	3.7	8.9	594
31	e13	---	e16	28	---	37	---	17	---	5.1	6.3	---
TOTAL	413.7	458.3	582	2653	1418	2661	1489	1143	639.7	277.6	630.73	3957.5
MEAN	13.3	15.3	18.8	85.6	50.6	85.8	49.6	36.9	21.3	8.95	20.3	132
MAX	111	69	67	513	241	432	97	216	69	45	138	1060
MIN	4.1	9.0	11	12	27	37	33	17	9.7	3.0	.93	5.6
CFSM	.23	.26	.32	1.48	.87	1.48	.86	.64	.37	.15	.35	2.28
IN.	.27	.29	.37	1.70	.91	1.71	.96	.73	.41	.18	.41	2.54

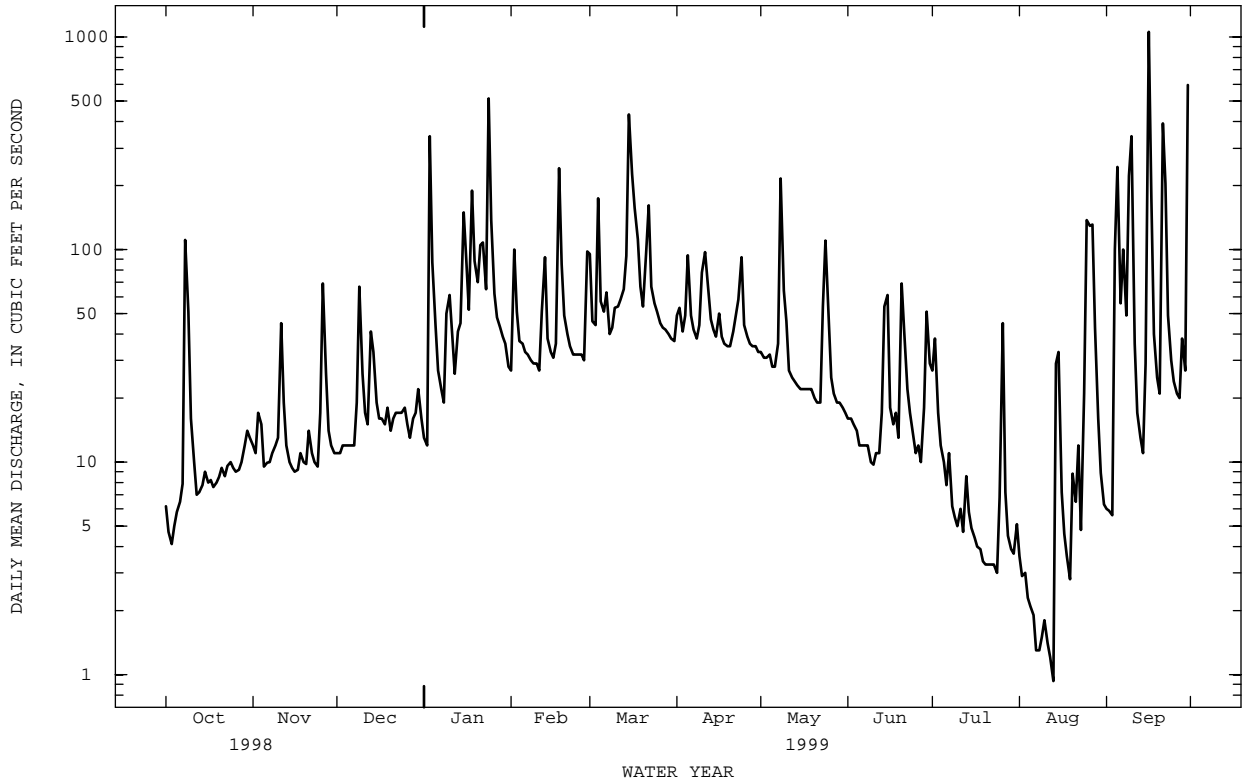
01646000 DIFFICULT RUN NEAR GREAT FALLS, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1935 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	39.9	50.6	60.4	75.5	82.6	90.6	82.0	71.5	67.2	40.8	38.0	37.9
MAX	317	116	165	194	228	227	224	203	1210	115	143	245
(WY)	1980	1973	1997	1996	1998	1993	1973	1989	1972	1975	1955	1975
MIN	4.69	7.75	11.4	16.5	32.4	33.2	31.5	21.8	10.0	4.52	1.88	5.57
(WY)	1942	1942	1966	1966	1942	1981	1985	1955	1986	1955	1966	1986

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR		FOR 1999 WATER YEAR		WATER YEARS 1935 - 1999	
ANNUAL TOTAL	29899.9		16323.53			
ANNUAL MEAN	81.9		44.7		61.3	
HIGHEST ANNUAL MEAN					184	
LOWEST ANNUAL MEAN					28.4	
HIGHEST DAILY MEAN	1510	Mar 21	1060	Sep 16	e25000	Jun 22 1972
LOWEST DAILY MEAN	4.1	Oct 3	.93	Aug 13	.10	aSep 7 1966
ANNUAL SEVEN-DAY MINIMUM	5.6	Sep 10	1.3	Aug 7	.16	Sep 3 1966
INSTANTANEOUS PEAK FLOW			1680	Sep 16	32200	Jun 22 1972
INSTANTANEOUS PEAK STAGE			8.42	Sep 16	b21.40	Jun 22 1972
INSTANTANEOUS LOW FLOW			.60	Aug 13	.05	cSep 9 1966
ANNUAL RUNOFF (CFSM)	1.41		.77		1.06	
ANNUAL RUNOFF (INCHES)	19.21		10.49		14.37	
10 PERCENT EXCEEDS	171		93		105	
50 PERCENT EXCEEDS	41		22		38	
90 PERCENT EXCEEDS	8.0		5.3		13	

- a Also Sep 8, 9, 1966.
- b From floodmarks.
- c Also Sep 10, 1966.
- e Estimated.



POTOMAC RIVER BASIN

01646500 POTOMAC RIVER NEAR WASHINGTON, DC

LOCATION.--Lat 38°56'58", long 77°07'40", Montgomery County, 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, and at mile 117.4.

DRAINAGE AREA.--11,560 mi<sup>2</sup>.

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 sea level. 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.--No estimated daily discharges. Water-discharge records good. 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. National Weather Service gage-height telemeter at station. Satellite telemeter at station.

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 greater than base discharge of 45,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Mar 20	1015	*46,400	*6.51	No other peak greater than base discharge.			

Minimum discharge, 141 ft<sup>3</sup>/s, Aug 13.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1210	1410	1180	1210	7560	4450	11300	7390	2370	1080	438	1230
2	1270	1230	1210	1130	7210	4460	11600	6620	2180	1100	478	1270
3	1320	1220	1240	2360	7100	4460	11100	6090	2220	972	424	1190
4	1350	1560	1100	3490	7160	6000	10500	5740	2210	1180	431	1230
5	1300	1470	1240	2780	6460	9660	10600	5470	2200	1250	374	2100
6	1290	1340	1150	2170	5970	14700	11400	5250	2090	865	487	2380
7	1490	1470	1100	1940	5710	12100	11300	4830	1850	724	486	2170
8	2630	1480	1140	2180	5380	11600	10100	5580	1600	680	401	2800
9	3390	1300	1490	2350	5500	10600	9230	5740	1520	649	476	10500
10	2770	1240	1480	2440	5600	10100	9200	9940	1340	488	379	14300
11	2410	1640	1470	2230	5770	9570	14200	8540	1370	517	281	9350
12	2090	1770	1650	2440	6320	8800	26000	7100	1270	377	288	6480
13	1930	1620	1650	2790	6430	8640	33200	6370	1320	451	174	4710
14	2020	1460	1400	3230	5700	8580	28900	5800	1480	402	304	3680
15	1900	1390	1670	4910	5350	10500	22100	5710	1600	284	479	3110
16	1810	1290	1490	5010	4900	12500	17700	4940	1280	383	358	7160
17	1590	1180	1210	5180	4570	13500	15200	4530	1470	287	274	9140
18	1580	1180	1300	5860	5760	16200	14000	4570	1500	234	260	10300
19	1320	1230	1390	12300	6330	29800	12300	5200	1380	424	270	7320
20	1380	1320	1390	12500	6110	44700	10900	4710	1620	428	685	5350
21	1450	1340	1340	8890	5230	36200	9790	4110	1870	441	595	5710
22	1260	1270	1240	7960	5020	30700	9410	3710	1620	295	568	6100
23	1370	1190	1350	8040	4950	35300	9550	3840	1400	358	464	4610
24	1400	1240	1310	12600	4640	32800	11000	4060	1190	344	799	4980
25	1330	1220	1280	29100	4310	26400	11400	4140	1120	440	1460	4780
26	1240	1390	1250	28400	4010	22100	12900	3640	1080	725	2300	4020
27	1340	1400	1210	21900	3860	19000	12200	3590	900	762	2000	3380
28	1220	1410	1140	16500	4020	16600	10800	3360	803	746	1670	3300
29	1340	1320	1030	12700	---	14700	9540	3260	1170	679	1830	3440
30	1270	1280	987	10300	---	13300	8270	2940	1070	516	1550	12000
31	1390	---	1230	8730	---	12000	---	2650	---	490	1360	---
TOTAL	50660	40860	40317	243620	156930	510020	405690	159420	46093	18571	22343	158090
MEAN	1634	1362	1301	7859	5605	16450	13520	5143	1536	599	721	5270
MAX	3390	1770	1670	29100	7560	44700	33200	9940	2370	1250	2300	14300
MIN	1210	1180	987	1130	3860	4450	8270	2650	803	234	174	1190
(†)	607	597	605	610	582	583	604	689	780	791	708	581
MEAN≠	2242	2959	2907	8471	6187	17040	14130	5832	2316	1391	1429	5854
CFSM≠	0.19	0.17	0.16	0.73	0.54	1.47	1.22	0.50	0.20	0.12	0.12	0.51
IN≠	0.22	0.19	0.19	0.85	0.56	1.70	1.36	0.58	0.22	0.14	0.14	0.57

† 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.

01646500 POTOMAC RIVER NEAR WASHINGTON, DC--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1930 - 1958, BY WATER YEAR (WY) (UNREGULATED)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	6120	6496	9843	13570	16660	21060	19120	13610	7960	5135	5804	4419
MAX	44100	21040	30900	37190	36790	76510	36430	27780	19090	21040	28210	19940
(WY)	1943	1933	1951	1937	1939	1936	1933	1932	1951	1949	1955	1945
MIN	583	700	1536	2527	2982	6505	7202	3953	2867	1284	569	679
(WY)	1931	1931	1944	1956	1934	1931	1947	1930	1930	1930	1930	1930

SUMMARY STATISTICS

WATER YEARS 1930 - 1958

ANNUAL MEAN	10790
HIGHEST ANNUAL MEAN	16100 1949
LOWEST ANNUAL MEAN	4525 1930
HIGHEST DAILY MEAN	426000 Mar 19 1936
LOWEST DAILY MEAN	448 Aug 25 1930
ANNUAL SEVEN-DAY MINIMUM	499 Aug 21 1930
INSTANTANEOUS PEAK FLOW	484000 Mar 19 1936
INSTANTANEOUS PEAK STAGE	(a) 28.10 Mar 19 1936
INSTANTANEOUS LOW FLOW	430 Aug 24 1930
ANNUAL RUNOFF (CFSM)	.93
ANNUAL RUNOFF (INCHES)	12.68
10 PERCENT EXCEEDS	23600
50 PERCENT EXCEEDS	6440
90 PERCENT EXCEEDS	1810

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1959 - 1999, BY WATER YEAR (WY) (REGULATED, UNADJUSTED)

MEAN	6008	7848	11490	14430	17870	25530	20790	15370	9312	4735	4063	4768
MAX	36790	42030	37630	52890	61040	67370	57850	40410	46630	17160	21720	44620
(WY)	1977	1986	1997	1996	1998	1994	1993	1989	1972	1972	1996	1996
MIN	908	1097	1038	1682	5605	7403	5810	3921	1536	599	538	791
(WY)	1964	1966	1966	1981	1999	1990	1995	1969	1999	1999	1966	1964

SUMMARY STATISTICS

FOR 1998 CALENDAR YEAR

FOR 1999 WATER YEAR

WATER YEARS 1959 - 1999

ANNUAL TOTAL	6650717	1852614	
ANNUAL MEAN	18220	5076	11820
ANNUAL MEAN#	18830	5722	12323
HIGHEST ANNUAL MEAN			23760 1996
HIGHEST ANNUAL MEAN#			24370 1996
LOWEST ANNUAL MEAN			4900 1969
LOWEST ANNUAL MEAN#			5306 1969
HIGHEST DAILY MEAN	140000 Mar 22	44700 Mar 20	334000 Jun 24 1972
LOWEST DAILY MEAN	987 Dec 30	174 Aug 13	(b) 121 Sep 9 1966
LOWEST DAILY MEAN#	1810 Sep 9	1860 Oct 24	(c) 601 Sep 10 1966
ANNUAL SEVEN-DAY MINIMUM	1160 Dec 25	303 Aug 13	181 Sep 7 1966
INSTANTANEOUS PEAK FLOW		46400 Mar 20	359000 Jun 24 1972
INSTANTANEOUS PEAK STAGE		6.51 Mar 20	22.03 Jun 24 1972
INSTANTANEOUS LOW FLOW		141 Aug 13	66 Sep 9 1966
ANNUAL RUNOFF (CFSM)	1.58	.44	1.02
ANNUAL RUNOFF (CFSM)#	1.63	.49	1.03
ANNUAL RUNOFF (INCHES)	21.40	5.96	13.89
ANNUAL RUNOFF (INCHES)#	22.12	6.72	14.48
10 PERCENT EXCEEDS	50900	12100	27100
50 PERCENT EXCEEDS	6070	2170	6480
90 PERCENT EXCEEDS	1270	506	1550

a At previous site, 1 mi upstream at same datum.

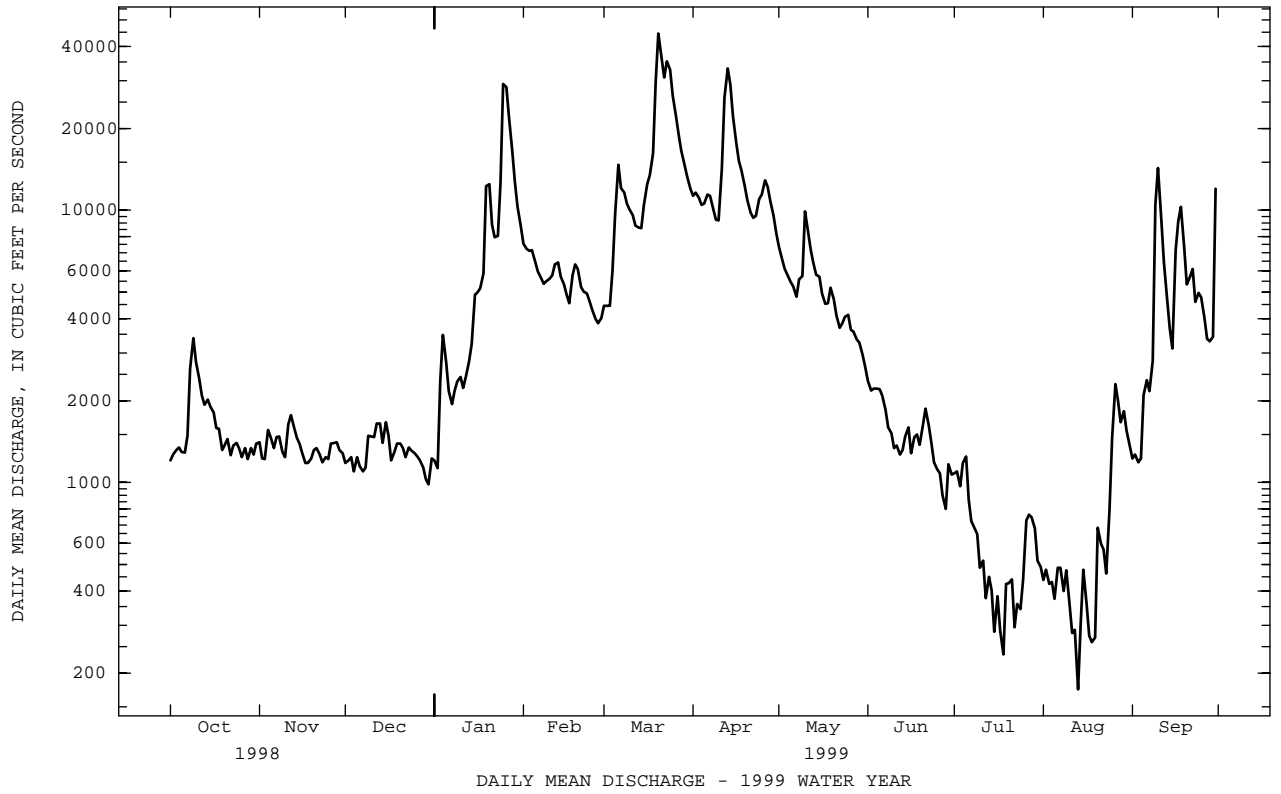
# Adjusted for diversion.

b Minimum daily discharge observed at gaging station, does not include diversion of 489 ft<sup>3</sup>/s.

c Includes diversion of 449 ft<sup>3</sup>/s for municipal use.

POTOMAC RIVER BASIN

01646500 POTOMAC RIVER NEAR WASHINGTON, DC--Continued



POTOMAC RIVER BASIN

01646500 POTOMAC RIVER NEAR WASHINGTON, DC--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1989 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: October 1988 to current year.

WATER TEMPERATURE: October 1988 to current year.

INSTRUMENTATION.--Water-quality monitor October 1988 to current year.

REMARKS.--Missing record for specific conductance during Jan and Mar due to instrument malfunction. Missing record for water temperature during July-Sep due to instrument malfunction.

EXTREMES FOR PERIOD OF DAILY RECORD--

SPECIFIC CONDUCTANCE (water years 1989-98): Maximum, 747 microsiemens, Jan. 11, 1991 (may have been greater than 1,000 microsiemens during period of missing record in Jan and Mar 1999); minimum, 68 microsiemens, Oct. 23, 1990.

WATER TEMPERATURE (water years 1989-93, 1995-99): Maximum, 33.5°C, July 11, 1993; minimum, 0.0°C, on many day during winter periods.

EXTREMES FOR CURRENT YEAR.--

SPECIFIC CONDUCTANCE: Maximum, UNKNOWN (may have been greater than 1,000 microsiemens during period of missing record in Jan and Mar); minimum, 119 microsiemens, Sep 16.

WATER TEMPERATURE: Maximum, 33.4°C, Jul 18; minimum, 0.1°C, Dec 24.

SPECIFIC CONDUCTANCE (MICROSIEMENS/CM AT 25 DEG. C), WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DAY	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
1	410	403	406	391	384	388	438	431	435	516	447	477
2	408	398	403	398	387	395	435	430	432	471	452	461
3	404	397	401	403	396	400	432	429	430	931	446	615
4	407	398	403	405	401	404	430	426	427	704	504	579
5	413	406	410	415	405	411	427	425	426	518	489	506
6	416	410	414	419	411	416	425	419	422	520	499	511
7	421	414	419	417	410	413	420	415	419	499	447	462
8	420	222	387	423	410	417	417	413	414	495	458	479
9	382	257	354	429	423	427	414	391	407	546	437	454
10	392	380	389	427	420	425	396	374	388	829	546	751
11	403	391	395	420	403	413	404	393	397	770	700	749
12	410	403	408	416	407	413	405	396	403	734	696	720
13	406	389	397	432	416	426	411	403	407	715	615	682
14	392	389	390	436	432	435	418	398	410	664	615	646
15	397	391	395	440	435	438	403	396	400	---	---	---
16	404	397	402	442	438	441	407	401	404	1070	766	907
17	417	404	413	445	441	444	410	402	407	766	641	712
18	425	416	419	446	442	444	411	406	408	831	621	699
19	422	416	419	449	433	439	415	408	411	717	494	570
20	422	403	418	436	423	430	423	414	420	494	398	428
21	413	403	409	429	422	426	422	416	420	471	414	442
22	419	407	415	428	422	425	416	407	410	475	452	464
23	424	417	421	435	423	430	418	411	414	476	456	469
24	429	418	425	444	435	440	423	416	419	478	341	435
25	435	424	430	444	438	441	444	418	425	409	341	367
26	435	428	431	447	444	446	456	441	449	390	289	364
27	430	420	428	450	446	449	476	450	456	289	240	260
28	420	407	415	451	430	438	471	456	463	289	241	265
29	409	393	403	442	434	438	476	464	468	289	265	275
30	400	385	393	436	430	433	486	436	462	265	263	264
31	392	383	388	---	---	---	502	466	479	265	257	261
MONTH	435	222	406	451	384	426	502	374	424	---	---	---

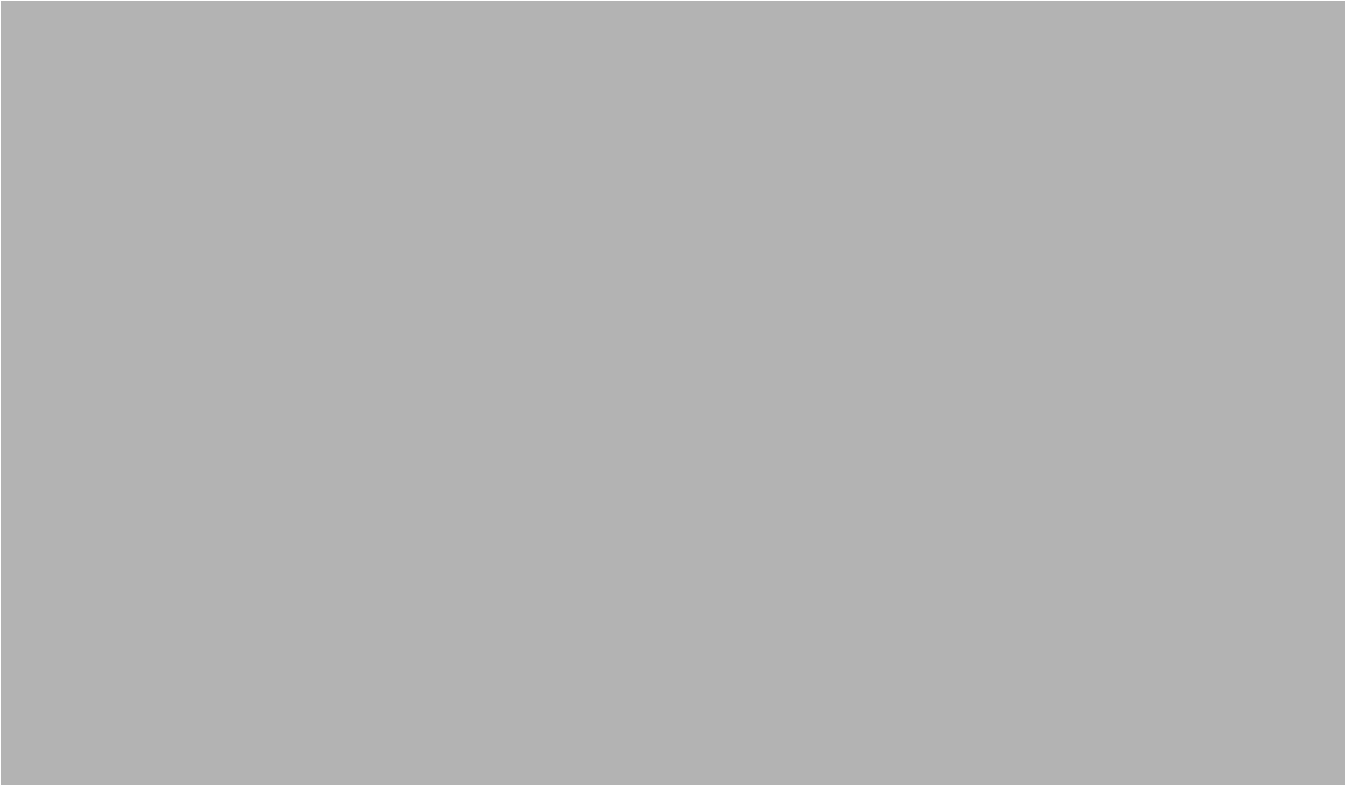
## POTOMAC RIVER BASIN

01646500 POTOMAC RIVER NEAR WASHINGTON, DC--Continued

SPECIFIC CONDUCTANCE (MICROSIEMENS/CM AT 25 DEG. C), WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	FEBRUARY			MARCH			APRIL			MAY		
1	278	261	268	532	384	465	292	256	268	279	256	264
2	313	278	298	384	355	375	280	270	273	294	259	267
3	302	283	287	453	351	390	277	271	273	286	267	277
4	296	287	290	413	351	387	284	273	276	289	276	282
5	310	296	305	397	351	365	298	279	286	288	264	274
6	312	306	308	384	344	360	308	291	298	285	269	277
7	315	312	314	385	353	364	334	307	318	285	274	280
8	340	315	321	353	277	320	323	281	287	294	276	287
9	330	324	328	277	256	261	292	280	285	292	276	283
10	331	324	328	532	266	342	304	267	283	299	285	289
11	339	329	334	504	396	431	278	270	272	311	299	306
12	346	333	337	513	401	463	284	262	274	309	281	296
13	350	332	337	442	345	396	273	239	249	287	256	278
14	351	339	346	740	307	358	241	172	191	256	243	248
15	349	338	344	---	---	---	188	173	179	264	249	255
16	346	330	339	1010	543	699	208	188	198	278	264	271
17	349	333	343	570	383	455	233	207	216	286	278	281
18	353	227	313	393	338	362	260	232	250	292	283	288
19	309	277	300	352	315	331	265	236	250	295	285	290
20	319	305	311	315	197	247	268	244	260	295	282	288
21	326	311	316	230	190	202	266	240	255	289	277	281
22	328	311	316	249	192	202	268	245	250	288	281	284
23	340	321	330	203	193	197	263	245	250	294	284	288
24	336	325	331	200	173	189	278	258	265	290	238	277
25	343	323	333	182	172	179	281	257	268	304	242	287
26	342	323	335	192	180	187	280	259	268	322	298	307
27	349	336	343	215	192	205	354	274	301	345	297	305
28	507	337	383	234	208	222	373	266	315	320	303	312
29	---	---	---	262	231	242	274	257	263	333	320	327
30	---	---	---	254	240	248	277	263	266	325	296	308
31	---	---	---	257	249	254	---	---	---	299	291	295
MONTH	507	227	323	---	---	---	373	172	263	345	238	286
DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	299	290	293	429	387	408	446	361	382	388	372	381
2	302	291	295	452	429	442	374	368	371	409	388	402
3	317	300	310	479	452	465	384	373	377	423	407	411
4	335	292	309	480	471	475	388	375	381	423	419	421
5	432	289	331	484	475	478	388	376	379	424	386	415
6	324	290	295	488	477	482	382	376	379	386	359	368
7	298	290	293	501	487	494	381	373	377	359	341	347
8	305	291	299	506	499	503	373	365	369	344	301	317
9	299	287	292	507	503	505	392	368	374	349	326	337
10	323	291	308	506	494	501	406	373	391	360	293	332
11	326	309	322	501	491	496	413	389	403	383	360	373
12	323	313	319	491	488	490	414	381	397	391	340	377
13	314	280	297	493	488	490	386	382	384	340	300	311
14	280	266	272	488	478	482	387	384	385	301	279	287
15	268	264	266	478	465	473	408	381	392	279	256	265
16	276	263	268	465	445	456	419	398	411	256	119	190
17	278	273	276	445	433	440	413	380	405	185	159	171
18	284	276	279	433	426	431	380	360	373	202	185	193
19	281	276	279	427	420	423	367	361	363	202	197	199
20	277	266	273	421	404	412	376	349	365	201	196	198
21	269	266	268	404	396	399	360	351	356	239	201	217
22	273	262	267	407	395	401	378	354	367	284	239	264
23	269	262	266	397	395	396	387	355	362	301	284	294
24	302	266	276	396	389	392	370	344	352	303	227	256
25	307	292	303	389	380	386	351	334	342	262	227	237
26	310	305	307	387	374	383	366	348	359	292	262	282
27	317	305	309	379	361	371	365	350	361	301	292	298
28	340	317	329	375	364	367	362	325	347	313	301	308
29	348	337	341	397	369	379	363	338	351	320	218	314
30	387	338	358	374	364	370	363	340	346	323	255	292
31	---	---	---	433	371	387	381	348	365	---	---	---
MONTH	432	262	297	507	361	438	446	325	373	424	119	302

01646500 POTOMAC RIVER NEAR WASHINGTON, DC--Continued





## POTOMAC RIVER BASIN

01646500 POTOMAC RIVER NEAR WASHINGTON, DC--Continued

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
1	24.5	23.2	23.8	14.7	13.5	14.1	10.2	9.2	9.7	.7	.2	.5
2	23.2	21.6	22.3	14.3	13.4	13.6	10.2	9.3	9.9	.4	.2	.2
3	22.1	20.5	21.0	13.6	12.5	12.9	10.4	9.4	9.9	1.1	.2	.4
4	20.5	18.5	19.3	12.5	12.0	12.1	10.3	9.8	10.1	1.1	.2	.3
5	18.5	17.9	18.1	12.0	10.6	11.1	11.8	10.2	10.7	.3	.2	.2
6	18.2	17.9	18.1	10.8	9.6	9.9	12.9	11.1	11.9	.3	.3	.3
7	18.3	17.6	18.0	9.6	9.2	9.4	13.8	12.1	12.9	.3	.3	.3
8	18.6	18.1	18.3	9.2	8.7	8.8	13.8	13.3	13.4	.3	.3	.3
9	18.4	18.0	18.2	9.3	8.3	8.8	13.3	12.7	13.0	.3	.3	.3
10	18.2	17.7	17.9	9.3	8.5	8.8	12.8	11.5	11.8	.4	.3	.3
11	18.5	16.9	17.8	10.8	9.1	10.1	11.8	10.4	10.9	.4	.4	.4
12	18.2	17.5	17.8	10.6	9.6	10.1	10.4	9.2	9.5	.4	.4	.4
13	18.2	17.7	18.0	10.5	10.1	10.3	9.3	8.5	8.8	.6	.4	.4
14	18.3	17.6	18.0	10.6	9.7	10.1	8.6	7.7	8.1	.7	.5	.6
15	18.1	17.1	17.7	10.5	9.7	10.2	7.8	2.6	7.3	1.4	.7	.9
16	17.7	16.7	17.2	10.7	9.5	10.2	2.6	1.8	2.0	1.6	.5	.9
17	17.7	16.3	17.0	10.7	10.0	10.4	2.0	1.1	1.6	2.2	.6	1.2
18	18.3	16.5	17.4	10.8	10.2	10.5	1.1	.6	.8	3.9	1.6	2.4
19	18.0	17.3	17.7	10.7	9.8	10.3	1.0	.3	.6	3.5	1.8	2.4
20	18.2	17.3	17.7	11.0	10.0	10.5	1.4	.7	1.0	1.9	1.2	1.3
21	18.0	16.7	17.1	11.0	9.6	10.2	2.2	1.3	1.7	2.2	1.2	1.6
22	17.0	15.2	15.9	10.0	9.0	9.5	3.2	2.0	2.8	2.8	2.2	2.5
23	15.2	14.3	14.8	9.6	8.7	9.1	2.0	.6	1.1	4.5	2.7	3.4
24	15.1	13.6	14.3	9.3	8.4	9.0	5.0	.1	3.7	5.4	.7	3.3
25	14.5	13.4	14.0	9.1	8.2	8.5	4.4	3.5	4.0	5.6	.6	3.5
26	15.5	13.7	14.6	9.5	8.5	9.0	3.5	2.2	2.6	4.4	3.4	3.8
27	15.1	14.5	14.8	9.4	8.5	9.0	2.4	1.9	2.1	4.6	3.2	3.8
28	16.0	14.7	15.3	9.8	8.3	9.1	2.4	2.0	2.2	5.8	4.6	5.0
29	16.1	15.3	15.7	9.6	8.6	9.1	2.5	2.4	2.4	6.4	5.7	6.0
30	15.7	14.6	15.1	9.5	8.7	9.1	2.5	1.0	1.8	6.8	5.7	6.1
31	15.3	14.1	14.6	---	---	---	1.0	.4	.6	6.2	4.8	5.7
MONTH	24.5	13.4	17.3	14.7	8.2	10.1	13.8	.1	6.1	6.8	.2	1.9
DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
1	4.9	4.4	4.6	6.1	5.3	5.7	12.2	11.5	11.9	18.7	16.0	17.2
2	5.1	4.3	4.6	7.4	4.8	5.9	13.3	11.5	12.4	18.7	16.5	17.5
3	6.7	5.1	5.6	8.7	5.6	6.9	14.5	12.7	13.5	17.7	16.8	17.2
4	6.8	5.4	6.1	8.4	6.8	7.6	16.0	13.8	15.0	19.7	16.6	18.0
5	6.9	5.5	6.1	7.0	5.8	6.4	16.2	14.6	15.2	21.3	18.3	19.9
6	6.6	5.6	6.0	6.6	5.8	6.1	15.2	14.1	14.6	20.3	19.4	19.9
7	6.3	5.7	5.9	6.1	4.6	5.5	15.8	14.6	15.0	20.9	19.1	19.9
8	6.1	5.6	5.8	5.1	3.9	4.5	17.3	14.7	15.7	22.0	19.5	20.7
9	6.3	4.9	5.5	4.3	2.4	3.6	17.9	16.0	16.8	22.8	20.3	21.4
10	7.3	5.0	5.9	3.4	2.3	2.7	17.6	15.5	16.4	23.1	20.9	21.9
11	7.6	5.3	6.4	4.3	2.6	3.3	16.7	14.3	15.4	23.3	21.4	22.1
12	8.8	6.3	7.5	5.3	3.2	4.1	14.3	13.3	13.7	24.1	21.5	22.7
13	7.9	6.2	7.5	5.8	4.0	4.8	13.4	11.8	12.5	23.2	22.2	22.8
14	6.3	5.1	5.7	5.3	4.2	4.9	12.6	10.8	11.8	22.2	20.3	21.1
15	6.4	4.0	5.1	4.5	3.3	3.8	12.6	11.3	11.7	21.5	19.1	20.2
16	7.0	4.2	5.5	5.6	3.8	4.6	12.5	11.3	11.9	21.4	18.9	20.3
17	7.4	5.3	6.1	7.3	5.1	6.2	12.2	11.6	11.9	21.6	19.1	20.5
18	8.1	6.6	7.2	8.8	7.3	8.2	12.4	11.6	12.0	22.9	20.1	21.6
19	8.0	6.7	7.3	8.7	7.6	8.3	12.3	11.5	11.8	23.2	21.3	22.3
20	7.4	6.2	6.8	8.7	7.2	8.0	13.0	11.8	12.3	23.7	20.9	22.2
21	6.7	5.1	5.6	8.3	7.8	8.1	12.6	11.8	12.4	23.9	20.5	22.4
22	5.6	3.5	4.4	8.2	7.3	7.8	14.4	11.7	12.7	24.6	21.3	23.2
23	4.4	2.6	3.2	7.9	7.0	7.5	14.5	13.4	14.1	24.6	22.6	23.8
24	4.2	2.1	2.9	7.9	7.2	7.6	15.5	13.2	14.2	24.3	22.5	23.5
25	4.0	2.3	2.9	8.5	7.0	7.8	15.5	13.6	14.4	23.7	21.6	22.7
26	5.0	2.8	3.5	9.2	7.4	8.3	15.9	14.2	14.9	22.8	20.7	21.9
27	5.9	3.0	4.2	9.1	8.1	8.5	16.6	15.3	15.9	23.2	20.3	21.8
28	5.9	4.7	5.2	9.1	8.4	8.6	17.0	15.9	16.3	23.5	20.8	22.4
29	---	---	---	10.8	8.9	9.6	17.3	16.2	16.6	25.1	21.7	23.5
30	---	---	---	11.5	10.0	10.6	18.2	16.0	16.9	26.9	23.2	25.0
31	---	---	---	12.2	10.7	11.3	---	---	---	27.7	24.9	26.3
MONTH	8.8	2.1	5.5	12.2	2.3	6.7	18.2	10.8	14.0	27.7	16.0	21.5





01646580 POTOMAC RIVER AT CHAIN BRIDGE AT WASHINGTON, DC

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 mi<sup>2</sup>.

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.
- pH: June 1978 to September 1981.
- WATER TEMPERATURE: June 1978 to September 1981.
- DISSOLVED OXYGEN: June 1978 to September 1981.
- SUSPENDED SEDIMENT DISCHARGE: October 1978 to September 1981.

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

REMARKS--Extreme high flows are sampled from the George Mason Memorial Bridge (14th Street) located 6 mi downstream from Chain Bridge. On May 3 and Nov. 17, 1994 samples were collected and analyzed using ultraclean methodologies. Data on trace metals for these dates are available from the University of Delaware. Data on organics for these dates are available from George Mason University.

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 1998 TO SEPTEMBER 1999

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (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, (PER-CENT SOLVED) (MG/L) (00300)	OXYGEN, SATUR-ATION (MG/L) (00301)	HARD-NESS TOTAL AS (MG/L) (00900)	CALCIUM DIS-SOLVED AS CA (MG/L) (00915)	MAGNE-SIUM, DIS-SOLVED AS MG (MG/L) (00925)
OCT 1998												
14...	1000	1990	351	--	15.0	18.0	758	9.2	98	150	42	11
NOV 12...	0815	1700	412	8.5	12.0	10.0	772	11.2	98	160	44	13
DEC 15...	0945	1650	388	8.4	5.0	7.5	771	12.3	101	170	46	13
JAN 1999												
21...	0900	8940	366	7.6	6.0	2.0	768	14.1	101	130	38	9.0
FEB 17...	0900	4440	334	8.5	7.0	6.5	758	12.2	100	140	40	8.9
MAR 09...	1015	10500	259	7.6	-3.0	4.0	768	13.1	99	99	29	6.6
APR 13...	1215	34600	233	7.8	15.0	13.0	759	10.7	102	86	25	5.7
MAY 10...	1100	10600	278	8.0	20.0	22.0	763	8.7	100	--	--	--
JUN 07...	1030	1890	314	8.2	31.0	27.0	763	7.7	97	--	--	--
22...	0945	1700	332	8.2	22.5	22.0	765	8.3	95	--	--	--
JUL 12...	1030	308	348	8.5	22.0	26.5	767	6.7	83	--	--	--
AUG 09...	1000	510	371	8.4	24.0	27.5	757	6.5	83	--	--	--
SEP 14...	1115	3640	336	8.1	26.5	26.0	763	7.9	98	--	--	--

## POTOMAC RIVER BASIN

01646580 POTOMAC RIVER AT CHAIN BRIDGE AT WASHINGTON, DC--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DATE	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	ALKA- LINITY WAT DIS TOT IT FIELD (MG/L AS CACO3 (39086)	CAR- BONATE WATER DIS IT FIELD (MG/L AS CO3 (00452)	BICAR- BONATE WATER DIS IT FIELD (MG/L AS HCO3 (00453)	CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405)	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)	NITRO- GEN, TOTAL (MG/L AS N) (00600)
OCT 1998												
14...	14	3.4	110	--	134	--	40	19	.19	3.3	209	1.6
NOV												
12...	17	3.0	106	E2	129	.8	45	21	.17	.41	238	1.9
DEC												
15...	16	3.1	118	--	145	1.0	39	22	.20	.43	233	1.1
JAN 1999												
21...	22	5.1	89	--	109	4.7	37	32	<.10	3.5	224	2.6
FEB												
17...	13	2.4	88	1	107	.6	42	20	<.10	.35	195	1.6
MAR												
09...	11	2.3	66	--	80	--	22	18	<.10	2.7	150	1.8
APR												
13...	9.3	2.1	54	--	66	--	29	14	<.10	4.6	143	1.6
MAY												
10...	--	--	78	--	95	--	--	--	--	--	--	1.5
JUN												
07...	--	--	89	--	109	--	--	--	--	--	--	--
22...	--	--	90	--	109	--	--	--	--	--	--	1.1
JUL												
12...	--	--	88	--	107	--	--	--	--	--	--	.83
AUG												
09...	--	--	74	1	90	--	--	--	--	--	--	--
SEP												
14...	--	--	86	--	104	--	--	--	--	--	--	--
DATE	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,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, DIS- SOLVED (MG/L AS P) (00671)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	ACETO- CHLOR, WATER FLTRD REC (UG/L) (49260)
OCT 1998												
14...	--	<.010	1.32	.027	.30	.25	.057	E.048	.042	E9.7	6.4	<.0020
NOV												
12...	.925	.012	.937	.049	.91	.27	.497	<.050	.019	17	8.8	<.0020
DEC												
15...	.882	.010	.892	.021	.22	.22	<.050	<.050	<.010	16	E3.6	<.0020
JAN 1999												
21...	1.68	.023	1.71	.208	.87	.67	.244	.162	.131	36	11	<.0020
FEB												
17...	1.32	.020	1.34	<.020	.28	.15	.029	.016	.013	25	7.9	<.0020
MAR												
09...	1.35	.013	1.37	<.020	.41	.29	.062	.024	.016	41	8.1	<.0020
APR												
13...	.909	.013	.922	.068	.66	.66	.132	.049	.033	35	4.5	<.0020
MAY												
10...	1.02	.014	1.04	.108	.47	.29	.081	.049	.045	--	--	<.0020
JUN												
07...	.585	.011	.596	.053	<.10	.28	.095	.078	.061	--	--	<.0020
22...	--	<.010	.658	.032	.45	.35	.099	.090	.067	--	--	<.0020
JUL												
12...	--	<.010	.211	.033	.62	.44	.128	.116	.081	--	--	<.0020
AUG												
09...	--	<.010	.068	.029	<.10	<.10	.092	.082	.055	--	--	<.0020
SEP												
14...	1.08	.022	1.10	<.020	E.10	.31	.090	.078	.057	--	--	<.0020

E Estimated

01646580 POTOMAC RIVER AT CHAIN BRIDGE AT WASHINGTON, DC--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DATE	ALA- CHLOR, WATER, DISS, REC, (UG/L) (46342)	ATRA- ZINE, WATER, DISS, REC (UG/L) (39632)	BEN- FLUR- ALIN WAT FLD 0.7 U GF, REC (UG/L) (82673)	BUTYL- ATE, WATER, DISS, REC (UG/L) (04028)	CAR- BARYL WATER FLTRD 0.7 U GF, REC (UG/L) (82680)	CARBO- FURAN WATER FLTRD 0.7 U GF, REC (UG/L) (82674)	CHLOR- PYRIFOS DIS- SOLVED (UG/L) (38933)	CYANA- ZINE, WATER, DISS, REC (UG/L) (04041)	DCPA WATER FLTRD 0.7 U GF, REC (UG/L) (82682)	DEETHYL ATRA- ZINE, WATER, DISS, REC (UG/L) (04040)	DI- AZINON, DIS- SOLVED (UG/L) (39572)	DI- ELDRIN DIS- SOLVED (UG/L) (39381)
	OCT 1998											
14...	<.002	.068	<.0020	<.0020	<.0030	<.0030	<.0040	<.0040	<.0020	E.0749	<.002	<.001
NOV												
12...	<.002	.057	<.0020	<.0020	<.0030	<.0030	<.0040	<.0040	<.0020	E.0674	<.002	<.001
DEC												
15...	<.002	.046	<.0020	<.0020	<.0030	<.0030	<.0040	<.0040	<.0020	E.0632	<.002	<.001
JAN 1999												
21...	<.002	.037	<.0020	<.0020	<.0030	<.0030	<.0040	<.0040	<.0020	E.0344	<.002	<.001
FEB												
17...	<.002	.029	<.0020	<.0020	<.0030	<.0030	<.0040	<.0040	<.0020	E.0313	<.002	<.001
MAR												
09...	<.002	.022	<.0020	<.0020	<.0030	<.0030	<.0040	<.0040	<.0020	E.0253	<.002	<.001
APR												
13...	<.002	.019	<.0020	<.0020	<.0030	<.0030	<.0040	<.0040	<.0020	E.0167	<.002	<.001
MAY												
10...	<.002	.071	<.0020	<.0020	E.0052	<.0030	<.0040	<.0040	<.0020	E.0632	.005	<.001
JUN												
07...	<.002	.078	<.0020	<.0020	<.0030	<.0030	<.0040	<.0040	<.0020	E.0345	<.002	<.001
22...	<.002	.144	<.0020	<.0020	E.0088	<.0030	<.0040	.0087	<.0020	E.0832	.005	<.001
JUL												
12...	<.002	.266	<.0020	<.0020	<.0030	<.0030	<.0040	.0151	E.0019	E.142	<.002	<.001
AUG												
09...	<.002	.066	<.0020	<.0020	<.0030	<.0030	<.0040	<.0040	<.0020	E.0762	<.002	<.001
SEP												
14...	<.002	.029	<.0020	<.0020	<.0030	<.0030	<.0040	<.0040	<.0020	E.0211	<.002	<.001
DATE	2,6-DI- ETHYL ANILINE WAT FLT 0.7 U GF, REC (UG/L) (82660)	DISUL- FOTON WATER FLTRD 0.7 U GF, REC (UG/L) (82677)	EPTC WATER FLTRD 0.7 U GF, REC (UG/L) (82668)	ETHAL- FLUR- ALIN WAT FLT 0.7 U GF, REC (UG/L) (82663)	ETHO- PROP WATER FLTRD 0.7 U GF, REC (UG/L) (82672)	FONOFO WATER DISS REC (UG/L) (04095)	LINDANE DIS- SOLVED (UG/L) (39341)	LIN- URON WATER FLTRD 0.7 U GF, REC (UG/L) (82666)	MALA- THION, DIS- SOLVED (UG/L) (39532)	METHYL AZIN- PHOS WAT FLT 0.7 U GF, REC (UG/L) (82686)	METHYL PARA- THION WAT FLT 0.7 U GF, REC (UG/L) (82667)	METO- LACHLOR WATER DISSOLV (UG/L) (39415)
OCT 1998												
14...	<.0030	<.0170	<.0020	<.0040	<.0030	<.0030	<.004	<.0020	<.005	<.0010	<.0060	.016
NOV												
12...	<.0030	<.0170	<.0020	<.0040	<.0030	<.0030	<.004	<.0020	<.005	<.0010	<.0060	.013
DEC												
15...	<.0030	<.0170	<.0020	<.0040	<.0030	<.0030	<.004	<.0020	<.005	<.0010	<.0060	.011
JAN 1999												
21...	<.0030	<.0170	<.0040	<.0040	<.0030	<.0030	<.004	<.0020	<.005	<.0010	<.0060	.047
FEB												
17...	<.0030	<.0170	<.0020	<.0040	<.0030	<.0030	<.004	<.0020	<.005	<.0010	<.0060	.013
MAR												
09...	<.0030	<.0170	<.0020	<.0040	<.0030	<.0030	<.004	<.0020	<.005	<.0010	<.0060	.014
APR												
13...	<.0030	<.0170	<.0020	<.0040	<.0030	<.0030	<.004	<.0020	<.005	<.0010	<.0060	.014
MAY												
10...	<.0030	<.0170	<.0020	<.0040	<.0030	<.0030	<.004	<.0020	<.005	<.0010	<.0060	.028
JUN												
07...	<.0030	<.0170	<.0020	<.0040	<.0030	<.0030	<.004	<.0020	<.005	<.0010	<.0060	.018
22...	<.0030	<.0170	<.0020	<.0040	<.0030	<.0030	<.004	<.0020	<.005	<.0010	<.0060	.042
JUL												
12...	<.0030	<.0170	<.0020	<.0040	<.0030	<.0030	<.004	<.0020	<.005	<.0010	<.0060	.106
AUG												
09...	<.0030	<.0170	<.0020	<.0040	<.0030	<.0030	<.004	<.0020	<.005	<.0010	<.0060	.019
SEP												
14...	<.0030	<.0170	<.0020	<.0040	<.0030	<.0030	<.004	<.0020	<.005	<.0010	<.0060	.016

E Estimated

## POTOMAC RIVER BASIN

01646580 POTOMAC RIVER AT CHAIN BRIDGE AT WASHINGTON, DC--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DATE	METRI- BUZIN SENCOR WATER DISSOLV (UG/L) (82630)	MOL- INATE WATER FLTRD 0.7 U GF, REC (UG/L) (82671)	NAPROP- AMIDE WATER FLTRD 0.7 U GF, REC (UG/L) (82684)	PARA- THION, DIS- SOLVED (UG/L) (39542)	PEB- ULATE WATER FILTRD 0.7 U GF, REC (UG/L) (82669)	PENDI- METH- ALIN WAT FLT 0.7 U GF, REC (UG/L) (82683)	PER- METHRIN CIS WAT FLT 0.7 U GF, REC (UG/L) (82687)	PHORATE WATER FLTRD 0.7 U GF, REC (UG/L) (82664)	PRO- METON, WATER, DISS, REC (UG/L) (04037)	PRON- AMIDE WATER FLTRD 0.7 U GF, REC (UG/L) (82676)	PROP- CHLOR, WATER, DISS, REC (UG/L) (04024)	PRO- PARGITE WATER FLTRD 0.7 U GF, REC (UG/L) (82685)
OCT 1998												
14...	<.004	<.0040	<.0030	<.004	<.0040	<.0040	<.0050	<.0020	E.0096	<.0030	<.0070	<.0130
NOV												
12...	<.004	<.0040	<.0030	<.004	<.0040	<.0040	<.0050	<.0020	E.0075	<.0030	<.0070	<.0130
DEC												
15...	<.004	<.0040	<.0030	<.004	<.0040	<.0040	<.0050	<.0020	E.0050	<.0030	<.0070	<.0130
JAN 1999												
21...	.012	<.0040	<.0030	<.004	<.0040	<.0040	<.0050	<.0020	E.0073	<.0030	<.0070	<.0130
FEB												
17...	<.004	<.0040	<.0030	<.004	<.0040	<.0040	<.0050	<.0020	E.0035	<.0030	<.0070	<.0130
MAR												
09...	<.004	<.0040	<.0030	<.004	<.0040	<.0040	<.0050	<.0020	<.0180	<.0030	<.0070	<.0130
APR												
13...	<.004	<.0040	<.0030	<.004	<.0040	<.0040	<.0050	<.0020	<.0180	<.0030	<.0070	<.0130
MAY												
10...	<.004	<.0040	<.0030	<.004	<.0040	<.0040	<.0050	<.0020	<.0180	<.0030	<.0070	<.0130
JUN												
07...	<.004	<.0040	<.0030	<.004	<.0040	<.0040	<.0050	<.0020	.0219	<.0030	<.0070	<.0130
22...	<.004	<.0040	<.0030	<.004	<.0040	<.0040	<.0050	<.0020	E.0099	<.0030	<.0070	<.0130
JUL												
12...	<.004	<.0040	<.0030	<.004	<.0040	<.0040	<.0050	<.0020	.0236	<.0030	<.0070	--
AUG												
09...	<.004	<.0040	<.0030	<.004	<.0040	<.0040	<.0050	<.0020	E.0124	<.0030	<.0070	<.0130
SEP												
14...	<.004	<.0040	<.0030	<.004	<.0040	<.0040	<.0050	<.0020	E.0116	<.0030	<.0070	<.0130
DATE	PRO- PANIL WATER FLTRD 0.7 U GF, REC (UG/L) (82679)	SI- MAZINE, WATER, DISS, REC (UG/L) (04035)	TEBU- THIURON WATER FLTRD 0.7 U GF, REC (UG/L) (82670)	TER- BACIL WATER FLTRD 0.7 U GF, REC (UG/L) (82665)	TER- BUFOS WATER FLTRD 0.7 U GF, REC (UG/L) (82675)	THIO- BENCARB WATER FLTRD 0.7 U GF, REC (UG/L) (82681)	TRIAL- LATE WATER FLTRD 0.7 U GF, REC (UG/L) (82678)	TRI- FLUR- ALIN WAT FLT 0.7 U GF, REC (UG/L) (82661)	ALPHA BHC DIS- SOLVED (UG/L) (34253)	SEDI- MENT, DIS- CHARGE, SUS- PENDE (MG/L) (80154)	SEDI- MENT, DIS- CHARGE, SUS- PENDE (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
OCT 1998												
14...	<.0040	.0234	<.0100	<.0070	<.0130	<.0020	<.0010	<.0020	<.0020	--	--	--
NOV												
12...	<.0040	.0179	E.0074	<.0070	<.0130	<.0020	<.0010	<.0020	<.0020	2	9.2	--
DEC												
15...	<.0040	.0129	E.0045	<.0070	<.0130	<.0020	<.0010	<.0020	<.0020	<1	<4.5	--
JAN 1999												
21...	<.0040	.123	E.0044	E.0081	<.0130	<.0020	<.0010	<.0020	<.0020	35	845	99
FEB												
17...	<.0040	.0128	E.0063	<.0070	<.0130	<.0020	<.0010	<.0020	<.0020	2	24	--
MAR												
09...	<.0040	.0128	<.0100	<.0070	<.0130	<.0020	<.0010	<.0020	<.0020	13	360	--
APR												
13...	<.0040	.0103	<.0100	<.0070	<.0130	<.0020	<.0010	<.0020	<.0020	60	5610	94
MAY												
10...	<.0040	.0267	<.0100	<.0070	<.0130	<.0020	<.0010	<.0020	<.0020	11	315	--
JUN												
07...	<.0040	.0364	<.0100	<.0070	<.0130	<.0020	<.0010	<.0020	<.0020	2	12	--
22...	<.0040	.103	E.0053	<.0070	<.0130	<.0020	<.0010	E.0019	<.0020	4	18	--
JUL												
12...	<.0040	.285	<.0100	<.0070	<.0130	<.0020	<.0010	<.0020	<.0020	4	3.7	--
AUG												
09...	<.0040	.0292	E.0055	<.0070	<.0130	<.0020	<.0010	<.0020	<.0020	4	5.4	--
SEP												
14...	<.0040	.0198	E.0059	<.0070	<.0130	<.0020	<.0010	<.0020	<.0020	7	66	--

E Estimated

01652500 FOURMILE RUN AT ALEXANDRIA, VA

LOCATION.--Lat 38°50'35", long 77°05'09", Arlington County, Hydrologic Unit 02070010, on left bank at upstream side of bridge on Shirlington Road, at Arlington County-Alexandria City line, 0.1 mi upstream from I-95, and 2.5 mi upstream from mouth.

DRAINAGE AREA.--13.8 mi<sup>2</sup>.

PERIOD OF RECORD.--May 1951 to September 1969, October 1969 to September 1973 (annual maximum only), October 1973 to September 1975, October 1975 to September 1977 (annual maximum only) July 1979 to September 1982, October 1982 to September 1998 (annual maximum only), October 1998 to present.

GAGE.--Water-stage recorder. Datum of gage is 28.57 ft above sea level. May 4, 1951 to Sep. 30, 1969, water stage recorder, and Oct. 1, 1969 to Sep. 27, 1973, nonrecording gage, at site 0.4 mi downstream at datum 6.02 lower. Sep. 28, 1973 to Sep. 26, 1975, water-stage recorder, and Sep. 27, 1975 to Sep. 30, 1977, nonrecording gage, at present site and datum.

REMARKS.--Records fair. Several measurements of water temperature were made during the year. Water-quality records for some periods have been collected at this location.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 14,600 ft<sup>3</sup>/s, Jul. 22, 1969, gage height, 11.6 ft, site and datum then in use, from rating curve extended above 670 ft<sup>3</sup>/s on basis of slope-area measurement of peak flow; maximum gage height, 17.8 ft, from floodmarks, Jun. 21, 1972; minimum discharge, 0.6 ft<sup>3</sup>/s Sep. 8, 1954.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,800 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Jun 14	1755	*3,160	*8.58	Sep 16	1350	2,560	7.96
Aug 24	0345	1,840	7.23	Sep 30	0135	2,110	7.51
Sep 4	1745	2,640	8.05				

Minimum discharge, 0.90 ft<sup>3</sup>/s, Jan 1 and Aug 19.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	4.5	6.3	4.2	2.5	2.5	18	39	5.0	3.2	57	2.0	2.6
2	3.8	8.0	4.3	3.2	63	9.7	9.1	5.1	3.4	19	2.0	4.5
3	3.8	16	4.5	229	4.0	52	7.6	5.3	3.4	10	2.7	8.2
4	3.9	7.2	4.7	5.6	4.3	59	41	5.4	3.1	7.5	2.3	256
5	4.0	4.5	4.6	5.7	4.1	12	36	5.3	4.9	5.5	3.1	127
6	3.6	5.0	4.2	4.8	3.3	29	10	5.2	3.2	5.7	2.1	71
7	3.4	5.2	6.7	4.1	5.6	16	11	6.2	4.2	4.7	2.1	39
8	119	5.5	61	4.7	7.6	8.3	13	13	3.5	4.5	4.3	26
9	13	6.0	76	53	10	10	46	5.9	4.2	5.3	5.2	83
10	4.9	7.8	2.2	5.6	12	43	16	5.6	5.3	19	5.3	24
11	4.4	55	1.9	4.5	8.9	27	58	5.6	3.5	6.2	2.8	6.0
12	3.7	5.5	2.2	4.7	54	23	16	5.7	3.5	20	2.1	3.6
13	3.5	4.8	75	3.9	11	16	13	4.9	30	7.5	1.5	4.9
14	3.0	4.9	5.3	7.4	6.6	190	9.7	4.0	174	3.0	47	3.5
15	3.0	5.6	3.7	88	6.5	220	21	4.1	15	2.9	9.2	83
16	3.0	5.6	3.5	9.4	6.1	45	12	4.3	4.5	5.9	4.6	929
17	3.0	6.9	3.0	7.1	17	33	9.0	4.5	6.7	3.3	4.9	51
18	3.0	7.8	3.2	108	120	25	8.2	4.7	7.7	3.2	4.7	30
19	2.3	8.5	3.3	6.7	11	24	8.6	4.0	4.5	3.7	5.3	25
20	2.6	9.8	4.4	6.4	9.0	23	9.8	3.6	64	3.4	85	20
21	3.1	10	4.9	78	7.5	209	25	3.5	12	3.5	71	351
22	5.6	8.5	6.7	11	6.5	33	12	67	4.2	14	25	48
23	5.1	8.8	8.5	24	6.6	12	49	48	3.6	3.7	8.2	12
24	4.9	9.1	6.3	315	7.3	11	13	62	4.1	22	117	7.4
25	5.6	9.5	3.1	10	8.7	9.5	8.0	6.8	4.5	31	246	5.9
26	4.8	83	3.0	4.9	8.4	8.5	9.1	4.4	4.1	27	128	4.6
27	4.5	4.1	2.6	4.5	6.9	8.3	8.7	5.5	3.7	3.1	84	7.3
28	4.7	5.3	3.1	3.9	118	8.1	12	5.7	5.1	3.7	18	8.9
29	5.8	4.1	4.4	3.5	---	7.8	12	5.1	44	3.5	5.1	24
30	5.6	3.9	4.8	3.6	---	7.5	8.0	4.1	7.6	4.8	7.2	284
31	5.2	---	2.0	2.3	---	8.1	---	4.4	---	2.4	2.8	---
TOTAL	250.3	332.2	327.3	1025.0	536.4	1205.8	550.8	323.9	444.7	316.0	910.5	2550.4
MEAN	8.07	11.1	10.6	33.1	19.2	38.9	18.4	10.4	14.8	10.2	29.4	85.0
MAX	119	83	76	315	120	220	58	67	174	57	246	929
MIN	2.3	3.9	1.9	2.3	2.5	7.5	7.6	3.5	3.1	2.4	1.5	2.6
CF5M	.59	.80	.77	2.40	1.39	2.82	1.33	.76	1.07	.74	2.13	6.16
IN.	.67	.90	.88	2.76	1.45	3.25	1.48	.87	1.20	.85	2.45	6.87



01652500 FOURMILE RUN AT ALEXANDRIA, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1952-1969, 1974-1975, 1980-1982, 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	10.8	12.0	14.2	15.0	17.5	22.5	16.9	15.8	14.8	14.7	18.8	17.8
MAX	39.0	36.4	36.9	35.6	37.4	44.3	42.0	52.3	41.2	38.4	64.3	85.0
(WY)	1980	1953	1968	1964	1961	1953	1952	1953	1982	1969	1967	1999
MIN	2.54	2.57	3.07	3.84	6.23	6.05	6.79	6.90	5.22	1.78	2.01	1.94
(WY)	1964	1966	1966	1981	1959	1981	1967	1961	1954	1957	1962	1954

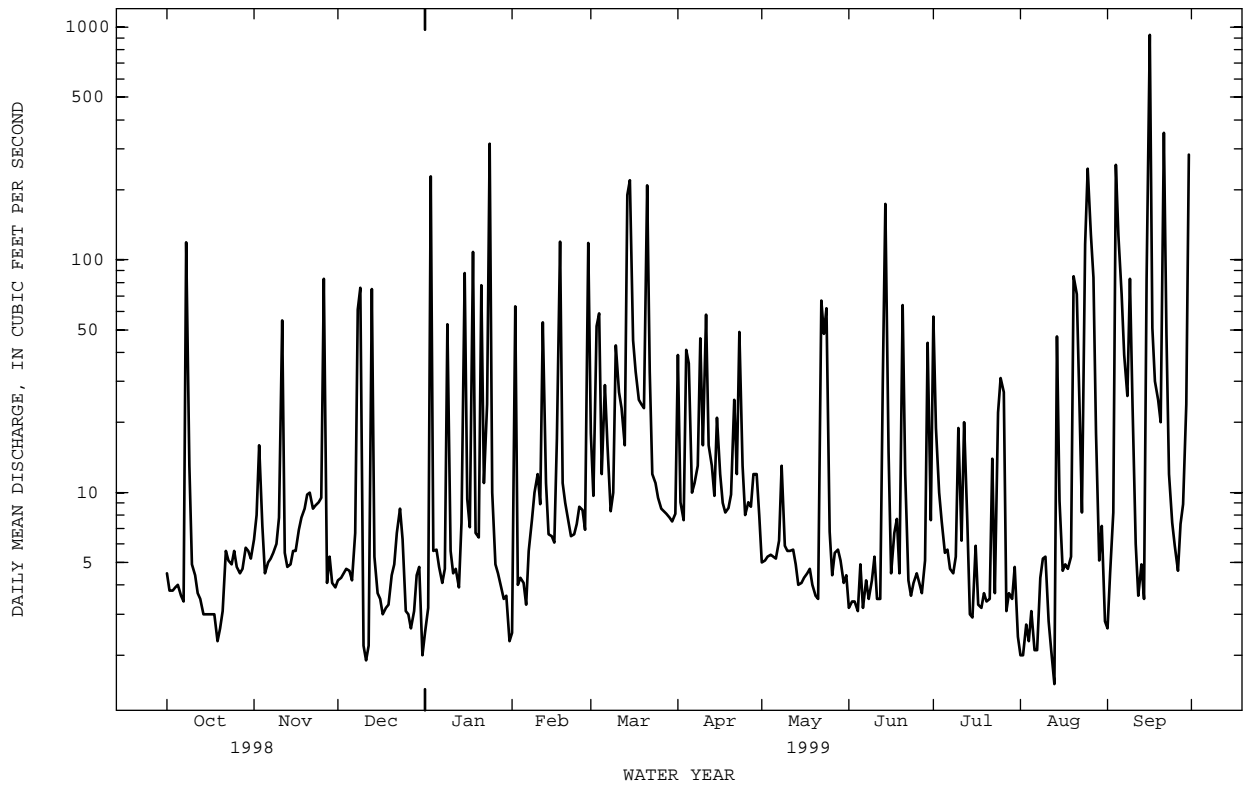
SUMMARY STATISTICS

FOR 1999 WATER YEAR

WATER YEARS 1952 - 1969  
1974 - 1975  
1980 - 1982  
1999

ANNUAL TOTAL	8773.3		
ANNUAL MEAN	24.0	15.7	
HIGHEST ANNUAL MEAN		24.0	1999
LOWEST ANNUAL MEAN		7.72	1959
HIGHEST DAILY MEAN	929	Sep 16	1060
LOWEST DAILY MEAN	1.5	Aug 13	.70
ANNUAL SEVEN-DAY MINIMUM	2.3	Aug 1	.94
INSTANTANEOUS PEAK FLOW	3160	Jun 14	14600
INSTANTANEOUS PEAK STAGE	8.58	Jun 14	b17.80
INSTANTANEOUS LOW FLOW	.90	cJan 1	.60
ANNUAL RUNOFF (CFSM)	1.74		1.14
ANNUAL RUNOFF (INCHES)	23.65		15.48
10 PERCENT EXCEEDS	57		30
50 PERCENT EXCEEDS	6.1		6.0
90 PERCENT EXCEEDS	3.1		2.6

- a Also Aug 17, 23, 24, 29, 30, 1957.
- b From floodmarks.
- c Also Aug 19, 1999.



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 mi<sup>2</sup>.

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 sea level. Prior to Sep. 20, 1965, at present site at datum 7.78 ft higher. Sep. 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.--No estimated daily discharges. Records good. Some regulation by Lake Barcroft, formerly Alexandria Reservoir, on Holmes Run 3.6 mi upstream, usable capacity 2,092 acre-ft. Maximum discharge, 19,900 ft<sup>3</sup>/s, from rating curve extended above 2,500 ft<sup>3</sup>/s on basis of culvert computations of peak flow for main channel and bypass channels. Several measurements of water temperature were made during the year. Water-quality records for some periods have been collected at this location.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 2,820 ft<sup>3</sup>/s, Sep 16, gage height, 5.83 ft; minimum discharge, 2.6 ft<sup>3</sup>/s, Jun 10, gage height, 0.83 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	5.2	3.5	6.8	12	11	38	49	10	5.2	52	18	6.8
2	4.1	3.6	6.3	7.0	103	17	20	9.6	4.9	21	9.4	7.0
3	4.0	11	5.7	233	20	54	14	9.4	4.6	13	6.0	7.8
4	4.0	6.1	6.4	22	15	113	43	10	4.0	10	6.4	220
5	4.7	4.7	6.0	16	14	22	44	9.4	3.8	7.2	7.6	233
6	6.9	4.4	6.0	12	14	29	16	9.4	4.0	5.1	6.9	99
7	4.8	4.0	7.1	11	13	25	14	9.9	4.0	4.6	6.2	101
8	92	4.0	54	11	12	15	13	15	3.9	4.9	7.6	19
9	25	4.5	100	50	12	16	41	12	3.4	4.0	6.4	114
10	8.9	4.6	15	21	11	51	22	9.9	2.9	4.0	4.6	83
11	6.8	23	12	14	10	37	58	9.2	3.3	3.9	5.2	11
12	6.0	5.5	9.5	14	52	37	20	8.6	3.0	11	6.7	7.3
13	6.0	4.6	83	14	25	28	14	8.6	12	9.6	7.4	5.2
14	5.8	4.6	18	18	13	195	13	7.6	87	5.4	27	6.5
15	5.2	4.3	12	131	12	310	20	7.4	38	5.2	12	73
16	5.2	4.2	10	25	11	68	19	6.8	13	4.6	5.3	1070
17	5.2	4.6	9.4	16	16	35	13	6.8	9.4	4.2	5.3	67
18	5.2	4.6	8.9	151	157	27	12	7.3	9.2	6.1	6.4	17
19	5.2	4.6	7.7	27	25	19	12	7.4	6.6	5.2	5.7	13
20	5.2	7.3	6.9	16	17	17	12	5.8	59	3.5	73	12
21	4.8	5.9	6.8	103	14	182	23	5.2	26	3.5	27	364
22	4.3	5.2	6.8	45	12	105	33	66	14	21	26	115
23	4.0	5.2	6.6	30	12	30	70	71	11	6.0	10	21
24	4.0	5.2	10	403	11	23	25	84	9.2	4.0	97	14
25	4.0	4.7	9.1	49	11	19	15	15	7.8	15	201	12
26	4.9	57	8.6	21	11	16	13	11	6.8	42	164	10
27	4.1	14	6.8	17	10	15	12	8.6	6.0	11	72	18
28	4.9	10	8.0	16	128	15	11	6.7	11	7.7	25	23
29	4.6	8.7	8.2	14	---	15	11	5.9	28	5.6	13	29
30	4.0	6.9	11	12	---	13	11	5.2	22	12	9.8	387
31	3.9	---	8.9	11	---	12	---	5.2	---	11	7.5	---
TOTAL	262.9	240.5	481.5	1542.0	772	1598	693	463.9	423.0	323.3	885.4	3165.6
MEAN	8.48	8.02	15.5	49.7	27.6	51.5	23.1	15.0	14.1	10.4	28.6	106
MAX	92	57	100	403	157	310	70	84	87	52	201	1070
MIN	3.9	3.5	5.7	7.0	10	12	11	5.2	2.9	3.5	4.6	5.2
CFSM	.25	.24	.46	1.48	.82	1.53	.69	.44	.42	.31	.85	3.13
IN.	.29	.27	.53	1.70	.85	1.76	.76	.51	.47	.36	.98	3.49

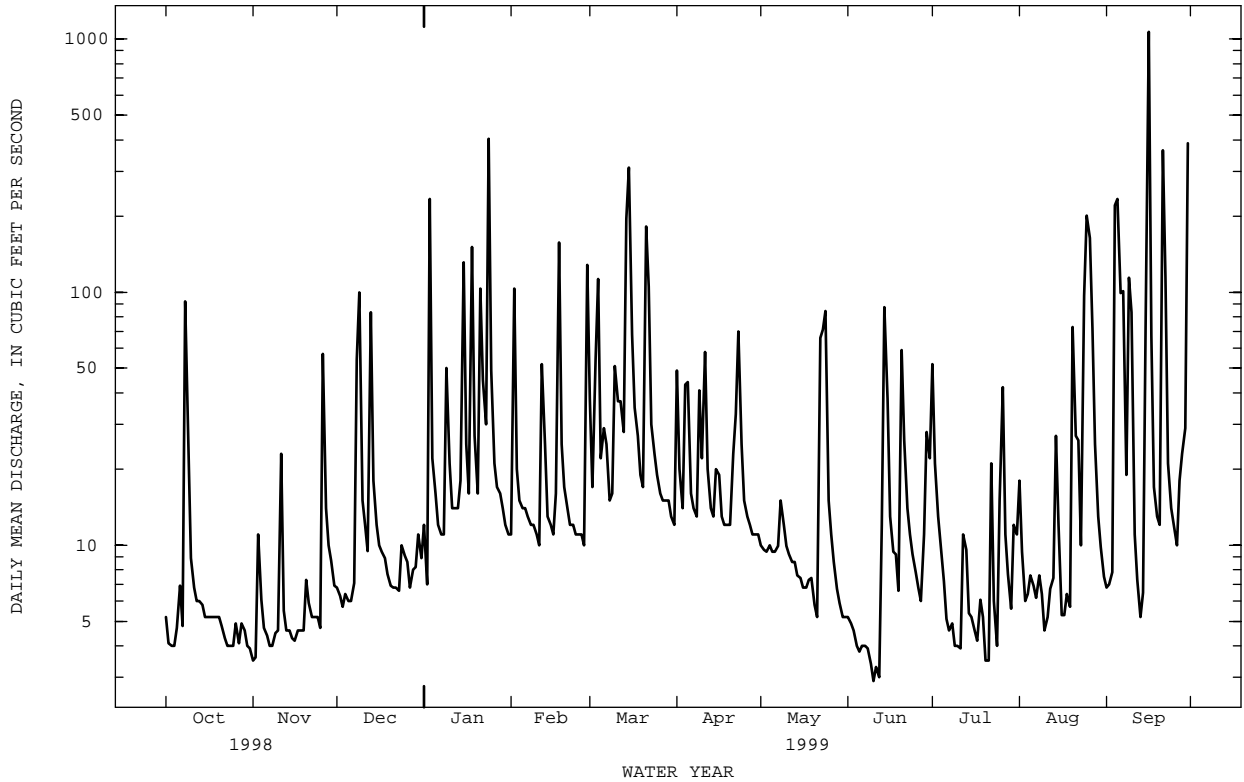
01653000 CAMERON RUN AT ALEXANDRIA, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1956 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	31.9	31.2	39.0	43.9	46.7	55.6	41.2	38.8	35.6	45.8	35.9	32.5
MAX	147	80.5	99.2	157	128	132	81.8	117	265	662	364	172
(WY)	1984	1964	1970	1978	1979	1993	1970	1989	1972	1981	1981	1975
MIN	4.52	4.40	3.47	10.0	15.6	19.9	10.6	8.59	7.93	2.51	3.85	5.31
(WY)	1964	1966	1966	1966	1968	1966	1969	1956	1956	1957	1957	1977

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR	WATER YEARS 1956 - 1999
ANNUAL TOTAL	15071.0	10851.1	
ANNUAL MEAN	41.3	29.7	36.9
HIGHEST ANNUAL MEAN			64.4
LOWEST ANNUAL MEAN			21.4
HIGHEST DAILY MEAN	565	Jan 28	3680
LOWEST DAILY MEAN	3.5	aSep 6	1.1
ANNUAL SEVEN-DAY MINIMUM	4.1	Sep 10	1.3
INSTANTANEOUS PEAK FLOW			19900
INSTANTANEOUS PEAK STAGE			18.14
INSTANTANEOUS LOW FLOW			1.1
ANNUAL RUNOFF (CFSM)	1.23	.88	1.10
ANNUAL RUNOFF (INCHES)	16.64	11.98	14.90
10 PERCENT EXCEEDS	108	69	80
50 PERCENT EXCEEDS	14	11	16
90 PERCENT EXCEEDS	4.6	4.6	4.8

a Also Nov 1, 1998.  
 b Also Sep 23-25, 1964.  
 c Also Sep 22-25, 1964.



## POTOMAC RIVER BASIN

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 mi<sup>2</sup>.

## WATER-DISCHARGE RECORDS

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 sea level (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, Jan. 1, 2, 5-8, and Feb. 25, 26, and period of no gage-height record, May 1-3, which are fair. Maximum discharge, 12,000 ft<sup>3</sup>/s, from rating curve extended above 6,600 ft<sup>3</sup>/s on basis of contracted-opening and flow-over-road measurement of peak flow. 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 Department of Environmental Quality - Water Division.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,400 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Sep 16	1300	*2,320	*9.31	Sep 30	0530	1,700	8.38
Sep 21	1830	1,600	8.22				

Minimum discharge, no flow part or all of each day, Aug 5-14.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.0	3.0	2.0	e2.7	6.2	30	27	e6.8	2.7	32	4.5	.32
2	1.1	3.0	2.2	e2.3	80	12	15	e6.5	2.6	11	4.6	.20
3	.49	6.7	2.4	243	13	61	10	e6.4	2.5	4.1	.84	.13
4	.35	6.5	2.6	12	9.8	98	48	6.6	2.3	2.1	.19	188
5	.31	2.2	2.6	e3.8	10	16	38	7.2	2.1	1.4	.00	182
6	.52	2.4	2.4	e3.3	7.9	23	12	6.1	2.1	1.0	.00	83
7	.62	2.7	2.5	e3.0	7.5	21	11	6.4	2.1	.79	.00	62
8	96	3.3	21	e2.7	7.4	11	10	36	2.1	.97	.00	6.7
9	14	4.2	64	39	6.4	12	32	6.9	1.8	.51	.00	140
10	2.9	4.5	5.4	13	6.2	30	23	5.7	1.6	.48	.00	81
11	1.8	35	2.8	4.7	5.9	28	47	5.5	1.7	2.8	.00	5.0
12	1.3	5.2	2.4	5.2	40	30	17	4.6	1.6	1.6	.00	2.6
13	1.3	2.2	54	9.9	22	26	11	4.8	30	5.7	.00	2.0
14	1.5	1.9	8.2	8.5	7.4	119	9.7	4.5	70	1.3	83	1.6
15	1.7	1.9	3.2	125	6.7	288	19	4.2	18	.57	12	29
16	1.4	1.8	2.7	17	6.4	56	9.9	3.9	3.5	.31	1.7	1160
17	1.5	2.3	2.6	8.8	14	34	9.1	4.2	2.9	.29	.67	33
18	1.4	3.2	2.4	118	136	23	8.3	3.8	3.4	.24	.34	9.0
19	1.5	3.6	2.4	18	18	16	8.5	3.8	2.3	.19	.41	4.7
20	1.8	3.5	2.2	14	11	13	9.1	3.5	56	.16	19	3.9
21	2.2	4.5	2.3	76	8.9	103	34	3.2	12	.12	1.7	430
22	1.9	5.4	2.5	32	7.7	67	13	17	4.5	.86	3.4	64
23	2.3	3.2	3.1	11	7.1	19	57	54	2.8	.52	1.1	13
24	2.4	3.2	4.6	368	7.5	16	11	81	2.3	3.6	15	6.2
25	2.1	3.2	6.5	30	e7.3	14	8.5	8.8	1.8	5.4	161	4.7
26	2.0	61	4.8	13	e7.1	12	8.1	4.6	1.7	25	37	4.0
27	2.5	5.5	3.7	10	6.9	12	8.1	3.8	1.4	1.7	43	5.0
28	2.6	2.2	4.2	8.7	97	11	7.8	3.3	1.6	.63	14	12
29	3.0	1.8	4.8	7.4	---	11	7.9	3.2	23	.43	2.0	10
30	3.8	1.8	8.9	6.5	---	10	7.2	2.8	10	4.5	.94	433
31	3.3	---	4.9	6.2	---	10	---	2.8	---	3.5	.53	---
TOTAL	161.59	190.9	240.3	1222.7	571.3	1232	537.2	321.9	272.4	113.77	406.92	2976.05
MEAN	5.21	6.36	7.75	39.4	20.4	39.7	17.9	10.4	9.08	3.67	13.1	99.2
MAX	96	61	64	368	136	288	57	81	70	32	161	1160
MIN	.31	1.8	2.0	2.3	5.9	10	7.2	2.8	1.4	.12	.00	.13
CFSM	.22	.27	.33	1.68	.87	1.69	.76	.44	.39	.16	.56	4.22
IN.	.26	.30	.38	1.94	.90	1.95	.85	.51	.43	.18	.64	4.71

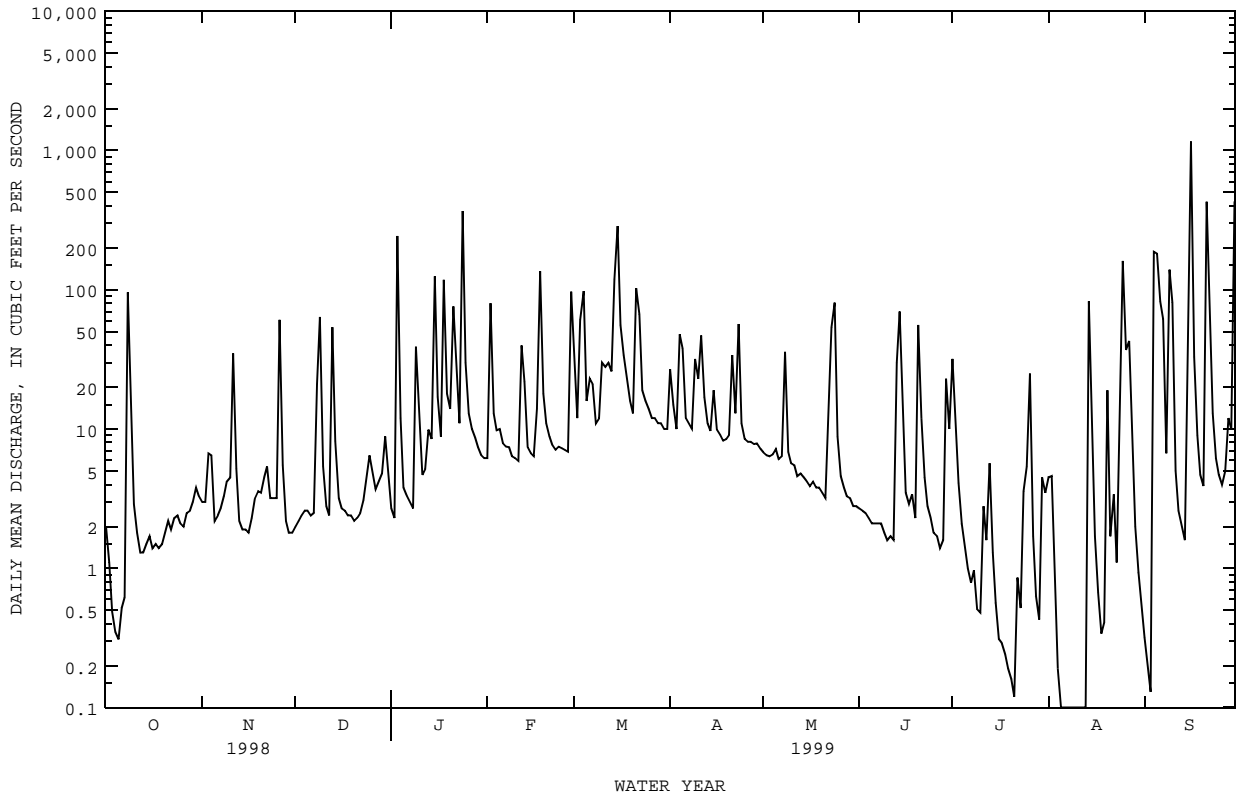
01654000 ACCOTINK CREEK NEAR ANNANDALE, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1948 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	18.2	24.5	28.6	33.6	36.5	42.9	35.2	33.0	24.8	20.0	21.5	22.3
MAX	76.6	70.4	73.8	87.0	113	114	94.5	125	212	74.5	123	120
(WY)	1980	1994	1997	1996	1998	1993	1983	1989	1972	1969	1967	1996
MIN	2.03	3.25	5.48	4.53	12.1	10.6	8.40	8.46	2.83	1.81	1.94	.45
(WY)	1955	1955	1966	1981	1978	1981	1985	1986	1986	1955	1957	1954

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR	WATER YEARS 1948 - 1999	
ANNUAL TOTAL	13664.73	8247.03		
ANNUAL MEAN	37.4	22.6	28.4	
HIGHEST ANNUAL MEAN			49.4	1972
LOWEST ANNUAL MEAN			14.3	1954
HIGHEST DAILY MEAN	985	Jan 28	1160	Sep 16
LOWEST DAILY MEAN	.31	Oct 5	.00	aAug 5
ANNUAL SEVEN-DAY MINIMUM	.73	Sep 10	.00	bAug 5
INSTANTANEOUS PEAK FLOW			2320	Sep 16
INSTANTANEOUS PEAK STAGE			9.31	Sep 16
INSTANTANEOUS LOW FLOW			.00	(d)
ANNUAL RUNOFF (CFSM)	1.59		.96	
ANNUAL RUNOFF (INCHES)	21.63		13.05	16.41
10 PERCENT EXCEEDS	78		50	51
50 PERCENT EXCEEDS	9.8		5.0	12
90 PERCENT EXCEEDS	1.4		.85	3.4

- a Also Aug 6-13, 1999.
- b Also Aug 6, 7, 1999.
- c From high-water mark in gage house.
- d No flow part or all of each day Aug 5-14, 1999.
- e Estimated.



## POTOMAC RIVER BASIN

01654000 ACCOTINK CREEK NEAR ANNANDALE, VA--Continued  
(National water-quality assessment station)

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--April 1993 to August 1995, September 1997 to current year.

## WATER-QUALITY DATA, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DATE	TIME	SAMPLE TYPE	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	TEMPER- ATURE AIR (DEG C) (00020)	TEMPER- ATURE WATER (DEG C) (00010)	TUR- BID- ITY (NTU) (00076)	OXYGEN, DIS- SOLVED (MG/L) (00300)	COLI- FORM, FECAL, UM-MF (COLS./ 100 ML) (31625)
MAR											
18...	1515	ENVIRONMENTAL	20.0	671	7.25	746	18.0	13.1	8	10.90	K73
APR											
13...	1000	ENVIRONMENTAL	11.5	317	7.06	749	9.5	9.7	9	10.46	370
13...	1005	ENVIRONMENTAL	11.5	--	--	--	--	--	--	--	K840
13...	1010	ENVIRONMENTAL	11.5	--	--	--	--	--	--	--	320
13...	1015	ENVIRONMENTAL	11.5	--	--	--	--	--	--	--	280
13...	1020	ENVIRONMENTAL	11.5	--	--	--	--	--	--	--	430
13...	1025	ENVIRONMENTAL	11.5	--	--	--	--	--	--	--	500
13...	1030	ENVIRONMENTAL	11.5	--	--	--	--	--	--	--	300
13...	1035	ENVIRONMENTAL	11.5	--	--	--	--	--	--	--	K640
13...	1040	ENVIRONMENTAL	11.5	--	--	--	--	--	--	--	470
MAY											
24...	1115	ENVIRONMENTAL	380	--	--	--	--	--	--	--	K100000
24...	1130	ENVIRONMENTAL	357	--	--	--	--	--	--	--	K95000
24...	1145	ENVIRONMENTAL	330	149	6.31	739	22.5	--	443	6.80	K58000
24...	1200	ENVIRONMENTAL	300	151	6.81	--	--	20.0	450	6.62	K70000
24...	1230	ENVIRONMENTAL	247	147	7.01	--	--	20.0	471	6.54	K76000
24...	1300	ENVIRONMENTAL	198	150	6.92	--	--	20.2	365	6.65	200000
24...	1330	ENVIRONMENTAL	161	158	6.91	738	23.5	20.7	260	6.74	K150000
24...	1530	ENVIRONMENTAL	77.5	176	6.91	738	22.5	20.8	133	6.75	K75000
24...	1730	ENVIRONMENTAL	42.9	181	6.99	739	20.5	20.1	81	6.52	K88000
24...	1900	ENVIRONMENTAL	32.8	184	6.98	741	19.0	19.8	60	6.44	K64000
27...	1115	ENVIRONMENTAL	4.56	256	6.43	750	18.5	16.8	8	8.70	K840
27...	1120	ENVIRONMENTAL	4.56	--	--	--	--	--	--	--	K780
27...	1125	ENVIRONMENTAL	4.56	--	--	--	--	--	--	--	K880
27...	1130	ENVIRONMENTAL	4.56	--	--	--	--	--	--	--	580
27...	1135	ENVIRONMENTAL	4.56	--	--	--	--	--	--	--	540
27...	1140	ENVIRONMENTAL	4.56	--	--	--	--	--	--	--	K700
27...	1145	ENVIRONMENTAL	4.56	--	--	--	--	--	--	--	K1200
27...	1150	ENVIRONMENTAL	4.56	--	--	--	--	--	--	--	K1100
JUL											
07...	1100	ENVIRONMENTAL	1.28	221	7.12	751	26.5	26.1	6	4.57	380
07...	1105	ENVIRONMENTAL	1.28	--	--	--	--	--	--	--	370
07...	1110	ENVIRONMENTAL	1.28	--	--	--	--	--	--	--	380
07...	1115	ENVIRONMENTAL	1.28	--	--	--	--	--	--	--	450
07...	1120	ENVIRONMENTAL	1.28	--	--	--	--	--	--	--	410
07...	1125	ENVIRONMENTAL	1.28	--	--	--	--	--	--	--	440
07...	1130	ENVIRONMENTAL	1.28	--	--	--	--	--	--	--	440
07...	1135	ENVIRONMENTAL	1.28	--	--	--	--	--	--	--	340
AUG											
01...	1715	ENVIRONMENTAL	12.9	187	7.12	746	25.5	27.0	22	5.81	E16000
11...	1255	ENVIRONMENTAL	.00	233	6.88	744	35.5	21.9	4	2.55	K37
14...	1640	ENVIRONMENTAL	7.70	--	--	--	--	--	--	--	K120000
14...	1745	ENVIRONMENTAL	118	147	6.94	744	24.0	26.3	225	5.42	K170000
14...	1915	ENVIRONMENTAL	388	134	6.75	745	22.0	25.9	570	4.50	K170000
14...	1945	ENVIRONMENTAL	516	92	6.63	745	22.0	26.1	857	4.33	K180000
14...	2000	ENVIRONMENTAL	530	90	6.59	745	22.0	26.2	795	4.34	K140000
14...	2010	ENVIRONMENTAL	531	91	6.55	745	22.0	26.2	816	4.36	K130000
14...	2025	ENVIRONMENTAL	513	89	6.54	745	22.5	26.1	768	4.51	K120000
14...	2100	ENVIRONMENTAL	391	91	6.54	745	22.5	26.3	690	5.06	K170000
14...	2145	ENVIRONMENTAL	222	93	6.59	745	22.5	26.2	551	5.39	K240000
15...	0015	ENVIRONMENTAL	72.9	95	6.62	746	21.5	25.3	306	7.96	K340000
17...	0955	ENVIRONMENTAL	1.28	136	6.73	752	26.5	23.7	24	5.67	3200
17...	1000	ENVIRONMENTAL	1.28	--	--	--	--	--	--	--	2300
17...	1005	ENVIRONMENTAL	1.28	--	--	--	--	--	--	--	3600
17...	1010	ENVIRONMENTAL	1.28	--	--	--	--	--	--	--	2900
17...	1015	ENVIRONMENTAL	1.28	--	--	--	--	--	--	--	2600
17...	1020	ENVIRONMENTAL	1.28	--	--	--	--	--	--	--	3000
17...	1025	ENVIRONMENTAL	1.18	--	--	--	--	--	--	--	2700
17...	1030	ENVIRONMENTAL	1.18	--	--	--	--	--	--	--	2400

K Result based on colony count outside optimal range.

01654000 ACCOTINK CREEK NEAR ANNANDALE, VA--Continued  
(National water-quality assessment station)

WATER-QUALITY DATA, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DATE	TIME	SAMPLE TYPE	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	TEMPER- ATURE AIR (DEG C) (00020)	TEMPER- ATURE WATER (DEG C) (00010)	TUR- BID- ITY (NTU) (00076)	OXYGEN, DIS- SOLVED (MG/L) (00300)	COLI- FORM, FECAL, UM-MF 0.7 (COLS./ 100 ML) (31625)
SEP											
09...	2055	ENVIRONMENTAL	103	--	6.89	750	20.5	--	122	--	E31000
09...	2137	ENVIRONMENTAL	393	101	7.10	750	20.0	22.9	256	7.34	E35000
09...	2330	ENVIRONMENTAL	901	76	6.89	749	20.0	22.0	616	7.10	58000
10...	0015	ENVIRONMENTAL	1020	68	6.79	749	20.0	21.8	656	6.90	E52000
10...	0100	REPLICATE	1131	64	6.73	749	20.0	21.8	473	6.80	42000
10...	0100	ENVIRONMENTAL	1130	64	6.73	749	20.0	21.8	473	6.80	E31000
10...	0101	REPLICATE	1131	64	6.73	749	20.0	21.8	473	6.80	31000
10...	0115	ENVIRONMENTAL	1110	64	6.73	749	20.0	21.9	396	6.80	E45000
10...	0124	ENVIRONMENTAL	1070	65	6.69	749	20.0	21.8	419	6.79	42000
10...	0154	ENVIRONMENTAL	724	68	6.65	749	19.5	21.8	282	6.70	E36000
10...	0320	ENVIRONMENTAL	185	79	6.67	749	20.0	21.8	227	6.97	36000
10...	0603	ENVIRONMENTAL	80.4	91	6.69	749	19.5	21.6	171	7.07	23000
16...	0645	ENVIRONMENTAL	1750	64	7.26	744	16.5	19.2	339	8.50	42000
16...	0900	ENVIRONMENTAL	1980	56	7.08	740	18.5	19.1	266	7.92	43000
16...	0945	ENVIRONMENTAL	2030	57	7.00	741	18.0	19.0	230	7.75	K55000
16...	1115	ENVIRONMENTAL	2210	64	6.96	740	17.5	19.1	167	7.74	37000
16...	1230	ENVIRONMENTAL	2190	69	7.02	738	17.0	19.1	144	7.72	46000
16...	1315	ENVIRONMENTAL	2160	68	7.06	738	17.0	19.2	150	7.86	50000
16...	1430	ENVIRONMENTAL	2310	65	7.20	737	17.0	19.1	181	7.86	83000
16...	1545	ENVIRONMENTAL	2110	67	7.07	739	16.5	19.0	175	7.72	59000
16...	1730	ENVIRONMENTAL	1510	67	7.02	742	16.5	18.9	145	7.82	67000
16...	2100	ENVIRONMENTAL	142	90	7.06	746	15.5	18.4	117	8.04	K69000
17...	0900	ENVIRONMENTAL	32.8	131	6.96	755	20.0	17.2	38	8.31	11000
27...	1105	ENVIRONMENTAL	4.30	243	7.16	762	21.0	18.7	6	8.55	K290
27...	1110	ENVIRONMENTAL	4.30	243	7.16	762	20.0	18.7	5	8.76	K300
27...	1115	ENVIRONMENTAL	4.30	244	7.16	762	20.0	18.7	6	8.54	400
27...	1120	ENVIRONMENTAL	4.30	243	7.16	762	20.0	18.7	5	8.74	K230
27...	1125	ENVIRONMENTAL	4.30	244	7.16	762	20.0	18.7	6	8.54	K270
27...	1130	ENVIRONMENTAL	4.30	244	7.16	762	20.0	18.7	5	8.53	K260
27...	1135	ENVIRONMENTAL	4.30	244	7.17	762	21.5	18.7	5	8.52	K310
27...	1140	REPLICATE	4.30	243	7.17	762	21.5	18.8	6	8.53	K270
27...	1140	ENVIRONMENTAL	4.30	243	7.17	762	21.5	18.8	6	8.53	K310
27...	1141	REPLICATE	4.30	243	7.17	762	21.5	18.8	6	8.53	K270

E Estimated.

K Result based on colony count outside optimal range.

POTOMAC RIVER BASIN

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 mi<sup>2</sup>.

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

REVISED RECORDS.--WSP 2103: Drainage area. WDR VA-79-1: 1973-77(P). WDR VA-95-1: 1972-94 (M).

GAGE.--Water-stage recorder. Datum of gage is 199.15 ft above sea level. July 1950 to December 1986, water-stage recorder at same site and datum.

REMARKS.--Records good except those for periods with ice effect, Dec. 25-28, Dec. 31 to Jan. 1, and Jan. 5-8, which are fair. Maximum discharge, 32,500 ft<sup>3</sup>/s, from rating curve extended above 7,000 ft<sup>3</sup>/s, on basis of contracted-opening measurement of peak flow. No flow at times in many years. 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 Department of Environmental Quality - Water Division.

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 greater than base discharge of 1,800 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Sep 30	0730	*2,680	*10.04	No other peak greater than base discharge.			

Minimum discharge, 0.07 ft<sup>3</sup>/s, Aug 4, 7.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.6	1.8	3.3	e4.4	31	112	46	12	1.0	28	1.2	.74
2	1.1	1.2	2.8	4.0	127	72	61	10	.82	12	.59	.64
3	.92	1.6	2.9	116	105	101	52	9.6	.75	2.5	.26	.60
4	1.3	8.0	3.7	63	70	339	80	9.3	.69	2.4	.08	.74
5	1.2	2.6	3.6	e21	52	131	117	9.9	1.6	1.6	.09	11
6	1.2	.97	3.3	e9.8	40	100	78	10	2.1	.74	.14	26
7	1.6	1.7	3.3	e7.3	37	88	59	11	1.4	.38	.08	24
8	33	1.4	4.0	e6.2	37	60	49	44	1.1	.19	.98	10
9	27	1.6	25	18	32	56	45	41	.77	.14	.72	3.7
10	6.7	2.4	15	34	28	66	89	25	.98	.52	.30	6.4
11	2.7	2.5	6.7	15	25	81	75	17	.86	.55	.15	7.3
12	1.9	5.1	4.5	11	25	103	87	14	.89	.81	.16	2.9
13	1.1	4.9	6.8	19	52	100	61	9.9	3.2	1.2	.13	1.7
14	.63	3.3	21	20	34	200	47	7.6	2.1	.96	.21	1.1
15	.74	3.2	9.4	100	27	1080	41	6.1	.90	.50	1.1	1.4
16	.82	2.5	6.0	85	24	525	42	4.5	1.2	.21	1.3	183
17	.73	2.8	5.1	34	24	271	37	3.9	1.3	.09	1.6	63
18	.87	2.8	5.2	145	273	188	33	3.7	.77	.31	1.1	15
19	.78	3.3	4.6	112	165	136	29	3.3	.37	1.7	.82	7.5
20	.69	4.1	3.9	48	100	107	26	2.8	1.1	.84	2.2	4.5
21	.86	4.0	4.0	56	70	166	31	2.7	5.5	.79	3.2	149
22	1.4	4.2	4.0	195	52	250	39	3.2	3.5	13	2.8	110
23	1.7	4.1	3.7	83	40	147	34	20	2.4	14	1.7	22
24	3.2	3.3	4.4	990	37	121	40	21	1.8	4.4	3.5	9.5
25	1.7	3.7	e4.2	364	35	105	30	29	1.2	2.3	2.1	5.0
26	2.0	4.2	e4.0	155	34	81	25	11	.48	2.0	9.6	2.8
27	.90	11	e3.7	98	31	69	22	7.2	.49	.97	29	2.6
28	1.3	5.2	e4.1	74	60	62	19	5.2	.59	8.8	9.4	131
29	1.6	3.7	4.8	58	---	55	15	3.5	.86	13	3.4	176
30	1.2	3.2	5.2	44	---	49	15	2.0	.68	4.2	1.6	1380
31	3.3	---	e4.7	36	---	43	---	1.6	---	2.3	.89	---
TOTAL	105.74	104.37	186.9	3025.7	1667	5064	1424	361.0	41.40	121.40	80.40	2359.12
MEAN	3.41	3.48	6.03	97.6	59.5	163	47.5	11.6	1.38	3.92	2.59	78.6
MAX	33	11	25	990	273	1080	117	44	5.5	28	29	1380
MIN	.63	.97	2.8	4.0	24	43	15	1.6	.37	.09	.08	.60
CFSM	.04	.04	.06	1.05	.64	1.75	.51	.12	.01	.04	.03	.84
IN.	.04	.04	.07	1.21	.66	2.02	.57	.14	.02	.05	.03	.94



01656000 CEDAR RUN NEAR CATLETT, VA--Continued

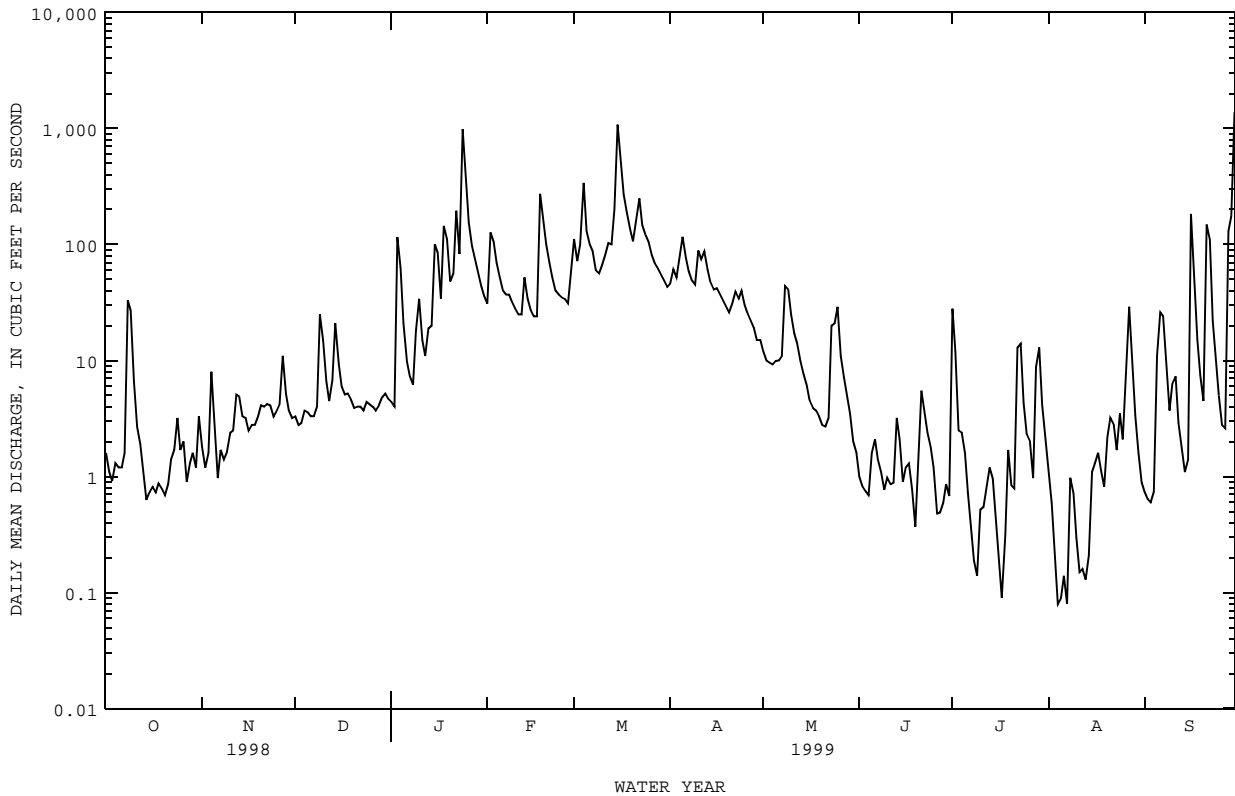
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1951 - 1987, 1990 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	45.8	63.4	109	148	169	178	123	73.7	70.6	29.8	44.6	39.6
MAX	450	248	379	467	501	531	544	210	917	323	407	388
(WY)	1980	1973	1993	1978	1998	1993	1983	1971	1972	1956	1955	1975
MIN	.40	3.15	3.53	4.64	28.0	22.3	19.6	9.41	1.38	.74	.58	.37
(WY)	1987	1966	1966	1981	1954	1981	1985	1956	1999	1963	1966	1954

SUMMARY STATISTICS FOR 1998 CALENDAR YEAR FOR 1999 WATER YEAR WATER YEARS 1951 - 1986  
1990 - 1999

ANNUAL TOTAL	49855.23	14541.03	
ANNUAL MEAN	137 c	39.8	90.9
HIGHEST ANNUAL MEAN			171
LOWEST ANNUAL MEAN			27.6
HIGHEST DAILY MEAN	3710	Mar 21	1380 Sep 30
LOWEST DAILY MEAN	e.12	aSep 15	.08 bAug 4
ANNUAL SEVEN-DAY MINIMUM	e.14	Sep 10	.32 Aug 2
INSTANTANEOUS PEAK FLOW			2680 Sep 30
INSTANTANEOUS PEAK STAGE			10.04 Sep 30
INSTANTANEOUS LOW FLOW			.07 bAug 4
ANNUAL RUNOFF (CFSM)	1.46		.43
ANNUAL RUNOFF (INCHES)	19.86		5.79
10 PERCENT EXCEEDS	308		100
50 PERCENT EXCEEDS	21		5.1
90 PERCENT EXCEEDS	.90		.75
			1.8
			e18500
			f27.66
			32500
			Jun 22 1972
			Jun 22 1972
			(g)
			(c)
			(d)

- a Also Sep 16, 1998.
- b Also Aug 7, 1999.
- c Many days in 1954, 1957, 1959, 1963-64, 1966, 1983, and 1993.
- d Many days in 1954, 1957, 1959, 1963-64, 1966, and 1983.
- e Estimated.
- f From floodmarks.
- g Many days in 1954, 1957, 1959, 1963-64, 1966, 1983, 1991, and 1993.





01656100 CEDAR RUN NEAR ADEN, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1973 - 1987, 1997 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	130	143	253	292	359	308	266	118	74.7	39.0	71.7	134
MAX	924	584	668	893	908	786	1088	384	353	192	336	958
(WY)	1980	1973	1973	1978	1979	1984	1983	1978	1982	1975	1984	1975
MIN	1.61	4.59	8.45	5.96	58.7	27.8	29.7	17.2	4.78	2.55	1.14	1.32
(WY)	1987	1999	1999	1981	1977	1981	1981	1977	1977	1985	1987	1980

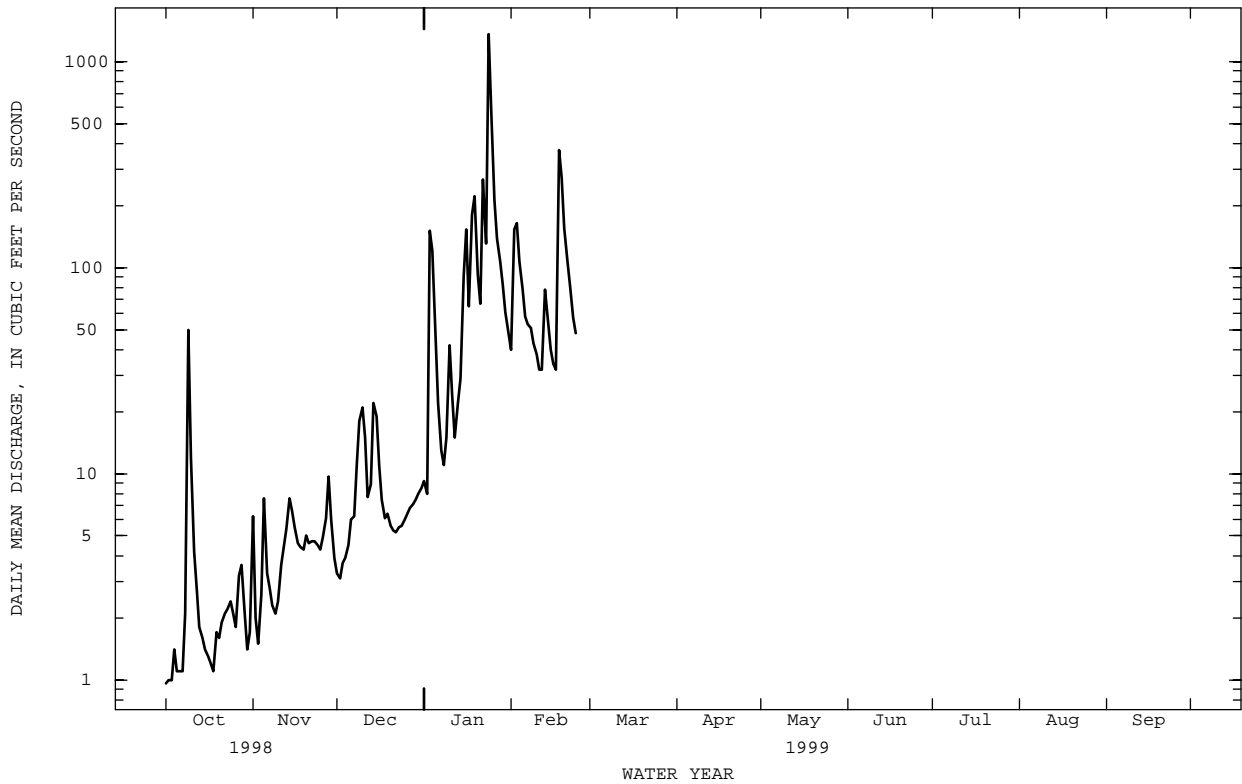
SUMMARY STATISTICS

FOR 1998 CALENDAR YEAR

WATER YEARS 1973 - 1987  
1997 - 1999

ANNUAL TOTAL	72828.86		
ANNUAL MEAN	200	184	
HIGHEST ANNUAL MEAN		313	1984
LOWEST ANNUAL MEAN		52.0	1981
HIGHEST DAILY MEAN	4770	10400	Feb 26 1979
LOWEST DAILY MEAN	.16	.16	Sep 11 1998
ANNUAL SEVEN-DAY MINIMUM	.19	.19	Sep 10 1998
INSTANTANEOUS PEAK FLOW		14900	Oct 1 1979
INSTANTANEOUS PEAK STAGE		15.29	Oct 1 1979
INSTANTANEOUS LOW FLOW		.16	aSep 10 1998
ANNUAL RUNOFF (CFSM)	1.29	1.18	
ANNUAL RUNOFF (INCHES)	17.48	16.09	
10 PERCENT EXCEEDS	386	330	
50 PERCENT EXCEEDS	20	48	
90 PERCENT EXCEEDS	1.1	2.9	

a Also Sep 11-12, 1998.  
e Estimated.



## POTOMAC RIVER BASIN

01656100 CEDAR RUN NEAR ADEN, VA--Continued

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--October 1996 to January 1999 (discontinued).

## WATER-QUALITY DATA, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SEDI- MENT, SUS- PENDED (MG/L) (80154)
OCT			
01...	1200	1.1	5
02...	1200	1.1	8
03...	1200	1.0	7
04...	1200	1.6	5
05...	1200	1.1	5
06...	1200	1.1	5
07...	1200	1.1	6
09...	1200	42	20
10...	1200	11	9
11...	1200	4.0	7
13...	1200	1.3	3
14...	1200	1.0	5
15...	1200	.77	8
16...	1200	.89	3
17...	1200	1.0	3
18...	1200	1.4	2
19...	1200	2.1	4
20...	1200	1.8	9
21...	1200	1.8	3
22...	1200	1.6	2
23...	1200	1.1	4
24...	1200	.66	2
25...	1200	.48	7
26...	1200	1.3	3
27...	1000	3.5	7
27...	1005	3.5	4
27...	1010	3.5	4
27...	1200	4.0	4
28...	1200	3.7	4
29...	1200	1.9	5
30...	1200	1.1	7
31...	1200	1.8	5
NOV			
01...	1200	14	7
02...	1200	1.3	5
03...	1200	.66	6
04...	1200	.77	6
05...	1200	7.5	5
06...	1200	1.6	6
07...	1200	.66	1
08...	1200	.57	4
09...	1200	1.1	5
10...	1200	1.1	4
11...	1200	1.6	4
12...	1200	1.8	3
13...	1200	2.7	2
14...	1200	4.8	2
15...	1200	4.3	6
16...	1200	2.3	3
17...	1200	1.6	2
18...	1200	1.6	6
19...	1200	4.0	7
20...	1200	2.5	6
21...	1200	6.8	7
22...	1200	4.5	8
23...	1200	4.0	9
24...	1200	5.2	8
25...	1000	3.7	5
25...	1005	3.7	4
25...	1010	3.7	6
25...	1200	3.7	9
26...	1200	6.8	7
27...	1200	6.1	7
28...	1200	9.5	8
29...	1200	5.5	9
30...	1200	3.2	8

POTOMAC RIVER BASIN

01656100 CEDAR RUN NEAR ADEN, VA--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SEDI- MENT, SUS- PENDEDED (MG/L) (80154)
DEC			
01...	1200	3.0	8
02...	1200	3.0	6
03...	1200	2.1	10
04...	1200	2.1	8
05...	1200	2.7	8
06...	1200	3.5	12
07...	1200	3.7	11
08...	1200	9.9	5
09...	1200	21	5
10...	1200	35	6
11...	1200	15	13
12...	1200	7.5	6
13...	1200	9.9	13
14...	1200	26	9
16...	1200	11	19
17...	0930	7.9	4
17...	0945	7.5	3
17...	1000	7.5	5
17...	1200	6.8	9
18...	1200	5.8	9
19...	1200	6.5	5
20...	1200	5.5	4
21...	1200	5.5	4
22...	1200	8.7	6
28...	1200	11	95
29...	1200	10	7
30...	1200	9.9	24
31...	1200	11	5
JAN			
03...	1200	122	108
03...	1415	186	807
03...	1815	362	348
03...	2215	252	184
04...	0215	203	149
04...	1200	104	61
05...	1200	36	33
06...	1200	22	22
07...	1200	13	16
08...	1200	10	19
09...	1200	10	12
12...	1200	16	10

## POTOMAC RIVER BASIN

01656100 CEDAR RUN NEAR ADEN, VA--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

## SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DAY	MEAN		MEAN		MEAN		MEAN		MEAN		MEAN	
	CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)
	OCTOBER		NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH	
1	6	.02	9	.18	8	.06	5	.12	---	---	---	---
2	7	.02	6	.04	7	.04	9	.18	---	---	---	---
3	7	.02	6	.01	10	.06	208	132	---	---	---	---
4	5	.02	8	.05	8	.05	80	30	---	---	---	---
5	5	.01	9	.20	8	.07	34	4.5	---	---	---	---
6	5	.02	6	.03	11	.11	22	1.4	---	---	---	---
7	6	.02	5	.01	12	.12	17	.58	---	---	---	---
8	21	.19	4	.01	22	.56	18	.51	---	---	---	---
9	27	4.4	5	.01	33	2.7	16	.75	---	---	---	---
10	10	.33	4	.01	24	2.4	24	2.8	---	---	---	---
11	7	.08	4	.01	13	.54	15	1.0	---	---	---	---
12	5	.02	3	.01	7	.15	12	.50	---	---	---	---
13	3	.01	3	.03	14	.34	---	---	---	---	---	---
14	5	.01	5	.07	23	1.3	---	---	---	---	---	---
15	7	.01	4	.04	14	.75	---	---	---	---	---	---
16	3	.01	3	.02	7	.22	---	---	---	---	---	---
17	3	.01	2	.01	5	.10	---	---	---	---	---	---
18	2	.01	5	.02	5	.08	---	---	---	---	---	---
19	4	.02	7	.06	5	.08	---	---	---	---	---	---
20	7	.04	6	.05	4	.06	---	---	---	---	---	---
21	3	.02	7	.12	4	.06	---	---	---	---	---	---
22	2	.01	8	.11	6	.14	---	---	---	---	---	---
23	3	.01	9	.10	6	.16	---	---	---	---	---	---
24	3	.00	8	.10	7	.20	---	---	---	---	---	---
25	5	.01	6	.05	8	.26	---	---	---	---	---	---
26	4	.01	7	.11	8	.30	---	---	---	---	---	---
27	5	.04	9	.20	8	.26	---	---	---	---	---	---
28	4	.04	9	.24	7	.22	---	---	---	---	---	---
29	5	.03	9	.13	7	.19	---	---	---	---	---	---
30	6	.02	8	.08	6	.17	---	---	---	---	---	---
31	5	.02	---	---	5	.15	---	---	---	---	---	---
TOTAL	---	5.48	---	2.11	---	11.90	---	---	---	---	---	---



## POTOMAC RIVER BASIN

01656120 CEDAR RUN AT ROUTE 646 NEAR ADEN, VA

LOCATION.--Lat. 38°38'29" long 77°30'46"i, Prince William County, Hydrologic unit 02070010, on left bank at upstream side of bridge on State Highway 646, 2.0 miles southeast of Aden.

DRAINAGE AREA.--Not determined.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1996 to September 1999 (discontinued).

REVISED RECORDS.--WDR-98-1: 1997(M).

GAGE.--Water stage recorder. Elevation of gage is 160 ft above sea level, from topographic map.

REMARKS.--No estimated daily discharges. Records fair.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 3,220 ft<sup>3</sup>/s, Sep 30, gage height, 12.38 ft; minimum discharge, 0.34 ft<sup>3</sup>/s, Aug 8, gage height, 1.15 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.2	2.9	4.0	15	53	289	63	20	5.1	4.1	3.3	2.1
2	1.3	8.6	3.4	14	164	166	75	19	3.7	56	2.4	1.8
3	1.4	3.8	4.1	162	208	124	69	18	2.8	16	1.9	1.5
4	1.3	2.8	4.1	156	125	818	72	17	2.1	6.5	1.5	1.7
5	1.6	5.6	4.3	106	94	315	231	18	1.7	4.2	1.6	6.2
6	1.8	8.6	6.3	48	73	206	133	18	1.6	3.4	1.0	9.2
7	1.9	5.8	6.6	22	68	186	103	18	2.0	2.3	.64	21
8	3.1	3.4	7.4	19	66	126	82	54	2.7	1.6	.48	16
9	36	2.3	17	22	61	107	73	80	3.1	.95	1.5	7.7
10	15	2.1	27	55	54	118	112	46	2.4	.73	2.0	4.2
11	6.8	3.5	14	40	47	135	101	30	2.2	.58	1.5	2.5
12	4.4	4.3	8.7	23	46	221	117	22	1.9	.70	.77	3.5
13	3.2	5.8	11	26	93	206	92	19	1.8	1.7	1.4	1.8
14	2.7	7.7	16	36	80	258	71	14	2.8	2.0	.95	1.0
15	1.9	8.4	21	80	60	2320	61	12	4.0	1.6	.75	2.1
16	1.6	6.9	14	186	51	1180	62	12	3.8	1.5	.95	239
17	1.6	6.2	11	79	48	443	57	9.8	2.7	1.1	1.6	182
18	1.4	5.1	9.2	166	421	291	49	8.2	2.2	.85	1.2	30
19	2.0	5.1	8.7	291	389	201	42	8.1	1.8	1.9	.75	10
20	1.9	6.4	9.7	108	200	151	37	7.2	2.5	2.3	.92	5.3
21	2.2	5.5	9.0	75	130	173	39	6.4	3.7	3.4	.90	8.9
22	2.4	5.8	8.5	300	100	473	50	6.3	4.5	3.4	1.2	232
23	2.5	5.8	9.1	141	75	242	49	36	6.5	5.3	1.1	48
24	2.5	5.6	9.8	1290	65	174	52	43	4.1	12	1.8	16
25	2.4	5.5	10	883	62	149	45	47	3.0	6.2	1.1	8.4
26	2.1	6.4	11	283	60	115	41	26	2.3	3.6	1.8	4.9
27	1.8	6.8	12	165	56	95	32	15	1.9	2.5	3.7	3.6
28	3.0	10	12	121	77	85	28	11	2.0	4.3	4.7	153
29	3.8	7.5	14	95	---	78	24	8.8	3.2	36	7.5	216
30	3.3	5.2	15	74	---	67	22	11	2.2	9.9	4.2	2480
31	2.8	---	16	62	---	60	---	8.5	---	4.4	2.7	---
TOTAL	120.9	169.4	333.9	5143	3026	9572	2084	669.3	86.3	201.01	57.81	3719.4
MEAN	3.90	5.65	10.8	166	108	309	69.5	21.6	2.88	6.48	1.86	124
MAX	36	10	27	1290	421	2320	231	80	6.5	56	7.5	2480
MIN	1.2	2.1	3.4	14	46	60	22	6.3	1.6	.58	.48	1.0

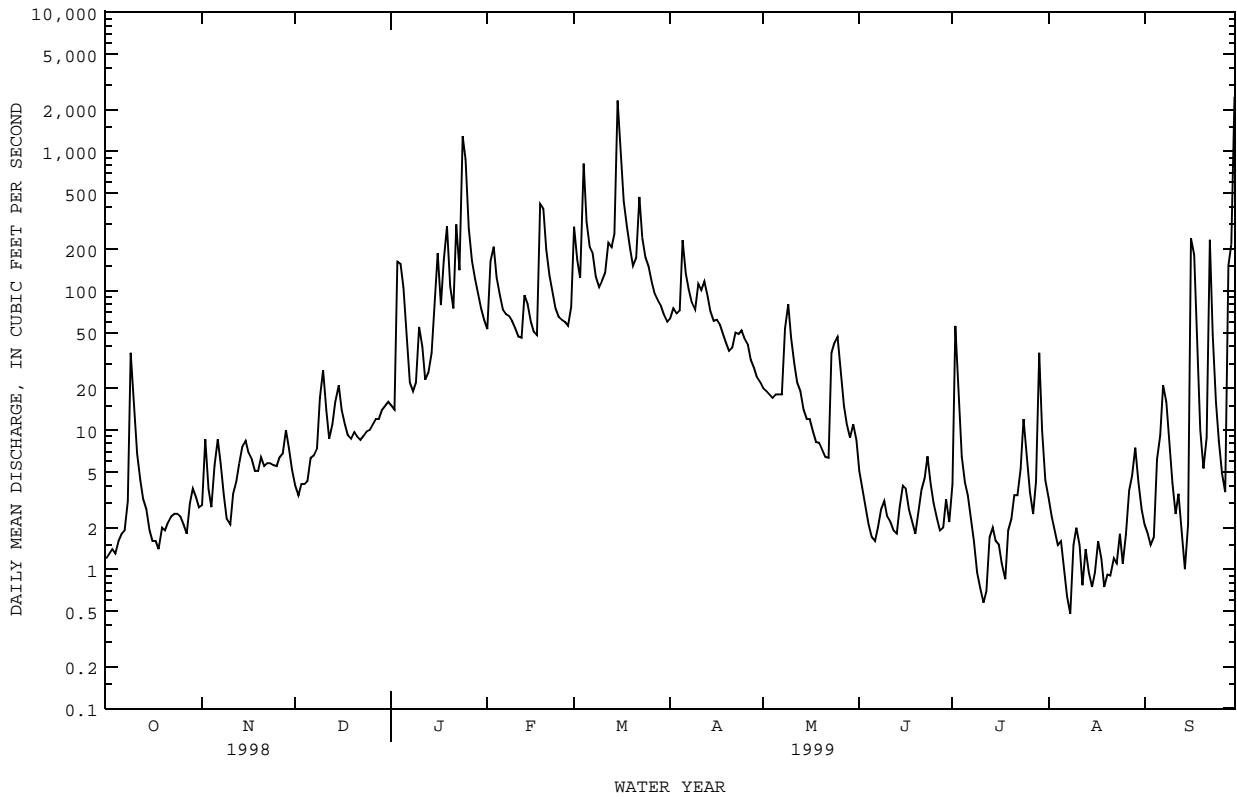


01656120 CEDAR RUN AT ROUTE 646 NEAR ADEN, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1996 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	129	177	234	346	450	441	142	126	63.2	14.2	3.43	44.7
MAX	366	285	597	617	931	678	231	308	155	20.7	5.57	124
(WY)	1997	1998	1997	1998	1998	1998	1998	1998	1998	1997	1997	1999
MIN	3.90	5.65	10.8	166	108	309	69.5	21.6	2.88	6.48	1.86	2.32
(WY)	1999	1999	1999	1999	1999	1999	1999	1999	1999	1999	1999	1998

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR	WATER YEARS 1996 - 1999
ANNUAL TOTAL	88593.95	25183.02	
ANNUAL MEAN	243	69.0	179
HIGHEST ANNUAL MEAN			274 1998
LOWEST ANNUAL MEAN			69.0 1999
HIGHEST DAILY MEAN	5720	Feb 5	2480 Sep 30 5720 Feb 5 1998
LOWEST DAILY MEAN	.46	Sep 15	.48 Aug 8 .46 Sep 15 1998
ANNUAL SEVEN-DAY MINIMUM	.55	Sep 11	1.0 Aug 15 .55 Sep 11 1998
INSTANTANEOUS PEAK FLOW			3220 Sep 30 7820 Oct 19 1996
INSTANTANEOUS PEAK STAGE			12.38 Sep 30 16.61 Oct 19 1996
INSTANTANEOUS LOW FLOW			.34 Aug 8 .34 Aug 8 1999
10 PERCENT EXCEEDS	528	164	384
50 PERCENT EXCEEDS	24	9.2	50
90 PERCENT EXCEEDS	1.9	1.6	2.2



POTOMAC RIVER BASIN

01656120 CEDAR RUN AT ROUTE 646 NEAR ADEN, VA--Continued

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1996 to current year.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DATE	TIME	SAMPLE TYPE	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND-ARD UNITS) (00400)	BARO-METRIC PRES-SURE (MM OF HG) (00025)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	OXYGEN, DIS-SOLVED (MG/L) (00300)
OCT 27...	0900	ENVIRONMENTAL	1.5	98	7.3	765	15.0	11.6	8.4
NOV 25...	0840	ENVIRONMENTAL	9.9	175	7.1	755	4.0	5.7	10.3
DEC 17...	0830	ENVIRONMENTAL	12	172	7.0	742	8.5	4.0	11.5
JAN 13...	0915	ENVIRONMENTAL	16	298	6.8	757	8.0	.2	13.7
FEB 02...	1045	ENVIRONMENTAL	53	176	7.0	760	10.0	4.8	12.2
MAR 10...	1145	ENVIRONMENTAL	83	147	6.9	749	2.3	2.5	14.2
15...	1145	ENVIRONMENTAL	2970	95	7.0	742	2.5	2.0	13.8
15...	1150	REPLICATE	2960	95	7.0	742	2.5	2.0	13.8
APR 13...	1130	ENVIRONMENTAL	63	142	7.2	750	10.5	10.5	10.3
MAY 17...	0815	ENVIRONMENTAL	6.2	173	7.2	759	15.0	15.5	7.9
JUN 22...	1020	ENVIRONMENTAL	2.1	190	7.0	757	21.0	19.0	8.6
JUL 20...	1045	ENVIRONMENTAL	1.7	219	6.9	752	26.5	26.0	6.0
AUG 17...	1115	ENVIRONMENTAL	1.4	212	7.0	754	27.5	25.0	8.0
SEP 14...	1130	ENVIRONMENTAL	1.5	200	7.2	752	27.3	20.5	9.0
16...	1145	ENVIRONMENTAL	246	116	6.4	737	19.5	19.0	9.1
16...	1147	REPLICATE	246	116	6.4	737	19.5	19.0	9.1

DATE	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)	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)	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, DIS-SOLVED (MG/L AS P) (00671)
OCT 27...	77	<.01	<.05	.03	<.1	.3	.34	<.05	.01
NOV 25...	83	<.01	<.05	.03	.3	<.1	<.05	<.05	.02
DEC 17...	90	.01	<.05	.02	.2	.4	<.05	<.05	.01
JAN 13...	93	.01	.90	.07	.5	.4	.053	.026	.02
FEB 02...	97	.02	1.7	.11	.8	.6	.13	.073	.06
MAR 10...	98	.01	.87	<.02	.3	.3	.034	.012	.02
15...	97	.01	.83	.11	1.1	.5	.25	.10	.08
15...	97	.01	.82	.11	1.1	.5	.27	.11	.09
APR 13...	101	<.01	.14	<.02	.4	.3	.025	.011	.01
MAY 17...	65	.01	.07	.04	.4	.4	.024	.013	.02
JUN 22...	93	<.01	<.05	.02	.4	.4	.029	.013	.01
JUL 20...	99	<.01	<.05	<.02	.6	.6	.05	.028	.02
AUG 17...	97	<.01	<.05	<.02	.4	.5	.022	.019	.01
SEP 14...	100	<.01	<.05	<.02	.6	.4	.029	.021	<.01
16...	98	<.01	.12	.03	.8	.4	.13	.029	.03
16...	98	<.01	.12	.04	.8	.4	.12	.029	.02

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

01656120 CEDAR RUN AT ROUTE 646 NEAR ADEN, VA--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SEDI- MENT, SUS- PENDED (MG/L) (80154)
OCT			
01...	1200	1.3	9
02...	1200	1.5	5
03...	1200	1.5	6
04...	1200	1.2	7
05...	1200	1.7	7
06...	1200	1.8	9
07...	1200	1.9	14
08...	1200	2.9	5
09...	1200	51	19
10...	1200	13	13
11...	1200	6.8	8
12...	1200	4.7	6
13...	1200	3.1	8
14...	1200	2.9	6
15...	1200	1.9	5
16...	1200	1.5	5
17...	1200	1.7	5
18...	1200	1.3	4
19...	1200	1.9	3
20...	1200	1.9	6
21...	1200	2.4	5
22...	1200	2.4	4
23...	1210	2.4	5
24...	1200	2.5	4
25...	1100	2.4	10
25...	1200	2.4	10
26...	1200	2.1	8
27...	0905	1.8	1
27...	0910	1.8	2
27...	1200	1.8	13
28...	1200	3.1	10
29...	1200	3.8	5
30...	1200	3.4	6
31...	1200	2.9	15
NOV			
01...	1200	2.4	3
02...	1200	8.6	12
03...	1200	3.8	8
04...	1200	2.9	9
06...	1200	8.9	88
07...	1200	5.9	5
08...	1200	3.2	2
09...	1200	2.2	5
10...	1200	2.1	4
11...	1200	3.8	12
12...	1200	4.0	5
13...	1200	5.9	5
14...	1200	8.3	4
15...	1200	8.6	7
16...	1200	7.0	3
17...	1200	6.2	3
18...	2000	4.9	3
19...	1200	4.9	5
20...	1200	6.5	8
21...	1200	5.4	6
22...	1200	5.9	9
23...	1200	5.4	11
24...	1200	5.7	12
25...	0825	5.7	3
25...	0830	5.7	2
25...	0835	5.7	3
25...	1200	5.4	6
26...	1200	7	4
27...	1200	7.0	5
28...	1200	12	17
29...	1200	7.3	6
30...	1200	4.9	20

## POTOMAC RIVER BASIN

01656120 CEDAR RUN AT ROUTE 646 NEAR ADEN, VA--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SEDI- MENT, SUS- PENDED (MG/L) (80154)
DEC			
01...	1200	4.0	6
02...	1200	3.4	8
03...	1200	4.5	8
04...	1200	4.0	7
05...	1200	4.5	32
06...	1200	6.8	20
07...	1200	6.5	12
08...	1200	7.0	2
09...	1200	15	3
10...	1200	30	13
11...	1200	13	3
12...	1200	8.6	2
13...	1200	12	53
14...	1200	13	55
16...	1200	14	20
17...	0815	11	5
17...	0830	11	3
17...	0845	11	3
17...	1200	11	56
18...	1200	9.2	13
19...	1200	8.6	3
20...	1200	9.6	7
21...	1200	8.9	3
22...	1200	8.6	4
28...	1200	13	15
29...	1200	14	5
30...	1200	15	3

01656120 CEDAR RUN AT ROUTE 646 NEAR ADEN, VA--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SEDI- MENT, SUS- PENDED (MG/L) (80154)
JAN			
03...	1845	383	710
03...	2245	385	209
04...	0245	263	40
04...	0645	194	28
04...	1200	120	127
07...	1200	21	51
08...	1200	23	11
09...	1200	20	16
12...	1200	23	16
13...	0845	24	5
13...	0900	24	4
13...	0910	24	5
13...	1200	24	8
14...	1200	34	7
15...	1200	44	16
16...	1200	182	17
17...	1200	77	18
18...	1200	67	11
18...	1736	170	163
18...	2136	504	112
19...	0136	515	62
19...	0536	393	67
19...	1200	257	82
19...	1336	233	73
19...	2136	162	56
20...	1200	104	38
21...	1200	71	16
22...	0215	165	86
22...	0615	471	338
22...	1015	408	91
22...	1200	364	75
22...	1415	312	282
22...	2215	201	80
23...	0215	168	85
23...	1200	135	40
24...	0400	148	60
24...	0800	497	61
24...	1200	1340	241
24...	1201	1340	116
24...	1600	2110	60
24...	2000	2360	314
25...	0000	2410	220
25...	0400	1410	176
25...	1200	657	97
25...	1201	656	23
25...	2000	447	23
26...	0400	344	45
26...	1200	276	23
26...	2000	229	15
27...	0800	173	10
27...	1200	161	13
27...	2000	146	11
28...	1200	119	11
29...	1200	93	8
30...	1200	73	8
31...	1200	62	7

## POTOMAC RIVER BASIN

01656120 CEDAR RUN AT ROUTE 646 NEAR ADEN, VA--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SEDI- MENT, SUS- PENDED (MG/L) (80154)
FEB			
01...	1200	52	17
02...	1200	93	11
02...	1345	145	17
02...	1745	312	28
02...	2145	328	20
03...	0145	278	27
03...	1015	182	19
03...	1025	182	17
03...	1030	182	17
03...	1200	182	16
03...	2000	165	17
04...	1200	122	15
05...	1200	93	9
06...	1200	71	6
07...	1200	68	7
08...	1200	67	7
09...	1200	61	9
10...	1200	53	7
11...	1200	47	6
12...	1200	43	5
13...	1200	109	16
16...	1200	51	24
17...	1200	48	10
18...	1130	175	46
18...	1200	240	43
18...	1530	857	71
18...	1930	890	58
18...	2330	674	47
19...	0330	528	52
19...	0730	430	31
19...	1130	366	25
19...	1200	360	27
19...	1930	288	45
20...	0330	238	21
20...	0730	217	17
20...	1200	197	14
20...	1930	168	23
23...	1200	76	7
24...	1200	65	6
25...	1200	63	6
26...	1200	61	5
27...	1200	57	6
28...	1200	62	6
28...	2315	166	15

POTOMAC RIVER BASIN

01656120 CEDAR RUN AT ROUTE 646 NEAR ADEN, VA--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SEDI- MENT, SUS- PENDEDED (MG/L) (80154)
MAR			
01...	0315	334	27
01...	0715	346	30
01...	1115	316	19
01...	1200	310	15
01...	1515	280	11
01...	1915	248	10
02...	1115	165	8
02...	1200	163	13
03...	1200	110	10
03...	2215	165	10
04...	0215	757	13
04...	0615	1160	68
04...	1040	924	236
04...	1045	924	240
04...	1050	923	238
04...	1200	919	163
04...	1415	837	156
04...	1815	629	46
05...	0215	414	32
05...	1015	314	22
05...	1200	296	29
05...	2215	246	12
06...	1200	195	14
07...	1200	184	12
08...	1200	123	8
09...	1200	105	6
10...	1155	117	5
10...	1200	117	6
10...	1201	118	16
10...	1205	118	8
11...	1200	131	7
11...	2230	163	10
12...	0230	242	10
12...	0630	259	23
12...	1200	225	15
12...	1830	194	13
13...	0630	223	27
13...	1200	213	10
13...	1830	192	10
14...	0630	168	24
14...	1200	165	7
14...	1830	207	14
14...	2230	736	151
15...	0230	2090	268
15...	0630	2490	193
15...	1030	2560	132
15...	1115	2570	124
15...	1130	2560	139
15...	1140	2550	117
15...	1200	2530	116
15...	1435	2360	92
15...	1835	2240	68
15...	2235	2340	85
16...	0235	2240	76
16...	0635	1500	62
16...	1035	1010	45
16...	1200	913	87
16...	1835	677	26
17...	0635	487	24
17...	1200	434	14
17...	1835	387	10
18...	0635	312	6
18...	1200	290	9
18...	1835	265	8
19...	0635	214	6
19...	1200	195	7
20...	1200	150	8
21...	1200	132	7
22...	1200	486	38
23...	0930	248	11
23...	1200	234	9
23...	1330	227	26
24...	1200	170	7
25...	0130	161	11
25...	1200	150	7
26...	1200	113	8
27...	1200	96	6
28...	1200	84	6
29...	1200	79	5

## POTOMAC RIVER BASIN

01656120 CEDAR RUN AT ROUTE 646 NEAR ADEN, VA--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SEDI- MENT, SUS- PENDEDED (MG/L) (80154)
MAR			
30...	1200	68	7
31...	1200	61	3
APR			
01...	1200	65	8
02...	1200	79	4
03...	1200	69	3
04...	1200	64	4
04...	2345	156	23
05...	0400	286	42
05...	0800	276	46
05...	1200	246	27
05...	1201	245	22
05...	2345	168	20
06...	1200	131	20
07...	1200	104	8
08...	1200	83	8
09...	1200	71	6
10...	1200	134	14
11...	1200	97	12
12...	1200	123	21
13...	1110	93	3
13...	1115	93	5
13...	1120	93	5
13...	1200	93	36
14...	1200	71	4
15...	1200	60	3
16...	1200	65	5
17...	1200	57	3
18...	1200	52	3
19...	1200	42	10
20...	1200	37	4
21...	1200	35	2
22...	1200	48	4
23...	1200	49	4
24...	1200	52	3
MAY			
04...	1200	17	11
05...	1200	18	10
06...	1200	17	15
07...	1200	17	14
08...	1200	45	31
09...	1200	81	21
10...	1200	44	23
11...	1200	29	14
12...	1200	21	15
13...	1200	18	18
14...	1200	15	15
15...	1200	13	10
16...	1200	11	9
17...	0810	9.9	1
17...	0815	9.9	2
17...	0820	9.9	1
17...	1200	9.6	10
18...	1200	8.3	13
19...	1200	8.3	13
20...	1200	6.8	15
21...	1200	6.2	7
22...	1200	5.4	7
23...	1200	40	113
24...	1200	45	63
25...	1200	68	25
26...	1200	24	50
27...	1200	15	23
28...	1200	11	16
29...	1200	9.2	21
30...	1200	12	20
31...	1200	8.3	15



01656120 CEDAR RUN AT ROUTE 646 NEAR ADEN, VA--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SEDI- MENT, SUS- PENDEDED (MG/L) (80154)
JUN			
01...	1200	4.9	16
02...	1200	3.4	16
03...	1200	2.5	31
04...	1200	2.2	14
05...	1200	1.8	15
06...	1200	1.7	13
07...	1200	1.9	16
08...	1200	2.5	6
09...	1200	3.1	14
10...	1200	2.4	7
11...	1200	2.2	14
12...	1200	1.8	11
13...	1200	1.5	12
14...	1200	3.1	10
15...	1200	4.0	13
16...	1200	3.8	26
17...	1200	2.7	7
18...	1200	2.2	13
19...	1200	1.8	12
20...	1200	2.5	13
21...	1200	3.8	14
22...	1000	3.4	3
22...	1010	3.4	2
22...	1015	3.4	6
22...	1200	3.4	10
23...	1200	6.5	12
24...	1200	4.0	12
25...	1200	3.1	13
JUL			
14...	1200	2.2	10
20...	1030	2.5	8
20...	1035	2.5	8
20...	1040	2.5	6
21...	1200	3.1	4
22...	1200	3.1	11
23...	1200	3.8	11
24...	1200	13	7
25...	1200	5.7	6
26...	1200	3.4	5
27...	1200	2.4	7
28...	1200	1.9	6
29...	1200	25	18
30...	1200	8.9	20
31...	1200	4.3	19
AUG			
01...	1200	3.2	15
02...	1200	2.4	22
03...	1200	1.9	6
04...	1200	1.5	7
05...	1200	1.2	8
06...	1200	.91	6
07...	1200	.65	6
08...	1200	.39	8
09...	1200	1.7	3
10...	1200	2.2	5
11...	1200	1.7	8
12...	1200	.73	4
13...	1200	1.5	4
14...	1200	.82	4
15...	1200	.65	<1
16...	1200	.91	2
17...	1055	1.7	3
17...	1100	1.7	2
17...	1105	1.7	2
17...	1200	1.7	3
18...	1200	1.1	10
19...	1200	.73	6
20...	1200	.91	6
21...	1200	.82	11
22...	1200	1.2	8
23...	1200	1.1	10
24...	1200	1.9	6
25...	1200	1.0	6
26...	1200	1.7	5
27...	1200	3.8	9
28...	1200	2.9	7
29...	1200	7.3	8
30...	1200	4.3	11
31...	1200	2.7	14

## POTOMAC RIVER BASIN

01656120 CEDAR RUN AT ROUTE 646 NEAR ADEN, VA--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SEDI- MENT, SUS- PENDED (MG/L) (80154)
SEP			
01...	1200	1.9	11
02...	1200	1.8	14
03...	1200	1.5	9
04...	1200	1.4	7
05...	1200	5.2	12
06...	1200	8.9	10
07...	1200	20	9
08...	1200	18	9
09...	1200	7.6	8
10...	1200	4.3	10
11...	1200	2.5	10
12...	1200	4.3	10
13...	1200	1.8	17
14...	1135	.91	6
14...	1140	.91	5
14...	1145	.91	4
14...	1200	.91	10
15...	1200	1.4	6
16...	1115	192	86
16...	1200	249	130
16...	1404	356	113
16...	1410	359	115
16...	1430	374	109
16...	1435	376	81
16...	1830	453	143
16...	2230	460	92
17...	0230	350	25
17...	0630	255	43
17...	1200	148	204
18...	1200	27	82
19...	1200	9.9	34
20...	1200	5.2	23
21...	1200	5.4	21
22...	0015	143	44
22...	0415	428	49
22...	0815	300	23
22...	1200	211	99
22...	1215	207	20
22...	1615	148	19
23...	1200	45	45
24...	1200	16	20
25...	1200	8.3	16
26...	1200	4.7	16
27...	1200	3.4	22

01656120 CEDAR RUN AT ROUTE 646 NEAR ADEN, VA--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1998 TO SEPTEMBER

DAY	MEAN		MEAN		MEAN		MEAN		MEAN		MEAN	
	CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)
	OCTOBER		NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH	
1	8	.02	4	.04	7	.08	2	.10	5	.70	18	15
2	6	.02	10	.22	8	.07	5	.19	15	8.9	10	4.6
3	6	.02	9	.09	8	.09	228	161	20	12	10	3.5
4	7	.02	9	.07	9	.10	32	16	14	4.9	69	160
5	7	.03	11	.18	26	.30	21	6.2	9	2.4	23	20
6	9	.05	10	.24	20	.34	17	2.2	6	1.3	13	7.4
7	15	.08	5	.08	14	.24	14	.81	7	1.3	12	5.9
8	43	.42	3	.02	20	.41	12	.60	7	1.3	8	2.8
9	26	2.2	4	.03	36	1.9	13	.78	8	1.4	6	1.8
10	13	.54	5	.03	92	6.7	14	2.1	7	1.0	6	2.1
11	8	.15	9	.09	36	1.4	10	1.1	6	.76	8	2.9
12	6	.08	6	.06	24	.56	7	.44	6	.75	15	9.3
13	7	.06	5	.08	48	1.5	7	.48	13	3.4	15	8.8
14	6	.05	4	.09	51	2.2	8	.78	10	2.2	32	50
15	5	.03	6	.14	33	1.9	21	6.2	8	1.3	138	856
16	5	.02	3	.06	21	.79	20	11	7	1.0	52	188
17	5	.02	3	.05	16	.48	17	3.6	12	1.6	16	20
18	4	.01	3	.04	11	.29	52	40	45	64	8	5.9
19	3	.02	5	.07	4	.10	67	53	31	35	7	3.7
20	5	.03	7	.12	6	.15	38	11	16	8.7	8	3.1
21	5	.03	7	.10	3	.09	28	5.8	11	3.9	20	14
22	4	.03	9	.14	4	.09	200	188	9	2.4	44	58
23	5	.03	11	.17	4	.10	55	22	7	1.3	26	17
24	5	.03	10	.15	4	.11	127	590	6	1.1	15	7.3
25	9	.06	5	.07	4	.12	113	334	6	.98	10	4.0
26	7	.04	4	.08	5	.14	28	23	5	.85	8	2.5
27	3	.01	6	.11	5	.15	12	5.2	6	.89	6	1.6
28	8	.06	13	.37	5	.16	11	3.5	8	2.0	6	1.3
29	6	.06	8	.16	5	.17	8	2.1	---	---	5	1.1
30	7	.06	15	.21	3	.13	8	1.6	---	---	4	.71
31	11	.09	---	---	3	.11	7	1.1	---	---	4	.57
TOTAL	---	4.37	---	3.36	---	20.97	---	1493.88	---	167.33	---	1478.88



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## 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 mi<sup>2</sup>.

## WATER-DISCHARGE RECORDS

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

REVISED RECORDS.--WSP 2103: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 238.88 ft above sea level.

REMARKS.--No estimated daily discharges. Records good. No flow at times in 1954, 1957, 1962-66, 1983, 1985, 1987, 1988, 1991, 1993, 1998, and 1999.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 200 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Jan 24	1330	221	4.57	Sep 16	0930	228	4.62
Mar 15	0215	236	4.68	Sep 30	0745	*462	*5.97

Minimum discharge, 0.00 ft<sup>3</sup>/s, Aug 4-24.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.05	.15	.16	1.7	3.3	10	5.1	1.8	.31	.38	.11	.30
2	.02	.16	.17	1.7	5.6	5.1	5.7	1.8	.30	.55	.08	.27
3	.03	.25	.20	1.1	5.0	6.0	4.9	1.7	.29	1.6	.03	.24
4	.03	.27	.21	2.2	3.4	32	18	1.8	.28	.82	.00	.31
5	.03	.24	.20	.70	2.7	8.3	15	1.7	.27	.56	.00	2.5
6	.04	.25	.21	.44	2.4	5.7	7.4	1.7	.24	.39	.00	2.4
7	.04	.26	.22	.37	2.3	4.9	5.4	1.8	.22	.30	.00	1.1
8	.15	.25	.58	.37	2.5	3.5	4.6	1.8	.21	.25	.00	.73
9	.20	.24	1.4	.54	2.2	3.5	4.9	1.5	.20	.22	.00	.56
10	.14	.22	.53	.84	2.1	3.7	7.3	1.4	.19	.18	.00	.54
11	.11	.30	.49	.46	1.9	3.9	5.6	1.2	.19	.17	.00	.53
12	.08	.29	.44	.43	2.3	6.2	5.7	1.2	.16	.14	.00	.45
13	.08	.27	1.9	.57	5.7	6.8	4.3	1.1	.18	.18	.00	.40
14	.09	.26	2.2	.53	3.4	25	3.7	1.1	.18	.18	.00	.36
15	.09	.27	1.3	3.2	2.7	106	3.5	.96	.18	.16	.00	.60
16	.09	.24	1.0	3.0	2.3	20	3.8	.91	.14	.14	.00	112
17	.08	.21	1.0	1.0	2.3	9.3	3.4	.91	.15	.10	.00	8.8
18	.09	.18	.96	12	15	6.4	2.9	.93	.17	.09	.00	1.9
19	.09	.20	.89	6.2	8.6	4.7	2.7	1.0	.14	.07	.00	1.1
20	.10	.18	.86	1.7	4.7	3.8	2.7	.88	.17	.06	.00	.77
21	.11	.24	.88	1.4	3.5	11	2.9	.80	.32	.04	.00	1.0
22	.10	.21	1.0	6.2	2.8	23	3.5	.98	.31	.04	.00	4.5
23	.13	.20	1.0	2.1	2.3	8.4	3.3	7.7	.23	.04	.00	1.6
24	.11	.19	1.4	81	2.3	6.2	3.9	2.2	.19	.05	.18	.98
25	.13	.19	1.1	15	2.3	5.1	2.9	1.2	.15	.10	5.3	.75
26	.13	.28	1.1	5.4	2.3	4.5	2.6	.67	.12	.08	2.1	.70
27	.14	.25	1.2	3.5	2.2	4.2	2.3	.51	.11	.03	.75	.71
28	.13	.19	1.5	3.4	5.6	4.3	2.1	.44	.12	.02	.58	3.1
29	.13	.18	1.8	3.7	---	4.3	1.9	.39	.73	.06	.50	6.1
30	.13	.17	2.0	4.0	---	4.0	1.8	.32	.46	.11	.43	140
31	.14	---	1.6	3.7	---	4.2	---	.32	---	.14	.34	---
TOTAL	3.01	6.79	29.50	178.35	103.7	354.0	143.8	42.72	6.91	7.25	10.40	295.30
MEAN	.097	.23	.95	5.75	3.70	11.4	4.79	1.38	.23	.23	.34	9.84
MAX	.20	.30	2.2	.81	15	106	18	7.7	.73	1.6	5.3	140
MIN	.02	.15	.16	.37	1.9	3.5	1.8	.32	.11	.02	.00	.24
CFSM	.01	.03	.12	.75	.48	1.49	.63	.18	.03	.03	.04	1.29
IN.	.01	.03	.14	.87	.50	1.72	.70	.21	.03	.04	.05	1.44

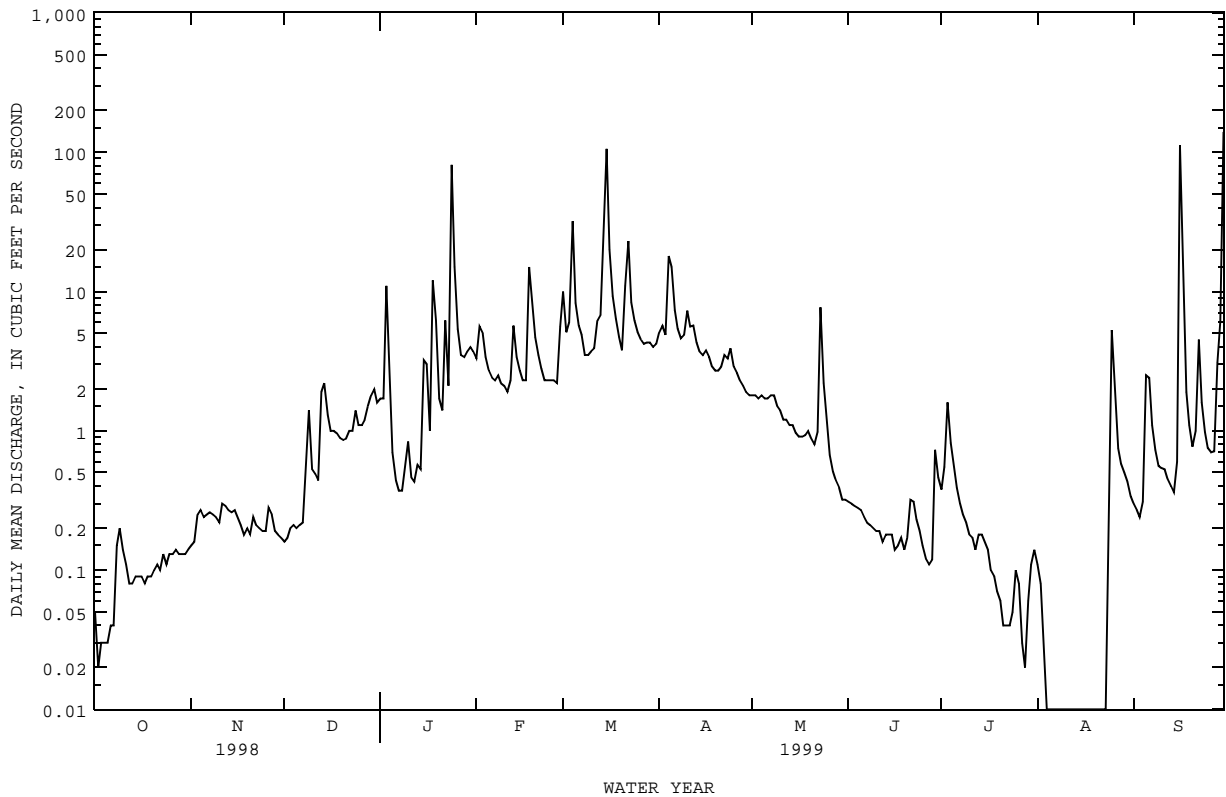
01658500 SOUTH FORK QUANTICO CREEK NEAR INDEPENDENT HILL, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1951 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	3.24	5.77	7.96	10.3	12.1	13.9	11.5	8.01	4.73	2.48	2.55	3.16
MAX	23.9	19.2	24.4	31.2	54.0	35.0	33.0	42.8	48.8	15.1	24.5	37.2
(WY)	1980	1953	1997	1996	1998	1994	1983	1989	1972	1975	1955	1975
MIN	.070	.23	.58	1.01	3.60	1.77	2.90	1.38	.23	.055	.010	.000
(WY)	1989	1999	1966	1981	1968	1981	1969	1999	1999	1963	1963	1964

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR	WATER YEARS 1951 - 1999
ANNUAL TOTAL	4313.43	1181.73	
ANNUAL MEAN	11.8	3.24	7.10
HIGHEST ANNUAL MEAN			13.5 1998
LOWEST ANNUAL MEAN			2.55 1981
HIGHEST DAILY MEAN	355 Feb 5	140 Sep 30	770 Jun 22 1972
LOWEST DAILY MEAN	.00 aAug 31	.00 bAug 4	.00 (c)
ANNUAL SEVEN-DAY MINIMUM	.00 Aug 31	.00 Aug 4	.00 (c)
INSTANTANEOUS PEAK FLOW		462 Sep 30	4160 May 6 1989
INSTANTANEOUS PEAK STAGE		5.97 Sep 30	11.62 May 6 1989
INSTANTANEOUS LOW FLOW		.00 bAug 4	.00 (c)
ANNUAL RUNOFF (CFSM)	1.55	.42	.93
ANNUAL RUNOFF (INCHES)	21.00	5.75	12.63
10 PERCENT EXCEEDS	22	5.6	14
50 PERCENT EXCEEDS	1.6	.67	2.7
90 PERCENT EXCEEDS	.07	.07	.20

- a No flow many days August to September, 1998.
- b Also 5-23, 1999.
- c No flow at times many years. See REMARKS.



01658500 SOUTH FORK QUANTICO CREEK NEAR INDEPENDENT HILL, VA--Continued

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1951, 1953, 1955-56, 1969, 1973-75, 1983-85, 1994 to current year.

## WATER-QUALITY DATA, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DATE	TIME	SAMPLE TYPE	ELEV. OF LAND SURFACE DATUM (FT. ABOVE NGVD) (72000)	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND-ARD UNITS) (00400)	BARO-METRIC PRES-SURE (MM OF HG) (00025)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	OXYGEN, DIS-SOLVED (MG/L) (00300)
OCT 28...	0900	ENVIRONMENTAL	239	.74	59	6.6	753	14.5	11.7	5.5
NOV 24...	0945	ENVIRONMENTAL	239	1.5	58	6.8	754	11.5	7.2	9.3
DEC 16...	0930	ENVIRONMENTAL	239	1.4	73	6.8	752	8.5	3.7	11.5
JAN 12...	1000	ENVIRONMENTAL	239	.59	135	6.8	760	2.5	.5	11.8
FEB 02...	0945	ENVIRONMENTAL	239	4.1	72	6.7	750	7.5	3.4	12.4
MAR 10...	1000	ENVIRONMENTAL	239	1.0	65	6.8	749	1.0	1.2	14.0
APR 13...	0930	ENVIRONMENTAL	239	1.2	65	6.7	752	11.5	9.1	10.1
MAY 19...	0915	ENVIRONMENTAL	239	.03	69	6.9	762	19.0	15.1	7.9
JUN 22...	0920	ENVIRONMENTAL	239	.0	66	6.7	757	20.0	17.8	9.6
JUL 20...	0915	ENVIRONMENTAL	239	.0	73	6.9	752	25.0	23.1	4.6
AUG 17...	0915	ENVIRONMENTAL	239	.0	80	6.8	754	25.3	21.9	4.5
SEP 14...	1000	ENVIRONMENTAL	239	.0	74	6.7	752	26.3	20.0	8.8
16...	1035	ENVIRONMENTAL	239	215	48	6.5	737	20.0	18.7	9.5
16...	1037	REPLICATE	239	215	48	6.5	737	20.0	18.7	9.5

DATE	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)	COLI-FORM, FECAL, UM-MF (COLS./100 ML) (31625)	E. COLI WATER WHOLE TOTAL UREASE (COL /100 ML) (31633)	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)	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, DIS-SOLVED (MG/L AS P) (00671)
OCT 28...	51	<38	<47	<.01	<.05	.04	.2	.1	<.05	<.05	.01
NOV 24...	78	100	92	<.01	<.05	.03	.2	<.1	<.05	<.05	.01
DEC 16...	98	57	46	.02	<.05	.02	.2	.2	<.05	<.05	.01
JAN 12...	99	25	21	<.01	.18	<.02	.2	.1	.020	.004	<.01
FEB 02...	97	31	29	<.01	<.05	<.02	.2	.1	.020	.007	.01
MAR 10...	99	K9	K10	<.01	<.05	.02	.1	.1	.016	.005	.02
APR 13...	100	50	50	<.01	<.05	<.02	.2	.2	.019	.009	.01
MAY 19...	85	208	175	<.01	.05	.03	<.1	.3	.023	.007	<.01
JUN 22...	93	K44	K38	<.01	.08	.04	.3	.3	.029	.012	.02
JUL 20...	99	136	136	<.01	<.05	.03	.4	.2	.032	.009	<.01
AUG 17...	90	34	34	<.01	.05	<.02	.3	.3	.016	.007	<.01
SEP 14...	100	112	107	<.01	<.05	<.02	.3	.3	.022	.011	<.01
16...	102	--	--	<.01	.12	<.02	1.1	.5	.16	.022	<.01
16...	102	--	--	<.01	.12	.03	1.1	.6	.15	.023	<.01

&lt; Actual value is known to be less than the value shown.



01658500 SOUTH FORK QUANTICO CREEK NEAR INDEPENDENT HILL, VA--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SEDI- MENT, SUS- PENDED (MG/L) (80154)
OCT			
01...	1200	.05	7
02...	1200	.03	5
03...	1200	.03	7
04...	1200	.03	6
05...	1200	.03	5
06...	1200	.05	5
07...	1200	.05	5
08...	1200	.14	4
09...	1200	.22	5
10...	1200	.14	7
11...	1200	.11	6
12...	1200	.09	5
13...	1200	.09	4
14...	1200	.09	14
15...	1200	.09	7
16...	1200	.11	15
17...	1200	.08	4
18...	1200	.09	5
19...	1200	.09	7
20...	1200	.11	5
21...	1200	.11	5
22...	1200	.09	8
23...	1200	.13	27
24...	1200	.11	21
25...	1100	.11	16
25...	1200	.14	16
26...	1200	.13	31
27...	1200	.14	14
28...	0905	.13	2
28...	0910	.13	3
28...	1200	.13	22
29...	1200	.13	13
30...	1200	.13	7
31...	1200	.14	11
NOV			
01...	1200	.14	6
02...	1200	.16	8
03...	1200	.25	11
04...	1200	.27	73
05...	1200	.25	13
06...	1200	.27	46
07...	1200	.27	5
08...	1200	.25	9
09...	1200	.25	109
10...	1200	.22	135
11...	1200	.34	57
12...	1200	.29	118
13...	1200	.27	30
14...	1200	.27	29
15...	1200	.27	25
16...	1200	.25	12
17...	1200	.20	86
18...	1200	.18	25
19...	1200	.20	15
20...	1200	.16	22
21...	1200	.25	16
22...	1200	.20	18
23...	1200	.20	13
24...	0930	.18	3
24...	0935	.18	4
24...	0940	.18	4
24...	1200	.18	49
25...	1200	.20	12
26...	1200	.29	7
27...	1200	.27	7
28...	1200	.18	11
29...	1200	.18	8
30...	1200	.18	8

## POTOMAC RIVER BASIN

01658500 SOUTH FORK QUANTICO CREEK NEAR INDEPENDENT HILL, VA--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SEDI- MENT, SUS- PENDED (MG/L) (80154)
DEC			
01...	1200	.16	9
02...	1200	.18	23
03...	1200	.22	36
04...	1200	.20	48
05...	1200	.20	33
06...	1200	.22	23
07...	1200	.22	19
08...	1200	.34	18
09...	1200	1.3	12
10...	1200	.45	16
11...	1200	.48	8
12...	1200	.45	8
13...	1200	1.8	4
14...	1200	2.0	13
15...	1200	1.3	30
16...	0925	1.0	8
16...	0930	1.0	5
16...	0935	1.0	7
16...	1200	1.0	5
17...	1200	1.0	5
18...	1200	.93	17
19...	1200	.86	53
20...	1200	.86	26
21...	1200	.86	18
22...	1200	1.0	12
30...	1200	2.0	59
JAN			
12...	0945	.37	3
14...	1200	.51	260
15...	1200	1.1	143
16...	1200	2.4	53
17...	1200	1.0	44
18...	1200	3.4	43
18...	2020	30	457
18...	2220	21	290
19...	1200	4.9	266
20...	1200	1.5	177
21...	1200	.80	151
22...	1200	5.3	194
23...	1200	2.0	165
24...	0920	68	280
24...	1120	156	224
24...	1320	220	250
24...	1520	194	481
24...	1720	121	445
24...	1920	77	319
25...	0320	23	80
25...	1200	13	89
26...	1200	5.1	29
27...	1200	3.3	38
28...	1200	3.3	31
29...	1200	3.8	26
30...	1200	3.9	32
31...	1200	3.8	32

01658500 SOUTH FORK QUANTICO CREEK NEAR INDEPENDENT HILL, VA--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SEDI- MENT, SUS- PENDED (MG/L) (80154)
FEB			
02...	0930	4.9	11
02...	0935	4.9	7
02...	0940	4.9	7
02...	1200	5.7	15
03...	1200	4.7	11
04...	1200	3.4	12
05...	1200	2.7	22
06...	1200	2.3	19
07...	1200	2.3	12
08...	1200	2.4	40
09...	1200	2.1	19
10...	1200	2.0	20
11...	1200	1.9	16
12...	1200	1.9	14
13...	1200	5.7	9
14...	1200	3.3	9
15...	1200	2.5	9
16...	1200	2.3	11
17...	1200	2.3	7
18...	1200	27	59
19...	1200	7.9	13
20...	1200	4.7	6
21...	1200	3.6	7
23...	1200	2.3	39
28...	1200	3.6	14
MAR			
01...	1200	9.3	10
02...	1200	4.9	9
03...	1200	3.6	16
03...	2345	34	120
04...	0145	46	67
04...	0345	48	68
04...	0545	53	66
04...	0745	48	60
04...	0940	28	53
04...	0945	28	62
04...	0946	28	55
04...	0950	28	51
04...	1010	28	4
04...	1020	28	3
04...	1200	27	27
05...	1200	7.9	12
06...	1200	5.3	10
07...	1200	4.7	8
08...	1200	3.4	12
10...	1015	3.6	14
13...	1200	6.4	10
14...	1200	5.3	5
14...	2200	117	46
14...	2400	202	125
15...	0200	234	230
15...	0400	195	268
15...	0600	132	196
15...	1000	89	126
15...	1200	78	43
15...	1400	72	83
15...	2000	57	27
15...	2400	38	25
16...	1200	18	9
17...	1200	9.0	5
18...	1200	6.4	5
19...	1200	4.7	5
20...	1200	3.8	4
21...	1200	3.8	6
21...	2315	51	37
22...	0315	39	50
22...	1200	19	14
23...	1200	8.2	4
24...	1200	6.0	5
25...	1200	4.9	6
26...	1200	4.7	4
27...	1200	4.1	4
28...	1200	4.1	9
29...	1200	4.3	5
30...	1200	3.9	6
31...	1200	4.1	6

## POTOMAC RIVER BASIN

01658500 SOUTH FORK QUANTICO CREEK NEAR INDEPENDENT HILL, VA--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SEDI- MENT, SUS- PENDED (MG/L) (80154)
APR			
01...	1200	4.9	8
02...	1200	5.7	4
03...	1200	4.9	9
04...	1200	4.3	16
04...	1730	39	268
04...	1930	75	718
04...	2130	45	175
04...	2330	32	84
05...	1200	14	13
06...	1200	6.9	10
07...	1200	5.3	7
08...	1200	4.7	6
09...	1200	4.3	8
10...	1200	7.2	9
11...	1200	5.3	2
12...	1200	5.5	2
13...	0925	4.3	4
13...	0930	4.3	4
13...	0935	4.3	4
13...	1200	4.3	<1
14...	1200	3.6	11
15...	1200	3.4	6
16...	1200	3.8	8
17...	1200	3.3	6
18...	1200	2.8	4
19...	1200	2.5	8
20...	1200	2.7	5
21...	1200	2.5	8
23...	1200	3.1	6
24...	1200	3.9	5
25...	1200	2.8	5
26...	1200	2.5	9
27...	1200	2.3	4
28...	1200	2.0	3
29...	1200	1.9	5
30...	1200	1.8	5
MAY			
01...	1200	1.8	5
02...	1200	1.8	6
03...	1200	1.6	6
04...	1200	1.8	4
05...	1200	1.7	6
06...	1200	1.7	2
07...	1200	1.8	4
08...	1200	1.8	3
09...	1200	1.5	8
10...	1200	1.3	7
11...	1200	1.2	9
12...	1200	1.2	11
13...	1200	1.2	6
14...	1200	1.1	11
15...	1200	1.0	5
16...	1200	.93	12
17...	1200	.93	7
18...	1200	.93	8
19...	0900	1.1	2
19...	0905	1.1	3
19...	0910	1.1	<1
19...	1200	1.1	11
20...	1200	.86	5
21...	1200	.80	12
22...	1200	.80	16
23...	1200	5.7	18
24...	1200	2.3	15
25...	1200	1.2	14
26...	1200	.64	14
27...	1200	.54	14
28...	1200	.42	14
29...	1200	.39	9
30...	1200	.32	12
31...	1200	.32	14

01658500 SOUTH FORK QUANTICO CREEK NEAR INDEPENDENT HILL, VA--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SEDI- MENT, SUS- PENDED (MG/L) (80154)
JUN			
01...	1200	.32	14
02...	1200	.32	17
03...	1200	.32	48
04...	1200	.29	15
05...	1200	.29	8
06...	1200	.25	11
07...	1200	.22	14
08...	1200	.22	21
09...	1200	.20	16
10...	1200	.20	17
11...	1200	.20	17
12...	1200	.16	8
13...	1200	.18	10
14...	1200	.18	9
15...	1200	.18	9
22...	0900	.34	2
22...	0910	.34	3
22...	0915	.34	2
22...	1200	.32	15
23...	1200	.25	8
24...	1200	.20	8
25...	1200	.16	7
26...	1200	.13	9
27...	1200	.11	8
28...	1200	.11	8
29...	1200	.93	28
30...	1200	.42	8
JUL			
01...	1200	.34	41
02...	1200	.34	8
03...	1200	1.7	22
04...	1200	.74	13
05...	1200	.54	13
06...	1200	.39	8
07...	1200	.32	6
08...	1200	.25	12
20...	0915	.06	6
20...	0920	.06	6
20...	0925	.06	6
AUG			
17...	0915	.00	4
24...	1200	.18	678
25...	1200	.06	31
25...	2000	23	628
26...	1200	1.6	241
27...	1200	.74	152
28...	1200	.54	91
29...	1200	.51	70
30...	1200	.45	129
31...	1200	.34	122

## POTOMAC RIVER BASIN

01658500 SOUTH FORK QUANTICO CREEK NEAR INDEPENDENT HILL, VA--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SEDI- MENT, SUS- PENDED (MG/L) (80154)
SEP			
01...	1200	.29	349
02...	1200	.27	365
03...	1200	.25	162
04...	1200	.22	438
05...	1200	1.6	129
06...	1200	1.7	142
08...	1200	.74	27
09...	1200	.54	50
10...	1200	.54	92
11...	1200	.54	280
12...	1200	.45	305
13...	1200	.39	300
14...	0945	.37	3
14...	0950	.37	4
14...	0955	.37	4
14...	1200	.37	11
15...	1200	.51	16
16...	0445	15	362
16...	0645	127	174
16...	0845	214	254
16...	1000	225	451
16...	1005	223	308
16...	1030	214	302
16...	1045	206	233
16...	1200	169	110
16...	1245	166	172
16...	1445	207	146
16...	1645	207	111
16...	1845	111	115
16...	2045	58	96
16...	2245	35	66
17...	0045	24	52
17...	0245	18	36
17...	0445	13	27
17...	1200	6.4	15
18...	1200	1.7	12
19...	1200	1.0	9
20...	1200	.74	22
21...	1200	.80	27
22...	1200	4.3	12
23...	1200	1.6	9
24...	1200	1.0	12
25...	1200	.74	25
26...	1200	.74	17
27...	1200	.69	17

POTOMAC RIVER BASIN

01658500 SOUTH FORK QUANTICO CREEK NEAR INDEPENDENT HILL, VA--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DAY	MEAN		MEAN		MEAN		MEAN		MEAN		MEAN	
	CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)
	OCTOBER		NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH	
1	9	.00	1	.00	4	.00	16	.07	7	.06	10	.28
2	8	.00	1	.00	4	.00	60	.28	7	.11	10	.13
3	8	.00	2	.00	5	.00	89	2.5	6	.08	34	1.0
4	7	.00	2	.00	5	.00	26	.18	6	.05	41	4.2
5	6	.00	3	.00	5	.00	8	.02	4	.03	13	.30
6	6	.00	2	.00	6	.00	4	.00	3	.02	10	.15
7	5	.00	1	.00	6	.00	3	.00	3	.02	9	.11
8	4	.00	2	.00	7	.01	3	.00	4	.03	12	.11
9	5	.00	2	.00	7	.03	7	.01	3	.02	13	.12
10	6	.00	2	.00	6	.01	7	.02	3	.02	14	.14
11	5	.00	2	.00	5	.01	5	.01	4	.02	14	.15
12	4	.00	2	.00	5	.01	3	.00	8	.05	17	.28
13	3	.00	3	.00	4	.02	10	.02	6	.10	10	.19
14	4	.00	3	.00	9	.05	162	.23	6	.05	18	4.2
15	5	.00	3	.00	16	.06	130	.90	4	.03	108	42
16	4	.00	3	.00	6	.02	54	.47	3	.02	12	.71
17	3	.00	3	.00	4	.01	40	.11	7	.04	5	.14
18	3	.00	4	.00	5	.01	116	6.8	30	1.4	5	.09
19	4	.00	4	.00	6	.01	218	3.7	12	.29	5	.06
20	3	.00	4	.00	7	.01	151	.69	5	.07	4	.05
21	2	.00	4	.00	8	.02	128	.51	4	.04	12	.70
22	3	.00	4	.00	9	.02	144	2.4	3	.03	21	1.7
23	3	.00	4	.00	9	.03	138	.79	3	.02	5	.11
24	4	.00	4	.00	9	.04	205	51	3	.02	5	.08
25	4	.00	4	.00	10	.03	56	2.4	3	.02	6	.08
26	3	.00	2	.00	10	.03	24	.36	3	.02	4	.05
27	3	.00	3	.00	10	.03	24	.23	4	.02	4	.05
28	2	.00	4	.00	10	.04	20	.19	11	.17	8	.09
29	2	.00	3	.00	10	.05	17	.17	---	---	6	.06
30	1	.00	3	.00	11	.06	19	.20	---	---	6	.06
31	2	.00	---	---	11	.05	17	.17	---	---	6	.07
TOTAL	---	0.00	---	0.00	---	0.66	---	74.43	---	2.85	---	57.46





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## POTOMAC RIVER BASIN

01658698 LITTLE CREEK AT MOCKING BIRD ROAD AT TRIANGLE, VA

LOCATION.--Lat 38°31'59", long 77°19'19", Prince William County, Hydrologic Unit 02070010, on right bank, beside Fuller Road, on Quantico Marine Base, 1.2 mi east of U.S. Highway 1, and 1.5 mi upstream from Potomac River.

DRAINAGE AREA.--Not determined.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--February 1999 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 60 ft above sea level, from topographic map.

REMARKS.--No estimated daily discharges. Records fair. Several measurements of water temperature were made during the year.

EXTREMES FOR CURRENT YEAR.--February to September 1999, maximum discharge, 92 ft<sup>3</sup>/s, Sep 16, gage height, 2.68 ft; minimum discharge, 0.04 ft<sup>3</sup>/s, Aug 2-3, 7, 9, 11, gage height, 0.82 ft.

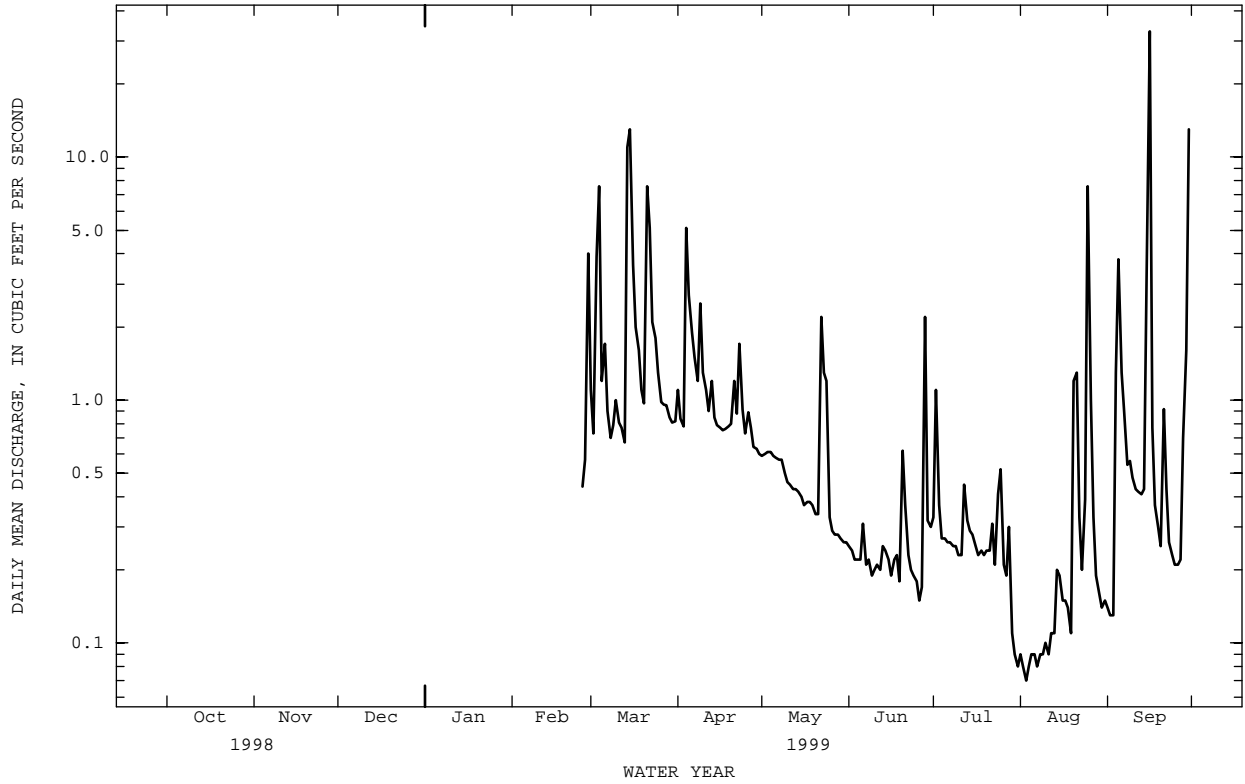
DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	---	---	---	1.1	1.1	.59	.25	.33	.09	.14
2	---	---	---	---	---	.73	.84	.60	.24	1.1	.08	.13
3	---	---	---	---	---	3.9	.78	.61	.22	.37	.07	.13
4	---	---	---	---	---	7.6	5.1	.61	.22	.27	.08	1.3
5	---	---	---	---	---	1.2	2.7	.59	.22	.27	.09	3.8
6	---	---	---	---	---	1.7	1.9	.58	.31	.26	.09	1.3
7	---	---	---	---	---	.90	1.5	.57	.21	.26	.08	.89
8	---	---	---	---	---	.70	1.2	.57	.22	.25	.09	.54
9	---	---	---	---	---	.79	2.5	.50	.19	.25	.09	.56
10	---	---	---	---	---	1.0	1.3	.46	.20	.23	.10	.48
11	---	---	---	---	---	.81	1.1	.45	.21	.23	.09	.43
12	---	---	---	---	---	.77	.90	.43	.20	.45	.11	.42
13	---	---	---	---	---	.67	1.2	.43	.25	.32	.11	.41
14	---	---	---	---	---	11	.85	.42	.24	.29	.20	.43
15	---	---	---	---	---	13	.79	.40	.22	.28	.19	3.2
16	---	---	---	---	---	3.6	.77	.37	.19	.25	.15	33
17	---	---	---	---	---	2.0	.75	.38	.22	.23	.15	.77
18	---	---	---	---	---	1.6	.76	.38	.23	.24	.14	.37
19	---	---	---	---	---	1.1	.78	.37	.18	.23	.11	.30
20	---	---	---	---	---	.97	.80	.34	.62	.24	1.2	.25
21	---	---	---	---	---	7.6	1.2	.34	.37	.24	1.3	.92
22	---	---	---	---	---	5.1	.88	2.2	.23	.31	.33	.43
23	---	---	---	---	---	2.1	1.7	1.3	.20	.21	.20	.26
24	---	---	---	---	---	1.8	.91	1.2	.19	.41	.39	.23
25	---	---	---	---	---	1.3	.73	.33	.18	.52	7.6	.21
26	---	---	---	---	---	.44	.98	.89	.29	.15	.21	.21
27	---	---	---	---	---	.57	.96	.77	.28	.17	.19	.22
28	---	---	---	---	---	4.0	.95	.64	.28	2.2	.19	.70
29	---	---	---	---	---	---	.85	.63	.27	.32	.11	1.6
30	---	---	---	---	---	---	.81	.60	.26	.30	.09	13
31	---	---	---	---	---	---	.82	---	.26	---	.08	---
TOTAL	---	---	---	---	---	78.41	36.57	16.66	9.15	9.02	15.10	66.63
MEAN	---	---	---	---	---	2.53	1.22	.54	.30	.29	.49	2.22
MAX	---	---	---	---	---	13	5.1	2.2	2.2	1.1	7.6	33
MIN	---	---	---	---	---	.67	.60	.26	.15	.08	.07	.13

01658698 LITTLE CREEK AT MOCKING BIRD ROAD AT TRIANGLE, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1999 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	---	---	---	---	---	2.53	1.22	.54	.31	.29	.49	2.22
MAX	---	---	---	---	---	2.53	1.22	.54	.31	.29	.49	2.22
(WY)	---	---	---	---	---	1999	1999	1999	1999	1999	1999	1999
MIN	---	---	---	---	---	2.53	1.22	.54	.31	.29	.49	2.22
(WY)	---	---	---	---	---	1999	1999	1999	1999	1999	1999	1999



## POTOMAC RIVER BASIN

01658698 LITTLE CREEK AT MOCKING BIRD ROAD AT TRIANGLE, VA--Continued

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--April 1999 to current year.

## WATER-QUALITY DATA, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DATE	TIME	SAMPLE TYPE	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	TEMPER- ATURE AIR (DEG C) (00020)	TEMPER- ATURE WATER (DEG C) (00010)	OXYGEN, DIS- SOLVED (MG/L) (00300)
APR 08...	0930	ENVIRONMENTAL	.82	197	6.9	754	30.0	15.0	10.5
MAY 17...	0930	ENVIRONMENTAL	.43	187	6.9	760	16.0	14.7	8.3
JUN 22...	1115	ENVIRONMENTAL	.23	184	7.0	757	22.5	17.8	9.1
JUL 21...	0830	ENVIRONMENTAL	.14	180	6.6	760	26.5	23.7	5.5
AUG 17...	1200	ENVIRONMENTAL	.17	165	7.1	754	27.0	23.7	7.6
SEP 15...	1250	ENVIRONMENTAL	8.6	110	6.6	754	22.5	20.8	9.1
15...	1253	OTHER QA	8.6	110	6.6	754	22.5	20.8	9.1
15...	1255	REPLICATE	8.6	110	6.6	754	22	21	9.1

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## POTOMAC RIVER BASIN

01658705 LITTLE CREEK AT GEIGER ROAD AT QUANTICO, VA

LOCATION.--Lat 38°31'41", long 77°17'46", Prince William County, Hydrologic Unit 02070010, on left bank 75 ft downstream from bridge on Geiger Road on Quantico Marine Base, 2.7 mi east of U.S. Highway 1, and 0.7 mi upstream from Potomac River.

DRAINAGE AREA.--Not determined.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--February 1999 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 10 ft above sea level, from topographic map.

REMARKS.--Records fair except for period of no gage-height record, July 9-12, which is poor. Several measurements of water temperature were made during the year.

EXTREMES FOR CURRENT YEAR.--February to September 1999, maximum discharge, 135 ft<sup>3</sup>/s, Sep 30, gage height, 10.81 ft; minimum discharge, 0.14 ft<sup>3</sup>/s, Jun 2, 10, gage height, 7.25 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

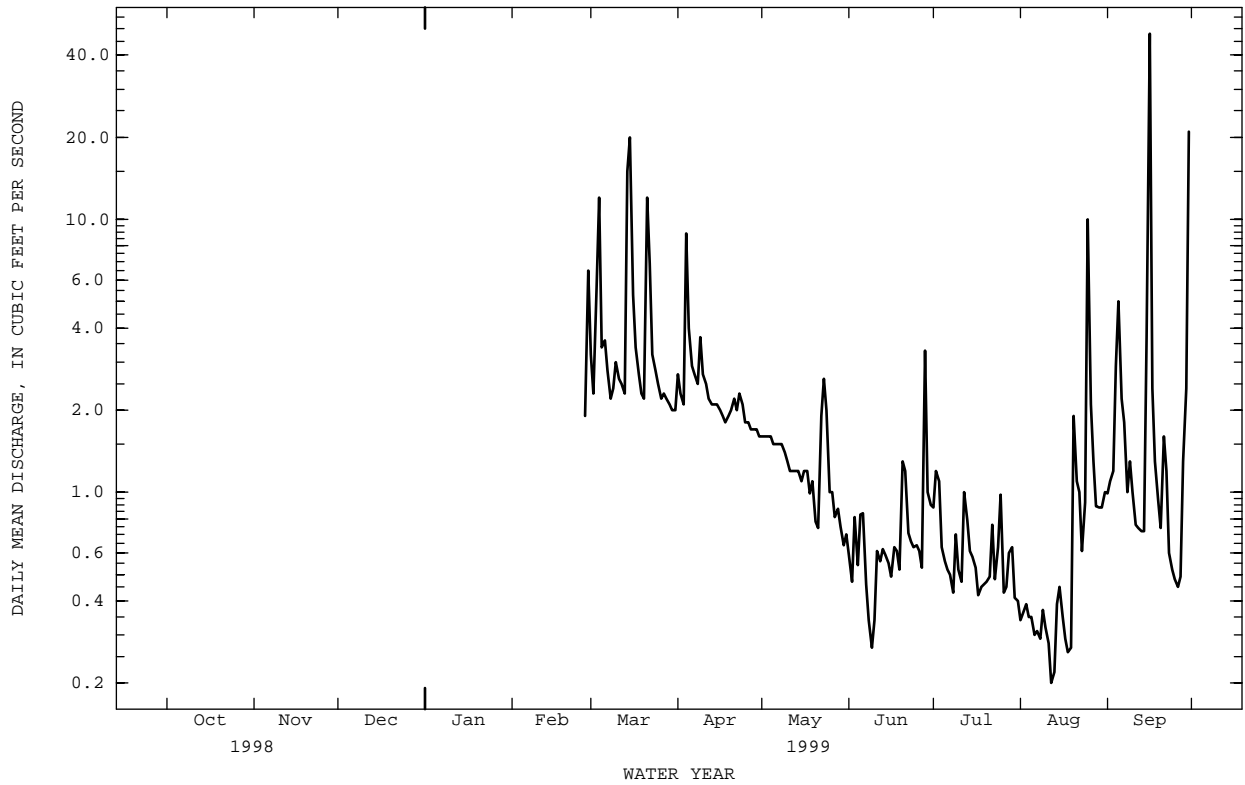
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	---	---	---	3.2	2.7	1.6	.59	.88	.34	.99
2	---	---	---	---	---	2.3	2.3	1.6	.47	1.2	.36	1.1
3	---	---	---	---	---	5.6	2.1	1.6	.81	1.1	.39	1.2
4	---	---	---	---	---	12	8.9	1.6	.54	.63	.35	2.9
5	---	---	---	---	---	3.4	4.0	1.5	.83	.56	.35	5.0
6	---	---	---	---	---	3.6	2.9	1.5	.84	.52	.30	2.2
7	---	---	---	---	---	2.8	2.7	1.5	.46	.50	.31	1.8
8	---	---	---	---	---	2.2	2.5	1.5	.34	.43	.29	1.0
9	---	---	---	---	---	2.4	3.7	1.4	.27	e.70	.37	1.3
10	---	---	---	---	---	3.0	2.7	1.3	.34	e.52	.32	1.0
11	---	---	---	---	---	2.6	2.5	1.2	.61	e.47	.28	.76
12	---	---	---	---	---	2.5	2.2	1.2	.56	e1.0	.20	.74
13	---	---	---	---	---	2.3	2.1	1.2	.62	.79	.22	.72
14	---	---	---	---	---	15	2.1	1.2	.59	.61	.39	.72
15	---	---	---	---	---	20	2.1	1.1	.55	.58	.45	3.7
16	---	---	---	---	---	5.3	2.0	1.2	.49	.53	.35	48
17	---	---	---	---	---	3.4	1.9	1.2	.63	.42	.29	2.4
18	---	---	---	---	---	2.7	1.8	.99	.61	.45	.26	1.3
19	---	---	---	---	---	2.3	1.9	1.1	.52	.46	.27	.94
20	---	---	---	---	---	2.2	2.0	.78	1.3	.47	1.9	.74
21	---	---	---	---	---	12	2.2	.74	1.2	.49	1.1	1.6
22	---	---	---	---	---	6.9	2.0	1.9	.71	.76	1.0	1.2
23	---	---	---	---	---	3.2	2.3	2.6	.66	.48	.61	.60
24	---	---	---	---	---	2.8	2.1	2.0	.63	.63	.92	.52
25	---	---	---	---	---	2.5	1.8	1.0	.64	.98	10	.48
26	---	---	---	---	---	2.2	1.8	1.0	.61	.43	2.1	.45
27	---	---	---	---	---	1.9	2.3	1.7	.81	.53	1.3	.49
28	---	---	---	---	---	6.5	2.2	1.7	.87	3.3	.60	.89
29	---	---	---	---	---	2.1	1.7	.75	1.0	.63	.88	2.4
30	---	---	---	---	---	2.0	1.6	.64	.90	.41	.88	21
31	---	---	---	---	---	2.0	---	.70	---	.40	1.0	---
TOTAL	---	---	---	---	---	139.0	74.0	39.28	22.15	19.08	28.67	108.55
MEAN	---	---	---	---	---	4.48	2.47	1.27	.74	.62	.92	3.62
MAX	---	---	---	---	---	20	8.9	2.6	3.3	1.2	10	48
MIN	---	---	---	---	---	2.0	1.6	.64	.27	.40	.20	.45

01658705 LITTLE CREEK AT GEIGER ROAD AT QUANTICO, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1999 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	---	---	---	---	---	4.48	2.47	1.27	.74	.62	.92	3.62
MAX	---	---	---	---	---	4.48	2.47	1.27	.74	.62	.92	3.62
(WY)	---	---	---	---	---	1999	1999	1999	1999	1999	1999	1999
MIN	---	---	---	---	---	4.48	2.47	1.27	.74	.62	.92	3.62
(WY)	---	---	---	---	---	1999	1999	1999	1999	1999	1999	1999

e Estimated.



## POTOMAC RIVER BASIN

01658705 LITTLE CREEK AT GEIGER ROAD AT QUANTICO, VA--Continued

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--April 1999 to current year.

## WATER-QUALITY DATA, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DATE	TIME	SAMPLE TYPE	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	TEMPER- ATURE AIR (DEG C) (00020)	TEMPER- ATURE WATER (DEG C) (00010)	OXYGEN, DIS- SOLVED (MG/L) (00300)
APR 08...	1145	ENVIRONMENTAL	2.4	207	6.9	754	30.0	15.5	10.7
MAY 17...	1015	ENVIRONMENTAL	1.3	159	7.2	760	17.0	15.7	10.6
JUN 22...	1130	ENVIRONMENTAL	.81	163	6.9	757	24.5	20.9	11.0
JUL 21...	0945	ENVIRONMENTAL	.59	166	6.9	760	27.5	24.3	7.8
AUG 17...	1230	ENVIRONMENTAL	.44	196	7.2	754	28.5	28.5	10.6
SEP 15...	1335	ENVIRONMENTAL	13	129	6.8	754	22.5	21.2	8.9
15...	1337	OTHER QA	13	129	6.8	754	22.5	21.2	8.9
15...	1340	REPLICATE	13	129	6.8	754	22.5	21.2	8.9



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01660100 CHOPAWAMSIK CREEK AT RUSSELL ROAD NEAR JOPLIN, VA

LOCATION.--Lat. 38°31'23", long 77°22'26", Prince William County, Hydrologic unit 02070011, on left bank at upstream side of Russell Road, 4.5 miles southwest of Dumfries and 2.6 miles upstream from mouth.

DRAINAGE AREA.--Not determined.

PERIOD OF RECORD.--February 1996 to current year.

GAGE.--Water stage recorder. Elevation of gage is 30 ft above sea level, from topographic map.

REMARKS.--Records fair except for Oct. 19 to Nov. 24, which is poor.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 250 ft<sup>3</sup>/s, Mar 15, gage height, 4.37 ft; no flow many days in July and August.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.02	.04	.40	.42	3.5	28	7.8	3.5	.30	.11	.01	.16
2	.03	.05	.42	.39	8.5	16	9.9	3.3	.33	.17	.00	.14
3	.03	.06	.40	8.6	12	12	8.7	3.1	.31	.37	.00	.09
4	.02	.07	.41	2.3	8.3	72	19	3.1	.27	.21	.00	.11
5	.04	.07	.40	.86	5.8	34	68	3.0	.26	.14	.00	.91
6	.05	.08	.41	e.55	4.6	22	28	3.0	.27	.12	.00	.77
7	.05	.07	.49	.56	4.7	20	20	3.0	.25	.09	.00	.97
8	.24	.08	1.6	.61	4.8	13	16	3.5	.30	.07	.00	.51
9	.08	.08	3.9	1.0	4.5	13	15	2.9	.32	.05	.00	.34
10	.03	.08	.93	.80	4.0	14	23	2.2	.35	.04	.00	.24
11	.04	.09	.60	.51	3.6	13	17	1.9	.39	.02	.00	.15
12	.04	.09	.55	.82	4.3	16	18	1.3	.30	.04	.00	.12
13	.04	.09	3.4	1.1	5.2	17	13	1.1	.33	.04	.00	.09
14	.04	.09	1.5	1.1	6.6	31	12	.96	.41	.03	.00	.09
15	.03	.09	.74	3.9	6.1	176	9.5	.77	.51	.03	.00	1.5
16	.02	.12	.62	2.8	4.6	71	12	.64	.54	.03	.00	44
17	.02	.09	.55	1.6	5.0	35	9.6	.62	.62	.02	.00	5.6
18	.02	.15	.39	4.1	21	21	8.8	.62	.68	.02	.00	1.6
19	.20	.10	.41	9.0	28	15	7.7	.62	.60	.00	.00	1.1
20	.26	.17	.39	9.7	14	11	8.0	.55	.54	.00	.01	.93
21	.18	.15	.40	7.5	9.2	21	7.7	.45	.77	.00	.03	1.2
22	.14	.17	.59	11	7.3	70	9.9	.57	.68	.02	.00	1.7
23	.05	.15	.45	10	6.0	30	9.1	3.6	.55	.00	.00	1.0
24	.04	.13	.55	103	5.6	20	9.7	6.9	.50	.03	.00	.79
25	.05	.10	.48	51	5.5	16	7.9	3.2	.52	.06	4.6	.69
26	.02	1.1	.39	21	5.7	13	6.9	1.5	.39	.02	1.6	.57
27	.03	.52	.40	12	4.8	11	5.4	.78	.13	.01	1.7	.70
28	.07	.24	.54	8.9	9.4	10	4.7	.50	.28	.04	.42	1.1
29	.12	.23	.63	6.5	---	9.5	4.2	.41	.19	.04	.30	3.3
30	.15	.22	.69	4.7	---	7.8	3.8	.35	.10	.03	.28	90
31	.20	---	.55	3.9	---	7.3	---	.32	---	.02	.19	---
TOTAL	2.35	4.77	24.18	290.22	212.6	865.6	400.3	58.26	11.99	1.87	9.14	160.47
MEAN	.076	.16	.78	9.36	7.59	27.9	13.3	1.88	.40	.060	.29	5.35
MAX	.26	1.1	3.9	103	28	176	68	6.9	.77	.37	4.6	90
MIN	.02	.04	.39	.39	3.5	7.3	3.8	.32	.10	.00	.00	.09

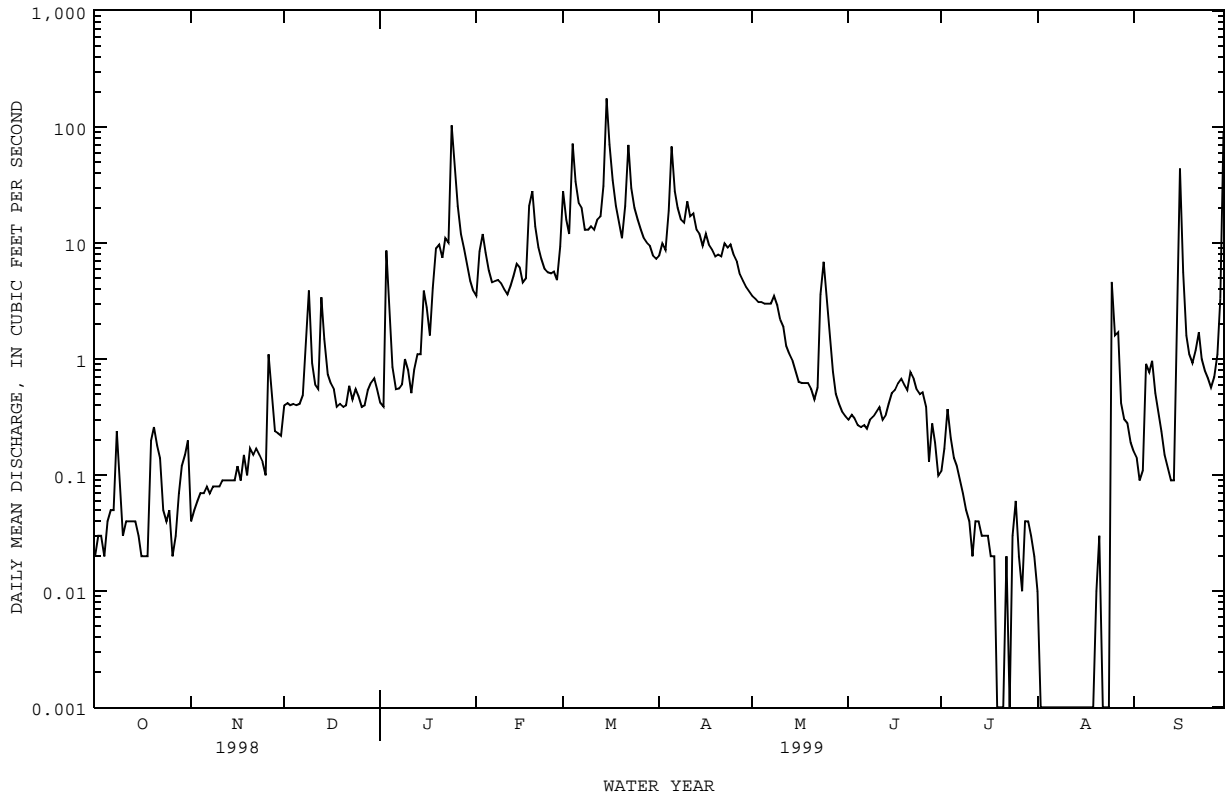
01660100 CHOPAWAMSIC CREEK AT RUSSELL ROAD NEAR JOPLIN, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1996 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	11.1	18.4	21.7	30.7	49.9	45.8	32.0	22.8	10.2	6.44	4.01	9.94
MAX	31.7	34.9	54.7	50.6	101	72.3	44.1	40.9	22.1	18.6	13.9	33.0
(WY)	1997	1997	1997	1998	1998	1998	1998	1998	1998	1996	1996	1996
MIN	.076	.16	.78	9.36	7.59	27.9	13.3	1.88	.40	.060	.29	.044
(WY)	1999	1999	1999	1999	1999	1999	1999	1999	1999	1999	1999	1998

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR	WATER YEARS 1996 - 1999
ANNUAL TOTAL	10057.31	2041.75	
ANNUAL MEAN	27.6	5.59	20.2
HIGHEST ANNUAL MEAN			30.1 1998
LOWEST ANNUAL MEAN			5.59 1999
HIGHEST DAILY MEAN	555 Feb 5	176 Mar 15	555 Feb 5 1998
LOWEST DAILY MEAN	.02 aSep 24	.00 bJul 19	.00 bJul 19 1999
ANNUAL SEVEN-DAY MINIMUM	.02 Sep 23	.00 Aug 2	.00 Aug 2 1999
INSTANTANEOUS PEAK FLOW		250 Mar 15	851 Feb 5 1998
INSTANTANEOUS PEAK STAGE		4.37 Mar 15	6.55 Feb 5 1998
INSTANTANEOUS LOW FLOW		.00 bJul 10	.00 bJul 10 1999
10 PERCENT EXCEEDS	67	14	50
50 PERCENT EXCEEDS	6.1	.55	9.5
90 PERCENT EXCEEDS	.05	.02	.12

a Also Sep 25-26, 28-29, and Oct 1, 4, 16-18, 26, 1998.  
 b Many days in July and August, 1999.  
 e Estimated.



POTOMAC RIVER BASIN

01660110 CHOPAWAMSIK CREEK AT I-95 NEAR JOPLIN, VA

WATER QUALITY RECORDS

PERIOD OF RECORD.--February 1996 to current year.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DATE	TIME	SAMPLE TYPE	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND-ARD UNITS) (00400)	BARO-METRIC PRES-SURE (MM OF HG) (00025)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)
OCT										
27...	0800	ENVIRONMENTAL	.02	272	3.9	765	14.3	12.0	8.2	76
NOV										
24...	1045	ENVIRONMENTAL	.17	128	6.1	754	13.3	8.5	10.6	92
DEC										
16...	1100	ENVIRONMENTAL	.55	109	6.4	752	9.5	4.3	11.9	93
JAN										
12...	1130	ENVIRONMENTAL	.73	154	6.3	762	3.0	1.1	13.0	94
FEB										
02...	1145	ENVIRONMENTAL	8.9	92	6.1	750	9.0	4.3	13.0	100
MAR										
10...	1315	ENVIRONMENTAL	13	128	6.5	751	3.5	4.5	13.1	95
APR										
13...	1230	ENVIRONMENTAL	14	68	6.5	751	15.3	12.0	10.2	100
MAY										
17...	1045	ENVIRONMENTAL	.73	154	6.3	760	18.0	15.9	7.4	92
JUN										
22...	1215	ENVIRONMENTAL	.73	193	5.8	757	25.0	20.3	10.1	112
JUL										
29...	0915	ENVIRONMENTAL	.05	1230	2.7	749	24.3	22.7	2.2	99
AUG										
26...	0845	ENVIRONMENTAL	1.2	153	5.3	752	23.5	21.7	7.8	94
SEP										
14...	1300	ENVIRONMENTAL	.09	560	3.7	752	27.5	22.0	4.8	90
16...	1145	ENVIRONMENTAL	58	163	4.7	737	20.5	18.7	9.4	98
16...	1147	REPLICATE	64	163	4.7	737	20.5	18.7	9.4	98

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)	ANC UNFLTRD TIT 4.5 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)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L) (70300)
OCT										
27...	12	7.7	3.2	2.5	--	110	4.6	<.1	14	185
NOV										
24...	6.9	3.9	2.5	2.2	--	41	4.1	<.1	14	92
DEC										
16...	6.0	3.3	2.5	2.3	1.7	30	4.6	<.1	13	85
JAN										
12...	7.4	4.1	6.6	1.8	1.3	43	12	<.1	14	106
FEB										
02...	5.1	2.6	4.6	1.5	5.0	21	7.0	<.1	11	68
MAR										
10...	4.4	2.3	13	2.4	--	17	19	<.1	12	89
APR										
13...	3.6	2.0	4.0	1.1	--	13	5.7	<.1	11	58
MAY										
17...	7.8	4.3	4.2	1.7	--	37	6.5	<.1	12	93
JUN										
22...	11	6.4	4.3	2.0	--	72	6.5	<.1	13	127
JUL										
29...	49	27	14	3.4	--	520	19	<.1	17	616
AUG										
26...	11	4.7	2.2	3.1	--	57	2.7	<.1	9.4	97
SEP										
14...	20	12	4.6	2.3	--	230	6.3	<.1	15	270
16...	8.8	4.7	3.6	2.0	--	64	5.2	<.1	9.0	111
16...	9.0	4.7	3.7	2.0	--	65	5.3	<.1	9.1	111

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

01660110 CHOPAWAMSIC CREEK AT I-95 NEAR JOPLIN, VA--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

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)	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, DIS- SOLVED (MG/L AS P) (00671)	ALUM- INUM, TOTAL RECOV- ERABLE (UG/L AS AL) (01105)	ARSENIC TOTAL (UG/L AS AS) (01002)
OCT 27...	<.01	<.05	.08	.1	.2	<.05	<.05	<.01	620	<1
NOV 24...	<.01	<.05	.05	.2	<.1	<.05	<.05	.01	320	<1
DEC 16...	.01	<.05	.05	.1	.1	<.05	<.05	<.01	250	<1
JAN 12...	<.01	<.05	.04	<.1	<.1	.004	<.004	<.01	490	<1
FEB 02...	<.01	<.05	.02	.2	E.09	.016	<.004	<.01	450	<1
MAR 10...	<.01	<.05	.03	.3	.1	.015	<.004	.02	477	<1
APR 13...	<.01	<.05	<.02	.2	.1	.012	<.004	<.01	244	<1
MAY 17...	<.01	<.05	.08	.2	.1	.012	<.004	.02	543	<1
JUN 22...	<.01	.09	.05	.2	.1	.005	<.004	<.01	475	<1
JUL 29...	<.01	.10	.28	.4	.4	.014	.006	<.01	7720	<1
AUG 26...	<.01	.24	.04	.5	.3	.038	<.004	<.01	796	<1
SEP 14...	<.01	<.05	.18	.3	.3	.009	<.004	<.01	1410	<1
16...	<.01	.12	.03	.4	.2	.057	<.004	<.01	3720	E2
16...	<.01	.12	.03	.5	.2	.061	<.004	<.01	3750	2

DATE	BARIIUM, TOTAL RECOV- ERABLE (UG/L AS BA) (01007)	BERYL- LIUM, TOTAL RECOV- ERABLE (UG/L AS BE) (01012)	BORON, TOTAL RECOV- ERABLE (UG/L AS B) (01022)	CADMIUM WATER UNFLTRD TOTAL (UG/L AS CD) (01027)	CHRO- MIUM, TOTAL RECOV- ERABLE (UG/L AS CR) (01034)	COBALT, TOTAL RECOV- ERABLE (UG/L AS CO) (01037)	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)	LEAD, TOTAL RECOV- ERABLE (UG/L AS PB) (01051)
OCT 27...	<100	<10	20	<1	<1.0	34	5	19000	19000	<1
NOV 24...	<100	<10	<10	<1	<1.0	12	1	8400	7600	<1
DEC 16...	<100	<10	<10	<1	<1.0	8	2	5800	5400	<1
JAN 12...	<100	<10	<10	<1	<1.0	14	6	7800	7600	<1
FEB 02...	<100	<10	<10	<1	<1.0	6	3	3000	2300	2
MAR 10...	24.2	<4	<24	<1	<1.0	5	2	2400	2000	3
APR 13...	25.4	<4	<24	<1	<1.0	3	<1	1810	1300	<1
MAY 17...	34.2	<4	E33.9	<1	<1.0	12	2	8040	5900	<1
JUN 22...	30.3	<4	<24	<1	<1.0	23	7	10100	8200	<1
JUL 29...	55.4	<4	<24	<1	1.9	150	35	61000	68000	6
AUG 26...	50.8	<4	E21.6	<1	<1.0	16	10	4300	2000	<1
SEP 14...	39.1	<5	E14.5	<1	<1.0	46	6	57100	58000	<1
16...	34.4	<5	E12.8	<1	2.0	20	17	3420	1200	2
16...	34.9	<5	E16.8	<1	1.7	20	18	3450	1200	2

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

## POTOMAC RIVER BASIN

01660110 CHOPAWAMSIC CREEK AT I-95 NEAR JOPLIN, VA--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DATE	LITHIUM TOTAL RECOV- ERABLE (UG/L AS LI) (01132)	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)	MOLYB- DENUM, TOTAL RECOV- ERABLE (UG/L AS MO) (01062)	NICKEL, TOTAL RECOV- ERABLE (UG/L AS NI) (01067)	SELE- NIUM, TOTAL RECOV- ERABLE (UG/L AS SE) (01147)	SILVER, TOTAL RECOV- ERABLE (UG/L AS AG) (01077)	STRON- TIUM, TOTAL RECOV- ERABLE (UG/L AS SR) (01082)	ZINC, TOTAL RECOV- ERABLE (UG/L AS ZN) (01092)
OCT										
27...	<10	3100	3200	<.1	<1.0	24	<1	<1	90	30
NOV										
24...	<10	1100	1100	<.1	<1.0	8	<1	<1	60	<10
DEC										
16...	<10	773	780	<.1	<1.0	6	<1	<1	60	<10
JAN										
12...	<10	1100	1200	<.1	<1.0	11	<1	<1	50	20
FEB										
02...	<10	440	460	<.1	<1.0	5	<1	<1	<10	10
MAR										
10...	<10	360	350	<.1	1.0	5	<1	<1	26.5	<10
APR										
13...	<12	257	260	<.1	<1.0	2	<1	<1	21.2	<40
MAY										
17...	<16.0	1110	1100	<.1	<1.0	9	<1	<1	38.1	<10
JUN										
22...	<12	2200	2300	<.1	<1.0	17	<1	<1	50.3	<40
JUL										
29...	20.6	12000	14000	<.1	<1.0	140	<1	<1	159	165
AUG										
26...	<12	1030	1000	<.1	<1.0	21	<1	<1	39.6	E29.0
SEP										
14...	E6.5	5450	5700	<.1	<1.0	39	<1	<1	72.1	36.2
16...	16.8	675	680	<.1	<1.0	38	<3	<1	28.2	80.0
16...	16.2	679	690	<.1	<1.0	38	<1	<1	28.8	78.7

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

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## POTOMAC RIVER BASIN

01660500 BEAVERDAM RUN NEAR GARRISONVILLE, VA

LOCATION.--Lat. 38°30'25", long 77°25'46", Stafford County, Hydrologic unit 02070011, on left bank 3.4 miles upstream from mouth and 2.2 miles north of Garrisonville.

DRAINAGE AREA.--12.7 mi<sup>2</sup>.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--May 1951 to June 1957, and March 1997 to current year.

GAGE.--Water stage recorder. Datum of gage is 150.43 ft above sea level. May 1951 to June 1957, at site 500 ft. upstream at same datum.

REMARKS.--No estimated daily discharges. Records fair. Flow regulated by Lunga Reservoir 2.5 mi upstream, capacity 420 acre-ft. Statistics of monthly mean data and summary statistics for water years 1951\*, 1952 - 1956, 1957\* (unregulated flow) are available in previous data books, water years 1991 - 1998.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 58 ft<sup>3</sup>/s, Sep 30, gage height, 1.33 ft; minimum, 0.16 ft<sup>3</sup>/s, May 5.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	5.9	6.6	3.8	3.9	3.3	5.0	1.8	1.1	2.8	1.9	1.4	2.4
2	5.7	6.6	3.7	3.7	4.8	3.7	2.1	1.4	2.7	2.0	1.4	2.4
3	6.0	7.4	3.7	9.3	4.0	5.1	1.8	.80	2.7	1.9	1.2	2.3
4	6.0	6.5	3.9	4.5	3.5	12	2.7	1.6	3.8	1.8	1.4	2.9
5	6.1	5.9	3.8	3.4	3.3	5.1	3.9	.72	6.8	1.7	1.2	3.6
6	6.3	5.9	3.9	3.3	3.6	4.8	2.1	1.1	2.0	1.5	1.2	3.4
7	6.3	4.8	3.8	3.0	3.6	4.5	2.0	1.8	1.9	1.7	1.4	2.8
8	7.7	4.8	4.9	2.4	3.6	4.0	1.9	1.2	1.6	1.5	1.4	2.5
9	6.4	4.7	5.7	2.9	3.4	3.7	2.1	1.0	1.6	1.5	1.4	2.5
10	6.2	4.7	3.9	2.6	3.4	1.5	4.0	.91	1.5	1.6	2.4	2.6
11	6.4	5.0	3.8	2.2	3.3	1.1	2.5	.90	1.5	1.5	7.8	2.7
12	6.5	4.7	4.0	2.3	3.4	1.1	2.1	.85	1.3	2.2	5.9	2.6
13	6.2	4.9	6.5	2.6	3.8	1.4	2.0	.84	2.1	2.5	1.6	2.5
14	5.9	5.3	4.3	2.8	3.6	4.8	1.8	.78	1.8	2.1	1.8	2.1
15	6.3	4.9	4.1	4.8	3.5	17	1.7	1.1	2.4	2.2	2.4	5.5
16	6.5	5.2	3.9	4.0	3.5	5.2	1.8	1.4	6.8	1.9	1.9	19
17	6.7	4.8	3.9	3.4	3.4	2.8	1.8	4.0	6.1	2.0	1.8	3.7
18	6.5	4.8	4.0	6.2	6.4	2.1	1.8	9.6	2.3	1.9	1.6	2.4
19	6.1	4.7	4.1	4.5	4.4	1.7	1.7	8.1	2.5	1.6	1.7	2.3
20	6.0	4.7	3.9	3.3	4.1	1.7	2.0	2.9	2.9	1.4	3.1	2.2
21	6.3	4.4	4.2	3.3	3.7	4.1	2.0	3.0	3.0	1.8	2.0	2.7
22	6.2	4.6	4.1	2.9	3.5	8.4	1.5	3.4	2.7	2.2	2.2	3.3
23	6.4	4.8	4.0	3.1	3.5	3.4	1.5	5.2	2.3	2.0	2.0	2.3
24	6.4	4.4	4.2	17	3.4	2.5	1.4	3.7	2.2	1.8	1.9	2.2
25	6.4	4.8	4.1	6.7	3.6	2.1	1.4	3.3	2.3	2.3	3.3	2.2
26	6.2	5.8	4.1	4.3	3.4	1.7	1.3	3.2	2.4	1.9	3.2	2.3
27	6.1	4.7	4.1	3.6	3.5	1.7	1.1	3.2	2.2	1.8	3.4	2.4
28	6.2	4.9	4.1	3.6	5.3	1.7	1.7	3.1	5.7	2.0	2.9	3.4
29	6.1	4.8	4.1	3.6	---	1.5	1.4	3.3	3.0	2.3	2.8	4.0
30	6.4	4.7	3.9	3.5	---	1.3	.75	3.1	2.0	2.0	2.4	16
31	6.5	---	4.2	3.3	---	1.2	---	3.1	---	1.7	2.5	---
TOTAL	194.9	154.8	128.7	130.0	105.8	117.9	57.65	79.70	84.9	58.2	72.6	113.2
MEAN	6.29	5.16	4.15	4.19	3.78	3.80	1.92	2.57	2.83	1.88	2.34	3.77
MAX	7.7	7.4	6.5	17	6.4	17	4.0	9.6	6.8	2.5	7.8	19
MIN	5.7	4.4	3.7	2.2	3.3	1.1	.75	.72	1.3	1.4	1.2	2.1



01660500 BEAVERDAM RUN NEAR GARRISONVILLE, VA--Continued

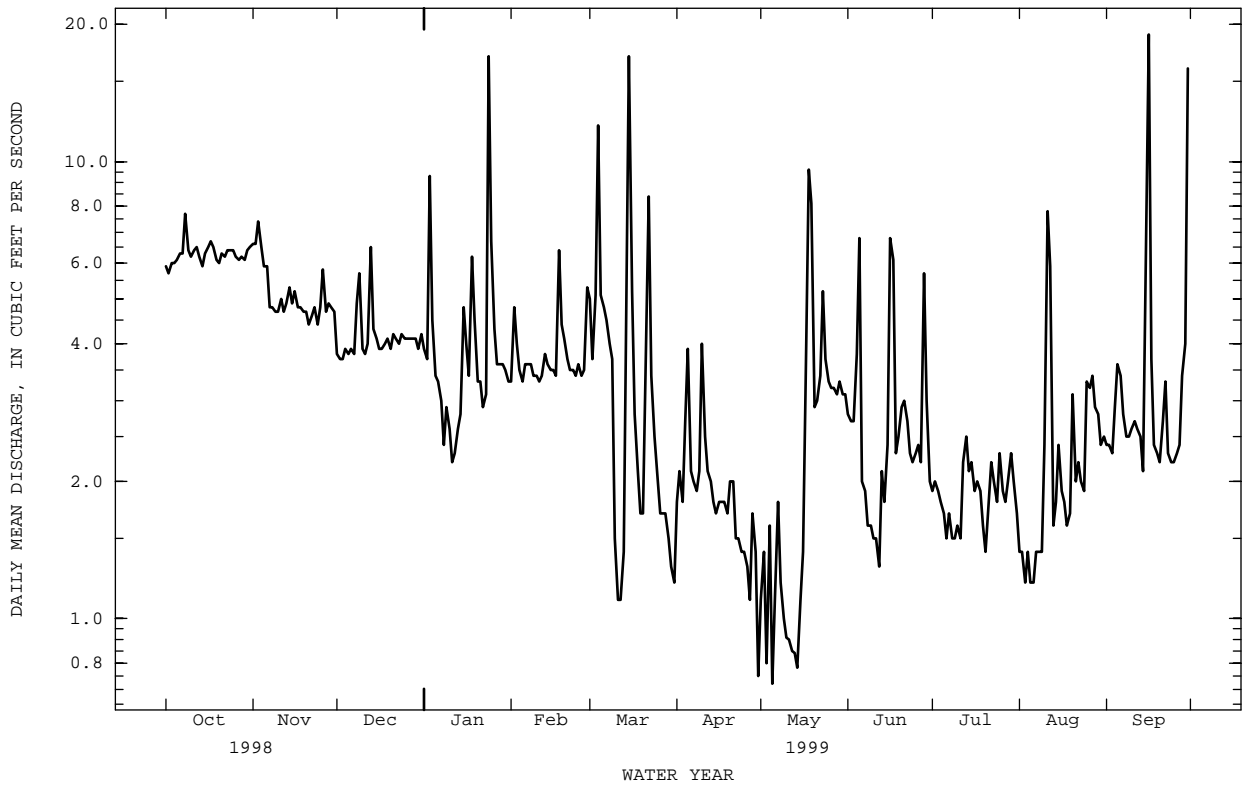
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1997\* - 1999, BY WATER YEAR (WY) [REGULATED, UNADJUSTED]

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	5.35	7.79	5.85	13.8	37.3	25.1	14.6	12.7	8.29	5.23	3.88	4.08
MAX	6.29	10.4	7.54	23.4	70.8	46.4	25.0	25.0	14.7	8.51	7.32	6.40
(WY)	1999	1998	1998	1998	1998	1998	1998	1998	1998	1998	1998	1998
MIN	4.42	5.16	4.15	4.19	3.78	3.80	1.92	2.57	2.83	1.88	1.97	2.05
(WY)	1998	1999	1999	1999	1999	1999	1999	1999	1999	1999	1997	1997

SUMMARY STATISTICS FOR 1998 CALENDAR YEAR FOR 1999 WATER YEAR WATER YEARS 1997\* - 1999

ANNUAL TOTAL	7273.1		1298.35									
ANNUAL MEAN	19.9		3.56						12.0			
HIGHEST ANNUAL MEAN									20.5		1998	
LOWEST ANNUAL MEAN									3.56		1999	
HIGHEST DAILY MEAN	250		Feb 5		19		Sep 16		250		Feb 5 1998	
LOWEST DAILY MEAN	3.7		aDec 2		.72		May 5		.72		May 5 1999	
ANNUAL SEVEN-DAY MINIMUM	3.8		Dec 1		.91		May 9		.91		May 9 1999	
INSTANTANEOUS PEAK FLOW					58		Sep 30		276		Feb 5 1998	
INSTANTANEOUS PEAK STAGE					1.33		Sep 30		2.74		Feb 5 1998	
INSTANTANEOUS LOW FLOW					.16		May 5		.16		May 5 1999	
ANNUAL RUNOFF (CFSM)	1.57				.28				.95			
ANNUAL RUNOFF (INCHES)	21.30				3.80				12.86			
10 PERCENT EXCEEDS	45				6.2				26			
50 PERCENT EXCEEDS	8.2				3.3				6.4			
90 PERCENT EXCEEDS	4.7				1.5				1.8			

\* Partial water year.  
a Also Dec 3, 1998.



POTOMAC RIVER BASIN

01660500 BEAVERDAM RUN NEAR GARRISONVILLE, VA--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--March 1997 to current year.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DATE	TIME	SAMPLE TYPE	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND-ARD UNITS) (00400)	BARO-METRIC PRES-SURE (MM OF HG) (00025)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)
OCT										
28...	0800	ENVIRONMENTAL	3.2	33	6.7	753	14.0	13.9	9.0	88
NOV										
24...	0830	ENVIRONMENTAL	2.5	34	6.7	754	7.0	8.1	11.0	94
DEC										
16...	0800	ENVIRONMENTAL	4.0	35	6.7	754	9.0	5.0	11.2	98
JAN										
12...	0845	ENVIRONMENTAL	1.1	45	6.6	760	2.5	.8	11.9	98
FEB										
02...	0845	ENVIRONMENTAL	2.5	50	6.7	755	7.3	4.0	12.8	97
MAR										
10...	0830	ENVIRONMENTAL	1.5	48	6.6	749	1.0	2.0	13.8	90
15...	0900	ENVIRONMENTAL	18	74	6.8	742	1.0	4.5	12.8	97
15...	0903	REPLICATE	18	74	6.8	742	1.0	4.5	12.8	102
APR										
13...	0830	ENVIRONMENTAL	1.9	56	6.3	752	9.3	9.6	9.4	102
MAY										
19...	0830	ENVIRONMENTAL	9.0	40	6.6	752	18.5	18.0	8.0	85
JUN										
22...	0820	ENVIRONMENTAL	2.4	68	6.5	757	21.0	18.7	10.0	98
JUL										
20...	0800	ENVIRONMENTAL	1.9	48	6.7	752	26.5	24.3	6.4	99
AUG										
17...	0845	ENVIRONMENTAL	1.9	42	6.6	754	25.3	24.0	7.4	90
SEP										
14...	0830	ENVIRONMENTAL	1.9	42	6.6	752	25.5	20.8	9.1	100
16...	1330	ENVIRONMENTAL	26	41	6.7	737	21.5	19.1	9.5	90
16...	1333	REPLICATE	26	41	6.7	737	21.5	19.1	9.5	90

DATE	COLI-FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	E. COLI WATER WHOLE TOTAL UREASE (COL / 100 ML) (31633)	NITRO-GEN, NITRITE 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 + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO-GEN, AMMONIA + 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, DIS-SOLVED (MG/L AS P) (00671)
OCT										
28...	140	130	<.01	<.05	.05	.3	.3	<.05	<.05	<.01
NOV										
24...	120	110	<.01	.07	.06	.4	.3	<.05	<.05	<.01
DEC										
16...	66	48	.02	.10	.10	.3	.5	<.05	<.05	.01
JAN										
12...	24	20	<.01	.09	.13	.4	.4	.012	.004	<.01
FEB										
02...	38	49	<.01	.14	.14	.4	.4	.017	.007	<.01
MAR										
10...	35	24	<.01	.19	.10	.3	.3	.013	.006	.02
15...	--	--	.01	.12	.03	.3	.2	.035	.004	<.01
15...	--	--	.02	.12	.03	.3	.2	.037	.006	<.01
APR										
13...	67	58	<.01	.08	<.02	.2	.1	.013	<.004	<.01
MAY										
19...	236	160	<.01	.10	.03	<.1	.3	.017	<.004	<.01
JUN										
22...	K42	K14	<.01	.12	.04	.3	.2	.015	<.004	<.01
JUL										
20...	112	113	<.01	<.05	.02	.4	.2	.02	.006	<.01
AUG										
17...	73	80	<.01	<.05	.04	.4	.2	.021	.007	<.01
SEP										
14...	109	86	<.01	.08	<.02	.4	.3	.011	.005	<.01
16...	--	--	<.01	.06	.02	.4	.1	.071	.011	<.01
16...	--	--	<.01	<.05	<.02	.4	E.06	.071	<.004	<.01

< Actual value is known to be less than the value shown.  
 E Estimated.  
 K Results based on colony count outside optimal range.

## POTOMAC RIVER BASIN

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01660500 BEAVERDAM RUN NEAR GARRISONVILLE, VA--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SEDI- MENT, SUS- PENDED (MG/L) (80154)
OCT			
01...	1200	5.7	53
03...	1200	5.7	24
05...	1200	5.7	19
06...	1200	5.7	23
07...	1200	6.3	34
08...	1200	7.6	46
09...	1200	6.3	57
10...	1200	5.7	49
11...	1200	7.0	33
12...	1200	6.3	25
13...	1200	6.3	34
14...	1200	5.7	40
15...	1200	6.3	28
16...	1200	7.0	22
17...	1200	6.3	23
18...	1200	6.3	27
19...	1200	5.7	37
20...	1200	5.7	23
21...	1200	6.3	27
22...	1200	5.7	28
23...	1200	6.3	25
24...	1200	6.3	25
25...	1100	6.3	22
25...	1200	6.3	22
26...	1200	6.3	17
27...	1200	6.3	17
28...	0805	5.7	4
28...	0810	5.7	2
28...	0815	5.7	3
28...	1200	6.3	19
29...	1200	6.3	24
30...	1200	5.7	13
31...	1200	5.7	22
NOV			
01...	1200	6.3	13
02...	1200	6.3	21
03...	1200	7.6	17
04...	1200	6.3	18
05...	1200	5.7	43
06...	1200	5.7	15
07...	1200	4.5	44
08...	1200	5.1	7
09...	1200	4.0	13
10...	1200	4.5	12
11...	1200	5.7	13
12...	1200	4.5	7
13...	1200	4.5	16
14...	1200	4.5	16
15...	1200	4.5	23
16...	1200	4.5	14
17...	1200	4.5	19
18...	1200	4.5	16
19...	1200	4.5	13
20...	1200	4.5	17
21...	1200	4.5	13
22...	1200	5.1	9
23...	1200	4.5	14
24...	0810	4.5	4
24...	0815	4.5	3
24...	0820	4.5	3
24...	1200	4.0	13
25...	1200	4.5	13
26...	1200	5.7	15
27...	1200	5.1	15
28...	1200	5.1	11
29...	1200	4.5	20
30...	1200	5.1	12

## POTOMAC RIVER BASIN

01660500 BEAVERDAM RUN NEAR GARRISONVILLE, VA--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SEDI- MENT, SUS- PENDED (MG/L) (80154)
DEC			
01...	1200	4.0	11
02...	1200	3.4	20
03...	1200	4.0	16
04...	1200	3.4	28
05...	1200	4.0	48
06...	1200	3.4	47
07...	1200	4.0	40
08...	1200	4.5	5
09...	1200	5.1	23
10...	1200	3.4	6
11...	1200	3.4	8
12...	1200	4.0	6
13...	1200	9.0	10
14...	1200	4.0	11
16...	0755	4.0	3
16...	0800	4.0	4
16...	0815	4.0	5
16...	1200	3.4	49
17...	1200	4.0	37
19...	1200	4.0	8
20...	1200	4.0	11
21...	1200	4.0	12
22...	1200	4.0	7
29...	1200	4.0	15
30...	1200	4.0	21
JAN			
12...	0835	1.9	2
13...	1200	2.4	61
14...	1200	2.4	22
15...	1200	5.7	5
16...	1200	4.0	1
17...	1200	3.4	16
18...	1200	5.1	25
19...	1200	4.0	27
20...	1200	3.4	21
21...	1200	2.9	18
22...	1200	2.9	21
23...	1200	4.0	14
24...	1045	28	75
24...	1145	38	141
24...	1200	38	232
24...	1245	37	77
24...	1345	32	38
24...	1445	28	25
25...	1200	7.0	124
26...	1200	4.0	70
27...	1200	3.4	53
28...	1200	3.4	30
29...	1200	3.4	62
30...	1200	3.4	44
FEB			
02...	1200	5.7	8
03...	1200	3.4	7
04...	1200	3.4	8
05...	1200	4.0	9
06...	1200	4.0	8
07...	1200	4.0	9
08...	1200	3.4	39
09...	1200	2.9	42
10...	1200	2.9	17
11...	1200	3.4	16
12...	1200	3.4	16
13...	1200	3.4	15
15...	1200	3.4	17
16...	1200	3.4	11
17...	1200	3.4	7
18...	1200	8.3	13
19...	1200	4.5	13
20...	1200	4.0	9
26...	1200	3.4	9
27...	1200	2.9	9
28...	1200	5.1	10

01660500 BEAVERDAM RUN NEAR GARRISONVILLE, VA--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SEDI- MENT, SUS- PENDEDED (MG/L) (80154)
MAR			
01...	1200	4.5	12
02...	1200	4.0	12
03...	1200	3.4	10
04...	1200	9.7	45
05...	1200	5.1	22
06...	1200	5.1	9
07...	1200	4.5	17
10...	0840	1.5	2
10...	0845	1.5	6
10...	0850	1.5	3
10...	1200	1.5	10
12...	1200	1.1	9
13...	1200	1.5	11
14...	1200	1.1	16
14...	2245	26	56
14...	2345	35	84
15...	0045	36	48
15...	0145	31	31
15...	0245	28	23
15...	0345	26	20
15...	0445	23	22
15...	0910	18	16
15...	0915	18	23
15...	0920	18	16
15...	1200	15	77
16...	1200	4.5	25
17...	1200	2.4	22
18...	1200	1.9	23
19...	1200	1.9	24
20...	1200	1.5	18
21...	1200	1.9	11
22...	1200	7.6	46
23...	1200	2.9	18
24...	1200	1.9	16
25...	1200	1.9	13
26...	1200	1.5	12
27...	1200	1.5	10
28...	1200	1.9	12
29...	1200	1.5	16
30...	1200	1.5	15
31...	1200	1.1	15
APR			
01...	1200	1.5	14
02...	1200	1.9	33
03...	1200	1.9	16
04...	1200	2.4	14
05...	1200	4.0	39
06...	1200	1.9	22
07...	1200	1.9	18
08...	1200	1.9	16
09...	1200	1.9	12
10...	1200	4.5	27
11...	1200	2.4	17
12...	1200	2.4	13
13...	0820	1.9	1
13...	0830	1.9	2
13...	0835	1.9	3
13...	1200	1.9	12
14...	1200	1.9	12
15...	1200	1.5	16
16...	1200	1.9	13
17...	1200	1.9	13
18...	1200	1.9	9
19...	1200	1.5	8
20...	1200	1.9	12
21...	1200	1.9	14
22...	1200	1.5	11
23...	1200	1.5	9
24...	1200	1.5	16
25...	1200	1.5	11
26...	1200	1.1	11
27...	1200	1.1	10
28...	1200	1.1	7
29...	1200	.42	14
30...	1200	1.1	28

## POTOMAC RIVER BASIN

01660500 BEAVERDAM RUN NEAR GARRISONVILLE, VA--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SEDI- MENT, SUS- PENDEDED (MG/L) (80154)
MAY			
01...	1200	1.5	13
02...	1200	3.4	16
03...	1200	1.5	8
04...	1200	1.1	23
05...	1200	.74	16
06...	1200	1.1	25
07...	1200	1.1	30
08...	1200	2.9	39
09...	1200	1.1	28
10...	1200	.74	36
11...	1200	.74	44
12...	1200	.74	44
13...	1200	1.1	23
14...	1200	1.1	24
15...	1200	1.5	34
16...	1200	1.9	36
17...	1200	1.5	34
18...	1200	9.7	62
19...	0800	9.7	5
19...	0805	9.5	5
19...	0810	9.2	4
19...	1200	9.0	52
20...	1200	2.9	57
21...	1200	2.9	45
22...	1200	3.4	32
23...	1200	5.1	71
24...	1200	4.5	51
25...	1200	3.4	61
26...	1200	3.4	66
27...	1200	3.4	68
28...	1200	2.9	61
29...	1200	3.4	66
30...	1200	3.4	67
31...	1200	3.4	52
JUN			
01...	1200	2.9	51
02...	1200	2.9	52
03...	1200	2.9	60
04...	1200	2.9	55
05...	1200	7.6	111
06...	1200	1.5	95
07...	1200	1.9	37
08...	1200	1.5	37
09...	1200	1.5	45
10...	1200	1.5	39
11...	1200	1.5	47
12...	1200	1.5	35
13...	1200	2.4	38
14...	1200	1.9	56
15...	1200	2.9	115
16...	1200	7.0	24
17...	1200	7.0	41
19...	1200	4.0	92
20...	1200	2.4	60
21...	1200	3.4	49
22...	0800	2.4	25
22...	0810	2.4	3
22...	0815	2.4	4
22...	1200	2.4	55
23...	1200	2.4	33
24...	1200	2.4	30
25...	1200	2.4	29
26...	1200	3.4	27
27...	1200	3.4	22
28...	1200	2.4	144
28...	1730	24	237
29...	1200	2.4	99
30...	1200	1.5	111

POTOMAC RIVER BASIN

01660500 BEAVERDAM RUN NEAR GARRISONVILLE, VA--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SEDI- MENT, SUS- PENDED (MG/L) (80154)
JUL			
01...	1200	1.9	81
02...	1200	1.9	90
03...	1200	1.9	98
04...	1200	1.5	24
05...	1200	2.4	74
06...	1200	1.5	52
07...	1200	1.5	37
08...	1200	1.5	25
12...	1200	1.9	25
20...	0805	1.5	5
20...	0810	1.5	5
20...	0815	1.5	1
21...	1200	1.5	11
24...	1200	1.5	2
29...	1200	2.4	77
30...	1200	1.9	53
31...	1200	1.9	24
AUG			
01...	1200	1.9	56
02...	1200	1.1	24
03...	1200	1.1	35
04...	1200	1.1	40
05...	1200	1.1	37
06...	1200	1.1	34
07...	1200	1.5	25
08...	1200	2.4	29
09...	1200	1.5	34
10...	1200	1.5	28
11...	1200	7.6	24
17...	0825	1.5	2
17...	0830	1.5	3
17...	0835	1.5	5
18...	1200	1.5	34
19...	1200	1.5	29
20...	1200	2.9	48
21...	1200	1.9	23
22...	1200	1.9	19
23...	1200	1.9	30
24...	1200	1.9	19
25...	1200	1.9	23
26...	1200	2.9	59
28...	1200	2.4	30
30...	1200	2.4	41
31...	1200	2.4	39

## POTOMAC RIVER BASIN

01660500 BEAVERDAM RUN NEAR GARRISONVILLE, VA--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SEDI- MENT, SUS- PENDED (MG/L) (80154)
SEP			
01...	1200	2.4	32
02...	1200	1.9	40
03...	1200	2.9	148
04...	1200	2.4	45
05...	1200	4.0	39
06...	1200	3.4	30
07...	1200	2.4	52
08...	1200	2.4	40
09...	1200	2.4	23
10...	1200	3.4	29
11...	1200	3.4	23
12...	1200	3.4	28
13...	1200	2.4	28
14...	0810	2.4	2
14...	0815	2.4	2
14...	0820	2.3	3
14...	1200	1.9	22
15...	1200	7.0	79
16...	0430	23	220
16...	0530	25	130
16...	0630	34	174
16...	0730	34	95
16...	0830	32	50
16...	0930	28	39
16...	1030	23	42
16...	1055	22	73
16...	1155	22	61
16...	1200	23	140
16...	1300	26	41
16...	1315	26	47
16...	1316	26	49
16...	1324	26	63
16...	1400	24	40
16...	1500	26	32
16...	1508	26	56
16...	1512	26	50
16...	1520	26	63
16...	1600	25	32
17...	1200	3.4	108
18...	1200	2.9	39
19...	1200	2.9	29
20...	1200	1.9	21
21...	1200	1.9	25
22...	1200	2.9	27
23...	1200	2.9	34
24...	1200	1.9	26
25...	1200	2.4	22
26...	1200	2.9	33
27...	1200	1.9	28



01660500 BEAVERDAM RUN NEAR GARRISONVILLE, VA--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DAY	MEAN		MEAN		MEAN		MEAN		MEAN		MEAN	
	CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)
	OCTOBER		NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH	
1	3	.05	2	.04	3	.03	9	.10	11	.09	7	.09
2	3	.05	3	.05	5	.05	13	.13	5	.06	7	.07
3	3	.05	2	.04	5	.05	43	1.2	4	.04	8	.12
4	2	.04	3	.05	8	.09	21	.27	4	.04	20	.60
5	2	.04	5	.08	13	.14	8	.07	5	.04	13	.18
6	3	.05	3	.04	14	.14	5	.05	4	.04	6	.08
7	4	.07	6	.07	12	.12	4	.03	6	.06	9	.11
8	5	.10	4	.05	9	.12	3	.02	18	.17	8	.09
9	6	.10	2	.03	6	.10	2	.02	20	.18	7	.07
10	5	.08	2	.03	2	.03	2	.01	10	.09	6	.03
11	4	.07	2	.03	3	.03	1	.01	8	.07	7	.02
12	3	.06	2	.03	2	.02	2	.01	8	.07	9	.03
13	4	.06	3	.04	3	.05	18	.12	8	.08	13	.05
14	4	.06	3	.05	4	.04	10	.07	8	.08	34	.94
15	3	.05	4	.05	4	.05	3	.03	8	.08	29	1.5
16	2	.04	3	.05	11	.12	4	.04	6	.06	33	.45
17	3	.05	4	.05	12	.13	7	.06	5	.04	31	.23
18	3	.05	3	.04	6	.07	11	.18	7	.11	30	.17
19	4	.06	3	.04	3	.04	12	.14	7	.08	29	.13
20	3	.05	3	.04	4	.04	10	.09	5	.06	22	.09
21	3	.05	3	.03	4	.04	8	.08	5	.05	17	.23
22	3	.05	2	.03	3	.04	9	.07	5	.05	39	.84
23	3	.05	3	.04	3	.04	9	.08	5	.05	22	.21
24	3	.05	3	.04	4	.04	61	3.3	5	.05	17	.11
25	2	.04	3	.04	4	.05	60	1.1	5	.05	13	.08
26	2	.03	4	.06	4	.05	34	.40	5	.05	11	.05
27	2	.03	4	.05	5	.05	24	.24	5	.05	9	.04
28	2	.04	3	.04	5	.06	17	.16	6	.09	10	.05
29	3	.05	4	.06	6	.07	26	.25	---	---	12	.05
30	2	.04	3	.04	8	.08	22	.21	---	---	12	.04
31	3	.05	---	---	9	.10	18	.16	---	---	11	.03
TOTAL	---	1.66	---	1.33	---	2.08	---	8.70	---	1.98	---	6.78



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## 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 downstream from bridge on State Highway 729, 0.8 mi upstream from mouth, and 1.0 mi northwest of Laurel Mills.

DRAINAGE AREA.--27.6 mi<sup>2</sup>.

PERIOD OF RECORD.--April 1958 to July 1995. October 1997 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 sea level.

REMARKS.--Records good except those for periods of doubtful gage-height record, Oct. 18-28 and Nov. 12-17, and periods with ice effect, Dec. 26-28, Jan. 1, 2, 5, 6, 8, and Feb. 22, 23, which are fair. Maximum discharge, 9,120 ft<sup>3</sup>/s, from rating curve extended above 2,500 ft<sup>3</sup>/s on basis of velocity-area study and slope-area measurement of peak flow. No flow many days in September 1966. 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 Department of Environmental Quality - Water Division.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 310 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Sep 5	2130	334	4.62	Sep 30	0030	*5,740	*11.95
Sep 9	2100	469	5.48				

Minimum discharge, 0.04 ft<sup>3</sup>/s, Aug 12, 13, 19.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.39	1.5	1.8	e3.7	10	11	18	8.3	2.7	1.2	.38	.46
2	.39	1.4	1.8	e2.4	21	9.1	17	7.9	2.5	1.0	.31	.40
3	.45	2.0	1.8	68	17	10	15	7.8	2.3	1.5	.24	.35
4	.64	2.3	1.8	21	14	24	20	8.3	2.0	1.0	.18	.50
5	.68	1.8	1.9	e13	12	16	20	7.8	1.8	.81	.14	41
6	.83	1.8	1.9	e8.2	12	16	17	8.0	1.8	.61	.14	44
7	.93	1.7	2.0	4.5	11	14	16	8.2	1.7	.50	.12	31
8	11	1.8	3.4	e7.2	11	12	16	23	1.6	.53	.11	11
9	5.2	1.9	9.0	8.9	9.7	13	16	12	1.4	.45	.13	75
10	3.5	2.0	4.0	13	9.3	15	17	8.5	1.3	.40	.09	53
11	1.8	2.7	2.8	9.8	8.7	13	18	7.5	1.4	.39	.09	18
12	1.5	2.9	2.6	6.5	8.9	16	18	6.8	1.4	.43	.06	12
13	1.4	e2.2	5.0	24	8.7	19	15	6.6	1.4	.54	.06	9.4
14	1.5	e1.9	5.3	18	7.9	23	14	6.5	1.5	.52	.19	7.9
15	1.4	e1.8	3.2	52	7.7	58	14	6.1	1.4	.41	.29	10
16	1.4	e1.8	2.7	20	7.9	62	15	5.4	1.1	.34	.24	111
17	1.5	e1.7	2.6	11	8.1	49	13	5.5	1.3	.28	.11	50
18	e1.4	1.7	2.4	27	23	40	12	5.3	1.5	.25	.08	29
19	e1.4	1.7	2.3	20	17	30	12	5.1	1.2	.22	.35	22
20	e1.3	1.8	2.2	13	14	26	12	4.4	2.5	.31	2.7	20
21	e1.3	1.9	2.3	18	12	35	12	4.1	2.5	7.7	.61	60
22	e1.2	1.8	2.2	34	e11	37	13	5.1	1.8	2.3	.30	47
23	e1.2	2.1	2.1	25	e10	30	12	16	1.4	1.9	.24	32
24	e1.4	2.4	2.4	117	10	27	13	9.8	1.0	.97	.28	25
25	e1.5	2.0	3.0	49	9.9	24	11	6.4	.93	.81	.49	21
26	e1.6	2.3	e3.6	29	9.6	21	10	5.0	.87	.61	19	18
27	e1.5	2.1	e2.7	22	8.8	20	9.8	4.2	.86	.44	16	18
28	e1.4	1.8	e2.2	17	11	19	9.3	3.8	2.2	.84	2.7	40
29	1.5	1.7	2.6	14	---	17	9.1	3.5	3.3	1.3	1.4	267
30	1.3	1.7	2.9	12	---	16	8.8	3.1	1.7	.68	.78	1080
31	1.3	---	4.0	11	---	15	---	2.9	---	.45	.57	---
TOTAL	53.81	58.2	90.5	699.2	321.2	737.1	423.0	222.9	50.36	29.69	48.38	2154.01
MEAN	1.74	1.94	2.92	22.6	11.5	23.8	14.1	7.19	1.68	.96	1.56	71.8
MAX	11	2.9	9.0	117	23	62	20	23	3.3	7.7	19	1090
MIN	.39	1.4	1.8	2.4	7.7	9.1	8.8	2.9	.86	.22	.06	.35
CFSM	.06	.07	.11	.82	.42	.86	.51	.26	.06	.03	.06	2.60
IN.	.07	.08	.12	.94	.43	.99	.57	.30	.07	.04	.07	2.90

01662800 BATTLE RUN NEAR LAUREL MILLS, VA--Continued

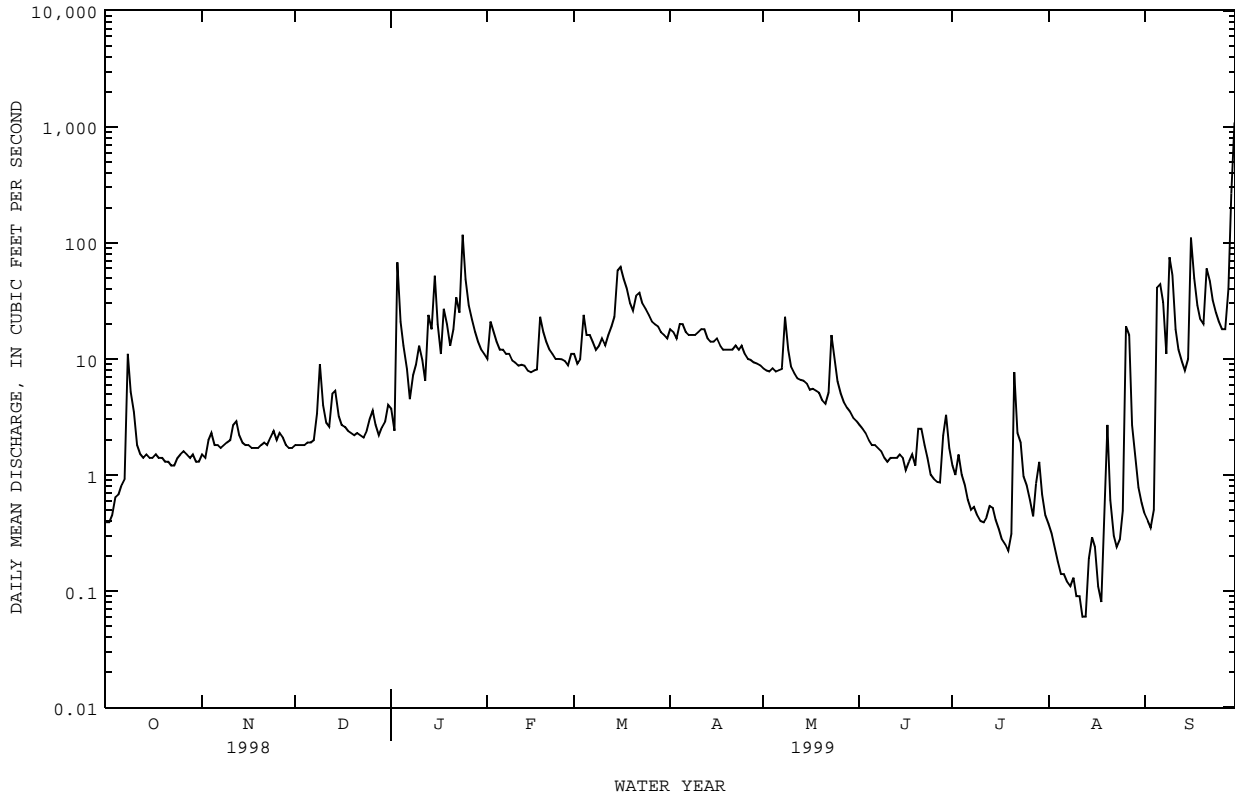
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1958 - 1995, 1997 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	16.9	23.2	26.1	34.6	41.4	48.7	41.4	32.5	22.2	11.3	11.7	12.9
MAX	119	106	79.9	116	132	144	150	85.9	91.8	39.9	73.8	102
(WY)	1980	1986	1993	1978	1998	1993	1983	1988	1972	1972	1994	1979
MIN	.92	1.94	1.82	1.45	7.92	12.5	9.31	7.19	1.68	.96	.42	.63
(WY)	1992	1999	1966	1966	1989	1981	1981	1999	1999	1999	1966	1985

SUMMARY STATISTICS FOR 1998 CALENDAR YEAR FOR 1999 WATER YEAR WATER YEARS 1958 - 1995 1997 - 1999

ANNUAL TOTAL	14885.87	4888.35	
ANNUAL MEAN	40.8	13.4	26.9
HIGHEST ANNUAL MEAN			48.4
LOWEST ANNUAL MEAN			9.17
HIGHEST DAILY MEAN	654	Jan 28	1080
LOWEST DAILY MEAN	.34	Sep 30	.06
ANNUAL SEVEN-DAY MINIMUM	.41	Sep 27	.09
INSTANTANEOUS PEAK FLOW			5740
INSTANTANEOUS PEAK STAGE			11.95
INSTANTANEOUS LOW FLOW			.04
ANNUAL RUNOFF (CFSM)	1.48		.49
ANNUAL RUNOFF (INCHES)	20.06		6.60
10 PERCENT EXCEEDS	92		23
50 PERCENT EXCEEDS	11		3.7
90 PERCENT EXCEEDS	1.2		.45

- a Also Aug 13, 1999.
- b Also Sep 6-13, 1966.
- c Also Sep 7, 1966.
- d Also Jun 27, 1995.
- e Estimated.
- f From high-water mark in gage house. Result of backwater from bridge collapse.
- g Also Aug 13, 19, 1999.



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 mi<sup>2</sup>.

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 sea level. Prior to Nov. 21, 1951, nonrecording gage at bridge 80 ft downstream at same datum.

REMARKS.--Records good except for period with ice effect, Jan. 7, which is fair. National Weather Service gage-height telemeter at station. Maximum discharge, 90,000 ft<sup>3</sup>/s, from rating curve extended above 43,000 ft<sup>3</sup>/s on basis of slope-area measurement of peak flow. Minimum gage height, 2.31 ft, Sep. 13, 1966. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum flood since at least 1828, that of Oct. 16, 1942.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 6,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Sep 30	2245	*18,200	*19.11	No other peak greater than base discharge.			

Minimum discharge, 3.9 ft<sup>3</sup>/s, Aug 15, gage height, 2.28 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	20	49	64	59	373	428	401	236	90	37	23	15
2	16	54	63	70	482	376	491	225	82	35	17	13
3	14	64	60	270	671	347	446	218	77	40	14	13
4	15	70	60	1070	505	681	418	217	73	48	12	12
5	14	76	59	428	434	694	564	218	67	45	10	14
6	14	68	62	192	391	556	470	215	61	34	9.2	562
7	16	60	68	e130	376	530	417	219	58	28	8.1	747
8	54	58	67	123	371	466	390	323	57	24	8.4	465
9	320	59	178	156	347	439	381	481	55	20	8.0	218
10	144	64	234	255	324	476	482	302	49	18	7.3	620
11	76	74	130	211	307	473	472	233	46	16	6.7	382
12	51	69	93	166	298	493	510	204	45	16	6.5	165
13	42	81	93	246	322	546	463	192	50	16	6.4	101
14	37	77	130	429	297	633	406	184	50	16	5.4	73
15	36	70	126	788	272	1530	381	181	49	15	5.1	59
16	32	66	101	1020	264	1570	396	175	47	15	10	291
17	30	63	87	515	265	1180	382	162	46	14	8.1	1250
18	31	62	78	554	532	1140	350	155	42	16	7.1	529
19	36	61	73	971	810	1070	331	149	45	18	5.3	292
20	39	60	68	576	549	878	321	143	53	15	9.5	198
21	40	68	67	412	457	826	319	133	63	182	33	469
22	39	66	66	842	396	1170	339	126	72	164	31	868
23	38	65	64	762	350	930	340	197	63	86	20	528
24	38	63	65	2660	344	806	335	331	53	63	15	328
25	36	64	67	2450	332	733	326	262	46	47	12	235
26	41	69	61	1190	327	641	297	184	39	33	17	179
27	43	72	61	840	313	570	285	147	35	23	53	145
28	50	72	72	664	337	523	266	127	33	20	105	336
29	45	70	69	541	---	483	256	115	37	46	47	925
30	49	67	75	459	---	443	249	107	40	42	26	11400
31	48	---	66	407	---	405	---	98	---	31	20	---
TOTAL	1504	1981	2627	19456	11046	22036	11484	6259	1623	1223	566.1	21432
MEAN	48.5	66.0	84.7	628	394	711	383	202	54.1	39.5	18.3	714
MAX	320	81	234	2660	810	1570	564	481	90	182	105	11400
MIN	14	49	59	59	264	347	249	98	33	14	5.1	1.12
CFSM	.08	.11	.14	1.01	.64	1.15	.62	.33	.09	.06	.03	1.15
IN.	.09	.12	.16	1.17	.66	1.32	.69	.38	.10	.07	.03	1.29

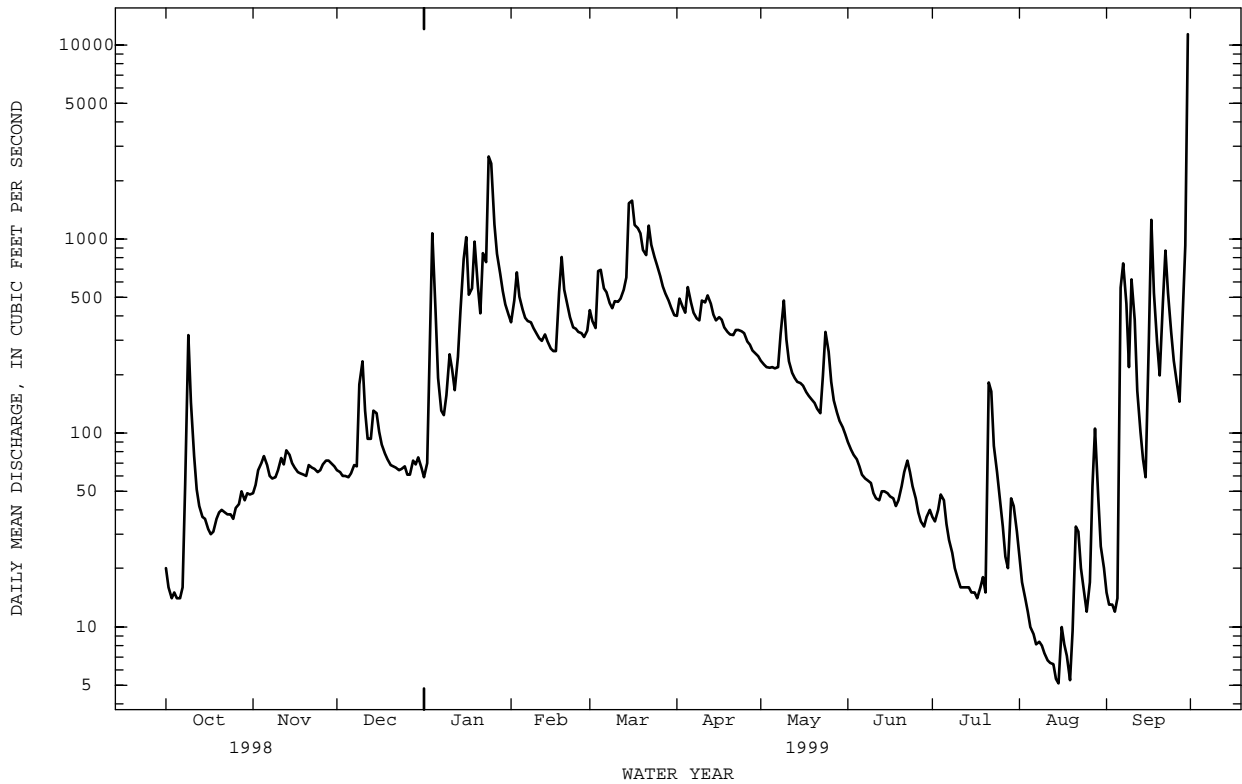
01664000 RAPPAHANNOCK RIVER AT REMINGTON, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1943 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	489	578	717	868	1014	1200	1045	834	591	338	367	367
MAX	4895	2575	2172	2480	3496	3751	3784	2177	3520	974	2926	2815
(WY)	1943	1986	1951	1998	1998	1993	1983	1989	1972	1949	1955	1996
MIN	27.3	61.8	61.1	78.3	212	292	248	198	54.1	30.1	13.2	15.4
(WY)	1987	1966	1966	1966	1989	1981	1981	1977	1999	1966	1966	1985

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR	WATER YEARS 1943 - 1999
ANNUAL TOTAL	392022	101237.1	
ANNUAL MEAN	1074	277	699
HIGHEST ANNUAL MEAN			1231
LOWEST ANNUAL MEAN			251
HIGHEST DAILY MEAN	14200	Mar 21	64000
LOWEST DAILY MEAN	14	aOct 3	2.9
ANNUAL SEVEN-DAY MINIMUM	16	Oct 1	3.2
INSTANTANEOUS PEAK FLOW			18200
INSTANTANEOUS PEAK STAGE			19.11
INSTANTANEOUS LOW FLOW			3.9
ANNUAL RUNOFF (CFSM)	1.73	.45	1.13
ANNUAL RUNOFF (INCHES)	23.52	6.07	15.32
10 PERCENT EXCEEDS	2500	566	1410
50 PERCENT EXCEEDS	387	98	420
90 PERCENT EXCEEDS	28	16	72

a Also Oct 5-6, 1998.  
 b From floodmarks.  
 e Estimated.



RAPPAHANNOCK RIVER BASIN

01665500 RAPIDAN RIVER NEAR RUCKERSVILLE, VA

LOCATION.--Lat 38°16'48", long 78°20'27", Madison County, Hydrologic Unit 02080103, on left bank 10 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 mi<sup>2</sup>.

PERIOD OF RECORD.--September 1942 to June 1995, October 1998 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 sea level.

REMARKS.--Records good except those for period with ice effect, Jan. 6-9, and period of no gage-height record, Jul. 2-14, 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 0.76 ft<sup>3</sup>/s. Maximum discharge, 106,000 ft<sup>3</sup>/s, from rating curve extended above 8,700 ft<sup>3</sup>/s on basis of slope-area measurement of peak flow. 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 Department of Environmental Quality - Water Division.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,400 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Jan 24	0945	2,530	5.74	Sep 30	0130	*24,700	*14.63
Sep 6	2200	1,610	4.89				

Minimum discharge, 0.85 ft<sup>3</sup>/s, Aug 12, gage height, 1.14 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	9.1	16	23	33	133	106	143	61	35	14	3.9	10
2	6.6	16	22	31	193	93	138	59	34	e17	3.5	8.9
3	6.6	24	22	325	168	124	125	58	32	e15	3.0	7.1
4	8.1	26	23	174	149	235	126	58	30	e26	2.6	9.0
5	8.6	23	24	108	134	170	122	57	29	e19	2.6	219
6	9.9	21	24	e89	127	162	113	57	28	e14	3.2	503
7	12	21	23	e72	124	155	107	58	27	e11	2.7	617
8	138	20	32	e64	119	141	103	106	25	e9.2	2.4	230
9	71	21	90	e75	109	146	105	80	22	e11	2.4	180
10	40	21	60	91	103	142	103	66	21	e9.0	2.1	192
11	30	34	45	84	97	137	107	61	23	e8.0	1.9	115
12	24	34	39	75	94	141	103	57	24	e7.3	1.3	92
13	21	30	56	79	91	136	93	56	24	e6.9	1.6	77
14	19	27	60	93	85	170	89	76	24	e9.6	5.2	68
15	17	27	50	187	82	462	92	74	22	13	6.6	68
16	17	24	44	154	80	294	93	61	19	10	3.5	257
17	16	23	40	120	80	248	85	58	24	8.4	2.3	187
18	16	23	37	174	178	268	82	57	28	7.7	1.5	137
19	16	22	35	172	162	264	79	56	22	20	2.0	117
20	16	23	34	137	137	237	78	53	25	17	76	103
21	15	23	34	123	122	281	78	50	31	18	18	207
22	15	23	32	114	112	299	78	56	27	32	10	228
23	15	23	32	255	105	265	79	78	22	23	6.6	172
24	17	22	36	1370	102	246	86	66	19	14	5.9	142
25	16	22	33	616	99	222	75	59	17	13	7.6	120
26	16	27	32	376	95	199	71	51	16	11	35	104
27	15	25	34	281	91	183	69	46	15	6.6	89	99
28	16	24	33	227	103	169	67	44	21	7.4	38	560
29	16	24	33	189	---	155	65	42	20	8.5	23	3020
30	16	23	33	162	---	143	63	39	15	6.4	15	7230
31	16	---	30	142	---	133	---	37	---	4.7	12	---
TOTAL	674.9	712	1145	6192	3274	6126	2817	1837	721	397.7	390.4	15079.0
MEAN	21.8	23.7	36.9	200	117	198	93.9	59.3	24.0	12.8	12.6	503
MAX	138	34	90	1370	193	462	143	106	35	32	89	7230
MIN	6.6	16	22	31	80	93	63	37	15	4.7	1.3	7.1
CFSM	.19	.21	.32	1.75	1.03	1.73	.82	.52	.21	.11	.11	4.41
IN.	.22	.23	.37	2.02	1.07	2.00	.92	.60	.24	.13	.13	4.92



01665500 RAPIDAN RIVER NEAR RUCKERSVILLE, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1943 - 1995, 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	130	138	159	175	197	245	226	177	165	79.0	90.6	87.4
MAX	976	798	465	483	485	570	692	376	1675	378	760	598
(WY)	1943	1986	1951	1978	1984	1993	1983	1978	1995	1949	1955	1979
MIN	9.44	23.7	20.4	21.0	52.4	79.7	72.8	48.0	23.3	6.99	6.32	5.83
(WY)	1964	1999	1966	1981	1989	1981	1981	1977	1977	1977	1966	1954

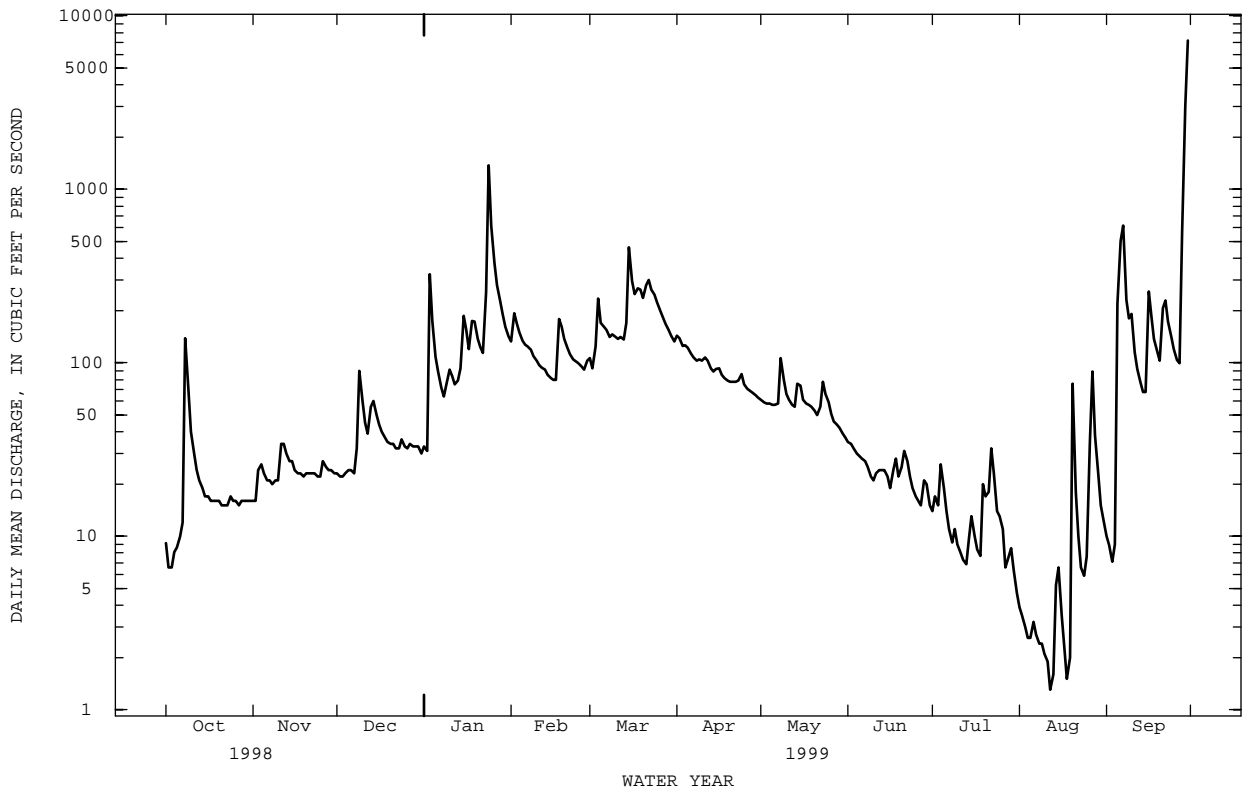
SUMMARY STATISTICS

FOR 1999 WATER YEAR

WATER YEARS 1943 - 1995  
1999

ANNUAL TOTAL	39366.0		
ANNUAL MEAN	108		154
HIGHEST ANNUAL MEAN			337
LOWEST ANNUAL MEAN			70.6
HIGHEST DAILY MEAN	7230	Sep 30	e29400
LOWEST DAILY MEAN	1.3	Aug 12	.90
ANNUAL SEVEN-DAY MINIMUM	2.1	Aug 7	1.1
INSTANTANEOUS PEAK FLOW	24700	Sep 30	106000
INSTANTANEOUS PEAK STAGE	14.63	Sep 30	a31.30
INSTANTANEOUS LOW FLOW	.85	Aug 12	(b)
ANNUAL RUNOFF (CFSM)	.95		1.35
ANNUAL RUNOFF (INCHES)	12.85		18.34
10 PERCENT EXCEEDS	181		308
50 PERCENT EXCEEDS	44		97
90 PERCENT EXCEEDS	8.6		20

- a From floodmarks.
- b Not determined.
- c Probably occurred Sep 12, 1966.
- e Estimated.



## RAPPAHANNOCK RIVER BASIN

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 mi<sup>2</sup>.

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 sea level.

REMARKS.--Records good except those for period with ice effect, Jan. 5-8, and period of doubtful gage-height record, Jul. 9-19, 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 Department of Environmental Quality - Water Division.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Oct. 15, 1942, reached a stage of 23.9 ft, from floodmarks, discharge, about 44,000 ft<sup>3</sup>/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,700 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Jan 24	1500	1,990	8.30	Sep 30	0600	*13,800	*18.80

Minimum discharge, 2.4 ft<sup>3</sup>/s, Aug 13.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	19	41	50	62	169	165	167	92	52	20	10	15
2	18	41	48	77	263	139	179	89	50	21	8.5	13
3	19	46	48	330	249	143	161	87	47	50	7.1	11
4	19	56	49	305	208	341	157	86	43	38	5.7	11
5	22	47	50	e140	186	239	164	86	41	23	4.5	36
6	25	45	50	e120	173	216	150	87	39	18	5.3	287
7	29	46	50	e110	166	211	143	88	38	14	5.9	363
8	156	45	57	e100	165	186	138	218	36	22	4.8	147
9	154	47	124	134	150	187	139	144	32	e18	4.1	478
10	68	48	94	233	143	190	156	105	29	e15	5.1	334
11	52	55	75	158	135	181	144	93	31	e12	4.3	151
12	46	60	65	113	133	201	149	87	32	e11	3.1	104
13	42	51	80	122	131	190	135	83	32	e13	2.6	83
14	40	50	96	129	121	257	128	97	35	e17	3.9	70
15	37	50	75	344	117	716	127	99	32	e14	3.5	71
16	36	48	70	268	116	483	136	83	27	e11	7.6	422
17	36	48	66	176	116	343	123	80	28	e9.5	6.4	293
18	36	48	63	271	225	336	118	77	35	e8.5	4.4	182
19	36	48	60	286	237	330	115	75	31	e8.4	3.4	141
20	37	51	59	190	187	287	113	71	30	8.9	45	118
21	35	51	58	159	169	314	112	67	43	9.8	31	298
22	35	48	58	149	152	376	115	65	39	111	15	278
23	34	48	56	161	141	305	111	98	32	40	11	199
24	37	49	60	1150	136	279	130	99	27	24	9.3	159
25	38	48	59	735	133	255	115	89	24	42	10	133
26	39	53	62	459	130	228	108	76	23	23	22	112
27	39	57	75	346	124	211	105	70	22	16	153	103
28	39	50	61	285	144	199	100	65	26	13	50	217
29	40	49	60	239	---	185	99	62	26	13	30	889
30	39	49	60	206	---	173	96	59	21	14	22	7900
31	40	---	56	183	---	163	---	55	---	13	17	---
TOTAL	1342	1473	1994	7740	4519	8029	3933	2732	1003	671.1	515.5	13618
MEAN	43.3	49.1	64.3	250	161	259	131	88.1	33.4	21.6	16.6	454
MAX	156	60	124	1150	263	716	179	218	52	111	153	7900
MIN	18	41	48	62	116	139	96	55	21	8.4	2.6	11
CFSM	.24	.27	.36	1.39	.90	1.45	.73	.49	.19	.12	.09	2.54
IN.	.28	.31	.41	1.61	.94	1.67	.82	.57	.21	.14	.11	2.83

01666500 ROBINSON RIVER NEAR LOCUST DALE, VA--Continued

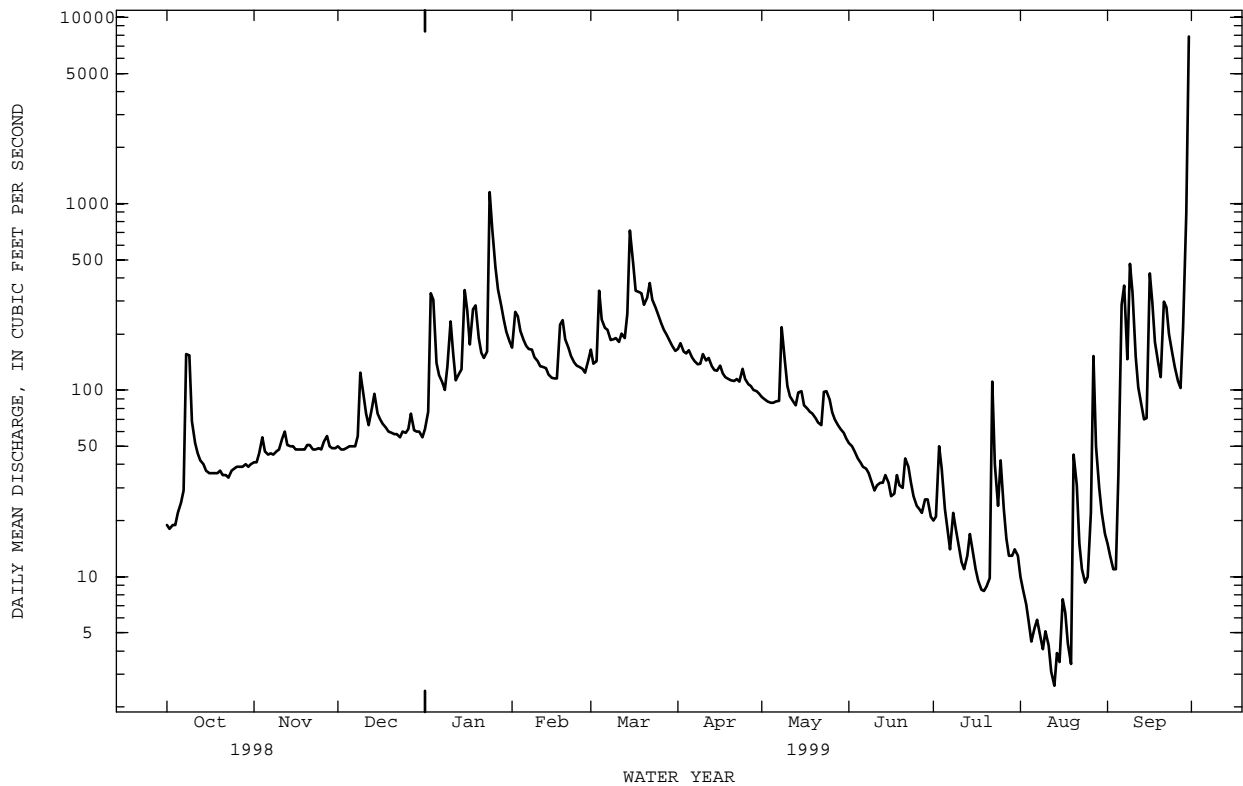
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1944 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	170	216	232	276	307	350	308	251	212	128	138	164
MAX	783	1350	624	752	1254	980	989	625	1154	522	1063	1119
(WY)	1991	1986	1973	1978	1998	1993	1983	1989	1995	1949	1955	1996
MIN	18.5	35.1	32.0	47.5	105	105	89.3	70.9	33.4	21.3	12.2	8.05
(WY)	1964	1966	1966	1966	1977	1981	1981	1977	1999	1944	1963	1954

SUMMARY STATISTICS FOR 1998 CALENDAR YEAR FOR 1999 WATER YEAR WATER YEARS 1944 - 1999

ANNUAL TOTAL	127141	47569.6	
ANNUAL MEAN	348	130	229
HIGHEST ANNUAL MEAN			445
LOWEST ANNUAL MEAN			95.6
HIGHEST DAILY MEAN	5570	May 8	7900 Sep 30
LOWEST DAILY MEAN	18	aSep 30	2.6 Aug 13
ANNUAL SEVEN-DAY MINIMUM	19	19 Sep 29	3.8 Aug 9
INSTANTANEOUS PEAK FLOW			13800 Sep 30
INSTANTANEOUS PEAK STAGE			18.80 Sep 30
INSTANTANEOUS LOW FLOW			2.4 Aug 13
ANNUAL RUNOFF (CFSM)	1.95	.73	1.2
ANNUAL RUNOFF (INCHES)	26.42	9.89	17.36
10 PERCENT EXCEEDS	730	243	428
50 PERCENT EXCEEDS	127	67	149
90 PERCENT EXCEEDS	35	13	40

- a Also Oct 2, 1998.
- b Also Sep 27, 1954.
- c Backwater from debris.
- d Also Sep 12, 1954.
- 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 mi<sup>2</sup>.

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 sea level.

REMARKS.--Records good except those for period with ice effect, Jan. 6-8, which is fair. Prior to 1977, diurnal fluctuation at low flow caused by mill at Rapidan, and since July 1986, by powerplant at same site. National Weather Service gage-height telemeter at station. Maximum discharge, 59,300 ft<sup>3</sup>/s, from rating curve extended above 43,000 ft<sup>3</sup>/s on basis of slope-area measurement at gage height 30.26 ft. 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 Department of Environmental Quality - Water Division.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,500 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Jan 24	1800	5,590	7.05	Sep 30	1845	*19,200	*17.53

Minimum discharge, 4.2 ft<sup>3</sup>/s, Aug 11, 13.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	38	83	99	98	395	427	373	199	119	53	24	30
2	38	82	97	185	610	351	437	193	114	58	20	27
3	35	87	95	502	684	319	382	188	110	59	16	24
4	37	111	96	1020	525	838	363	185	104	98	13	24
5	38	114	97	440	457	649	386	184	98	77	10	39
6	44	93	100	e280	414	541	343	188	96	54	8.4	647
7	53	94	100	e250	394	526	320	190	92	42	5.9	1010
8	120	93	106	e230	389	461	306	518	92	36	6.4	563
9	514	93	217	250	353	444	308	435	89	42	6.7	308
10	206	95	253	430	330	471	364	258	80	35	5.2	862
11	129	101	149	329	311	453	322	213	76	30	4.6	355
12	102	125	112	271	301	502	354	193	81	27	5.4	219
13	91	124	124	269	303	473	309	181	84	26	5.3	166
14	86	113	236	291	278	578	284	213	84	32	6.1	136
15	80	109	189	687	264	2320	274	252	83	39	4.8	121
16	76	106	158	795	259	1720	296	208	78	34	10	391
17	78	102	142	489	258	1020	272	186	73	34	19	783
18	76	100	130	594	420	867	254	178	79	27	16	391
19	75	98	121	848	660	822	248	173	83	24	12	284
20	75	100	116	546	478	728	244	167	78	21	14	234
21	75	105	115	443	415	739	241	153	86	21	101	314
22	72	105	115	402	367	1010	249	148	95	120	50	552
23	69	99	113	395	333	791	243	190	85	103	32	425
24	72	98	115	2860	321	714	279	235	73	62	25	328
25	76	98	122	2170	311	653	261	208	64	55	21	270
26	80	105	106	1190	303	576	238	173	59	45	26	231
27	79	119	98	861	290	520	229	155	57	34	143	205
28	80	111	122	699	325	481	218	143	59	28	147	388
29	79	102	119	588	---	448	217	137	62	25	80	1050
30	79	103	121	498	---	408	207	131	59	25	53	13700
31	78	---	110	439	---	374	---	125	---	28	37	---
TOTAL	2830	3068	3993	19349	10748	21224	8821	6300	2492	1394	927.8	24077
MEAN	91.3	102	129	624	384	685	294	203	83.1	45.0	29.9	803
MAX	514	125	253	2860	684	2320	437	518	119	120	147	13700
MIN	35	82	95	98	258	319	207	125	57	21	4.6	24
CFSM	.19	.22	.27	1.32	.81	1.45	.62	.43	.18	.10	.06	1.70
IN.	.22	.24	.31	1.52	.85	1.67	.70	.50	.20	.11	.07	1.90

01667500 RAPIDAN RIVER NEAR CULPEPER, VA--Continued

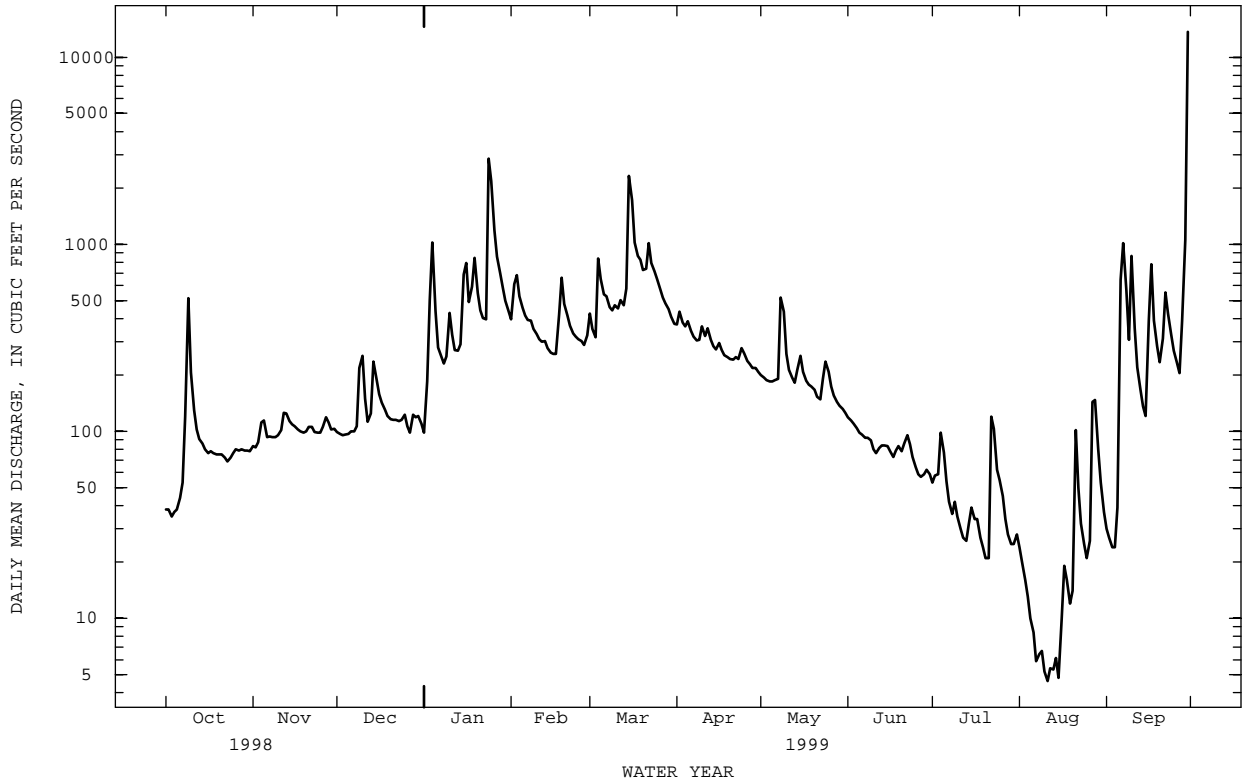
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1931 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	422	469	552	677	747	851	779	580	487	304	332	367
MAX	3163	2690	1653	1924	3048	2236	2615	1734	2901	1206	2323	2908
(WY)	1943	1986	1949	1998	1998	1993	1937	1998	1995	1949	1955	1996
MIN	8.10	29.4	62.4	93.6	91.5	179	210	166	83.1	45.0	22.5	14.0
(WY)	1931	1931	1931	1966	1931	1931	1981	1956	1999	1999	1957	1954

SUMMARY STATISTICS FOR 1998 CALENDAR YEAR FOR 1999 WATER YEAR WATER YEARS 1931 - 1999

ANNUAL TOTAL	329272	105223.8	
ANNUAL MEAN	902	288	546
HIGHEST ANNUAL MEAN			1099
LOWEST ANNUAL MEAN			151
HIGHEST DAILY MEAN	12800	Feb 18	13700 Sep 30
LOWEST DAILY MEAN	35	Oct 3	4.6 Aug 11
ANNUAL SEVEN-DAY MINIMUM	38	Sep 29	5.4 Aug 9
INSTANTANEOUS PEAK FLOW			19200 Sep 30
INSTANTANEOUS PEAK STAGE			17.53 Sep 30
INSTANTANEOUS LOW FLOW			4.2 bAug 11
ANNUAL RUNOFF (CFSM)	1.91		.61
ANNUAL RUNOFF (INCHES)	25.95		8.29
10 PERCENT EXCEEDS	1990		556
50 PERCENT EXCEEDS	326		136
90 PERCENT EXCEEDS	67		29

- a From high-water mark in gage house.
- b Also Aug 13, 1999.
- c Also Oct 5, 11, 1954.
- e Estimated.



## RAPPAHANNOCK RIVER BASIN

01668000 RAPPAHANNOCK RIVER NEAR FREDERICKSBURG, VA

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 mi<sup>2</sup>.

## 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 sea level. 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 fair. Maximum discharge, 140,000 ft<sup>3</sup>/s, from rating curve extended above 76,000 ft<sup>3</sup>/s on basis of flow-over-dam and slope-area measurements at gage heights 26.1 ft and 26.9 ft, present datum.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in June 1889 was probably several feet lower than that of Oct. 16, 1942.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 26,400 ft<sup>3</sup>/s, Sep 30, gage height, 10.36 ft, stage rising, peak occurred Oct 1, 1999; peak discharges greater than base discharge of 16,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Jan 25	0130	*14,000	*7.78	No peak greater than base discharge.			

Minimum discharge, 8.8 ft<sup>3</sup>/s, Aug 19-23, gage height, 0.85 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	74	121	192	209	816	1180	915	595	289	122	87	87
2	77	121	180	198	842	1120	957	572	270	126	78	69
3	69	133	171	372	1620	863	1070	551	255	181	65	57
4	63	143	170	1930	1300	2430	960	536	241	148	53	56
5	62	160	169	e1200	1030	2290	1080	531	227	145	47	69
6	58	189	174	e750	887	1460	1130	535	219	171	42	87
7	57	191	174	e600	814	1280	974	531	208	154	37	1050
8	65	167	189	e480	783	1150	912	543	198	119	30	1690
9	121	162	251	e390	765	997	891	1030	192	e96	26	919
10	811	159	485	e440	702	1020	1040	945	184	e80	23	749
11	440	162	597	e750	652	1050	1150	683	174	74	20	1430
12	281	174	417	575	620	1210	1050	577	156	71	18	752
13	210	180	372	441	647	1350	1060	529	147	e77	17	497
14	171	197	372	468	667	1330	943	504	151	69	16	376
15	150	212	459	645	595	9350	887	496	163	68	14	333
16	136	198	420	1990	560	7260	848	531	158	67	12	509
17	130	188	348	1280	548	3440	868	502	158	65	11	1730
18	123	178	304	885	713	2530	819	469	161	63	9.7	1540
19	123	169	275	2350	2060	2250	762	454	144	62	9.2	914
20	121	169	260	1470	1450	1930	739	433	139	60	8.8	669
21	117	170	244	918	1070	1710	735	416	163	58	8.8	558
22	119	167	240	783	904	2650	744	392	168	426	8.8	1080
23	115	173	234	1110	789	2360	785	408	178	423	20	1280
24	109	177	246	4830	708	1870	836	511	e190	390	64	925
25	108	173	239	9160	685	1680	822	663	e163	257	51	716
26	111	183	238	3390	654	1480	765	570	143	176	46	595
27	114	188	212	2080	638	1280	705	463	132	139	41	520
28	119	190	219	1570	654	1180	664	394	127	112	39	508
29	127	203	254	1280	---	1100	632	361	132	92	226	1340
30	126	198	255	1070	---	1030	613	331	127	75	182	14500
31	125	---	254	909	---	951	---	312	---	79	121	---
TOTAL	4632	5195	8614	44523	24173	62781	26356	16368	5357	4245	1431.3	35605
MEAN	149	173	278	1436	863	2025	879	528	179	137	46.2	1187
MAX	811	212	597	9160	2060	9350	1150	1030	289	426	226	14500
MIN	57	121	169	198	548	863	613	312	127	58	8.8	56
CFSM	.09	.11	.17	.90	.54	1.27	.55	.33	.11	.09	.03	.74
IN.	.11	.12	.20	1.04	.56	1.46	.61	.38	.12	.10	.03	.83

01668000 RAPPAHANNOCK RIVER NEAR FREDERICKSBURG, VA--Continued

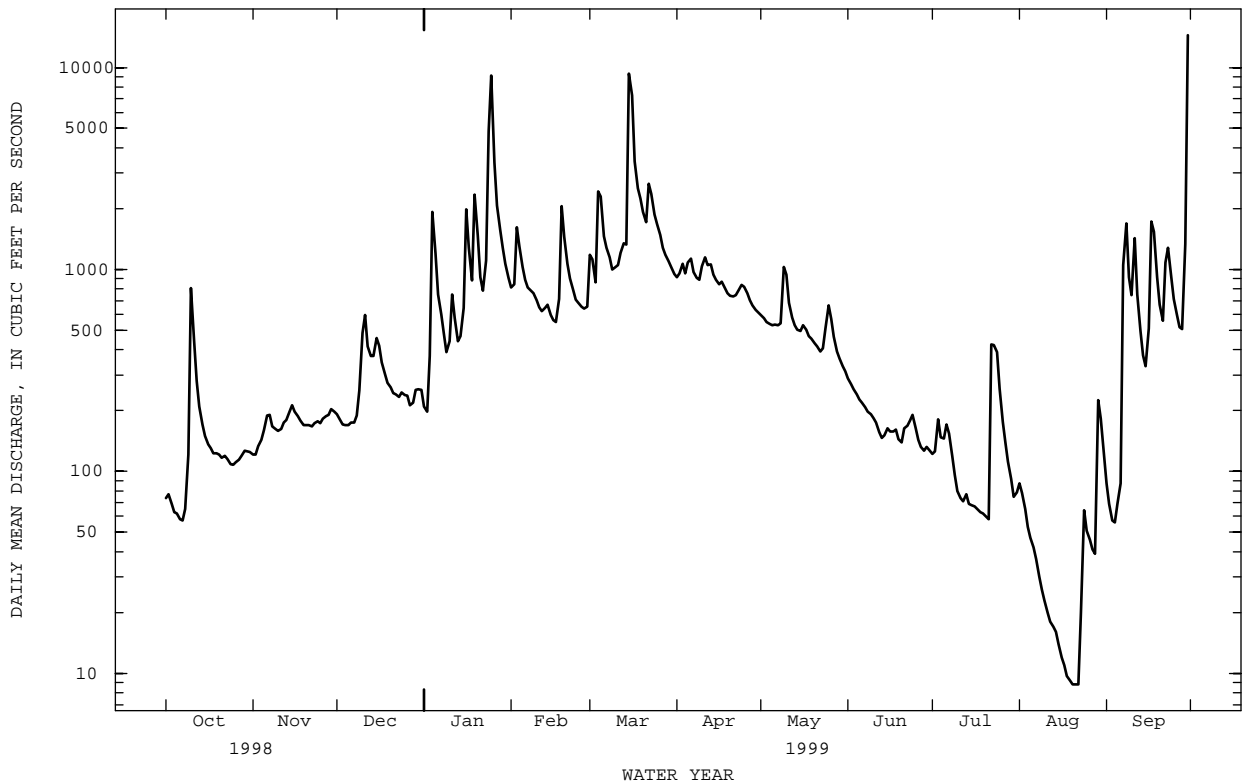
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1907 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	1146	1323	1670	2225	2520	2711	2490	1905	1419	912	1011	951
MAX	11090	6522	5357	6472	8880	8505	9484	10310	7112	3368	7190	6924
(WY)	1943	1986	1949	1996	1998	1993	1983	1924	1972	1949	1955	1996
MIN	15.3	75.4	147	268	224	526	587	492	179	78.6	21.1	46.5
(WY)	1931	1931	1931	1966	1931	1931	1981	1956	1999	1930	1930	1930

SUMMARY STATISTICS FOR 1998 CALENDAR YEAR FOR 1999 WATER YEAR WATER YEARS 1907 - 1999

ANNUAL TOTAL	900571	239280.3	
ANNUAL MEAN	2467	656	1686
HIGHEST ANNUAL MEAN			3072
LOWEST ANNUAL MEAN			440
HIGHEST DAILY MEAN	39800	Feb 5	a14500 Sep 30
LOWEST DAILY MEAN	57	Oct 7	8.8 bAug 20
ANNUAL SEVEN-DAY MINIMUM	64	Oct 2	9.8 Aug 16
INSTANTANEOUS PEAK FLOW			14000 Jan 25
INSTANTANEOUS PEAK STAGE			7.78 Jan 25
INSTANTANEOUS LOW FLOW			8.8 fAug 19
ANNUAL RUNOFF (CFSM)	1.55		.41
ANNUAL RUNOFF (INCHES)	20.99		5.58
10 PERCENT EXCEEDS	5500		1290
50 PERCENT EXCEEDS	722		348
90 PERCENT EXCEEDS	111		65
			14.35
			3330
			990
			230

- a Stage rising, peak occurred Oct 1, 1999.
- b Also Aug 21-22, 1999.
- c Also Oct 12, 1930.
- d From floodmarks.
- e Estimated.
- f Also Aug 20-23, 1999.



## RAPPAHANNOCK RIVER BASIN

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. October 1991 to September 1993.

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 1998 TO SEPTEMBER 1999

DATE	TIME	SAMPLE TYPE	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	AGENCY ANA- LYZING SAMPLE (CODE NUMBER) (00028)	TEMPER- ATURE AIR (DEG C) (00020)	TEMPER- ATURE WATER (DEG C) (00010)
OCT									
07...	1130	ENVIRONMENTAL	58	136	6.7	762	VDCLS	20.0	19.0
22...	0920	ENVIRONMENTAL	118	102	6.3	761	VDCLS	9.5	14.0
NOV									
03...	0900	ENVIRONMENTAL	130	114	7.7	753	VDCLS	6.0	11.5
19...	1230	ENVIRONMENTAL	168	117	7.7	757	VDCLS	14.0	9.0
DEC									
03...	1030	ENVIRONMENTAL	168	115	6.5	754	VDCLS	12.0	8.3
17...	0900	ENVIRONMENTAL	357	111	7.7	746	VDCLS	5.0	5.0
JAN									
04...	1130	ENVIRONMENTAL	2810	111	6.8	758	VDCLS	-1	-1
07...	0900	ENVIRONMENTAL	600	108	6.9	758	VDCLS	3.5	.0
07...	0915	REPLICATE	600	108	6.9	758	VDCLS	3.5	.0
16...	1000	ENVIRONMENTAL	2410	100	7.1	755	VDCLS	3.5	.9
22...	1100	ENVIRONMENTAL	724	100	6.5	760	VDCLS	9.0	5.1
25...	1030	ENVIRONMENTAL	9500	79	7.0	759	VDCLS	3.0	9.1
FEB									
10...	0900	ENVIRONMENTAL	709	88	6.3	759	VDCLS	6.5	5.5
19...	1030	ENVIRONMENTAL	2180	92	6.5	753	VDCLS	6.0	6.6
22...	0900	ENVIRONMENTAL	923	88	6.6	761	VDCLS	-1.0	2.9
MAR									
11...	0900	ENVIRONMENTAL	1050	82	6.4	754	VDCLS	-1	2.5
15...	0930	ENVIRONMENTAL	11500	91	7.4	744	VDCLS	2.1	3.8
15...	0945	REPLICATE	11500	91	7.4	744	VDCLS	2.1	3.8
16...	1030	ENVIRONMENTAL	7490	84	6.7	756	VDCLS	13.0	4.5
20...	0930	ENVIRONMENTAL	1980	84	6.3	762	VDCLS	7.0	9.5
22...	0930	ENVIRONMENTAL	2720	71	6.9	752	VDCLS	9.0	8.0
22...	0935	REPLICATE	2720	71	6.9	752	USGS	9.0	8.0
APR									
13...	0930	ENVIRONMENTAL	1090	87	6.6	754	VDCLS	10.5	12.3
26...	0900	ENVIRONMENTAL	779	83	6.6	753	VDCLS	17.0	15.7
MAY									
06...	0900	ENVIRONMENTAL	535	84	7.1	751	VDCLS	17.0	19.2
20...	0945	ENVIRONMENTAL	431	82	7.2	758	VDCLS	17.0	19.5
20...	0950	REPLICATE	435	82	7.2	758	USGS	17.0	19.5
24...	1130	ENVIRONMENTAL	455	78	7.0	742	VDCLS	23.5	23.4
JUN									
09...	0830	ENVIRONMENTAL	195	78	6.5	756	VDCLS	23.0	27.7
25...	1000	ENVIRONMENTAL	162	95	7.0	754	VDCLS	22.5	24.5
JUL									
07...	0830	ENVIRONMENTAL	159	92	6.7	754	VDCLS	27.5	31.6
22...	0915	ENVIRONMENTAL	639	118	6.9	754	VDCLS	26.0	28.8
26...	0830	ENVIRONMENTAL	181	92	6.8	751	VDCLS	24.5	28.9
AUG									
05...	1000	ENVIRONMENTAL	48	112	7.8	749	VDCLS	29.0	28.9
19...	0830	ENVIRONMENTAL	9.4	104	7.1	755	VDCLS	27.5	26.3
SEP									
15...	0915	ENVIRONMENTAL	340	75	6.7	754	VDCLS	20.5	22.6



01668000 RAPPAHANNOCK RIVER NEAR FREDERICKSBURG, VA--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DATE	TUR- BID- ITY (NTU) (00076)	OXYGEN, DIS- SOLVED (MG/L) (00300)	SILICA, DIS- SOLVED AS SIO2 (MG/L) (00955)	RESIDUE TOTAL AT 105 DEG. C, SUS- PENDED (MG/L) (00530)	RESIDUE FIXED NON FILTER- ABLE (MG/L) (00540)	RESIDUE VOLA- TILE, SUS- PENDED (MG/L) (00535)	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)
OCT										
07...	1	9.0	3.6	<3	<3	<3	.007	<.002	.007	.010
22...	2	9.6	4.7	5	<3	5	.018	<.002	.018	.006
NOV										
03...	2	9.9	2.8	<3	<3	<3	.006	<.002	.006	<.004
19...	3	11.4	5.1	<3	<3	<3	<.004	<.002	<.004	.006
DEC										
03...	2	10.2	3.4	<3	<3	<3	<.004	<.002	<.004	<.004
17...	3	12.2	7.8	<3	<3	<3	.277	.002	.279	<.004
JAN										
04...	44	13.9	8.6	125	99	26	.564	.003	.567	<.004
07...	22	14.1	8.8	9	6	3	.772	.006	.778	.160
07...	16	14.1	8.8	10	7	3	.775	.006	.781	.152
16...	73	13.4	11.0	102	83	19	.781	.004	.785	.086
22...	18	12.1	10.6	8	6	<3	.913	.004	.917	.043
25...	215	10.5	9.0	348	300	48	.835	.008	.843	.078
FEB										
10...	4	11.8	10.8	3	<3	<3	.789	.002	.791	<.004
19...	21	11.0	9.2	24	19	5	.533	<.002	.533	<.004
22...	10	12.8	9.8	4	3	<3	.602	<.002	.602	<.004
MAR										
11...	6	13.5	9.0	<3	<3	<3	.496	<.002	.496	.052
15...	127	13.1	7.4	675	585	90	.466	.003	.469	.047
15...	249	13.1	7.4	675	560	115	.475	.003	.478	.048
16...	97	12.7	8.2	111	95	16	.795	.004	.799	.060
20...	11	10.5	10.7	10	8	<3	.700	.002	.702	.006
22...	14	11.5	10.5	18	15	3	.618	.002	.620	.015
22...	--	11.5	11	10	2	8	--	--	.556	.010
APR										
13...	4	10.4	8.3	<3	<3	<3	.272	.002	.274	<.004
26...	--	8.9	5.6	<3	<3	<3	.129	.002	.131	.004
MAY										
06...	2	8.1	3.7	<3	<3	<3	.034	<.002	.034	.004
20...	3	8.5	5.9	--	--	--	.239	.002	.241	.012
20...	--	8.5	37	<1	--	<1	--	--	.203	.011
24...	2	5.9	5.0	<3	<3	<3	.188	.003	.191	.015
JUN										
09...	3	4.5	3.8	<3	<3	<3	.007	<.002	.007	.020
25...	2	7.7	3.0	<3	<3	<3	.005	<.002	.005	.011
JUL										
07...	7	4.6	5.6	18	6	12	.007	<.002	E.007	<.004
22...	8	6.2	9.2	11	<3	11	.005	<.002	.005	<.004
26...	5	5.7	7.3	<3	<3	<3	.732	.034	.766	.050
AUG										
05...	<1	7.9	11.1	<3	<3	<3	.004	<.002	.004	.010
19...	1	7.6	12.6	<3	<3	<3	<.004	<.002	<.004	.005
SEP										
15...	7	7.4	9.3	6	3	3	.503	.004	.507	.028

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

## RAPPAHANNOCK RIVER BASIN

01668000 RAPPAHANNOCK RIVER NEAR FREDERICKSBURG, VA--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DATE	NITRO- GEN,AM- MONIA + ORGANIC TOTAL AS N) (00625)	NITRO- GEN,AM- MONIA + ORGANIC DIS. AS N) (00623)	NITROGEN TOTAL SEDIMNT SUSP AS N (00601)	NITRO- GEN DIS- SOLVED AS N) (00602)	PHOS- PHORUS TOTAL AS P) (00665)	PHOS TOTAL SEDIMNT SUSP AS P (00667)	PHOS- PHORUS DIS- SOLVED AS P) (00666)	PHOS- PHORUS ORTHO, DIS- SOLVED AS P) (00671)	CARBON, INORG + ORGANIC SUSP. TOTAL AS C) (00694)
OCT									
07...	--	--	.028	.265	--	.004	.011	.002	.096
22...	--	--	<.001	.239	--	.005	.013	.002	.206
NOV									
03...	--	--	.004	.193	--	.004	.008	.004	.132
19...	--	--	.014	.175	--	.002	.009	.003	.309
DEC									
03...	--	--	.012	.185	--	.006	.008	.005	.230
17...	--	--	.020	.477	--	.008	.014	.005	.225
JAN									
04...	--	--	.912	.709	--	.141	.003	.005	7.93
07...	--	--	.109	1.16	--	.045	.021	.010	.857
07...	--	--	.11	1.1	--	.047	.020	.012	.9
16...	--	--	.718	1.05	--	.141	.022	.015	5.72
22...	--	--	.070	1.24	--	.029	.026	.011	.580
25...	--	--	1.40	1.24	--	.425	.048	.022	13.3
FEB									
10...	--	--	.009	.922	--	.008	.019	.008	.136
19...	--	--	.146	.727	--	.041	.015	.005	1.32
22...	--	--	.032	.826	--	.017	.024	.005	.292
MAR									
11...	--	--	.047	.747	--	.010	.011	.006	.403
15...	--	--	2.02	.865	--	.380	.034	.023	22.4
15...	--	--	1.073	.891	--	.353	.043	.023	8.89
16...	--	--	.355	1.12	--	.118	.045	.033	3.20
20...	--	--	.053	.842	--	.021	.018	.010	.490
22...	--	--	.052	.755	--	.021	.020	.012	.512
22...	.2	.1	--	.70	E.04	--	<.05	.011	--
APR									
13...	--	--	.024	.447	--	.009	.010	.009	.299
26...	--	--	.007	.290	--	.006	.011	.005	.145
MAY									
06...	--	--	.014	.222	--	.007	.010	.005	.158
20...	--	--	.013	.442	--	.005	.016	.006	.171
20...	.2	.2	--	.39	<.05	--	<.05	.003	--
24...	--	--	.009	.415	--	.008	.020	.007	.192
JUN									
09...	--	--	.027	.302	--	.008	.018	.003	.355
25...	--	--	.006	.288	--	.009	.020	.003	.096
JUL									
07...	--	--	.484	.324	--	.033	.016	.006	6.25
22...	--	--	.231	.324	--	.025	.011	<.002	3.03
26...	--	--	.022	1.28	--	.011	.030	.011	.164
AUG									
05...	--	--	--	.392	--	.013	.013	.004	--
19...	--	--	.026	.437	--	.010	.018	.006	.154
SEP									
15...	--	--	.317	.833	--	.013	.028	.019	.183

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

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## 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 mi<sup>2</sup>.

PERIOD OF RECORD.--September 1943 to September 1999 (discontinued).

REVISED RECORDS.--WSP 1382: 1944(M), 1945, 1946-51(M), 1952(P), 1953-54(M). WSP 2103: Drainage area. WDR VA-94-1: 1979(P), 1985(M), 1992(M).

GAGE.--Water-stage recorder. Datum of gage is 3.04 ft above sea level. 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 doubtful or no gage-height record, Jan. 6-9, Apr. 8, Jun. 2-7, and Sep. 16-30, which are fair. Prior to 1980, slight diurnal fluctuation at low flow caused by gristmill upstream from station. Maximum discharge, 6,820 ft<sup>3</sup>/s, from rating curve extended above 1,400 ft<sup>3</sup>/s. No flow at times in 1943, 1957, 1959-60, 1966, 1977, and 1999. 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 Department of Environmental Quality - Water Division.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in September 1935 exceeded 9.3 ft.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 250 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Sep 16	Unknown	*3,740	a*9.76	No other peak greater than base discharge.			

Minimum discharge, no flow part or all of each day Aug 4-19 and Sep 2-4.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	6.2	7.7	11	31	29	66	36	14	1.3	5.5	.01	.01
2	7.6	8.2	11	28	33	55	45	16	e1.0	5.3	.01	.00
3	4.9	10	10	71	37	43	40	18	e.80	3.6	.01	.00
4	4.2	13	10	100	35	47	37	19	e.63	3.0	.00	.00
5	3.9	14	10	69	35	42	34	17	e.50	2.7	.00	.01
6	4.2	13	10	e40	32	37	32	16	e.40	2.6	.00	.01
7	4.4	12	10	e38	31	33	32	15	e.30	2.3	.00	.12
8	7.0	12	12	e36	31	28	e30	12	.13	2.0	.00	.44
9	16	12	47	e35	30	26	29	10	.08	1.8	.00	.63
10	10	12	63	34	27	33	32	8.6	.05	2.1	.00	1.8
11	5.6	13	49	33	25	38	30	7.2	.04	4.9	.00	1.5
12	4.2	14	37	29	25	38	29	6.5	.04	3.8	.00	1.8
13	3.5	14	58	27	34	36	27	5.8	.06	7.8	.00	1.7
14	3.2	13	76	27	35	40	25	5.2	.05	8.9	.00	1.6
15	2.7	13	57	46	31	147	23	3.9	.09	7.3	.02	2.3
16	2.3	12	43	61	28	143	24	3.8	.08	4.9	.00	e1420
17	2.2	12	34	50	27	79	22	3.7	.30	4.1	.00	e646
18	2.6	12	30	44	37	56	20	3.8	1.0	3.5	.00	e319
19	2.3	11	26	52	52	46	19	3.5	1.1	3.2	.00	e185
20	2.3	11	24	48	46	39	18	3.1	1.3	2.9	.03	e101
21	2.8	13	24	40	36	45	18	2.8	2.5	2.8	.12	e60
22	3.2	13	23	33	30	101	19	2.5	2.2	2.5	.23	e42
23	3.3	13	22	30	26	91	18	2.8	1.6	2.0	.13	e36
24	3.9	12	28	63	25	62	21	2.9	1.2	1.7	.03	e28
25	3.9	11	31	104	25	50	20	2.4	1.0	1.8	.02	e24
26	3.8	13	30	70	27	43	17	2.2	1.0	1.2	.09	e20
27	4.6	14	29	49	27	40	15	2.0	1.0	.55	.43	e16
28	5.7	14	32	41	33	45	13	1.7	1.1	.16	.43	e12
29	6.5	12	35	35	---	42	13	1.5	1.1	.06	.16	e9.0
30	5.8	11	36	31	---	38	15	1.4	1.7	.03	.04	e8.1
31	7.1	---	34	31	---	34	---	1.3	---	.02	.01	---
TOTAL	149.9	364.9	952	1426	889	1663	753	215.6	23.65	95.02	1.77	2938.02
MEAN	4.84	12.2	30.7	46.0	31.8	53.6	25.1	6.95	.79	3.07	.057	97.9
MAX	16	14	76	104	52	147	45	19	2.5	8.9	.43	1420
MIN	2.2	7.7	10	27	25	26	13	1.3	.04	.02	.00	.00
CFSM	.11	.27	.67	1.01	.70	1.18	.55	.15	.02	.07	.00	2.15
IN.	.12	.30	.78	1.16	.73	1.36	.61	.18	.02	.08	.00	2.40

01668500 CAT POINT CREEK NEAR MONTROSS, VA--Continued

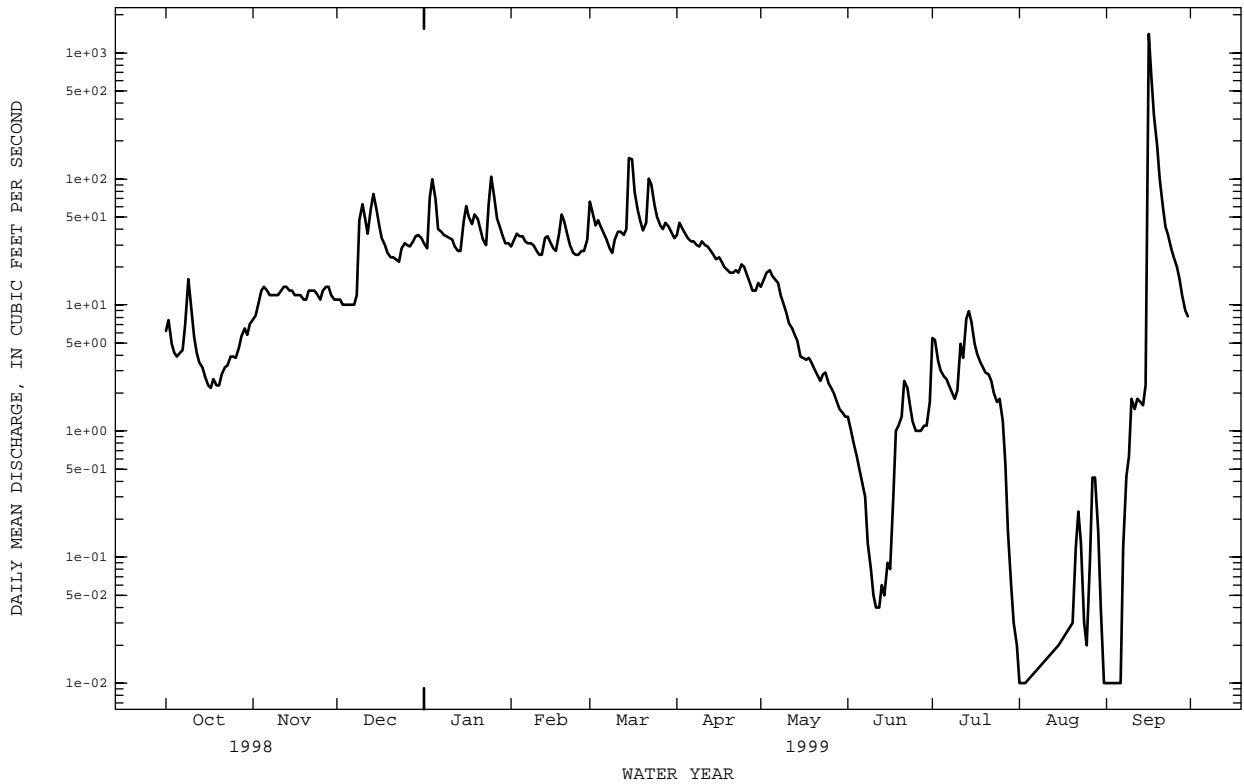
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1944 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	25.9	37.1	46.8	59.2	65.2	77.6	68.1	50.4	34.9	27.6	27.9	25.9
MAX	134	119	126	175	219	211	164	149	232	128	153	210
(WY)	1980	1980	1984	1978	1998	1994	1983	1990	1972	1995	1969	1979
MIN	1.47	6.70	11.6	12.9	24.1	23.2	20.7	6.95	.79	1.13	.057	.41
(WY)	1955	1992	1955	1955	1955	1945	1985	1999	1999	1957	1999	1954

SUMMARY STATISTICS FOR 1998 CALENDAR YEAR FOR 1999 WATER YEAR WATER YEARS 1944 - 1999

ANNUAL TOTAL	22834.70	9471.86	
ANNUAL MEAN	62.6	26.0	45.4
HIGHEST ANNUAL MEAN			89.4 1958
LOWEST ANNUAL MEAN			18.7 1954
HIGHEST DAILY MEAN	1890 Feb 5	e1420 Sep 16	2390 Sep 6 1979
LOWEST DAILY MEAN	.91 Sep 17	.00 bAug 4	.00 (c)
ANNUAL SEVEN-DAY MINIMUM	1.1 Sep 12	.00 dAug 4	.00 fAug 8 1957
INSTANTANEOUS PEAK FLOW		3740 Sep 16	6820 Aug 20 1969
INSTANTANEOUS PEAK STAGE		a9.76 Sep 16	g10.86 Sep 6 1992
INSTANTANEOUS LOW FLOW		.00 (h)	.00 (j)
ANNUAL RUNOFF (CFSM)	1.37	.57	1.00
ANNUAL RUNOFF (INCHES)	18.63	7.73	13.54
10 PERCENT EXCEEDS	121	46	96
50 PERCENT EXCEEDS	30	12	30
90 PERCENT EXCEEDS	3.1	.06	4.4

- a From floodmarks.
- b Also Aug 5-19, Sep 2-4, 1999.
- c Many days in 1943 (partial year), 1957, 1959, 1966, 1977, and 1999.
- d Also Aug 5-8, 1999.
- e Estimated.
- f Also Aug 9, 10, 1957, Aug 31 to Sep 7, 1966, and Aug 4-8, 1999.
- g Result of Chandlers Millpond dam washout.
- h Part or all of each day Aug 4-19 and Sep 2-4, 1999.
- j At times in 1943 (partial year), 1957, 1959-60, 1966, 1977, and 1999.



## RAPPAHANNOCK RIVER BASIN

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 mi<sup>2</sup>.

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 sea level.

REMARKS.--Records good except those for period with ice effect, Jan. 6, periods of doubtful gage-height record, Feb. 24 and Apr. 7, and period with backwater from beaver dams, Apr. 28 to Sep. 30, which are fair. Maximum discharge, 2,380 ft<sup>3</sup>/s, from rating curve extended above 1,400 ft<sup>3</sup>/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 Department of Environmental Quality - Water Division.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 250 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Sep 16	1730	*1,240	*6.19	No other peak greater than base discharge.			

Minimum discharge, no flow part or all of each day Aug 10-14.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.9	4.0	5.9	13	13	23	23	e9.8	e1.1	16	.51	e1.8
2	2.4	4.3	5.7	9.5	17	21	28	e9.3	e1.0	16	.44	e1.5
3	2.5	6.8	5.6	56	19	18	27	e9.0	e.80	11	.33	e1.4
4	2.0	9.8	5.3	71	18	20	25	e8.5	e.72	7.7	.29	e4.2
5	2.6	11	5.4	32	18	20	24	e8.0	e.70	5.6	.26	e9.5
6	2.9	9.9	5.5	e21	15	18	22	e8.8	e.60	4.5	.18	e13
7	4.5	8.6	5.3	16	14	15	e19	e8.4	e.50	4.1	.11	e12
8	5.2	7.4	7.0	16	15	13	18	e7.7	e.43	3.7	.05	e11
9	5.8	6.6	33	17	14	13	19	e7.2	e.37	3.6	e.01	e9.5
10	6.5	6.8	35	16	13	15	27	e6.7	e.34	3.3	.01	e8.4
11	5.6	8.1	19	14	12	18	26	e6.2	e.30	3.1	.00	e7.8
12	3.8	7.9	13	13	13	18	23	e5.9	.26	2.8	.00	e7.4
13	3.3	8.5	33	12	18	17	20	e5.3	.38	4.9	.00	e7.0
14	3.2	8.2	48	12	19	24	18	e6.0	.99	7.3	.18	e6.6
15	2.5	8.7	26	20	16	107	16	e5.5	1.1	7.4	12	16
16	2.2	8.5	17	27	13	75	18	e4.8	1.1	4.7	14	739
17	2.1	8.4	13	21	12	40	15	e5.0	1.1	3.4	e8.0	397
18	2.0	8.0	10	20	17	32	12	e4.4	1.1	2.6	e4.5	68
19	1.9	11	9.4	20	24	27	11	e3.9	.85	2.2	e2.5	35
20	1.8	9.1	8.9	18	20	24	11	e3.4	1.1	1.9	e10	25
21	1.6	9.2	8.4	16	16	30	12	e2.5	1.3	1.6	e16	26
22	2.1	9.9	9.7	14	13	82	13	e2.2	1.3	1.6	e9.0	39
23	2.2	8.1	8.7	13	12	53	13	e4.0	1.1	1.5	e6.0	26
24	2.1	7.2	13	37	e11	36	14	e3.5	.77	1.3	e4.2	21
25	2.2	6.6	15	60	12	33	13	e3.2	.69	1.3	e3.2	18
26	2.0	8.1	13	36	14	27	12	e2.8	.47	1.0	e3.0	17
27	2.3	8.7	12	26	14	25	11	e2.5	.49	.88	e6.1	19
28	2.3	8.9	13	22	17	29	e11	e2.0	.44	.81	e5.0	21
29	2.5	7.6	16	18	---	28	e10	e1.7	1.3	.73	e4.4	23
30	2.8	6.4	15	16	---	25	e9.9	e1.5	11	.65	e3.4	27
31	3.7	---	13	15	---	23	---	e1.3	---	.58	e2.5	---
TOTAL	91.5	242.3	447.8	717.5	429	949	520.9	161.0	33.70	127.75	116.17	1618.1
MEAN	2.95	8.08	14.4	23.1	15.3	30.6	17.4	5.19	1.12	4.12	3.75	53.9
MAX	6.5	11	48	71	24	107	28	9.8	11	16	16	739
MIN	1.6	4.0	5.3	9.5	11	13	9.9	1.3	.26	.58	.00	1.4
CFSM	.11	.29	.52	.83	.55	1.09	.62	.19	.04	.15	.13	1.93
IN.	.12	.32	.59	.95	.57	1.26	.69	.21	.04	.17	.15	2.15

01669000 PISCATAWAY CREEK NEAR TAPPAHANNOCK, VA--Continued

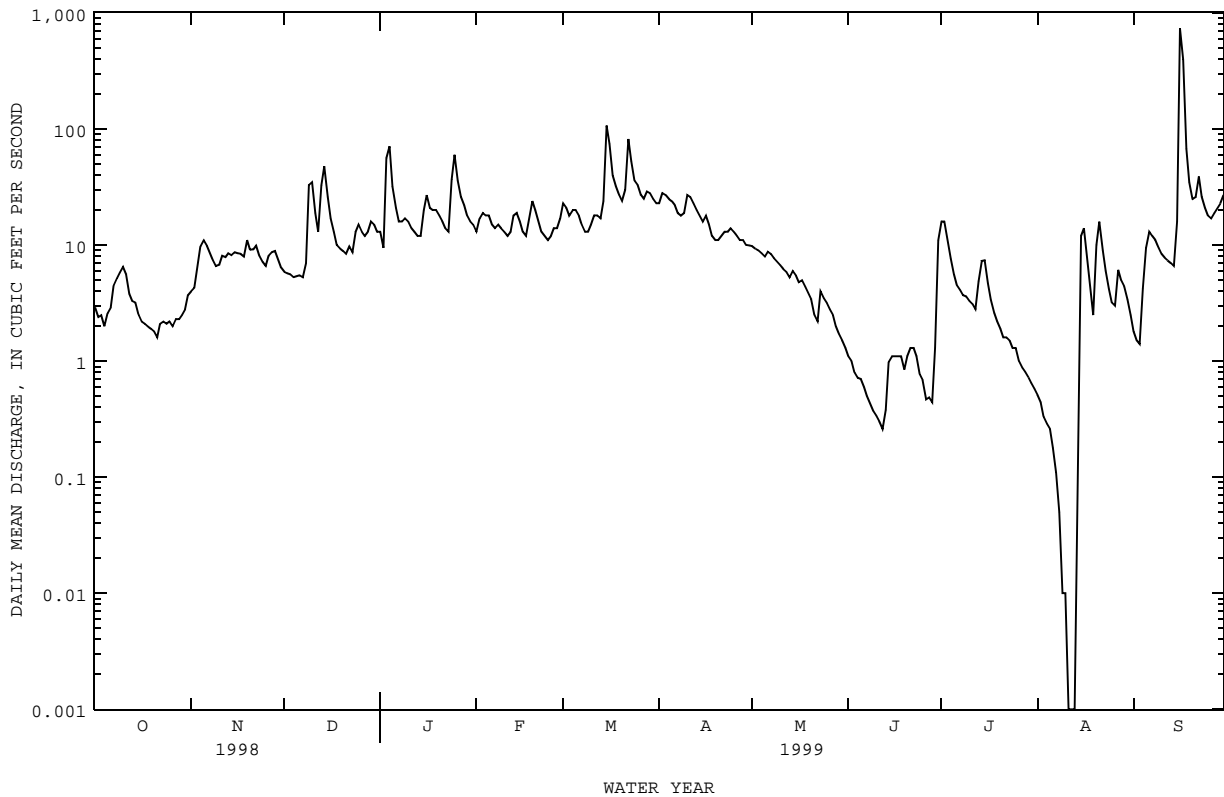
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1952 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	19.0	26.9	30.7	37.9	44.8	53.3	48.7	36.8	24.9	17.7	17.1	16.0
MAX	63.4	74.1	74.7	88.4	124	118	109	87.0	111	105	88.0	70.4
(WY)	1980	1980	1997	1978	1998	1994	1958	1972	1975	1975	1955	1979
MIN	1.30	6.30	9.20	7.93	14.0	13.5	13.4	5.19	1.12	2.01	1.00	.28
(WY)	1955	1955	1966	1955	1955	1981	1985	1999	1999	1954	1954	1954

SUMMARY STATISTICS FOR 1998 CALENDAR YEAR FOR 1999 WATER YEAR WATER YEARS 1952 - 1999

ANNUAL TOTAL	14903.8	5454.72	
ANNUAL MEAN	40.8	14.9	31.1
HIGHEST ANNUAL MEAN			56.8 1958
LOWEST ANNUAL MEAN			12.1 1954
HIGHEST DAILY MEAN	631 Feb 5	739 Sep 16	1080 Aug 13 1955
LOWEST DAILY MEAN	1.6 Oct 21	.00 aAug 11	.00 aAug 11 1999
ANNUAL SEVEN-DAY MINIMUM	1.9 Sep 15	.03 Aug 7	.03 Aug 7 1999
INSTANTANEOUS PEAK FLOW		1240 Sep 16	2380 Aug 20 1969
INSTANTANEOUS PEAK STAGE		6.19 Sep 16	b7.52 Aug 20 1969
INSTANTANEOUS LOW FLOW		.00 (c)	.00 (c)
ANNUAL RUNOFF (CFSM)	1.46	.53	1.11
ANNUAL RUNOFF (INCHES)	19.80	7.25	15.08
10 PERCENT EXCEEDS	101	26	63
50 PERCENT EXCEEDS	16	8.8	22
90 PERCENT EXCEEDS	2.5	.95	5.0

- a Also Aug 12, 13, 1999.
- b From high-water mark in well.
- c No flow part or all of each day Aug 10-14, 1999.
- 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 up stream 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 mi<sup>2</sup>.

PERIOD OF RECORD.--August 1981 to current year.

GAGE.--Water-stage recorder. Datum of gage is 21.60 ft above sea level.

REMARKS.--Records good except those for period with backwater from beaver dam, Oct. 7-28, and period with ice effect, Jan. 1, which are fair. Maximum discharge, 2,800 ft<sup>3</sup>/s, from rating curve extended above 2,150 ft<sup>3</sup>/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 Department of Environmental Quality - Water Division.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 600 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Jan 3	2000	660	6.29	Sep 17	0500	*6,600	*13.21
Mar 18	0100	603	6.21	Sep 22	0300	965	6.87

Minimum discharge, 0.01 ft<sup>3</sup>/s, Aug 11.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3.2	1.1	22	e100	85	67	107	40	7.5	4.7	.86	1.5
2	1.7	1.1	20	86	80	67	110	37	6.0	3.4	.76	1.4
3	1.1	2.1	19	374	78	71	107	36	4.7	3.2	.59	1.5
4	.89	3.3	18	624	73	80	103	36	3.7	6.3	.45	2.1
5	.83	3.3	17	447	69	77	97	35	2.9	12	.34	55
6	.73	3.3	16	342	65	73	88	36	2.5	7.5	.30	64
7	e.90	3.6	15	243	62	68	86	36	2.0	6.4	.22	57
8	e1.0	2.1	15	182	60	62	83	33	1.6	13	.12	52
9	e1.3	2.1	57	149	58	60	89	31	1.3	11	.06	53
10	e1.2	2.9	71	124	55	64	111	28	1.0	5.5	.02	50
11	e1.0	4.7	77	97	53	65	106	27	.94	22	.03	37
12	e.90	6.3	73	79	52	67	111	24	.85	36	.25	29
13	e.75	6.6	152	70	62	65	105	20	1.4	90	.29	22
14	e.80	7.2	188	63	58	72	100	20	1.5	121	.74	16
15	e.70	7.9	179	93	57	375	96	18	1.6	117	1.9	36
16	e.60	8.7	174	120	54	536	113	16	1.6	92	1.5	4070
17	e.54	10	158	117	54	563	94	16	1.5	75	1.0	6050
18	e.50	8.3	137	119	67	570	82	16	1.7	56	.82	3750
19	e.53	9.0	112	125	78	373	76	14	1.6	38	.59	1990
20	e.44	10	90	132	79	234	70	13	2.1	23	1.8	1080
21	e.35	11	72	114	75	182	66	12	2.9	13	1.6	770
22	e.44	12	60	89	68	193	62	11	3.3	8.7	1.4	842
23	e.46	12	51	76	61	216	61	13	2.9	6.9	1.2	501
24	e.42	12	71	109	56	205	75	16	2.4	5.6	.93	304
25	e.38	13	80	170	53	255	69	20	2.1	6.0	1.2	240
26	e.35	19	80	184	55	256	62	21	1.9	5.8	2.6	203
27	e.36	22	81	191	55	202	58	19	1.8	2.0	5.5	169
28	e.37	24	94	180	56	177	52	17	1.8	1.6	3.7	150
29	.49	24	110	158	---	155	47	15	1.9	1.7	2.5	139
30	.73	24	116	133	---	140	44	12	2.3	1.2	1.9	133
31	.99	---	110	106	---	119	---	9.3	---	.97	1.7	---
TOTAL	24.95	276.6	2535	5196	1778	5709	2530	697.3	71.29	796.47	36.87	20868.5
MEAN	.80	9.22	81.8	168	63.5	184	84.3	22.5	2.38	25.7	1.19	696
MAX	3.2	24	188	624	85	570	113	40	7.5	121	5.5	6050
MIN	.35	1.1	15	63	52	60	44	9.3	.85	.97	.02	1.4
CFSM	.01	.09	.76	1.55	.59	1.71	.78	.21	.02	.24	.01	6.44
IN.	.01	.10	.87	1.79	.61	1.97	.87	.24	.02	.27	.01	7.19



PIANKATANK RIVER BASIN

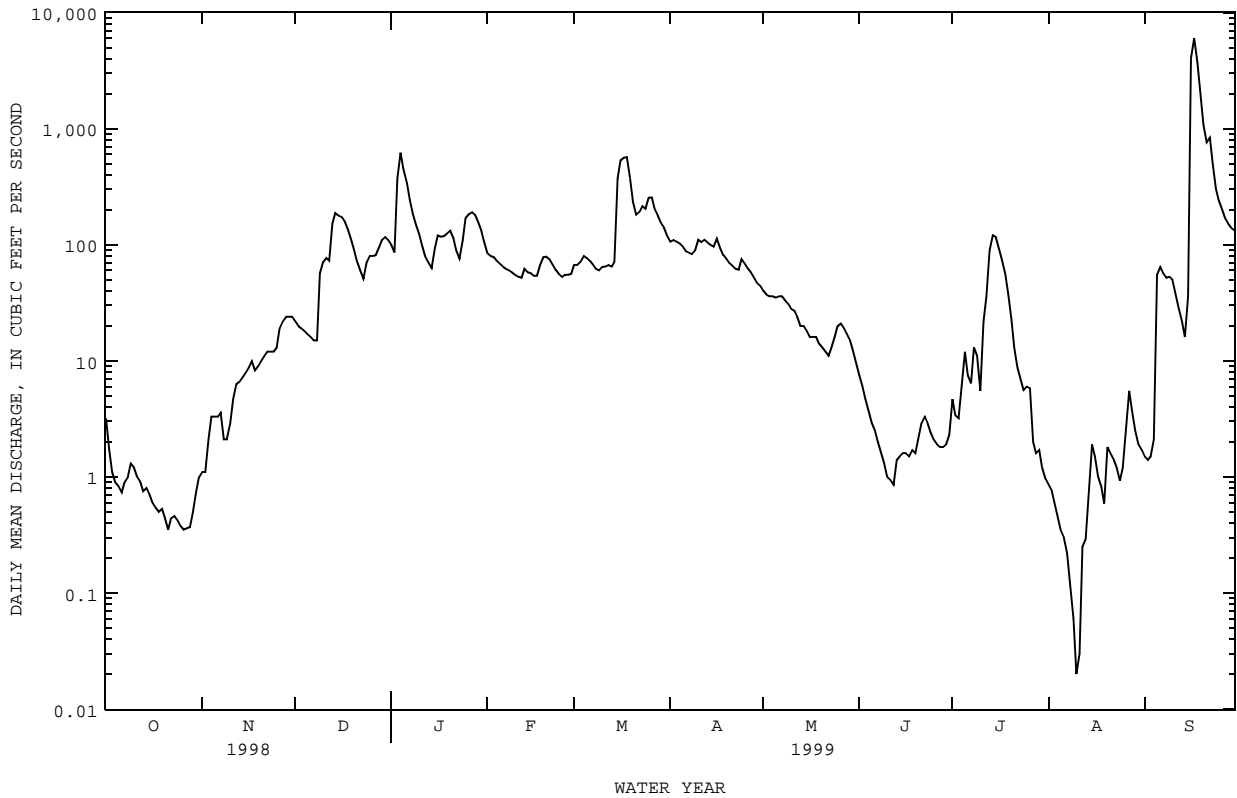
01669520 DRAGON SWAMP AT MASCOT, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1982 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	59.2	86.9	117	161	196	241	188	130	75.7	48.6	51.7	77.1
MAX	293	290	331	340	608	567	450	247	166	106	200	696
(WY)	1997	1986	1997	1993	1998	1994	1983	1998	1984	1996	1992	1999
MIN	.80	9.22	39.5	45.9	63.5	58.8	31.2	22.5	2.38	3.15	.56	.79
(WY)	1999	1999	1989	1989	1999	1985	1985	1999	1999	1993	1998	1997

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR	WATER YEARS 1982 - 1999
ANNUAL TOTAL	60991.17	40519.98	
ANNUAL MEAN	167	111	119
HIGHEST ANNUAL MEAN			178 1998
LOWEST ANNUAL MEAN			56.4 1985
HIGHEST DAILY MEAN	2690 Feb 6	6050 Sep 17	6050 Sep 17 1999
LOWEST DAILY MEAN	.01 aAug 25	.02 Aug 10	.01 aAug 25 1998
ANNUAL SEVEN-DAY MINIMUM	.06 Aug 21	.14 Aug 7	e.05 Sep 13 1991
INSTANTANEOUS PEAK FLOW		6600 Sep 17	6600 Sep 17 1999
INSTANTANEOUS PEAK STAGE		13.21 Sep 17	13.21 Sep 17 1999
INSTANTANEOUS LOW FLOW		.01 Aug 11	.00 aAug 25 1998
ANNUAL RUNOFF (CFSM)	1.55	1.03	1.10
ANNUAL RUNOFF (INCHES)	21.01	13.96	14.96
10 PERCENT EXCEEDS	382	175	261
50 PERCENT EXCEEDS	82	31	79
90 PERCENT EXCEEDS	.49	.86	6.3

a Also Aug 26, 1998.  
e Estimated.



## YORK RIVER BASIN

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 mi<sup>2</sup>.

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

GAGE.--Water-stage recorder. Elevation of gage is 43 ft above sea level, from topographic map.

REMARKS.--Records good except those for periods of doubtful gage-height record, Oct. 6, and Aug. 8 to Sept. 30, 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. Maximum discharge, 12,000 ft<sup>3</sup>/s, from rating curve extended above 10,100 ft<sup>3</sup>/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 Department of Environmental Quality - Water Division.

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, 3,460 ft<sup>3</sup>/s, Mar 16, gage height, 14.70 ft; minimum, 35 ft<sup>3</sup>/s, Aug 10, 11-12.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	44	57	91	72	82	220	282	71	51	121	75	e43
2	45	114	88	68	96	211	298	69	47	84	74	e42
3	44	122	63	136	107	158	288	67	46	49	72	e42
4	44	95	58	179	110	185	277	67	46	45	68	e45
5	45	50	57	151	100	239	281	66	45	44	45	e123
6	e45	46	57	129	88	219	272	65	45	41	39	e94
7	45	66	58	127	83	186	265	68	45	42	40	e95
8	67	117	57	103	82	166	260	64	44	47	e40	e59
9	87	112	83	80	82	163	257	63	44	68	e42	e63
10	52	109	81	78	81	168	269	63	43	47	e38	e60
11	47	113	75	77	77	168	273	58	43	43	e37	e53
12	45	114	73	75	79	181	273	57	43	43	e39	e47
13	45	110	113	74	93	187	260	57	47	45	e39	e44
14	46	110	114	76	118	179	142	64	52	46	e49	e44
15	45	111	94	92	102	1760	92	58	48	44	e88	e49
16	44	111	87	95	80	3410	88	56	52	42	e52	e1200
17	44	109	77	91	78	2340	85	56	48	42	e46	e1330
18	44	106	73	121	101	884	81	56	47	40	e40	e433
19	44	104	75	217	205	748	81	54	46	40	e40	e186
20	45	101	71	145	181	713	80	53	49	48	e53	e101
21	44	105	69	113	134	725	78	52	50	42	e63	e77
22	52	103	70	91	105	1730	79	51	63	44	e49	e77
23	87	99	68	81	94	953	82	59	75	41	e43	e67
24	83	95	77	233	87	780	106	66	68	40	e44	e60
25	79	93	83	622	85	489	94	63	49	39	e52	e57
26	78	100	68	376	91	333	93	57	43	39	e57	e55
27	82	98	72	203	89	314	92	53	43	38	e61	e60
28	120	95	81	135	97	301	76	51	44	40	e63	e91
29	66	93	102	107	---	292	75	62	56	44	e52	e182
30	44	91	101	107	---	284	72	91	96	73	e48	e371
31	43	---	84	87	---	274	---	83	---	77	e46	---
TOTAL	1745	2949	2420	4341	2807	18960	5051	1920	1518	1538	1594	5250
MEAN	56.3	98.3	78.1	140	100	612	168	61.9	50.6	49.6	51.4	175
MAX	120	122	114	622	205	3410	298	91	96	121	88	1330
MIN	43	46	57	68	77	158	72	51	43	38	37	42
(†)	184	173	174	150	134	114	105	127	133	157	149	129
MEAN†	62.2	104	83.7	145	105	615	172	66.0	55.0	54.7	56.2	179
CFSM†	.13	.22	.18	.31	.23	1.33	.37	.14	.12	.12	.12	.39
IN.†	.15	.25	.21	.36	.24	1.53	.41	.16	.13	.14	.14	.43

CAL YR 1998 TOTAL 244462 MEAN 670 MAX 9070 MIN 43 MEAN† 675 CFSM† 1.46 IN.† 19.80  
WTR YR 1999 TOTAL 50093 MEAN 137 MAX 3410 MIN 37 MEAN† 142 CFSM† .31 IN.† 4.16

† Total diversion, equivalent in cubic feet per second, per month, provided by Hanover county Department of Public Utilities.

‡ Adjusted for diversion.

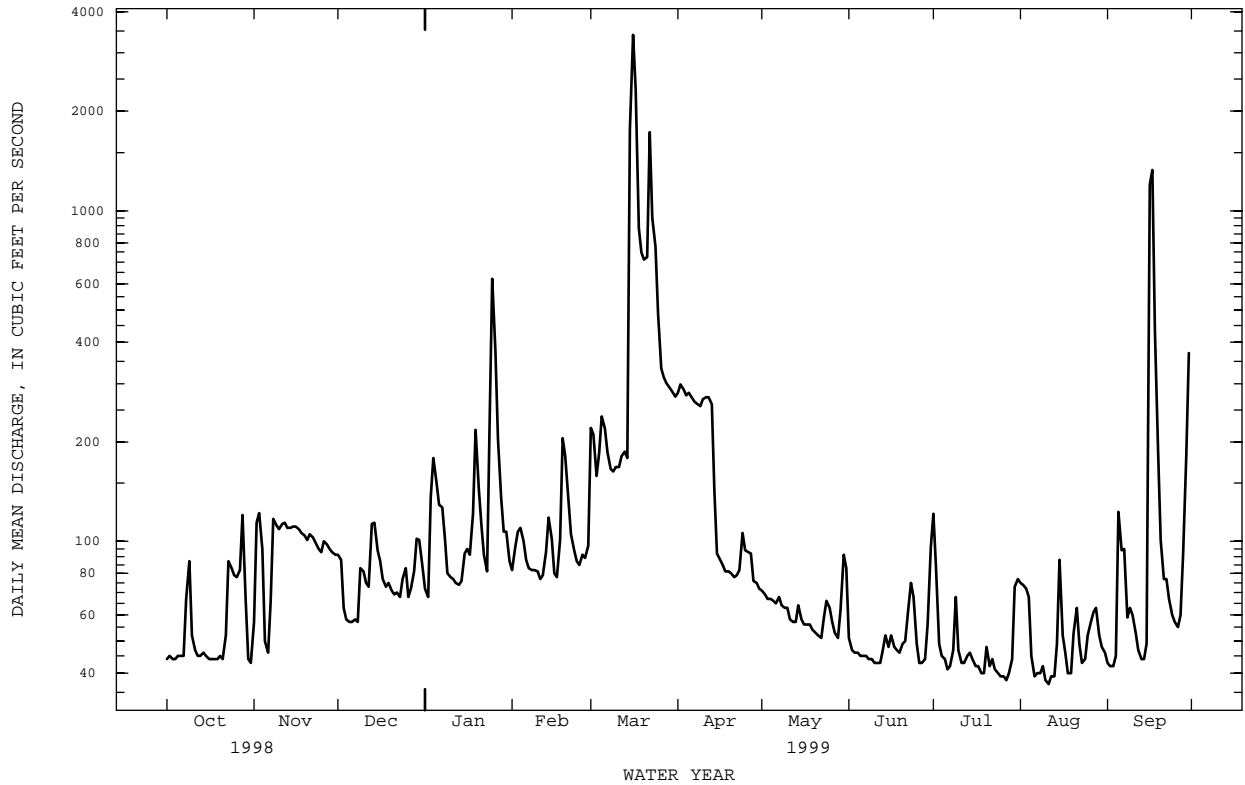
01671020 NORTH ANNA RIVER AT HART CORNER, NEAR DOSWELL, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1980 - 1999, BY WATER YEAR (WY) [REGULATED, UNADJUSTED]

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	219	339	400	570	715	857	662	449	246	167	164	152
MAX	1428	1561	1320	1389	2660	2345	1887	1217	795	591	614	1185
(WY)	1980	1986	1997	1998	1998	1994	1983	1990	1995	1984	1984	1996
MIN	43.7	46.7	75.2	71.9	100	90.5	108	61.9	50.6	49.6	51.4	46.1
(WY)	1992	1992	1981	1981	1999	1981	1981	1999	1999	1999	1999	1998

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR
ANNUAL TOTAL	244462	50093				
ANNUAL MEAN	670	137			410	
HIGHEST ANNUAL MEAN					731	1998
LOWEST ANNUAL MEAN					85.7	1981
HIGHEST DAILY MEAN	e9070	Feb 6	3410	Mar 16	10900	Mar 30 1994
LOWEST DAILY MEAN	43	Oct 31	e37	Aug 11	36	Oct 8 1991
ANNUAL SEVEN-DAY MINIMUM	44	Sep 28	e39	Aug 6	39	aOct 4 1991
INSTANTANEOUS PEAK FLOW			3460	Mar 16	12000	Mar 29 1994
INSTANTANEOUS PEAK STAGE			14.70	Mar 16	21.80	Mar 29 1994
INSTANTANEOUS LOW FLOW			b35	cAug 10	b35	cAug 10 1999
ANNUAL RUNOFF (CFSM)	1.45		.30		.89	
ANNUAL RUNOFF (INCHES)	19.64		4.02		12.04	
10 PERCENT EXCEEDS	1670		246		872	
50 PERCENT EXCEEDS	120		75		167	
90 PERCENT EXCEEDS	45		44		57	

- a Also Aug 6, 1999.
- b May have been lower.
- c Also Aug 11-12, 1999.
- 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 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1961 to current year.

REVISED RECORDS.--WDR VA-70-1: 1969.

GAGE.--Water-stage recorder. Datum of gage is 132.30 ft above sea level (levels by La Prade Bros., Engineers).

REMARKS.--Records good except for period with ice effect, Jan. 5, 6, which is fair, and period of no gage-height record, Aug. 3 to Sep. 30, which is poor. Maximum discharge, 12,000 ft<sup>3</sup>/s, from rating curve extended above 7,600 ft<sup>3</sup>/s on basis of contracted-opening measurement of peak flow. 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 Department of Environmental Quality - Water Division.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 650 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Mar 23	0600	*466	*4.04	No peak greater than base discharge.			

Minimum daily discharge, 0.29 ft<sup>3</sup>/s, Aug 13.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.1	2.0	10	11	29	98	51	23	7.3	5.6	.99	e2.1
2	1.5	1.9	7.6	11	37	116	67	22	6.6	3.6	.83	e1.7
3	1.2	2.0	6.9	37	48	100	73	20	6.2	2.7	e.80	e1.5
4	1.2	1.8	6.6	84	51	111	69	20	6.5	2.3	e.65	e1.6
5	1.3	2.3	6.4	e55	48	141	59	19	6.6	1.9	e.52	e1.7
6	1.4	2.3	6.3	e38	40	119	50	18	6.7	1.7	e.44	e4.2
7	1.7	2.2	5.8	31	35	93	45	17	6.1	1.7	e.38	e8.8
8	6.4	2.1	6.3	25	32	70	40	17	5.6	2.6	e.42	e11
9	5.9	2.0	14	22	28	58	39	16	5.3	2.5	e.40	e8.0
10	2.5	2.2	21	22	26	59	45	15	4.8	2.1	e.33	e5.4
11	1.8	2.6	22	19	24	58	44	14	4.3	2.2	e.30	e4.4
12	1.2	3.2	17	17	23	62	44	12	3.7	2.1	e.33	e3.3
13	1.1	2.7	33	17	34	62	43	13	3.4	2.6	e.29	e2.2
14	1.1	3.0	46	17	36	64	38	16	3.6	2.9	e.35	e1.6
15	1.1	4.0	38	21	32	319	35	15	3.4	2.7	e.42	e8.0
16	1.2	2.9	29	28	30	435	34	16	3.0	2.7	e.50	e130
17	1.3	3.2	22	26	28	334	32	16	3.1	2.6	e.59	e235
18	1.2	4.3	17	43	45	189	28	14	3.1	1.7	e.53	e120
19	1.0	4.7	14	128	99	124	26	13	3.5	1.4	e.46	e84
20	1.0	4.3	11	122	120	93	25	12	3.4	1.3	e1.1	e39
21	1.2	5.0	10	79	88	90	24	12	3.6	1.7	e1.3	e18
22	1.1	5.0	9.7	50	62	279	24	11	3.3	1.6	e.84	e13
23	1.1	5.5	9.4	37	46	412	26	16	3.0	1.8	e.95	e15
24	1.1	6.4	9.7	114	38	209	65	41	2.7	1.4	e1.0	e12
25	1.1	6.1	11	405	35	139	86	54	2.5	.95	e1.3	e11
26	1.1	7.8	11	357	35	108	66	34	2.4	.80	e1.7	e9.2
27	1.1	8.1	10	174	35	90	47	20	2.6	.80	e2.6	e7.6
28	1.4	8.1	11	103	42	77	35	14	2.2	1.2	e3.7	e12
29	1.3	8.7	13	69	---	68	29	12	2.5	1.5	e2.9	e105
30	1.3	9.2	14	48	---	59	25	9.9	3.2	1.9	e2.8	e200
31	1.8	---	13	36	---	53	---	8.1	---	1.5	e2.5	---
TOTAL	49.8	125.6	461.7	2246	1226	4289	1314	560.0	124.2	64.05	32.22	1076.3
MEAN	1.61	4.19	14.9	72.5	43.8	138	43.8	18.1	4.14	2.07	1.04	35.9
MAX	6.4	9.2	46	405	120	435	86	54	7.3	5.6	3.7	235
MIN	1.0	1.8	5.8	11	23	53	24	8.1	2.2	.80	.29	1.5
CFSM	.02	.04	.14	.68	.41	1.29	.41	.17	.04	.02	.01	.34
IN.	.02	.04	.16	.78	.43	1.49	.46	.19	.04	.02	.01	.37

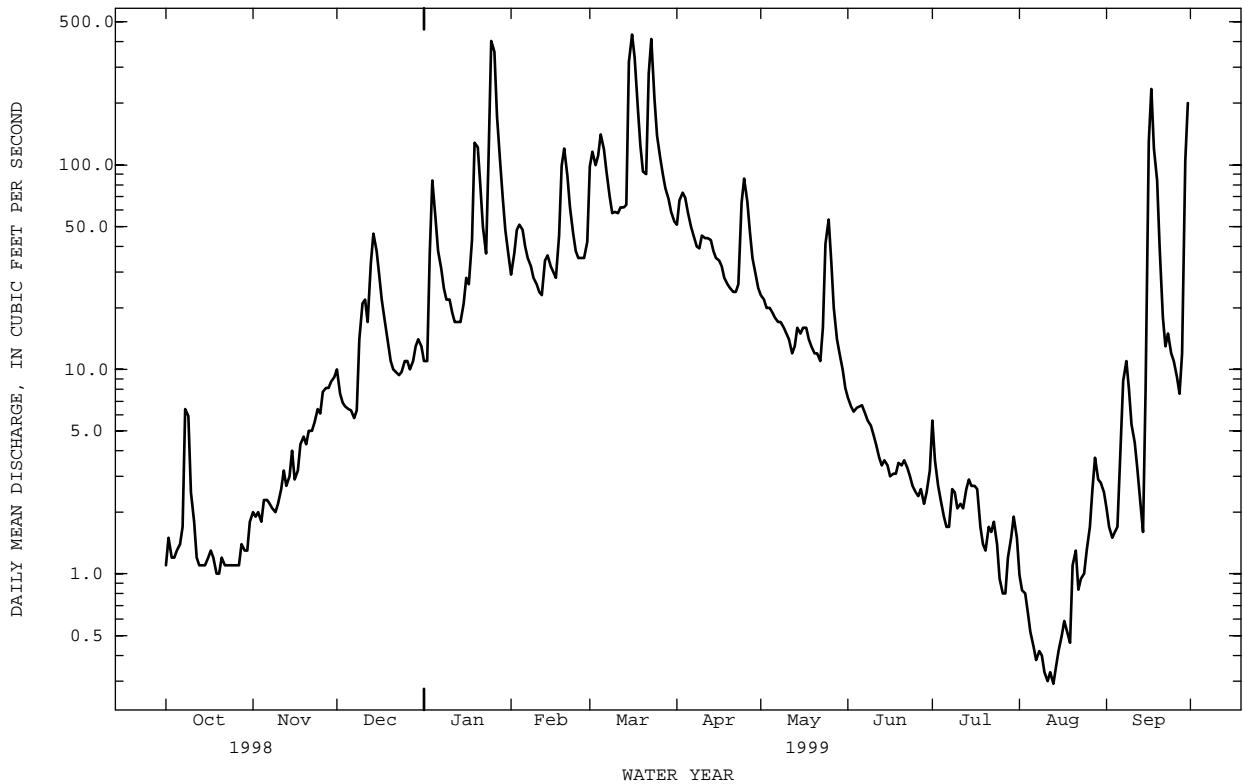
01671100 LITTLE RIVER NEAR DOSWELL, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1962 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	55.0	74.9	103	150	166	197	146	100	65.6	39.6	49.2	36.9
MAX	264	340	278	491	590	583	391	311	532	288	653	404
(WY)	1980	1973	1997	1978	1998	1994	1993	1990	1972	1975	1969	1975
MIN	1.03	3.25	14.9	20.5	43.8	33.0	43.8	18.1	4.14	2.07	1.04	.70
(WY)	1969	1992	1999	1981	1999	1981	1999	1999	1999	1999	1999	1968

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR	WATER YEARS 1962 - 1999
ANNUAL TOTAL	59259.5	11568.87	
ANNUAL MEAN	162	31.7	98.3
HIGHEST ANNUAL MEAN			181
LOWEST ANNUAL MEAN			29.8
HIGHEST DAILY MEAN	2490	Feb 6	9800
LOWEST DAILY MEAN	1.0	aOct 19	.10
ANNUAL SEVEN-DAY MINIMUM	1.1	aOct 19	.21
INSTANTANEOUS PEAK FLOW			12000
INSTANTANEOUS PEAK STAGE			Aug 21 1969
INSTANTANEOUS LOW FLOW			11.09
ANNUAL RUNOFF (CFSM)	1.52		.10
ANNUAL RUNOFF (INCHES)	20.60		.92
10 PERCENT EXCEEDS	361		194
50 PERCENT EXCEEDS	33		51
90 PERCENT EXCEEDS	1.8		6.1

- a Also Oct 20, 1998.
- b Also Aug 9, 1999.
- c Not determined.
- d Also Sep 26, 1968.
- e Estimated.



## YORK RIVER BASIN

01673000 PAMUNKEY RIVER NEAR HANOVER, VA

LOCATION.--Lat 37°46'03", long 77°19'57", Hanover County, Hydrologic Unit 02080106, on right bank 100 ft down- stream 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 mi<sup>2</sup>.

## 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 sea level. Prior to Oct. 15 1976, nonrecording gage at same site and datum.

REMARKS.--Records good except for periods of doubtful or no gage-height record, Oct. 30, Nov. 1-3, and Sep. 14-16, 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. Statistics of monthly mean data and summary statistics for water years 1942 - 1971 (unregulated flow) are available in previous data books, water years 1991 - 1998. Unknown amount of diversion for irrigation upstream from gage. Maximum discharge, 40,300 ft<sup>3</sup>/s, from rating curve extended above 22,000 ft<sup>3</sup>/s.

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, 6,640 ft<sup>3</sup>/s, Mar 18, gage height, 17.93 ft; minimum discharge, 45 ft<sup>3</sup>/s, Aug 7, gage height, 2.20 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	55	e65	152	179	373	483	620	274	134	558	97	112
2	54	e84	155	161	363	689	716	265	101	386	95	91
3	56	e137	143	245	422	686	741	251	100	173	92	76
4	53	153	113	506	484	614	740	245	96	111	89	74
5	57	127	106	605	537	750	692	233	82	95	82	244
6	58	97	105	500	449	858	640	229	82	80	57	517
7	58	95	105	425	390	725	589	226	78	69	47	959
8	60	118	107	383	356	586	563	225	76	68	51	552
9	96	160	159	317	331	514	551	210	72	69	51	315
10	112	162	215	265	311	491	619	203	70	90	52	268
11	85	157	211	226	294	480	651	189	67	91	49	222
12	91	157	201	220	279	491	656	164	63	91	51	183
13	86	155	273	223	304	499	636	155	68	100	49	176
14	106	147	384	214	338	507	573	171	81	101	55	e150
15	95	148	332	241	339	1670	434	177	85	94	73	e135
16	87	148	290	290	316	4490	403	172	75	84	101	e2700
17	79	155	256	278	292	6000	385	167	81	75	80	5950
18	80	153	213	333	305	6200	365	180	80	68	62	4740
19	77	149	180	576	484	3660	352	175	78	65	53	1860
20	75	151	167	741	783	1680	335	159	75	61	62	806
21	74	151	151	732	718	1370	321	146	88	66	75	507
22	69	155	144	518	531	2710	313	140	88	60	81	421
23	79	151	137	390	426	3250	319	158	95	60	65	347
24	109	146	148	494	367	2200	439	209	99	57	57	275
25	107	141	160	1820	327	1460	460	287	90	60	66	244
26	102	145	164	2420	318	1020	414	270	69	64	102	214
27	108	155	149	1630	320	889	403	211	64	57	92	193
28	111	155	161	858	324	812	347	169	65	53	90	261
29	130	152	183	628	---	743	314	143	64	54	367	610
30	e86	152	205	508	---	687	293	146	94	61	276	946
31	65	---	195	439	---	637	---	156	---	93	154	---
TOTAL	2560	4221	5664	17365	11081	47851	14884	6105	2460	3214	2773	24148
MEAN	82.6	141	183	560	396	1544	496	197	82.0	104	89.5	805
MAX	130	162	384	2420	783	6200	741	287	134	558	367	5950
MIN	53	65	105	161	279	480	293	140	63	53	47	74
CFSM	.08	.13	.17	.52	.37	1.43	.46	.18	.08	.10	.08	.74
IN.	.09	.15	.19	.60	.38	1.65	.51	.21	.08	.11	.10	.83

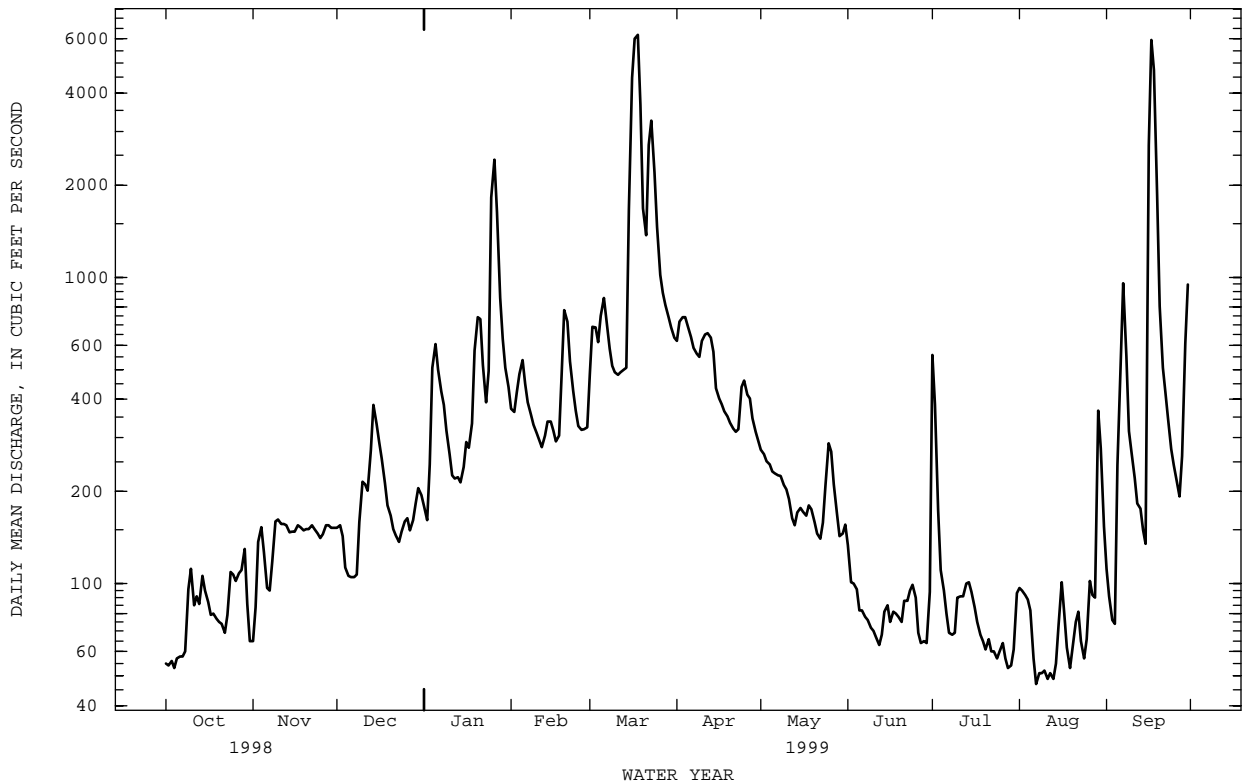
01673000 PAMUNKEY RIVER NEAR HANOVER, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1972 - 1999, BY WATER YEAR (WY) [REGULATED, UNADJUSTED]

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	711	861	1282	1696	1863	2111	1750	1169	794	533	438	520
MAX	3461	3505	3450	4334	7118	5430	5009	2821	4293	2747	2025	2939
(WY)	1980	1986	1997	1978	1998	1994	1984	1978	1972	1975	1985	1975
MIN	82.6	113	183	197	396	248	434	197	82.0	104	89.5	60.2
(WY)	1999	1992	1999	1981	1999	1981	1981	1999	1999	1999	1999	1998

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR
ANNUAL TOTAL	618194	142326				
ANNUAL MEAN	1694	390			1140	
HIGHEST ANNUAL MEAN					1859	1998
LOWEST ANNUAL MEAN					265	1981
HIGHEST DAILY MEAN	16400	Feb 7	6200	Mar 18	25000	Jun 23 1972
LOWEST DAILY MEAN	53	Oct 4	47	Aug 7	47	Sep 18 1991
ANNUAL SEVEN-DAY MINIMUM	55	Sep 29	50	Aug 7	50	Aug 7 1999
INSTANTANEOUS PEAK FLOW			6640	Mar 18	29900	Jun 23 1972
INSTANTANEOUS PEAK STAGE			17.93	Mar 18	29.22	Jun 23 1972
INSTANTANEOUS LOW FLOW			45	Aug 7	45	Aug 7 1999
ANNUAL RUNOFF (CFSM)	1.57		.36		1.05	
ANNUAL RUNOFF (INCHES)	21.27		4.90		14.33	
10 PERCENT EXCEEDS	5720		702		2670	
50 PERCENT EXCEEDS	377		167		607	
90 PERCENT EXCEEDS	66		65		119	

e Estimated.



## YORK RIVER BASIN

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, October 1991 to September 1994.

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 1998 TO SEPTEMBER 1999

DATE	TIME	SAMPLE TYPE	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	AGENCY ANA- LYZING SAMPLE (CODE NUMBER) (00028)	TEMPER- ATURE AIR (DEG C) (00020)	TEMPER- ATURE WATER (DEG C) (00010)
OCT									
27...	1000	ENVIRONMENTAL	111	235	7.2	762	VDCLS	15.0	12.2
NOV									
20...	1245	ENVIRONMENTAL	151	177	7.0	750	VDCLS	20.0	11.0
DEC									
14...	1030	ENVIRONMENTAL	390	152	7.3	758	VDCLS	7.0	8.0
18...	0815	ENVIRONMENTAL	219	159	7.5	759	VDCLS	.0	5.0
18...	0830	REPLICATE	219	159	7.5	759	VDCLS	.0	5.0
JAN									
04...	0925	ENVIRONMENTAL	496	169	7.0	764	VDCLS	.0	2.4
20...	1100	ENVIRONMENTAL	717	114	6.7	770	VDCLS	9.5	5.5
25...	1000	ENVIRONMENTAL	1820	108	7.2	--	VDCLS	10.2	10.0
27...	1030	ENVIRONMENTAL	1690	88	6.5	758	VDCLS	11.0	7.8
FEB									
20...	1145	ENVIRONMENTAL	826	106	7.1	756	VDCLS	7.0	6.9
20...	1200	REPLICATE	829	106	7.1	756	VDCLS	7.0	6.9
24...	1245	ENVIRONMENTAL	361	124	6.5	763	VDCLS	4.0	2.9
MAR									
05...	1230	ENVIRONMENTAL	772	98	6.6	764	VDCLS	8.0	7.3
07...	0915	ENVIRONMENTAL	743	92	6.3	762	VDCLS	1.5	7.2
15...	1000	ENVIRONMENTAL	1280	117	6.7	745	VDCLS	4.5	5.5
15...	1015	REPLICATE	1300	117	6.7	745	USGS	4.5	5.5
16...	0930	ENVIRONMENTAL	4400	60	6.4	757	VDCLS	10.8	6.8
22...	1145	ENVIRONMENTAL	2700	83	6.3	--	VDCLS	11.0	9.6
26...	0700	ENVIRONMENTAL	1100	79	7.0	759	VDCLS	2.0	9.2
APR									
08...	0845	ENVIRONMENTAL	567	109	6.3	752	VDCLS	17.0	15.7
08...	0850	REPLICATE	567	109	6.3	752	USGS	17.0	15.7
12...	1115	ENVIRONMENTAL	655	107	6.5	750	VDCLS	15.0	14.9
23...	0845	ENVIRONMENTAL	311	135	6.3	757	VDCLS	20.0	16.6
MAY									
19...	0830	ENVIRONMENTAL	176	174	7.0	755	VDCLS	21.5	18.8
JUN									
22...	1130	ENVIRONMENTAL	90	285	7.2	759	VDCLS	24.5	20.2
JUL									
01...	0830	ENVIRONMENTAL	668	171	6.6	757	VDCLS	24.5	24.1
02...	1130	ENVIRONMENTAL	388	119	6.4	757	VDCLS	27.5	25.0
20...	1045	ENVIRONMENTAL	57	320	7.2	754	VDCLS	30.0	27.7
AUG									
16...	1330	ENVIRONMENTAL	100	318	6.6	760	VDCLS	29.0	26.8
23...	1300	ENVIRONMENTAL	61	322	6.7	755	VDCLS	29.0	24.8
SEP									
06...	1200	ENVIRONMENTAL	483	123	7.0	751	VDCLS	23.0	23.6
08...	1215	ENVIRONMENTAL	526	111	6.7	751	VDCLS	26.5	23.7
08...	1230	REPLICATE	521	111	6.7	751	VDCLS	26.5	23.7
17...	1100	ENVIRONMENTAL	6030	71	6.4	755	VDCLS	20.0	19.1
20...	0915	ENVIRONMENTAL	842	90	6.5	755	VDCLS	17.0	17.9
24...	1215	ENVIRONMENTAL	243	165	6.6	754	VDCLS	22.0	16.9



01673000 PAMUNKEY RIVER NEAR HANOVER, VA--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DATE	TUR- BID- ITY (NTU) (00076)	OXYGEN, DIS- SOLVED (MG/L) (00300)	SILICA, DIS- SOLVED AS SIO2 (MG/L) (00955)	RESIDUE TOTAL AT 105 DEG. C, SUS- PENDE (MG/L) (00530)	RESIDUE FIXED NON FILTER- ABLE (MG/L) (00540)	RESIDUE VOLA- TILE, SUS- PENDE (MG/L) (00535)	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)
OCT										
27...	2	9.3	7.8	<3	<3	<3	.596	.002	.598	.007
NOV										
20...	2	10.2	9.2	3	<3	<3	.018	<.002	.018	.004
DEC										
14...	15	10.6	13.4	19	13	6	.310	<.002	.310	.012
18...	6	12.2	15.8	9	<3	6	.294	<.002	.299	.009
18...	4	12.2	15	7	4	<3	.294	<.002	.294	.010
JAN										
04...	20	13.6	11.5	30	25	5	.290	<.002	.290	.016
20...	25	11.6	14.4	45	27	18	.292	.026	.318	.011
25...	118	10.1	11.9	205	175	30	.336	.020	.356	.035
27...	73	11.8	9.9	82	69	13	.335	.014	.349	--
FEB										
20...	14	9.6	13.4	22	18	4	.284	.022	.306	.006
20...	22	9.6	14.3	17	14	<3	.284	.022	.306	.005
24...	12	12.7	13.1	5	4	<3	.227	.044	.271	.006
MAR										
05...	13	11.6	12.6	11	9	<3	.213	<.002	.213	.005
07...	--	11.2	12.3	14	12	<3	.184	.003	.187	.006
15...	48	10.6	9.8	68	56	12	.298	.004	.302	.025
15...	--	10.6	9.0	59	--	<1	--	--	.269	.015
16...	70	11.4	10.9	81	69	12	.233	.003	.236	.034
22...	28	11.5	10.5	35	30	5	.296	.005	.301	.026
26...	13	10.8	12.1	11	8	3	.270	.011	.281	.019
APR										
08...	9	9.2	11.0	8	6	<3	.203	.021	.224	.019
08...	--	9.2	9.7	8	.0	9	--	--	.208	.024
12...	7	8.7	10.9	100	89	11	.177	.002	.179	.011
23...	4	8.6	10.8	4	<3	<3	.185	.007	.192	.015
MAY										
19...	6	7.4	11.3	12	11	<3	.291	.003	.294	.082
JUN										
22...	3	6.8	9.1	<3	<3	<3	.406	.004	.410	.039
JUL										
01...	153	8.1	7.3	169	146	23	.420	.009	.429	.095
02...	27	6.0	7.9	21	16	5	.362	.007	.369	.097
20...	4	5.9	9.1	<3	<3	<3	.493	.007	.500	.054
AUG										
16...	--	6.5	8.9	--	--	--	.416	.008	.424	.058
23...	4	7.6	9.1	<3	<3	<3	.398	.003	.401	.027
SEP										
06...	20	6.4	8.9	18	11	7	.419	.007	.426	.070
08...	35	6.4	12.3	45	36	9	.288	.004	.292	.055
08...	35	6.4	12.6	39	31	8	.281	.007	.288	.053
17...	83	7.4	9.5	75	62	13	.276	.008	.284	.049
20...	17	7.9	13.1	18	10	8	.250	.022	.272	.041
24...	5	8.3	14.4	3	<3	<3	.403	.004	.407	.040

< 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 1998 TO SEPTEMBER 1999

DATE	NITRO- GEN, AM- MONIA + ORGANIC TOTAL AS N) (00625)	NITRO- GEN, AM- MONIA + ORGANIC DIS. AS N) (00623)	NITROGEN TOTAL SEDIMNT SUSP AS N (00601)	NITRO- GEN DIS- SOLVED AS N) (00602)	PHOS- PHORUS TOTAL AS P) (00665)	PHOS TOTAL SEDIMNT SUSP AS P (00667)	PHOS- PHORUS DIS- SOLVED AS P) (00666)	PHOS- PHORUS ORTHO, DIS- SOLVED AS P) (00671)	CARBON, INORG + ORGANIC TOTAL AS C) (00694)
OCT									
27...	--	--	.008	.769	--	.007	.120	.117	.151
NOV									
20...	--	--	.019	.578	--	.009	.061	.007	.191
DEC									
14...	--	--	.164	.594	--	.052	.051	.036	1.25
18...	--	--	.019	.547	--	.020	.056	.039	.227
18...	--	--	.03	.51	--	.015	.049	.040	.3
JAN									
04...	--	--	.170	.515	--	.059	.038	.036	1.43
20...	--	--	.171	.542	--	.059	.040	.022	1.47
25...	--	--	.951	.744	--	.237	.039	.031	9.02
27...	--	--	.343	.755	--	.101	.036	.016	3.29
FEB									
20...	--	--	.117	.500	--	.041	.031	.021	1.15
20...	--	--	.118	.527	--	.04	.041	.022	1.10
24...	--	--	.049	.597	--	.023	.048	.024	.416
MAR									
05...	--	--	.066	.462	--	.027	.039	.019	.580
07...	--	--	.076	.431	--	.030	.031	.020	.690
15...	--	--	.275	.527	--	.081	.028	.019	2.54
15...	.5	.3	--	.55	.14	--	<.05	.017	--
16...	--	--	.407	.492	--	.098	.018	.013	3.91
22...	--	--	.116	.552	--	.038	.026	.013	1.16
26...	--	--	.037	.530	--	.019	.036	.020	.489
APR									
08...	--	--	.037	.448	--	.013	.030	.023	.393
08...	.3	.3	--	.47	E.04	--	E.04	.021	--
12...	--	--	.020	.435	--	.013	.021	.013	.281
23...	--	--	.009	.454	--	.010	.037	.020	.173
MAY									
19...	--	--	.022	.682	--	.015	.057	.043	.299
JUN									
22...	--	--	.009	.871	--	.008	.082	.063	.198
JUL									
01...	--	--	.525	.815	--	.216	.059	.038	5.30
02...	--	--	.097	.860	--	.043	.079	.062	.950
20...	--	--	.011	.936	--	.013	.084	.058	.185
AUG									
16...	--	--	--	.926	--	.735	.067	.035	--
23...	--	--	.017	.808	--	.011	.116	.092	.119
SEP									
06...	--	--	.082	.883	--	.034	.109	.087	.811
08...	--	--	.182	.750	--	.062	.081	.053	2.11
08...	--	--	.189	.747	--	.0629	.083	.053	1.95
17...	--	--	.313	.889	--	.118	.062	.027	2.93
20...	--	--	.056	.861	--	.033	.056	.022	.578
24...	--	--	.006	.963	--	.014	.081	.053	.067

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

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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 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1977 to current year.

GAGE.--Water-stage recorder. Datum of gage is 38.36 ft above sea level.

REMARKS.--No estimated daily discharges. Records good. Maximum discharge, 1,620 ft<sup>3</sup>/s, from rating curve extended above 783 ft<sup>3</sup>/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 Department of Environmental Quality - Water Division.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 160 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Mar 16	0130	172	5.00	Sep 16	1900	*1,620	*9.46
Sep 6	2130	272	6.03				

Minimum discharge, 0.20 ft<sup>3</sup>/s, Aug 12.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	13	4.1	7.7	12	14	17	19	12	2.9	90	3.3	3.7
2	13	4.3	7.4	9.8	15	17	22	11	2.8	83	4.5	3.2
3	8.2	6.4	7.4	51	17	19	23	11	2.2	29	2.0	3.1
4	5.0	9.2	7.4	91	17	25	20	11	2.0	13	1.3	4.5
5	4.7	10	7.5	30	15	25	17	10	1.8	7.8	1.0	93
6	4.8	8.0	7.6	21	14	19	16	10	1.8	4.9	.71	203
7	4.7	8.2	7.7	15	13	16	15	9.9	1.6	3.3	.51	140
8	5.2	6.3	8.3	15	14	14	15	9.5	1.6	2.7	.34	120
9	6.3	6.2	23	15	13	14	16	9.1	1.4	1.9	.32	43
10	7.0	6.3	32	14	13	16	28	8.8	1.2	1.7	.27	48
11	5.5	8.3	18	12	13	17	28	7.1	1.2	3.5	.25	35
12	4.8	8.7	12	11	12	17	23	6.3	.66	3.3	.47	24
13	4.5	8.1	40	11	15	15	19	6.1	.77	8.1	.83	18
14	4.1	7.4	82	11	18	21	17	7.1	5.6	13	2.1	15
15	4.1	7.7	29	19	14	123	16	8.7	4.1	14	16	19
16	3.8	7.7	17	38	13	120	17	8.5	2.5	11	34	913
17	3.6	7.7	14	23	13	43	15	8.2	2.6	7.3	17	595
18	3.4	7.2	11	20	16	28	14	7.9	2.9	5.1	8.5	181
19	3.5	7.0	9.0	28	21	23	13	7.3	2.4	3.5	4.7	73
20	3.3	7.5	8.4	26	20	20	13	6.2	2.3	2.4	21	49
21	3.1	9.9	8.6	18	17	30	12	5.5	3.1	1.8	56	43
22	3.3	9.5	8.4	15	14	80	12	4.6	3.3	1.6	24	53
23	3.8	9.1	7.8	14	13	55	20	12	3.0	1.2	12	51
24	3.9	8.4	12	55	13	32	34	19	2.2	1.3	7.3	36
25	4.7	8.1	15	122	13	27	28	13	1.5	1.2	7.4	28
26	3.3	9.6	13	43	14	23	19	9.3	1.1	.95	7.7	24
27	3.6	9.7	12	23	14	21	15	7.2	.93	.67	13	24
28	3.9	9.4	14	20	15	21	13	5.8	1.0	.59	15	51
29	4.2	8.9	16	18	---	20	13	4.8	2.2	.64	8.9	104
30	4.6	7.8	16	16	---	19	13	3.9	21	.47	6.1	86
31	5.3	---	13	15	---	18	---	3.5	---	.54	4.6	---
TOTAL	156.2	236.7	492.2	831.8	413	955	545	264.3	83.66	319.46	281.10	3083.5
MEAN	5.04	7.89	15.9	26.8	14.8	30.8	18.2	8.53	2.79	10.3	9.07	103
MAX	13	10	82	122	21	123	34	19	21	90	56	913
MIN	3.1	4.1	7.4	9.8	12	14	12	3.5	.66	.47	.25	3.1
CFSM	.19	.30	.61	1.02	.56	1.18	.69	.33	.11	.39	.35	3.92
IN.	.22	.34	.70	1.18	.59	1.36	.77	.38	.12	.45	.40	4.38

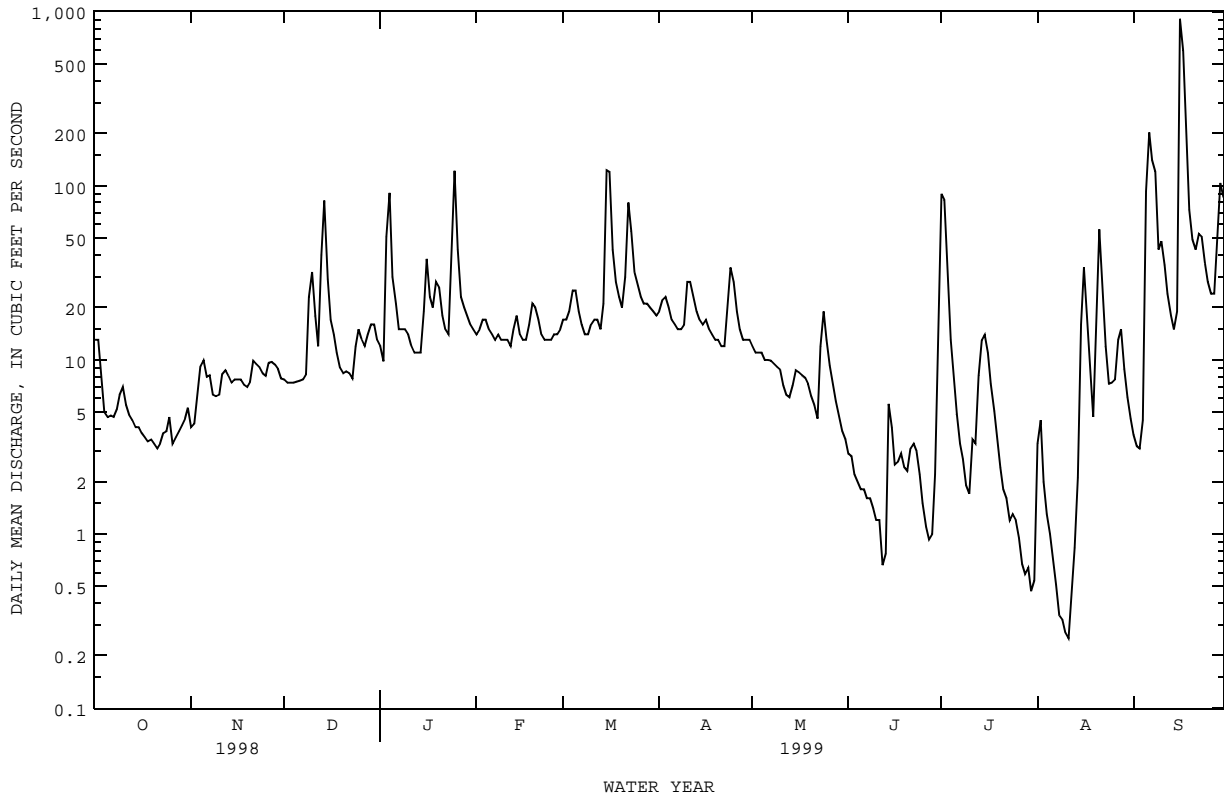
01673550 TOTOPOTOMOY CREEK NEAR STUDLEY, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1978 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	14.0	22.9	25.5	36.4	38.4	50.7	41.6	29.2	17.5	12.5	13.5	13.9
MAX	54.0	80.8	56.0	114	103	127	106	68.4	43.2	25.8	49.7	103
(WY)	1980	1986	1997	1978	1998	1984	1984	1978	1979	1998	1985	1999
MIN	2.93	6.44	10.5	10.3	14.8	12.7	12.3	8.46	2.79	5.73	.92	1.18
(WY)	1982	1982	1981	1981	1999	1981	1985	1985	1999	1995	1995	1997

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR		FOR 1999 WATER YEAR		WATER YEARS 1978 - 1999	
ANNUAL TOTAL	13588.5		7661.92			
ANNUAL MEAN	37.2		21.0		26.3	
HIGHEST ANNUAL MEAN					45.1 1984	
LOWEST ANNUAL MEAN					11.8 1981	
HIGHEST DAILY MEAN	521	Feb 5	913	Sep 16	913	Sep 16 1999
LOWEST DAILY MEAN	e1.1	aSep 17	.25	Aug 11	e.03	Aug 31 1995
ANNUAL SEVEN-DAY MINIMUM	e1.3	Sep 15	.41	Aug 6	e.09	Aug 25 1995
INSTANTANEOUS PEAK FLOW			1620		1620 Sep 16 1999	
INSTANTANEOUS PEAK STAGE			9.46		9.46 Sep 16 1999	
INSTANTANEOUS LOW FLOW			.20		(b) Sep 1 1995	
ANNUAL RUNOFF (CFSM)	1.42		.80		1.00	
ANNUAL RUNOFF (INCHES)	19.29		10.88		13.62	
10 PERCENT EXCEEDS	76		34		52	
50 PERCENT EXCEEDS	16		11		17	
90 PERCENT EXCEEDS	3.4		2.0		4.1	

a Also Sep 18, 1998.  
 b Minimum discharge observed, 0.025 ft<sup>3</sup>/s.  
 e Estimated.



01673638 COHOKE MILL CREEK NEAR LESTER MANOR, VA

LOCATION.--Lat 37°37'36," long 76°57'46", King William County, Hydrologic unit 02080106, on right bank at downstream side of culvert on State Highway 626, 3.2 mi northeast of Lester Manor and 4.7 mi above mouth.

DRAINAGE AREA.--9.07 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1998 to current year.

GAGE.--Water stage recorder. Elevation of gage is 40 ft above sea level, from topographic map.

REMARKS.--No estimated daily discharges. Records fair.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 1,430 ft<sup>3</sup>/s, Sep 16, gage height, 10.31 ft; minimum discharge, 0.01 ft<sup>3</sup>/s, Aug 11-12, gage height, 2.94 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3.7	1.8	3.2	8.4	5.4	11	9.3	3.7	1.3	2.7	.25	.18
2	2.1	1.7	2.6	7.3	7.7	11	11	4.0	1.2	2.0	.34	.20
3	1.6	2.7	2.3	32	7.6	11	9.2	4.8	1.0	1.6	.17	.19
4	1.8	3.0	2.3	24	6.8	12	8.1	5.0	1.0	1.4	.13	.32
5	2.0	2.3	2.3	15	6.0	11	6.9	4.6	.90	1.2	.13	4.1
6	4.6	2.1	2.1	12	5.1	10	6.0	5.0	.76	.92	.12	2.3
7	.93	2.1	2.1	11	5.5	9.9	5.8	4.6	.87	.98	.07	2.3
8	.85	2.2	2.3	10	5.6	9.3	5.3	4.2	.78	1.2	.05	2.2
9	1.9	2.5	6.5	9.8	4.7	9.5	5.7	4.2	.63	.75	.05	5.8
10	2.2	2.7	4.5	8.7	4.5	11	11	3.9	.62	.46	.04	3.7
11	2.4	4.9	4.4	8.2	4.2	11	7.8	3.7	.57	.53	.02	2.7
12	2.2	3.9	5.4	7.7	4.6	11	8.1	3.5	.42	.45	.01	2.2
13	2.7	4.1	17	7.3	7.4	9.9	6.0	3.6	1.6	3.0	.02	1.9
14	2.0	4.6	8.6	6.4	6.4	12	4.9	3.9	1.3	3.1	.05	2.0
15	1.4	4.8	11	11	5.7	38	5.0	3.6	1.5	2.8	.24	3.3
16	1.4	4.6	10	12	5.5	24	7.3	3.5	1.9	2.1	.12	415
17	1.4	4.6	9.1	9.0	4.8	16	5.7	3.9	1.9	1.9	.08	44
18	1.2	4.4	8.6	9.0	6.9	12	4.3	3.5	2.3	1.5	.04	18
19	1.2	4.4	7.9	9.0	7.7	10	4.1	3.3	1.7	1.3	.02	11
20	1.3	4.9	7.4	8.3	6.9	9.5	4.0	3.0	2.0	1.0	.56	6.3
21	.93	6.5	6.6	6.8	5.0	12	3.6	2.7	2.6	.79	.37	7.9
22	1.1	5.5	6.1	6.5	4.5	29	3.6	2.3	2.4	.66	.34	15
23	1.2	5.4	5.4	6.5	3.8	18	4.3	3.9	1.7	.63	.28	10
24	1.1	5.8	9.8	17	3.9	14	9.9	3.8	1.3	.54	.25	6.9
25	1.1	5.1	9.3	19	4.3	12	5.4	3.4	1.3	.49	.38	5.7
26	1.2	6.4	8.3	14	5.2	11	4.1	2.8	1.3	.40	.45	5.5
27	1.1	5.2	8.1	10	4.4	9.8	3.4	2.3	1.2	.33	.47	5.1
28	1.3	4.7	9.0	8.8	7.0	11	3.1	1.9	1.1	.28	.46	5.6
29	1.2	4.3	9.6	7.8	---	10	2.9	1.7	1.2	.45	.47	6.9
30	1.4	3.8	9.8	6.3	---	9.1	3.2	1.6	2.4	.32	.26	9.4
31	1.6	---	8.8	5.4	---	8.5	---	1.4	---	.24	.20	---
TOTAL	52.11	121.0	210.4	334.2	157.1	403.5	179.0	107.3	40.75	36.02	6.44	605.69
MEAN	1.68	4.03	6.79	10.8	5.61	13.0	5.97	3.46	1.36	1.16	.21	20.2
MAX	4.6	6.5	17	32	7.7	38	11	5.0	2.6	3.1	.56	415
MIN	.85	1.7	2.1	5.4	3.8	8.5	2.9	1.4	.42	.24	.01	.18
CFSM	.19	.44	.75	1.19	.62	1.44	.66	.38	.15	.13	.02	2.23
IN.	.21	.50	.86	1.37	.64	1.65	.73	.44	.17	.15	.03	2.48

01673638 COHOKE MILL CREEK NEAR LESTER MANOR, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1999 - 1999, BY WATER YEAR (WY)

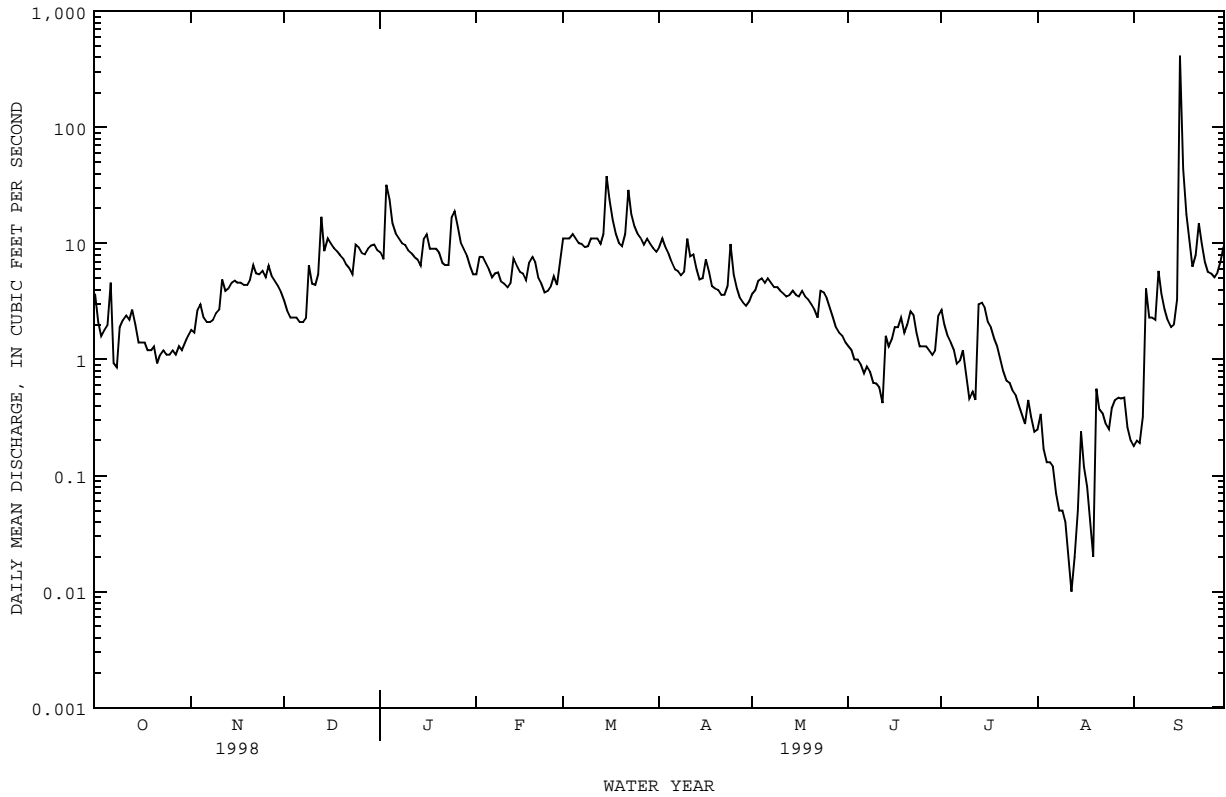
	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	1.68	4.03	6.79	10.8	5.61	13.0	5.97	3.46	1.36	1.16	.21	20.2
MAX	1.68	4.03	6.79	10.8	5.61	13.0	5.97	3.46	1.36	1.16	.21	20.2
(WY)	1999	1999	1999	1999	1999	1999	1999	1999	1999	1999	1999	1999
MIN	1.68	4.03	6.79	10.8	5.61	13.0	5.97	3.46	1.36	1.16	.21	20.2
(WY)	1999	1999	1999	1999	1999	1999	1999	1999	1999	1999	1999	1999

SUMMARY STATISTICS

FOR 1999 WATER YEAR

ANNUAL TOTAL	2253.51
ANNUAL MEAN	6.17
HIGHEST DAILY MEAN	415 Sep 16
LOWEST DAILY MEAN	.01 Aug 12
ANNUAL SEVEN-DAY MINIMUM	.03 Aug 8
INSTANTANEOUS PEAK FLOW	1430 Sep 16
INSTANTANEOUS PEAK STAGE	10.31 Sep 16
INSTANTANEOUS LOW FLOW	.01 aAug 11
ANNUAL RUNOFF (CFSM)	.68
ANNUAL RUNOFF (INCHES)	9.24
10 PERCENT EXCEEDS	11
50 PERCENT EXCEEDS	3.9
90 PERCENT EXCEEDS	.44

a Also Aug 12, 1999.



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 mi<sup>2</sup>.

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 sea level. Prior to Sep. 30, 1964, nonrecording gage at same site and datum.

REMARKS.--Records good except for period with backwater from beaver dam, Oct. 10 to Dec. 7, which is poor, and those for periods with ice effect, Dec. 26, 27, Dec. 31 to Jan. 1, 5 and 6, and period of doubtful gage-height record, Apr. 2-5, which are fair. Maximum discharge, 10,900 ft<sup>3</sup>/s, from rating curve extended above 3,400 ft<sup>3</sup>/s. Maximum discharge, 10,900 ft<sup>3</sup>/s, from rating curve extended above 3,400 ft<sup>3</sup>/s. Several measurements of water temperature were made during the year.

COOPERATION.--Records were provided by the Virginia Department of Environmental Quality - Water Division.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 900 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Mar 16	0730	*1,250	*8.41	No other peak greater than base discharge.			

Minimum discharge, 0.09 ft<sup>3</sup>/s, Aug 13.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.96	e.52	e3.0	e8.5	19	93	36	15	2.7	2.2	.66	.90
2	.68	e.60	2.8	7.8	28	81	e50	14	2.4	1.9	.36	.70
3	.51	e1.1	2.2	34	52	50	e55	14	2.2	1.8	.20	.68
4	.50	e1.4	1.7	93	45	175	e47	14	1.9	1.7	.18	.72
5	.50	e1.3	1.4	e30	32	216	e44	14	1.8	1.6	.15	2.2
6	.50	e1.1	1.5	e18	26	80	42	14	1.7	1.5	.13	4.3
7	.50	e1.0	1.6	14	23	58	36	15	1.8	1.2	.12	6.3
8	.78	e1.5	2.7	12	22	48	33	15	1.8	1.0	.13	4.3
9	1.7	e1.9	6.4	14	20	40	32	14	1.6	.89	.13	3.4
10	e1.3	e1.7	17	15	19	41	48	12	1.5	.86	.11	2.3
11	e1.1	e2.3	10	15	18	42	60	10	1.5	.92	.12	1.6
12	e1.0	e2.7	6.2	13	18	52	48	9.3	1.3	.84	.12	1.2
13	e.90	e2.6	7.2	13	20	70	42	9.1	1.3	1.2	.10	1.4
14	e.88	e2.7	12	12	21	109	35	7.6	1.4	.72	.18	.86
15	e.90	e2.5	13	15	20	671	31	7.5	1.3	.68	.29	3.0
16	e.80	e2.4	8.7	31	19	1070	31	7.2	1.2	.59	.35	73
17	e.75	e2.3	6.6	34	18	263	30	6.6	1.1	.64	.39	119
18	e.70	e2.8	5.5	28	47	118	27	6.7	1.5	.45	.39	52
19	e.68	e3.3	4.9	66	112	80	24	5.9	1.2	.39	.36	20
20	e.69	e3.0	4.3	51	64	60	23	5.8	1.3	.36	.87	10
21	e.70	e4.0	4.0	29	41	73	23	5.1	1.6	.57	1.1	6.6
22	e.75	e3.7	3.6	21	31	192	24	5.0	1.7	.57	.77	6.5
23	e.70	e3.4	3.7	18	26	140	24	5.1	1.5	.62	.87	7.2
24	e.64	e3.2	4.6	110	23	87	24	6.1	1.4	.94	.91	6.3
25	e.60	e3.6	5.6	413	22	80	23	5.9	1.3	1.3	1.1	5.5
26	e.68	e4.5	e5.3	114	23	69	21	5.2	1.7	1.0	1.5	4.3
27	e.66	e4.2	e5.1	53	21	55	19	4.5	1.3	.79	1.8	3.4
28	e.62	e3.7	6.2	37	28	48	18	4.0	1.1	.93	1.4	5.0
29	e.58	e3.5	7.9	29	---	44	17	3.6	1.7	1.3	1.1	56
30	e.55	e3.2	9.3	24	---	40	16	3.4	4.4	1.1	1.1	467
31	e.52	---	e8.9	20	---	36	---	3.0	---	.87	1.0	---
TOTAL	23.33	75.72	182.9	1392.3	858	4281	983	267.6	50.2	31.43	17.99	875.66
MEAN	.75	2.52	5.90	44.9	30.6	138	32.8	8.63	1.67	1.01	.58	29.2
MAX	1.7	4.5	17	413	112	1070	60	15	4.4	2.2	1.8	467
MIN	.50	.52	1.4	7.8	18	36	16	3.0	1.1	.36	.10	.68
CFSM	.01	.03	.08	.58	.40	1.78	.42	.11	.02	.01	.01	.38
IN.	.01	.04	.09	.67	.41	2.06	.47	.13	.02	.02	.01	.42



01673800 PO RIVER NEAR SPOTSYLVANIA, VA--Continued

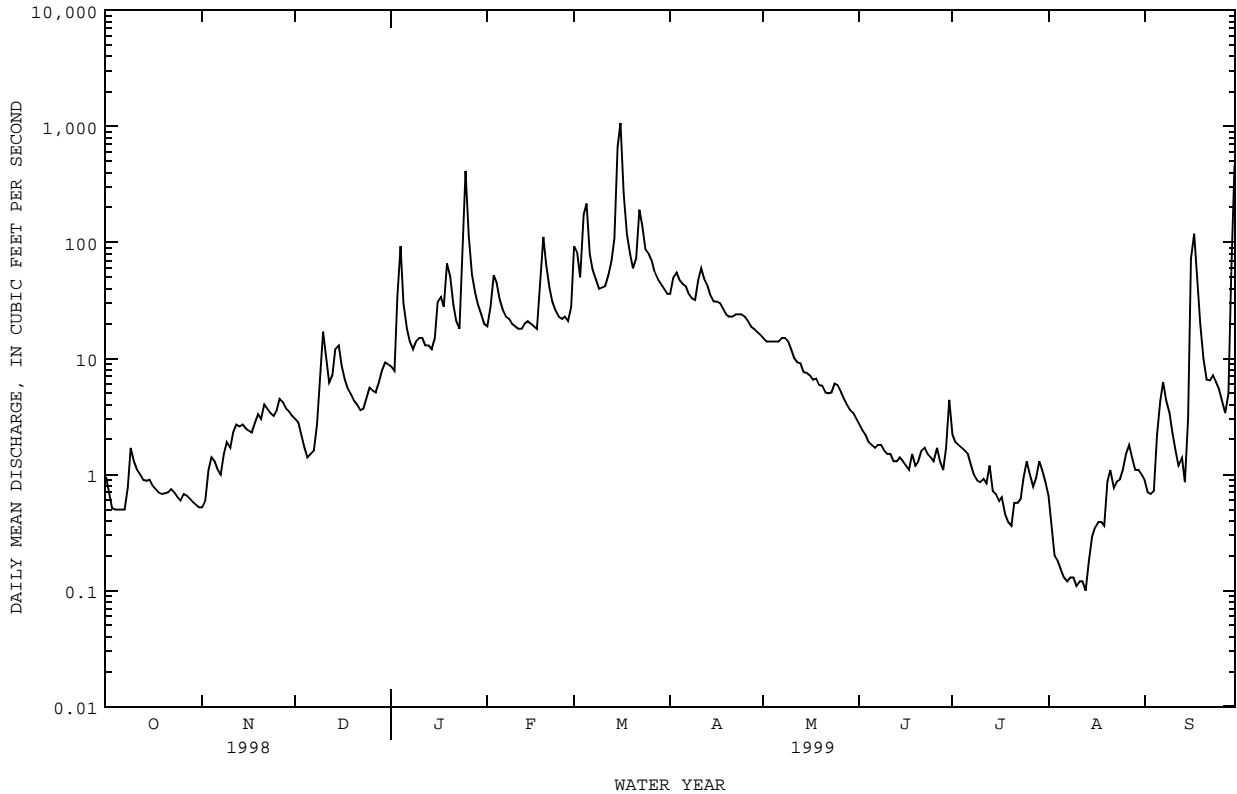
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1963 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	43.5	65.0	85.6	119	137	157	113	76.9	50.9	28.6	24.5	25.9
MAX	275	278	210	326	560	566	397	221	490	145	207	268
(WY)	1980	1994	1997	1978	1998	1994	1983	1972	1972	1984	1969	1975
MIN	.24	.85	5.90	10.4	30.6	25.2	27.1	8.63	1.67	1.01	.25	.26
(WY)	1992	1992	1999	1981	1999	1981	1981	1999	1999	1999	1963	1991

SUMMARY STATISTICS FOR 1998 CALENDAR YEAR FOR 1999 WATER YEAR WATER YEARS 1963 - 1999

ANNUAL TOTAL	45462.56	9039.13	
ANNUAL MEAN	125	24.8	76.9
HIGHEST ANNUAL MEAN			164 1972
LOWEST ANNUAL MEAN			18.7 1981
HIGHEST DAILY MEAN	3040 Feb 5	1070 Mar 16	8160 Jun 22 1972
LOWEST DAILY MEAN	.50 aOct 4	.10 Aug 13	.04 Sep 23 1991
ANNUAL SEVEN-DAY MINIMUM	.57 Oct 2	.12 Aug 7	.06 Oct 6 1986
INSTANTANEOUS PEAK FLOW		1250 Mar 16	10900 Jun 22 1972
INSTANTANEOUS PEAK STAGE		8.41 Mar 16	19.03 Jun 22 1972
INSTANTANEOUS LOW FLOW		.09 Aug 13	.03 Sep 23 1991
ANNUAL RUNOFF (CFSM)	1.61	.32	.99
ANNUAL RUNOFF (INCHES)	21.85	4.34	13.51
10 PERCENT EXCEEDS	232	52	150
50 PERCENT EXCEEDS	22	4.3	35
90 PERCENT EXCEEDS	.97	.62	2.5

a Also Oct 5-7, 1998.  
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 mi<sup>2</sup>.

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 sea level. Prior to Aug. 17, 1978, gage located on left bank at same datum.

REMARKS.--Records good except those for period of doubtful gage-height record, Oct. 31 to Nov. 2, and period with ice effect, Jan. 5-7, which are fair. Some diurnal fluctuation from gristmill upstream on Po River. Maximum discharge, 13,400 ft<sup>3</sup>/s, from rating curve extended above 8,100 ft<sup>3</sup>/s. No flow at times in September and October 1954 and September 1966. 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 Department of Environmental Quality - Water Division.

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 ft<sup>3</sup>/s, from rating curve extended above 8,100 ft<sup>3</sup>/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Mar 17	1600	*1,640	*9.18	No peak greater than base discharge.			

Minimum discharge, 0.01 ft<sup>3</sup>/s, Aug 11-14.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.0	e1.1	7.3	16	44	132	127	42	7.7	35	3.7	2.3
2	1.9	e1.1	7.7	15	49	202	143	39	7.1	32	3.2	.91
3	1.3	1.6	7.2	33	63	180	149	38	6.7	16	1.4	.54
4	1.2	3.4	7.1	101	77	153	143	38	5.7	12	.68	.56
5	1.2	3.4	7.1	e84	74	226	133	37	5.1	9.8	.45	3.0
6	1.4	2.5	8.7	e66	59	294	120	36	5.1	7.4	.26	7.7
7	1.6	2.0	7.2	e48	51	232	114	37	4.1	6.0	.13	19
8	2.8	3.1	6.8	36	45	126	110	37	4.2	5.0	.09	20
9	5.5	4.4	14	30	41	95	100	36	4.4	4.2	.06	20
10	4.3	4.1	23	28	38	90	110	33	3.9	4.1	.03	27
11	3.0	5.0	18	30	36	91	132	29	3.9	4.4	.02	18
12	2.5	6.1	22	28	35	98	151	26	3.8	5.5	.01	12
13	2.2	5.4	28	26	56	110	137	25	4.9	5.0	.01	10
14	2.2	6.0	42	26	59	133	115	22	5.7	4.7	.42	8.0
15	2.1	5.8	31	30	49	355	100	21	5.8	4.6	.72	9.0
16	1.8	5.4	26	38	44	685	93	18	4.4	4.2	.23	236
17	1.7	4.8	22	40	40	1510	88	16	4.2	3.7	.08	525
18	1.7	5.4	19	62	65	1260	82	15	4.0	3.3	.03	541
19	1.7	7.4	16	109	192	631	80	15	4.0	2.3	.05	382
20	1.7	7.1	16	104	230	344	71	15	4.1	1.9	.37	163
21	1.6	9.4	14	87	160	249	70	14	4.1	1.8	.26	93
22	1.7	8.7	12	60	96	395	72	13	5.3	1.3	.06	72
23	1.9	6.6	12	45	68	695	68	14	5.4	.84	.04	57
24	1.4	7.5	14	82	56	767	67	15	4.6	.77	.04	44
25	1.3	8.3	14	273	49	457	64	15	4.0	1.3	.26	37
26	1.4	8.6	14	378	48	310	59	13	3.8	.98	1.8	31
27	1.5	9.3	13	410	46	245	55	12	3.5	1.3	4.0	26
28	1.4	9.2	14	206	53	203	51	11	3.5	2.4	11	32
29	1.3	10	17	101	---	175	48	9.8	3.9	4.1	8.7	40
30	1.2	8.8	18	67	---	153	45	9.2	21	3.5	5.7	126
31	e1.2	---	17	53	---	136	---	8.1	---	3.5	4.0	---
TOTAL	59.7	171.5	495.1	2712	1923	10732	2897	709.1	157.9	192.89	47.80	2563.01
MEAN	1.93	5.72	16.0	87.5	68.7	346	96.6	22.9	5.26	6.22	1.54	85.4
MAX	5.5	10	42	410	230	1510	151	42	21	35	11	541
MIN	1.2	1.1	6.8	15	35	90	45	8.1	3.5	.77	.01	.54
CFSM	.01	.02	.06	.34	.27	1.35	.38	.09	.02	.02	.01	.33
IN.	.01	.02	.07	.39	.28	1.55	.42	.10	.02	.03	.01	.37

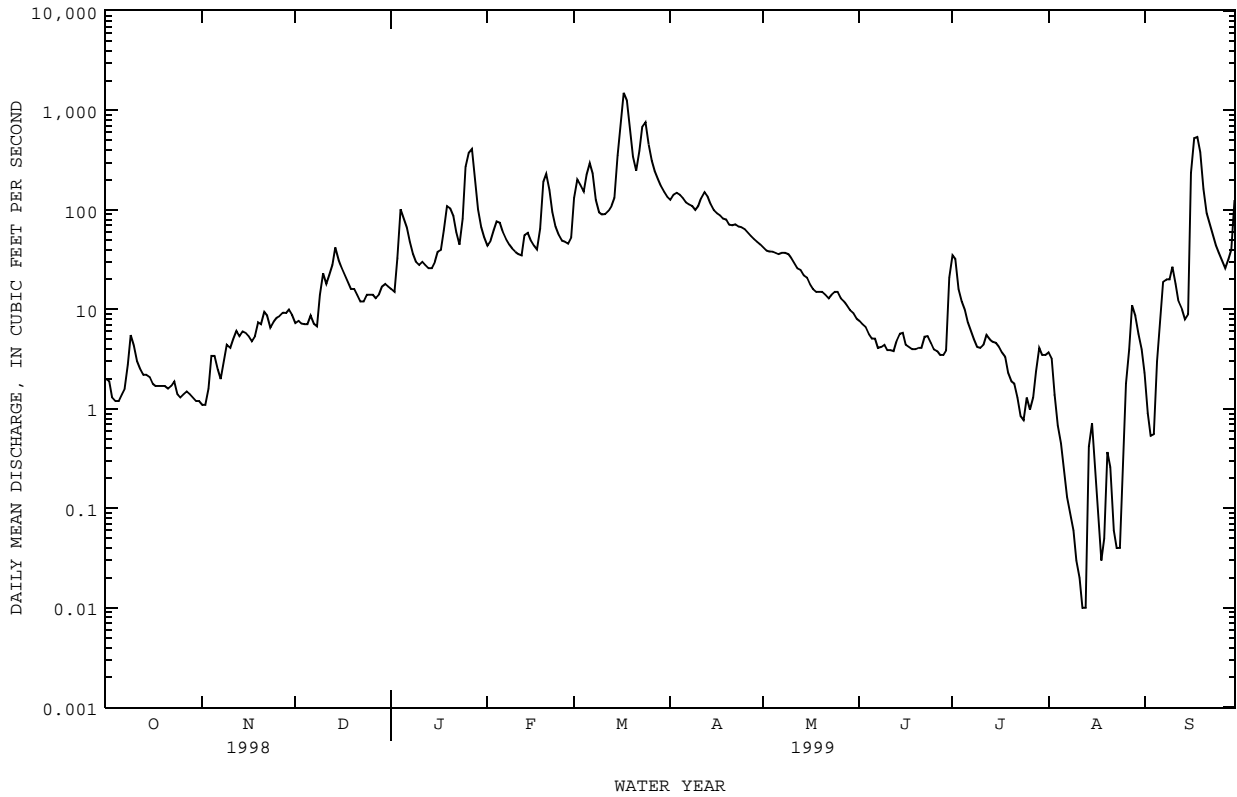
01674000 MATTAPONI RIVER NEAR BOWLING GREEN, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1943 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	123	169	268	363	411	483	380	253	139	103	114	81.2
MAX	860	721	1041	1174	1706	1540	1164	707	1111	853	939	714
(WY)	1943	1973	1949	1978	1998	1994	1983	1972	1972	1945	1955	1975
MIN	1.44	5.72	16.0	34.7	68.7	79.8	96.6	22.9	5.26	6.22	1.18	.43
(WY)	1992	1999	1999	1981	1999	1981	1999	1999	1999	1999	1977	1954

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR	WATER YEARS 1943 - 1999
ANNUAL TOTAL	146109.0	22661.00	
ANNUAL MEAN	400	62.1	240
HIGHEST ANNUAL MEAN			516
LOWEST ANNUAL MEAN			61.0
HIGHEST DAILY MEAN	6310	Feb 6	1510
LOWEST DAILY MEAN	e1.1	aNov 1	.01
ANNUAL SEVEN-DAY MINIMUM	1.3	Oct 27	.05
INSTANTANEOUS PEAK FLOW			1640
INSTANTANEOUS PEAK STAGE			9.18
INSTANTANEOUS LOW FLOW			.01
ANNUAL RUNOFF (CFSM)	1.56		.24
ANNUAL RUNOFF (INCHES)	21.15		3.28
10 PERCENT EXCEEDS	990		145
50 PERCENT EXCEEDS	70		14
90 PERCENT EXCEEDS	2.1		1.3

- a Also Nov 2, 1998.
- b Also Aug 13, 1999.
- c Many days in September and October 1954, and September 1966.
- d Many days in September and October 1954.
- e Estimated.
- f From floodmark in well.
- g Also Aug 12-14, 1999.



01674500 MATTAPONI RIVER NEAR BEULAHVILLE, VA

LOCATION.--Lat 37°53'02", long 77°09'55", King William County, Hydrologic Unit 02080105, on right bank, 10 ft upstream from bridge on State Highway 628, 2.4 mi north of Beulahville, and 3.3 mi downstream from Maracossic Creek.

DRAINAGE AREA.--601 mi<sup>2</sup>.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--September 1941 to September 1987, October 1989 to current year.

REVISED RECORDS.--WSP 2103: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 12.43 ft above sea level (levels by Virginia Department of Transportation). Prior to Oct. 14, 1942, nonrecording gage. 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, water-stage recorder on left bank 80 ft downstream from previous site, at same datum. Sep. 8, 1987, to Aug. 31, 1989, nonrecording gage on downstream side of bridge at same datum. Sep. 1, 1989, to Mar. 31, 1994, water-stage recorder on upstream side of same datum. Apr. 1, 1994, to Sep. 28, 1995, nonrecording gage on downstream side of bridge at same datum. Sep. 29, 1995, water-stage recorder at present site and datum.

REMARKS.--Records good. Diurnal fluctuation at times during low flow caused by gristmill on Po River. Maximum discharge, 16,900 ft<sup>3</sup>/s, from rating curve extended above 11,760 ft<sup>3</sup>/s.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 2,560 ft<sup>3</sup>/s, Sep 18, gage height, 13.37 ft; minimum discharge, 0.70 ft<sup>3</sup>/s, Aug 13, gage height, 0.79 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	18	31	69	121	261	295	399	157	32	70	7.2	16
2	27	29	70	117	249	418	426	154	30	102	6.0	15
3	24	36	68	161	274	523	435	143	26	112	5.7	14
4	21	53	79	328	299	551	434	136	22	129	4.6	15
5	18	57	69	e388	306	502	430	137	21	89	3.9	36
6	19	51	60	e360	294	492	407	134	20	59	3.4	94
7	19	56	61	301	267	526	386	133	19	41	2.4	222
8	21	57	57	272	244	518	352	130	17	39	1.8	268
9	54	53	101	210	231	422	331	126	15	37	1.5	198
10	81	52	162	182	215	355	364	118	13	28	1.2	159
11	79	54	157	153	200	342	376	107	13	25	1.1	128
12	68	54	143	152	189	357	394	99	14	23	.89	100
13	55	52	174	150	214	369	394	90	14	25	.78	86
14	46	54	285	144	236	386	377	84	18	38	4.3	69
15	41	59	287	163	264	715	335	82	26	42	82	60
16	34	56	239	239	246	1110	308	78	26	37	97	670
17	32	56	182	249	224	1330	287	72	25	29	60	2020
18	29	56	155	251	233	1390	267	68	27	23	37	2440
19	25	52	129	322	301	1460	255	66	29	18	23	2020
20	24	51	113	431	432	1600	238	60	26	13	20	1650
21	28	59	100	440	506	1660	233	56	29	11	25	1050
22	25	63	95	363	453	1290	222	52	35	10	23	492
23	24	59	88	292	353	996	222	52	34	10	19	356
24	27	61	95	338	288	1080	237	57	27	8.7	17	273
25	28	68	104	566	250	1230	226	61	21	6.9	16	217
26	26	69	104	724	236	1320	215	63	18	6.6	36	177
27	25	76	100	789	239	1110	203	59	18	5.7	44	152
28	26	72	107	765	248	686	189	52	16	4.9	39	170
29	28	71	115	649	---	553	177	45	15	4.7	30	212
30	26	69	124	427	---	483	165	40	16	5.1	25	257
31	33	---	131	316	---	429	---	33	---	8.0	20	---
TOTAL	1031	1686	3823	10363	7752	24498	9284	2744	662	1060.6	657.77	13636
MEAN	33.3	56.2	123	334	277	790	309	88.5	22.1	34.2	21.2	455
MAX	81	76	287	789	506	1660	435	157	35	129	97	2440
MIN	18	29	57	117	189	295	165	33	13	4.7	.78	14
CFSM	.06	.09	.21	.56	.46	1.31	.51	.15	.04	.06	.04	.76
IN.	.06	.10	.24	.64	.48	1.52	.57	.17	.04	.07	.04	.84

01674500 MATTAPONI RIVER NEAR BEULAHVILLE, VA--Continued

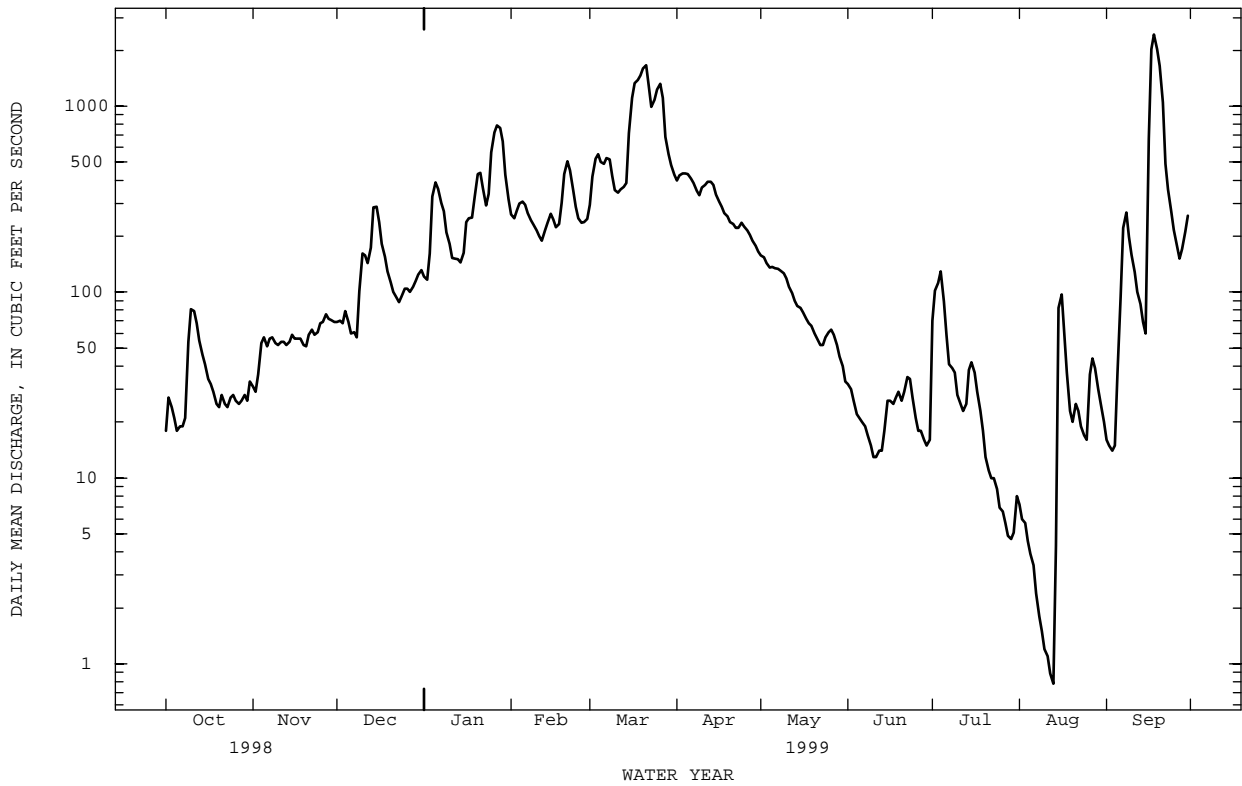
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1942 - 1987, 1989 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	316	427	626	809	933	1091	960	649	404	289	326	235
MAX	1801	1461	2115	2418	3100	2483	3291	1912	3217	2119	2409	1287
(WY)	1980	1973	1949	1978	1998	1979	1984	1978	1972	1945	1969	1975
MIN	26.1	49.9	96.8	131	277	229	288	88.5	22.1	34.2	20.3	17.4
(WY)	1942	1992	1966	1981	1999	1981	1995	1999	1999	1999	1977	1980

SUMMARY STATISTICS FOR 1998 CALENDAR YEAR FOR 1999 WATER YEAR WATER YEARS 1942 - 1987 1989 - 1999

ANNUAL TOTAL	300391	77197.37		
ANNUAL MEAN	823	211	586	
HIGHEST ANNUAL MEAN			1210	1972
LOWEST ANNUAL MEAN			185	1981
HIGHEST DAILY MEAN	6360	Feb 9	2440	Sep 18
LOWEST DAILY MEAN	11	Sep 17	.78	Aug 13
ANNUAL SEVEN-DAY MINIMUM	13	Sep 12	1.4	Aug 7
INSTANTANEOUS PEAK FLOW			2560	Sep 18
INSTANTANEOUS PEAK STAGE			13.37	Sep 18
INSTANTANEOUS LOW FLOW			.70	Aug 13
ANNUAL RUNOFF (CFSM)	1.37		.35	.98
ANNUAL RUNOFF (INCHES)	18.59		4.78	13.26
10 PERCENT EXCEEDS	2370		445	1330
50 PERCENT EXCEEDS	250		88	370
90 PERCENT EXCEEDS	25		16	61

e Estimated.



01674500 MATTAPONI RIVER NEAR BEULAHVILLE, VA--Continued

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1968, 1969, 1979 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: October 1991 to September 1994.

WATER TEMPERATURE: October 1991 to September 1994.

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 1998 TO SEPTEMBER 1999

DATE	TIME	SAMPLE TYPE	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	AGENCY ANA- LYZING SAMPLE (CODE NUMBER) (00028)	TEMPER- ATURE AIR (DEG C) (00020)	TEMPER- ATURE WATER (DEG C) (00010)
OCT									
27...	0815	ENVIRONMENTAL	24	59	6.9	762	VDCLS	13.0	10.7
NOV									
20...	1030	ENVIRONMENTAL	51	58	7.6	752	VDCLS	16.5	7.3
DEC									
14...	0900	ENVIRONMENTAL	284	65	7.0	758	VDCLS	5.0	7.0
17...	1130	ENVIRONMENTAL	181	68	6.8	747	VDCLS	6.0	5.0
17...	1145	REPLICATE	181	68	6.8	747	VDCLS	6.0	5.0
JAN									
04...	1250	ENVIRONMENTAL	333	64	6.7	762	VDCLS	2.0	2.7
25...	1130	ENVIRONMENTAL	560	69	6.7	--	VDCLS	13.5	9.3
27...	0845	ENVIRONMENTAL	792	85	6.0	760	VDCLS	2.0	7.2
FEB									
20...	0915	ENVIRONMENTAL	417	73	6.4	754	VDCLS	4.5	6.1
20...	0930	REPLICATE	419	73	6.4	754	VDCLS	4.5	6.1
24...	0930	ENVIRONMENTAL	292	73	6.3	764	VDCLS	-1.5	2.5
MAR									
05...	0930	ENVIRONMENTAL	506	67	6.9	765	VDCLS	3.0	6.8
15...	1200	ENVIRONMENTAL	737	74	6.3	746	VDCLS	4.0	5.0
16...	1100	ENVIRONMENTAL	1100	58	6.2	757	VDCLS	10.0	4.7
22...	0930	ENVIRONMENTAL	1340	66	5.8	--	VDCLS	11.0	9.4
26...	0830	ENVIRONMENTAL	1300	57	6.8	759	VDCLS	2.3	9.0
APR									
08...	1100	ENVIRONMENTAL	352	66	6.3	752	VDCLS	25.0	15.7
12...	0915	ENVIRONMENTAL	395	66	6.7	750	VDCLS	13.0	14.8
12...	0930	REPLICATE	395	66	6.7	750	USGS	13.0	14.8
23...	1145	ENVIRONMENTAL	221	54	6.6	757	VDCLS	20.6	16.4
23...	1150	REPLICATE	221	54	6.6	757	USGS	20.6	16.4
MAY									
19...	1045	ENVIRONMENTAL	66	65	6.8	754	VDCLS	22.0	18.3
JUN									
17...	1115	ENVIRONMENTAL	25	62	6.8	755	VDCLS	22.0	21.4
22...	0930	ENVIRONMENTAL	35	57	6.8	759	VDCLS	21.5	18.8
JUL									
02...	0915	ENVIRONMENTAL	102	52	6.9	757	VDCLS	25.5	24.2
20...	0915	ENVIRONMENTAL	13	67	6.6	754	VDCLS	25.0	25.6
AUG									
16...	1115	ENVIRONMENTAL	98	54	6.9	760	VDCLS	25.5	23.9
23...	1100	ENVIRONMENTAL	19	63	6.9	756	VDCLS	26.0	22.7
SEP									
06...	0915	ENVIRONMENTAL	89	59	7.6	750	VDCLS	24.0	23.4
08...	0930	ENVIRONMENTAL	280	57	7.5	757	VDCLS	21.5	23.6
17...	0930	ENVIRONMENTAL	1890	49	6.7	754	VDCLS	15.0	18.4
17...	0945	REPLICATE	1900	49	6.7	754	VDCLS	15.0	18.4
20...	1045	ENVIRONMENTAL	1700	74	6.1	755	VDCLS	21.0	17.5
24...	1045	ENVIRONMENTAL	274	73	6.0	754	VDCLS	21.0	15.9

01674500 MATTAPONI RIVER NEAR BEULAHVILLE, VA--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DATE	TUR- BID- ITY (NTU) (00076)	OXYGEN, DIS- SOLVED (MG/L) (00300)	SILICA, DIS- SOLVED (MG/L) AS SIO2) (00955)	RESIDUE TOTAL AT 105 DEG. C, SUS- PENDEDED (MG/L) (00530)	RESIDUE FIXED NON FILTER- ABLE (MG/L) (00540)	RESIDUE VOLA- TILE, SUS- PENDEDED (MG/L) (00535)	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)
OCT										
27...	2	9.6	6.2	<3	<3	<3	.074	<.002	.074	.007
NOV										
20...	3	9.5	5.8	<3	<3	<3	.232	.065	.297	.007
DEC										
14...	10	11.5	7.6	17	12	5	.100	<.002	.100	.008
17...	5	12.2	9.0	5	3	<3	.030	<.002	.073	<.004
17...	5	12.2	9.0	5	3	<3	.075	<.002	.075	<.004
JAN										
04...	<1	13.1	8.2	15	12	3	.196	<.002	.196	.014
25...	14	10.0	8.9	22	18	4	.128	<.002	.128	.014
27...	16	10.9	10.1	22	18	4	.141	<.002	.141	.016
FEB										
20...	6	10.4	8.9	10	8	<3	.129	<.002	.129	.015
20...	8	10.4	8.8	10	8	<3	.126	<.002	.126	.014
24...	10	12.8	10.4	5	3	<3	.126	<.002	.126	<.004
MAR										
05...	13	11.2	9.4	7	5	<3	.107	<.002	.107	<.004
15...	32	10.5	7.5	38	30	8	.172	<.002	.172	.019
16...	22	11.9	6.8	25	20	5	.159	<.002	.159	.014
22...	10	9.6	8.2	7	5	<3	.108	<.002	.108	.011
26...	11	10.4	8.1	9	7	<3	.058	<.002	.058	.008
APR										
08...	5	9.9	5.7	5	3	<3	.077	<.002	.077	.020
12...	5	8.7	5.6	5	3	<3	.096	<.002	.096	<.004
12...	--	8.7	5.4	5	.0	8	--	--	.075	.027
23...	3	8.8	6.5	<3	<3	<3	.118	<.002	.118	.024
23...	--	8.8	6.0	<1	--	7	--	--	.098	.020
MAY										
19...	6	8.0	6.6	<3	<3	<3	.198	.003	.201	.066
JUN										
17...	6	7.2	5.5	<3	<3	<3	.153	<.002	.153	.036
22...	7	7.7	5.5	<3	<3	<3	.163	<.002	.163	.024
JUL										
02...	7	6.5	5.7	4	<3	<3	.144	.002	.146	.045
20...	6	5.8	6.5	<3	<3	<3	.128	<.002	.128	.041
AUG										
16...	15	6.4	6.2	6	4	<3	.120	.002	.122	.049
23...	5	7.9	6.9	<3	<3	<3	.090	<.002	.090	.03
SEP										
06...	6	6.7	6.8	5	3	<3	.090	<.002	.090	.024
08...	8	6.6	--	10	6	4	E.133	<.002	.133	.029
17...	36	6.3	5.6	27	20	7	.080	<.002	.080	.008
17...	39	6.3	5.7	23	16	7	.077	<.002	.077	.007
20...	7	6.8	10.4	6	3	3	.068	<.002	.068	.022
24...	6	8.5	10.9	5	3	<3	.151	.002	.153	.041

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

## YORK RIVER BASIN

01674500 MATTAPONI RIVER NEAR BEULAHVILLE, VA--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DATE	NITRO- GEN, AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO- GEN, AM- MONIA + ORGANIC DIS. (MG/L AS N) (00623)	NITROGEN TOTAL SEDIMNT SUSP (MG/L AS N) (00601)	NITRO- GEN DIS- SOLVED (MG/L AS N) (00602)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS TOTAL SEDIMNT SUSP (MG/L AS P) (00667)	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	CARBON, INORG + ORGANIC TOTAL (MG/L AS C) (00694)
OCT									
27...	--	--	.007	.306	--	.006	.026	.009	.173
NOV									
20...	--	--	.029	.243	--	.013	.021	.005	.303
DEC									
14...	--	--	.109	.392	--	.032	.021	.009	1.17
17...	--	--	.036	.283	--	.016	.017	.008	.446
17...	--	--	.02	.30	--	.018	.025	.010	.41
JAN									
04...	--	--	.095	.412	--	.029	.011	.009	.961
25...	--	--	.120	.376	--	.034	.012	.009	1.31
27...	--	--	.127	.386	--	.041	.013	.008	1.38
FEB									
20...	--	--	.052	.343	--	.020	.016	.005	.723
20...	--	--	.058	.366	--	.022	.022	.005	.732
24...	--	--	.043	.385	--	.016	.018	.005	.449
MAR									
05...	--	--	.045	.356	--	.020	.020	.005	.529
15...	--	--	.193	.377	--	.052	.016	.008	2.27
16...	--	--	.116	.354	--	.031	.015	.007	1.27
22...	--	--	.058	.380	--	.021	.021	.006	.538
26...	--	--	.037	.370	--	.017	.022	.008	.440
APR									
08...	--	--	.030	.397	--	.011	.026	.016	.363
12...	--	--	.026	.472	--	.014	.031	.014	.406
12...	.5	.4	--	.49	.05	--	E.03	.018	--
23...	--	--	.010	.434	--	.010	.037	.015	.238
23...	.4	<.1	--	--	.07	--	<.05	.015	--
MAY									
19...	--	--	.011	.605	--	.013	.053	.031	.189
JUN									
17...	--	--	.011	.579	--	.009	.052	.019	.170
22...	--	--	.014	.532	--	.009	.045	.023	.198
JUL									
02...	--	--	.025	.579	--	.016	.044	.019	.358
20...	--	--	.010	.505	--	.012	.053	.024	.155
AUG									
16...	--	--	.058	.559	--	.027	.033	.014	.472
23...	--	--	.014	.476	--	.008	.047	.020	.100
SEP									
06...	--	--	.022	.451	--	.012	.041	.015	.172
08...	--	--	.102	.535	--	.033	.028	.008	.957
17...	--	--	.174	.667	--	.032	.044	.016	1.79
17...	--	--	.185	.621	--	.036	.038	.015	1.73
20...	--	--	.059	.587	--	.024	.023	.012	.545
24...	--	--	.029	.671	--	.023	.031	.014	.442

&lt; Actual value is known to be less than the value shown.

E Estimated.



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## 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 mi<sup>2</sup>.

## WATER-DISCHARGE RECORDS

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

GAGE.--Water-stage recorder. Datum of gage is 1,639.20 ft above sea level.

REMARKS.--Records good except for period with ice effect, Jan. 5-8, which is fair. U.S. Army Corps of Engineers satellite water temperature, precipitation and gage-height telemeter at station. Maximum discharge, 30,000 ft<sup>3</sup>/s, from rating curve extended above 1,300 ft<sup>3</sup>/s on basis of slope-area measurements at gage heights 8.88 ft, 11.40 ft, 13.88 ft, and 22.25 ft. 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 ft<sup>3</sup>/s, and flood of Dec. 26, 1973, reached a stage of 13.88 ft, discharge, 7,560 ft<sup>3</sup>/s, from rating curve extended as explained above.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,500 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Jan 24	1200	*1,190	*6.81	No peak greater than base discharge.			

Minimum discharge, 13 ft<sup>3</sup>/s, Aug 4, 6-8, 11-13, Sep 25-27, gage height, 2.61 ft, Aug 7, 11, 12-13.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	19	20	21	27	89	82	118	55	36	22	17	18
2	18	20	20	37	228	78	119	51	35	22	16	17
3	18	25	20	79	222	85	106	49	35	21	15	16
4	19	27	21	103	183	186	98	47	33	19	15	16
5	21	24	21	e70	154	172	92	46	31	19	14	39
6	20	22	21	e52	129	173	84	45	30	18	14	134
7	20	22	22	e45	131	185	79	43	29	18	14	98
8	33	22	30	e43	177	163	74	51	28	18	14	56
9	34	22	40	117	157	157	73	47	27	16	17	36
10	25	22	33	184	138	149	74	41	26	17	16	28
11	22	28	26	158	120	133	73	38	33	17	14	23
12	21	27	24	113	112	126	72	36	35	17	14	20
13	20	24	31	74	109	117	65	41	29	20	13	18
14	20	23	39	127	93	125	60	74	28	19	24	17
15	20	23	32	485	84	183	60	85	27	18	25	17
16	21	23	27	245	79	195	67	70	26	18	19	17
17	21	22	25	151	76	368	61	62	27	17	17	17
18	20	22	23	165	121	643	56	57	28	18	15	15
19	20	21	23	244	123	580	54	77	25	21	14	14
20	20	22	22	157	106	400	53	66	26	19	26	14
21	20	22	22	122	94	362	53	56	26	17	25	16
22	20	21	22	117	83	385	56	52	25	18	19	17
23	20	21	22	177	74	309	52	55	24	20	17	15
24	20	21	23	924	69	274	53	62	23	18	16	14
25	21	21	23	555	67	238	52	66	23	25	53	14
26	21	24	23	312	65	206	49	55	23	18	84	13
27	21	23	26	224	61	182	49	50	23	15	38	14
28	21	22	21	176	69	161	72	46	23	16	27	18
29	21	21	22	139	---	143	73	42	23	28	23	19
30	21	21	23	112	---	126	61	39	22	25	20	44
31	22	---	40	93	---	112	---	37	---	19	18	---
TOTAL	660	678	788	5627	3213	6798	2108	1641	829	593	673	814
MEAN	21.3	22.6	25.4	182	115	219	70.3	52.9	27.6	19.1	21.7	27.1
MAX	34	28	40	924	228	643	119	85	36	28	84	134
MIN	18	20	20	27	61	78	49	36	22	15	13	13
CFSM	.13	.14	.16	1.15	.73	1.39	.44	.34	.17	.12	.14	.17
IN.	.16	.16	.19	1.32	.76	1.60	.50	.39	.20	.14	.16	.19

JAMES RIVER BASIN

02011400 JACKSON RIVER NEAR BACOVA, VA--Continued

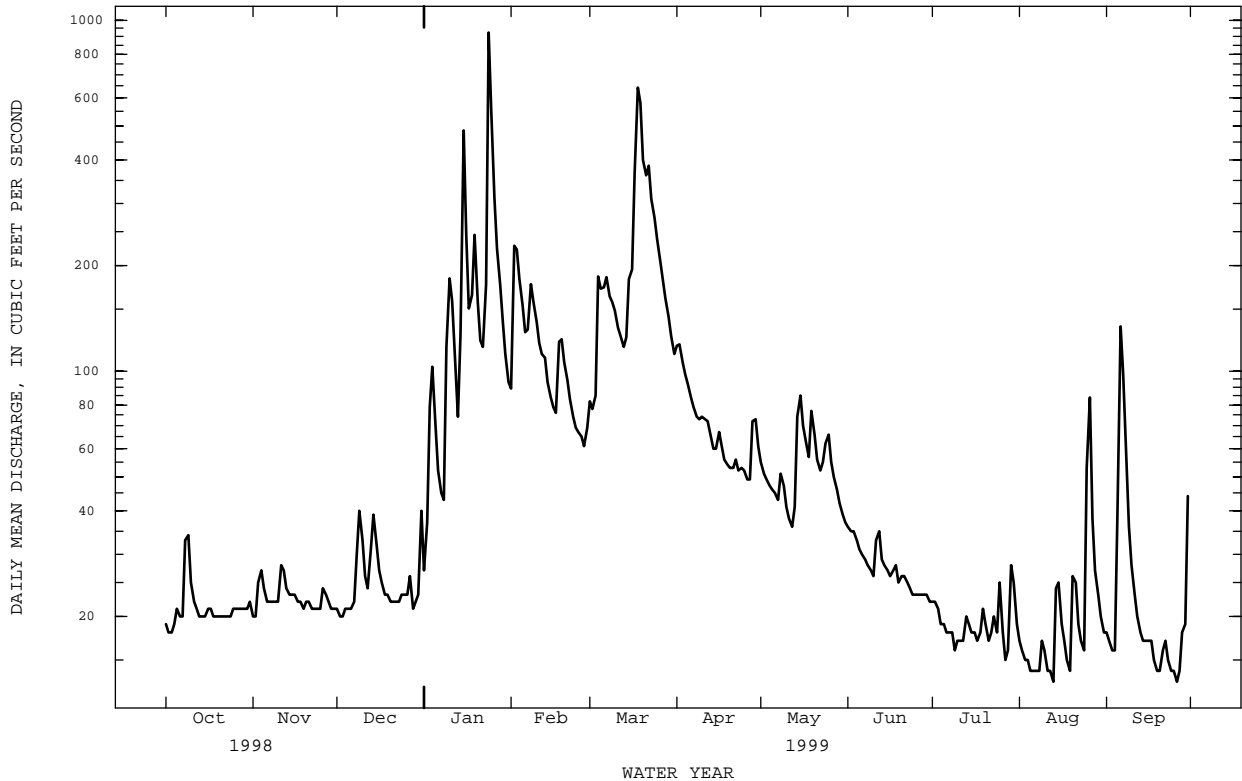
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1975 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	84.5	125	162	249	258	371	276	225	132	60.1	56.9	64.0
MAX	367	762	419	703	604	767	814	508	388	130	282	342
(WY)	1980	1986	1997	1996	1998	1993	1987	1989	1982	1989	1984	1979
MIN	19.7	22.6	25.4	31.6	101	68.0	70.3	52.9	27.6	19.1	20.6	20.1
(WY)	1989	1999	1999	1981	1978	1981	1999	1999	1999	1999	1988	1998

SUMMARY STATISTICS FOR 1998 CALENDAR YEAR FOR 1999 WATER YEAR WATER YEARS 1975 - 1999

ANNUAL TOTAL		73798		24422								
ANNUAL MEAN		202		66.9						172		
HIGHEST ANNUAL MEAN										244		1996
LOWEST ANNUAL MEAN										66.9		1999
HIGHEST DAILY MEAN				2930	Mar 21		924	Jan 24		8820	Jan 19	1996
LOWEST DAILY MEAN				18	aSep 25		13	bAug 13		13	bAug 13	1999
ANNUAL SEVEN-DAY MINIMUM				19	Sep 27		15	Aug 2		15	Aug 2	1999
INSTANTANEOUS PEAK FLOW							1190	Jan 24		30000	Nov 4	1985
INSTANTANEOUS PEAK STAGE							6.81	Jan 24		c22.25	Nov 4	1985
INSTANTANEOUS LOW FLOW							13	dAug 4		13	dAug 4	1999
ANNUAL RUNOFF (CFSM)				1.28			.42			1.09		
ANNUAL RUNOFF (INCHES)				17.38			5.75			14.77		
10 PERCENT EXCEEDS				484			157			365		
50 PERCENT EXCEEDS				57			28			88		
90 PERCENT EXCEEDS				20			17			28		

- a Also Sep 28, and Oct 2-3, 1998.
- b Also Sep 26, 1999.
- c From floodmark.
- d Also Aug 6-8, 11-13, and Sep 25-27, 1999.
- e Estimated.



## JAMES RIVER BASIN

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.--Interruption in record due to instrument malfunction. Some record in prior years fragmentary due to instrument malfunction. Records represent water temperature at sensor within 0.5°C. Temperature at the sensor was compared with the average for the river by temperature cross section on Jun. 28, 1995. No variation of temperature was found within the cross section.

## EXTREMES FOR PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: Maximum recorded, 31.1°C, Jul. 6, 1999; minimum recorded, 0.0°C on many days during winter periods.

## EXTREMES FOR CURRENT YEAR.--

WATER TEMPERATURE: Maximum recorded, 31.1°C, Jul 6; minimum recorded, 0.0°C, Dec 25-28, 30-31, Jan 1-14, Mar 15.

## TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DAY	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
1	20.9	17.3	19.5	12.4	8.8	10.9	8.5	6.7	7.4	.4	.0	.0
2	18.1	14.3	16.2	11.0	9.5	10.4	7.1	4.2	5.7	.0	.0	.0
3	15.8	13.1	14.8	10.6	9.5	10.1	6.7	4.2	5.7	.0	.0	.0
4	17.3	15.0	16.0	9.9	8.1	9.3	8.5	6.7	7.4	.0	.0	.0
5	18.5	16.1	17.1	8.5	6.4	7.5	8.5	7.1	7.8	.0	.0	.0
6	17.7	16.9	17.3	6.7	4.9	5.8	10.6	7.8	9.0	.0	.0	.0
7	16.9	16.1	16.5	6.7	4.6	5.5	11.0	8.8	9.9	.0	.0	.0
8	17.7	15.8	16.6	5.3	4.2	4.9	11.0	10.6	10.8	.0	.0	.0
9	16.5	14.6	15.5	8.5	5.3	6.7	10.6	8.1	9.7	.0	.0	.0
10	16.5	14.6	15.5	9.5	7.1	7.9	8.1	6.0	7.2	.0	.0	.0
11	17.3	13.5	15.3	10.6	8.5	9.7	7.4	5.3	6.5	.0	.0	.0
12	17.3	13.5	15.2	8.5	6.0	7.4	5.3	4.2	4.9	.0	.0	.0
13	16.9	13.5	15.0	7.8	6.0	6.9	6.0	5.3	5.6	.4	.0	.0
14	15.0	12.1	13.7	7.4	5.7	6.5	6.0	4.6	5.5	.4	.0	.2
15	14.3	10.6	12.5	9.5	7.4	8.2	4.6	2.1	3.6	3.5	.4	2.0
16	14.6	10.6	12.7	8.8	5.7	7.3	4.6	2.5	3.7	3.5	1.4	2.3
17	15.8	11.7	13.6	7.8	6.0	7.0	4.6	3.2	4.1	3.9	1.4	2.7
18	16.5	12.8	14.4	7.8	4.9	6.5	3.5	1.8	2.6	4.9	3.5	4.1
19	16.5	14.6	15.5	7.8	4.6	6.3	4.6	1.8	3.2	4.9	3.2	4.0
20	15.8	12.8	14.4	7.8	6.4	7.1	6.4	4.6	5.4	5.7	2.8	4.2
21	13.9	12.1	12.8	6.7	4.6	6.0	7.1	4.9	5.9	5.3	3.9	4.5
22	12.4	9.5	11.1	5.3	2.5	3.9	6.7	3.2	5.8	7.1	4.6	5.9
23	11.0	7.4	9.2	6.7	1.8	4.2	3.2	1.4	2.0	9.9	7.1	8.5
24	11.3	7.4	9.4	8.5	6.4	7.2	2.5	1.1	1.8	8.8	6.7	8.1
25	11.3	7.4	9.4	6.4	3.9	5.5	1.4	.0	.4	6.7	4.9	5.6
26	11.0	7.1	9.1	8.1	6.0	6.9	.7	.0	.0	6.0	4.2	5.1
27	---	---	---	8.1	5.7	6.8	.4	.0	.0	7.1	3.9	5.2
28	12.1	9.5	10.9	7.8	4.6	6.2	1.1	.0	.6	9.5	5.7	7.6
29	13.9	11.0	12.1	7.4	4.2	6.0	1.8	.7	1.1	9.2	7.1	7.9
30	11.3	9.2	10.6	7.8	4.9	6.4	1.1	.0	.4	7.1	4.2	5.8
31	13.9	11.0	12.1	---	---	---	.0	.0	.0	5.7	3.2	4.1
MONTH	---	---	---	12.4	1.8	7.0	11.0	.0	4.6	9.9	.0	2.8

02011400 JACKSON RIVER NEAR BACOVA, VA--Continued

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
1	3.5	2.5	2.8	6.0	4.2	4.9	12.4	9.9	11.0	17.7	11.3	14.6
2	5.7	2.8	4.2	7.4	2.8	5.1	16.1	11.0	13.3	18.1	11.7	15.0
3	7.4	4.9	5.8	6.4	4.2	5.5	17.3	12.1	14.7	18.9	12.1	15.7
4	6.7	4.6	5.6	4.9	2.8	3.8	16.9	14.3	15.7	20.9	13.9	17.3
5	6.4	3.5	4.9	6.0	1.8	3.7	18.1	14.3	16.0	18.5	15.4	17.0
6	6.4	4.2	5.2	6.0	3.9	4.7	16.5	12.4	14.7	21.3	15.4	18.2
7	6.4	4.9	5.6	6.0	2.5	4.3	17.3	12.4	14.9	21.3	16.9	19.4
8	7.4	5.3	6.2	5.7	1.1	3.3	16.9	11.7	14.7	21.3	17.7	19.4
9	7.4	4.6	6.0	3.9	1.8	2.5	18.1	14.3	16.1	20.9	16.5	18.5
10	8.5	4.6	6.4	3.2	1.1	2.0	18.1	14.3	15.9	22.1	15.4	18.9
11	8.5	4.6	6.6	5.7	.7	3.0	16.1	13.9	14.8	22.9	16.5	20.0
12	8.1	5.3	7.0	6.4	1.4	4.0	14.3	10.2	12.1	23.8	17.3	20.7
13	5.3	2.5	3.8	6.4	1.8	4.2	13.9	8.5	11.0	21.3	18.1	19.3
14	3.9	.7	2.4	5.7	3.2	3.9	15.0	8.8	12.0	18.1	14.3	15.9
15	4.6	.4	2.6	4.2	.0	2.1	12.8	10.2	11.0	18.9	12.8	15.6
16	6.0	1.8	3.8	7.1	1.4	4.0	13.9	9.5	11.4	19.7	13.5	16.7
17	6.4	4.2	5.2	8.8	3.5	5.7	12.4	9.2	10.9	21.3	15.0	18.1
18	8.8	6.0	7.3	8.8	5.7	7.2	11.0	8.8	9.8	21.7	17.3	19.4
19	7.1	5.7	6.2	8.5	6.0	7.2	10.2	7.8	9.2	21.7	18.5	19.9
20	6.0	3.5	4.9	8.8	5.7	7.1	13.1	9.2	10.9	22.1	16.1	19.0
21	4.6	2.5	3.4	8.1	6.7	7.6	11.0	9.5	10.2	22.1	16.1	19.1
22	3.9	.7	2.3	8.1	5.3	6.6	16.5	9.5	12.8	20.1	16.5	18.6
23	2.1	.4	1.1	6.4	4.9	5.7	17.7	13.1	15.3	20.5	17.7	18.9
24	3.9	.4	2.0	8.1	6.0	7.0	19.3	13.5	16.5	20.1	17.3	18.5
25	3.5	2.5	2.9	9.9	6.4	7.9	18.5	12.4	15.5	18.5	15.0	16.7
26	6.0	1.8	3.7	10.6	6.0	8.0	16.1	12.8	14.7	18.9	14.6	16.8
27	4.9	2.5	4.0	10.2	6.0	8.2	18.1	12.8	15.5	20.5	14.6	17.5
28	6.4	4.9	5.4	11.3	6.0	8.6	16.5	12.1	14.0	21.3	15.0	18.2
29	---	---	---	10.2	6.7	8.5	13.9	11.3	12.4	22.5	15.8	19.4
30	---	---	---	12.1	6.0	9.1	16.9	11.0	13.7	23.8	17.3	20.5
31	---	---	---	11.3	6.4	9.3	---	---	---	23.3	18.5	21.0
MONTH	8.8	.4	4.5	12.1	.0	5.6	19.3	7.8	13.4	23.8	11.3	18.2

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
1	22.1	18.5	20.4	25.5	22.1	23.7	28.7	25.1	26.5	22.9	16.1	19.1
2	22.9	18.9	20.8	26.0	22.5	24.2	29.2	23.3	25.6	23.8	16.5	19.7
3	22.9	19.7	21.4	28.7	22.9	25.5	28.2	21.3	24.1	24.2	16.9	20.1
4	24.6	18.9	21.7	29.7	24.2	26.4	27.8	20.9	24.0	22.5	18.5	20.4
5	22.9	19.3	21.3	30.6	23.8	26.8	26.9	21.3	23.7	20.9	20.1	20.3
6	25.1	18.9	21.9	31.1	24.2	27.2	26.4	20.1	22.7	20.1	19.3	19.6
7	25.5	20.9	23.3	28.7	24.6	26.4	26.4	19.3	22.6	22.9	18.9	20.6
8	26.9	21.3	24.0	28.7	22.5	25.1	24.6	20.9	22.6	22.9	19.7	21.3
9	28.7	22.1	25.0	27.8	20.9	24.2	27.3	21.3	23.6	22.5	19.3	21.0
10	28.7	22.5	25.0	26.0	22.5	24.0	26.9	19.7	22.9	22.9	19.3	21.0
11	26.0	22.9	24.3	26.0	21.7	23.4	26.0	20.5	23.0	21.7	16.9	19.3
12	26.9	21.3	23.8	22.1	18.9	20.1	27.8	20.5	23.6	21.7	16.5	18.9
13	26.0	20.9	23.4	20.9	18.1	19.5	26.9	21.3	23.9	22.1	16.9	19.4
14	24.6	21.7	23.1	21.7	19.7	20.4	28.2	22.9	24.9	22.1	19.3	20.7
15	26.0	20.9	23.2	26.0	19.7	22.0	25.1	22.5	23.9	20.9	18.1	19.4
16	22.9	20.5	21.6	27.8	20.9	23.8	26.4	21.7	23.8	18.1	16.1	17.1
17	22.5	19.3	20.5	27.3	22.1	24.4	28.2	22.1	24.6	19.3	14.3	16.6
18	23.3	17.3	20.0	27.3	22.5	24.5	---	---	---	19.3	14.6	16.6
19	20.9	16.9	19.1	27.8	22.9	25.0	26.0	21.7	23.4	19.7	15.4	17.2
20	19.3	17.7	18.6	26.9	22.9	24.7	26.0	21.3	23.1	20.9	16.5	18.3
21	22.1	17.7	19.5	28.2	23.3	25.3	25.5	21.7	23.2	18.9	16.1	18.1
22	22.1	18.5	20.0	29.2	24.2	25.9	25.5	19.7	22.3	17.3	13.1	15.2
23	24.6	17.7	20.8	30.6	24.2	26.8	24.2	20.1	22.1	17.7	12.4	14.7
24	25.1	18.9	21.6	28.7	23.8	25.6	23.3	20.5	21.8	18.5	13.1	15.5
25	22.5	21.3	21.7	28.7	23.8	25.7	21.3	19.3	20.3	19.7	14.3	16.6
26	23.3	20.5	22.0	28.7	22.1	24.9	22.9	19.7	21.1	20.5	15.4	17.5
27	24.6	21.3	22.7	28.2	22.9	25.0	22.5	20.1	21.3	18.1	17.3	17.6
28	27.3	22.1	24.1	28.7	22.5	24.8	25.1	20.5	22.4	19.3	17.3	18.3
29	26.9	22.9	24.6	27.8	22.9	24.7	26.0	20.9	23.1	19.3	18.1	18.9
30	24.2	22.9	23.4	29.2	23.3	25.8	23.8	19.3	21.4	18.1	15.0	16.3
31	---	---	---	30.6	24.2	27.0	22.1	16.5	19.1	---	---	---
MONTH	28.7	16.9	22.1	31.1	18.1	24.6	---	---	---	24.2	12.4	18.5

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 mi<sup>2</sup>.

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

REVISED RECORDS.--WDR VA-85-1: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 2,200.02 ft above sea level (levels by Virginia Department of Transportation). Jul. 2 to Sep. 6, 1990, nonrecording gage at present site and datum.

REMARKS.--Records good except for period with ice effect, Jan. 5-7, which is fair. Virginia Power gage-height transmitter at station, receiver at Back Creek Dam. Maximum discharge, 17,500 ft<sup>3</sup>/s, from rating curve extended above 3,800 ft<sup>3</sup>/s. Minimum gage height, 0.07 ft, Jul. 21, 1977. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 850 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Jan 15	0630	884	3.45	Jan 24	1100	*1,080	*3.70

Minimum discharge, 0.73 ft<sup>3</sup>/s, Aug 12-13, gage height, 0.30 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.4	2.5	3.9	3.5	39	56	70	27	16	4.4	2.1	3.8
2	2.2	2.6	3.7	3.6	168	61	70	26	15	4.3	1.9	3.2
3	2.2	3.6	3.6	27	194	112	62	25	14	4.0	1.6	2.7
4	3.0	4.5	3.6	30	146	267	55	24	13	3.6	1.4	2.5
5	3.2	4.6	3.5	e16	108	175	51	23	11	3.1	1.2	24
6	3.0	4.1	3.5	e12	86	156	45	23	10	2.6	1.1	85
7	3.3	3.6	3.6	e10	81	157	41	21	9.3	2.4	.96	50
8	9.4	3.3	5.6	9.5	121	135	38	24	8.3	2.0	.97	25
9	10	3.3	12	43	126	124	39	20	7.5	1.8	1.3	16
10	6.3	3.4	11	85	106	107	42	18	7.9	1.8	1.0	12
11	4.9	4.9	8.3	47	85	84	39	17	29	2.0	1.1	9.0
12	4.2	6.1	7.0	32	77	75	42	15	16	2.0	.87	7.1
13	3.7	5.4	11	36	69	70	41	29	12	2.4	1.1	6.1
14	3.4	4.7	16	151	55	76	41	169	11	2.3	5.4	5.2
15	3.0	4.4	12	573	49	79	42	99	9.6	2.4	4.0	4.9
16	3.0	4.3	9.7	210	47	85	45	71	8.3	2.1	3.0	4.6
17	2.9	3.9	8.0	111	46	211	39	55	9.5	1.8	2.3	4.2
18	2.8	3.7	6.8	149	51	409	36	44	9.1	1.8	1.9	4.0
19	2.7	3.5	6.1	207	50	368	34	44	7.6	1.8	2.0	3.9
20	2.5	3.6	5.6	127	49	230	34	34	7.2	1.6	5.0	3.9
21	2.4	3.8	5.3	92	46	206	34	29	7.1	1.6	3.9	4.1
22	2.6	3.5	5.4	93	40	264	35	26	6.3	2.1	3.1	3.9
23	2.7	3.4	5.3	162	34	201	33	29	5.6	2.2	2.7	3.7
24	2.7	3.3	5.1	762	34	168	39	40	4.9	1.7	7.9	3.5
25	2.7	3.1	4.2	370	33	167	38	43	4.6	1.5	30	3.1
26	2.8	4.4	3.5	182	31	147	38	38	4.4	1.1	34	2.8
27	2.8	5.2	3.6	122	29	125	37	33	4.3	1.0	15	3.0
28	2.6	5.3	4.2	90	38	104	37	27	4.8	3.3	9.8	3.9
29	2.6	4.6	4.5	69	---	88	32	23	4.7	5.5	7.1	4.8
30	2.7	4.2	4.4	52	---	75	29	19	4.6	3.7	5.5	14
31	2.7	---	3.2	42	---	67	---	17	---	2.6	4.3	---
TOTAL	107.4	120.8	193.2	3918.6	2038	4649	1258	1132	282.6	76.5	163.50	323.9
MEAN	3.46	4.03	6.23	126	72.8	150	41.9	36.5	9.42	2.47	5.27	10.8
MAX	10	6.1	16	762	194	409	70	169	29	5.5	34	85
MIN	2.2	2.5	3.2	3.5	29	56	29	15	4.3	1.0	.87	2.5
CFM	.06	.07	.10	2.10	1.21	2.50	.70	.61	.16	.04	.09	.18
IN.	.07	.07	.12	2.43	1.26	2.88	.78	.70	.17	.05	.10	.20

02011460 BACK CREEK NEAR SUNRISE, VA--Continued

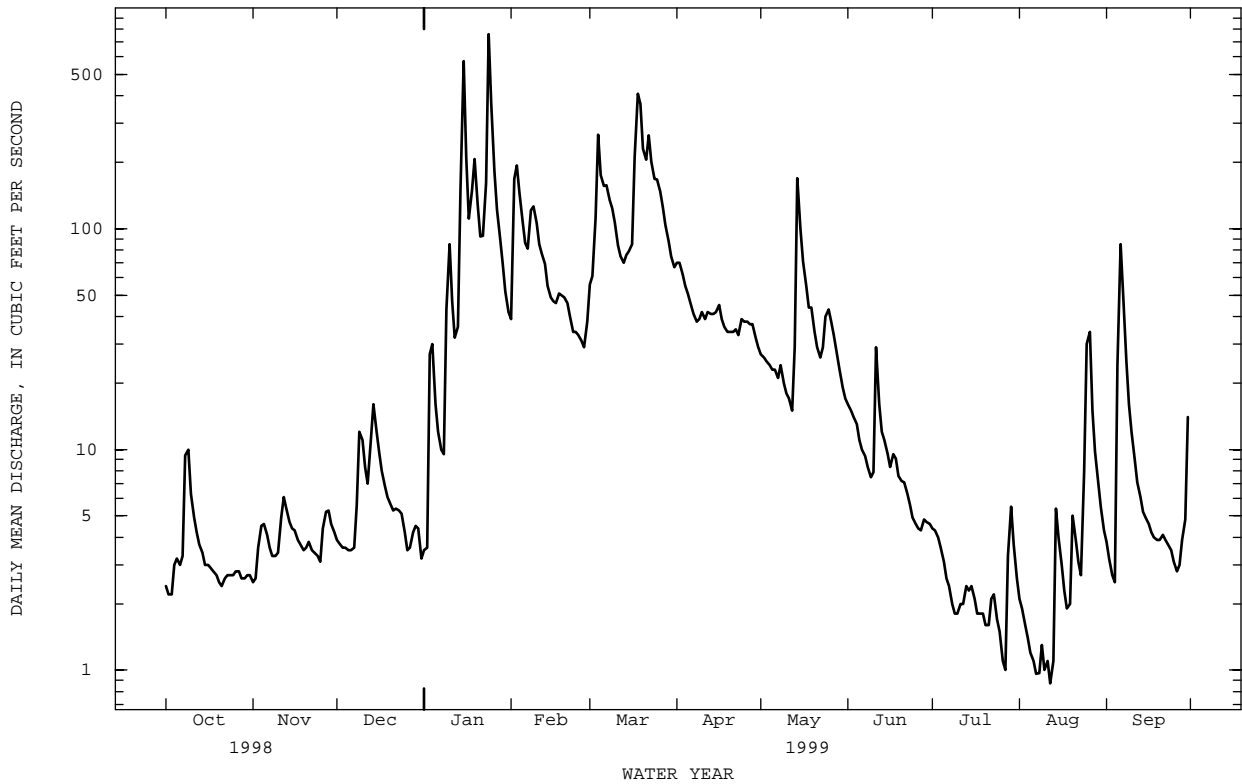
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1974 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	42.6	81.5	106	148	147	205	134	126	61.0	26.2	24.7	25.0
MAX	256	512	249	426	326	394	330	391	174	69.5	88.9	180
(WY)	1977	1986	1997	1996	1994	1993	1987	1996	1995	1994	1996	1996
MIN	3.46	4.03	6.23	8.49	45.4	54.5	41.9	31.8	9.42	2.47	4.41	2.48
(WY)	1999	1999	1999	1981	1978	1988	1999	1991	1999	1999	1987	1983

SUMMARY STATISTICS FOR 1998 CALENDAR YEAR FOR 1999 WATER YEAR WATER YEARS 1974 - 1999

ANNUAL TOTAL	32734.7	14263.50	
ANNUAL MEAN	89.7	39.1	93.8
HIGHEST ANNUAL MEAN			155 1996
LOWEST ANNUAL MEAN			39.1 1999
HIGHEST DAILY MEAN	2590 Jan 8	762 Jan 24	6280 Nov 4 1985
LOWEST DAILY MEAN	2.2 aSep 6	.87 Aug 12	.87 Aug 12 1999
ANNUAL SEVEN-DAY MINIMUM	2.4 Sep 27	1.0 Aug 6	1.0 Aug 6 1999
INSTANTANEOUS PEAK FLOW		1080 Jan 24	17500 Nov 4 1985
INSTANTANEOUS PEAK STAGE		3.70 Jan 24	10.01 Nov 4 1985
INSTANTANEOUS LOW FLOW		b.73 Aug 12	b.73 Aug 12 1999
ANNUAL RUNOFF (CFSM)	1.49	.65	1.56
ANNUAL RUNOFF (INCHES)	20.26	8.83	21.20
10 PERCENT EXCEEDS	195	109	208
50 PERCENT EXCEEDS	17	9.0	43
90 PERCENT EXCEEDS	2.8	2.4	5.8

a Also Sep 7, and Oct 2, 3, 1998.  
 b Also Aug 13, 1999.  
 e Estimated.



## 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 mi<sup>2</sup>.

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 sea level (Virginia Power bench mark). Nov. 5, 1992, to Jan. 5, 1993, nonrecording gage at present site and datum.

REMARKS.--No estimated daily discharges. Records good. 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. Maximum discharge, 5,690 ft<sup>3</sup>/s, from rating curve extended above 960 ft<sup>3</sup>/s on basis of release from Back Creek Lake at peak flow. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 1,140 ft<sup>3</sup>/s, Jan 24, gage height, 6.16 ft; minimum discharge, 1.7 ft<sup>3</sup>/s, Dec 5-7, gage height, 3.43 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	16	13	2.0	2.0	43	70	89	50	25	12	9.1	14
2	14	13	2.0	2.0	119	85	91	48	26	11	9.1	14
3	14	13	2.0	5.2	146	133	89	38	17	11	9.3	14
4	13	7.1	2.0	6.2	147	260	85	32	11	11	9.3	14
5	13	2.6	1.7	9.2	153	268	52	29	11	11	9.2	20
6	13	2.4	1.7	9.4	154	258	47	28	11	12	9.2	21
7	14	2.5	2.1	9.8	148	238	46	28	11	12	8.9	18
8	15	2.7	3.8	9.9	147	166	47	26	11	12	9.2	16
9	14	2.7	4.2	11	153	133	48	22	11	11	8.6	16
10	14	2.8	3.5	11	149	137	48	21	11	12	8.9	15
11	13	3.2	2.6	10	149	106	45	22	11	12	8.8	15
12	13	2.9	2.2	10	144	101	58	22	11	11	9.5	14
13	13	2.9	4.1	11	124	100	75	23	11	11	15	14
14	13	2.7	4.0	16	74	96	75	144	11	12	15	14
15	13	3.0	3.2	38	74	105	54	132	11	11	14	15
16	13	2.9	2.7	17	46	131	59	61	11	10	13	14
17	13	2.9	2.5	13	40	174	68	58	11	9.0	13	14
18	13	2.8	2.3	62	41	449	31	63	11	9.3	13	14
19	13	2.8	2.2	132	42	522	42	64	11	7.7	14	14
20	13	2.9	2.2	137	40	474	69	48	11	8.0	15	15
21	13	2.9	2.6	138	38	187	51	71	11	8.1	14	15
22	13	2.7	2.7	141	40	266	45	61	11	8.2	13	15
23	13	2.9	2.2	149	40	287	37	35	11	8.0	13	15
24	13	2.8	2.2	829	41	286	33	35	12	9.3	13	15
25	13	2.3	2.2	611	48	157	31	44	11	8.5	18	15
26	13	2.4	2.2	467	76	154	30	54	12	8.2	15	15
27	13	2.0	2.0	442	76	138	31	55	11	8.4	14	15
28	13	2.0	2.1	339	71	117	40	57	12	8.7	14	15
29	13	2.0	2.2	57	---	83	48	56	12	8.0	13	16
30	13	2.0	2.2	55	---	86	49	56	11	9.5	13	16
31	13	---	2.2	49	---	89	---	37	---	9.2	13	---
TOTAL	413	114.8	77.8	3798.7	2563	5856	1613	1520	369	310.1	374.1	457
MEAN	13.3	3.83	2.51	123	91.5	189	53.8	49.0	12.3	10.0	12.1	15.2
MAX	16	13	4.2	829	154	522	91	144	26	12	18	21
MIN	13	2.0	1.7	2.0	38	70	30	21	11	7.7	8.6	14



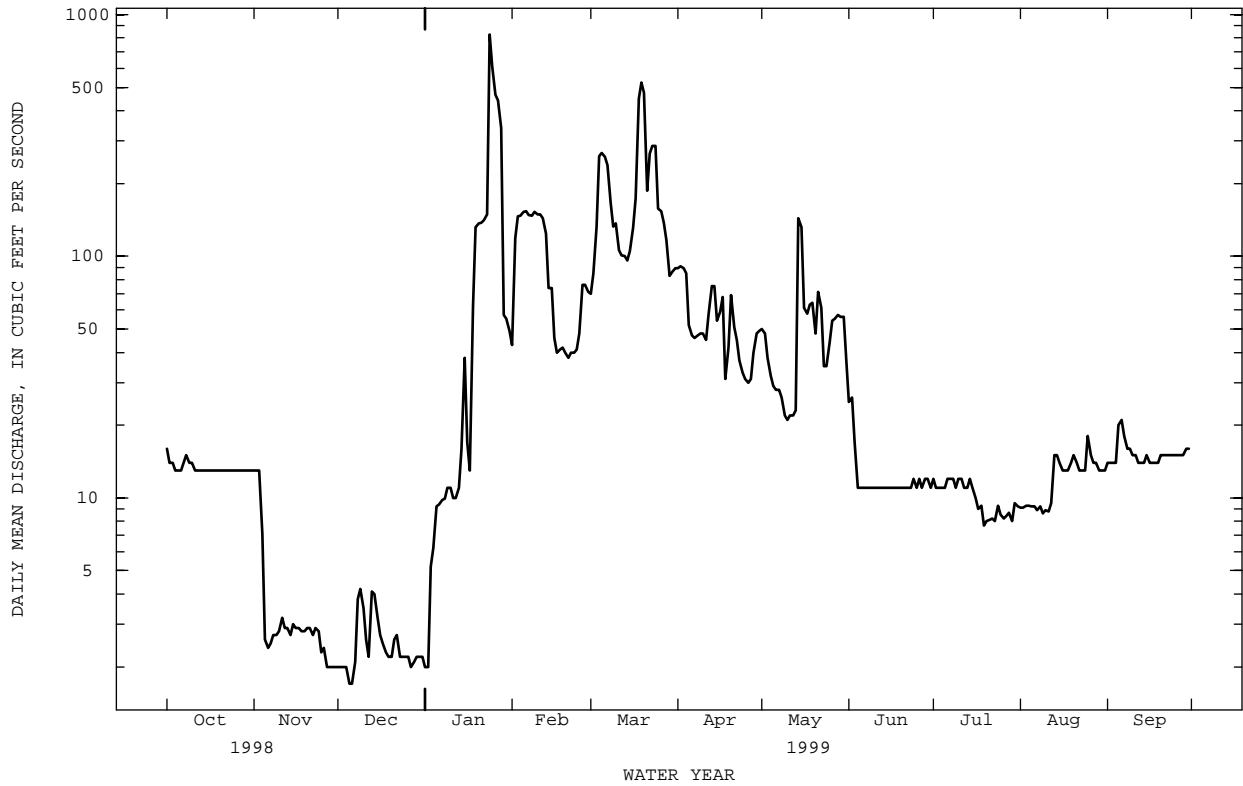
02011470 BACK CREEK AT SUNRISE, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1985 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	34.3	80.2	120	198	171	261	167	171	78.6	32.3	31.4	34.6
MAX	150	371	285	504	416	616	496	399	259	83.0	96.1	230
(WY)	1990	1986	1997	1996	1994	1993	1987	1989	1995	1994	1996	1996
MIN	9.31	3.83	2.51	14.8	58.2	61.4	51.1	37.5	12.3	10.0	12.1	11.5
(WY)	1985	1999	1999	1985	1993	1988	1986	1991	1999	1999	1999	1985

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR	WATER YEARS 1985 - 1999
ANNUAL TOTAL	44801.6	17466.5	
ANNUAL MEAN	123	47.9	115
HIGHEST ANNUAL MEAN			175 1996
LOWEST ANNUAL MEAN			47.9 1999
HIGHEST DAILY MEAN	3010 Jan 8	829 Jan 24	4890 Jan 19 1996
LOWEST DAILY MEAN	1.7 aDec 5	1.7 aDec 5	1.7 aDec 5 1998
ANNUAL SEVEN-DAY MINIMUM	1.9 Nov 30	1.9 Nov 30	1.9 Nov 30 1998
INSTANTANEOUS PEAK FLOW		1140 Jan 24	5690 Jan 19 1996
INSTANTANEOUS PEAK STAGE		6.16 Jan 24	11.99 Jan 19 1996
INSTANTANEOUS LOW FLOW		1.7 bDec 5	1.7 bDec 5 1998
ANNUAL RUNOFF (CFSM)	1.61	.63	1.51
ANNUAL RUNOFF (INCHES)	21.90	8.54	20.49
10 PERCENT EXCEEDS	280	137	249
50 PERCENT EXCEEDS	16	14	41
90 PERCENT EXCEEDS	2.7	2.7	14

a Also Dec 6, 1998.  
 b Also Dec 6, 7, 1998.



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 mi<sup>2</sup>.

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 sea level (Virginia Power bench mark). Nov. 5, 1992, to Jan. 5, 1993, nonrecording gage at present site and datum.

REMARKS.--No estimated daily discharges. Records good. Flow regulated since January 1985 by Little Back Creek Lake 1.2 mi upstream, amount unknown. Maximum discharge, 580 ft<sup>3</sup>/s, from rating curve extended above 30 ft<sup>3</sup>/s on basis of slope-area measurement of peak flow. Minimum gage height, 0.62 ft, Nov. 16, 1994. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 39 ft<sup>3</sup>/s, Jan 24, gage height, 2.53 ft; minimum discharge, 0.74 ft<sup>3</sup>/s, Jul 10, gage height, 0.62 ft, result of regulation.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.1	2.5	2.0	1.9	3.5	4.7	3.9	3.3	1.9	1.4	2.0	2.2
2	2.5	2.6	2.0	1.9	7.5	5.3	3.5	3.2	1.9	1.6	2.0	2.4
3	2.4	2.5	1.9	3.0	8.8	7.9	3.1	3.1	1.7	1.7	2.0	3.3
4	2.8	2.2	1.8	3.0	7.2	12	3.2	3.1	4.0	1.8	1.9	2.1
5	2.9	2.1	1.8	3.0	5.5	9.2	3.2	2.9	1.6	1.8	2.1	3.4
6	2.9	1.9	1.7	3.0	4.7	7.9	3.1	2.8	2.0	1.9	2.0	4.9
7	3.0	1.8	1.8	3.0	4.4	8.0	2.8	2.7	1.9	1.8	1.9	3.6
8	3.9	1.7	2.3	3.0	5.5	7.4	2.7	2.7	2.1	1.8	2.0	2.8
9	3.1	1.7	2.6	3.3	5.4	6.7	2.9	2.4	1.9	3.4	2.1	2.6
10	2.8	1.8	2.3	4.1	4.8	5.5	2.6	2.3	2.0	1.2	2.1	2.4
11	2.8	1.9	2.2	4.1	4.5	4.9	2.6	2.3	3.5	1.4	2.1	2.3
12	3.0	1.9	1.9	3.9	4.5	4.5	2.5	2.3	1.7	1.6	1.9	2.2
13	3.8	1.9	2.2	3.5	4.3	4.4	2.6	2.9	1.6	1.7	2.1	2.2
14	2.5	1.9	2.3	7.6	4.1	4.5	2.3	4.7	1.9	1.7	2.5	2.1
15	2.8	1.9	2.2	21	4.0	4.8	2.4	5.3	1.8	1.6	2.3	2.1
16	2.8	1.9	2.1	11	3.9	4.8	2.5	4.9	1.9	1.8	2.0	1.9
17	2.7	2.0	2.0	6.8	3.9	9.0	2.3	4.4	2.2	1.9	2.0	2.1
18	2.7	3.3	1.9	7.5	4.0	16	2.2	3.9	1.9	2.0	2.1	2.1
19	4.9	1.4	1.9	9.9	4.1	15	2.3	3.5	1.9	2.3	2.1	2.0
20	2.0	1.5	1.8	7.8	4.1	10	2.5	4.2	1.9	1.9	2.3	2.0
21	2.5	1.6	1.8	6.5	4.0	9.4	2.7	2.0	1.9	1.8	2.1	2.0
22	2.7	1.7	2.0	6.4	3.9	11	2.6	2.3	1.9	2.0	2.1	1.9
23	2.7	1.7	2.1	8.9	3.6	9.2	3.1	2.3	1.9	1.9	1.9	2.2
24	2.7	1.7	2.0	31	3.4	7.4	2.8	4.0	2.0	2.3	2.1	1.7
25	2.6	1.7	1.9	17	3.2	6.8	2.2	3.2	2.0	2.3	3.8	1.6
26	2.8	1.9	1.8	9.2	3.0	8.3	2.4	3.3	2.0	3.6	3.8	1.7
27	3.0	1.8	1.8	6.3	2.7	5.0	2.6	3.0	2.0	1.7	2.7	1.9
28	2.9	1.8	1.8	4.9	3.3	4.3	3.2	2.6	2.1	2.4	2.3	1.9
29	4.3	1.8	1.9	4.2	---	4.3	3.3	2.2	2.0	2.7	2.3	2.2
30	2.2	2.0	1.9	3.7	---	4.1	3.3	2.1	3.2	2.4	2.2	3.0
31	2.4	---	1.9	3.3	---	3.9	---	2.0	---	2.3	2.0	---
TOTAL	89.2	58.1	61.6	213.7	125.8	226.2	83.4	95.9	62.3	61.7	68.8	70.8
MEAN	2.88	1.94	1.99	6.89	4.49	7.30	2.78	3.09	2.08	1.99	2.22	2.36
MAX	4.9	3.3	2.6	31	8.8	16	3.9	5.3	4.0	3.6	3.8	4.9
MIN	2.0	1.4	1.7	1.9	2.7	3.9	2.2	2.0	1.6	1.2	1.9	1.6

02011490 LITTLE BACK CREEK NEAR SUNRISE, VA--Continued

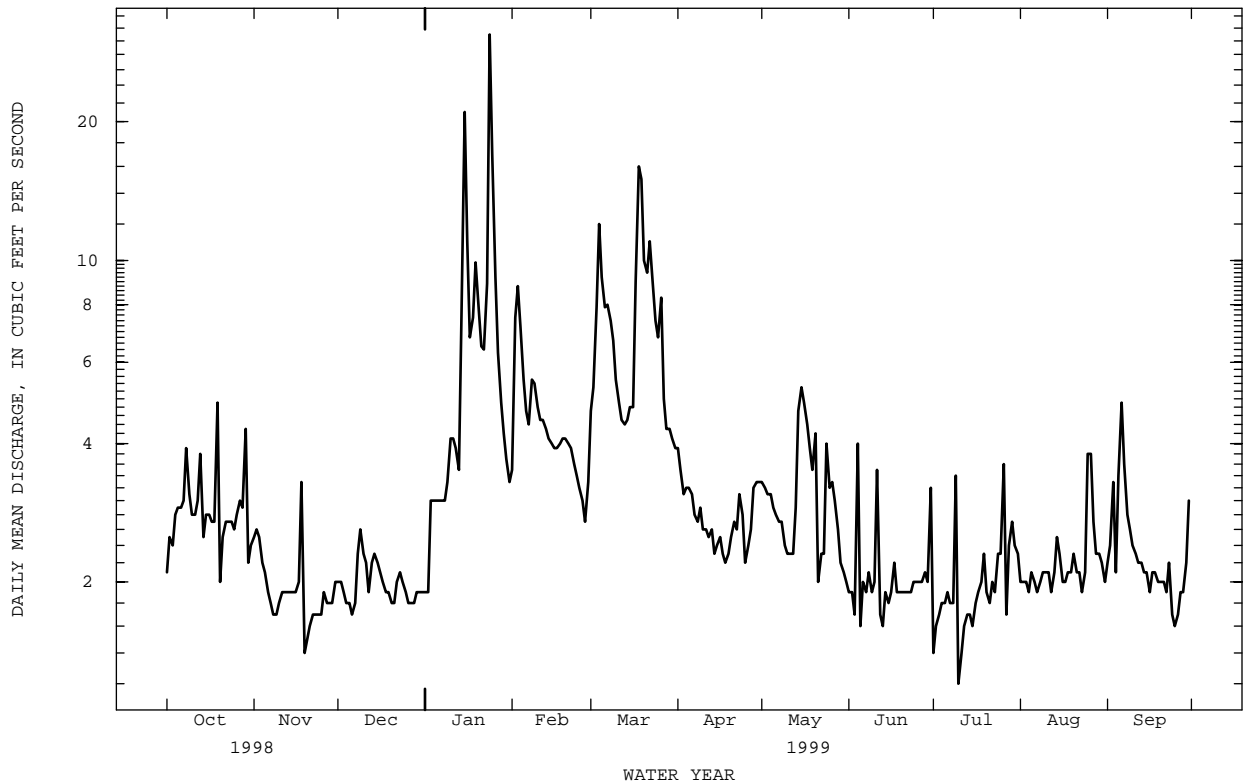
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1985 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	3.55	5.03	5.73	7.70	7.04	8.64	6.56	6.88	4.40	3.38	3.35	3.34
MAX	7.46	12.6	9.65	15.7	12.9	16.4	13.1	14.8	8.41	4.95	5.13	7.29
(WY)	1990	1986	1997	1996	1994	1993	1987	1985	1995	1994	1989	1996
MIN	2.17	1.94	1.99	3.56	3.78	3.91	2.78	3.09	2.08	1.99	2.22	2.28
(WY)	1987	1999	1999	1985	1993	1985	1999	1999	1999	1999	1999	1985

SUMMARY STATISTICS FOR 1998 CALENDAR YEAR FOR 1999 WATER YEAR WATER YEARS 1985 - 1999

ANNUAL TOTAL	2189.4	1217.5	
ANNUAL MEAN	6.00	3.34	5.46
HIGHEST ANNUAL MEAN			7.00 1996
LOWEST ANNUAL MEAN			3.34 1999
HIGHEST DAILY MEAN	77 Jan 8	31 Jan 24	158 Nov 4 1985
LOWEST DAILY MEAN	1.4 Nov 19	1.2 Jul 10	.90 Oct 13 1984
ANNUAL SEVEN-DAY MINIMUM	1.6 Nov 19	1.6 Jul 10	1.2 Jan 24 1985
INSTANTANEOUS PEAK FLOW		39 Jan 24	580 Nov 4 1985
INSTANTANEOUS PEAK STAGE		2.53 Jan 24	4.06 Nov 4 1985
INSTANTANEOUS LOW FLOW		a.74 Jul 10	a.74 Jul 10 1999
ANNUAL RUNOFF (CFSM)	1.22	.68	1.11
ANNUAL RUNOFF (INCHES)	16.59	9.22	15.12
10 PERCENT EXCEEDS	11	5.5	9.3
50 PERCENT EXCEEDS	3.8	2.4	3.9
90 PERCENT EXCEEDS	1.9	1.8	2.5

a Result of regulation.



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 mi<sup>2</sup>.

## 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 sea level.

REMARKS.--Records good except for period with ice effect, Jan. 6-8, 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. Statistics of monthly mean data and summary statistics for water years 1952-1984 (unregulated flow) are available in previous data books, water years 1991-1998. Diversion 10.5 mi upstream from station by Virginia Power for recreation lakes, net averages 0.5 ft<sup>3</sup>/s. U.S. Army Corps of Engineers satellite water temperature and gage-height telemeter at station. Maximum discharge, 18,400 ft<sup>3</sup>/s, from rating curve extended above 14,000 ft<sup>3</sup>/s on basis of slope-area measurement of peak flow.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 1,700 ft<sup>3</sup>/s, Jan 24, gage height, 5.46 ft; minimum discharge, 5.3 ft<sup>3</sup>/s, Dec 30, gage height, 1.74 ft, result of freezeup.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	18	19	9.2	11	79	106	129	90	37	15	16	22
2	18	19	9.4	11	303	118	125	84	36	14	16	21
3	17	24	8.9	27	340	186	122	73	35	14	16	20
4	17	22	9.2	28	279	418	117	63	22	14	15	19
5	17	12	9.4	24	248	424	91	54	21	13	15	78
6	17	9.8	9.5	e24	231	414	75	51	20	13	14	213
7	18	9.4	9.5	e23	224	408	73	48	19	14	14	130
8	25	9.3	14	e22	236	326	72	52	18	14	14	76
9	20	9.1	18	31	248	247	73	42	18	13	14	51
10	19	8.9	15	38	232	232	71	40	17	13	14	39
11	19	11	13	33	220	188	69	40	17	14	13	32
12	19	9.4	12	31	209	170	70	38	16	14	13	27
13	19	8.9	17	33	190	167	89	43	16	14	13	24
14	19	8.9	20	85	119	169	90	138	16	14	16	23
15	19	11	18	467	112	195	82	162	16	14	19	21
16	19	15	16	188	94	268	69	104	15	13	19	20
17	19	9.9	15	97	78	454	90	80	17	12	19	19
18	19	9.9	14	133	86	785	57	83	15	12	18	18
19	19	11	13	280	92	816	44	87	15	13	17	18
20	19	12	13	242	91	675	83	67	15	10	21	17
21	19	9.6	13	219	85	402	75	87	15	11	22	17
22	19	10	13	223	81	470	62	86	14	11	22	16
23	19	8.4	12	305	78	464	58	57	14	11	21	15
24	20	8.6	12	1310	76	435	50	62	14	11	21	14
25	19	10	11	907	75	291	46	64	14	25	45	14
26	19	9.1	11	642	100	263	43	77	15	15	60	13
27	19	9.1	11	553	102	218	44	75	15	15	43	13
28	19	8.9	11	479	103	193	68	74	15	16	34	17
29	19	9.4	12	125	---	136	96	71	15	18	30	20
30	19	9.6	11	102	---	130	95	69	15	17	26	45
31	19	---	11	89	---	127	---	59	---	16	23	---
TOTAL	586	342.2	391.1	6782	4411	9895	2328	2220	547	433	663	1072
MEAN	18.9	11.4	12.6	219	158	319	77.6	71.6	18.2	14.0	21.4	35.7
MAX	25	24	20	1310	340	816	129	162	37	25	60	213
MIN	17	8.4	8.9	11	75	106	43	38	14	10	13	13

02011500 BACK CREEK NEAR MOUNTAIN GROVE, VA--Continued

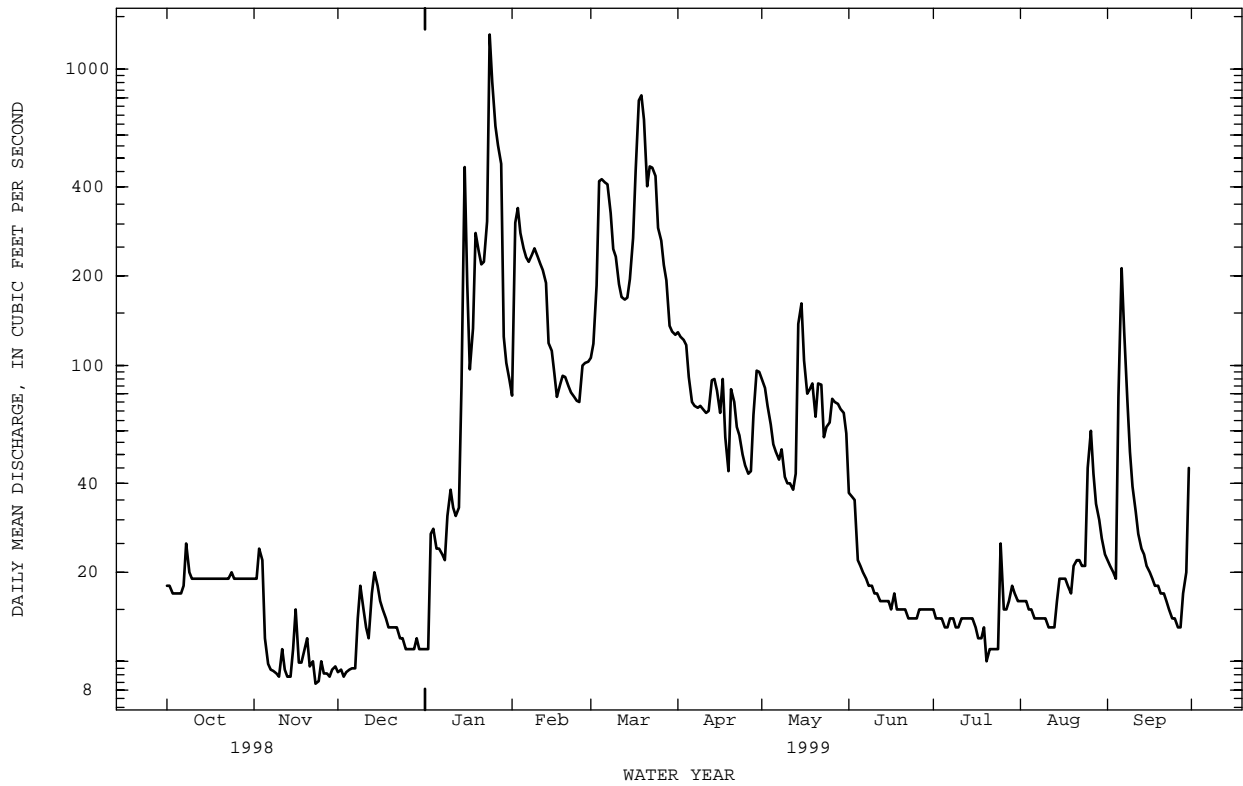
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1985 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	52.2	136	188	317	285	400	260	250	118	48.3	44.7	50.8
MAX	246	696	392	818	608	833	824	528	351	105	127	300
(WY)	1990	1986	1997	1996	1998	1993	1987	1996	1995	1994	1989	1996
MIN	18.9	11.4	12.6	77.7	107	92.8	77.6	62.9	18.2	14.0	17.9	16.5
(WY)	1999	1999	1999	1986	1993	1988	1999	1991	1999	1999	1987	1985

SUMMARY STATISTICS FOR 1998 CALENDAR YEAR FOR 1999 WATER YEAR WATER YEARS 1985 - 1999

ANNUAL TOTAL	75116.3	29670.3	
ANNUAL MEAN	206	81.3	179
HIGHEST ANNUAL MEAN			262
LOWEST ANNUAL MEAN			81.3
HIGHEST DAILY MEAN	4450	Jan 8	9940
LOWEST DAILY MEAN	8.4	Nov 23	8.4
ANNUAL SEVEN-DAY MINIMUM	9.1	Nov 23	9.1
INSTANTANEOUS PEAK FLOW			1700
INSTANTANEOUS PEAK STAGE			5.46
INSTANTANEOUS LOW FLOW			a5.3
ANNUAL RUNOFF (CFSM)	1.54		1.33
ANNUAL RUNOFF (INCHES)	20.85		8.24
10 PERCENT EXCEEDS	487		223
50 PERCENT EXCEEDS	42		21
90 PERCENT EXCEEDS	12		11

a Result of freezep. e Estimated.



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 record due to instrument malfunction. Some record in prior years fragmentary due to instrument malfunction. Records represent water temperature at sensor within 0.5°C. Temperature at the sensor was compared with the average for the creek by temperature cross section on Jun. 28, 1995. No variation of temperature was found within the cross section.

## 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, 31.6°C, Jul 23, 31; minimum recorded, 0.0°C, Dec 31, Jan 1-14, Mar 15.

## TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DAY	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
1	22.1	16.9	18.9	13.9	8.1	10.8	11.3	5.3	7.4	2.1	.0	.7
2	19.3	12.4	15.4	11.0	9.2	10.2	7.8	3.5	5.1	.4	.0	.3
3	15.4	12.1	13.9	10.6	9.9	10.2	6.4	3.9	5.2	.4	.0	.0
4	18.1	14.3	15.9	11.0	7.4	9.4	8.5	6.0	7.2	.4	.0	.0
5	19.3	16.1	17.3	10.6	2.5	6.2	8.5	6.4	7.6	.7	.0	.0
6	17.7	16.9	17.3	6.0	4.2	5.0	11.3	8.1	9.3	.0	.0	.0
7	16.9	16.1	16.5	9.5	3.9	5.6	10.6	7.8	9.3	.0	.0	.0
8	17.7	15.8	16.7	5.7	3.9	4.8	11.0	9.9	10.4	.0	.0	.0
9	17.7	14.3	15.5	9.2	5.3	6.7	11.3	6.4	9.1	.0	.0	.0
10	18.1	13.9	15.5	9.2	6.4	7.7	8.1	4.6	6.2	.0	.0	.0
11	18.9	13.1	15.4	13.5	7.1	9.8	7.4	4.2	5.6	.0	.0	.0
12	18.1	12.4	14.8	10.2	4.6	6.7	5.3	3.5	4.5	.4	.0	.0
13	17.3	12.8	14.7	7.8	4.6	6.1	6.4	4.9	5.5	.4	.0	.0
14	16.9	11.0	13.4	7.8	4.6	6.2	7.4	3.9	5.3	3.2	.0	.9
15	15.8	9.5	12.1	11.0	6.4	8.1	4.9	3.2	3.8	4.2	2.5	3.5
16	16.1	9.5	12.4	9.2	4.9	6.9	5.7	2.8	3.9	4.6	1.8	2.9
17	17.3	11.0	13.6	8.5	5.3	6.9	4.2	2.8	3.7	4.2	1.8	3.1
18	17.7	12.1	14.5	9.9	4.2	6.6	4.9	1.4	3.2	5.3	3.9	4.3
19	16.9	14.3	15.4	8.1	4.2	6.3	4.6	2.1	3.7	5.7	3.2	4.3
20	18.1	12.4	14.3	8.1	6.0	7.1	7.1	4.6	5.6	6.4	4.2	5.1
21	15.8	10.6	12.4	8.8	4.2	5.9	7.4	4.2	5.8	6.0	4.6	5.3
22	13.5	8.8	11.1	6.0	1.8	3.7	6.7	2.8	5.2	8.1	5.3	6.5
23	13.1	6.4	8.9	6.7	1.4	4.1	2.8	1.8	2.3	8.8	7.1	8.0
24	13.1	6.4	9.2	11.0	4.9	7.2	2.8	1.4	2.1	7.4	6.0	7.0
25	12.4	7.1	9.6	6.7	3.5	5.2	4.2	.7	1.6	6.7	5.3	6.0
26	---	---	---	9.2	5.7	6.9	3.5	.7	1.2	7.8	5.3	6.1
27	---	---	---	10.6	5.3	6.8	2.1	.7	1.0	8.1	4.9	6.2
28	12.8	9.2	11.2	8.8	3.9	5.7	1.4	.4	.9	8.8	6.4	7.4
29	16.1	11.3	12.8	8.1	3.5	5.5	1.8	1.1	1.4	7.4	5.3	6.4
30	11.7	8.5	10.5	8.5	4.2	6.0	2.5	.4	1.0	6.7	3.2	5.0
31	16.5	11.0	12.6	---	---	---	1.4	.0	.6	5.3	3.2	4.0
MONTH	---	---	---	13.9	1.4	6.8	11.3	.0	4.7	8.8	.0	3.0

02011500 BACK CREEK NEAR MOUNTAIN GROVE, VA--Continued

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DAY	FEBRUARY			MARCH			APRIL			MAY		
	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
1	3.5	2.5	3.0	6.0	3.9	5.0	10.2	8.1	9.2	17.3	9.2	13.1
2	6.4	3.5	5.1	8.1	2.8	5.4	14.6	8.1	11.1	17.7	9.2	13.4
3	7.8	4.9	6.1	6.4	4.2	5.3	15.0	8.1	11.6	18.5	9.5	14.0
4	7.4	4.6	5.6	5.7	3.5	4.3	13.9	9.9	12.1	20.1	11.3	15.4
5	7.4	3.9	5.4	7.4	3.2	4.9	15.8	9.9	12.7	16.5	12.4	14.8
6	6.7	4.9	5.8	6.0	4.6	5.2	14.6	9.2	12.2	20.9	13.1	16.5
7	6.7	5.3	5.9	7.1	3.2	4.6	15.8	9.2	12.7	20.5	14.3	17.4
8	7.8	5.7	6.4	6.7	2.1	4.3	15.4	8.8	12.4	19.3	15.4	17.2
9	8.1	4.6	6.1	4.6	2.1	3.0	16.9	11.7	14.0	19.3	13.9	16.5
10	8.8	4.6	6.4	4.6	2.8	3.6	16.5	12.1	13.9	22.1	12.8	17.2
11	9.2	4.2	6.6	7.1	1.8	4.1	14.6	11.0	12.6	23.3	14.3	18.4
12	7.8	4.2	6.5	7.4	1.8	4.3	12.4	8.8	10.4	23.8	15.0	19.0
13	5.3	3.2	4.0	7.1	1.8	4.4	13.9	6.7	10.0	19.3	15.8	17.3
14	5.7	1.8	3.4	5.7	2.8	3.7	14.6	7.1	10.9	16.1	12.8	14.3
15	6.4	1.4	4.0	6.0	.0	3.2	12.1	8.8	9.4	18.9	11.3	14.6
16	7.1	2.5	4.8	8.1	2.1	4.7	14.6	8.5	11.0	19.3	11.0	15.0
17	7.1	4.6	5.9	8.8	3.2	5.5	11.3	7.8	9.8	20.5	12.8	16.7
18	9.2	6.4	7.5	8.5	4.2	5.9	10.2	7.8	9.1	20.5	15.0	17.7
19	6.7	4.6	5.4	8.1	4.6	5.9	10.6	6.7	8.6	20.1	15.8	17.9
20	6.0	2.5	4.2	8.5	4.2	5.9	13.1	8.8	10.7	21.7	13.1	17.0
21	4.9	2.1	3.3	6.7	5.3	6.0	11.3	8.1	9.4	20.9	13.5	17.3
22	4.2	.4	2.3	8.1	4.2	5.7	17.3	8.5	12.4	18.5	13.9	16.3
23	2.5	.4	1.5	6.4	4.2	5.3	16.9	11.7	14.3	20.1	15.4	17.3
24	5.3	1.1	3.0	7.8	5.7	6.5	19.3	12.1	15.3	19.7	15.4	17.2
25	4.6	2.8	3.8	9.5	4.6	6.7	18.1	9.5	13.8	19.3	13.1	15.8
26	7.1	2.5	4.5	9.9	4.2	6.7	15.4	10.2	13.0	18.9	12.8	15.7
27	6.0	2.5	4.5	9.9	4.6	6.8	18.5	11.0	14.5	20.1	12.8	16.2
28	7.1	5.3	5.9	11.0	4.2	7.3	15.8	11.0	13.0	20.9	12.8	16.8
29	---	---	---	9.5	4.6	7.0	12.8	9.9	11.2	22.1	13.9	17.8
30	---	---	---	11.3	4.2	7.7	16.9	9.5	12.7	22.9	15.0	18.8
31	---	---	---	10.6	4.2	7.7	---	---	---	22.1	16.1	19.1
MONTH	9.2	.4	4.9	11.3	.0	5.4	19.3	6.7	11.8	23.8	9.2	16.5
DAY	JUNE			JULY			AUGUST			SEPTEMBER		
	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
1	20.9	16.5	18.8	26.4	21.3	23.4	29.2	23.3	25.8	23.3	14.6	18.3
2	22.1	17.3	19.5	26.9	21.7	23.5	30.6	21.7	24.7	24.2	15.4	19.2
3	22.5	17.7	20.0	29.7	21.3	24.6	29.2	19.3	23.2	24.6	15.8	19.6
4	25.1	16.5	20.2	30.6	22.5	25.8	27.8	19.3	22.9	22.1	17.7	20.0
5	23.3	16.9	20.1	31.1	22.1	25.9	27.8	19.7	22.7	21.3	19.7	20.5
6	26.4	16.9	20.9	31.1	22.5	26.3	26.9	18.1	21.7	20.5	19.7	19.9
7	26.9	18.9	22.3	29.2	22.9	25.2	27.8	17.7	22.0	24.6	19.3	21.2
8	27.8	19.3	22.9	29.2	19.7	23.7	23.3	19.7	21.7	24.6	18.9	21.3
9	28.7	19.7	23.6	28.7	19.3	23.1	28.7	20.5	23.2	22.1	17.7	20.1
10	28.7	20.5	23.7	26.9	20.9	23.3	28.2	17.7	22.0	23.8	18.1	20.4
11	26.9	20.9	23.3	26.4	20.5	22.7	27.3	19.3	22.4	22.1	15.0	18.3
12	28.2	19.7	23.0	21.3	17.7	18.8	28.2	19.3	23.0	22.1	15.0	18.1
13	25.1	18.9	21.8	20.9	16.9	18.7	26.0	20.1	23.0	22.1	15.8	18.7
14	23.3	19.7	21.6	21.7	18.5	19.9	29.2	22.1	24.3	22.5	18.5	20.2
15	26.0	19.3	21.9	25.5	18.9	21.6	25.1	20.9	22.9	20.5	17.3	18.8
16	21.7	19.3	20.2	27.8	19.3	22.8	27.3	20.5	23.1	18.1	15.8	16.7
17	22.5	17.7	19.5	26.9	20.5	23.5	29.2	20.5	23.8	20.5	13.5	16.4
18	24.6	15.4	19.0	26.0	20.5	22.9	28.7	20.5	23.7	19.3	13.1	15.8
19	20.9	14.6	17.8	27.8	20.9	23.7	26.4	20.9	23.0	19.7	14.3	16.6
20	18.9	16.1	17.4	26.4	21.3	23.5	26.0	20.1	22.5	20.9	15.8	17.9
21	24.2	16.5	19.5	27.8	21.7	24.1	26.4	20.1	22.3	18.9	15.8	17.3
22	24.2	17.7	20.2	28.7	22.5	24.8	26.4	18.1	21.3	18.5	12.1	14.8
23	26.9	16.1	20.5	31.6	22.9	25.9	25.5	18.9	21.6	18.1	10.6	13.9
24	26.0	17.3	21.0	28.2	21.7	24.4	22.5	20.1	21.3	18.9	12.1	14.8
25	21.7	20.1	21.1	30.1	22.5	25.1	20.9	19.3	20.1	19.7	12.4	15.7
26	23.8	19.7	21.6	29.7	19.7	23.9	24.2	19.7	21.6	20.5	13.5	16.7
27	25.5	20.1	22.3	29.2	21.7	24.3	22.1	19.3	20.9	17.7	16.1	17.0
28	27.3	21.7	23.8	27.3	21.3	23.6	26.4	19.7	22.2	19.3	17.3	18.2
29	27.3	22.1	24.1	29.7	21.3	24.1	26.0	19.7	22.3	19.3	18.1	18.8
30	24.2	21.7	22.6	31.1	21.7	25.1	24.6	18.1	20.7	19.3	15.0	16.7
31	---	---	---	31.6	22.9	26.2	22.1	15.0	18.1	---	---	---
MONTH	28.7	14.6	21.1	31.6	16.9	23.7	30.6	15.0	22.4	24.6	10.6	18.1

## JAMES RIVER BASIN

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 Gath-right 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 mi<sup>2</sup>.

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

GAGE.--Water-stage recorder. Datum of gage is at sea level (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. U.S. Army Corps of Engineers satellite precipitation and elevation telemeter at station.

COOPERATION.--Records were provided by the U.S. Army Corps of Engineers.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 168,400 acre-ft, Jan. 20, 1996, elevation, 1,598.4 ft; minimum, (after first filling to minimum conservation pool), 68,500 acre-ft, Jan. 8-14, 1999, elevation, 1,557.0 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 124,800 acre-ft, Mar. 22, elevation, 1,582.4 ft; minimum, 68,500 acre-ft, Jan. 8-14, elevation, 1,557.0 ft.

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MONTHEND ELEVATION AND CONTENTS AT 2400, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

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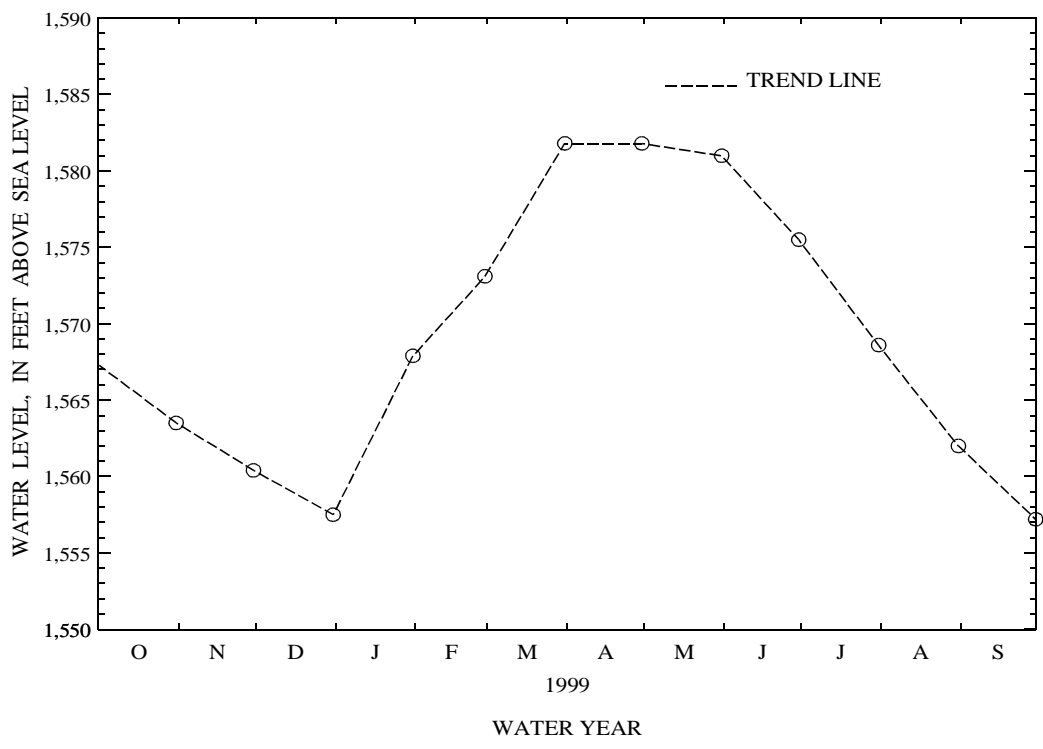
Date	Elevation (feet)	Contents (acre-feet)	Change in contents (acre-feet)
Sep. 30.....	1,567.4	89,500	-
Oct. 31.....	1,563.5	81,300	-8,200
Nov. 30.....	1,560.4	75,000	-6,300
Dec. 31.....	1,557.5	69,400	-5,600
CAL YR 1998.....			-14,600
Jan. 31.....	1,567.9	90,600	+21,200
Feb. 28.....	1,573.1	102,200	+11,600
Mar. 31.....	1,581.8	123,200	+21,000
Apr. 30.....	1,581.8	123,200	0
May 31.....	1,581.0	121,200	-2,000
Jun. 30.....	1,575.5	107,800	-13,400
Jul. 31.....	1,568.6	92,100	-15,700
Aug. 31.....	1,562.0	78,200	-13,900
Sep. 30.....	1,557.2	68,900	-9,300
WTR YR 1999.....			-20,600

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JAMES RIVER BASIN

02011795 LAKE MOOMAW NEAR HOT SPRINGS, VA--Continued



02011800 JACKSON RIVER BELOW GATHRIGHT DAM, NEAR HOT SPRINGS, VA

LOCATION.--Lat 37°56'54", lon 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 Lake Moomaw, and 7.3 mi southwest of Hot Springs.

DRAINAGE AREA.--345 mi<sup>2</sup>.

## 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 sea level (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 Lake Moomaw (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. Statistics of monthly mean data and summary statistics for water years 1974-1979 (unregulated flow) are available in previous data books, water years 1991-1998. U.S. Army Corps of Engineers satellite water-quality and gage-height telemeter at station. Maximum discharge, 29,000 ft<sup>3</sup>/s, result of cofferdam failure during construction of Gathright Dam, from rating curve extended above 9,200 ft<sup>3</sup>/s on basis of slope-area measurement of peak flow. Minimum discharge, 3.0 ft<sup>3</sup>/s, Jul. 12, 1979, result of gate closure at Gathright Dam, gage height, 7.78 ft.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Jun. 21, 1972, reached a stage of 17.20 ft, from floodmark.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 1,100 ft<sup>3</sup>/s, Mar 23, gage height, 10.63 ft; minimum discharge, 11 ft<sup>3</sup>/s, Apr 8, gage height, 7.88 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	219	199	167	167	162	162	257	217	278	300	295	269
2	202	199	167	167	162	162	256	217	278	300	292	260
3	202	167	167	168	162	162	257	217	280	299	292	260
4	202	166	167	167	160	162	256	244	283	298	292	260
5	202	169	167	168	159	162	259	218	285	296	292	226
6	202	171	168	167	160	162	260	220	285	299	292	198
7	202	170	167	167	160	164	237	223	285	300	292	260
8	202	170	167	167	160	164	190	226	292	300	292	260
9	202	170	167	167	159	164	214	226	293	300	292	260
10	202	170	167	164	159	164	214	226	292	300	291	260
11	202	170	167	161	159	165	214	226	289	300	290	260
12	201	170	167	159	159	164	214	226	288	300	292	260
13	201	170	167	159	160	165	214	226	289	300	292	258
14	202	170	167	159	159	165	214	227	288	300	292	256
15	201	170	167	160	159	167	214	226	289	300	292	256
16	201	170	166	159	159	167	214	226	288	300	292	256
17	201	170	165	159	160	168	214	226	289	300	292	256
18	201	170	165	159	161	170	214	226	288	299	292	256
19	201	170	167	159	161	341	206	227	288	298	292	256
20	201	170	168	159	162	513	194	226	288	298	292	256
21	201	169	168	159	162	513	190	229	287	300	292	256
22	201	169	167	159	162	846	190	227	285	300	290	256
23	201	168	167	161	162	1090	190	226	285	300	291	256
24	201	167	167	162	162	1090	190	226	285	300	292	256
25	201	167	168	164	162	801	190	227	285	300	294	256
26	200	168	168	161	162	548	190	226	285	300	292	256
27	198	167	168	159	162	523	190	226	285	300	292	256
28	198	167	167	159	162	522	189	226	285	300	292	230
29	199	167	167	159	---	367	190	226	285	300	292	199
30	199	167	167	160	---	257	200	226	291	300	292	201
31	199	---	167	161	---	257	---	252	---	300	292	---
TOTAL	6247	5127	5178	5026	4498	10627	6421	7013	8593	9287	9051	7505
MEAN	202	171	167	162	161	343	214	226	286	300	292	250
MAX	219	199	168	168	162	1090	260	252	293	300	295	269
MIN	198	166	165	159	159	162	189	217	278	296	290	198
(†)	-4134	-3176	-2823	+10688	+5848	+10587	0	-1008	-6756	-7915	-7008	-4689
MEAN†	68.2	65.0	76.0	507	370	684	214	194	61.2	44.3	65.9	93.9
CFSM†	.20	.19	.22	1.47	1.07	1.98	.62	.56	.18	.13	.19	.27
IN.†	.23	.21	.25	1.69	1.12	2.29	.69	.65	.20	.15	.22	.30

CAL YR 1998 TOTAL 191983 MEAN 526 MAX 5440 MIN 156 MEAN† 506 CFSM† 1.47 IN.† 19.91  
WTR YR 1999 TOTAL 84573 MEAN 232 MAX 1090 MIN 159 MEAN† 203 CFSM† 0.59 IN.† 7.99

† Total change of contents, equivalent in cubic feet per second, per month, in Lake Moomaw; provided by U.S. Army Corps of Engineers.

‡ Adjusted for monthly change in contents.

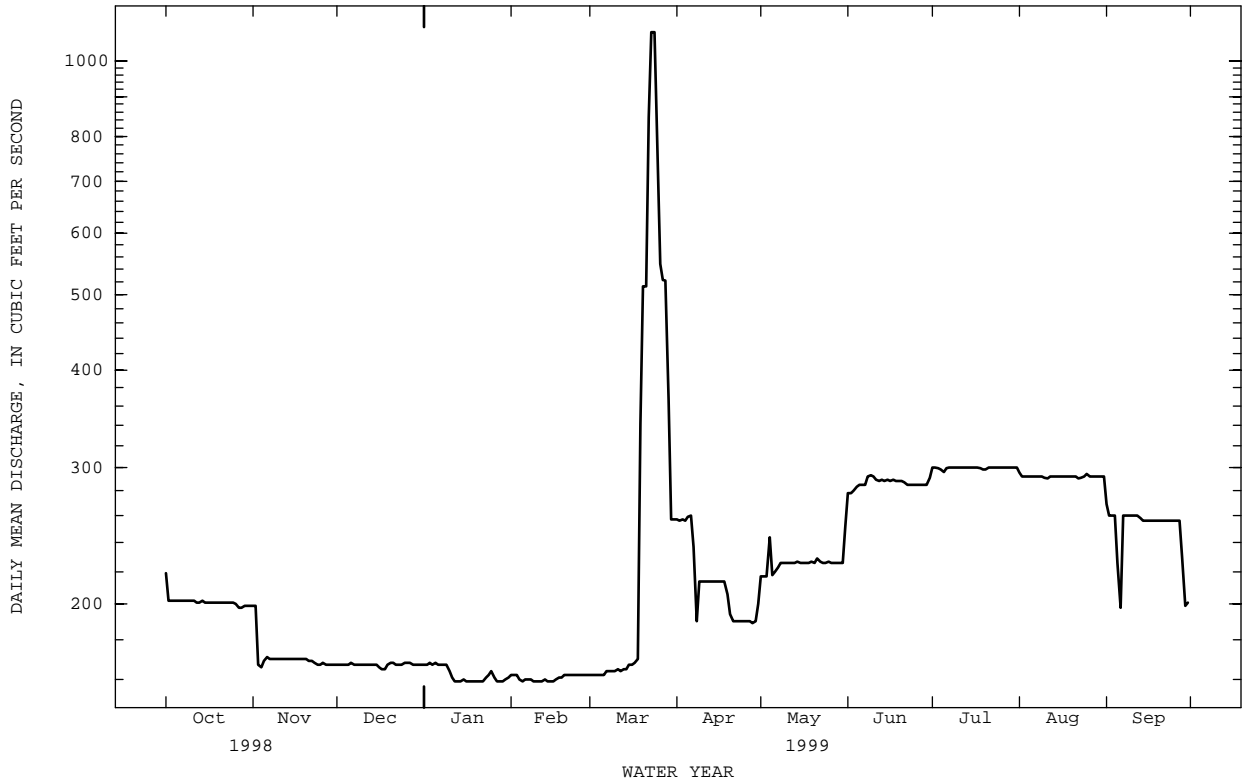
02011800 JACKSON RIVER BELOW GATHRIGHT DAM, NEAR HOT SPRINGS, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1980 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	235	301	273	475	650	904	723	592	426	273	278	258
MAX	829	1235	1061	1555	1466	1881	2052	1477	1017	398	644	661
(WY)	1980	1986	1997	1996	1998	1993	1987	1989	1982	1995	1984	1996
MIN	70.8	64.1	60.8	74.5	114	74.4	172	226	202	123	71.4	57.5
(WY)	1981	1982	1982	1981	1981	1981	1981	1999	1980	1980	1981	1981

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR	WATER YEARS 1980 - 1999
ANNUAL TOTAL	191983	84573	
ANNUAL MEAN	526	232	448
HIGHEST ANNUAL MEAN			592
LOWEST ANNUAL MEAN			196
HIGHEST DAILY MEAN	5440	Mar 24	1090
LOWEST DAILY MEAN	156	bJan 1	159
ANNUAL SEVEN-DAY MINIMUM	156	Jan 1	159
INSTANTANEOUS PEAK FLOW			1100
INSTANTANEOUS PEAK STAGE			10.63
INSTANTANEOUS LOW FLOW			11
ANNUAL RUNOFF (CFSM)	1.52	.67	1.30
ANNUAL RUNOFF (INCHES)	20.70	9.12	17.63
10 PERCENT EXCEEDS	1070	299	899
50 PERCENT EXCEEDS	272	202	264
90 PERCENT EXCEEDS	167	162	151

- a Also Mar 24, 1999.
- b Also Jan 2-4, 6, 7, 10-14, 1998.
- c Also Jan 13, 14, 16-22, 27-29, and Feb. 5, 9-12, 14-16, 1999.



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 record due to instrument malfunction. Some record in prior years fragmentary due to instrument malfunction. The intake tower at Gathright Dam permits selective withdrawal of water from one or more reservoir depths. Records represent specific conductance within 5 microsiemens, pH within 0.5 units, water temperature within 0.5°C, and dissolved oxygen within 0.5 mg/L at the intake to the monitor. All four parameters were compared at the intake with the average for the river by a cross section on Jun. 27, 1995. A maximum variation of 3 microsiemens was found for specific conductance, a maximum of 0.1 units for pH, a maximum variation of 0.2°C for water temperature, and 0.4 mg/L for dissolved oxygen was found within the cross section.

EXTREMES FOR PERIOD OF RECORD.--

SPECIFIC CONDUCTANCE (water years 1979, 1981-99): Maximum recorded, 249 microsiemens, Nov. 5, 1985; minimum recorded, 78 microsiemens, May 14, 1979.

pH (water years 1979, 1981-99): Maximum recorded, 9.3 units, Jan. 19, 20, 1996; minimum recorded, 6.3 units, May 18, 1996.

WATER TEMPERATURE (water years 1979, 1981-99): Maximum recorded, 28.0°C, Aug. 1, 2, 1979; minimum recorded, 0.0°C, Feb. 16-19, 1979.

DISSOLVED OXYGEN (water years 1979, 1981, 1984-99): 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 recorded, 154 microsiemens, Sep 14; minimum recorded, 121 microsiemens, Nov 6-9, 11, Mar 29.

pH: Maximum recorded, 8.1 units, Nov 25-30, Dec 1-7, 9-12, 15-17, Jan 7; minimum recorded, 6.4 units, Aug 16-17.

WATER TEMPERATURE: Maximum recorded, 15.6°C, Aug 5; minimum recorded, 5.1°C, Feb 1, Mar 9.

DISSOLVED OXYGEN: Maximum recorded, 12.5 mg/L, Mar 23; minimum recorded, 8.2 mg/L, Sep 29.

## SPECIFIC CONDUCTANCE (MICROSIEMENS/CM AT 25 DEG. C), WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DAY	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
1	129	127	128	126	125	125	137	137	137	140	139	140
2	130	128	129	125	124	125	137	137	137	140	139	139
3	130	128	129	126	124	124	137	137	137	140	138	139
4	130	129	129	124	124	124	137	137	137	140	139	139
5	130	129	130	124	122	123	138	137	137	139	139	139
6	130	129	129	123	121	122	139	138	138	139	139	139
7	130	129	129	122	121	121	139	138	139	139	138	138
8	130	129	129	122	121	121	140	138	139	138	137	138
9	130	129	129	122	121	122	140	139	139	138	137	138
10	130	128	129	122	122	122	140	139	139	138	137	138
11	130	129	129	123	121	122	140	140	140	138	138	138
12	130	129	130	126	122	123	141	140	141	138	137	137
13	131	129	130	132	126	130	141	140	141	138	137	138
14	130	129	130	133	132	132	141	140	141	138	138	138
15	131	129	130	133	133	133	140	138	139	139	138	138
16	130	129	130	135	133	134	138	138	138	138	137	138
17	130	129	130	136	135	135	141	138	139	138	138	138
18	130	129	130	138	135	137	140	140	140	138	137	138
19	130	129	129	139	138	138	140	139	139	138	138	138
20	130	128	129	140	138	139	140	139	139	138	137	138
21	130	128	129	139	138	139	140	139	139	138	137	137
22	129	128	128	139	136	138	140	139	140	137	137	137
23	128	127	128	136	136	136	140	139	139	138	135	137
24	128	127	128	136	136	136	140	139	139	138	137	137
25	128	127	128	137	136	136	140	139	139	138	137	137
26	128	128	128	137	136	136	140	139	139	137	136	137
27	128	128	128	137	136	136	140	139	139	137	136	137
28	128	127	127	137	136	136	140	139	140	137	136	137
29	128	127	127	137	136	137	140	140	140	137	137	137
30	128	126	127	137	137	137	140	140	140	137	137	137
31	126	126	126	---	---	---	140	139	140	137	136	137
MONTH	131	126	129	140	121	131	141	137	139	140	135	138

02011800 JACKSON RIVER BELOW GATHRIGHT DAM, NEAR HOT SPRINGS, VA--Continued

SPECIFIC CONDUCTANCE (MICROSIEMENS/CM AT 25 DEG. C), WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	FEBRUARY			MARCH			APRIL			MAY		
1	137	136	136	129	129	129	124	123	123	128	128	128
2	137	137	137	129	129	129	123	123	123	129	128	128
3	137	136	136	129	128	129	123	123	123	129	128	129
4	136	133	135	129	129	129	123	122	123	129	128	128
5	133	133	133	129	128	129	123	122	123	150	128	129
6	133	133	133	129	128	128	123	122	123	129	128	129
7	133	132	132	129	128	128	123	122	122	129	128	129
8	133	132	132	128	128	128	128	122	123	130	128	129
9	132	131	131	128	127	128	123	122	122	130	129	130
10	132	131	131	128	127	128	123	122	123	130	129	130
11	132	131	131	128	127	128	123	122	122	130	129	130
12	131	131	131	128	128	128	123	122	122	131	129	130
13	131	131	131	128	127	128	123	122	122	130	129	129
14	131	131	131	127	127	127	123	122	123	130	129	130
15	131	131	131	127	126	126	123	122	122	130	129	129
16	131	131	131	127	127	127	123	122	123	130	129	129
17	131	131	131	130	127	128	123	123	123	130	129	129
18	131	131	131	131	129	130	123	122	122	130	129	129
19	131	130	130	130	126	128	123	122	123	130	129	130
20	131	130	130	126	125	125	123	123	123	130	129	130
21	130	130	130	125	125	125	123	123	123	132	129	131
22	130	130	130	125	123	124	124	123	123	132	131	132
23	130	129	129	123	123	123	124	122	123	132	131	132
24	130	129	130	123	122	122	124	123	123	133	131	132
25	130	129	129	123	122	122	124	123	123	132	131	132
26	130	129	129	123	122	123	124	123	123	132	131	132
27	129	129	129	123	122	122	124	123	123	132	132	132
28	130	129	129	122	122	122	129	123	126	133	132	132
29	---	---	---	123	121	122	129	128	128	133	132	132
30	---	---	---	124	123	123	129	128	128	133	131	132
31	---	---	---	123	123	123	---	---	---	132	131	131
MONTH	137	129	131	131	121	126	129	122	123	150	128	130
DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	131	131	131	134	134	134	133	133	133	145	144	145
2	131	130	131	135	134	134	134	133	133	146	145	146
3	132	131	131	135	134	134	134	133	134	146	146	146
4	132	131	131	135	134	135	134	133	134	147	146	146
5	132	131	131	135	135	135	135	134	134	150	147	148
6	132	131	132	136	135	135	134	134	134	150	148	149
7	132	132	132	136	135	135	135	134	134	149	148	149
8	133	132	132	136	135	135	135	134	134	150	149	149
9	132	132	132	136	135	136	135	134	135	150	149	149
10	133	131	132	136	135	136	135	134	135	151	150	150
11	134	132	133	136	136	136	136	135	135	151	150	150
12	134	133	133	136	136	136	135	135	135	152	150	151
13	134	133	134	136	136	136	136	135	135	153	152	153
14	134	133	134	136	136	136	136	135	136	154	152	153
15	134	133	133	136	136	136	136	135	136	153	152	153
16	134	133	133	137	136	136	137	136	136	153	151	153
17	133	132	133	137	136	136	138	136	137	152	151	152
18	133	132	133	137	136	136	138	138	138	152	151	151
19	134	132	133	136	132	134	138	138	138	152	150	151
20	133	132	133	133	132	132	139	137	139	152	151	151
21	134	133	133	133	132	132	139	139	139	152	150	151
22	134	133	133	133	132	132	140	139	139	150	150	150
23	134	133	133	133	132	133	141	140	141	151	149	150
24	134	133	133	---	---	---	141	141	141	150	149	150
25	134	132	133	---	---	---	144	137	142	150	149	150
26	133	132	132	---	---	---	142	142	142	150	149	149
27	133	132	133	133	133	133	143	142	142	150	149	149
28	133	132	133	133	132	133	143	142	143	150	148	149
29	133	132	133	133	132	133	144	143	143	153	149	150
30	134	133	133	133	133	133	144	143	144	152	149	150
31	---	---	---	133	133	133	145	144	144	---	---	---
MONTH	134	130	133	---	---	---	145	133	138	154	144	150

## JAMES RIVER BASIN

02011800 JACKSON RIVER BELOW GATHRIGHT DAM, NEAR HOT SPRINGS, VA--Continued

PH, WATER, WHOLE, FIELD, STANDARD UNITS, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	7.3	7.2	7.3	7.3	7.2	7.2	8.1	8.0	8.0	7.9	7.8	7.9
2	7.3	7.3	7.3	7.3	7.2	7.3	8.1	8.0	8.0	7.9	7.8	7.9
3	7.3	7.3	7.3	7.3	7.2	7.3	8.1	8.0	8.1	7.9	7.9	7.9
4	7.3	7.3	7.3	7.3	7.2	7.3	8.1	8.0	8.1	7.9	7.9	7.9
5	7.4	7.2	7.3	7.3	7.2	7.2	8.1	8.0	8.0	7.9	7.9	7.9
6	7.4	7.3	7.3	7.3	7.2	7.2	8.1	8.0	8.0	7.9	7.9	7.9
7	7.3	7.3	7.3	7.3	7.2	7.3	8.1	8.0	8.0	8.1	7.8	7.9
8	7.4	7.3	7.3	7.3	7.2	7.3	8.0	8.0	8.0	7.9	7.8	7.8
9	7.4	7.3	7.3	7.3	7.3	7.3	8.1	8.0	8.0	7.9	7.8	7.8
10	7.4	7.3	7.3	7.3	7.2	7.3	8.1	8.0	8.0	7.9	7.8	7.8
11	7.4	7.3	7.3	7.3	7.3	7.3	8.1	8.0	8.0	7.9	7.8	7.9
12	7.4	7.3	7.3	7.3	7.3	7.3	8.1	8.0	8.0	7.9	7.8	7.9
13	7.3	7.3	7.3	7.5	7.3	7.4	8.0	8.0	8.0	7.9	7.8	7.9
14	7.3	7.3	7.3	7.5	7.5	7.5	8.0	8.0	8.0	7.9	7.8	7.9
15	7.3	7.3	7.3	7.5	7.5	7.5	8.1	8.0	8.0	7.9	7.8	7.9
16	7.3	7.3	7.3	7.6	7.5	7.5	8.1	8.0	8.1	7.9	7.8	7.9
17	7.3	7.3	7.3	7.6	7.6	7.6	8.1	7.8	7.9	7.9	7.8	7.9
18	7.3	7.3	7.3	7.8	7.6	7.7	7.8	7.8	7.8	7.9	7.8	7.9
19	7.3	7.2	7.3	7.9	7.8	7.8	7.9	7.8	7.8	7.9	7.8	7.9
20	7.3	7.3	7.3	7.9	7.8	7.9	7.9	7.8	7.8	7.9	7.8	7.9
21	7.3	7.3	7.3	7.9	7.9	7.9	7.8	7.8	7.8	7.9	7.8	7.9
22	7.3	7.3	7.3	7.9	7.8	7.9	7.8	7.8	7.8	7.9	7.8	7.9
23	7.3	7.2	7.2	8.0	7.9	8.0	7.9	7.8	7.8	7.9	7.8	7.8
24	7.3	7.2	7.2	8.0	8.0	8.0	7.9	7.8	7.8	7.9	7.8	7.8
25	7.3	7.2	7.2	8.1	8.0	8.0	7.8	7.8	7.8	7.9	7.8	7.8
26	7.3	7.2	7.2	8.1	8.0	8.0	7.9	7.8	7.8	7.9	7.8	7.9
27	7.3	7.2	7.3	8.1	8.0	8.0	7.9	7.8	7.8	8.0	7.8	7.8
28	7.3	7.2	7.2	8.1	8.0	8.0	7.9	7.8	7.8	7.8	7.7	7.8
29	7.3	7.2	7.2	8.1	8.0	8.0	7.9	7.8	7.8	7.8	7.7	7.8
30	7.3	7.2	7.2	8.1	8.0	8.0	7.9	7.8	7.8	7.8	7.7	7.8
31	7.3	7.2	7.2	---	---	---	7.9	7.8	7.8	7.8	7.7	7.8
MONTH	7.4	7.2	7.3	8.1	7.2	7.6	8.1	7.8	7.9	8.1	7.7	7.9
DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	FEBRUARY			MARCH			APRIL			MAY		
1	7.8	7.7	7.8	7.9	7.8	7.8	7.8	7.7	7.7	7.7	7.6	7.6
2	7.8	7.7	7.8	7.9	7.8	7.8	7.8	7.7	7.7	7.7	7.6	7.6
3	7.8	7.7	7.8	7.9	7.8	7.8	7.8	7.7	7.7	7.7	7.5	7.6
4	7.9	7.7	7.8	7.9	7.8	7.8	7.8	7.7	7.7	7.7	7.5	7.6
5	7.9	7.8	7.8	7.9	7.8	7.8	7.8	7.7	7.7	7.7	7.5	7.6
6	7.9	7.8	7.8	7.9	7.8	7.8	7.8	7.7	7.7	7.7	7.5	7.6
7	7.8	7.8	7.8	7.9	7.8	7.8	7.8	7.6	7.7	7.7	7.5	7.6
8	7.9	7.8	7.8	7.9	7.8	7.8	7.8	7.6	7.7	7.7	7.5	7.6
9	7.9	7.8	7.8	7.8	7.8	7.8	7.8	7.6	7.7	7.7	7.5	7.6
10	7.8	7.8	7.8	7.9	7.8	7.8	7.8	7.7	7.7	7.7	7.5	7.6
11	7.8	7.8	7.8	7.9	7.8	7.8	7.8	7.7	7.7	7.7	7.5	7.6
12	7.9	7.8	7.8	7.9	7.8	7.8	7.8	7.7	7.8	7.7	7.5	7.6
13	7.9	7.8	7.8	7.9	7.8	7.8	7.8	7.7	7.8	7.7	7.5	7.6
14	7.9	7.8	7.8	7.9	7.8	7.8	7.8	7.7	7.7	7.7	7.6	7.7
15	7.9	7.8	7.8	7.8	7.8	7.8	7.8	7.7	7.7	7.7	7.6	7.7
16	7.8	7.8	7.8	7.9	7.8	7.8	7.9	7.7	7.8	7.8	7.6	7.7
17	7.9	7.8	7.8	7.9	7.7	7.8	7.8	7.7	7.7	7.8	7.6	7.7
18	7.9	7.8	7.8	7.7	7.6	7.7	7.8	7.7	7.8	7.8	7.6	7.7
19	7.9	7.8	7.8	7.7	7.7	7.7	7.8	7.7	7.7	7.8	7.6	7.7
20	7.9	7.8	7.8	7.7	7.7	7.7	7.8	7.7	7.7	7.7	7.6	7.7
21	7.9	7.8	7.8	7.7	7.7	7.7	7.8	7.7	7.7	7.9	7.6	7.7
22	7.9	7.8	7.8	7.7	7.7	7.7	7.8	7.7	7.7	7.9	7.7	7.8
23	7.9	7.8	7.8	7.7	7.7	7.7	7.8	7.6	7.7	7.9	7.7	7.8
24	7.9	7.8	7.8	7.7	7.7	7.7	7.8	7.7	7.7	8.0	7.7	7.8
25	7.9	7.8	7.8	7.8	7.7	7.7	7.8	7.7	7.7	7.9	7.7	7.8
26	7.9	7.8	7.8	7.8	7.7	7.7	7.8	7.7	7.7	7.9	7.7	7.8
27	7.9	7.8	7.8	7.8	7.7	7.8	7.8	7.7	7.7	7.9	7.7	7.8
28	7.9	7.8	7.8	7.8	7.7	7.8	7.7	7.0	7.6	7.8	7.7	7.8
29	---	---	---	7.8	7.7	7.8	7.7	7.5	7.6	7.8	7.7	7.7
30	---	---	---	7.8	7.7	7.7	7.7	7.5	7.6	7.8	7.7	7.7
31	---	---	---	7.8	7.7	7.7	---	---	---	7.8	7.7	7.7
MONTH	7.9	7.7	7.8	7.9	7.6	7.8	7.9	7.0	7.7	8.0	7.5	7.7

02011800 JACKSON RIVER BELOW GATHRIGHT DAM, NEAR HOT SPRINGS, VA--Continued

PH, WATER, WHOLE, FIELD, STANDARD UNITS, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DAY	JUNE			JULY			AUGUST			SEPTEMBER		
	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
1	7.8	7.7	7.7	7.8	7.7	7.8	6.8	6.8	6.8	7.1	6.9	7.0
2	7.7	7.6	7.7	7.8	7.6	7.7	6.9	6.8	6.8	7.1	6.9	7.0
3	7.7	7.6	7.6	7.7	7.5	7.6	6.8	6.8	6.8	7.1	7.0	7.0
4	7.7	7.6	7.6	7.7	7.5	7.6	6.9	6.7	6.8	7.1	7.0	7.0
5	7.7	7.6	7.6	7.5	7.3	7.4	7.0	6.7	6.8	7.2	7.1	7.2
6	7.7	7.6	7.6	7.4	7.2	7.3	6.9	6.7	6.8	7.2	7.1	7.1
7	7.7	7.6	7.6	7.4	7.2	7.3	6.8	6.7	6.8	7.2	7.1	7.2
8	7.7	7.5	7.6	7.3	7.2	7.2	6.8	6.7	6.7	7.4	7.2	7.3
9	7.6	7.5	7.6	7.3	7.2	7.3	6.8	6.7	6.7	7.4	7.2	7.3
10	7.6	7.5	7.6	7.3	7.2	7.3	6.8	6.6	6.7	7.3	7.2	7.3
11	7.6	7.5	7.6	7.3	7.2	7.3	6.7	6.6	6.7	7.4	7.2	7.3
12	7.6	7.5	7.5	7.3	7.1	7.2	6.7	6.6	6.6	7.4	7.3	7.4
13	7.6	7.5	7.5	7.2	7.0	7.1	6.7	6.6	6.6	7.4	7.3	7.3
14	7.7	7.6	7.6	7.2	7.0	7.1	6.7	6.6	6.6	7.3	7.2	7.3
15	7.7	7.5	7.6	7.2	7.0	7.1	6.7	6.6	6.6	7.4	7.2	7.3
16	7.7	7.6	7.6	7.2	7.0	7.1	6.7	6.4	6.6	7.4	7.3	7.4
17	7.7	7.6	7.6	7.1	6.9	7.0	6.5	6.4	6.5	7.4	7.3	7.4
18	7.8	7.6	7.7	7.1	6.9	7.0	6.7	6.5	6.6	7.5	7.4	7.4
19	7.8	7.7	7.7	7.1	6.9	7.0	6.6	6.5	6.6	7.5	7.4	7.4
20	7.8	7.6	7.7	7.0	6.9	7.0	6.7	6.6	6.6	7.5	7.3	7.4
21	7.7	7.6	7.7	7.0	6.9	6.9	6.7	6.6	6.6	7.4	7.4	7.4
22	7.7	7.6	7.7	7.0	6.9	6.9	6.8	6.6	6.7	7.4	7.4	7.4
23	7.8	7.6	7.7	7.0	6.8	6.9	6.8	6.6	6.7	7.6	7.4	7.5
24	7.8	7.7	7.8	---	---	---	6.7	6.7	6.7	7.6	7.5	7.5
25	7.8	7.7	7.7	---	---	---	6.9	6.7	6.8	7.7	7.5	7.6
26	7.8	7.7	7.7	---	---	---	6.9	6.8	6.8	7.7	7.5	7.6
27	7.8	7.7	7.7	6.9	6.8	6.9	6.9	6.8	6.8	7.6	7.5	7.6
28	7.9	7.7	7.8	6.9	6.8	6.9	6.9	6.8	6.8	7.6	7.5	7.5
29	7.9	7.8	7.8	6.9	6.8	6.9	7.0	6.9	6.9	7.7	7.5	7.6
30	7.9	7.8	7.8	6.9	6.8	6.8	7.0	6.9	6.9	7.8	7.7	7.7
31	---	---	---	6.9	6.8	6.8	7.0	6.9	6.9	---	---	---
MONTH	7.9	7.5	7.7	---	---	---	7.0	6.4	6.7	7.8	6.9	7.3

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DAY	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
1	14.9	14.4	14.7	14.1	13.8	13.9	11.3	11.0	11.2	7.5	7.3	7.4
2	14.6	14.2	14.4	---	---	---	11.1	10.9	11.0	7.3	6.9	7.2
3	14.6	14.2	14.3	13.9	13.7	13.8	11.2	10.9	11.0	7.2	6.9	7.0
4	14.6	14.3	14.4	13.9	13.4	13.7	11.1	10.9	11.0	6.9	6.6	6.7
5	14.5	14.3	14.4	13.6	13.3	13.5	11.0	10.8	10.9	6.6	6.3	6.4
6	14.4	14.3	14.3	13.4	13.2	13.3	11.1	10.8	10.9	6.4	6.2	6.3
7	---	---	---	13.4	13.1	13.3	11.1	10.8	10.9	6.3	6.2	6.2
8	14.4	14.2	14.3	13.3	13.1	13.2	11.0	10.9	10.9	6.2	5.6	6.1
9	14.4	14.1	14.2	13.4	13.1	13.2	10.9	10.6	10.8	6.1	5.8	6.0
10	14.4	14.1	14.2	13.4	13.1	13.3	10.8	10.5	10.6	5.8	5.6	5.7
11	14.3	14.0	14.2	13.4	12.9	13.2	10.6	10.4	10.5	5.7	5.5	5.6
12	14.3	14.0	14.1	13.1	12.8	13.0	10.6	10.4	10.5	5.8	5.5	5.7
13	14.3	14.0	14.1	13.0	12.7	12.9	10.6	10.4	10.5	5.9	5.5	5.7
14	14.2	13.9	14.0	---	---	---	10.4	10.2	10.3	5.8	5.6	5.7
15	14.1	13.8	14.0	---	---	---	10.2	10.1	10.2	5.8	5.5	5.6
16	14.1	13.8	14.0	12.8	12.5	12.6	10.1	10.0	10.1	5.6	5.4	5.5
17	14.2	13.8	14.0	12.7	12.5	12.6	10.1	9.8	10.0	5.7	5.4	5.5
18	14.2	13.8	14.0	12.5	12.3	12.4	9.8	9.6	9.7	5.6	5.4	5.5
19	14.2	14.0	14.1	12.6	12.3	12.4	9.8	9.6	9.7	5.6	5.4	5.5
20	14.1	13.8	14.0	12.5	12.2	12.4	9.8	9.5	9.7	5.7	5.4	5.5
21	14.0	13.8	13.9	12.3	12.0	12.1	---	---	---	5.5	5.3	5.4
22	13.9	13.6	13.8	12.1	11.8	12.0	9.6	9.1	9.4	5.6	5.3	5.4
23	13.8	13.6	13.7	12.1	11.7	11.9	---	---	---	5.7	5.4	5.5
24	13.8	13.5	13.7	12.0	11.6	11.9	---	---	---	5.9	5.6	5.7
25	13.8	13.4	13.6	11.8	11.5	11.6	8.9	8.5	8.7	5.7	5.4	5.6
26	---	---	---	11.7	11.5	11.6	8.6	8.3	8.5	5.6	5.4	5.5
27	---	---	---	11.5	11.4	11.5	8.5	8.2	8.3	5.7	5.3	5.5
28	---	---	---	11.4	11.2	11.3	8.3	8.1	8.2	5.8	5.4	5.6
29	---	---	---	11.4	11.1	11.2	8.2	8.0	8.1	5.7	5.4	5.5
30	---	---	---	11.3	11.1	11.2	8.0	7.5	7.7	5.5	5.3	5.4
31	---	---	---	---	---	---	7.7	7.5	7.6	5.5	5.2	5.3
MONTH	---	---	---	---	---	---	---	---	---	7.5	5.2	5.8





02011800 JACKSON RIVER BELOW GATHRIGHT DAM, NEAR HOT SPRINGS, VA--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DAY	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
1	9.6	9.2	9.4	11.0	10.0	10.2	9.6	9.3	9.5	11.0	10.7	10.8
2	10.1	9.3	9.5	---	---	---	9.7	9.4	9.6	11.1	10.8	10.9
3	10.3	9.3	9.6	10.1	9.8	9.9	9.8	9.5	9.6	10.9	10.6	10.8
4	9.7	9.4	9.5	10.7	9.6	9.8	9.9	9.5	9.6	11.2	10.8	11.0
5	10.1	9.2	9.5	10.2	9.6	9.8	9.9	9.6	9.7	11.4	11.1	11.3
6	10.3	9.2	9.4	10.0	9.6	9.7	10.0	9.6	9.7	11.5	11.2	11.3
7	---	---	---	9.9	9.6	9.7	9.9	9.6	9.7	11.6	11.3	11.4
8	10.1	9.3	9.5	9.9	9.5	9.6	9.9	9.7	9.7	11.6	11.2	11.4
9	10.3	9.4	9.6	9.6	9.4	9.5	9.9	9.7	9.8	11.4	11.1	11.3
10	9.8	9.5	9.6	9.5	9.3	9.4	10.1	9.8	9.9	11.6	11.3	11.4
11	10.5	9.5	9.8	10.2	9.3	9.4	10.3	9.8	10.0	11.7	11.3	11.5
12	10.1	9.6	9.8	10.2	9.2	9.4	10.3	9.9	10.1	11.7	11.3	11.5
13	10.0	9.6	9.8	9.5	9.1	9.3	10.2	9.9	10.0	11.6	11.3	11.4
14	10.3	9.8	10.0	9.3	8.9	9.2	10.3	9.9	10.1	11.6	11.2	11.4
15	10.8	9.8	10.2	9.5	8.9	9.1	10.4	10.2	10.3	11.5	11.1	11.3
16	10.8	10.0	10.3	9.2	8.9	9.0	10.4	10.2	10.3	11.5	11.2	11.3
17	11.1	9.9	10.3	9.0	8.8	8.9	10.5	10.2	10.3	11.6	11.2	11.4
18	10.7	9.8	10.1	9.0	8.6	8.8	10.5	10.2	10.3	11.4	11.1	11.2
19	10.3	9.9	10.1	9.0	8.6	8.7	10.6	10.2	10.3	11.4	11.1	11.3
20	10.3	9.8	10.0	8.8	8.4	8.6	10.6	10.2	10.4	11.5	11.2	11.3
21	10.2	9.9	10.0	8.9	8.6	8.7	---	---	---	11.5	11.2	11.3
22	10.2	9.9	10.0	9.0	8.7	8.9	10.5	10.1	10.3	11.6	11.3	11.4
23	10.1	9.7	9.8	9.2	8.7	8.9	---	---	---	11.5	11.0	11.3
24	9.8	9.4	9.6	9.2	8.7	8.9	---	---	---	11.4	11.0	11.1
25	9.7	9.4	9.6	9.4	8.8	9.1	10.7	10.4	10.5	11.5	11.1	11.3
26	---	---	---	9.2	8.8	9.0	10.6	10.3	10.4	11.6	11.3	11.4
27	---	---	---	9.2	8.9	9.1	10.6	10.3	10.5	11.6	11.0	11.3
28	11.9	9.4	11.5	9.4	9.2	9.3	11.0	10.3	10.5	11.3	11.0	11.1
29	11.8	10.6	11.4	9.5	9.2	9.3	10.5	10.2	10.4	11.5	11.0	11.2
30	11.2	10.3	10.6	9.5	9.2	9.4	10.7	10.2	10.5	11.5	11.2	11.3
31	10.8	10.1	10.4	---	---	---	10.9	10.6	10.7	11.7	11.3	11.5
MONTH	---	---	---	---	---	---	---	---	---	11.7	10.6	11.3
DAY	FEBRUARY			MARCH			APRIL			MAY		
	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
1	11.5	11.1	11.3	11.2	10.8	11.0	11.5	11.2	11.3	10.7	9.8	10.2
2	11.4	11.0	11.1	11.3	10.9	11.1	11.4	11.1	11.3	10.4	9.8	10.1
3	11.4	11.0	11.1	11.3	10.9	11.1	11.3	11.1	11.2	10.3	9.8	10.1
4	11.2	10.8	11.0	11.7	11.0	11.4	11.3	10.4	11.0	10.3	9.9	10.1
5	11.3	10.9	11.0	11.8	11.4	11.6	11.3	10.7	11.0	10.2	9.6	10.0
6	11.3	10.8	11.0	11.6	11.2	11.4	11.3	11.0	11.2	10.3	9.9	10.0
7	10.9	10.6	10.8	11.8	11.4	11.5	11.3	10.5	10.9	10.0	9.8	9.9
8	11.1	10.6	10.8	11.8	11.4	11.6	10.8	10.5	10.6	9.9	9.6	9.7
9	11.1	10.6	10.9	11.7	11.3	11.5	10.8	10.2	10.5	9.9	9.4	9.7
10	11.1	10.7	10.9	11.7	11.4	11.5	10.7	10.0	10.4	9.9	9.5	9.7
11	11.1	10.6	10.8	11.7	11.4	11.6	10.7	9.9	10.4	10.0	9.5	9.8
12	10.8	10.5	10.6	11.8	11.5	11.6	10.3	10.0	10.1	10.1	9.8	9.9
13	11.2	10.5	10.9	11.8	11.4	11.6	10.7	9.7	10.3	10.1	9.6	9.8
14	11.2	10.9	11.0	11.6	11.4	11.5	10.6	10.0	10.3	9.9	9.6	9.8
15	11.2	10.8	11.0	11.9	11.4	11.6	10.4	10.1	10.3	10.3	9.7	10.0
16	11.2	10.6	10.9	12.1	11.6	11.8	10.4	9.9	10.1	10.3	9.6	10.0
17	11.1	10.7	10.9	11.9	11.3	11.6	10.7	10.1	10.4	10.0	9.7	9.9
18	11.1	10.6	10.8	11.6	11.1	11.3	10.5	10.1	10.3	10.1	9.7	9.9
19	11.0	10.6	10.7	11.9	11.2	11.6	10.6	10.3	10.4	10.0	9.5	9.8
20	11.1	10.6	10.8	12.0	11.9	11.9	10.6	10.1	10.3	10.3	9.6	10.0
21	11.1	10.6	10.9	11.9	11.8	11.9	10.5	10.0	10.3	10.3	9.6	9.9
22	11.2	10.9	11.0	12.3	11.6	12.0	10.5	9.9	10.2	9.9	9.5	9.7
23	11.5	11.0	11.2	12.5	12.3	12.4	10.4	9.6	10.1	9.9	9.2	9.5
24	11.4	11.0	11.2	12.4	12.1	12.3	10.4	9.9	10.1	9.4	9.0	9.2
25	11.4	11.0	11.2	12.2	11.7	12.0	10.3	9.9	10.1	9.4	9.1	9.2
26	11.4	11.0	11.2	12.0	11.7	11.9	10.2	9.7	10.0	9.5	9.1	9.3
27	11.3	10.9	11.1	11.9	11.7	11.8	10.3	9.9	10.0	9.4	8.9	9.2
28	11.2	10.8	10.9	11.7	11.2	11.5	10.6	9.8	10.1	9.4	8.9	9.1
29	---	---	---	11.6	10.9	11.3	10.6	10.0	10.3	9.4	9.0	9.2
30	---	---	---	11.5	11.0	11.3	10.6	9.9	10.3	9.3	9.0	9.1
31	---	---	---	11.4	11.1	11.3	---	---	---	9.3	9.0	9.1
MONTH	11.5	10.5	11.0	12.5	10.8	11.6	11.5	9.6	10.5	10.7	8.9	9.7



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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 50 ft upstream from Dry Run and 1.7 mi upstream from Dunlap Creek and bridge on U.S. Highway 60.

DRAINAGE AREA.--439 mi<sup>2</sup>.

PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: June 1978 to current year.

INSTRUMENTATION.--Water-temperature recorder since June 1978.

REMARKS.--Some record in prior years fragmentary due to instrument malfunction. Records represent water temperature at sensor within 0.5°C. U.S. Army Corps of Engineers satellite water-temperature telemeter at station. Temperature at the sensor was compared with the average for the river by temperature cross section on Oct. 1, 1991. A maximum variation of 0.5°C was found within the cross section.

EXTREMES FOR PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: Maximum recorded, 30.5°C, Jul. 21, 1980; minimum recorded, 0.0°C on many days during winter periods.

EXTREMES FOR CURRENT YEAR.--

WATER TEMPERATURE: Maximum recorded, 22.1°C, Jul 6; minimum recorded, 1.0°C, Jan 6.

## TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DAY	MAX	MIN	MEAN	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
				MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
1	18.6	16.2	17.8	14.2	12.3	13.3	11.6	9.8	10.6	3.9	3.0	3.5			
2	16.8	14.5	15.6	13.1	12.5	12.8	9.9	8.2	9.0	3.7	2.9	3.4			
3	15.2	13.9	14.7	12.8	12.3	12.6	9.6	7.9	8.8	4.8	2.9	4.0			
4	16.9	14.7	15.8	12.3	10.9	12.0	11.5	9.4	10.5	4.6	2.8	3.7			
5	18.2	16.4	17.0	10.9	9.5	10.2	10.7	10.2	10.5	2.8	1.5	2.2			
6	17.3	16.4	17.1	9.5	8.7	9.1	12.6	10.6	11.4	2.3	1.0	1.5			
7	16.4	15.9	16.1	10.5	8.6	9.3	12.3	11.0	11.7	4.3	2.3	3.6			
8	16.8	15.9	16.2	9.4	9.0	9.2	12.4	11.8	12.1	4.1	3.1	3.7			
9	15.9	15.1	15.5	11.7	9.2	10.4	12.1	10.0	11.4	5.0	3.9	4.5			
10	16.6	14.9	15.6	12.6	11.3	11.9	10.0	8.3	8.9	4.1	2.6	3.2			
11	16.8	14.5	15.5	13.9	12.0	13.1	9.4	8.0	8.7	3.9	2.6	3.2			
12	16.5	14.5	15.4	12.0	10.0	10.8	8.3	7.5	7.9	5.5	3.5	4.5			
13	16.2	14.6	15.3	10.8	9.7	10.2	8.9	8.1	8.5	6.4	5.4	5.9			
14	15.7	13.7	14.6	10.8	9.6	10.2	9.2	7.7	8.6	6.9	6.3	6.6			
15	14.9	12.8	13.8	12.7	10.8	11.7	7.7	6.5	7.1	6.4	4.7	5.8			
16	15.2	12.9	14.0	11.7	10.2	10.9	8.0	6.6	7.3	5.2	3.8	4.6			
17	15.9	13.6	14.7	11.7	10.0	10.8	7.8	7.0	7.6	5.9	4.3	5.1			
18	16.3	14.4	15.3	11.0	9.4	10.2	7.1	6.0	6.6	7.4	5.9	6.6			
19	16.6	15.4	15.8	10.8	9.0	10.0	8.0	6.1	7.0	6.4	5.2	5.8			
20	16.1	14.3	15.2	11.4	10.3	10.8	9.9	8.0	9.0	6.5	5.3	5.9			
21	14.4	13.1	13.7	10.5	8.5	9.7	9.4	8.5	8.9	6.7	6.0	6.3			
22	13.3	11.9	12.8	8.7	7.0	7.9	9.7	7.1	9.0	8.2	6.0	6.9			
23	12.4	10.4	11.5	9.5	6.7	8.2	7.1	4.9	5.6	10.7	8.2	9.6			
24	13.2	10.9	12.0	12.0	9.5	10.8	---	---	---	9.8	7.8	8.8			
25	12.8	11.2	12.1	10.1	8.4	9.1	5.5	4.2	4.8	7.8	6.3	7.0			
26	---	---	---	11.2	9.2	10.1	4.8	3.7	4.2	7.2	5.7	6.5			
27	---	---	---	10.6	9.1	9.8	4.9	3.4	4.2	7.4	5.5	6.6			
28	13.9	12.5	13.2	10.2	8.4	9.4	6.1	4.8	5.6	9.5	7.3	8.3			
29	15.2	13.6	14.2	10.1	8.3	9.3	6.6	6.0	6.3	9.5	7.0	8.4			
30	13.9	12.4	12.8	10.5	8.8	9.7	6.5	4.0	5.5	7.1	5.6	6.4			
31	15.3	12.7	14.0	---	---	---	4.0	2.9	3.4	6.3	4.9	5.7			
MONTH	---	---	---	14.2	6.7	10.4	---	---	---	10.7	1.0	5.4			

02012800 JACKSON RIVER AT FILTRATION PLANT, AT COVINGTON, VA--Continued

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
1	4.9	4.3	4.6	7.2	5.8	6.6	11.9	10.4	11.1	15.8	12.8	14.4
2	6.6	4.6	5.7	8.9	5.5	7.0	13.6	10.5	12.0	16.2	12.9	14.5
3	7.9	6.2	7.0	8.1	6.2	7.5	14.0	11.2	12.8	16.9	13.3	15.0
4	7.6	6.4	7.0	6.4	5.0	5.7	13.8	12.5	13.2	17.8	14.2	15.8
5	7.1	5.4	6.3	7.5	4.7	6.1	15.3	12.1	13.5	16.4	14.3	15.0
6	7.1	6.1	6.6	7.6	6.7	7.1	13.7	11.7	12.7	17.6	14.5	15.8
7	7.3	6.5	6.9	7.8	5.2	6.4	14.1	11.3	12.6	17.5	15.9	16.7
8	8.5	7.1	7.7	6.7	4.0	5.6	14.4	11.0	12.9	17.0	15.7	16.3
9	7.7	6.5	7.3	6.0	4.1	4.9	15.6	13.5	14.3	16.7	14.8	15.7
10	8.7	6.7	7.7	5.0	3.7	4.4	15.0	13.3	13.8	17.9	14.4	16.1
11	8.7	6.6	7.7	7.5	3.7	5.4	15.0	12.6	13.5	18.5	15.7	17.1
12	9.9	7.2	8.7	8.0	4.8	6.3	13.1	10.1	11.8	19.0	16.2	17.5
13	7.2	4.6	5.9	7.0	4.9	6.1	13.7	9.1	11.2	17.7	15.7	16.8
14	5.7	3.6	4.6	6.5	5.1	5.8	14.6	10.6	12.6	15.7	13.4	14.5
15	6.4	3.8	5.1	5.1	2.8	4.1	13.3	10.4	11.8	16.8	12.6	14.6
16	7.4	4.8	6.1	7.7	4.2	6.0	14.3	10.1	11.8	17.2	14.4	15.9
17	7.6	6.5	7.1	9.2	5.4	7.4	12.8	10.8	11.9	18.1	15.3	16.7
18	9.4	7.6	8.4	9.5	6.6	8.2	11.4	10.1	10.7	18.8	16.7	17.6
19	8.5	6.9	7.4	9.7	7.1	8.6	11.6	9.6	10.6	19.1	16.9	17.7
20	7.3	5.9	6.6	9.3	5.9	7.8	13.4	10.8	11.8	18.7	15.7	17.2
21	6.5	5.2	5.8	8.9	7.3	7.7	12.1	10.7	11.3	18.8	16.0	17.4
22	6.0	4.0	4.8	8.8	6.1	7.3	16.0	11.1	13.2	17.7	16.4	17.1
23	4.4	3.2	3.8	7.3	5.8	6.6	16.4	14.2	15.2	18.2	16.7	17.3
24	5.6	3.0	4.3	8.0	6.6	7.2	17.7	14.2	15.7	18.4	16.7	17.3
25	5.7	5.0	5.3	8.6	6.2	7.4	16.7	13.0	14.9	17.2	15.6	16.4
26	7.9	4.4	5.9	9.5	6.1	7.9	14.7	13.3	13.9	18.2	15.2	16.5
27	6.9	5.3	6.2	9.5	6.1	8.0	15.4	12.9	14.0	19.1	15.6	17.2
28	8.1	6.4	7.1	10.2	6.2	8.5	14.6	11.7	13.5	19.5	16.0	17.7
29	---	---	---	9.7	6.9	8.3	12.8	11.0	11.8	20.4	16.9	18.5
30	---	---	---	11.1	7.3	9.4	15.6	11.8	13.5	20.9	17.6	19.1
31	---	---	---	10.8	8.2	9.7	---	---	---	20.5	18.3	19.3
MONTH	9.9	3.0	6.3	11.1	2.8	6.9	17.7	9.1	12.8	20.9	12.6	16.6
DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
1	19.2	17.6	18.1	19.5	17.7	18.7	20.9	19.7	20.2	18.5	16.1	17.4
2	18.4	17.1	17.8	19.9	18.3	19.1	21.1	18.6	19.7	19.0	16.8	17.9
3	20.0	17.8	18.8	20.4	18.6	19.6	20.8	18.4	19.7	19.2	17.0	18.1
4	20.2	17.8	19.1	21.5	19.1	20.4	20.7	18.6	19.8	18.6	17.8	18.2
5	19.6	18.1	19.0	22.0	19.8	21.0	20.0	18.6	19.4	18.3	17.8	18.1
6	20.1	17.6	18.9	22.1	20.0	21.1	20.4	18.0	19.2	18.0	17.6	17.8
7	20.8	18.9	19.9	21.7	19.9	20.9	20.1	18.1	19.3	19.5	17.1	18.1
8	20.9	19.1	20.1	21.3	18.8	20.1	19.9	18.5	19.2	19.8	18.0	18.8
9	21.2	19.3	20.3	20.5	18.6	19.7	20.5	17.9	19.0	18.9	17.8	18.4
10	21.0	19.6	20.4	20.1	19.3	19.9	20.2	18.0	19.3	19.5	17.8	18.5
11	20.3	19.4	19.9	19.7	18.3	19.0	20.0	18.8	19.4	18.6	16.6	17.7
12	20.9	18.8	19.8	19.1	16.0	17.5	20.5	18.4	19.5	18.6	16.6	17.6
13	20.4	18.9	19.8	17.2	15.8	16.4	20.2	18.7	19.6	18.6	16.8	17.7
14	20.2	19.0	19.5	17.5	16.9	17.2	21.1	19.3	20.1	18.7	18.0	18.3
15	20.8	18.1	19.5	19.7	16.8	18.1	20.2	18.8	19.5	18.0	16.4	17.3
16	20.1	17.2	18.3	20.3	18.1	19.3	20.0	18.6	19.4	16.4	15.7	16.1
17	18.6	16.6	17.5	20.1	18.7	19.6	20.9	18.8	19.8	17.2	14.9	16.0
18	19.2	16.3	17.7	20.6	18.5	19.6	21.0	19.2	20.1	16.7	15.5	16.2
19	18.5	16.8	17.5	21.2	19.0	20.0	20.2	19.2	19.7	16.7	15.7	16.2
20	17.1	16.2	16.6	20.1	18.7	19.4	19.7	18.3	19.1	17.4	15.9	16.6
21	19.0	16.2	17.4	20.1	18.5	19.3	19.6	18.6	19.1	17.3	15.7	16.8
22	18.8	17.8	18.3	20.8	18.4	19.6	19.6	17.4	18.6	15.9	14.1	15.1
23	19.5	16.6	18.0	21.6	19.1	20.2	19.0	18.0	18.5	15.9	14.0	15.0
24	19.3	17.6	18.5	20.9	19.5	20.0	18.5	18.0	18.2	16.4	14.8	15.6
25	19.0	17.4	18.2	21.1	18.6	19.8	18.1	17.2	17.6	17.0	15.3	16.1
26	19.1	16.8	17.9	20.9	18.8	20.1	19.2	17.2	18.1	17.1	15.9	16.5
27	19.0	18.1	18.6	20.5	19.3	20.0	18.9	17.6	18.4	16.8	16.2	16.6
28	20.0	18.0	18.9	19.9	18.6	19.3	19.6	17.6	18.6	16.7	16.1	16.3
29	20.2	18.6	19.4	20.1	17.6	19.0	19.8	18.2	19.1	17.5	16.7	17.0
30	19.9	18.3	18.9	21.4	18.7	20.0	19.3	17.7	18.6	17.1	15.6	16.4
31	---	---	---	21.7	19.7	20.8	18.1	16.3	17.4	---	---	---
MONTH	21.2	16.2	18.8	22.1	15.8	19.5	21.1	16.3	19.1	19.8	14.0	17.1

JAMES RIVER BASIN

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 mi<sup>2</sup>.

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 sea level. Prior to Dec. 8, 1949, nonrecording gage at same site and datum.

REMARKS.--Records good except for period with ice effect, Jan. 5, which is 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. Maximum discharge, 27,400 ft<sup>3</sup>/s, from rating curve extended above 4,500 ft<sup>3</sup>/s on basis of step-backwater computations and contracted-opening measurement at gage height 15.65 ft. Minimum gage height, 0.69 ft, Jun. 6, Jul. 14, 1969. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

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 greater than base discharge of 2,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Mar 18	0200	*1780	*5.05	No peak greater than base discharge.			

Minimum discharge, 5.2 ft<sup>3</sup>/s, Jul 24, gage height, 1.09 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	14	19	20	19	65	106	104	158	43	15	15	12
2	14	19	21	19	120	132	108	145	43	16	14	11
3	16	23	21	57	171	175	100	128	43	14	13	11
4	15	24	20	88	150	467	96	114	42	13	13	11
5	15	21	20	e56	121	342	94	103	39	13	12	101
6	17	21	21	50	101	354	88	93	36	12	12	228
7	18	21	21	42	96	472	83	87	33	12	11	123
8	36	21	25	36	112	339	80	143	30	12	11	71
9	32	20	30	47	115	262	79	142	26	11	12	48
10	19	20	30	151	101	212	83	123	25	11	12	37
11	16	23	25	85	87	169	103	108	24	12	11	30
12	15	23	24	63	79	170	150	95	23	13	11	26
13	14	22	30	61	73	165	147	95	22	15	10	22
14	14	22	45	123	64	184	133	608	22	15	11	21
15	14	22	37	502	57	529	126	598	24	14	11	23
16	14	22	30	261	54	628	126	352	19	14	11	19
17	14	21	26	140	53	988	111	239	19	13	11	18
18	14	21	24	108	126	1490	101	181	19	15	10	17
19	14	21	22	137	247	943	94	214	18	14	10	16
20	13	21	21	117	189	484	96	185	18	13	14	16
21	14	21	20	92	143	395	96	150	18	13	14	17
22	14	21	20	75	116	442	96	126	17	13	12	17
23	14	20	20	118	99	364	98	109	16	13	13	16
24	15	20	21	1010	87	295	161	110	15	12	16	15
25	16	20	20	503	80	241	168	101	15	11	37	14
26	16	22	19	243	74	197	154	82	16	12	28	13
27	16	23	18	160	67	166	140	70	16	12	21	39
28	16	21	19	120	72	144	139	61	16	12	17	91
29	18	21	19	94	---	126	158	53	15	19	16	65
30	19	20	19	77	---	111	166	48	14	22	13	329
31	19	---	19	65	---	98	---	45	---	17	12	---
TOTAL	515	636	727	4719	2919	11190	3478	4866	726	423	434	1477
MEAN	16.6	21.2	23.5	152	104	361	116	157	24.2	13.6	14.0	49.2
MAX	36	24	45	1010	247	1490	168	608	43	22	37	329
MIN	13	19	18	19	53	98	79	45	14	11	10	11
CFSM	.10	.13	.14	.93	.64	2.20	.71	.96	.15	.08	.09	.30
IN.	.12	.14	.16	1.07	.66	2.54	.79	1.10	.16	.10	.10	.34

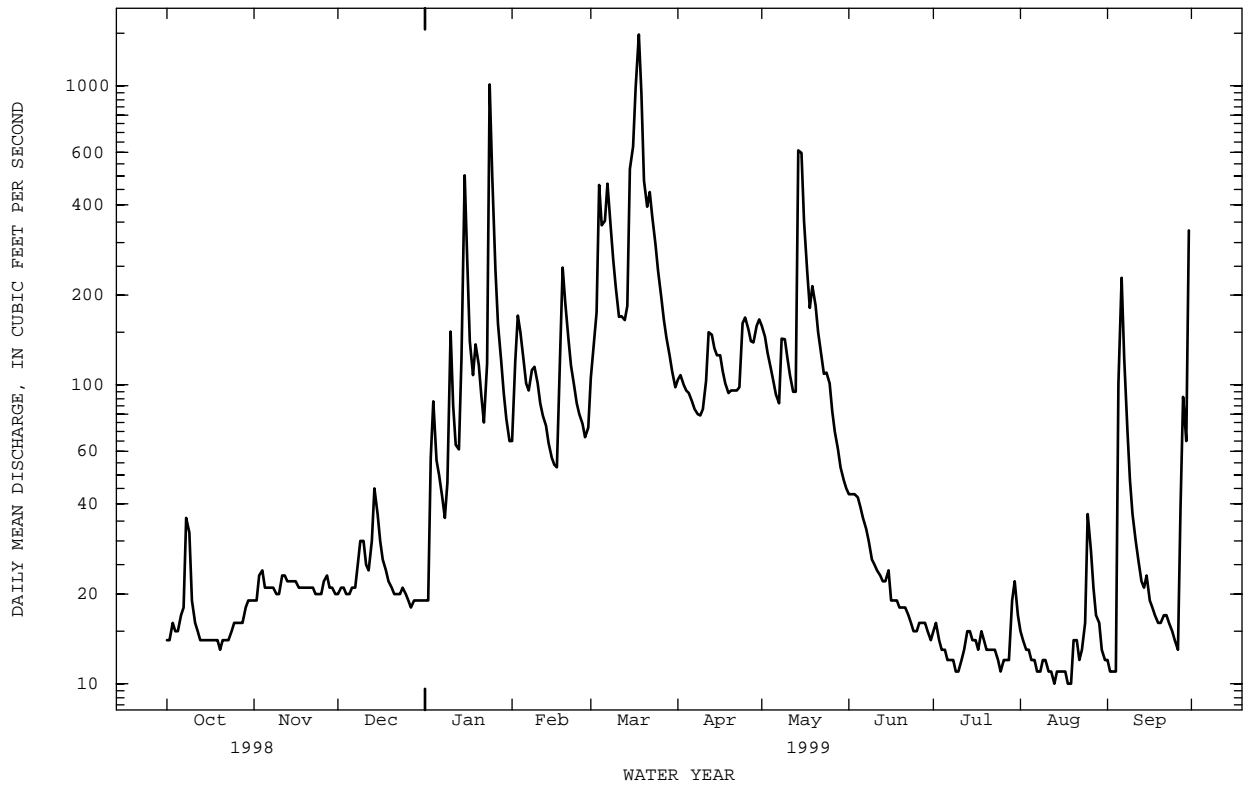
02013000 DUNLAP CREEK NEAR COVINGTON, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1929 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	65.8	106	168	248	309	403	283	215	105	48.1	56.2	38.3
MAX	431	659	694	770	821	1053	1071	536	584	358	514	336
(WY)	1990	1986	1974	1996	1998	1993	1987	1989	1972	1972	1984	1989
MIN	13.4	15.7	21.5	24.2	21.5	59.1	54.7	43.7	24.2	13.6	12.5	11.0
(WY)	1942	1932	1956	1981	1934	1988	1986	1930	1999	1999	1932	1970

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR	WATER YEARS 1929 - 1999
ANNUAL TOTAL	90001	32110	
ANNUAL MEAN	247	88.0	170
HIGHEST ANNUAL MEAN			320
LOWEST ANNUAL MEAN			67.3
HIGHEST DAILY MEAN	3680	Mar 21	1490
LOWEST DAILY MEAN	13	Oct 20	10
ANNUAL SEVEN-DAY MINIMUM	14	Oct 14	11
INSTANTANEOUS PEAK FLOW			1780
INSTANTANEOUS PEAK STAGE			5.05
INSTANTANEOUS LOW FLOW			5.2
ANNUAL RUNOFF (CFSM)	1.50		.54
ANNUAL RUNOFF (INCHES)	20.41		7.28
10 PERCENT EXCEEDS	678		177
50 PERCENT EXCEEDS	55		25
90 PERCENT EXCEEDS	19		13

a Also Aug 18, 19, 1999.  
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 mi<sup>2</sup>.

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 sea level.

REMARKS.--Records good except for period of no gage-height record, May 15, which is fair. 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 Lake Moomaw (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. Statistics of monthly mean data and summary statistics for water years 1975-1979, (unregulated flow) are available in previous data books, water years 1991-1998. Diversion by Westvaco plant averages 47 ft<sup>3</sup>/s for industrial use of which approximately 42 ft<sup>3</sup>/s is returned upstream from station. Diversion 2.0 mi upstream from station for city of Covington water supply averages less than 4.0 ft<sup>3</sup>/s. U.S. Army Corps of Engineers satellite gage-height telemeter at station. Virginia Department of Emergency Services gage-height radio transmitter at station. Maximum discharge, 31,300 ft<sup>3</sup>/s, from rating curve extended above 19,000 ft<sup>3</sup>/s. Minimum discharge, 41 ft<sup>3</sup>/s, Jan. 5, 1981, gage height, 4.38 ft, result of freezeup. Several measurements of water temperature were made during the year.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Jun. 21, 1972, reached a stage of 24.36 ft, discharge, 34,000 ft<sup>3</sup>/s, from floodmarks, and flood of Dec. 27, 1973, reached a stage of 22.09 ft, from floodmarks, discharge, 28,300 ft<sup>3</sup>/s, from rating curve extended above 19,000 ft<sup>3</sup>/s.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 2,660 ft<sup>3</sup>/s, Jan 24, gage height, 7.43 ft; minimum discharge, 157 ft<sup>3</sup>/s, Nov 3, gage height, 4.61 ft; minimum daily, 192 ft<sup>3</sup>/s, Nov 25.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	304	230	196	212	280	307	423	412	353	336	327	289
2	252	229	199	211	386	336	425	393	353	331	320	272
3	247	230	198	282	455	374	416	371	349	326	316	273
4	253	200	198	316	411	792	415	357	349	329	312	271
5	250	200	200	256	362	634	414	365	348	327	312	505
6	251	200	199	239	329	621	408	333	338	328	314	571
7	251	197	197	240	323	751	398	336	336	325	313	454
8	319	196	218	235	348	611	334	461	337	330	314	362
9	264	193	230	250	351	524	358	437	342	330	309	318
10	256	193	215	357	330	464	362	396	336	330	304	299
11	252	201	208	293	305	410	392	366	338	331	302	285
12	248	196	205	257	293	411	432	347	336	337	306	279
13	246	197	225	254	287	402	424	346	334	335	305	274
14	244	198	239	312	272	430	405	875	332	330	311	272
15	242	201	229	961	260	920	399	e949	332	327	302	275
16	239	199	219	608	252	1050	396	680	333	322	299	270
17	239	200	212	397	255	1500	375	536	335	334	301	262
18	237	198	209	344	379	2250	360	469	331	329	299	262
19	237	197	208	385	551	1710	344	493	333	323	303	259
20	236	198	208	355	462	1310	329	463	336	324	330	258
21	235	198	203	315	391	1180	321	422	327	331	309	263
22	234	196	205	283	342	1470	317	394	324	333	304	257
23	232	194	213	344	317	1710	311	375	320	329	310	250
24	233	193	214	1960	297	1590	388	389	320	330	310	250
25	233	192	211	1090	286	1340	391	373	322	333	405	249
26	235	198	207	608	276	896	369	350	320	330	367	246
27	233	194	206	451	270	802	353	336	322	331	322	288
28	231	194	205	378	279	766	360	323	321	336	310	343
29	233	194	209	330	---	654	409	316	320	338	303	283
30	233	195	208	297	---	421	403	311	323	334	303	782
31	230	---	207	276	---	398	---	311	---	328	302	---
TOTAL	7629	6001	6500	13096	9349	27034	11431	13285	10000	10237	9744	9521
MEAN	246	200	210	422	334	872	381	429	333	330	314	317
MAX	319	230	239	1960	551	2250	432	949	353	338	405	782
MIN	230	192	196	211	252	307	311	311	320	322	299	246
(+)	-4134	-3176	-2823	+10688	+5848	+10587	0	-1008	-6756	-7915	-7008	-4689
MEAN†	113	94.2	119	767	543	1214	381	396	108	74.9	88.3	161
CFSM‡	.18	.15	.19	1.25	.88	1.98	.62	.64	.18	.12	.14	.26
IN.‡	.21	.17	.22	1.44	.92	2.28	.69	.74	.20	.14	.17	.29

CAL YR 1998 TOTAL 332017 MEAN 910 MAX 5770 MIN 192 MEAN‡ 889 CFSM‡ 1.45 IN.‡ 19.66  
WTR YR 1999 TOTAL 133827 MEAN 367 MAX 2250 MIN 192 MEAN‡ 338 CFSM‡ .55 IN.‡ 7.47

† Total change in contents, equivalent in cubic feet per second, per month, in Lake Moomaw; provided by U.S. Army Corps of Engineers.

‡ Adjusted for monthly change in contents.



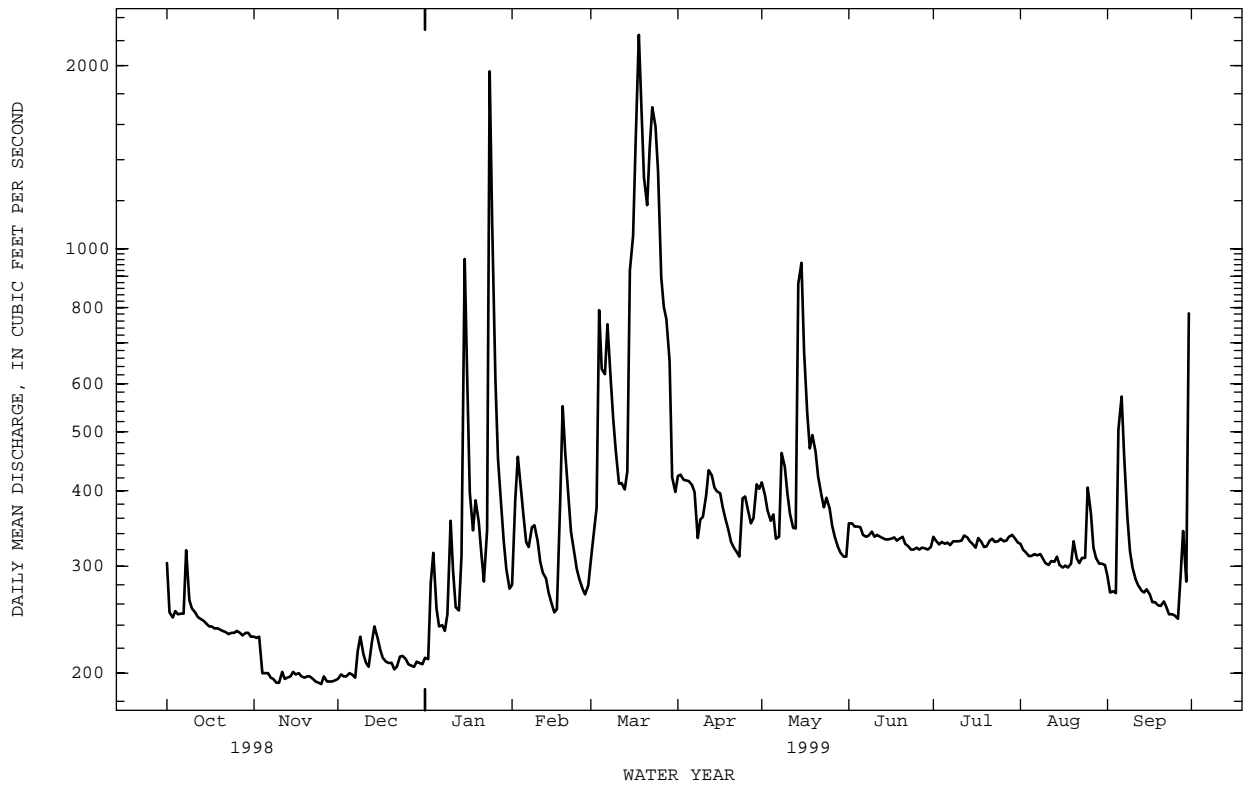
02013100 JACKSON RIVER BELOW DUNLAP CREEK, AT COVINGTON, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1980 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	347	503	532	866	1132	1516	1180	932	614	351	375	347
MAX	1302	2363	1685	2644	2702	3189	3540	2223	1403	526	1285	938
(WY)	1980	1986	1997	1996	1998	1993	1987	1989	1982	1995	1984	1989
MIN	111	114	130	119	283	211	356	397	303	190	117	87.3
(WY)	1981	1982	1981	1981	1981	1981	1986	1991	1980	1981	1981	1981

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR	WATER YEARS 1980 - 1999
ANNUAL TOTAL	332017	133827	
ANNUAL MEAN	910	367	722
HIGHEST ANNUAL MEAN			954 1984
LOWEST ANNUAL MEAN			348 1981
HIGHEST DAILY MEAN	5770	Mar 24	2250 Mar 18 15100 Jan 19 1996
LOWEST DAILY MEAN	192	Nov 25	192 Nov 25 67 aSep 3 1981
ANNUAL SEVEN-DAY MINIMUM	194	Nov 23	194 Nov 23 71 Sep 25 1981
INSTANTANEOUS PEAK FLOW			2660 Jan 24 31300 Nov 4 1985
INSTANTANEOUS PEAK STAGE			7.43 Jan 24 23.31 Nov 4 1985
INSTANTANEOUS LOW FLOW			157 Nov 3 b41 Jan 5 1981
ANNUAL RUNOFF (CFSM)	1.48	.60	1.18
ANNUAL RUNOFF (INCHES)	20.12	8.11	15.98
10 PERCENT EXCEEDS	2240	466	1580
50 PERCENT EXCEEDS	385	320	361
90 PERCENT EXCEEDS	205	205	213

a Also Sep 27-29, 1981.  
 b Result of freezeup.  
 e Estimated.



## JAMES RIVER BASIN

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 mi<sup>2</sup>.

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 sea level. Prior to Sep. 30, 1956, nonrecording gage at site 1.3 mi downstream at different datum.

REMARKS.--Records good. U.S. Army Corps of Engineers satellite gage-height telemeter at station. Maximum discharge, 15,400 ft<sup>3</sup>/s, from rating curve extended above 12,000 ft<sup>3</sup>/s. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,400 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Mar 18	0530	*708	*4.35	No peak greater than base discharge.			

Minimum discharge, 17 ft<sup>3</sup>/s, Aug 17-19, gage height, 1.86 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	21	28	24	19	82	89	124	119	60	27	26	20
2	21	28	23	21	211	91	125	116	56	28	23	19
3	21	32	23	58	284	117	111	109	54	25	22	19
4	21	34	23	62	224	269	102	102	53	22	20	19
5	22	35	24	42	182	213	96	94	49	21	20	136
6	22	33	22	34	150	219	91	89	45	20	19	334
7	24	30	22	33	136	291	86	86	42	20	19	156
8	75	29	28	35	127	256	82	291	40	19	18	92
9	63	29	41	56	106	227	81	274	38	19	19	64
10	37	29	39	85	92	206	89	215	36	19	18	50
11	29	32	30	70	82	175	91	182	35	19	18	42
12	26	32	24	57	77	159	136	156	34	21	18	36
13	24	30	39	56	77	148	132	169	34	23	18	33
14	24	32	57	69	70	157	123	312	32	29	19	31
15	24	30	41	266	64	e344	121	427	32	27	18	32
16	24	29	30	215	61	336	126	314	31	22	19	31
17	24	28	25	135	62	445	113	256	32	21	18	29
18	24	27	23	104	97	654	100	217	32	21	17	27
19	24	25	21	98	149	575	92	240	31	20	17	26
20	23	25	21	84	141	430	94	219	31	19	24	26
21	23	25	20	74	128	382	109	186	31	19	41	28
22	23	25	20	67	112	386	101	162	31	19	34	29
23	24	25	20	118	97	327	99	143	30	19	25	27
24	25	24	21	445	88	285	113	140	28	20	21	25
25	25	23	21	381	85	248	103	136	26	20	31	24
26	25	27	20	240	81	211	99	110	27	20	46	23
27	25	27	19	177	74	185	101	96	26	20	39	147
28	25	28	20	144	74	165	108	85	29	19	31	190
29	27	29	22	120	---	149	121	76	26	30	26	121
30	27	25	21	96	---	135	119	69	25	39	22	505
31	27	---	21	82	---	122	---	64	---	33	20	---
TOTAL	849	855	805	3543	3213	7996	3188	5254	1076	700	726	2341
MEAN	27.4	28.5	26.0	114	115	258	106	169	35.9	22.6	23.4	78.0
MAX	75	35	57	445	284	654	136	427	60	39	46	505
MIN	21	23	19	19	61	89	81	64	25	19	17	19
CFSM	.18	.19	.17	.75	.75	1.69	.69	1.11	.23	.15	.15	.51
IN.	.21	.21	.20	.86	.78	1.94	.78	1.28	.26	.17	.18	.57

02014000 POTTS CREEK NEAR COVINGTON, VA--Continued

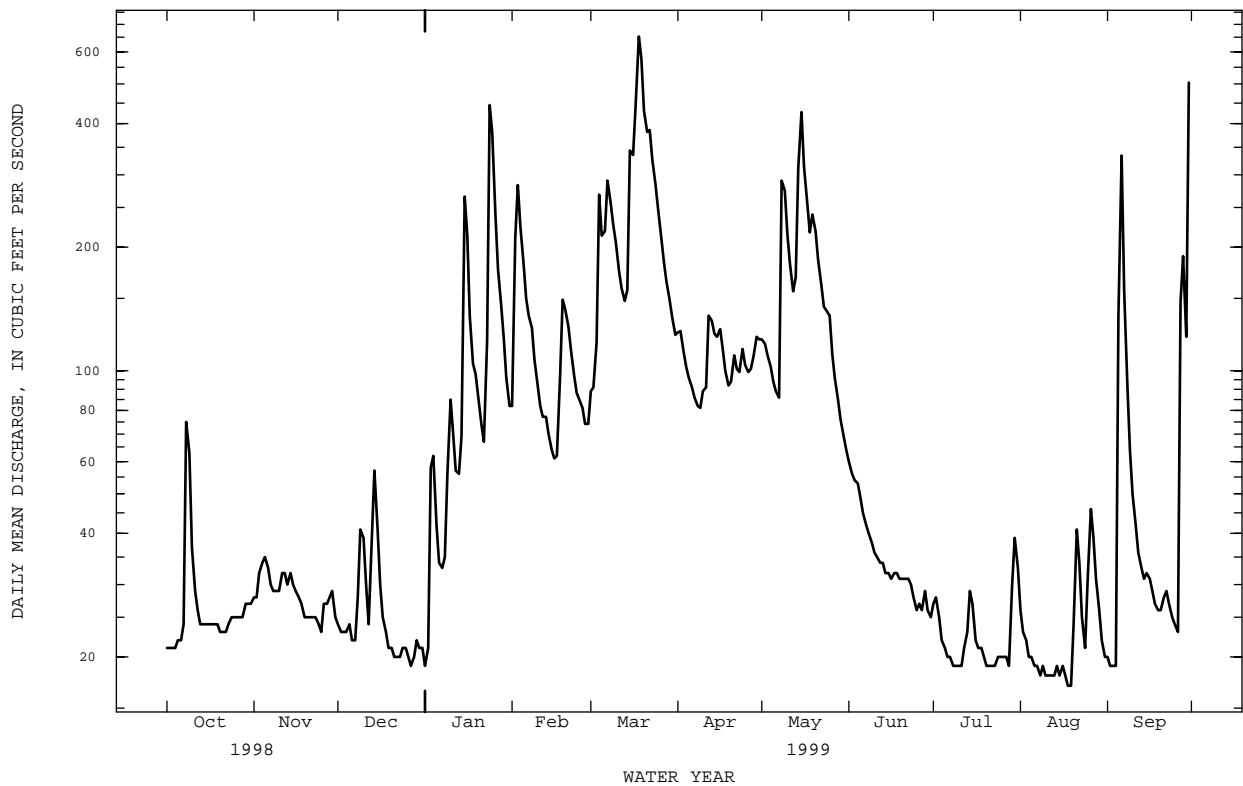
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1929 - 1956, 1966 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	95.0	127	173	248	300	379	290	224	136	66.5	66.3	61.1
MAX	548	766	643	788	725	1078	1184	519	650	288	461	516
(WY)	1990	1986	1949	1937	1998	1955	1987	1971	1972	1938	1940	1989
MIN	20.7	23.8	24.7	29.8	26.9	75.7	80.5	51.4	29.4	22.1	21.9	18.4
(WY)	1940	1940	1940	1956	1934	1988	1986	1934	1934	1966	1930	1968

SUMMARY STATISTICS FOR 1998 CALENDAR YEAR FOR 1999 WATER YEAR WATER YEARS 1929 - 1956  
1966 - 1999

ANNUAL TOTAL		82660		30546								
ANNUAL MEAN		226		83.7					180			
HIGHEST ANNUAL MEAN									320			1973
LOWEST ANNUAL MEAN									77.2			1988
HIGHEST DAILY MEAN				3100	Mar 21		654	Mar 18	8870		Jun 21	1972
LOWEST DAILY MEAN				19	Dec 27		17	aAug 18	15		Dec 17	1930
ANNUAL SEVEN-DAY MINIMUM				20	Sep 14		18	Aug 13	15		Dec 17	1930
INSTANTANEOUS PEAK FLOW							708	Mar 18	15400		Nov 4	1985
INSTANTANEOUS PEAK STAGE							4.35	Mar 18	13.46		Nov 4	1985
INSTANTANEOUS LOW FLOW							17	bAug 17	c13		Nov 29	1930
ANNUAL RUNOFF (CFSM)		1.48					.55		1.18			
ANNUAL RUNOFF (INCHES)		20.10					7.43		15.98			
10 PERCENT EXCEEDS				573			212		397			
50 PERCENT EXCEEDS				63			35		86			
90 PERCENT EXCEEDS				21			20		27			

- a Also Aug 19, 1999.
- b Also Aug 18, 19, 1999.
- c Minimum observed.
- e Estimated.



## JAMES RIVER BASIN

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 mi<sup>2</sup>.

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

REVISED RECORDS.--WSP 2104: Drainage area. WRD VA-62-1: 1961. WRD VA-96-1: 1985(M).

GAGE.--Water-stage recorder. Datum of gage is 1,610.14 ft above sea level. Prior to July 12, 1974, at site 700 ft upstream at datum 11.84 ft higher.

REMARKS.--Records good except those for period of no gage-height record, Dec. 6-8, and period with ice effect, Jan. 5-7, which are fair. Maximum discharge, 22,900 ft<sup>3</sup>/s, from rating curve extended above 3,300 ft<sup>3</sup>/s on basis of slope-area measurement of peak flow. Minimum discharge, 19 ft<sup>3</sup>/s, result of freezeup. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location by the Virginia Department of Environmental Quality - Water Division.

COOPERATION.--Records were provided by the Virginia Department of Environmental Quality - Water Division.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Jan 24	1045	*1,260	*4.14	No peak greater than base discharge.			

Minimum discharge, 23 ft<sup>3</sup>/s, Aug 7, 11, 12-13.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	38	36	34	33	84	87	95	56	40	30	25	32
2	37	36	33	33	239	80	94	55	39	30	25	31
3	38	39	33	75	195	92	86	54	39	29	25	31
4	40	41	34	60	156	178	83	53	37	27	24	31
5	39	37	34	e47	129	141	79	53	36	27	25	168
6	39	36	e34	e39	112	140	75	52	35	26	24	267
7	40	36	e35	e36	113	146	72	51	34	26	24	142
8	62	36	e38	38	150	123	70	63	33	26	24	84
9	51	36	48	45	127	123	69	56	32	25	25	64
10	41	36	40	70	115	120	70	52	46	25	25	55
11	39	41	36	54	103	111	70	50	56	25	24	49
12	38	39	35	49	102	110	72	49	39	26	24	46
13	38	37	40	68	105	104	66	208	36	27	25	44
14	36	37	48	153	90	111	63	455	35	27	47	43
15	36	36	39	450	85	135	64	263	34	26	37	43
16	37	36	37	171	82	159	68	173	32	25	31	46
17	37	36	36	111	81	393	64	127	35	25	30	44
18	37	34	35	188	117	570	61	102	34	26	30	41
19	37	35	34	221	117	431	60	103	32	26	30	40
20	37	35	34	130	106	286	60	81	33	25	39	41
21	37	35	34	108	96	268	61	70	33	26	36	42
22	36	34	34	108	86	285	62	64	32	26	32	43
23	36	34	34	147	80	220	59	67	31	25	31	40
24	36	34	34	840	79	199	65	73	30	26	32	39
25	36	34	32	384	78	174	60	65	30	28	95	39
26	37	36	33	209	77	149	59	56	30	26	98	38
27	36	35	32	158	74	133	59	52	30	25	49	39
28	36	34	35	129	82	120	60	48	31	26	40	44
29	36	34	35	109	---	110	58	45	30	39	36	51
30	36	34	35	95	---	99	57	43	30	29	34	99
31	36	---	30	86	---	91	---	41	---	26	32	---
TOTAL	1195	1079	1105	4444	3060	5488	2041	2780	1044	831	1078	1816
MEAN	38.5	36.0	35.6	143	109	177	68.0	89.7	34.8	26.8	34.8	60.5
MAX	62	41	48	840	239	570	95	455	56	39	98	267
MIN	36	34	30	33	74	80	57	41	30	25	24	31
CFSM	.35	.33	.32	1.30	.99	1.61	.62	.82	.32	.24	.32	.55
IN.	.40	.36	.37	1.50	1.03	1.86	.69	.94	.35	.28	.36	.61

02015700 BULLPASTURE RIVER AT WILLIAMSVILLE, VA--Continued

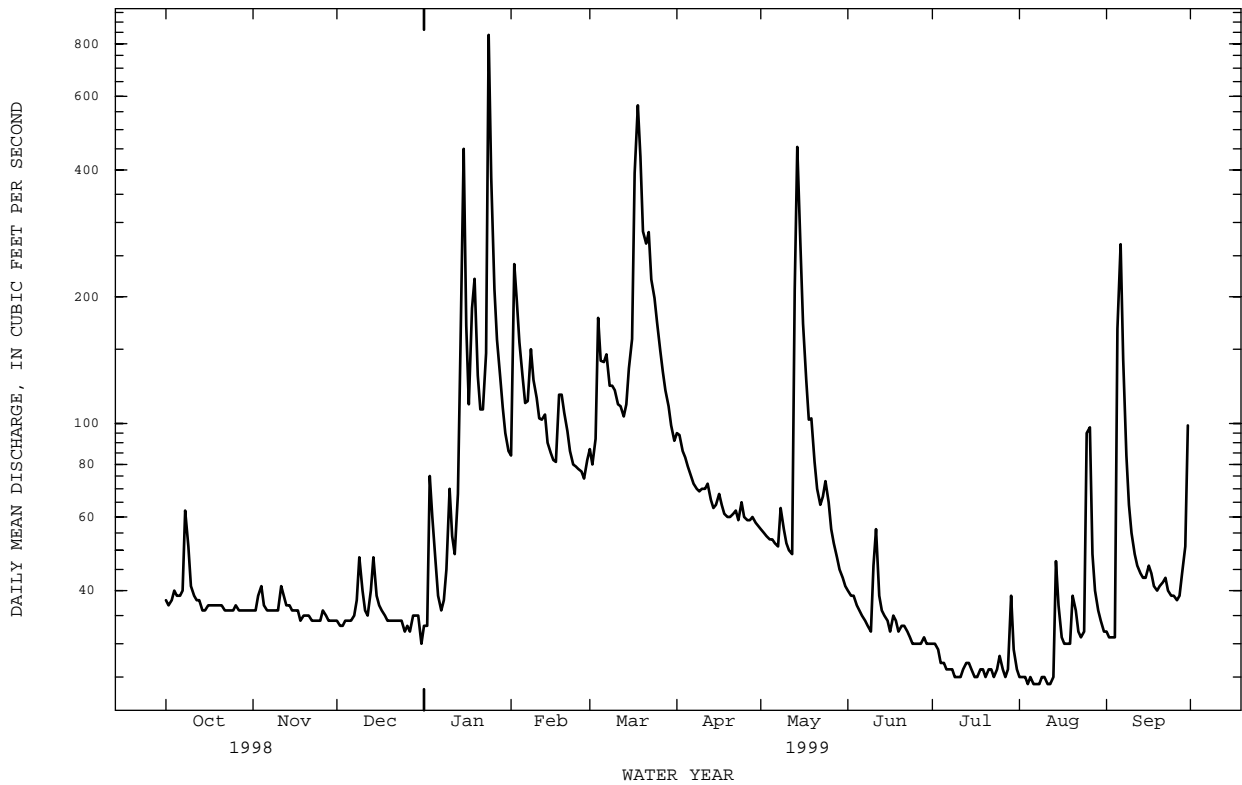
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1960 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	84.0	121	161	200	224	314	222	189	117	65.4	64.7	67.7
MAX	295	784	543	631	498	655	663	448	376	245	272	432
(WY)	1977	1986	1974	1996	1982	1993	1987	1996	1982	1972	1969	1996
MIN	30.1	35.9	31.9	34.7	63.8	62.2	68.0	65.4	34.8	26.8	27.7	28.5
(WY)	1989	1992	1966	1981	1963	1981	1999	1977	1999	1999	1964	1968

SUMMARY STATISTICS FOR 1998 CALENDAR YEAR FOR 1999 WATER YEAR WATER YEARS 1960 - 1999

ANNUAL TOTAL	68639	25961	
ANNUAL MEAN	188	71.1	152
HIGHEST ANNUAL MEAN			248
LOWEST ANNUAL MEAN			71.1
HIGHEST DAILY MEAN	3800	Jan 8	e8700
LOWEST DAILY MEAN	30	Dec 31	23
ANNUAL SEVEN-DAY MINIMUM	33	Dec 25	24
INSTANTANEOUS PEAK FLOW			1260
INSTANTANEOUS PEAK STAGE			4.14
INSTANTANEOUS LOW FLOW			23
ANNUAL RUNOFF (CFSM)	1.71	.65	1.38
ANNUAL RUNOFF (INCHES)	23.21	8.78	18.81
10 PERCENT EXCEEDS	443	137	302
50 PERCENT EXCEEDS	63	40	81
90 PERCENT EXCEEDS	36	27	34

- a Also Aug 6-8, 11, 12, 1999.
- b Also Sep 9, 1964.
- c From floodmarks.
- d Also Aug 11, 12-13, 1999.
- e Estimated.
- f Result of freezeup.



## 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 mi<sup>2</sup>.

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 sea level (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 of doubtful gage-height record, Aug. 14-17, which is fair. Low flow affected by springs and by occasional regulation from unknown source. Maximum discharge, 40,900 ft<sup>3</sup>/s, from rating curve extended above 13,000 ft<sup>3</sup>/s on basis of slope-area measurements at gage heights 15.70 ft and 19.15 ft. Minimum gage height, 1.43 ft, Jan. 31, 1981, result of freezeup. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in March 1913 reached a stage of 20.8 ft, from floodmarks, discharge, about 45,000 ft<sup>3</sup>/s, from rating curve extended above 13,000 ft<sup>3</sup>/s on basis of records for other stations in James River Basin.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 5,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Jan 24	1745	*5,210	*7.55	No other peak greater than base discharge.			

Minimum daily discharge, 61 ft<sup>3</sup>/s, Aug 13.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	74	80	82	95	303	273	385	266	150	88	81	77
2	73	80	81	86	517	279	408	248	143	88	73	74
3	72	89	81	196	888	272	394	234	142	83	69	71
4	74	92	81	391	743	445	363	222	136	80	67	70
5	77	93	82	262	602	648	343	213	131	78	67	476
6	79	88	82	161	490	565	320	205	126	75	67	752
7	82	85	82	190	437	546	297	203	119	73	66	720
8	177	84	92	144	472	512	284	1070	115	75	66	422
9	204	82	128	174	528	475	276	832	110	70	66	262
10	140	82	140	214	469	476	268	507	112	69	66	186
11	108	94	123	256	422	443	298	396	189	69	65	145
12	93	92	107	224	377	429	306	328	196	72	62	125
13	87	93	121	256	352	431	285	302	139	78	61	111
14	84	91	144	401	330	444	266	1170	118	77	e61	102
15	82	87	145	1360	288	888	262	1490	107	75	e65	100
16	82	85	133	1300	265	1050	272	958	102	73	e65	106
17	81	85	114	692	251	1930	268	684	104	72	e66	101
18	82	83	105	518	520	3270	251	531	99	73	67	96
19	82	82	99	674	770	2370	239	442	98	82	63	93
20	81	84	96	670	623	1510	238	391	98	72	80	90
21	80	82	93	503	515	1230	236	328	99	73	83	116
22	78	82	92	426	432	1460	234	288	97	71	79	140
23	77	82	90	499	361	1240	231	269	94	72	83	120
24	79	82	92	3480	323	984	224	275	90	89	74	102
25	79	81	89	2830	300	832	212	268	88	96	76	94
26	80	86	87	1170	284	711	209	255	87	80	103	88
27	80	85	86	771	266	617	204	220	87	73	231	114
28	81	84	84	604	260	545	224	201	87	74	137	140
29	80	84	86	484	---	482	299	185	88	101	105	144
30	80	83	89	398	---	436	292	174	86	85	90	1180
31	81	---	89	334	---	392	---	156	---	87	81	---
TOTAL	2789	2562	3095	19763	12388	26185	8388	13311	3437	2423	2487	6417
MEAN	90.0	85.4	99.8	638	442	845	280	429	115	78.2	80.2	214
MAX	204	94	145	3480	888	3270	408	1490	196	101	231	1180
MIN	72	80	81	86	251	272	204	156	86	69	61	70
CFSM	.20	.19	.22	1.38	.96	1.83	.61	.93	.25	.17	.17	.46
IN.	.23	.21	.25	1.59	1.00	2.11	.68	1.07	.28	.20	.20	.52

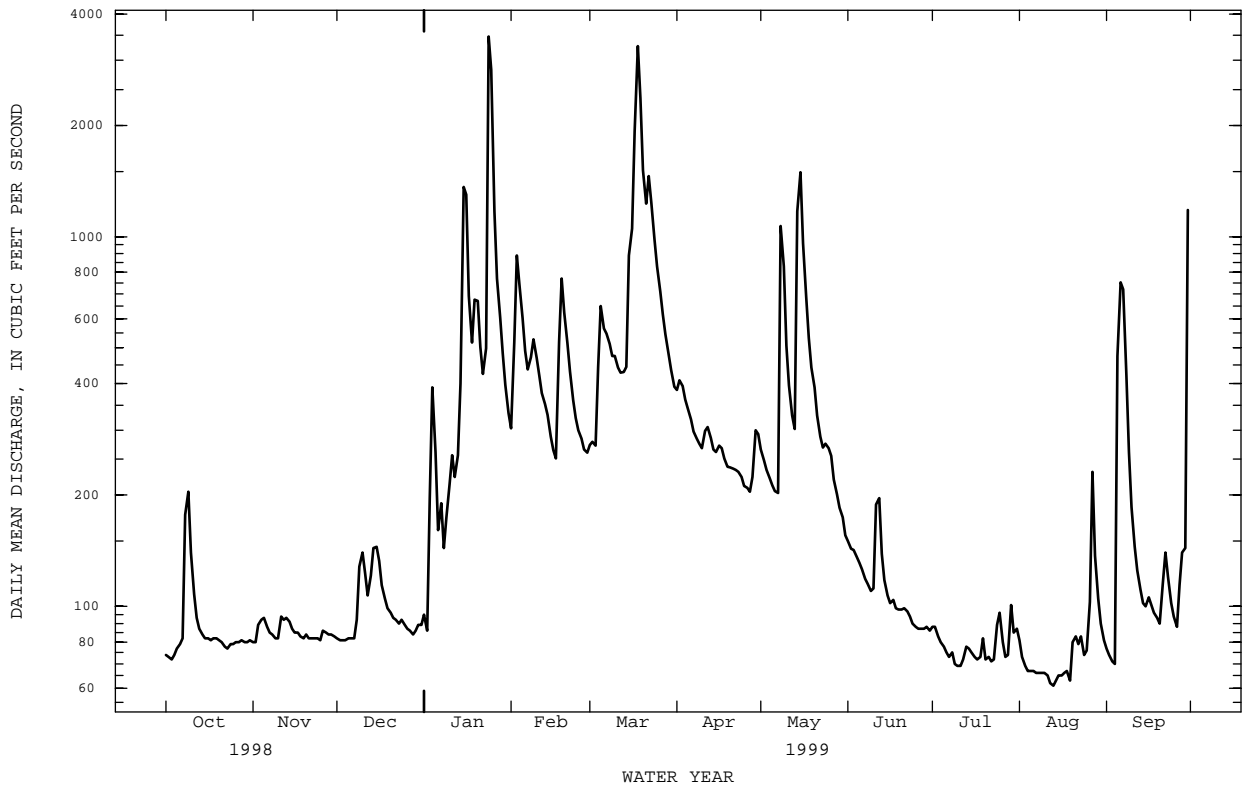
02016000 COWPASTURE RIVER NEAR CLIFTON FORGE, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1926 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	276	376	564	749	872	1112	840	646	384	218	231	214
MAX	1474	2745	1883	2253	1911	2531	2878	2342	1484	1213	1531	1510
(WY)	1938	1986	1974	1996	1998	1993	1987	1989	1982	1972	1969	1996
MIN	45.4	62.8	82.9	95.3	89.9	203	235	147	98.1	64.9	64.9	60.3
(WY)	1931	1932	1966	1981	1934	1981	1995	1930	1964	1930	1930	1932

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR	WATER YEARS 1926 - 1999
ANNUAL TOTAL	258147	103245	
ANNUAL MEAN	707	283	539
HIGHEST ANNUAL MEAN			935
LOWEST ANNUAL MEAN			248
HIGHEST DAILY MEAN	13300	Jan 8	33900
LOWEST DAILY MEAN	72	Oct 3	40
ANNUAL SEVEN-DAY MINIMUM	74	Sep 28	64
INSTANTANEOUS PEAK FLOW			5210
INSTANTANEOUS PEAK STAGE			7.55
INSTANTANEOUS LOW FLOW			a60
ANNUAL RUNOFF (CFSM)	1.53	.61	1.17
ANNUAL RUNOFF (INCHES)	20.83	8.33	15.88
10 PERCENT EXCEEDS	1680	609	1170
50 PERCENT EXCEEDS	199	120	260
90 PERCENT EXCEEDS	80	74	86

a Minimum recorded, could have been less during period of doubtful gage-height record, Aug 14-17, 1999.  
 e Estimated.



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 mi<sup>2</sup>.

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 sea level (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 of no gage-height record, Mar. 12-15, which is fair. Flow regulated since December 1979 by Lake Moomaw (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. Statistics of monthly mean data and summary statistics for water years 1925 - 1979 (unregulated flow) are available in previous data books, water years 1991 - 1998. National Weather Service gage-height telemeter at station. Maximum discharge, 87,500 ft<sup>3</sup>/s, from rating curve extended above 66,000 ft<sup>3</sup>/s. Minimum discharge, 133 ft<sup>3</sup>/s, result of freezeup. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in November 1877 reached a stage of about 33 ft, discharge, about 120,000 ft<sup>3</sup>/s. Flood in March 1913 reached a stage of 30.4 ft, from floodmarks, discharge, about 98,000 ft<sup>3</sup>/s.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 10,200 ft<sup>3</sup>/s, Jan 24, gage height, 8.86 ft; minimum discharge, 323 ft<sup>3</sup>/s, Jan 1, gage height, 1.72 ft; minimum daily, 351 ft<sup>3</sup>/s, Oct 3.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	421	381	359	375	922	878	1270	1180	668	519	480	458
2	372	385	353	364	1370	958	1310	1140	683	530	457	424
3	351	432	357	697	2020	1010	1280	1080	677	511	439	415
4	362	402	359	1110	1770	1760	1240	1010	651	500	433	413
5	370	372	367	709	1500	1880	1210	1010	639	493	427	1200
6	372	370	366	510	1310	1700	1170	883	624	486	425	2090
7	382	363	361	580	1230	1820	1140	877	613	479	422	1650
8	816	359	409	510	1260	1740	1050	2360	599	487	425	1150
9	689	360	509	563	1300	1570	987	2100	602	469	431	809
10	512	353	497	772	1220	1500	1030	1560	596	469	423	649
11	446	391	454	837	1130	1380	1130	1360	671	465	423	554
12	416	382	419	724	1040	e1350	1240	1230	694	486	425	514
13	402	375	484	776	977	e1300	1230	1160	613	499	424	487
14	397	371	551	1110	907	e1400	1170	2480	592	489	439	474
15	384	373	545	2880	811	e2500	1160	3400	569	487	430	475
16	390	368	491	2750	755	2930	1180	2410	563	477	444	495
17	382	366	449	1620	733	4420	1140	1850	575	475	447	468
18	389	361	421	1310	1210	7340	1050	1540	553	516	428	453
19	389	358	405	1460	1780	5750	997	1400	550	478	427	449
20	384	360	402	1460	1570	3860	967	1370	558	458	512	442
21	377	358	393	1240	1390	3220	958	1200	556	469	477	480
22	374	355	389	1080	1240	3640	955	1080	552	467	478	507
23	373	354	382	1240	1120	3660	928	1010	533	466	498	474
24	376	353	401	6930	1000	3160	1020	1020	521	475	491	452
25	376	353	387	5570	923	2820	1070	987	515	500	502	443
26	382	377	382	2630	881	2160	1020	908	517	471	713	434
27	379	371	369	1850	816	1900	976	824	514	455	718	509
28	382	366	369	1510	826	1760	1030	762	518	454	574	1100
29	381	366	385	1300	---	1650	1200	722	508	514	514	754
30	382	366	390	1140	---	1360	1210	686	503	500	485	3260
31	390	---	386	977	---	1260	---	648	---	495	469	---
TOTAL	12798	11101	12791	46584	33011	73636	33318	41247	17527	15039	14680	22482
MEAN	413	370	413	1503	1179	2375	1111	1331	584	485	474	749
MAX	816	432	551	6930	2020	7340	1310	3400	694	530	718	3260
MIN	351	353	353	364	733	878	928	648	503	454	422	413
(†)	-4131	-3176	-2823	+10680	+5848	+10587	0	-1008	-6756	-7915	-7008	-4689
MEAN‡	279	264	322	1847	1388	2717	1111	1298	359	230	247	593
CFSM‡	.20	.19	.23	1.35	1.01	1.98	.81	.95	.26	.17	.18	.43
IN.‡	.23	.21	.27	1.55	1.05	2.28	.90	1.09	.29	.19	.21	.48

CAL YR 1998 TOTAL 804346 MEAN 2204 MAX 24700 MIN 351 MEAN‡ 2184 CFSM‡ 1.59 IN.‡ 21.59  
WTR YR 1999 TOTAL 334214 MEAN 916 MAX 7340 MIN 351 MEAN‡ 887 CFSM‡ .65 IN.‡ 8.77

† Total change in contents, equivalent in cubic feet per second, per month, in Lake Moomaw; provided by U.S. Army Corps of Engineers.  
‡ Adjusted for monthly change in contents.



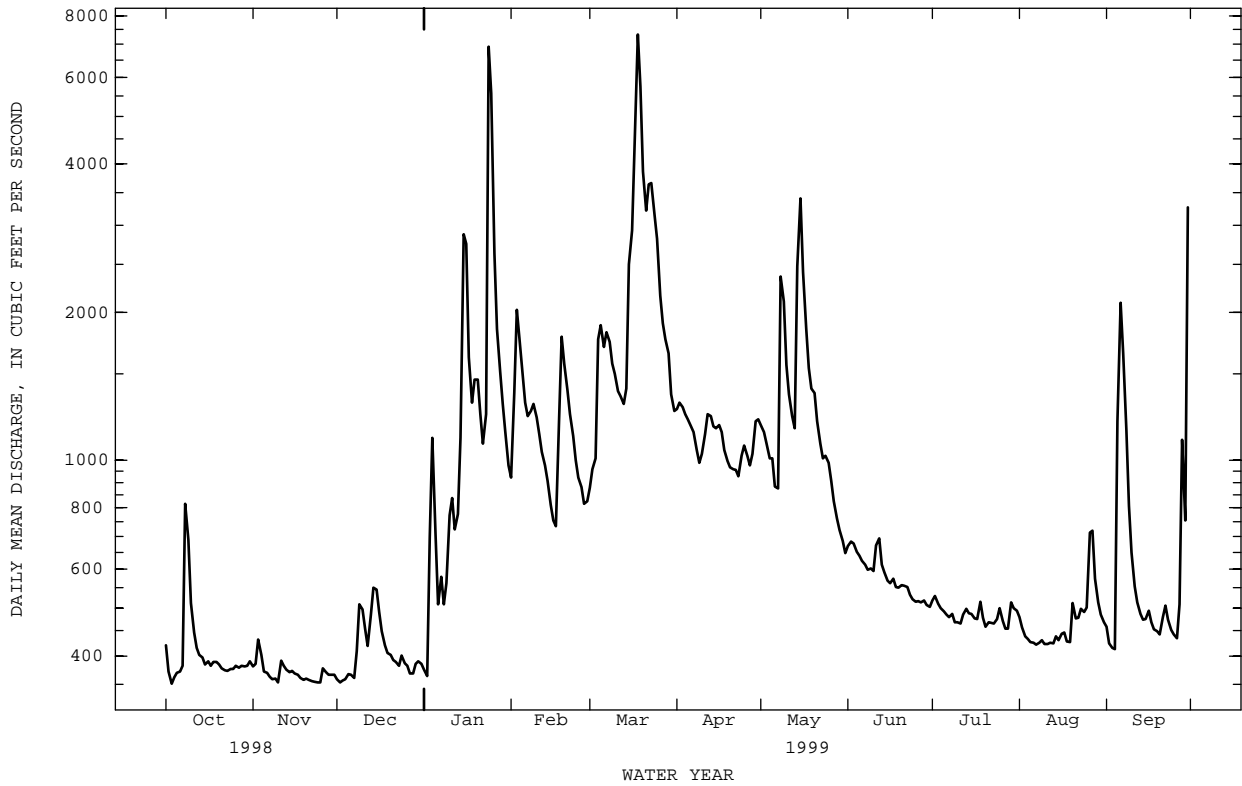
02016500 JAMES RIVER AT LICK RUN, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1980 - 1999, BY WATER YEAR (WY) [REGULATED, UNADJUSTED]

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	812	1326	1483	2220	2672	3578	2876	2158	1399	694	701	739
MAX	3495	7206	4206	5302	6425	8083	9349	5639	3660	1186	2704	2839
(WY)	1990	1986	1997	1996	1998	1993	1987	1989	1982	1995	1984	1996
MIN	270	326	328	268	949	623	755	940	561	479	264	269
(WY)	1981	1982	1981	1981	1981	1981	1986	1991	1988	1981	1981	1981

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR	WATER YEARS 1980 - 1999
ANNUAL TOTAL	804346	334214	
ANNUAL MEAN	2204	916	1716
HIGHEST ANNUAL MEAN			2256
LOWEST ANNUAL MEAN			789
HIGHEST DAILY MEAN	24700	Jan 8	7340
LOWEST DAILY MEAN	351	Oct 3	351
ANNUAL SEVEN-DAY MINIMUM	356	Nov 19	356
INSTANTANEOUS PEAK FLOW			10200
INSTANTANEOUS PEAK STAGE			8.86
INSTANTANEOUS LOW FLOW			323
ANNUAL RUNOFF (CFSM)	1.61	.67	1.25
ANNUAL RUNOFF (INCHES)	21.79	9.06	16.98
10 PERCENT EXCEEDS	5250	1670	3710
50 PERCENT EXCEEDS	814	552	842
90 PERCENT EXCEEDS	373	373	393

a Result of freezeup.  
e Estimated.



## JAMES RIVER BASIN

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 mi<sup>2</sup>.

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 sea level. Prior to June 7, 1937, nonrecording gage at same site and datum.

REMARKS.--Records good except those for period with ice effect, Jan. 4-6, and period of no gage-height record, Feb. 28 to Mar. 17, which are fair. Maximum discharge, 8,000 ft<sup>3</sup>/s, from rating curve extended above 3,200 ft<sup>3</sup>/s on basis of slope-area measurement of peak flow. 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 Department of Environmental Quality - Water Division.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,100 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Jan 24	1600	*520	*5.60	No peak greater than base discharge.			

Minimum discharge, 5.6 ft<sup>3</sup>/s, Aug 19.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	9.6	13	16	21	65	e60	85	89	37	14	12	12
2	9.3	13	16	19	167	e62	92	87	34	14	13	11
3	9.0	15	16	29	265	e64	84	82	33	13	12	11
4	9.4	17	16	e40	186	e120	80	77	31	13	11	11
5	9.6	16	16	e34	149	e160	76	72	28	13	10	90
6	9.6	14	16	e22	123	e135	72	68	26	12	9.9	212
7	10	15	16	26	109	e140	68	68	25	11	9.3	101
8	44	16	17	23	103	e130	65	174	23	11	8.8	63
9	28	15	23	26	89	e125	64	153	22	11	8.6	41
10	18	15	23	51	79	e120	66	125	20	10	7.8	29
11	16	16	19	41	71	e115	85	107	19	11	7.7	22
12	14	16	19	36	66	e108	160	93	18	14	7.0	18
13	13	15	29	41	64	e100	143	99	17	20	6.9	16
14	13	15	37	64	58	e170	134	312	17	19	8.5	15
15	12	16	30	320	54	e265	127	328	16	19	8.0	16
16	13	16	26	192	51	e350	126	230	16	16	7.2	15
17	12	16	24	130	50	e396	109	182	18	15	6.5	13
18	12	16	22	103	84	415	97	150	18	15	6.2	13
19	12	15	21	83	113	339	89	180	16	13	6.9	12
20	12	15	21	68	107	281	95	180	16	13	27	12
21	12	15	20	57	97	284	101	166	17	13	27	13
22	11	15	20	50	87	296	99	143	16	14	14	12
23	12	15	19	55	79	247	95	124	15	16	12	11
24	12	15	20	353	73	211	95	118	14	13	14	11
25	13	15	20	288	68	184	88	99	14	12	16	11
26	12	16	19	205	65	157	82	83	14	12	24	11
27	11	17	20	155	60	135	82	69	15	11	21	14
28	12	17	19	125	e58	116	84	58	16	11	17	18
29	12	16	19	101	---	102	89	51	14	23	14	25
30	12	16	19	83	---	90	89	45	15	20	13	54
31	13	---	20	69	---	81	---	40	---	14	12	---
TOTAL	417.5	462	638	2910	2640	5558	2821	3852	600	436	378.3	913
MEAN	13.5	15.4	20.6	93.9	94.3	179	94.0	124	20.0	14.1	12.2	30.4
MAX	44	17	37	353	265	415	160	328	37	23	27	212
MIN	9.0	13	16	19	50	60	64	40	14	10	6.2	11
CFSM	.13	.15	.20	.90	.91	1.72	.90	1.19	.19	.14	.12	.29
IN.	.15	.17	.23	1.04	.94	1.99	1.01	1.38	.21	.16	.14	.33

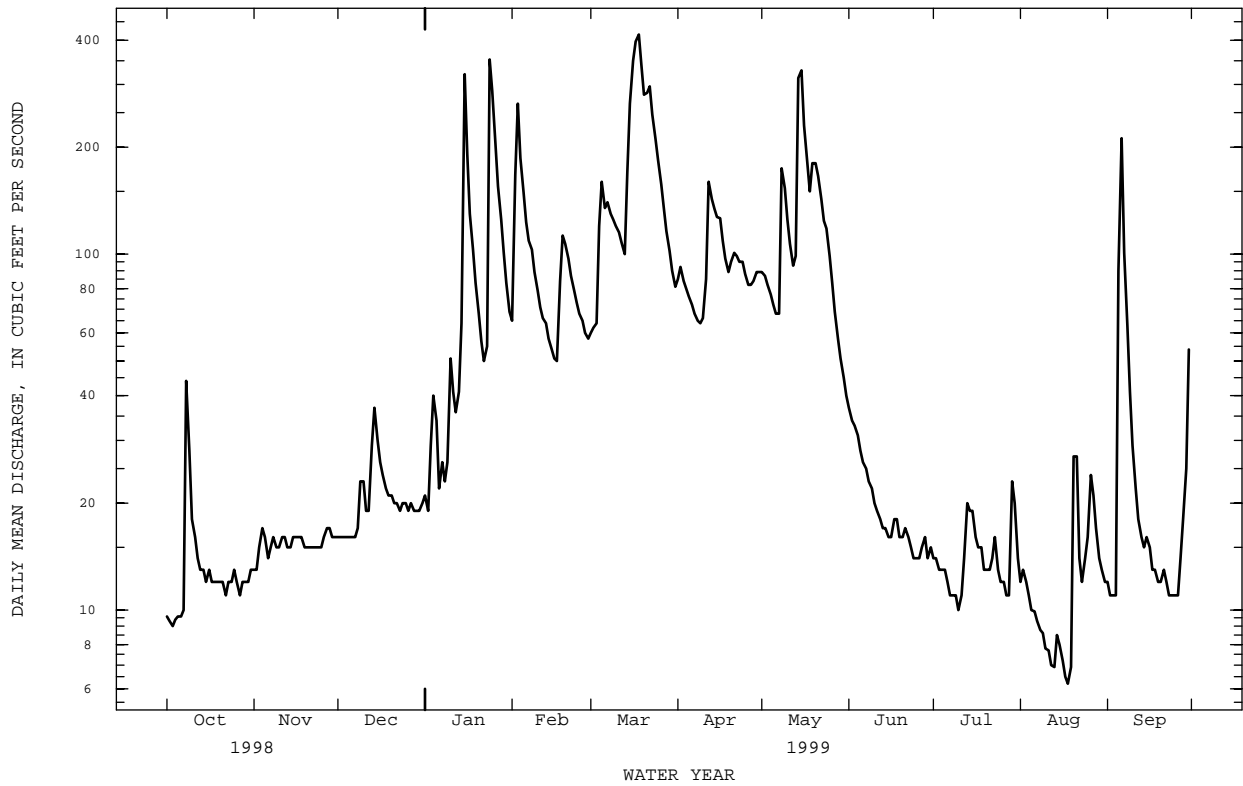
02017500 JOHNS CREEK AT NEW CASTLE, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1927 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	56.9	88.1	133	189	226	278	223	160	89.3	40.3	43.0	40.1
MAX	396	445	514	546	542	730	820	398	471	291	364	353
(WY)	1930	1986	1949	1996	1998	1955	1987	1989	1972	1941	1940	1989
MIN	9.81	14.0	15.7	16.2	18.0	51.9	47.8	33.5	20.0	8.90	9.39	9.07
(WY)	1992	1931	1940	1956	1934	1988	1995	1930	1999	1930	1930	1930

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR		FOR 1999 WATER YEAR		WATER YEARS 1927 - 1999	
ANNUAL TOTAL	63505.6		21625.8			
ANNUAL MEAN	174		59.2		130	
HIGHEST ANNUAL MEAN					235	
LOWEST ANNUAL MEAN					59.2	
HIGHEST DAILY MEAN	2170	Mar 21	415	Mar 18	6040	Jun 21 1972
LOWEST DAILY MEAN	9.0	Oct 3	6.2	Aug 18	6.2	Aug 18 1999
ANNUAL SEVEN-DAY MINIMUM	9.4	Sep 29	7.2	Aug 13	7.1	Sep 27 1968
INSTANTANEOUS PEAK FLOW			520		8000	
INSTANTANEOUS PEAK STAGE			5.60		12.48	
INSTANTANEOUS LOW FLOW			5.6		5.6	
ANNUAL RUNOFF (CFSM)	1.67		.57		1.25	
ANNUAL RUNOFF (INCHES)	22.72		7.74		16.98	
10 PERCENT EXCEEDS	463		145		300	
50 PERCENT EXCEEDS	35		21		59	
90 PERCENT EXCEEDS	12		11		13	

e Estimated.



## JAMES RIVER BASIN

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 abandoned railway bridge, 700 ft downstream from Stony Run, 0.2 mi northeast of Horton, 0.4 mi northwest of Parr, and at mile 12.0.

DRAINAGE AREA.--329 mi<sup>2</sup>.

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 sea level (levels by U.S. Army Corps of Engineers). Prior to June 7, 1937, nonrecording gage at same site and datum.

REMARKS.--No estimated daily discharges. Records good. Maximum discharge, 58,500 ft<sup>3</sup>/s, from rating curve extended above 11,000 ft<sup>3</sup>/s on basis of slope-area measurement of peak flow. Minimum discharge, 20 ft<sup>3</sup>/s, probably occurred Dec. 21, 25, 1980, and Jan. 4, 1981, gage height, 3.20 ft, result of freezeup. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,200 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Sep 6	1130	*2,100	*7.35	No peak greater than base discharge.			

Minimum discharge, 27 ft<sup>3</sup>/s, Aug 20, gage height, 3.24 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	39	47	57	58	191	180	248	259	111	53	55	46
2	38	48	55	63	272	187	273	255	103	51	49	43
3	38	52	55	81	694	195	267	245	97	49	44	41
4	39	54	55	109	605	377	253	233	92	47	43	40
5	41	55	55	112	456	486	245	217	86	45	41	62
6	42	57	55	97	355	414	233	203	81	44	39	1580
7	44	55	55	106	310	429	217	196	77	42	37	912
8	85	52	59	92	290	414	205	467	72	40	36	404
9	196	51	66	87	263	396	199	578	67	39	35	256
10	125	53	73	84	236	384	195	426	63	38	34	182
11	81	55	80	123	213	346	205	349	60	37	34	132
12	66	54	71	124	194	315	393	300	58	38	33	103
13	58	54	80	118	184	303	456	269	56	42	32	87
14	52	54	97	142	172	309	380	495	54	51	32	76
15	49	55	114	435	156	745	347	1070	52	60	33	70
16	47	54	94	745	145	1110	350	793	51	57	35	67
17	46	55	82	411	140	1250	333	615	54	53	33	63
18	47	54	75	308	168	1370	307	504	55	56	32	60
19	47	54	71	262	415	1140	283	447	56	60	30	55
20	46	53	67	223	393	875	268	458	54	54	29	54
21	45	53	65	190	333	769	281	409	52	47	35	54
22	43	53	63	166	288	1000	269	361	52	48	56	200
23	42	53	60	175	254	850	260	321	52	54	48	121
24	42	54	61	1050	229	705	260	296	50	57	40	87
25	44	54	61	1310	210	605	254	282	49	52	40	71
26	44	56	60	701	196	506	238	242	49	46	44	63
27	47	55	59	486	181	415	234	211	48	43	112	85
28	46	57	57	370	173	364	237	179	49	41	97	720
29	46	58	60	304	---	323	249	156	50	44	73	377
30	46	60	60	254	---	291	258	139	51	54	59	804
31	47	---	61	214	---	260	---	123	---	69	51	---
TOTAL	1718	1619	2083	9000	7716	17313	8197	11098	1901	1511	1391	6915
MEAN	55.4	54.0	67.2	290	276	558	273	358	63.4	48.7	44.9	230
MAX	196	60	114	1310	694	1370	456	1070	111	69	112	1580
MIN	38	47	55	58	140	180	195	123	48	37	29	40
CFSM	.17	.16	.20	.88	.84	1.70	.83	1.09	.19	.15	.14	.70
IN.	.19	.18	.24	1.02	.87	1.96	.93	1.25	.21	.17	.16	.78

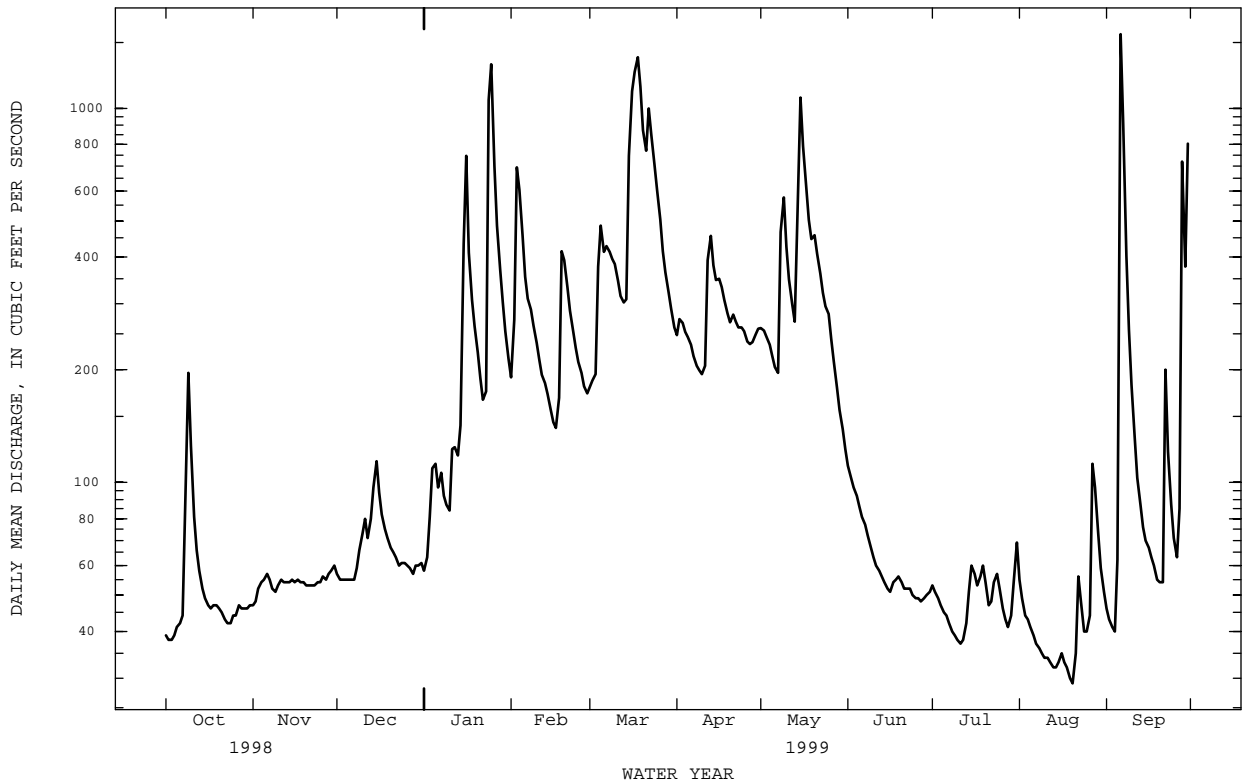
02018000 CRAIG CREEK AT PARR, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1925 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	189	280	388	563	664	796	652	458	268	136	161	143
MAX	1093	2112	1519	1642	1757	2116	2427	1202	1134	979	1290	974
(WY)	1938	1986	1949	1937	1998	1993	1987	1942	1972	1941	1940	1928
MIN	34.9	45.9	48.9	51.2	55.6	141	143	93.2	63.4	33.5	35.6	34.1
(WY)	1931	1931	1966	1956	1934	1988	1995	1930	1999	1966	1964	1968

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR	WATER YEARS 1925 - 1999
ANNUAL TOTAL	190479	70462	
ANNUAL MEAN	522	193	391
HIGHEST ANNUAL MEAN			655 1973
LOWEST ANNUAL MEAN			185 1981
HIGHEST DAILY MEAN	7800 Mar 21	1580 Sep 6	21000 Nov 4 1985
LOWEST DAILY MEAN	38 Oct 2	29 Aug 20	25 Sep 4 1966
ANNUAL SEVEN-DAY MINIMUM	39 Sep 29	32 Aug 14	27 Aug 22 1964
INSTANTANEOUS PEAK FLOW		2100 Sep 6	58500 Nov 4 1985
INSTANTANEOUS PEAK STAGE		7.35 Sep 6	a24.76 Nov 4 1985
INSTANTANEOUS LOW FLOW		27 Aug 20	b20 cDec 21 1980
ANNUAL RUNOFF (CFSM)	1.59	.59	1.19
ANNUAL RUNOFF (INCHES)	21.54	7.97	16.16
10 PERCENT EXCEEDS	1320	431	868
50 PERCENT EXCEEDS	106	77	182
90 PERCENT EXCEEDS	43	42	49

- a From floodmarks.
- b Result of freezeup.
- c Also probably occurred Dec 25, 1980, and Jan 4, 1981.



## JAMES RIVER BASIN

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 Haymakertown, and 8.2 mi northeast of Catawba.

DRAINAGE AREA.--34.3 mi<sup>2</sup>.

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 sea level. Prior to Aug. 1, 1953, nonrecording gage at site 80 ft downstream at same datum.

REMARKS.--Records good except for period with ice effect, Jan. 4-8, which is fair. At a point 5.3 mi upstream from station, there has been transmountain diversion through a tunnel into Roanoke River Basin for municipal water supply of city of Roanoke since December 1974. From October 1953 to October 1976, monthly means adjusted for pumpage by Citadel Cement Corporation. Maximum discharge, 21,200 ft<sup>3</sup>/s, from rating curve extended above 1,700 ft<sup>3</sup>/s on basis of slope-area measurements at gage heights 10.35 ft and 19.19 ft. Minimum discharge, 0.28 ft<sup>3</sup>/s, Aug. 21, 1987, gage height, 0.99 ft, cause 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 Department of Environmental Quality - Water Division.

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, 355 ft<sup>3</sup>/s, Sep 21, gage height, 3.83 ft; minimum discharge, 0.48 ft<sup>3</sup>/s, Aug 18, 19.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.4	3.4	3.2	4.8	6.7	4.9	8.3	5.8	3.1	1.6	2.3	.78
2	2.8	3.5	3.0	2.8	13	5.4	7.9	5.7	3.1	1.5	3.2	.82
3	2.1	5.4	3.2	6.0	16	6.3	7.5	5.9	3.2	1.3	3.7	1.0
4	3.1	6.1	3.5	e4.7	12	6.6	7.9	5.6	3.0	1.3	3.0	1.2
5	2.6	6.8	3.5	e4.0	7.8	6.4	7.8	5.6	2.9	1.1	3.2	39
6	2.7	5.1	3.5	e3.6	6.7	5.4	8.9	5.7	2.9	.94	1.8	78
7	5.0	3.4	3.6	e4.4	7.7	5.1	8.6	5.3	2.7	1.0	1.3	23
8	9.7	3.8	4.6	e3.9	7.0	5.7	8.5	5.7	2.7	1.1	1.3	16
9	6.8	3.8	6.3	4.9	6.2	6.4	9.0	4.6	2.6	.85	1.4	22
10	5.2	4.2	4.9	4.6	6.2	6.4	6.8	4.9	2.5	.97	1.2	18
11	3.8	4.5	4.0	4.1	6.2	6.1	8.7	4.2	2.5	1.1	1.2	13
12	3.4	4.3	4.0	4.0	7.4	6.3	10	4.4	2.5	2.5	1.1	9.3
13	3.1	4.1	7.5	5.0	5.4	6.6	12	4.4	2.4	2.1	1.0	8.1
14	2.8	3.9	7.5	5.4	5.2	8.3	12	7.2	2.4	2.0	1.2	7.4
15	2.9	4.6	5.5	11	5.2	18	12	6.6	2.2	1.9	1.0	12
16	2.8	4.4	4.8	8.6	5.3	20	11	5.9	2.4	1.4	.72	13
17	2.9	4.0	4.3	7.1	5.4	23	9.8	5.4	3.3	2.8	.65	9.3
18	2.4	4.1	3.9	6.6	14	24	9.9	5.2	2.2	5.1	.59	5.1
19	2.5	4.0	4.0	5.1	15	19	9.3	5.6	2.0	3.1	.58	3.6
20	3.1	4.0	4.1	6.1	9.9	15	9.6	5.1	1.8	2.1	3.1	16
21	3.4	3.8	4.1	6.0	8.8	18	8.6	4.5	1.9	3.0	1.3	84
22	3.4	3.9	4.1	5.6	7.1	18	8.1	4.3	1.8	8.4	.91	24
23	3.4	4.0	4.1	10	7.1	16	7.7	4.4	1.6	3.3	.81	13
24	3.2	5.6	4.9	27	6.1	14	7.3	4.1	1.5	2.4	1.1	9.9
25	3.0	4.8	4.8	16	5.1	12	7.1	3.9	1.6	2.1	3.0	8.0
26	2.9	4.5	4.5	10	4.8	10	6.5	3.8	1.7	1.8	3.3	6.8
27	3.1	3.3	4.6	8.2	5.3	9.4	7.0	3.8	1.6	1.8	1.8	35
28	2.7	2.4	5.0	8.8	4.9	8.3	8.4	3.7	1.7	2.7	1.2	52
29	3.2	3.3	5.2	7.8	---	7.1	6.9	3.5	1.4	6.3	1.1	56
30	2.7	3.3	4.9	6.5	---	6.9	6.0	3.4	1.4	4.1	.87	65
31	2.6	---	4.6	6.0	---	6.4	---	3.2	---	2.8	.73	---
TOTAL	105.7	126.3	139.7	218.6	217.5	331.0	259.1	151.4	68.6	74.46	49.66	650.30
MEAN	3.41	4.21	4.51	7.05	7.77	10.7	8.64	4.88	2.29	2.40	1.60	21.7
MAX	9.7	6.8	7.5	27	16	24	12	7.2	3.3	8.4	3.7	84
MIN	2.1	2.4	3.0	2.8	4.8	4.9	6.0	3.2	1.4	.85	.58	.78
(†)	0	0	0	255	140	221	85.8	10.8	0	0	0	250
MEAN†	3.41	4.21	4.51	15.3	12.8	17.8	11.5	5.23	2.29	2.40	1.60	30.0
CFSM†	.10	.12	.13	.45	.37	.52	.34	.15	.07	.07	.05	.87
IN.†	.11	.14	.15	.51	.39	.60	.37	.18	.07	.08	.05	.98

CAL YR 1998 TOTAL 17538.5 MEAN 48.1 MAX 967 MIN 2.1 MEAN† 52.9 CFSM† 1.54 IN.† 20.92  
WTR YR 1999 TOTAL 2392.32 MEAN 6.55 MAX 84 MIN .58 MEAN† 9.19 CFSM† .27 IN.† 3.64

† Total diversion, equivalent in cubic feet per second, per month, provided by city of Roanoke.

‡ Adjusted for diversion.

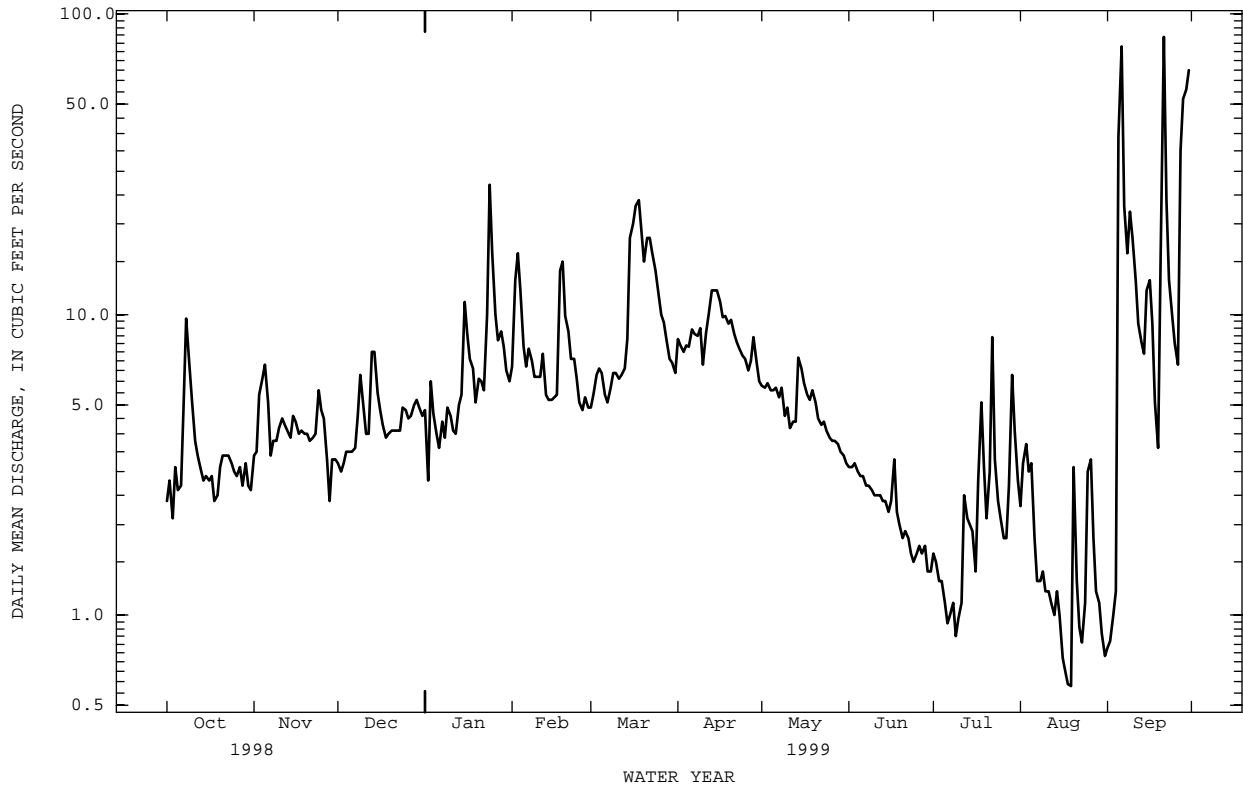
02018500 CATAWBA CREEK NEAR CATAWBA, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1975 - 1999, BY WATER YEAR (WY) [REGULATED, UNADJUSTED]

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	14.9	32.0	22.4	39.3	56.5	84.1	74.1	40.6	31.4	11.4	11.6	18.2
MAX	82.2	390	105	131	221	278	337	122	142	52.2	75.5	105
(WY)	1990	1986	1997	1996	1998	1993	1987	1989	1992	1989	1985	1979
MIN	3.41	2.01	3.16	3.45	5.82	6.20	6.78	4.88	2.29	2.40	1.60	2.30
(WY)	1999	1982	1982	1981	1981	1981	1981	1999	1999	1999	1999	1981

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR	WATER YEARS 1975 - 1999
ANNUAL TOTAL	17538.5	2392.32	
ANNUAL MEAN	48.1	6.55	36.2
HIGHEST ANNUAL MEAN			64.9 1987
LOWEST ANNUAL MEAN			6.16 1981
HIGHEST DAILY MEAN	967 Feb 17	84 Sep 21	7400 Nov 4 1985
LOWEST DAILY MEAN	2.1 Sep 29	.58 Aug 19	.58 Aug 19 1999
ANNUAL SEVEN-DAY MINIMUM	2.3 Sep 27	.82 Aug 13	.82 Aug 13 1999
INSTANTANEOUS PEAK FLOW		355 Sep 21	21200 Nov 4 1985
INSTANTANEOUS PEAK STAGE		3.83 Sep 21	a19.19 Nov 4 1985
INSTANTANEOUS LOW FLOW		.48 bAug 18	c.28 Aug 21 1987
ANNUAL RUNOFF (CFSM)	1.40	.19	1.06
ANNUAL RUNOFF (INCHES)	19.02	2.59	14.34
10 PERCENT EXCEEDS	105	12	72
50 PERCENT EXCEEDS	8.1	4.6	12
90 PERCENT EXCEEDS	3.2	1.4	4.4

- a From high-water mark.
- b Also Aug 19, 1999.
- c Regulation form unknown source.
- e Estimated.



## 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 mi<sup>2</sup>.

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 sea level. Prior to Jul. 1, 1927, nonrecording gage at same site and datum.

REMARKS.--Records good except for periods of doubtful gage-height record, May 8-13, and Jun. 3 to Aug. 11, which are fair. Flow regulated since December 1979 by Lake Moomaw (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. Statistics of monthly mean data and summary statistics for water years 1898 - 1979 (unregulated flow) are available in previous data books, water years 1991 - 1998. National Weather Service gage-height telemeter at station. Maximum discharge, 179,000 ft<sup>3</sup>/s, from rating curve extended above 110,000 ft<sup>3</sup>/s. Minimum gage height, 1.44 ft, Sep. 8, 1966. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in November 1877 reached a stage of 34.9 ft, from floodmark, discharge, about 142,000 ft<sup>3</sup>/s, from rating curve extended above 110,000 ft<sup>3</sup>/s.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 12,700 ft<sup>3</sup>/s, Jan 25, gage height, 9.58 ft; minimum discharge, 428 ft<sup>3</sup>/s, Nov 23-26, Dec 2-3, 5; minimum gage height, 2.13 ft, Aug 12-14; minimum daily, 428 ft<sup>3</sup>/s, Nov 25, Dec 3.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP		
1	549	493	441	478	1290	1070	1690	1380	744	557	577	558		
2	540	494	433	470	1590	1100	1750	1340	762	571	543	538		
3	497	521	428	587	2590	1170	1720	1290	761	575	517	502		
4	480	570	433	1060	2860	1540	1620	1230	730	565	497	499		
5	491	519	433	1000	2380	2430	1530	1180	707	550	485	847		
6	580	486	439	705	2000	2220	1440	1150	691	530	476	3340		
7	593	472	439	721	1720	2180	1360	1070	671	520	473	3690		
8	756	464	447	702	1630	2290	1290	e1500	655	514	469	2040		
9	983	457	530	660	1660	2080	1200	e2900	632	518	472	1390		
10	877	448	583	701	1610	1990	1190	e2700	630	517	471	1100		
11	698	453	564	893	1490	1840	1210	e2400	619	509	467	916		
12	605	471	536	887	1380	1680	1380	e2200	707	524	452	800		
13	556	462	570	855	1300	1640	1630	e1900	678	566	447	738		
14	533	452	655	990	1240	1650	1530	1750	622	571	450	694		
15	503	456	671	2060	1160	2830	1460	4870	595	567	460	678		
16	482	453	656	4200	1080	4900	1480	4000	581	565	455	700		
17	481	448	592	2600	1040	5830	1460	2990	608	554	472	689		
18	478	445	537	1830	1270	9070	1370	2430	604	637	472	648		
19	486	438	506	1550	2180	8630	1300	2100	578	598	459	618		
20	512	438	491	1790	2360	5950	1260	2000	577	573	527	613		
21	526	438	485	1500	2080	4650	1230	1780	590	553	589	888		
22	512	434	478	1270	1800	5160	1250	1570	586	554	552	841		
23	494	432	472	1160	1570	5250	1210	1420	578	547	580	820		
24	491	429	484	5330	1390	4580	1230	1330	565	544	613	695		
25	493	428	487	10000	1280	4040	1280	1310	554	564	605	643		
26	496	438	474	4520	1210	3350	1250	1230	552	569	718	612		
27	495	447	469	2950	1120	2830	1210	1090	554	528	796	643		
28	486	442	465	2290	1070	2570	1210	981	555	516	827	1990		
29	486	439	472	1890	---	2370	1300	901	555	534	703	1950		
30	488	441	480	1590	---	2100	1410	843	551	579	637	3910		
31	491	---	478	1400	---	1780	---	791	---	569	590	---		
TOTAL	17138	13808	15628	58639	45350	100770	41450	55626	18792	17138	16851	34590		
MEAN	553	460	504	1892	1620	3251	1382	1794	626	553	544	1153		
MAX	983	570	671	10000	2860	9070	1750	4870	762	637	827	3910		
MIN	478	428	428	470	1040	1070	1190	791	551	509	447	499		
(†)	-4134	-3176	-2823	+10680	+5848	+10587	0	-1008	-6756	-7915	-7008	-4689		
MEAN†	419	354	413	2236	1828	3592	1382	1762	401	298	318	997		
CFSM†	.20	.17	.20	1.08	.88	1.73	.67	.85	.19	.14	.15	.48		
IN. ‡	.23	.19	.23	1.24	.92	2.00	.74	.98	.22	.17	.18	.54		
CAL YR 1998	TOTAL	1264935	MEAN	3466	MAX	33200	MIN	428	MEAN†	3445	CFSM†	1.66	IN. ‡	22.54
WTR YR 1999	TOTAL	435780	MEAN	1194	MAX	10000	MIN	428	MEAN†	1165	CFSM†	.56	IN. ‡	7.62

† Total change in contents, equivalent in cubic feet per second, per month, in Lake Moomaw; provided by U.S. Army Corps of Engineers.

‡ Adjusted for change in contents.



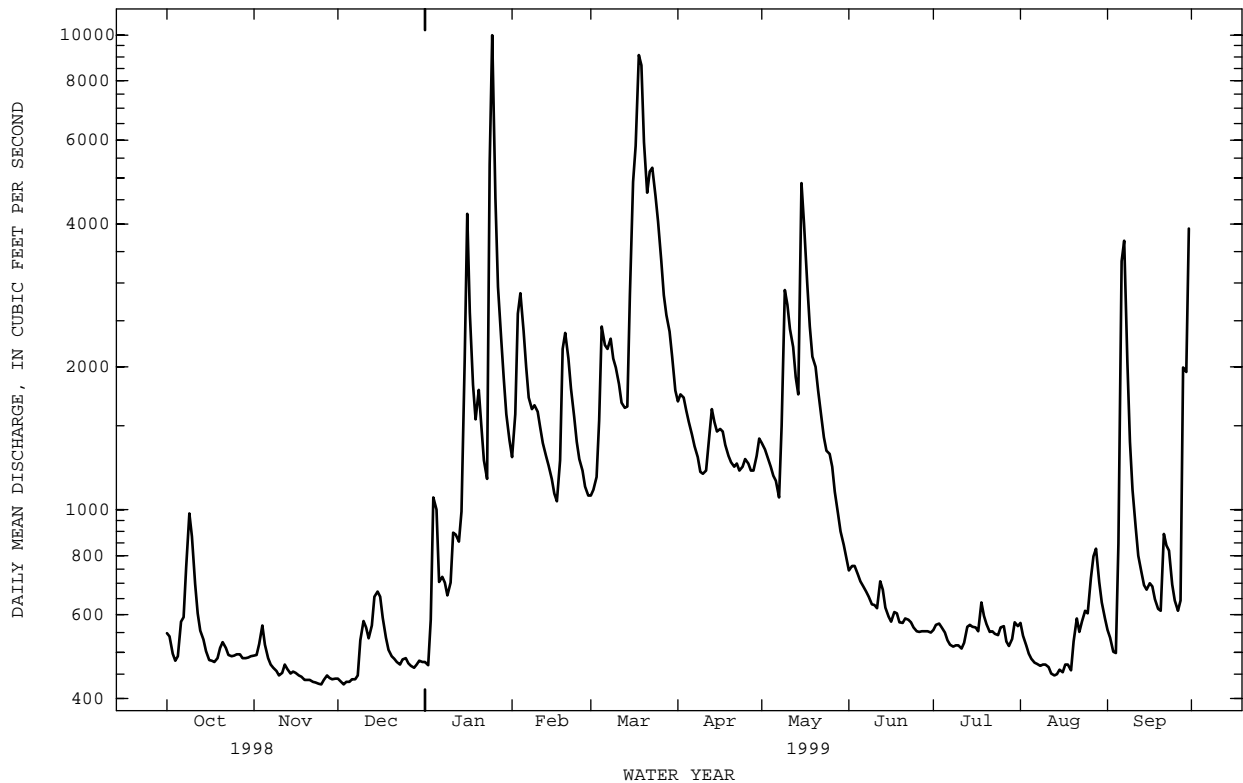
02019500 JAMES RIVER AT BUCHANAN, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1980 - 1999, BY WATER YEAR (WY) [REGULATED, UNADJUSTED]

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	1228	1952	2253	3623	4166	5334	4580	3197	2136	1049	1045	1128
MAX	5679	10190	6450	10310	11270	12790	16170	8908	5251	2236	3834	4288
(WY)	1990	1986	1997	1996	1998	1993	1987	1989	1982	1989	1984	1996
MIN	419	453	453	396	1260	922	1081	1515	626	553	338	361
(WY)	1981	1982	1981	1981	1981	1981	1995	1991	1999	1999	1981	1981

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR	WATER YEARS 1980 - 1999
ANNUAL TOTAL	1264934	435780	
ANNUAL MEAN	3466	1194	2631
HIGHEST ANNUAL MEAN			3664
LOWEST ANNUAL MEAN			1092
HIGHEST DAILY MEAN	33200	Jan 9	102000
LOWEST DAILY MEAN	a428	Nov 25	257
ANNUAL SEVEN-DAY MINIMUM	434	Nov 19	268
INSTANTANEOUS PEAK FLOW			179000
INSTANTANEOUS PEAK STAGE			b38.84
INSTANTANEOUS LOW FLOW		c428	d230
ANNUAL RUNOFF (CFSM)	1.67	.58	1.27
ANNUAL RUNOFF (INCHES)	22.68	7.81	17.23
10 PERCENT EXCEEDS	8680	2320	5760
50 PERCENT EXCEEDS	1070	678	1300
90 PERCENT EXCEEDS	473	465	540

- a Also Dec 3, 1998.
- b From floodmarks.
- c Also Nov 24-26, Dec 2-3, 5, 1998.
- d Result of freezeup.
- e Estimated.
- f Also Jan 12, 1981.



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 adn 400 ft upstream from Mill Creek.

DRAINAGE AREA.--144 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1938 to September 1996. October 1998 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 1,382.84 ft above sea level. Prior to Oct. 1, 1998, at datum 2.0 ft higher.

REMARKS.--Records good except those for period of no gage-height record, Oct. 1 and Dec. 8, and period with ice effect Jan. 1-11, which is fair. Virginia Department of EMergency Services gage-height radio transmitter at station. Maximum discharge, 56,300 ft<sup>3</sup>/s, from rating curve extended above 9,200 ft<sup>3</sup>/s on basis of slope-area measurement at gage heights 12.78 ft and 20.23 ft. No flow Sep. 5, 6, 1957, Sep. 28, 1959, result of diversion. 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 Department of Environmental Quality - Water Division.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,500 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Jan 24	1415	*1,860	*5.97	No peak greater than base discharge.			

Minimum discharge, 1.3 ft<sup>3</sup>/s, Sep 3.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e3.5	5.6	5.9	e8.5	94	81	117	42	31	7.1	4.2	1.9
2	3.0	5.9	5.5	e7.8	199	74	116	41	28	6.9	3.2	1.7
3	3.3	7.6	5.5	e43	336	81	104	39	27	6.2	2.6	1.5
4	3.8	8.8	5.7	e80	267	181	98	39	24	5.3	2.6	1.7
5	4.2	8.2	5.7	e60	207	200	91	38	21	4.2	2.4	1.0
6	4.6	6.9	6.0	e44	164	196	84	38	20	3.8	2.2	336
7	5.2	6.5	6.1	e34	147	197	79	39	18	4.3	2.0	342
8	25	6.5	e8.0	e36	152	182	73	216	16	3.5	2.0	171
9	17	6.5	18	e38	136	175	71	271	15	3.3	2.3	100
10	9.4	6.5	12	e76	129	168	69	205	14	3.8	2.3	66
11	7.3	7.8	8.4	e70	118	147	69	159	15	3.2	2.1	46
12	6.6	7.6	7.4	64	109	135	65	128	14	4.3	1.7	35
13	6.2	7.6	11	71	102	126	59	129	12	5.0	1.6	29
14	5.9	6.7	14	124	89	136	54	808	12	5.2	2.0	24
15	5.5	6.4	11	435	80	214	53	577	11	4.6	2.1	21
16	5.7	6.6	9.9	394	73	282	55	404	10	4.4	2.4	20
17	5.8	6.5	9.6	229	70	663	51	283	11	3.7	2.1	18
18	6.0	5.9	8.8	175	166	1110	49	213	11	3.4	1.7	16
19	5.9	5.8	8.6	232	296	839	47	172	9.6	3.2	1.7	14
20	5.6	6.1	8.3	205	255	535	46	136	10	3.8	4.2	14
21	5.4	6.3	8.1	159	205	467	44	109	10	4.2	4.8	24
22	5.1	6.1	8.0	149	166	601	44	92	9.7	4.7	4.5	17
23	4.7	6.0	7.8	167	138	506	43	94	8.8	3.9	3.4	14
24	5.3	6.0	8.0	1290	119	390	43	87	8.1	5.0	3.2	12
25	5.9	6.1	7.7	923	105	311	41	77	7.5	5.4	3.4	11
26	6.6	7.1	7.4	464	95	258	40	67	7.4	3.8	3.6	10
27	8.2	6.7	7.0	295	85	216	39	58	7.0	3.6	3.4	10
28	6.2	6.7	7.4	215	84	184	44	50	6.8	5.9	3.3	14
29	5.6	6.1	7.6	164	---	158	45	44	6.6	9.4	3.0	17
30	4.7	6.1	7.7	129	---	136	43	38	6.9	4.9	2.5	339
31	5.3	---	7.8	105	---	116	---	34	---	4.0	2.1	---
TOTAL	202.5	199.2	259.9	6486.3	4186	9065	1876	4727	408.4	144.0	84.6	1736.8
MEAN	6.53	6.64	8.38	209	150	292	62.5	152	13.6	4.65	2.73	57.9
MAX	25	8.8	18	1290	336	1110	117	808	31	9.4	4.8	342
MIN	3.0	5.6	5.5	7.8	70	74	39	34	6.6	3.2	1.6	1.5
CFSM	.05	.05	.06	1.45	1.04	2.03	.43	1.06	.09	.03	.02	.40
IN.	.05	.05	.07	1.68	1.08	2.34	.48	1.22	.11	.04	.02	.45

02020500 CALFPASTURE RIVER ABOVE MILL CREEK, AT GOSHEN, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1939 - 1996, 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	75.3	125	188	233	265	362	263	221	134	47.6	57.8	60.0
MAX	469	1540	768	931	651	849	992	638	600	352	458	799
(WY)	1977	1986	1974	1996	1994	1993	1987	1942	1982	1972	1940	1996
MIN	3.90	6.21	8.38	7.82	47.7	50.9	47.3	29.0	10.2	3.77	2.73	2.08
(WY)	1942	1942	1999	1981	1977	1981	1995	1977	1964	1966	1999	1970

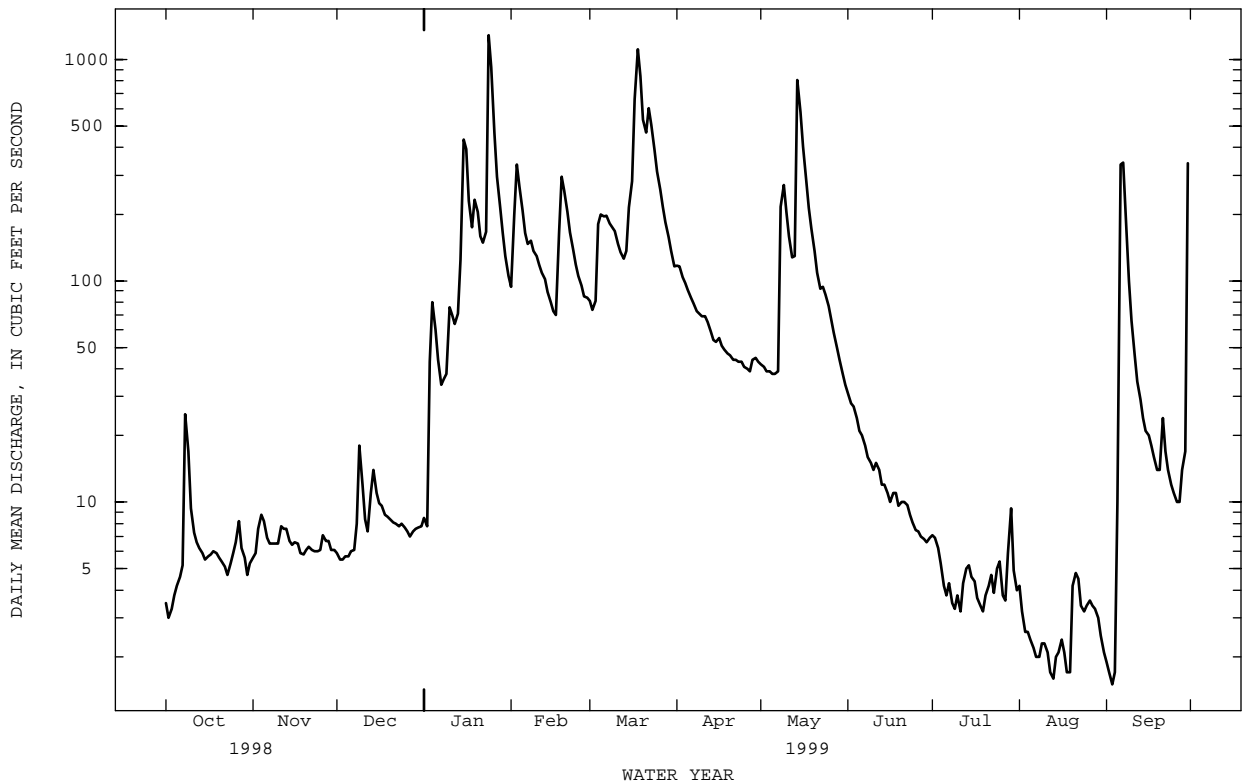
SUMMARY STATISTICS

FOR 1999 WATER YEAR

WATER YEARS 1939 - 1996  
1999

ANNUAL TOTAL	29375.7		
ANNUAL MEAN	80.5		
HIGHEST ANNUAL MEAN		169	
LOWEST ANNUAL MEAN		303	1973
HIGHEST DAILY MEAN		65.3	1956
LOWEST DAILY MEAN	1290	Jan 24	21900
ANNUAL SEVEN-DAY MINIMUM	1.5	Sep 3	a.00
INSTANTANEOUS PEAK FLOW	1.9	cAug 12	.93
INSTANTANEOUS PEAK STAGE	1860	Jan 24	56300
INSTANTANEOUS LOW FLOW	5.97	Jan 24	20.23
ANNUAL RUNOFF (CFSM)	1.3	Sep 3	a.00
ANNUAL RUNOFF (INCHES)	.56		1.17
10 PERCENT EXCEEDS	7.59		15.93
50 PERCENT EXCEEDS	209		376
90 PERCENT EXCEEDS	14		63
	3.5		7.6

- a Result of diversion.
- b Also Sep 6, 1957 and Sep 28, 1959.
- c Also Aug 13, 1999.
- 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 mi<sup>2</sup>.

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 sea level (levels by U.S. Army Corps of Engineers).

REMARKS.--Records good except for period of doubtful gage-height record, Nov. 19-25, and for period with ice effect, Jan. 4-6, which are fair. Since 1966, some regulation at times by Lake Merriweather on Little Calfpasture River. National Weather Service gage-height telemeter at station. Maximum discharge, 87,700 ft<sup>3</sup>/s, from rating curve extended above 16,000 ft<sup>3</sup>/s on basis of slope-area measurement at peak flow. Minimum gage height, 0.79 ft, Sep. 10, 1966. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,500 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Jan 24	1645	*4,260	*6.26	No peak greater than base discharge.			

Minimum discharge, 14 ft<sup>3</sup>/s, Aug 7, 13, 18-19, gage height, 0.84 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	19	24	27	35	203	197	255	124	61	27	25	20
2	18	25	27	33	410	175	273	119	57	28	23	19
3	18	29	27	133	664	174	249	113	56	27	20	19
4	20	31	27	e190	553	407	247	110	53	24	18	20
5	21	31	28	e145	431	418	234	107	48	23	17	83
6	22	28	28	e110	341	402	215	103	45	21	17	349
7	24	26	29	96	305	396	203	102	43	25	16	477
8	60	26	33	85	328	351	189	692	39	23	16	256
9	63	27	56	99	292	340	182	854	37	20	18	160
10	39	26	49	116	271	337	179	612	35	20	16	113
11	31	32	39	149	246	306	179	455	34	20	16	86
12	28	31	35	133	228	288	181	348	35	22	15	69
13	26	30	43	166	219	272	159	305	34	25	14	59
14	25	29	53	265	194	297	146	1410	33	24	16	134
15	24	29	46	831	176	525	143	1330	32	23	17	309
16	24	27	41	802	164	778	151	929	30	21	17	254
17	24	27	38	472	158	1550	141	671	33	21	16	85
18	25	27	36	361	441	2860	132	517	32	21	15	84
19	25	e27	35	431	761	1930	126	414	30	20	14	79
20	23	e24	35	376	623	1250	126	326	31	19	21	67
21	22	e25	34	294	495	1130	123	260	31	20	22	53
22	22	e24	34	259	391	1430	123	215	30	20	21	49
23	21	e23	33	267	315	1170	118	209	30	21	20	38
24	21	e25	34	2730	269	931	116	190	28	23	19	33
25	23	e25	34	1900	241	763	111	157	27	37	22	31
26	24	30	33	925	219	632	107	137	27	25	21	29
27	25	30	32	596	197	539	105	114	27	20	21	30
28	26	29	32	409	195	455	121	91	27	20	21	42
29	24	29	34	334	---	354	147	82	25	40	21	50
30	24	28	33	269	---	277	133	73	24	33	19	441
31	23	---	33	224	---	243	---	67	---	26	20	---
TOTAL	814	824	1098	13235	9330	21177	4914	11236	1074	739	574	3538
MEAN	26.3	27.5	35.4	427	333	683	164	362	35.8	23.8	18.5	118
MAX	63	32	56	2730	761	2860	273	1410	61	40	25	477
MIN	18	23	27	33	158	174	105	67	24	19	14	19
CFSM	.08	.08	.11	1.30	1.01	2.08	.50	1.10	.11	.07	.06	.36
IN.	.09	.09	.12	1.50	1.05	2.39	.56	1.27	.12	.08	.06	.40

02021500 MAURY RIVER AT ROCKBRIDGE BATHS, VA--Continued

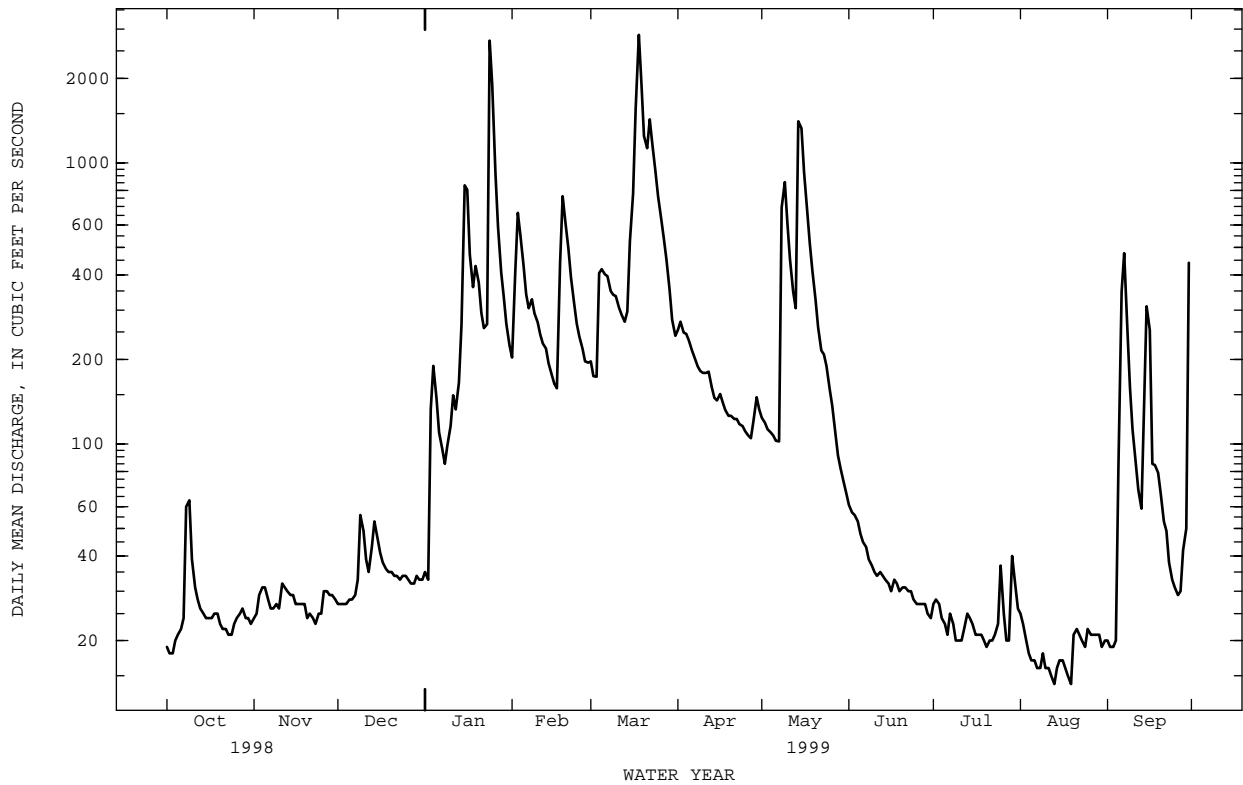
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1929 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	194	272	404	558	622	850	618	470	271	119	137	135
MAX	1254	2689	1450	1895	1530	2017	2245	1463	1374	807	1016	1388
(WY)	1980	1986	1974	1998	1998	1936	1987	1989	1995	1972	1969	1996
MIN	16.5	24.1	26.6	32.3	50.9	117	122	81.0	34.7	14.6	14.9	16.1
(WY)	1931	1931	1966	1981	1934	1981	1995	1930	1964	1966	1964	1930

SUMMARY STATISTICS FOR 1998 CALENDAR YEAR FOR 1999 WATER YEAR WATER YEARS 1929 - 1999

ANNUAL TOTAL	200870	68553	
ANNUAL MEAN	550	188	386
HIGHEST ANNUAL MEAN			685
LOWEST ANNUAL MEAN			157
HIGHEST DAILY MEAN	13100	Jan 8	2860
LOWEST DAILY MEAN	18	Oct 2	14
ANNUAL SEVEN-DAY MINIMUM	19	Sep 28	16
INSTANTANEOUS PEAK FLOW			4260
INSTANTANEOUS PEAK STAGE			6.26
INSTANTANEOUS LOW FLOW			14
ANNUAL RUNOFF (CFSM)	1.67	.57	1.17
ANNUAL RUNOFF (INCHES)	22.71	7.75	15.95
10 PERCENT EXCEEDS	1540	447	900
50 PERCENT EXCEEDS	99	43	155
90 PERCENT EXCEEDS	22	20	30

- a Also Aug 19, 1999.
- b From floodmarks.
- c Also Aug 13, 18-19, 1999.
- e Estimated.



JAMES RIVER BASIN

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 mi<sup>2</sup>.

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 sea level (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 with ice effect, Jan. 6, 7, which is fair. Maximum discharge, 23,000 ft<sup>3</sup>/s, from rating curve extended above 800 ft<sup>3</sup>/s on basis of contracted-opening and slope-area measurements of peak flow. Minimum discharge, 0.90 ft<sup>3</sup>/s, July 22, 1966, result of temporary dam 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 Department of Environmental Quality - Water Division.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 600 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Mar 17	1845	*254	*4.47	No peak greater than base discharge.			

Minimum discharge, 3.6 ft<sup>3</sup>/s, Aug 17-19, 31, Sep 1, 2, 3.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	6.3	7.7	6.7	5.0	11	9.3	26	13	9.0	7.1	4.7	3.8
2	6.3	7.6	6.8	5.0	38	8.7	22	12	9.4	6.9	4.5	3.8
3	6.5	9.7	6.7	30	33	9.9	19	12	9.6	6.3	4.3	3.7
4	7.1	9.7	6.5	14	25	24	19	12	8.7	6.1	4.2	4.1
5	7.1	8.6	6.5	7.9	18	14	17	11	8.4	5.8	4.3	15
6	7.5	8.4	6.5	e6.3	15	13	16	11	8.3	5.7	4.1	12
7	7.8	8.1	6.0	e5.9	14	12	15	11	8.0	6.5	4.1	7.9
8	18	8.4	6.3	6.5	14	10	14	38	7.7	7.6	4.2	6.0
9	9.5	8.4	8.4	8.0	12	11	14	26	7.6	6.3	4.3	5.6
10	7.8	8.4	6.1	9.2	10	12	13	20	7.4	6.3	4.2	5.1
11	7.5	11	5.4	7.5	9.6	12	17	17	7.5	6.0	4.0	4.6
12	7.5	9.4	5.3	7.3	9.5	11	15	15	7.6	7.1	3.9	4.5
13	7.5	8.7	8.2	9.3	9.1	10	14	16	7.3	7.5	3.9	4.4
14	7.1	8.3	7.8	13	8.4	16	13	74	7.3	6.8	4.3	4.4
15	7.0	8.2	6.1	41	8.2	49	16	69	7.1	6.5	4.0	4.6
16	6.9	8.1	5.7	22	7.9	72	16	45	7.1	6.3	4.0	5.6
17	6.9	7.7	5.4	13	8.1	142	14	36	8.7	6.1	3.8	4.9
18	6.8	7.6	5.3	14	36	143	13	29	7.8	5.9	3.8	4.4
19	6.9	7.6	5.1	13	38	89	13	24	7.2	5.7	4.0	4.4
20	6.9	7.8	5.1	11	29	60	13	19	7.4	5.6	5.8	6.8
21	6.6	7.6	5.1	9.3	21	81	13	16	7.7	5.6	4.8	11
22	6.9	7.3	5.1	8.6	17	82	13	15	7.4	5.7	4.3	6.9
23	7.3	7.4	4.9	12	14	61	12	15	7.1	5.6	4.4	5.6
24	7.2	7.3	5.4	104	12	51	13	17	6.8	6.4	4.4	5.1
25	7.5	7.0	5.1	52	11	44	12	13	6.6	8.6	4.9	4.8
26	7.5	7.8	5.1	34	10	38	12	12	6.7	5.6	4.9	4.7
27	7.5	7.3	5.0	25	9.5	34	11	11	6.6	4.7	4.5	5.0
28	7.4	6.9	5.2	18	10	30	15	10	6.6	5.0	4.3	6.4
29	7.5	6.9	5.3	13	---	26	14	9.9	6.4	6.9	4.1	11
30	7.6	6.9	5.3	11	---	22	13	9.6	6.6	5.4	3.9	19
31	7.7	---	5.0	9.8	---	20	---	9.2	---	4.8	3.9	---
TOTAL	235.6	241.8	182.4	545.6	458.3	1216.9	447	647.7	227.6	192.4	132.8	195.1
MEAN	7.60	8.06	5.88	17.6	16.4	39.3	14.9	20.9	7.59	6.21	4.28	6.50
MAX	18	11	8.4	104	38	143	26	74	9.6	8.6	5.8	19
MIN	6.3	6.9	4.9	5.0	7.9	8.7	11	9.2	6.4	4.7	3.8	3.7
CFSM	.22	.23	.17	.50	.47	1.12	.43	.60	.22	.18	.12	.19
IN.	.25	.26	.19	.58	.49	1.29	.48	.69	.24	.20	.14	.21

02022500 KERRS CREEK NEAR LEXINGTON, VA--Continued

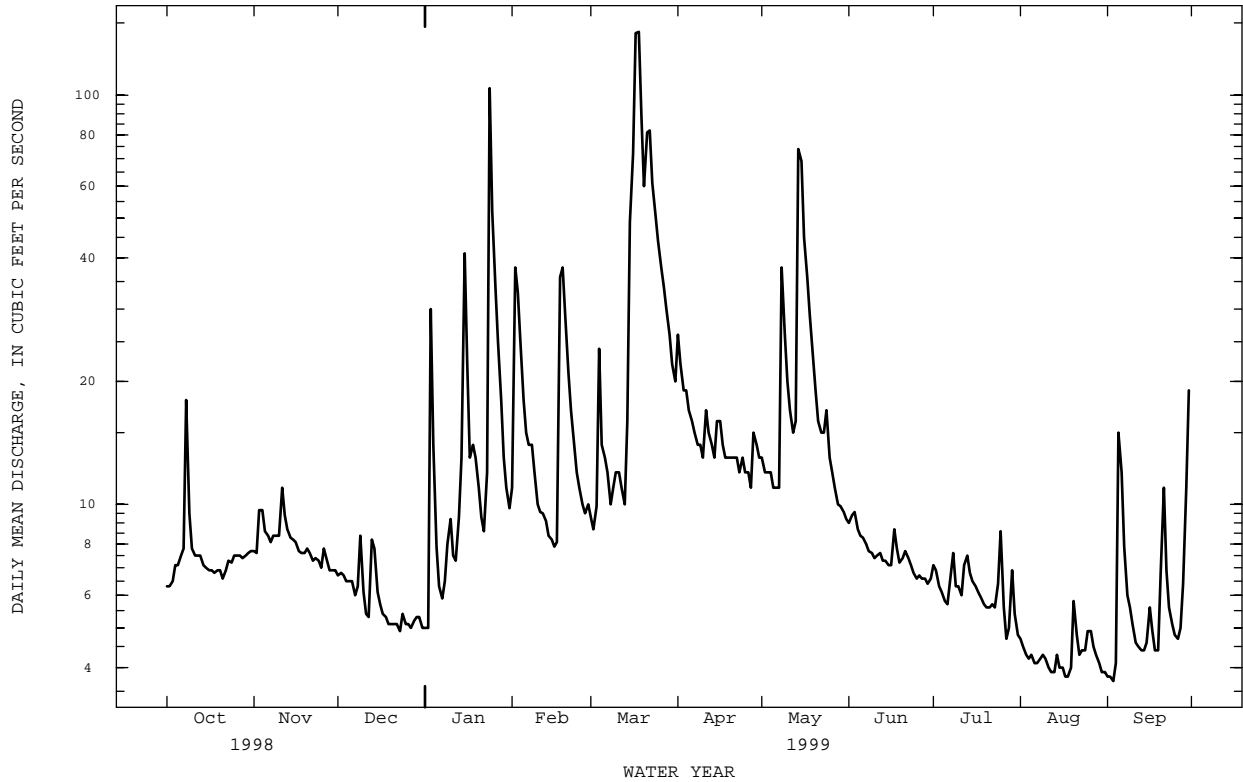
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1927 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	23.0	24.1	32.8	46.8	55.3	74.2	58.3	38.7	27.8	17.6	23.5	19.3
MAX	141	209	129	163	150	357	306	159	194	99.5	162	188
(WY)	1938	1986	1949	1937	1998	1936	1987	1989	1995	1972	1969	1950
MIN	5.24	6.50	5.88	5.15	8.86	14.5	10.3	12.0	7.59	5.56	4.28	5.31
(WY)	1964	1966	1966	1966	1931	1981	1942	1956	1999	1966	1999	1970

SUMMARY STATISTICS FOR 1998 CALENDAR YEAR FOR 1999 WATER YEAR WATER YEARS 1927 - 1999

ANNUAL TOTAL	18942.8	4723.2	
ANNUAL MEAN	51.9	12.9	36.7
HIGHEST ANNUAL MEAN			75.5
LOWEST ANNUAL MEAN			12.9
HIGHEST DAILY MEAN	1060	Jan 8	e4840
LOWEST DAILY MEAN	4.9	Dec 23	3.7
ANNUAL SEVEN-DAY MINIMUM	5.1	Dec 21	3.9
INSTANTANEOUS PEAK FLOW			254
INSTANTANEOUS PEAK STAGE			4.47
INSTANTANEOUS LOW FLOW			3.6
ANNUAL RUNOFF (CFSM)	1.48		.37
ANNUAL RUNOFF (INCHES)	20.13		5.02
10 PERCENT EXCEEDS	119		24
50 PERCENT EXCEEDS	18		7.8
90 PERCENT EXCEEDS	6.6		4.6

- a From high-water mark in gage house.
- b Also Aug 18-19, 31, and Sep 1, 2, 3, 1999.
- c Result of temporary dam upstream.
- 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 mi<sup>2</sup>.

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 sea level.

REMARKS.--No estimated daily discharges. Records good. Since 1966, some regulation at times by Lake Merriweather on Little Calfpasture River. Maximum discharge, 105,000 ft<sup>3</sup>/s, from rating curve extended above 17,000 ft<sup>3</sup>/s on basis of slope-area measurement of peak flow. Minimum discharge, 20 ft<sup>3</sup>/s, occurred during filling of a small reservoir 2 mi upstream. Unqualified minimum discharge, 37 ft<sup>3</sup>/s, Sep. 9, 1966. Minimum gage height, 0.98 ft, Jan. 5, 1981. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

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 greater than base discharge of 6,200 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Jan 24	2030	*5,280	*6.88	No peak greater than base discharge.			

Minimum discharge, 77 ft<sup>3</sup>/s, Oct 2-3.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	81	91	99	102	438	407	570	286	162	91	100	88
2	80	92	96	105	640	370	600	272	158	95	96	87
3	80	100	97	364	997	358	550	263	166	95	92	86
4	84	116	100	458	889	569	533	255	151	90	89	88
5	91	112	102	317	736	652	516	247	143	89	89	1260
6	94	102	105	288	625	631	489	244	137	87	89	1370
7	95	99	101	224	566	630	463	239	127	88	89	1110
8	166	98	121	196	567	590	435	683	123	95	88	658
9	206	97	171	240	536	572	421	1140	117	89	88	438
10	148	98	172	383	501	578	413	867	112	87	89	383
11	117	100	137	312	471	549	433	687	111	87	88	280
12	105	112	121	286	437	515	434	574	114	90	87	224
13	101	113	169	330	421	497	386	509	111	97	86	187
14	98	110	181	411	383	527	357	1520	111	98	87	165
15	97	106	161	962	347	828	360	1820	109	90	86	297
16	96	104	138	1260	324	1120	391	1280	103	89	86	552
17	97	104	128	797	315	1950	357	926	122	88	86	244
18	98	104	120	628	583	3690	332	716	128	87	86	206
19	98	106	117	669	1150	2820	316	600	112	87	85	188
20	98	100	113	646	983	1850	320	501	109	86	115	179
21	94	102	113	526	805	1660	317	424	109	87	107	310
22	91	100	110	445	676	2270	311	373	109	92	96	267
23	90	99	109	458	586	1900	297	377	102	91	90	205
24	92	102	117	2900	524	1520	289	370	96	103	90	170
25	94	101	114	3220	487	1260	273	322	92	157	94	150
26	94	112	110	1580	453	1060	265	280	92	127	100	139
27	93	113	106	1040	413	921	258	253	92	95	98	134
28	91	109	108	729	401	815	283	217	91	98	96	177
29	93	105	110	621	---	718	333	197	91	124	92	218
30	91	103	111	537	---	609	307	183	90	141	88	999
31	91	---	105	472	---	558	---	173	---	112	87	---
TOTAL	3144	3110	3762	21506	16254	32994	11609	16798	3490	3032	2839	10859
MEAN	101	104	121	694	580	1064	387	542	116	97.8	91.6	362
MAX	206	116	181	3220	1150	3690	600	1820	166	157	115	1370
MIN	80	91	96	102	315	358	258	173	90	86	85	86
CFSM	.16	.16	.19	1.07	.90	1.65	.60	.84	.18	.15	.14	.56
IN.	.18	.18	.22	1.24	.94	1.90	.67	.97	.20	.17	.16	.63



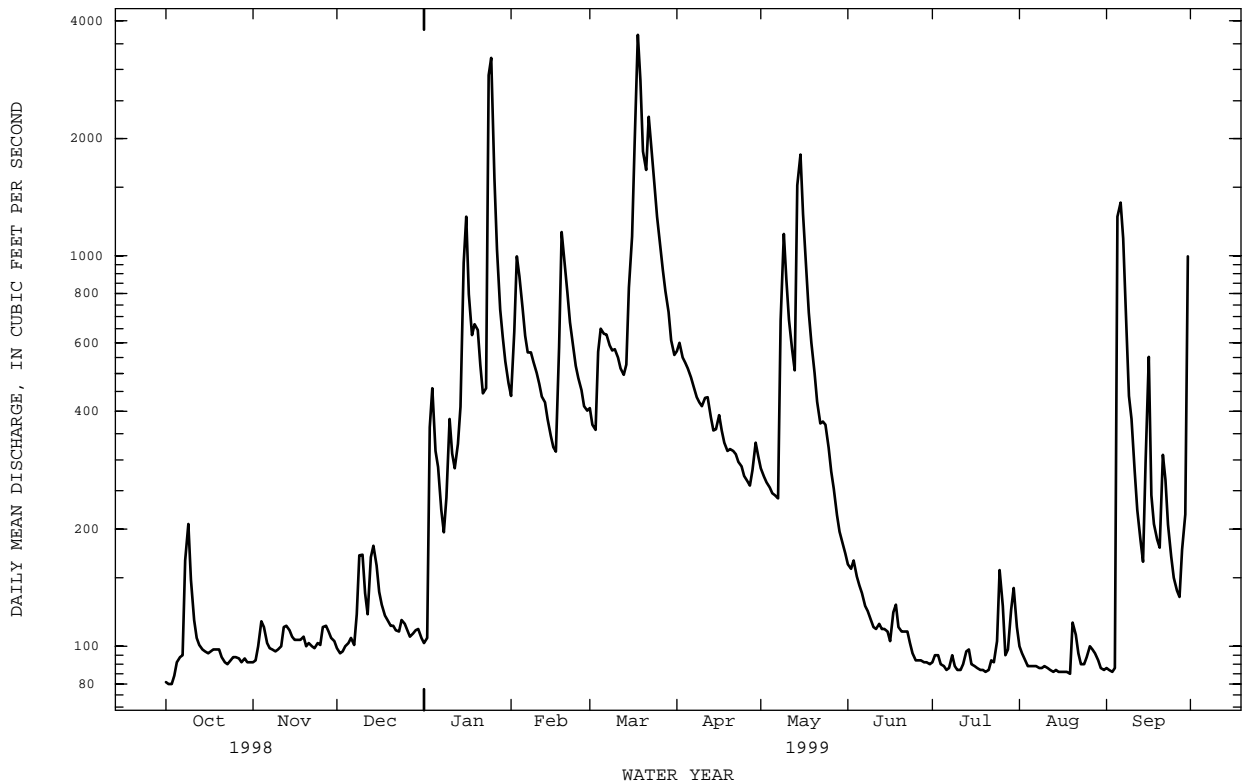
02024000 MAURY RIVER NEAR BUENA VISTA, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1939 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	362	470	694	917	1074	1373	1055	819	547	277	323	292
MAX	1997	3400	2430	2891	3140	3187	3672	2373	2647	1351	3060	2087
(WY)	1980	1986	1949	1998	1998	1993	1987	1989	1995	1972	1969	1996
MIN	72.1	83.3	76.4	100	273	240	276	224	116	53.7	63.4	75.2
(WY)	1942	1966	1966	1981	1977	1981	1995	1941	1999	1966	1964	1963

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR		FOR 1999 WATER YEAR		WATER YEARS 1939 - 1999	
ANNUAL TOTAL	382604		129397			
ANNUAL MEAN	1048		355		682	
HIGHEST ANNUAL MEAN					1181	
LOWEST ANNUAL MEAN					269	
HIGHEST DAILY MEAN	14300	Jan 8	3690	Mar 18	56000	Aug 20 1969
LOWEST DAILY MEAN	80	aOct 2	80	aOct 2	22	Oct 10 1941
ANNUAL SEVEN-DAY MINIMUM	84	Sep 29	86	Aug 13	40	Sep 7 1966
INSTANTANEOUS PEAK FLOW			5280		105000	Aug 20 1969
INSTANTANEOUS PEAK STAGE			6.88		31.23	Aug 20 1969
INSTANTANEOUS LOW FLOW			a77		20	Oct 10 1941
ANNUAL RUNOFF (CFSM)	1.62		.55		1.06	
ANNUAL RUNOFF (INCHES)	22.03		7.45		14.34	
10 PERCENT EXCEEDS	2810		760		1510	
50 PERCENT EXCEEDS	353		157		346	
90 PERCENT EXCEEDS	97		89		106	

a Also Oct 3, 1998.



JAMES RIVER BASIN

02025500 JAMES RIVER AT HOLCOMB ROCK, VA

LOCATION.--Lat 37°30'04", long 79°15'46", Bedford County, Hydrologic Unit 02080203, on right bank at Holcomb Rock, 0.9 mi downstream from Pedlar River, and at mile 268.6.

DRAINAGE AREA.--3,259 mi<sup>2</sup>.

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 and as "at Holcombs Rock" June 1931 to September 1990.

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 sea level. 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.--No estimated daily discharges. Records good. Some diurnal fluctuation caused by powerplants upstream from station. Flow regulated since December 1979 by Lake Moomaw (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. Statistics of monthly mean data and summary statistics for water years 1927 - 1979 (unregulated flow) are available in previous data books, water years 1991 - 1998. National Weather Service gage-height telemeter at station. Maximum discharge, 207,000 ft<sup>3</sup>/s, from rating curve extended above 73,000 ft<sup>3</sup>/s on basis of records for other stations in James River Basin. Minimum gage height, 2.80 ft, Oct. 29, 1987. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in March 1913 reached a stage of 31.3 ft, from floodmarks, discharge, 118,000 ft<sup>3</sup>/s, from rating curve extended as explained above.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 25,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Jan 25	0715	*16,200	*11.70	No peak greater than base discharge.			

Minimum daily discharge, 506 ft<sup>3</sup>/s, Jun 21.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP		
1	757	754	768	804	1920	1730	2640	1920	1040	719	771	698		
2	747	760	757	801	2840	1710	2690	1850	1030	771	768	662		
3	742	794	754	1200	3720	1710	2640	1790	1170	781	712	643		
4	722	837	752	1480	4330	1970	2490	1720	1080	832	690	626		
5	711	857	755	1550	3610	3140	2390	1650	1160	780	645	2100		
6	720	797	759	1210	3060	3260	2250	1620	946	768	631	5570		
7	741	741	767	1170	2780	3080	2080	1550	853	580	619	6270		
8	939	798	803	1130	2400	3160	2000	1830	990	795	619	3910		
9	1140	774	858	1100	2470	3070	1940	4620	924	616	619	2610		
10	1180	764	924	1180	2370	2920	1850	3860	921	684	619	2110		
11	1030	767	936	1220	2220	2820	1890	3060	882	663	619	1610		
12	976	783	890	1380	2060	2620	2030	2680	872	693	598	1310		
13	860	827	989	1290	1870	2460	2250	2330	891	816	592	1060		
14	659	789	1030	1400	1780	2510	2280	3030	856	746	596	885		
15	786	777	1030	1930	1660	3450	2150	6830	609	788	595	1040		
16	776	742	1090	5630	1540	6390	2190	6370	989	829	595	1440		
17	773	796	1040	4340	1470	7550	2160	4660	948	688	600	1310		
18	773	755	950	3150	1690	11500	2040	3760	927	740	606	1090		
19	773	756	868	2730	3150	12400	1910	3190	905	809	601	949		
20	774	758	621	2760	3780	8890	1880	2930	852	781	721	750		
21	765	757	826	2620	3270	6890	1820	2780	506	775	716	1050		
22	753	753	788	2140	2870	7680	1800	2460	796	781	750	1580		
23	738	757	821	1950	2500	7810	1770	2200	781	748	656	1080		
24	737	756	828	4980	2210	7010	1770	1920	857	733	729	1110		
25	676	753	821	14400	2020	6000	1750	1930	819	772	809	903		
26	782	772	818	7750	1880	5110	1780	1810	803	810	841	858		
27	770	745	809	4800	1770	4140	1730	1600	786	763	977	887		
28	758	802	751	3520	1730	3820	1710	1510	776	915	974	1640		
29	731	767	833	2960	---	3250	1760	1370	577	730	943	4480		
30	767	764	813	2550	---	3110	1920	1180	795	587	760	7020		
31	752	---	804	2190	---	2710	---	1180	---	771	731	---		
TOTAL	24808	23252	26253	87315	68970	143870	61560	81190	26341	23264	21702	57251		
MEAN	800	775	847	2817	2463	4641	2052	2619	878	750	700	1908		
MAX	1180	857	1090	14400	4330	12400	2690	6830	1170	915	977	7020		
MIN	659	741	621	801	1470	1710	1710	1180	506	580	592	626		
(+)	-4134	-3176	-2823	+10680	+5848	+10587	0	-1008	-6756	-7915	-7008	-4689		
MEAN†	667	669	756	3161	2672	4982	2052	2587	653	495	474	1752		
CFSM‡	.20	.21	.23	.97	.82	1.53	.63	.79	.20	.15	.15	.54		
IN.‡	.24	.23	.27	1.19	.85	1.76	.70	.92	.22	.18	.17	.60		
CAL YR 1998	TOTAL	1813476	MEAN	4968	MAX	48500	MIN	555	MEAN‡	4948	CFSM‡	1.52	IN.‡	20.61
WTR YR 1999	TOTAL	645776	MEAN	1769	MAX	14400	MIN	506	MEAN‡	1740	CFSM‡	.53	IN.‡	7.25

† Total change in contents, equivalent in cubic feet per second, per month, in Lake Moomaw; provided by U.S. Army Corps of Engineers.

‡ Adjusted for monthly change in contents.

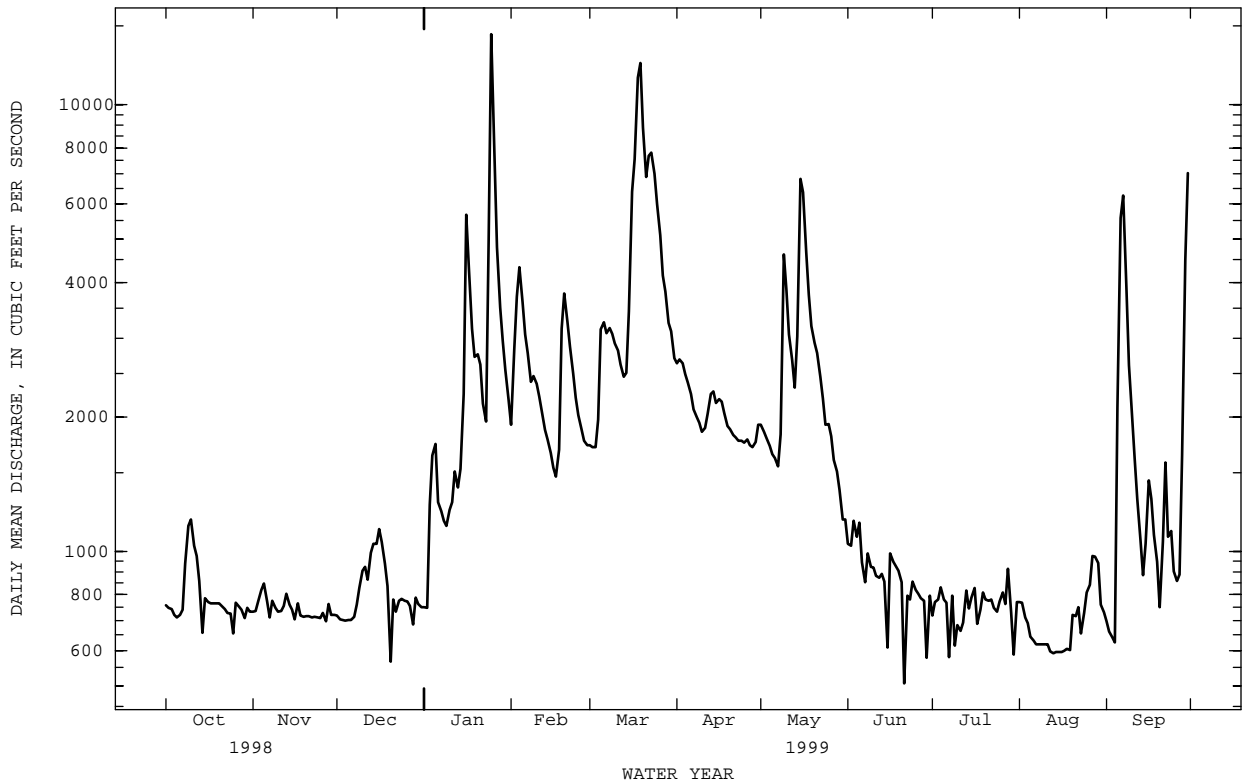
02025500 JAMES RIVER AT HOLCOMB ROCK, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1980 - 1999, BY WATER YEAR (WY) [REGULATED, UNADJUSTED]

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	1921	2974	3297	5025	5762	7384	6517	4430	3139	1549	1485	1680
MAX	7966	17270	9246	13540	16260	16910	21670	12380	9990	4562	5640	7233
(WY)	1980	1986	1997	1996	1998	1993	1987	1989	1995	1995	1984	1996
MIN	690	775	847	730	2139	1472	1616	2205	878	750	595	674
(WY)	1992	1999	1999	1981	1981	1981	1995	1991	1999	1999	1981	1983

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR	WATER YEARS 1980 - 1999
ANNUAL TOTAL	1813476	645776	
ANNUAL MEAN	4968	1769	3751
HIGHEST ANNUAL MEAN			5064
LOWEST ANNUAL MEAN			1613
HIGHEST DAILY MEAN	e48500	Jan 9	14400
LOWEST DAILY MEAN	555	Sep 3	506
ANNUAL SEVEN-DAY MINIMUM	734	Dec 1	597
INSTANTANEOUS PEAK FLOW			16200
INSTANTANEOUS PEAK STAGE			11.70
INSTANTANEOUS LOW FLOW			b89
ANNUAL RUNOFF (CFSM)	1.52	.54	1.15
ANNUAL RUNOFF (INCHES)	20.70	7.37	15.64
10 PERCENT EXCEEDS	13000	3340	8100
50 PERCENT EXCEEDS	1510	989	1930
90 PERCENT EXCEEDS	760	714	809

- a From high-water mark in gage house.
- b Result of regulation.
- e Estimated.



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 mile 227.8.

DRAINAGE AREA.--3,683 mi<sup>2</sup>.

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 sea level. Prior to Sep. 12, 1930, nonrecording gage at same site and datum.

REMARKS.--Records fair. Large diurnal fluctuation caused by powerplants upstream from station. Flow regulated since December 1979 by Lake Moomaw (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. Statistics of monthly mean data and summary statistics for water years 1925 - 1979 (unregulated flow) are available in previous data books, water years 1991 - 1998. National Weather Service gage-height telemeter at station. Maximum discharge, 226,000 ft<sup>3</sup>/s, from rating curve extended above 177,000 ft<sup>3</sup>/s on basis of slope-area measurement of peak flow. Minimum gage height, 2.21 ft, Oct. 13, 14, 1930. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 26,500 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Sep 30	0245	*27,800	*10.57	No other peak greater than base discharge.			

Minimum daily discharge, 550 ft<sup>3</sup>/s, Aug 10.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	845	815	1030	1010	2410	1880	2860	2120	1330	e1100	e650	e900
2	924	923	895	1150	2980	1780	2870	2050	1310	e1050	e900	e800
3	760	1000	925	1530	3610	1810	2880	2020	1230	e900	e800	e700
4	830	1050	1010	2410	4670	1960	2510	1990	1280	e1000	e700	821
5	804	874	1060	2150	4370	2540	2480	1940	1300	e900	e750	1830
6	836	970	922	2040	3590	3590	2530	1900	1280	e850	e600	5510
7	830	961	1080	1600	3060	3120	2610	1840	e1050	892	e620	7960
8	964	837	1060	1590	2700	3100	2460	1870	e1100	829	e650	5610
9	1380	897	1340	1580	2450	3250	2130	3020	e1160	903	e580	3650
10	1460	959	1290	1430	2620	2980	2190	4530	e1000	e720	e550	2830
11	1320	960	1350	1700	2400	2900	2220	3260	e1050	775	e630	2410
12	1170	883	1160	1610	2340	2750	2310	2710	e950	750	e600	2010
13	1180	963	1510	1830	2180	2430	2340	2480	e1000	1040	e570	1700
14	986	983	1730	1670	2000	2560	2420	2610	e950	1010	e560	1530
15	820	945	1510	2300	1940	4450	2390	5580	e1000	871	e570	2050
16	928	898	1360	4500	1770	5980	2350	7200	e750	886	e610	1870
17	950	874	1500	6030	1780	7440	2340	5380	1050	994	e630	2030
18	761	955	1450	4390	2040	10100	2340	4120	1170	e790	e570	1690
19	991	851	1170	3410	2750	12900	2260	3430	1060	875	e660	1430
20	902	888	1290	3000	3840	10200	2300	2920	1370	867	e680	1290
21	872	985	906	2940	3840	7880	2250	2720	e1000	885	e860	1120
22	880	851	1100	2540	3210	7640	2180	2550	e750	982	e800	1390
23	810	878	1050	2420	2710	8230	2130	2470	e670	929	e780	1290
24	944	900	1170	4910	2440	7580	2090	2420	e650	868	e800	1280
25	729	913	1170	14000	2330	6550	2010	2070	e900	1010	e900	1300
26	856	1000	1160	10400	2120	5690	1950	2080	e870	e870	e1180	1180
27	827	903	1070	6110	2040	4730	1970	1990	e920	920	e1100	1050
28	889	992	1120	4420	2040	4090	1980	1800	e850	e900	e1030	1870
29	836	902	1180	3500	---	3750	1990	1670	e940	e1000	e1000	7560
30	879	987	1050	2790	---	3220	1960	1590	e720	e900	e1100	17500
31	952	---	1100	2560	---	2990	---	1380	---	e750	e800	---
TOTAL	29115	27797	36718	103520	76230	150070	69300	85710	30660	28016	23230	84161
MEAN	939	927	1184	3339	2722	4841	2310	2765	1022	904	749	2805
MAX	1460	1050	1730	14000	4670	12900	2880	7200	1370	1100	1180	17500
MIN	729	815	895	1010	1770	1780	1950	1380	650	770	550	700
(†)	-4134	-3176	-2823	+10680	+5848	+10587	0	-1008	-6756	-7915	-7008	-4689
MEAN‡	806	821	1093	3684	2931	5182	2310	2732	797	648	523	2649
CFSM‡	.22	.22	.30	1.00	.80	1.41	.63	.74	.22	.18	.14	.72
IN.‡	.25	.25	.34	1.15	.83	1.62	.70	.85	.24	.20	.16	.80

CAL YR 1998	TOTAL	2037813	MEAN	5583	MAX	61600	MIN	729	MEAN‡	5563	CFSM‡	1.51	IN.‡	20.51
WTR YR 1999	TOTAL	744527	MEAN	2040	MAX	17500	MIN	550	MEAN‡	2011	CFSM‡	.55	IN.‡	7.41

† Total change in contents equivalent in cubic feet per second, per month, in Lake Moomaw; provided by U.S. Army Corps of Engineers.

‡ Adjusted for monthly change in contents.

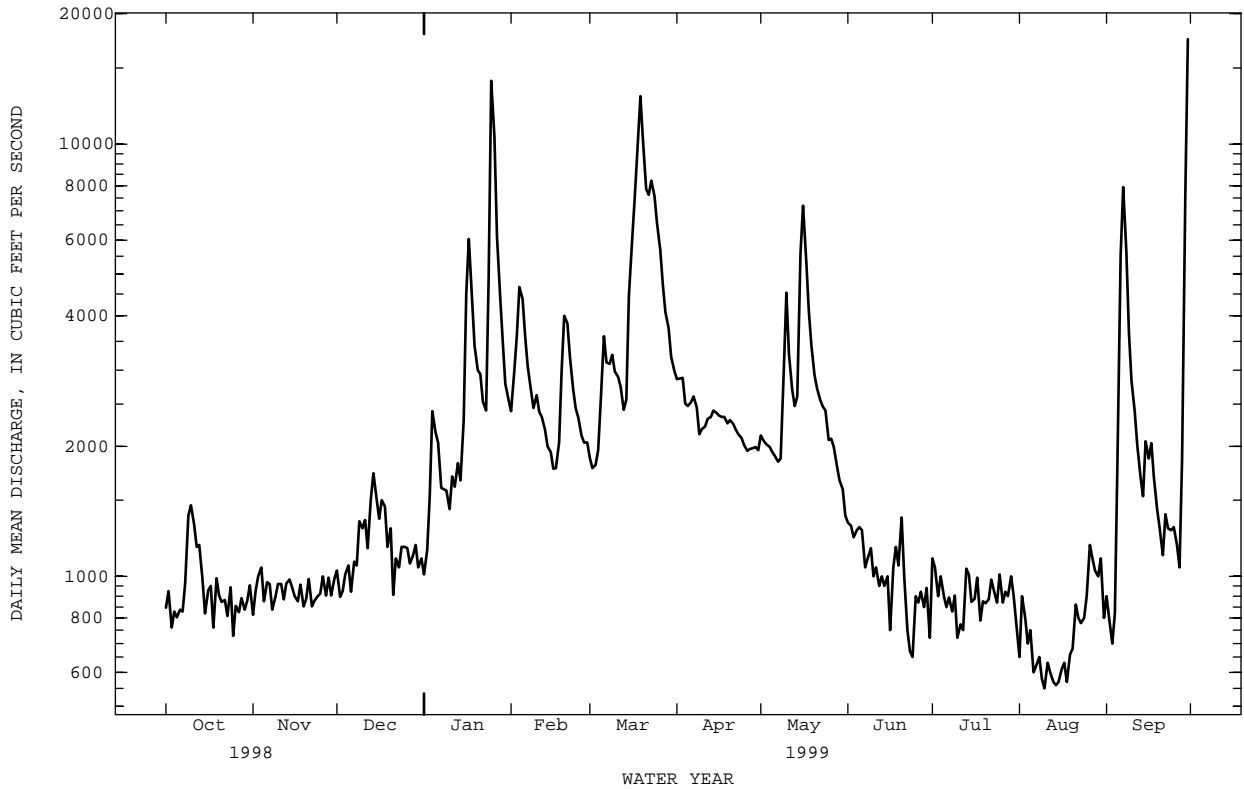
02026000 JAMES RIVER AT BENT CREEK, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1980 - 1999, BY WATER YEAR (WY) [REGULATED, UNADJUSTED]

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	2325	3302	3961	5629	6583	8312	7383	5198	3719	1955	1839	2209
MAX	9173	16910	10380	11680	17200	18860	24090	13990	10710	4973	6027	9873
(WY)	1980	1986	1997	1991	1998	1993	1987	1989	1995	1995	1984	1996
MIN	743	927	987	858	2521	1626	1842	2765	1022	904	725	841
(WY)	1987	1999	1981	1981	1981	1981	1995	1999	1999	1999	1981	1980

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR	WATER YEARS 1980 - 1999
ANNUAL TOTAL	2037813	744527	
ANNUAL MEAN	5583	2040	4354
HIGHEST ANNUAL MEAN			5735
LOWEST ANNUAL MEAN			1791
HIGHEST DAILY MEAN	61600	Jan 9	142000
LOWEST DAILY MEAN	729	Oct 25	467
ANNUAL SEVEN-DAY MINIMUM	833	Oct 1	523
INSTANTANEOUS PEAK FLOW			226000
INSTANTANEOUS PEAK STAGE			30.76
INSTANTANEOUS LOW FLOW			382
ANNUAL RUNOFF (CFSM)	1.52	.55	1.18
ANNUAL RUNOFF (INCHES)	20.58	7.52	16.06
10 PERCENT EXCEEDS	13900	3790	9380
50 PERCENT EXCEEDS	2100	1300	2490
90 PERCENT EXCEEDS	901	800	952

a Not determined.  
e Estimated.



JAMES RIVER BASIN

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 mi<sup>2</sup>.

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 sea level. Sept. 15, 1969, to Oct. 15, 1970, nonrecording gage at same site and datum.

REMARKS.--Records good except those for periods with doubtful or no gage-height record, Dec. 4-14, Feb. 3-4, Mar. 10-24, Jul. 16-20, Aug. 11, 12, Aug. 15 to Sep. 3, Sep. 22-26, and period with ice effect, Jan. 6, which are fair. Maximum discharge, 80,000 ft<sup>3</sup>/s, from rating curve extended above 7,600 ft<sup>3</sup>/s on basis of slope-area measurement of peak flow. 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 Department of Environmental Quality - Water Division.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,600 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Sep 6	1800	1,980	4.11	Sep 30	0030	*8,680	*10.61

Minimum discharge, 2.8 ft<sup>3</sup>/s, Aug 13, 14.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	8.9	21	23	22	134	84	137	58	34	15	8.0	e6.3
2	7.6	22	22	23	645	72	127	57	35	18	7.5	e5.9
3	8.2	27	22	265	e400	71	111	55	38	15	6.3	e5.7
4	8.5	31	e22	142	e296	83	108	54	31	11	5.5	7.9
5	9.0	28	e22	82	234	72	101	53	29	9.4	5.0	744
6	11	25	e23	e66	196	75	97	53	27	7.6	4.7	1030
7	14	25	e24	63	174	81	104	52	26	11	4.8	732
8	99	25	e28	57	155	74	91	94	23	17	4.2	351
9	50	24	e37	76	133	77	91	69	21	11	4.0	287
10	31	24	e32	87	118	e79	86	60	19	8.6	3.8	336
11	26	33	e25	68	107	e78	105	56	21	7.9	e3.3	215
12	25	35	e22	61	101	e76	97	53	23	9.4	e3.2	165
13	24	30	e63	62	95	e75	85	53	21	15	3.1	136
14	23	27	e52	68	84	e105	81	87	23	15	5.5	117
15	22	26	39	173	80	e250	81	100	20	13	e4.4	107
16	22	24	33	147	77	e230	87	80	18	e10	e4.0	169
17	21	24	30	116	74	e220	78	74	23	e9.0	e4.3	139
18	22	24	27	216	125	e225	73	70	29	e8.6	e3.8	115
19	23	23	26	201	119	e205	73	67	20	e13	e5.0	105
20	23	23	26	164	105	e188	74	60	19	e9.7	e12	98
21	21	23	25	141	96	e210	73	56	24	8.6	e16	125
22	20	23	24	123	88	e195	71	57	23	36	e8.5	e100
23	21	22	24	146	82	e170	67	94	20	19	e6.6	e88
24	22	22	27	704	81	e158	68	67	16	17	e7.4	e80
25	23	23	26	496	78	153	62	58	15	34	e18	e74
26	22	26	24	324	76	139	62	51	15	19	e12	e66
27	21	26	24	249	72	129	60	45	15	11	e10	127
28	22	25	24	204	85	122	71	44	16	9.7	e8.5	966
29	22	24	25	173	---	115	71	40	14	24	e7.7	2560
30	22	23	25	148	---	107	62	37	12	17	e6.9	3590
31	22	---	24	130	---	100	---	35	---	11	e6.4	---
TOTAL	716.2	758	870	4997	4110	4018	2554	1889	670	440.5	210.4	12647.8
MEAN	23.1	25.3	28.1	161	147	130	85.1	60.9	22.3	14.2	6.79	422
MAX	99	35	63	704	645	250	137	100	38	36	18	3590
MIN	7.6	21	22	22	72	71	60	35	12	7.6	3.1	5.7
CFSM	.25	.27	.30	1.74	1.58	1.40	.92	.66	.24	.15	.07	4.54
IN.	.29	.30	.35	2.00	1.65	1.61	1.02	.76	.27	.18	.08	5.07

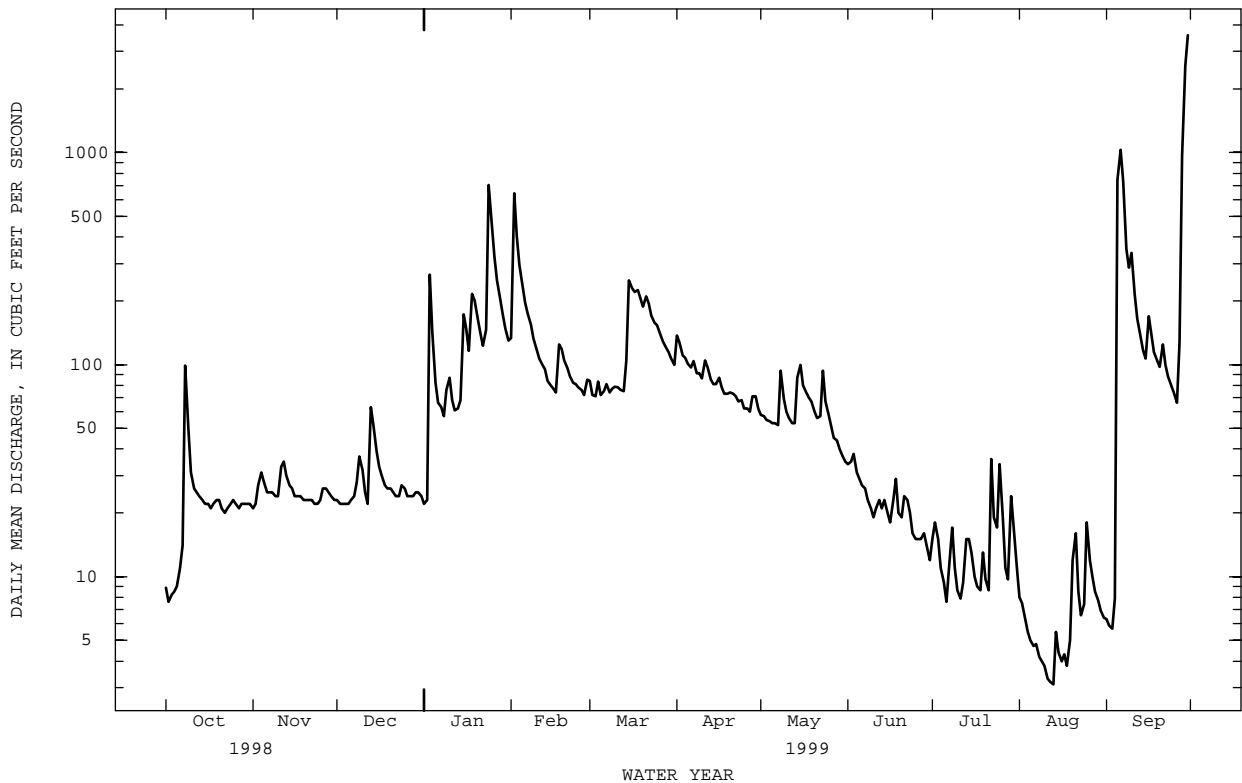
02027000 TYE RIVER NEAR LOVINGSTON, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1939 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	103	131	169	194	220	262	238	182	135	78.3	106	94.0
MAX	550	765	499	568	773	568	692	492	676	382	1541	556
(WY)	1943	1986	1997	1998	1998	1993	1987	1989	1972	1972	1969	1979
MIN	8.69	15.3	23.7	14.7	69.7	64.0	63.1	53.1	22.3	14.2	6.79	6.87
(WY)	1942	1942	1981	1981	1963	1981	1966	1941	1999	1999	1999	1954

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR		FOR 1999 WATER YEAR		WATER YEARS 1939 - 1999	
ANNUAL TOTAL	85157.6		33880.9			
ANNUAL MEAN	233		92.8		159	
HIGHEST ANNUAL MEAN					280	
LOWEST ANNUAL MEAN					61.7	
HIGHEST DAILY MEAN	3830	Jan 8	3590	Sep 30	e32600	Aug 20 1969
LOWEST DAILY MEAN	7.6	Oct 2	3.1	Aug 13	.60	aSep 9 1966
ANNUAL SEVEN-DAY MINIMUM	8.4	Sep 28	3.8	Aug 7	.73	Sep 7 1966
INSTANTANEOUS PEAK FLOW			8680	Sep 30	80000	Aug 20 1969
INSTANTANEOUS PEAK STAGE			10.61	Sep 30	b29.00	Aug 20 1969
INSTANTANEOUS LOW FLOW			2.8	cAug 13	.50	dSep 10 1966
ANNUAL RUNOFF (CFSM)	2.51		1.00		1.71	
ANNUAL RUNOFF (INCHES)	34.14		13.58		23.29	
10 PERCENT EXCEEDS	609		167		323	
50 PERCENT EXCEEDS	70		35		102	
90 PERCENT EXCEEDS	20		8.6		22	

- a Also Sep 10, 11, 1966.
- b From floodmarks.
- c Also Aug 14, 1999.
- d Also Sep 11, 1966.
- 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 mi<sup>2</sup>.

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 sea level. 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 period with ice effect, Jan. 6, and periods of doubtful gage-height record, Jan. 16, 17, 20-22, Feb. 4-17, 20-27, Apr. 3-6, 13-15, 17-19, 21-23, May 11, 12, 15-22, and Sep. 2-4, 9, which are fair. Periodic dewatering of upstream quarries adds small amount of inflow. Maximum discharge, 38,000 ft<sup>3</sup>/s, from rating curve extended above 6,000 ft<sup>3</sup>/s on basis of slope-area measurement of peak flow. 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 Department of Environmental Quality - Water Division.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in June 1949 reached a stage of 9.9 ft, from floodmarks.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 650 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Sep 6	1615	1,460	6.26	Sep 30	0015	*4,400	*9.61

Minimum discharge, 1.3 ft<sup>3</sup>/s, Aug. 12-14, 19.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.3	5.6	6.5	8.0	85	55	94	36	24	11	e4.0	3.1
2	2.0	5.6	6.3	8.1	276	51	79	35	24	13	4.7	e2.8
3	2.6	8.0	5.9	113	247	51	e70	36	25	9.5	e3.1	e2.6
4	2.1	9.5	6.3	68	e200	55	e69	35	21	7.8	3.3	e4.0
5	2.9	8.4	6.3	45	e162	50	e65	35	20	6.7	3.1	174
6	4.1	7.3	6.3	e38	e130	52	e62	35	18	5.9	3.0	700
7	6.0	7.5	6.3	33	e110	52	65	34	17	10	2.6	471
8	60	6.6	7.1	29	e100	51	62	50	16	12	2.2	243
9	25	6.8	14	36	e88	53	63	40	14	7.2	2.4	e175
10	13	7.6	12	36	e77	54	59	38	13	6.1	2.2	192
11	8.8	13	9.0	31	e69	53	76	e36	14	5.6	1.9	140
12	7.6	15	8.2	30	e65	52	65	e34	14	6.6	1.6	112
13	7.2	9.2	29	29	e65	51	e59	36	13	9.4	1.4	90
14	6.8	8.4	25	30	e53	67	e55	59	20	8.7	3.6	75
15	6.4	7.3	17	64	e51	91	e53	e51	14	8.3	3.2	71
16	6.3	7.3	14	e56	e48	80	59	e48	13	6.8	2.1	86
17	6.7	7.2	12	e50	e46	81	e52	e44	17	6.1	1.7	61
18	6.1	6.8	11	104	77	86	e49	e42	16	5.5	1.5	55
19	6.5	7.0	10	99	66	87	e48	e39	12	9.5	1.7	51
20	5.9	7.1	9.5	e84	e60	87	52	e37	13	6.4	10	47
21	5.5	7.5	9.1	e72	e55	105	e46	e36	14	10	8.2	53
22	5.5	6.2	8.5	e64	e52	102	e44	e40	12	19	4.3	45
23	5.7	6.8	8.4	81	e51	100	e42	51	11	8.9	3.3	40
24	6.6	6.8	10	269	e50	101	43	44	9.7	9.1	3.7	36
25	6.0	6.6	9.4	263	e47	97	40	39	9.3	22	5.9	34
26	6.0	8.2	8.7	199	e45	91	39	36	9.2	9.9	9.4	31
27	5.9	8.2	8.4	159	e44	86	37	33	9.0	7.0	6.8	64
28	6.1	7.6	8.7	131	59	80	45	31	9.1	6.2	5.7	353
29	5.9	6.7	9.5	109	---	75	40	29	7.9	10	4.1	1420
30	5.8	6.6	9.3	93	---	70	38	26	7.4	7.1	3.8	2100
31	6.3	---	8.6	80	---	66	---	25	---	5.4	3.3	---
TOTAL	253.6	232.4	320.3	2511.1	2478	2232	1670	1190	436.6	276.7	117.8	6931.5
MEAN	8.18	7.75	10.3	81.0	88.5	72.0	55.7	38.4	14.6	8.93	3.80	231
MAX	60	15	29	269	276	105	94	59	25	22	10	2100
MIN	2.0	5.6	5.9	8.0	44	50	37	25	7.4	5.4	1.4	2.6
CFSM	.17	.16	.22	1.70	1.86	1.51	1.17	.81	.31	.19	.08	4.85
IN.	.20	.18	.25	1.96	1.94	1.74	1.31	.93	.34	.22	.09	5.42



02027500 PINEY RIVER AT PINEY RIVER, VA--Continued

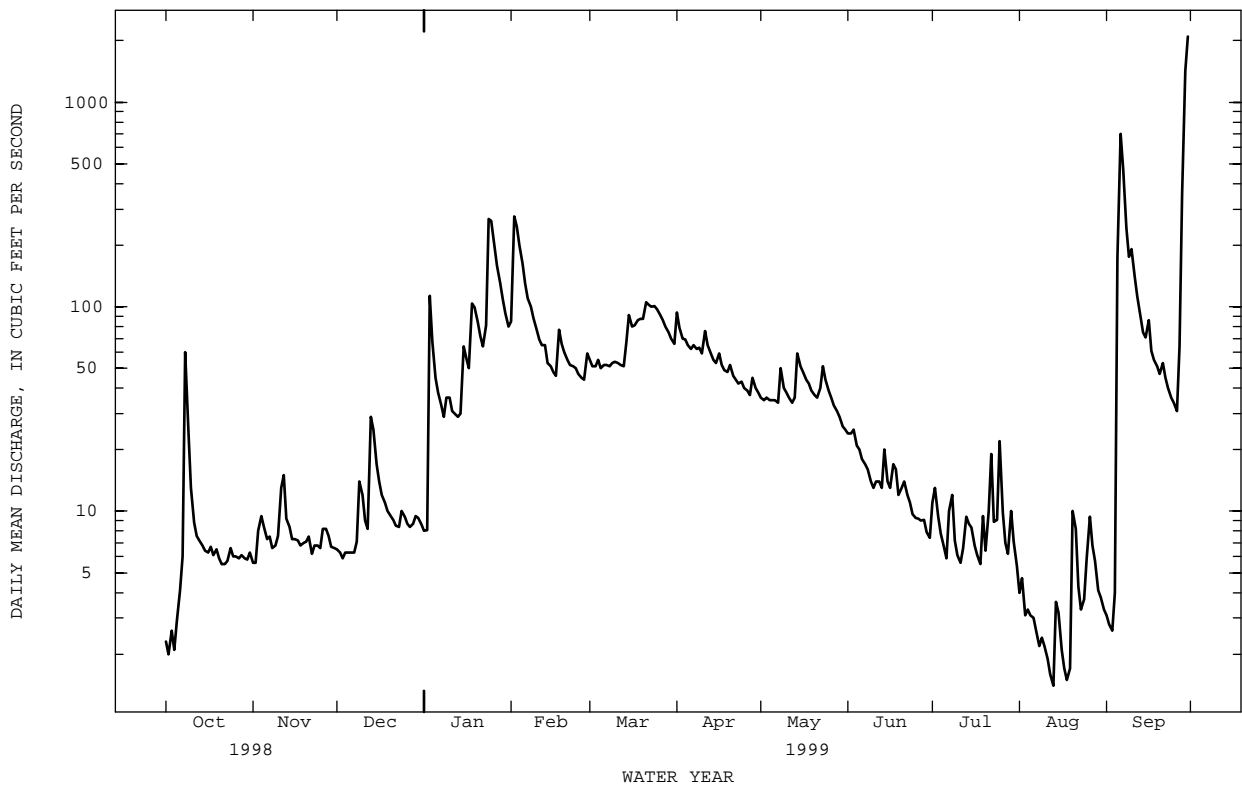
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1950 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	64.3	89.5	107	119	131	160	147	110	88.8	39.7	59.5	52.2
MAX	313	644	297	339	347	311	417	352	541	213	1239	388
(WY)	1991	1986	1997	1998	1998	1993	1987	1989	1972	1972	1969	1996
MIN	4.75	7.75	10.3	7.94	34.4	37.8	38.4	35.8	14.6	8.93	3.80	3.75
(WY)	1964	1999	1999	1981	1977	1981	1966	1963	1999	1999	1999	1998

SUMMARY STATISTICS FOR 1998 CALENDAR YEAR FOR 1999 WATER YEAR WATER YEARS 1950 - 1999

ANNUAL TOTAL	45383.8	18650.0	
ANNUAL MEAN	124	51.1	97.1
HIGHEST ANNUAL MEAN			188 1969
LOWEST ANNUAL MEAN			35.9 1956
HIGHEST DAILY MEAN	2060 Jan 8	2100 Sep 30	25000 Aug 20 1969
LOWEST DAILY MEAN	2.0 Oct 2	1.4 Aug 13	a1.4 Sep 13 1966
ANNUAL SEVEN-DAY MINIMUM	2.4 Sep 28	2.0 Aug 7	a1.7 Sep 7 1966
INSTANTANEOUS PEAK FLOW		4400 Sep 30	38000 Aug 20 1969
INSTANTANEOUS PEAK STAGE		9.61 Sep 30	b13.80 Aug 20 1969
INSTANTANEOUS LOW FLOW		1.3 cAug 12	a1.1 Sep 13 1966
ANNUAL RUNOFF (CFSM)	2.61	1.07	2.04
ANNUAL RUNOFF (INCHES)	35.47	14.58	27.70
10 PERCENT EXCEEDS	327	90	202
50 PERCENT EXCEEDS	36	22	60
90 PERCENT EXCEEDS	5.5	5.5	11

- a Dewatering of upstream quarry at a rate of 300 gallons per minute or 0.67 ft<sup>3</sup>/s included in flow.
- b From floodmarks.
- c Also Aug 13, 14, 19, 1999.
- 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 mi<sup>2</sup>.

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 sea level. Prior to Aug. 21, 1943, nonrecording gage at same site and datum.

REMARKS.--Records good except those for periods of no gage-height record, Oct. 13 to Dec. 14, and period with ice effect, Jan. 6 which are fair. Maximum discharge, 70,000 ft<sup>3</sup>/s, from rating curve extended above 8,500 ft<sup>3</sup>/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. 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 Department of Environmental Quality - Water Division.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Oct. 15, 1942, reached a stage of 23.4 ft, from floodmarks, discharge, about 30,000 ft<sup>3</sup>/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,500 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Sep 30	0230	*5,300	*9.54	No other peak greater than base discharge.			

Minimum discharge, 1.2 ft<sup>3</sup>/s, Aug 19.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	7.7	e12	e15	20	88	69	102	34	19	5.4	4.0	2.6
2	7.4	e13	e15	20	446	59	97	32	19	6.7	5.3	2.4
3	7.3	e16	e14	159	284	59	85	31	20	5.9	3.6	2.1
4	8.8	e18	e15	99	213	66	81	30	17	4.9	3.8	2.3
5	9.4	e16	e15	65	169	57	75	30	15	4.1	2.8	431
6	10	e15	e16	e48	147	59	70	30	14	3.3	2.2	391
7	12	e15	e19	37	133	56	68	30	14	8.0	2.2	320
8	85	e14	e28	35	119	52	65	94	13	14	1.9	150
9	31	e14	e37	60	104	55	66	59	10	7.3	1.7	134
10	18	e15	e31	59	94	58	62	50	9.6	5.6	1.5	163
11	15	e18	e26	44	85	56	68	44	12	5.8	1.4	87
12	14	e21	e23	43	81	54	64	41	13	5.0	1.4	63
13	e13	e18	e60	46	70	51	57	42	11	8.5	1.4	49
14	e13	e17	e41	53	62	80	53	79	12	7.8	1.7	39
15	e12	e16	32	152	63	219	55	62	10	7.0	1.5	41
16	e12	e16	27	113	63	191	58	49	9.0	6.0	1.4	151
17	e12	e15	25	88	62	179	51	45	13	4.8	1.6	113
18	e13	e15	23	184	116	182	48	43	16	4.0	1.4	84
19	e14	e15	21	161	100	167	47	42	11	6.2	1.4	71
20	e14	e16	21	121	88	148	48	38	10	5.2	4.4	61
21	e13	e17	21	98	77	167	46	35	15	9.7	6.6	68
22	e12	e16	21	83	68	159	46	37	14	10	4.1	54
23	e13	e16	20	112	63	141	42	51	11	7.4	3.1	45
24	e13	e15	23	552	61	133	42	41	8.6	7.6	2.7	40
25	e14	e14	22	328	62	122	39	36	7.8	10	7.9	36
26	e13	e15	21	210	61	112	38	32	8.0	7.1	13	31
27	e12	e16	21	166	59	104	36	30	7.5	4.6	6.5	44
28	e13	e15	22	138	74	96	39	28	7.8	3.7	4.8	349
29	e13	e14	23	116	---	90	39	26	6.5	4.1	3.6	1080
30	e12	e14	22	99	---	83	36	23	5.2	4.6	3.0	2240
31	e13	---	20	82	---	77	---	21	---	3.7	2.6	---
TOTAL	469.6	467	740	3591	3112	3201	1723	1265	359.0	198.0	104.5	6344.4
MEAN	15.1	15.6	23.9	116	111	103	57.4	40.8	12.0	6.39	3.37	211
MAX	85	21	60	552	446	219	102	94	20	14	13	2240
MIN	7.3	12	14	20	59	51	36	21	5.2	3.3	1.4	2.1
CFSM	.16	.16	.25	1.22	1.17	1.09	.61	.43	.13	.07	.04	2.24
IN.	.18	.18	.29	1.41	1.22	1.26	.68	.50	.14	.08	.04	2.49

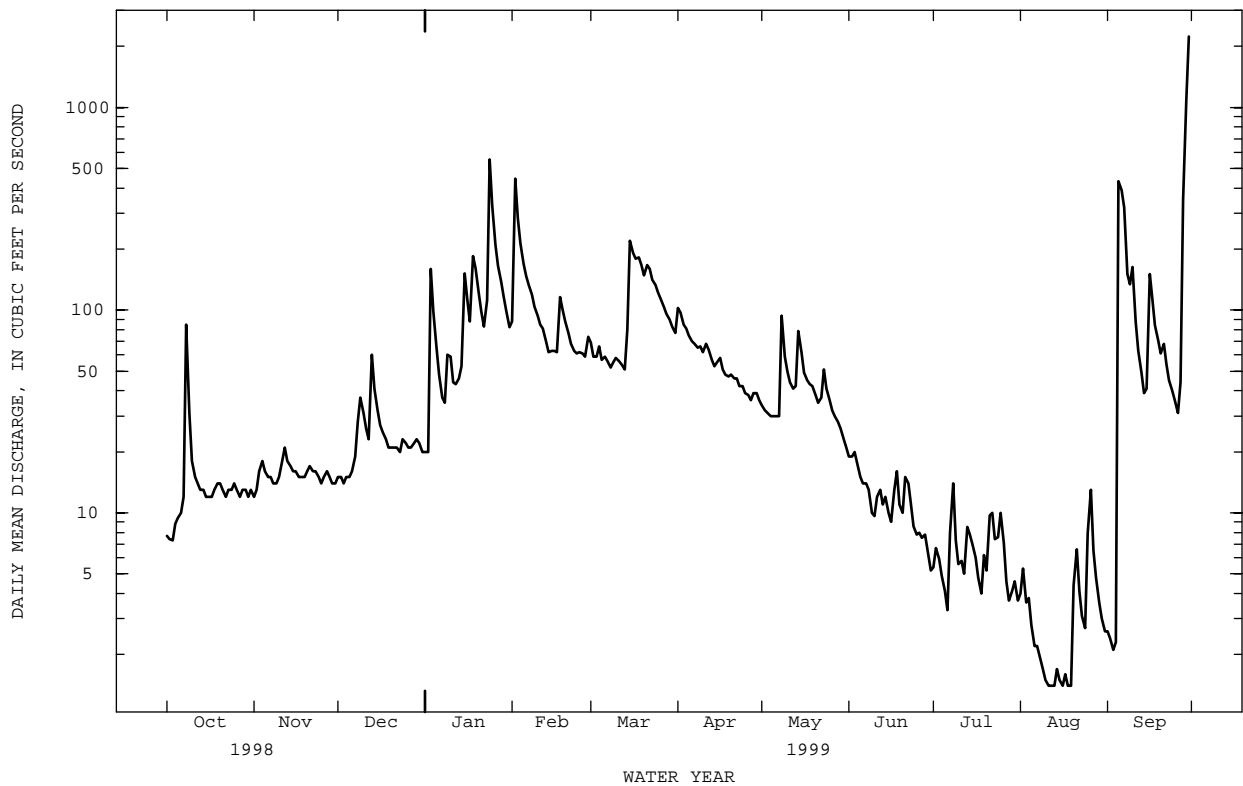
02028500 ROCKFISH RIVER NEAR GREENFIELD, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1943 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	94.1	124	150	173	198	246	221	161	123	73.2	85.6	86.1
MAX	394	733	445	480	723	629	698	369	696	327	1246	506
(WY)	1991	1986	1951	1996	1998	1993	1983	1990	1995	1972	1969	1979
MIN	8.65	15.6	18.5	23.1	62.0	55.9	52.5	40.8	12.0	6.39	3.37	3.34
(WY)	1964	1999	1966	1981	1944	1981	1981	1999	1999	1999	1999	1954

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR	WATER YEARS 1943 - 1999
ANNUAL TOTAL	72773.0	21574.5	
ANNUAL MEAN	199	59.1	144
HIGHEST ANNUAL MEAN			290
LOWEST ANNUAL MEAN			45.9
HIGHEST DAILY MEAN	2330	Feb 17	e28800
LOWEST DAILY MEAN	6.7	Sep 29	.20
ANNUAL SEVEN-DAY MINIMUM	7.3	Sep 27	.30
INSTANTANEOUS PEAK FLOW			5300
INSTANTANEOUS PEAK STAGE			9.54
INSTANTANEOUS LOW FLOW			1.2
ANNUAL RUNOFF (CFSM)	2.11	.62	1.53
ANNUAL RUNOFF (INCHES)	28.62	8.48	20.75
10 PERCENT EXCEEDS	515	121	300
50 PERCENT EXCEEDS	77	26	87
90 PERCENT EXCEEDS	12	4.6	18

- a Also Aug 12, 13, 16, 18, 19, 1999.
- b Also Sep 9-11, 1966.
- c From floodmarks.
- d Also Sep 9-12, 1966.
- e Estimated.



JAMES RIVER BASIN

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 mi<sup>2</sup>.

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 sea level. Prior to Nov. 28, 1928, nonrecording gage at same site and datum.

REMARKS.--No estimated daily discharges. Records good. Large diurnal fluctuation caused by powerplants upstream from station. Flow regulated since December 1979 by Lake Moomaw (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. Statistics of monthly mean data and summary statistics for water years 1925 - 1979 (unregulated flow) are available in previous data books, water years 1991 - 1998. National Weather Service gage-height telemeter at station. Maximum discharge, 301,000 ft<sup>3</sup>/s, from rating curve extended above 120,000 ft<sup>3</sup>/s on basis of slope-conveyance study. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in October 1870 reached a stage of 30.7 ft, discharge, about 215,000 ft<sup>3</sup>/s, and flood in November 1877 reached a stage of 27.9 ft, discharge, about 160,000 ft<sup>3</sup>/s, from information by local resident. Flood in March 1913 reached a stage of 25.16 ft, from floodmarks, discharge, 121,000 ft<sup>3</sup>/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 35,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Sep 30	0930	*72,200	*20.38	No other peak greater than base discharge.			

Minimum discharge, 536 ft<sup>3</sup>/s, Aug 10-11, 15, gage height, 2.13 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1060	1150	1120	1210	3140	2600	3800	2490	1500	778	691	829
2	1000	996	1160	1090	3760	2540	4180	2580	1500	1170	729	1070
3	1110	1160	1010	1550	5870	2480	4110	2450	1550	1090	1080	846
4	870	1330	1020	3420	5590	2610	3770	2340	1350	982	826	816
5	1010	1310	1070	2940	6180	2790	3470	2400	1530	1080	749	1750
6	972	1110	1140	2650	5270	3740	3410	2250	1480	962	792	5910
7	1030	1190	987	2340	4380	4290	3480	2210	1450	886	617	10600
8	1180	1170	1140	1970	3950	3720	3040	2330	1100	994	674	8670
9	2010	1030	1280	1920	3450	3830	2850	2440	1170	961	728	5400
10	1810	1150	1670	1940	3280	4030	2820	4990	1230	1060	601	4470
11	1870	1200	1420	1760	3150	3660	2730	4600	1130	775	576	3260
12	1660	1220	1510	2060	3040	3520	3180	3590	1200	792	709	2570
13	1430	1170	1400	2050	2920	3280	3010	3330	1040	815	646	2150
14	1500	1200	2040	2020	2630	3140	3090	4370	1280	1210	596	1990
15	1180	1220	2020	2530	2420	6990	3250	4670	1050	1080	583	1610
16	1000	1170	1600	3560	2390	7470	3200	8330	1170	915	622	2950
17	1130	1110	1560	6840	2290	8850	3020	7150	776	933	656	3100
18	1170	1080	1600	5810	2450	9820	2910	5610	1280	1120	665	2580
19	955	1160	1480	5500	3570	14100	2860	4590	1250	814	617	2040
20	1210	1040	1260	4060	4200	13000	2790	3870	1280	923	778	1850
21	1100	1080	1370	3810	4830	10000	2760	3480	1610	903	783	1630
22	1050	1180	919	3580	4410	9050	2610	3320	1190	971	1080	1620
23	1070	1010	1160	3200	3820	9600	2450	3420	799	1100	877	2150
24	985	1050	1180	6350	3130	9290	2640	3120	697	1020	857	1660
25	1140	1060	1350	14200	3050	8280	2460	2520	674	981	901	1640
26	914	1070	1290	15500	2760	7260	2450	2450	1050	1180	1160	1740
27	1050	1160	1220	9000	2600	6360	2490	2350	956	935	1330	1520
28	1000	1040	1180	6190	2700	5440	2360	2150	1060	977	1230	1900
29	1110	1160	1260	5070	---	4940	2480	1900	908	950	1160	8120
30	1030	1030	1290	4130	---	4500	2450	1870	1060	1060	1090	51300
31	1070	---	1170	3360	---	4090	---	1730	---	979	1230	---
TOTAL	36676	34006	40876	131610	101230	185270	90120	104900	35320	30396	25633	137741
MEAN	1183	1134	1319	4245	3615	5976	3004	3384	1177	981	827	4591
MAX	2010	1330	2040	15500	6180	14100	4180	8330	1610	1210	1330	51300
MIN	870	996	919	1090	2290	2480	2360	1730	674	775	576	816
(†)	-4134	-3176	-2823	+10680	+5848	+10587	0	-1008	-6756	-7915	-7008	-4689
MEAN‡	1050	1028	1228	4590	3824	6318	3004	3351	952	725	601	4435
CFSM‡	.23	.22	.27	1.00	.83	1.38	.66	.73	.21	.16	.13	.97
IN.‡	.26	.25	.31	1.15	.87	1.59	.73	.84	.23	.18	.15	1.08

CAL YR 1998 TOTAL 2665997 MEAN 7304 MAX 68100 MIN 870 MEAN‡ 7284 CFSM‡ 1.59 IN.‡ 21.58  
WTR YR 1999 TOTAL 953778 MEAN 2613 MAX 51300 MIN 576 MEAN‡ 2585 CFSM‡ .56 IN.‡ 7.66

† Total change in contents, equivalent in cubic feet per second, per month, in Lake Moomaw; provided by U.S. Army Corps of Engineers.  
‡ Adjusted for monthly change in contents.

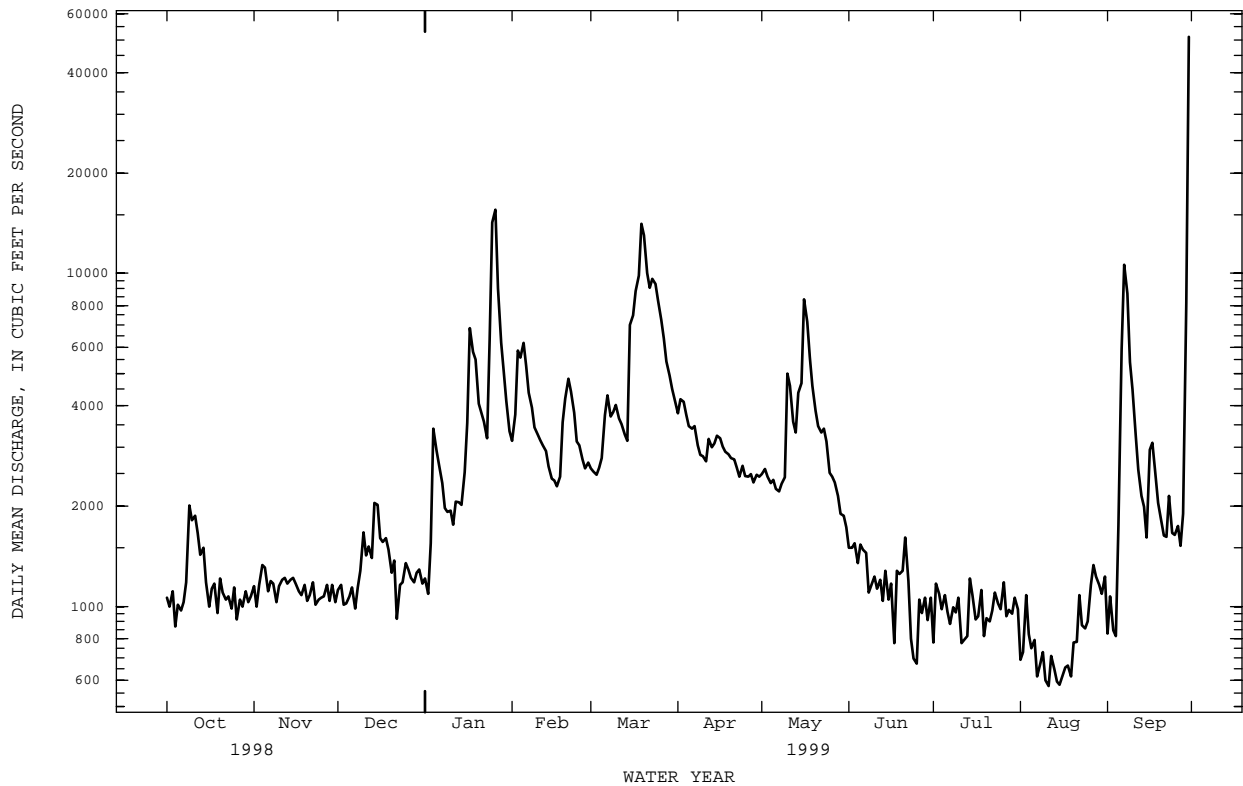
02029000 JAMES RIVER AT SCOTTSVILLE, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1980 - 1999, BY WATER YEAR (WY) [REGULATED, UNADJUSTED]

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	2950	4377	5029	7281	8272	10340	9473	6621	4684	2520	2353	2885
MAX	11990	25090	13450	18230	22960	23820	28930	18230	14380	6941	7934	13180
(WY)	1980	1986	1997	1996	1998	1993	1987	1989	1995	1995	1984	1996
MIN	963	1134	1318	1165	3198	1961	2493	3384	1177	981	827	844
(WY)	1987	1999	1981	1981	1981	1981	1995	1999	1999	1999	1999	1983

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR	WATER YEARS 1980 - 1999
ANNUAL TOTAL	2665997	953778	
ANNUAL MEAN	7304	2613	5547
HIGHEST ANNUAL MEAN			7531
LOWEST ANNUAL MEAN			2217
HIGHEST DAILY MEAN	68100	Jan 9	199000
LOWEST DAILY MEAN	870	Oct 4	571
ANNUAL SEVEN-DAY MINIMUM	1010	Oct 1	602
INSTANTANEOUS PEAK FLOW			72200
INSTANTANEOUS PEAK STAGE			20.38
INSTANTANEOUS LOW FLOW			536
ANNUAL RUNOFF (CFSM)	1.59	.57	1.21
ANNUAL RUNOFF (INCHES)	21.64	7.74	16.44
10 PERCENT EXCEEDS	18500	5020	11900
50 PERCENT EXCEEDS	2550	1600	3210
90 PERCENT EXCEEDS	1070	895	1150

a Also Aug 11, 15, 1999.



JAMES RIVER BASIN

02030000 HARDWARE RIVER BELOW BRIERY CREEK, 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 Creek, 2.4 mi northeast of Scottsville, and 10.8 mi upstream from mouth.

DRAINAGE AREA.--116 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1938 to September 1995, October 1996 to current year. Monthly discharge only for some periods, published in WSP 1303. Published as "below Briery Run" prior to October 1990.

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 sea level.

REMARKS.--Records good except for periods of doubtful gage-height record, Apr. 23 to May 7, and Jul. 18-27, which are fair. Maximum discharge, 52,000 ft<sup>3</sup>/s, from rating curve extended above 18,000 ft<sup>3</sup>/s on basis of slope-area measurements at gage heights 23.8 ft and 31.0 ft. Minimum gage height, 0.81 ft, Sep. 8, 1966. Several measurements of water temperature were made during the year.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,500 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Sep 30	1045	*5,970	*15.73	No other peak greater than base discharge.			
Minimum discharge, 1.3 ft <sup>3</sup> /s, Aug 19, gage height, 1.15 ft.							

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	14	24	30	42	80	89	95	e43	29	17	5.2	4.0
2	13	25	29	44	214	75	122	e42	29	35	4.2	2.9
3	12	32	27	163	182	74	96	e40	32	19	3.8	4.7
4	14	50	28	180	133	140	89	e43	29	13	4.1	4.9
5	18	31	27	105	109	98	83	e40	26	11	3.0	158
6	21	27	28	98	96	88	78	e60	25	8.8	2.6	135
7	26	27	28	101	89	84	76	e50	24	8.8	2.5	138
8	62	27	29	63	83	74	73	98	22	17	2.4	66
9	89	28	81	65	75	74	74	74	20	16	2.5	49
10	36	28	75	92	72	78	73	54	18	9.4	2.4	379
11	26	34	43	79	68	78	75	48	18	8.5	2.4	97
12	23	39	33	61	69	73	84	45	20	8.6	2.4	56
13	22	31	85	53	70	68	70	54	20	12	2.3	43
14	21	30	98	57	64	131	66	161	19	15	2.2	35
15	20	30	61	128	62	932	67	106	19	12	2.2	35
16	20	29	46	123	62	456	75	70	16	10	2.2	175
17	20	28	40	90	63	229	66	60	21	8.1	2.1	147
18	21	28	35	135	125	169	63	55	25	e7.0	2.1	74
19	21	28	31	149	124	135	62	51	20	e9.0	1.7	55
20	24	29	30	103	90	118	62	47	18	e8.0	4.0	47
21	22	33	30	92	78	148	62	43	24	e17	11	46
22	20	29	29	86	71	185	62	44	25	e15	8.0	56
23	21	28	28	95	66	135	e60	144	21	e12	5.4	43
24	23	29	37	699	65	124	e63	69	16	e12	4.5	36
25	24	31	39	379	64	118	e68	55	14	e14	6.9	32
26	24	36	30	183	63	105	e56	46	14	e11	45	30
27	24	41	44	137	62	98	e63	41	13	e8.0	19	30
28	25	33	44	117	73	93	e60	37	14	5.7	11	53
29	24	31	42	101	---	87	e58	34	14	5.6	7.8	185
30	23	30	41	90	---	81	e46	33	11	6.8	6.1	e3410
31	24	---	33	82	---	78	---	31	---	7.0	5.0	---
TOTAL	777	926	1281	3992	2472	4515	2147	1818	616	367.3	186.0	5626.5
MEAN	25.1	30.9	41.3	129	88.3	146	71.6	58.6	20.5	11.8	6.00	188
MAX	89	50	98	699	214	932	122	161	32	35	45	3410
MIN	12	24	27	42	62	68	46	31	11	5.6	1.7	2.9
CFSM	.22	.27	.36	1.11	.76	1.26	.62	.51	.18	.10	.05	1.62
IN.	.25	.30	.41	1.28	.79	1.45	.69	.58	.20	.12	.06	1.80

02030000 HARDWARE RIVER BELOW BRIERY CREEK, NEAR SCOTTSVILLE, VA--Continued

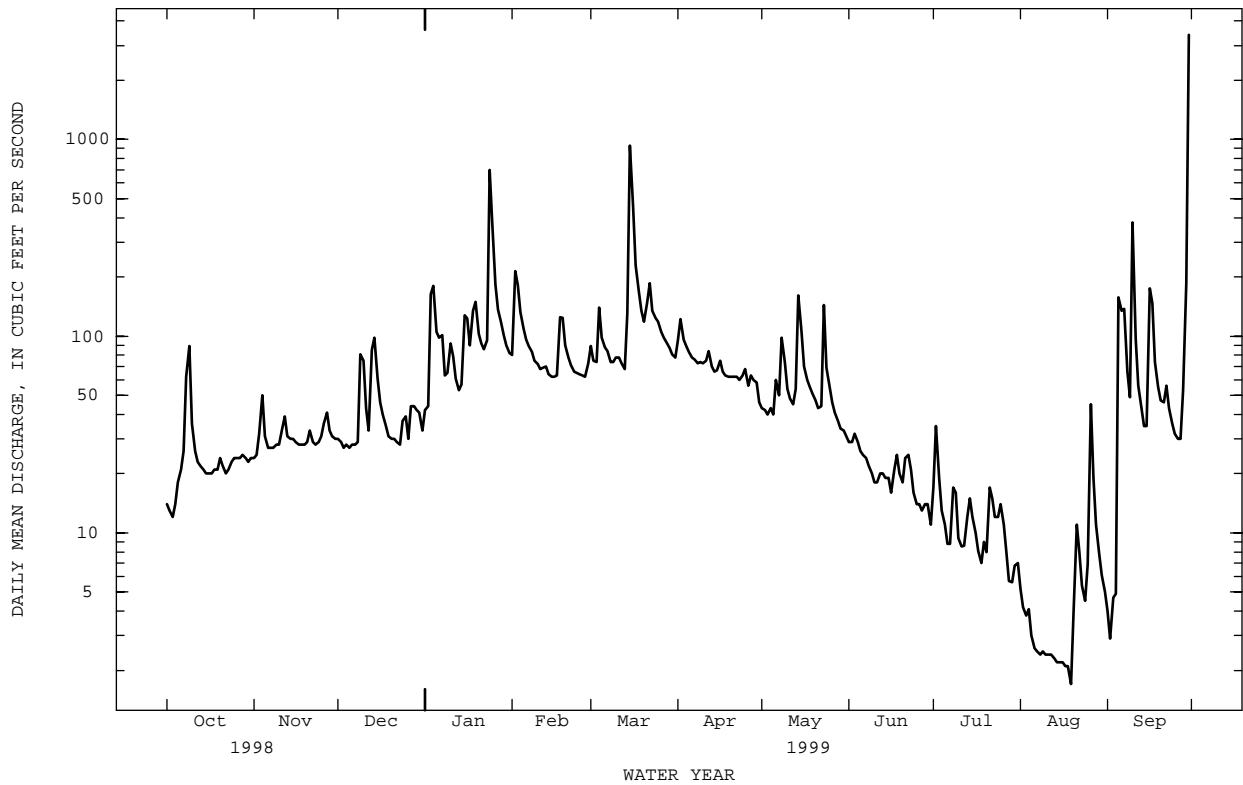
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1939 - 1995, 1997 - 1999 BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	90.0	100	132	156	189	218	184	137	108	76.9	97.6	83.9
MAX	370	514	514	448	664	613	604	398	560	273	1155	750
(WY)	1977	1986	1949	1998	1998	1993	1983	1989	1972	1975	1969	1944
MIN	11.4	17.5	20.5	25.0	50.3	35.1	39.5	36.0	20.5	9.45	4.71	7.93
(WY)	1942	1942	1966	1966	1954	1981	1981	1981	1999	1966	1966	1954

SUMMARY STATISTICS FOR 1998 CALENDAR YEAR FOR 1999 WATER YEAR WATER YEARS 1939 - 1995 1997 - 1999

ANNUAL TOTAL	76519.0			24723.8					
ANNUAL MEAN	210			67.7			131		
HIGHEST ANNUAL MEAN							249		
LOWEST ANNUAL MEAN							39.0		
HIGHEST DAILY MEAN	3140			Jan 28			e3410 Sep 30		
LOWEST DAILY MEAN	8.0			Sep 29			1.7 Aug 19		
ANNUAL SEVEN-DAY MINIMUM	10			Sep 24			2.1 Aug 13		
INSTANTANEOUS PEAK FLOW							5970 Sep 30		
INSTANTANEOUS PEAK STAGE							15.73 Sep 30		
INSTANTANEOUS LOW FLOW							1.3 Aug 19		
ANNUAL RUNOFF (CFSM)	1.81			.58			1.13		
ANNUAL RUNOFF (INCHES)	24.54			7.93			15.30		
10 PERCENT EXCEEDS	430			122			239		
50 PERCENT EXCEEDS	98			40			82		
90 PERCENT EXCEEDS	22			8.0			26		

a From floodmarks.  
 b Also Sep 6-8, 1966.  
 e Estimated.



JAMES RIVER BASIN

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 mi<sup>2</sup>.

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 sea level. Oct. 1, 1942, to Sep. 30, 1951, on right bank 20 ft downstream from former highway bridge at different datum.

REMARKS.--Records good except those for periods of backwater from beaver dams, Jun. 6-27, Jun. 29 to Jul. 3, 9-12, Jul. 18 to Aug. 13, 20-24, and Aug. 28 to Sep. 3, 8-15, 17-27, which are poor. Maximum discharge, 20,000 ft<sup>3</sup>/s, from rating curve extended above 8,000 ft<sup>3</sup>/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 Department of Environmental Quality - Water Division.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Sep. 6, 1979, reached a stage of 24.5 ft, from floodmarks, discharge, about 13,500 ft<sup>3</sup>/s, from rating curve extended above 8,300 ft<sup>3</sup>/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,200 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Sep 30	0500	*5,000	*15.26	No other peak greater than base discharge.			
Minimum daily discharge, 1.2 ft <sup>3</sup> /s, Aug 12-13.							

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	15	22	26	27	65	66	76	38	21	e8.9	e6.3	e3.1
2	14	22	26	30	197	56	83	37	20	e10	e8.0	e2.8
3	14	28	25	209	150	61	70	36	19	e12	e6.4	e2.7
4	15	35	26	141	115	87	67	36	18	14	e6.9	2.5
5	17	27	25	70	93	67	64	36	17	9.8	e5.0	226
6	19	25	25	59	84	65	61	38	e16	8.2	e3.9	184
7	20	25	25	50	77	63	58	37	e15	7.5	e3.7	127
8	94	25	32	41	74	58	57	125	e14	22	e2.5	e82
9	54	26	85	52	67	59	57	68	e13	13	e1.8	e72
10	29	26	47	67	64	63	57	49	e12	e8.6	e1.4	e90
11	24	34	33	50	59	62	59	42	e14	e9.0	e1.3	e59
12	23	33	29	42	60	59	61	39	e18	e7.6	e1.2	e39
13	22	27	51	46	57	55	53	38	e15	13	e1.2	e29
14	22	27	58	60	52	75	54	73	e17	12	6.4	e25
15	21	27	40	158	52	301	53	64	e15	10	5.7	e27
16	21	27	34	123	51	254	58	49	e13	8.9	3.3	94
17	22	25	32	82	51	179	51	44	e16	7.4	1.9	e74
18	22	25	30	131	99	153	48	41	e21	e7.1	1.6	e52
19	21	25	28	127	103	129	47	41	e17	e10	1.5	e43
20	22	27	27	89	84	113	48	36	e15	e8.4	e6.4	e35
21	20	28	28	72	73	124	47	33	e20	e14	e9.2	e39
22	20	27	27	62	66	128	48	33	e18	e16	e5.2	e33
23	19	26	25	80	61	107	48	43	e16	e13	e3.8	e28
24	21	25	29	442	60	100	53	40	e12	e14	e3.0	e26
25	21	25	30	248	58	92	46	33	e11	e17	11	e23
26	21	29	28	148	57	84	44	29	e10	e11	33	e22
27	21	30	28	115	55	78	42	27	e9.6	e8.4	14	e21
28	22	25	30	97	62	74	41	25	12	e6.4	e8.2	23
29	22	25	30	83	---	69	42	24	e10	e7.5	e5.0	417
30	21	26	30	73	---	65	40	23	e9.2	e6.6	e3.8	2080
31	22	---	27	67	---	63	---	22	---	e6.0	e3.2	---
TOTAL	741	804	1016	3141	2146	3009	1633	1299	453.8	327.3	175.8	3981.1
MEAN	23.9	26.8	32.8	101	76.6	97.1	54.4	41.9	15.1	10.6	5.67	133
MAX	94	35	85	442	197	301	83	125	21	22	33	2080
MIN	14	22	25	27	51	55	40	22	9.2	6.0	1.2	2.5
CFSM	.25	.28	.34	1.06	.80	1.02	.57	.44	.16	.11	.06	1.39
IN.	.29	.31	.40	1.22	.84	1.17	.64	.51	.18	.13	.07	1.55



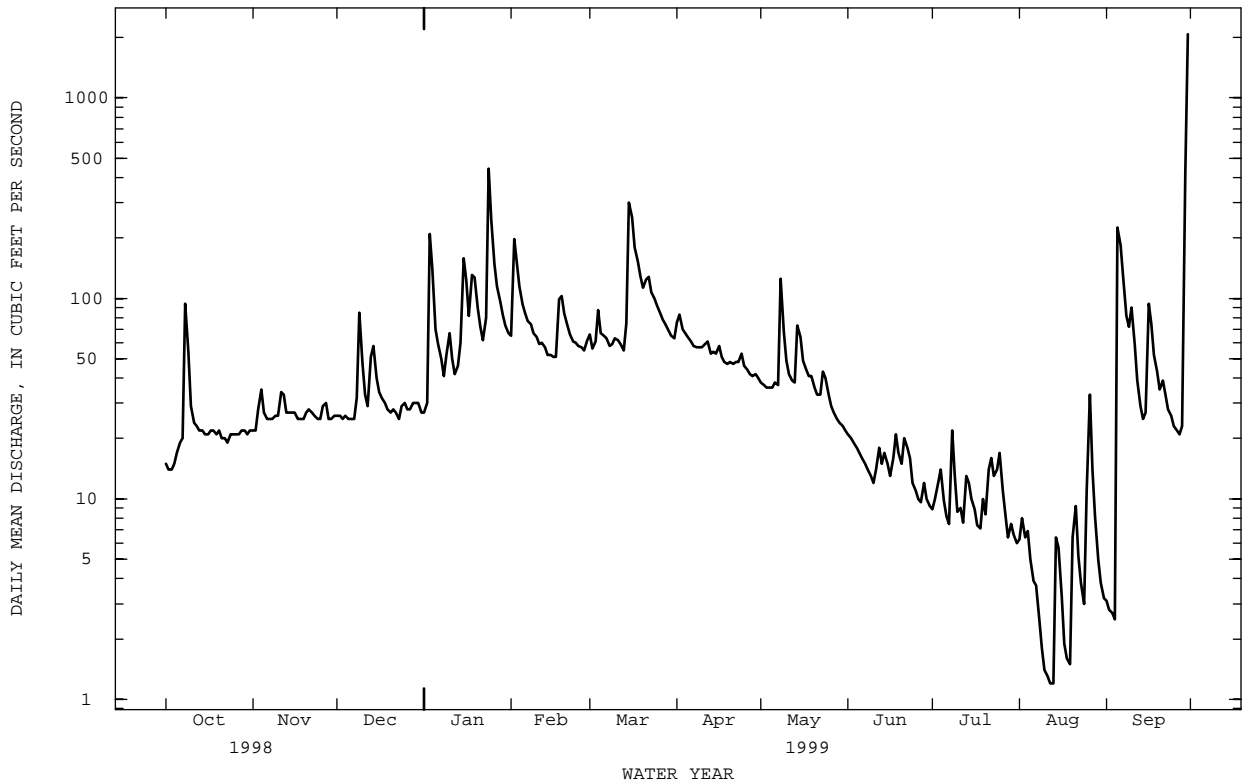
02031000 MECHUMS RIVER NEAR WHITE HALL, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1943 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	87.1	103	117	133	151	169	171	123	91.2	62.4	56.7	86.9
MAX	606	636	329	425	550	473	703	289	322	192	245	422
(WY)	1943	1986	1949	1996	1998	1993	1983	1989	1995	1991	1949	1987
MIN	8.65	19.7	20.7	24.0	55.4	45.2	37.1	34.9	15.1	8.95	5.67	8.29
(WY)	1944	1944	1944	1981	1947	1981	1981	1981	1999	1944	1999	1943

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR	WATER YEARS 1943 - 1999
ANNUAL TOTAL	59116	18727.0	
ANNUAL MEAN	162	51.3	112
HIGHEST ANNUAL MEAN			178
LOWEST ANNUAL MEAN			41.6
HIGHEST DAILY MEAN	2920	Feb 17	10600
LOWEST DAILY MEAN	14	Sep 29	.70
ANNUAL SEVEN-DAY MINIMUM	15	Sep 28	1.2
INSTANTANEOUS PEAK FLOW			20000
INSTANTANEOUS PEAK STAGE			b30.30
INSTANTANEOUS LOW FLOW			.60
ANNUAL RUNOFF (CFSM)	1.70	.54	1.18
ANNUAL RUNOFF (INCHES)	23.05	7.30	15.99
10 PERCENT EXCEEDS	346	91	200
50 PERCENT EXCEEDS	70	29	70
90 PERCENT EXCEEDS	21	7.6	21

a Also Aug 13, 1999.  
 b From floodmarks, datum then in use.  
 e Estimated.



02032640 NORTH FORK RIVANNA RIVER NEAR EARLYSVILLE, VA

LOCATION.--Lat 38°09'48", long 78°25'30", Albemarle County, Hydrologic Unit 02080204, on right bank at downstream side of bridge on State Highway 606, 0.4 mi upstream from mouth of Jacobs Run, 1.9 mi downstream from mouth of Marsh Run, and 2.1 mi southeast of Advance Mills.

DRAINAGE AREA.--108 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1993 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 365 ft above sea level, from topographic map.

REMARKS.--Records good except those for periods of doubtful gage-height record, Oct. 15, 16, 19, 25, 26, 30, Nov. 13-20, 22-24, 29, 30, Dec. 3, 5, 6, Jul. 31 to Aug. 13, Sep. 12-15, and periods with ice effect, Jan. 1, 2, 6, which are fair. Maximum discharge, 30,100 ft<sup>3</sup>/s, from rating curve extended above 2,150 ft<sup>3</sup>/s on basis of slope-area measurement of peak flow. Several measurements of water temperature were made during the year.

COOPERATION.--Records were provided by the Virginia Department of Environmental Quality - Water Division.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in April 1992 reached a stage of 19.92 ft, from floodmark, by the Virginia Department of Highways.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Jan 24	1130	2,110	7.01	Sep 30	0400	*19,600	*20.13

Minimum discharge, 0.54 ft<sup>3</sup>/s, Aug 10.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	4.9	13	17	e21	74	81	98	46	19	9.5	e4.0	4.9
2	4.4	13	17	e20	145	69	102	45	17	10	e4.7	4.2
3	4.4	17	e16	355	130	87	89	43	16	15	e3.5	3.9
4	5.3	20	17	194	108	183	84	44	15	16	e2.6	4.1
5	6.0	17	e16	91	93	124	81	43	14	11	e2.1	52
6	6.8	15	e15	e70	85	110	75	44	13	8.6	e1.7	483
7	8.7	15	18	57	82	103	73	45	12	8.2	e1.3	426
8	98	15	23	52	79	90	70	113	12	12	e1.1	112
9	50	15	81	50	70	91	72	83	11	8.4	e1.2	212
10	24	16	50	74	66	94	73	61	9.8	6.7	e.93	192
11	17	23	35	59	61	91	75	52	9.4	6.2	e.85	64
12	14	25	28	48	59	93	75	46	10	6.3	e.70	e42
13	13	e18	44	56	57	87	66	43	10	8.1	e.69	e32
14	12	e17	52	76	53	111	62	73	11	8.6	14	e28
15	e10	e16	39	191	50	483	63	69	12	8.0	40	e25
16	e10	e16	33	157	50	311	70	54	9.8	6.9	7.9	151
17	11	e15	29	106	50	225	61	49	11	5.9	5.4	99
18	11	e15	26	154	148	238	57	45	12	8.5	4.1	53
19	e10	e15	24	156	149	214	55	42	11	22	4.7	36
20	11	e16	23	114	118	181	55	38	9.9	11	13	28
21	11	17	23	92	100	212	54	34	11	8.2	9.4	68
22	11	e16	23	81	87	244	56	42	12	16	6.4	119
23	10	e15	22	196	77	205	56	64	10	14	5.0	68
24	11	e15	25	1270	73	182	75	53	8.5	10	4.5	46
25	e11	17	24	540	69	158	62	42	8.1	11	5.3	32
26	e11	19	23	268	66	136	58	34	9.0	8.8	6.9	24
27	12	19	22	179	63	121	55	29	8.8	5.9	22	22
28	12	18	23	138	75	110	52	26	9.5	5.2	11	212
29	12	e16	24	110	---	101	51	24	10	6.6	8.3	1470
30	e11	e16	24	92	---	92	49	22	9.8	9.4	6.9	7080
31	13	---	22	79	---	85	---	20	---	e6.3	5.4	---
TOTAL	456.5	500	858	5146	2337	4712	2024	1468	341.6	298.3	205.57	11193.1
MEAN	14.7	16.7	27.7	166	83.5	152	67.5	47.4	11.4	9.62	6.63	373
MAX	98	25	81	1270	149	483	102	113	19	22	40	7080
MIN	4.4	13	15	20	50	69	49	20	8.1	5.2	.69	3.9
CFSM	.14	.15	.26	1.53	.77	1.41	.62	.44	.11	.09	.06	3.45
IN.	.16	.17	.30	1.77	.80	1.62	.70	.50	.12	.10	.07	3.85

02032640 NORTH FORK RIVANNA RIVER NEAR EARLYSVILLE, VA--Continued

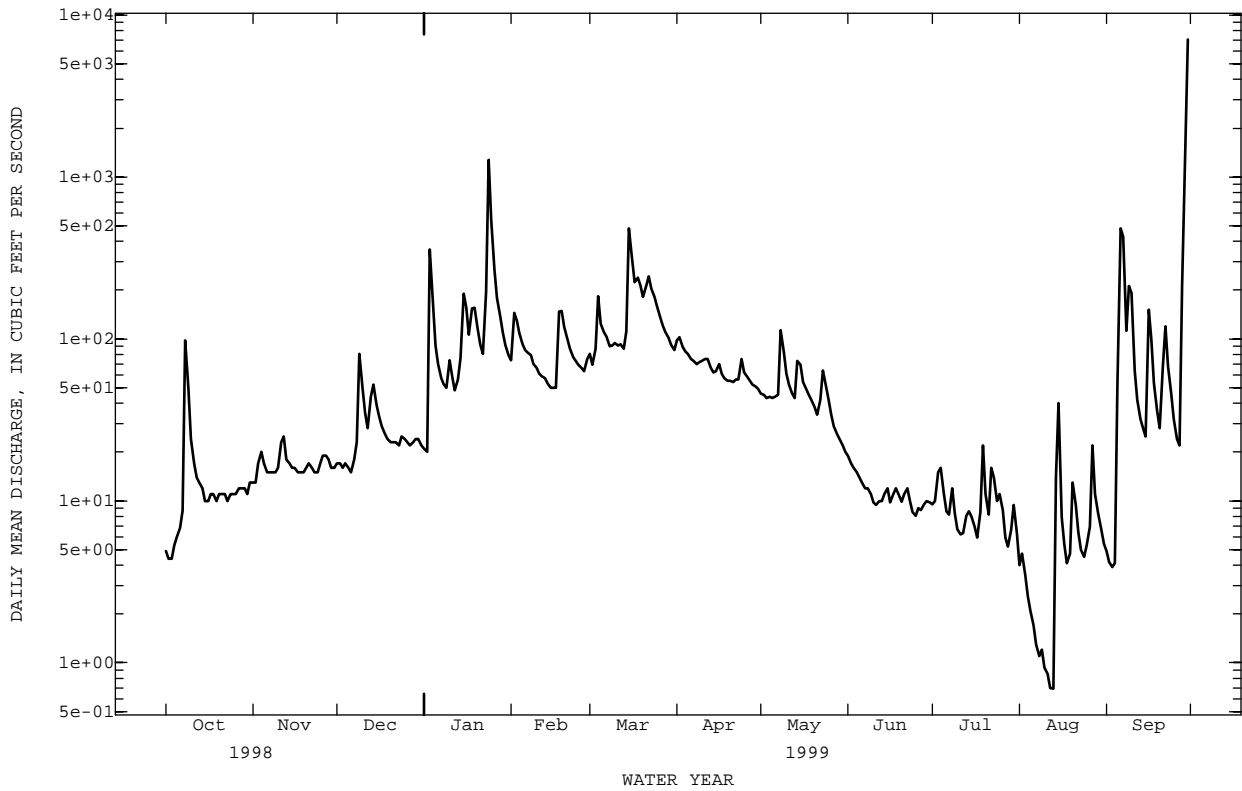
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1994 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	67.4	132	142	320	243	245	146	142	127	80.7	42.2	197
MAX	195	233	367	574	624	406	247	421	316	195	112	682
(WY)	1996	1998	1997	1996	1998	1994	1998	1998	1995	1995	1994	1996
MIN	14.7	16.7	27.7	143	80.1	127	60.1	47.4	11.4	9.62	6.63	7.80
(WY)	1999	1999	1999	1997	1995	1995	1995	1999	1999	1999	1999	1998

SUMMARY STATISTICS FOR 1998 CALENDAR YEAR FOR 1999 WATER YEAR WATER YEARS 1994 - 1999

ANNUAL TOTAL	70848.8	29540.07	
ANNUAL MEAN	194	80.9	156
HIGHEST ANNUAL MEAN			246
LOWEST ANNUAL MEAN			80.9
HIGHEST DAILY MEAN	4320	May 8	7080
LOWEST DAILY MEAN	3.7	Sep 7	.69
ANNUAL SEVEN-DAY MINIMUM	4.9	Sep 1	.97
INSTANTANEOUS PEAK FLOW			19600
INSTANTANEOUS PEAK STAGE			20.13
INSTANTANEOUS LOW FLOW			.54
ANNUAL RUNOFF (CFSM)	1.79	.75	1.45
ANNUAL RUNOFF (INCHES)	24.37	10.16	19.66
10 PERCENT EXCEEDS	435	132	304
50 PERCENT EXCEEDS	52	25	76
90 PERCENT EXCEEDS	8.9	6.5	14

a From floodmarks.  
e Estimated.



## JAMES RIVER BASIN

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 mi<sup>2</sup>.

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. WDR VA-72-1: 1969(M).

GAGE.--Water-stage recorder. Datum of gage is 210.39 ft above sea level. 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.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 6,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Sep 30	2200	*22,700	*23.31	No other peak greater than base discharge.			

Minimum discharge, 18 ft<sup>3</sup>/s, Aug 13.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	59	115	138	158	401	510	400	260	163	54	47	43
2	70	115	143	146	688	463	545	230	131	76	48	38
3	60	147	141	558	906	370	459	213	130	75	43	36
4	52	270	140	1430	651	794	429	214	136	62	36	36
5	53	197	138	592	522	682	384	200	128	74	32	402
6	65	122	137	375	487	527	378	245	122	58	30	790
7	74	123	139	343	454	529	355	229	115	50	28	1570
8	191	140	144	311	444	459	330	511	111	66	29	687
9	661	115	359	281	443	425	330	626	107	73	28	385
10	325	167	443	325	369	467	341	390	99	60	26	1030
11	299	118	280	332	360	482	376	256	88	53	25	595
12	183	181	212	323	337	473	388	249	80	49	23	314
13	142	181	265	325	365	402	354	255	81	46	19	191
14	124	172	376	342	326	474	309	380	79	55	21	190
15	115	136	314	629	312	3860	310	501	81	49	135	231
16	112	184	245	983	272	2690	331	354	81	46	155	676
17	110	105	210	603	256	1310	324	290	94	45	65	822
18	110	103	192	675	501	1020	311	265	93	47	44	453
19	109	130	173	999	785	947	276	264	94	76	36	332
20	137	133	165	642	626	809	284	255	92	49	100	229
21	103	142	159	501	540	822	290	230	88	60	108	205
22	101	143	155	430	481	1040	281	192	90	60	67	336
23	118	141	156	411	468	869	284	448	96	104	51	361
24	116	143	164	3000	384	754	355	416	90	74	45	260
25	106	138	189	2870	394	676	377	350	83	67	43	208
26	111	144	174	1270	370	599	260	289	74	64	76	162
27	112	174	157	899	368	534	304	257	66	49	114	168
28	114	152	155	677	390	513	274	213	61	44	78	269
29	116	146	181	628	---	474	255	160	64	45	80	980
30	119	138	186	485	---	432	278	191	60	67	60	15500
31	115	---	176	436	---	398	---	179	---	49	49	---
TOTAL	4282	4415	6206	21979	12900	24804	10172	9112	2877	1846	1741	27499
MEAN	138	147	200	709	461	800	339	294	95.9	59.5	56.2	917
MAX	661	270	443	3000	906	3860	545	626	163	104	155	15500
MIN	52	103	137	146	256	370	255	160	60	44	19	36
CFSM	.21	.22	.30	1.07	.69	1.21	.51	.44	.14	.09	.08	1.38
IN.	.24	.25	.35	1.23	.72	1.39	.57	.51	.16	.10	.10	1.54

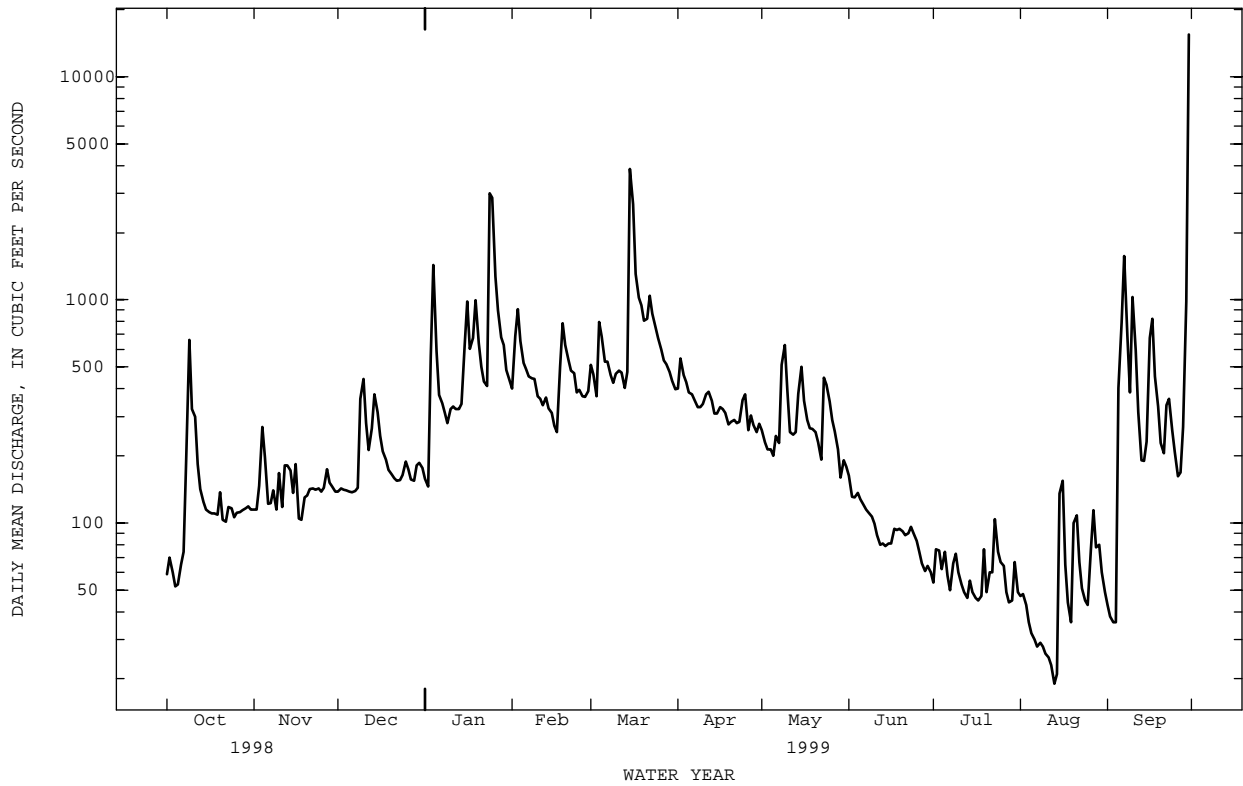
02034000 RIVANNA RIVER AT PALMYRA, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1935 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	557	587	760	951	1054	1209	1053	766	591	395	464	470
MAX	3535	3521	2667	2620	3468	3415	3662	2472	4473	1524	3404	2915
(WY)	1943	1986	1949	1936	1998	1993	1937	1989	1972	1975	1969	1979
MIN	46.4	79.8	88.9	104	302	225	214	212	95.9	39.0	20.2	19.1
(WY)	1942	1942	1966	1966	1954	1981	1981	1956	1999	1966	1966	1954

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR	WATER YEARS 1935 - 1999
ANNUAL TOTAL	405773	127833	
ANNUAL MEAN	1112	350	736
HIGHEST ANNUAL MEAN			1401
LOWEST ANNUAL MEAN			241
HIGHEST DAILY MEAN	19000	Feb 18	68000
LOWEST DAILY MEAN	43	Sep 6	5.2
ANNUAL SEVEN-DAY MINIMUM	57	Sep 1	5.6
INSTANTANEOUS PEAK FLOW			22700
INSTANTANEOUS PEAK STAGE			23.31
INSTANTANEOUS LOW FLOW			18
ANNUAL RUNOFF (CFSM)	1.67	.53	1.11
ANNUAL RUNOFF (INCHES)	22.73	7.16	15.07
10 PERCENT EXCEEDS	2450	634	1430
50 PERCENT EXCEEDS	451	192	422
90 PERCENT EXCEEDS	91	52	110

a Also Sep 10, 11, 1966.



## JAMES RIVER BASIN

02035000 JAMES RIVER AT CARTERSVILLE, VA

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 mi<sup>2</sup>.

## 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 sea level. Prior to Jun. 4, 1927, nonrecording gage at same site and datum.

REMARKS.--Records good except for Jun. to Sep., which are fair. Moderate diurnal fluctuation caused by powerplants upstream from station. National Weather Service gage-height telemeter at station. Maximum discharge, 362,000 ft<sup>3</sup>/s, from rating curve extended above 160,000 ft<sup>3</sup>/s on basis of slope-conveyance study. Minimum gage height, 0.02 ft, Sep. 13, 14, 1966.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 40,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Sep 30	2100	*81,100	*21.73	No other peak greater than base discharge.			

Minimum discharge, 667 ft<sup>3</sup>/s, Aug 13, gage height, 0.54 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1160	1220	1340	1580	4350	4150	5710	3130	2200	1260	e1200	e1700
2	1100	1340	1390	1600	4380	3910	5730	3310	2020	1110	e1000	e1200
3	1050	1270	1460	2180	7670	3590	6230	3140	1970	1320	e880	1470
4	1160	1510	1340	5260	7470	4110	e5600	3080	1950	1310	1280	1190
5	948	1790	1350	5410	7670	4720	e5100	2940	1860	1210	1010	2800
6	1050	1590	1340	3710	6990	4460	e4700	2900	1830	1260	903	8250
7	1070	1400	1430	3660	6020	5690	e4400	2880	1830	1170	941	14400
8	1230	1400	1350	3120	5200	5160	4490	2840	1800	1160	808	15400
9	2150	1360	1690	2730	4850	4930	3950	3520	1590	1160	794	10400
10	3210	1270	2300	2690	4220	5150	3690	3950	1490	1130	854	8740
11	2340	1510	2470	2700	4260	5000	3950	6090	1510	1170	769	7870
12	2300	1390	1960	2680	4030	4800	4000	4730	1470	1090	746	5660
13	1940	1510	2150	2700	3940	4520	4370	4020	1470	992	745	4370
14	1610	1520	2500	2910	3660	4330	3990	6430	1350	1020	790	3570
15	1730	1470	3050	2920	3420	13200	4090	8680	1570	1360	743	3570
16	1300	1490	2580	4870	3240	17400	4180	10000	1400	e1250	777	6710
17	1170	1460	2100	6660	3120	13200	4110	11200	1480	e1150	888	10900
18	1290	1350	2020	8660	3570	12800	3920	8550	1260	e1100	869	7550
19	1330	1320	1990	9450	5470	15500	3820	6540	1540	1420	781	5520
20	1170	1420	1820	7140	5650	17300	3610	5400	1540	1260	870	4080
21	1340	1310	1630	5560	6240	14500	3630	4470	1600	1180	929	3530
22	1240	1350	1640	5100	6050	12900	3500	4110	1810	1140	1130	3410
23	1200	1450	1270	4510	5280	12400	3460	5170	1500	1170	1240	3740
24	1220	1290	1580	9110	4610	12100	3310	4650	1230	1320	1340	3940
25	1130	1340	1610	21900	4110	11500	3510	3880	1100	e1220	1240	3110
26	1300	1330	1830	22800	4020	9900	3290	3130	1010	e1140	1240	2890
27	1070	1380	1680	14400	3600	8780	3120	3040	1250	1380	3240	2850
28	1210	1490	1580	9550	3640	7720	3230	2850	1240	1250	e2500	3050
29	1180	1360	1640	7300	---	6930	3190	2590	1250	1150	e1900	8140
30	1280	1430	1730	5920	---	6520	3250	2410	1190	1160	e1500	57000
31	1230	---	1670	4950	---	5960	---	2330	---	1270	e1400	---
TOTAL	43708	42320	55490	193730	136730	263130	123130	141960	46310	37282	35307	217010
MEAN	1410	1411	1790	6249	4883	8488	4104	4579	1544	1203	1139	7234
MAX	3210	1790	3050	22800	7670	17400	6230	11200	2200	1420	3240	57000
MIN	948	1220	1270	1580	3120	3590	3120	2330	1010	992	743	1190
CFSM	.23	.23	.29	1.00	.78	1.36	.66	.73	.25	.19	.18	1.16
IN.	.26	.25	.33	1.15	.81	1.56	.73	.84	.28	.22	.21	1.29

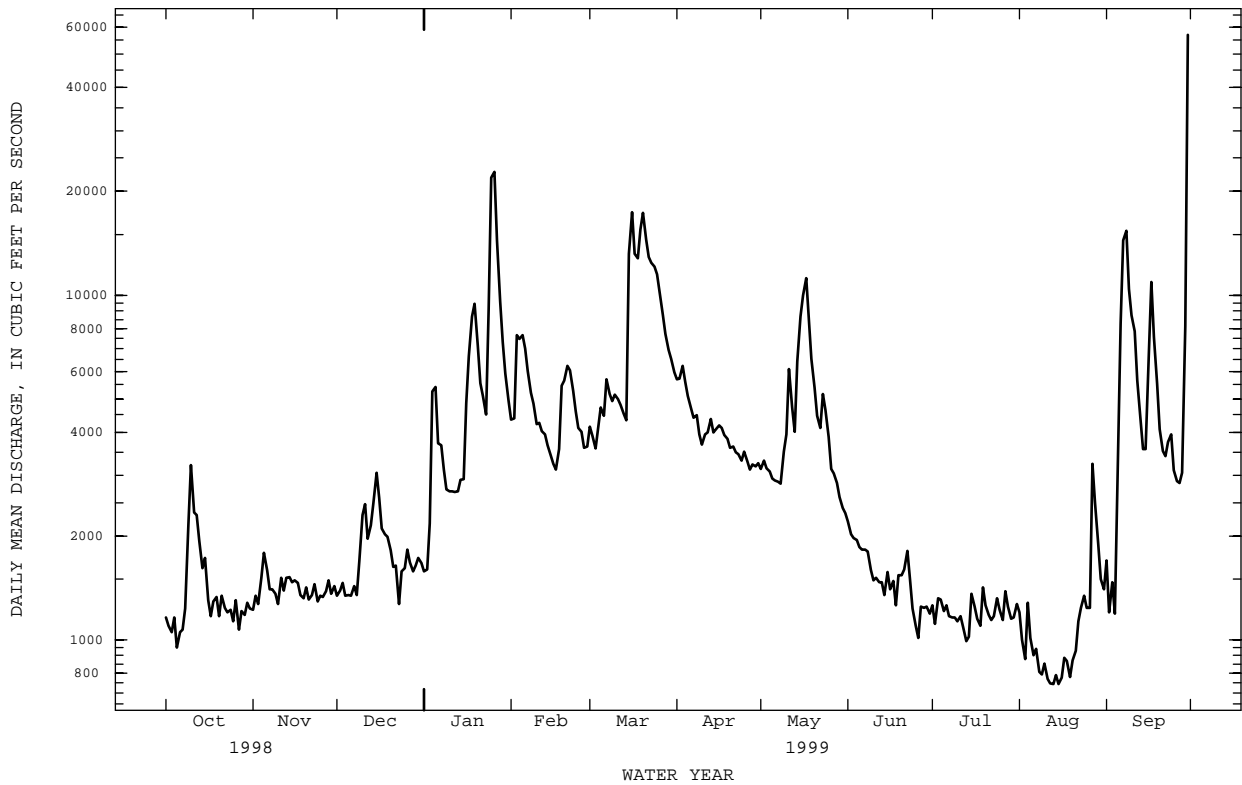
02035000 JAMES RIVER AT CARTERSVILLE, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1899 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	4220	4761	6986	9630	10920	13150	11070	7965	6052	3795	4006	3554
MAX	20830	28210	25990	26480	33750	31810	33500	23530	30330	15070	20490	18140
(WY)	1907	1986	1949	1936	1998	1993	1987	1989	1972	1919	1969	1996
MIN	528	924	1054	1353	2055	2646	3286	2710	1544	605	652	561
(WY)	1931	1931	1966	1956	1934	1981	1995	1930	1999	1966	1930	1930

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR	WATER YEARS 1899 - 1999
ANNUAL TOTAL	3782808	1336107	
ANNUAL MEAN	10360	3661	7156
HIGHEST ANNUAL MEAN			12410
LOWEST ANNUAL MEAN			2981
HIGHEST DAILY MEAN	78500	Mar 22	57000
LOWEST DAILY MEAN	948	Oct 5	743
ANNUAL SEVEN-DAY MINIMUM	1080	Oct 1	775
INSTANTANEOUS PEAK FLOW			81100
INSTANTANEOUS PEAK STAGE			21.73
INSTANTANEOUS LOW FLOW			b667
ANNUAL RUNOFF (CFSM)	1.66	.59	1.14
ANNUAL RUNOFF (INCHES)	22.49	7.94	15.54
10 PERCENT EXCEEDS	26600	7600	15000
50 PERCENT EXCEEDS	3740	2300	4470
90 PERCENT EXCEEDS	1300	1140	1440

- a From floodmarks.
- b May has been affected by regulation.
- c Also Sep 14, 1966.
- e Estimated.



## JAMES RIVER BASIN

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, October 1991 to September 1994.

WATER TEMPERATURE: April 1968 to January 1976, October 1980 to May 1981, October 1991 to September 1994.

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 1998 TO SEPTEMBER 1999

DATE	TIME	SAMPLE TYPE	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	AGENCY ANA- LYZING SAMPLE (CODE NUMBER) (00028)	TEMPER- ATURE AIR (DEG C) (00020)	TEMPER- ATURE WATER (DEG C) (00010)
OCT									
01...	1215	ENVIRONMENTAL	1210	336	7.8	745	VDCLS	29.0	26.0
20...	1359	ENVIRONMENTAL	1100	--	8.4	--	VDCLS	--	18.0
NOV									
05...	1030	ENVIRONMENTAL	1820	279	6.9	750	VDCLS	6.0	12.0
18...	1333	ENVIRONMENTAL	1480	197	7.7	--	VDCLS	--	11.0
DEC									
02...	1130	ENVIRONMENTAL	1380	326	6.9	756	VDCLS	15.0	9.3
15...	1414	ENVIRONMENTAL	3100	231	7.6	--	VDCLS	--	6.4
JAN									
04...	1000	ENVIRONMENTAL	4950	115	7.0	756	VDCLS	.5	1.0
08...	0900	ENVIRONMENTAL	3150	286	6.9	760	VDCLS	.0	-1.5
25...	1000	ENVIRONMENTAL	23400	91	6.8	754	VDCLS	8.0	9.8
26...	1000	ENVIRONMENTAL	24200	165	7.3	760	VDCLS	10.0	7.4
FEB									
11...	0915	ENVIRONMENTAL	4604	169	6.8	757	VDCLS	4.5	7.5
19...	1115	ENVIRONMENTAL	5475	149	6.7	747	VDCLS	11.0	8.7
MAR									
10...	1000	ENVIRONMENTAL	5160	230	6.4	747	VDCLS	.0	5.3
16...	0915	ENVIRONMENTAL	18700	101	7.1	752	VDCLS	8.0	5.4
16...	0930	REPLICATE	18700	101	7.1	752	VDCLS	8.0	5.4
17...	0900	ENVIRONMENTAL	12900	113	6.5	750	VDCLS	18.0	6.6
20...	0800	ENVIRONMENTAL	17800	146	7.3	759	VDCLS	10.0	9.2
APR									
07...	0915	ENVIRONMENTAL	4440	153	6.4	754	VDCLS	22.0	15.9
07...	0920	REPLICATE	4440	153	6.4	754	USGS	22.0	15.9
20...	1414	ENVIRONMENTAL	3720	199	8.2	--	VDCLS	--	16.2
MAY									
04...	1030	ENVIRONMENTAL	3150	228	6.7	749	VDCLS	22.0	18.2
11...	1000	ENVIRONMENTAL	6230	235	7.7	753	VDCLS	24.0	22.7
11...	1015	REPLICATE	6210	235	7.7	753	USGS	24.0	22.7
15...	0915	ENVIRONMENTAL	9150	142	7.0	757	VDCLS	15.0	18.6
17...	0900	ENVIRONMENTAL	11700	141	7.1	755	VDCLS	17.5	19.7
JUN									
11...	1000	ENVIRONMENTAL	1540	214	6.4	757	VDCLS	24.0	27.2
JUL									
06...	1100	ENVIRONMENTAL	1300	327	7.8	749	VDCLS	34.5	32.4
AUG									
03...	1045	ENVIRONMENTAL	803	350	8.2	752	VDCLS	28.0	29.4
28...	0800	ENVIRONMENTAL	2950	302	7.8	749	VDCLS	22.0	26.8
SEP									
06...	1015	ENVIRONMENTAL	7680	206	7.4	747	VDCLS	22.0	22.4
07...	0930	ENVIRONMENTAL	12100	266	6.1	746	VDCLS	24.5	23.5
10...	0845	ENVIRONMENTAL	8060	200	6.5	744	VDCLS	21	25.3
17...	0845	ENVIRONMENTAL	11600	92	6.6	752	VDCLS	16.5	19.6
30...	0830	ENVIRONMENTAL	53700	132	7.0	749	VDCLS	18.5	19.7
30...	0845	REPLICATE	55000	132	7.0	749	VDCLS	18.5	19.7



02035000 JAMES RIVER AT CARTERSVILLE, VA--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DATE	TUR- BID- ITY (NTU) (00076)	OXYGEN, DIS- SOLVED (MG/L) (00300)	SILICA, DIS- SOLVED AS SIO2 (MG/L) (00955)	RESIDUE TOTAL AT 105 DEG. C, SUS- PENDED (MG/L) (00530)	RESIDUE FIXED NON FILTER- ABLE (MG/L) (00540)	RESIDUE VOLA- TILE, SUS- PENDED (MG/L) (00535)	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)
OCT										
01...	<1	8.1	2.8	<3	<3	<3	.015	<.002	.015	.005
20...	2	9.5	4.5	<3	<3	<3	.030	<.002	.030	.015
NOV										
05...	1	10.5	4.4	<3	<3	<3	.147	<.002	.147	.005
18...	1	10.0	7.0	<3	<3	<3	.008	<.002	.008	.011
DEC										
02...	2	10.4	3.7	<3	<3	<3	.018	<.002	.018	<.004
15...	5	12.8	11.2	3	<3	<3	.050	<.002	.050	.012
JAN										
04...	28	12.7	9.8	28	22	6	.507	.005	.512	.026
08...	6	15.5	7.2	6	3	3	.239	.004	.243	.004
25...	79	10.9	8.1	226	194	32	.363	.003	.366	.027
26...	123	10.8	7.4	208	172	36	.438	.005	.443	--
FEB										
11...	--	11.2	6.4	5	4	<3	.269	.005	.274	<.004
19...	16	11.9	5.8	12	9	<3	.185	.005	.190	.033
MAR										
10...	4	12.3	2.4	3	<3	<3	.052	<.002	.052	<.004
16...	64	13.9	6.4	86	71	15	.209	<.002	.209	.024
16...	68	13.9	6.5	83	68	15	.214	<.002	.214	.030
17...	37	10.2	7.0	39	32	7	.238	.002	.240	.011
20...	41	10.5	6.3	71	59	12	.270	.002	.272	.004
APR										
07...	3	10.0	3.4	6	4	<3	.102	<.002	.102	.013
07...	--	10.0	3.3	4	.0	8	--	--	.083	.004
20...	2	10.2	2.1	3	3	<3	.049	<.002	.049	.004
MAY										
04...	5	9.5	2.8	3	<3	<3	.039	<.002	.039	.007
11...	13	6.6	4.2	30	24	6	.212	.005	.217	.012
11...	--	6.6	3.7	27	19	8	--	--	.16	.061
15...	54	7.2	6.9	80	60	20	.273	.006	.279	.053
17...	38	7.4	7.9	64	51	13	.317	.016	.333	.082
JUN										
11...	3	6.8	5.5	<3	<3	<3	.018	<.002	.018	<.004
JUL										
06...	2	6.8	7.9	<3	<3	<3	.052	<.002	.052	.018
AUG										
03...	<1.0	7.6	8.5	<3	<3	<3	.021	<.002	.021	<.004
28...	12	7.0	6.1	7	4	3	.084	.002	.086	.022
SEP										
06...	22	6.5	7.2	24	17	7	.161	.002	.163	.033
07...	19	6.3	<.1	29	20	9	<.004	<.002	<.004	<.004
10...	7	6.9	6.5	9	6	3	.305	.005	.310	.028
17...	45	7.4	10.1	46	38	8	.253	.002	.255	.022
30...	251	6.2	7.7	316	264	52	.288	.003	.291	.055
30...	214	6.2	7.9	155	120	35	.286	.003	.289	.059

< 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 1998 TO SEPTEMBER 1999

DATE	NITRO- GEN, AM- MONIA + ORGANIC TOTAL AS N) (00625)	NITRO- GEN, AM- MONIA + ORGANIC DIS. AS N) (00623)	NITROGEN TOTAL SEDIMNT SUSP AS N (00601)	NITRO- GEN DIS- SOLVED AS N) (00602)	PHOS- PHORUS TOTAL AS P) (00665)	PHOS TOTAL SEDIMNT SUSP AS P (00667)	PHOS- PHORUS DIS- SOLVED AS P) (00666)	PHOS- PHORUS ORTHO, DIS- SOLVED AS P) (00671)	CARBON, INORG + ORGANIC TOTAL AS C) (00694)
OCT									
01...	--	--	.011	.748	--	.006	.053	.044	.136
20...	--	--	.023	.234	--	.005	.038	.027	.247
NOV									
05...	--	--	.026	.317	--	.009	.051	.042	.122
18...	--	--	.034	.276	--	.008	.044	.036	.228
DEC									
02...	--	--	.009	.177	--	.006	.090	.085	.138
15...	--	--	.047	.327	--	.008	.034	.022	.439
JAN									
04...	--	--	.228	.786	--	.062	.046	.043	1.82
08...	--	--	.055	.455	--	.021	.026	--	.536
25...	--	--	.780	.669	--	.230	.062	.015	7.85
26...	--	--	1.20	.671	--	.288	.031	.017	10.9
FEB									
11...	--	--	.025	.408	--	.012	.022	.012	.296
19...	--	--	.059	.374	--	.026	.049	.006	.625
MAR									
10...	--	--	.031	.186	--	.012	.013	.008	.318
16...	--	--	.333	.435	--	.084	.022	.013	2.96
16...	--	--	.32	.442	--	.081	.02	.014	2.74
17...	--	--	.161	.402	--	.046	.019	.008	1.39
20...	--	--	.411	.416	--	.109	.024	.013	3.30
APR									
07...	--	--	.023	.318	--	.010	.028	.025	.288
07...	.2	.2	--	.23	E.05	--	E.03	.018	--
20...	--	--	.035	.322	--	.0089	.069	.057	.307
MAY									
04...	--	--	.022	.240	--	.013	.035	.023	.272
11...	--	--	.185	.693	--	.052	.046	.027	1.76
11...	.5	.3	--	.46	.10	--	.06	.032	--
15...	--	--	.241	.616	--	.080	.039	.025	2.70
17...	--	--	.345	.640	--	.089	.052	.043	3.40
JUN									
11...	--	--	.014	.306	--	.010	.060	.038	.173
JUL									
06...	--	--	.025	.374	--	.011	.081	.063	.261
AUG									
03...	--	--	.031	.361	--	.011	.081	.071	.216
28...	--	--	.012	.417	--	.012	.084	.070	.202
SEP									
06...	--	--	.070	.523	--	.018	.053	.040	.518
07...	--	--	<.050	.028	--	.002	.007	.003	<.050
10...	--	--	.061	.544	--	.017	.047	.035	.569
17...	--	--	.162	1.52	--	.063	.044	.030	1.69
30...	--	--	1.72	.673	--	.535	.031	.011	17.8
30...	--	--	1.89	.633	--	.508	.027	.011	20.1

&lt; Actual value is known to be less than the value shown.

E Estimated.

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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 mi<sup>2</sup>.

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 sea level. 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 doubtful or no gage-height record, Oct. 1, 17-21, 30, Jan. 31 to Feb. 1, Jul. 28 to Aug. 1, Aug. 30 to Sep. 1, and periods with ice effect, Dec. 25-28, Dec. 30 to Jan. 1, and Jan. 7-10, which are fair. Maximum discharge, 4,180 ft<sup>3</sup>/s, from rating curve extended above 2,600 ft<sup>3</sup>/s. Minimum gage height, 1.53 ft, Sept. 30, Oct. 1, 1970. 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 Department of Environmental Quality - Water Division.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 200 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Sep 17	0445	*372	*3.35	No other peak greater than base discharge.			

Minimum discharge, 0.24 ft<sup>3</sup>/s, Aug 19.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e5.0	1.1	1.9	e7.5	e9.6	27	16	5.9	1.9	1.2	e.80	e.46
2	1.7	1.1	1.8	8.1	15	20	23	7.9	1.6	1.5	1.1	.59
3	.89	3.2	1.8	31	15	17	21	7.1	1.4	1.2	.56	.60
4	.70	3.9	2.0	29	12	23	17	5.6	1.6	.95	.45	1.2
5	.64	3.0	2.1	15	10	20	15	4.8	1.6	.77	.44	17
6	.66	2.3	2.2	8.2	9.1	17	12	4.9	1.5	.60	.49	12
7	.84	2.0	1.8	e7.6	8.7	18	12	4.7	1.4	.60	.48	12
8	1.5	1.7	2.1	e7.0	8.5	13	11	4.3	.77	.61	.60	10
9	2.0	1.7	17	e6.4	8.2	11	13	3.6	.72	.61	.75	7.0
10	1.5	2.2	9.9	e6.0	8.0	13	19	3.2	.73	.67	.58	4.6
11	.96	3.2	6.1	5.5	7.4	13	20	2.8	.75	.80	.59	2.5
12	.70	2.7	4.2	5.2	8.1	12	19	2.4	.82	1.0	.35	1.6
13	.64	2.3	34	5.1	11	10	15	2.3	1.2	.94	.41	1.1
14	.65	2.2	27	4.8	10	17	12	28	1.2	1.5	.49	.79
15	.61	2.2	14	9.5	9.4	74	11	32	1.1	1.4	.71	7.2
16	.64	2.1	8.2	9.8	8.3	79	15	17	1.2	.83	.64	161
17	e.70	2.5	5.5	7.8	7.9	45	13	10	1.5	.60	.53	268
18	e.66	2.6	3.8	17	18	30	11	7.7	1.8	.96	.48	75
19	e.64	2.5	2.9	19	21	22	11	6.1	1.5	.70	1.0	31
20	e.62	2.5	2.5	14	16	18	11	5.0	1.5	.39	5.0	17
21	e.65	3.6	2.6	9.8	13	25	8.9	4.1	1.8	.33	.53	12
22	.69	2.7	3.1	7.5	11	40	8.2	3.8	1.1	e.36	.44	13
23	.71	2.5	3.2	7.4	8.9	34	8.1	14	.97	.47	.55	9.6
24	.83	3.5	7.9	60	8.7	25	9.4	11	.73	.84	.86	7.4
25	.69	4.2	e7.3	102	8.9	21	7.7	9.2	.61	1.2	1.1	5.8
26	.64	4.5	e6.8	44	9.3	18	6.5	6.9	.82	.91	1.5	4.4
27	.71	3.5	e6.4	23	8.4	16	5.5	5.3	1.2	.57	.86	3.6
28	.97	2.9	e7.6	16	16	15	5.3	4.1	1.3	e.53	.68	18
29	.96	2.5	13	13	---	14	5.9	3.7	1.2	e.50	.61	31
30	e.92	2.1	e10	10	---	13	6.1	3.1	1.1	e.54	e.57	38
31	.97	---	e8.5	e9.8	---	12	---	2.2	---	e.64	e.50	---
TOTAL	30.99	79.0	227.2	526.0	305.4	732	368.6	232.7	36.62	24.72	24.65	773.44
MEAN	1.00	2.63	7.33	17.0	10.9	23.6	12.3	7.51	1.22	.80	.80	25.8
MAX	5.0	4.5	34	102	21	79	23	32	1.9	1.5	5.0	268
MIN	.61	1.1	1.8	4.8	7.4	10	5.3	2.2	.61	.33	.35	.46
CFSM	.05	.12	.33	.77	.49	1.07	.56	.34	.06	.04	.04	1.17
IN.	.05	.13	.38	.89	.51	1.23	.62	.39	.06	.04	.04	1.30

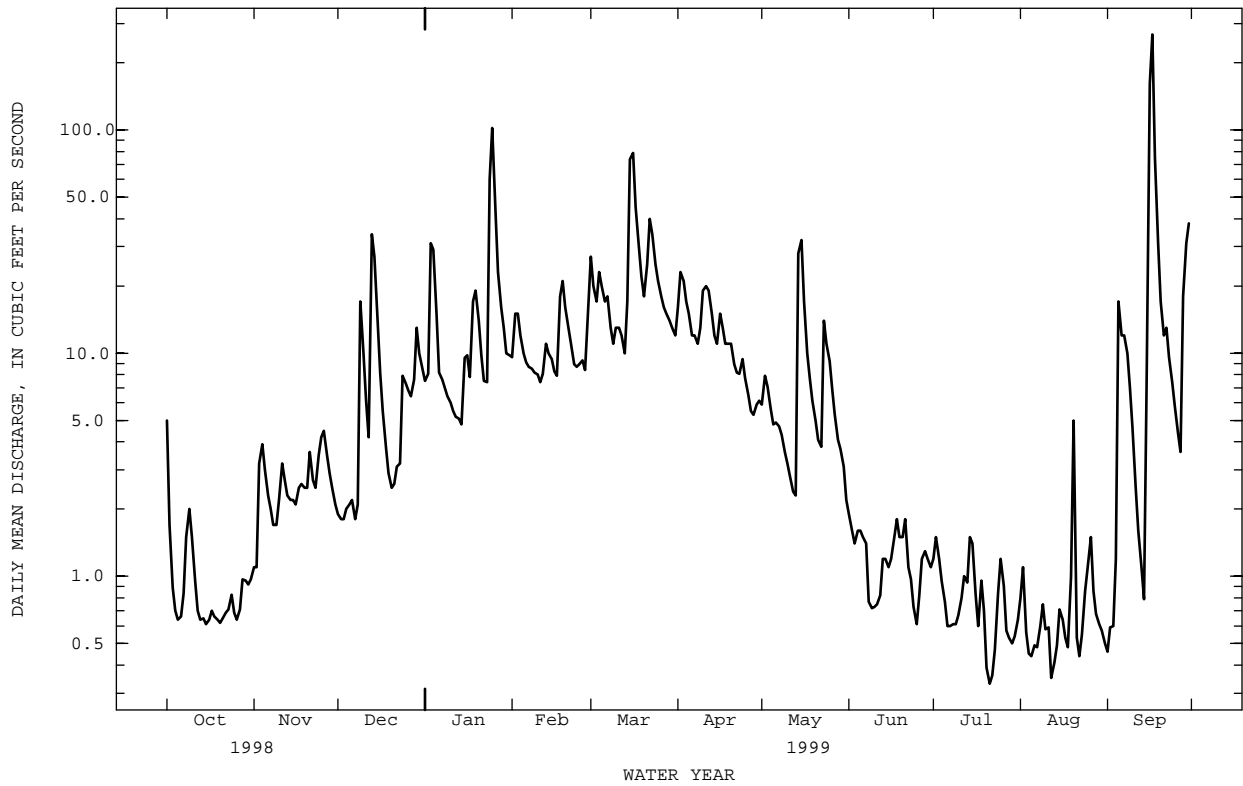
02036500 FINE CREEK AT FINE CREEK MILLS, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1945 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	14.4	17.3	21.7	27.5	31.5	35.1	29.2	20.5	11.6	8.01	11.2	8.85
MAX	119	104	53.9	92.5	92.7	99.1	84.1	54.1	60.8	25.7	83.3	46.1
(WY)	1973	1986	1949	1978	1979	1994	1983	1978	1972	a1949	1955	1996
MIN	.47	2.63	5.60	6.38	8.76	11.4	7.63	3.21	1.22	.80	.74	.31
(WY)	1969	1999	1966	1955	1991	1985	1985	1991	1999	1999	1977	1968

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR		FOR 1999 WATER YEAR		WATER YEARS 1945 - 1999	
ANNUAL TOTAL	9619.90		3361.32			
ANNUAL MEAN	26.4		9.21		19.7	
HIGHEST ANNUAL MEAN					40.7	
LOWEST ANNUAL MEAN					8.79	
HIGHEST DAILY MEAN	447	Mar 19	268	Sep 17	1880	Oct 21
LOWEST DAILY MEAN	e.32	Sep 16	.33	Jul 21	.08	Oct 1
ANNUAL SEVEN-DAY MINIMUM	e.45	Sep 12	.52	Aug 12	.10	Sep 25
INSTANTANEOUS PEAK FLOW			372		4180	
INSTANTANEOUS PEAK STAGE			3.35		9.02	
INSTANTANEOUS LOW FLOW			.24		.08	
ANNUAL RUNOFF (CFSM)	1.19		.42		.89	
ANNUAL RUNOFF (INCHES)	16.19		5.66		12.10	
10 PERCENT EXCEEDS	55		19		38	
50 PERCENT EXCEEDS	7.6		4.1		11	
90 PERCENT EXCEEDS	.72		.61		2.2	

a Also 1975.  
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 sea level. Prior to Oct. 1, 1938, at datum 3.06 ft higher.

REMARKS.--Records good except those for period of no gage-height record, Sep. 13, 14, 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. Beginning with the 1969 water year, the descriptive statement that above 2,540 ft<sup>3</sup>/s, gage height, 14.5 ft, there is interchange of flow with the James River and that discharge above 2,540 ft<sup>3</sup>/s is included in discharge for the James River near Richmond (station 02037500) has been used. Daily discharges in excess of 2,540 ft<sup>3</sup>/s for water years 1937-68 should be used with caution until historical records of canal construction and modifications can be reviewed. Figures given show flow in canal only. Probably no flow at times when head gates were closed. 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 Department of Environmental Quality - Water Division.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 727 ft<sup>3</sup>/s, Sep 16, maximum gage height, 8.49 ft, Sep 16; minimum discharge, 4.8 ft<sup>3</sup>/s, Apr 9, result of head gates being opened.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	135	150	10	7.2	7.7	246	5.4	196	144	267	266	155
2	135	151	10	7.2	7.7	248	5.5	194	143	267	265	156
3	135	155	10	24	7.6	247	5.3	194	143	264	261	154
4	137	153	10	21	55	248	5.2	192	143	268	249	157
5	139	155	10	12	260	200	5.2	192	142	266	224	201
6	138	157	10	8.9	262	72	5.1	191	141	264	217	192
7	139	159	10	8.4	259	26	5.2	184	142	264	219	179
8	141	158	10	8.3	252	8.7	5.1	171	141	263	219	154
9	142	159	12	8.2	248	5.5	5.1	169	135	263	219	150
10	148	159	10	7.9	244	5.3	6.0	170	126	264	217	147
11	151	161	10	7.7	240	5.2	5.4	176	126	264	217	145
12	147	163	10	7.7	242	5.1	5.3	180	126	266	217	142
13	150	164	36	7.6	241	5.0	5.4	176	125	265	216	e140
14	150	165	31	7.6	240	6.4	32	190	126	266	217	e136
15	148	165	14	11	237	55	196	197	125	268	220	141
16	149	165	7.4	8.8	234	51	203	194	126	272	218	414
17	146	124	7.0	8.2	234	30	200	204	174	267	217	129
18	145	26	7.0	8.6	238	15	198	197	273	265	220	115
19	147	12	7.0	8.5	248	8.1	197	187	268	265	221	124
20	147	12	6.9	8.2	260	6.4	197	180	277	269	247	158
21	147	12	6.8	8.0	261	7.4	198	175	275	264	206	192
22	149	12	6.8	7.8	264	12	198	174	279	265	182	197
23	149	12	7.0	7.7	258	9.5	197	192	279	264	184	175
24	148	11	8.7	39	254	7.1	200	183	272	266	198	160
25	146	11	7.9	70	248	6.2	198	177	266	268	196	159
26	145	11	7.5	52	246	5.8	198	172	264	265	161	157
27	149	11	7.4	36	245	5.6	197	170	263	265	157	157
28	147	11	7.4	22	245	5.6	196	164	267	269	161	185
29	147	10	7.4	14	---	5.5	197	150	275	265	159	153
30	149	10	7.2	9.6	---	5.3	197	147	275	265	157	175
31	150	---	7.2	8.1	---	5.2	---	145	---	264	156	---
TOTAL	4495	2824	319.6	471.2	6038.0	1568.9	3268.2	5583	5861	8237	6483	4999
MEAN	145	94.1	10.3	15.2	216	50.6	109	180	195	266	209	167
MAX	151	165	36	70	264	248	203	204	279	272	266	414
MIN	135	10	6.8	7.2	7.6	5.0	5.1	145	125	263	156	115

02037000 JAMES RIVER AND KANAWHA CANAL NEAR RICHMOND, VA--Continued

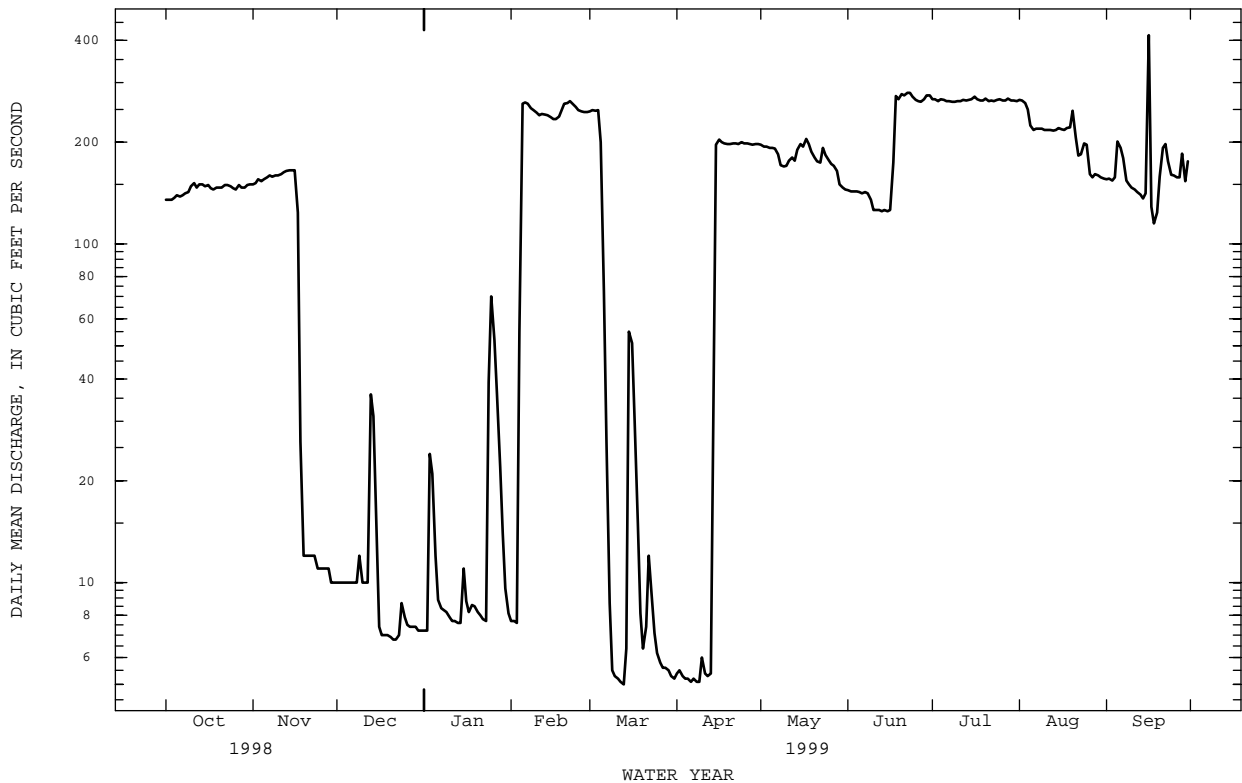
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1937 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	585	614	636	657	672	660	676	655	662	599	584	565
MAX	1078	1014	1220	1145	1086	1094	1108	1086	1061	956	1108	937
(WY)	1949	1948	1949	1949	1979	1951	1951	1952	1951	1940	1940	1949
MIN	.60	.60	.60	.60	.60	.60	.60	.60	.60	.60	.60	.60
(WY)	a1981	a1980	a1980	a1980	a1980	a1980	a1980	a1980	a1980	a1980	a1980	a1980

SUMMARY STATISTICS FOR 1998 CALENDAR YEAR FOR 1999 WATER YEAR WATER YEARS 1937 - 1999

ANNUAL TOTAL	22289.8	50147.9	
ANNUAL MEAN	61.1	137	630
HIGHEST ANNUAL MEAN			1023
LOWEST ANNUAL MEAN			1.48
HIGHEST DAILY MEAN	165	Nov 14	414
LOWEST DAILY MEAN	c2.3	Jun 14	c5.0
ANNUAL SEVEN-DAY MINIMUM	c2.6	Jun 2	c5.2
INSTANTANEOUS PEAK FLOW			727
INSTANTANEOUS PEAK STAGE			8.49
INSTANTANEOUS LOW FLOW			4.8
10 PERCENT EXCEEDS	148		264
50 PERCENT EXCEEDS	21		153
90 PERCENT EXCEEDS	7.2		7.2

- a Estimated, leakage through head gates; also 1983.
- b See REMARKS.
- c Result of headgates being closed.
- d Probably no flow at times when headgates were closed prior to 1958.
- e Estimated.
- f Many days in 1937-38, 1949-50, 1952, 1954-55, and 1957.
- g Interchange of flow with James River makes maximum discharge indeterminate.
- h From floodmarks.



JAMES RIVER BASIN

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 mi<sup>2</sup>.

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 sea level.

REMARKS.--Records good except those for periods of doubtful or no gage-height record, Oct. 7, Nov. 18, 19, Mar. 4, Jun. 14, and Aug. 6, which are fair. City of Richmond takes from 40 ft<sup>3</sup>/s to 90 ft<sup>3</sup>/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. Maximum discharge, 313,000 ft<sup>3</sup>/s, includes canal flow. Minimum daily discharge of James River and James River and Kanawha Canal combined, 214 ft<sup>3</sup>/s, Oct. 5, 1941, caused by recharging of the pool above Boshier Dam after the canal gates were closed. 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 Department of Environmental Quality - Water Division.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 61,600 ft<sup>3</sup>/s, Sep 30, gage height, 14.21 ft stage rising, peak occurred Oct 1, 1999, peak discharges greater than base discharge of 50,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Jan 25	1630	*24,900	*9.46	No peak greater than base discharge.			

Minimum discharge, 314 ft<sup>3</sup>/s, Aug 14, gage height, 3.02 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	990	1140	1460	1890	4830	3920	5430	3300	2220	1020	921	864
2	998	1140	1390	1780	4580	4260	5550	3190	1930	1060	889	944
3	921	1290	1420	2270	5420	3940	6270	3280	1760	855	632	742
4	861	1250	1450	3630	8020	e3910	6020	3100	1770	1150	570	767
5	891	1440	1390	6350	7100	4800	5640	3050	1750	1080	890	1310
6	883	1640	1390	5030	7370	4800	4990	2940	1620	952	e680	2700
7	e926	1500	1410	3760	6450	5110	4790	2900	1710	979	632	7100
8	976	1330	1440	3760	5600	5730	4750	2840	1700	883	602	12500
9	1140	1360	1570	3230	5060	5070	4620	2860	1640	856	571	9670
10	2020	1300	1920	2940	4600	5100	4390	3420	1320	878	422	6490
11	2650	1260	2370	2920	4150	5320	4280	4920	1330	873	469	6200
12	2040	1440	2530	2860	4180	5020	4490	5230	1350	958	476	4680
13	1940	1380	2470	2910	4000	4840	4570	4200	1280	861	388	3290
14	1690	1450	2800	2900	3890	4640	4570	4390	e1250	822	345	2570
15	1440	1460	2900	3260	3590	8460	4130	8410	1230	904	522	2220
16	1510	1490	3180	3650	3340	20000	4310	8360	1370	1170	417	6740
17	1200	1480	2780	5320	3240	14500	4300	11000	1250	1060	352	12400
18	1090	e1450	2300	6500	3270	13200	4200	9490	1270	876	485	8200
19	1170	e1370	2170	9320	4500	13500	4070	7280	1020	853	480	4940
20	1210	1350	2140	9140	5870	16800	3960	5790	1400	1130	710	3320
21	1090	1450	2000	6790	5800	14700	3750	4950	1380	834	797	2440
22	1210	1360	1800	5780	6080	13700	3780	4290	1510	846	662	2240
23	1140	1390	1760	5250	5610	12800	3680	4400	1600	842	764	2130
24	1120	1450	1570	6120	4970	12300	3610	5160	1280	926	834	2310
25	1140	1350	1780	20500	4250	11500	3490	4430	971	1070	835	2240
26	1070	1380	1820	23000	4040	10300	3530	3650	844	934	774	1850
27	1190	1400	1990	17900	3810	8970	3330	3120	806	874	840	1750
28	1040	1400	1900	11800	3650	7870	3220	3010	1060	1050	1980	2030
29	1120	1490	1830	8490	---	6930	3260	2780	1040	889	1510	2980
30	1100	1440	1850	6900	---	6400	3270	2470	1140	863	1130	26000
31	1180	---	1930	5680	---	5860	---	2320	---	846	933	---
TOTAL	38946	41630	60710	201630	137270	264250	130250	140530	41801	29194	22512	143617
MEAN	1256	1388	1958	6504	4902	8524	4342	4533	1393	942	726	4787
MAX	2650	1640	3180	23000	8020	20000	6270	11000	2220	1170	1980	26000
MIN	861	1140	1390	1780	3240	3910	3220	2320	806	822	345	742
CFSM	.19	.21	.29	.96	.73	1.26	.64	.67	.21	.14	.11	.71
IN.	.21	.23	.33	1.11	.76	1.45	.72	.77	.23	.16	.12	.79



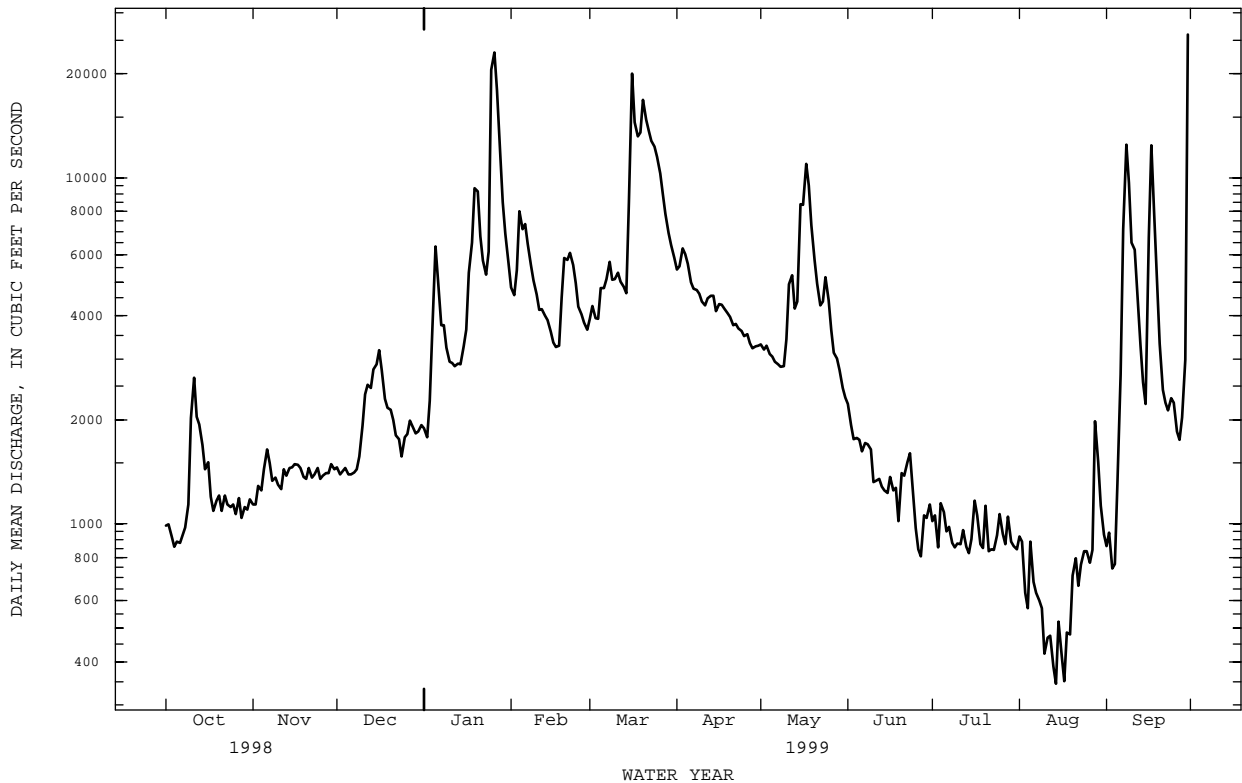
02037500 JAMES RIVER NEAR RICHMOND, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1937 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	4002	4687	6784	9281	10940	12950	10900	7795	5557	3183	3643	3223
MAX	19090	30480	26480	25300	34960	32740	35900	24280	30910	11300	21710	18390
(WY)	1938	1986	1949	1937	1998	1993	1987	1989	1972	1972	1969	1996
MIN	177	338	450	837	3243	2988	2766	2137	904	76.1	149	125
(WY)	1942	1942	1966	1966	1959	1981	1966	1941	1964	1966	1966	1963

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR	WATER YEARS 1937 - 1999
ANNUAL TOTAL	3959409	1252340	
ANNUAL MEAN	10850	3431	6890
HIGHEST ANNUAL MEAN			13540 1973
LOWEST ANNUAL MEAN			2666 1981
HIGHEST DAILY MEAN	84100	Mar 22	a26000 Sep 30 b296000 Jun 23 1972
LOWEST DAILY MEAN	861	Oct 4	345 Aug 14 c10 dSep 8 1966
ANNUAL SEVEN-DAY MINIMUM	922	Oct 2	424 Aug 11 c10 fSep 8 1966
INSTANTANEOUS PEAK FLOW			24900 Jan 25 b313000 Jun 23 1972
INSTANTANEOUS PEAK STAGE			9.46 Jan 25 28.62 Jun 23 1972
INSTANTANEOUS LOW FLOW			314 Aug 14 (g) (h)
ANNUAL RUNOFF (CFSM)	1.61	.51	1.02
ANNUAL RUNOFF (INCHES)	21.79	6.89	13.85
10 PERCENT EXCEEDS	27700	6910	15000
50 PERCENT EXCEEDS	4100	2130	4120
90 PERCENT EXCEEDS	1160	859	944

- a Stage rising, peak occurred Oct 1, 1999.
- b Includes canal flow.
- c Result of diversion by Boshier Dam construction.
- d Also Sep 9-15, 1966, Sep 30, Oct 5, 6, 1968, and Oct 8-10, 1970.
- e Estimated.
- f Also Sep 9, 1966.
- g Not determined.
- h Probably occurred Sep 8-15, 1966.



02038850 HOLIDAY CREEK NEAR ANDERSONVILLE, VA

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 mi<sup>2</sup>.

PERIOD OF RECORD.--April 1966 to current year.

REVISED RECORDS.--WDR VA-72-1: 1967-71(M), 1966-69(P), 1971(P). WDR VA-98-1: 1997.

GAGE.--Water-stage recorder. Datum of gage is 472.97 ft above sea level.

REMARKS.--No estimated daily discharges. Records good. Maximum discharge, 9,640 ft<sup>3</sup>/s, from rating curve extended above 4,200 ft<sup>3</sup>/s on basis of slope-area measurement of peak flow. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 150 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Jan 24	1045	*218	*2.87	No other peak greater than base discharge.			

Minimum discharge, 0.32 ft<sup>3</sup>/s, Aug 19-20, gage height, 0.66 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.0	3.3	2.9	3.3	5.3	6.1	15	4.9	3.4	2.7	2.1	.45
2	.99	3.3	2.6	3.1	13	5.0	12	4.7	3.3	3.3	4.4	.41
3	.92	4.9	2.7	23	8.4	4.9	8.3	4.7	3.4	2.6	1.8	.39
4	.86	3.4	2.7	11	6.5	5.7	7.6	4.7	3.2	2.0	1.3	.59
5	.82	2.7	2.6	11	5.5	4.8	6.9	4.5	3.2	1.7	1.1	17
6	.82	2.9	2.6	7.4	5.0	4.9	6.6	4.6	3.1	1.3	.88	9.0
7	.79	2.8	2.5	3.2	4.9	4.7	6.4	4.5	3.0	1.2	.73	5.7
8	2.0	2.7	3.2	3.3	4.8	4.4	6.4	4.2	2.9	1.5	.65	3.6
9	3.4	2.7	11	4.4	4.4	4.8	6.5	4.1	2.8	1.2	.67	3.1
10	2.4	2.8	4.1	4.7	4.2	5.2	6.2	3.9	2.7	.99	.50	4.9
11	2.2	3.6	2.8	3.2	4.1	5.5	9.1	3.9	2.9	.94	.48	3.1
12	2.1	3.3	2.8	2.9	4.4	4.9	7.7	3.9	2.9	2.6	.46	2.6
13	2.1	2.9	14	2.9	4.6	4.6	6.8	8.2	3.0	4.1	.43	2.1
14	2.2	3.0	6.1	2.7	4.1	13	6.2	41	3.1	4.1	.43	2.1
15	2.1	3.1	2.8	13	3.9	43	6.4	16	2.8	3.3	.42	5.3
16	2.1	3.0	3.0	8.4	3.9	20	6.7	7.4	2.9	2.6	.41	49
17	2.1	3.1	3.4	4.9	4.4	12	6.0	5.9	3.4	2.0	.39	10
18	2.2	3.0	3.2	31	16	8.6	5.9	5.2	3.1	1.9	.37	5.2
19	2.2	2.9	3.1	16	9.8	6.9	5.8	4.9	2.7	1.6	.33	4.1
20	2.3	3.0	3.0	8.8	7.0	7.2	5.9	4.5	2.9	1.4	.60	3.6
21	2.2	3.1	2.9	5.4	5.7	9.1	5.6	4.1	3.7	1.4	.51	3.9
22	2.2	2.8	2.9	4.0	5.0	9.5	5.6	4.4	3.3	1.5	.49	4.6
23	2.4	2.8	2.9	11	4.7	7.3	5.3	4.9	2.9	1.2	.65	3.6
24	2.6	2.9	3.0	102	4.7	7.0	5.3	4.3	2.5	.95	.65	3.2
25	2.6	2.6	2.9	25	4.5	6.6	5.3	4.1	2.4	1.0	1.3	3.0
26	2.6	3.2	3.3	12	4.4	5.8	5.3	4.2	2.7	.74	1.9	2.9
27	2.7	3.0	3.1	8.3	4.3	5.6	5.3	4.0	3.0	.64	1.1	4.7
28	2.8	2.6	2.9	6.3	6.5	5.6	6.1	3.9	3.0	.66	.73	14
29	2.9	2.5	3.5	5.3	---	5.3	6.1	3.8	2.3	.82	.64	16
30	3.0	2.6	2.9	4.8	---	5.0	5.4	3.6	2.0	.74	.48	43
31	3.3	---	3.3	4.4	---	5.2	---	3.5	---	.51	.46	---
TOTAL	64.90	90.5	114.7	356.7	164.0	248.2	203.7	190.5	88.5	53.19	27.36	231.14
MEAN	2.09	3.02	3.70	11.5	5.86	8.01	6.79	6.15	2.95	1.72	.88	7.70
MAX	3.4	4.9	14	102	16	43	15	41	3.7	4.1	4.4	49
MIN	.79	2.5	2.5	2.7	3.9	4.4	5.3	3.5	2.0	.51	.33	.39
CFSM	.25	.35	.43	1.35	.69	.94	.80	.72	.35	.20	.10	.90
IN.	.28	.39	.50	1.56	.72	1.08	.89	.83	.39	.23	.12	1.01

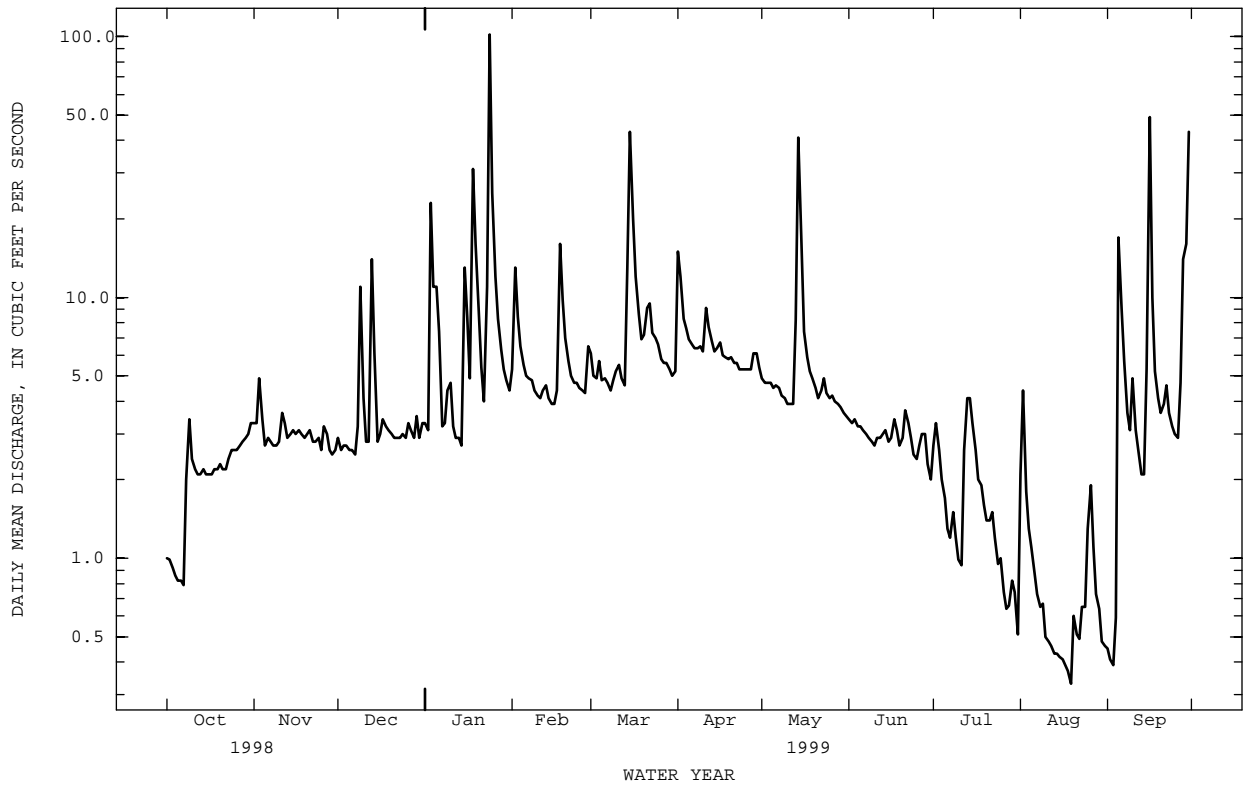
02038850 HOLIDAY CREEK NEAR ANDERSONVILLE, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1966 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	6.12	7.57	8.83	11.4	12.8	14.2	11.8	9.87	8.34	4.63	4.60	6.36
MAX	25.6	32.3	25.6	30.5	36.9	37.9	32.6	36.0	70.2	15.3	24.9	36.8
(WY)	1972	1986	1974	1978	1998	1994	1973	1971	1972	1972	1973	1996
MIN	1.23	2.40	2.16	2.40	5.38	4.12	4.37	2.93	1.63	.61	.58	.81
(WY)	1987	1982	1989	1989	1989	1981	1967	1981	1966	1966	1987	1970

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR		FOR 1999 WATER YEAR		WATER YEARS 1966 - 1999	
ANNUAL TOTAL	4541.40		1833.39			
ANNUAL MEAN	12.4		5.02		8.91	
HIGHEST ANNUAL MEAN					18.6	
LOWEST ANNUAL MEAN					3.28	
HIGHEST DAILY MEAN	275	Jan 28	102	Jan 24	1740	Jun 21 1972
LOWEST DAILY MEAN	.79	Oct 7	.33	Aug 19	.20	aJul 25 1966
ANNUAL SEVEN-DAY MINIMUM	.89	Oct 1	.40	Aug 13	.20	Sep 6 1966
INSTANTANEOUS PEAK FLOW			218		9640	
INSTANTANEOUS PEAK STAGE			2.87		14.64	
INSTANTANEOUS LOW FLOW			.32		.10	
ANNUAL RUNOFF (CFSM)	1.46		.59		1.04	
ANNUAL RUNOFF (INCHES)	19.81		8.00		14.19	
10 PERCENT EXCEEDS	26		8.4		15	
50 PERCENT EXCEEDS	5.2		3.3		5.3	
90 PERCENT EXCEEDS	1.8		.87		1.9	

a Also 11 other days in Jul and Sep 1966.  
 b Also Aug 20, 1999.



## 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 mi<sup>2</sup>.

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 sea level (levels by Virginia Department of Transportation). Prior to Aug. 19, 1953, nonrecording gage at same site and datum.

REMARKS.--Records good except those for period of doubtful or no gage-height record, Dec .24 to Jan. 2, Feb. 23 to Mar. 24, Apr. 8 to May 12, and period with ice effect, Jan. 5-10, which are fair. Maximum discharge, 9,160 ft<sup>3</sup>/s, from rating curve extended above 1,600 ft<sup>3</sup>/s on basis of slope-area measurement at gage height 11.96 ft. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location by the Virginia Department of Environmental Quality - Water Division.

COOPERATION.--Records were provided by the Virginia Department of Environmental Quality - Water Division.

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 greater than base discharge of 500 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Jan 24	2400	*747	*6.43	No other peak greater than base discharge.			

Minimum discharge, 6.3 ft<sup>3</sup>/s, Aug 20.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	15	20	21	e31	52	e69	52	e34	17	33	11	7.7
2	14	20	20	e29	74	e57	68	e32	17	32	13	7.3
3	14	23	20	156	73	e51	55	e30	17	26	11	7.0
4	14	26	20	207	64	e59	52	e29	16	21	11	7.4
5	16	25	20	e90	57	e55	46	e28	16	17	10	25
6	17	24	20	e48	53	e51	43	e29	16	15	9.6	34
7	18	23	20	e55	50	e50	41	e28	16	14	9.1	35
8	21	23	20	e47	50	e46	e48	e27	15	13	8.9	79
9	23	23	41	e44	47	e44	e39	e26	14	13	8.5	53
10	21	23	37	e42	45	e47	e50	e26	14	12	8.1	40
11	20	27	30	42	43	e46	e105	e25	14	11	7.9	30
12	19	27	27	41	43	e44	e71	e25	14	12	7.9	21
13	19	26	122	39	47	e41	e55	30	15	17	7.7	17
14	18	26	96	39	43	e78	e52	186	16	23	7.6	14
15	18	26	61	80	41	e160	e51	180	15	24	7.8	19
16	17	24	46	86	40	e215	e46	82	16	19	7.6	212
17	17	24	39	67	40	e140	e41	53	17	16	7.2	225
18	17	23	33	114	69	e90	e40	41	16	14	7.0	90
19	17	23	30	161	76	e72	e39	35	16	13	6.7	50
20	17	23	29	100	63	e58	e38	30	15	12	6.7	35
21	17	24	28	74	55	e60	e36	27	16	11	7.1	29
22	17	23	27	61	49	e83	e34	26	16	11	7.2	28
23	17	22	26	55	e47	e66	e33	28	16	11	7.1	23
24	18	22	e30	329	e45	e58	e31	26	15	15	7.1	20
25	18	22	e35	528	e44	56	e33	24	14	49	7.2	18
26	19	23	e33	272	e43	51	e32	23	14	25	16	16
27	19	22	e31	140	e42	47	e31	22	14	17	15	22
28	19	21	e34	89	e53	45	e32	21	14	14	11	34
29	19	21	e36	71	---	43	e34	20	15	13	9.8	46
30	19	21	e34	61	---	41	e38	19	65	12	8.9	153
31	20	---	e32	55	---	40	---	18	---	11	8.2	---
TOTAL	554	700	1098	3253	1448	2063	1366	1230	511	546	278.9	1397.4
MEAN	17.9	23.3	35.4	105	51.7	66.5	45.5	39.7	17.0	17.6	9.00	46.6
MAX	23	27	122	528	76	215	105	186	65	49	16	225
MIN	14	20	20	29	40	40	31	18	14	11	6.7	7.0
CFSM	.26	.33	.51	1.51	.74	.95	.65	.57	.24	.25	.13	.67
IN.	.30	.37	.59	1.74	.77	1.10	.73	.66	.27	.29	.15	.75

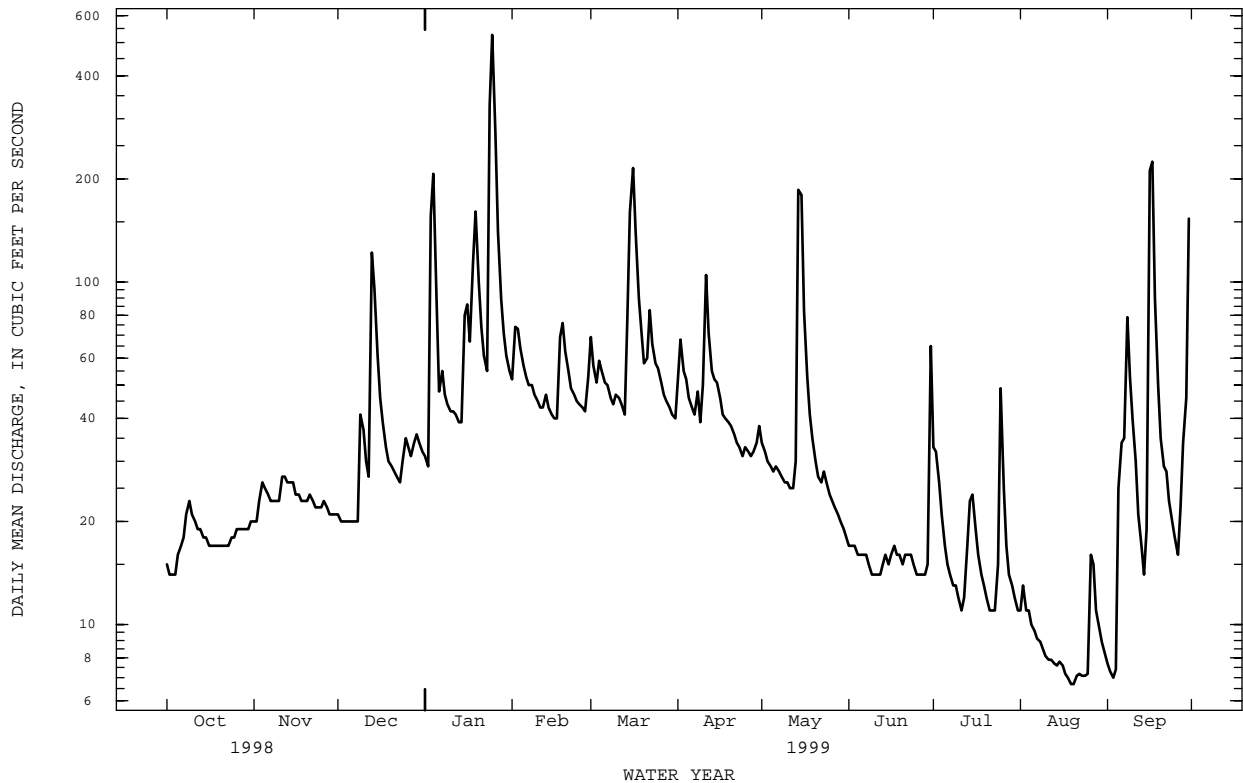
02039000 BUFFALO CREEK NEAR HAMPDEN SYDNEY, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1947 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	49.9	64.0	72.3	92.1	101	113	92.5	66.6	50.0	39.4	40.8	41.5
MAX	365	315	157	313	295	324	256	173	294	129	260	168
(WY)	1972	1986	1997	1978	1979	1993	1983	1978	1972	1989	1955	1979
MIN	9.94	14.6	18.7	25.3	36.9	37.5	29.4	23.4	11.2	14.0	9.00	6.67
(WY)	1971	1970	1966	1966	1968	1981	1967	1969	1970	1970	1999	1970

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR		FOR 1999 WATER YEAR		WATER YEARS 1947 - 1999	
ANNUAL TOTAL	32673		14445.3			
ANNUAL MEAN	89.5		39.6		68.4	
HIGHEST ANNUAL MEAN					134	1972
LOWEST ANNUAL MEAN					28.5	1970
HIGHEST DAILY MEAN	1210	Jan 28	528	Jan 25	4940	Aug 18 1955
LOWEST DAILY MEAN	14	aSep 12	6.7	bAug 19	e2.7	cOct 7 1970
ANNUAL SEVEN-DAY MINIMUM	14	dSep 10	7.0	Aug 18	2.9	Oct 4 1970
INSTANTANEOUS PEAK FLOW			747	Jan 24	9160	Jun 21 1972
INSTANTANEOUS PEAK STAGE			6.43	Jan 24	12.38	Jun 21 1972
INSTANTANEOUS LOW FLOW			6.3	Aug 20	(f)	(g)
ANNUAL RUNOFF (CFSM)	1.28		.57		.98	
ANNUAL RUNOFF (INCHES)	17.44		7.71		13.33	
10 PERCENT EXCEEDS	223		71		120	
50 PERCENT EXCEEDS	42		26		43	
90 PERCENT EXCEEDS	17		11		18	

- a Also Sep 13-16, 1998.
- b Also Aug 20, 1999.
- c Also Oct 8, 1970.
- d Also Sep 11, 12, 1998.
- e Estimated.
- f Not determined.
- g Probably occurred Oct 7, 8, 1970.



## JAMES RIVER BASIN

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 mi<sup>2</sup>.

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 sea level. Prior to Nov. 29, 1928, nonrecording gage at same site and datum.

REMARKS.--Records good except those for period with ice effect, Jan. 6, and periods of doubtful gage-height record, Jun. 27, 28, and Aug. 25, which are fair. Maximum discharge, 33,100 ft<sup>3</sup>/s, from rating curve extended above 12,000 ft<sup>3</sup>/s on basis of contracted-opening measurement of peak flow. 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 Department of Environmental Quality - Water Division.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,900 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Jan 25	1230	*3,970	*15.14	Sep 16	2000	1,910	11.90

Minimum discharge, 20 ft<sup>3</sup>/s, Aug 18-20.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	63	74	83	118	201	268	175	113	85	91	57	29
2	61	73	82	113	297	226	405	104	81	95	158	27
3	58	81	81	388	423	196	309	98	79	95	96	25
4	58	98	81	776	304	217	242	95	78	75	61	38
5	62	99	82	403	248	227	215	93	75	62	48	172
6	66	89	82	e235	214	194	190	92	73	54	40	301
7	72	82	82	240	200	185	172	92	71	50	36	251
8	81	80	86	185	194	167	162	90	70	47	33	403
9	89	81	137	171	182	157	159	85	67	44	32	291
10	92	82	192	167	171	169	159	80	64	40	30	177
11	81	87	129	156	161	171	178	76	64	38	28	135
12	74	90	107	144	160	165	312	73	63	42	26	101
13	71	89	297	136	166	153	268	96	64	67	26	81
14	70	86	467	132	158	218	205	1300	72	107	26	69
15	68	85	250	223	148	1310	182	1080	66	116	25	117
16	67	87	170	434	144	1400	199	479	64	91	25	1360
17	66	86	137	292	144	676	182	284	66	69	23	1120
18	66	84	120	508	248	420	154	219	70	58	22	428
19	66	83	109	1240	468	314	138	184	65	51	21	234
20	65	82	104	524	309	257	132	160	61	45	25	163
21	65	84	101	329	240	258	128	141	63	41	26	132
22	63	85	99	252	203	372	122	134	68	40	26	129
23	62	83	99	222	179	321	119	154	66	40	29	122
24	63	83	119	1270	169	262	113	146	61	57	30	101
25	66	84	138	3270	164	241	107	132	56	155	e33	88
26	69	86	132	1080	159	221	104	118	55	101	108	81
27	69	87	121	553	154	200	104	111	e55	69	102	85
28	70	85	127	377	185	187	113	103	e54	54	73	161
29	70	85	137	292	---	172	130	98	66	47	52	376
30	72	84	138	242	---	162	126	94	82	43	39	1170
31	73	---	132	213	---	151	---	88	---	39	32	---
TOTAL	2138	2544	4221	14685	5993	9637	5304	6212	2024	2023	1388	7967
MEAN	69.0	84.8	136	474	214	311	177	200	67.5	65.3	44.8	266
MAX	92	99	467	3270	468	1400	405	1300	85	155	158	1360
MIN	58	73	81	113	144	151	104	73	54	38	21	25
CFSM	.23	.28	.45	1.56	.71	1.03	.58	.66	.22	.22	.15	.88
IN.	.26	.31	.52	1.80	.74	1.18	.65	.76	.25	.25	.17	.98

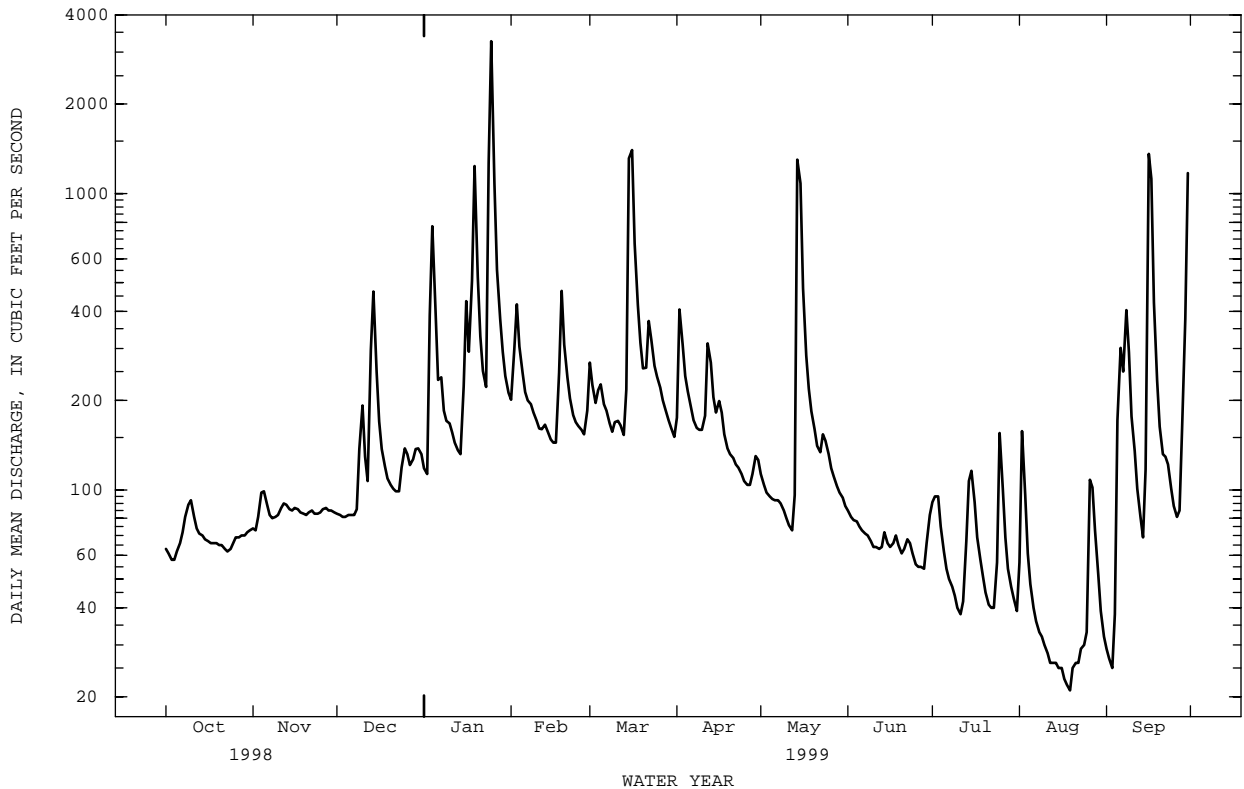
02039500 APPOMATTOX RIVER AT FARMVILLE, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1926 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	194	246	305	407	444	484	409	277	209	162	195	197
MAX	1190	1287	961	1430	1402	1518	1155	872	1866	518	1783	1140
(WY)	1972	1986	1997	1978	1979	1993	1983	1978	1972	1972	1940	1996
MIN	30.3	51.0	61.6	96.3	114	126	107	95.2	29.5	40.5	19.6	16.7
(WY)	1931	1932	1966	1966	1934	1981	1966	1969	1970	1966	1930	1968

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR		FOR 1999 WATER YEAR		WATER YEARS 1926 - 1999	
ANNUAL TOTAL	165358		64136			
ANNUAL MEAN	453		176		294	
HIGHEST ANNUAL MEAN					584	
LOWEST ANNUAL MEAN					115	
HIGHEST DAILY MEAN	7470	Jan 29	3270	Jan 25	28000	Jun 22 1972
LOWEST DAILY MEAN	58	aSep 16	21	Aug 19	6.3	Oct 5 1968
ANNUAL SEVEN-DAY MINIMUM	59	Sep 12	24	bAug 14	8.1	Sep 30 1968
INSTANTANEOUS PEAK FLOW			3970		33100	
INSTANTANEOUS PEAK STAGE			15.14		c29.70	
INSTANTANEOUS LOW FLOW			20		dAug 18	
ANNUAL RUNOFF (CFSM)	1.50		.58		.97	
ANNUAL RUNOFF (INCHES)	20.30		7.87		13.19	
10 PERCENT EXCEEDS	983		306		530	
50 PERCENT EXCEEDS	185		101		167	
90 PERCENT EXCEEDS	68		46		62	

- a Also Sep 17, 18, 1998.
- b Also Aug 15, 1999.
- c From floodmarks.
- d Also Aug 19-20, 1999.
- 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 mi<sup>2</sup>.

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 sea level. August 1900 to December 1905, non-recording gage at same site, different datum. March 1926 to October 1936, nonrecording gage at same site and datum.

REMARKS.--Records good except those for periods of doubtful gage-height record, Jan. 27 to Feb. 1, Apr. 14, 15, Aug. 22, 23, and Sep 18-22, which are fair. National Weather Service gage-height telemeter at station. Maximum discharge, 35,000 ft<sup>3</sup>/s, from rating curve extended above 20,000 ft<sup>3</sup>/s on basis of records for stations at Farmville and near Petersburg. Minimum gage height, 3.52 ft, Oct. 2, 1930. 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 Department of Environmental Quality - Water Division.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Sep 16	2200	*4,720	*19.53	No other peak greater than base discharge.			
Minimum discharge, 36 ft <sup>3</sup> /s, Aug 19.							

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	140	94	144	261	e438	358	357	275	168	112	71	57
2	127	96	143	246	438	444	495	257	156	120	69	51
3	122	104	143	404	559	413	735	239	148	123	90	46
4	121	117	147	1080	714	431	625	229	139	121	142	47
5	118	127	146	1350	575	460	495	221	133	117	100	285
6	116	138	143	799	467	422	434	217	128	95	75	807
7	120	138	145	521	410	382	396	213	123	95	64	612
8	129	128	147	480	381	347	363	208	117	172	58	418
9	143	123	184	413	364	323	347	201	112	133	54	541
10	154	119	220	373	345	311	352	191	108	93	51	502
11	152	121	259	349	324	315	348	181	102	154	48	329
12	137	124	245	333	311	315	382	172	98	88	46	231
13	121	129	300	313	315	302	835	166	100	103	44	182
14	112	135	535	299	315	301	e750	531	99	119	43	146
15	107	134	660	307	299	1380	e450	2100	100	149	44	132
16	105	130	445	362	283	2840	476	2310	107	177	45	2930
17	114	130	317	554	275	3010	470	1000	106	159	43	4340
18	112	130	260	550	301	1820	428	591	106	127	39	e3400
19	110	131	231	841	464	959	374	438	105	101	38	e2600
20	108	129	207	1570	705	720	339	360	107	89	67	e700
21	104	133	194	934	554	630	320	311	104	79	52	e470
22	101	139	189	620	428	1200	306	277	99	76	e46	e400
23	101	148	183	500	365	1270	295	293	99	70	e40	368
24	98	149	201	1150	327	900	293	347	101	68	53	315
25	93	145	224	2780	305	691	275	306	97	90	73	266
26	89	148	254	3000	297	588	260	266	90	128	108	224
27	88	148	263	e2150	289	510	250	236	85	180	121	201
28	91	149	254	e1600	289	452	247	216	85	126	150	233
29	93	149	256	e700	---	413	254	200	98	96	128	322
30	92	147	269	e540	---	380	275	186	121	84	89	778
31	92	---	273	e470	---	356	---	176	---	76	68	---
TOTAL	3510	3932	7581	25849	11137	23243	12226	12914	3341	3520	2159	21933
MEAN	113	131	245	834	398	750	408	417	111	114	69.6	731
MAX	154	149	660	3000	714	3010	835	2310	168	180	150	4340
MIN	88	94	143	246	275	301	247	166	85	68	38	46
CFSM	.16	.18	.34	1.15	.55	1.03	.56	.57	.15	.16	.10	1.01
IN.	.18	.20	.39	1.32	.57	1.19	.63	.66	.17	.18	.11	1.12



02040000 APPOMATTOX RIVER AT MATTOAX, VA

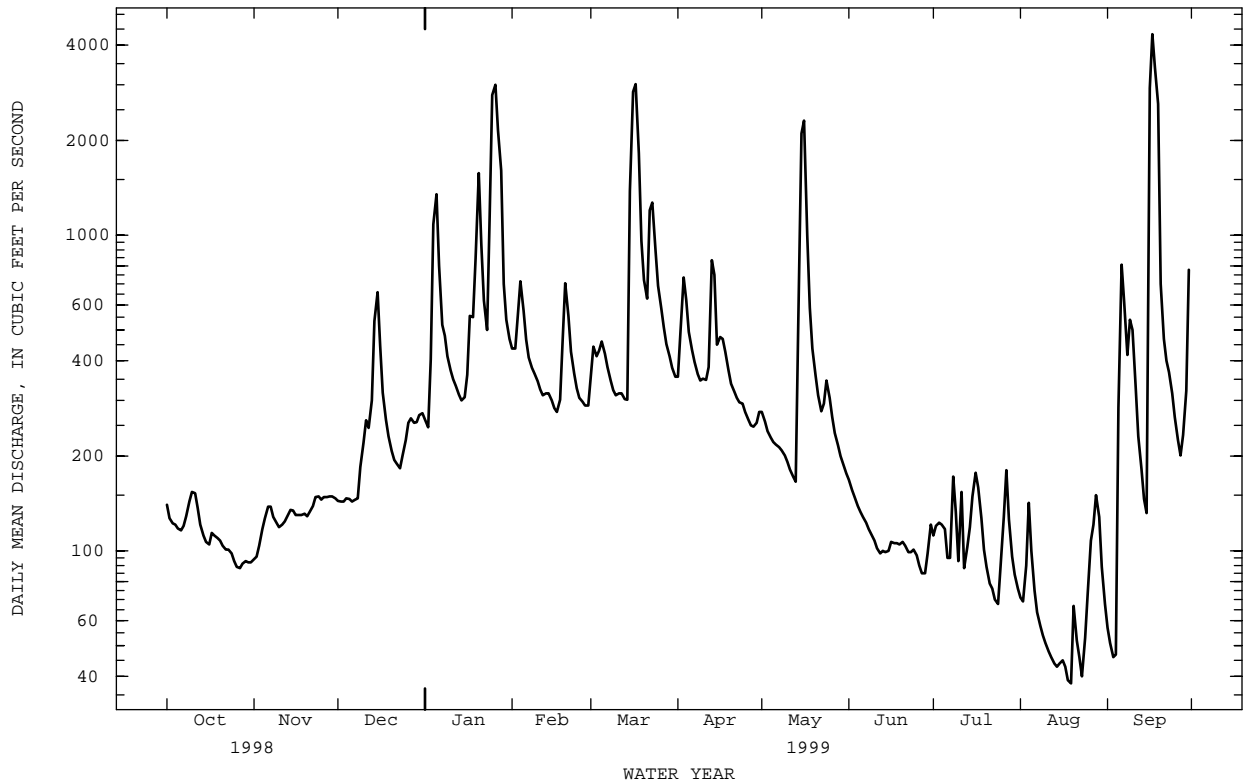
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1926 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	471	542	739	1026	1139	1242	1058	667	483	374	427	398
MAX	3932	2728	2620	3650	3605	3566	2975	1889	4369	1918	4566	2294
(WY)	1972	1986	1994	1978	1998	1993	1983	1978	1972	1938	1940	1975
MIN	32.7	107	123	207	248	309	273	208	95.0	56.5	35.6	30.0
(WY)	1931	1931	1966	1966	1931	1981	1966	1926	1970	1966	1930	1932

SUMMARY STATISTICS FOR 1998 CALENDAR YEAR FOR 1999 WATER YEAR WATER YEARS 1926 - 1999

ANNUAL TOTAL	370837	131345	
ANNUAL MEAN	1016	360	714
HIGHEST ANNUAL MEAN			1553
LOWEST ANNUAL MEAN			285
HIGHEST DAILY MEAN	10200	Mar 23	4340
LOWEST DAILY MEAN	79	Sep 15	38
ANNUAL SEVEN-DAY MINIMUM	83	Sep 10	42
INSTANTANEOUS PEAK FLOW			4720
INSTANTANEOUS PEAK STAGE			19.53
INSTANTANEOUS LOW FLOW			36
ANNUAL RUNOFF (CFSM)	1.40	.50	.98
ANNUAL RUNOFF (INCHES)	19.00	6.73	13.36
10 PERCENT EXCEEDS	3440	695	1600
50 PERCENT EXCEEDS	313	207	384
90 PERCENT EXCEEDS	108	88	116

a From floodmark in gage house.  
e Estimated.



## JAMES RIVER BASIN

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 mi<sup>2</sup>.

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 sea level. Prior to Sept. 2, 1949, nonrecording gage at same site and datum.

REMARKS.--Records good except for period of doubtful or no gage-height record, Sep. 5-8, which is fair. Maximum discharge, 15,000 ft<sup>3</sup>/s, from rating curve extended above 3,900 ft<sup>3</sup>/s. Minimum gage height, 0.29 ft, Aug. 9-12, 1957. Several measurements of water temperature were made during the year. Water-quality records for some periods have been collected at this location.

COOPERATION.--Records were provided by the Virginia Department of Environmental Quality - Water Division.

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 greater than base discharge of 1,200 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Jan 26	0230	1,420	7.74	Sep 17	0830	*6,140	*12.20

Minimum discharge, 1.6 ft<sup>3</sup>/s, Aug 16-18.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3.0	5.3	21	66	82	56	70	59	15	14	4.8	3.2
2	2.7	5.8	20	58	89	56	113	52	14	12	5.4	2.6
3	2.3	6.5	19	152	109	55	139	45	13	11	7.2	2.3
4	2.2	8.7	19	347	118	66	113	42	12	9.4	7.7	2.4
5	2.3	11	19	572	102	74	93	39	12	8.5	6.3	e70
6	2.4	11	19	326	85	73	83	37	11	7.5	5.8	e330
7	2.8	12	20	151	74	64	75	36	11	6.6	5.3	e260
8	2.9	12	20	107	69	56	68	34	10	7.6	4.4	e229
9	3.6	12	35	94	68	51	64	31	9.3	8.0	3.7	282
10	4.5	12	56	83	64	52	69	29	8.8	12	3.2	180
11	5.0	12	61	71	58	56	78	26	8.6	11	2.7	78
12	5.2	12	50	62	55	56	179	24	7.6	7.9	2.3	39
13	5.5	14	101	55	60	53	330	24	8.0	9.5	2.0	25
14	5.8	14	206	51	61	57	183	134	9.1	15	1.9	18
15	5.7	15	228	65	59	317	118	347	9.7	18	1.8	18
16	5.3	16	123	99	56	879	132	421	9.7	19	1.6	1270
17	5.0	16	72	120	53	886	171	214	9.9	18	1.6	5070
18	4.7	16	52	113	59	357	134	99	11	15	2.3	1870
19	4.2	16	42	159	81	183	97	65	11	11	2.2	646
20	4.0	17	35	211	91	133	80	51	11	9.1	2.3	232
21	3.9	17	31	168	80	119	70	40	11	8.7	2.6	131
22	3.6	18	29	116	65	210	64	34	14	7.2	3.7	197
23	3.4	18	28	92	55	311	59	41	15	6.0	3.2	311
24	3.4	19	38	208	50	224	55	47	16	5.6	2.5	271
25	3.9	19	66	714	49	154	49	37	13	9.4	2.7	135
26	3.9	20	89	1200	49	124	44	30	9.8	7.8	5.0	82
27	4.3	21	82	517	49	103	42	26	8.7	5.6	5.7	61
28	4.4	21	78	228	50	90	41	22	8.2	5.1	5.8	59
29	4.1	21	80	158	---	82	49	19	8.7	6.0	6.2	82
30	4.5	21	85	119	---	76	56	17	14	4.8	5.1	133
31	4.9	---	79	97	---	69	---	16	---	4.6	3.9	---
TOTAL	123.4	439.3	1903	6579	1940	5142	2918	2138	330.1	300.9	120.9	12089.5
MEAN	3.98	14.6	61.4	212	69.3	166	97.3	69.0	11.0	9.71	3.90	403
MAX	5.8	21	228	1200	118	886	330	421	16	19	7.7	5070
MIN	2.2	5.3	19	51	49	51	41	16	7.6	4.6	1.6	2.3
CFSM	.03	.09	.39	1.34	.44	1.05	.62	.44	.07	.06	.02	2.55
IN.	.03	.10	.45	1.55	.46	1.21	.69	.50	.08	.07	.03	2.85

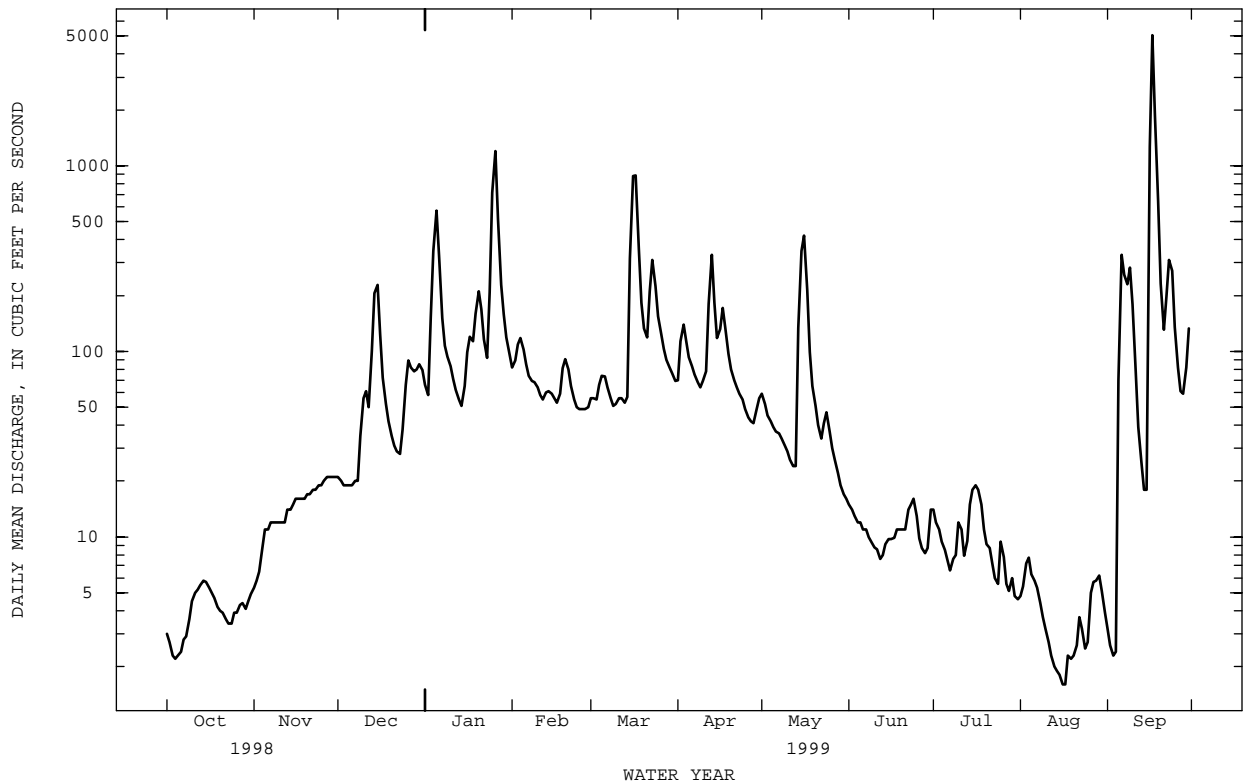
02041000 DEEP CREEK NEAR MANNBORO, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1947 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	102	138	154	221	253	280	214	132	82.2	66.1	57.9	79.0
MAX	859	821	453	800	793	718	632	406	449	301	309	1002
(WY)	1973	1986	1997	1978	1979	1993	1987	1971	1972	1975	1978	1979
MIN	3.55	14.6	26.4	48.5	52.4	74.8	51.2	36.4	11.0	7.26	3.43	2.19
(WY)	1971	1999	1966	1966	1968	1981	1985	1985	1999	1991	1987	1968

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR		FOR 1999 WATER YEAR		WATER YEARS 1947 - 1999	
ANNUAL TOTAL	66450.4		34024.1			
ANNUAL MEAN	182		93.2		148	
HIGHEST ANNUAL MEAN					319	
LOWEST ANNUAL MEAN					67.5	
HIGHEST DAILY MEAN	5050	Mar 20	5070	Sep 17	12000	Oct 6 1972
LOWEST DAILY MEAN	1.3	Sep 3	1.6	aAug 16	.04	Oct 4 1968
ANNUAL SEVEN-DAY MINIMUM	1.9	Aug 29	1.9	Aug 13	.16	Oct 13 1970
INSTANTANEOUS PEAK FLOW			6140		Sep 17	15000
INSTANTANEOUS PEAK STAGE			12.20		Sep 17	b24.04
INSTANTANEOUS LOW FLOW			1.6		cAug 16	.03
ANNUAL RUNOFF (CFSM)	1.15		.59		.94	
ANNUAL RUNOFF (INCHES)	15.65		8.01		12.70	
10 PERCENT EXCEEDS	335		181		286	
50 PERCENT EXCEEDS	52		34		74	
90 PERCENT EXCEEDS	3.4		3.9		16	

- a Also Aug 17, 1999.
- b From floodmarks.
- c Also Aug 17-18, 1999.
- d Also Oct 5, 1968.
- e Estimated.



## JAMES RIVER BASIN

02041650 APPOMATTOX RIVER AT MATOACA, VA

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 Rohoic Creek, 2.8 mi downstream from Lake Chesdin, 3.5 mi west of Petersburg, and at mile 15.9

DRAINAGE AREA.--1,344 mi<sup>2</sup>.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1969 to current year.

GAGE.--Water-stage recorder. Datum of gage is 68.30 ft above sea level.

REMARKS.--No estimated daily discharges. Records good. Flow regulated by Appomattox Water Authority at Lake Chesdin, capacity, 36,000 acre-ft, 2.8 mi upstream from which an average of 36.1 ft<sup>3</sup>/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 Department of Environmental Quality - Water Division.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 13,100 ft<sup>3</sup>/s, Sep 16, gage height, 11.58 ft; minimum, 47 ft<sup>3</sup>/s, Aug 30-31, result of regulation; minimum daily, 47 ft<sup>3</sup>/s, Aug 31, result of regulation.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	97	84	106	123	827	507	633	482	189	206	90	50
2	97	82	105	302	681	510	805	441	112	185	88	52
3	98	75	106	1100	622	638	962	437	109	164	84	54
4	100	74	107	1790	810	863	1050	376	128	151	71	71
5	100	101	107	2210	940	529	962	309	119	134	57	665
6	100	106	106	2220	569	574	682	309	114	119	53	1130
7	101	107	107	1960	936	658	670	317	113	109	60	1920
8	103	106	108	1210	613	570	582	331	108	221	63	1800
9	99	99	121	1000	496	494	566	296	101	153	64	1740
10	86	85	109	552	469	519	643	243	98	101	63	1400
11	81	87	109	453	477	511	762	245	94	95	62	1040
12	80	84	243	433	472	482	1080	226	86	95	61	524
13	80	84	1040	465	553	393	1090	215	88	129	58	270
14	81	84	1230	434	440	542	1290	599	83	213	61	188
15	85	83	1140	659	415	1530	1240	1710	85	187	63	233
16	96	83	1090	751	437	3650	1210	3230	86	194	65	8850
17	99	83	596	730	421	4880	1130	3080	87	208	67	11300
18	99	85	376	979	539	4790	1060	1740	89	197	61	10300
19	100	85	346	1200	571	2780	752	1140	89	162	54	8930
20	97	86	291	1410	805	1620	633	664	89	125	58	6730
21	91	85	320	1810	921	1290	504	368	104	105	54	2720
22	90	84	351	1510	722	1620	449	318	115	101	52	1910
23	90	90	219	1180	496	2160	592	570	104	98	50	1550
24	90	121	243	1390	447	2190	560	536	100	108	49	1360
25	91	105	186	3270	474	1660	442	413	99	154	50	830
26	90	106	307	4770	477	1270	431	396	101	112	62	563
27	86	105	376	5040	419	1080	416	357	101	106	57	533
28	85	105	427	4450	487	871	389	288	109	150	55	594
29	83	105	964	2610	---	675	435	224	106	270	50	794
30	83	106	737	1520	---	636	433	211	143	153	48	1230
31	83	---	178	1060	---	547	---	210	---	90	47	---
TOTAL	2841	2775	11851	48591	16536	41039	22453	20281	3149	4595	1877	69331
MEAN	91.6	92.5	382	1567	591	1324	748	654	105	148	60.5	2311
MAX	103	121	1230	5040	940	4880	1290	3230	189	270	90	11300
MIN	80	74	105	123	415	393	389	210	83	90	47	50
(†)	1249	1225	1126	1069	727	894	1004	1176	1238	1181	1205	1094

CAL YR 1998 TOTAL 654733 MEAN 1794 MAX 13600 MIN 69 (†) 13575  
WTR YR 1999 TOTAL 245319 MEAN 672 MAX 11300 MIN 47 (†) 13188

† Total diversion, in cubic feet per second, at Lake Chesdin, provided by Appomattox Water Authority.

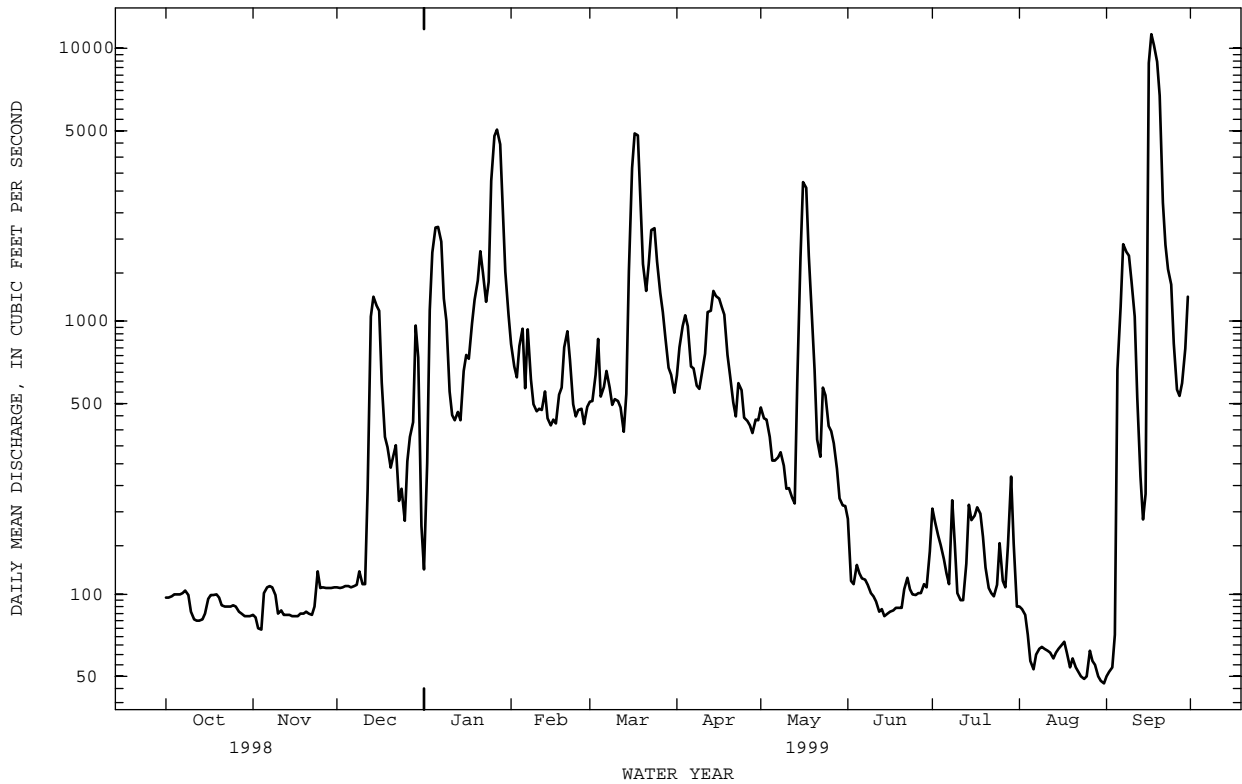
02041650 APPOMATTOX RIVER AT MATOACA, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1970 - 1999, BY WATER YEAR (WY) [REGULATED, UNADJUSTED]

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	1066	1081	1419	2080	2267	2576	2094	1340	897	556	485	764
MAX	6869	5648	3857	5868	6532	6098	5003	4452	5293	2123	1818	5312
(WY)	1973	1986	1997	1978	1998	1993	1983	1978	1972	1995	1978	1979
MIN	87.8	92.5	382	384	591	478	498	411	105	99.2	60.5	85.1
(WY)	1994	1999	1999	1981	1999	1981	1985	1985	1999	1986	1999	1993

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR	WATER YEARS 1970 - 1999
ANNUAL TOTAL	654733	245319	
ANNUAL MEAN	1794	672	1381
HIGHEST ANNUAL MEAN			2559
LOWEST ANNUAL MEAN			460
HIGHEST DAILY MEAN	13600	Mar 21	39400
LOWEST DAILY MEAN	a69	Sep 18	a32
ANNUAL SEVEN-DAY MINIMUM	a79	Sep 15	a48
INSTANTANEOUS PEAK FLOW			40800
INSTANTANEOUS PEAK STAGE			11.58
INSTANTANEOUS LOW FLOW			a47
ANNUAL RUNOFF (CFSM)	1.33	.50	1.03
ANNUAL RUNOFF (INCHES)	18.12	6.79	13.96
10 PERCENT EXCEEDS	6230	1510	3420
50 PERCENT EXCEEDS	505	270	690
90 PERCENT EXCEEDS	87	81	147

a Result of regulation.  
 b Also Aug 31, 1999.



02041650 APPOMATTOX RIVER AT MATOACA, VA--Continued

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1978 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: October 1991 to September 1993.

WATER TEMPERATURE: October 1991 to September 1993.

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 1998 TO SEPTEMBER 1999

DATE	TIME	SAMPLE TYPE	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	AGENCY ANA- LYZING SAMPLE (CODE NUMBER) (00028)	TEMPER- ATURE AIR (DEG C) (00020)	TEMPER- ATURE WATER (DEG C) (00010)
OCT									
08...	0930	ENVIRONMENTAL	100	98	6.5	752	VDCLS	21.5	21.0
20...	1100	ENVIRONMENTAL	97	96	6.6	757	VDCLS	17.5	20.0
NOV									
02...	0845	ENVIRONMENTAL	85	100	7.6	754	VDCLS	12.0	13.2
17...	1200	ENVIRONMENTAL	82	101	--	749	VDCLS	22.0	14.8
DEC									
01...	1130	ENVIRONMENTAL	104	96	6.9	756	VDCLS	20.0	12.8
15...	1045	ENVIRONMENTAL	1169	95	7.3	762	VDCLS	4.0	11.1
15...	1100	REPLICATE	--	95	7.3	762	VDCLS	4.0	11.1
JAN									
04...	1130	ENVIRONMENTAL	1846	101	7.4	756	VDCLS	3.0	6.0
08...	0900	ENVIRONMENTAL	1275	101	7.3	761	VDCLS	2.0	3.8
21...	1115	ENVIRONMENTAL	1873	95	6.7	754	VDCLS	12.0	5.1
25...	1315	ENVIRONMENTAL	3497	94	6.8	756	VDCLS	13.0	8.0
26...	1245	ENVIRONMENTAL	4809	94	7.1	760	VDCLS	12.0	7.8
FEB									
09...	1000	ENVIRONMENTAL	513	74	6.2	757	VDCLS	5.0	7.9
23...	1030	ENVIRONMENTAL	487	83	6.4	764	VDCLS	- .5	7.1
MAR									
09...	0915	ENVIRONMENTAL	513	89	7.0	762	VDCLS	.5	7.1
16...	1215	ENVIRONMENTAL	3760	91	7.5	753	VDCLS	14.0	7.8
17...	1215	ENVIRONMENTAL	4945	89	6.6	752	VDCLS	23.0	8.2
17...	1220	REPLICATE	--	89	6.6	752	VDCLS	23.0	8.2
19...	1045	ENVIRONMENTAL	2846	79	6.4	757	VDCLS	13.5	8.1
20...	1100	ENVIRONMENTAL	1636	71	6.9	759	VDCLS	14.0	8.8
23...	1100	ENVIRONMENTAL	2212	73	6.4	757	VDCLS	12.0	9.4
23...	1105	REPLICATE	--	73	6.4	757	USGS	12.0	9.4
APR									
12...	1000	ENVIRONMENTAL	1083	79	6.5	748	VDCLS	12.5	15.6
26...	0915	ENVIRONMENTAL	380	85	7.0	753	VDCLS	26.0	17.1
MAY									
03...	1000	ENVIRONMENTAL	443	85	7.1	752	VDCLS	18.0	15.8
17...	1230	ENVIRONMENTAL	3147	93	7.4	758	VDCLS	21.0	20.0
17...	1245	REPLICATE	--	93	7.4	758	USGS	21.0	20.0
18...	1030	ENVIRONMENTAL	1781	93	6.6	755	VDCLS	22.0	19.8
21...	1000	ENVIRONMENTAL	327	89	6.7	757	VDCLS	22.2	20.0
JUN									
08...	0915	ENVIRONMENTAL	111	87	6.6	749	VDCLS	16.0	22.3
28...	1230	ENVIRONMENTAL	113	94	7.4	749	VDCLS	28.0	25.7
JUL									
13...	0830	ENVIRONMENTAL	121	87	6.9	757	VDCLS	15.5	16.8
21...	1000	ENVIRONMENTAL	106	92	6.7	755	VDCLS	26.0	28.2
AUG									
05...	0815	ENVIRONMENTAL	58	96	6.0	750	VDCLS	25.0	23.7
24...	0915	ENVIRONMENTAL	49	105	7.2	755	VDCLS	23.5	24.1
SEP									
06...	1430	ENVIRONMENTAL	1018	99	7.3	750	VDCLS	22.5	23.9
07...	1315	ENVIRONMENTAL	1938	97	6.4	749	VDCLS	29.5	24.8
15...	1045	ENVIRONMENTAL	202	93	6.6	751	VDCLS	23.0	23.7
17...	1200	ENVIRONMENTAL	11299	63	6.7	760	VDCLS	24.5	21.6
18...	0900	ENVIRONMENTAL	10553	47	6.4	763.5	VDCLS	20.0	19.8
24...	1115	ENVIRONMENTAL	1364	58	7.1	752	VDCLS	22.0	19.2

02041650 APPOMATTOX RIVER AT MATOACA, VA--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DATE	TUR- BID- ITY (NTU) (00076)	OXYGEN, DIS- SOLVED (MG/L) (00300)	SILICA, DIS- SOLVED AS (MG/L) (00955)	RESIDUE TOTAL AT 105 DEG. C, SUS- PENDED (MG/L) (00530)	RESIDUE FIXED NON FILTER- ABLE (MG/L) (00540)	RESIDUE VOLA- TILE, SUS- PENDED (MG/L) (00535)	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)
OCT										
08...	2	7.6	18.5	<3	<3	<3	.211	.005	.216	.011
20...	2	7.9	17.0	<3	<3	<3	.147	.003	.150	.006
NOV										
02...	2	9.9	15.6	<3	<3	<3	.119	.002	.121	.004
17...	2	11.4	14.4	<3	<3	<3	.139	.003	.142	.011
DEC										
01...	3	10.7	14.8	<3	<3	<3	.121	.003	.124	.014
15...	13	9.7	15.2	13	9	4	.044	.004	.048	.059
15...	14	9.7	15	13	9	4	.042	.004	.046	.059
JAN										
04...	17	12.2	16.5	17	13	4	.109	<.002	.109	.020
08...	7	13.0	17.8	3	<3	<3	.229	<.002	.229	<.004
21...	28	12.4	16.5	10	7	3	.413	.002	.415	.038
25...	21	11.5	14.4	24	19	5	.327	.002	.329	.011
26...	24	14.7	14.6	20	16	4	.323	.002	.325	.014
FEB										
09...	28	10.9	14.0	8	6	<3	.286	.003	.289	.044
23...	6	12.7	16.3	5	3	<3	.219	<.002	.000	.005
MAR										
09...	5	11.7	16.9	5	3	<3	.140	<.002	.140	<.004
16...	12	13.4	16.9	13	9	4	.124	<.002	.124	.007
17...	10	11.4	17.0	10	6	4	.130	<.002	.130	.006
17...	11	11.4	16.4	10	7	3	.124	<.002	.124	.005
19...	--	12.7	14.2	15	12	3	.216	.002	.218	.02
20...	32	11.4	13.7	19	15	4	.290	.002	.292	.021
23...	28	12.0	13.7	16	13	3	.283	.002	.285	.02
23...	--	12.0	14	5	.0	6	--	--	.23	.017
APR										
12...	7	9.9	13.4	7	4	3	.057	<.002	.057	.011
26...	--	9.8	12.9	<3	<3	<3	.041	<.002	.041	.011
MAY										
03...	4	10.0	13.1	<3	<3	3	.058	.002	.060	.016
17...	4	8.5	14.3	7	4	<3	.025	<.002	.025	.013
17...	--	8.5	13	6	1	5	--	--	.015	.032
18...	6	9.1	14.6	6	4	<3	.085	.002	.087	.029
21...	7	9.1	14.9	6	<3	4	.125	.003	.128	.037
JUN										
08...	5	6.1	13.4	<3	<3	<3	.277	.007	.284	.014
28...	5	9.2	15.1	<3	<3	<3	.050	<.002	.050	.007
JUL										
13...	4	7.0	14.9	<3	<3	<3	.280	.01	.290	.025
21...	3	6.6	15.5	<3	<3	<3	.140	.002	.142	.011
AUG										
05...	3	6.6	15.9	<3	<3	<3	.368	.011	.379	.01
24...	--	7.0	17.1	<3	<3	<3	.361	.004	.365	.009
SEP										
06...	11	7.5	14.6	28	19	9	.083	.006	.089	.198
07...	15	7.8	--	17	12	5	--	--	--	--
15...	4	7.6	14.1	<3	<3	<3	.207	.01	.217	.026
17...	24	8.9	12.6	20	14	6	.076	.004	.080	.071
18...	37	9.1	8.5	29	21	8	.087	.003	.090	.051
24...	18	10.7	12.6	9	4	5	.148	.004	.152	.06

< 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 1998 TO SEPTEMBER 1999

DATE	NITRO- GEN, AM- MONIA + ORGANIC TOTAL AS N) (00625)	NITRO- GEN, AM- MONIA + ORGANIC DIS. AS N) (00623)	NITROGEN TOTAL SEDIMNT SUSP TOTAL AS N (00601)	NITRO- GEN DIS- SOLVED AS N) (00602)	PHOS- PHORUS TOTAL AS P) (00665)	PHOS TOTAL SEDIMNT SUSP TOTAL AS P (00667)	PHOS- PHORUS DIS- SOLVED AS P) (00666)	PHOS- PHORUS ORTHO, DIS- SOLVED AS P) (00671)	CARBON, INORG + ORGANIC TOTAL AS C) (00694)
OCT									
08...	--	--	.016	.454	--	.005	.018	.013	.168
20...	--	--	.006	.416	--	.002	.017	.010	.244
NOV									
02...	--	--	.004	.322	--	.004	.012	.008	.096
17...	--	--	.011	.354	--	.005	.012	.007	.184
DEC									
01...	--	--	.007	.373	--	.005	.015	.008	.117
15...	--	--	.143	.350	--	.028	.008	.004	1.03
15...	--	--	.14	.29	--	.029	.007	.004	1.0
JAN									
04...	--	--	.133	.311	--	.028	.003	.007	1.00
08...	--	--	.094	.412	--	.017	.006	.005	.656
21...	--	--	.074	.738	--	.028	.027	.008	.602
25...	--	--	.123	.541	--	.037	.024	.008	1.07
26...	--	--	.094	.552	--	.034	.013	.008	.877
FEB									
09...	--	--	.044	.707	--	.025	.032	.010	.510
23...	--	--	.079	.470	--	.017	.019	.003	.550
MAR									
09...	--	--	.084	.333	--	.014	.011	.005	.577
16...	--	--	.136	.309	--	.024	.011	.003	.909
17...	--	--	.116	.293	--	.020	.015	.006	.724
17...	--	--	.101	.303	--	.020	.013	.004	.727
19...	--	--	.105	.525	--	.039	.020	.010	.752
20...	--	--	.111	.590	--	.044	.023	.010	.842
23...	--	--	.087	.672	--	.021	.037	.009	.680
23...	.4	.4	--	.59	.05	--	<.05	.008	--
APR									
12...	--	--	.089	.324	--	.017	.011	.004	.595
26...	--	--	.034	.312	--	.010	.012	.005	.321
MAY									
03...	--	--	.023	.362	--	.010	.019	.004	.240
17...	--	--	.094	.281	--	.020	.012	.006	.806
17...	.3	.3	--	.31	E.04	--	<.05	.002	--
18...	--	--	.076	.610	--	.021	.012	.006	.622
21...	--	--	.069	.427	--	.018	.020	.006	.532
JUN									
08...	--	--	.005	.705	--	.007	.023	.014	.203
28...	--	--	.129	.463	--	.033	.018	.006	.882
JUL									
13...	--	--	.014	.674	--	.005	.046	.024	.203
21...	--	--	.022	.488	--	.008	.018	.012	2.38
AUG									
05...	--	--	.047	.692	--	.007	.047	.035	.275
24...	--	--	.018	.668	--	.006	.060	.028	.117
SEP									
06...	--	--	.114	.560	--	.023	.017	.011	.777
07...	--	--	--	--	--	--	--	--	--
15...	--	--	.320	.550	--	.007	.018	.012	.107
17...	--	--	.102	.642	--	.023	.032	.011	.833
18...	--	--	.150	.786	--	.054	.041	.010	1.31
24...	--	--	.078	.853	--	.028	.046	.018	.574

&lt; Actual value is known to be less than the value shown.

E Estimated.



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## JAMES RIVER BASIN

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 Schiminoe Creek.

DRAINAGE AREA.--252 mi<sup>2</sup>.

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 sea level.

REMARKS.--Records good. Maximum discharge, 7,710 ft<sup>3</sup>/s, from rating curve extended above 5,520 ft<sup>3</sup>/s. Minimum gage height, 1.53 ft, Sep. 13, 1965. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 5,370 ft<sup>3</sup>/s, Sep 17, gage height, 10.95 ft; minimum discharge, 0.51 ft<sup>3</sup>/s, Aug, 17, gage height, 1.73 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	13	8.7	34	209	407	140	222	137	41	95	5.5	28
2	22	8.6	31	188	318	142	218	124	28	157	18	20
3	29	12	28	304	264	144	213	110	18	316	12	14
4	39	14	30	528	232	160	208	100	12	401	8.0	13
5	41	17	30	624	215	149	197	93	10	355	5.9	89
6	34	16	33	e600	197	170	186	84	8.6	313	4.5	118
7	23	17	36	e530	183	191	184	76	7.8	232	3.4	150
8	17	17	30	520	172	188	178	69	7.0	192	3.8	198
9	16	17	68	497	159	176	173	64	7.0	172	2.2	279
10	16	15	94	422	148	167	202	55	6.5	96	1.4	685
11	15	16	129	324	137	157	206	47	5.8	79	1.2	1370
12	14	18	140	249	130	148	266	40	5.4	88	1.1	1100
13	13	17	254	202	130	142	275	40	6.4	136	.87	833
14	13	17	365	176	129	144	277	108	6.7	186	.90	631
15	12	17	444	186	129	311	287	104	12	213	.89	521
16	9.8	16	456	209	126	470	314	101	19	212	.77	2260
17	9.2	15	390	206	127	682	294	102	22	194	.66	4910
18	7.4	13	434	228	137	822	248	98	19	162	.92	3880
19	5.7	12	398	262	153	976	215	96	16	130	1.2	3980
20	4.2	12	284	300	157	946	180	85	15	92	2.0	3380
21	3.0	15	191	319	161	825	152	68	18	61	1.7	2430
22	2.2	15	138	312	159	764	134	53	20	41	2.1	2000
23	2.0	18	112	305	158	782	124	64	21	28	9.8	1390
24	2.5	19	135	354	153	822	156	80	20	20	31	1060
25	2.4	20	162	491	143	746	170	113	17	17	58	835
26	2.0	28	175	591	136	727	177	142	14	13	76	602
27	2.5	29	190	637	128	630	173	138	11	11	89	458
28	3.0	36	205	668	127	534	165	136	10	9.6	76	365
29	4.0	37	225	684	---	430	165	118	9.7	8.4	60	333
30	7.1	35	236	600	---	333	155	85	37	7.1	48	329
31	9.0	---	228	515	---	262	---	58	---	5.2	36	---
TOTAL	393.0	547.3	5705	12240	4815	13280	6114	2788	450.9	4042.3	562.81	34261
MEAN	12.7	18.2	184	395	172	428	204	89.9	15.0	130	18.2	1142
MAX	41	37	456	684	407	976	314	142	41	401	89	4910
MIN	2.0	8.6	28	176	126	140	124	40	5.4	5.2	.66	13
CFSM	.05	.07	.73	1.57	.68	1.70	.81	.36	.06	.52	.07	4.53
IN.	.06	.08	.84	1.81	.71	1.96	.90	.41	.07	.60	.08	5.06

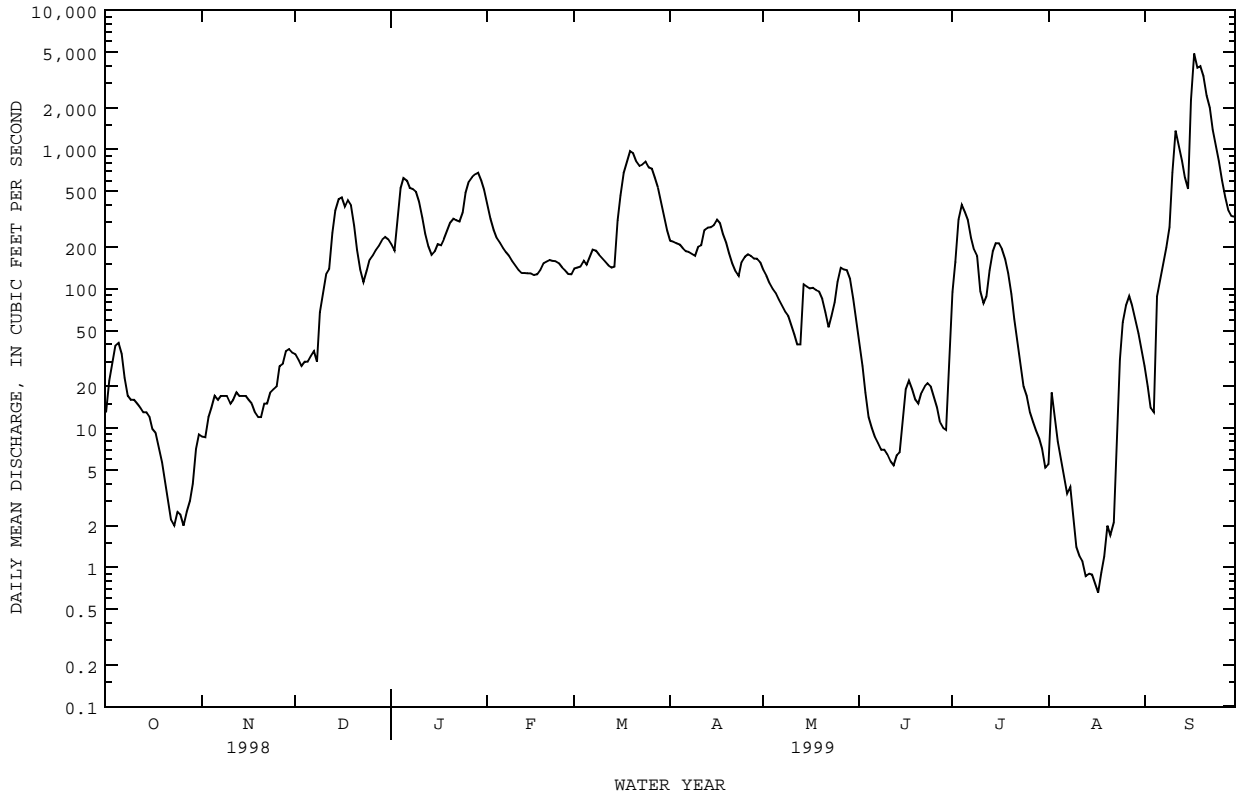
02042500 CHICKAHOMINY RIVER NEAR PROVIDENCE FORGE, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1942 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	142	206	285	380	425	480	381	238	162	145	159	125
MAX	794	768	1043	1214	1198	1055	1152	676	757	1081	1445	1142
(WY)	1980	1986	1958	1978	1998	1998	1984	1978	1972	1945	1955	1999
MIN	3.81	17.5	28.0	58.7	94.4	108	102	34.9	14.1	12.5	5.53	.17
(WY)	1969	1966	1966	1955	1942	1981	1995	1985	1977	1968	1995	1997

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR	WATER YEARS 1942 - 1999
ANNUAL TOTAL	131393.4	85199.31	
ANNUAL MEAN	360	233	262
HIGHEST ANNUAL MEAN			482 1958
LOWEST ANNUAL MEAN			91.4 1966
HIGHEST DAILY MEAN	2750 Mar 22	4910 Sep 17	6680 Aug 15 1955
LOWEST DAILY MEAN	1.3 Sep 21	.66 Aug 17	.07 aSep 12 1997
ANNUAL SEVEN-DAY MINIMUM	2.4 Oct 21	.87 Aug 12	.07 Sep 12 1997
INSTANTANEOUS PEAK FLOW		5370 Sep 17	7710 Aug 15 1955
INSTANTANEOUS PEAK STAGE		10.95 Sep 17	11.67 Aug 15 1955
INSTANTANEOUS LOW FLOW		.51 Aug 17	.06 bSep 12 1997
ANNUAL RUNOFF (CFSM)	1.43	.93	1.04
ANNUAL RUNOFF (INCHES)	19.40	12.58	14.13
10 PERCENT EXCEEDS	944	529	600
50 PERCENT EXCEEDS	176	124	165
90 PERCENT EXCEEDS	9.0	6.9	21

a Also Sep 15-17, and Oct 12, 13, 1997.  
 b Also Sep 14-15, 16, 17, 18, 1997.  
 e Estimated.



## GREAT DISMAL SWAMP BASIN

02043600 LAKE DRUMMOND IN GREAT DISMAL SWAMP, VA

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.

PERIOD OF RECORD.--May 1926 to current year. Prior to October 1973, published as Lake Drummond in Dismal Swamp.

REVISED RECORDS.--WSP 1032: 1934-43.

GAGE.--Nonrecording gage. Datum of gage is 12.16 ft above sea level. Aug. 22, 1978, to Oct. 1, 1981, water-stage recorder at same site and datum.

REMARKS.--Mean daily gage heights are shown in table below, no readings available Sep. 16-23, 25, 29.

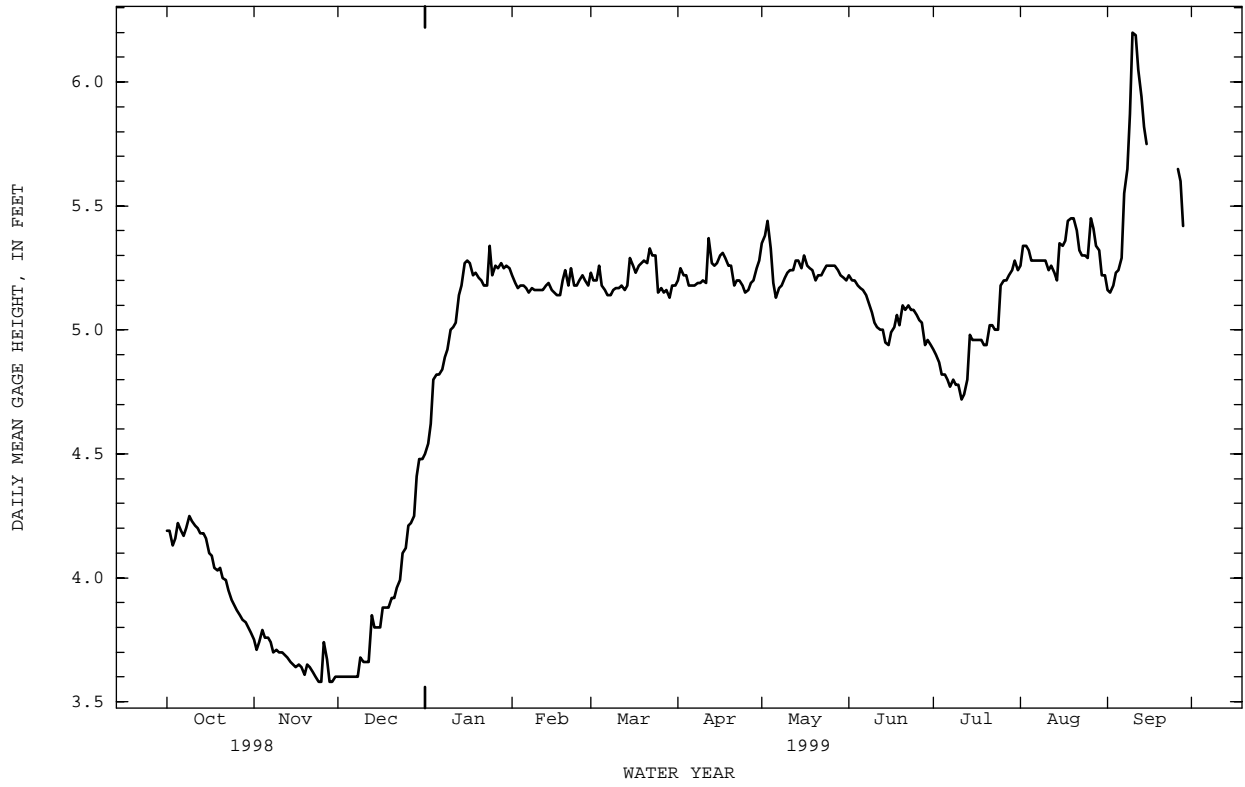
EXTREMES FOR PERIOD OF RECORD.--Maximum gage height, 7.0 ft, from floodmark, probably occurred during period Sep. 16-18, 1999; minimum gage height, -0.67 ft, Nov. 3, 1952.

EXTREMES FOR CURRENT YEAR.--Maximum instantaneous gage height, 7.0 ft, from floodmark, probably occurred during period Sep 16-18; minimum instantaneous gage height, 3.58 ft, Nov. 24-25, 28-29.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	4.19	3.75	3.60	4.50	5.22	5.23	5.20	5.35	5.22	4.92	5.26	5.16
2	4.19	3.71	3.60	4.54	5.19	5.20	5.25	5.38	5.20	4.90	5.34	5.15
3	4.13	3.74	3.60	4.62	5.17	5.20	5.22	5.44	5.20	4.87	5.34	5.18
4	4.16	3.79	3.60	4.80	5.18	5.26	5.22	5.33	5.18	4.82	5.32	5.23
5	4.22	3.76	3.60	4.82	5.18	5.18	5.18	5.19	5.17	4.82	5.28	5.24
6	4.19	3.76	3.60	4.82	5.17	5.16	5.18	5.13	5.16	4.80	5.28	5.29
7	4.17	3.74	3.60	4.84	5.15	5.14	5.18	5.17	5.14	4.77	5.28	5.55
8	4.20	3.70	3.60	4.89	5.17	5.14	5.19	5.18	5.11	4.80	5.28	5.65
9	4.25	3.71	3.68	4.92	5.16	5.16	5.19	5.21	5.07	4.78	5.28	5.87
10	4.23	3.70	3.66	5.00	5.16	5.17	5.20	5.23	5.03	4.78	5.28	6.20
11	4.21	3.70	3.66	5.01	5.16	5.17	5.19	5.24	5.01	4.72	5.24	6.19
12	4.20	3.69	3.66	5.03	5.16	5.18	5.37	5.24	5.00	4.74	5.26	6.05
13	4.18	3.68	3.85	5.14	5.18	5.16	5.27	5.28	5.00	4.80	5.23	5.94
14	4.18	3.66	3.80	5.18	5.19	5.18	5.26	5.28	4.95	4.98	5.20	5.82
15	4.16	3.65	3.80	5.27	5.16	5.29	5.27	5.25	4.94	4.96	5.35	5.75
16	4.10	3.64	3.80	5.28	5.15	5.26	5.30	5.30	4.99	4.96	5.34	---
17	4.09	3.65	3.88	5.27	5.14	5.23	5.31	5.26	5.01	4.96	5.36	---
18	4.04	3.64	3.88	5.22	5.14	5.26	5.29	5.25	5.06	4.96	5.44	---
19	4.03	3.61	3.88	5.23	5.20	5.27	5.26	5.24	5.02	4.94	5.45	---
20	4.04	3.65	3.92	5.21	5.24	5.28	5.26	5.20	5.10	4.94	5.45	---
21	4.00	3.64	3.92	5.20	5.18	5.27	5.18	5.22	5.08	5.02	5.40	---
22	3.99	3.62	3.96	5.18	5.25	5.33	5.20	5.22	5.10	5.02	5.32	---
23	3.95	3.60	3.99	5.18	5.18	5.30	5.20	5.24	5.08	5.00	5.30	---
24	3.91	3.58	4.10	5.34	5.18	5.30	5.18	5.26	5.08	5.00	5.30	5.96
25	3.89	3.58	4.12	5.22	5.20	5.15	5.15	5.26	5.06	5.18	5.29	---
26	3.87	3.74	4.21	5.26	5.22	5.17	5.16	5.26	5.04	5.20	5.45	5.65
27	3.85	3.67	4.22	5.25	5.20	5.15	5.19	5.26	5.03	5.20	5.41	5.60
28	3.83	3.58	4.25	5.27	5.18	5.16	5.20	5.24	4.94	5.22	5.34	5.42
29	3.82	3.58	4.41	5.25	---	5.13	5.25	5.22	4.96	5.24	5.32	---
30	3.80	3.60	4.48	5.26	---	5.18	5.28	5.21	4.94	5.28	5.22	5.28
31	3.78	---	4.48	5.25	---	5.18	---	5.20	---	5.24	5.22	---
MEAN	4.06	3.67	3.88	5.07	5.18	5.21	5.23	5.25	5.06	4.96	5.32	---
MAX	4.25	3.79	4.48	5.34	5.25	5.33	5.37	5.44	5.22	5.28	5.45	---
MIN	3.78	3.58	3.60	4.50	5.14	5.13	5.15	5.13	4.94	4.72	5.20	---

02043600 LAKE DRUMMOND IN GREAT DISMAL SWAMP, VA--Continued



CHOWAN RIVER BASIN

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 mi<sup>2</sup>.

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 sea level.

REMARKS.--Records good except for period of no gage-height record, Jan. 21 to Feb. 2, which is fair. Maximum discharge, 29,900 ft<sup>3</sup>/s, from rating curve extended above 16,000 ft<sup>3</sup>/s on basis of slope-area measurement of peak flow. Minimum gage height, 1.83 ft, Oct. 15, 1954. Several measurements of water temperature were made during the year. Water-quality records for some periods have been collected at this location.

COOPERATION.--Records were provided by the Virginia Department of Environmental Quality - Water Division.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in August 1940 reached a stage of 20.8 ft, discharge, about 19,000 ft<sup>3</sup>/s, from information by local resident.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,500 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Sep 17	1530	*7,850	*13.82	No other peak greater than base discharge.			

Minimum discharge, 5.3 ft<sup>3</sup>/s, Aug 12.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	32	30	56	137	e170	124	163	306	60	66	30	27
2	34	31	58	111	e201	118	335	222	58	57	28	22
3	31	35	54	654	260	112	440	178	53	54	25	19
4	33	47	51	1410	268	135	306	160	51	47	20	69
5	53	54	50	1040	217	197	259	148	46	39	16	1890
6	66	53	50	413	178	192	261	140	45	34	14	2140
7	62	49	51	257	158	153	220	136	44	32	12	860
8	55	47	52	202	160	128	185	131	45	35	9.6	471
9	64	46	73	171	150	113	169	120	44	35	8.9	407
10	61	46	112	149	139	116	196	108	40	34	7.3	304
11	54	50	99	127	126	117	546	98	36	28	5.8	181
12	44	64	70	112	122	108	1820	92	35	28	5.6	117
13	37	59	187	104	135	99	2280	90	38	41	7.1	86
14	34	56	605	114	140	113	839	340	49	89	8.1	69
15	31	56	395	223	124	524	474	977	65	143	14	82
16	28	55	202	293	114	1340	679	828	103	116	27	4060
17	26	52	139	230	109	1170	711	419	88	73	26	6550
18	25	50	102	249	135	526	477	276	70	54	18	3610
19	27	47	77	390	186	349	347	217	60	45	14	720
20	26	48	68	341	212	262	283	182	55	38	11	376
21	26	50	64	e270	176	290	244	158	63	32	8.5	267
22	25	48	61	e170	147	698	221	136	76	29	8.0	860
23	26	48	59	e150	123	785	204	121	73	28	9.5	1230
24	25	50	82	e740	112	502	180	111	61	28	9.5	547
25	28	50	181	e1500	110	362	159	99	53	80	8.8	325
26	30	53	218	e980	111	288	148	87	48	120	14	227
27	31	60	162	e620	107	240	144	85	45	81	174	229
28	32	60	149	e399	110	205	148	76	47	54	427	361
29	31	59	168	e337	---	178	192	72	48	41	121	342
30	30	57	187	e249	---	161	288	69	54	34	56	411
31	29	---	167	e199	---	147	---	63	---	31	36	---
TOTAL	1136	1510	4049	12341	4300	9852	12918	6245	1653	1646	1179.7	26859
MEAN	36.6	50.3	131	398	154	318	431	201	55.1	53.1	38.1	895
MAX	66	64	605	1500	268	1340	2280	977	103	143	427	6550
MIN	25	30	50	104	107	99	144	63	35	28	5.6	19
CFSM	.12	.16	.42	1.29	.50	1.03	1.39	.65	.18	.17	.12	2.90
IN.	.14	.18	.49	1.49	.52	1.19	1.56	.75	.20	.20	.14	3.23

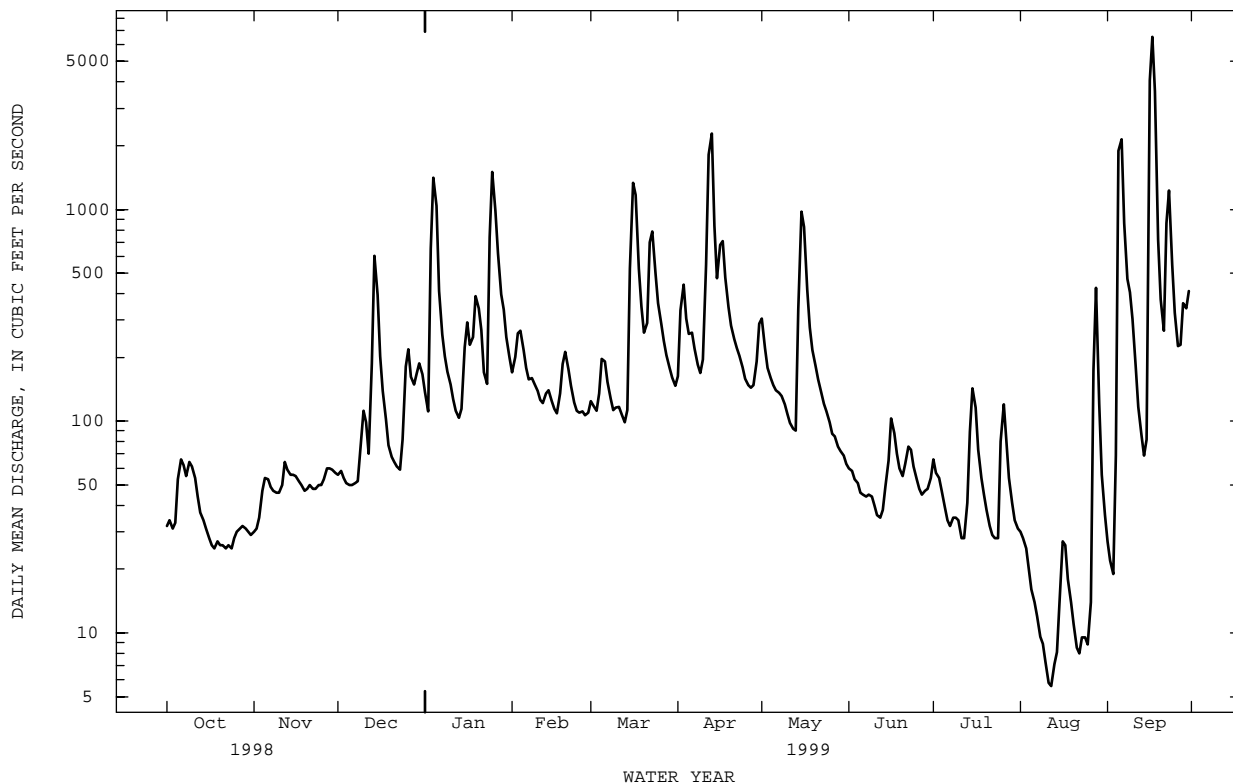
02044500 NOTTOWAY RIVER NEAR RAWLINGS, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1951 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	228	247	294	422	496	559	466	302	208	152	130	167
MAX	2024	1560	893	1289	1248	1350	1201	893	1359	965	650	1436
(WY)	1973	1986	1958	1978	1979	1998	1987	1958	1972	1975	1955	1979
MIN	13.0	50.3	65.0	95.0	123	126	124	98.3	55.1	25.2	8.60	3.62
(WY)	1964	1999	1966	1966	1968	1981	1966	1991	1999	1966	1963	1954

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR	WATER YEARS 1951 - 1999
ANNUAL TOTAL	136571	83688.7	
ANNUAL MEAN	374	229	305
HIGHEST ANNUAL MEAN			619
LOWEST ANNUAL MEAN			144
HIGHEST DAILY MEAN	9140	Mar 20	6550
LOWEST DAILY MEAN	22	aSep 16	5.6
ANNUAL SEVEN-DAY MINIMUM	24	Sep 12	7.5
INSTANTANEOUS PEAK FLOW			7850
INSTANTANEOUS PEAK STAGE			13.82
INSTANTANEOUS LOW FLOW			5.3
ANNUAL RUNOFF (CFSM)	1.21		.74
ANNUAL RUNOFF (INCHES)	16.44		10.08
10 PERCENT EXCEEDS	713		452
50 PERCENT EXCEEDS	139		103
90 PERCENT EXCEEDS	31		28

a Also Sep 17, 1998.  
 b Also Oct 15, 1954.  
 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 mi<sup>2</sup>.

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 sea level. Prior to Oct. 11, 1934, nonrecording gage at same site and datum.

REMARKS.--Records good except those for periods of doubtful or no gage-height record, Dec. 1-11, Dec. 31 to Feb. 2, and Aug. 2-24, which are fair. Diurnal fluctuation at low flow caused by Baskerville Mill, 33 mi upstream. Maximum discharge, 25,200 ft<sup>3</sup>/s, from rating curve extended above 13,000 ft<sup>3</sup>/s. Minimum gage height, 0.62 ft, Sep. 2, 5, 1932. 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 Department of Environmental Quality - Water Division.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 3,500 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Sep 8	0600	7,150	17.50	Sep 17	1030	*12,500	*21.28

Minimum daily discharge, 17 ft<sup>3</sup>/s, Aug 15, 23-25.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	31	34	e70	e300	e320	235	306	477	100	78	59	60
2	28	32	e68	e235	e347	247	440	440	92	110	e119	46
3	25	34	e64	e1200	452	235	622	340	89	97	e77	38
4	30	40	e68	e1800	474	358	614	285	83	79	e57	109
5	34	43	e62	e1450	445	355	489	255	76	68	e47	3470
6	31	56	e60	e900	374	344	440	235	72	58	e41	5650
7	49	58	e59	e650	325	320	414	222	69	57	e36	6000
8	60	56	e63	e430	310	264	366	211	65	78	e32	6280
9	60	50	e125	e350	306	231	326	195	64	85	e27	1740
10	59	50	e190	e300	286	227	325	179	62	62	e23	1080
11	68	50	e175	e260	263	230	754	162	57	51	e21	933
12	62	52	156	e230	245	229	3080	150	52	48	e20	465
13	56	55	193	e210	259	211	3120	140	52	50	e19	299
14	50	74	591	e235	269	217	2740	171	53	228	e18	226
15	48	71	791	e400	261	2010	1080	567	52	751	e17	296
16	45	69	495	e500	245	2420	1050	1130	70	350	e18	6260
17	44	67	316	e460	229	2150	1270	780	119	214	e34	12300
18	39	66	233	e490	256	1360	965	432	115	137	e29	11700
19	39	61	182	e650	374	764	659	317	97	97	e23	10000
20	37	60	152	e600	405	558	513	256	86	77	e20	5730
21	36	59	136	e460	379	518	437	214	78	65	e19	1320
22	34	59	125	e350	317	1280	393	189	92	55	e18	866
23	32	61	120	e310	272	1580	359	172	106	48	e17	1870
24	34	57	142	e1500	239	1180	329	162	100	45	e17	1850
25	42	59	245	e2500	226	784	289	152	83	45	17	847
26	36	63	369	e1850	224	610	262	143	75	108	20	534
27	33	65	376	e920	222	508	249	132	65	137	46	413
28	34	68	325	e710	221	435	246	127	60	106	262	1050
29	35	75	336	e550	---	383	277	120	56	93	392	1460
30	35	74	367	e450	---	343	400	111	58	102	161	1160
31	35	---	e350	e375	---	311	---	105	---	75	91	---
TOTAL	1281	1718	7004	21625	8545	20897	22814	8571	2298	3654	1797	84052
MEAN	41.3	57.3	226	698	305	674	760	276	76.6	118	58.0	2802
MAX	68	75	791	2500	474	2420	3120	1130	119	751	392	12300
MIN	25	32	59	210	221	211	246	105	52	45	17	38
CFSM	.07	.10	.39	1.20	.53	1.16	1.31	.48	.13	.20	.10	4.84
IN.	.08	.11	.45	1.39	.55	1.34	1.47	.55	.15	.23	.12	5.40



02045500 NOTTOWAY RIVER NEAR STONY CREEK, VA--Continued

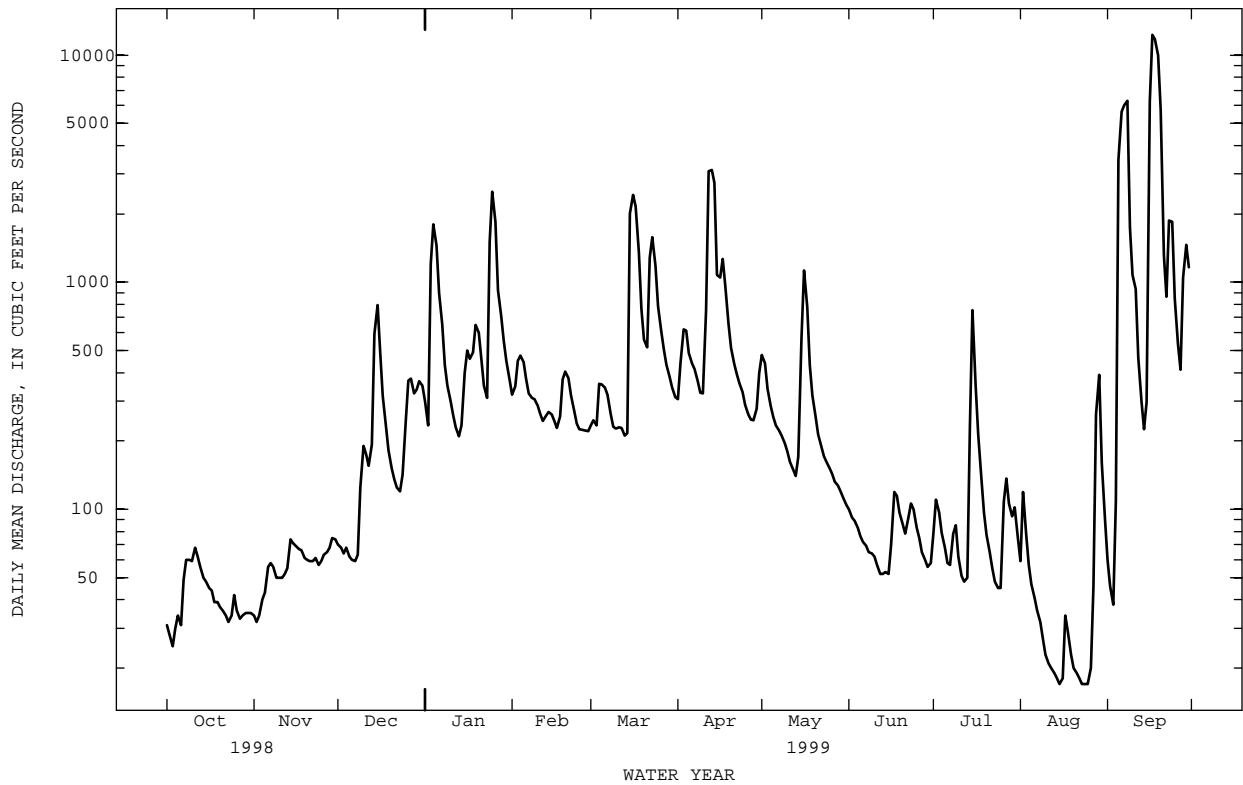
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1931 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	309	405	517	829	939	1041	859	536	331	349	300	305
MAX	2666	2800	1783	2578	2355	2827	2261	1878	1612	2423	3057	2802
(WY)	1973	1986	1958	1936	1979	1998	1987	1958	1938	1938	1940	1999
MIN	14.0	43.1	65.7	109	176	196	192	129	74.6	46.6	14.9	9.40
(WY)	1931	1942	1966	1966	1931	1981	1966	1942	1942	1966	1963	1932

SUMMARY STATISTICS FOR 1998 CALENDAR YEAR FOR 1999 WATER YEAR WATER YEARS 1931 - 1999

ANNUAL TOTAL	267326	184256	
ANNUAL MEAN	732	505	558
HIGHEST ANNUAL MEAN			1100 1973
LOWEST ANNUAL MEAN			191 1942
HIGHEST DAILY MEAN	11700	Mar 22	12300 Sep 17 24000 Aug 17 1940
LOWEST DAILY MEAN	25	Oct 3	17 aAug 15 4.3 Aug 15 1977
ANNUAL SEVEN-DAY MINIMUM	30	Sep 30	18 Aug 20 6.0 Aug 30 1932
INSTANTANEOUS PEAK FLOW			12500 Sep 17 25200 Aug 17 1940
INSTANTANEOUS PEAK STAGE			21.28 Sep 17 23.66 Aug 17 1940
INSTANTANEOUS LOW FLOW			(b) 3.4 cAug 15 1977
ANNUAL RUNOFF (CFSM)	1.26	.87	.96
ANNUAL RUNOFF (INCHES)	17.18	11.84	13.10
10 PERCENT EXCEEDS	1890	1050	1170
50 PERCENT EXCEEDS	210	189	300
90 PERCENT EXCEEDS	43	36	60

- a Also Aug 23-25, 1999.
- b Not determined.
- c Also Aug 16, 1977.
- e Estimated.



## CHOWAN RIVER BASIN

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 mi<sup>2</sup>.

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 sea level. 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, Dec. 13-17, Mar. 15, Apr. 11, 12, May 14-16, Jul. 14, 15, 25, and Sep. 5-8, 15-17, which are fair. Maximum discharge, 11,400 ft<sup>3</sup>/s, from rating curve extended above 5,800 ft<sup>3</sup>/s on basis of contracted-opening measurement of peak flow. No flow part of Oct. 13, 1954. 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 Department of Environmental Quality - Water Division.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,200 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Sep 17	Unknown	*7,150	a*17.24	No other peak greater than base discharge.			

Minimum discharge, 0.79 ft<sup>3</sup>/s, Aug 24.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.0	2.1	4.7	29	51	36	50	52	9.0	18	2.4	1.2
2	1.9	2.1	4.3	20	67	35	89	45	8.4	17	3.9	1.1
3	1.8	2.2	4.4	605	92	36	89	40	8.0	13	3.7	.98
4	2.0	2.5	4.4	885	79	92	72	37	7.5	10	3.1	2.9
5	2.2	2.6	4.5	548	64	53	61	34	7.3	8.6	2.8	e640
6	2.0	3.0	4.4	188	52	43	53	32	7.0	7.8	2.5	e910
7	2.1	3.8	4.4	94	46	40	50	31	6.7	7.5	2.2	e400
8	2.5	3.9	4.5	66	45	34	45	29	6.6	7.6	2.1	e250
9	3.4	3.8	6.2	54	42	31	43	27	6.3	7.0	1.9	86
10	2.7	3.8	9.7	45	39	34	52	25	6.0	6.4	1.7	58
11	2.4	4.3	9.6	37	36	34	e320	23	5.9	6.0	1.6	38
12	2.1	4.7	9.4	33	34	32	e920	21	5.8	5.8	1.5	17
13	1.8	4.7	e40	31	38	29	528	21	6.1	7.1	1.4	9.0
14	1.6	4.8	e145	28	36	40	212	e84	6.2	e35	1.3	6.5
15	1.4	5.2	e100	55	34	e550	131	e180	7.5	e50	1.3	e10
16	1.5	5.0	e44	130	32	465	319	e150	10	18	1.3	e110
17	1.4	4.9	e33	105	31	253	256	70	12	13	1.2	e4050
18	1.3	5.0	22	83	39	151	157	41	11	10	1.1	1210
19	1.6	4.9	16	109	69	98	106	30	9.8	8.6	1.1	360
20	1.9	4.8	13	88	64	73	83	23	9.1	7.6	1.0	162
21	1.9	4.7	11	72	51	93	69	19	11	6.8	1.1	122
22	1.9	4.5	10	57	41	416	61	16	12	6.4	1.1	754
23	2.3	4.9	9.3	48	35	349	54	16	11	5.9	1.0	364
24	2.4	4.4	15	342	32	194	48	18	9.6	7.7	.89	193
25	2.5	4.1	38	727	32	124	42	16	8.8	e32	.90	121
26	2.6	4.6	30	485	33	92	39	15	8.3	15	1.3	84
27	2.6	5.1	24	239	32	75	37	14	7.8	6.9	2.4	71
28	2.5	5.1	29	140	32	65	37	12	7.5	4.4	2.5	109
29	2.1	4.7	38	99	---	57	45	11	7.4	3.5	2.1	106
30	2.2	4.7	43	75	---	51	56	10	8.3	2.9	1.5	146
31	2.2	---	34	60	---	45	---	9.6	---	2.6	1.3	---
TOTAL	64.8	124.9	764.8	5577	1278	3720	4124	1151.6	247.9	358.1	55.19	10392.68
MEAN	2.09	4.16	24.7	180	45.6	120	137	37.1	8.26	11.6	1.78	346
MAX	3.4	5.2	145	885	92	550	920	180	12	50	3.9	4050
MIN	1.3	2.1	4.3	20	31	29	37	9.6	5.8	2.6	.89	.98
CFSM	.02	.04	.22	1.61	.41	1.07	1.23	.33	.07	.10	.02	3.09
IN.	.02	.04	.25	1.85	.42	1.24	1.37	.38	.08	.12	.02	3.45

02046000 STONY CREEK NEAR DINWIDDIE, VA--Continued

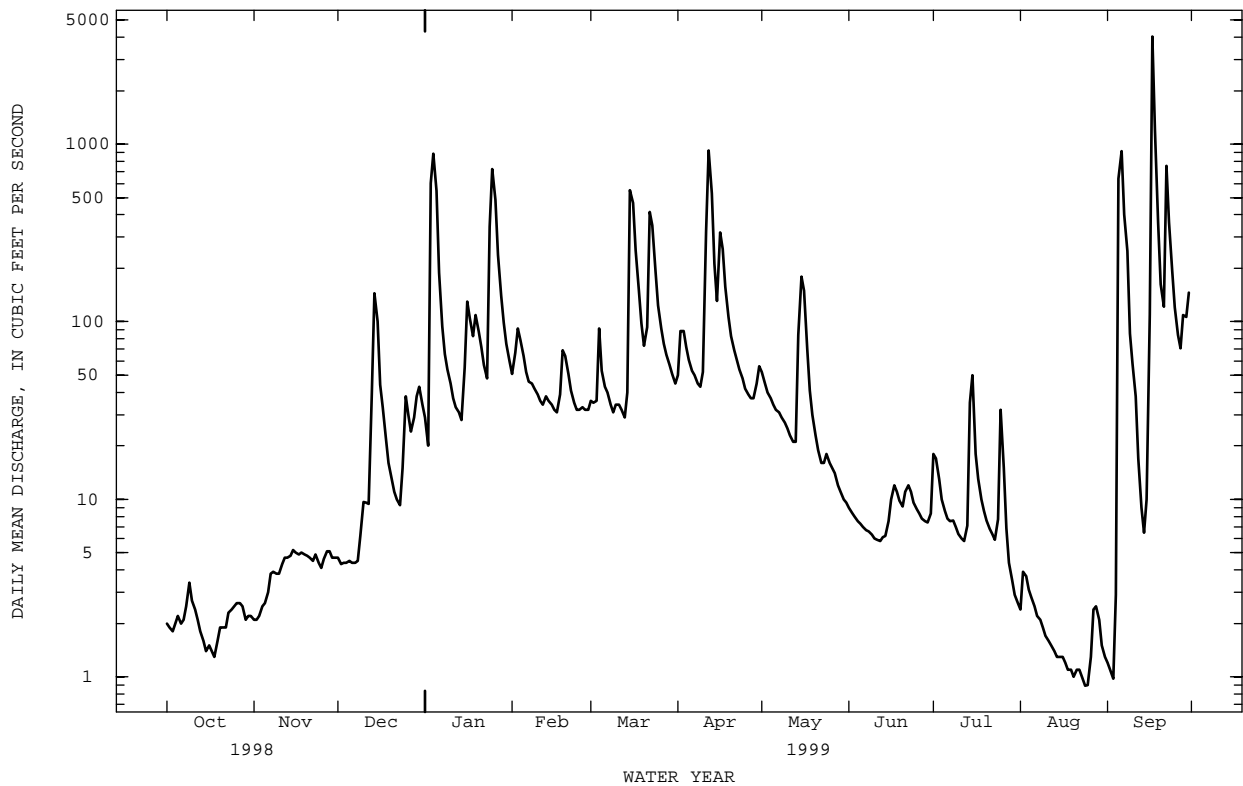
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1947 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	68.4	87.0	106	168	197	218	164	95.2	58.7	47.2	45.2	58.4
MAX	554	510	426	549	541	551	377	351	156	560	288	774
(WY)	1973	1986	1958	1978	1979	1998	1952	1958	1981	1975	1955	1979
MIN	.12	2.99	5.68	15.5	37.5	27.7	27.0	20.9	8.26	2.62	.97	.18
(WY)	1955	1966	1966	1966	1968	1981	1966	1991	1999	1986	1963	1954

SUMMARY STATISTICS FOR 1998 CALENDAR YEAR FOR 1999 WATER YEAR WATER YEARS 1947 - 1999

ANNUAL TOTAL	50397.33		27858.97				109					
ANNUAL MEAN	138		76.3				34.1				1979	
HIGHEST ANNUAL MEAN							7050				1981	
LOWEST ANNUAL MEAN							e.04		bOct 7		1993	
HIGHEST DAILY MEAN	e3700		Mar 20		e4050		Sep 17		20.84		Oct 6 1972	
LOWEST DAILY MEAN	.80		Sep 17		.89		Aug 24		e.05		cOct 6 1993	
ANNUAL SEVEN-DAY MINIMUM	1.0		Sep 14		1.0		Aug 19		20.84		Oct 6 1972	
INSTANTANEOUS PEAK FLOW					7150		Sep 17		11400		Oct 6 1972	
INSTANTANEOUS PEAK STAGE					a17.24		Sep 17		20.84		Oct 6 1972	
INSTANTANEOUS LOW FLOW					.79		Aug 24		d.00		Oct 13 1954	
ANNUAL RUNOFF (CFSM)	1.23				.68				.97			
ANNUAL RUNOFF (INCHES)	16.74				9.25				13.23			
10 PERCENT EXCEEDS	351				145				242			
50 PERCENT EXCEEDS	29				17				48			
90 PERCENT EXCEEDS	1.9				2.0				5.1			

- a From high-water mark in well.
- b Also Oct 8, 9, 1993.
- c Also Oct 7, 8, 1998.
- d Observed.
- e Estimated.



## CHOWAN RIVER BASIN

02047000 NOTTOWAY RIVER NEAR SEBRELL, VA

LOCATION.--Lat 36°46'13", long 77°09'59", Southampton County, Hydrologic Unit 03010201, on right bank at 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 mi<sup>2</sup>.

PERIOD OF RECORD.--September 1941 to current year.

REVISED RECORDS.--WSP 1333: 1942, 1944, 1948-49. WSP 2104: Drainage area. WDR-91-1: 1982(m).

GAGE.--Water-stage recorder. Datum of gage is 5.94 ft above sea level. Prior to Aug. 23, 1950, nonrecording gage on right bank at site 1,000 ft upstream at same datum. Aug. 23, 1950 to Oct. 1, 1996, water-stage recorder at above site and datum. Nonrecording gage Oct. 1, 1996 to Apr. 9, 1997 at present site and datum. Apr. 9, 1997 to current year, water-stage recorder at present site and datum.

REMARKS.--Records good except those for period of no gage-height record, Sep. 19-21 which is fair. Maximum discharge, 36,000 ft<sup>3</sup>/s, from rating curve extended above 25,000 ft<sup>3</sup>/s. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 36,000 ft<sup>3</sup>/s, occurred Sep 19 or 20, gage height, 26.98 ft; minimum discharge, 39 ft<sup>3</sup>/s, Aug 25-26, gage height, 3.02 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	54	43	81	685	2180	640	903	808	167	96	224	198
2	51	44	82	631	1530	656	888	948	154	96	191	141
3	48	50	83	714	1260	655	979	956	145	124	194	110
4	59	50	82	1300	1230	654	1160	863	135	163	234	104
5	53	48	81	2190	1260	716	1230	737	126	151	245	575
6	50	47	80	2830	1210	878	1120	647	118	131	187	1820
7	54	50	80	3250	1110	823	996	582	111	116	146	2560
8	55	58	78	3450	1020	763	908	525	105	130	118	3250
9	66	67	88	2920	944	680	820	472	99	205	100	4240
10	79	68	97	1950	892	633	751	426	92	213	85	5970
11	80	66	109	1350	826	605	886	383	87	187	73	7650
12	76	62	153	1000	757	590	2000	339	86	155	65	7460
13	84	61	251	794	711	573	2970	307	84	142	58	5780
14	82	62	385	664	686	557	3640	302	80	189	59	3970
15	74	64	606	850	677	1030	4300	332	78	455	117	2470
16	67	76	1010	1410	651	2140	4970	559	84	1110	132	8760
17	63	81	941	1640	618	3030	4940	1200	83	1040	73	24100
18	61	78	701	1720	618	3670	4280	1270	102	738	55	29600
19	59	77	555	1730	730	4270	3650	892	149	494	49	e34500
20	56	76	466	1690	908	4550	3080	609	152	327	44	e34000
21	51	73	396	1630	1030	4020	2240	474	142	231	43	e27000
22	50	70	345	1560	996	2920	1570	394	132	180	50	19900
23	47	69	296	1390	897	2430	1220	362	124	153	47	13300
24	46	69	289	1350	797	2630	1020	327	136	132	42	9720
25	45	70	333	2060	714	2900	883	292	149	127	40	7280
26	43	71	393	2940	652	3010	771	270	141	209	41	5780
27	46	70	530	3580	611	2660	679	259	124	332	48	5080
28	50	72	638	4190	599	2000	617	234	113	391	51	4400
29	46	74	645	4640	---	1520	602	215	102	331	115	3240
30	43	76	647	4420	---	1220	668	199	97	276	367	2770
31	43	---	676	3390	---	1030	---	182	---	255	313	---
TOTAL	1781	1942	11197	63918	26114	54453	54741	16365	3497	8879	3606	275728
MEAN	57.5	64.7	361	2062	933	1757	1825	528	117	286	116	9191
MAX	84	81	1010	4640	2180	4550	4970	1270	167	1110	367	34500
MIN	43	43	78	631	599	557	602	182	78	96	40	104
CFSM	.04	.05	.25	1.45	.66	1.24	1.28	.37	.08	.20	.08	6.47
IN.	.05	.05	.29	1.67	.68	1.43	1.43	.43	.09	.23	.09	7.22

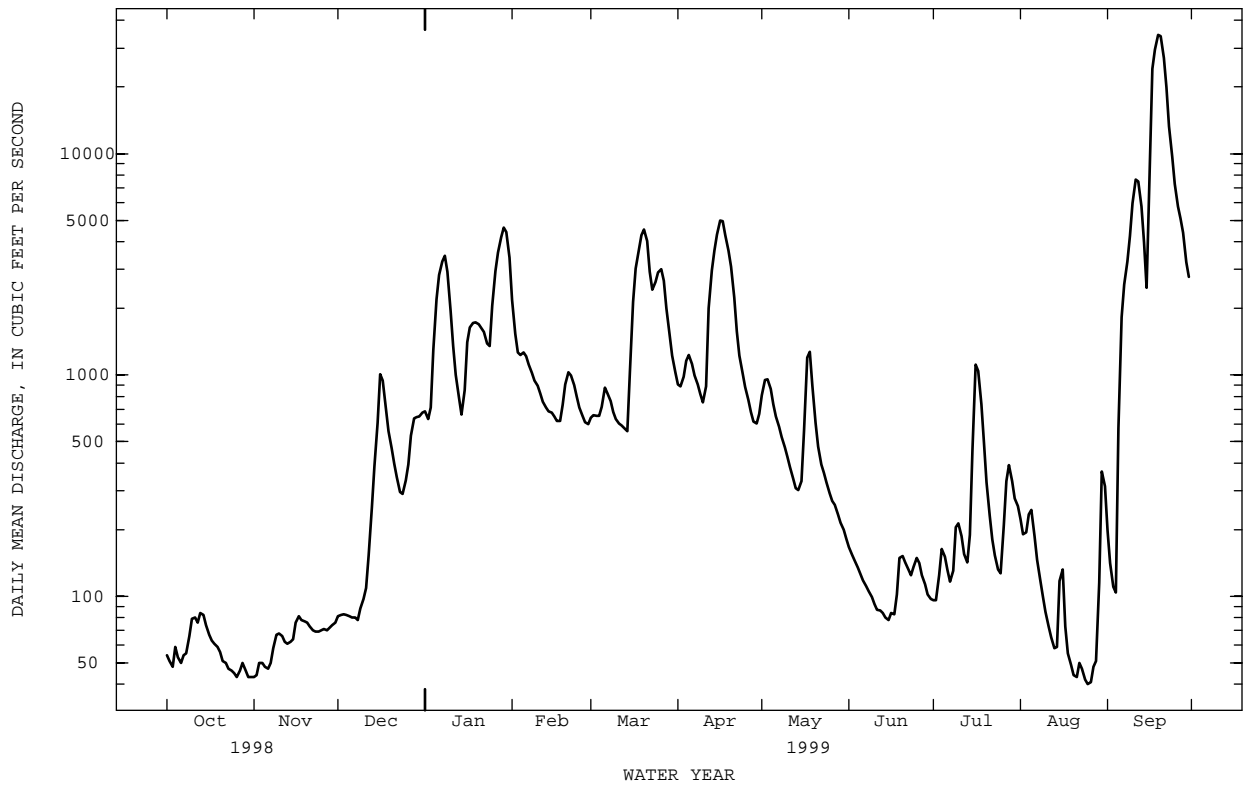
02047000 NOTTOWAY RIVER NEAR SEBRELL, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1941 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	646	863	1323	2074	2499	2808	2095	1324	755	721	616	683
MAX	4491	4854	4310	6115	6255	6531	5127	5180	2246	5782	2831	9191
(WY)	1973	1986	1958	1978	1998	1998	1987	1978	1972	1975	1955	1999
MIN	27.4	59.5	98.8	196	516	389	427	300	117	48.9	43.3	27.8
(WY)	1955	1942	1966	1966	1981	1981	1966	1942	1999	1966	1963	1954

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR		FOR 1999 WATER YEAR		WATER YEARS 1941 - 1999	
ANNUAL TOTAL	630774		522221			
ANNUAL MEAN	1728		1431		1362	
HIGHEST ANNUAL MEAN					2671	
LOWEST ANNUAL MEAN					366	
HIGHEST DAILY MEAN	15900		Mar 24		e34500	
LOWEST DAILY MEAN	43		aOct 26		40	
ANNUAL SEVEN-DAY MINIMUM	45		Oct 26		44	
INSTANTANEOUS PEAK FLOW					36000	
INSTANTANEOUS PEAK STAGE					c26.98	
INSTANTANEOUS LOW FLOW					39	
ANNUAL RUNOFF (CFSM)	1.22				1.01	
ANNUAL RUNOFF (INCHES)	16.51				13.67	
10 PERCENT EXCEEDS	4700				3250	
50 PERCENT EXCEEDS	355				385	
90 PERCENT EXCEEDS	61				56	

- a Also Oct 30 to Nov 1, 1998.
- b Occurred Sep 19 or 20, 1999.
- c From high-water mark in gage house.
- d Also Aug 26, 1999.
- e Estimated.
- f Observed.



CHOWAN RIVER BASIN

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 mi<sup>2</sup>.

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 sea level (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 for period of no gage-height record, Sep. 16-21, which is fair. Maximum discharge, 12,300 ft<sup>3</sup>/s, from rating curve extended above 5,000 ft<sup>3</sup>/s. No flow at times most years. 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 Department of Environmental Quality - Water Division.

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 ft<sup>3</sup>/s, from rating curve extended above 4,900 ft<sup>3</sup>/s.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 12,300 ft<sup>3</sup>/s, Sep 17, gage height, 17.11 ft, from floodmarks; no flow part or all of each day Oct 1 to Dec 13, and Jun 4 to Jul 9.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	.00	189	669	160	420	140	.34	.00	275	.07
2	.00	.00	.00	185	570	159	355	134	.13	.00	233	.05
3	.00	.00	.00	242	472	161	299	130	.05	.00	188	.04
4	.00	.00	.00	367	405	160	267	124	.01	.00	140	.16
5	.00	.00	.00	607	349	151	247	119	.00	.00	96	226
6	.00	.00	.00	784	302	142	229	112	.00	.00	67	465
7	.00	.00	.00	721	259	131	209	104	.00	.00	48	862
8	.00	.00	.00	656	226	116	193	94	.00	.00	36	889
9	.00	.00	.00	635	198	110	188	87	.00	10	40	744
10	.00	.00	.00	627	178	111	206	76	.00	102	59	916
11	.00	.00	.00	554	168	111	360	66	.00	173	63	1270
12	.00	.00	.00	467	154	111	646	59	.00	135	53	1330
13	.00	.00	3.7	398	152	111	984	56	.00	137	37	1130
14	.00	.00	44	322	144	155	1030	53	.00	153	24	891
15	.00	.00	70	399	130	441	963	49	.00	240	20	801
16	.00	.00	121	513	124	966	973	46	.00	494	12	e6270
17	.00	.00	185	660	117	1270	950	43	.00	607	7.7	e11300
18	.00	.00	173	690	142	1150	864	39	.00	444	5.4	e11400
19	.00	.00	146	594	164	1190	741	33	.00	300	2.9	e9480
20	.00	.00	125	533	173	1330	646	27	.00	233	1.2	e7230
21	.00	.00	107	469	185	1240	594	22	.00	192	.27	e5010
22	.00	.00	95	464	183	1050	554	30	.00	160	.09	3280
23	.00	.00	85	436	170	858	497	29	.00	131	.08	2120
24	.00	.00	93	446	162	732	422	22	.00	142	.06	1380
25	.00	.00	110	660	156	643	344	17	.00	346	.04	948
26	.00	.00	113	826	158	627	274	14	.00	246	.17	683
27	.00	.00	123	936	154	719	217	9.9	.00	208	2.9	509
28	.00	.00	157	841	154	757	185	6.3	.00	192	3.7	416
29	.00	.00	176	747	---	681	175	4.0	.00	261	2.6	450
30	.00	.00	185	733	---	581	156	2.1	.00	313	.70	620
31	.00	---	189	748	---	507	---	1.0	---	316	.14	---
TOTAL	0.00	0.00	2300.70	17449	6418	16631	14188	1748.3	0.53	5535.00	1418.95	70636.16
MEAN	.000	.000	74.2	563	229	536	473	56.4	.018	179	45.8	2355
MAX	.00	.00	189	936	669	1330	1030	140	.34	607	275	11400
MIN	.00	.00	.00	185	117	110	156	1.0	.00	.00	.04	.04
CFSM	.00	.00	.25	1.91	.78	1.82	1.61	.19	.00	.61	.16	8.01
IN.	.00	.00	.29	2.21	.81	2.10	1.80	.22	.00	.70	.18	8.94

02047500 BLACKWATER RIVER NEAR DENDRON, VA--Continued

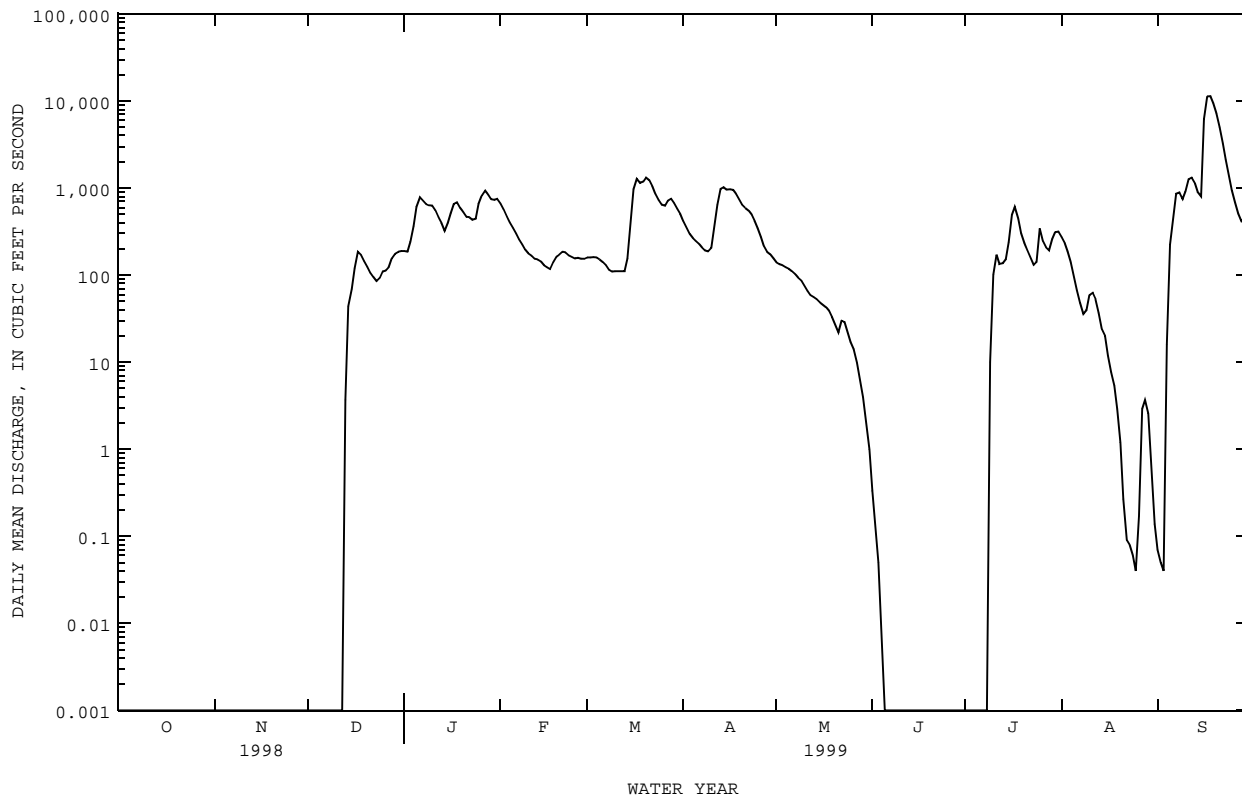
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1942 - 1986, 1989 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	148	203	314	500	578	660	457	262	142	142	166	177
MAX	1128	1108	1240	1473	1732	1501	1271	879	988	1364	912	2355
(WY)	1973	1980	1958	1978	1998	1975	1989	1958	1963	1945	1969	1999
MIN	.000	.000	2.65	21.1	70.8	79.5	87.2	25.8	.018	.32	.000	.000
(WY)	(a)	(b)	1981	1981	1942	1981	1981	1991	1999	1957	(c)	(d)

SUMMARY STATISTICS FOR 1998 CALENDAR YEAR FOR 1999 WATER YEAR WATER YEARS 1942 - 1986 1989 - 1999

ANNUAL TOTAL	157045.35	136325.64	
ANNUAL MEAN	430	373	312
HIGHEST ANNUAL MEAN			622
LOWEST ANNUAL MEAN			57.5
HIGHEST DAILY MEAN	3910	Feb 6	e11400 Sep 18
LOWEST DAILY MEAN	.00	Aug 8	.00 gOct 1
ANNUAL SEVEN-DAY MINIMUM	.00	jAug 8	.00 kOct 1
INSTANTANEOUS PEAK FLOW			12300 Sep 17
INSTANTANEOUS PEAK STAGE			m17.11 Sep 17
INSTANTANEOUS LOW FLOW			.00 (n)
ANNUAL RUNOFF (CFSM)	1.46		1.27
ANNUAL RUNOFF (INCHES)	19.87		17.25
10 PERCENT EXCEEDS	1130		768
50 PERCENT EXCEEDS	48		112
90 PERCENT EXCEEDS	.00		.00

- a Monthly mean flow is 0.0 ft<sup>3</sup>/s in 1955, 1969, 1981, 1984, 1994, 1998, 1999.
- b Monthly mean flow is 0.0 ft<sup>3</sup>/s in 1955, 1981, 1999.
- c Monthly mean flow is 0.0 ft<sup>3</sup>/s in 1976, 1980, 1993.
- d Monthly mean flow is 0.0 ft<sup>3</sup>/s in 1944, 1954, 1980, 1983, 1993, 1995, 1997.
- e Estimated.
- f Also Aug 9 to Sep 2, Sep 20 to Dec 12, 1998.
- g Also Oct 2 to Dec 12, 1998, Jun 5 to Jul 8, 1999.
- h No flow at times most years.
- j Also Aug 9-27, Sep 20 to Dec 6, 1998.
- k Also Oct 2 to Dec 6, 1998, Jun 5 to Jul 2, 1999.
- m From floodmarks.
- n No flow part or all of each day Oct 1 to Dec 13, 1998, Jun 4 to Jul 9, 1999.



## 02049500 BLACKWATER RIVER NEAR FRANKLIN, VA

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 mi<sup>2</sup>.

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 sea level.

REMARKS.--Records good except for period of no gage-height record, Sep. 16-27, and for periods of tidal effect below 20 ft<sup>3</sup>/s, which are poor. Low flow reversed by tide some years. Diversion upstream from station by city of Norfolk for municipal water supply most years. Maximum discharge, 23,000 ft<sup>3</sup>/s, from rating curve extended above 12,800 ft<sup>3</sup>/s. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in August 1940 reached a stage of about 22 ft, discharge, 21,000 ft<sup>3</sup>/s, from rating curve extended above 9,400 ft<sup>3</sup>/s.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 23,000 ft<sup>3</sup>/s, probably occurred Sep 18, gage height, 26.27 ft; minimum daily, 1.4 ft<sup>3</sup>/s, Jun 10, 12.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	7.9	5.0	1.6	343	1210	454	854	444	16	6.1	278	19
2	7.6	4.9	1.6	321	1090	504	809	407	11	7.5	294	12
3	7.4	5.3	1.5	403	1040	508	746	374	7.2	7.4	304	7.4
4	14	5.6	1.5	856	1000	514	678	345	4.7	6.8	300	14
5	31	5.3	1.7	966	933	501	610	330	3.2	5.4	283	379
6	34	4.9	1.6	933	845	474	543	309	2.3	3.8	258	900
7	29	4.4	1.6	882	763	446	486	284	1.9	3.0	223	1450
8	22	3.8	1.7	856	691	416	441	260	1.6	4.0	179	1990
9	19	3.5	2.2	880	629	384	407	233	1.6	4.4	134	2000
10	17	2.9	2.8	903	577	369	397	203	1.4	5.0	85	2070
11	15	2.6	3.1	870	526	357	494	165	1.5	11	58	2260
12	13	3.0	3.3	816	482	342	1090	118	1.4	14	52	2110
13	11	2.7	36	761	472	324	1440	89	1.7	31	51	1970
14	9.9	2.4	208	704	466	312	1650	81	2.2	112	84	1890
15	9.5	2.3	276	848	444	512	1630	95	3.1	193	139	1920
16	9.9	2.1	226	1440	416	828	1550	88	5.6	213	153	e13000
17	9.3	1.9	178	1660	386	1110	1460	72	7.6	248	93	e20000
18	8.5	1.8	142	1720	384	1390	1330	47	8.2	330	59	e22000
19	8.0	1.8	122	1770	453	1590	1230	38	8.5	415	47	e20500
20	8.0	1.7	119	1730	503	1640	1150	36	8.3	481	32	e18500
21	7.6	1.8	125	1580	531	1580	1070	47	8.2	512	21	e15500
22	7.2	1.9	130	1390	529	1530	971	46	8.5	480	14	e12800
23	7.1	1.9	129	1180	499	1520	863	44	8.8	401	11	e10500
24	6.8	2.0	155	1230	468	1480	764	53	8.5	325	8.2	e8000
25	6.6	2.1	270	2020	441	1370	685	70	6.8	331	6.5	e5890
26	6.2	1.7	342	2230	421	1240	626	88	6.2	299	5.3	e4150
27	5.8	1.8	334	2190	404	1090	573	86	6.5	306	9.4	e2740
28	5.9	1.8	330	2030	392	968	516	65	5.9	458	18	2080
29	5.5	1.9	351	1820	---	880	474	44	5.0	505	38	1650
30	5.5	1.8	366	1620	---	852	469	26	4.9	427	43	1400
31	5.3	---	359	1410	---	862	---	20	---	335	29	---
TOTAL	360.5	86.6	4222.2	38362	16995	26347	26006	4607	168.3	6480.4	3309.4	177701.4
MEAN	11.6	2.89	136	1237	607	850	867	149	5.61	209	107	5923
MAX	34	5.6	366	2230	1210	1640	1650	444	16	512	304	22000
MIN	5.3	1.7	1.5	321	384	312	397	20	1.4	3.0	5.3	7.4
(†)	0	0	0	0	0	0	0	7.1	0	0	0	0
MEAN†	11.6	2.89	136	1237	607	850	867	156	5.61	209	107	5923
CFSM†	.02	.00	.22	2.01	.98	1.38	1.40	.25	.01	.34	.17	9.60
IN.†	.02	.01	.25	2.31	1.02	1.59	1.57	.29	.01	.39	.20	10.71

CAL YR 1998 TOTAL 276118.91 MEAN 756 MAX 7150 MIN .83 MEAN† 757 CFSM† 1.23 IN.† 16.66  
WTR YR 1999 TOTAL 304645.80 MEAN 835 MAX 22000 MIN 1.4 MEAN† 835 CFSM† 1.35 IN.† 18.37

† Average daily diversion, in cubic feet per second, by city of Norfolk.

‡ Adjusted for diversion.



02049500 BLACKWATER RIVER NEAR FRANKLIN, VA--Continued

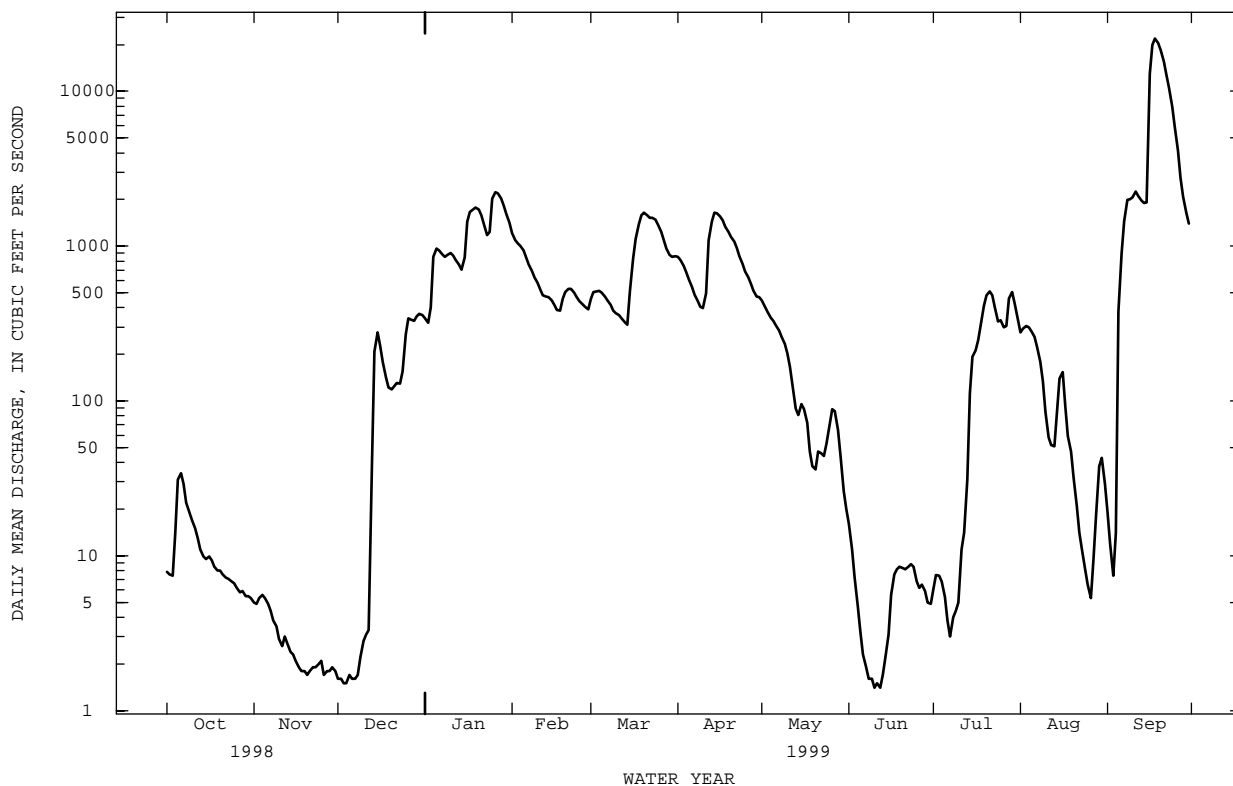
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1944 - 1999, BY WATER YEAR (WY) [UNADJUSTED]

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	286	367	625	1015	1195	1290	917	554	339	293	349	380
MAX	1795	1713	2082	2271	3520	2915	2783	1890	1925	2003	1481	5923
(WY)	1973	1980	1958	1978	1998	1989	1989	1958	1963	1945	1969	1999
MIN	.94	1.69	2.12	12.5	152	158	107	51.4	5.61	3.02	2.08	2.16
(WY)	1988	1981	1981	1981	1981	1981	1995	1985	1999	1986	1995	1995

SUMMARY STATISTICS FOR 1998 CALENDAR YEAR FOR 1999 WATER YEAR WATER YEARS 1944 - 1999

ANNUAL TOTAL	276118.91		304645.8			
ANNUAL MEAN	756		835		632	
HIGHEST ANNUAL MEAN					1155	
LOWEST ANNUAL MEAN					133	
HIGHEST DAILY MEAN	7150		Feb 7		e22000	
LOWEST DAILY MEAN	.83		Aug 25		1.4	
ANNUAL SEVEN-DAY MINIMUM	1.1		Aug 19		1.6	
INSTANTANEOUS PEAK FLOW					23000	
INSTANTANEOUS PEAK STAGE					b26.27	
INSTANTANEOUS LOW FLOW					(c)	
ANNUAL RUNOFF (CFSM)	1.23				1.35	
ANNUAL RUNOFF (INCHES)	16.65				18.37	
10 PERCENT EXCEEDS	2380				1580	
50 PERCENT EXCEEDS	92				248	
90 PERCENT EXCEEDS	2.3				2.7	
					23000	
					b26.27	
					(c)	
					1.02	
					13.91	
					1640	
					373	
					8.0	

- a Probably occurred Sep 18, 1999.
- b From floodmarks.
- c Not determined, tidally affected most years during periods of extreme low flows; minimum measured flow, 2.4 ft<sup>3</sup>/s (reverse flow), Sep 17, 1952.
- e Estimated.



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 mi<sup>2</sup>.

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 sea level (levels by U.S. Army Corps of Engineers). Prior to Jul. 5, 1951, nonrecording gage at same site and datum. Jul. 5, 1951 to Jul. 11, 1980, water-stage recorder at site 20 ft downstream at same datum.

REMARKS.--Records good except those for periods of doubtful or no gage-height record, Dec. 2-9, Feb. 3, and period with ice effect, Jan. 6, which are fair. Maximum discharge, 14,400 ft<sup>3</sup>/s, from rating curve extended above 2,320 ft<sup>3</sup>/s on basis of slope-area measurement of peak flow. 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 Department of Environmental Quality - Water Division.

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 greater than base discharge of 2,200 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Apr 11	1530	2,620	14.10	Sep 16	0815	*3,120	*15.89

Minimum discharge, 0.18 ft<sup>3</sup>/s, Aug 21, 22.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.74	4.2	5.4	14	23	24	76	29	7.0	3.7	2.5	.81
2	.79	4.2	e5.6	12	53	20	83	23	6.5	3.5	2.2	.81
3	.62	4.8	e5.3	661	e47	19	44	20	6.1	3.5	1.9	.79
4	6.2	5.5	e5.2	97	34	26	36	19	5.8	2.9	1.6	.88
5	4.8	5.4	e5.1	39	28	23	41	18	5.3	2.4	1.4	323
6	2.3	5.1	e5.4	e28	24	20	31	18	4.9	1.9	1.3	93
7	1.9	4.8	e5.3	23	23	20	28	17	4.8	2.1	1.2	29
8	4.1	4.6	e11	21	24	18	25	15	4.5	5.6	1.0	21
9	10	4.9	e16	19	22	18	32	14	4.2	3.3	.86	15
10	4.5	5.1	13	17	21	20	132	13	3.8	2.5	.77	8.7
11	3.0	5.7	7.4	15	19	20	914	12	3.6	3.2	.69	5.9
12	2.5	6.4	5.5	15	20	19	222	11	3.7	2.9	.68	4.6
13	2.4	5.8	137	14	22	17	76	155	3.9	9.4	.63	3.7
14	2.3	5.4	41	14	20	91	52	428	4.5	17	.57	3.4
15	2.2	5.4	15	43	18	555	47	117	5.6	15	.55	14
16	2.2	5.6	11	42	18	135	84	42	6.7	7.0	.47	1630
17	2.3	5.6	9.3	26	18	63	51	28	5.7	4.6	.45	96
18	2.3	5.4	8.6	72	43	45	39	23	5.5	3.7	.43	32
19	2.3	5.4	7.8	91	47	36	34	19	4.8	3.1	.33	19
20	2.4	5.5	7.6	41	31	30	30	17	4.1	2.8	.26	14
21	2.5	5.8	7.5	29	25	91	26	15	4.7	2.4	.19	30
22	2.4	5.4	7.5	24	22	156	25	13	5.4	2.3	.21	58
23	2.5	5.3	7.5	23	20	59	23	13	4.9	2.2	.22	22
24	2.8	5.4	24	872	20	43	22	12	4.0	7.0	.24	14
25	3.0	5.4	32	187	19	36	22	10	3.4	63	.74	11
26	3.2	5.7	18	65	19	32	19	10	3.2	12	12	9.0
27	3.2	6.1	15	47	18	28	19	9.7	3.3	6.4	10	11
28	3.3	5.7	25	37	20	25	21	9.0	4.5	4.5	4.0	69
29	3.5	5.4	27	31	---	24	32	8.4	9.3	3.8	2.3	73
30	3.7	5.4	22	26	---	23	44	7.9	4.8	3.2	1.3	123
31	3.9	---	17	24	---	21	---	7.4	---	3.0	.90	---
TOTAL	93.85	160.4	530.0	2669	718	1757	2330	1153.4	148.5	209.9	51.89	2822.71
MEAN	3.03	5.35	17.1	86.1	25.6	56.7	77.7	37.2	4.95	6.77	1.67	94.1
MAX	10	6.4	137	872	53	555	914	428	9.3	63	12	1630
MIN	.62	4.2	5.1	12	18	17	19	7.4	3.2	1.9	.19	.79
CFSM	.05	.10	.31	1.55	.46	1.02	1.40	.67	.09	.12	.03	1.69
IN.	.06	.11	.35	1.79	.48	1.18	1.56	.77	.10	.14	.03	1.89

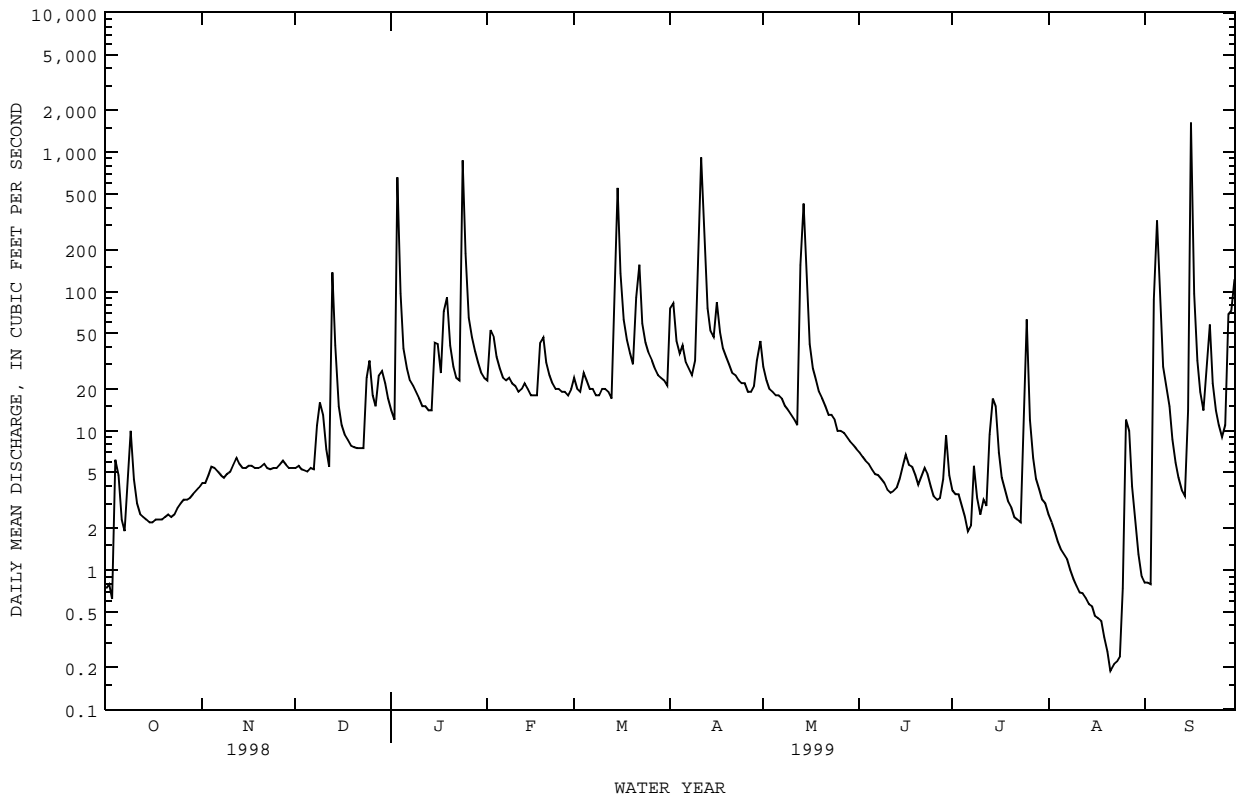
02051000 NORTH MEHERRIN RIVER NEAR LUNENBURG, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1947 - 1980, 1982 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	33.2	45.4	53.3	72.2	90.4	96.9	77.6	46.0	27.1	20.5	19.1	28.2
MAX	442	299	186	194	249	293	223	161	154	98.6	138	292
(WY)	1972	1986	1949	1978	1979	1975	1978	1971	1968	1975	1955	1979
MIN	1.70	4.37	7.22	12.7	18.7	32.8	15.3	11.2	3.97	2.72	1.67	.16
(WY)	1994	1992	1966	1955	1968	1985	1995	1964	1964	1957	1999	1954

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR	WATER YEARS 1947 - 1980	1982 - 1999
ANNUAL TOTAL	21798.04	12644.65		
ANNUAL MEAN	59.7	34.6	50.6	
HIGHEST ANNUAL MEAN			98.8	1972
LOWEST ANNUAL MEAN			21.2	1992
HIGHEST DAILY MEAN	2480	Mar 19	6710	Oct 23 1971
LOWEST DAILY MEAN	.62	Oct 3	.19	Aug 21
ANNUAL SEVEN-DAY MINIMUM	.74	Sep 13	.27	Aug 18
INSTANTANEOUS PEAK FLOW			3120	Sep 16
INSTANTANEOUS PEAK STAGE			15.89	Sep 16
INSTANTANEOUS LOW FLOW			.18	bAug 21
ANNUAL RUNOFF (CFSM)	1.07		.62	.91
ANNUAL RUNOFF (INCHES)	14.58		8.46	12.36
10 PERCENT EXCEEDS	122		52	93
50 PERCENT EXCEEDS	15		11	20
90 PERCENT EXCEEDS	2.2		2.2	3.8

a Also Sep 6-21 and Oct 8-14, 1954.  
 b Also Aug 22, 1999.  
 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 mi<sup>2</sup>.

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 sea level. Prior to Nov. 17, 1931, nonrecording gage at same site and datum.

REMARKS.--Records good except those for periods of doubtful or no gage-height record, May 9-18, and Sep. 16-19, which are fair. Maximum discharge, 38,000 ft<sup>3</sup>/s, from rating curve extended above 13,000 ft<sup>3</sup>/s on basis of velocity-area studies and records for Nottoway River near Stony Creek. Minimum gage height, 0.72 ft, Sept. 23, 24, 1932. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,500 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Jan 4	1330	5,000	16.49	Sep 7	0345	9,190	23.19
Jan 26	0030	5,210	16.91	aSep 17	Unknown	*16,200	*29.97
Apr 13	0730	5,660	17.78				

a Probably occurred.

Minimum discharge, 24 ft<sup>3</sup>/s, Oct 3-4, gage height, 1.47 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	28	59	70	245	305	243	309	646	107	131	54	102
2	27	60	70	196	333	240	997	477	101	110	328	100
3	25	63	74	2110	506	237	978	391	97	102	216	98
4	29	72	68	4780	543	260	588	348	92	77	87	121
5	61	73	68	1540	432	328	593	322	88	64	61	2960
6	64	67	68	539	355	293	533	308	86	56	51	6490
7	60	66	70	393	315	253	436	296	84	97	46	8100
8	64	66	70	365	313	225	378	283	80	110	41	1930
9	88	66	106	309	305	213	356	e275	77	70	38	779
10	79	66	189	283	280	216	591	e265	74	57	36	636
11	66	67	165	252	257	216	1460	e250	69	66	34	399
12	65	68	142	237	249	213	4520	e235	66	79	32	237
13	63	71	358	227	268	204	4710	e220	67	76	31	199
14	62	75	998	222	294	232	1080	e420	72	227	35	176
15	e59	75	653	285	269	2290	746	e1100	77	465	257	214
16	58	74	303	459	242	2740	1080	e550	105	334	88	e8500
17	55	71	216	502	230	1170	1200	e370	142	173	63	e15400
18	55	69	173	385	261	700	726	e315	115	111	46	e12000
19	55	68	132	459	353	521	560	280	96	87	37	e7000
20	56	69	112	716	449	424	484	241	87	76	32	831
21	54	70	101	448	356	489	436	208	97	74	32	596
22	53	69	94	346	294	2270	402	187	105	73	32	2330
23	49	68	91	300	255	1500	384	175	99	61	31	3140
24	50	68	151	1210	235	770	369	165	89	57	29	840
25	52	70	473	4600	227	574	344	152	80	103	29	561
26	55	70	519	3240	226	481	327	141	75	141	40	457
27	55	70	327	840	222	415	317	138	73	137	1510	580
28	57	73	276	587	222	372	312	133	77	88	1730	1030
29	59	70	319	474	---	338	332	126	76	72	255	1480
30	59	70	361	395	---	312	484	119	69	67	150	1510
31	59	---	313	341	---	285	---	114	---	52	112	---
TOTAL	1721	2063	7130	27285	8596	19024	26032	9250	2622	3493	5563	78796
MEAN	55.5	68.8	230	880	307	614	868	298	87.4	113	179	2627
MAX	88	75	998	4780	543	2740	4710	1100	142	465	1730	15400
MIN	25	59	68	196	222	204	309	114	66	52	29	98
CFSM	.10	.12	.42	1.59	.56	1.11	1.57	.54	.16	.20	.33	4.76
IN.	.12	.14	.48	1.84	.58	1.28	1.75	.62	.18	.24	.37	5.31

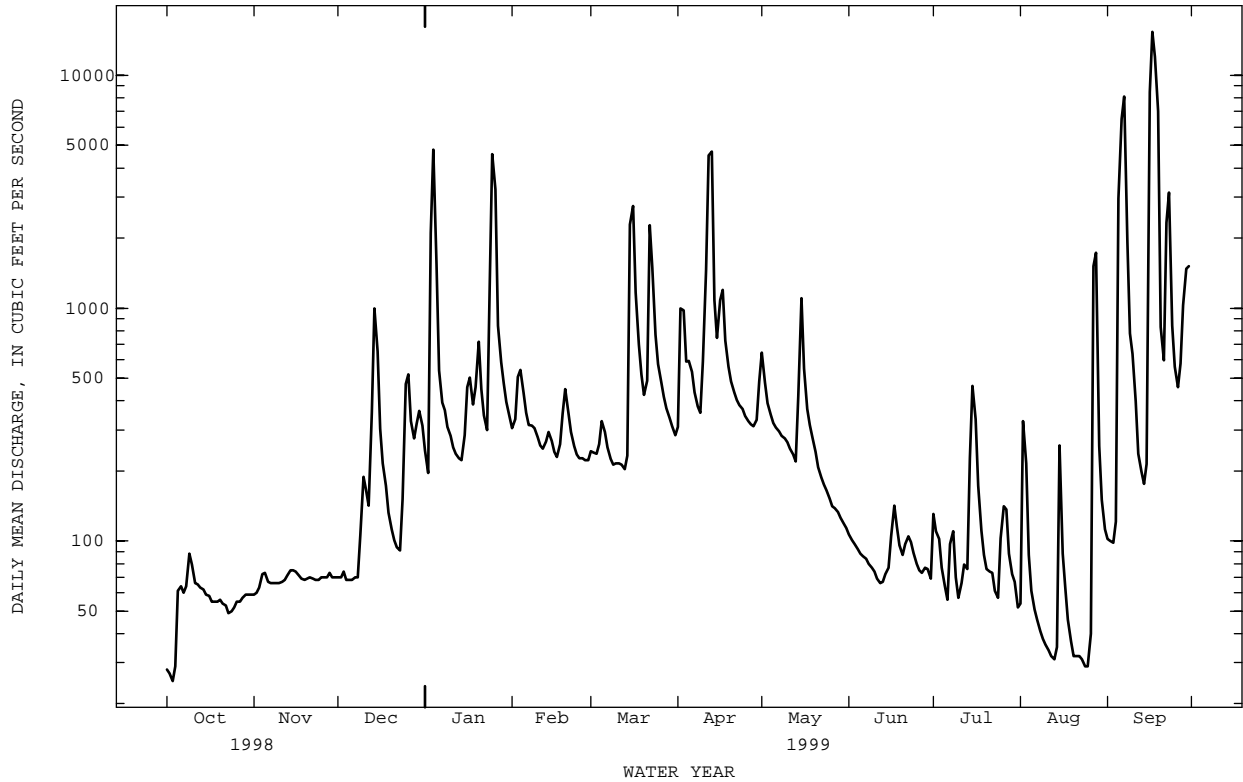
02051500 MEHERRIN RIVER NEAR LAWRENCEVILLE, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1929 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	303	376	470	737	835	923	751	457	314	313	294	277
MAX	2266	2853	1340	2391	1904	2707	2067	1571	1555	2358	4199	2627
(WY)	1972	1986	1997	1936	1998	1998	1987	1958	1938	1945	1940	1999
MIN	17.1	44.1	64.6	88.8	175	190	162	128	87.4	42.8	33.0	9.70
(WY)	1931	1934	1966	1934	1931	1981	1966	1942	1999	1932	1995	1954

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR		FOR 1999 WATER YEAR		WATER YEARS 1929 - 1999	
ANNUAL TOTAL	255578		191575			
ANNUAL MEAN	700		525		503	
HIGHEST ANNUAL MEAN					916	
LOWEST ANNUAL MEAN					202	
HIGHEST DAILY MEAN	e13500		Mar 21		e15400	
LOWEST DAILY MEAN	25		Oct 3		25	
ANNUAL SEVEN-DAY MINIMUM	30		Sep 28		32	
INSTANTANEOUS PEAK FLOW					16200	
INSTANTANEOUS PEAK STAGE					c29.97	
INSTANTANEOUS LOW FLOW					24	
ANNUAL RUNOFF (CFSM)	1.27		.95		42.00	
ANNUAL RUNOFF (INCHES)	17.22		12.91		4.2	
10 PERCENT EXCEEDS	1340		895		38000	
50 PERCENT EXCEEDS	230		213		4.6	
90 PERCENT EXCEEDS	56		57		aOct 7 1954	

- a Also Oct 8, 1954.
- b Probably occurred Sep 17, 1999.
- c From floodmarks.
- e Estimated.



## CHOWAN RIVER BASIN

02052000 MEHERRIN RIVER AT EMPORIA, VA

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 mi<sup>2</sup>.

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 sea level (levels by U.S. Army Corps of Engineers).

REMARKS.--Records good except for period of no gage-height record, Mar. 17-23, which is fair. Prior to November 1965 and since April 1986, low and medium flow regulated by powerplant 0.8 mi upstream from station. Minimum discharge, 5.0 ft<sup>3</sup>/s, Nov. 11, 1954, gage height, 1.00 ft, result of regulation. 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 Department of Environmental Quality - Water Division.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in August 1940 reached a stage of 31.5 ft, from floodmarks, discharge, about 40,000 ft<sup>3</sup>/s, from rating curve extended above 18,000 ft<sup>3</sup>/s on basis of record for station near Lawrenceville.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 18,800 ft<sup>3</sup>/s, Sep 16, gage height, 26.33 ft; minimum 6.3 ft<sup>3</sup>/s, Oct 3, result of regulation; minimum daily, 19.0 ft<sup>3</sup>/s, Oct 3.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	48	59	102	271	371	277	348	758	133	122	95	111
2	29	72	64	221	406	274	611	619	177	198	182	92
3	19	83	100	1580	516	285	1170	462	132	131	547	82
4	38	87	67	5380	624	365	698	391	124	115	144	155
5	68	101	96	5000	540	343	732	367	125	76	86	2470
6	63	96	62	1550	428	353	635	338	124	79	86	6650
7	91	92	97	574	375	302	506	322	97	108	50	10600
8	89	44	63	456	356	259	415	311	116	349	65	8720
9	129	90	149	352	344	247	386	291	73	122	72	2570
10	114	89	162	342	325	252	636	253	144	108	33	1550
11	82	66	177	303	300	245	1150	216	110	101	38	1050
12	70	85	142	266	288	250	3240	236	109	103	64	407
13	75	51	336	250	315	230	4860	247	73	125	61	236
14	49	87	862	232	309	284	2930	290	61	319	101	245
15	76	99	945	413	314	2410	1250	2260	123	1040	205	497
16	40	73	449	583	278	4410	1200	1620	102	543	287	12600
17	52	108	302	612	261	e2200	1780	715	197	306	113	18000
18	53	75	244	558	327	e1050	1220	432	173	161	89	17700
19	63	89	196	594	431	e750	794	352	83	139	72	14800
20	62	87	183	720	485	e580	632	301	197	115	64	6550
21	47	92	91	686	442	e720	546	270	87	160	50	2880
22	47	82	97	424	341	e3560	498	239	75	122	53	2610
23	48	87	151	354	297	e2600	455	235	134	104	52	5510
24	48	84	118	1430	275	1340	423	232	173	48	52	3510
25	48	87	429	4850	258	815	401	229	117	260	56	1490
26	48	99	522	6070	266	570	374	227	73	192	69	734
27	56	89	417	2910	251	458	364	225	113	175	628	646
28	55	87	386	1070	262	400	349	118	110	146	3120	2220
29	51	102	329	661	---	363	399	122	107	128	832	2920
30	57	67	373	508	---	338	606	179	98	131	218	3550
31	58	---	333	416	---	319	---	154	---	97	153	---
TOTAL	1873	2509	8044	39636	9985	26849	29608	13011	3560	5923	7737	131155
MEAN	60.4	83.6	259	1279	357	866	987	420	119	191	250	4372
MAX	129	108	945	6070	624	4410	4860	2260	197	1040	3120	18000
MIN	19	44	62	221	251	230	348	118	61	48	33	82
CFSM	.08	.11	.35	1.71	.48	1.16	1.32	.56	.16	.26	.33	5.85
IN.	.09	.12	.40	1.97	.50	1.34	1.47	.65	.18	.29	.39	6.53

02052000 MEHERRIN RIVER AT EMPORIA, VA--Continued

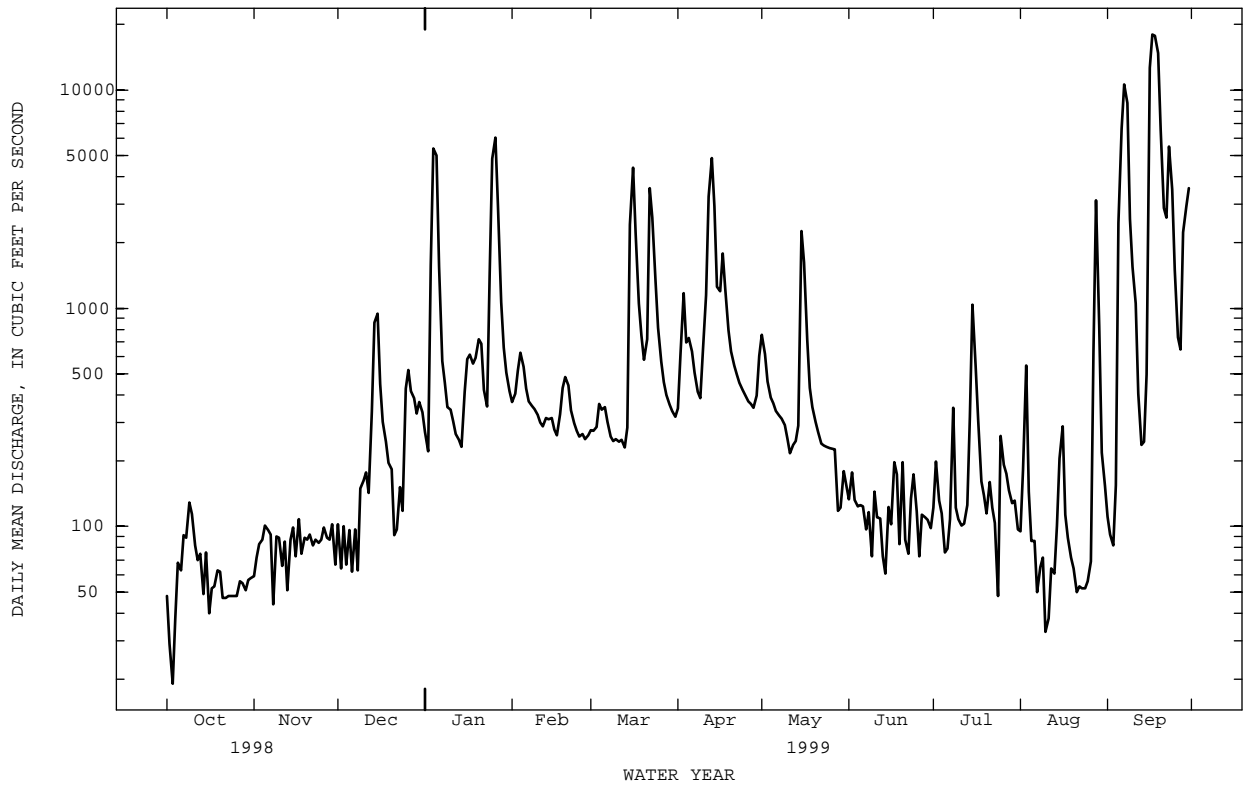
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1952 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	413	529	668	1075	1237	1376	1063	660	421	342	298	368
MAX	3057	3711	1772	3063	2749	3631	3077	2244	1399	2647	1536	4372
(WY)	1973	1986	1973	1978	1998	1998	1987	1958	1972	1975	1955	1999
MIN	37.7	60.0	89.9	159	298	261	221	256	119	62.9	46.3	18.7
(WY)	1969	1955	1966	1966	1968	1981	1995	1995	1999	1954	1995	1954

SUMMARY STATISTICS FOR 1998 CALENDAR YEAR FOR 1999 WATER YEAR WATER YEARS 1952 - 1999

ANNUAL TOTAL	347670.6		279890		701	
ANNUAL MEAN	953		767		1297	
HIGHEST ANNUAL MEAN					248	
LOWEST ANNUAL MEAN					1981	
HIGHEST DAILY MEAN	15200	Mar 22	18000	Sep 17	20700	Oct 8 1972
LOWEST DAILY MEAN	a9.6	Sep 24	a19	Oct 3	a7.1	Jul 20 1986
ANNUAL SEVEN-DAY MINIMUM	37	Sep 27	49	Oct 21	a9.1	Nov 4 1954
INSTANTANEOUS PEAK FLOW			18800		Sep 16	21100
INSTANTANEOUS PEAK STAGE			26.33		Sep 16	27.38
INSTANTANEOUS LOW FLOW			a6.3		Oct 3	a5.0
ANNUAL RUNOFF (CFSM)	1.28		1.03		.94	
ANNUAL RUNOFF (INCHES)	17.31		13.94		12.76	
10 PERCENT EXCEEDS	2340		1550		1440	
50 PERCENT EXCEEDS	275		245		356	
90 PERCENT EXCEEDS	57		63		70	

a Result of regulation.  
e Estimated.



ROANOKE RIVER BASIN

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 mi<sup>2</sup>.

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 sea level. 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 those for period with ice effect, Jan. 4-6, and periods of doubtful or no gage-height record, Jan. 7-9 and Sep. 30, which are fair. Virginia Department of Emergency Services gage-height radio transmitter at station. Maximum discharge, 14,200 ft<sup>3</sup>/s, from rating curve extended above 3,700 ft<sup>3</sup>/s on basis of slope-area measurement of peak flow. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location by the Virginia Department of Environmental Quality - Water Division.

COOPERATION.--Records were provided by the Virginia Department of Environmental Quality - Water Division.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Sep. 30, 1959, reached a stage of 9.89 ft, from information by local resident.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 800 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Aug 23	1900	892	2.76	Sep 5	1630	*3,210	*5.61

Minimum discharge, 11 ft<sup>3</sup>/s, Aug 18-20.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	23	26	24	24	48	53	75	52	29	20	21	17
2	22	26	25	22	78	47	73	50	29	19	20	16
3	21	26	25	51	71	59	63	48	35	19	19	15
4	22	27	25	e56	63	81	60	47	30	18	17	15
5	22	27	25	e40	56	73	57	46	27	17	16	1350
6	22	27	25	e30	51	91	54	44	26	16	15	1350
7	23	26	25	e34	49	120	51	43	25	15	14	364
8	101	26	32	e32	48	98	50	55	24	17	14	166
9	45	26	67	e35	44	89	50	46	23	16	14	147
10	31	26	34	62	42	81	50	41	22	15	14	145
11	27	31	26	38	39	70	282	39	22	16	13	85
12	25	32	24	34	40	65	276	37	22	53	13	62
13	23	29	83	37	42	60	168	36	21	63	13	51
14	23	28	56	44	36	66	124	125	20	35	18	45
15	23	28	34	123	37	107	114	124	20	29	14	44
16	23	27	27	76	37	134	110	87	21	24	13	50
17	22	26	25	51	40	184	89	71	26	21	13	40
18	22	26	23	59	185	196	80	62	24	21	12	35
19	22	26	22	58	160	157	74	100	21	20	11	33
20	23	26	22	45	112	120	71	68	21	19	21	33
21	23	27	21	39	85	175	65	56	26	18	20	52
22	22	26	21	36	69	226	61	51	27	19	16	46
23	23	26	21	83	59	172	57	47	23	19	177	35
24	23	26	28	308	57	139	55	45	21	17	107	31
25	24	25	25	176	54	116	51	42	21	16	58	29
26	24	28	23	104	51	96	53	40	23	15	46	27
27	24	27	22	78	48	83	57	37	23	14	32	37
28	24	26	24	65	55	75	63	35	21	16	26	114
29	25	25	28	56	---	69	61	33	25	96	22	124
30	25	24	28	49	---	64	57	31	21	42	20	e210
31	26	---	23	45	---	59	---	30	---	26	18	---
TOTAL	828	802	913	1990	1756	3225	2551	1668	719	771	847	4768
MEAN	26.7	26.7	29.5	64.2	62.7	104	85.0	53.8	24.0	24.9	27.3	159
MAX	101	32	83	308	185	226	282	125	35	96	177	1350
MIN	21	24	21	22	36	47	50	30	20	14	11	15
CFSM	.24	.24	.27	.58	.57	.95	.77	.49	.22	.23	.25	1.44
IN.	.28	.27	.31	.67	.59	1.09	.86	.56	.24	.26	.29	1.61



02053800 SOUTH FORK ROANOKE RIVER NEAR SHAWSVILLE, VA--Continued

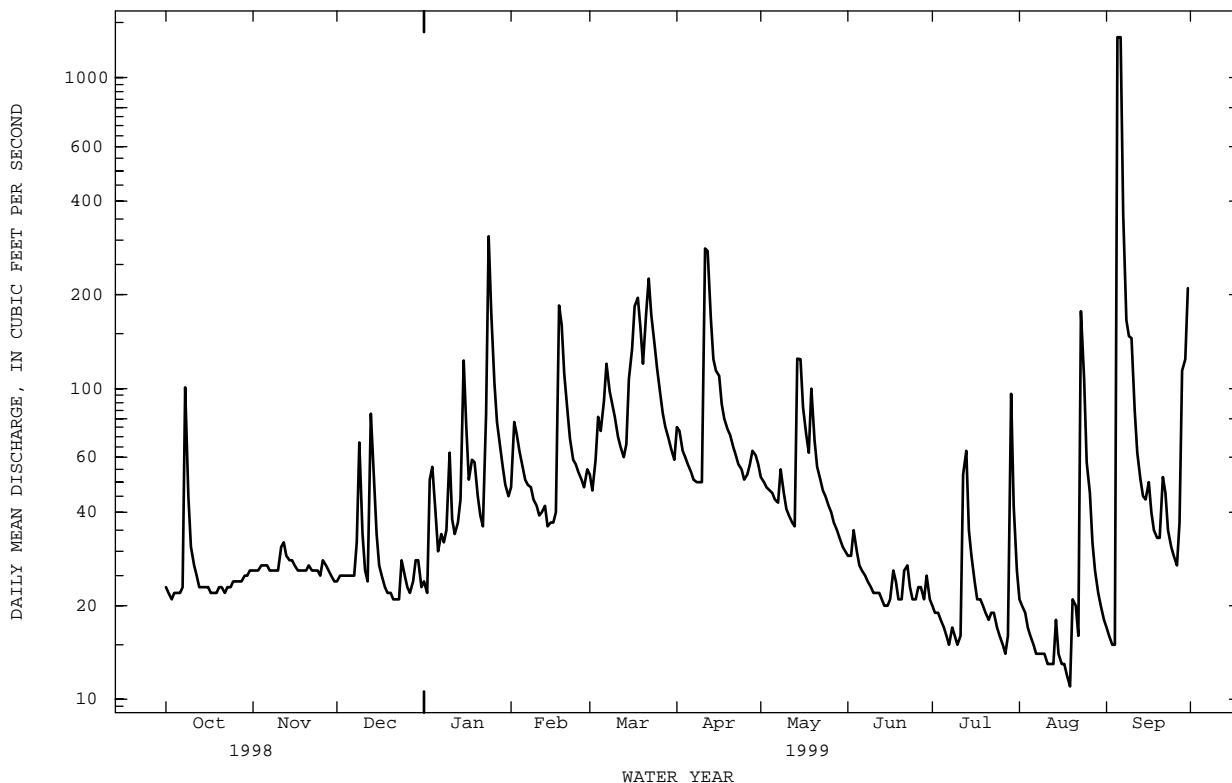
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1961 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	73.0	91.2	99.7	139	168	212	185	135	101	58.2	53.5	63.8
MAX	294	407	232	299	523	571	750	334	483	205	174	347
(WY)	1972	1986	1973	1996	1998	1993	1987	1978	1972	1972	1994	1989
MIN	21.4	24.4	22.1	18.9	62.7	55.6	51.0	50.7	24.0	20.6	17.4	17.8
(WY)	1992	1982	1966	1966	1999	1981	1966	1963	1999	1966	1963	1968

SUMMARY STATISTICS FOR 1998 CALENDAR YEAR FOR 1999 WATER YEAR WATER YEARS 1961 - 1999

ANNUAL TOTAL	52205	20838	
ANNUAL MEAN	143	57.1	115
HIGHEST ANNUAL MEAN			205 1981
LOWEST ANNUAL MEAN			46.5 1972
HIGHEST DAILY MEAN	1920	Mar 21	1350 aSep 5 6840 Jun 21 1972
LOWEST DAILY MEAN	21	bSep 15	11 Aug 19 7.5 Jul 28 1966
ANNUAL SEVEN-DAY MINIMUM	22	Sep 11	13 Aug 13 8.9 Jul 23 1966
INSTANTANEOUS PEAK FLOW			3210 Sep 5 14200 Jun 21 1972
INSTANTANEOUS PEAK STAGE			5.61 Sep 5 c11.12 Jun 21 1972
INSTANTANEOUS LOW FLOW			11 dAug 18 7.5 fJul 27 1966
ANNUAL RUNOFF (CFSM)	1.30	.52	1.04
ANNUAL RUNOFF (INCHES)	17.65	7.05	14.17
10 PERCENT EXCEEDS	288	107	220
50 PERCENT EXCEEDS	64	33	70
90 PERCENT EXCEEDS	23	19	28

- a Also Sep 6, 1999.
- b Also Sep 16, 29, 1998.
- c From high-water mark in well.
- d Also Aug 19-20, 1999.
- e Estimated.
- f Also Jul 28, 29, 1966.



## 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 mi<sup>2</sup>.

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 sea level. Prior to July 30, 1949, nonrecording gage at same site and datum.

REMARKS.--Records good except for period with ice effect, Jan. 6, which is fair. Occasional diurnal fluctuation caused by meat-processing plant upstream from station. Virginia Department of Emergency Services gage-height radio transmitter at station. Maximum discharge, 24,500 ft<sup>3</sup>/s, from rating curve extended above 12,000 ft<sup>3</sup>/s on basis of slope-area measurement of peak flow. Minimum discharge, 8.0 ft<sup>3</sup>/s, Jan. 19, 1959, gage height, 0.60 ft, result of freezeup. 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 Department of Environmental Quality - Water Division.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in August 1940 reached a stage of 12.2 ft, from information by local residents, discharge, 19,000 ft<sup>3</sup>/s, from rating curve extended above 12,000 ft<sup>3</sup>/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 3,500 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Sep 5	2015	*4,250	*7.01	No other peak greater than base discharge.			

Minimum discharge, 27 ft<sup>3</sup>/s, Aug 19.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	47	51	44	50	80	95	127	139	61	39	48	35
2	44	49	42	44	165	85	138	131	59	39	49	34
3	44	53	42	77	178	113	117	124	65	38	44	31
4	45	54	43	104	140	217	110	119	60	41	40	31
5	46	51	44	60	114	170	104	115	56	36	37	1630
6	46	50	45	e53	100	175	100	111	54	33	34	2330
7	49	48	44	68	94	193	94	106	52	30	33	646
8	239	47	50	61	91	168	90	117	49	32	32	293
9	122	48	103	74	82	157	89	109	47	30	32	204
10	83	48	69	108	76	145	94	99	46	29	32	215
11	69	50	53	82	70	126	495	93	44	32	31	139
12	61	55	48	73	69	116	605	88	45	93	30	108
13	58	52	109	85	72	107	370	85	43	137	28	91
14	55	49	117	99	63	128	283	168	41	74	44	81
15	53	49	75	371	60	488	259	210	40	60	36	78
16	53	48	62	204	60	521	254	157	42	50	31	85
17	52	48	55	133	61	482	215	132	51	45	30	73
18	51	47	50	121	324	449	195	121	50	42	29	65
19	51	47	48	115	333	343	179	186	44	42	27	62
20	50	48	47	95	224	254	174	145	43	39	38	61
21	49	47	46	84	167	413	160	120	49	42	47	93
22	48	46	45	77	130	529	149	108	51	59	38	88
23	47	46	45	140	110	381	143	100	46	48	114	70
24	49	46	54	793	103	302	141	96	43	40	181	63
25	48	45	55	420	97	244	132	90	43	36	88	57
26	48	50	50	235	90	199	130	85	44	34	108	54
27	48	51	48	155	82	169	138	80	44	31	75	57
28	47	47	49	120	92	147	156	73	44	44	57	122
29	48	46	55	100	---	131	160	69	44	137	48	164
30	49	44	56	87	---	118	150	66	41	87	42	270
31	51	---	50	77	---	107	---	63	---	57	37	---
TOTAL	1850	1460	1743	4365	3327	7272	5551	3505	1441	1576	1540	7330
MEAN	59.7	48.7	56.2	141	119	235	185	113	48.0	50.8	49.7	244
MAX	239	55	117	793	333	529	605	210	65	137	181	2330
MIN	44	44	42	44	60	85	89	63	40	29	27	31
CFSM	.23	.19	.22	.55	.46	.91	.72	.44	.19	.20	.19	.95
IN.	.27	.21	.25	.63	.48	1.05	.80	.51	.21	.23	.22	1.06

02054500 ROANOKE RIVER AT LAFAYETTE, VA--Continued

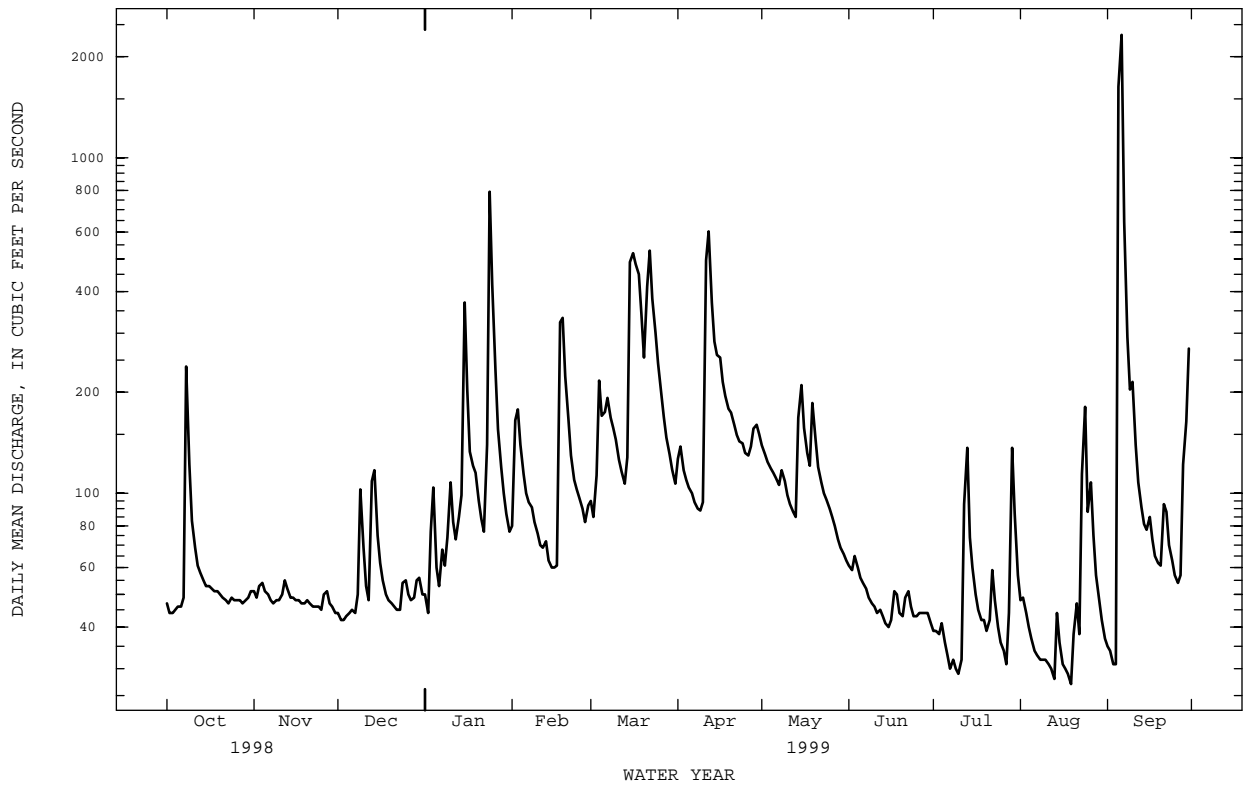
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1944 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	136	170	227	313	398	471	414	284	185	114	112	123
MAX	603	770	913	682	1214	1309	1497	716	791	590	551	570
(WY)	1977	1978	1949	1947	1998	1993	1987	1978	1972	1949	1948	1989
MIN	36.7	44.1	47.0	52.0	83.4	103	102	99.1	48.0	43.2	37.0	29.4
(WY)	1954	1954	1964	1981	1959	1981	1966	1963	1999	1963	1963	1954

SUMMARY STATISTICS FOR 1998 CALENDAR YEAR FOR 1999 WATER YEAR WATER YEARS 1944 - 1999

ANNUAL TOTAL	128299	40960	
ANNUAL MEAN	352	112	245
HIGHEST ANNUAL MEAN			442
LOWEST ANNUAL MEAN			87.0
HIGHEST DAILY MEAN	5040	Mar 21	2330
LOWEST DAILY MEAN	40	Sep 16	27
ANNUAL SEVEN-DAY MINIMUM	42	Sep 12	31
INSTANTANEOUS PEAK FLOW			4250
INSTANTANEOUS PEAK STAGE			7.01
INSTANTANEOUS LOW FLOW			27
ANNUAL RUNOFF (CFSM)	1.37	.44	15.60
ANNUAL RUNOFF (INCHES)	18.57	5.93	12.95
10 PERCENT EXCEEDS	846	201	497
50 PERCENT EXCEEDS	126	63	134
90 PERCENT EXCEEDS	46	40	50

- a Also Jan 15, 18, 19, 1959.
- b From high-water mark in gage house.
- c Result of freezeup.
- e Estimated.



## ROANOKE RIVER BASIN

02054510 ROANOKE RIVER NEAR WABUN, VA

LOCATION.--Lat 37°14'48", long 87°09'55", Roanoke County, Hydrologic Unit 03010101, on right bank 150 ft downstream from mouth of Dry Hollow, 0.7 mi downstream from bridge on State Highway 5800, 3 mi upstream from Dry Branch, and 5.9 mi southwest of Salem.

DRAINAGE AREA.--273 mi<sup>2</sup>.

PERIOD OF RECORD.--April 1994 to September 1999 (discontinued).

GAGE.--Water-stage recorder. Elevation of gage is 1,140 ft above sea level, from topographic map.

REMARKS.--Records good except for period with ice effect, Jan. 5-7, which is fair. Water is withdrawn upstream for municipal use by Roanoke County, amount unknown. Roanoke County gage-height transmitter at station. Maximum discharge, 15,900 ft<sup>3</sup>/s, from rating curve extended above 1,660 ft<sup>3</sup>/s. Minimum discharge, 24 ft<sup>3</sup>/s, Dec. 30, 1995, gage height, 2.57 ft, result of freezeup. Several observations of water temperature were made during the year.

COOPERATION.--Records were provided by the Virginia Department of Environmental Quality - Water Division.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Apr. 21, 1992, reached a stage of 13.69 ft, from high-water marks in the gage vicinity, from information by local resident, discharge not determined.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 3,500 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Sep 5	2045	*4,950	*7.72	No other peak greater than base discharge.			

Minimum discharge, 26 ft<sup>3</sup>/s, Aug 19-20.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	45	50	50	48	83	96	139	152	68	47	52	39
2	44	50	48	45	137	76	166	146	64	45	52	35
3	44	55	47	71	166	104	137	138	68	46	49	34
4	44	57	47	121	129	223	123	130	67	47	45	32
5	44	55	47	e73	100	170	114	120	63	44	41	1630
6	44	52	48	e61	106	183	111	115	61	40	37	2610
7	46	50	48	e74	137	208	105	109	59	38	35	602
8	218	50	50	57	105	168	105	117	56	37	34	254
9	131	49	110	60	85	152	118	118	54	38	33	152
10	79	49	65	125	86	141	128	104	52	36	33	166
11	65	51	56	94	78	118	431	94	52	36	32	99
12	59	55	49	71	83	105	609	89	52	85	31	78
13	55	58	97	90	102	98	394	86	52	139	30	72
14	52	55	114	103	91	110	285	152	51	74	40	69
15	50	53	63	322	87	445	241	224	49	67	39	73
16	50	54	61	245	86	516	261	173	49	58	33	69
17	50	53	53	158	86	451	228	130	54	52	30	67
18	50	52	50	134	300	432	210	98	59	49	28	65
19	50	52	46	116	353	364	193	170	53	47	27	62
20	50	52	46	88	249	272	181	160	52	46	34	59
21	49	54	45	66	191	387	174	119	54	45	47	76
22	48	54	43	63	154	522	162	101	58	62	40	78
23	47	52	43	90	116	384	153	102	54	57	68	70
24	48	52	48	720	103	300	152	103	51	47	188	63
25	49	52	54	467	77	245	147	96	49	43	71	59
26	49	55	50	251	80	201	141	90	49	39	80	56
27	49	58	47	164	78	173	149	84	50	36	70	55
28	49	55	46	115	99	153	158	79	52	39	63	86
29	50	53	50	98	---	141	168	75	50	127	53	116
30	49	52	56	128	---	124	160	72	49	72	46	223
31	50	---	51	113	---	109	---	70	---	65	41	---
TOTAL	1807	1589	1728	4431	3547	7171	5843	3616	1651	1703	1502	7149
MEAN	58.3	53.0	55.7	143	127	231	195	117	55.0	54.9	48.5	238
MAX	218	58	114	720	353	522	609	224	68	139	188	2610
MIN	44	49	43	45	77	76	105	70	49	36	27	32
CFSM	.21	.19	.20	.52	.46	.85	.71	.43	.20	.20	.18	.87
IN.	.25	.22	.24	.60	.48	.98	.80	.49	.22	.23	.20	.97

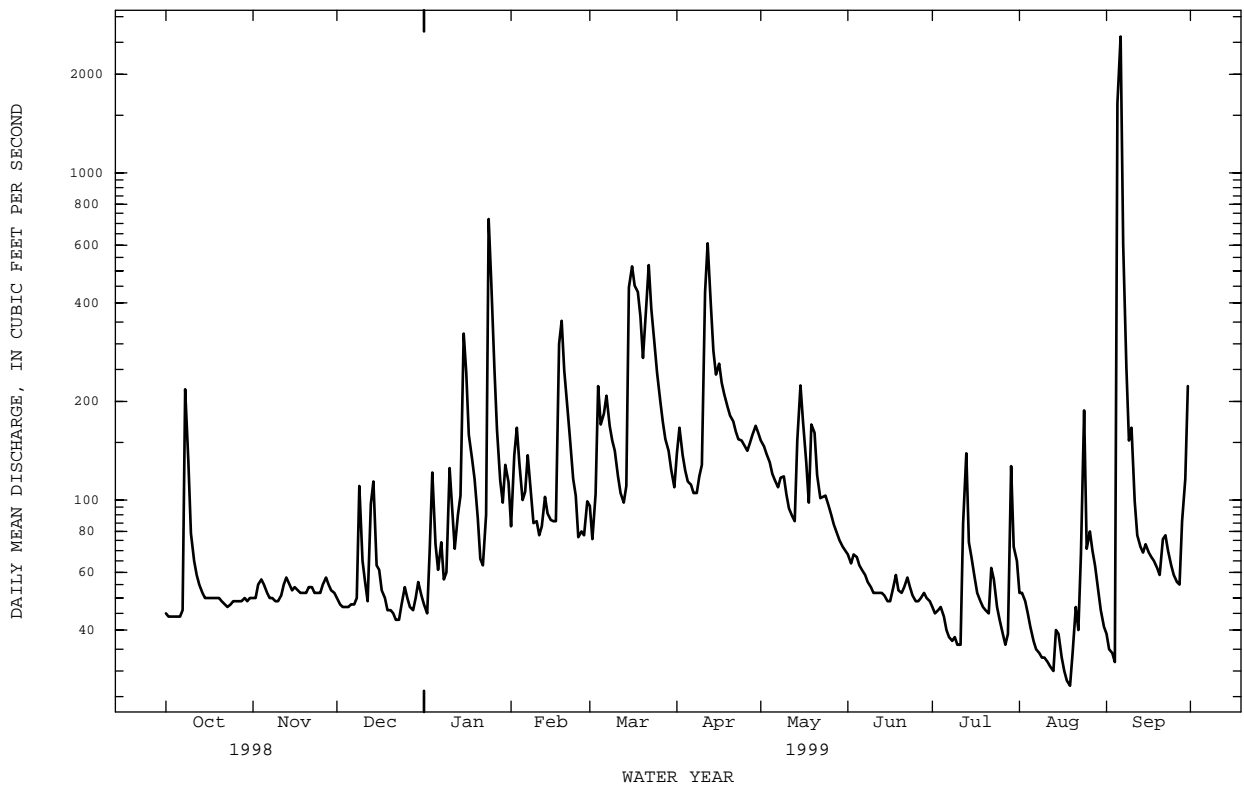
02054510 ROANOKE RIVER NEAR WABUN, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1994 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	90.2	135	216	468	543	454	284	241	233	118	139	181
MAX	165	352	679	747	1237	798	643	457	373	183	289	599
(WY)	1997	1997	1997	1996	1998	1998	1998	1998	1995	1995	1996	1996
MIN	55.5	53.0	55.7	143	127	231	104	117	55.0	54.9	48.5	45.9
(WY)	1998	1999	1999	1999	1999	1999	1995	1999	1999	1999	1999	1998

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR	WATER YEARS 1994 - 1999
ANNUAL TOTAL	128973	41737	
ANNUAL MEAN	353	114	258
HIGHEST ANNUAL MEAN			357 1998
LOWEST ANNUAL MEAN			114 1999
HIGHEST DAILY MEAN	6740	Mar 21	2610 Sep 6 7790 Jan 19 1996
LOWEST DAILY MEAN	41	aSep 16	27 Aug 19 1999
ANNUAL SEVEN-DAY MINIMUM	43	bSep 11	32 Aug 13 1999
INSTANTANEOUS PEAK FLOW			4950 Sep 5 15900 Sep 6 1996
INSTANTANEOUS PEAK STAGE			7.72 Sep 5 12.45 Sep 6 1996
INSTANTANEOUS LOW FLOW			26 cAug 19 24 dDec 30 1995
ANNUAL RUNOFF (CFSM)	1.29	.42	.94
ANNUAL RUNOFF (INCHES)	17.57	5.69	12.82
10 PERCENT EXCEEDS	798	204	495
50 PERCENT EXCEEDS	131	67	130
90 PERCENT EXCEEDS	47	44	52

- a Also Sep 17, 1998.
- b Also Sep 12, 13, 1998.
- c Also Aug 20, 1999.
- d Result of freezeup.
- e Estimated.



## ROANOKE RIVER BASIN

02054530 ROANOKE RIVER AT GLENVAR, VA

LOCATION.--Lat 37°16'04", long 80°08'23", Roanoke County, Hydrologic Unit 03010101, on left bank 150 ft downstream from bridge on State Highway 1154, 0.2 mi downstream from mouth of Callahan Branch, 0.3 mi south of Glenvar, and 2.5 mi upstream from mouth of Mill Creek.

DRAINAGE AREA.--284 mi<sup>2</sup>.

PERIOD OF RECORD.--December 1991 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 1,100 ft above sea level, from topographic map.

REMARKS.--Records good except for period with ice effect, Jan. 5-8, which is fair. Water is withdrawn upstream for municipal use by Roanoke County, amount unknown. Roanoke County gage-height transmitter at station. Maximum discharge, 19,800 ft<sup>3</sup>/s, from rating curve extended above 10,900 ft<sup>3</sup>/s. Several observations of water temperature were made during the year.

COOPERATION.--Records were provided by the Virginia Department of Environmental Quality - Water Division.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 21, 1972, reached a stage of about 20.2 ft, from information by local resident, discharge, about 25,000 ft<sup>3</sup>/s, from rating curve extended above 10,900 ft<sup>3</sup>/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 3,500 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Sep 5	2200	*5,050	*8.88	No other peak greater than base discharge.			

Minimum discharge, 27 ft<sup>3</sup>/s, Aug 19-20.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	48	53	52	61	89	101	137	158	72	50	55	39
2	45	52	50	59	129	80	167	148	70	47	55	36
3	44	57	50	77	161	93	132	140	73	49	49	34
4	45	58	51	118	128	226	123	133	71	48	44	33
5	46	56	51	e76	102	168	116	127	66	45	40	1540
6	47	54	52	e63	101	179	110	124	63	40	37	3020
7	49	53	52	e76	128	210	104	118	61	37	34	701
8	220	53	55	e67	107	165	102	125	57	35	34	280
9	145	54	103	74	86	144	114	124	56	37	34	157
10	88	55	78	119	87	137	125	109	53	34	33	181
11	72	55	67	104	80	121	429	103	52	35	32	112
12	64	58	60	85	82	107	680	98	51	76	31	90
13	60	58	98	97	100	99	430	95	51	157	30	84
14	57	57	127	99	92	108	318	155	50	84	37	78
15	54	56	78	259	86	435	273	252	49	74	39	85
16	54	55	77	208	85	559	295	189	49	62	32	83
17	54	53	69	133	86	472	257	141	57	54	30	76
18	53	52	63	114	280	453	231	110	60	50	29	74
19	53	53	60	106	357	368	211	180	53	48	27	69
20	53	53	59	102	256	276	203	168	51	45	33	67
21	51	53	58	82	196	383	187	126	55	45	45	86
22	50	54	57	81	156	553	172	109	61	64	38	87
23	49	53	57	99	118	393	163	109	57	59	34	78
24	50	53	63	762	108	305	160	110	52	47	213	70
25	51	53	69	509	84	253	149	104	50	41	76	65
26	51	56	63	267	86	210	144	97	51	38	87	62
27	51	58	60	173	81	178	155	93	53	36	73	63
28	51	56	60	122	102	154	169	86	52	38	67	96
29	49	53	65	98	---	136	184	82	50	121	55	122
30	50	52	68	122	---	123	172	78	51	76	47	231
31	52	---	64	110	---	110	---	76	---	69	42	---
TOTAL	1906	1636	2036	4522	3553	7299	6212	3867	1697	1741	1512	7799
MEAN	61.5	54.5	65.7	146	127	235	207	125	56.6	56.2	48.8	260
MAX	220	58	127	762	357	559	680	252	73	157	213	3020
MIN	44	52	50	59	80	80	102	76	49	34	27	33
CFM	.22	.19	.23	.51	.45	.83	.73	.44	.20	.20	.17	.92
IN.	.25	.21	.27	.59	.47	.96	.81	.51	.22	.23	.20	1.02

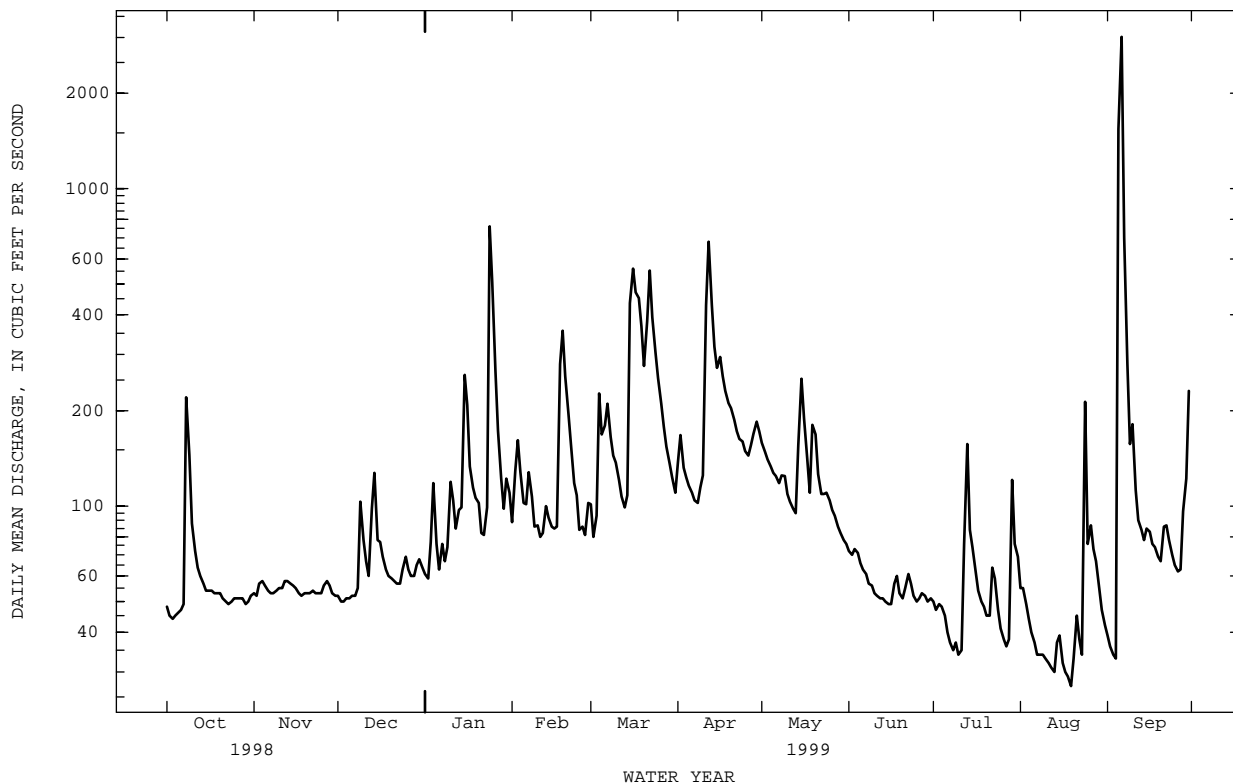
02054530 ROANOKE RIVER AT GLENVAR, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1992 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	86.1	139	253	495	586	679	436	308	291	131	130	159
MAX	170	355	715	784	1400	1667	839	610	660	195	295	586
(WY)	1997	1997	1997	1996	1998	1993	1992	1992	1992	1995	1996	1996
MIN	57.6	54.5	65.7	146	127	235	120	125	56.6	56.2	48.8	47.3
(WY)	1998	1999	1999	1999	1999	1999	1995	1999	1999	1999	1999	1998

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR	WATER YEARS 1992 - 1999
ANNUAL TOTAL	142172	43780	
ANNUAL MEAN	390	120	300
HIGHEST ANNUAL MEAN			392 1998
LOWEST ANNUAL MEAN			120 1999
HIGHEST DAILY MEAN	7690	Mar 21	3020 Sep 6
LOWEST DAILY MEAN	41	aSep 16	27 Aug 19
ANNUAL SEVEN-DAY MINIMUM	43	bSep 12	32 Aug 13
INSTANTANEOUS PEAK FLOW			5050 Sep 5
INSTANTANEOUS PEAK STAGE			19800 Apr 21 1992
INSTANTANEOUS LOW FLOW			8.88 Sep 5
ANNUAL RUNOFF (CFSM)	1.37	.42	17.73
ANNUAL RUNOFF (INCHES)	18.62	5.73	14.36
10 PERCENT EXCEEDS	894	210	592
50 PERCENT EXCEEDS	132	74	147
90 PERCENT EXCEEDS	50	45	61

- a Also Sep 17, 1998.
- b Also Sep 13, 14, 1998.
- c Also Aug 20, 1999.
- e Estimated.



## ROANOKE RIVER BASIN

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 mi<sup>2</sup>.

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 sea level (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 good except those for period of no gage-height record Oct. 1-13, and period with ice effect Jan. 3-5, which are fair. Prior to 1949, diurnal fluctuation at low flow caused by powerplants upstream from station. Since March 1994, water withdrawn upstream for municipal use by the city of Roanoke, amount unknown. American Electric Power and Virginia Department of Emergency Services gage-height radio transmitters at station. Maximum discharge, 32,300 ft<sup>3</sup>/s, from rating curve extended above 26,000 ft<sup>3</sup>/s. Practically no flow Dec. 23, 1909, Dec. 19, 1963, when flow was retarded by freezing, gage height, 0.0 ft. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,500 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Sep 6	0030	*3,600	*5.97	No other peak greater than base discharge.			

Minimum discharge, 29 ft<sup>3</sup>/s, Aug 13, gage height, 0.21 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e62	71	72	81	179	153	205	219	98	71	95	58
2	e60	70	72	80	198	122	251	205	123	71	94	55
3	e52	98	73	e78	247	149	200	193	107	60	75	50
4	e62	78	73	e75	215	267	186	182	100	61	67	48
5	e64	77	74	e70	175	235	175	173	93	57	59	805
6	e74	74	75	99	145	222	166	166	88	48	54	2830
7	e70	74	75	112	189	272	157	162	84	50	51	1100
8	e350	71	111	109	181	235	147	200	81	44	49	477
9	e320	73	139	109	129	206	164	174	76	43	50	335
10	e110	72	123	136	132	199	184	152	72	43	46	279
11	e95	77	94	144	122	177	417	139	68	43	43	210
12	e88	73	84	126	119	158	899	131	69	175	41	157
13	e84	76	179	123	140	148	563	128	68	193	37	136
14	75	75	190	145	137	193	423	257	65	131	48	124
15	73	74	112	358	126	565	364	310	62	102	53	145
16	72	75	103	373	123	826	369	259	64	88	47	149
17	72	72	94	243	126	648	337	215	85	81	40	120
18	72	72	85	219	368	629	305	162	77	125	37	110
19	71	72	80	174	532	527	283	229	73	86	35	107
20	70	73	78	152	371	402	272	238	67	66	90	102
21	67	72	76	131	291	497	255	179	71	161	61	220
22	67	73	74	119	239	764	235	156	74	185	61	172
23	67	74	76	241	186	568	229	144	74	94	77	132
24	65	73	100	999	163	449	220	149	66	76	203	118
25	69	72	90	813	144	372	206	140	63	67	221	107
26	69	89	86	401	130	313	195	134	64	60	141	97
27	69	78	80	280	122	270	203	126	65	55	107	146
28	68	77	79	203	149	239	250	117	66	91	99	286
29	67	75	84	148	---	214	245	111	61	209	82	242
30	66	73	87	169	---	191	231	107	60	130	70	370
31	68	---	89	158	---	172	---	102	---	101	63	---
TOTAL	2738	2253	2907	6668	5378	10382	8336	5359	2284	2867	2296	9287
MEAN	88.3	75.1	93.8	215	192	335	278	173	76.1	92.5	74.1	310
MAX	350	98	190	999	532	826	899	310	123	209	221	2830
MIN	52	70	72	70	119	122	147	102	60	43	35	48
CFSM	.22	.19	.24	.54	.49	.85	.70	.44	.19	.23	.19	.78
IN.	.26	.21	.27	.63	.51	.98	.79	.50	.22	.27	.22	.87



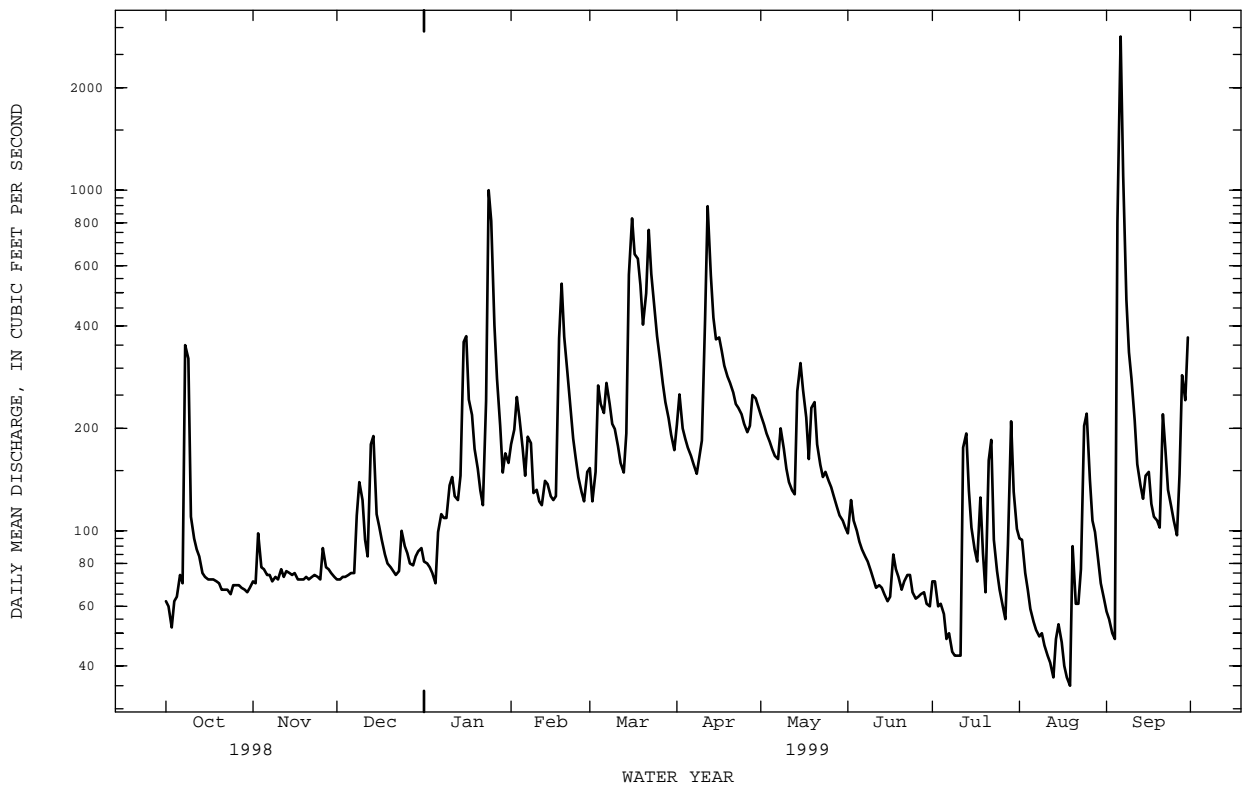
02055000 ROANOKE RIVER AT ROANOKE, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1899 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	231	246	348	478	570	692	585	420	305	219	225	202
MAX	1080	1626	1425	1353	1912	2521	2558	1466	1206	1190	2140	1569
(WY)	1907	1986	1902	1937	1998	1899	1987	1901	1972	1905	1940	1928
MIN	47.9	43.8	55.2	65.5	52.5	119	108	112	75.3	45.6	43.5	42.6
(WY)	1992	1932	1918	1981	1934	1981	1942	1941	1926	1930	1981	1930

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR
ANNUAL TOTAL	191846	60755						
ANNUAL MEAN	526	166						
HIGHEST ANNUAL MEAN							374	
LOWEST ANNUAL MEAN							836	1901
HIGHEST DAILY MEAN	8810	Mar 21	2830	Sep 6	18200	Aug 15	1981	1981
LOWEST DAILY MEAN	52	Oct 3	35	Aug 19	19	Aug 29	1981	1981
ANNUAL SEVEN-DAY MINIMUM	58	Sep 11	42	Aug 13	22	Aug 24	1981	1981
INSTANTANEOUS PEAK FLOW			3600	Sep 6	32300	Nov 4	1985	1985
INSTANTANEOUS PEAK STAGE			5.97	Sep 6	a23.35	Nov 4	1985	1985
INSTANTANEOUS LOW FLOW			29	Aug 13	(b)	cDec 23	1909	1909
ANNUAL RUNOFF (CFSM)	1.33		.42		.95			
ANNUAL RUNOFF (INCHES)	18.07		5.72		12.86			
10 PERCENT EXCEEDS	1150		307		755			
50 PERCENT EXCEEDS	171		110		210			
90 PERCENT EXCEEDS	67		62		75			

- a From floodmark.
- b Practically no flow; retarded by freezing.
- c Also Dec. 19, 1963.
- 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 mi<sup>2</sup>.

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 sea level (Norfolk Southern Railway bench mark).

REMARKS.--Records good except those for periods of no gage-height record, Oct. 31 to Nov. 4, Jun. 20-21, and period with ice effect Jan. 2-7, which are fair. Withdrawal of water 1,000 ft downstream of gage by city of Roanoke for Carvins Cove Reservoir. Virginia Department of Emergency Services radio transmitter at station. Maximum discharge, 10,400 ft<sup>3</sup>/s, from rating curve extended above 130 ft<sup>3</sup>/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 discharge, 0.20 ft<sup>3</sup>/s, result of freezeup. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

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 greater than base discharge of 250 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Sep 21	0015	328	4.04	Sep 28	1400	*346	*4.13

Minimum discharge, 0.58 ft<sup>3</sup>/s, Sep 3-4, gage height, 0.91 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.4	e4.7	4.7	3.0	5.3	3.7	7.6	3.6	2.4	1.3	.74	.62
2	2.3	e4.6	4.2	e2.9	11	3.5	6.6	3.4	2.3	1.3	.74	.61
3	2.2	e5.2	4.2	e2.6	8.5	4.2	6.0	3.3	2.3	1.4	.69	.59
4	2.2	e5.1	4.2	e2.4	7.0	4.8	5.6	3.1	2.1	1.5	.67	.64
5	2.2	4.9	4.0	e2.2	5.9	4.2	5.3	3.1	2.1	.99	.66	42
6	2.4	5.0	4.0	e2.1	5.3	4.3	4.8	3.1	2.0	.91	.64	25
7	2.7	5.1	4.0	e2.6	5.2	4.2	4.6	2.9	1.9	2.2	.64	15
8	5.9	5.1	4.4	2.9	4.9	4.1	4.4	3.4	1.8	1.9	.67	11
9	2.9	5.1	5.1	3.3	4.3	4.4	4.5	2.9	1.7	.88	.69	9.4
10	2.3	5.2	3.9	3.2	4.1	4.5	4.4	2.8	1.7	.79	.66	7.4
11	2.1	6.0	3.7	2.9	3.9	4.3	7.1	2.6	1.7	.82	.65	5.2
12	2.0	5.3	3.7	3.3	3.8	4.3	5.8	2.5	1.7	2.2	.63	4.3
13	2.1	5.1	6.9	3.9	3.6	4.1	4.8	3.0	1.4	1.9	.63	3.9
14	2.1	5.1	5.2	4.2	3.5	7.2	4.6	8.3	1.4	1.5	.65	5.3
15	2.2	5.1	4.4	9.6	3.5	21	5.5	6.5	1.4	1.3	.66	11
16	2.2	5.1	4.1	5.1	3.4	19	5.5	4.7	1.5	1.0	.68	11
17	2.2	4.8	3.8	3.9	3.4	16	4.7	4.1	1.9	.97	.63	9.4
18	2.4	4.7	3.7	4.2	10	13	4.6	3.8	1.6	1.3	.64	7.7
19	2.7	4.5	3.4	3.7	7.7	12	4.5	5.8	1.5	1.2	.64	6.0
20	3.0	4.6	3.3	3.3	6.1	10	5.3	4.1	e1.4	.97	1.6	11
21	3.1	4.3	3.3	3.1	5.1	14	4.7	3.8	e1.8	1.5	1.0	59
22	3.2	4.5	3.2	3.0	4.4	13	4.6	3.5	1.6	2.3	.71	18
23	3.4	4.6	3.2	8.3	4.2	12	4.3	3.4	1.5	1.2	.72	11
24	3.7	4.7	3.6	22	4.0	11	4.7	3.4	1.4	.96	.87	10
25	3.7	4.3	3.3	12	4.0	10	4.1	3.1	1.4	.87	8.3	13
26	3.5	5.1	3.3	8.2	3.8	8.7	4.0	3.0	1.5	.75	2.9	12
27	3.3	5.1	3.1	6.6	3.6	8.0	4.0	2.8	1.3	.71	1.5	25
28	3.6	5.0	3.2	5.5	4.0	7.2	4.4	2.7	1.3	.84	1.2	76
29	4.0	4.9	3.3	4.8	---	6.4	4.2	2.6	1.2	2.2	1.1	48
30	4.3	4.7	3.2	4.3	---	6.0	3.9	2.5	1.2	1.2	.89	45
31	e5.0	---	3.0	4.1	---	5.5	---	2.4	---	.86	.64	---
TOTAL	91.3	147.5	120.6	153.2	143.5	254.6	149.1	110.2	50.0	39.72	34.04	504.06
MEAN	2.95	4.92	3.89	4.94	5.12	8.21	4.97	3.55	1.67	1.28	1.10	16.8
MAX	5.9	6.0	6.9	22	11	21	7.6	8.3	2.4	2.3	8.3	76
MIN	2.0	4.3	3.0	2.1	3.4	3.5	3.9	2.4	1.2	.71	.63	.59
CFM	.25	.42	.33	.42	.44	.70	.42	.30	.14	.11	.09	1.44
IN.	.29	.47	.38	.49	.46	.81	.47	.35	.16	.13	.11	1.60

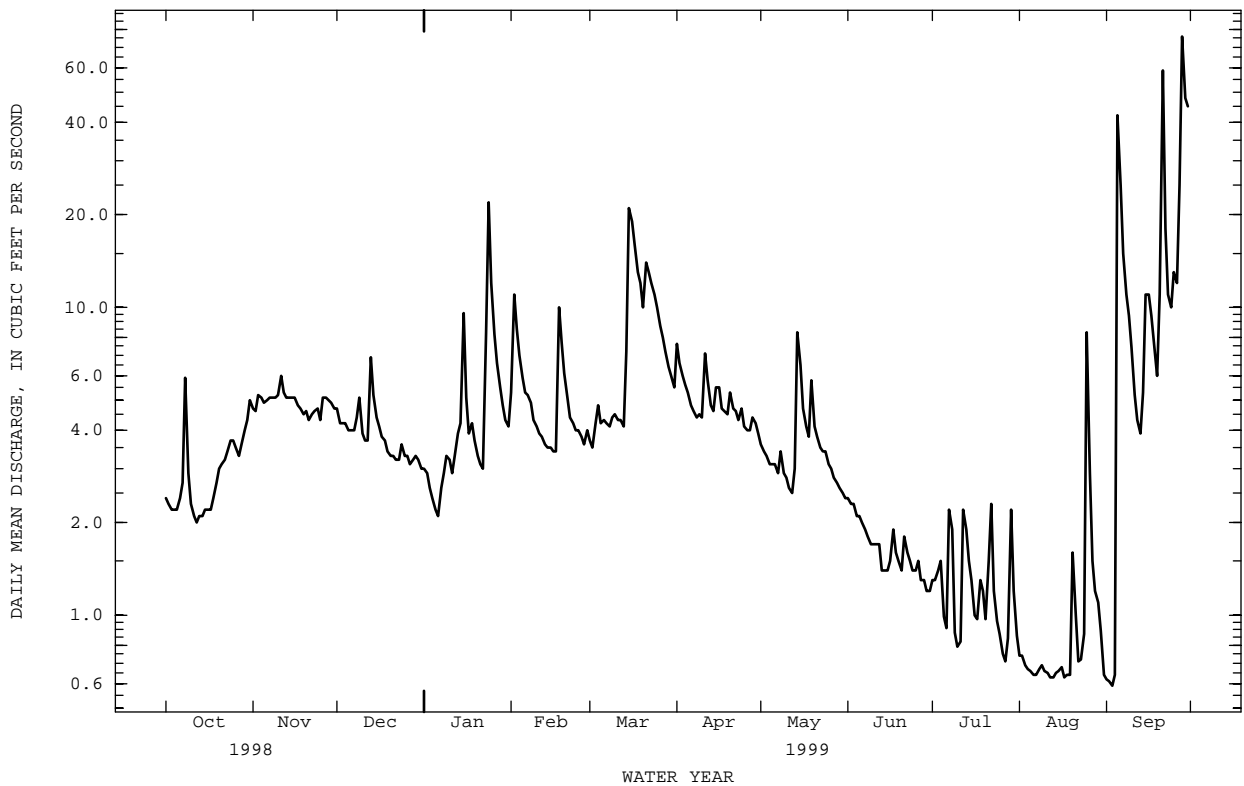
02055100 TINKER CREEK NEAR DALEVILLE, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1956 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	8.08	11.0	10.5	14.4	19.1	22.8	19.7	12.6	8.78	6.63	6.31	7.10
MAX	34.2	118	32.6	35.9	82.6	69.3	87.9	33.8	39.0	21.8	29.8	50.4
(WY)	1980	1986	1973	1996	1998	1993	1987	1958	1972	1973	1984	1979
MIN	2.09	1.76	2.00	1.78	3.78	3.16	3.21	3.44	1.67	1.13	1.10	1.36
(WY)	1987	1982	1966	1966	1981	1981	1981	1981	1999	1966	1999	1968

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR		FOR 1999 WATER YEAR		WATER YEARS 1956 - 1999	
ANNUAL TOTAL	7198.1		1797.82			
ANNUAL MEAN	19.7		4.93		12.3	
HIGHEST ANNUAL MEAN					21.6	
LOWEST ANNUAL MEAN					3.23	
HIGHEST DAILY MEAN	454		76		2560	
LOWEST DAILY MEAN	2.0		.59		.59	
ANNUAL SEVEN-DAY MINIMUM	2.0		.65		.65	
INSTANTANEOUS PEAK FLOW			346		10400	
INSTANTANEOUS PEAK STAGE			4.13		b13.36	
INSTANTANEOUS LOW FLOW			.58		d.20	
ANNUAL RUNOFF (CFSM)	1.69		.42		1.05	
ANNUAL RUNOFF (INCHES)	22.89		5.72		14.23	
10 PERCENT EXCEEDS	39		8.6		24	
50 PERCENT EXCEEDS	6.1		3.7		6.9	
90 PERCENT EXCEEDS	2.3		.90		2.5	

- a Also Sep 23-25, 28, 29 and Oct 12, 1998.
- b From floodmarks.
- c Also Sep 4, 1999.
- d Result of freezeup.
- e Estimated.



## ROANOKE RIVER BASIN

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 American Electric Power at Niagara, 2 mi downstream from Tinker Creek, 2.1 mi southeast of Vinton, and at mile 355.3.

DRAINAGE AREA.--512 mi<sup>2</sup>.

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 sea level (levels by U.S. Army Corps of Engineers).

REMARKS.--Records good except for period with ice effect, Jan. 2-6, which is fair. Flow regulated by dam and powerplant 200 ft upstream from station. Maximum discharge, 52,300 ft<sup>3</sup>/s, from rating curve extended above 12,000 ft<sup>3</sup>/s on basis of slope-area measurements at gage heights 18.98 ft and 25.30 ft. Minimum gage height, 0.17 ft, Aug. 25, 1971. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 3,500 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Sep 6	0315	*5,090	*9.04	No other peak greater than base discharge.			
Minimum discharge, 43 ft <sup>3</sup> /s, Dec 30, gage height, 1.03 ft.							

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	129	144	151	161	314	252	335	293	159	121	188	129
2	129	144	140	e155	372	226	351	278	198	143	165	131
3	109	217	145	e150	372	262	297	266	212	123	160	117
4	127	162	144	e140	334	371	277	264	169	120	140	124
5	129	163	148	e135	297	330	273	245	154	111	146	1190
6	125	155	141	e180	265	315	271	245	146	104	130	4090
7	144	154	140	214	299	355	255	239	135	184	125	1260
8	454	146	208	211	283	332	238	375	133	172	125	569
9	352	152	245	212	234	303	267	250	131	115	127	433
10	231	153	213	238	233	293	280	230	126	92	124	349
11	197	166	171	237	226	276	618	218	120	91	123	278
12	178	148	165	219	214	252	1000	210	122	347	121	228
13	175	155	345	225	232	243	695	229	121	286	108	212
14	158	153	273	242	228	319	539	541	121	200	119	203
15	158	155	208	482	221	759	483	424	119	162	118	235
16	156	146	193	475	213	1020	483	347	117	139	122	246
17	160	150	182	339	222	792	437	302	143	172	118	192
18	154	146	171	348	522	766	400	249	147	388	112	183
19	153	148	166	281	604	659	370	354	135	258	107	178
20	154	148	165	262	467	523	367	329	125	151	215	182
21	145	147	167	242	387	641	348	261	125	230	138	337
22	149	147	171	221	332	907	327	233	130	418	126	252
23	142	149	182	393	280	723	309	218	132	202	151	209
24	144	149	209	1170	266	585	309	226	126	149	292	197
25	150	149	175	962	251	509	285	211	120	153	421	187
26	145	172	186	526	236	436	288	199	119	148	291	167
27	149	151	172	397	226	379	278	200	119	136	186	270
28	149	154	170	318	258	332	382	183	121	205	175	536
29	148	149	175	265	---	304	335	175	120	345	154	419
30	145	147	164	272	---	277	314	168	114	213	144	597
31	142	---	171	268	---	262	---	162	---	184	135	---
TOTAL	5180	4619	5656	9940	8388	14003	11411	8124	4059	5862	4906	13700
MEAN	167	154	182	321	300	452	380	262	135	189	158	457
MAX	454	217	345	1170	604	1020	1000	541	212	418	421	4090
MIN	109	144	140	135	213	226	238	162	114	91	107	117
CFSM	.33	.30	.36	.63	.59	.88	.74	.51	.26	.37	.31	.89
IN.	.38	.34	.41	.72	.61	1.02	.83	.59	.29	.43	.36	1.00

02056000 ROANOKE RIVER AT NIAGARA, VA--Continued

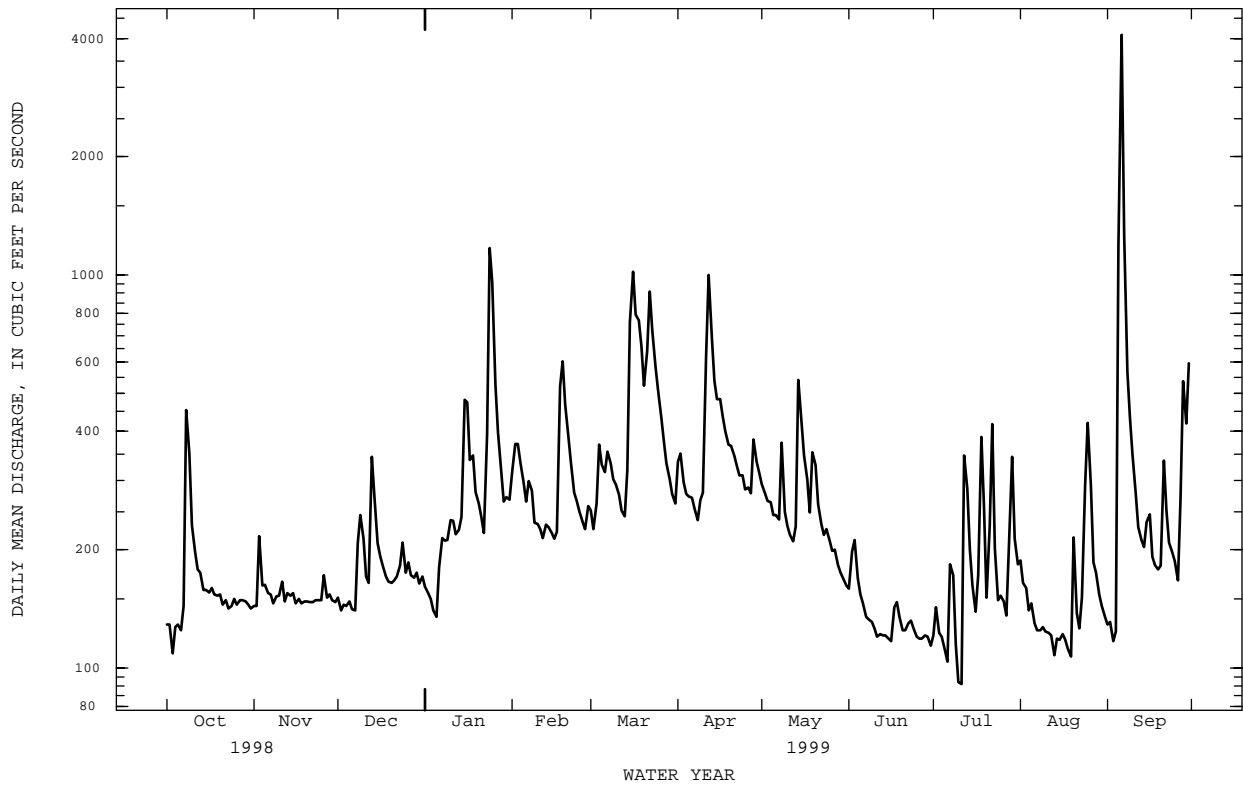
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1927 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	352	369	474	640	783	915	827	564	421	292	340	319
MAX	1722	2100	2065	1941	2805	2846	3661	1447	1550	1396	2456	2051
(WY)	1938	1986	1949	1937	1998	1993	1987	1958	1972	1949	1940	1928
MIN	86.0	101	115	110	117	210	157	193	135	109	92.2	84.0
(WY)	1931	1942	1966	1966	1934	1981	1942	1930	1999	1930	1956	1954

SUMMARY STATISTICS FOR 1998 CALENDAR YEAR FOR 1999 WATER YEAR WATER YEARS 1927 - 1999

ANNUAL TOTAL	281779	95848	
ANNUAL MEAN	772	263	523
HIGHEST ANNUAL MEAN			984 1949
LOWEST ANNUAL MEAN			198 1981
HIGHEST DAILY MEAN	12600	Mar 21	4090 Sep 6 19700 Nov 4 1985
LOWEST DAILY MEAN	109	Oct 3	91 Jul 11 8.0 Oct 9 1954
ANNUAL SEVEN-DAY MINIMUM	127	Sep 27	115 Aug 13 67 Jan 28 1966
INSTANTANEOUS PEAK FLOW			5090 Sep 6 52300 Nov 4 1985
INSTANTANEOUS PEAK STAGE			9.04 Sep 6 a25.30 Nov 4 1985
INSTANTANEOUS LOW FLOW			b43 Dec 30 1.0 cOct 16 1956
ANNUAL RUNOFF (CFSM)	1.51		.51 1.02
ANNUAL RUNOFF (INCHES)	20.47		6.96 13.88
10 PERCENT EXCEEDS	1540		428 988
50 PERCENT EXCEEDS	330		203 311
90 PERCENT EXCEEDS	144		125 136

- a From floodmark.
- b Result of regulation.
- c Also Oct 20, 1956, and Nov 25, 26, 1990.
- e Estimated.



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 mi<sup>2</sup>.

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

GAGE.--Water-stage recorder. Datum of gage is 822.67 ft above sea level. 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 for period with ice effect, Jan. 2-8, which is fair. Maximum discharge, 20,000 ft<sup>3</sup>/s, from rating curve extended above 5,900 ft<sup>3</sup>/s on basis of slope-area measurement of peak flow. Several measurements of water temperature were made during the year.

EXTREMES OUTSIDE PERIOD OF RECORD.--Floods of May 30, 1971, and Jun. 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 greater than base discharge of 600 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Sep 5	1915	*812	*6.56	Sep 6	1100	622	5.91

Minimum discharge, 1.4 ft<sup>3</sup>/s, Aug 19-20, gage height, 2.20 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	4.7	8.7	8.8	8.3	21	20	32	19	9.7	3.6	5.9	3.1
2	4.9	7.9	8.8	e8.0	55	16	36	17	9.1	3.7	6.4	2.8
3	3.8	9.1	8.1	e7.8	50	17	28	16	10	3.7	6.3	2.7
4	4.6	10	8.5	e7.4	38	33	26	15	9.5	3.7	4.2	2.6
5	5.0	10	8.6	e7.0	30	25	24	14	8.0	3.5	3.5	341
6	5.7	10	8.6	e6.8	26	24	22	14	7.6	2.6	3.2	440
7	8.2	8.7	8.7	e10	24	22	20	13	7.4	4.9	2.8	165
8	44	8.5	12	e12	24	20	19	56	6.7	3.4	2.4	76
9	21	9.1	37	14	19	21	19	25	5.9	2.2	2.4	110
10	7.7	9.7	9.7	18	19	22	21	18	5.6	2.0	2.4	146
11	5.2	11	4.5	17	17	22	70	15	5.3	1.9	2.2	61
12	4.6	11	3.7	16	17	19	77	12	5.3	11	2.0	41
13	4.4	10	31	23	16	19	51	22	5.5	41	1.8	30
14	4.3	9.7	33	32	14	25	43	107	4.8	19	2.3	24
15	3.8	9.5	16	54	13	98	41	96	4.7	16	1.8	21
16	4.2	8.9	11	42	13	100	44	56	4.8	9.9	1.9	33
17	4.3	8.8	8.9	28	13	65	34	43	8.1	8.3	1.9	20
18	4.2	8.7	7.5	39	52	56	30	36	9.1	9.5	1.6	15
19	4.3	9.1	6.9	37	47	47	28	45	6.2	6.9	1.5	12
20	4.3	8.9	7.3	27	36	41	26	32	5.4	5.2	5.5	11
21	4.1	8.6	7.0	22	29	46	25	27	6.0	5.6	4.2	16
22	3.9	8.3	6.8	19	24	57	23	24	8.1	50	4.8	25
23	4.6	8.4	6.5	25	21	46	21	21	7.1	12	4.9	12
24	5.3	8.9	12	144	20	42	23	19	5.7	6.5	17	9.5
25	5.9	8.4	13	75	19	40	19	18	5.3	4.8	21	8.5
26	5.9	10	9.4	47	19	34	18	16	5.7	3.9	22	7.3
27	5.5	12	9.0	36	17	30	19	15	6.8	3.4	10	9.1
28	6.0	10	9.5	29	19	27	23	13	5.7	4.1	6.4	63
29	7.2	8.6	11	24	---	25	28	12	5.0	26	4.8	81
30	7.3	8.8	11	21	---	23	22	11	4.1	24	3.9	149
31	8.0	---	8.8	18	---	21	---	10	---	9.1	3.3	---
TOTAL	216.9	279.3	352.6	874.3	712	1103	912	857	198.2	311.4	164.3	1937.6
MEAN	7.00	9.31	11.4	28.2	25.4	35.6	30.4	27.6	6.61	10.0	5.30	64.6
MAX	44	12	37	144	55	100	77	107	10	50	22	440
MIN	3.8	7.9	3.7	6.8	13	16	18	10	4.1	1.9	1.5	2.6
CFSM	.12	.16	.20	.50	.45	.63	.54	.49	.12	.18	.09	1.14
IN.	.14	.18	.23	.57	.47	.72	.60	.56	.13	.20	.11	1.27

02056650 BACK CREEK NEAR DUNDEE, VA--Continued

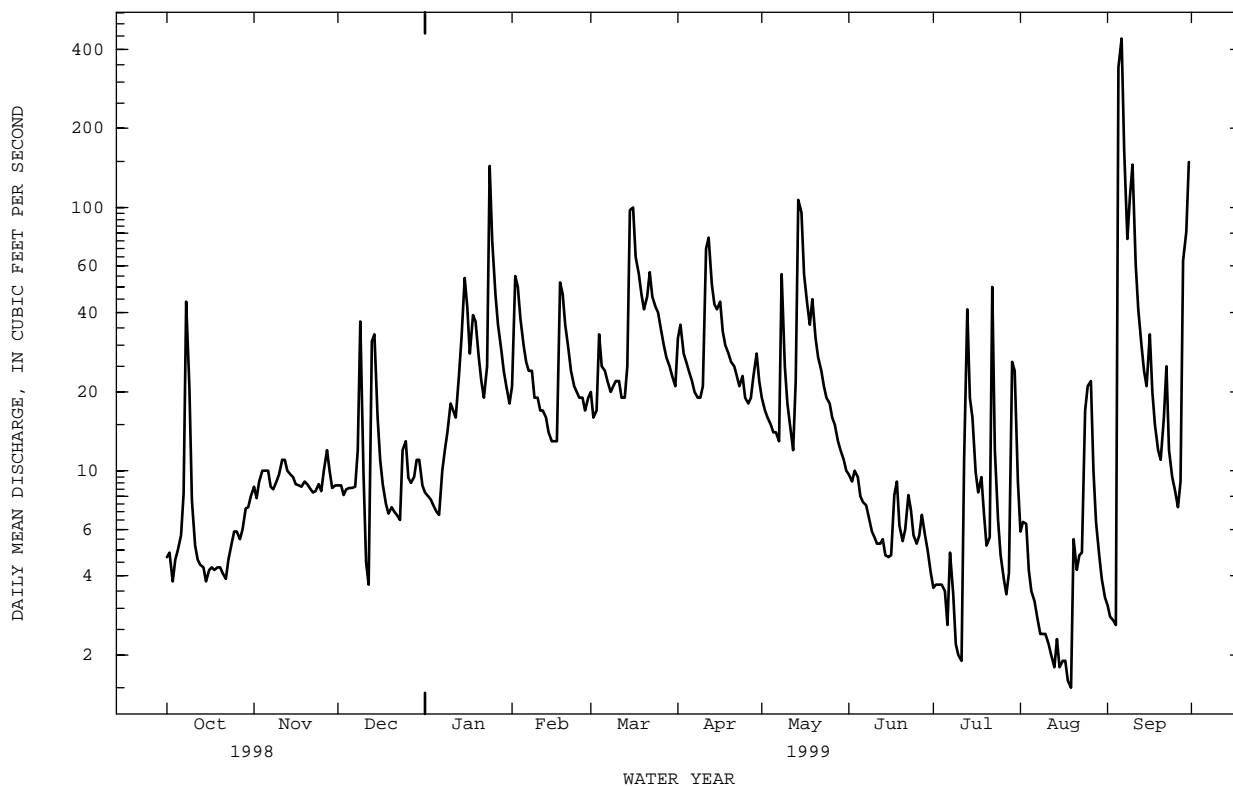
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1974 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	34.3	48.5	47.8	70.6	84.1	111	112	66.7	52.9	28.5	24.6	41.6
MAX	154	292	117	146	317	265	396	190	173	110	121	314
(WY)	1977	1986	1987	1996	1998	1993	1987	1978	1992	1989	1985	1979
MIN	5.61	6.58	11.4	11.6	21.6	20.5	22.4	20.8	6.61	6.96	3.47	5.03
(WY)	1992	1982	1999	1981	1989	1981	1981	1981	1999	1981	1981	1998

SUMMARY STATISTICS FOR 1998 CALENDAR YEAR FOR 1999 WATER YEAR WATER YEARS 1974 - 1999

ANNUAL TOTAL	29061.4	7918.6	
ANNUAL MEAN	79.6	21.7	60.1
HIGHEST ANNUAL MEAN			108 1987
LOWEST ANNUAL MEAN			15.9 1981
HIGHEST DAILY MEAN	1790	Feb 4	4000 Nov 4 1985
LOWEST DAILY MEAN	3.3	aSep 14	.90 Aug 30 1981
ANNUAL SEVEN-DAY MINIMUM	3.6	Sep 11	1.1 Aug 26 1981
INSTANTANEOUS PEAK FLOW			812 Sep 5 20000 Nov 4 1985
INSTANTANEOUS PEAK STAGE			6.56 Sep 5 b25.10 Nov 4 1985
INSTANTANEOUS LOW FLOW			1.4 cAug 19 (d)
ANNUAL RUNOFF (CFSM)	1.40		.38 1.06
ANNUAL RUNOFF (INCHES)	19.03		5.19 14.36
10 PERCENT EXCEEDS	178		44 114
50 PERCENT EXCEEDS	31		12 32
90 PERCENT EXCEEDS	5.2		3.9 9.7

- a Also Sep 15, 1998.
- b From floodmark, present site.
- c Also Aug 20, 1999.
- d Not determined.
- e Estimated.



## ROANOKE RIVER BASIN

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 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1976 to current year.

GAGE.--Water-stage recorder. Datum of gage is 876.45 ft above sea level.

REMARKS.--Records good except those for periods with ice effect, Jan. 2, 5-8, and periods with backwater from beaver dams, Jul. 30 to Aug. 25, and Sep. 1-26, which are fair. American Electric Power gage-height transmitter at station with recorder at Roanoke. Maximum discharge, 20,800 ft<sup>3</sup>/s, from rating curve extended above 7,000 ft<sup>3</sup>/s on basis of slope-area measurement of peak flow. Minimum gage height, 1.13 ft, July 21, 1986. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location by the Virginia Department of Environmental Quality - Water Division.

COOPERATION.--Records were provided by the Virginia Department of Environmental Quality - Water Division.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,500 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Sep 30	0200	*1,420	*5.74	No peak greater than base discharge.			

Minimum daily discharge, 4.6 ft<sup>3</sup>/s, Aug 19.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	23	32	34	38	58	61	70	56	32	24	e13	e23
2	22	32	34	e36	131	55	92	51	31	24	e16	e21
3	21	34	34	72	121	55	71	49	30	24	e14	e20
4	21	36	34	123	90	77	67	48	32	25	e13	e19
5	24	37	34	e63	76	70	63	46	28	20	e12	e159
6	28	35	34	e48	69	65	61	46	27	18	e11	e592
7	34	33	35	e59	65	64	59	46	26	16	e10	e180
8	111	34	36	e50	64	60	57	65	25	34	e9.0	e74
9	79	34	68	53	58	61	55	67	23	28	e10	e54
10	41	36	54	86	56	64	56	52	21	19	e10	e63
11	32	44	38	68	54	63	196	47	20	16	e9.0	e50
12	29	47	35	51	53	59	225	44	20	20	e7.0	e36
13	29	38	91	53	53	57	119	42	23	69	e6.0	e27
14	28	36	99	59	50	67	98	119	20	50	e5.4	e23
15	27	36	54	86	48	195	89	175	19	41	e5.2	e33
16	27	35	44	95	48	183	97	98	20	33	e6.2	e35
17	28	34	40	68	50	125	81	80	27	27	e5.9	e31
18	28	35	36	92	92	107	73	70	36	23	e5.2	e30
19	27	34	35	96	106	94	70	72	26	23	e4.6	e29
20	28	35	35	72	81	84	68	61	23	27	e6.2	e25
21	28	36	35	62	70	89	65	55	25	23	e23	e26
22	27	35	34	56	63	100	63	53	30	75	e21	e28
23	26	34	34	58	60	82	60	50	28	41	e19	e27
24	28	35	44	227	59	78	58	46	24	27	e18	e24
25	30	35	51	172	58	75	55	43	22	21	e50	e23
26	30	36	44	107	57	71	54	42	24	18	104	e21
27	29	36	43	84	55	67	59	40	29	15	68	27
28	29	35	42	73	58	64	58	37	28	16	44	95
29	29	35	42	65	---	62	64	36	32	48	32	203
30	29	34	42	59	---	60	62	34	31	e20	28	657
31	30	---	40	55	---	58	---	33	---	e16	24	---
TOTAL	1002	1068	1355	2386	1903	2472	2365	1803	782	881	609.7	2655
MEAN	32.3	35.6	43.7	77.0	68.0	79.7	78.8	58.2	26.1	28.4	19.7	88.5
MAX	111	47	99	227	131	195	225	175	36	75	104	657
MIN	21	32	34	36	48	55	54	33	19	15	4.6	19
CFSM	.28	.31	.38	.67	.59	.69	.69	.51	.23	.25	.17	.77
IN.	.32	.35	.44	.77	.62	.80	.77	.58	.25	.28	.20	.86



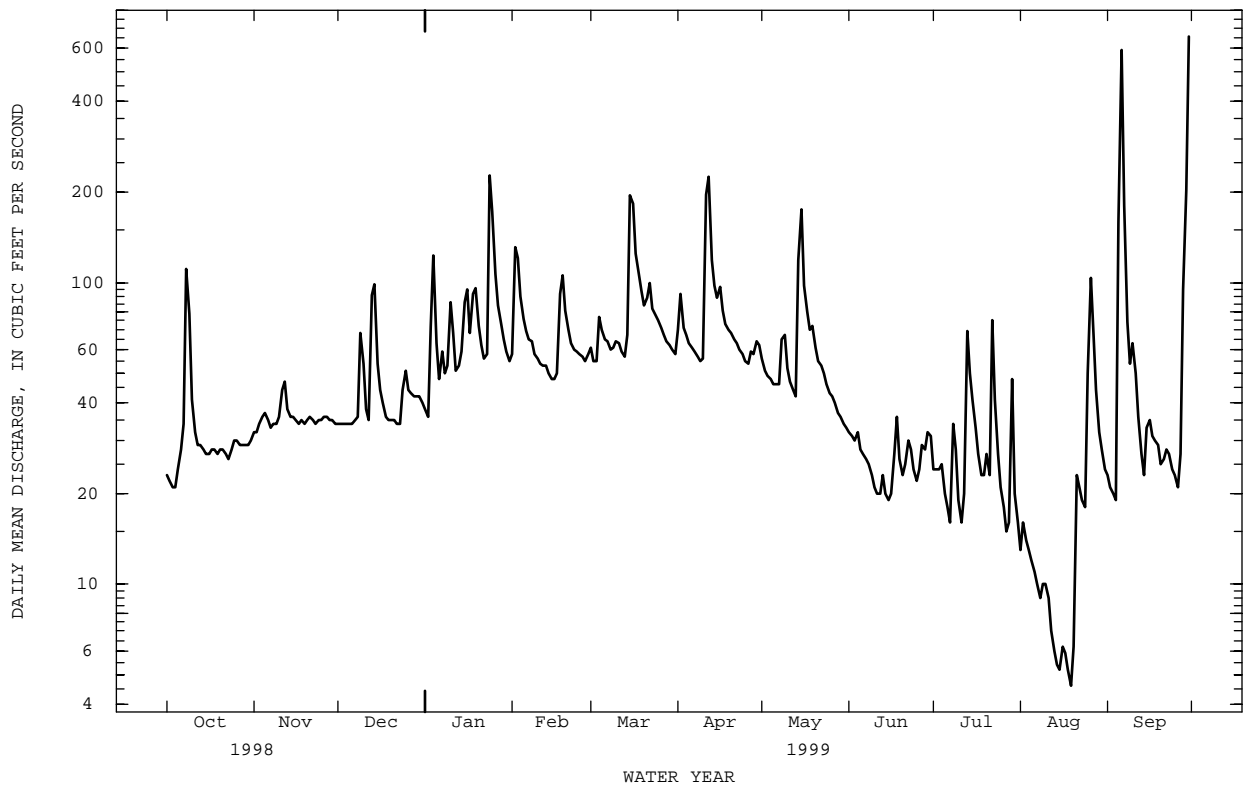
02056900 BLACKWATER RIVER NEAR ROCKY MOUNT, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1977 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	101	116	113	163	172	229	242	141	127	83.9	68.2	96.2
MAX	544	584	272	349	495	585	821	346	416	261	205	375
(WY)	1977	1986	1997	1996	1998	1993	1987	1978	1992	1989	1985	1979
MIN	26.5	29.1	43.7	47.0	66.1	60.1	65.3	53.6	26.1	24.6	12.4	23.0
(WY)	1992	1982	1999	1981	1989	1981	1981	1981	1999	1977	1981	1983

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR	WATER YEARS 1977 - 1999
ANNUAL TOTAL	55643	19281.7	
ANNUAL MEAN	152	52.8	137
HIGHEST ANNUAL MEAN			234
LOWEST ANNUAL MEAN			46.1
HIGHEST DAILY MEAN	2390	Feb 4	5410
LOWEST DAILY MEAN	20	aSep 10	e4.6
ANNUAL SEVEN-DAY MINIMUM	21	Sep 9	5.5
INSTANTANEOUS PEAK FLOW			1420
INSTANTANEOUS PEAK STAGE			5.74
INSTANTANEOUS LOW FLOW			(b)
ANNUAL RUNOFF (CFSM)	1.33	.46	(b)
ANNUAL RUNOFF (INCHES)	18.00	6.24	1.20
10 PERCENT EXCEEDS	297	90	235
50 PERCENT EXCEEDS	70	40	88
90 PERCENT EXCEEDS	28	20	36

- a Also Sep 14, 1998.
- b Not determined.
- c Probably occurred Aug 19, 1999.
- 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 mi<sup>2</sup>.

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 American Electric Power.

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, 1,142,000 acre-ft, Apr. 12, elevation, 795.0 ft; minimum, 1,023,000 acre-ft, Dec. 9, elevation, 789.1 ft.

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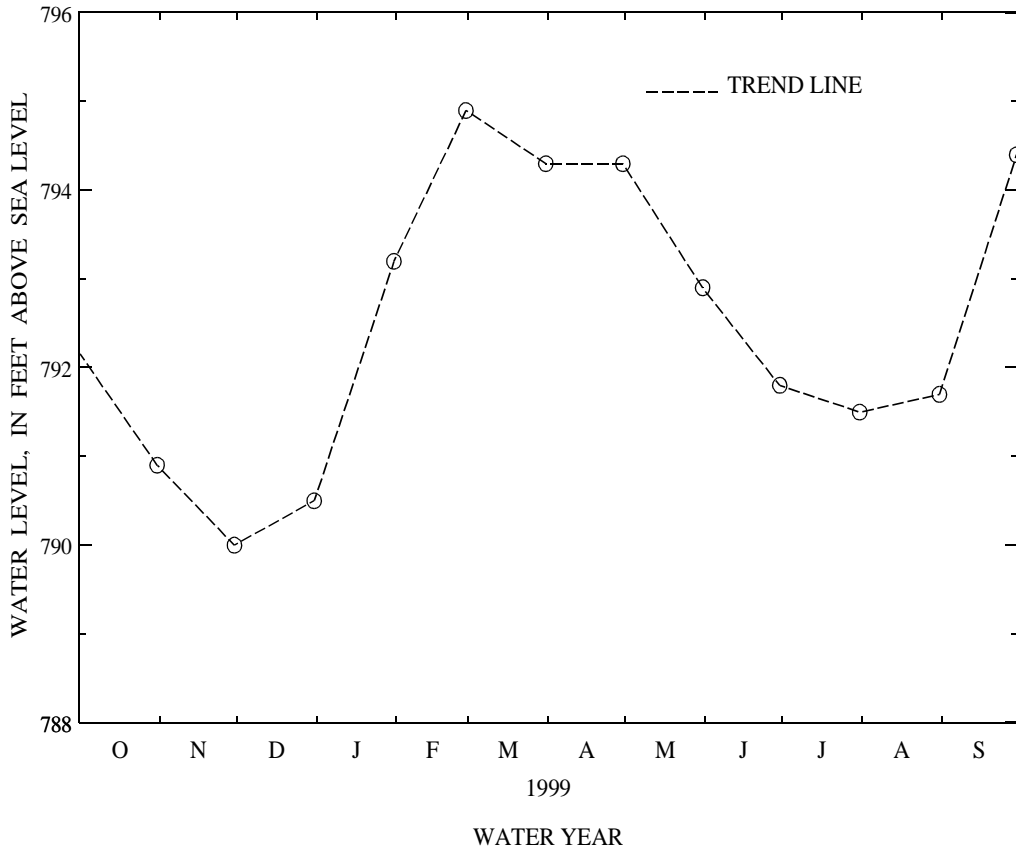
MONTHEND ELEVATION AND CONTENTS AT 2400, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

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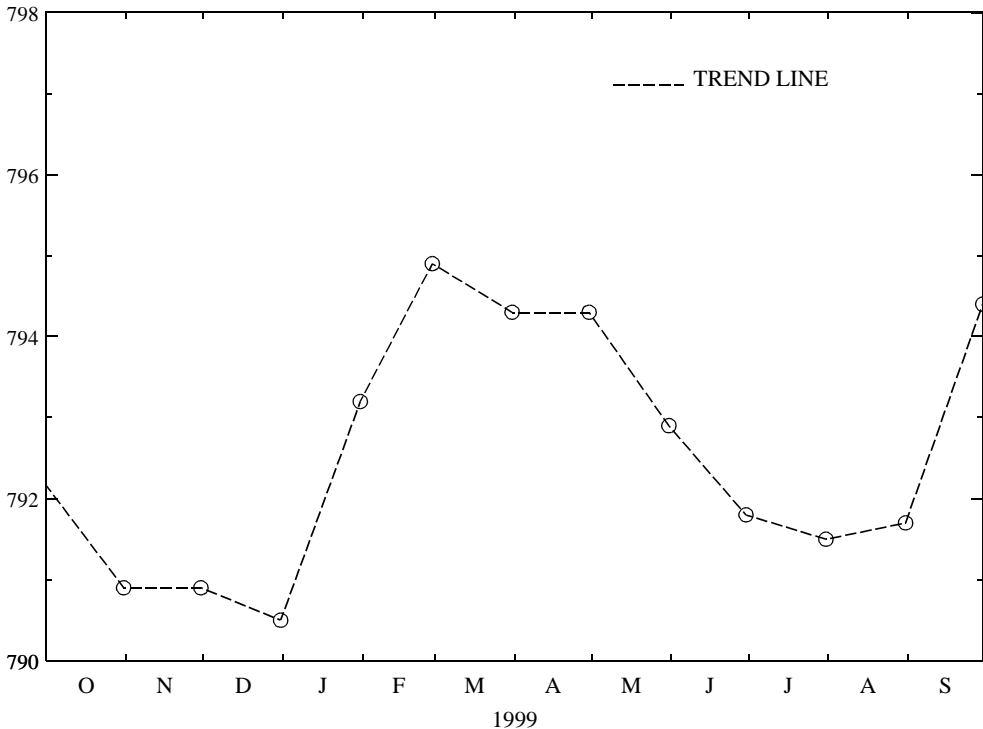
Date	Elevation (feet)	Contents (acre-feet)	Change in contents (acre-feet)
Sept. 30.....	792.2	1,084,900	-
Oct. 31.....	790.9	1,058,400	-26,500
Nov. 30.....	790.0	1,040,000	-18,400
Dec. 31.....	790.5	1,050,200	+10,200
CAL YR 1998.....			-24,500
Jan. 31.....	793.2	1,105,300	+55,100
Feb. 28.....	794.9	1,140,000	+34,700
Mar. 31.....	794.3	1,127,700	-12,300
Apr. 30.....	794.3	1,127,700	0
May 31.....	792.9	1,099,200	-28,500
June 30.....	791.8	1,076,700	-22,500
July 31.....	791.5	1,070,600	-6,100
Aug. 31.....	791.7	1,074,700	+4,100
Sept. 30.....	794.4	1,129,800	+55,100
WTR YR 1999.....			+44,900

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02057400 SMITH MOUNTAIN LAKE NEAR PENHOOK, VA--Continued



WATER LEVEL, IN FEET ABOVE SEA LEVEL



--- TREND LINE

ROANOKE RIVER BASIN

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 mi<sup>2</sup>.

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 sea level (U.S. Army Corps of Engineers bench mark). Prior to Nov. 18, 1963, nonrecording gage at same site and datum.

REMARKS.--No estimated daily discharges. Records good. American Electric Power gage-height transmitter at station, recorder at Roanoke. Maximum discharge, 65,600 ft<sup>3</sup>/s, from rating curve extended above 25,500 ft<sup>3</sup>/s on basis of slope-area measurement of peak flow. Minimum gage height, 1.95 ft, Aug. 29, 30, 1981. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Sep 30	0915	*5,420	*10.32	No other peak greater than base discharge.			
Minimum discharge, 44 ft <sup>3</sup> /s, Aug 19-20, gage height, 2.04 ft.							

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	88	134	141	175	233	244	254	228	117	97	101	71
2	87	130	140	169	615	218	362	199	113	107	90	69
3	84	131	139	317	604	208	289	184	113	109	82	65
4	98	144	139	482	401	257	253	179	110	97	75	64
5	115	154	140	326	324	245	231	176	106	91	72	347
6	126	147	142	283	282	223	215	174	105	77	69	1110
7	140	136	143	276	264	215	209	173	103	75	66	658
8	174	134	147	238	270	197	200	287	100	162	64	280
9	258	137	243	236	243	198	196	209	97	105	63	190
10	181	142	260	302	225	213	194	175	92	97	64	197
11	142	178	183	282	216	212	502	159	87	109	63	211
12	134	254	158	243	215	200	786	150	88	102	58	151
13	131	181	511	233	222	189	399	158	90	176	55	128
14	131	153	604	244	204	216	312	228	91	209	53	120
15	128	149	299	313	193	732	282	451	92	174	52	122
16	126	145	218	366	192	819	297	268	96	134	60	310
17	125	142	189	290	195	459	267	205	113	114	57	267
18	125	140	172	344	369	357	236	182	125	113	51	171
19	125	139	162	461	470	303	225	186	114	98	46	141
20	124	140	161	343	348	269	221	184	105	90	49	135
21	122	142	159	279	289	312	213	158	116	104	62	139
22	121	140	158	247	250	400	209	148	122	830	73	181
23	117	139	155	245	229	322	201	149	118	352	67	149
24	118	140	217	1190	226	286	193	144	109	174	61	129
25	124	141	299	995	222	274	186	135	101	130	169	122
26	128	146	239	469	219	250	184	133	103	110	337	118
27	128	149	216	354	210	231	194	132	108	98	258	123
28	128	143	218	304	218	220	214	128	111	91	150	884
29	129	140	212	268	---	215	232	124	107	129	107	1310
30	128	142	199	243	---	209	251	121	104	168	89	3980
31	130	---	184	224	---	201	---	119	---	122	77	---
TOTAL	4015	4432	6547	10741	7948	8894	8007	5646	3156	4644	2740	11942
MEAN	130	148	211	346	284	287	267	182	105	150	88.4	398
MAX	258	254	604	1190	615	819	786	451	125	830	337	3980
MIN	84	130	139	169	192	189	184	119	87	75	46	64
CFSM	.37	.42	.60	.99	.81	.82	.76	.52	.30	.43	.25	1.14
IN.	.43	.47	.70	1.14	.84	.95	.85	.60	.34	.49	.29	1.27

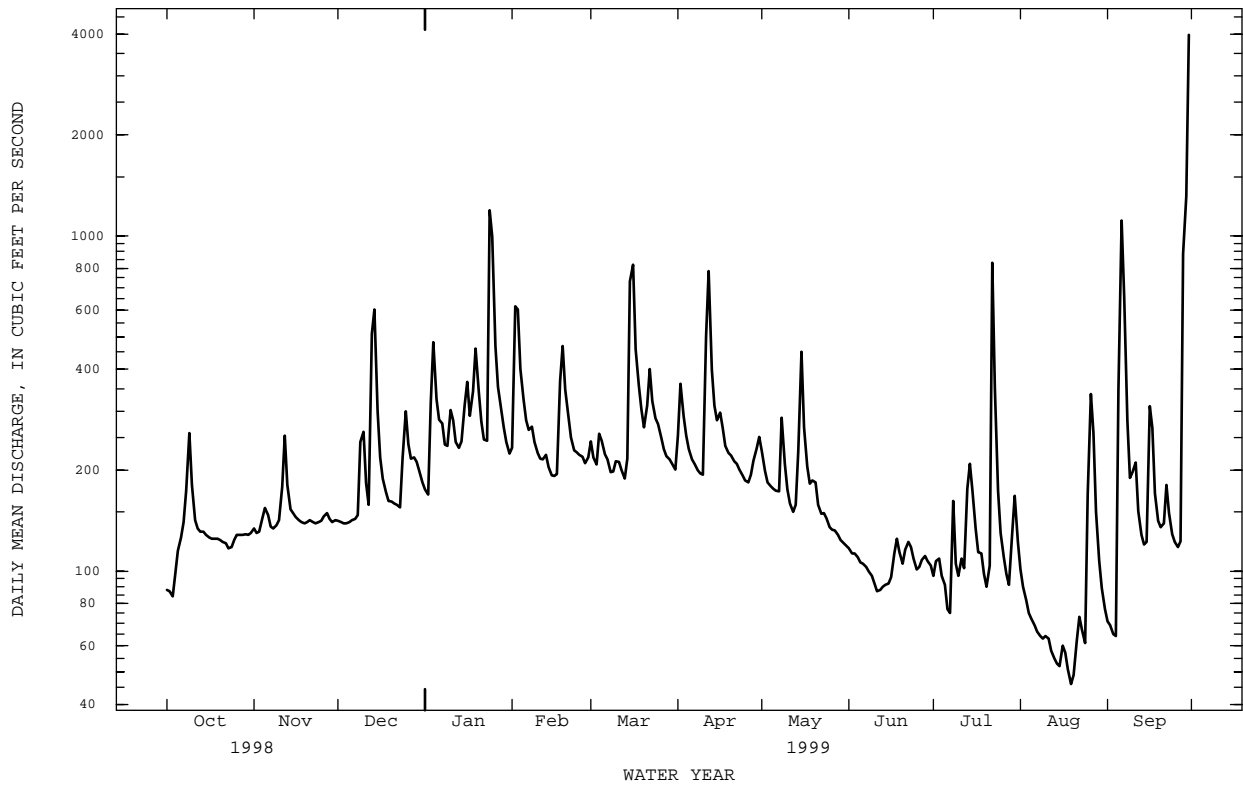
02058400 PIGG RIVER NEAR SANDY LEVEL, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1963 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	298	313	357	487	510	599	541	405	337	261	242	309
MAX	1220	995	836	1054	1086	1578	2265	989	1200	814	867	1864
(WY)	1991	1986	1974	1978	1998	1993	1987	1978	1972	1972	1985	1987
MIN	110	103	143	160	228	203	202	165	105	85.4	49.3	70.0
(WY)	1982	1982	1966	1981	1968	1981	1985	1981	1999	1967	1981	1968

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR	WATER YEARS 1963 - 1999
ANNUAL TOTAL	152822	78712	
ANNUAL MEAN	419	216	389
HIGHEST ANNUAL MEAN			709
LOWEST ANNUAL MEAN			155
HIGHEST DAILY MEAN	9520	Jan 28	34900
LOWEST DAILY MEAN	82	aSep 16	25
ANNUAL SEVEN-DAY MINIMUM	86	Sep 11	29
INSTANTANEOUS PEAK FLOW			65600
INSTANTANEOUS PEAK STAGE			b31.12
INSTANTANEOUS LOW FLOW			24
ANNUAL RUNOFF (CFSM)	1.20	.62	1.11
ANNUAL RUNOFF (INCHES)	16.24	8.37	15.10
10 PERCENT EXCEEDS	685	330	600
50 PERCENT EXCEEDS	256	169	258
90 PERCENT EXCEEDS	118	90	124

- a Also Sep 17, 1998.
- b From floodmarks.
- c Also Aug 20, 1999.
- d Also Aug 30, 1981.



## 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 mi<sup>2</sup>.

PERIOD OF RECORD.--September 1962 to current year.

GAGE.--Water-stage recorder. Datum of gage is at sea level. 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, 614 ft, is 98,180 acre-ft of which 78,670 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 American Electric Power.

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, 92,710 acre-ft, May 28, elevation, 612.3 ft; minimum, 57,200 acre-ft, Jan. 18, elevation, 600.0 ft.

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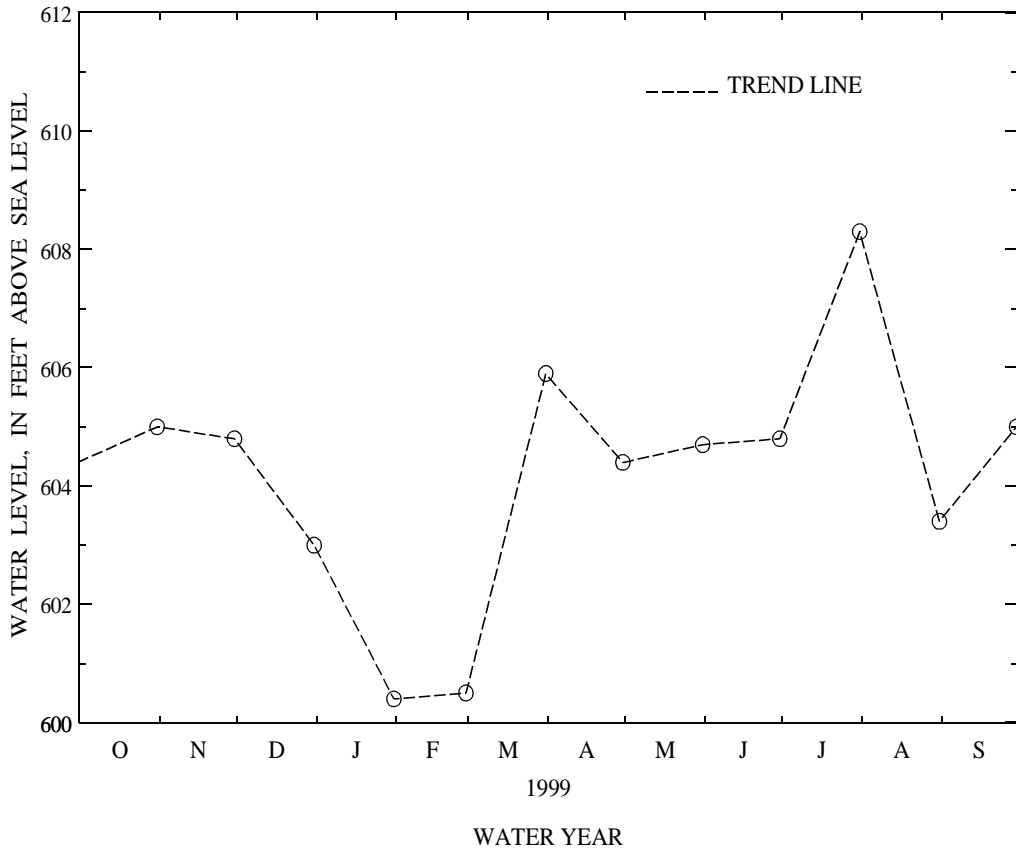
MONTHEND ELEVATION AND CONTENTS AT 2400, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

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Date	Elevation (feet)	Contents (acre-feet)	Change in contents (acre-feet)
Sept. 30.....	604.4	68,990	-
Oct. 31.....	605.0	70,600	+1,610
Nov. 30.....	604.8	70,060	-540
Dec. 31.....	603.0	65,240	-4,820
CAL YR 1998.....			-18,000
Jan. 31.....	600.4	58,270	-6,970
Feb. 28.....	600.5	58,540	+270
Mar. 31.....	605.9	73,250	+14,710
Apr. 30.....	604.4	68,990	-4,260
May 31.....	604.7	69,800	+810
June 30.....	604.8	70,060	+260
July 31.....	608.3	80,300	+10,240
Aug. 31.....	603.4	66,310	-13,990
Sept. 30.....	605.0	70,600	+4,290
WTR YR 1999.....			+1,610

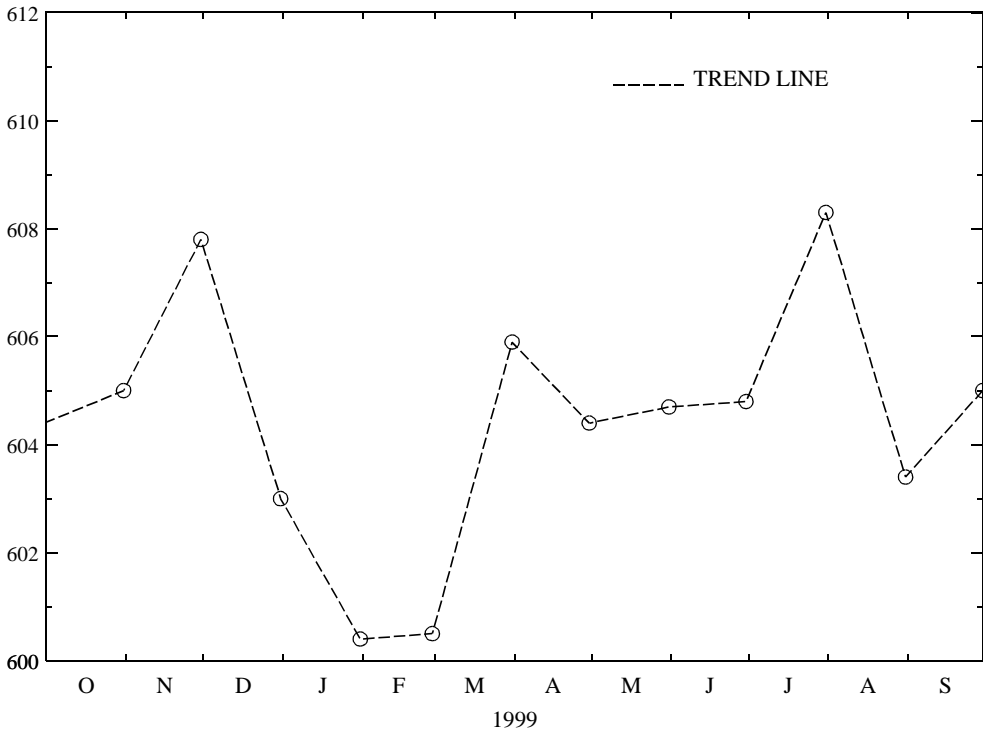
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02059400 LEESVILLE LAKE NEAR LEESVILLE, VA--Continued





WATER LEVEL, IN FEET ABOVE SEA LEVEL



## ROANOKE RIVER BASIN

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 mi<sup>2</sup>.

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 sea level. Mar. 15, 1925, to Aug. 4, 1928, nonrecording gage at site 1,300 ft downstream at different datum.

REMARKS.--Records good except those for period with ice effect, Jan. 5-9, and periods of doubtful gage-height record, Jan. 12, 13, May 3, Aug. 16-19, which are fair. Prior to October 1954, diurnal fluctuation at low flow caused by mill upstream from station. American Electric Power gage-height transmitter at station with recorder at Roanoke. Maximum discharge, 53,200 ft<sup>3</sup>/s, from rating curve extended above 11,000 ft<sup>3</sup>/s on basis of slope-area measurements at gage heights 19.25 ft, 24.1 ft, 24.89 ft, and 37.49 ft. Minimum discharge, 3.0 ft<sup>3</sup>/s, Aug. 31, 1932, and Jan. 30, 1934, result of freezeup. 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 Department of Environmental Quality - Water Division.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,300 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Sep 30	0115	*5,170	*7.87	No other peak greater than base discharge.			

Minimum daily discharge, 10 ft<sup>3</sup>/s, Aug 19.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	35	42	51	58	80	81	115	76	41	31	22	22
2	32	43	49	62	156	76	140	72	41	41	21	21
3	32	51	49	228	260	93	109	e73	51	40	21	20
4	33	70	51	291	164	97	102	73	49	31	18	20
5	37	56	51	e125	127	86	96	70	43	26	18	179
6	43	50	51	e77	108	85	91	70	39	22	16	474
7	51	47	54	e99	98	81	88	70	36	29	15	291
8	80	46	55	e80	99	79	86	99	36	87	14	147
9	100	49	119	e88	94	83	85	114	33	51	16	77
10	55	51	79	127	86	84	85	85	31	31	16	82
11	48	75	60	99	84	83	180	76	31	25	15	67
12	47	64	56	e92	80	78	179	69	33	57	13	49
13	48	53	134	e86	82	74	119	110	33	121	12	45
14	46	52	140	101	81	89	105	133	31	69	14	46
15	44	52	80	152	75	346	104	201	32	57	14	48
16	42	52	65	156	74	343	110	109	33	45	e12	108
17	45	52	61	110	74	211	96	86	42	35	e11	68
18	43	49	58	180	104	173	87	75	41	41	e11	48
19	44	49	55	201	207	141	85	71	32	34	e10	44
20	45	50	55	134	143	120	85	66	31	31	36	43
21	40	51	59	113	115	125	83	59	36	38	43	63
22	39	49	59	99	101	147	81	60	42	155	25	73
23	37	49	55	109	90	133	77	60	41	62	20	48
24	41	52	79	733	85	122	84	56	37	39	20	44
25	40	50	76	393	83	116	77	53	34	30	41	42
26	42	52	66	172	80	106	73	52	38	24	70	40
27	41	52	67	129	79	98	77	51	38	21	121	48
28	41	51	64	113	89	94	91	48	36	29	51	332
29	42	49	65	100	---	88	92	48	44	81	32	586
30	42	50	63	92	---	87	81	45	33	37	27	1790
31	42	---	60	84	---	84	---	42	---	26	22	---
TOTAL	1397	1558	2086	4683	2998	3703	2963	2372	1118	1446	797	4965
MEAN	45.1	51.9	67.3	151	107	119	98.8	76.5	37.3	46.6	25.7	166
MAX	100	75	140	733	260	346	180	201	51	155	121	1790
MIN	32	42	49	58	74	74	73	42	31	21	10	20
CFSM	.24	.28	.36	.80	.57	.64	.53	.41	.20	.25	.14	.88
IN.	.28	.31	.41	.93	.59	.73	.59	.47	.22	.29	.16	.98

02059500 GOOSE CREEK NEAR HUDDLESTON, VA--Continued

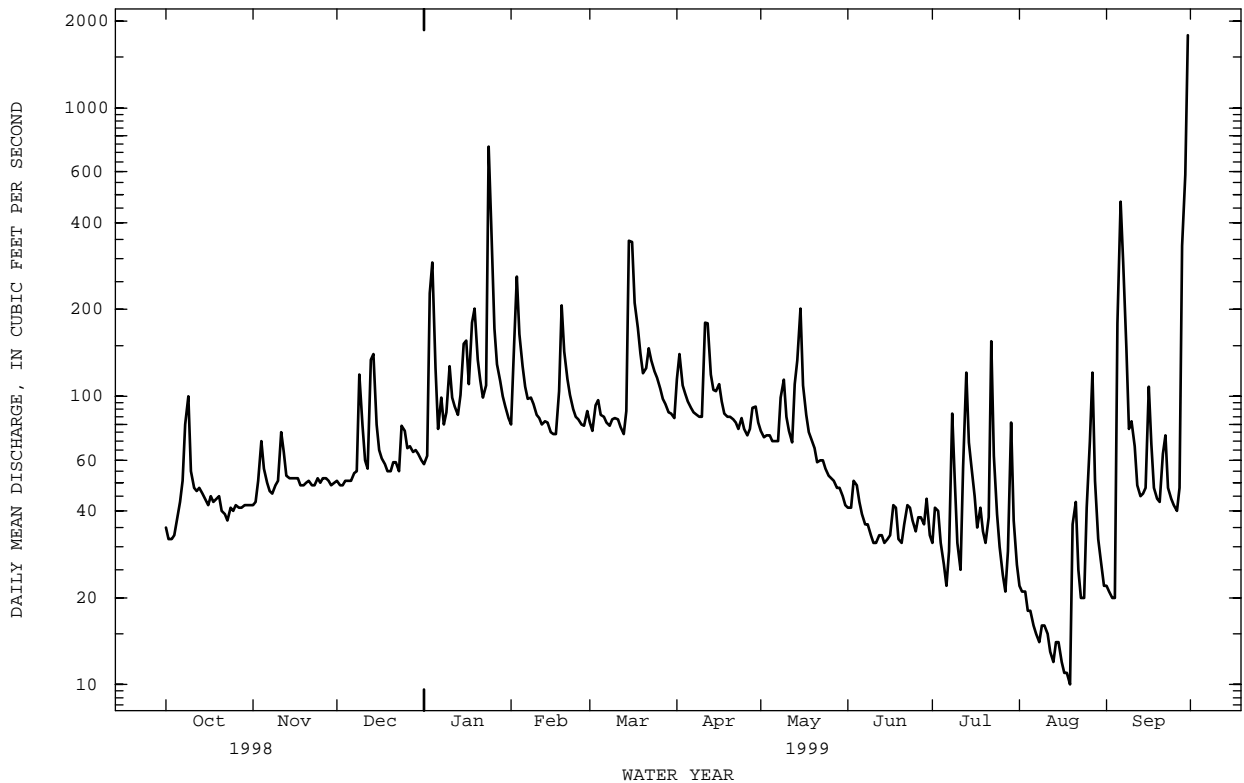
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1931 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	132	137	172	231	250	288	263	199	153	115	132	130
MAX	719	642	616	772	821	909	1320	780	802	466	822	1229
(WY)	1938	1986	1949	1936	1998	1975	1987	1989	1995	1949	1940	1987
MIN	27.9	32.9	45.2	46.6	48.5	80.1	73.2	56.8	37.3	26.3	22.9	28.8
(WY)	1932	1932	1966	1966	1934	1981	1942	1981	1999	1966	1932	1933

SUMMARY STATISTICS FOR 1998 CALENDAR YEAR FOR 1999 WATER YEAR WATER YEARS 1931 - 1999

ANNUAL TOTAL	91218	30086	
ANNUAL MEAN	250	82.4	183
HIGHEST ANNUAL MEAN			393
LOWEST ANNUAL MEAN			66.8
HIGHEST DAILY MEAN	6020	Jan 28	1790 Sep 30
LOWEST DAILY MEAN	31	aSep 14	e 10 Aug 19
ANNUAL SEVEN-DAY MINIMUM	32	Sep 11	12 Aug 13
INSTANTANEOUS PEAK FLOW			5170 Sep 30
INSTANTANEOUS PEAK STAGE			7.87 Sep 30
INSTANTANEOUS LOW FLOW			(c) Aug 19
ANNUAL RUNOFF (CFSM)	1.33	.44	.98
ANNUAL RUNOFF (INCHES)	18.05	5.95	13.25
10 PERCENT EXCEEDS	461	133	323
50 PERCENT EXCEEDS	103	60	112
90 PERCENT EXCEEDS	42	30	48

- a Also Sep 16, 17, 1998.
- b From floodmarks.
- c Not determined.
- d Also Jan 30, 1934, result of freezeup.
- e Estimated.



## ROANOKE RIVER BASIN

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 mi<sup>2</sup>.

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 sea level. 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. Statistics of monthly mean data and summary statistics for water years 1931 - 1962 (unregulated flow) are available in previous data books, water years 1991 - 1998. U.S. Army Corps of Engineers satellite gage-height telemeter at station. American Electric Power gage-height transmitter at station with recorder at Roanoke. Hadson Power Company gage-height telemeter at station. Maximum discharge, 105,000 ft<sup>3</sup>/s, from rating curve extended above 52,000 ft<sup>3</sup>/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 gage height, 1.53 ft, Jan. 2, 1977, result of freezeup. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 8,630 ft<sup>3</sup>/s, Sep 30, gage height, 10.60 ft; minimum daily, 479 ft<sup>3</sup>/s, Aug 17, 19.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	676	792	790	535	559	642	888	1240	726	503	545	510
2	681	743	794	528	747	800	1290	1280	732	552	486	495
3	719	766	762	632	776	801	1430	1310	732	622	487	552
4	719	781	734	749	665	828	1410	1430	742	614	489	603
5	735	774	792	591	612	834	1280	1340	741	550	488	670
6	743	785	788	543	593	850	837	1280	713	497	538	843
7	754	786	778	561	583	840	800	1360	712	502	589	779
8	811	762	779	571	584	807	769	1370	727	512	536	628
9	812	771	854	560	580	773	804	1390	724	589	483	566
10	775	795	823	556	567	783	814	1360	710	668	480	588
11	770	797	772	552	558	789	1350	1350	719	548	484	634
12	749	846	785	564	554	784	2860	1280	721	510	488	572
13	754	765	992	560	549	779	3190	1290	724	557	541	514
14	760	767	934	570	547	824	2720	1530	720	547	585	515
15	758	795	860	616	565	2290	1750	1530	713	530	535	529
16	757	819	777	642	541	3730	1310	1250	719	569	484	643
17	763	735	739	588	545	2890	1200	1310	687	610	479	597
18	765	776	622	619	708	2010	984	1270	540	566	482	600
19	760	754	621	691	759	1790	810	1230	636	509	479	576
20	763	754	624	608	649	1580	792	1220	625	503	541	518
21	758	760	618	579	606	1660	800	1230	518	514	601	534
22	776	765	626	561	578	2310	786	1270	522	563	542	555
23	759	758	615	591	585	2100	788	1270	520	621	484	535
24	760	756	654	1240	583	1690	780	1260	514	631	482	578
25	769	775	568	1120	581	1270	821	1100	629	568	525	619
26	753	761	544	734	574	1060	1550	748	698	504	563	571
27	757	765	543	641	577	904	1530	743	566	502	681	535
28	754	768	541	609	585	872	1410	720	512	501	675	722
29	768	769	546	588	---	808	1340	692	500	530	581	1040
30	753	773	542	578	---	825	1260	688	517	573	521	6510
31	778	---	539	551	---	814	---	706	---	604	522	---
TOTAL	23409	23213	21956	19628	16910	39737	38353	37047	19559	17169	16396	24131
MEAN	755	774	708	633	604	1282	1278	1195	652	554	529	804
MAX	812	846	992	1240	776	3730	3190	1530	742	668	681	6510
MIN	676	735	539	528	541	642	769	688	500	497	479	495
(†)	-12548	-9549	+2712	+24266	+17626	+1215	-2148	-13962	-11209	+2088	-4986	+29943
MEAN†	350	455	796	1416	1233	1321	1207	745	278	621	368	1802
CFSM†	.20	.25	.44	.79	.69	.74	.67	.42	.16	.35	.21	1.01
IN. ‡	.23	.28	.51	.91	.72	.85	.75	.48	.17	.40	.24	1.12

CAL YR 1998 TOTAL 809179 MEAN 2217 MAX 17300 MIN 539 MEAN† 2158 CFSM† 1.21 IN. ‡ 16.38  
WTR YR 1999 TOTAL 297508 MEAN 815 MAX 6510 MIN 479 MEAN† 879 CFSM† .49 IN. ‡ 6.67

† Total change in contents, equivalent in cubic feet per second, per month, in Smith Mountain and Leesville Lakes; provided by American Electric Power.

‡ Adjusted for monthly change in contents.

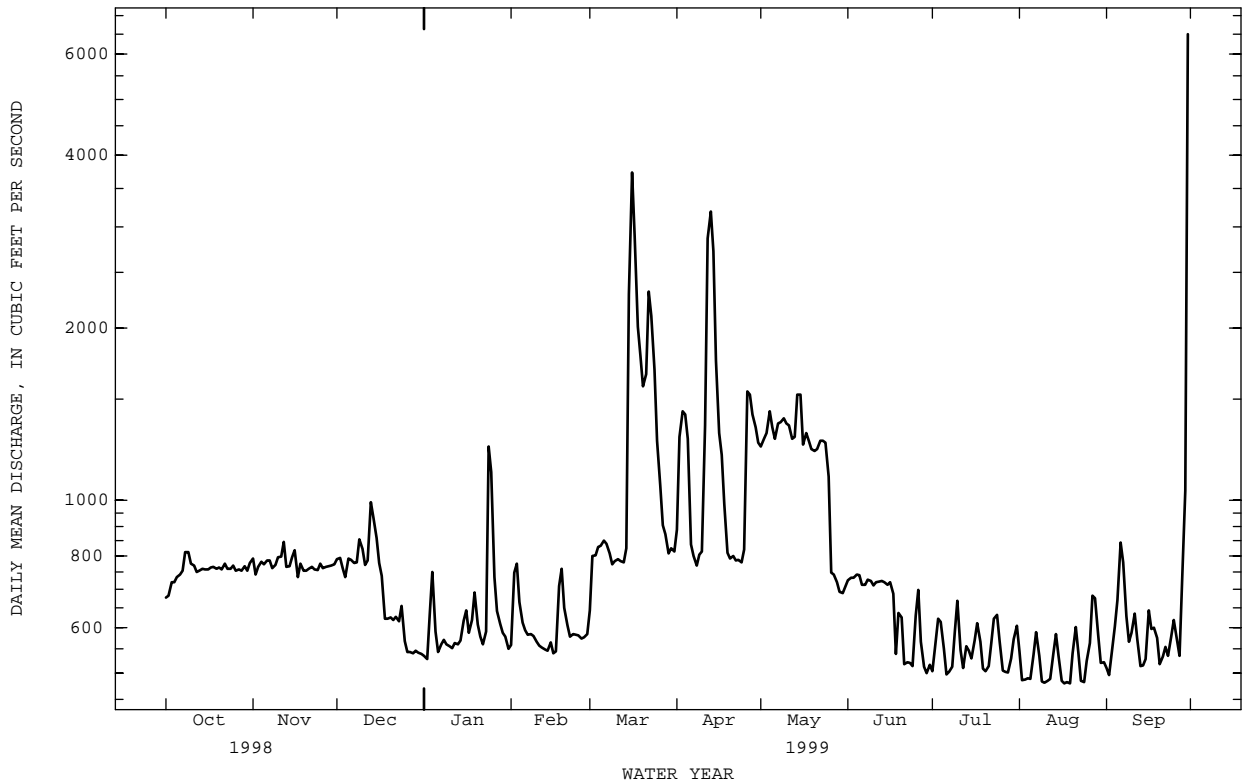
02060500 ROANOKE (STAUNTON) RIVER AT ALTAVISTA, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1963 - 1999, BY WATER YEAR (WY) [REGULATED, UNADJUSTED]

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	1156	1311	1398	2134	2307	2829	2513	1931	1520	1088	1024	1217
MAX	4811	6190	3622	4643	7119	7795	10930	4716	5684	3363	3108	5246
(WY)	1991	1986	1997	1978	1998	1993	1987	1978	1972	1972	1985	1987
MIN	189	396	351	620	581	338	604	484	220	504	311	439
(WY)	1964	1982	1964	1965	1981	1981	1964	1964	1964	1981	1963	1963

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR		FOR 1999 WATER YEAR		WATER YEARS 1963 - 1999	
ANNUAL TOTAL	809179		297508			
ANNUAL MEAN	2217		815		1698	
HIGHEST ANNUAL MEAN					2903	
LOWEST ANNUAL MEAN					645	
HIGHEST DAILY MEAN	17300	Jan 28	6510	Sep 30	46700	Sep 8 1987
LOWEST DAILY MEAN	539	Dec 31	a479	Aug 17	39	Jul 10 1966
ANNUAL SEVEN-DAY MINIMUM	546	Dec 25	512	Aug 13	116	Sep 2 1965
INSTANTANEOUS PEAK FLOW			8630		62100	
INSTANTANEOUS PEAK STAGE			10.60		34.45	
INSTANTANEOUS LOW FLOW			b474		cAug 15	
ANNUAL RUNOFF (CFSM)	1.24		.46		.95	
ANNUAL RUNOFF (INCHES)	16.83		6.19		12.90	
10 PERCENT EXCEEDS	4900		1280		3380	
50 PERCENT EXCEEDS	872		720		1020	
90 PERCENT EXCEEDS	689		521		271	

- a Also Aug 19, 1999.
- b Result of regulation.
- c Also Aug 16, 17, 18, 19, 1999.



ROANOKE RIVER BASIN

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 mi<sup>2</sup>.

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 sea level.

REMARKS.--Records good except those for period with ice effect, Jan. 6, and periods of doubtful or no gage-height record, Jan. 8-11, and Aug. 1-30, which are fair. Maximum discharge, 65,600 ft<sup>3</sup>/s, from rating curve extended above 24,000 ft<sup>3</sup>/s on basis of slope-area measurements of 24.96 ft and 29.93 ft. 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 Department of Environmental Quality - Water Division.

EXTREMES OUTSIDE PERIOD OF RECORD.--Floods in October 1937 and August 1939 reached a stage of 23.1 ft, discharge, 27,500 ft<sup>3</sup>/s, from rating curve extended above 7,000 ft<sup>3</sup>/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 greater than base discharge of 4,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Sep 30	0530	*9,280	*16.45	No other peak greater than base discharge.			

Minimum daily discharge, 5.7 ft<sup>3</sup>/s, Aug 19.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	73	71	84	93	200	204	222	151	74	39	e22	29
2	67	72	83	85	615	189	333	143	73	40	e24	26
3	64	79	83	328	502	185	235	138	71	43	e19	24
4	60	107	84	465	348	228	217	137	72	42	e15	22
5	59	92	84	173	281	193	200	133	67	38	e11	34
6	63	79	84	e115	246	180	196	136	64	32	e12	451
7	71	76	84	156	232	180	193	139	62	31	e12	420
8	111	75	86	e120	237	164	187	164	60	42	e11	198
9	140	78	183	e145	210	164	187	169	56	53	e10	105
10	92	79	143	e162	199	177	183	141	52	39	e10	222
11	77	109	100	e140	186	174	306	133	49	30	e9.1	114
12	73	118	91	134	182	165	369	127	50	43	e8.2	76
13	73	92	212	127	179	159	240	127	52	95	e7.5	64
14	72	85	225	131	168	199	209	341	49	75	e6.7	60
15	69	84	130	215	161	728	203	433	49	63	e6.4	65
16	69	82	110	234	161	583	223	223	49	53	e6.0	201
17	70	80	100	166	165	397	196	183	58	44	e6.0	145
18	71	80	94	253	400	324	182	167	65	39	e6.0	91
19	72	80	90	328	429	274	177	158	53	35	e5.7	79
20	74	82	89	211	290	244	166	140	46	32	e23	68
21	71	82	89	173	240	273	162	123	49	40	e50	72
22	68	79	89	152	214	303	158	120	57	64	e59	103
23	64	78	87	149	197	237	155	123	52	54	e27	79
24	64	80	110	1200	191	223	182	115	47	39	e25	62
25	68	80	118	822	187	225	161	108	44	32	e145	51
26	70	86	106	439	183	209	148	104	44	29	e120	48
27	70	88	104	323	173	193	151	94	45	25	e74	65
28	71	84	106	269	182	190	166	87	45	24	e48	901
29	71	83	105	234	---	183	183	84	43	28	e40	2110
30	69	84	101	208	---	165	168	80	42	31	e36	5060
31	71	---	94	193	---	154	---	76	---	26	32	---
TOTAL	2277	2524	3348	7943	6958	7466	6058	4597	1639	1300	886.6	11045
MEAN	73.5	84.1	108	256	248	241	202	148	54.6	41.9	28.6	368
MAX	140	118	225	1200	615	728	369	433	74	95	145	5060
MIN	59	71	83	85	161	154	148	76	42	24	5.7	22
CFSM	.23	.26	.34	.80	.78	.75	.63	.46	.17	.13	.09	1.15
IN.	.26	.29	.39	.92	.81	.87	.70	.53	.19	.15	.10	1.28

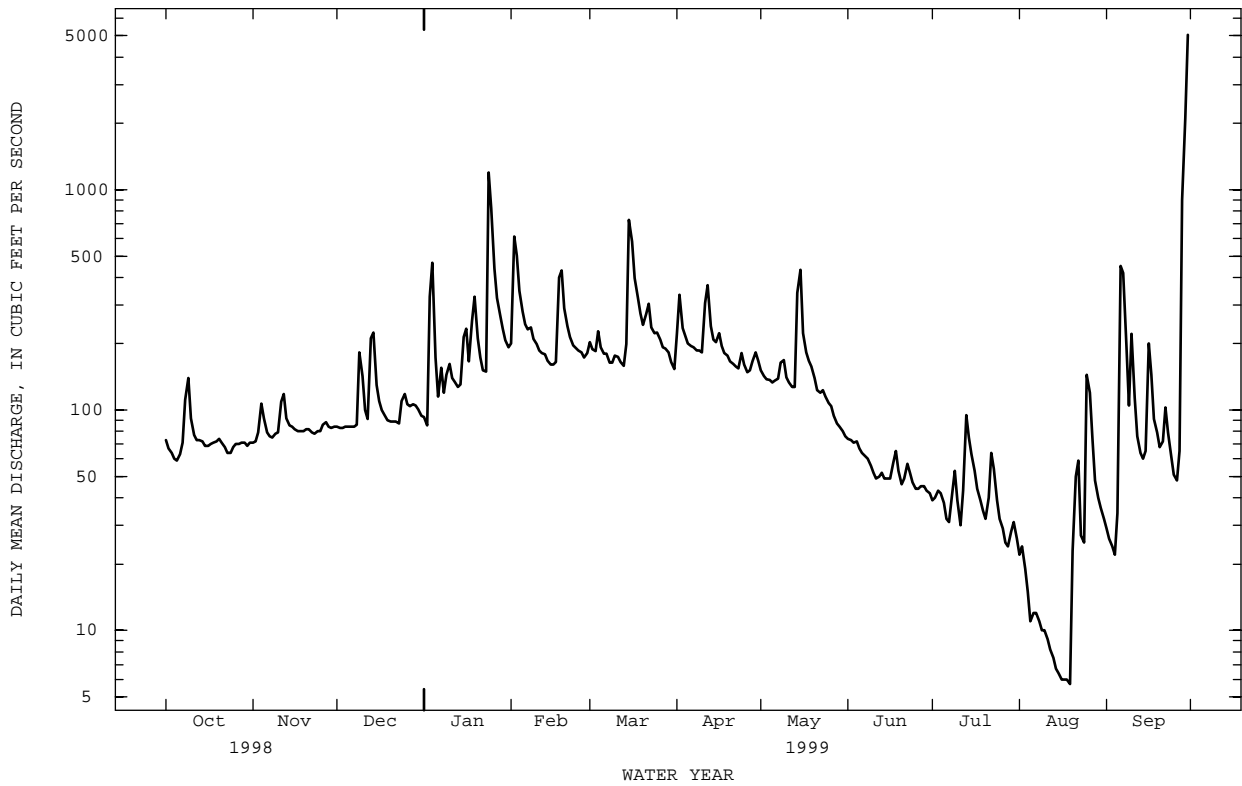
02061500 BIG OTTER RIVER NEAR EVINGTON, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1937 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	229	256	336	418	493	545	487	378	310	213	238	208
MAX	1163	1200	1192	1045	1165	1332	2062	1335	2124	925	1412	1150
(WY)	1991	1986	1949	1998	1998	1993	1987	1989	1995	1949	1940	1996
MIN	52.5	68.7	68.6	95.7	193	153	127	106	54.6	27.9	28.6	29.9
(WY)	1964	1966	1966	1966	1968	1981	1966	1981	1999	1966	1999	1968

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR
ANNUAL TOTAL	161427	56041.6				
ANNUAL MEAN	442	154				
HIGHEST ANNUAL MEAN			341		635	1949
LOWEST ANNUAL MEAN					139	1981
HIGHEST DAILY MEAN	6850	Jan 28	5060	Sep 30	35700	Jun 23 1995
LOWEST DAILY MEAN	43	Sep 17	e 5.7	Aug 19	e 5.7	Aug 19 1999
ANNUAL SEVEN-DAY MINIMUM	46	Sep 11	6.3	Aug 13	6.3	Aug 13 1999
INSTANTANEOUS PEAK FLOW			9280	Sep 30	65600	Jun 23 1995
INSTANTANEOUS PEAK STAGE			16.45	Sep 30	29.93	Jun 23 1995
INSTANTANEOUS LOW FLOW			e 5.7	Aug 19	e 5.7	Aug 19 1999
ANNUAL RUNOFF (CFSM)	1.38		.48		1.07	
ANNUAL RUNOFF (INCHES)	18.77		6.51		14.50	
10 PERCENT EXCEEDS	921		240		626	
50 PERCENT EXCEEDS	189		93		218	
90 PERCENT EXCEEDS	70		32		80	

e Estimated.



## ROANOKE RIVER BASIN

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 mi<sup>2</sup>.

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 sea level. 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 for periods of no gage-height record, Dec. 24, 25, Jan. 7, 8, Apr. 9-12, 23-27, Jul. 1-12, Jul. 28 to Aug. 2, and Sep. 7-9, 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. Statistics of monthly mean data and summary statistics for water years 1924 - 1962 (unregulated flow) are available in previous data books, water years 1991 - 1998. U.S. Army Corps of Engineers satellite gage-height telemeter at station. Maximum discharge, 130,000 ft<sup>3</sup>/s, at present site, from gage-height relation curve, from rating curve extended above 55,000 ft<sup>3</sup>/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. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 20,400 ft<sup>3</sup>/s, Sep 30, gage height, 21.63 ft; minimum daily, 475 ft<sup>3</sup>/s, Aug. 18.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	853	927	965	739	910	982	1350	1650	880	e670	e695	620
2	831	927	978	726	1300	1150	1880	1620	890	e730	e530	559
3	857	920	970	1050	1980	1250	2080	1660	890	e860	506	522
4	885	948	945	1640	1510	1340	2000	1680	886	e895	511	694
5	887	982	965	1190	1200	1380	1940	1790	906	e820	503	970
6	879	953	991	879	1080	1310	1550	1650	877	e710	494	1350
7	906	953	996	e920	1020	1290	1290	1680	846	e660	653	e1650
8	951	949	1010	e900	1000	1250	1210	1750	854	e695	687	e1350
9	1060	921	1140	868	984	1200	e1250	1770	852	e720	528	e1050
10	1040	940	1220	863	941	1190	e1300	1740	835	e780	487	835
11	958	987	1080	837	904	1220	e2200	1700	819	e680	487	967
12	923	1020	1010	839	886	1200	e3700	1630	823	e685	490	894
13	913	1010	1430	843	887	1180	3500	1600	840	765	500	756
14	914	941	1540	839	868	1250	3310	1860	849	863	653	726
15	902	940	1250	1010	831	2490	2530	2270	837	791	684	771
16	899	982	1090	1180	864	4570	1930	1900	840	751	527	1320
17	906	956	1030	1050	841	3800	1820	1730	874	809	486	1210
18	908	908	942	1290	1190	2890	1560	1670	770	799	475	927
19	904	954	836	1560	1900	2380	1310	1630	705	691	478	916
20	910	937	834	1230	1440	2240	1210	1580	744	615	494	792
21	901	940	825	1020	1160	2200	1180	1550	679	592	661	777
22	895	930	824	946	1020	2710	1180	1560	610	686	764	1010
23	907	937	825	933	961	2740	e1220	1600	617	780	606	892
24	888	935	e912	3190	944	2430	e1220	1560	605	845	540	811
25	893	946	e928	3890	932	2010	e1200	1560	587	793	665	862
26	905	962	812	2000	919	1750	e1700	1140	841	622	996	847
27	902	958	780	1440	898	1470	e1920	973	833	531	839	785
28	897	958	784	1200	926	1370	1890	952	725	e530	942	1430
29	914	965	787	1080	---	1300	1870	889	685	e660	855	3070
30	902	958	779	992	---	1260	1730	852	638	e670	690	16400
31	911	---	757	936	---	1230	---	844	---	e700	632	---
TOTAL	28201	28544	30235	38080	30296	56032	54030	48040	23637	22398	19058	45763
MEAN	910	951	975	1228	1082	1807	1801	1550	788	723	615	1525
MAX	1060	1020	1540	3890	1980	4570	3700	2270	906	895	996	16400
MIN	831	908	757	726	831	982	1180	844	587	530	475	522
(†)	-12548	-9549	+2712	+24266	+17626	+1215	-2148	-13962	-11209	+2088	-4986	+29943
MEAN†	505	633	1063	2011	1711	1847	1729	1099	414	790	454	2524
CFSM†	.21	.26	.44	.83	.71	.76	.72	.46	.17	.33	.19	1.05
IN. ‡	.24	.29	.51	.96	.74	.88	.80	.52	.19	.38	.22	1.17

CAL YR 1998 TOTAL 1168608 MEAN 3202 MAX 29200 MIN 757 MEAN† 3143 CFSM† 1.30 IN.† 17.67  
WTR YR 1999 TOTAL 424314 MEAN 1163 MAX 16400 MIN 475 MEAN† 1227 CFSM† .51 IN.† 6.90

† Total change in contents, equivalent in cubic feet per second, per month, in Smith Mountain and Leesville Lakes; provided by American Electric Power.

‡ Adjusted for monthly change in contents.



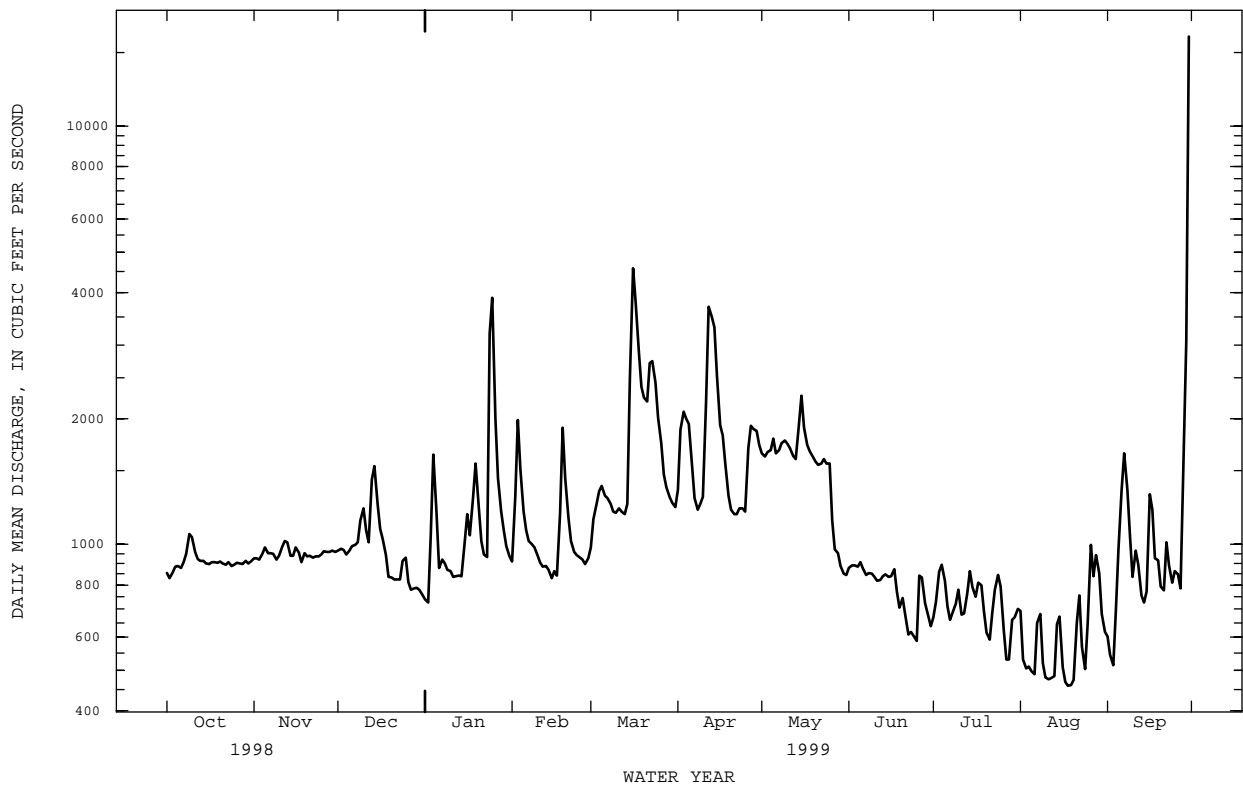
02062500 ROANOKE (STAUNTON) RIVER AT BROOKNEAL, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1963 - 1999, BY WATER YEAR (WY) [REGULATED, UNADJUSTED]

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	1606	1823	2061	3059	3324	4061	3583	2698	2137	1497	1395	1716
MAX	6446	8961	5625	7695	9536	11760	14410	7039	7522	4775	4675	8822
(WY)	1991	1986	1997	1978	1998	1993	1987	1978	1995	1972	1985	1996
MIN	325	553	637	867	953	561	921	836	405	683	411	512
(WY)	1964	1982	1964	1981	1981	1981	1981	1964	1964	1963	1964	1965

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR
ANNUAL TOTAL	1168608	424314										
ANNUAL MEAN	3202	1163							2408			
HIGHEST ANNUAL MEAN									4440			1973
LOWEST ANNUAL MEAN									853			1981
HIGHEST DAILY MEAN			29200	Mar 21	16400	Sep 30	65600	Sep 9	1987			
LOWEST DAILY MEAN			757	Dec 31	475	Aug 18	140	Jul 25	1966			
ANNUAL SEVEN-DAY MINIMUM			804	Dec 25	542	Aug 14	203	Sep 4	1965			
INSTANTANEOUS PEAK FLOW					20400	Sep 30	85800	Sep 9	1987			
INSTANTANEOUS PEAK STAGE					21.63	Sep 30	39.80	Sep 9	1987			
INSTANTANEOUS LOW FLOW					472	aAug 18	b136	cJul 25	1966			
ANNUAL RUNOFF (CFSM)	1.33	.48							1.00			
ANNUAL RUNOFF (INCHES)	18.00	6.54							13.55			
10 PERCENT EXCEEDS	7200	1780							4700			
50 PERCENT EXCEEDS	1390	936							1410			
90 PERCENT EXCEEDS	886	663							548			

- a Also Aug 19, 1999.
- b Lowest recorded discharge; may have been lower during period of no gage-height record, Jul 25, 26, 1966.
- c Also Jul 26, 1966.
- e Estimated.



## ROANOKE RIVER BASIN

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 mi<sup>2</sup>.

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 sea level. Prior to Jan. 15, 1935, nonrecording gage at same site and datum.

REMARKS.--Records good except those for period with ice effect, Jan. 5, 6, and periods of doubtful or no gage-height record, Jan. 8 and Sep. 1-3, which are fair. Small diurnal fluctuation caused by gristmill at Spring Mills. Maximum discharge, 62,800 ft<sup>3</sup>/s, from rating curve extended above 7,100 ft<sup>3</sup>/s on basis of slope-area measurements at gage heights 23.9 ft, 26.5 ft, 29.2 ft, and 36.1 ft. Minimum gage height, 2.18 ft, Oct. 9, 1932. 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 Department of Environmental Quality - Water Division.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in August 1940 reached a stage of 26.5 ft, from floodmarks, discharge, 22,000 ft<sup>3</sup>/s, by slope-area measurement.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,300 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Jan 24	1545	3,190	11.11	Sep 30	0430	*4,620	*13.81

Minimum discharge, 7.8 ft<sup>3</sup>/s, Aug 19.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	40	48	52	59	107	129	198	81	42	34	21	e18
2	37	47	52	57	302	100	279	75	41	35	34	e17
3	36	52	51	312	245	93	173	72	40	35	30	e16
4	38	68	52	322	169	127	143	71	39	31	22	20
5	41	60	52	e115	132	107	128	72	38	27	20	123
6	45	53	53	e73	115	98	112	72	36	27	19	316
7	50	51	53	e83	109	96	106	71	36	88	17	220
8	62	51	53	e74	110	84	99	69	35	86	17	163
9	92	53	116	83	97	85	100	65	33	41	16	65
10	58	54	92	94	92	93	101	62	31	29	16	52
11	49	59	61	81	87	94	250	60	31	25	16	40
12	47	64	55	74	88	86	274	58	33	31	16	35
13	45	57	249	70	92	79	163	59	32	82	15	32
14	45	55	173	71	82	123	134	111	35	61	22	31
15	43	55	86	217	79	737	124	140	34	56	15	64
16	44	55	66	204	78	495	130	78	35	42	12	647
17	44	54	60	124	81	269	109	64	41	35	9.7	211
18	43	53	55	442	283	196	101	60	41	34	9.0	88
19	43	52	52	420	266	151	96	59	35	36	8.3	62
20	43	53	52	193	168	130	94	57	33	29	12	53
21	41	55	51	142	130	201	94	52	41	28	14	57
22	41	53	50	117	109	286	93	54	41	29	17	130
23	40	52	50	132	97	182	88	73	38	28	16	71
24	42	53	70	1880	93	156	92	59	33	27	15	54
25	47	53	78	738	91	150	83	52	31	27	195	47
26	45	56	63	312	89	127	81	51	33	29	156	43
27	45	56	63	207	85	114	81	49	34	25	53	54
28	45	55	70	161	107	107	88	48	33	27	35	472
29	45	52	73	132	---	101	98	45	32	26	27	1140
30	45	52	69	114	---	95	88	43	51	24	22	2490
31	47	---	62	102	---	90	---	43	---	22	19	---
TOTAL	1428	1631	2234	7205	3583	4981	3800	2025	1088	1156	916.0	6831
MEAN	46.1	54.4	72.1	232	128	161	127	65.3	36.3	37.3	29.5	228
MAX	92	68	249	1880	302	737	279	140	51	88	195	2490
MIN	36	47	50	57	78	79	81	43	31	22	8.3	16
CFSM	.27	.31	.42	1.34	.74	.93	.73	.38	.21	.22	.17	1.32
IN.	.31	.35	.48	1.55	.77	1.07	.82	.44	.23	.25	.20	1.47

02064000 FALLING RIVER NEAR NARUNA, VA--Continued

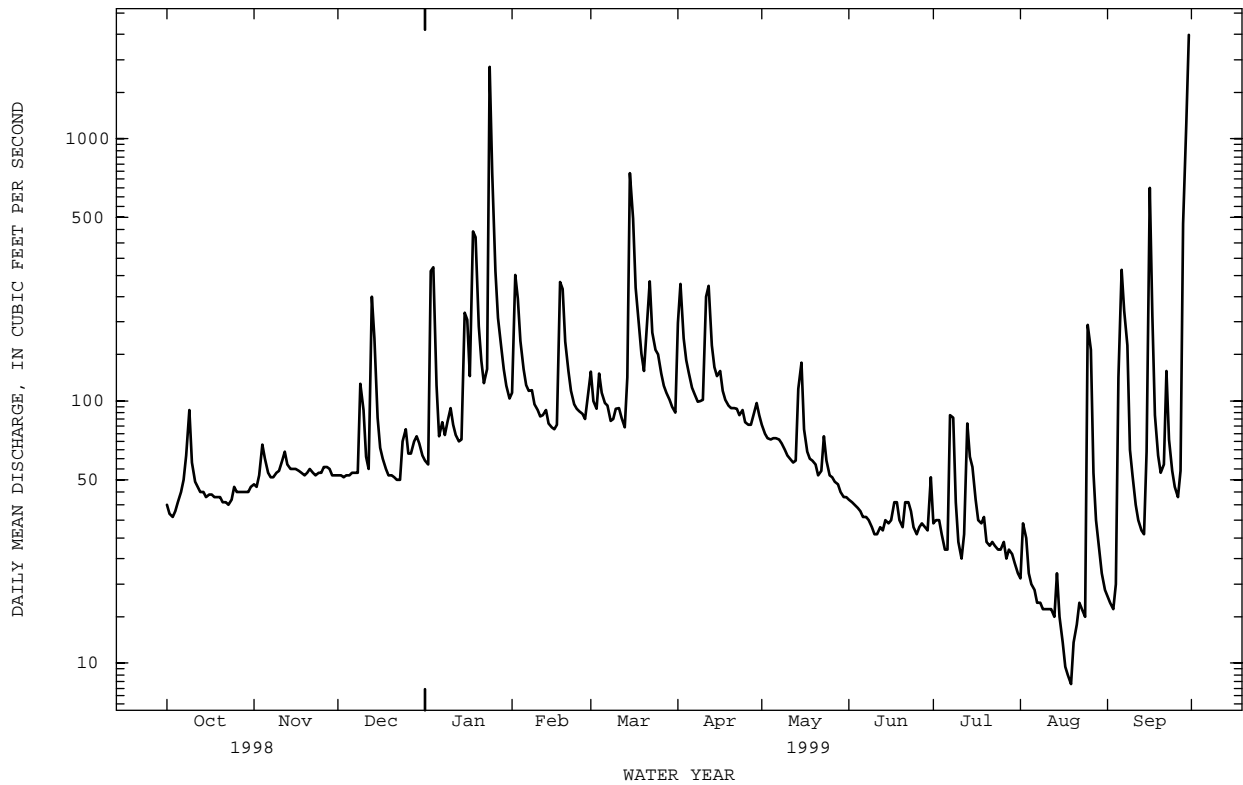
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1930 - 1934, 1942 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	104	125	160	204	236	263	216	165	121	90.5	82.2	125
MAX	399	639	487	636	683	844	552	606	898	334	400	1475
(WY)	1973	1986	1997	1978	1979	1975	1987	1971	1972	1972	1985	1996
MIN	24.5	32.2	44.0	47.9	56.5	62.9	60.2	50.7	25.4	29.9	23.9	20.1
(WY)	1970	1970	1966	1966	1931	1981	1966	1981	1970	1970	1932	1970

SUMMARY STATISTICS FOR 1998 CALENDAR YEAR FOR 1999 WATER YEAR WATER YEARS 1930 - 1934 1942 - 1999

ANNUAL TOTAL		87735		36878.0								
ANNUAL MEAN		240		101						157		
HIGHEST ANNUAL MEAN										322		1996
LOWEST ANNUAL MEAN										60.9		1970
HIGHEST DAILY MEAN				4010	Mar 21		2490	Sep 30		e200000		Sep 6 1996
LOWEST DAILY MEAN				36	Oct 3		8.3	Aug 19		5.0		aSep 27 1932
ANNUAL SEVEN-DAY MINIMUM				39	Sep 29		11	Aug 15		7.7		Jul 22 1966
INSTANTANEOUS PEAK FLOW							4620	Sep 30		62800		Sep 6 1996
INSTANTANEOUS PEAK STAGE							13.81	Sep 30		b36.14		Sep 6 1996
INSTANTANEOUS LOW FLOW							7.8	Aug 19		3.0		Oct 9 1932
ANNUAL RUNOFF (CFSM)			1.39				.58			.91		
ANNUAL RUNOFF (INCHES)			18.87				7.93			12.34		
10 PERCENT EXCEEDS			538				173			268		
50 PERCENT EXCEEDS			116				58			94		
90 PERCENT EXCEEDS			45				27			38		

- a Also Oct 9, 14, 1932.
- b From high-water mark on gage house.
- e Estimated.



## ROANOKE RIVER BASIN

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 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 mi<sup>2</sup>.

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 sea level. Prior to July 14, 1950, nonrecording gage at same site and datum.

REMARKS.--Records good except for period with ice effect, Jan. 6, 7, and period of doubtful gage-height record, Jan. 8-12, which are fair, and for period of no gage-height record, Apr. 21 to Jul 30, which is poor. Maximum discharge, 15,200 ft<sup>3</sup>/s, from rating curve extended above 5,400 ft<sup>3</sup>/s on basis of contracted-opening measurement of peak flow. Minimum gage height, 0.74 ft, Oct. 6, 1970. 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 Department of Environmental Quality - Water Division.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of August 1940 reached a stage of 17.5 ft, from floodmarks, discharge not determined.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Jan 25	1100	*1,690	*9.25	No other peak greater than base discharge.			

Minimum discharge, 8.3 ft<sup>3</sup>/s, Aug 19, 20.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	27	35	37	49	80	114	86	e54	e29	e80	25	14
2	25	35	37	47	135	84	170	e52	e29	e59	33	14
3	25	38	37	167	146	76	109	e51	e28	e43	26	14
4	26	45	37	286	107	92	92	e50	e28	e33	20	14
5	28	43	37	133	91	85	86	e51	e27	e27	18	82
6	30	38	37	e58	83	77	77	e51	e27	e22	17	186
7	31	38	37	e66	81	76	73	e50	e26	e21	16	180
8	34	38	38	e59	83	67	70	e48	e25	e20	15	175
9	37	39	75	e60	76	66	71	e46	e24	e20	14	141
10	33	39	65	e65	72	75	80	e44	e23	e19	14	86
11	31	44	44	e60	68	73	190	e42	e23	e17	13	48
12	31	44	40	e56	69	68	227	e41	e22	e19	13	33
13	30	41	145	53	72	63	117	e42	e22	e44	12	28
14	31	40	152	55	65	81	94	e340	e24	e34	12	26
15	30	40	68	103	62	249	85	e300	e25	e28	16	30
16	29	40	53	149	62	395	98	e180	e28	e24	13	222
17	30	40	48	90	62	221	85	e110	e29	e22	12	422
18	31	39	44	137	114	122	75	e75	e26	e21	10	111
19	31	38	41	334	153	100	71	e61	e23	e20	9.2	49
20	31	39	41	280	101	88	69	e55	e27	e20	8.5	39
21	30	39	41	108	85	96	e65	e50	e28	e19	11	35
22	30	38	41	88	76	140	e62	e46	e26	e20	11	45
23	30	38	40	90	69	107	e60	e52	e25	e22	10	38
24	31	38	57	333	68	94	e55	e47	e24	e41	10	33
25	32	38	68	1220	66	92	e53	e43	e23	e84	16	32
26	32	39	54	480	65	84	e52	e41	e22	e46	142	30
27	33	40	54	144	63	78	e53	e39	e22	e33	43	36
28	33	38	62	115	80	74	e55	e37	e22	e27	24	77
29	34	37	66	100	---	71	e60	e34	e25	e24	19	168
30	34	37	60	88	---	68	e57	e33	e120	e22	17	318
31	35	---	52	81	---	65	---	e31	---	20	15	---
TOTAL	955	1175	1708	5154	2354	3241	2597	2196	852	951	634.7	2726
MEAN	30.8	39.2	55.1	166	84.1	105	86.6	70.8	28.4	30.7	20.5	90.9
MAX	37	45	152	1220	153	395	227	340	120	84	142	422
MIN	25	35	37	47	62	63	52	31	22	17	8.5	14
CFM	.31	.40	.56	1.70	.86	1.07	.88	.72	.29	.31	.21	.93
IN.	.36	.45	.65	1.96	.89	1.23	.99	.83	.32	.36	.24	1.03

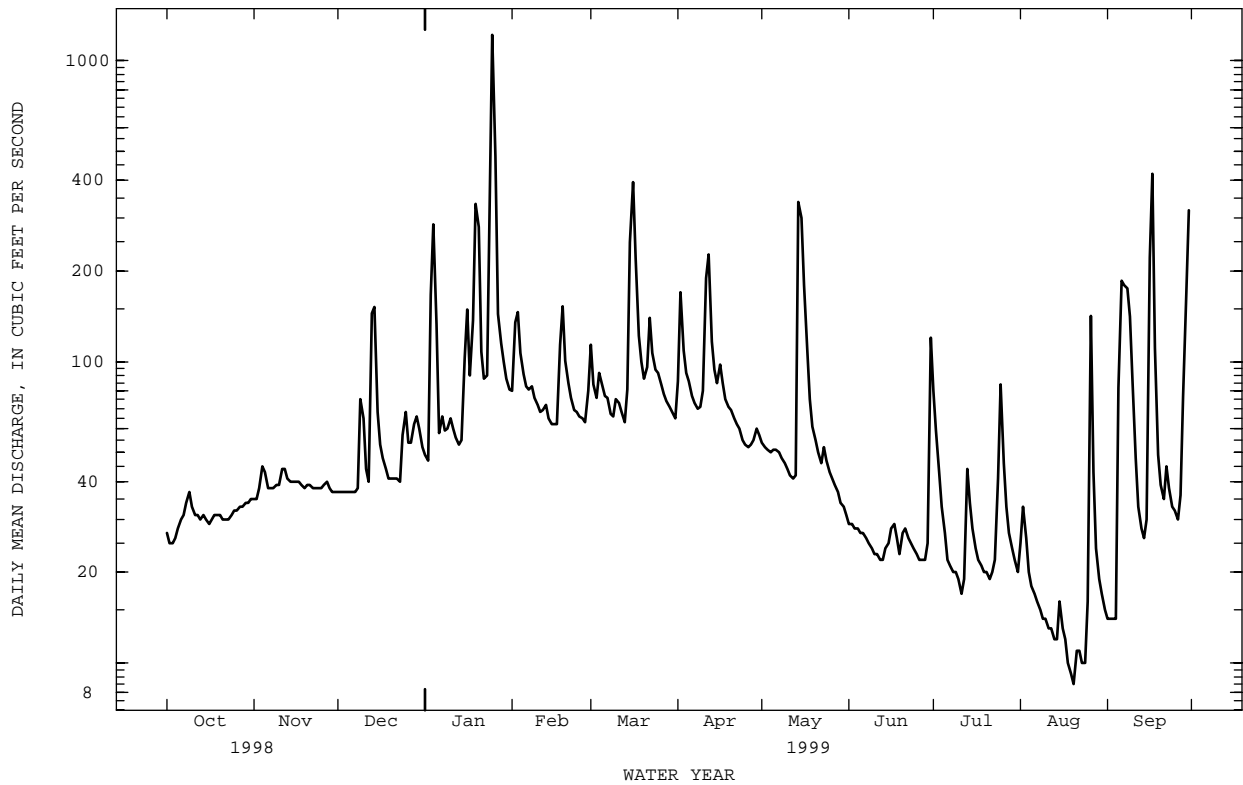
02065500 CUB CREEK AT PHENIX, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1947 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	68.3	91.9	104	134	149	164	144	103	76.9	57.1	53.5	69.9
MAX	293	429	279	478	447	443	354	261	518	192	257	572
(WY)	1972	1986	1997	1978	1979	1975	1983	1971	1972	1972	1985	1996
MIN	14.0	22.7	27.9	35.1	56.4	51.7	50.4	37.8	15.7	19.5	16.2	8.03
(WY)	1971	1970	1966	1966	1968	1981	1966	1981	1970	1966	1964	1968

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR
ANNUAL TOTAL	53691	24543.7				
ANNUAL MEAN	147	67.2			101	
HIGHEST ANNUAL MEAN					188	1972
LOWEST ANNUAL MEAN					36.1	1970
HIGHEST DAILY MEAN	1990	Jan 29	1220	Jan 25	6920	Sep 6 1996
LOWEST DAILY MEAN	25	aOct 2	8.5	Aug 20	2.8	bOct 6 1970
ANNUAL SEVEN-DAY MINIMUM	26	Sep 28	10	Aug 18	3.2	Oct 5 1970
INSTANTANEOUS PEAK FLOW			1690	Jan 25	15200	Sep 6 1996
INSTANTANEOUS PEAK STAGE			9.25	Jan 25	21.89	Sep 6 1996
INSTANTANEOUS LOW FLOW			8.3	cAug 19	2.6	Oct 6 1970
ANNUAL RUNOFF (CFSM)	1.50		.69		1.03	
ANNUAL RUNOFF (INCHES)	20.38		9.32		13.99	
10 PERCENT EXCEEDS	272		121		173	
50 PERCENT EXCEEDS	75		44		65	
90 PERCENT EXCEEDS	32		20		26	

- a Also Oct 3, 1998.
- b Also Oct 7, 1970.
- c Also Aug 20, 1999.
- e Estimated.



## ROANOKE RIVER BASIN

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 mi<sup>2</sup>.

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 sea level. 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 periods of doubtful or no gage-height record, Dec. 24-25, Jan. 13-14, and Jul. 2-7, which are 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. Statistics of monthly mean data and summary statistics for water years 1901 - 1906, 1928 - 1930, 1951 - 1962 (unregulated flow) are available in previous data books, water years 1991 - 1998. U.S. Army Corps of Engineers satellite gage-height telemeter at station. Maximum discharge, 97,000 ft<sup>3</sup>/s, from graph based on gage readings, site and datum then in use. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Aug. 16, 1940, reached a stage of 41.6 ft, present site and datum, discharge, 150,000 ft<sup>3</sup>/s, from information by U.S. Army Corps of Engineers.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 19,600 ft<sup>3</sup>/s, Sep 30, gage height, 22.50 ft, stage rising, peak occurred Oct 1, 1999; maximum peak discharge, 11,000 ft<sup>3</sup>/s, Jan 25, gage height, 16.96 ft; minimum daily, 511 ft<sup>3</sup>/s, Aug 19.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP		
1	1030	1110	1180	1050	1340	1400	1740	2020	1040	805	761	649		
2	971	1130	1180	1020	1570	1410	2620	1920	1060	e880	759	636		
3	929	1130	1200	1690	2540	1560	2770	1900	1060	e950	642	607		
4	1030	1150	1190	2760	2330	1630	2620	1920	1060	e1050	616	604		
5	1040	1190	1140	2340	1840	1740	2460	2000	1050	e1100	597	1140		
6	1040	1220	1190	1380	1560	1680	2250	1980	1060	e930	579	1750		
7	1040	1170	1200	1300	1460	1630	1760	1880	1030	e870	563	2710		
8	1100	1170	1200	1260	1420	1580	1660	1960	1000	819	676	2360		
9	1200	1160	1330	1230	1390	1520	1570	1990	1010	848	684	1780		
10	1290	1140	1570	1210	1340	1490	1630	2000	1010	767	568	1350		
11	1190	1200	1460	1180	1280	1490	2460	1920	979	911	549	1160		
12	1130	1250	1280	1120	1250	1510	5530	1890	971	845	542	1170		
13	1080	1300	1700	e1100	1260	1470	4970	1810	980	773	543	1010		
14	1070	1230	2540	e1040	1230	1510	4570	1920	1000	983	552	818		
15	1060	1180	1890	1330	1190	3000	3810	2640	1010	1090	676	885		
16	1050	1180	1540	1880	1160	6440	2900	2670	1010	912	677	3350		
17	1050	1230	1310	1710	1180	5960	2330	2010	1020	810	554	3520		
18	1060	1170	1280	1630	1340	4440	2120	1950	1070	873	527	1940		
19	1060	1150	1170	3290	2390	3390	1840	1890	892	852	511	1240		
20	1060	1190	1090	2500	2290	2960	1630	1820	904	741	512	1160		
21	1070	1170	1070	1790	1740	2730	1570	1770	917	687	529	964		
22	1060	1170	1050	1470	1490	3360	1540	1730	820	672	663	1050		
23	1050	1150	1050	1370	1350	3840	1530	1780	789	735	736	1260		
24	1060	1150	e1110	4600	1290	3330	1620	1810	780	799	603	1050		
25	1050	1150	e1290	9300	1270	2840	1580	1740	755	905	583	908		
26	1070	1180	1220	4860	1260	2320	1520	1660	744	869	1120	964		
27	1080	1200	1140	2890	1240	2020	2130	1240	1020	677	1320	1060		
28	1080	1190	1100	1980	1240	1800	2260	1170	892	632	998	1290		
29	1080	1190	1090	1700	---	1720	2210	1130	768	667	1020	3720		
30	1110	1190	1090	1530	---	1640	2220	1080	731	693	885	12600		
31	1090	---	1080	1410	---	1600	---	1050	---	679	688	---		
TOTAL	33280	35390	39930	64920	42240	75010	71420	56250	28432	25824	21233	54705		
MEAN	1074	1180	1288	2094	1509	2420	2381	1815	948	833	685	1824		
MAX	1290	1300	2540	9300	2540	6440	5530	2670	1070	1100	1320	12600		
MIN	929	1110	1050	1020	1160	1400	1520	1050	731	632	511	604		
(†)	-12548	-9549	+2712	+24266	+17626	+1215	-2148	-13962	-11209	+2088	-4986	+29943		
MEAN†	669	861	1376	2877	2138	2459	2309	1364	574	900	524	2822		
CFSM†	.22	.29	.46	.97	.72	.83	.78	.46	.19	.30	.18	.95		
IN. ‡	.26	.32	.53	1.11	.75	.95	.87	.53	.22	.35	.20	1.06		
CAL YR 1998	TOTAL	1475269	MEAN	4042	MAX	33500	MIN	929	MEAN†	3983	CFSM†	1.34	IN. ‡	18.17
WTR YR 1999	TOTAL	548634	MEAN	1503	MAX	12600	MIN	511	MEAN†	1567	CFSM†	.53	IN. ‡	7.15

† Total change in contents, equivalent in cubic feet per second, per month, in Smith Mountain and Leesville Lakes; provided by American Electric Power.

‡ Adjusted for monthly change in contents.

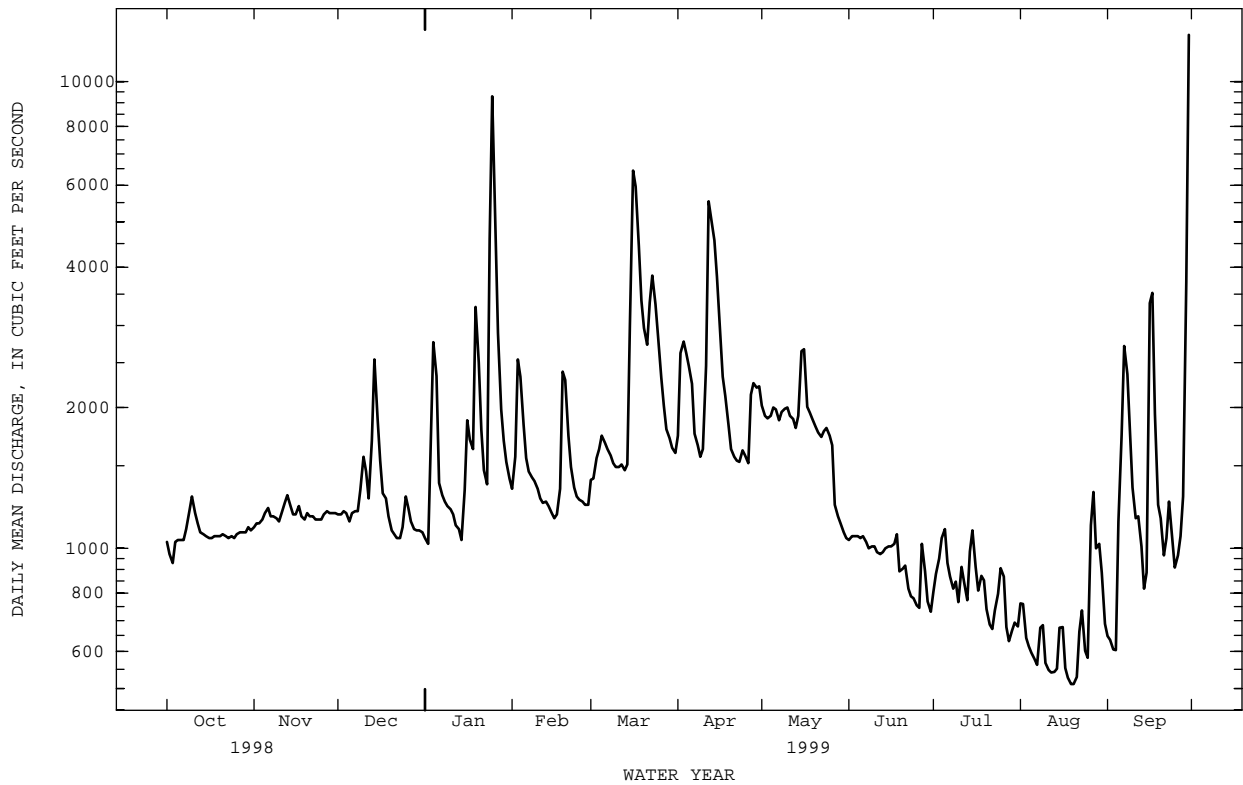
02066000 ROANOKE (STAUNTON) RIVER AT RANDOLPH, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1963 - 1999, BY WATER YEAR (WY) [REGULATED, UNADJUSTED]

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	2038	2300	2572	3804	4130	5027	4356	3376	2603	1851	1662	2138
MAX	7906	11230	6887	9532	12230	13970	17570	10060	10260	5635	5988	11350
(WY)	1991	1986	1997	1978	1998	1975	1987	1978	1972	1972	1985	1996
MIN	428	789	1054	1085	1509	769	1270	1038	491	833	493	662
(WY)	1964	1982	1966	1966	1999	1981	1981	1964	1964	1999	1964	1963

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR	FOR WATER YEARS 1963 - 1999
ANNUAL TOTAL	1475269	548634	
ANNUAL MEAN	4042	1503	2981
HIGHEST ANNUAL MEAN			5102
LOWEST ANNUAL MEAN			1151
HIGHEST DAILY MEAN	33500	Jan 29	78700
LOWEST DAILY MEAN	929	Oct 3	179
ANNUAL SEVEN-DAY MINIMUM	972	Sep 13	238
INSTANTANEOUS PEAK FLOW			89300
INSTANTANEOUS PEAK STAGE			34.94
INSTANTANEOUS LOW FLOW			176
ANNUAL RUNOFF (CFSM)	1.36	.50	1.00
ANNUAL RUNOFF (INCHES)	18.43	6.86	13.61
10 PERCENT EXCEEDS	9420	2460	5700
50 PERCENT EXCEEDS	1730	1190	1790
90 PERCENT EXCEEDS	1060	736	854

- a Stage rising, peak occurred Oct 1, 1999.
- b Also Jul 7, 1970.
- c Also Sep 9, 1965.
- 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 mi<sup>2</sup>; Townes Dam, 32.9 mi<sup>2</sup>.

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, 8,040 acre-ft, and Townes Reservoir, 1,380 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.

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 MONTHEND ELEVATION AND CONTENTS AT 2400, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999
 

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Date	Contents (acre-feet)	Change in contents (acre-feet)
Sept. 30.....	5,080	-
Oct. 31.....	5,240	+160
Nov. 30.....	5,530	+290
Dec. 31.....	5,490	-40
CAL YR 1998.....		+750
Jan. 31.....	6,400	+910
Feb. 28.....	6,630	+230
Mar. 31.....	6,600	-30
Apr. 30.....	6,520	-80
May 31.....	7,790	+1,270
June 30.....	7,210	-580
July 31.....	6,240	-970
Aug. 31.....	5,530	-710
Sept. 30.....	7,480	+1,950
WTR YR 1999.....		+2,400

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## ROANOKE RIVER BASIN

02068500 DAN RIVER NEAR FRANCISCO, NC

LOCATION.--Lat 36°30'53", long 80°18'11", Stokes County, Hydrologic Unit 03010103, on left bank 200 ft upstream from bridge on State Highway 704, 700 ft downstream of remains of Georges Mill, 0.2 mi downstream of Elk Creek, 3 mi east of Francisco, and 7.9 mi downstream of Little Dan River.

DRAINAGE AREA.--129 mi<sup>2</sup>.

PERIOD OF RECORD.--August 1924 to September 1987. December 1991 to current year. Monthly discharge only for some periods, published in WSP 1303.

REVISED RECORDS.--WSP 1303: 1938-50 (monthly runoff). WSP 1433: 1925-26, 1928-29, 1931, 1942, 1948. WDR NC-80-1: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 831.99 ft above sea level. Prior to Nov. 15, 1929, nonrecording gage at same site and datum. Satellite telemetry at station.

REMARKS.--Records good except those for discharges above 1,000 ft<sup>3</sup>/s, which are fair. Since 1938, considerable diurnal fluctuation and regulation by Talbott and Townes Reservoirs (stations 02067800 and 02067820, respectively) and Pinnacles Hydroelectric Plant in Virginia, 28 mi upstream.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of 1916 reached a stage of about 15 ft, from information by local residents, discharge, 16,000 ft<sup>3</sup>/s.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	122	58	59	e65	137	220	213	174	83	e100	135	40
2	55	59	58	67	244	130	178	154	94	e150	77	28
3	53	62	56	262	151	144	159	145	100	e100	49	28
4	59	59	58	153	140	205	153	111	107	e120	52	21
5	75	58	58	e220	131	157	150	109	76	e90	52	106
6	69	58	59	173	136	138	124	132	74	e80	42	265
7	76	58	58	102	134	133	117	132	79	e70	41	104
8	e150	58	59	81	132	128	121	118	150	e68	41	117
9	e100	60	99	88	129	142	121	109	130	e64	43	127
10	78	61	90	e88	116	159	136	111	120	66	38	83
11	73	e90	80	80	108	145	122	105	128	95	33	54
12	70	e80	85	99	110	136	151	104	76	110	93	50
13	75	e76	427	94	113	134	122	98	74	162	86	49
14	73	e70	207	85	105	157	121	380	79	124	110	77
15	78	e68	183	119	116	207	126	391	81	94	47	253
16	87	e66	134	105	106	175	141	150	87	84	29	157
17	75	e64	74	101	107	156	123	125	99	73	22	67
18	70	59	94	161	203	153	120	165	83	129	75	61
19	72	60	71	149	174	147	121	404	80	131	55	61
20	70	63	66	125	156	143	113	260	84	80	62	61
21	65	61	63	116	146	172	111	181	82	81	54	65
22	59	59	63	111	148	177	114	132	73	88	35	100
23	58	59	e110	128	146	136	123	127	66	101	29	59
24	71	71	e200	566	136	136	118	120	62	149	60	51
25	57	59	119	278	114	132	87	114	77	98	227	54
26	58	76	109	186	111	142	92	113	124	71	261	54
27	54	59	97	159	111	141	116	110	104	82	98	61
28	53	55	79	177	151	137	130	103	105	69	76	136
29	57	56	78	230	---	135	142	118	137	107	70	325
30	59	58	76	158	---	135	263	122	114	92	53	464
31	60	---	84	125	---	132	---	108	---	99	47	---
TOTAL	2231	1900	3153	4651	3811	4684	4028	4825	2828	3027	2192	3178
MEAN	72.0	63.3	102	150	136	151	134	156	94.3	97.6	70.7	106
MAX	150	90	427	566	244	220	263	404	150	162	261	464
MIN	53	55	56	65	105	128	87	98	62	64	22	21
†	-2	+6	-1	+15	+3	-1	0	+21	-11	-15	-12	+35

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1938 - 1999\*®, BY WATER YEAR (WY)

MEAN	150	157	178	201	224	264	271	222	198	168	167	149
MAX	543	327	479	424	463	571	677	405	438	373	514	630
(WY)	1938	1980	1997	1978	1960	1993	1980	1949	1972	1938	1940	1979
MIN	49.7	61.3	77.5	76.2	94.9	94.2	120	109	78.3	54.8	52.5	50.4
(WY)	1964	1954	1998	1956	1956	1981	1967	1986	1967	1986	1981	1968

02068500 DAN RIVER NEAR FRANCISCO, NC--Continued

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR		FOR 1999 WATER YEAR		WATER YEARS 1938 - 1999* <sup>ⓐ</sup>	
ANNUAL TOTAL	70378		40508		196 (UNADJUSTED)	
ANNUAL MEAN	193		111		300 1960	
HIGHEST ANNUAL MEAN					97.5 1956	
LOWEST ANNUAL MEAN					6830 Sep 22 1979	
HIGHEST DAILY MEAN	1520	Apr 17	566	Jan 24	21	Sep 4 1999
LOWEST DAILY MEAN	42	Sep 13	21	Sep 4	28	Aug 24 1981
ANNUAL SEVEN-DAY MINIMUM	50	Sep 24	41	Aug 29	21200	Aug 17 1985
INSTANTANEOUS PEAK FLOW			944 Jan 24		19.50	Aug 17 1985
INSTANTANEOUS PEAK STAGE			3.10 Jan 24		7.1	Sep 8 1932
INSTANTANEOUS LOW FLOW			15 Sep 4			
10 PERCENT EXCEEDS	389		168		319	
50 PERCENT EXCEEDS	146		101		157	
90 PERCENT EXCEEDS	59		57		84	

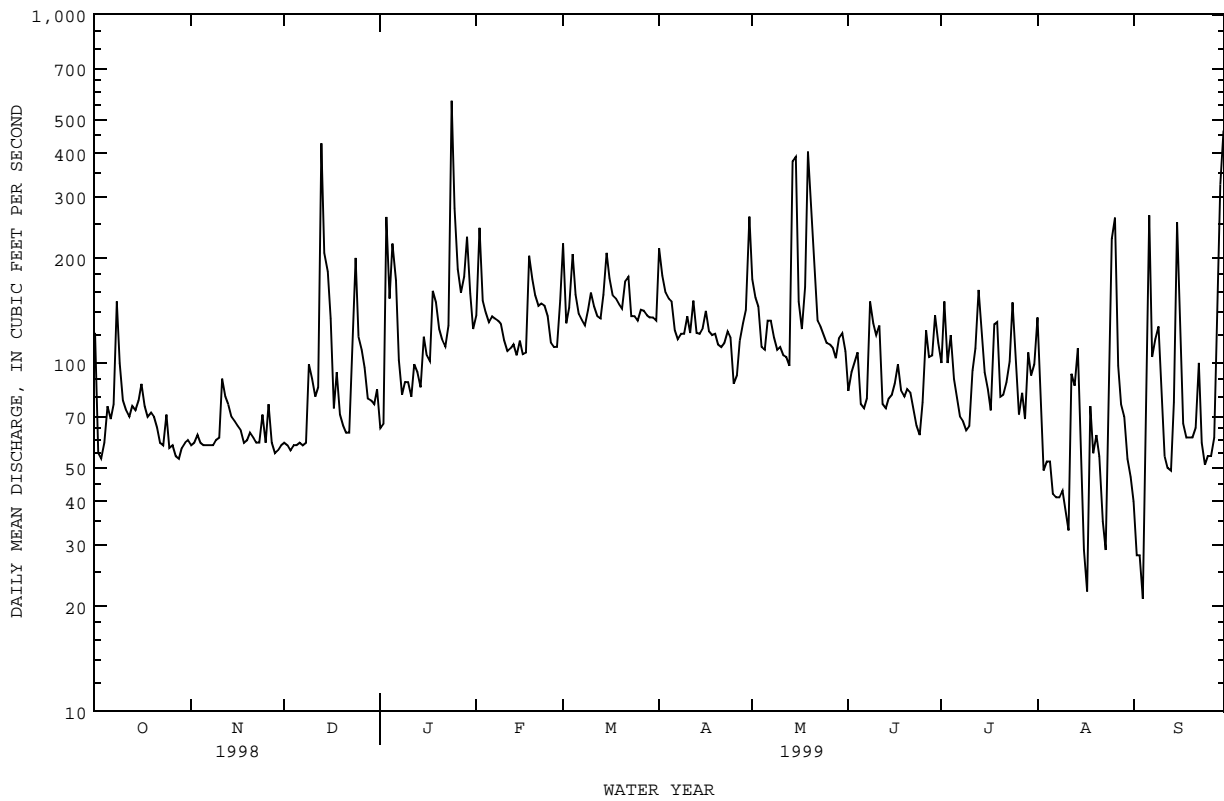
<sup>ⓐ</sup> Estimated.

† Change in contents, equivalent in cubic feet per second, in Talbott and Townes Reservoirs by City of Danville, Virginia.

++ Adjusted for change in contents.

\* \* \* Regulated period only (1938-1999). See REMARKS.

<sup>ⓐ</sup> See PERIOD OF RECORD.



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 mi<sup>2</sup>.

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 sea level. Prior to Oct. 9, 1964, nonrecording gage and crest-stage gage at same site and datum.

REMARKS.--Records good except for period of doubtful gage-height record, Aug. 17, 18, which is fair. Maximum discharge, 20,600 ft<sup>3</sup>/s, from rating curve extended above 2,900 ft<sup>3</sup>/s on basis of contracted-opening measurements at gage heights 18.32 ft and 22.00 ft. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location by the Virginia Department of Environmental Quality - Water Division.

COOPERATION.--Records were provided by the Virginia Department of Environmental Quality - Water Division.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,300 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Sep 30	0300	*1,000	*6.44	No peak greater than base discharge.			

Minimum discharge, 18 ft<sup>3</sup>/s, Aug 19.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	35	40	42	52	77	85	117	115	54	61	36	34
2	33	40	41	50	176	73	105	91	52	90	33	33
3	32	42	42	114	127	74	86	80	53	72	31	31
4	34	43	42	103	103	106	80	74	49	70	30	30
5	41	43	42	71	91	83	75	69	48	48	29	226
6	44	42	42	77	82	80	72	67	47	41	29	250
7	52	41	42	65	78	76	69	69	45	39	27	116
8	127	41	43	62	75	70	67	77	43	82	26	74
9	61	42	81	66	69	71	66	62	42	46	26	129
10	48	43	52	69	67	71	65	58	39	44	26	145
11	44	95	46	61	65	69	75	55	46	57	25	75
12	43	57	46	58	65	65	75	53	43	67	24	60
13	43	48	321	57	65	63	65	52	39	124	22	54
14	43	46	118	56	60	77	63	513	38	74	24	50
15	41	45	72	73	59	138	72	238	40	64	35	55
16	41	44	62	67	59	114	78	140	44	55	25	60
17	41	44	56	62	60	98	65	110	55	49	e22	47
18	41	43	53	102	115	90	62	95	44	76	e20	44
19	40	43	51	94	90	81	62	262	38	101	19	43
20	41	43	51	77	80	77	61	151	39	57	42	43
21	39	43	49	69	72	98	59	116	48	51	39	45
22	38	42	49	65	67	91	58	100	46	54	28	58
23	38	42	48	78	66	80	56	92	41	44	25	43
24	40	43	88	328	67	79	55	82	37	44	65	41
25	40	42	80	196	66	77	54	75	42	53	267	40
26	40	46	63	126	65	73	54	73	63	40	170	38
27	40	44	63	101	62	69	58	69	49	36	65	63
28	40	42	60	89	83	67	73	64	52	40	51	123
29	40	42	59	80	---	66	111	61	84	87	44	330
30	40	42	55	73	---	65	199	58	46	53	39	500
31	40	---	52	68	---	63	---	56	---	40	35	---
TOTAL	1360	1353	2011	2709	2211	2489	2257	3277	1406	1859	1379	2880
MEAN	43.9	45.1	64.9	87.4	79.0	80.3	75.2	106	46.9	60.0	44.5	96.0
MAX	127	95	321	328	176	138	199	513	84	124	267	500
MIN	32	40	41	50	59	63	54	52	37	36	19	30
CFSM	.52	.53	.77	1.03	.93	.95	.89	1.25	.55	.71	.53	1.13
IN.	.60	.59	.88	1.19	.97	1.09	.99	1.44	.62	.82	.61	1.27

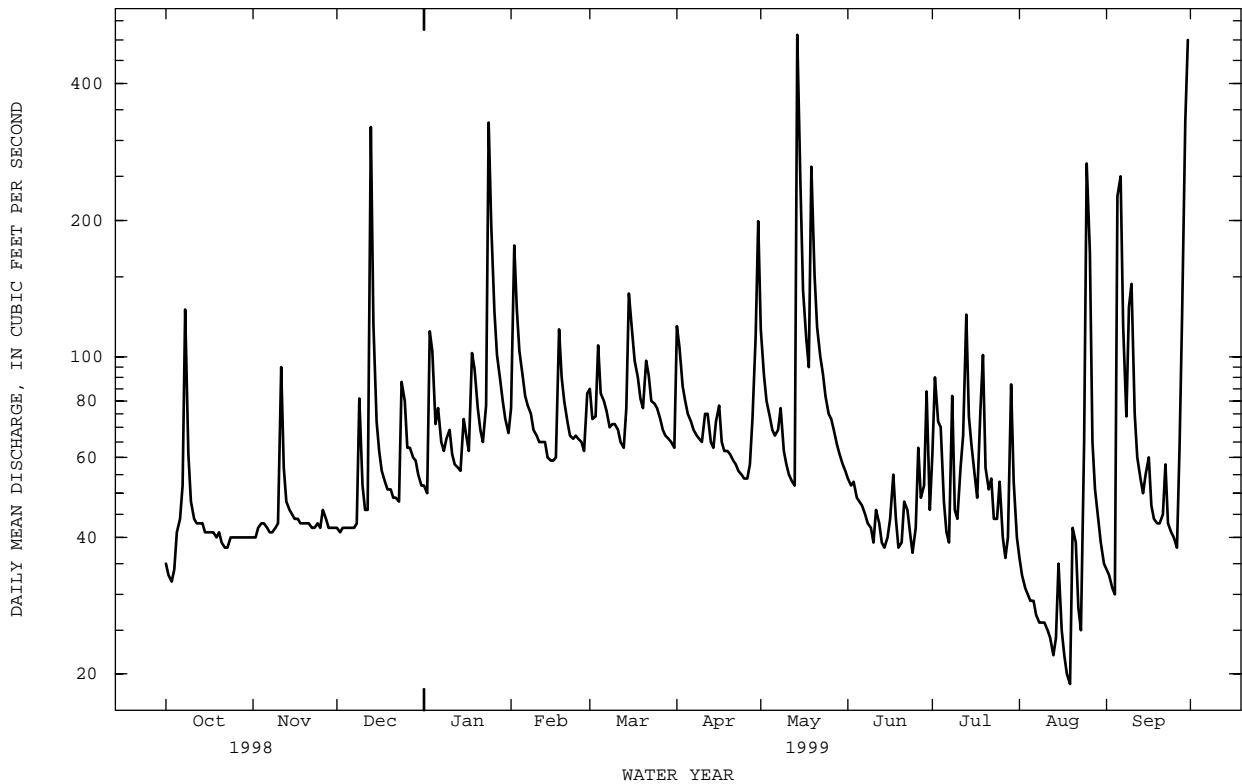
02069700 SOUTH MAYO RIVER NEAR NETTLERIDGE, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1963 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	100	106	118	143	154	186	181	150	128	108	97.8	92.6
MAX	304	339	240	261	352	423	497	295	435	303	407	417
(WY)	1990	1986	1997	1993	1990	1993	1987	1990	1972	1989	1985	1979
MIN	37.1	45.0	55.5	48.6	77.6	65.0	69.7	56.5	45.4	43.2	28.0	38.9
(WY)	1964	1982	1981	1981	1981	1981	1967	1981	1986	1977	1981	1998

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR	WATER YEARS 1963 - 1999
ANNUAL TOTAL	41002	25191	
ANNUAL MEAN	112	69.0	130
HIGHEST ANNUAL MEAN			206
LOWEST ANNUAL MEAN			59.3
HIGHEST DAILY MEAN	853	Jan 28	6820
LOWEST DAILY MEAN	32	Oct 3	19
ANNUAL SEVEN-DAY MINIMUM	34	Sep 28	22
INSTANTANEOUS PEAK FLOW			20600
INSTANTANEOUS PEAK STAGE			22.00
INSTANTANEOUS LOW FLOW			18
ANNUAL RUNOFF (CFSM)	1.33	.82	1.54
ANNUAL RUNOFF (INCHES)	18.03	11.08	20.91
10 PERCENT EXCEEDS	210	104	215
50 PERCENT EXCEEDS	80	58	99
90 PERCENT EXCEEDS	40	38	51

e Estimated.



## ROANOKE RIVER BASIN

02070000 NORTH MAYO RIVER NEAR SPENCER, VA

LOCATION.--Lat 36°33'58", long 79°59'14", 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 mi<sup>2</sup>.

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 sea level (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 of no gage-height record, Oct. 1-7, which is fair. Maximum discharge, 17,200 ft<sup>3</sup>/s, from rating curve extended above 7,200 ft<sup>3</sup>/s on basis of slope-area measurement at gage height 13.41 ft and velocity-area study. Minimum gage height, 1.08 ft, Oct. 8, 1954. 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 Department of Environmental Quality - Water Division.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,400 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Sep 29	2300	*1,160	*4.33	No peak greater than base discharge.			

Minimum discharge, 17 ft<sup>3</sup>/s, Aug 19-20.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e45	49	53	71	95	101	118	123	53	46	43	36
2	e42	50	53	69	236	88	143	97	52	69	39	35
3	e40	52	53	116	170	87	109	87	52	50	35	34
4	e43	54	53	149	127	98	98	81	50	48	33	32
5	e50	53	53	101	109	88	90	78	49	43	32	197
6	e53	52	54	126	101	87	86	76	48	40	31	275
7	e56	52	54	98	97	85	84	75	48	37	30	117
8	81	52	55	86	94	80	82	87	46	38	28	73
9	71	53	95	93	88	80	81	74	44	39	28	88
10	54	54	72	104	86	83	80	69	43	36	27	71
11	52	75	60	90	84	80	85	66	42	48	26	54
12	51	73	58	84	83	77	97	65	43	52	24	48
13	50	58	323	81	82	76	80	63	42	93	23	46
14	50	55	178	81	78	84	78	141	41	70	23	45
15	50	55	101	97	77	221	81	152	43	61	23	53
16	49	54	86	98	77	183	95	92	46	51	22	75
17	53	54	77	87	77	128	81	80	56	46	20	51
18	52	53	72	130	130	111	77	75	50	44	19	46
19	50	53	70	138	122	101	76	118	43	42	17	45
20	50	53	69	106	105	95	75	89	44	40	25	44
21	49	53	68	95	93	110	74	75	53	46	38	44
22	47	52	68	89	87	120	73	70	52	133	25	53
23	46	52	66	122	84	100	71	67	47	58	22	46
24	48	53	102	525	85	98	70	64	44	48	24	43
25	49	53	121	270	84	95	68	61	44	57	148	42
26	49	55	89	152	82	90	68	61	50	45	117	41
27	49	55	84	122	80	86	72	60	49	40	63	76
28	49	53	82	110	89	83	82	57	51	50	49	245
29	50	53	80	101	---	82	105	56	50	150	44	419
30	49	53	76	94	---	80	214	55	45	75	39	590
31	50	---	72	89	---	78	---	54	---	50	37	---
TOTAL	1577	1636	2597	3774	2802	3055	2693	2468	1420	1745	1154	3064
MEAN	50.9	54.5	83.8	122	100	98.5	89.8	79.6	47.3	56.3	37.2	102
MAX	81	75	323	525	236	221	214	152	56	150	148	590
MIN	40	49	53	69	77	76	68	54	41	36	17	32
CFSM	.47	.50	.78	1.13	.93	.91	.83	.74	.44	.52	.34	.95
IN.	.54	.56	.89	1.30	.97	1.05	.93	.85	.49	.60	.40	1.06

02070000 NORTH MAYO RIVER NEAR SPENCER, VA--Continued

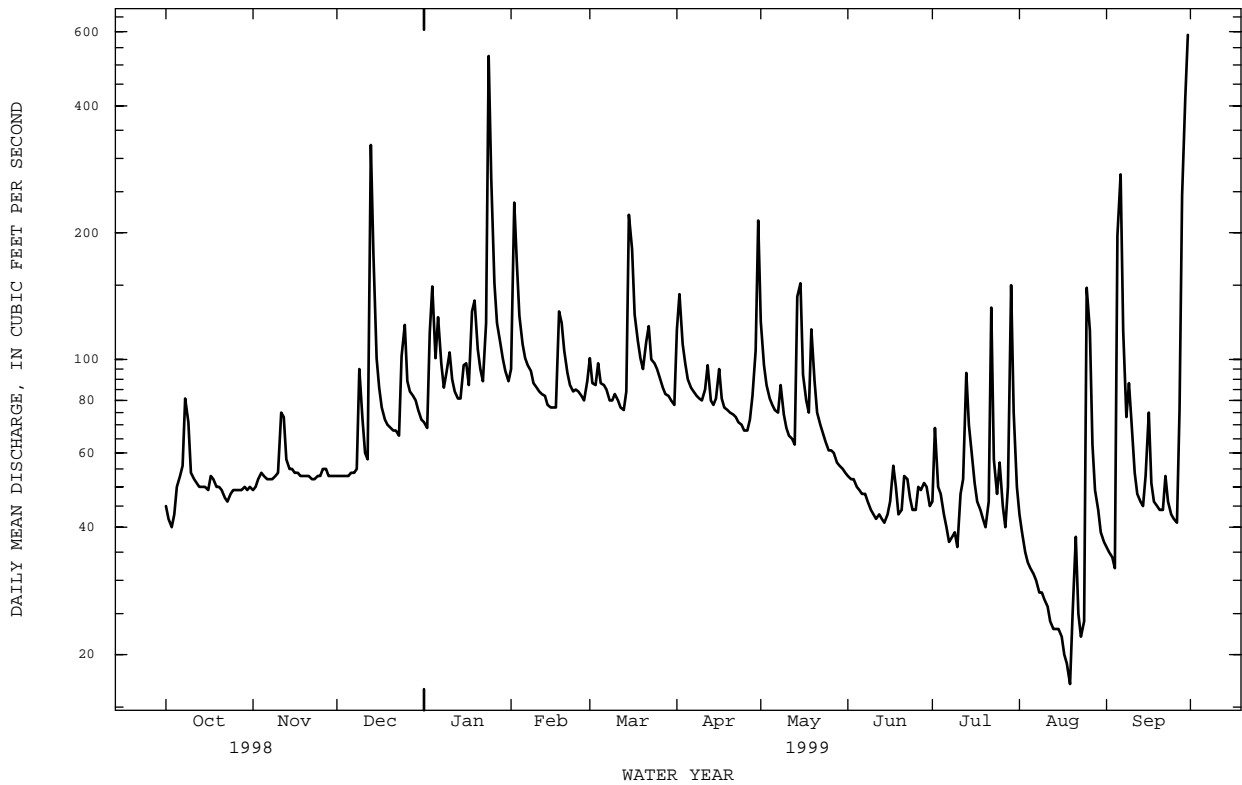
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1929 - 1935, 1937 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	114	106	123	147	158	183	166	137	124	105	98.8	104
MAX	498	392	256	368	364	479	523	329	470	320	446	462
(WY)	1938	1986	1997	1937	1960	1993	1987	1972	1972	1989	1985	1987
MIN	30.4	33.8	43.5	40.6	49.6	85.5	67.1	58.0	45.0	35.2	26.0	25.7
(WY)	1932	1932	1956	1956	1931	1981	1967	1956	1956	1956	1981	1954

SUMMARY STATISTICS FOR 1998 CALENDAR YEAR FOR 1999 WATER YEAR WATER YEARS 1929 - 1935 1937 - 1999

ANNUAL TOTAL		50454		27985								
ANNUAL MEAN		138		76.7						130		
HIGHEST ANNUAL MEAN										218		1987
LOWEST ANNUAL MEAN										62.6		1956
HIGHEST DAILY MEAN				1740	Jan 28		590	Sep 30		7460	Aug 18	1985
LOWEST DAILY MEAN				e40	Oct 3		17	Aug 19		15	Aug 15	1956
ANNUAL SEVEN-DAY MINIMUM				44	Sep 28		21	Aug 13		18	Aug 9	1956
INSTANTANEOUS PEAK FLOW							1160	Sep 29		17200	Oct 9	1947
INSTANTANEOUS PEAK STAGE							4.33	Sep 29		15.80	Oct 9	1947
INSTANTANEOUS LOW FLOW							17	aAug 19		15	bAug 11	1956
ANNUAL RUNOFF (CFSM)			1.28				.71			1.21		
ANNUAL RUNOFF (INCHES)			17.38				9.64			16.39		
10 PERCENT EXCEEDS			236				117			201		
50 PERCENT EXCEEDS			93				67			96		
90 PERCENT EXCEEDS			50				40			51		

a Also Aug 20, 1999.  
 b Also Aug 15, 1956.  
 e Estimated.



## ROANOKE RIVER BASIN

02071530 SMITH RIVER AT SMITH RIVER CHURCH NEAR WOOLWINE, VA

LOCATION.--Lat 36°46'42", long 80°14'58", Patrick County, Hydrologic Unit 03010103, on left bank 10 ft downstream from bridge on State Highway 708, 119 miles southeast of Woolwine, and 29 miles upstream from Philpott Dam.

DRAINAGE AREA.--26.7 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1994 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 210 ft above sea level, from topographic map.

REMARKS.--Records good. Several observations of water temperature were made during the year.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 492 ft<sup>3</sup>/s, May 14, gage height, 5.43 ft; minimum discharge, 4.5 ft<sup>3</sup>/s, Aug 18-19, gage height, 2.27 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	12	15	14	20	67	31	47	36	28	77	12	9.6
2	11	15	14	20	125	29	38	32	28	41	12	8.9
3	11	17	14	54	69	42	34	30	27	29	11	8.4
4	13	18	14	39	56	43	32	28	25	24	11	8.1
5	17	16	14	34	49	37	31	27	25	21	11	68
6	17	16	14	31	45	36	30	26	23	19	11	71
7	30	15	13	26	43	34	29	25	22	26	13	31
8	84	16	16	29	40	32	27	29	21	25	11	22
9	26	16	24	54	38	33	27	23	20	18	10	27
10	19	16	16	41	37	33	27	22	19	17	9.5	26
11	18	44	14	33	36	31	38	21	20	18	9.1	19
12	17	19	15	31	36	29	31	21	20	34	8.8	16
13	16	17	94	31	35	28	29	39	19	44	8.6	15
14	15	16	35	33	33	43	28	224	18	42	9.1	14
15	15	15	25	76	33	53	36	93	19	36	8.3	21
16	15	15	22	48	32	44	34	62	21	28	8.3	19
17	15	15	20	40	33	40	30	52	25	25	8.0	15
18	15	14	19	67	54	37	29	48	20	23	6.9	14
19	15	14	19	51	39	35	28	105	18	21	6.6	14
20	15	14	18	44	33	34	27	59	20	19	22	13
21	14	14	18	39	31	43	26	50	25	19	11	13
22	14	14	18	37	29	38	25	46	21	18	9.6	13
23	15	14	18	50	29	36	24	43	19	16	9.2	12
24	15	14	35	120	29	35	24	40	18	18	10	12
25	15	14	27	69	28	33	23	39	25	17	35	11
26	15	14	25	54	27	32	24	37	33	14	22	11
27	15	14	24	47	26	31	24	36	22	13	16	31
28	15	14	23	43	34	30	31	34	20	14	12	61
29	15	14	24	40	---	28	43	34	21	26	11	92
30	15	14	22	37	---	28	44	30	19	17	10	111
31	15	---	21	36	---	27	---	29	---	14	9.8	---
TOTAL	559	483	689	1374	1166	1085	920	1420	661	773	362.8	807.0
MEAN	18.0	16.1	22.2	44.3	41.6	35.0	30.7	45.8	22.0	24.9	11.7	26.9
MAX	84	44	94	120	125	53	47	224	33	77	35	111
MIN	11	14	13	20	26	27	23	21	18	13	6.6	8.1
CFSM	.68	.60	.83	1.66	1.56	1.31	1.15	1.72	.83	.93	.44	1.01
IN.	.78	.67	.96	1.91	1.62	1.51	1.28	1.98	.92	1.08	.51	1.12



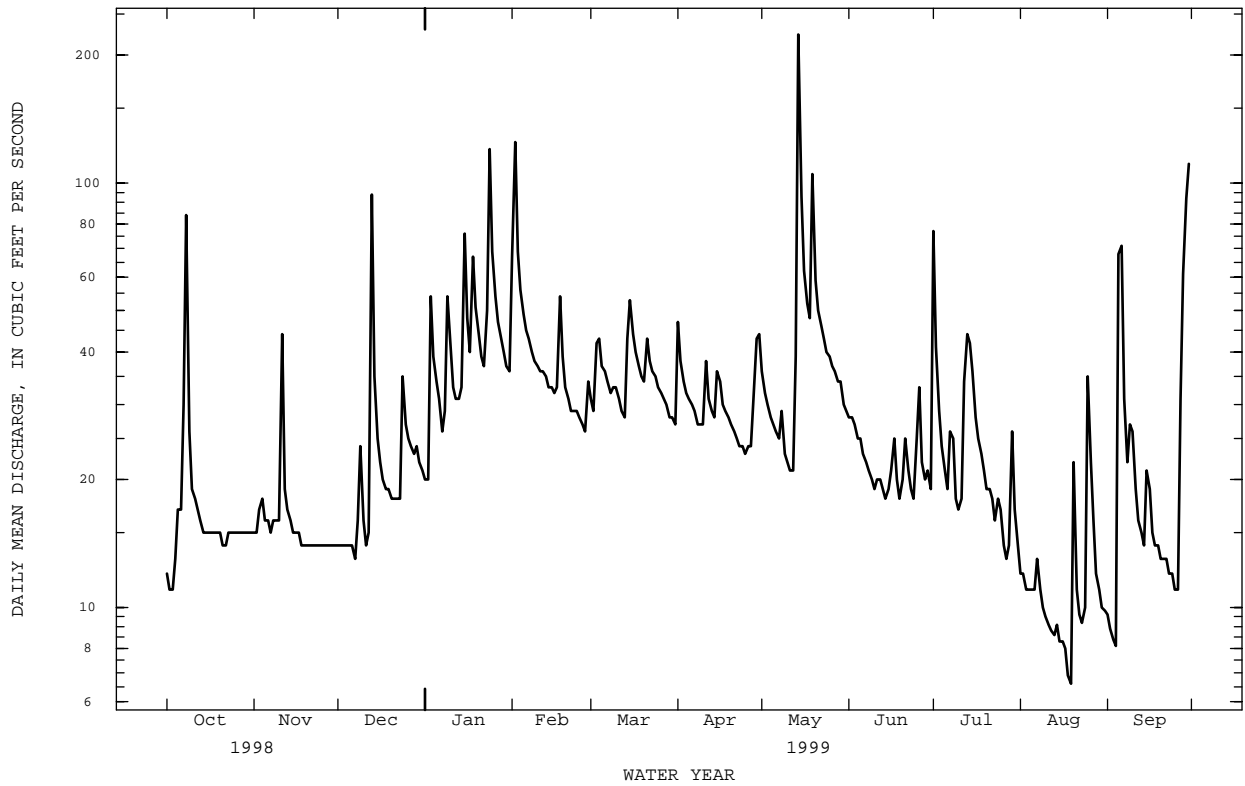
02071530 SMITH RIVER AT SMITH RIVER CHURCH NEAR WOOLWINE, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1995 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	26.6	31.3	41.0	68.3	68.5	65.2	51.2	49.6	36.8	23.6	26.1	28.2
MAX	49.8	54.3	95.2	86.9	120	94.4	74.6	59.9	50.8	24.9	55.1	70.0
(WY)	1997	1997	1997	1995	1998	1998	1998	1998	1996	1999	1996	1996
MIN	15.5	16.1	17.6	44.3	41.6	35.0	30.7	37.4	22.0	22.2	11.7	13.2
(WY)	1998	1999	1998	1999	1999	1999	1999	1995	1999	1998	1999	1995

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR	WATER YEARS 1995 - 1999
ANNUAL TOTAL	17623	10299.8	
ANNUAL MEAN	48.3	28.2	42.9
HIGHEST ANNUAL MEAN			52.5
LOWEST ANNUAL MEAN			28.2
HIGHEST DAILY MEAN	383	Feb 17	669
LOWEST DAILY MEAN	10	aSep 28	6.6
ANNUAL SEVEN-DAY MINIMUM	11	Sep 27	8.0
INSTANTANEOUS PEAK FLOW			492
INSTANTANEOUS PEAK STAGE			5.43
INSTANTANEOUS LOW FLOW			b4.5
ANNUAL RUNOFF (CFSM)	1.81	1.06	1.61
ANNUAL RUNOFF (INCHES)	24.55	14.35	21.83
10 PERCENT EXCEEDS	92	45	75
50 PERCENT EXCEEDS	31	24	33
90 PERCENT EXCEEDS	14	12	14

a Also Sep 29, 1998.  
 b Also Aug 19, 1999.



## ROANOKE RIVER BASIN

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 mi<sup>2</sup>.

PERIOD OF RECORD.--August 1950 to current year.

GAGE.--Water-stage recorder. Datum of gage is at sea level.

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 above 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, water supply, 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, 158,250 acre-ft, May 23, elevation, 971.22 ft; minimum, 118,810 acre-ft, Sep. 24, 25, 26, elevation, 955.68 ft.

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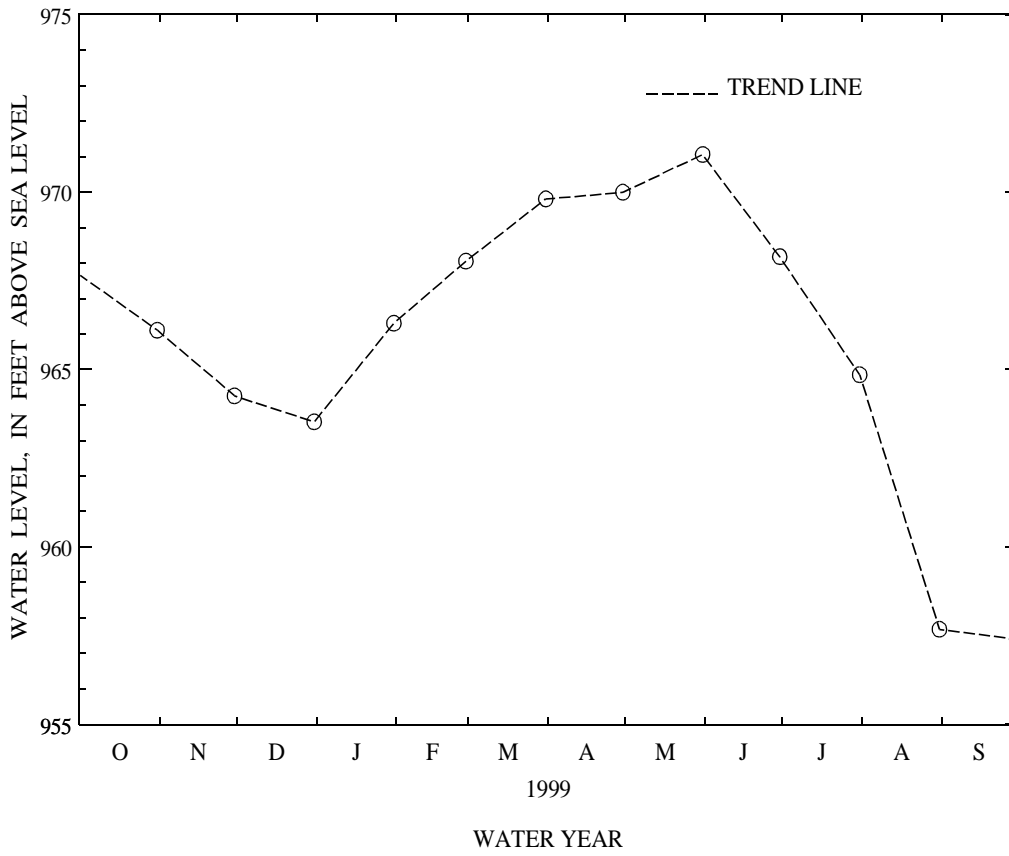
MONTHEND ELEVATION AND CONTENTS AT 2400, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

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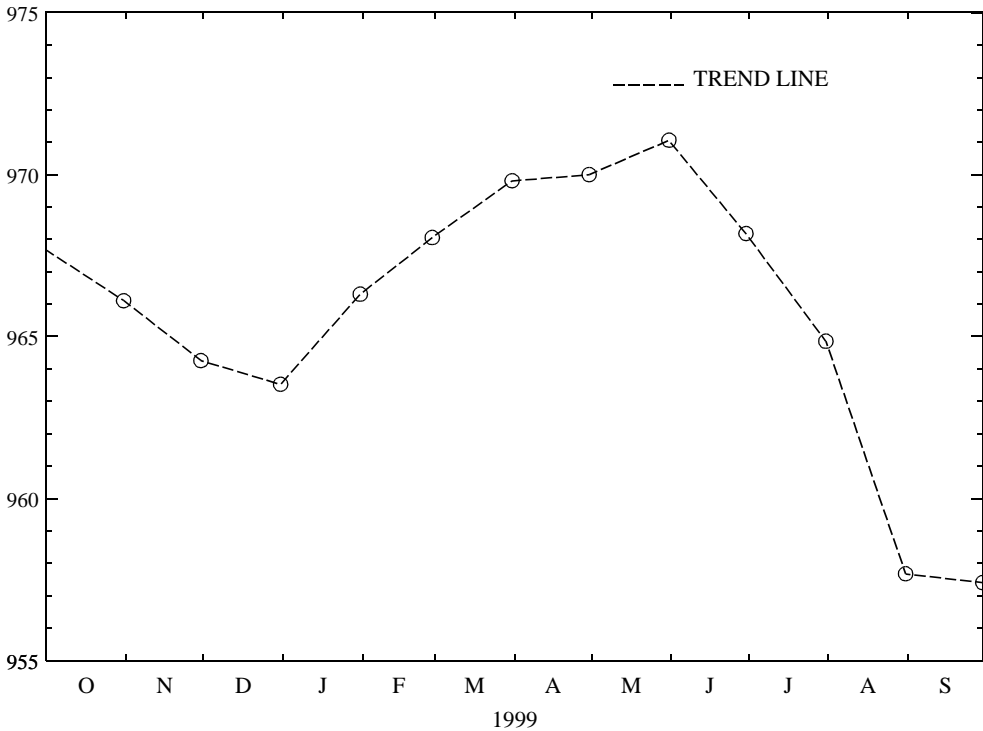
Date	Elevation (feet)	Contents (acre-feet)	Change in contents (acre-feet)
Sept. 30.....	967.71	148,600	-
Oct. 31.....	966.11	144,350	-4,250
Nov. 30.....	964.26	139,550	-4,800
Dec. 31.....	963.53	137,690	-1,860
CAL YR 1998.....			-3,890
Jan. 31.....	966.31	144,880	+7,190
Feb. 28.....	968.06	149,540	+4,660
Mar. 31.....	969.81	154,320	+4,770
Apr. 30.....	970.00	154,840	+633
May 31.....	971.06	157,800	+2,960
June 30.....	968.18	149,870	-7,930
July 31.....	964.86	141,090	-8,780
Aug. 31.....	957.68	123,440	-17,650
Sept. 30.....	957.41	122,810	-632
WTR YR 1999.....			-25,790

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02071900 PHILPOTT LAKE NEAR PHILPOTT, VA--Continued



WATER LEVEL, IN FEET ABOVE SEA LEVEL



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, 1.3 mi southwest of Philpott (corrected), 11.6 mi upstream from Reed Creek, and at mile 44.1.

DRAINAGE AREA.--216 mi<sup>2</sup>.

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 sea level (U.S. Army Corps of Engineers bench mark). Prior to Oct. 8, 1952, at site 1.9 mi downstream at different datum.

REMARKS.--Records good. Since August 1950, flow regulated by Philpott Lake (station 02071900) 0.2 mi upstream. Statistics of monthly mean data and summary statistics for water years 1947 - 1950 (unregulated flow) are available in previous data books, water years 1991 - 1998. Maximum discharge, 17,000 ft<sup>3</sup>/s, at site then in use, from rating curve extended above 9,700 ft<sup>3</sup>/s on basis of slope-area measurements at gage heights 18.2 ft and 20.3 ft. Minimum discharge observed, 2.3 ft<sup>3</sup>/s, result of repairs at dam, but may have been less during periods of estimated record. Minimum daily discharge, 20 ft<sup>3</sup>/s, caused by turbines being shut down for repair at Philpott Dam. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 1,490 ft<sup>3</sup>/s, Sep 1, gage height, 5.19 ft; minimum daily, 50 ft<sup>3</sup>/s, Aug 21, 28, Sep 4.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	267	60	226	217	160	159	171	153	275	270	53	521
2	163	222	226	54	160	159	171	58	275	268	327	515
3	57	226	221	55	159	158	60	58	251	53	327	517
4	58	227	222	160	159	e160	60	58	274	53	328	50
5	163	229	60	183	158	161	220	218	55	325	329	52
6	266	283	60	172	53	55	220	218	55	323	329	508
7	267	60	218	195	54	55	220	219	277	321	53	506
8	164	61	224	175	159	161	221	58	277	325	53	509
9	163	227	221	54	159	161	222	58	273	324	495	186
10	58	228	222	54	159	161	60	152	273	53	496	62
11	58	229	222	164	158	161	61	148	256	53	496	100
12	215	227	60	164	159	160	221	154	53	324	498	52
13	213	226	61	164	55	55	221	154	53	322	497	190
14	214	61	221	165	55	55	221	154	269	322	52	178
15	212	62	220	165	159	161	222	52	270	322	55	154
16	213	227	221	55	159	169	227	52	271	321	501	154
17	57	229	221	54	159	114	60	211	269	54	497	154
18	57	226	220	163	162	240	60	207	268	57	500	52
19	268	226	60	163	159	145	223	206	53	321	502	52
20	212	227	60	162	55	55	222	209	53	322	361	155
21	211	61	220	163	55	55	225	206	269	324	50	155
22	200	60	218	163	159	133	225	52	269	323	51	155
23	161	226	217	54	159	171	224	52	269	323	505	154
24	58	226	218	55	159	172	60	158	269	53	510	154
25	58	226	217	163	159	172	60	151	270	53	518	52
26	218	226	55	160	159	172	224	147	53	325	504	52
27	215	225	54	151	55	60	220	148	53	324	508	155
28	220	60	217	145	55	60	224	153	270	327	50	155
29	220	60	219	160	---	167	218	58	270	326	51	156
30	219	226	218	55	---	169	372	58	268	328	511	154
31	60	---	218	55	---	185	---	273	---	53	507	---
TOTAL	5185	5359	5537	4062	3620	4221	5415	4253	6360	7492	10514	6009
MEAN	167	179	179	131	129	136	180	137	212	242	339	200
MAX	268	283	226	217	162	240	372	273	277	328	518	521
MIN	57	60	54	54	53	55	60	52	53	53	50	50
(†)	-2143	-2420	-938	+3625	+2349	+2405	+319	+1492	-3998	-4427	-8898	-319
MEAN‡	98	98	148	248	213	214	191	185	79	99	52	190
CFSM‡	.45	.45	.69	1.15	.99	.99	.88	.86	.37	.46	.24	.88
IN. ‡	.52	.51	.79	1.32	1.03	1.14	.99	.99	.41	.53	.28	.98

CAL YR 1998 TOTAL 111454 MEAN 305 MAX 1290 MIN 45 MEAN‡ 300 CFSM‡ 1.39 IN.‡ 18.86  
WTR YR 1999 TOTAL 68027 MEAN 186 MAX 521 MIN 50 MEAN‡ 151 CFSM‡ .70 IN.‡ 9.49

† Total change in contents, equivalent in cubic feet per second, per month, in Philpott Lake; provided by U.S. Army Corps of Engineers.

‡ Adjusted for monthly change in contents.

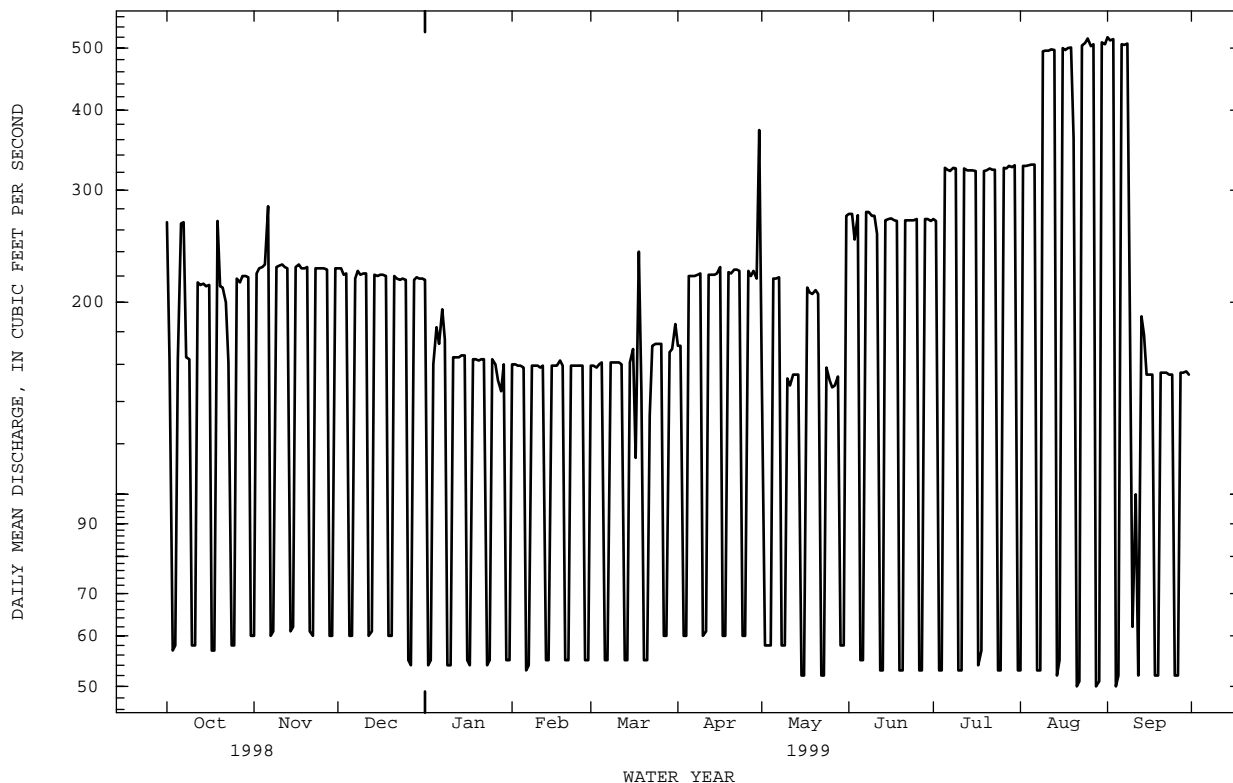
02072000 SMITH RIVER NEAR PHILPOTT, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1951 - 1999, BY WATER YEAR (WY) [REGULATED, UNADJUSTED]

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	237	227	249	274	271	337	385	309	281	243	258	260
MAX	755	835	586	526	718	946	1194	796	827	646	479	724
(WY)	1990	1986	1997	1991	1973	1993	1983	1978	1972	1972	1970	1979
MIN	96.1	70.5	88.0	71.1	58.2	60.5	69.2	61.3	67.2	82.2	77.4	126
(WY)	1952	1953	1996	1953	1953	1953	1969	1964	1964	1964	1964	1956

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR	WATER YEARS 1951 - 1999
ANNUAL TOTAL	111454	68027	
ANNUAL MEAN	305	186	277
HIGHEST ANNUAL MEAN			441
LOWEST ANNUAL MEAN			123
HIGHEST DAILY MEAN	1290	aMar 11	5710
LOWEST DAILY MEAN	45	Jan 10	c20
ANNUAL SEVEN-DAY MINIMUM	75	May 11	42
INSTANTANEOUS PEAK FLOW			1490
INSTANTANEOUS PEAK STAGE			5.19
INSTANTANEOUS LOW FLOW			d12
ANNUAL RUNOFF (CFSM)	1.41	.86	f2.3
ANNUAL RUNOFF (INCHES)	19.19	11.72	1.28
10 PERCENT EXCEEDS	756	324	655
50 PERCENT EXCEEDS	226	165	207
90 PERCENT EXCEEDS	53	54	46

- a Also Mar 12, 1998.
- b Also Aug 28 and Sep 4, 1999.
- c Caused by turbines being shut down for repair at Philpott Dam.
- d Result of regulation.
- e Estimated.
- f Result of repair at dam but may have been less during periods of estimated record.



## ROANOKE RIVER BASIN

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 mi<sup>2</sup>.

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 sea level (levels by U.S. Army Corps of Engineers).

REMARKS.--Records good. 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 ft<sup>3</sup>/s. Statistics of monthly mean data and summary statistics for water years 1940 - 1950 (unregulated flow) are available in previous data books, water years 1991 - 1998. U.S. Army Corps of Engineers satellite gage-height telemeter at station. Minimum gage height, 1.06 ft, Sep. 18, 26, 1953. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

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 ft<sup>3</sup>/s, from rating curve extended above 23,000 ft<sup>3</sup>/s on basis of backwater studies and records for station at Martinsville.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 1,880 ft<sup>3</sup>/s, Sep 30, gage height, 4.25 ft; minimum discharge, 41 ft<sup>3</sup>/s, May 27, gage height, 1.32 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	290	77	246	242	196	187	218	186	296	297	73	553
2	179	241	247	75	300	183	208	86	296	293	347	547
3	66	246	241	109	230	186	94	184	274	73	346	547
4	71	250	241	209	204	188	91	93	292	69	347	64
5	184	246	77	210	195	185	246	236	74	343	e350	164
6	285	302	76	199	87	81	244	244	71	343	e350	598
7	307	75	237	221	86	79	e244	246	289	341	71	549
8	203	77	251	205	188	182	e244	94	293	349	61	537
9	187	245	265	86	187	185	e244	83	290	344	e510	208
10	74	246	247	89	185	185	86	152	291	71	512	108
11	73	276	244	192	184	183	e120	166	270	67	511	121
12	228	251	80	189	184	181	e265	173	74	350	513	69
13	232	246	211	191	81	77	264	173	67	361	514	176
14	233	78	272	191	78	94	e265	210	282	352	62	188
15	231	78	252	212	182	331	e265	110	289	348	62	164
16	233	245	248	95	182	253	265	79	293	346	513	168
17	75	247	245	87	184	170	92	210	296	71	512	162
18	72	246	244	223	219	277	89	224	289	70	515	87
19	285	245	80	214	207	180	e250	223	73	342	515	63
20	232	246	80	199	90	87	e250	224	69	344	369	138
21	231	77	243	192	85	99	e250	220	287	351	64	166
22	233	76	242	190	186	170	250	91	290	406	57	163
23	178	245	241	100	186	199	249	71	289	352	515	160
24	73	246	e330	269	186	199	85	165	288	74	532	159
25	73	247	256	244	185	196	84	168	290	69	647	85
26	227	247	82	208	183	193	248	169	75	342	552	61
27	237	247	80	195	78	86	244	153	70	347	543	157
28	237	77	246	150	86	86	257	170	286	360	71	266
29	238	76	246	216	---	186	e250	74	292	387	64	361
30	238	246	243	82	---	186	e440	73	287	364	538	559
31	77	---	242	81	---	205	---	290	---	75	541	---
TOTAL	5782	5947	6535	5365	4624	5279	6401	5040	6922	8301	11177	7348
MEAN	187	198	211	173	165	170	213	163	231	268	361	245
MAX	307	302	330	269	300	331	440	290	296	406	647	598
MIN	66	75	76	75	78	77	84	71	67	67	57	61
CFSM	.72	.77	.81	.67	.64	.66	.82	.63	.89	1.03	1.39	.95
IN.	.83	.85	.94	.77	.66	.76	.92	.72	.99	1.19	1.61	1.06

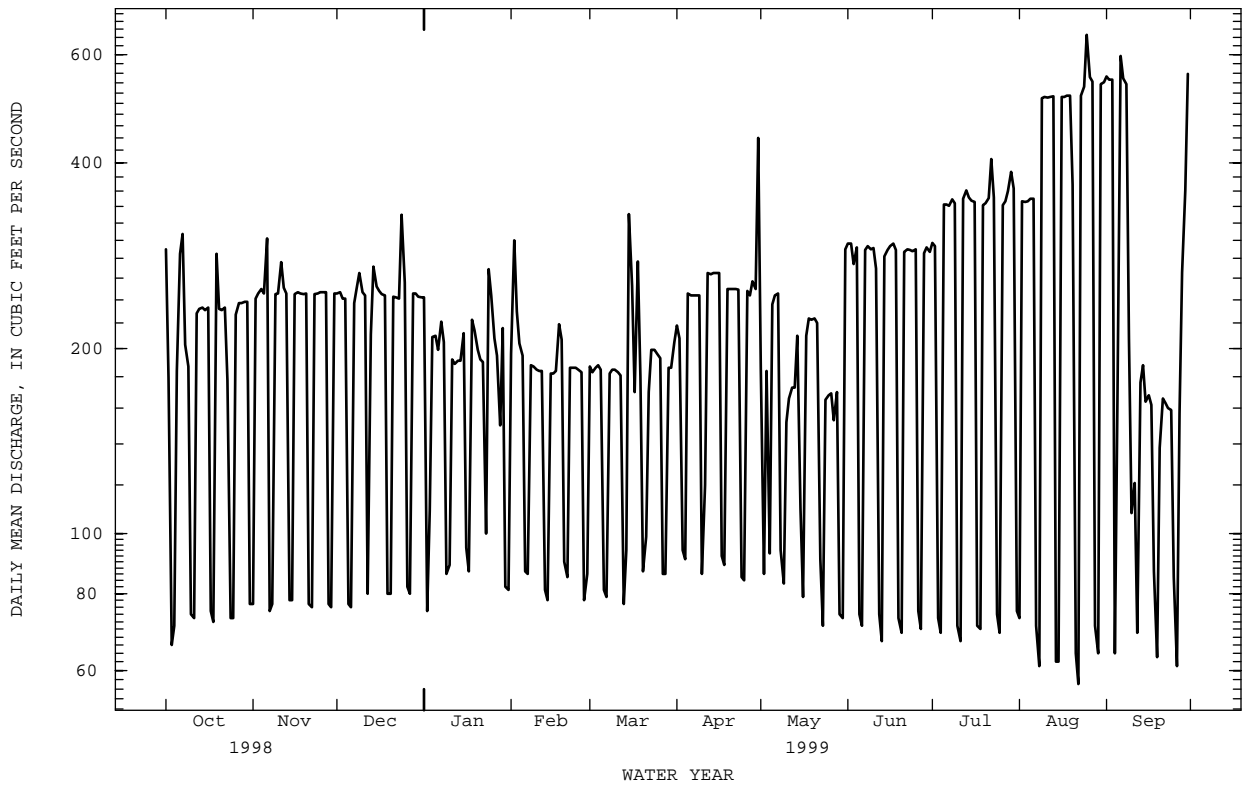
02072500 SMITH RIVER AT BASSETT, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1951 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	279	271	300	335	341	416	462	370	334	285	298	308
MAX	944	996	724	655	846	1197	1474	902	1004	759	568	912
(WY)	1990	1986	1997	1991	1998	1993	1987	1978	1992	1972	1994	1979
MIN	121	98.4	110	107	110	114	98.6	86.7	84.4	138	124	157
(WY)	1952	1953	1996	1989	1989	1982	1969	1964	1964	1981	1953	1967

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR	WATER YEARS 1951 - 1999
ANNUAL TOTAL	139439	78721	
ANNUAL MEAN	382	216	333
HIGHEST ANNUAL MEAN			523 1987
LOWEST ANNUAL MEAN			150 1953
HIGHEST DAILY MEAN	1830	Apr 19	6080 Apr 24 1992
LOWEST DAILY MEAN	58	Sep 27	44 Aug 23 1964
ANNUAL SEVEN-DAY MINIMUM	133	May 11	67 Oct 6 1980
INSTANTANEOUS PEAK FLOW			1880 Sep 30 17700 Sep 7 1987
INSTANTANEOUS PEAK STAGE			4.25 Sep 30 15.20 Sep 7 1987
INSTANTANEOUS LOW FLOW			41 May 27 19 Jul 19 1956
ANNUAL RUNOFF (CFSM)	1.47	.83	1.29
ANNUAL RUNOFF (INCHES)	20.03	11.31	17.47
10 PERCENT EXCEEDS	900	350	725
50 PERCENT EXCEEDS	271	210	249
90 PERCENT EXCEEDS	80	74	76

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 mi<sup>2</sup>.

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 sea level.

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. Maximum discharge, 39,000 ft<sup>3</sup>/s, from rating curve extended above 17,000 ft<sup>3</sup>/s on basis of computations of flow over dam at gage heights 16.76 ft and 21.50 ft. 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 Department of Environmental Quality - Water Division.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 3,520 ft<sup>3</sup>/s, Sep 30, gage height, 4.93 ft; minimum discharge, 23 ft<sup>3</sup>/s, Jan 3, result of regulation; minimum daily 86 ft<sup>3</sup>/s, May 30, result of regulation.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	329	135	300	309	324	292	435	388	402	396	134	628
2	291	197	300	150	650	268	381	146	365	393	312	618
3	102	312	296	304	429	288	217	249	352	243	395	620
4	134	417	297	376	335	295	206	300	348	135	403	270
5	263	313	141	297	306	272	366	170	226	312	404	604
6	252	360	137	293	189	172	364	324	123	405	396	942
7	459	142	288	298	189	163	364	342	252	398	219	733
8	366	137	324	317	289	260	358	242	361	407	106	651
9	280	302	433	190	285	264	377	170	356	400	485	602
10	146	304	323	203	274	270	190	273	356	227	592	267
11	140	386	302	283	272	265	241	244	326	137	562	181
12	251	325	148	279	267	259	416	253	236	427	581	193
13	299	307	809	279	171	154	375	246	115	486	583	263
14	303	148	409	276	158	214	392	373	234	488	240	278
15	298	143	362	344	258	689	387	245	355	420	107	345
16	297	303	338	208	262	480	405	177	373	352	484	339
17	188	305	330	181	266	328	199	253	390	239	570	316
18	134	304	324	423	400	461	189	347	364	132	588	160
19	245	302	157	367	400	242	401	328	228	241	584	99
20	348	306	155	309	212	186	353	325	130	366	545	197
21	291	142	320	290	186	272	360	317	278	619	208	266
22	286	136	318	282	276	327	362	180	363	922	104	280
23	289	300	308	306	274	323	365	143	371	433	450	253
24	133	304	474	980	277	325	148	264	351	282	620	263
25	133	301	399	496	273	317	176	156	358	151	1230	206
26	244	307	178	358	271	303	392	364	223	300	696	99
27	296	308	171	320	164	178	349	148	124	402	667	705
28	295	140	329	271	198	176	395	305	268	534	281	1210
29	299	138	333	296	---	287	406	150	358	543	124	1390
30	296	296	327	176	---	286	535	86	347	451	467	1610
31	193	---	316	167	---	301	---	221	---	264	623	---
TOTAL	7880	7820	9646	9628	7855	8917	10104	7729	8933	11505	13760	14588
MEAN	254	261	311	311	281	288	337	249	298	371	444	486
MAX	459	417	809	980	650	689	535	388	402	922	1230	1610
MIN	102	135	137	150	158	154	148	86	115	132	104	99
(†)	-2143	-2420	-938	+3625	+2349	+2405	+319	+1492	-3998	-4427	-8898	-319
MEAN‡	185	180	281	428	364	365	347	297	165	228	157	475
CFSM‡	.49	.47	.74	1.13	.96	.96	.91	.78	.43	.60	.41	1.25
IN.‡	.56	.53	.85	1.30	1.00	1.11	1.02	.90	.48	.69	.48	1.40

CAL YR 1998 TOTAL 208613 MEAN 572 MAX 3160 MIN 102 MEAN‡ 566 CFSM‡ 1.49 IN.‡ 20.23  
WTR YR 1999 TOTAL 118365 MEAN 324 MAX 1610 MIN 86 MEAN‡ 289 CFSM‡ .76 IN.‡ 10.32

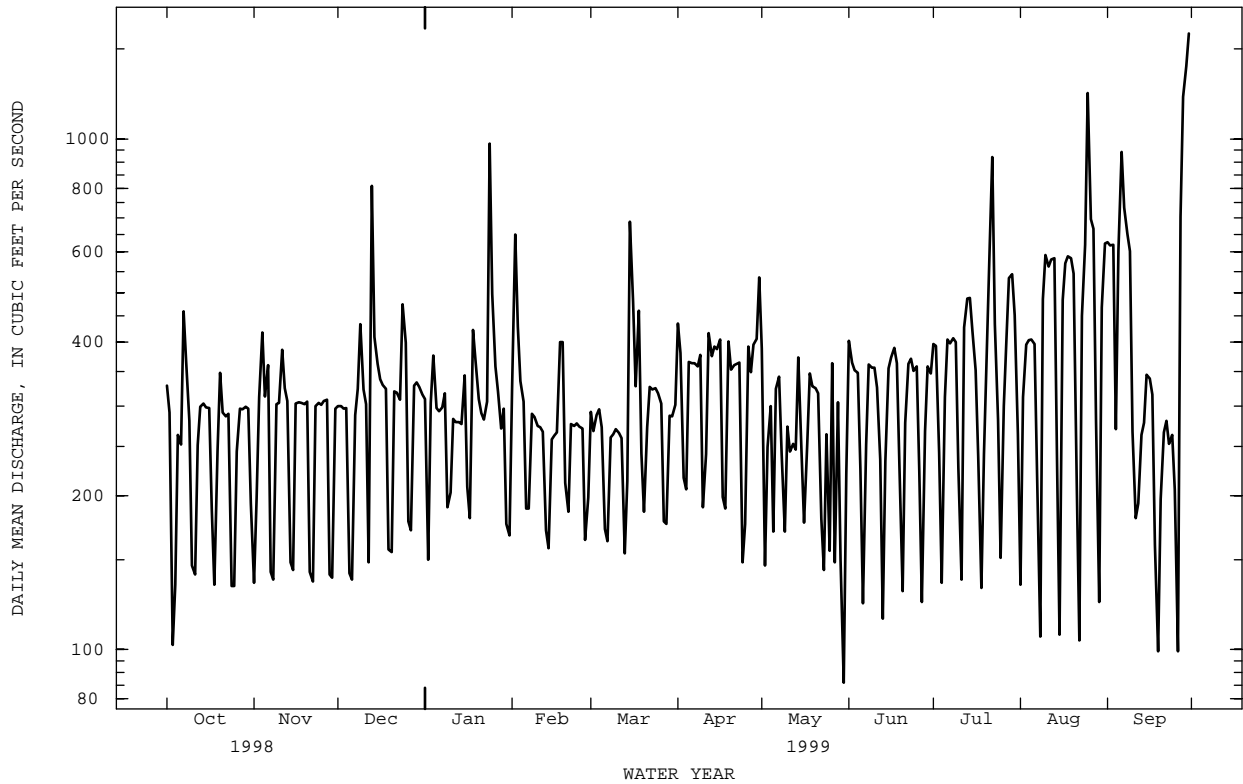
† Total change in contents, equivalent in cubic feet per second, per month, in Philpott Lake; provided by U.S. Army Corps of Engineers.  
‡ Adjusted for monthly change in contents.

02073000 SMITH RIVER AT MARTINSVILLE, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1951 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	397	389	436	503	526	628	650	528	484	417	410	436
MAX	1389	1266	988	1000	1212	1735	2206	1138	1467	1174	1032	1624
(WY)	1990	1986	1997	1991	1998	1993	1987	1978	1992	1989	1985	1987
MIN	163	162	203	206	233	233	206	164	144	195	165	205
(WY)	1952	1953	1996	1957	1968	1981	1969	1964	1964	1981	1953	1951

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR	WATER YEARS 1951 - 1999
ANNUAL TOTAL	208613	118365	
ANNUAL MEAN	572	324	483
HIGHEST ANNUAL MEAN			817
LOWEST ANNUAL MEAN			243
HIGHEST DAILY MEAN	3160	Jan 28	1610
LOWEST DAILY MEAN	102	Oct 3	86
ANNUAL SEVEN-DAY MINIMUM	239	Oct 21	204
INSTANTANEOUS PEAK FLOW			3520
INSTANTANEOUS PEAK STAGE			4.93
INSTANTANEOUS LOW FLOW			23
ANNUAL RUNOFF (CFSM)	1.50	.85	1.27
ANNUAL RUNOFF (INCHES)	20.42	11.59	17.28
10 PERCENT EXCEEDS	1150	487	911
50 PERCENT EXCEEDS	402	300	362
90 PERCENT EXCEEDS	173	148	168



ROANOKE RIVER BASIN

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 of 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 of Stuart Creek, and 3.9 mi upstream from mouth.

DRAINAGE AREA.--538 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1939 to current year. Prior to October 1970, published as "Smith River at Spray".

REVISED RECORDS.--WSP 1433: 1946.

GAGE.--Water-stage recorder. Datum of gage is 539.56 ft above sea level. Satellite telemetry at station.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Flow regulated since August 1950 by Philpott Lake, 40 mi upstream (usable capacity, 6,325,000,000 ft<sup>3</sup>). Additional regulation by hydroelectric plant at Martinsville, Virginia, 18 mi upstream. Maximum discharge prior to regulation: 45,600 ft<sup>3</sup>/s, Aug. 15, 1940, from rating curve extended above 12,000 ft<sup>3</sup>/s on the basis of computation of peak flow over dam 1.5 mi downstream; gage height: 19.28 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

Table with 13 columns (DAY, OCT, NOV, DEC, JAN, FEB, MAR, APR, MAY, JUN, JUL, AUG, SEP) and 31 rows of daily mean discharge data. Includes summary rows for TOTAL, MEAN, MAX, MIN, and †.

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1951 - 1999\*, BY WATER YEAR (WY)

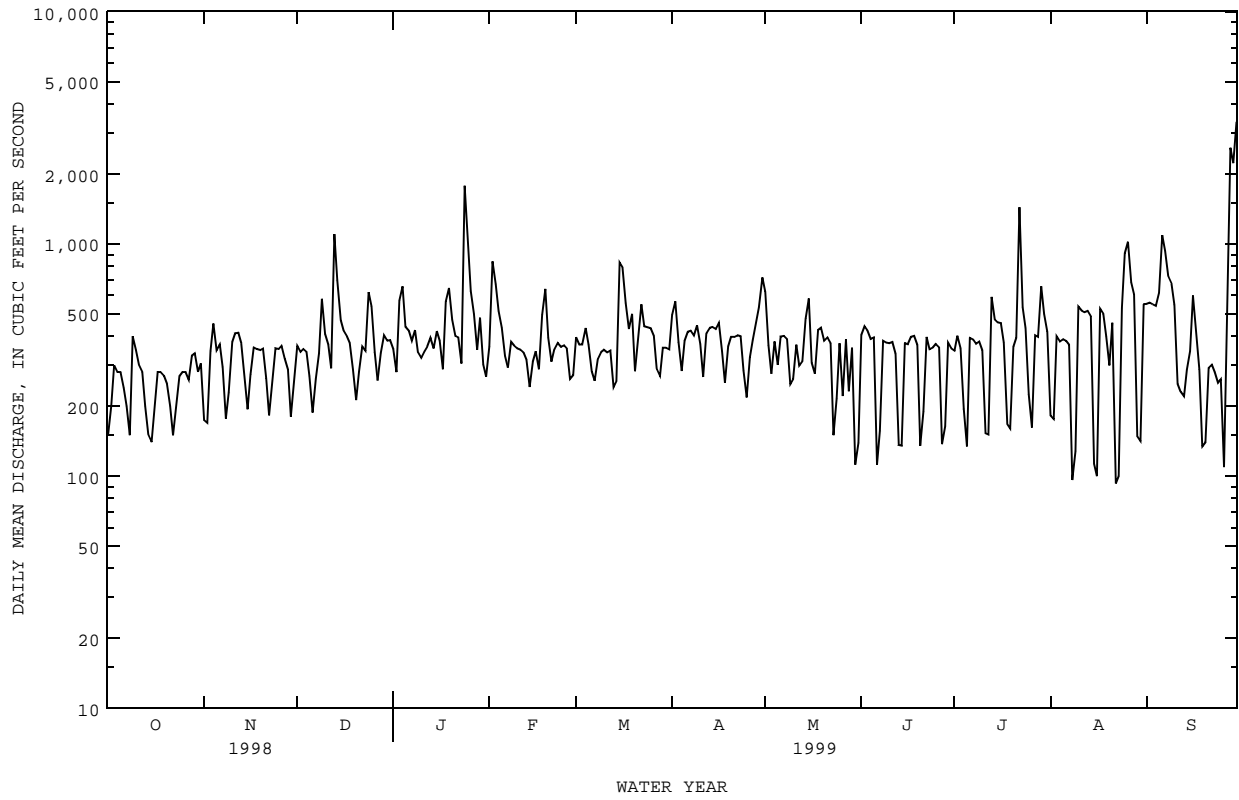
Table with 13 columns (MEAN, MAX, (WY), MIN, (WY)) and 5 rows of monthly mean data for water years 1951-1999.

SUMMARY STATISTICS FOR 1998 CALENDAR YEAR FOR 1999 WATER YEAR WATER YEARS 1951 - 1999\*

Table with 4 columns (Statistic, 1998 Calendar Year, 1999 Water Year, 1951-1999\*) and 13 rows of summary statistics including annual total, mean, highest/lowest annual/daily means, and percent exceeds.

e Estimated.
† 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.
\* Regulated period only (1951-1999). See REMARKS.

02074000 SMITH RIVER AT EDEN, NC--Continued



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 mi<sup>2</sup>.

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 sea level. 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, Oct. 4 to Dec. 15 and Aug. 17-19, which are fair. Diurnal fluctuation at low flow caused by small mill upstream from station. Maximum discharge, 23,000 ft<sup>3</sup>/s, from rating curve extended above 11,000 ft<sup>3</sup>/s. Minimum gage height, 0.40 ft, Sep. 29, 1930. 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 Department of Environmental Quality - Water Division.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,500 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Jan 24	1300	1,810	4.87	Sep 30	0230	*3,210	*5.97
Sep 28	1430	2,070	5.12				

Minimum discharge, 14 ft<sup>3</sup>/s, Aug 19-20.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	36	e45	e46	59	93	86	122	76	38	31	28	19
2	34	e44	e45	58	178	75	126	65	36	34	27	19
3	33	e43	e45	256	147	77	94	60	36	31	24	18
4	e37	e47	e44	222	112	92	86	58	35	31	23	18
5	e40	e52	e45	120	95	79	80	58	35	28	23	266
6	e43	e48	e46	118	89	78	76	58	35	25	22	514
7	e46	e46	e47	104	88	76	73	57	34	41	21	145
8	e49	e45	e63	76	90	73	71	55	34	49	20	60
9	e84	e45	e84	78	83	74	71	52	32	34	21	52
10	e60	e48	e87	79	81	76	70	50	30	28	21	45
11	e48	e58	e68	71	77	73	80	48	29	32	20	36
12	e45	e67	e62	69	78	70	85	48	30	35	19	33
13	e43	e63	e170	67	78	68	70	50	29	63	18	31
14	e43	e54	e220	65	75	83	68	94	29	51	17	29
15	e41	e49	e74	87	73	151	71	93	30	46	17	45
16	e40	e48	65	86	72	142	74	61	32	36	16	241
17	e41	e47	60	74	73	105	67	55	40	32	e15	92
18	e41	e46	57	180	123	91	64	52	37	37	e15	52
19	e40	e45	56	186	118	82	64	53	31	39	e14	43
20	e40	e46	57	108	95	76	65	50	34	33	16	39
21	e39	e48	56	89	85	135	63	47	43	33	20	40
22	e39	e47	57	81	80	151	63	46	38	338	18	77
23	e38	e46	55	94	76	104	61	46	35	60	16	44
24	e39	e45	94	991	77	93	59	46	32	40	16	38
25	e42	e47	104	375	78	91	57	44	31	34	22	35
26	e42	e49	75	175	75	83	57	44	33	31	45	33
27	e43	e51	70	128	73	79	59	44	33	28	175	35
28	e43	e48	68	109	80	77	67	43	37	28	34	934
29	e42	e47	66	99	---	75	80	41	31	41	25	1450
30	e41	e46	63	90	---	73	110	39	29	38	22	1520
31	e44	---	60	86	---	70	---	38	---	29	20	---
TOTAL	1336	1460	2209	4480	2542	2758	2253	1671	1008	1436	810	6003
MEAN	43.1	48.7	71.3	145	90.8	89.0	75.1	53.9	33.6	46.3	26.1	200
MAX	84	67	220	991	178	151	126	94	43	338	175	1520
MIN	33	43	44	58	72	68	57	38	29	25	14	18
CFSM	.38	.43	.64	1.29	.81	.79	.67	.48	.30	.41	.23	1.79
IN.	.44	.48	.73	1.49	.84	.92	.75	.56	.33	.48	.27	1.99

02074500 SANDY RIVER NEAR DANVILLE, VA--Continued

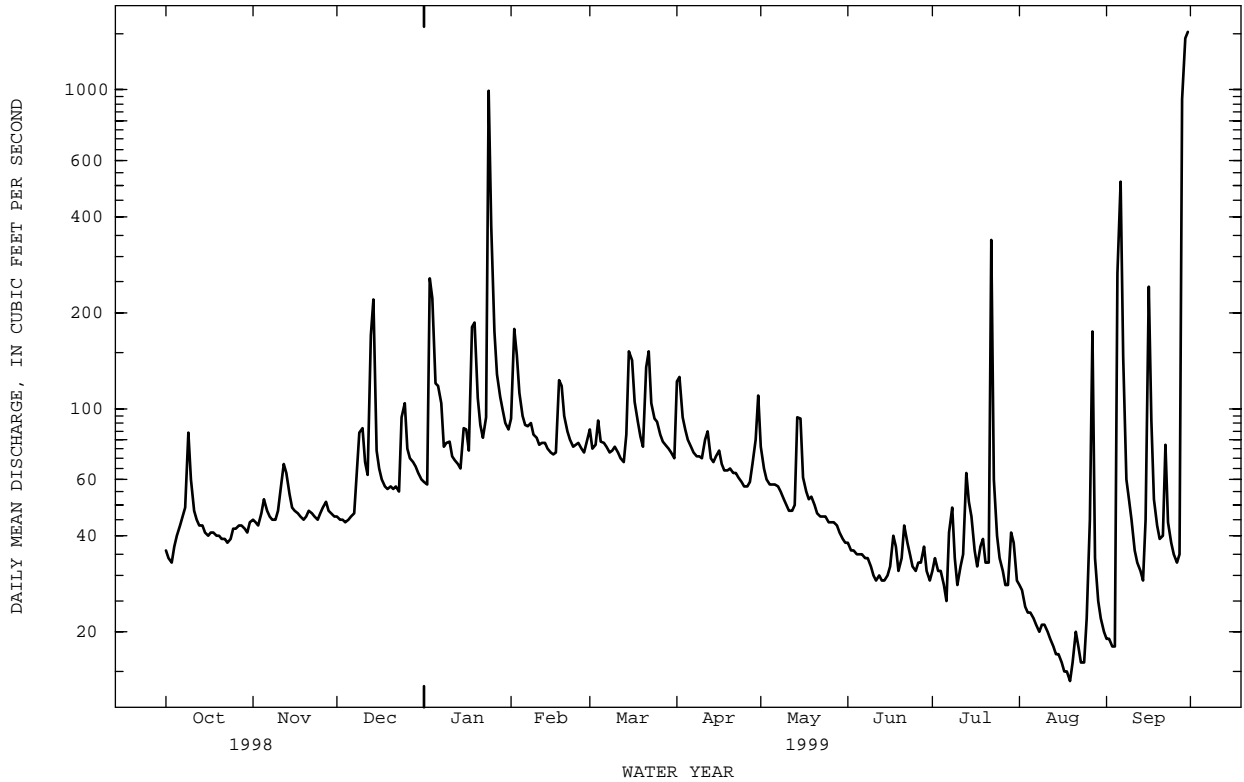
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1930 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	83.4	84.0	107	142	149	175	148	109	87.8	75.5	82.7	87.0
MAX	366	281	249	409	369	738	591	279	376	265	556	739
(WY)	1938	1958	1974	1936	1979	1975	1987	1971	1972	1989	1940	1996
MIN	22.6	32.2	35.2	31.5	40.2	63.9	53.1	52.8	33.6	26.0	17.0	14.2
(WY)	1932	1932	1934	1934	1934	1967	1967	1986	1999	1986	1932	1930

SUMMARY STATISTICS FOR 1998 CALENDAR YEAR FOR 1999 WATER YEAR WATER YEARS 1930 - 1999

ANNUAL TOTAL		54255		27966								
ANNUAL MEAN		149		76.6						111		
HIGHEST ANNUAL MEAN										191		1996
LOWEST ANNUAL MEAN										58.5		1981
HIGHEST DAILY MEAN			2990	Jan 28		1520	Sep 30		8340		Sep 6	1996
LOWEST DAILY MEAN			33	Oct 3		e14	Aug 19		8.0		aAug 29	1932
ANNUAL SEVEN-DAY MINIMUM			36	Sep 28		16	Aug 14		8.6		Aug 27	1932
INSTANTANEOUS PEAK FLOW						3210	Sep 30		23000		Aug 14	1940
INSTANTANEOUS PEAK STAGE						5.97	Sep 30		b14.80		Aug 14	1940
INSTANTANEOUS LOW FLOW						14	cAug 19		3.0		Sep 29	1930
ANNUAL RUNOFF (CFSM)		1.33		.68					.99			
ANNUAL RUNOFF (INCHES)		18.02		9.29					13.42			
10 PERCENT EXCEEDS		213		104					166			
50 PERCENT EXCEEDS		77		51					72			
90 PERCENT EXCEEDS		42		28					35			

- a Also Aug 31 to Sep 2, 1932.
- b From floodmarks, present datum.
- c Also Aug 20, 1999.
- e Estimated.



## ROANOKE RIVER BASIN

02075045 DAN RIVER AT SEWAGE TREATMENT PLANT, NEAR DANVILLE, VA

LOCATION.--Lat 36°33'45", long 79°22'12", Pittsylvania County, Hydrologic Unit 03010104, on right bank at footbridge at Danville sewage treatment plant, 0.1 mi downstream from Pumpkin Creek, and 0.6 mi southeast of Danville.

DRAINAGE AREA.--2,105 mi<sup>2</sup>, approximately .

PERIOD OF RECORD.--October 1995 to current year.

GAGE.--Water-stage recorder. Datum of gage is 365.19 ft above sea level.

REMARKS.--Records good except for periods of doubtful gage-height record, Dec. 15, 18, 24, 26, and Jan. 4-6, 10-11, 15, which are fair. Diurnal fluctuation caused by mills and hydroelectric generating facility at Schoolfield Dam 5.2 mi upstream. Since August 1950, flow regulated by Philpott Lake (station 02071900) 76.6 mi upstream. 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.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 18,200 ft<sup>3</sup>/s, Sep 30, gage height, 16.42 ft; minimum discharge, 208 ft<sup>3</sup>/s, Jul 6, gage height, 3.49 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	958	806	741	811	1560	1500	1570	5900	627	1070	949	946
2	810	569	854	1040	2030	1500	2540	2800	1250	1260	662	935
3	499	624	877	2440	2900	1530	2320	1840	726	1250	640	913
4	872	757	806	e3410	2260	1540	1620	1530	1190	1150	817	919
5	531	1210	990	e2260	1780	1720	1540	1590	705	981	774	1760
6	674	856	963	e1530	1760	1510	1510	1260	1180	348	748	4310
7	750	816	829	1390	1520	1490	1460	1440	596	1020	726	3300
8	917	828	754	1620	1510	1250	1390	1440	605	1150	679	1870
9	1080	726	1250	1580	1510	1410	1350	1240	706	1180	435	1640
10	1150	724	1600	e1330	1490	1220	1320	1250	912	964	389	1370
11	727	1060	1210	e1510	1390	1490	1380	1100	961	867	857	1550
12	647	1020	977	1310	1290	1230	1240	1040	1100	776	836	826
13	773	1190	2190	1140	1590	1300	1290	1270	1030	1390	821	873
14	775	869	4130	1470	1180	1270	1350	1690	564	1600	839	683
15	760	892	e2220	e1560	1060	1940	1340	8820	629	1400	743	1310
16	770	965	1450	1580	1370	2970	1470	3000	935	1180	412	3440
17	752	825	1290	1550	1270	2210	1440	1940	1100	1040	430	2250
18	705	898	e1370	1770	1470	1890	1190	1530	1100	956	779	1370
19	568	1020	1170	2890	2020	1660	1070	1530	1090	713	794	792
20	737	805	824	2270	2170	1470	1330	1750	997	818	836	813
21	797	912	915	1840	1520	1820	1210	1560	600	986	889	825
22	773	921	1140	1470	1620	2480	1150	1290	678	2900	756	1190
23	698	592	1010	1680	1380	2080	1190	1320	1130	1790	452	1060
24	813	710	e1550	7320	1540	1860	1210	1250	1090	1200	427	900
25	604	1270	1900	8340	1510	1640	1070	1040	911	1030	915	633
26	644	1040	e1990	3490	1410	1560	870	1120	900	923	2540	879
27	793	536	1160	2400	1480	1530	1050	1050	741	764	2810	491
28	711	926	1330	1910	1200	1150	1260	1050	983	889	1450	5860
29	814	887	1320	1730	---	1330	1600	916	791	1200	966	9410
30	820	730	1310	1640	---	1310	5220	1080	998	1490	635	16900
31	807	---	1270	1540	---	1290	---	708	---	1200	657	---
TOTAL	23729	25984	41390	67821	44790	50150	45550	56344	26825	35485	26663	70018
MEAN	765	866	1335	2188	1600	1618	1518	1818	894	1145	860	2334
MAX	1150	1270	4130	8340	2900	2970	5220	8820	1250	2900	2810	16900
MIN	499	536	741	811	1060	1150	870	708	564	348	389	491
(†)	-2143	-2420	-938	+3625	+2349	+2405	+319	+1492	-3998	-4427	-8898	-319
MEAN†	696	785	1305	2305	1684	1695	1529	1866	761	1002	573	2323
CFSM†	.33	.37	.62	1.09	.80	.80	.73	.89	.36	.48	.27	1.10
IN. ‡	.38	.42	.71	1.26	.83	.93	.81	1.02	.40	.55	.31	1.23

CAL YR 1998 TOTAL 944118 MEAN 2587 MAX 28200 MIN 336 MEAN† 2581 CFSM† 1.23 IN. ‡ 16.65  
WTR YR 1999 TOTAL 514749 MEAN 1410 MAX 16900 MIN 348 MEAN† 1375 CFSM† .65 IN. ‡ 8.87

† Total change in contents, equivalent in cubic feet per second, per month, in Philpott Lake; provided by U.S. Army Corps of Engineers.

‡ Adjusted for change in contents.

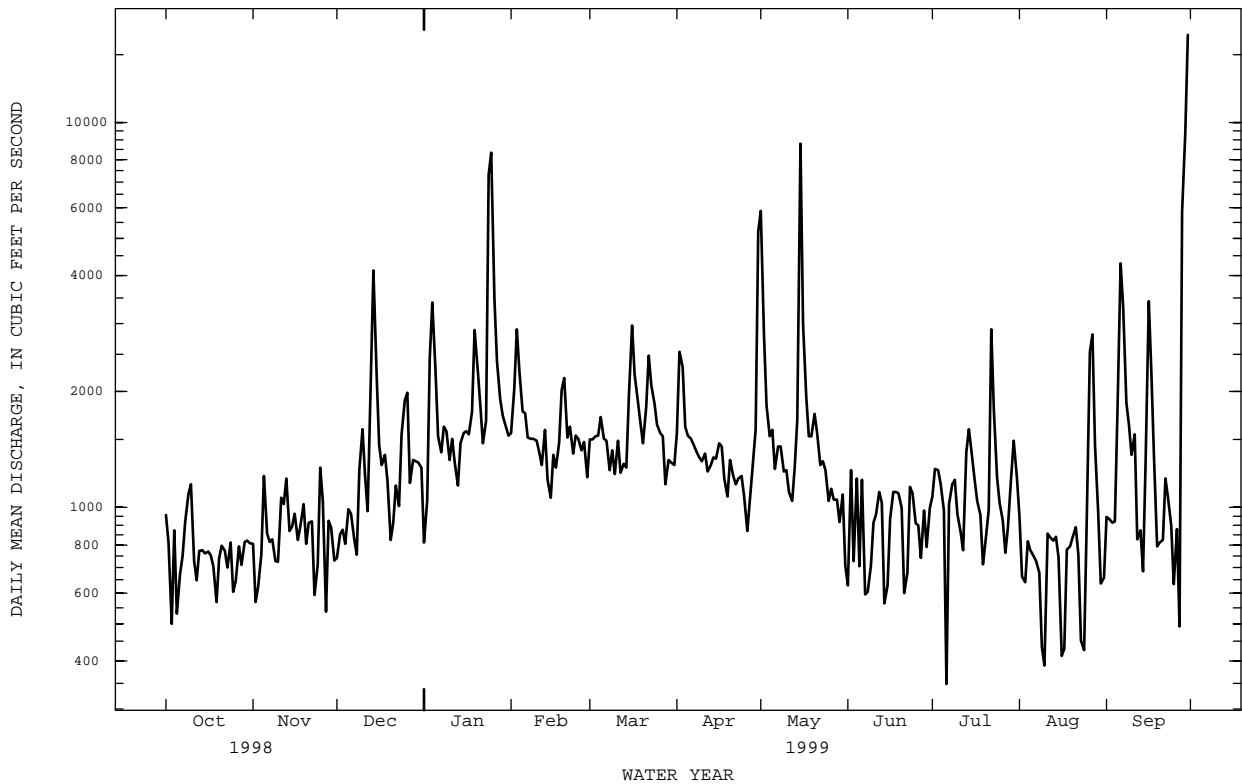
02075045 DAN RIVER AT SEWAGE TREATMENT PLANT, NEAR DANVILLE, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1996 - 1999, BY WATER YEAR (WY) [REGULATED, UNADJUSTED]

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	1458	1511	2102	3623	3495	3245	3350	2832	2067	1304	1551	3061
MAX	2418	2120	4516	4924	5565	4776	4969	3983	3289	1437	3027	8158
(WY)	1997	1996	1997	1998	1998	1997	1998	1998	1996	1996	1996	1996
MIN	765	866	1263	2188	1600	1618	1518	1818	894	1145	860	713
(WY)	1999	1999	1996	1999	1999	1999	1999	1999	1999	1999	1999	1998

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR	WATER YEARS 1996 - 1999
ANNUAL TOTAL	944118	514749	
ANNUAL MEAN	2587	1410	2459
HIGHEST ANNUAL MEAN			3035
LOWEST ANNUAL MEAN			1410
HIGHEST DAILY MEAN	28200	Jan 28	16900
LOWEST DAILY MEAN	336	Sep 7	348
ANNUAL SEVEN-DAY MINIMUM	618	Sep 24	653
INSTANTANEOUS PEAK FLOW			18200
INSTANTANEOUS PEAK STAGE			16.42
INSTANTANEOUS LOW FLOW			208
ANNUAL RUNOFF (CFSM)	1.23	.67	1.17
ANNUAL RUNOFF (INCHES)	16.68	9.10	15.87
10 PERCENT EXCEEDS	4650	2050	4110
50 PERCENT EXCEEDS	1600	1180	1660
90 PERCENT EXCEEDS	734	706	814

e Estimated.





## ROANOKE RIVER BASIN

02075500 DAN RIVER AT PACES, VA

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 mi<sup>2</sup>, approximately.

PERIOD OF RECORD.--November 1950 to current year.

GAGE.--Water-stage recorder. Datum of gage is 322.48 ft above sea level.

REMARKS.--Records good. Diurnal fluctuation caused by mills 23 mi upstream at Danville. Since August 1950, flow regulated by Philpott Lake (station 02071900) 101.4 mi upstream. U.S. Army Corps of Engineers satellite gage-height telemeter at station. Maximum discharge, 64,800 ft<sup>3</sup>/s, from rating curve extended above 32,000 ft<sup>3</sup>/s. Minimum gage height, 1.71 ft, Sep. 4, 1956. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location. Analytical results of water samples collected for the Albemarle-Pamlico Sound NAWQA are given in the section "Analyses of Samples Collected at Water-Quality Miscellaneous Sampling sites".

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, 18,000 ft<sup>3</sup>/s, Sep 30, gage height, 19.67 ft, stage rising, peak occurred Oct 1, 1999; maximum peak discharge 15,700 ft<sup>3</sup>/s, Jan 25, gage height, 18.22 ft; minimum, 360 ft<sup>3</sup>/s, Jul 6, gage height, 2.09 ft, minimum daily 458 ft<sup>3</sup>/s, Aug 17.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP		
1	889	847	834	1430	2040	1810	2330	9730	870	1210	1120	858		
2	807	825	906	1310	2780	1780	4190	5550	809	1350	816	993		
3	909	576	996	3560	4090	1810	3890	3250	1250	1410	653	966		
4	596	728	970	5820	3700	1920	2870	2120	898	1270	745	938		
5	938	1040	1040	4820	2870	1970	2090	2040	1120	1280	798	1680		
6	673	1210	1050	2330	2220	1990	2170	1950	878	660	763	4790		
7	e800	886	1000	1910	2170	1800	2080	1490	1100	677	735	6350		
8	888	864	774	2100	2030	1680	1930	1900	660	1180	714	3910		
9	1200	860	1170	2070	1960	1600	1860	1550	678	1240	611	2440		
10	1220	691	1630	1960	1910	1390	1900	1500	835	1190	468	2230		
11	1120	885	1770	1680	1910	1800	1840	1310	902	943	586	1940		
12	849	1250	1170	1660	1730	1750	1810	1090	1070	788	e900	1580		
13	709	1200	1970	1610	1790	1330	1680	1520	1100	1090	808	888		
14	875	1240	5080	1570	1550	1520	1810	1970	871	2030	805	943		
15	880	952	4080	2130	1580	2900	e1740	7770	658	1900	824	1170		
16	861	942	1950	2680	1510	4340	2450	5600	748	1510	620	7590		
17	866	1040	1890	2290	1460	3700	2160	2900	1210	1270	458	6720		
18	815	918	1670	2500	1790	2940	1890	2070	1200	1070	595	3830		
19	776	985	1330	4170	2410	2170	1590	1890	1180	887	780	1780		
20	658	1090	1410	4130	2870	2260	1440	1870	1130	766	779	1210		
21	849	839	1210	2480	2270	2260	1680	2060	890	1030	841	1050		
22	856	1250	920	2360	1970	3860	1550	1600	708	1850	860	1370		
23	847	753	1430	2100	1800	3450	1450	1490	917	3250	628	1730		
24	822	700	1860	9410	1780	2720	1470	1430	1210	1500	483	1240		
25	842	959	2120	14800	1830	2320	1530	1300	1090	1210	585	954		
26	593	1520	2740	8200	1790	2230	1020	1290	975	983	1590	886		
27	e780	906	1970	4540	1670	2020	1340	1010	794	866	3740	992		
28	801	678	1620	2940	1480	1970	1560	1400	845	866	2440	2520		
29	805	1300	1630	2590	---	1510	1760	912	1090	942	1650	10900		
30	853	710	1610	2510	---	1750	5580	1050	780	1550	878	15600		
31	857	---	1560	2050	---	1700	---	1110	---	1530	694	---		
TOTAL	26234	28644	51360	105710	58960	68250	62660	73722	28466	39298	28967	90048		
MEAN	846	955	1657	3410	2106	2202	2089	2378	949	1268	934	3002		
MAX	1220	1520	5080	14800	4090	4340	5580	9730	1250	3250	3740	15600		
MIN	593	576	774	1310	1460	1330	1020	912	658	660	458	858		
(†)	-2143	-2420	-938	+3625	+2349	+2405	+319	+1492	-3998	-4427	-8898	-319		
MEAN‡	680	874	1627	3527	2190	2279	2099	2426	816	1125	647	2991		
CFSM‡	.27	.34	.64	1.38	.86	.89	.82	.95	.32	.44	.25	1.17		
IN. ‡	.31	.38	.74	1.60	.89	1.03	.92	1.10	.36	.51	.29	1.31		
CAL YR 1998	TOTAL	1247324	MEAN	3417	MAX	29400	MIN	574	MEAN‡	3412	CFSM‡	1.34	IN. ‡	18.17
WTR YR 1999	TOTAL	663697	MEAN	1818	MAX	15600	MIN	476	MEAN‡	1783	CFSM‡	.70	IN. ‡	9.49

† Total change in contents, equivalent in cubic feet per second, per month, in Philpott Lake; provided by U.S. Army Corps of Engineers.

‡ Adjusted for monthly change in contents.

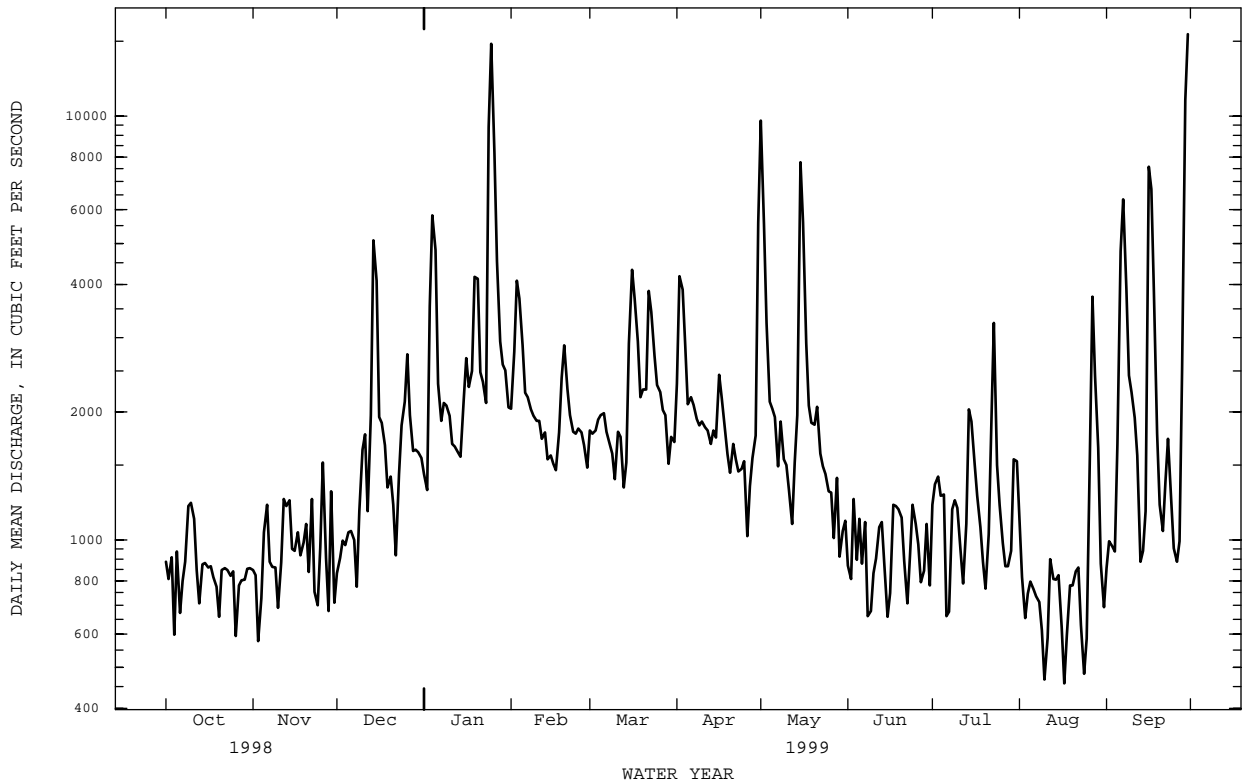
02075500 DAN RIVER AT PACES, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1951 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	2026	2065	2668	3483	3940	4525	4048	2871	2385	1870	1759	1914
MAX	7253	6184	5734	8407	9141	11190	11500	6505	8987	5091	4833	10200
(WY)	1960	1958	1997	1978	1960	1975	1987	1978	1972	1975	1985	1996
MIN	616	778	1083	1015	1756	1580	1318	1184	860	788	647	452
(WY)	1954	1954	1981	1981	1977	1981	1967	1986	1986	1977	1977	1954

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR	WATER YEARS 1951 - 1999
ANNUAL TOTAL	1247324	662319	
ANNUAL MEAN	3417	1815	2790
HIGHEST ANNUAL MEAN			4050
LOWEST ANNUAL MEAN			1310
HIGHEST DAILY MEAN	29400	Jan 29	a15600
LOWEST DAILY MEAN	574	Sep 21	458
ANNUAL SEVEN-DAY MINIMUM	780	Sep 29	668
INSTANTANEOUS PEAK FLOW			15700
INSTANTANEOUS PEAK STAGE			18.22
INSTANTANEOUS LOW FLOW			360
ANNUAL RUNOFF (CFSM)	1.34	.71	1.09
ANNUAL RUNOFF (INCHES)	18.20	9.66	14.86
10 PERCENT EXCEEDS	6610	2940	5000
50 PERCENT EXCEEDS	2030	1430	1900
90 PERCENT EXCEEDS	844	775	915

a Stage rising, peak occurred Oct 1, 1999.  
 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 mi<sup>2</sup>.

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 sea level (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 good except for periods of doubtful gage-height record, Nov. 23, Dec. 24, which are fair, and Jul. 4-12 and Jul 25 to Sep 4, which are poor. Flow regulated by a reservoir and hydroelectric generating facility 0.5 mi upstream from station. Maximum discharge, 50,000 ft<sup>3</sup>/s, from rating curve extended above 13,000 ft<sup>3</sup>/s on basis of slope-area measurement of peak flow and velocity-area study. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 4,650 ft<sup>3</sup>/s, Sep 30, gage height, 15.21 ft, stage rising, peak occurred Oct 1, 1999; maximum peak discharge 3,560 ft<sup>3</sup>/s, Jan 25, gage height 12.78 ft; minimum observed 17.8 ft<sup>3</sup>/s, Aug 19.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	96	121	121	180	362	356	345	358	124	103	e24	e25
2	96	135	149	232	506	343	801	290	121	115	e22	e25
3	94	105	126	564	714	298	594	260	118	119	e21	e25
4	95	129	142	897	586	348	447	226	110	e97	e20	e35
5	117	105	124	829	431	369	342	219	118	e95	e21	341
6	147	138	133	295	339	340	357	221	103	e95	e19	585
7	102	86	134	333	408	314	297	212	103	e95	e20	792
8	141	134	144	295	335	279	307	230	103	e95	e19	918
9	161	124	210	291	385	264	306	193	103	e95	e19	512
10	113	99	235	243	341	291	373	196	102	e95	e21	536
11	149	130	195	247	295	294	509	181	102	e95	e19	179
12	92	154	166	232	308	271	1460	164	101	e95	e19	141
13	108	137	455	223	314	243	956	176	101	103	e19	123
14	107	137	664	218	302	297	506	223	100	144	e23	120
15	109	133	448	412	283	792	396	421	100	199	e22	294
16	129	131	263	519	277	1340	438	371	101	149	e21	1460
17	90	125	211	380	295	989	385	260	102	117	e20	1380
18	106	140	188	472	351	578	289	210	102	105	e19	596
19	112	146	187	1020	603	454	360	203	101	104	e19	306
20	90	117	160	983	485	385	282	180	101	103	e21	187
21	107	135	167	462	387	416	271	198	101	102	e20	177
22	114	177	167	378	348	688	245	156	102	101	e20	265
23	90	e112	165	357	283	642	279	180	113	100	e20	398
24	110	120	e249	1530	291	471	273	129	103	99	e30	249
25	90	126	304	3410	314	434	254	152	103	e80	e80	169
26	104	144	307	2010	292	402	203	161	103	e60	e70	145
27	108	143	247	938	274	364	241	171	103	e40	e30	156
28	90	133	235	544	283	335	271	104	103	e30	e26	389
29	106	124	230	463	---	306	279	127	112	e25	e25	2450
30	97	141	251	407	---	320	405	131	103	e23	e25	4030
31	127	---	151	364	---	263	---	125	---	e25	e26	---
TOTAL	3397	3881	6928	19728	10392	13486	12471	6428	3162	2903	780	17008
MEAN	110	129	223	636	371	435	416	207	105	93.6	25.2	567
MAX	161	177	664	3410	714	1340	1460	421	124	199	80	4030
MIN	90	86	121	180	274	243	203	104	100	23	19	25
CFSM	.20	.24	.41	1.16	.68	.80	.76	.38	.19	.17	.05	1.04
IN.	.23	.26	.47	1.34	.71	.92	.85	.44	.22	.20	.05	1.16

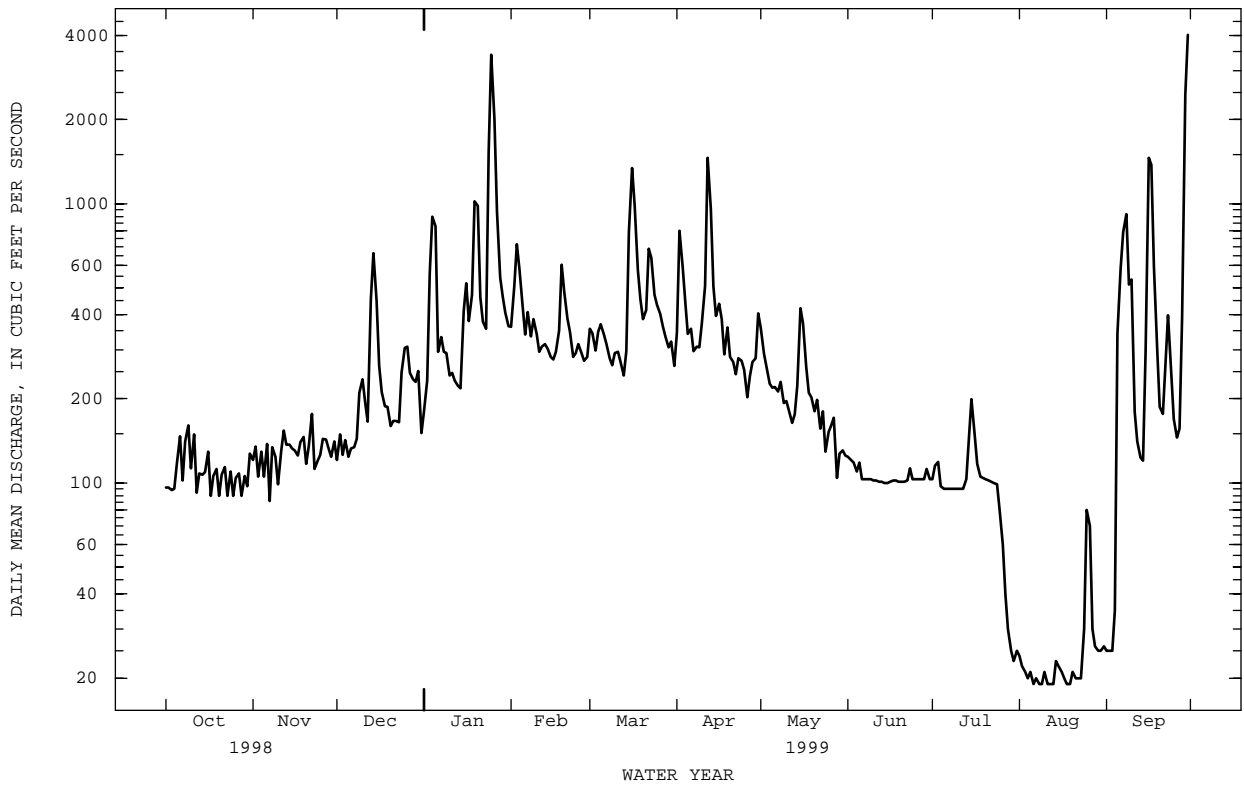
02077000 BANISTER RIVER AT HALIFAX, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1905 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	356	394	500	689	766	845	727	484	383	302	325	380
MAX	1691	1431	1211	2125	1857	2738	2121	1374	1588	1065	2898	3717
(WY)	1938	1973	1949	1937	1979	1975	1983	1978	1972	1938	1940	1944
MIN	34.9	86.1	163	170	185	270	196	178	94.0	80.1	25.2	29.4
(WY)	1931	1932	1966	1981	1934	1981	1967	1981	1970	1986	1999	1954

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR	WATER YEARS 1905 - 1999
ANNUAL TOTAL	240428	100564	
ANNUAL MEAN	659	276	513
HIGHEST ANNUAL MEAN			814
LOWEST ANNUAL MEAN			225
HIGHEST DAILY MEAN	9350	Jan 29	44700
LOWEST DAILY MEAN	86	Nov 7	6.0
ANNUAL SEVEN-DAY MINIMUM	95	Sep 15	18
INSTANTANEOUS PEAK FLOW			50000
INSTANTANEOUS PEAK STAGE			c40.80
INSTANTANEOUS LOW FLOW			6.0
ANNUAL RUNOFF (CFSM)	1.20		.94
ANNUAL RUNOFF (INCHES)	16.35		12.73
10 PERCENT EXCEEDS	1400		952
50 PERCENT EXCEEDS	250		305
90 PERCENT EXCEEDS	100		112

- a Stage rising, peak occurred Oct 1, 1999.
- b Also Aug 8, 9, 11-13, 18, 19, 1999.
- c From floodmarks.
- d Not determined.
- e Estimated.
- f Many days in August and September 1932.



## ROANOKE RIVER BASIN

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 mi<sup>2</sup>.

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). WSP 1723: 1930(m). WDR VA-75-1: 1974.

GAGE.--Water-stage recorder. Datum of gage is 315.24 ft above sea level. Jul. 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 September 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. Statistics of monthly mean data and summary statistics for water years 1929 - 1934, 1951 - 1964 (unregulated flow) are available in previous data books, water years 1991 - 1998. Maximum discharge, 10,800 ft<sup>3</sup>/s, from rating curve extended above 8,200 ft<sup>3</sup>/s. Minimum gage height, 3.58 ft, Sep. 14, 1932. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

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, 5,530 ft<sup>3</sup>/s, Sep 17, gage height, 18.31 ft; minimum discharge, 2.1 ft<sup>3</sup>/s, Aug 24, gage height, 3.93 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

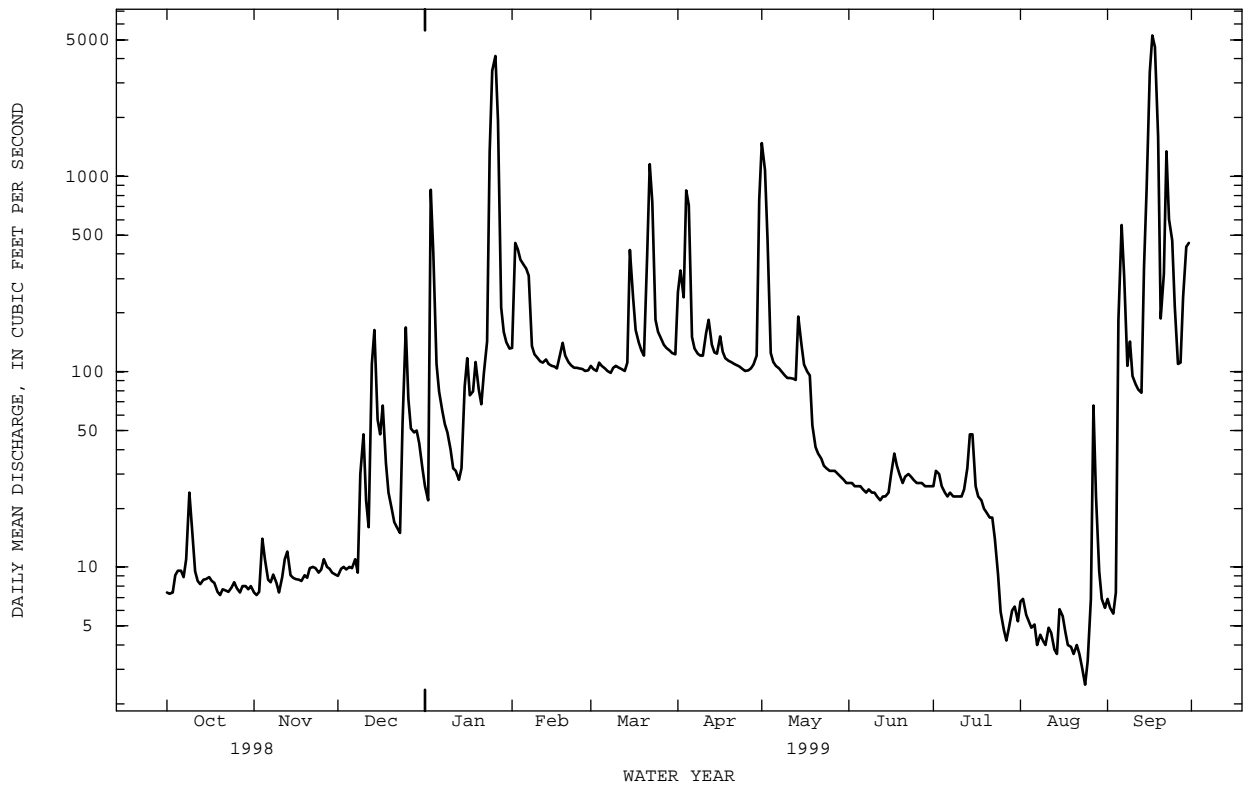
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	7.4	7.4	9.0	26	132	107	256	1480	27	26	6.7	6.9
2	7.3	7.2	9.8	22	457	103	330	1080	27	31	6.9	6.2
3	7.4	7.5	10	852	424	101	241	472	26	30	5.7	5.8
4	9.1	14	9.7	405	374	111	848	125	26	26	5.3	7.4
5	9.6	11	10	110	352	107	712	112	26	24	4.9	184
6	9.6	8.6	9.9	79	337	104	150	107	25	23	5.1	564
7	8.9	8.4	11	63	310	101	131	104	24	24	4.0	305
8	11	9.2	9.4	54	135	99	124	100	25	23	4.5	107
9	24	8.3	30	49	123	105	121	96	24	23	4.2	143
10	16	7.4	48	40	117	107	121	93	24	23	4.0	95
11	9.5	8.9	22	32	113	105	158	93	23	23	4.9	86
12	8.5	11	16	31	111	103	184	92	22	25	4.6	81
13	8.2	12	110	28	116	101	138	91	23	32	3.8	78
14	8.6	9.1	163	32	110	111	126	191	23	48	3.6	345
15	8.7	8.8	57	84	107	420	124	137	24	48	6.1	852
16	8.9	8.7	48	117	106	241	152	109	30	26	5.6	3410
17	8.5	8.6	67	76	104	164	127	100	38	23	4.7	5270
18	8.3	8.5	34	79	123	141	117	96	33	22	4.0	4600
19	7.5	9.1	24	112	141	128	114	53	30	20	3.9	1600
20	7.2	8.8	20	81	121	121	112	41	27	19	3.6	187
21	7.7	9.9	17	68	112	395	110	38	29	18	4.0	318
22	7.6	10	16	99	108	1150	108	36	30	18	3.6	1340
23	7.5	9.9	15	143	105	742	106	33	29	14	3.1	602
24	7.9	9.4	55	1330	105	184	103	32	28	9.2	2.5	470
25	8.4	9.7	168	3480	104	160	101	31	27	5.9	3.3	217
26	7.8	11	73	4140	103	147	102	31	27	4.8	6.9	110
27	7.4	10	51	1920	101	138	104	31	27	4.2	67	111
28	8.0	9.8	49	213	102	132	109	30	26	4.9	23	240
29	8.0	9.4	50	160	---	128	121	29	26	6.0	9.5	437
30	7.7	9.2	43	142	---	125	756	28	26	6.3	6.9	457
31	8.0	---	32	131	---	123	---	27	---	5.3	6.2	---
TOTAL	280.2	280.8	1286.8	14198	4753	6104	6106	5118	802	635.6	232.1	22235.3
MEAN	9.04	9.36	41.5	458	170	197	204	165	26.7	20.5	7.49	741
MAX	24	14	168	4140	457	1150	848	1480	38	48	67	5270
MIN	7.2	7.2	9.0	22	101	99	101	27	22	4.2	2.5	5.8
CFM	.03	.03	.14	1.58	.59	.68	.70	.57	.09	.07	.03	2.56
IN.	.04	.04	.17	1.83	.61	.79	.79	.66	.10	.08	.03	2.86

02077500 HYCO RIVER NEAR DENNISTON, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1965 - 1999, BY WATER YEAR (WY) [REGULATED, UNADJUSTED]

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	115	125	202	484	510	600	368	217	112	131	103	167
MAX	805	786	815	1692	1364	1683	1048	1332	647	1492	420	1341
(WY)	1972	1973	1973	1978	1998	1993	1983	1978	1982	1975	1995	1996
MIN	9.04	9.36	21.1	28.5	62.1	44.6	38.7	26.2	17.2	15.8	7.49	11.1
(WY)	1999	1999	1966	1966	1991	1981	1981	1986	1986	1966	1999	1998

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR	WATER YEARS 1965 - 1999
ANNUAL TOTAL	142724.8	62031.8	
ANNUAL MEAN	391	170	260
HIGHEST ANNUAL MEAN			536
LOWEST ANNUAL MEAN			37.1
HIGHEST DAILY MEAN	8370	Mar 21	5270
LOWEST DAILY MEAN	6.6	Sep 29	2.5
ANNUAL SEVEN-DAY MINIMUM	7.2	Sep 27	3.4
INSTANTANEOUS PEAK FLOW			5530
INSTANTANEOUS PEAK STAGE			18.31
INSTANTANEOUS LOW FLOW			2.1
ANNUAL RUNOFF (CFSM)	1.35	.59	.90
ANNUAL RUNOFF (INCHES)	18.37	7.98	12.22
10 PERCENT EXCEEDS	1450	307	613
50 PERCENT EXCEEDS	48	32	73
90 PERCENT EXCEEDS	8.3	6.9	20



## ROANOKE RIVER BASIN

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 mi<sup>2</sup>, approximately.

PERIOD OF RECORD.--July 1950 to current year.

GAGE.--Water-stage recorder. Datum of gage is at sea level.

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, water supply, 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, 1,630,300 acre-ft, Apr. 18, elevation, 302.75 ft; minimum, 1,149,240 acre-ft, Sep. 2, elevation, 292.44 ft.

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MONTHEND ELEVATION AND CONTENTS AT 2400, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

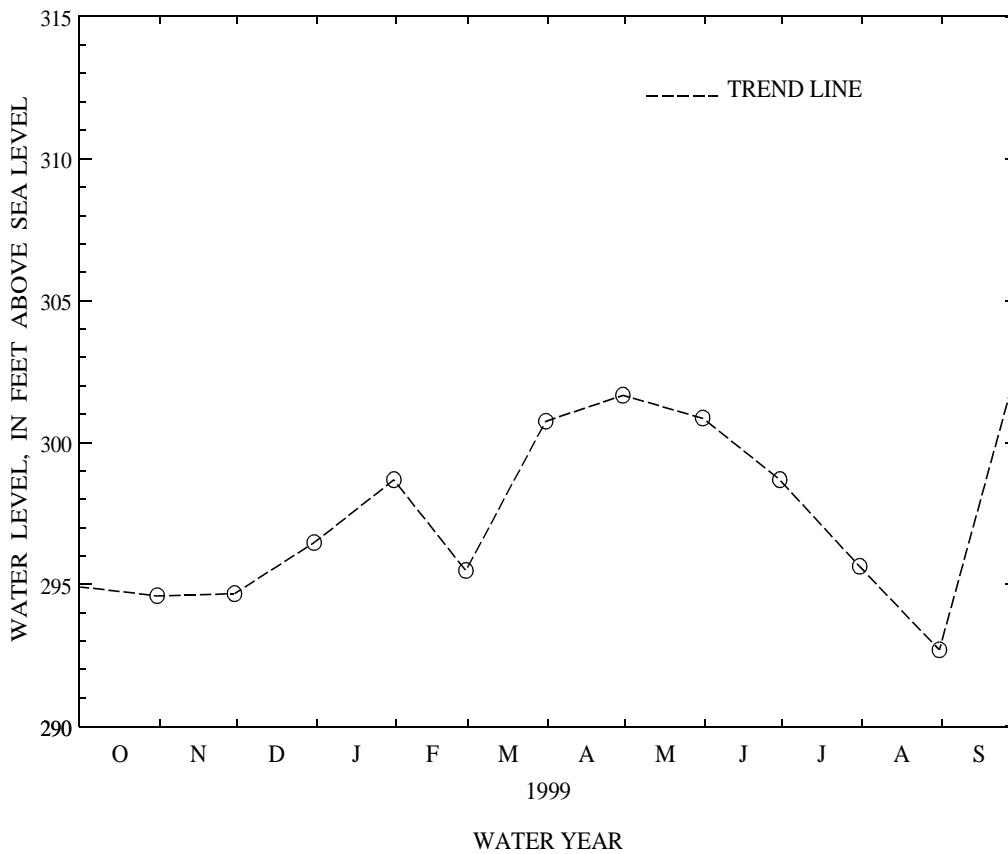
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Date	Elevation (feet)	Contents (acre-feet)	Change in contents (acre-feet)
Sept. 30.....	294.93	1,252,910	-
Oct. 31.....	294.60	1,238,820	-14,090
Nov. 30.....	294.68	1,242,240	+3,416
Dec. 31.....	296.48	1,321,600	+79,360
CAL YR 1998.....			+8,590
Jan. 31.....	298.69	1,424,680	+103,090
Feb. 28.....	295.49	1,277,460	-147,220
Mar. 31.....	300.75	1,526,480	+249,020
Apr. 30.....	301.67	1,573,670	+47,200
May 31.....	300.86	1,532,030	-41,640
June 30.....	298.69	1,424,680	-107,350
July 31.....	295.64	1,284,060	-140,620
Aug. 31.....	292.70	1,159,670	-124,390
Sept. 30.....	302.60	1,622,380	+462,710
WTR YR 1999.....			+369,470

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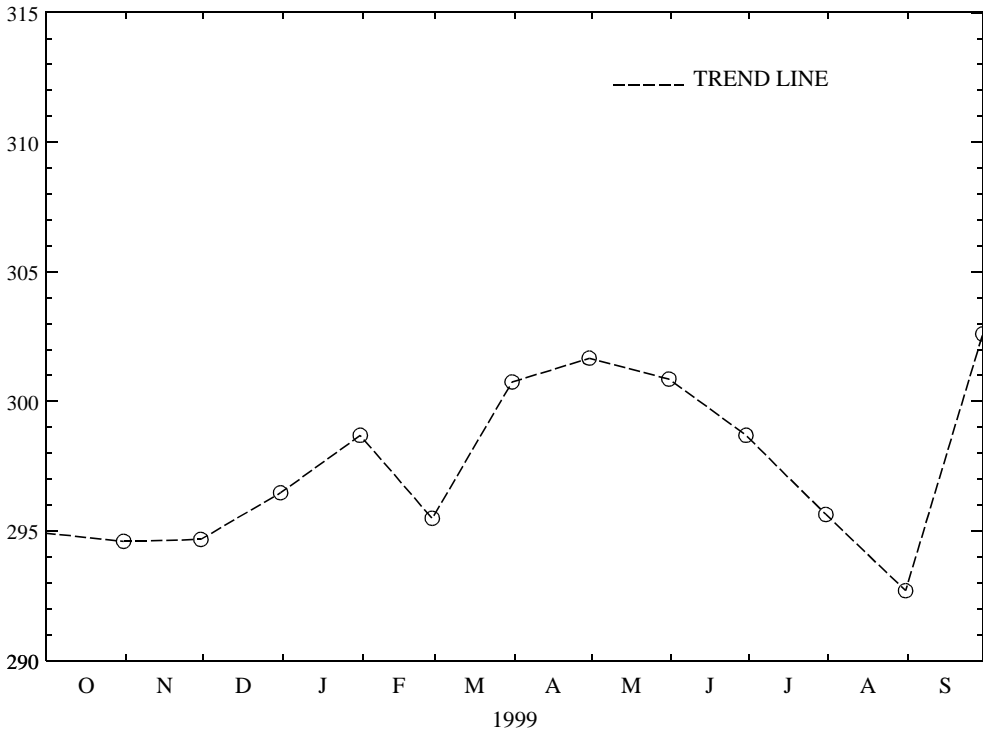
ROANOKE RIVER BASIN

02079490 JOHN H. KERR RESERVOIR NEAR BOYDTON, VA--Continued





WATER LEVEL, IN FEET ABOVE SEA LEVEL



## 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 of Bear Creek, and 4 mi southeast of Jefferson.

DRAINAGE AREA.--205 mi<sup>2</sup>.

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 sea level. 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. Satellite telemetry at station.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Maximum discharge for period of record, from rating curve extended above 14,000 ft<sup>3</sup>/s on basis of slope-area measurement of peak flow. Minimum discharge for period of record result of freezeup. Minimum discharge for current water year also occurred Sept. 26.

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 ft<sup>3</sup>/s.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	160	145	136	e194	363	510	371	627	181	239	168	126
2	156	144	135	e191	669	416	455	453	181	323	e180	120
3	151	147	133	e367	525	430	338	380	191	348	e162	116
4	146	151	135	e490	434	521	314	340	195	343	e155	115
5	151	146	134	e275	381	e452	299	317	175	266	145	124
6	172	145	136	e233	346	e443	287	320	166	233	140	158
7	204	146	135	e226	332	e429	278	347	161	245	134	201
8	520	141	144	e243	329	e420	270	318	157	390	132	139
9	428	142	162	e393	305	407	266	331	155	280	133	122
10	232	145	166	e615	299	394	260	284	164	235	138	116
11	196	220	151	e376	284	370	255	270	229	251	131	111
12	179	300	151	e310	278	356	269	259	317	394	124	107
13	170	186	980	e290	276	339	244	256	187	854	122	105
14	166	163	662	293	e268	367	238	387	166	455	130	105
15	160	156	316	930	e264	451	271	370	159	357	171	108
16	158	157	244	697	250	457	327	294	179	337	130	123
17	158	152	214	447	252	416	267	271	342	303	121	115
18	157	145	200	423	423	415	245	281	243	282	117	101
19	155	141	194	463	465	418	240	351	185	346	110	98
20	154	141	205	373	401	391	239	345	170	241	140	101
21	150	142	214	328	e393	390	229	273	171	222	173	106
22	148	140	192	306	e367	401	222	257	176	213	146	108
23	146	138	182	838	e342	356	219	248	170	222	146	100
24	147	138	248	1700	e318	344	216	236	168	197	197	98
25	148	138	418	1060	e298	339	220	230	202	270	383	93
26	148	143	277	667	294	320	216	222	319	251	507	92
27	147	145	232	528	294	309	234	217	391	195	234	121
28	147	140	213	450	359	297	426	205	430	181	171	374
29	146	135	206	402	---	287	433	196	308	179	151	552
30	147	135	202	366	---	280	613	190	251	174	141	352
31	146	---	e197	340	---	273	---	185	---	175	130	---
TOTAL	5593	4607	7314	14814	9809	11998	8761	9260	6489	9001	5162	4407
MEAN	180	154	236	478	350	387	292	299	216	290	167	147
MAX	520	300	980	1700	669	521	613	627	430	854	507	552
MIN	146	135	133	191	250	273	216	185	155	174	110	92
CFSM	.88	.75	1.15	2.33	1.71	1.89	1.42	1.46	1.06	1.42	.81	.72
IN.	1.01	.84	1.33	2.69	1.78	2.18	1.59	1.68	1.18	1.63	.94	.80

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1925 - 1999, BY WATER YEAR (WY)

	361	406	409	478	523	593	566	463	392	333	355	325
MEAN	361	406	409	478	523	593	566	463	392	333	355	325
MAX	901	1889	797	1346	1173	1316	1350	1052	1036	904	2613	1212
(WY)	1991	1978	1958	1995	1998	1979	1983	1973	1992	1941	1940	1979
MIN	117	124	146	140	197	222	236	220	158	111	93.7	99.5
(WY)	1955	1932	1934	1940	1934	1988	1986	1941	1988	1930	1925	1954

SUMMARY STATISTICS

FOR 1998 CALENDAR YEAR

FOR 1999 WATER YEAR

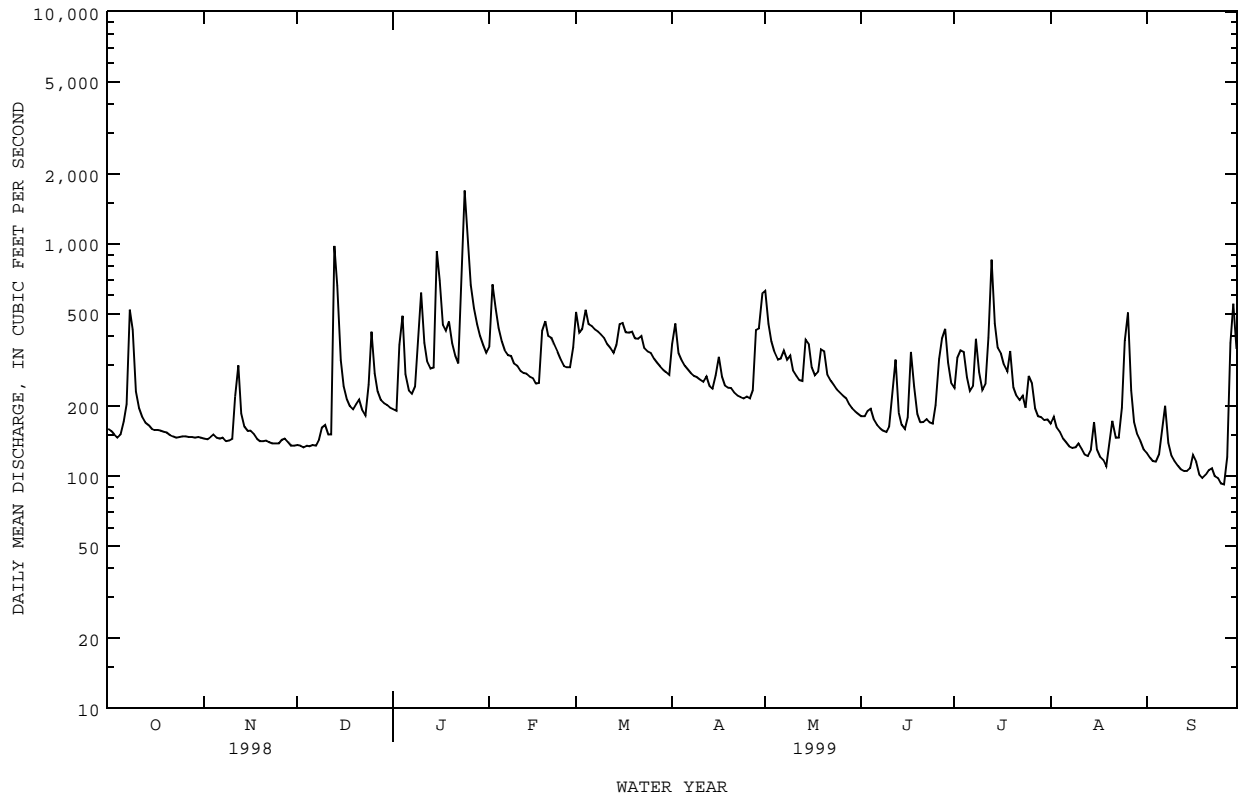
WATER YEARS 1925 - 1999

ANNUAL TOTAL	190878	97215	
ANNUAL MEAN	523	266	433
HIGHEST ANNUAL MEAN			669
LOWEST ANNUAL MEAN			233
HIGHEST DAILY MEAN	6480	Jan 8	1700
LOWEST DAILY MEAN	133	Dec 3	92
ANNUAL SEVEN-DAY MINIMUM	135	Nov 29	100
INSTANTANEOUS PEAK FLOW			2650
INSTANTANEOUS PEAK STAGE			5.34
INSTANTANEOUS LOW FLOW			90*
ANNUAL RUNOFF (CFSM)	2.55	1.30	2.11
ANNUAL RUNOFF (INCHES)	34.64	17.64	28.69
10 PERCENT EXCEEDS	974	429	715
50 PERCENT EXCEEDS	366	232	349
90 PERCENT EXCEEDS	147	134	171

e Estimated.

\* See REMARKS.

03161000 SOUTH FORK NEW RIVER NEAR JEFFERSON, NC--Continued



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 mi<sup>2</sup>.

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 sea level.

REMARKS.--Records good except for period with ice effect, Jan. 1-16, which is fair. American Electric Power gage-height transmitter at station, recorder at Roanoke. National Weather Service gage-height telemeter at station. U.S. Army Corps of Engineers satellite precipitation and gage-height telemeter at station. Maximum discharge, 141,000 ft<sup>3</sup>/s, from rating curve extended above 32,000 ft<sup>3</sup>/s on basis of computation of peak flow over dam at Fries 6 mi downstream and slope-area measurement of peak flow. Minimum discharge, 193 ft<sup>3</sup>/s, Jan. 9, 1956, gage height, 0.52 ft, result of freezeup. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 9,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Jan 5	0300	9,190	3.97	Jan 10	1830	*13,400	*4.97

Minimum discharge, 399 ft<sup>3</sup>/s, Aug 19-20, gage height, 0.69 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	676	606	594	e720	1310	2320	1320	3830	802	944	899	503
2	639	601	598	e600	2050	2310	1710	2900	794	823	841	485
3	591	607	597	e900	2370	2080	1560	2220	795	780	785	470
4	597	615	602	e1300	1940	2580	1310	1830	876	934	713	457
5	624	622	610	e1100	1640	2330	1190	1610	814	864	632	555
6	648	613	624	e960	1450	2210	1120	1500	763	737	565	1190
7	663	599	624	e900	1340	2410	1090	1520	734	673	529	1130
8	1910	587	650	e940	1300	2340	1040	1850	715	994	504	770
9	1510	600	816	e1200	1250	2100	1020	2400	697	1020	493	668
10	1140	614	828	e1900	1190	1980	1020	1910	673	794	498	589
11	823	708	728	e2000	1170	1850	1090	1600	705	816	509	533
12	732	838	685	e1500	1100	1700	1260	1430	740	1200	480	505
13	690	841	2010	e1450	1090	1570	1120	1360	819	2280	462	487
14	663	733	3850	e1400	1010	1620	1030	2270	722	2110	463	473
15	648	671	1660	e1700	951	2050	1110	2220	663	1320	471	472
16	635	644	1050	e3500	950	2260	1610	1780	661	1080	492	471
17	629	640	882	2440	973	2160	1500	1460	776	993	482	460
18	623	628	807	1850	1570	2180	1290	1360	957	951	435	455
19	624	623	761	1810	2100	2280	1180	2540	836	951	410	450
20	622	618	754	1640	1900	2180	1130	1900	712	914	632	449
21	615	617	775	1420	1660	2120	1090	1530	692	790	1160	456
22	609	613	782	1270	1510	2100	1030	1280	704	790	704	473
23	594	619	743	1750	1330	1900	971	1190	679	836	556	492
24	595	617	866	6830	1270	1740	953	1120	659	746	550	465
25	603	609	1190	5610	1240	1640	968	1060	660	859	633	446
26	603	617	1190	3500	1220	1520	955	1020	844	971	1670	436
27	610	625	972	2490	1180	1420	1110	971	983	842	1330	461
28	610	627	876	1970	1320	1330	1790	925	1090	724	826	691
29	615	616	848	1670	---	1250	2880	887	1120	755	650	1150
30	614	602	820	1470	---	1180	3620	853	877	805	577	1930
31	612	---	792	1310	---	1120	---	831	---	824	533	---
TOTAL	22367	19170	29584	59100	39384	59830	40067	51157	23562	30120	20484	18572
MEAN	722	639	954	1906	1407	1930	1336	1650	785	972	661	619
MAX	1910	841	3850	6830	2370	2580	3620	3830	1120	2280	1670	1930
MIN	591	587	594	600	950	1120	953	831	659	673	410	436
CFSM	.64	.56	.84	1.69	1.24	1.71	1.18	1.46	.69	.86	.58	.55
IN.	.74	.63	.97	1.94	1.30	1.97	1.32	1.68	.77	.99	.67	.61

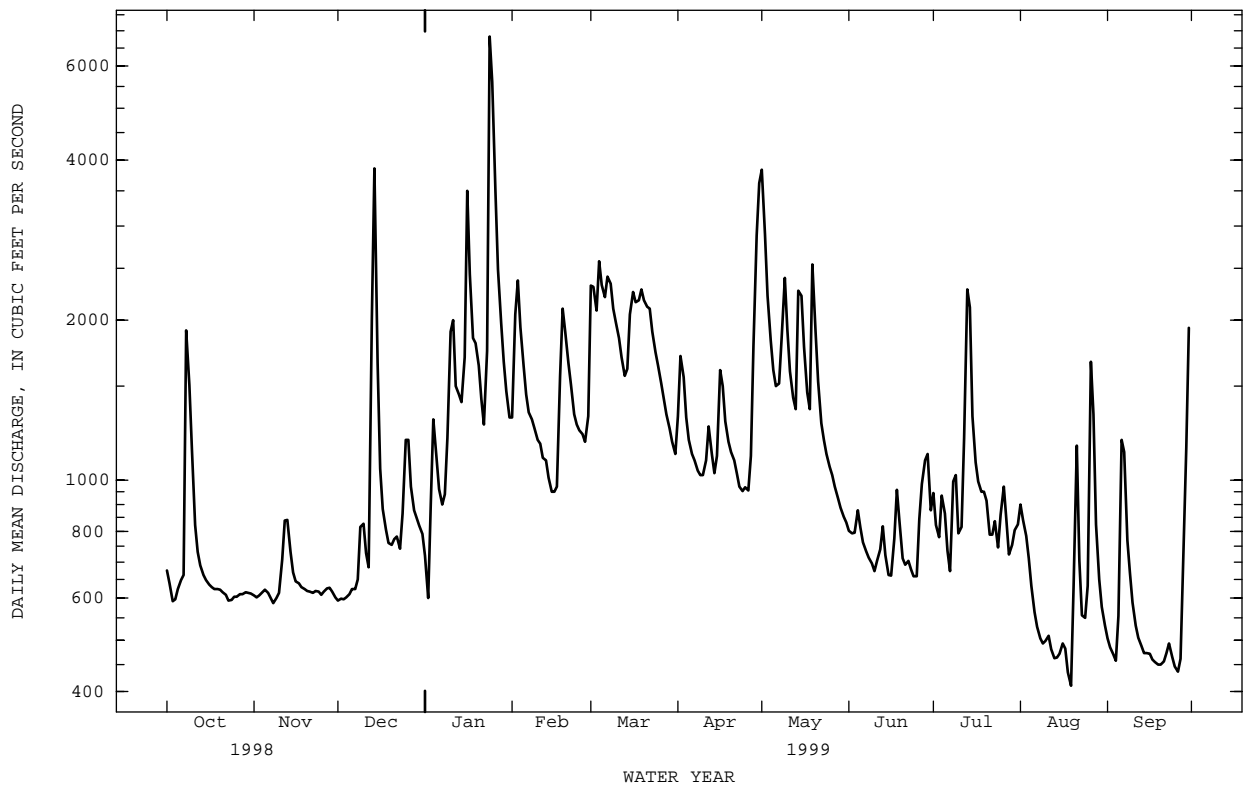
03164000 NEW RIVER NEAR GALAX, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1930 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	1398	1628	1822	2245	2612	2917	2640	2157	1706	1375	1372	1235
MAX	3625	7189	4005	5744	5566	5827	6345	4469	5280	4017	8148	4827
(WY)	1977	1978	1962	1995	1998	1993	1987	1973	1992	1949	1940	1989
MIN	435	504	592	568	630	958	1017	811	614	426	453	381
(WY)	1954	1954	1956	1956	1934	1988	1942	1941	1988	1930	1988	1954

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR	WATER YEARS 1930 - 1999
ANNUAL TOTAL	889710	413397	
ANNUAL MEAN	2438	1133	1922
HIGHEST ANNUAL MEAN			2807
LOWEST ANNUAL MEAN			1034
HIGHEST DAILY MEAN	18300	Apr 20	6830
LOWEST DAILY MEAN	587	aSep 29	410
ANNUAL SEVEN-DAY MINIMUM	603	Nov 29	459
INSTANTANEOUS PEAK FLOW			8040
INSTANTANEOUS PEAK STAGE			3.66
INSTANTANEOUS LOW FLOW			399
ANNUAL RUNOFF (CFSM)	2.16	1.00	1.70
ANNUAL RUNOFF (INCHES)	29.26	13.60	23.09
10 PERCENT EXCEEDS	4920	2060	3460
50 PERCENT EXCEEDS	1540	887	1460
90 PERCENT EXCEEDS	616	553	670

- a Also Nov 8, 1998.
- b From floodmark.
- c Also Aug 20, 1999.
- d Result of freezeup.
- e Estimated.



KANAWHA RIVER BASIN

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 mi<sup>2</sup>.

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 sea level. 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 for period with ice effect, Jan. 1-6, which is fair. Maximum discharge, 6,980 ft<sup>3</sup>/s, from rating curve extended above 2,200 ft<sup>3</sup>/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. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

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 ft<sup>3</sup>/s, by contracted-opening measurement.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 850 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Oct 8	0545	*891	*3.31	No other peak greater than base discharge.			

Minimum discharge, 13 ft<sup>3</sup>/s, Aug 18-20, gage height, 1.18 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	63	36	29	e33	73	50	74	60	32	47	19	19
2	48	36	29	e31	112	46	57	50	32	35	21	18
3	46	37	29	e35	78	65	50	45	32	33	19	17
4	47	40	29	e58	67	71	48	42	30	37	18	17
5	49	37	30	e52	62	63	45	41	30	27	18	98
6	49	35	31	e50	59	74	44	41	29	25	17	69
7	67	35	29	46	58	72	43	46	28	24	16	32
8	336	35	34	42	55	57	42	78	27	26	16	26
9	71	35	52	68	55	56	42	45	26	23	18	47
10	54	36	34	60	55	54	42	41	26	22	16	42
11	48	52	31	53	53	53	54	38	32	26	16	27
12	44	36	33	46	57	51	45	36	29	46	15	24
13	42	33	297	49	58	49	41	36	27	54	15	23
14	41	33	77	52	52	61	39	167	26	48	16	22
15	41	32	51	116	51	93	53	68	25	42	16	22
16	41	31	44	67	50	78	50	52	28	32	15	23
17	41	31	39	55	54	68	42	47	33	28	15	20
18	41	31	36	67	116	60	41	46	27	28	14	20
19	41	31	36	56	71	54	40	142	25	29	14	20
20	42	31	36	50	63	52	39	66	26	25	50	20
21	41	31	34	47	56	78	38	54	28	25	27	22
22	38	30	34	45	51	63	38	50	29	24	22	22
23	38	30	33	139	48	56	37	47	26	23	20	20
24	39	30	57	232	50	53	37	43	25	27	21	20
25	39	30	48	105	49	51	36	40	31	30	48	19
26	39	31	42	81	48	49	39	40	58	23	31	19
27	37	29	40	71	49	47	41	38	33	21	25	36
28	38	29	39	65	56	45	51	36	33	20	22	87
29	39	29	39	61	---	44	70	35	28	25	21	134
30	38	29	36	58	---	43	102	34	26	22	20	148
31	38	---	34	55	---	43	---	33	---	21	19	---
TOTAL	1676	1001	1442	2045	1706	1799	1420	1637	887	918	640	1133
MEAN	54.1	33.4	46.5	66.0	60.9	58.0	47.3	52.8	29.6	29.6	20.6	37.8
MAX	336	52	297	232	116	93	102	167	58	54	50	148
MIN	37	29	29	31	48	43	36	33	25	20	14	17
CFSM	1.37	.85	1.18	1.67	1.55	1.47	1.20	1.34	.75	.75	.52	.96
IN.	1.58	.95	1.36	1.93	1.61	1.70	1.34	1.55	.84	.87	.60	1.07

03165000 CHESTNUT CREEK AT GALAX, VA--Continued

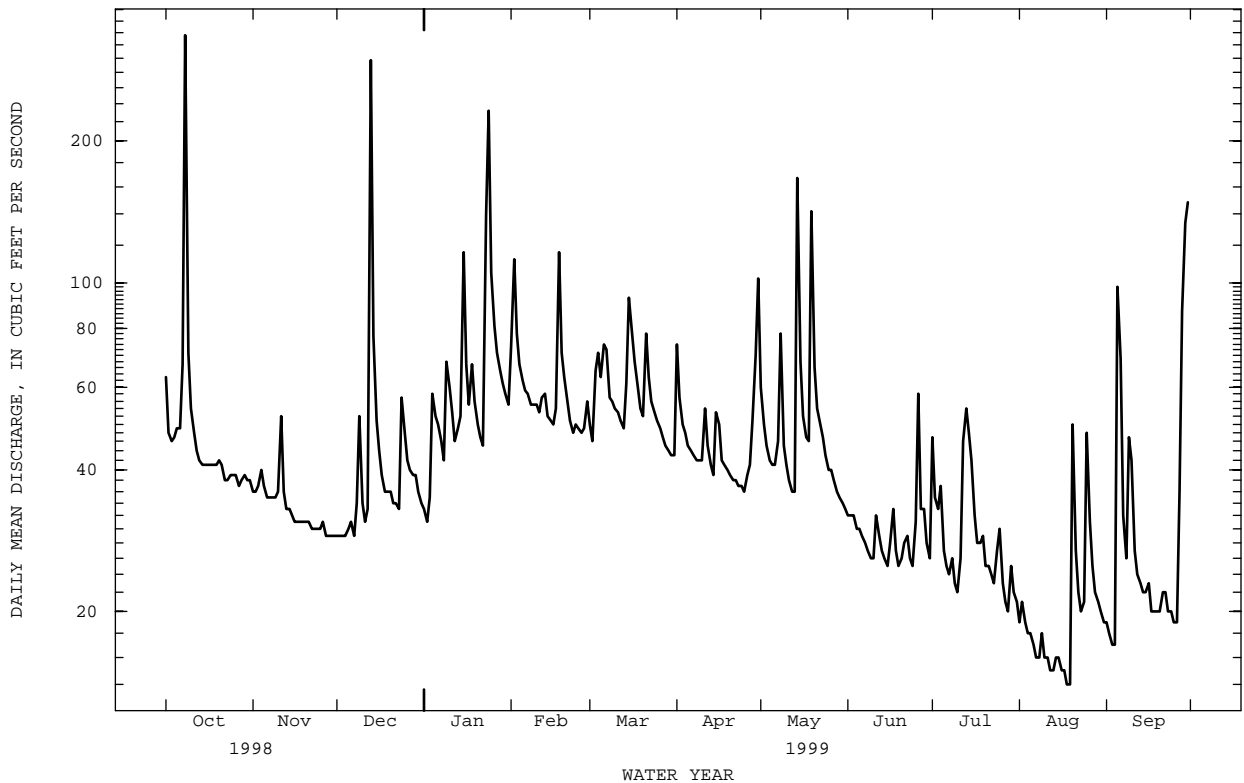
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1945 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	59.1	62.9	64.9	72.0	82.6	94.8	90.8	75.9	67.0	52.0	49.3	53.7
MAX (WY)	197	157	112	161	166	301	233	160	172	150	156	254
MIN (WY)	1948	1980	1958	1995	1998	1993	1983	1973	1992	1989	1949	1989
MIN (WY)	19.8	27.3	25.8	23.9	35.9	38.1	37.4	34.2	25.5	20.7	15.6	18.6
(WY)	1964	1982	1964	1956	1989	1988	1989	1956	1988	1986	1981	1954

SUMMARY STATISTICS FOR 1998 CALENDAR YEAR FOR 1999 WATER YEAR WATER YEARS 1945 - 1999

ANNUAL TOTAL	29237	16304	
ANNUAL MEAN	80.1	44.7	68.6
HIGHEST ANNUAL MEAN			107 1993
LOWEST ANNUAL MEAN			37.3 1981
HIGHEST DAILY MEAN	1290	Jan 8	2050 Apr 21 1992
LOWEST DAILY MEAN	29	aAug 7	12 Aug 26 1981
ANNUAL SEVEN-DAY MINIMUM	29	Nov 27	13 Aug 23 1981
INSTANTANEOUS PEAK FLOW			6980 Oct 17 1947
INSTANTANEOUS PEAK STAGE			c14.40 Oct 17 1947
INSTANTANEOUS LOW FLOW			12 dAug 25 1981
ANNUAL RUNOFF (CFSM)	2.03	1.13	1.74
ANNUAL RUNOFF (INCHES)	27.60	15.39	23.67
10 PERCENT EXCEEDS	129	67	109
50 PERCENT EXCEEDS	55	39	52
90 PERCENT EXCEEDS	33	21	28

- a Also Nov 27 to Dec 4, and Dec 7, 1998.
- b Also Aug 19, 1999.
- c From floodmark, site and datum then in use.
- d Also Aug 19-20, 1999.
- e Estimated.
- f Also part or all of each day Aug 26-30, 1981.



KANAWHA RIVER BASIN

03165500 NEW RIVER AT IVANHOE, VA

LOCATION.--Lat 36°50'05", long 80°57'10", Wythe County, Hydrologic Unit 05050001, on left bank at Ivanhoe, 2.1 mi downstream from Big Branch, and 2.3 mi upstream from Cripple Creek.

DRAINAGE AREA.--1,340 mi<sup>2</sup>.

PERIOD OF RECORD.--August to December 1927, October 1929 to September 1978, October 1978 to September 1982 (annual maximum only), February 1996 to present. Monthly discharge only for some periods, published in WSP 1305. Gage-height records collected in vicinity, October 1916 to July 1943, are contained in reports of the National Weather Service.

REVISED RECORDS.--WSP 783: Drainage area, 1933(M).

GAGE.--Water-stage recorder. Datum of gage is 1,943.09 ft above sea level.

REMARKS.--Records good except for period of no gage-height record Nov. 13-14, which is fair. Large diurnal fluctuation and some regulation caused by powerplants at Buck 2.8 mi upstream and at Byllesby 5.5 mi upstream. Maximum discharge, 155,000 ft<sup>3</sup>/s, from rating curve extended above 32,000 ft<sup>3</sup>/s on basis of flood records for other stations on New River. Minimum gage height, 0.59 ft, Oct. 11, 1965. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in July 1916 reached a stage of 34.8 ft, from floodmark, discharge, 132,000 ft<sup>3</sup>/s, from rating curve extended as explained above. Flood in September 1878 was about 5 ft lower than flood in July 1916 and was the highest known from 1840 to 1916.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 13,500 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Jan 24	2245	*7,870	*6.20	No peak greater than base discharge.			

Minimum discharge, 245 ft<sup>3</sup>/s, Sep 2, gage height, 1.36 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	777	702	673	814	1640	2290	1610	3690	991	1250	990	489
2	784	695	681	611	2290	2570	1950	3120	984	1080	932	442
3	661	713	658	1500	2610	2390	1860	2490	935	1000	913	429
4	682	717	639	1830	2320	2760	1660	2140	986	1120	751	392
5	685	763	663	1420	2000	2650	1500	1910	1040	1130	753	864
6	748	956	688	1230	1830	2490	1400	1770	898	873	622	1480
7	764	707	747	1150	1730	2640	1390	1660	813	831	576	1480
8	2340	663	730	1210	1640	2680	1360	2100	815	916	756	924
9	2040	706	1060	1590	1830	2400	1350	2530	837	1320	550	814
10	1660	705	1040	2390	1580	2240	1330	2130	724	1020	450	751
11	1120	836	937	2560	1240	2120	1430	1850	752	940	355	573
12	865	979	789	1880	1430	1940	1470	1720	854	1430	464	515
13	864	e900	1940	1880	1460	1820	1460	1600	903	2160	475	482
14	794	e770	3780	1700	1330	1890	1340	3170	896	2390	591	451
15	766	808	2330	2300	1280	2340	1360	2810	704	1760	269	499
16	733	746	1490	4040	1270	2580	1740	2240	752	1370	508	436
17	765	711	1150	2830	1290	2560	1750	1840	841	1260	500	406
18	837	718	1080	2190	2070	2490	1560	1690	1080	1260	438	410
19	893	709	916	2120	2440	2490	1440	2660	1080	1490	371	408
20	582	709	967	1960	2260	2500	1420	2360	834	1020	562	403
21	518	712	942	1770	2040	2430	1340	1930	800	1030	1280	405
22	679	674	938	1640	1890	2440	1290	1650	777	959	966	431
23	678	685	957	2130	1760	2210	1230	1530	791	969	611	450
24	669	680	1090	6020	1650	1990	1230	1480	738	828	562	456
25	691	714	1370	6210	1640	1920	1160	1280	734	1030	783	415
26	688	663	1620	3860	1590	1830	1200	1330	986	1170	1450	355
27	693	690	1350	2810	1580	1770	1260	1250	1210	1020	1700	464
28	685	711	1150	2350	1630	1630	1700	1220	1270	851	1060	795
29	711	711	1110	2050	---	1600	2720	1090	1330	849	722	1300
30	739	683	997	1870	---	1510	3370	1070	1050	826	615	2390
31	725	---	963	1710	---	1480	---	1030	---	863	552	---
TOTAL	26836	22136	35445	69625	49320	68650	46880	60340	27405	36015	22127	20109
MEAN	866	738	1143	2246	1761	2215	1563	1946	914	1162	714	670
MAX	2340	979	3780	6210	2610	2760	3370	3690	1330	2390	1700	2390
MIN	518	663	639	611	1240	1480	1160	1030	704	826	269	355
CFSM	.65	.55	.85	1.68	1.31	1.65	1.17	1.45	.68	.87	.53	.50
IN.	.74	.61	.98	1.93	1.37	1.91	1.30	1.68	.76	1.00	.61	.56



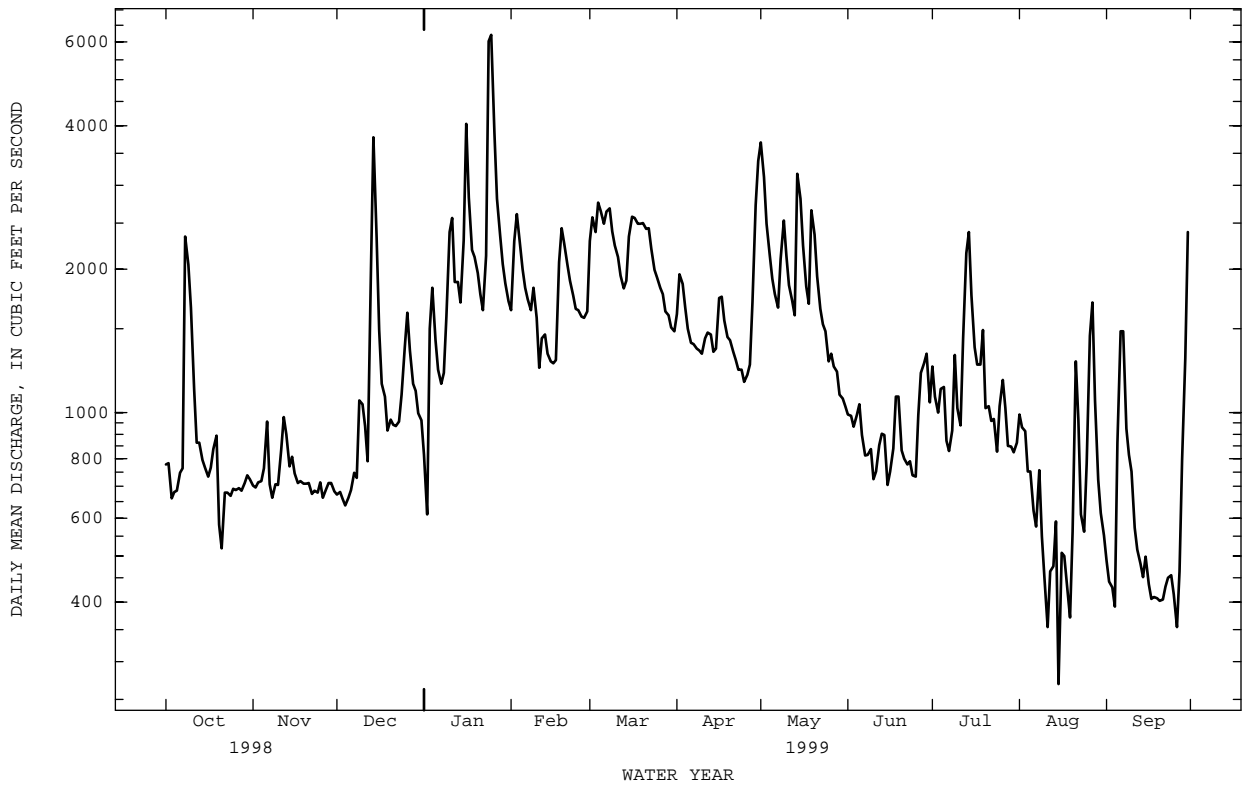
03165500 NEW RIVER AT IVANHOE, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1930 - 1978, 1996\*\*, 1997 - 1999 BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	1629	1797	2035	2498	2939	3212	2910	2391	1893	1546	1596	1356
MAX	4200	7149	4248	5052	6106	6266	5993	5000	4511	4440	8953	4499
(WY)	1930	1978	1962	1937	1998	1975	1960	1998	1976	1949	1940	1945
MIN	491	578	703	678	693	1450	1289	991	817	485	606	433
(WY)	1931	1932	1940	1940	1934	1931	1942	1941	1930	1930	1956	1954

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR	WATER YEARS 1930 - 1978 1996** 1997 - 1999
ANNUAL TOTAL	998030	484888	
ANNUAL MEAN	2734	1328	2140
HIGHEST ANNUAL MEAN			3188
LOWEST ANNUAL MEAN			1285
HIGHEST DAILY MEAN	20800	Apr 20	87600
LOWEST DAILY MEAN	518	Oct 21	184
ANNUAL SEVEN-DAY MINIMUM	644	Oct 20	343
INSTANTANEOUS PEAK FLOW			155000
INSTANTANEOUS PEAK STAGE		6.20	a38.1
INSTANTANEOUS LOW FLOW		245	44
ANNUAL RUNOFF (CFSM)	2.04	.99	1.60
ANNUAL RUNOFF (INCHES)	27.71	13.46	21.70
10 PERCENT EXCEEDS	5370	2390	3810
50 PERCENT EXCEEDS	1900	1110	1700
90 PERCENT EXCEEDS	706	580	742

\*\* Partial water year.  
a From floodmark.  
e Estimated.



KANAWHA RIVER BASIN

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 mi<sup>2</sup>.

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. WDR VA-92-1: 1984-86(P), 1987, 1988-89(P), 1990-91.

GAGE.--Water-stage recorder. Datum of gage is 1,924.65 ft above sea level. 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 for periods with ice effect, Jan. 4-7, which is fair. Occasional diurnal fluctuation at low flow caused by mills upstream from station. Maximum discharge, 17,500 ft<sup>3</sup>/s, from rating curve extended above 7,600 ft<sup>3</sup>/s on basis of velocity-area study and slope-area measurement at gage heights 11.4 ft and 10.01 ft, respectively. Minimum discharge observed, about 5 ft<sup>3</sup>/s, Dec. 22, 1909, gage height, 0.49 ft, present datum, result of freezeup. 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 Department of Environmental Quality - Water Division.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,300 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
May 14	2130	*1,960	*4.23	No peak greater than base discharge.			

Minimum discharge, 41 ft<sup>3</sup>/s, Sep 17-19, 26.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	87	76	66	66	140	249	140	383	114	83	64	54
2	82	74	67	67	170	264	143	293	109	76	62	54
3	80	75	63	116	211	241	133	238	106	72	59	55
4	88	79	64	e135	201	282	127	202	99	69	58	52
5	92	77	65	e100	185	272	122	181	98	67	57	79
6	86	77	68	e86	165	314	118	167	96	66	55	165
7	87	72	67	e98	155	430	113	158	93	63	58	96
8	130	75	71	90	153	382	109	761	89	63	53	69
9	103	73	92	123	144	305	110	620	86	61	58	62
10	93	72	91	158	137	273	116	351	84	63	57	56
11	88	73	77	135	129	237	325	260	85	77	55	55
12	83	75	70	123	122	210	677	211	83	118	54	53
13	81	74	103	105	119	196	374	186	81	153	52	52
14	78	72	125	103	111	204	271	1250	79	111	64	51
15	79	73	106	454	106	324	249	1210	78	91	63	52
16	77	72	84	411	102	458	279	623	80	80	60	52
17	77	72	76	205	101	601	259	422	96	77	55	51
18	78	68	70	155	146	648	230	348	89	77	53	49
19	76	67	68	144	190	505	202	627	80	78	52	48
20	77	69	68	139	202	373	185	347	78	69	61	50
21	77	70	66	122	184	315	168	268	80	71	59	60
22	75	69	66	107	167	277	153	232	79	70	56	58
23	75	69	66	206	153	235	141	212	76	66	59	54
24	75	71	79	731	143	213	132	191	74	69	54	50
25	72	64	82	618	142	198	125	176	74	79	93	50
26	76	72	76	336	138	181	124	163	80	78	122	47
27	73	72	70	245	130	167	129	150	79	70	85	60
28	75	71	68	201	150	156	204	139	75	66	66	65
29	74	67	68	173	---	147	466	130	76	68	61	58
30	74	67	68	151	---	139	442	124	78	71	58	93
31	75	---	69	135	---	133	---	119	---	68	56	---
TOTAL	2543	2157	2339	6038	4196	8929	6366	10742	2574	2390	1919	1850
MEAN	82.0	71.9	75.5	195	150	288	212	347	85.8	77.1	61.9	61.7
MAX	130	79	125	731	211	648	677	1250	114	153	122	165
MIN	72	64	63	66	101	133	109	119	74	61	52	47
CFSM	.33	.29	.31	.79	.61	1.17	.86	1.40	.35	.31	.25	.25
IN.	.38	.32	.35	.91	.63	1.34	.96	1.62	.39	.36	.29	.28

KANAWHA RIVER BASIN

03167000 REED CREEK AT GRAHAMS FORGE, VA--Continued

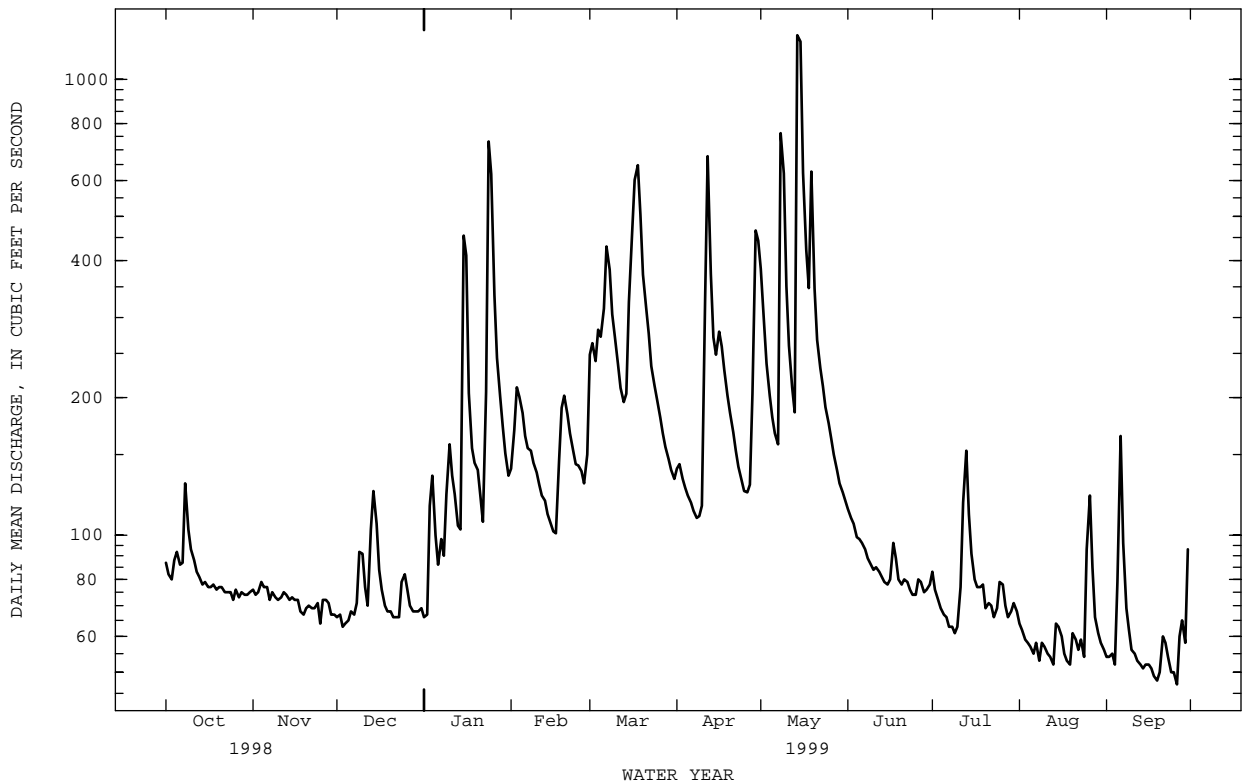
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1909 - 1916, 1927 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	141	162	242	357	462	510	419	324	209	155	139	116
MAX	626	606	790	911	1411	1406	1374	731	732	867	517	488
(WY)	1938	1930	1973	1936	1957	1955	1987	1958	1992	1916	1916	1989
MIN	45.3	50.7	59.9	61.2	63.5	120	100	91.4	74.6	63.5	60.5	51.4
(WY)	1942	1942	1942	1942	1934	1988	1942	1941	1941	1930	1930	1941

SUMMARY STATISTICS FOR 1998 CALENDAR YEAR FOR 1999 WATER YEAR WATER YEARS 1909 - 1916 1927 - 1999

ANNUAL TOTAL		112242		52043								
ANNUAL MEAN		308		143						269		
HIGHEST ANNUAL MEAN										424		1972
LOWEST ANNUAL MEAN										118		1941
HIGHEST DAILY MEAN				2100	Apr 20		1250	May 14		10600	Apr 5	1977
LOWEST DAILY MEAN				e63	Jan 1		47	Sep 26		22	Jan 30	1934
ANNUAL SEVEN-DAY MINIMUM				66	Nov 29		50	Sep 14		33	Feb 24	1942
INSTANTANEOUS PEAK FLOW							1960	May 14		17500	Jul 16	1916
INSTANTANEOUS PEAK STAGE							4.23	May 14		a11.40	Jul 16	1916
INSTANTANEOUS LOW FLOW							41	bSep 17		c5.0	Dec 22	1909
ANNUAL RUNOFF (CFSM)			1.24				.58			1.09		
ANNUAL RUNOFF (INCHES)			16.90				7.84			14.78		
10 PERCENT EXCEEDS			786				275			542		
50 PERCENT EXCEEDS			142				86			159		
90 PERCENT EXCEEDS			72				58			74		

- a Present datum, from floodmarks.
- b Also Sep 18-19, 26, 1999.
- c Observed, result of freezeup.
- e Estimated.



KANAWHA RIVER BASIN

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 mi<sup>2</sup>.

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 sea level.

REMARKS.--Records good except those for period with ice effect, Jan. 7, and period of no gage-height record, Jul. 6-9, 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. American Electric Power gage-height transmitter at station. Maximum discharge, 185,000 ft<sup>3</sup>/s, from rating curve extended above 52,000 ft<sup>3</sup>/s on basis of flood records for other stations on New River. Minimum gage height, 0.47 ft, Sep. 7, 1930. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 17,500 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Jan 24	1645	*13,000	*4.71	No peak greater than base discharge.			

Minimum discharge, 586 ft<sup>3</sup>/s, Aug 15-16, gage height, 0.87 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1010	996	966	1120	2130	2780	2020	5280	1300	1450	1160	764
2	1030	981	962	997	3090	3490	2610	4450	1260	1650	1200	699
3	959	993	953	2350	3630	3220	2410	3420	1350	1360	1110	692
4	962	1010	923	2520	3240	4000	2160	2840	1250	1350	1040	661
5	1000	1030	942	1930	2680	3850	1940	2460	1310	1420	940	1430
6	993	1260	971	1460	2360	3670	1800	2270	1210	e1150	892	3180
7	1060	980	1020	e1400	2200	4070	1780	2190	1130	e1050	831	2050
8	3890	966	967	1560	2090	4050	1730	2960	1090	e1200	889	1460
9	3280	968	1520	1950	2130	3540	1700	3780	1080	e1700	897	1160
10	2110	988	1410	2670	2100	3170	1700	3040	1040	1320	721	1150
11	1490	1110	1260	3040	1750	2940	2030	2480	997	1210	694	974
12	1270	1360	1100	2340	1580	2620	2880	2240	1140	1560	664	837
13	1130	1230	2650	2340	1840	2440	2350	2040	1090	2600	696	813
14	1090	1050	5300	2070	1650	2460	2030	6180	1180	3110	932	763
15	1070	1090	3360	3100	1570	3360	1950	6740	1020	2260	620	780
16	1020	1060	1930	5710	1560	3960	2360	4060	991	1780	665	787
17	1020	993	1560	4040	1560	4180	2420	3080	1110	1450	748	742
18	1060	986	1310	2920	3000	4170	2240	2590	1230	1490	728	702
19	1270	986	1230	2700	3510	3990	1980	4140	1310	1880	619	701
20	996	988	1210	2510	3200	3690	1920	3870	1140	1250	696	704
21	764	1010	1210	2200	2740	3560	1830	2830	1080	1280	1320	727
22	970	989	1190	2000	2480	3690	1710	2420	1080	1130	1410	731
23	954	955	1210	2410	2200	3230	1660	2150	1070	1230	936	742
24	973	986	1300	9520	2100	2810	1590	2010	1030	1200	812	726
25	961	987	1690	9760	2150	2620	1580	1790	982	1450	1140	728
26	989	996	1900	5770	2020	2460	1550	1720	1170	1330	1680	648
27	975	994	1700	3900	2000	2320	1640	1670	1460	1280	2330	721
28	1010	987	1480	3160	2080	2180	1990	1570	1470	1140	1400	1200
29	999	979	1420	2700	---	2030	3660	1460	1660	1180	1100	1730
30	1010	974	1320	2380	---	1970	4870	1430	1510	1120	907	4180
31	1010	---	1250	2080	---	1910	---	1340	---	1110	824	---
TOTAL	38325	30882	47214	94607	64640	98430	64090	90500	35740	45690	30601	33182
MEAN	1236	1029	1523	3052	2309	3175	2136	2919	1191	1474	987	1106
MAX	3890	1360	5300	9760	3630	4180	4870	6740	1660	3110	2330	4180
MIN	764	955	923	997	1560	1910	1550	1340	982	1050	619	648
CFSM	.56	.47	.69	1.39	1.05	1.44	.97	1.33	.54	.67	.45	.50
IN.	.65	.52	.80	1.60	1.09	1.66	1.08	1.53	.60	.77	.52	.56

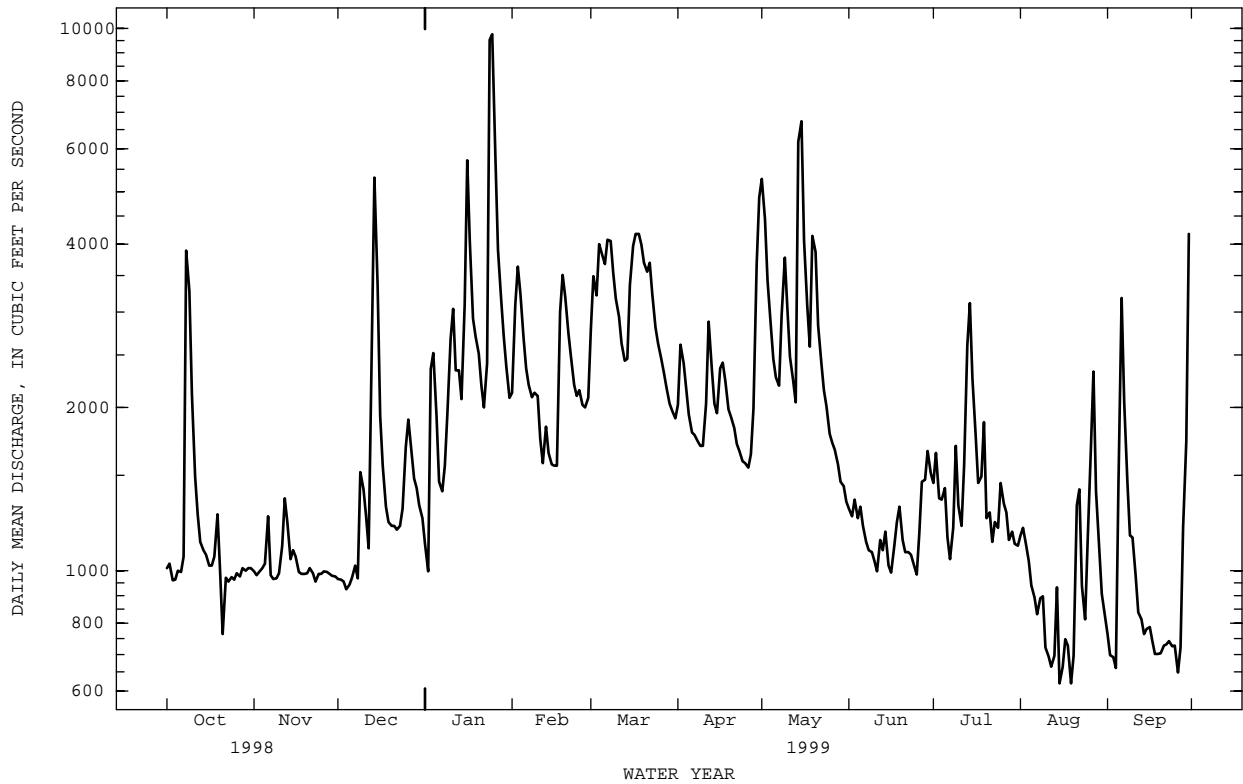
03168000 NEW RIVER AT ALLISONIA, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1930 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	2290	2598	2993	3809	4487	5052	4568	3743	2867	2264	2196	1997
MAX	6561	9597	6125	8600	9195	10870	11880	7736	8552	6230	11570	8448
(WY)	1990	1978	1962	1995	1998	1993	1987	1973	1992	1949	1940	1989
MIN	726	853	1007	1018	1041	1554	1685	1406	1067	744	850	743
(WY)	1931	1932	1966	1956	1934	1988	1942	1941	1988	1930	1988	1930

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR	WATER YEARS 1930 - 1999
ANNUAL TOTAL	1440727	673901	
ANNUAL MEAN	3947	1846	3232
HIGHEST ANNUAL MEAN			4761
LOWEST ANNUAL MEAN			1681
HIGHEST DAILY MEAN	32900	Apr 20	95000
LOWEST DAILY MEAN	764	Oct 21	453
ANNUAL SEVEN-DAY MINIMUM	941	Oct 21	555
INSTANTANEOUS PEAK FLOW			185000
INSTANTANEOUS PEAK STAGE			Aug 14 1940
INSTANTANEOUS LOW FLOW			Aug 14 1940
ANNUAL RUNOFF (CFSM)	1.79	.84	1.47
ANNUAL RUNOFF (INCHES)	24.34	11.38	19.94
10 PERCENT EXCEEDS	7880	3380	5820
50 PERCENT EXCEEDS	2510	1450	2420
90 PERCENT EXCEEDS	987	895	1100

a Also Aug 16, 1999.  
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 mi<sup>2</sup>.

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 at sea level (levels by Appalachian Power Company). Prior to Sep. 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 American Electric Power.

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MONTHEND ELEVATION AND CONTENTS AT 2400, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

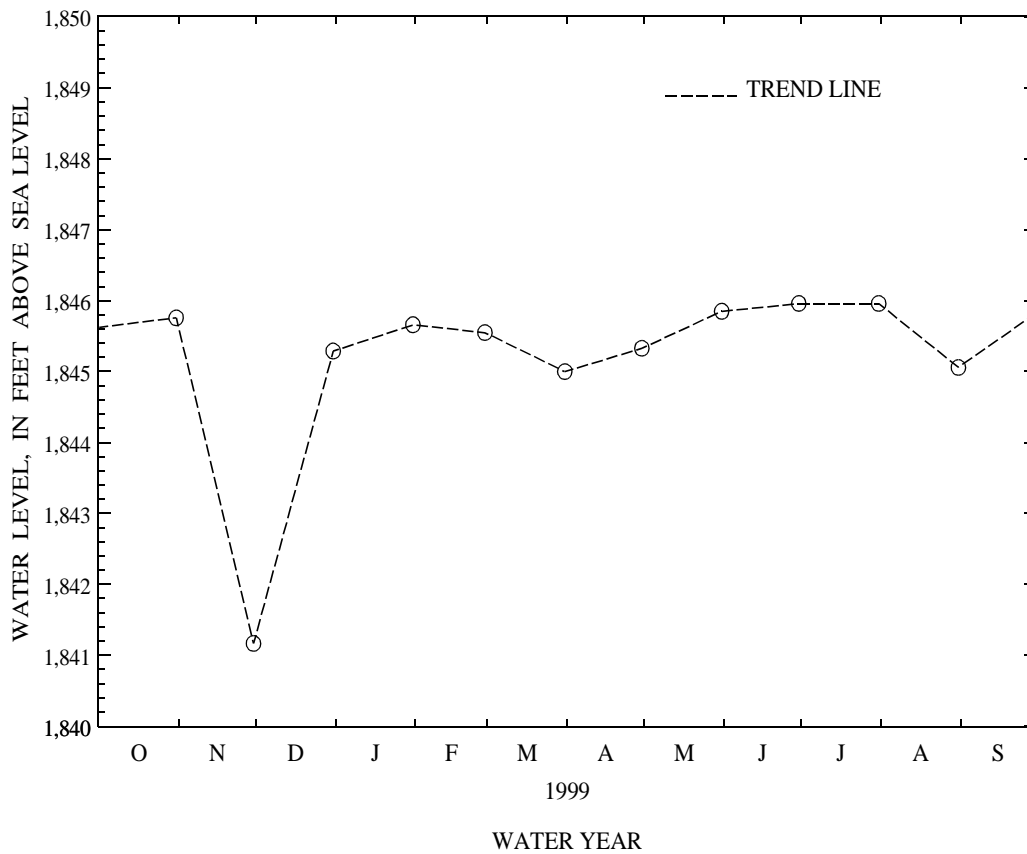
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Date	Elevation (feet)	Contents (acre-feet)	Change in contents (acre-feet)
Sep. 30.....	1,845.62	223,900	-
Oct. 31.....	1,845.76	224,500	+600
Nov. 30.....	1,841.17	204,800	-19,700
Dec. 31.....	1,845.29	222,500	+17,700
CAL YR 1998.....			+800
Jan. 31.....	1,845.66	224,100	+1,600
Feb. 28.....	1,845.55	223,600	-500
Mar. 31.....	1,845.00	221,200	-2,400
Apr. 30.....	1,845.33	222,600	+1,400
May 31.....	1,845.85	224,900	+2,300
Jun. 30.....	1,845.96	225,300	+400
Jul. 31.....	1,845.96	225,300	0
Aug. 31.....	1,845.06	221,500	-3,800
Sep. 30.....	1,845.82	224,700	+3,200
WTR YR 1999.....			+800

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KANAWHA RIVER BASIN

03169000 CLAYTOR RESERVOIR NEAR RADFORD, VA--Continued



## KANAWHA RIVER BASIN

03170000 LITTLE RIVER AT GRAYSONTOWN, 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 Graysontown, 7 mi south of Radford, and at mile 8.6.

DRAINAGE AREA.--300 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1928 to current year. Published as "at Grayson" prior to October 1990.

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 sea level. 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 period with ice effect, Jan. 3-5, period of doubtful gage-height record, Aug. 10-18, and period of no gage-height record, Aug. 25-27, which are fair. U.S. Army Corps of Engineers satellite gage-height telemeter at station. Maximum discharge, 22,800 ft<sup>3</sup>/s, from rating curve extended above 16,000 ft<sup>3</sup>/s on basis of slope-area measurements at gage heights 12.76 ft and 13.40 ft. Minimum discharge, 21 ft<sup>3</sup>/s, result of freezeup. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 3,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Sep 6	0100	*3,280	*4.13	No other peak greater than base discharge.			

Minimum discharge, 45 ft<sup>3</sup>/s, Aug 19-20, gage height, 0.73 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	117	129	129	129	239	252	252	273	143	108	109	55
2	115	129	129	116	393	230	329	230	161	110	98	52
3	107	129	127	e120	430	240	266	212	186	101	99	50
4	113	133	128	e250	316	380	240	202	155	89	94	48
5	130	144	129	e220	273	355	230	195	136	126	91	729
6	135	137	130	212	249	406	218	192	130	86	86	1870
7	131	131	132	244	238	512	213	191	125	81	83	646
8	489	129	142	238	236	395	207	272	121	80	79	268
9	458	130	269	297	222	337	204	346	115	96	79	180
10	206	132	264	559	210	320	216	223	109	80	e72	397
11	162	145	168	299	204	294	510	196	104	82	e66	236
12	147	192	149	265	203	292	895	186	103	140	e62	153
13	141	157	332	262	220	281	463	179	108	317	e60	128
14	137	140	516	281	202	276	352	563	101	247	e62	116
15	132	138	254	538	188	381	327	940	96	176	e75	113
16	129	136	193	500	193	456	377	453	98	151	e58	127
17	129	133	173	307	196	626	338	330	114	122	e52	145
18	129	130	158	276	530	589	282	279	136	109	e50	110
19	129	129	148	331	627	461	260	560	118	105	47	101
20	128	130	149	264	395	372	254	448	103	101	53	101
21	127	139	149	243	321	418	241	304	117	96	85	112
22	122	143	147	248	268	583	228	260	139	95	88	107
23	120	133	147	261	229	441	220	240	126	120	65	102
24	122	132	160	865	230	367	211	225	109	104	64	95
25	127	132	208	720	253	333	203	201	101	101	e67	90
26	128	136	182	415	232	319	203	187	108	97	e78	86
27	127	139	155	320	222	300	227	182	143	92	e150	117
28	127	134	177	278	233	274	239	169	117	87	91	283
29	128	130	179	251	---	253	254	162	107	177	73	343
30	129	129	191	252	---	232	297	154	121	292	65	603
31	129	---	142	245	---	221	---	150	---	152	60	---
TOTAL	4750	4100	5656	9806	7752	11196	8756	8704	3650	3920	2361	7563
MEAN	153	137	182	316	277	361	292	281	122	126	76.2	252
MAX	489	192	516	865	627	626	895	940	186	317	150	1870
MIN	107	129	127	116	188	221	203	150	96	80	47	48
CFSM	.51	.46	.61	1.05	.92	1.20	.97	.94	.41	.42	.25	.84
IN.	.59	.51	.70	1.22	.96	1.39	1.09	1.08	.45	.49	.29	.94



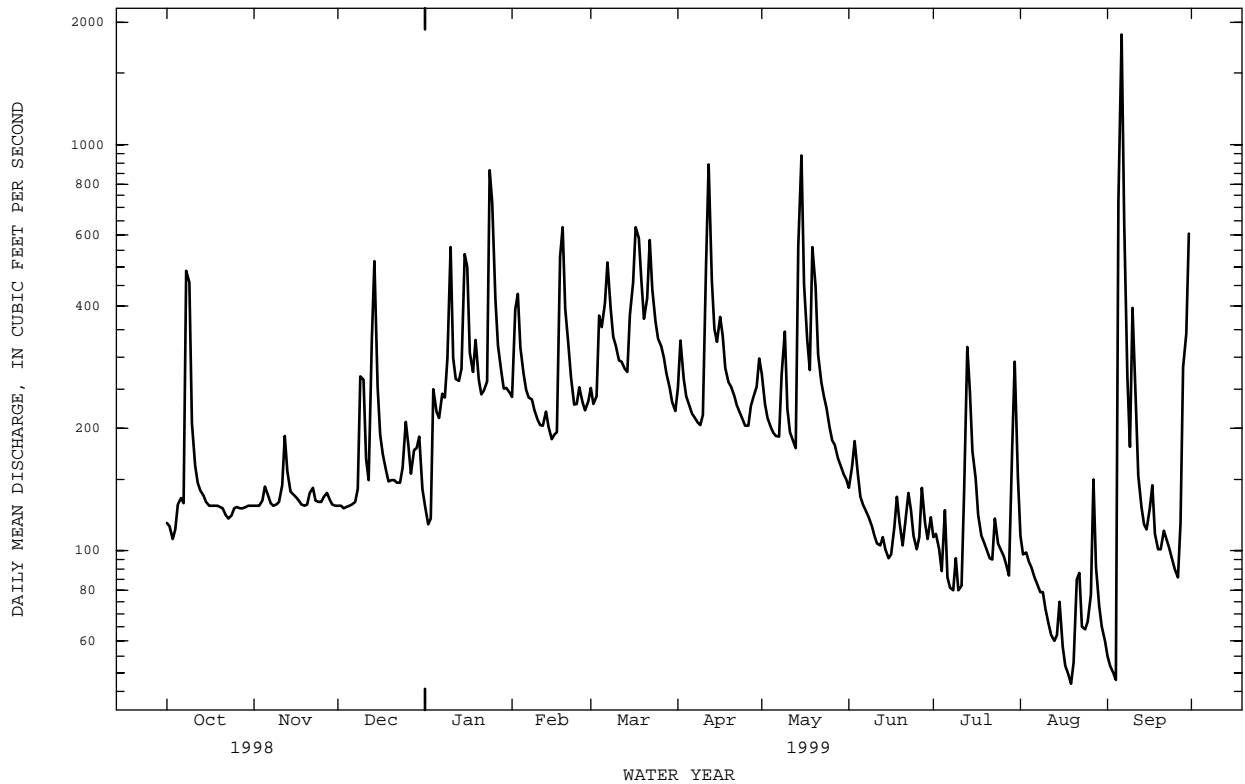
03170000 LITTLE RIVER AT GRAYSONTOWN, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1929 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	296	300	334	407	480	547	506	410	334	266	253	251
MAX	1458	916	860	1050	1055	1213	1444	810	942	945	1584	988
(WY)	1930	1986	1949	1937	1998	1993	1987	1958	1972	1949	1940	1989
MIN	86.7	107	115	108	113	220	146	168	122	108	76.2	76.9
(WY)	1954	1932	1966	1966	1934	1940	1942	1941	1999	1930	1999	1932

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR	WATER YEARS 1929 - 1999
ANNUAL TOTAL	148157	78214	
ANNUAL MEAN	406	214	365
HIGHEST ANNUAL MEAN			631
LOWEST ANNUAL MEAN			191
HIGHEST DAILY MEAN	3760	Mar 21	1870
LOWEST DAILY MEAN	100	aJan 1	47
ANNUAL SEVEN-DAY MINIMUM	106	Sep 11	57
INSTANTANEOUS PEAK FLOW			3280
INSTANTANEOUS PEAK STAGE			4.13
INSTANTANEOUS LOW FLOW			.71
ANNUAL RUNOFF (CFSM)	1.35		1.22
ANNUAL RUNOFF (INCHES)	18.37		9.70
10 PERCENT EXCEEDS	781		394
50 PERCENT EXCEEDS	269		158
90 PERCENT EXCEEDS	127		90

- a Also Sep 16, 1998.
- b Also Aug 20, 1999.
- c Result of freezeup.
- e Estimated.



## KANAWHA RIVER BASIN

03170500 LITTLE RIVER RESERVOIR NEAR RADFORD, VA

LOCATION.--Lat 37°04'40", long 80°34'22", Pulaski County, Hydrologic Unit 05050001, on left bank 30 ft upstream from dam, 0.25 mi upstream from mouth of Little River, 3 mi downstream from Meadow Creek, and 4 mi south of Radford.

DRAINAGE AREA.--337 mi<sup>2</sup>.

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

GAGE.--Water-stage recorder. Datum of gage is 1,770 ft above sea level, from topographic map.

REMARKS.--Reservoir is operated for generating power for the city of Radford. Missing record is due to instrument malfunction.

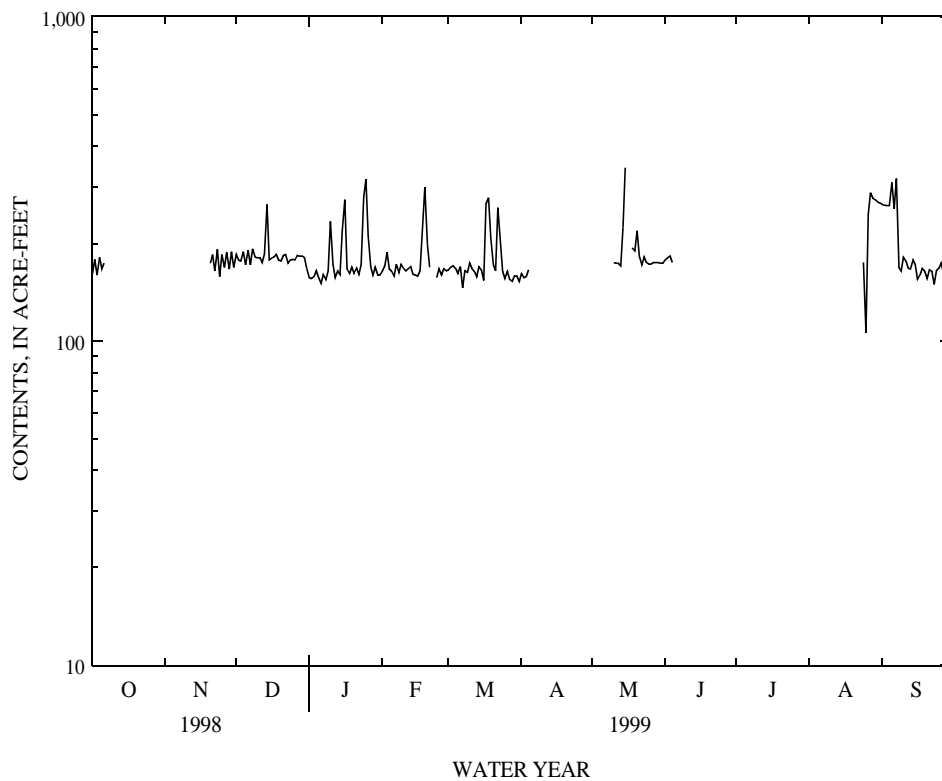
EXTREMES FOR CURRENT YEAR.--Maximum recorded contents, 452 acre-ft, Sep 5, minimum recorded contents, 8.4 acre-ft, Sep 6.

RESERVOIR STORAGE (ACRE-FEET), WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	162	---	185	157	164	166	162	---	178	---	---	264
2	179	---	178	156	171	169	157	---	181	---	---	263
3	160	---	177	158	188	171	158	---	183	---	---	262
4	182	---	189	165	167	168	166	---	175	---	---	262
5	167	---	172	157	164	162	---	---	---	---	---	309
6	174	---	191	151	159	170	---	---	---	---	---	256
7	---	---	172	161	173	146	---	---	---	---	---	317
8	---	---	193	155	163	165	---	---	---	---	---	169
9	---	---	182	165	173	163	---	---	---	---	---	165
10	---	---	181	234	168	174	---	175	---	---	---	182
11	---	---	181	173	165	168	---	174	---	---	---	177
12	---	---	175	157	167	164	---	174	---	---	---	168
13	---	---	186	165	170	158	---	171	---	---	---	167
14	---	---	264	161	161	170	---	224	---	---	---	178
15	---	---	178	219	160	166	---	343	---	---	---	172
16	---	---	180	273	159	154	---	---	---	---	---	155
17	---	---	182	167	165	265	---	---	---	---	---	160
18	---	---	185	162	220	277	---	194	---	---	---	168
19	---	---	178	169	298	208	---	190	---	---	---	165
20	---	174	177	162	199	172	---	219	---	---	---	156
21	---	185	184	168	169	165	---	183	---	---	---	166
22	---	165	185	161	---	258	---	172	---	---	---	164
23	---	192	174	172	---	202	---	182	---	---	---	150
24	---	158	178	278	157	164	---	175	---	---	175	165
25	---	185	179	316	167	156	---	173	---	---	106	168
26	---	169	178	211	160	164	---	173	---	---	246	174
27	---	188	184	170	167	155	---	175	---	---	287	160
28	---	167	183	160	165	153	---	175	---	---	276	168
29	---	189	183	169	---	159	---	175	---	---	273	163
30	---	169	181	160	---	159	---	174	---	---	269	196
31	---	---	168	160	---	153	---	174	---	---	267	---
TOTAL	---	---	5683	5592	---	5444	---	---	---	---	---	5789
MEAN	---	---	183	180	---	176	---	---	---	---	---	193
MAX	---	---	264	316	---	277	---	---	---	---	---	317
MIN	---	---	168	151	---	146	---	---	---	---	---	150

KANAWHA RIVER BASIN

03170500 LITTLE RIVER RESERVOIR NEAR RADFORD, VA--Continued



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 mi<sup>2</sup>.

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 sea level. 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. Statistic of monthly mean data and summary statistics for water years 1908-1915 (unregulated flow) are available in previous data books, water years 1991-1998. U.S. Army Corps of Engineers satellite precipitation and gage-height telemeter at station. National Weather Service gage-height telemeter at station. Maximum discharge, 218,000 ft<sup>3</sup>/s, from rating curve extended above 76,000 ft<sup>3</sup>/s on basis of records for other stations on New River and flow over Claytor Dam, computed by Appalachian Power Company. Minimum gage height, 1.08 ft, Aug. 25, 27, 1944. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Jul. 16, 1916, reached a stage of 35.7 ft, discharge, 200,000 ft<sup>3</sup>/s, at site and datum used by Geological Survey 1907-15, from reports of the National Weather Service.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 12,500 ft<sup>3</sup>/s, May 15, gage height, 4.80 ft; minimum discharge, 548 ft<sup>3</sup>/s, Aug 1, gage height, 1.58 ft; minimum daily, 912 ft<sup>3</sup>/s, Oct 18.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1300	973	1080	1230	2740	4950	2600	5740	1650	1970	1280	986
2	1250	1330	1120	982	4370	2770	2820	3950	1600	2050	1340	971
3	1300	1340	1070	2220	5410	2630	2270	3620	1910	1640	1350	977
4	1160	1130	1060	3690	4360	6600	1090	3230	1720	1620	1290	975
5	1140	991	1120	2530	2980	5330	2280	3430	1650	1810	1050	1730
6	1090	1730	1050	2860	2140	2970	2330	3080	1650	1820	1020	5110
7	1230	923	1110	1900	927	2800	2410	1720	1630	1350	1010	1780
8	5700	968	1070	1670	2800	5110	2350	3140	1560	1350	1020	1350
9	5210	3360	1180	1090	4200	5390	3220	4480	1450	1510	1000	1600
10	1670	3410	1250	2790	2310	4180	924	3430	1500	1710	1060	1530
11	1150	3410	1090	4620	2140	2610	1770	2840	1430	1550	981	1320
12	1100	3450	1110	2820	2420	2970	5920	2460	1430	3240	940	1250
13	1630	4270	1190	2940	919	3680	3010	2260	1470	3790	943	1020
14	1440	1380	2020	3170	917	969	2510	6650	1490	2900	997	2410
15	1150	1290	5810	4490	2430	5140	2330	9170	1420	1810	947	1260
16	2260	1390	2850	6240	2260	4300	2180	4860	1390	2140	943	1130
17	958	1310	2050	3200	2030	5250	3210	3550	1470	1940	965	1070
18	912	1320	1680	3710	4960	5620	2290	3680	1530	1720	928	1050
19	1030	1260	1030	3790	5430	5650	2660	5740	1620	2150	926	1050
20	1150	1360	1020	2940	2290	4750	2370	5180	1690	1750	939	1070
21	1220	1160	1840	2650	1440	1130	2460	3390	1590	1460	956	1060
22	1100	1360	1880	5060	3690	4980	2450	3080	1480	1720	990	1060
23	934	1230	1950	5470	2550	4950	2200	2740	1490	1250	1220	1070
24	959	1300	1060	7760	2370	3080	3540	2600	1420	1420	1090	1050
25	979	1170	1050	7650	3870	3690	3570	2500	1480	1690	2280	1040
26	927	1340	1040	7860	2440	4120	982	1910	1430	1620	2800	994
27	1190	1150	1530	5240	1600	1030	1030	2190	1880	1690	2940	1080
28	1240	1260	2960	3440	1330	993	1410	2150	1970	1410	1580	1180
29	1240	1210	2380	2860	---	2830	3010	2100	2020	2060	1260	1390
30	1240	1120	1510	3290	---	2720	6290	1910	2070	1500	995	2970
31	953	---	1620	926	---	3060	---	1840	---	1090	990	---
TOTAL	45812	48895	49780	111088	77323	116252	77486	108620	48090	56730	38030	42533
MEAN	1478	1630	1606	3583	2762	3750	2583	3504	1603	1830	1227	1418
MAX	5700	4270	5810	7860	5430	6600	6290	9170	2070	3790	2940	5110
MIN	912	923	1020	926	917	969	924	1720	1390	1090	926	971
( )	+302	-9932	+8924	+807	-252	-1210	+706	+1160	+202	0	-1916	+1613
MEAN	1488	1299	1894	3610	2753	3711	2606	3541	1610	1830	1165	1472
CFSM	.54	.47	.69	1.31	1.00	1.35	.95	1.29	.59	.67	.42	.54
IN	.62	.53	.79	1.51	1.04	1.56	1.06	1.49	.65	.77	.49	.60

CAL YR 1998 TOTAL 1704893 MEAN 4671 MAX 37300 MIN 912 MEAN 4672 CFSM 1.70 IN 23.08  
WTR YR 1999 TOTAL 820639 MEAN 2248 MAX 9170 MIN 912 MEAN 2249 CFSM .82 IN 11.11

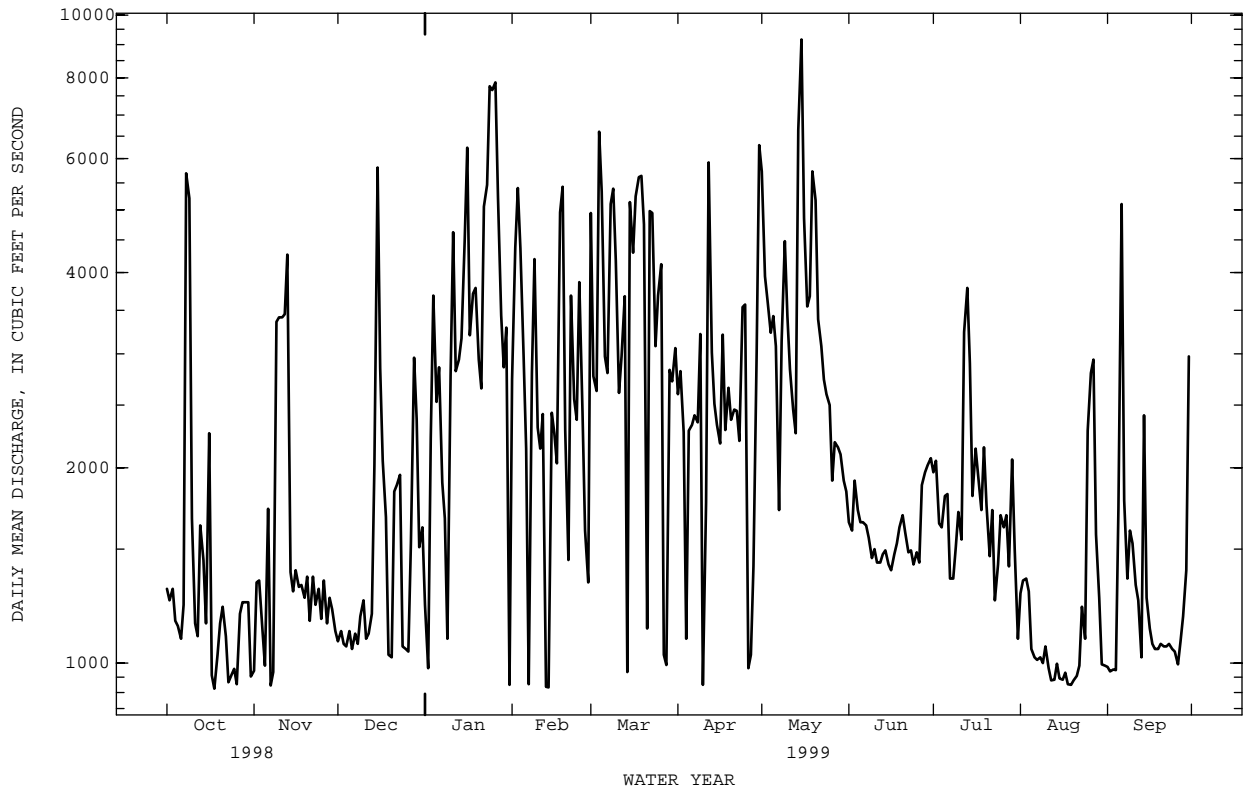
Total change in contents, equivalent in cubic feet per second, per month, in Claytor Reservoir; provided by American Electric Power.  
Adjusted for monthly change in contents.

03171000 NEW RIVER AT RADFORD, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1940 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	2688	3053	3608	4417	5429	6087	5518	4541	3608	2773	2684	2466
MAX	7619	10300	7426	9459	10590	13130	14490	8875	9627	7545	14170	9855
(WY)	1990	1978	1962	1995	1998	1993	1987	1973	1992	1949	1940	1989
MIN	1068	1156	1144	1064	2437	2016	2203	1721	1244	1208	1081	1126
(WY)	1989	1940	1940	1940	1941	1988	1942	1941	1941	1988	1956	1968

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR	WATER YEARS 1940 - 1999
ANNUAL TOTAL	1704893	820639	
ANNUAL MEAN	4671	2248	3897
HIGHEST ANNUAL MEAN			5471
LOWEST ANNUAL MEAN			2151
HIGHEST DAILY MEAN	37300	Apr 20	105000
LOWEST DAILY MEAN	912	Oct 18	627
ANNUAL SEVEN-DAY MINIMUM	1040	Oct 20	813
INSTANTANEOUS PEAK FLOW			218000
INSTANTANEOUS PEAK STAGE			4.80
INSTANTANEOUS LOW FLOW			548
ANNUAL RUNOFF (CFSM)	1.70	.82	1.42
ANNUAL RUNOFF (INCHES)	23.08	11.11	19.27
10 PERCENT EXCEEDS	9890	4480	7370
50 PERCENT EXCEEDS	3410	1680	2960
90 PERCENT EXCEEDS	1090	994	1180



KANAWHA RIVER BASIN

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 mi<sup>2</sup>.

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 sea level. Prior to Aug. 1, 1938, nonrecording gage at same site and datum.

REMARKS.--Records good except for period with ice effect Jan. 3-7, which is fair. U.S. Army Corps of Engineers satellite gage-height telemeter at station. Maximum discharge, 25,000 ft<sup>3</sup>/s, from rating curve extended above 7,200 ft<sup>3</sup>/s on basis of slope-area measurements at gage heights 16.50 ft and 19.28 ft. Minimum discharge, 15 ft<sup>3</sup>/s, Dec. 21, 1958, gage height, 2.42 ft, result of freezeup. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in September 1878 reached a stage of about 23.5 ft, discharge, 40,400 ft<sup>3</sup>/s, from rating curve extended as explained above.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
May 14	2100	*2,820	*8.15	No peak greater than base discharge.			

Minimum discharge, 30 ft<sup>3</sup>/s, Sep 4, gage height, 2.67 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	50	39	42	51	145	196	157	439	117	51	49	33
2	53	40	41	50	230	239	166	360	109	50	46	32
3	48	45	40	e50	424	252	156	303	103	48	44	31
4	45	44	40	e62	364	392	147	259	97	46	43	30
5	44	46	41	e80	295	387	139	227	91	44	40	71
6	44	47	41	e71	246	443	132	205	86	42	38	201
7	46	44	42	e68	220	644	126	199	82	39	35	166
8	67	42	49	67	205	588	121	718	77	40	35	98
9	67	41	62	72	181	468	118	727	73	37	36	71
10	59	41	91	104	159	401	117	527	71	37	34	58
11	52	44	76	134	143	331	280	407	68	39	34	49
12	46	42	61	105	133	291	1030	326	65	53	34	44
13	42	40	66	100	128	273	645	275	62	65	34	41
14	39	43	79	114	115	275	465	1010	61	86	33	40
15	38	44	97	611	108	453	395	1460	59	68	32	39
16	38	44	76	546	103	606	453	782	58	59	32	38
17	37	42	63	275	100	941	399	560	61	54	32	35
18	37	41	57	190	123	1230	343	432	60	51	32	34
19	37	41	53	191	228	1040	295	1210	60	48	32	34
20	36	41	51	183	255	753	269	876	58	50	34	34
21	35	40	50	152	230	600	250	604	57	48	33	38
22	35	40	49	132	203	499	220	451	55	45	33	36
23	35	40	49	163	176	401	200	366	54	44	48	35
24	35	40	53	1080	160	343	189	324	53	48	47	35
25	36	40	53	994	156	301	174	309	52	46	47	34
26	37	44	52	539	145	261	164	247	53	42	54	34
27	37	43	50	357	136	230	176	208	55	41	43	35
28	38	44	49	276	139	206	316	179	55	53	43	43
29	39	45	51	227	---	186	703	158	53	88	40	52
30	39	44	52	187	---	170	558	141	51	58	37	93
31	39	---	52	154	---	157	---	128	---	51	34	---
TOTAL	1330	1271	1728	7385	5250	13557	8903	14417	2056	1571	1188	1614
MEAN	42.9	42.4	55.7	238	188	437	297	465	68.5	50.7	38.3	53.8
MAX	67	47	97	1080	424	1230	1030	1460	117	88	54	201
MIN	35	39	40	50	100	157	117	128	51	37	32	30
CFSM	.14	.14	.18	.78	.61	1.43	.97	1.52	.22	.17	.13	.18
IN.	.16	.16	.21	.90	.64	1.65	1.09	1.76	.25	.19	.14	.20

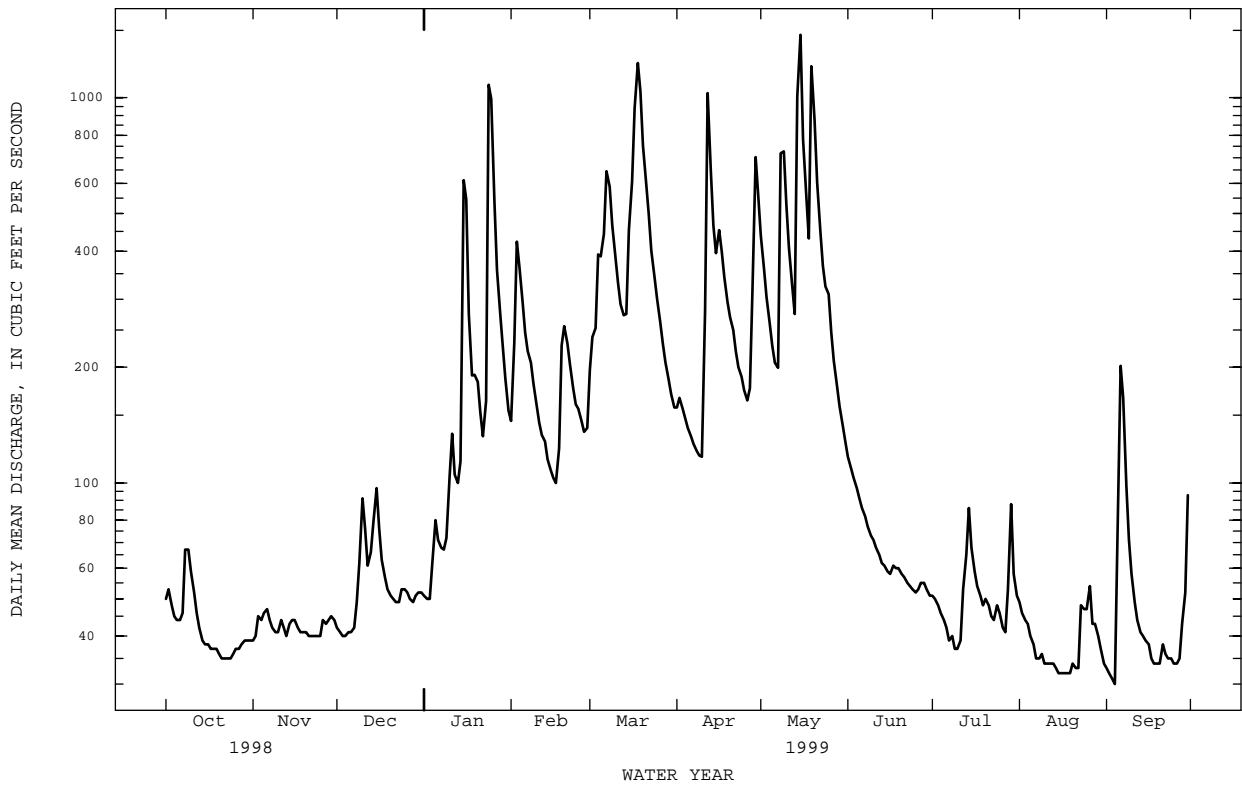
03173000 WALKER CREEK AT BANE, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1938 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	128	184	314	447	600	698	546	422	240	139	127	98.1
MAX	721	737	941	1191	1577	1800	1806	1044	1125	735	759	639
(WY)	1990	1980	1973	1996	1957	1955	1987	1971	1992	1938	1949	1989
MIN	34.7	42.4	44.9	44.8	95.6	108	126	115	60.6	41.6	33.7	35.6
(WY)	1964	1999	1956	1956	1942	1988	1986	1941	1988	1988	1988	1955

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR	WATER YEARS 1938 - 1999
ANNUAL TOTAL	138745	60270	
ANNUAL MEAN	380	165	326
HIGHEST ANNUAL MEAN			553 1949
LOWEST ANNUAL MEAN			135 1988
HIGHEST DAILY MEAN	4810	Apr 20	14100 Jun 5 1992
LOWEST DAILY MEAN	35	aOct 21	24 bSep 27 1964
ANNUAL SEVEN-DAY MINIMUM	36	Oct 19	28 Sep 22 1964
INSTANTANEOUS PEAK FLOW			25000 Jun 5 1992
INSTANTANEOUS PEAK STAGE			8.15 May 14 Jun 5 1992
INSTANTANEOUS LOW FLOW			30 Sep 4 c15 Dec 21 1958
ANNUAL RUNOFF (CFSM)	1.25	.54	1.07
ANNUAL RUNOFF (INCHES)	16.92	7.35	14.53
10 PERCENT EXCEEDS	1000	427	734
50 PERCENT EXCEEDS	97	61	161
90 PERCENT EXCEEDS	40	36	49

- a Also Oct 22-24, 1998.
- b Also Sep 28, 1964.
- c Result of freezeup.
- e Estimated.



KANAWHA RIVER BASIN

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 mi<sup>2</sup>.

PERIOD OF RECORD.--July 1908 to September 1916, March 1938 to September 1995, October 1995 to September 1997 (annual maximum only), October 1997 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 sea level. Jul. 22, 1908, to Sep. 30, 1916, and Mar. 31 to Nov. 7, 1938, nonrecording gage at same site and datum.

REMARKS.--Records good except those for period with ice effect Jan. 2-7, and periods of no gage-height record, Oct. 2-5, 13-15, and Sep. 23-24, which are fair. U.S. Army Corps of Engineers satellite gage-height telemeter at station. Maximum discharge, 12,900 ft<sup>3</sup>/s, from rating curve extended above 5,700 ft<sup>3</sup>/s on basis of contracted-opening measurement of peak flow. Minimum discharge, 8.8 ft<sup>3</sup>/s, result of freezeup. Minimum gage height, 2.19 ft, Dec. 24, 1943. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,200 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Jan 15	1130	*1,340	*5.63	No peak greater than base discharge.			

Minimum discharge, 9.0 ft<sup>3</sup>/s, Sep 4, gage height, 2.63 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	86	30	30	55	179	274	194	508	92	51	81	15
2	e52	30	30	e52	240	309	197	425	87	41	95	12
3	e44	40	28	e50	275	339	178	359	83	35	75	12
4	e41	50	27	e60	262	560	164	309	77	34	55	10
5	e38	46	28	e78	248	543	155	272	72	33	41	38
6	36	42	30	e75	217	605	144	249	68	30	26	133
7	33	38	31	e84	204	821	136	232	64	29	23	88
8	37	34	39	96	203	696	128	292	61	29	22	58
9	47	33	112	121	184	589	127	312	60	29	23	45
10	50	33	128	323	170	516	131	274	58	37	23	35
11	44	38	91	238	157	424	383	245	55	55	20	28
12	36	41	71	185	147	370	945	215	53	94	17	24
13	e31	45	81	164	142	342	652	196	55	121	13	22
14	e29	40	136	183	132	339	515	684	52	106	19	20
15	e28	38	119	953	123	472	448	719	54	87	24	19
16	28	35	93	767	122	473	432	496	57	72	34	18
17	27	34	79	461	121	727	361	383	63	64	31	19
18	26	32	72	365	178	1130	316	317	66	63	24	18
19	26	31	65	372	289	1140	281	642	60	58	21	18
20	25	31	59	321	297	858	284	429	53	53	27	19
21	25	30	58	274	264	711	270	323	52	59	38	20
22	26	30	59	231	231	629	248	263	48	88	36	19
23	26	30	66	222	203	527	227	226	43	79	32	e19
24	26	29	88	829	186	456	225	227	40	68	26	e19
25	25	29	88	882	181	402	204	234	40	63	29	17
26	26	34	77	588	171	351	192	183	48	95	38	15
27	26	37	75	432	158	309	214	154	49	97	32	18
28	25	38	75	339	168	275	527	135	48	77	29	24
29	26	34	71	277	---	249	766	120	60	106	25	47
30	28	32	72	230	---	222	624	108	63	100	21	108
31	31	---	68	194	---	200	---	99	---	92	17	---
TOTAL	1054	1064	2146	9501	5452	15858	9668	9630	1781	2045	1017	957
MEAN	34.0	35.5	69.2	306	195	512	322	311	59.4	66.0	32.8	31.9
MAX	86	50	136	953	297	1140	945	719	92	121	95	133
MIN	25	29	27	50	121	200	127	99	40	29	13	10
CFSM	.15	.16	.31	1.37	.87	2.29	1.45	1.39	.27	.30	.15	.14
IN.	.18	.18	.36	1.58	.91	2.65	1.61	1.61	.30	.34	.17	.16



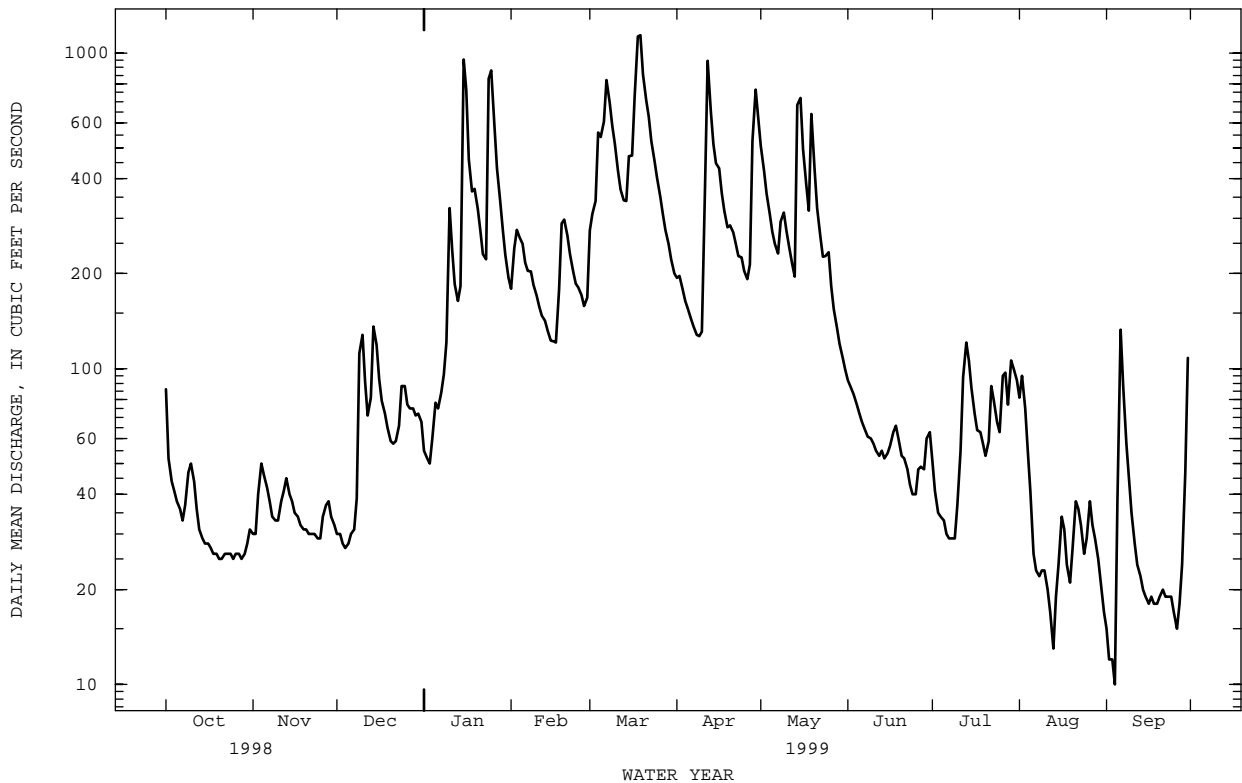
03175500 WOLF CREEK NEAR NARROWS, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1908-1916, 1938-1995, 1997-1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	110	162	305	438	556	653	488	371	206	135	112	77.5
MAX	621	754	850	1128	1469	1789	1728	1059	748	964	512	576
(WY)	1990	1978	1973	1957	1957	1955	1987	1971	1992	1916	1916	1989
MIN	21.4	28.6	31.1	50.0	122	113	120	99.4	49.3	32.9	26.8	27.4
(WY)	1964	1940	1940	1940	1942	1988	1995	1941	1914	1988	1988	1964

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR	WATER YEARS 1908 - 1916	1938 - 1995	1997 - 1999
ANNUAL TOTAL	124900	60173			
ANNUAL MEAN	342	165			
HIGHEST ANNUAL MEAN				299	
LOWEST ANNUAL MEAN				475	1972
HIGHEST DAILY MEAN	3410	Feb 18	1140	Mar 19	8380
LOWEST DAILY MEAN	25	aOct 20	10	Sep 4	10
ANNUAL SEVEN-DAY MINIMUM	26	Oct 19	16	Aug 29	16
INSTANTANEOUS PEAK FLOW			1340	Jan 15	12900
INSTANTANEOUS PEAK STAGE			5.63	Jan 15	b12.55
INSTANTANEOUS LOW FLOW			9.0	Sep 4	c8.8
ANNUAL RUNOFF (CFSM)	1.53		.74		1.34
ANNUAL RUNOFF (INCHES)	20.84		10.04		18.23
10 PERCENT EXCEEDS	910		432		684
50 PERCENT EXCEEDS	119		75		153
90 PERCENT EXCEEDS	32		25		39

- a Also Oct 21, 25, 28, 1998.
- b From floodmark in well; floodmark on downstream side of bridge was 13.8 ft.
- c Result of freezeup.
- e Estimated.



KANAWHA RIVER BASIN

03176500 NEW RIVER AT GLEN LYN, VA

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 mi<sup>2</sup>.

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 sea level. Aug. 11, 1927, to Oct. 16, 1934, on left bank opposite present site at same datum, and Oct. 17, 1934, to Jun. 16, 1939, on left bank at site 200 ft upstream at same datum.

REMARKS.--No estimated daily discharges. Records good. Flow regulated since 1939 by Claytor Reservoir (station 03169000) 55 mi upstream from station. Statistics of monthly mean data and summary statistics for water years 1928-1938 (unregulated flow) are available in previous data books, water years 1991-1998. Water withdrawn by American Electric Power at gage. U.S. Army Corps of Engineers satellite gage-height telemeter at station. Maximum discharge, 226,000 ft<sup>3</sup>/s, from rating curve extended above 89,000 ft<sup>3</sup>/s on basis of slope-area measurement of peak flow. Minimum gage height, 2.10 ft, Sep. 8, 1930. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 16,300 ft<sup>3</sup>/s, May 15, gage height, 6.88 ft; minimum discharge, 449 ft<sup>3</sup>/s, Aug 13, 19, gage height, 2.49 ft; minimum daily, 557 ft<sup>3</sup>/s, Aug 19, minimums affected by withdrawals.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1180	1060	1080	1720	1810	2090	3880	9140	2010	1880	955	771
2	1210	1080	1070	1290	4020	6130	3670	5700	1730	1920	1110	779
3	1140	1540	1050	1190	6010	3900	3720	5610	1550	2020	1210	760
4	1170	1550	1060	2620	6940	4890	3360	4520	1980	1420	1170	749
5	1060	1260	1040	3820	5770	9060	2170	4190	1870	1360	1080	1060
6	1010	1080	1070	2880	3630	6810	3180	4750	1750	1620	793	5770
7	916	1810	1050	3040	3100	5040	3240	3320	1570	1620	786	4680
8	1860	1080	1120	2210	1960	5520	3250	3500	1450	1000	738	2390
9	6640	1080	1210	2000	3630	6990	3230	5620	1340	1020	753	1650
10	4240	3290	1310	1670	5060	7180	3980	5630	1080	1210	726	1880
11	1690	3510	1330	3710	2980	5800	1880	4410	1100	1540	782	1620
12	1280	3440	1160	4940	2840	4040	6360	3910	1050	1550	719	1320
13	1250	3580	1230	3360	3110	4120	7520	3410	999	4690	568	1130
14	1780	4290	1400	3480	1540	4900	4770	4200	1040	4290	673	897
15	1630	1400	2220	5540	1470	3230	4140	14600	1100	2930	784	2830
16	1320	1290	6120	7090	2980	7780	4130	8780	1090	1780	644	1350
17	2310	1350	2940	7700	2830	7410	3870	6240	1290	2210	641	994
18	1110	1300	2140	4160	2980	10500	4390	5400	1390	1940	656	1050
19	1060	1240	1800	4760	6740	10000	4010	8280	1460	1750	557	971
20	1140	1230	1100	4480	6580	9200	3690	9400	1350	2210	745	963
21	1390	1290	1070	3600	3740	7400	3380	6310	1390	1580	755	1060
22	1490	1140	1880	3530	2210	4560	3580	4980	1220	1250	721	1070
23	1390	1300	1960	5770	4560	6690	3450	4520	1020	1610	744	953
24	1250	1210	1920	12100	3320	6680	4380	4110	1000	1340	1020	947
25	1210	1280	1110	10100	3180	4800	4580	3870	965	1540	1020	903
26	1050	1220	1100	11700	4620	5380	3190	3410	1010	1650	2830	890
27	1020	1310	1090	8110	3120	5240	1900	2560	940	1520	3990	927
28	1290	1170	1590	6660	2580	2190	2290	2810	1670	1780	3180	1010
29	1270	1220	3060	4510	---	2220	3920	2640	1780	2730	1640	1200
30	1450	1210	2490	3910	---	3900	5530	2420	2000	2880	1140	2020
31	1370	---	1630	3980	---	3680	---	2160	---	1670	752	---
TOTAL	49176	49810	51400	145630	103310	177330	114640	160400	41194	59510	33882	44594
MEAN	1586	1660	1658	4698	3690	5720	3821	5174	1373	1920	1093	1486
MAX	6640	4290	6120	12100	6940	10500	7520	14600	2010	4690	3990	5770
MIN	916	1060	1040	1190	1470	2090	1880	2160	940	1000	557	749
( )	+302	-9932	+8924	+807	-252	-1210	+706	+1160	+202	0	-1916	+1613
( )	13710	13725	13406	12546	10478	12071	12999	11616	14539	17121	16794	11163
mean	2038	1787	2378	5128	4055	6071	4278	5586	1864	2472	1573	1912
CFSM	.54	.47	.63	1.36	1.08	1.61	1.14	1.48	.49	.66	.42	.51
IN	.62	.53	.73	1.57	1.12	1.86	1.27	1.71	.55	.76	.48	.57

CAL YR 1998 TOTAL 2265536 MEAN 6207 MAX 48700 MIN 868 MEAN 6658 CFSM 1.77 IN 23.99  
WTR YR 1999 TOTAL 1030876 MEAN 2824 MAX 14600 MIN 557 MEAN 3264 CFSM .87 IN 11.76

Total change in contents, equivalent in cubic feet per second, per month, in Claytor Reservoir; provided by American Electric Power.  
Total water withdrawal, equivalent in cubic feet per second, per month by power plant; provided by American Electric Power.  
Adjusted for monthly change in contents and water withdrawal.

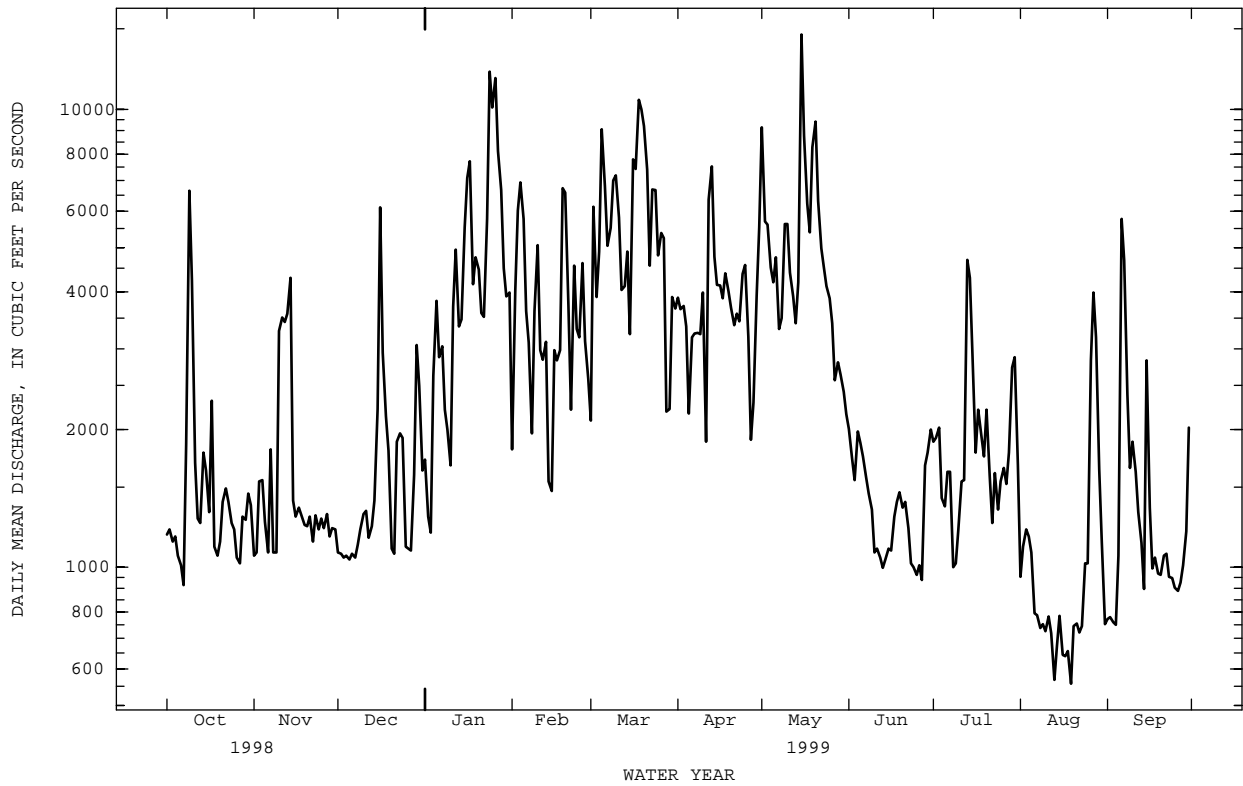
03176500 NEW RIVER AT GLEN LYN, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1939 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	3201	3727	4674	5995	7502	8440	7426	6007	4465	3262	3165	2839
MAX	9882	12450	10910	13290	15810	18650	20890	11270	12860	9784	16410	11500
(WY)	1990	1978	1949	1996	1957	1993	1987	1984	1992	1949	1940	1989
MIN	1204	1258	1305	1489	3304	2407	2673	2397	1373	1390	1093	1127
(WY)	1989	1982	1998	1966	1941	1988	1986	1941	1999	1988	1999	1998

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR	WATER YEARS 1939 - 1999
ANNUAL TOTAL	2265536	1030876	
ANNUAL MEAN	6207	2824	5045
HIGHEST ANNUAL MEAN			7424
LOWEST ANNUAL MEAN			2626
HIGHEST DAILY MEAN	48700	Apr 20	126000
LOWEST DAILY MEAN	868	Sep 16	a557
ANNUAL SEVEN-DAY MINIMUM	991	Sep 12	a646
INSTANTANEOUS PEAK FLOW			16300
INSTANTANEOUS PEAK STAGE			6.88
INSTANTANEOUS LOW FLOW			449
ANNUAL RUNOFF (CFSM)	1.65	.75	1.34
ANNUAL RUNOFF (INCHES)	22.37	10.18	18.19
10 PERCENT EXCEEDS	14500	5780	9690
50 PERCENT EXCEEDS	3550	1880	3700
90 PERCENT EXCEEDS	1080	997	1540

a Affected by withdrawals.  
 b Also Aug 19, 1999.



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 mi<sup>2</sup>.

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

GAGE.--Water-stage recorder. Datum of gage is 866.37 ft above sea level.

REMARKS.--Records good except those for periods of doubtful gage-height record Oct. 8-16, Sep. 6-7, and period of no gage-height record, May 19-20, which are fair. U.S. Army Corps of Engineers satellite precipitation and gage-height telemeter at station. Maximum discharge, 56,000 ft<sup>3</sup>/s, from rating curve extended above 7,000 ft<sup>3</sup>/s on basis of slope-area measurement of peak flow. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

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 greater than base discharge of 4,500 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Jan 24	1300	*3,330	*7.35	No peak greater than base discharge.			
Minimum discharge, 12 ft <sup>3</sup> /s, Sep 26, gage height, 2.27 ft.							

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	81	33	31	128	319	1430	278	572	92	73	172	19
2	56	32	28	115	302	970	278	472	105	61	134	19
3	49	38	27	429	291	1170	250	404	101	54	105	19
4	48	39	27	483	268	1770	235	358	85	46	67	19
5	46	36	38	279	241	1180	222	326	79	41	52	26
6	41	32	52	195	221	1280	207	333	74	36	44	e45
7	36	29	53	184	232	1210	198	294	69	33	37	e60
8	e95	30	353	188	246	901	187	293	65	32	35	38
9	e110	30	479	807	224	806	201	263	63	29	38	29
10	e85	32	233	893	224	1050	194	232	60	33	36	26
11	e60	58	133	481	204	1080	641	208	59	48	32	22
12	e47	58	107	333	228	860	1160	189	56	47	28	20
13	e41	45	475	263	285	691	734	190	53	46	27	20
14	e37	38	493	285	255	689	559	254	53	42	52	19
15	e35	36	247	1370	256	1200	516	214	55	35	48	18
16	e34	35	157	967	270	1390	492	181	52	32	35	17
17	33	33	130	620	301	1740	422	165	53	29	29	17
18	34	31	105	998	366	1480	385	183	52	43	24	17
19	35	30	84	1300	414	1100	358	e250	47	41	23	17
20	34	31	77	769	418	826	377	e184	45	36	41	17
21	32	35	70	525	363	704	353	155	43	36	45	17
22	30	33	94	399	317	612	333	152	40	48	32	16
23	30	31	136	405	282	512	317	151	38	74	27	16
24	30	30	168	2260	268	468	319	226	39	144	27	15
25	31	30	141	1430	274	426	282	210	44	115	48	14
26	31	49	118	806	282	386	288	163	44	69	65	14
27	31	48	105	576	267	354	324	138	45	62	37	18
28	33	41	103	454	1030	328	1070	121	97	51	29	29
29	37	35	109	369	---	306	1170	110	99	53	25	53
30	37	34	142	312	---	283	757	103	93	203	23	104
31	36	---	139	276	---	264	---	95	---	250	20	---
TOTAL	1395	1092	4654	18899	8648	27466	13107	7189	1900	1942	1437	780
MEAN	45.0	36.4	150	610	309	886	437	232	63.3	62.6	46.4	26.0
MAX	110	58	493	2260	1030	1770	1170	572	105	250	172	104
MIN	30	29	27	115	204	264	187	95	38	29	20	14
CFSM	.15	.12	.51	2.05	1.04	2.98	1.47	.78	.21	.21	.16	.09
IN.	.17	.14	.58	2.37	1.08	3.44	1.64	.90	.24	.24	.18	.10

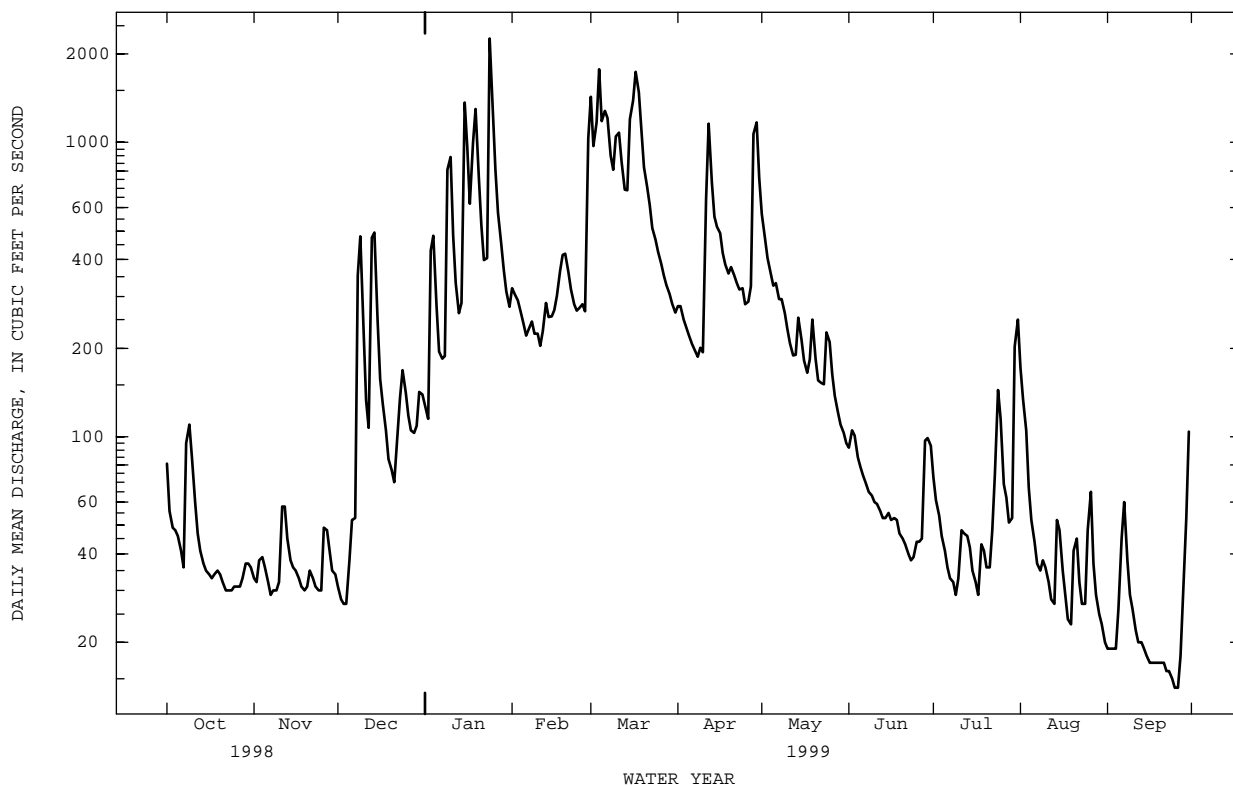
03207800 LEVISA FORK AT BIG ROCK, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1968 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	131	208	366	574	685	766	697	526	275	150	117	81.9
MAX	692	911	1201	1596	1451	2107	2355	1323	1135	630	325	273
(WY)	1990	1978	1973	1974	1994	1975	1987	1984	1979	1979	1971	1989
MIN	6.85	19.3	72.0	82.7	168	139	154	113	40.2	29.1	33.3	12.6
(WY)	1970	1970	1998	1981	1968	1988	1986	1976	1970	1970	1969	1969

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR	WATER YEARS 1968 - 1999
ANNUAL TOTAL	180075	88509	
ANNUAL MEAN	493	242	380
HIGHEST ANNUAL MEAN			606 1979
LOWEST ANNUAL MEAN			121 1988
HIGHEST DAILY MEAN	6990	Jun 10	24800 Apr 4 1977
LOWEST DAILY MEAN	27	aDec 3	5.1 Oct 19 1969
ANNUAL SEVEN-DAY MINIMUM	31	Oct 21	16 Sep 20 1969
INSTANTANEOUS PEAK FLOW			3330 Jan 24 1977
INSTANTANEOUS PEAK STAGE			7.35 Jan 24 1977
INSTANTANEOUS LOW FLOW			12 Sep 26 1969
ANNUAL RUNOFF (CFSM)	1.66	.82	5.0 cOct 1 1969
ANNUAL RUNOFF (INCHES)	22.55	11.09	1.28
10 PERCENT EXCEEDS	1060	690	17.37
50 PERCENT EXCEEDS	233	97	837
90 PERCENT EXCEEDS	35	29	183
			36

- a Also Dec 4, 1998.
- b Also Sep 26, 1999.
- c Also Oct. 13, 14, 17-20, 1969.
- e Estimated.



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 mi<sup>2</sup>.

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 sea level. Prior to Dec. 21, 1939, nonrecording gage at highway bridge 180 ft upstream at same datum.

REMARKS.--Records good except those for period with ice effect Jan. 5-7, and period of no gage-height record, May 18-21, which are fair. U.S. Army Corps of Engineers satellite precipitation and gage-height telemeter at station. Maximum discharge, 59,000 ft<sup>3</sup>/s, from rating curve extended above 32,000 ft<sup>3</sup>/s on basis of slope-area measurement of peak flow. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,500 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Jan 24	1130	*3,900	*6.36	No peak greater than base discharge.			

Minimum discharge, 7.5 ft<sup>3</sup>/s, Sep 25, gage height, 1.81 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	54	27	25	99	258	1580	199	376	108	120	62	11
2	40	27	23	94	256	882	193	324	106	82	84	11
3	35	28	23	784	253	1210	178	280	100	72	63	10
4	34	29	29	532	236	1880	170	247	89	64	43	11
5	34	31	33	e140	208	1130	161	222	83	51	36	11
6	32	28	38	e105	193	1090	152	248	77	45	30	16
7	30	26	41	e110	200	879	144	234	72	40	26	25
8	52	25	366	122	193	635	140	211	68	39	24	21
9	60	26	504	740	175	590	148	188	63	35	28	14
10	45	25	162	849	167	713	143	165	60	40	29	16
11	36	42	90	446	156	756	434	149	56	208	24	25
12	33	54	70	284	170	645	708	137	59	99	20	17
13	32	41	505	201	216	529	475	138	52	78	19	13
14	30	34	542	188	195	529	370	242	54	61	22	12
15	29	29	218	1460	197	1160	357	188	53	50	19	11
16	28	28	124	986	205	1340	366	153	51	47	19	11
17	27	27	100	575	249	1540	316	134	49	39	18	10
18	25	25	83	1010	274	1110	285	e124	48	38	18	9.8
19	27	24	69	1250	306	754	261	e940	42	51	16	9.0
20	28	25	65	723	315	566	253	e500	39	44	21	8.6
21	26	26	58	473	283	505	232	e300	37	38	28	10
22	26	25	68	338	254	422	212	255	35	35	24	10
23	26	24	86	332	233	356	193	221	34	32	19	9.4
24	26	24	111	2560	227	335	190	417	34	47	17	9.7
25	25	23	105	1380	225	306	174	375	42	91	24	8.2
26	26	30	95	689	232	277	181	280	44	66	28	8.3
27	26	30	88	473	232	256	229	219	43	45	24	11
28	26	30	86	368	1570	237	519	176	89	41	19	28
29	29	28	95	299	---	221	586	149	87	43	16	36
30	31	25	119	247	---	202	455	134	226	65	14	63
31	29	---	112	216	---	190	---	120	---	84	12	---
TOTAL	1007	866	4133	18073	7678	22825	8424	7846	2000	1890	846	466.0
MEAN	32.5	28.9	133	583	274	736	281	253	66.7	61.0	27.3	15.5
MAX	60	54	542	2560	1570	1880	708	940	226	208	84	63
MIN	25	23	23	94	156	190	140	120	34	32	12	8.2
CFSM	.11	.10	.47	2.04	.96	2.57	.98	.88	.23	.21	.10	.05
IN.	.13	.11	.54	2.35	1.00	2.97	1.10	1.02	.26	.25	.11	.06

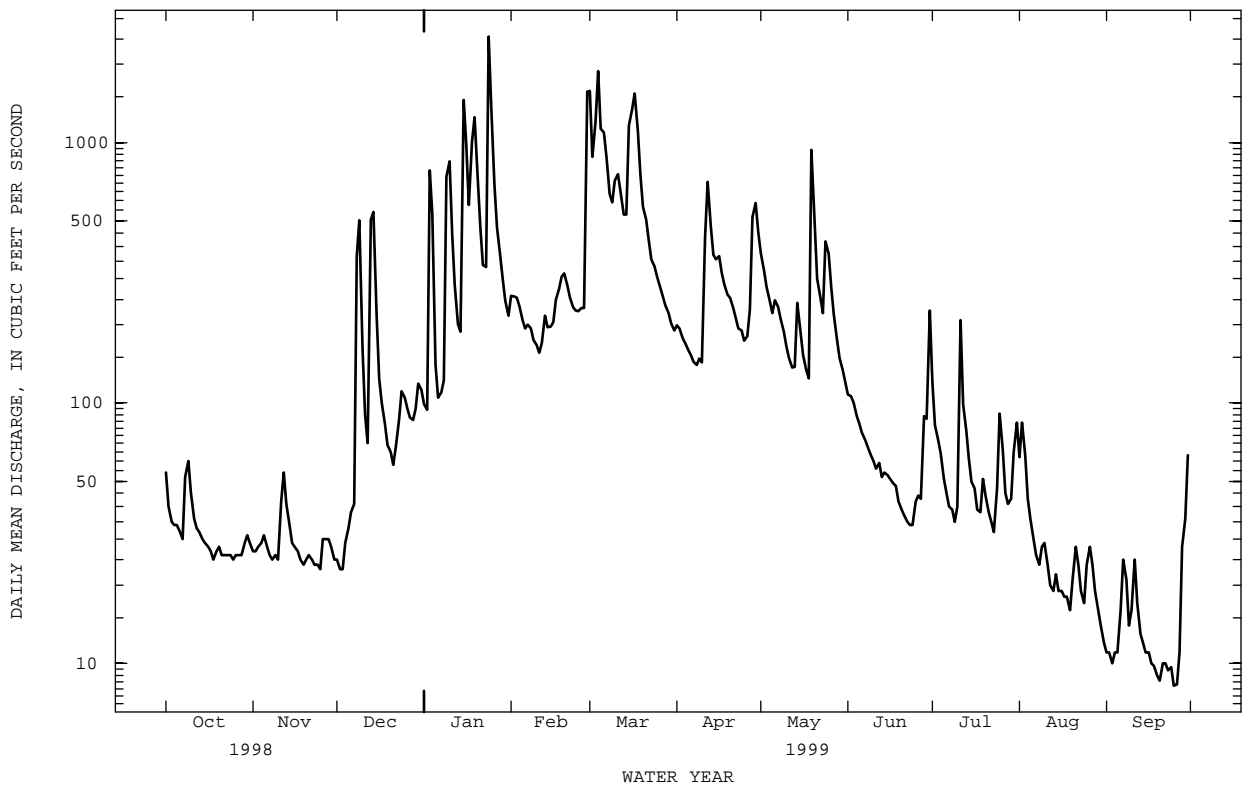
03208500 RUSSELL FORK AT HAYSI, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1926 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	87.6	164	331	519	650	776	584	420	186	148	119	63.3
MAX	838	961	1326	2083	1797	2331	1994	1429	738	566	561	608
(WY)	1990	1978	1927	1937	1939	1955	1977	1958	1998	1938	1966	1989
MIN	.98	2.46	11.1	19.6	57.7	168	64.0	63.4	21.6	3.03	8.81	2.07
(WY)	1954	1954	1954	1940	1941	1988	1942	1941	1966	1930	1953	1943

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR	WATER YEARS 1926 - 1999
ANNUAL TOTAL	179846	76054.0	
ANNUAL MEAN	493	208	336
HIGHEST ANNUAL MEAN			568
LOWEST ANNUAL MEAN			100
HIGHEST DAILY MEAN	11700	Apr 17	2560
LOWEST DAILY MEAN	23	aNov 25	8.2
ANNUAL SEVEN-DAY MINIMUM	24	Nov 19	9.2
INSTANTANEOUS PEAK FLOW			3900
INSTANTANEOUS PEAK STAGE			6.36
INSTANTANEOUS LOW FLOW			7.5
ANNUAL RUNOFF (CFSM)	1.72		.73
ANNUAL RUNOFF (INCHES)	23.39		9.89
10 PERCENT EXCEEDS	1170		530
50 PERCENT EXCEEDS	184		83
90 PERCENT EXCEEDS	28		20

- a Also Dec 2, 3, 1998.
- b Observed.
- c Also Jun 28, 1936.
- e Estimated.



## BIG SANDY RIVER BASIN

03208680 NORTH FORK OF POUND 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 mi<sup>2</sup>.

PERIOD OF RECORD.--July 1966 to current year. Published as "North Fork Pound River Lake" prior to October 1993.

GAGE.--Water-stage recorder. Datum of gage is at sea level (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 precipitation and 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, 3,310 acre-ft, Apr. 30, elevation, 1,611.81 ft; minimum, 1,956 acre-ft, Dec. 12, elevation, 1,601.57 ft.

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 MONTHEND ELEVATION AND CONTENTS AT 2400, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999
 

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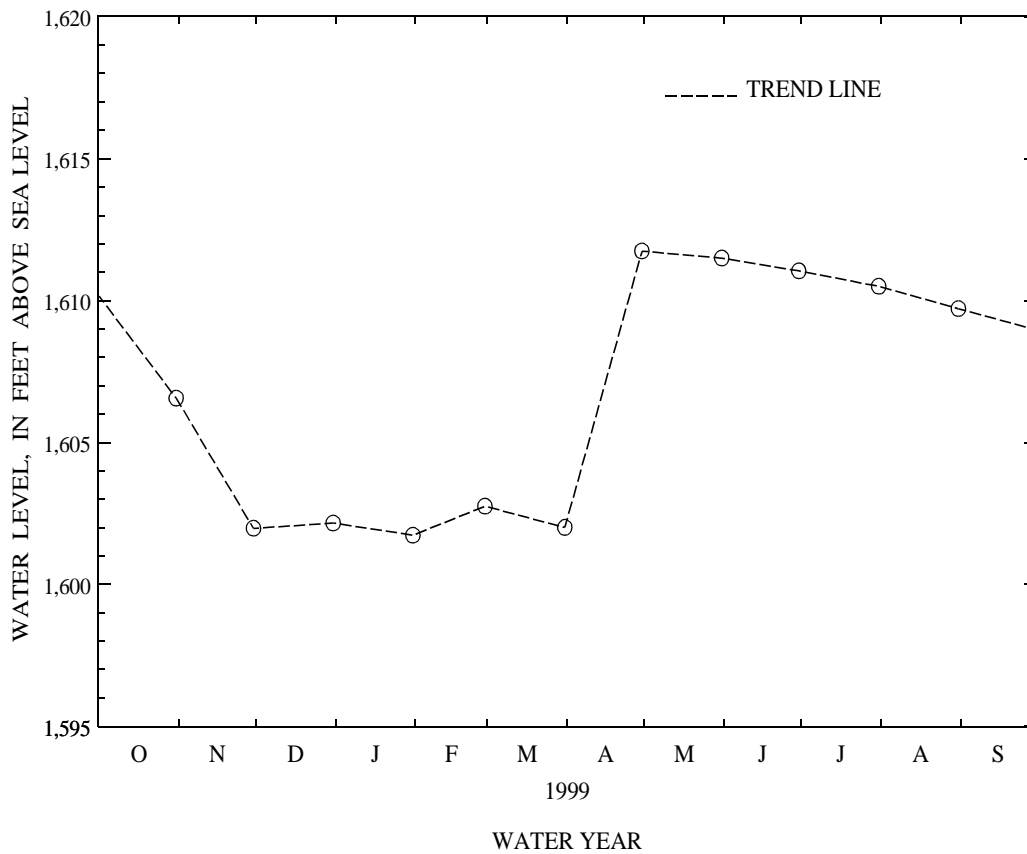
Date	Elevation (feet)	Contents (acre-feet)	Change in contents (acre-feet)
Sep. 30.....	1,610.28	3,070	-
Oct. 31.....	1,606.57	2,550	-520
Nov. 30.....	1,601.98	2,000	-550
Dec. 31.....	1,602.17	2,020	+20
CAL YR 1998.....			+40
Jan. 31.....	1,601.74	1,970	-50
Feb. 28.....	1,602.76	2,090	+120
Mar. 31.....	1,602.01	2,000	-90
Apr. 30.....	1,611.75	3,300	+1,300
May 31.....	1,611.50	3,260	-40
Jun. 30.....	1,611.05	3,190	-70
Jul. 31.....	1,610.51	3,110	-80
Aug. 31.....	1,609.72	2,990	-120
Sep. 30.....	1,608.98	2,880	-110
WTR YR 1999.....			-190

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BIG SANDY RIVER BASIN

03208680 NORTH FORK OF POUND LAKE AT POUND, VA--Continued



## 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 mi<sup>2</sup>.

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

REVISED RECORDS.--WDR VA-77-1: 1967(M). WDR VA-92-1: 1991(P).

GAGE.--Water-stage recorder. Datum of gage is 1,440.30 ft above sea level.

REMARKS.--Records good except those for period with ice effect Jan. 6, and period of no gage-height record, Apr. 2-5, which are fair. U.S. Army Corps of Engineers satellite precipitation and gage-height telemeter at station. Maximum discharge, 18,000 ft<sup>3</sup>/s, from rating curve extended above 3,100 ft<sup>3</sup>/s on basis of slope-area measurement of peak flow. Minimum gage height, 0.91 ft, Sep. 28, 1964. Several measurements of water temperature were made during the year. Water-quality record for some prior periods have been collected at this location.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Jan. 29, 1957, reached a stage of about 20.0 ft.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Jan 24	0830	*909	*6.55	No peak greater than base discharge.			

Minimum discharge, 3.8 ft<sup>3</sup>/s, Sep 19, gage height, 1.40 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	13	10	7.7	29	68	301	48	96	23	19	7.9	4.8
2	13	9.8	7.6	28	68	182	e45	81	22	17	9.1	4.9
3	10	11	7.5	200	65	243	e43	69	21	16	7.8	4.6
4	10	13	7.8	102	60	286	e41	61	21	14	6.9	4.6
5	9.8	11	9.8	56	53	210	e38	55	19	13	6.8	4.8
6	9.0	9.7	14	e52	51	185	37	94	19	12	6.3	8.0
7	8.6	9.0	11	40	52	145	36	86	18	11	6.2	8.8
8	18	9.0	116	39	49	117	35	75	17	11	6.1	6.5
9	17	9.5	117	262	44	122	37	62	16	9.8	7.9	5.7
10	11	12	44	174	42	141	35	53	16	36	6.9	5.6
11	9.7	31	30	96	39	130	96	47	15	45	6.1	5.2
12	8.8	15	25	70	40	116	99	42	15	19	6.0	4.8
13	8.2	9.4	148	56	40	103	79	44	14	17	5.9	4.7
14	8.2	8.6	110	51	35	111	69	84	14	14	5.8	4.7
15	8.0	8.4	52	204	35	258	79	55	15	12	5.6	5.0
16	7.7	8.4	36	146	35	271	89	45	14	11	5.8	4.9
17	7.4	8.0	30	99	38	315	81	40	14	10	5.4	4.3
18	7.1	8.5	24	206	46	236	73	39	13	10	5.4	4.1
19	7.3	7.5	21	205	47	165	66	64	12	16	5.3	4.1
20	7.7	7.7	20	129	52	132	63	47	12	11	9.9	4.5
21	7.2	8.4	18	94	49	117	56	40	12	12	8.8	4.5
22	7.2	7.9	22	74	46	98	51	40	11	11	6.4	4.7
23	7.7	7.5	25	108	45	83	49	37	11	9.0	5.9	4.7
24	7.8	7.6	31	601	45	78	62	74	12	19	5.7	4.4
25	8.3	7.8	27	269	48	69	52	54	15	18	10	4.5
26	8.5	10	26	156	52	64	59	43	14	13	9.5	4.3
27	8.6	10	24	114	54	60	71	36	13	9.7	6.9	4.8
28	9.0	8.4	26	91	402	55	129	32	19	9.5	6.0	7.2
29	13	7.9	30	73	---	51	151	28	27	14	5.8	11
30	10	8.0	36	62	---	48	119	26	35	10	5.6	17
31	9.8	---	32	55	---	45	---	25	---	8.6	5.2	---
TOTAL	296.6	300.0	1135.4	3941	1700	4537	1988	1674	499	457.6	208.9	171.7
MEAN	9.57	10.0	36.6	127	60.7	146	66.3	54.0	16.6	14.8	6.74	5.72
MAX	18	31	148	601	402	315	151	96	35	45	10	17
MIN	7.1	7.5	7.5	28	35	45	35	25	11	8.6	5.2	4.1
CFSM	.14	.15	.55	1.91	.91	2.20	1.00	.81	.25	.22	.10	.09
IN.	.17	.17	.64	2.20	.95	2.54	1.11	.94	.28	.26	.12	.10

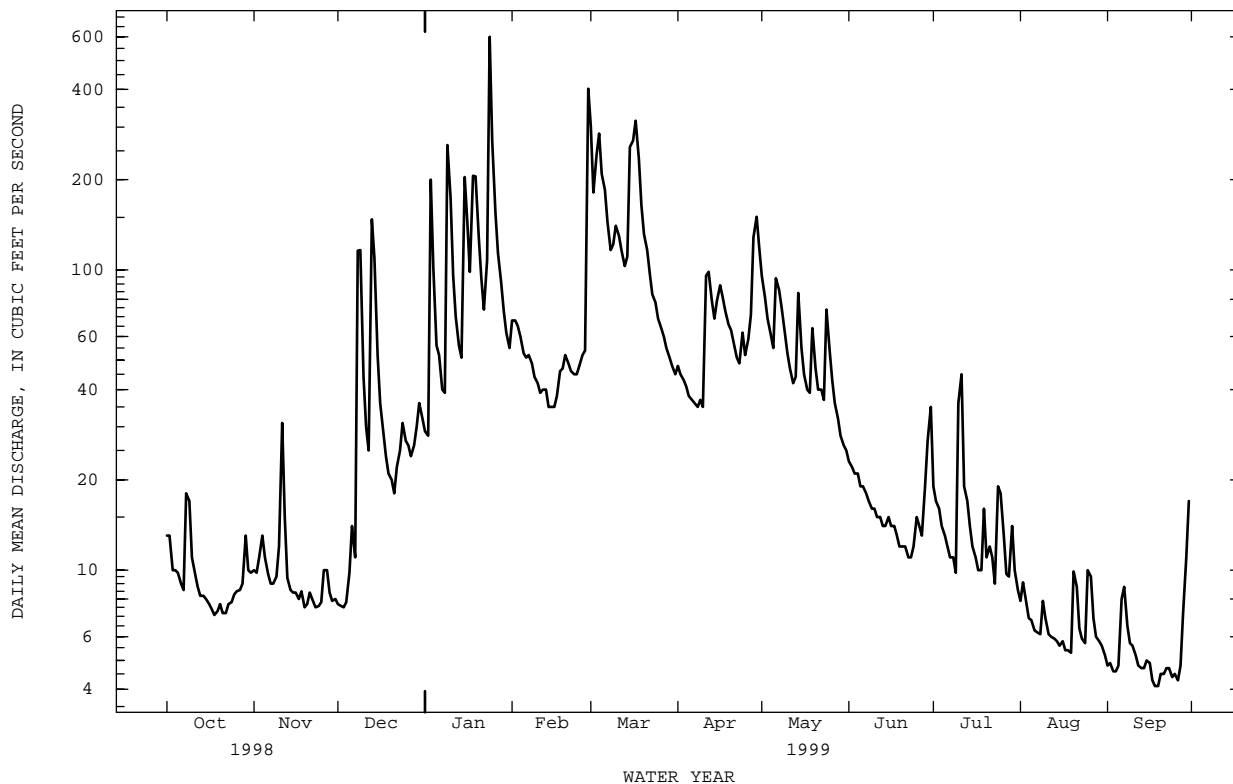
03208950 CRANES NEST RIVER NEAR CLINTWOOD, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1964 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	29.9	46.9	83.1	119	144	168	137	97.2	52.0	31.1	30.9	23.3
MAX	191	164	228	338	367	434	498	262	236	75.7	142	116
(WY)	1990	1978	1992	1972	1994	1975	1977	1984	1989	1991	1966	1982
MIN	1.67	6.33	4.41	5.98	36.6	37.8	28.1	21.2	7.40	5.50	6.74	3.95
(WY)	1964	1966	1966	1966	1968	1988	1986	1976	1966	1970	1999	1965

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR	WATER YEARS 1964 - 1999
ANNUAL TOTAL	34417.6	16909.2	
ANNUAL MEAN	94.3	46.3	79.9
HIGHEST ANNUAL MEAN			126 1994
LOWEST ANNUAL MEAN			34.7 1988
HIGHEST DAILY MEAN	1860	Apr 17	601 Jan 24
LOWEST DAILY MEAN	7.1	Oct 18	4.1 aSep 18
ANNUAL SEVEN-DAY MINIMUM	7.4	Oct 16	4.4 Sep 17
INSTANTANEOUS PEAK FLOW			909 Jan 24
INSTANTANEOUS PEAK STAGE			6.55 Jan 24
INSTANTANEOUS LOW FLOW			3.8 Sep 19
ANNUAL RUNOFF (CFSM)	1.42		.70
ANNUAL RUNOFF (INCHES)	19.25		9.46
10 PERCENT EXCEEDS	226		116
50 PERCENT EXCEEDS	44		20
90 PERCENT EXCEEDS	8.4		6.0

a Also Sep 19, 1999.  
 b From floodmark.  
 e Estimated.



## BIG SANDY RIVER BASIN

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 Blackklog Branch, and 3.7 mi northwest of Haysi.

DRAINAGE AREA.--221 mi<sup>2</sup>.

PERIOD OF RECORD.--September 1964 to current year.

GAGE.--Water-stage recorder. Datum of gage is at sea level (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 precipitation and 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, 67,700 acre-ft, May. 20, elevation, 1,396.50 ft; minimum, 28,200 acre-ft, Jan. 6, elevation, 1,350.55 ft.

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MONTHEND ELEVATION AND CONTENTS AT 2400, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

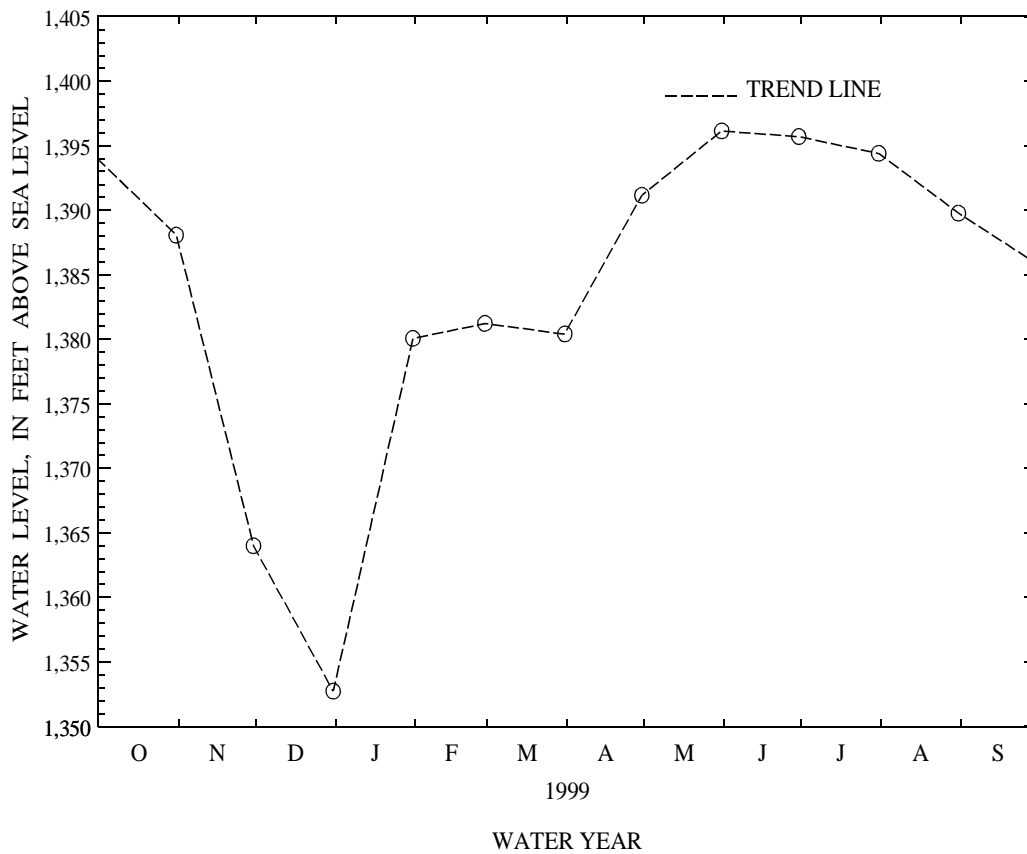
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Date	Elevation (feet)	Contents (acre-feet)	Change in contents (acre-feet)
Sep. 30.....	1,394.07	64,900	-
Oct. 31.....	1,388.07	58,500	-6,400
Nov. 30.....	1,364.01	37,300	-21,200
Dec. 31.....	1,352.73	29,600	-7,700
CAL YR 1998.....			-21,300
Jan. 31.....	1,380.07	50,600	+21,000
Feb. 28.....	1,381.24	51,700	+1,100
Mar. 31.....	1,380.41	50,900	-800
Apr. 30.....	1,391.18	61,700	+10,800
May 31.....	1,396.16	67,300	+5,600
Jun. 30.....	1,395.72	66,800	-500
Jul. 31.....	1,394.41	65,300	-1,500
Aug. 31.....	1,389.79	60,300	-5,000
Sep. 30.....	1,385.90	56,300	-4,000
WTR YR 1999.....			-8,600

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BIG SANDY RIVER BASIN

03208990 JOHN W. FLANNAGAN RESERVOIR NEAR HAYSI, VA--Continued



## 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 mi<sup>2</sup>.

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 sea level (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 Sep. 30, 1963, water-stage recorder at site 4.6 mi upstream at datum 79.91 ft higher.

REMARKS.--No estimated daily discharges. Records good. Flow regulated since March 1965 by John W. Flannagan Reservoir (station 03208990) 1,700 ft upstream and since August 1966 by North Fork of Pound Lake (station 03208680) 33 mi upstream. Statistics of monthly mean data and summary statistics for water years 1926-1964 (unregulated flow) are available in previous data books, water years 1991-1998. U.S. Army Corps of Engineers satellite precipitation and gage-height telemeter at station. Maximum discharge, about 30,000 ft<sup>3</sup>/s, from rating curve extended above 1,750 ft<sup>3</sup>/s. Maximum discharge since construction of John W. Flannagan Dam in 1965, 4,540 ft<sup>3</sup>/s. Minimum gage height since construction of John W. Flannagan Dam, 0.91 ft, Sep. 26, 1996, when gates in Flannagan Dam were closed for inspection. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 2,100 ft<sup>3</sup>/s, Mar 15, gage height, 5.89 ft; minimum daily, 18 ft<sup>3</sup>/s, Jan 9-14.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP		
1	46	182	46	203	264	831	88	56	68	34	74	115		
2	47	273	201	203	264	1220	42	56	70	34	49	119		
3	255	187	380	287	264	1210	43	56	55	34	35	119		
4	261	187	429	832	264	1280	43	49	43	34	57	115		
5	56	187	426	531	242	1190	43	43	45	34	85	115		
6	57	484	424	188	208	978	43	44	44	52	96	115		
7	58	669	424	193	209	834	43	45	44	61	94	88		
8	58	666	424	109	209	454	43	45	45	72	102	34		
9	58	660	654	18	201	505	43	45	45	82	112	45		
10	259	658	933	18	120	627	43	46	45	83	108	56		
11	256	654	925	18	81	599	43	46	43	83	99	50		
12	46	650	457	18	163	486	43	46	43	68	106	50		
13	46	648	390	18	181	444	43	47	44	61	112	66		
14	74	647	493	18	179	444	43	48	52	70	89	75		
15	110	642	420	19	179	996	52	135	56	87	97	74		
16	111	378	262	19	84	963	49	168	56	87	113	74		
17	293	264	132	19	59	1260	45	148	56	87	113	74		
18	271	264	58	19	150	1130	45	148	56	87	113	74		
19	59	269	58	19	203	791	45	148	55	56	113	74		
20	60	289	58	19	203	640	45	230	54	67	113	74		
21	61	293	58	19	203	411	45	208	63	87	113	74		
22	61	293	58	19	203	298	45	131	67	80	113	74		
23	61	293	58	19	203	346	45	129	76	79	113	74		
24	368	293	58	19	203	282	45	131	90	84	113	74		
25	397	293	58	627	203	226	45	131	85	63	113	74		
26	100	293	58	849	203	184	46	131	79	36	102	74		
27	88	293	58	454	203	184	46	131	79	34	92	74		
28	89	293	54	329	203	184	46	131	52	59	92	60		
29	224	181	50	264	---	184	46	131	34	74	102	42		
30	234	46	94	264	---	184	48	103	34	74	111	37		
31	182	---	181	264	---	184	---	67	---	74	114	---		
TOTAL	4346	11429	8379	5895	5351	19549	1384	3073	1678	2017	3058	2263		
MEAN	140	381	270	190	191	631	46.1	99.1	55.9	65.1	98.6	75.4		
MAX	397	669	933	849	264	1280	88	230	90	87	114	119		
MIN	46	46	46	18	59	184	42	43	34	34	35	34		
(†)	-3489	-10965	-3872	+10562	+615	-448	+6100	+2803	-287	-796	-2581	-2072		
MEAN‡	27.6	15.5	145	531	213	616	249	190	46.4	39.4	15.4	6.37		
CFSM‡	.12	.07	.66	2.40	.96	2.79	1.13	.86	.21	.18	.07	.03		
IN. ‡	.14	.08	.76	2.77	1.00	3.21	1.26	.99	.23	.21	.08	.03		
CAL YR 1998	TOTAL	134214	MEAN	368	MAX	3950	MIN	45	MEAN‡	338	CFSM‡	1.53	IN. ‡	20.77
WTR YR 1999	TOTAL	68442	MEAN	187	MAX	1280	MIN	18	MEAN‡	175	CFSM‡	0.79	IN. ‡	10.75

† Total change in contents, equivalent in cubic feet per second, per month, in North Fork of Pound Lake and John W. Flannagan Reservoir; provided by U. S. Army Corps of Engineers.

‡ Adjusted for monthly change in contents.

03209000 POUND RIVER BELOW FLANNAGAN DAM, NEAR HAYSI, VA--Continued

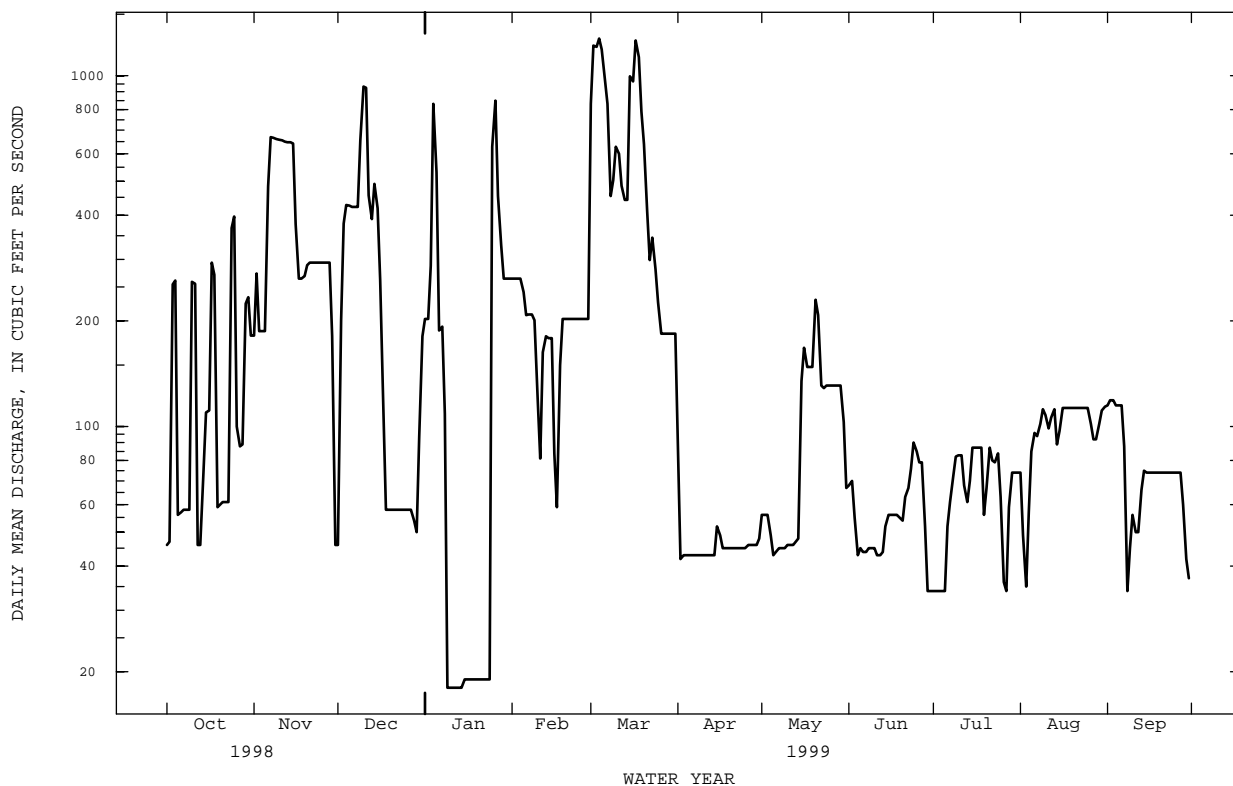
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1965 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	238	310	336	440	498	538	291	353	183	110	104	95.7
MAX	927	679	1003	1171	1343	1181	1004	1074	756	320	245	405
(WY)	1990	1978	1992	1972	1994	1975	1977	1975	1989	1989	1994	1982
MIN	48.9	24.8	16.1	31.8	92.3	110	46.1	47.4	9.66	5.49	7.13	32.5
(WY)	1989	1966	1966	1966	1992	1988	1995	1982	1966	1965	1965	1967

SUMMARY STATISTICS FOR 1998 CALENDAR YEAR FOR 1999 WATER YEAR WATER YEARS 1965 - 1999

ANNUAL TOTAL	134214	68422	
ANNUAL MEAN	368	187	291
HIGHEST ANNUAL MEAN			481 1975
LOWEST ANNUAL MEAN			120 1966
HIGHEST DAILY MEAN	3950	Apr 23	4410 Apr 9 1977
LOWEST DAILY MEAN	45	Sep 2	2.3 bJun 26 1965
ANNUAL SEVEN-DAY MINIMUM	48	Aug 28	2.5 Jun 25 1965
INSTANTANEOUS PEAK FLOW			2100 Mar 15 4540 Apr 8 1977
INSTANTANEOUS PEAK STAGE			5.89 Mar 15 8.20 Apr 8 1977
INSTANTANEOUS LOW FLOW			(c) 1.2 dFeb 16 1968
ANNUAL RUNOFF (CFSM)	1.66	.85	1.32
ANNUAL RUNOFF (INCHES)	22.59	11.52	17.87
10 PERCENT EXCEEDS	911	455	656
50 PERCENT EXCEEDS	224	88	142
90 PERCENT EXCEEDS	56	43	46

- a Also Jan 10-14, 1999.
- b Also Jun 27-29, 1965.
- c Not determined.
- d Also Aug 26, 1986.

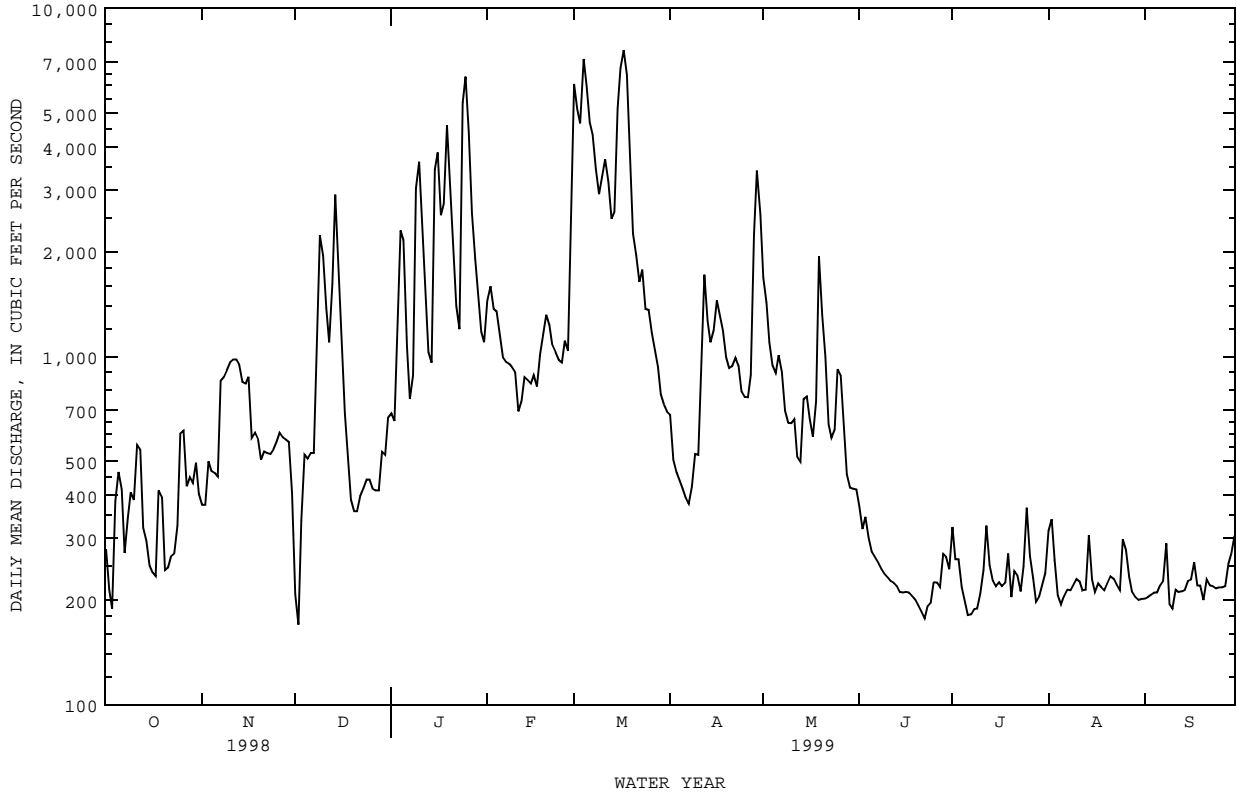






03209500 LEVISA FORK AT PIKEVILLE, KY--Continued

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR		FOR 1999 WATER YEAR		WATER YEARS 1969 - 1999	
ANNUAL TOTAL	722733		348936		1546	
ANNUAL MEAN	1980		956		2459	
HIGHEST ANNUAL MEAN					522	
LOWEST ANNUAL MEAN					1979	
HIGHEST DAILY MEAN	19800	Apr 17	7590	Mar 17	69300	Apr 5 1977
LOWEST DAILY MEAN	170	Dec 2	170	Dec 2	66	Dec 3 1970
ANNUAL SEVEN-DAY MINIMUM	195	Sep 12	193	Jun 18	103	Oct 10 1968
INSTANTANEOUS PEAK FLOW			8750		85500	
INSTANTANEOUS PEAK STAGE			17.50		52.72	
INSTANTANEOUS LOW FLOW					66	
10 PERCENT EXCEEDS	5020		2380		3590	
50 PERCENT EXCEEDS	1000		510		768	
90 PERCENT EXCEEDS	235		211		230	



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 mi<sup>2</sup>.

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 sea level. Nov. 1, 1920, to Nov. 14, 1931, nonrecording gage at site 400 ft downstream at same datum.

REMARKS.--Records good except for period with ice effect, Jan. 5-6, which is fair. Prior to August 1951, diurnal fluctuation at low flow caused by mill 500 ft upstream from station. Maximum discharge, 9,600 ft<sup>3</sup>/s, from rating curve extended above 3,700 ft<sup>3</sup>/s on basis of slope-area measurement of peak flow. Minimum discharge recorded, 2 ft<sup>3</sup>/s, but may have been less in 1925 and 1926 before installation of water-stage recorder. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 650 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
May 14	1445	*540	*3.65	No peak greater than base discharge.			

Minimum discharge, 13 ft<sup>3</sup>/s, Sep 24, gage height, 1.10 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	23	23	23	28	80	159	69	244	51	28	82	22
2	23	23	23	27	138	151	66	192	49	27	92	21
3	23	24	23	53	147	148	62	154	49	26	77	21
4	25	24	23	50	133	146	60	128	46	26	62	20
5	24	24	24	e41	112	138	58	111	45	25	53	30
6	23	23	24	e35	97	158	56	104	43	25	47	50
7	22	24	24	32	91	233	54	99	42	24	42	34
8	27	23	29	31	87	199	52	422	40	24	39	28
9	27	24	37	65	79	172	52	338	39	24	39	26
10	25	23	30	87	75	150	51	232	37	34	35	25
11	24	26	26	62	70	127	77	176	36	53	33	23
12	24	25	26	53	68	113	113	143	35	88	31	23
13	24	25	44	48	65	106	103	125	34	79	30	22
14	23	25	44	51	60	109	92	393	33	50	39	22
15	23	25	32	238	57	119	100	324	33	40	31	22
16	23	24	29	177	55	116	121	214	36	37	29	21
17	23	24	28	117	55	157	120	164	38	37	27	21
18	22	23	27	101	72	216	108	136	34	33	26	20
19	22	24	26	90	84	228	96	124	33	34	25	20
20	23	25	26	82	90	188	88	105	32	35	32	20
21	22	26	26	75	87	164	80	93	32	39	29	21
22	22	25	32	69	82	144	74	89	31	68	26	21
23	22	24	34	80	78	125	69	83	30	43	25	20
24	22	24	38	306	75	113	66	78	31	43	24	21
25	22	23	35	275	72	103	62	73	32	110	25	20
26	23	26	32	178	68	94	62	68	33	69	29	19
27	24	25	29	132	66	87	70	64	32	51	27	21
28	23	24	29	107	96	81	271	60	32	44	25	22
29	24	24	28	90	---	76	288	56	30	52	23	27
30	23	23	29	79	---	72	287	54	29	53	23	54
31	23	---	29	70	---	68	---	52	---	93	22	---
TOTAL	723	725	909	2929	2339	4260	2927	4698	1097	1414	1149	737
MEAN	23.3	24.2	29.3	94.5	83.5	137	97.6	152	36.6	45.6	37.1	24.6
MAX	27	26	44	306	147	233	288	422	51	110	92	54
MIN	22	23	23	27	55	68	51	52	29	24	22	19
CFSM	.31	.32	.39	1.24	1.10	1.81	1.28	1.99	.48	.60	.49	.32
IN.	.35	.35	.44	1.43	1.14	2.08	1.43	2.30	.54	.69	.56	.36

03471500 SOUTH FORK HOLSTON RIVER AT RIVERSIDE, NEAR CHILHOWIE, VA--Continued

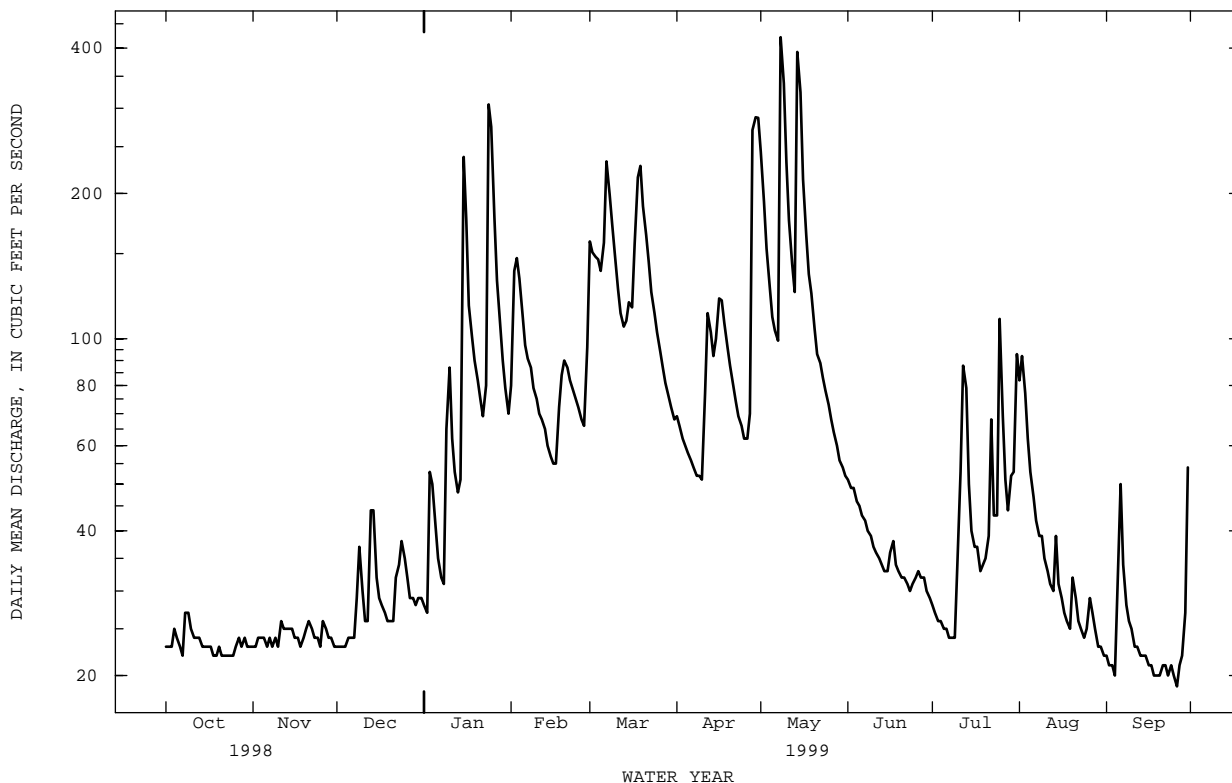
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1921 - 1932, 1942 - 1999 BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	49.5	69.0	110	154	204	209	170	140	90.9	58.7	54.7	44.6
MAX	162	409	272	353	508	512	570	278	322	172	209	254
(WY)	1990	1978	1973	1996	1957	1955	1987	1945	1923	1989	1942	1989
MIN	18.7	17.6	25.8	28.8	57.2	51.3	52.6	49.1	31.1	22.5	17.5	20.6
(WY)	1932	1932	1956	1956	1931	1988	1986	1926	1988	1988	1988	1988

SUMMARY STATISTICS FOR 1998 CALENDAR YEAR FOR 1999 WATER YEAR WATER YEARS 1921 - 1932 1942 - 1999

ANNUAL TOTAL		47836		23907								
ANNUAL MEAN		131		65.5						112		
HIGHEST ANNUAL MEAN										162		1974
LOWEST ANNUAL MEAN										53.8		1988
HIGHEST DAILY MEAN			1070	aFeb 17		422	May 8		4040		Nov 6	1977
LOWEST DAILY MEAN			22	bOct 7		19	Sep 26			8.0	Jul 19	1926
ANNUAL SEVEN-DAY MINIMUM			22	Oct 18		20	Sep 20		15		Jul 17	1926
INSTANTANEOUS PEAK FLOW						540	May 14		9600		Nov 6	1977
INSTANTANEOUS PEAK STAGE						3.65	May 14		10.20		Nov 6	1977
INSTANTANEOUS LOW FLOW						13	Sep 24		2.0	c Aug 26	1943	
ANNUAL RUNOFF (CFSM)		1.72		.86					1.48			
ANNUAL RUNOFF (INCHES)		23.38		11.69					20.05			
10 PERCENT EXCEEDS		302		140					227			
50 PERCENT EXCEEDS		66		39					70			
90 PERCENT EXCEEDS		24		23					27			

- a Also Feb 18, 1998.
- b Also Oct 18, 19, 21-25, 1998.
- c Also Oct 15, 1943, Aug 9, 11, 1944, and Oct 19, 1945.
- e Estimated.



## TENNESSEE RIVER BASIN

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 mi<sup>2</sup>.

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 sea level.

REMARKS.--Records good except for period with ice effect, Jan. 7, which is fair. Prior to 1980, some diurnal fluctuation at low flow caused by powerplant upstream from station. Maximum discharge, 22,000 ft<sup>3</sup>/s, from rating curve extended above 10,000 ft<sup>3</sup>/s on basis of slope-area measurement of peak flow. Minimum gage height, 2.07 ft, Aug. 19, 1988. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 3,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
May 8	0915	*3,190	*6.89	No other peak greater than base discharge.			

Minimum discharge, 68 ft<sup>3</sup>/s, Sep 27, gage height, 2.08 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	101	100	90	157	460	1020	304	850	173	128	246	88
2	98	99	88	145	598	813	289	702	172	134	281	84
3	96	103	88	446	556	819	274	578	191	118	233	82
4	102	106	88	383	498	868	262	492	174	111	194	81
5	104	104	92	267	424	781	249	429	160	106	170	108
6	99	101	101	228	376	881	238	441	151	101	156	442
7	97	100	96	e220	362	1170	231	446	146	97	140	215
8	119	99	119	216	365	978	224	2710	142	108	132	151
9	135	104	240	602	327	833	225	1680	138	98	173	123
10	114	104	158	828	319	756	219	1020	135	109	143	122
11	105	120	119	518	297	627	436	741	132	280	126	105
12	102	116	110	387	293	551	516	587	125	417	118	95
13	99	98	515	323	286	504	414	513	120	424	112	89
14	98	96	343	313	260	538	362	686	118	257	149	86
15	97	99	208	1750	249	634	419	678	118	202	127	84
16	97	99	160	1190	245	631	489	503	138	184	112	82
17	95	93	145	720	255	733	473	420	176	164	105	77
18	95	90	131	631	455	889	436	372	139	151	100	76
19	95	89	122	571	547	934	391	389	122	140	97	75
20	97	94	139	506	581	779	364	328	116	140	298	74
21	97	118	132	441	542	688	335	296	116	154	173	78
22	96	105	192	382	475	601	309	289	114	180	129	84
23	94	96	236	591	421	517	289	284	110	152	113	79
24	95	94	368	1530	385	468	321	272	115	177	106	76
25	96	91	328	1390	363	429	286	252	145	407	109	74
26	96	106	252	881	340	391	295	237	163	282	130	71
27	98	109	206	650	327	362	379	223	130	208	129	71
28	99	98	183	523	685	339	1260	207	146	177	110	80
29	103	93	172	435	---	321	1150	195	177	177	102	100
30	102	90	184	372	---	302	980	186	161	232	96	268
31	100	---	165	331	---	287	---	179	---	244	91	---
TOTAL	3121	3014	5570	17927	11291	20444	12419	17185	4263	5859	4500	3320
MEAN	101	100	180	578	403	659	414	554	142	189	145	111
MAX	135	120	515	1750	685	1170	1260	2710	191	424	298	442
MIN	94	89	88	145	245	287	219	179	110	97	91	71
CFSM	.33	.33	.60	1.92	1.34	2.19	1.38	1.84	.47	.63	.48	.37
IN.	.39	.37	.69	2.22	1.40	2.53	1.53	2.12	.53	.72	.56	.41

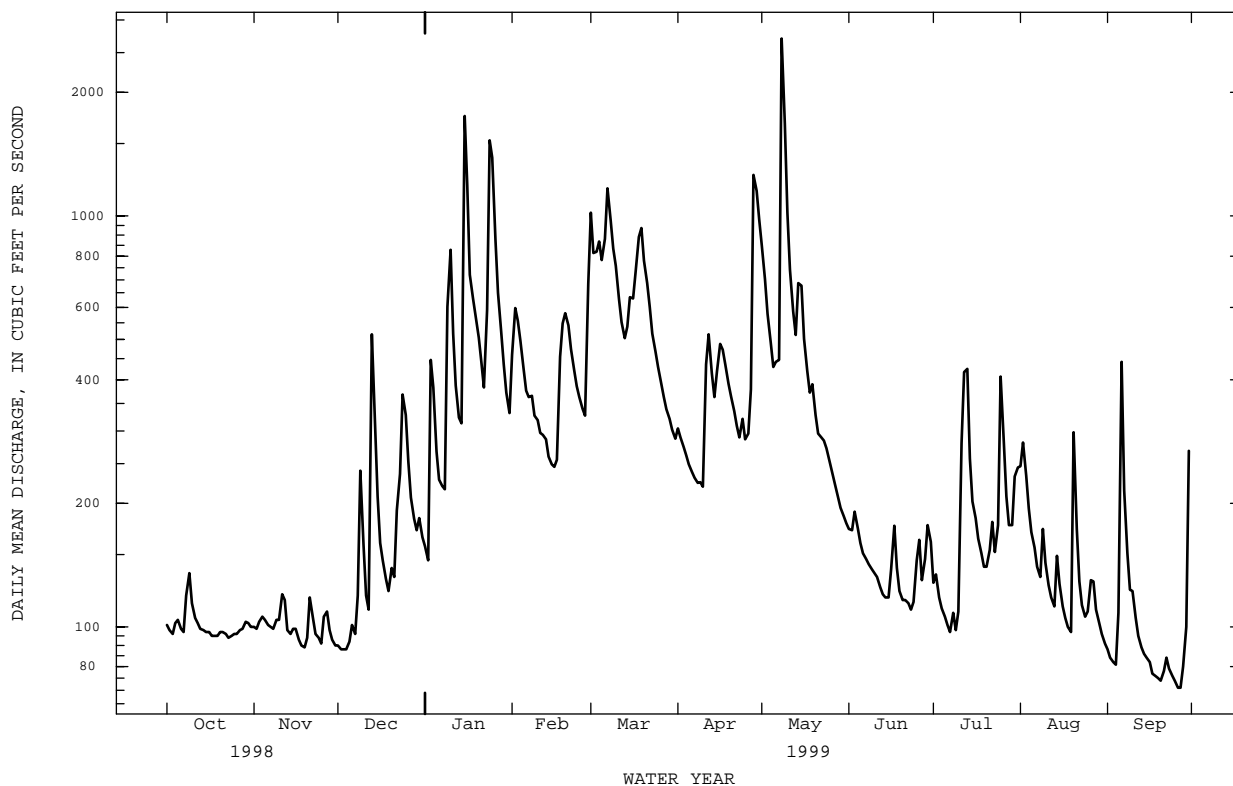
03473000 SOUTH FORK HOLSTON RIVER NEAR DAMASCUS, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1932 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	214	285	481	670	846	886	722	580	364	284	251	177
MAX	938	1258	1203	1490	2022	2075	1995	1367	968	1079	1193	790
(WY)	1978	1978	1973	1957	1957	1955	1987	1998	1998	1938	1940	1989
MIN	76.5	85.3	93.6	101	200	228	224	155	129	100	89.6	79.0
(WY)	1953	1940	1940	1940	1941	1988	1942	1941	1988	1988	1988	1954

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR	WATER YEARS 1932 - 1999
ANNUAL TOTAL	222613	108913	
ANNUAL MEAN	610	298	478
HIGHEST ANNUAL MEAN			712 1974
LOWEST ANNUAL MEAN			245 1988
HIGHEST DAILY MEAN	4840	Apr 17	2710 May 8 12800 Apr 5 1977
LOWEST DAILY MEAN	88	aDec 2	71 bSep 26 40 Dec 27 1983
ANNUAL SEVEN-DAY MINIMUM	90	Nov 29	76 Sep 21 63 Sep 13 1954
INSTANTANEOUS PEAK FLOW			3190 May 8 22000 Apr 5 1977
INSTANTANEOUS PEAK STAGE			6.89 May 8 17.11 Apr 5 1977
INSTANTANEOUS LOW FLOW			68 Sep 27 30 cOct 14 1941
ANNUAL RUNOFF (CFSM)	2.03	.99	1.59
ANNUAL RUNOFF (INCHES)	27.51	13.46	21.60
10 PERCENT EXCEEDS	1390	632	994
50 PERCENT EXCEEDS	405	177	305
90 PERCENT EXCEEDS	99	95	110

- a Also Dec 3, 4, 1998.
- b Also Sep 27, 1999.
- c Also Dec. 24, 1943.
- e Estimated.



TENNESSEE RIVER BASIN

03474000 MIDDLE FORK HOLSTON RIVER AT SEVEN MILE FORD, VA

LOCATION.--Lat 36°48'26", long 81°37'20", Smyth County, Hydrologic Unit 06010102, 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 at mile 32.1

DRAINAGE AREA.--132 mi<sup>2</sup>.

PERIOD OF RECORD.--July 1942 to December 1981, January 1982 to September 1987 (annual maximum only), October 1987 to September 1989, October 1989 to September 1996 (annual maximum only), October 1996 to current year.

REVISED RECORDS.--WSP 973: 1942(m). WSP 1306: 1947(M).

GAGE.--Water-stage recorder and concrete control. Datum of gage is 1,960.00 ft above sea level.

REMARKS.--No estimated daily discharges. Records good. Prior to April 1977, some diurnal fluctuation at low flow caused by mill 9 mi above station. Since May 1936, flow occasionally regulated by the filling or draining of Hungry Mother Lake on Hungry Mother Creek, capacity, about 1,600 acre-ft. Tennessee Valley Authority gage-height data logger at station, called at 6-hour intervals by computer at Knoxville, TN. Maximum discharge, 14,500 ft<sup>3</sup>/s. Minimum gage height, 0.89 ft, Sep. 8, 1988. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been made at this location.

COOPERATION.--Gage-height record of extremes were provided by Tennessee Valley Authority for the period Jan. 1, 1982, to Sep. 30, 1987, and Oct. 1, 1989 to Sep. 30, 1996.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
May 14	1500	*1,110	*2.83	No peak greater than base discharge.			

Minimum discharge, 26 ft<sup>3</sup>/s, Sep 18, 21, 24, gage height, 1.01 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	43	38	36	54	96	396	97	298	57	41	130	31
2	40	37	35	52	106	290	93	226	57	39	101	31
3	40	40	36	129	109	268	87	177	57	39	73	30
4	61	41	36	113	108	280	83	147	55	38	61	30
5	48	39	38	76	101	252	78	128	53	37	54	45
6	42	38	40	63	95	349	75	128	52	34	49	64
7	41	38	38	61	99	400	74	116	49	33	46	43
8	53	38	61	65	107	307	72	547	47	33	44	37
9	50	38	97	191	101	260	74	406	47	33	45	35
10	44	37	60	219	98	230	73	270	46	49	42	35
11	43	42	50	123	92	190	116	199	44	83	40	33
12	41	40	46	94	92	168	155	158	44	143	38	33
13	40	37	116	81	92	156	133	137	44	99	37	31
14	39	38	104	85	81	162	117	692	42	61	82	31
15	39	38	68	730	78	236	131	529	42	51	54	30
16	39	37	55	334	77	283	151	308	47	53	44	30
17	39	37	52	192	83	423	138	221	50	53	39	29
18	38	36	49	165	247	381	123	173	45	46	38	29
19	38	36	47	163	281	316	110	159	43	42	36	30
20	38	37	46	137	247	250	104	128	42	48	42	30
21	38	40	44	117	199	215	96	111	42	52	41	30
22	37	38	69	101	164	182	89	110	41	81	37	30
23	37	37	74	154	140	154	83	101	40	56	35	29
24	37	36	109	617	126	140	94	95	40	109	34	29
25	38	36	90	432	118	128	88	87	42	192	39	30
26	37	47	71	256	112	117	90	81	43	95	41	30
27	36	41	62	184	124	109	110	76	41	68	38	32
28	38	37	57	147	298	103	423	70	43	62	35	34
29	42	37	55	123	---	96	395	67	57	120	34	50
30	38	37	58	106	---	91	377	64	46	117	33	78
31	39	---	56	95	---	87	---	61	---	186	31	---
TOTAL	1273	1148	1855	5459	3671	7019	3929	6070	1398	2193	1493	1059
MEAN	41.1	38.3	59.8	176	131	226	131	196	46.6	70.7	48.2	35.3
MAX	61	47	116	730	298	423	423	692	57	192	130	78
MIN	36	36	35	52	77	87	72	61	40	33	31	29
CFSM	.31	.29	.45	1.33	.99	1.72	.99	1.48	.35	.54	.36	.27
IN.	.36	.32	.52	1.54	1.03	1.98	1.11	1.71	.39	.62	.42	.30

03474000 MIDDLE FORK HOLSTON RIVER AT SEVEN MILE FORD, VA--Continued

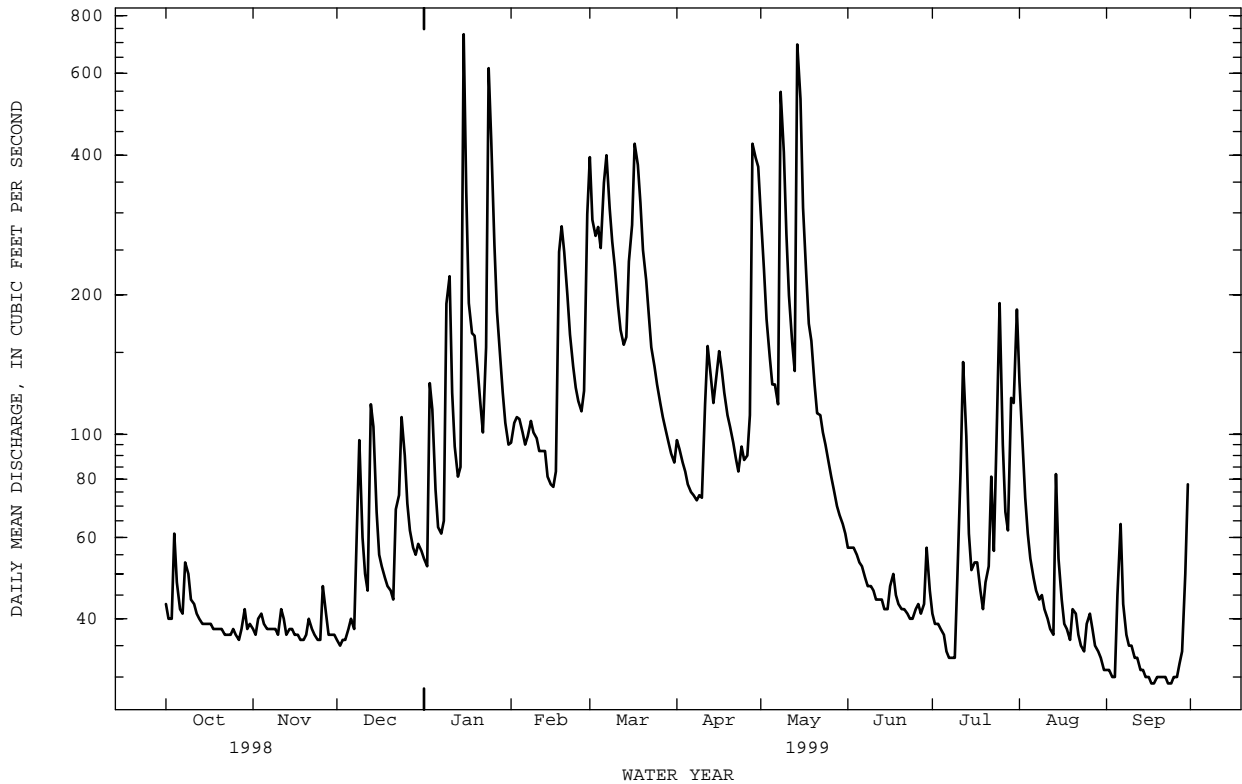
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1942 - 1981, 1988 - 1989, 1997 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	70.6	93.9	164	233	298	310	245	207	122	82.5	75.0	64.8
MAX	298	580	534	708	870	844	630	433	294	207	210	256
(WY)	1977	1978	1973	1957	1957	1955	1977	1945	1979	1989	1947	1989
MIN	32.4	29.8	34.1	37.0	85.5	74.5	107	73.0	38.9	33.8	28.1	32.4
(WY)	1989	1954	1956	1966	1954	1988	1963	1964	1988	1988	1988	1988

SUMMARY STATISTICS FOR 1998 CALENDAR YEAR FOR 1999 WATER YEAR WATER YEARS 1942 - 1981  
1988 - 1989  
1997 - 1999

ANNUAL TOTAL		66143		36567						163		
ANNUAL MEAN		181		100						250		1973
HIGHEST ANNUAL MEAN										79.2		1988
LOWEST ANNUAL MEAN										5990		Apr 4 1977
HIGHEST DAILY MEAN		1470		Mar 21		730		Jan 15		20		bSep 26 1944
LOWEST DAILY MEAN		35		Dec 2		29		aSep 17		24		Sep 3 1960
ANNUAL SEVEN-DAY MINIMUM		36		Nov 28		30		Sep 17		14500		Nov 6 1977
INSTANTANEOUS PEAK FLOW						1110		May 14		10.75		Jan 29 1957
INSTANTANEOUS PEAK STAGE						2.83		May 14		9.0		Sep 26 1944
INSTANTANEOUS LOW FLOW						26		cSep 18		1.24		
ANNUAL RUNOFF (CFSM)		1.37				.76				16.81		
ANNUAL RUNOFF (INCHES)		18.64				10.31				337		
10 PERCENT EXCEEDS		433				223				92		
50 PERCENT EXCEEDS		104				58				37		
90 PERCENT EXCEEDS		38				36						

- a Also Sep 18, 23, 24, 1999.
- b Also Aug 2, 1964.
- c Also Sep 21, 24, 1999.



## 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 mi<sup>2</sup>.

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 sea level.

REMARKS.--Records good except for period with ice effect, Jan. 6, which is fair. Prior to 1954, flow regulated by powerplant 0.9 mi upstream from station. Maximum discharge, 12,500 ft<sup>3</sup>/s, from rating curve extended above 12,000 ft<sup>3</sup>/s. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Jan. 29, 1957, reached a stage of 11.8 ft, from floodmark, discharge, 10,000 ft<sup>3</sup>/s, and flood of Dec. 10, 1972, reached a stage of 11.0 ft, from floodmark, discharge, 8,540 ft<sup>3</sup>/s, from information by Tennessee Valley Authority. Flood of Mar. 30, 1975, reached a stage of 10.37 ft, discharge, 7,410 ft<sup>3</sup>/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Jan 15	1415	*1,380	*4.84	No peak greater than base discharge.			

Minimum discharge, 53 ft<sup>3</sup>/s, Sep 16-17, 24-26, gage height, 1.95 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	82	71	63	83	164	542	173	390	101	79	228	58
2	73	70	60	80	169	417	168	305	97	73	187	57
3	70	71	60	168	170	377	157	250	101	71	140	56
4	89	76	60	203	166	456	151	215	95	70	118	55
5	96	74	62	164	160	400	145	192	92	69	108	64
6	77	71	67	e130	149	486	138	191	88	64	98	116
7	73	70	65	117	148	552	135	180	87	62	90	89
8	96	71	79	104	160	457	133	509	85	62	87	71
9	103	71	166	178	151	379	133	539	83	60	87	66
10	84	71	113	336	149	351	132	356	81	69	82	67
11	77	74	86	208	140	302	172	269	80	136	78	64
12	74	78	78	157	137	270	233	221	78	173	76	60
13	71	73	154	134	142	251	210	199	76	202	73	60
14	71	72	187	130	130	254	190	534	76	119	129	58
15	70	72	124	844	123	329	194	728	75	97	112	57
16	70	70	97	577	122	411	221	401	79	85	88	55
17	69	69	88	312	127	585	208	288	87	96	77	55
18	69	67	82	252	260	545	194	232	81	85	73	55
19	70	66	75	250	387	460	178	216	75	83	70	56
20	70	68	73	219	377	375	167	187	73	93	79	57
21	70	70	71	192	308	329	156	161	72	108	78	56
22	69	69	84	169	261	295	147	153	72	120	71	57
23	68	67	118	212	228	258	143	155	72	111	70	56
24	69	65	159	817	206	239	143	142	76	176	67	55
25	70	64	157	738	194	224	138	136	77	340	71	55
26	70	74	121	424	185	207	142	128	77	220	79	55
27	69	78	102	303	186	195	169	122	75	147	73	57
28	70	67	93	249	297	185	412	117	85	124	68	62
29	77	65	87	213	---	177	525	112	94	143	65	68
30	75	64	90	186	---	167	463	107	93	200	63	117
31	73	---	89	166	---	160	---	103	---	203	59	---
TOTAL	2334	2108	3010	8315	5396	10635	5870	7838	2483	3740	2844	1914
MEAN	75.3	70.3	97.1	268	193	343	196	253	82.8	121	91.7	63.8
MAX	103	78	187	844	387	585	525	728	101	340	228	117
MIN	68	64	60	80	122	160	132	103	72	60	59	55
CFSM	.36	.33	.46	1.27	.91	1.63	.93	1.20	.39	.57	.43	.30
IN.	.41	.37	.53	1.47	.95	1.87	1.03	1.38	.44	.66	.50	.34



03475000 MIDDLE FORK HOLSTON RIVER NEAR MEADOWVIEW, VA--Continued

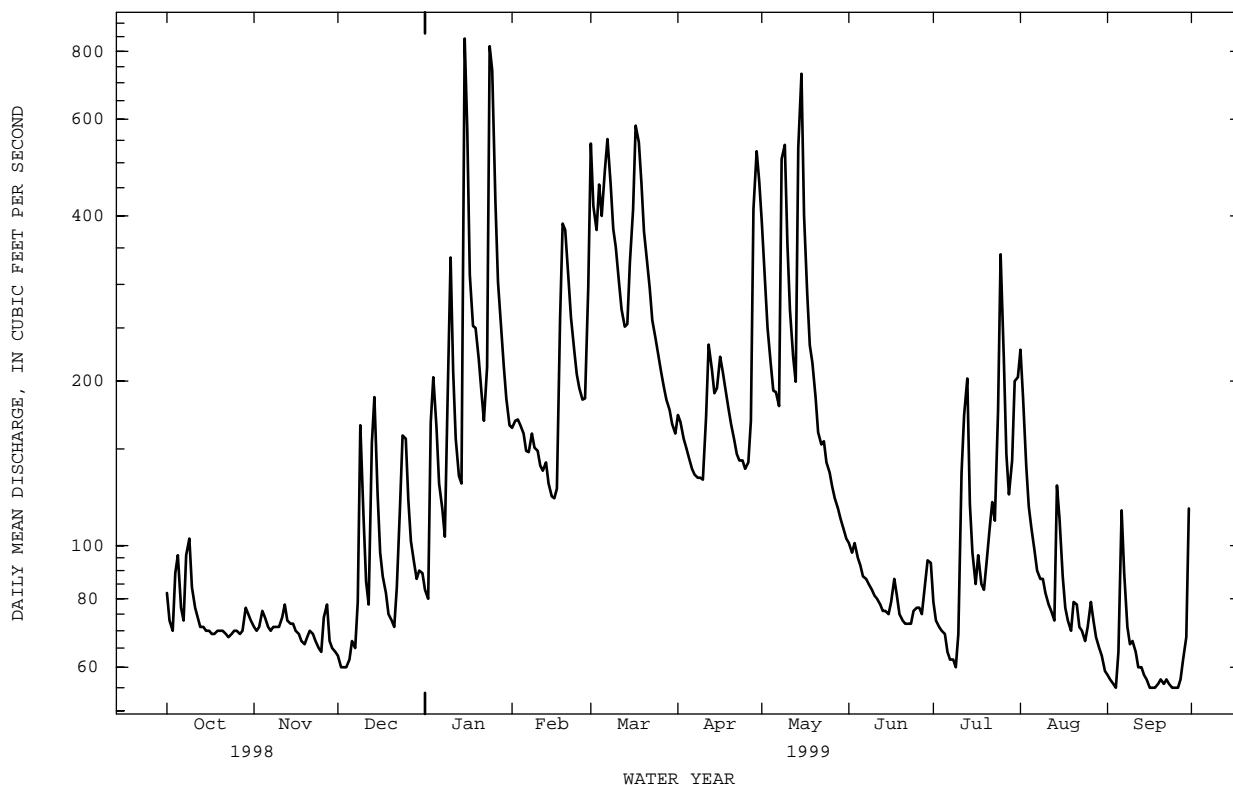
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1932 - 1953, 1976 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	112	131	211	350	457	458	355	302	192	143	144	97.1
MAX	479	739	526	731	1050	899	1158	677	485	420	649	357
(WY)	1977	1978	1943	1996	1994	1993	1987	1990	1981	1938	1940	1989
MIN	45.3	44.3	49.9	52.6	64.0	114	98.3	74.2	61.5	55.5	50.5	50.0
(WY)	1934	1942	1940	1940	1934	1988	1942	1941	1988	1988	1988	1952

SUMMARY STATISTICS FOR 1998 CALENDAR YEAR FOR 1999 WATER YEAR WATER YEARS 1932 - 1953  
1976 - 1999

ANNUAL TOTAL		106212		56487								
ANNUAL MEAN		291		155						245		
HIGHEST ANNUAL MEAN										356		1990
LOWEST ANNUAL MEAN										105		1941
HIGHEST DAILY MEAN			2600	Mar 21		844	Jan 15		8220	Apr 5		1977
LOWEST DAILY MEAN			60	aDec 2		55	bSep 4		c7.0	Nov 19		1950
ANNUAL SEVEN-DAY MINIMUM			62	Nov 29		56	Sep 15		38	Oct 25		1952
INSTANTANEOUS PEAK FLOW						1380	Jan 15		12500	Nov 7		1977
INSTANTANEOUS PEAK STAGE						4.84	Jan 15		13.41	Nov 7		1977
INSTANTANEOUS LOW FLOW						53	dSep 16		c6.0	fNov 10		1933
ANNUAL RUNOFF (CFSM)		1.38				.73			1.16			
ANNUAL RUNOFF (INCHES)		18.73				9.96			15.80			
10 PERCENT EXCEEDS		624				319			496			
50 PERCENT EXCEEDS		172				103			146			
90 PERCENT EXCEEDS		70				65			62			

- a Also Dec 3, 4, 1998.
- b Also Sep 16-18, 24-26, 1999.
- c Flow was regulated by powerplant.
- d Also Sep 17, 24-26, 1999.
- e Estimated.
- f Also Dec 4, 1936, Jan 21, 22, Feb 1, 1940, Jan 8, 1942, and Oct 15, 16, 31, 1943.



## TENNESSEE RIVER BASIN

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 mi<sup>2</sup>.

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 sea level.

REMARKS.--No estimated daily discharges. Records good. 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. Maximum discharge, 1,600 ft<sup>3</sup>/s, from rating curve extended above 390 ft<sup>3</sup>/s on basis of slope-area measurement of peak flow. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in 1936 reached a stage of about 12 ft.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 281 ft<sup>3</sup>/s, Aug 1, gage height, 5.42 ft; minimum discharge, 7.5 ft<sup>3</sup>/s, Sep 24, gage height, 2.63 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	13	12	10	13	34	43	32	36	19	20	30	9.8
2	12	12	10	15	33	40	29	33	21	18	23	9.7
3	12	13	10	34	31	76	28	32	20	17	17	9.5
4	13	12	10	22	30	77	27	31	19	16	16	9.2
5	13	12	11	19	28	66	26	29	18	16	15	11
6	12	11	11	17	27	64	25	36	18	15	15	13
7	13	11	11	16	29	59	25	32	18	21	15	11
8	24	11	27	18	28	54	25	49	18	16	15	9.9
9	16	11	24	28	27	57	25	37	21	15	15	14
10	14	12	15	24	26	54	24	33	29	27	14	21
11	14	14	13	21	25	50	52	31	21	26	14	12
12	13	12	16	19	26	47	37	29	19	50	14	11
13	13	11	44	18	25	45	32	31	18	27	14	10
14	13	11	24	27	24	46	30	31	18	22	13	10
15	13	11	18	64	24	51	37	28	18	20	12	9.9
16	13	11	15	40	24	48	32	27	21	19	12	9.5
17	13	11	15	33	29	45	30	26	19	18	11	9.3
18	13	11	13	42	39	44	29	26	18	18	12	9.3
19	13	11	13	36	48	42	28	30	17	17	11	9.2
20	13	12	13	32	54	41	28	26	16	18	30	12
21	13	11	12	30	45	42	26	24	16	18	15	16
22	12	11	21	28	41	39	26	25	16	17	13	8.9
23	12	11	19	45	40	38	25	24	15	17	12	8.7
24	12	11	34	74	37	37	25	24	16	18	12	8.1
25	12	11	23	55	37	36	24	22	19	17	12	8.1
26	12	13	19	46	35	34	26	22	17	16	12	8.0
27	12	11	16	41	34	33	53	21	19	16	12	8.3
28	12	11	16	39	46	31	60	20	23	15	11	8.5
29	12	10	14	37	---	30	45	20	28	15	11	11
30	12	10	15	34	---	30	40	20	22	16	10	10
31	12	---	14	33	---	29	---	19	---	15	9.8	---
TOTAL	406	342	526	1000	926	1428	951	874	577	596	447.8	315.9
MEAN	13.1	11.4	17.0	32.3	33.1	46.1	31.7	28.2	19.2	19.2	14.4	10.5
MAX	24	14	44	74	54	77	60	49	29	50	30	21
MIN	12	10	10	13	24	29	24	19	15	15	9.8	8.0
CFSM	.47	.41	.61	1.16	1.19	1.66	1.14	1.02	.69	.69	.52	.38
IN.	.55	.46	.71	1.34	1.24	1.92	1.28	1.17	.77	.80	.60	.42

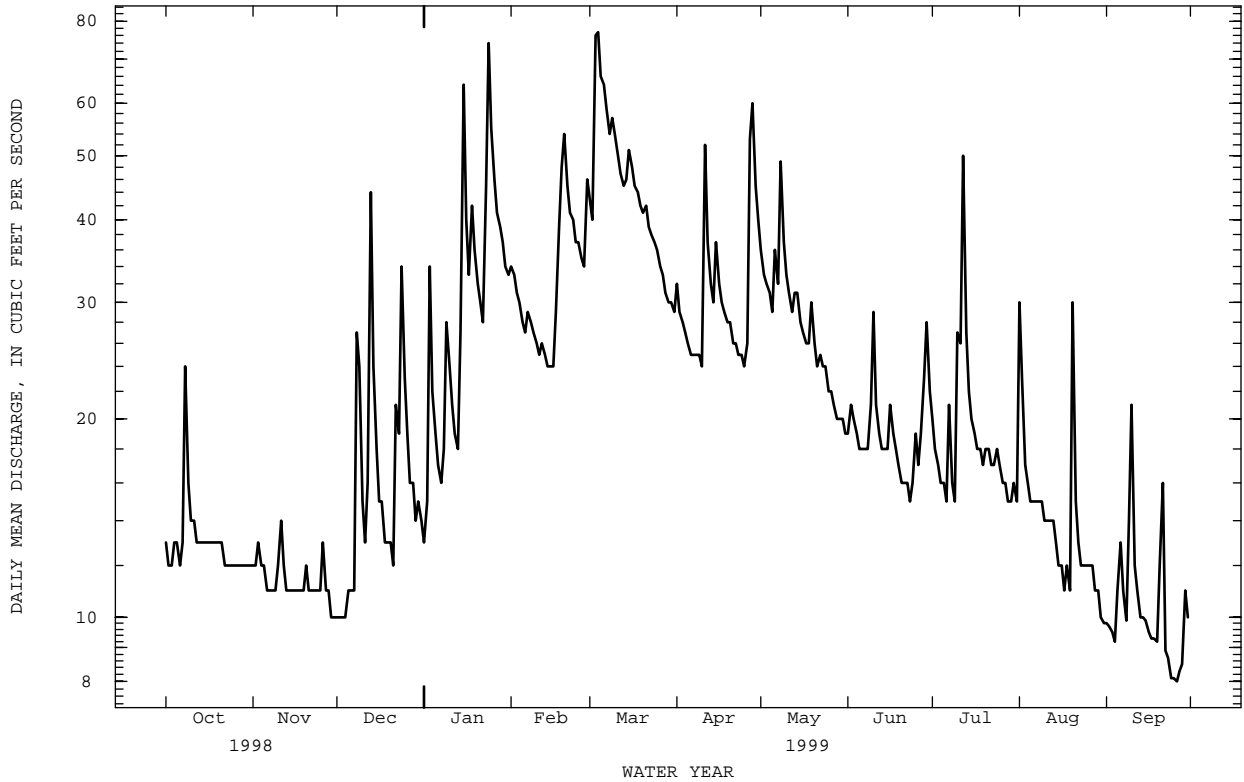
03478400 BEAVER CREEK AT BRISTOL, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1958 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	18.2	19.7	31.6	42.5	54.9	59.3	52.5	41.4	32.7	25.3	21.1	17.7
MAX	76.1	58.0	128	141	131	130	120	129	73.1	53.4	64.5	48.9
(WY)	1973	1978	1973	1974	1994	1963	1998	1958	1972	1982	1982	1982
MIN	8.08	10.3	9.13	8.92	19.5	19.7	19.3	17.7	13.0	10.2	9.96	9.23
(WY)	1970	1970	1966	1966	1981	1988	1985	1985	1988	1988	1988	1969

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR	WATER YEARS 1958 - 1999
ANNUAL TOTAL	15928	8389.7	
ANNUAL MEAN	43.6	23.0	34.7
HIGHEST ANNUAL MEAN			62.8
LOWEST ANNUAL MEAN			16.2
HIGHEST DAILY MEAN	466	Apr 17	580
LOWEST DAILY MEAN	10	aNov 29	7.4
ANNUAL SEVEN-DAY MINIMUM	10	Nov 28	7.6
INSTANTANEOUS PEAK FLOW			1600
INSTANTANEOUS PEAK STAGE			9.94
INSTANTANEOUS LOW FLOW			3.4
ANNUAL RUNOFF (CFSM)	1.58	.83	1.25
ANNUAL RUNOFF (INCHES)	21.39	11.27	17.00
10 PERCENT EXCEEDS	80	41	63
50 PERCENT EXCEEDS	34	19	27
90 PERCENT EXCEEDS	12	11	12

a Also Nov 30 to Dec 4, 1998.  
 b Also Sep 29, and Oct. 5, 15, 18, 19, 23, 24, 1969.



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 mi<sup>2</sup>.

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 sea level. 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, Jan. 7, which is fair. National Weather Service gage-height telemeter at station. Maximum discharge, 16,500 ft<sup>3</sup>/s, from rating curve extended above 13,000 ft<sup>3</sup>/s on basis of slope-area measurement of peak flow. Minimum discharge, 1.0 ft<sup>3</sup>/s, Oct. 15, 16, 1947, gage height, 0.13 ft, flow retarded by mine cave-in. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 3,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Jan 15	1445	*2,370	*4.71	No peak greater than base discharge.			

Minimum discharge, 21 ft<sup>3</sup>/s, Sep 26-27, gage height, 0.44 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	72	38	37	71	183	719	155	464	84	74	285	26
2	52	37	35	82	193	569	156	372	80	54	214	25
3	42	41	35	236	197	620	144	306	80	45	137	25
4	51	41	35	313	193	920	136	260	75	41	99	25
5	49	41	36	193	187	683	127	230	69	40	79	27
6	47	41	39	170	174	725	120	219	64	36	67	56
7	41	41	39	e150	175	775	114	206	60	33	58	66
8	58	39	62	129	195	640	111	309	56	32	54	50
9	68	38	212	232	185	528	112	368	54	30	60	40
10	64	37	155	493	179	473	111	318	51	43	55	36
11	51	46	95	339	170	389	369	267	48	75	49	32
12	43	46	72	240	164	333	900	228	44	90	45	28
13	40	47	129	188	164	308	508	206	43	122	42	27
14	37	46	232	180	149	317	366	368	42	88	49	27
15	35	43	160	1560	138	454	326	466	42	60	51	26
16	34	41	113	975	134	527	339	342	43	52	46	24
17	33	39	92	537	140	656	295	268	48	50	41	23
18	33	37	77	443	297	772	263	224	47	43	37	22
19	33	37	66	469	477	762	235	213	43	39	34	23
20	32	36	65	399	443	579	218	184	39	40	51	23
21	32	36	69	323	364	484	200	157	38	51	57	24
22	31	35	77	265	302	419	181	145	37	102	53	24
23	31	35	103	305	256	336	167	142	36	84	41	24
24	31	35	170	1260	234	291	166	156	35	64	36	22
25	32	35	178	1090	216	260	149	198	36	234	37	23
26	32	39	136	642	203	232	149	164	36	161	39	22
27	33	43	108	446	206	208	176	143	38	95	38	23
28	34	43	95	344	420	188	810	125	67	85	36	25
29	36	41	89	277	---	175	776	111	86	135	33	28
30	37	38	88	231	---	162	589	100	87	196	30	35
31	38	---	81	197	---	151	---	92	---	243	27	---
TOTAL	1282	1192	2980	12779	6338	14655	8468	7351	1608	2537	1980	881
MEAN	41.4	39.7	96.1	412	226	473	282	237	53.6	81.8	63.9	29.4
MAX	72	47	232	1560	477	920	900	466	87	243	285	66
MIN	31	35	35	71	134	151	111	92	35	30	27	22
CFSM	.19	.18	.43	1.86	1.02	2.13	1.27	1.07	.24	.37	.29	.13
IN.	.21	.20	.50	2.14	1.06	2.46	1.42	1.23	.27	.43	.33	.15

03488000 NORTH FORK HOLSTON RIVER NEAR SALTVILLE, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1907 - 1909, 1921 - 1999 BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	114	167	327	472	572	606	448	372	224	124	117	86.1
MAX	916	1077	1178	1317	1500	1735	1311	858	1036	353	584	474
(WY)	1977	1978	1927	1957	1957	1955	1987	1990	1907	1938	1940	1989
MIN	24.9	27.5	32.4	49.9	98.0	121	116	80.4	46.3	33.6	25.2	25.8
(WY)	1954	1940	1940	1966	1934	1988	1995	1941	1930	1988	1988	1930

SUMMARY STATISTICS FOR 1998 CALENDAR YEAR FOR 1999 WATER YEAR WATER YEARS 1907 - 1909 1921 - 1999

ANNUAL TOTAL		122538		62051								
ANNUAL MEAN		336		170						300		
HIGHEST ANNUAL MEAN										457		1973
LOWEST ANNUAL MEAN										135		1988
HIGHEST DAILY MEAN			4480	Mar 21		1560	Jan 15		10900		Apr 5	1977
LOWEST DAILY MEAN			31	aSep 15		22	bSep 18		2.0		Oct 15	1947
ANNUAL SEVEN-DAY MINIMUM			31	Sep 14		23	Sep 18		21		Sep 8	1952
INSTANTANEOUS PEAK FLOW						2370	Jan 15		16500		Jan 29	1957
INSTANTANEOUS PEAK STAGE						4.71	Jan 15		13.57		Nov 6	1977
INSTANTANEOUS LOW FLOW						21	cSep 26		d1.0		fOct 15	1947
ANNUAL RUNOFF (CFSM)		1.51				.77			1.35			
ANNUAL RUNOFF (INCHES)		20.53				10.40			18.37			
10 PERCENT EXCEEDS		816				429			647			
50 PERCENT EXCEEDS		170				84			157			
90 PERCENT EXCEEDS		36				33			39			

a Also Sep 16-20, and Oct 22-24, 1998.

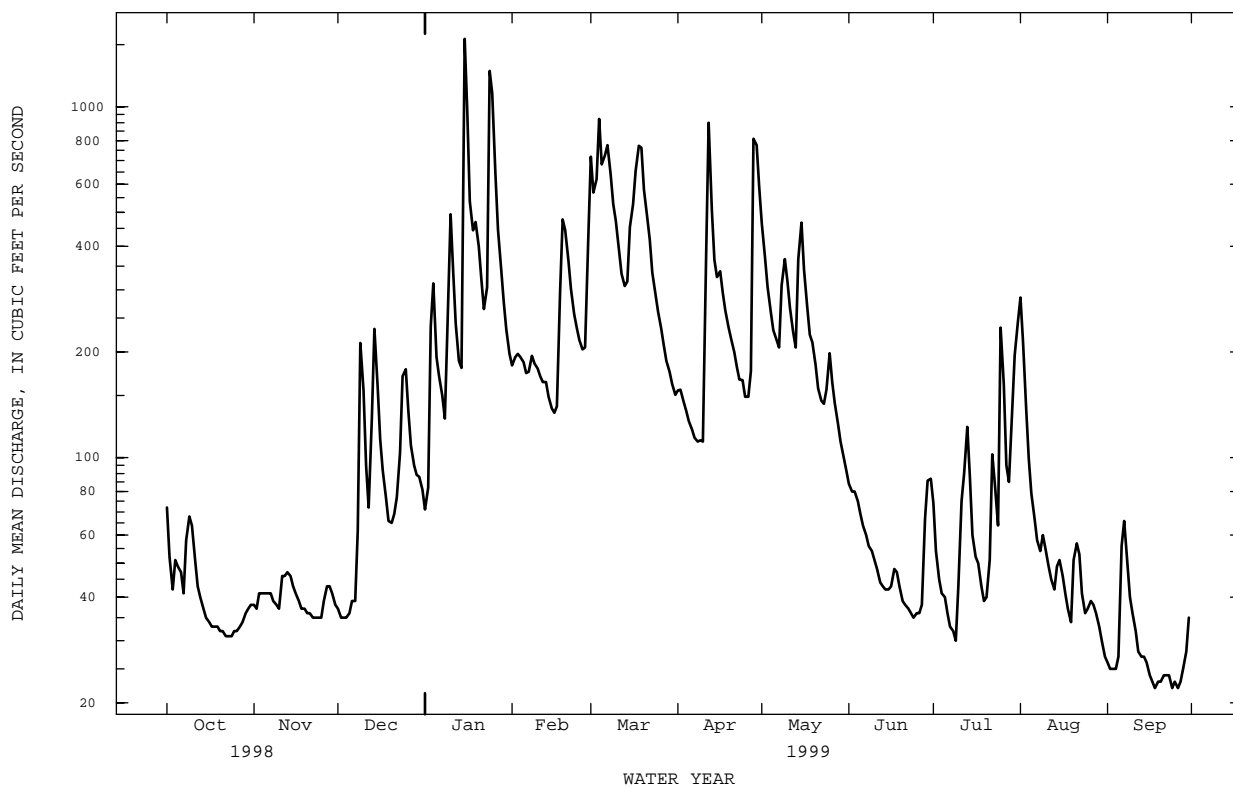
b Also Sep 24, 26, 1999.

c Also Sep 27, 1999.

d Flow retarded by mine cave-in.

e Estimated.

f Also Oct 16, 1947.



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 mi<sup>2</sup>.

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 sea level. 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 of no gage-height record, May 18-20, which is fair. National Weather Service gage-height telemeter at station. Maximum discharge, 34,500 ft<sup>3</sup>/s, from rating curve extended above 26,000 ft<sup>3</sup>/s on basis of contracted-opening measurement at gage height 24.40 ft. Minimum gage height, 0.96 ft, Feb. 10, 1934. Several measurements of water temperature made during the year. Water-quality records for some prior periods have been collected at this location.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 5,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Jan 24	1545	*5,010	*8.24	No other peak greater than base discharge.			

Minimum discharge, 47 ft<sup>3</sup>/s, Sep 4-5, gage height, 1.19 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	201	87	82	225	490	1780	479	815	193	221	564	55
2	185	86	80	219	470	1430	480	673	182	155	767	53
3	131	92	78	838	451	1840	454	577	173	128	457	51
4	121	93	77	1230	418	3390	424	505	163	118	296	48
5	112	94	79	700	384	2480	401	456	155	106	223	52
6	104	98	84	523	352	2410	372	438	146	97	180	90
7	99	94	90	417	341	2560	352	413	139	90	152	211
8	113	88	208	354	348	2030	337	519	133	84	136	182
9	154	87	782	492	337	1580	334	578	128	79	144	129
10	168	86	557	1040	320	1520	324	459	123	90	128	115
11	144	106	315	833	304	1430	495	398	119	218	113	109
12	119	116	224	599	308	1240	1690	356	114	184	102	86
13	105	115	503	485	353	1080	1120	337	108	251	95	74
14	96	108	848	434	333	1050	825	428	106	200	89	69
15	90	103	565	2310	318	1400	717	434	106	158	86	66
16	86	95	364	2490	325	1790	700	366	106	127	101	63
17	85	92	282	1380	351	2330	597	315	114	109	96	61
18	83	88	243	1360	594	2310	523	e290	113	100	82	58
19	82	85	207	1930	926	2020	476	e390	106	97	75	55
20	83	84	188	1380	1130	1580	451	e375	101	98	85	56
21	82	85	180	984	968	1350	428	320	97	109	103	57
22	81	84	235	743	776	1240	397	278	93	141	122	65
23	80	84	416	836	647	1050	364	267	90	245	104	60
24	78	84	630	3860	572	938	361	347	93	263	85	56
25	78	83	598	3780	528	853	340	508	93	296	80	53
26	78	88	449	2030	504	758	337	398	93	300	77	52
27	78	91	350	1330	472	681	440	321	98	277	82	56
28	81	91	297	978	994	616	1350	274	154	215	74	61
29	89	87	271	758	---	566	1450	246	206	268	70	88
30	86	86	261	619	---	527	1060	224	287	465	64	125
31	86	---	253	522	---	487	---	208	---	863	59	---
TOTAL	3258	2760	9796	35679	14314	46316	18078	12513	3932	6152	4891	2356
MEAN	105	92.0	316	1151	511	1494	603	404	131	198	158	78.5
MAX	201	116	848	3860	1130	3390	1690	815	287	863	767	211
MIN	78	83	77	219	304	487	324	208	90	79	59	48
CFSM	.20	.17	.60	2.18	.97	2.83	1.14	.76	.25	.38	.30	.15
IN.	.23	.19	.69	2.51	1.01	3.26	1.27	.88	.28	.43	.34	.17

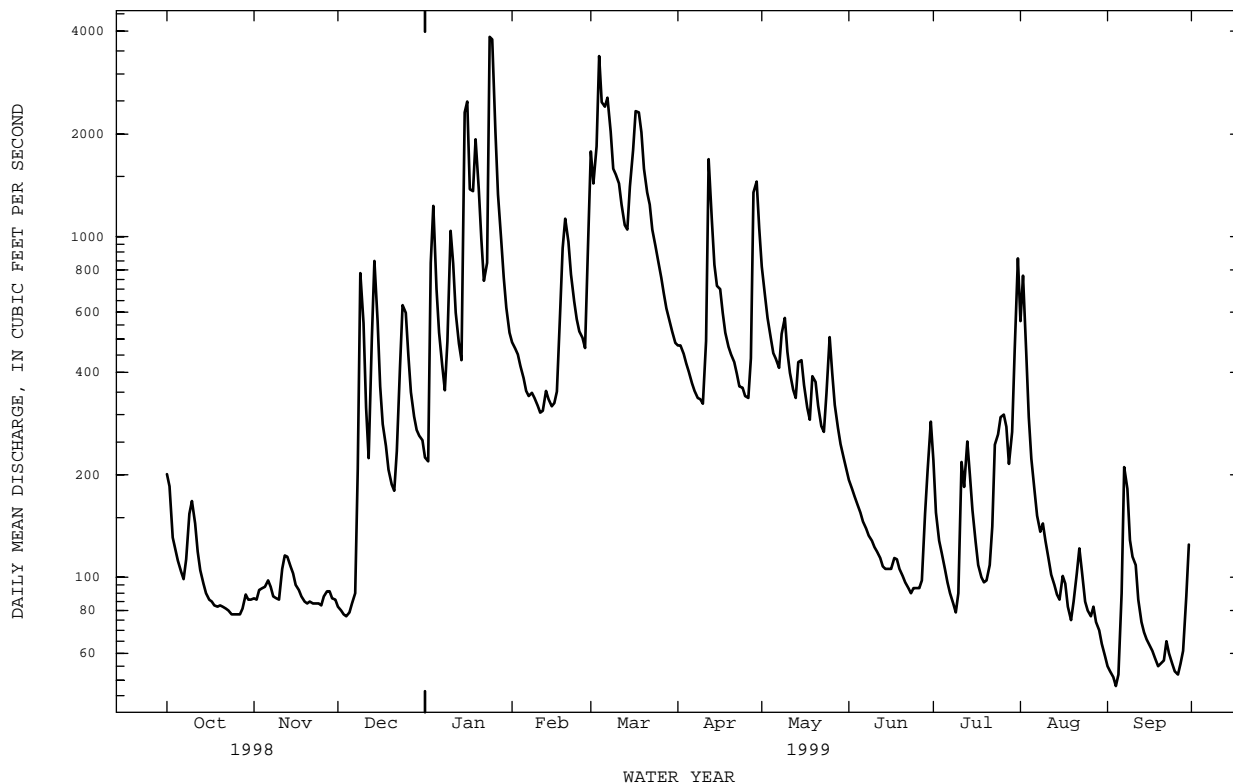
03524000 CLINCH RIVER AT CLEVELAND, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1921 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	262	396	772	1141	1374	1439	1019	799	484	326	313	208
MAX	1389	2011	3043	2817	3360	4572	3414	2254	2016	972	1640	1003
(WY)	1977	1978	1927	1937	1957	1955	1987	1958	1923	1938	1940	1989
MIN	53.8	64.0	80.7	92.1	206	309	228	195	79.7	78.2	63.2	55.3
(WY)	1931	1940	1940	1940	1941	1988	1942	1941	1930	1930	1988	1930

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR	WATER YEARS 1921 - 1999
ANNUAL TOTAL	330057	160045	
ANNUAL MEAN	904	438	708
HIGHEST ANNUAL MEAN			1076
LOWEST ANNUAL MEAN			287
HIGHEST DAILY MEAN	10900	Apr 17	27800
LOWEST DAILY MEAN	73	aSep 19	37
ANNUAL SEVEN-DAY MINIMUM	75	Sep 15	40
INSTANTANEOUS PEAK FLOW			5010
INSTANTANEOUS PEAK STAGE			8.24
INSTANTANEOUS LOW FLOW			47
ANNUAL RUNOFF (CFSM)	1.71	.83	1.34
ANNUAL RUNOFF (INCHES)	23.25	11.28	18.22
10 PERCENT EXCEEDS	2230	1100	1560
50 PERCENT EXCEEDS	451	224	373
90 PERCENT EXCEEDS	85	80	97

- a Also Sep 20, 1998.
- b Also Sep 28, 1964.
- c Also Sep 5, 1999.
- e Estimated.



## TENNESSEE RIVER BASIN

03528000 CLINCH RIVER ABOVE TAZEWell, 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 mi<sup>2</sup>.

## WATER-DISCHARGE RECORDS

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.--Data collection platform. Datum of gage is 1,060.7 ft above sea level. April 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.

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 ft<sup>3</sup>/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 14,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Jan 25	1530	*10,500	*8.01				

Minimum discharge, 109 ft<sup>3</sup>/s, Sept. 26.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	244	206	221	707	1680	7150	1490	2110	527	871	568	198
2	236	207	221	672	1760	5550	1520	1750	499	744	989	188
3	300	213	216	1200	1750	5370	1460	1490	488	598	874	177
4	329	218	208	2770	1600	7940	1390	1310	475	472	914	167
5	330	216	208	2780	1460	7970	1300	1180	441	404	705	159
6	281	217	216	1970	1310	5840	1200	1600	412	384	554	155
7	254	212	233	1370	1220	4890	1120	2780	386	349	458	153
8	289	217	312	1160	1230	4540	1050	2710	366	343	398	152
9	275	218	832	2490	1220	3990	1030	2090	347	335	361	158
10	278	227	1630	5180	1160	3650	988	1820	330	287	338	219
11	285	265	1320	3740	1100	3610	1010	1550	318	450	323	300
12	298	272	931	2660	1050	3330	1750	1280	331	656	311	250
13	302	266	2290	1960	1020	2980	2800	1120	312	551	294	232
14	282	282	2490	1690	1040	2830	2620	1020	290	555	274	214
15	253	271	2240	4650	1030	3570	2130	1080	284	490	258	198
16	236	256	1580	7230	976	4690	2080	1080	279	472	244	178
17	225	244	1100	5340	994	4760	2040	984	279	398	230	156
18	216	234	822	4510	1140	4770	1850	882	271	390	219	143
19	209	231	675	5520	1350	4480	1620	871	263	375	213	132
20	208	223	595	5050	2990	3880	1470	911	258	395	220	129
21	214	218	539	3680	3350	3340	1350	927	253	498	228	125
22	211	212	525	2760	2850	2950	1240	864	246	559	229	123
23	205	208	552	2630	2360	2630	1140	808	236	702	223	119
24	197	206	1410	5570	2010	2330	1060	749	238	483	245	117
25	196	207	1880	9900	1750	2090	984	784	301	1260	275	112
26	198	222	1630	7660	1590	1960	945	1050	327	1190	284	111
27	201	228	1270	4520	1480	1950	942	1030	337	839	264	115
28	203	227	1010	3260	3650	1960	1030	853	476	682	240	123
29	203	221	860	2570	---	1760	1490	719	853	629	232	139
30	203	221	783	2110	---	1580	2400	632	1020	536	219	148
31	204	---	742	1770	---	1450	---	570	---	466	205	---
TOTAL	7565	6865	29541	109079	46120	119790	44499	38604	11443	17363	11389	4890
MEAN	244	229	953	3519	1647	3864	1483	1245	381	560	367	163
MAX	330	282	2490	9900	3650	7970	2800	2780	1020	1260	989	300
MIN	196	206	208	672	976	1450	942	570	236	287	205	111
MED	236	221	822	2770	1400	3610	1370	1050	328	490	274	154
CFSM	.17	.16	.65	2.39	1.12	2.62	1.01	.84	.26	.38	.25	.11
IN.	.19	.17	.75	2.75	1.16	3.02	1.12	.97	.29	.44	.29	.12



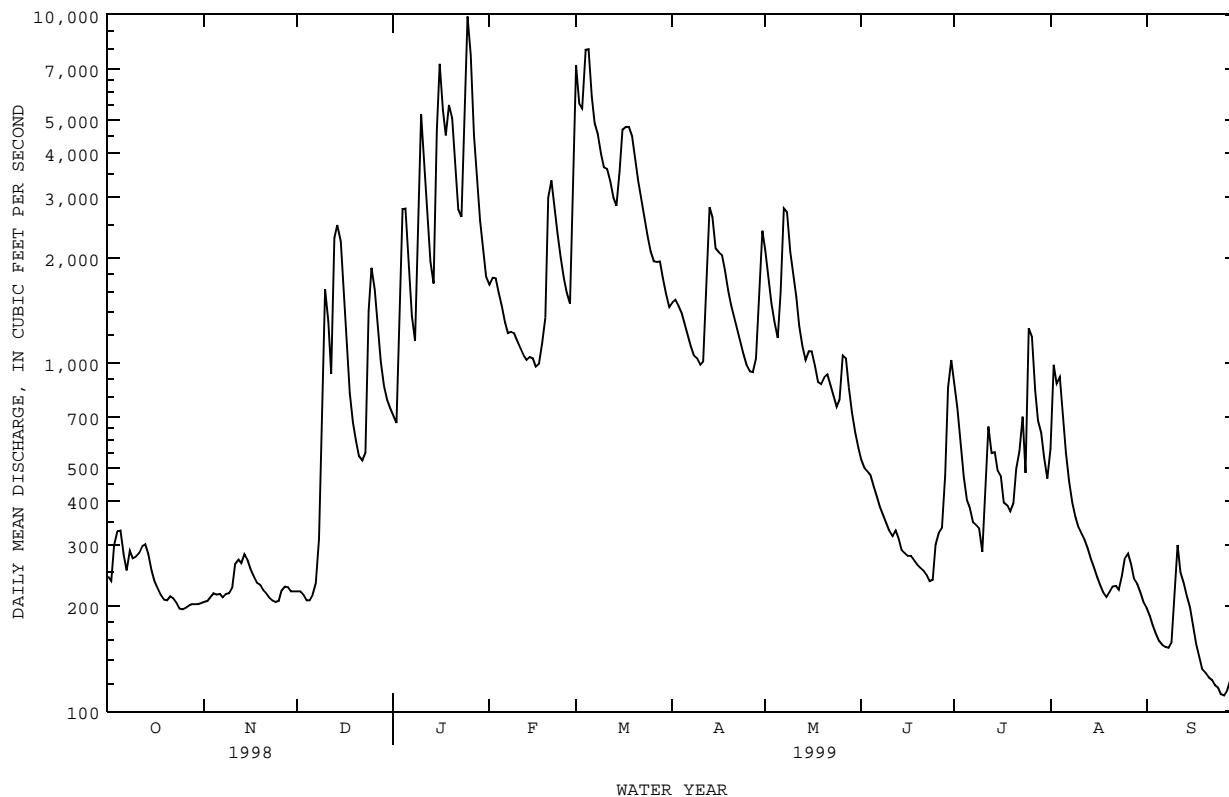
03528000 CLINCH RIVER ABOVE TAZEWELL, TN--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1919 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	658	1106	2346	3485	4141	4313	3093	2311	1291	953	860	529
MAX	2871	4794	9107	9500	9426	11950	8860	6382	3865	3251	4411	2939
(WY)	1990	1978	1927	1937	1957	1963	1977	1929	1989	1938	1942	1989
MIN	145	159	217	285	572	990	711	547	301	239	169	136
(WY)	1964	1940	1940	1940	1941	1988	1986	1941	1988	1988	1925	1955

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR	WATER YEARS 1919 - 1999
ANNUAL TOTAL	891100	447148	
ANNUAL MEAN	2441	1225	2082
HIGHEST ANNUAL MEAN			3269
LOWEST ANNUAL MEAN			850
HIGHEST DAILY MEAN	33800	Apr 18	9900
LOWEST DAILY MEAN	196	Oct 25	111
ANNUAL SEVEN-DAY MINIMUM	200	Oct 24	117
INSTANTANEOUS PEAK FLOW			10500
INSTANTANEOUS PEAK STAGE			8.01
INSTANTANEOUS LOW FLOW			109
ANNUAL RUNOFF (CFSM)	1.66	.83	1.41
ANNUAL RUNOFF (INCHES)	22.49	11.28	19.19
10 PERCENT EXCEEDS	5610	2980	4670
50 PERCENT EXCEEDS	1330	632	1110
90 PERCENT EXCEEDS	217	206	268

a From Floodmarks.



## TENNESSEE RIVER BASIN

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 mi<sup>2</sup>.

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 sea level.

REMARKS.--No estimated daily discharges. Records good. National Weather Service gage-height telemeter at station. Tennessee Valley Authority gage-height data recorder at station, called at 6-hour intervals by computer at Knoxville, Tennessee. Maximum discharge, 57,000 ft<sup>3</sup>/s, from rating curve extended above 20,000 ft<sup>3</sup>/s on basis of slope-area measurement of peak flow. Minimum gage height, 0.68 ft, Oct. 18, 1961, result of storage behind temporary dam. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 5,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Jan 09	2030	*4,230	*8.80	No peak greater than base discharge.			

Minimum discharge, 35 ft<sup>3</sup>/s, Sep 15-16, gage height, 1.09 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	56	49	47	154	475	2650	377	575	127	174	86	44
2	50	48	45	146	600	1630	379	497	121	121	258	43
3	46	49	44	945	542	2140	355	434	118	108	160	40
4	45	50	44	994	479	3030	340	380	113	102	107	40
5	45	56	44	548	413	1950	322	345	103	86	88	39
6	45	54	59	351	370	1540	304	628	101	80	77	39
7	44	50	70	297	358	1290	283	1080	96	76	69	40
8	74	49	367	282	376	1050	264	957	89	71	65	39
9	106	50	1330	2170	334	956	264	762	87	66	65	41
10	90	52	444	2440	319	1160	257	598	88	69	67	41
11	61	114	230	1140	304	1050	325	483	96	124	64	40
12	52	161	161	706	297	924	701	405	86	128	59	37
13	48	96	728	512	297	824	560	361	79	101	56	37
14	46	69	1280	552	262	848	470	462	74	85	55	37
15	45	59	549	2840	246	1140	506	473	72	76	53	36
16	44	53	326	2020	241	1410	751	359	72	70	52	36
17	43	50	236	1170	255	1260	669	300	71	64	51	40
18	43	49	188	1870	342	1130	580	267	70	70	49	40
19	45	47	153	2390	434	977	498	305	67	142	48	38
20	44	47	140	1520	811	808	447	292	64	143	49	39
21	45	47	128	1000	654	709	400	242	61	134	106	38
22	46	47	123	732	539	629	358	219	60	111	78	38
23	44	47	165	823	452	533	322	226	59	91	58	38
24	43	46	371	2970	399	481	298	272	59	255	59	38
25	43	45	401	2310	360	438	268	358	83	945	68	39
26	43	48	281	1430	348	411	261	258	114	345	95	38
27	43	50	226	978	317	417	323	212	104	202	82	38
28	43	51	194	750	2540	446	377	183	196	174	62	41
29	45	51	178	600	---	412	773	163	433	140	53	48
30	45	47	173	479	---	382	670	147	325	110	49	90
31	48	---	173	412	---	361	---	135	---	94	47	---
TOTAL	1560	1731	8898	35531	13364	32986	12702	12378	3288	4557	2335	1232
MEAN	50.3	57.7	287	1146	477	1064	423	399	110	147	75.3	41.1
MAX	106	161	1330	2970	2540	3030	773	1080	433	945	258	90
MIN	43	45	44	146	241	361	257	135	59	64	47	36
CFSM	.16	.18	.90	3.59	1.50	3.34	1.33	1.25	.34	.46	.24	.13
IN.	.18	.20	1.04	4.14	1.56	3.85	1.48	1.44	.38	.53	.27	.14

03531500 POWELL RIVER NEAR JONESVILLE, VA--Continued

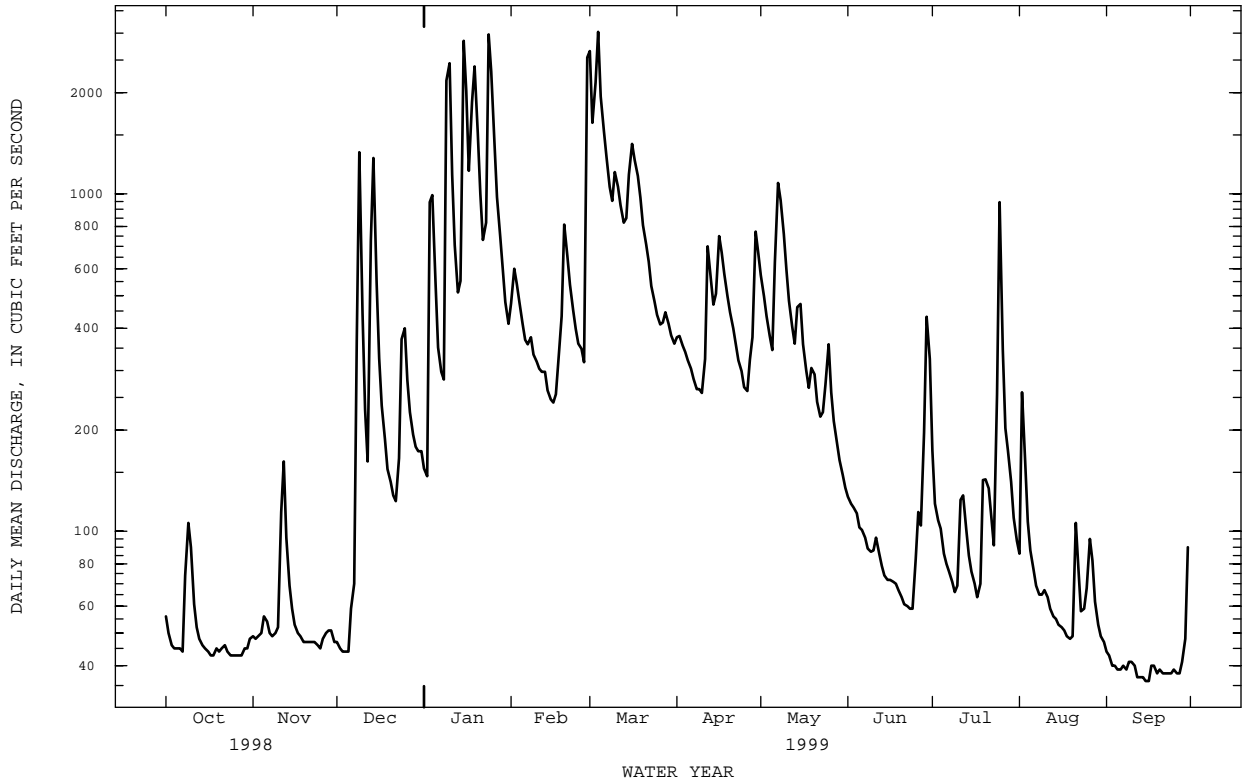
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1932 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	153	313	656	950	1073	1145	812	575	316	232	199	117
MAX	1086	1405	2026	2765	2666	3423	2542	1436	1601	825	1187	603
(WY)	1978	1974	1973	1937	1994	1963	1977	1984	1989	1941	1942	1982
MIN	22.9	29.7	46.5	57.8	124	281	169	108	46.7	47.7	49.0	24.5
(WY)	1955	1954	1966	1940	1941	1988	1986	1941	1936	1944	1953	1955

SUMMARY STATISTICS FOR 1998 CALENDAR YEAR FOR 1999 WATER YEAR WATER YEARS 1932 - 1999

ANNUAL TOTAL	203738	130562	
ANNUAL MEAN	558	358	543
HIGHEST ANNUAL MEAN			943
LOWEST ANNUAL MEAN			218
HIGHEST DAILY MEAN	11000	Apr 17	3030
LOWEST DAILY MEAN	43	aSep 19	36
ANNUAL SEVEN-DAY MINIMUM	43	Oct 23	38
INSTANTANEOUS PEAK FLOW			4230
INSTANTANEOUS PEAK STAGE			8.80
INSTANTANEOUS LOW FLOW			35
ANNUAL RUNOFF (CFSM)	1.75	1.12	1.70
ANNUAL RUNOFF (INCHES)	23.76	15.23	23.12
10 PERCENT EXCEEDS	1270	949	1230
50 PERCENT EXCEEDS	296	146	255
90 PERCENT EXCEEDS	46	44	54

- a Also Sep 20, and Oct 17, 18, 24-28, 1998.
- b Also Sep 16, 1999.
- c From floodmark.
- d Also Sep 20, 1954, and as a result of storage behind temporary dam Oct 18, 1961.



## 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 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 that 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.

Maximum discharge at crest-stage partial-record stations during water year 1999

Station name and number	Location and drainage area	Period of record (water years)	Water year 1999 maximum			Period of record maximum		
			Date	Gage height (ft)	Dis- charge (ft <sup>3</sup> /s)	Date	Gage height (ft)	Dis- charge (ft <sup>3</sup> /s)
POTOMAC RIVER BASIN								
Buffalo Branch tributary near Christian, VA (01622400)	Lat 38°11'55", long 79°13'10", Augusta County, Hydrologic Unit 02070005, on left up- stream 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 sea level. Drainage area is 0.49 mi <sup>2</sup> .	1967-99	-	<2.78	<22	9- 6-96	7.68	244
Chub Run near Stanley, VA (01629945)	Lat 38°34'31", long 78°27'32", Page County, Hydrologic Unit 02070005, 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 sea level. Drainage area is 3.16 mi <sup>2</sup> .	1959-69a, 1970-99	9-30-99	.96	29	9- 6-96	>10.08	*
Crooked Run near Mt. Jackson, VA (01632970)	Lat 38°45'44", long 78°41'06", Shenandoah County, Hydrologic Unit 02070006, on right up- stream wingwall of culvert on State Highway 263, 0.4 mi up- stream from mouth, and 2.3 mi west of Mt. Jackson. Datum of gage is 962.84 ft above sea level. Drainage area is 6.49 mi <sup>2</sup> .	1972-99	9-30-99	3.81	402	1-19-96	11.34	5,700
Pughs Run near Woodstock, VA (01633650)	Lat 38°55'48", long 78°32'43", Shenandoah County, Hydrologic Unit 02070006, on left up- stream 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 sea level. Drainage area is 3.66 mi <sup>2</sup> .	1971-99	3-17-99	2.94	13	9- 6-96	13.39	1,100

\* Discharge not determined.

< Less than.

> Greater than.

a Records provided by U.S. Department of Agriculture, Soil Conservation Service.

## DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Maximum discharge at crest-stage partial-record stations during water year 1999--Continued

Station name and number	Location and drainage area	Period of record (water years)	Water year 1999 maximum			Period of record maximum		
			Date	Gage height (ft)	Dis- charge (ft <sup>3</sup> /s)	Date	Gage height (ft)	Dis- charge (ft <sup>3</sup> /s)
GREAT WICOMICO RIVER BASIN								
Bush Mill Stream near Heaths- ville, VA (01661800)	Lat 37°52'36", long 76°29'42", Northumberland County, Hydrologic Unit 02080102, on right bank 12 ft upstream from bridge on State High- way 601, 2.2 mi northwest of Howland, and 3.0 mi southwest of Heathsville. Datum of gage is 22.22 ft above sea level. Drainage area is 6.82 mi <sup>2</sup> .	1964-69†, 1970-86†, 1987-99	9-16-99	11.50	1,390	9-16-99	11.50	1,390
RAPPAHANNOCK RIVER BASIN								
Pony Mountain Branch near Culpeper, VA (01665050)	Lat 38°27'04", long 77°57'24", Culpeper County, Hydrologic Unit 02080103, at culvert on State Highway 3, 0.3 mi upstream from mouth, and 2.7 mi southeast of Culpeper. Elevation of gage is 335 ft above sea level, from topo- graphic map. Drainage area is 0.30 mi <sup>2</sup> .	1958-69a, 1970-99	9-30-99	2.09	80	8-16-70	4.02	196
Farmers Hall Creek near Champlain, VA (01668300)	Lat 38°00'05", long 76°58'40", Essex County, Hydrologic Unit 02080104, on left up- stream 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 sea level. Drainage area is 2.18 mi <sup>2</sup> .	1966-99	9-16-99	6.67	148	8-20-69	19.2	510
PIANKATANK RIVER BASIN								
My Ladys Swamp near Saluda, VA (01669800)	Lat 37°34'34", long 76°31'30", Middlesex County, Hydrologic Unit 02080102, 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 sea level. Drainage area is 4.81 mi <sup>2</sup> .	1970-99	9-16-99	b28.4	*	9-16-99	b28.4	*
YORK RIVER BASIN								
Pamunkey Creek at Lahore, VA (01670180)	Lat 36°11'53", long 77°58'09", Orange County, Hydrologic Unit 02080106, on right bank on upstream side of bridge on State Highway 669, 0.45 mi south of Lahore, and 3.8 mi upstream from Lake Anna. Elevation of gage is 200 ft above sea level, from topographic map. Drainage area is 40.5 mi <sup>2</sup> .	1989-91†, 1992-99	3-15-99	6.64	1,150	6-27-95	17.20	6,900

\* Discharge not determined.

† Operated as a continuous-record gaging station.

a Records provided by U.S. Department of Agriculture, Soil Conservation Service.

b From high-water marks, by Virginia Department of Transportation.

## DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Maximum discharge at crest-stage partial-record stations during water year 1999--Continued

Station name and number	Location and drainage area	Period of record (water years)	Water year 1999 maximum		Period of record maximum			
			Date	Gage height (ft)	Dis- charge (ft <sup>3</sup> /s)	Date	Gage height (ft)	Dis- charge (ft <sup>3</sup> /s)
YORK RIVER BASIN--Continued								
Contrary Creek near Mineral, VA (01670300)	Lat 38°03'53", long 77°52'45", Louisa County, Hydrologic Unit 02080106, on left bank 200 ft downstream from bridge on U.S. Highway 522, 4.0 mi northeast of Mineral. Elevation of gage is 275 ft above sea level, from topo- graphic map. Drainage area is 5.53 mi <sup>2</sup> .	1976-86†, 1987-99	9-29-99	2.53	3.04	11-28-93	6.94	7,050
Waldrop Creek near Louisa, VA (01671650)	Lat 38°00'08", long 78°04'22", Louisa County, Hydrologic Unit 02080106 on left up- stream 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 sea level. Drainage area is 2.85 mi <sup>2</sup> .	1969-99	3-15-99	4.40	122	8-20-69	21.00	2,500
Reedy Creek near Dawn, VA (01674200)	Lat 37°52'55", long 77°21'35", Caroline County Hydrologic Unit 02080105, at bridge on U.S. Highway 301, 3.3 mi north of Dawn, and 11 mi south of Bowling Green. Drainage area is 16.8 mi <sup>2</sup> .	1951-69, 1972-99	9-16-99	5.23	202	8-20-69	7.28	2,500
JAMES RIVER BASIN								
Jackson River at Falling Spring, VA (02012500)	Lat 37°52'36", long 79°58'39", Alleghany County, Hydrologic Unit 02080201, 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 sea level. Drainage area is 411 mi <sup>2</sup> .	1925-84†, 1987-99	3-23-99	5.76	1,180	3-17-36 c1913	14.74 20	24,700 d50,000
Cowpasture River near Head Waters, VA (02015600)	Lat 38°19'30", long 79°26'14", Highland County, Hydrologic Unit 02080201, on left down- stream 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 sea level. Drainage area is 11.3 mi <sup>2</sup> .	1949-94, 1996-99	1-24-99	4.26	70	6-17-49	6.5	5,650
Craig Creek tributary near New Castle, VA (02017700)	Lat 37°33'21", long 79°59'52", Craig County, Hydrologic Unit 02080201, on right up- stream wingwall of culvert on State Highway 606, 0.4 mi upstream from mouth, and 7.1 mi northeast of New Castle. Drainage area is 2.05 mi <sup>2</sup> .	1968-99	9-28-99	Unknown	Unknown	11- 4-85	13.45	1,100

† Operated as a continuous-record gaging station.  
c Maximum known historical peak outside period of record.  
d Approximate.

## DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Maximum discharge at crest-stage partial-record stations during water year 1999--Continued

Station name and number	Location and drainage area	Period of record (water years)	Water year 1999 maximum			Period of record maximum		
			Date	Gage height (ft)	Dis- charge (ft <sup>3</sup> /s)	Date	Gage height (ft)	Dis- charge (ft <sup>3</sup> /s)
JAMES RIVER BASIN--Continued								
Renick Run near Buchanan, VA (02020100)	Lat 37°35'27", long 79°38'04", Botetourt County, Hydrologic Unit 02080201, on left up- stream wingwall of culvert on Frontage Road F054 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 sea level. Drainage area is 2.06 mi <sup>2</sup> .	1967-99	9-29-99	2.46	46	8-20-69	9.90	1,210
South River near Steeles Tavern, VA (02023300)	Lat 37°55'50", long 79°09'55", Augusta County, Hydrologic Unit 02080202, at bridge on State Highway 608, 2.5 mi northeast of Vesuvius, 3 mi east of Steeles Tavern, and 5 mi south of Greenville. Elevation of gage is 1,600 ft above sea level, from topo- graphic map. Drainage area is 15.7 mi <sup>2</sup> .	1951-99	-	<2.04	<135	8-20-69	8.70	4,700
James River at Bedford Dam near Major, VA (02024750)	Lat 37°34'40", long 79°22'36", Amherst County, Hydrologic Unit 02080203, on left bank 10 ft upstream from head- gates on headrace to city of Bedford hydroelectric plant, 1.2 mi north of Major, and 1.4 mi upstream from Blue Ridge Parkway. Drainage area is 3,070 mi <sup>2</sup> .	1989-99	1-25-99	7.55	15,100	1-20-96	14.63	104,000
Buffalo River tributary near Amherst, VA (02027700)	Lat 37°33'45", long 78°57'35", Amherst County, Hydrologic Unit 02080203, 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 sea level. Drainage area is 0.46 mi <sup>2</sup> .	1966-99	9-29-99	7.06	181	9- 6-96	7.33	196
Stockton Creek near Afton, VA (02030800)	Lat 38°01'48", long 78°48'30", Albemarle County, Hydrologic Unit 02080204, on left up- stream 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 sea level. Drainage area is 2.80 mi <sup>2</sup> .	1967-99	9-29-99	7.32	401	6-21-72 11-23-92	9.68 e9.73	678 425
Muddy Run near Stanardsville, VA (02032300)	Lat 38°14'05", long 78°37'02", Albemarle County, Hydrologic Unit 02080204, 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 sea level. Drainage area is 3.36 mi <sup>2</sup> .	1967-99	9-29-99	7.48	3,620	5-13-73 8-28-79	8.33 8.33	* *

\* Discharge not determined.

&lt; Less than.

e Affected by debris jam at upstream end of culvert.

## DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Maximum discharge at crest-stage partial-record stations during water year 1999--Continued

Station name and number	Location and drainage area	Period of record (water years)	Water year 1999 maximum		Period of record maximum			
			Date	Gage height (ft)	Dis- charge (ft <sup>3</sup> /s)	Date	Gage height (ft)	Dis- charge (ft <sup>3</sup> /s)
JAMES RIVER BASIN--Continued								
Moore's Creek near Char- lottesville, VA (02033300)	Lat 38°00'25", long 78°34'25", Albemarle County, Hydrologic unit 02080204, on right down- stream 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 Char- lottesville. Datum of gage is 505.40 ft above sea level. Drainage area is 3.52 mi <sup>2</sup> .	1967-99	9-29-99	15.11	313	6- 2-79	18.74	*
Willis River at Lakeside Village, VA (02034500)	Lat 37°40'00", long 78°10'00", Cumberland County, Hydrologic Unit 02080205, 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 sea level. Drainage area is 262 mi <sup>2</sup> .	1927-86†, 1987-99	9-16-99	10.32	1,040	6-22-72	29.80	24,000
Falling Creek near Chesterfield, VA (02038000)	Lat 37°31'21" 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. Elevation of gage is 126.39 ft above sea level. Drainage area is 32.8 mi <sup>2</sup> .	1955-94†, 1996-99	9-16-99	14.20	4,310	10- 1-79	15.32	5,930
Holiday Creek near Toga, VA (02038840)	Lat 37°25'58", long 78°41'12", Buckingham County Hydrol- ogic Unit 02080207, on left bank 40 ft downstream from State Forest Road 2307 (old Richmond Road), 1.8 mi up- stream from confluence of North Holiday Creek, and 5.2 mi south-southwest of Toga. Datum of gage is 614.40 ft above sea level. Drainage area is 1.68 mi <sup>2</sup> .	1971-99	9-29-99	1.46	50	6-21-72	6.72	2,820
North Holiday Creek near Toga, VA (02038845)	Lat 37°26'09", long 78°40'04", Buckingham County, Hydro- logic Unit 02080207, on left bank 18 ft upstream from State Forest Road 2307 (old Richmond Road), 1.0 mi up- stream from confluence of Holiday Creek, and 4.5 mi south-southwest of Toga. Datum of gage is 588.84 ft above sea level. Drainage area is 1.31 mi <sup>2</sup> .	1971-99	3-14-99	1.43	26	6-21-72	6.79	1,570

\* Discharge not determined.

† Operated as a continuous-record gaging station.



## DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Maximum discharge at crest-stage partial-record stations during water year 1999--Continued

Station name and number	Location and drainage area	Period of record (water years)	Water year 1999 maximum		Period of record maximum		
			Date	Gage height (ft)	Dis- charge (ft <sup>3</sup> /s)	Date	Gage height (ft)

## JAMES RIVER BASIN--Continued

Flat Creek near Amelia, VA (02040500)	Lat 37°23'27", long 78°03'45", Amelia County, Hydrologic Unit 02080207, at bridge on State Highway 681, 0.5 mi downstream from Horsepen Creek and 6.0 mi northwest of Amelia. Elevation of gage is 240 ft above sea level, from topographic map. Drainage area is 73.0 mi <sup>2</sup> .	1947, 1954-70, 1972-99	1-28-99	8.53	1,570	4-16-87	12.38	5,260
Bailey Branch tributary at Spring Grove, VA (02042250)	Lat 37°10'29", long 76°59'13", Surry County, Hydrologic Unit 02080206, on right up- stream wingwall of culvert on State Highway 10, 1.0 mi northwest of Spring Grove. Datum of gage is 61.39 ft above sea level. Drainage area is 0.71 mi <sup>2</sup> .	1967-99	9-16-99	8.12	474	9-16-99	8.12	474
Jordans Branch at Richmond, VA (02042400)	Lat 37°35'10", long 77°29'55", Henrico County, Hydrologic Unit 02080206, on left down- stream wall of bridge on U.S. Highway 250 (Broad Street), at Richmond, and 2.0 mi up- stream from mouth. Drainage area is 2.53 mi <sup>2</sup> .	1965-99	9-16-99	6.50	255	6-22-91	13.10	2,760

## CHOWAN RIVER BASIN

Falls Creek tributary near Victoria, VA (02044200)	Lat 37°02'04", long 78°10'26", Lunenburg County, Hydrologic Unit 03010201, at upstream end of culvert on State High- way 49, 3.6 mi northeast of Victoria. Datum of gage is 409.21 ft above sea level. Drainage area is 0.34 mi <sup>2</sup> .	1962-99	9-15-99	8.02	275	6-21-72	9.15	343
Blackwater River tributary near Holland, VA (02050050)	Lat 36°38'44", long 76°51'29", Suffolk City, Hydrologic Unit 03010202, on left up- stream wingwall of culvert on State Highway 272, 3.0 mi upstream from mouth, and 4.9 mi southwest of Holland. Datum of gage is 29.25 ft above sea level. Drainage area is 2.76 mi <sup>2</sup> .	1967-99	9-16-99	10.78	784	9-16-99	10.78	784

## ROANOKE RIVER BASIN

Powells Creek near Turbeville, VA (02075350)	Lat 36°34'50", long 79°11'20", Halifax County, Hydrologic Unit 03010104, at culvert on U.S. Highway 58, 0.8 mi up- stream from mouth, 1.1 mi east of Halifax-Pittsylvania County line, and 8.8 mi southwest of Turbeville. Datum of gage is 386.76 ft above sea level. Drainage area is 0.28 mi <sup>2</sup> .	1958-69a, 1970-99	4- 2-99	1.28	36	7-11-65	7.86	384
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a Records provided by U.S. Department of Agriculture, Soil Conservation Service.

## DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Maximum discharge at crest-stage partial-record stations during water year 1999--Continued

Station name and number	Location and drainage area	Period of record (water years)	Water year 1999 maximum			Period of record maximum		
			Date	Gage height (ft)	Dis- charge (ft <sup>3</sup> /s)	Date	Gage height (ft)	Dis- charge (ft <sup>3</sup> /s)
ROANOKE RIVER BASIN--Continued								
Dan River at South Boston, VA (02076000)	Lat 36°41'37", long 78°54'09", South Boston City, Hydro- logic Unit 03010104, on left bank 100 ft upstream from Norfolk and Western Railroad bridge at South Boston. Datum of gage is 299.23 ft above sea level. Drainage area is 2,730 mi <sup>2</sup> .	1900-07†, 1923-52†, 1953-62f, 1980-99f	1-25-99	21.90	*	8-16-40	31.8	81,000
Bearskin Creek near Chatham, VA (02076200)	Lat 36°50'30", long 79°29'05", Pittsylvania County, Hydro- logic Unit 03010105, on left upstream wingwall of culvert on State Highway 57, 4.5 mi west of Chatham, and 6 mi upstream from mouth. Eleva- tion of gage is 630 ft above sea level, from topographic map. Drainage area is 4.06 mi <sup>2</sup> .	1967-99	-	<4.15	<218	6-29-95	19.90	2,850
Blacks Creek near Mt. Airy, VA (02076700)	Lat 36°56'40", long 79°09'56", Pittsylvania County, Hydro- logic Unit 03010105, on left upstream wingwall of culvert on State Highway 40, 1.5 mi east of Mt. Airy, and 3.5 mi upstream from mouth. Eleva- tion of gage is 420 ft above sea level, from topographic map. Drainage area is 3.44 mi <sup>2</sup> .	1966-99	9-29-99	4.99	209	9- 8-87	g19.5	2,200
Roanoke River at Buggs Island, VA (02079500)	Lat 36°36'06", long 78°17'56", Mecklenburg County, Hydro- logic Unit 03010106, 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 southeast of Boydton. Datum of gage is 196.72 ft above sea level. Drainage area is 7,789 mi <sup>2</sup> .	1947-62†, 1963-99	12- 7-98	10.40	*	12- 7-48	h14.97	76,000

## KANAWHA RIVER BASIN

Mira Fork tributary near Dugspur, VA (03167300)	Lat 36°50'16", long 80°35'47", Carroll County, Hydrologic Unit 05050001, on left up- stream 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 sea level. Drainage area is 0.62 mi <sup>2</sup> .	1967-99	-	<2.78	<39.4	4-21-92	7.20	257
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\* Discharge not determined.

† Operated as a continuous-record gaging station.

&lt; Less than.

f Operated as a stage-only station.

g From high-water marks.

h At different datum.

## DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Maximum discharge at crest-stage partial-record stations during water year 1999--Continued

Station name and number	Location and drainage area	Period of record (water years)	Water year 1999 maximum		Period of record maximum		
			Date	Gage height (ft)	Dis- charge (ft <sup>3</sup> /s)	Date	Gage height (ft)

## KANAWHA RIVER BASIN--Continued

Thorne Springs Branch near Dublin, VA (03168750)	Lat 37°05'30", long 80°44'34", Pulaski County, Hydrologic Unit 05050001, at pond dam just upstream from U.S. Highway 11, 3.3 mi southwest of Dublin, and 4.3 mi up- stream from mouth. Elevation of gage is 1,975 ft above sea level, from topographic map. Drainage area is 4.77 mi <sup>2</sup> .	1957-69a, 1970-99	5-14-99	0.59	4.90	5-28-73	8.01	2,200
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## BIG SANDY RIVER BASIN

Russell Fork at Council, VA (03208040)	Lat 37°04'41", long 82°03'56", Buchanan County, Hydrologic Unit 05070202, 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. Elevation of gage is 1,680 ft above sea level, from topographic map. Drainage area is 10.2 mi <sup>2</sup> .	1981-83†, 1984-99	1-24-99	2.56	227	4-17-98	6.65	1,320
North Fork Pound River at Pound, VA (03208700)	Lat 37°07'32", long 82°37'36", Wise County, Hydrologic Unit 05070202, on right bank at Pound, 700 ft downstream from Stacy Branch, and 1,600 ft downstream from North Fork Pound River dam. Datum of gage is 1,500.00 ft above sea level. Drainage area is 18.5 mi <sup>2</sup> . Prior to Oct. 1, 1965, at datum 44.88 ft higher.	1963-87†, 1988-99	1-24-99	50.56	208	3-12-63	61.58	4,480
Pound River above Indian Creek, at Pound, VA (03208800)	Lat 37°07'26", long 82°36'29", Wise County, Hydrologic Unit 05070202, on left bank at Pound, 1,600 ft down- stream 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 sea level. Drainage area is 36.7 mi <sup>2</sup> .	1966-78†, 1979-99	1-24-99	6.99	548	5-18-75	19.44	3,460
Pound River below Bold Camp Creek at Pound, VA (03208850)	Lat 37°07'19", long 82°35'55", Wise County, Hydrologic Unit 05070202, 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 sea level. Drainage area is 61.2 mi <sup>2</sup> .	1966-78†, 1979-99	1-24-99	9.96	850	5-18-75	25.64	6,290

† Operated as a continuous-record gaging station.

a Records provided by U.S. Department of Agriculture, Soil Conservation Service.

## DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Maximum discharge at crest-stage partial-record stations during water year 1999--Continued

Station name and number	Location and drainage area	Period of record (water years)	Water year 1999 maximum			Period of record maximum		
			Date	Gage height (ft)	Dis- charge (ft <sup>3</sup> /s)	Date	Gage height (ft)	Dis- charge (ft <sup>3</sup> /s)
BIG SANDY RIVER BASIN--Continued								
Pound River near Georges Fork, VA (03208900)	Lat 37°09'51", long 82°31'30", Dickenson County, Hydro- logic Unit 05070202, on right bank 50 ft upstream from bridge on State High- way 624, 150 ft upstream from Camp Creek, and 2.6 mi northwest of Georges Fork. Datum of gage is 1,470.39 ft above sea level. Drainage area is 82.5 mi <sup>2</sup> .	1964-82†, 1983-99	1-24-99	5.67	901	5-18-75	14.91	10,900
Russell Fork at Bartlick, VA (03209200)	Lat 37°14'45", long 82°19'25", Dickenson County, Hydrologic Unit 05070202, on left bank at Bartlick just upstream from bridge on State High- way 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 sea level. Drainage area is 526 mi <sup>2</sup> .	1963-82†, 1983-99	1-24-99	11.22	3,740	4- 4-77	27.55	50,000
Knox Creek at Kelsa, VA (03213590)	Lat 37°27'02", long 82°03'34", Buchanan County, Hydrologic Unit 05070201, on downstream end of right 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. Elevation of gage is 945 ft above sea level, from topographic map. Drainage area is 84.3 mi <sup>2</sup> .	1980-81†, 1982-99	1-24-99	5.22	1,380	5- 7-84	20.2	13,000
TENNESSE RIVER BASIN								
Cedar Creek near Meadowview, VA (03475600)	Lat 36°44'50", long 81°51'20", Washington County, Hydro- logic Unit 06010102, on left downstream wingwall of cul- vert 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 sea level. Drainage area is 3.38 mi <sup>2</sup> .	1967-99	-	<5.29	<13.7	7-10-71	7.54	92
Lick Creek near Chatham Hill, VA (03487800)	Lat 36°57'44", long 81°28'21", Smyth County, Hydrologic Unit 06010101, 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 sea level. Drainage area is 25.5 mi <sup>2</sup> .	1966-68†, 1969-99	1-15-99	3.93	482	11- 7-77	8.09	2,660
Brumley Creek at Brumley Gap, VA (03488450)	Lat 36°47'30", long 82°01'10", Washington County, Hydro- logic Unit 06010101, on left downstream wingwall of bridge of 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 sea level. Drainage area is 21.1 mi <sup>2</sup> .	1979-81†, 1982-99	Unknown	Unknown	Unknown	5- 7-84	6.60	1,500

† Operated as a continuous-record gaging station.  
< Less than.

## DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Maximum discharge at crest-stage partial-record stations during water year 1999--Continued

Station name and number	Location and drainage area	Period of record (water years)	Water year 1999 maximum			Period of record maximum		
			Date	Gage height (ft)	Dis- charge (ft <sup>3</sup> /s)	Date	Gage height (ft)	Dis- charge (ft <sup>3</sup> /s)
TENNESSEE RIVER BASIN--Continued								
Cove Creek near Shelleys, VA (03489800)	Lat 36°39'13", long 82°21'16", Scott County, Hydrologic Unit 06010101, on right down- stream wingwall of bridge on U.S. Highway 58 and 421, 1.5 mi northwest of Shelleys, and at mile 3.3. Datum of gage is 1,381.53 ft above sea level. Drainage area is 17.3 mi <sup>2</sup> .	1951-99	3- 4-99	3.83	291	3-12-63	8.40	2,500
North Fork Holston River near Gate City, VA (03490000)	Lat 36°36'31", long 82°34'05", Scott County, Hydrologic Unit 06010101, on left bank 75 ft upstream from bridge on U.S. Highway 23, 1.6 mi downstream from Big Mountain Creek, 2.1 mi southeast of Gate City, and at mile 8.8. Datum of gage is 1,197.56 ft above sea level. Drainage area is 672 mi <sup>2</sup> .	1932-81†, 1982-99j	3- 4-99	6.92	5,670	4- 5-77 c1862 j22.5	19.79 j54,000	41,000
Clinch River at Richlands, VA (03521500)	Lat 37°05'10", long 81°46'52", Tazewell County, Hydrologic Unit 06010205, on right bank 1.0 mi southeast of Richlands, 1.6 mi downstream from Middle Creek, 2.2 mi upstream from Big Creek, and at mile 321.0. Datum of gage is 1,924.08 ft above sea level. Drainage area is 137 mi <sup>2</sup> .	1946-89†, 1990-99	1-24-99	6.27	1,640	6-22-01	j21.3	j11,500
Guest River at Coeburn, VA (03524500)	Lat 36°55'45", long 82°27'23", Wise County, Hydrologic Unit 06010205, on right bank 30 ft downstream from bridge on State Highway 72, 1.0 mi southwest of Coeburn, 1.4 mi upstream from Jaybird Branch, 1.8 mi downstream from Pine Camp Creek, and at mile 6.3. Datum of gage is 1,935.80 ft above sea level. Drainage area is 87.3 mi <sup>2</sup> .	1950-59†, 1960-78, 1979-81†, 1982-99	1-24-99	6.29	1,240	4- 5-77	20.95	18,000
Stony Creek at Ka, VA (03524900)	Lat 36°48'57", long 82°37'02", Scott County, Hydrologic Unit 06010205, at Ka, on left bank 300 ft upstream from bridge on State High- way 619, 600 ft downstream from Straight Fork, and 4.2 mi upstream from mouth. Elevation of gage is 1,510 ft above sea level, from topo- graphic map. Drainage area is 30.9 mi <sup>2</sup> .	1981†, 1982-99	-	<5.03	<1,440	5- 7-84	7.31	8,010
Copper Creek near Gate City, Va. (03526000)	Lat 36°40'26", long 82°33'57", Scott County, Hydrologic Unit 06010205, on right bank on upstream end of old bridge pier, 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 sea level. Drainage area is 106 mi <sup>2</sup> .	1948-72† 1973-95 1996-98† 1999	-	<7.32	<1,360	4- 5-77	13.57	7,660

† Operated as a continuous-record gaging station.

&lt; Less than.

c Maximum known historical peak outside period of record.

j Records provided by Tennessee Valley Authority.

## DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Maximum discharge at crest-stage partial-record stations during water year 1999--Continued

Station name and number	Location and drainage area	Period of record (water years)	Water year 1999 maximum			Period of record maximum		
			Date	Gage height (ft)	Dis- charge (ft <sup>3</sup> /s)	Date	Gage height (ft)	Dis- charge (ft <sup>3</sup> /s)

FOOTNOTES FOR CREST-STAGE PARTIAL-RECORD STATIONS: 1999 water year

- \* Discharge not determined.
- † Operated as a continuous-record gaging station.
- < Less than.
- > Greater than.
- a Records provided by U.S. Department of Agriculture, Soil Conservation Service.
- b From high-water marks, Virginia Department of Transportation.
- c Maximum known historical peak outside period of record.
- d Approximate.
- e Affected by debris jam at upstream end of culvert.
- f Operated as stage-only station.
- g From high-water marks.
- h At different datum.
- j Records provided by Tennessee Valley Authority.

## DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Maximum discharge at crest-stage partial-record stations during water year 1999--Continued

Station name and number	Location and drainage area	Period of record (water years)	Water year 1999 maximum			Period of record maximum		
			Date	Gage height (ft)	Dis- charge (ft <sup>3</sup> /s)	Date	Gage height (ft)	Dis- charge (ft <sup>3</sup> /s)

## 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 Department of Environmental Quality - Water Division are noted by an "[a]".

## Discharge measurements made at special study and miscellaneous sites during water year 1999

Stream	Tributary to	Location	Drainage area (mi <sup>2</sup> )	Measured previously (water years)	Measurements	
					Date	Discharge (ft <sup>3</sup> /s)
POTOMAC RIVER BASIN						
01605200 West Strait Creek [a]	Strait Creek	Lat 38°24'57", long 79°34'24", Highland County, at Monterey sewage treatment plant discharge, 0.3 mi upstream from Burners Run, and 0.4 mi downstream from bridge on U.S. Highway 220.	1.50	1995-98	7- 8-99	.163
01616190 Hot Run [a]	Opequon Creek	Lat 39°14'31", long 78°06'15", Frederick County, 200 ft upstream from railroad culvert, 0.9 mi upstream from confluence with Clearbrook Run, and at Stephenson.	0.14	-	10- 5-98 5- 4-99 6-30-99 8-17-99	.448 1.53 .925 .574
01616200 Clearbrook Run [a]	Hot Run	Lat 39°15'06", long 78°05'31", Frederick County, upstream from W.S. Frey Company discharge, 0.04 mi downstream from U.S. Highway 11, and 0.4 mi southeast of Clear Brook.	1.4	1994-98	5- 4-99 6-30-99 8-17-99	.851 .376 0
01621100 Muddy Creek [a]	Dry River	Lat 38°27'58", long 78°58'33", Rockingham County, 60 ft upstream from Wampler and Longacre discharge, 350 ft downstream from bridge on U.S. Highway 33, and 0.2 mi west of Hinton.	16.4	1963, 1976, 1979, 1981, 1991-94, 1997-98	9- 3-99	.396
01621210 War Branch [a]	Muddy Creek	Lat 38°27'58", long 78°58'38", Rockingham County, 500 ft upstream from mouth, and 0.3 mi west of Hinton.	12.5	1979, 1981, 1991-94, 1997-98	9- 3-99	.154
01621305 Dry River [a]	North River	Lat 38°23'33", long 78°58'51", Rockingham County, at bridge on State Highway 1306 (North River Road), at Bridgewater, and 100 ft upstream from mouth.	121.17	1993-96	7- 9-99	0
01621395 Blacks Run	Cooks Creek	Lat 38°27'47", long 78°51'55", Harrisonburg City, next to State Highway 753 (Liberty Street), 2 blocks west of US Highway 11, and 1.5 mi west of I-81.	-	-	3-22-99	2.39
01621410 Blacks Run	Cooks Creek	Lat 38°25'18", long 78°53'18", Harrisonburg City, below bridge on State Highway 726 1 block east of US Highway 11, and .5 mi west of I-81.	-	-	3-22-99 8-19-99	13.6 .84
01621425 Blacks Run	Cooks Creek	Lat 38°24'07", long 78°54'49", Harrisonburg City, below bridge at State Highway 679, .5 mi east of I-81.	-	-	3-22-99 8-19-99	21.0 2.34
01621440 Blacks Run	Cooks Creek	Lat 38°23'23", long 78°54'49", Harrisonburg City, below bridge on State Highway 988, .25 mi east of I-81.	-	-	3-22-99 8-19-99	22.7 2.00

a Provided by the Virginia Department of Environmental Quality - Water Division.



Discharge measurements made at special study and miscellaneous sites during water year 1999--Continued

Stream	Tributary to	Location	Drainage area (mi <sup>2</sup> )	Measured previously (water years)	Measurements	
					Date	Discharge (ft <sup>3</sup> /s)
POTOMAC RIVER BASIN--Continued						
01622220 Unnamed tribu- tary [a]	Middle River	Lat 38°04'23", long 79°14'57", Augusta County, at Castaline Trout Farms-Middlebrook, 0.6 mi upstream from bridge on State Highway 602, 0.7 mi upstream from mouth, and 2.4 mi north- west of Middlebrook.	1.13	1994-98	10-27-98	1.94
0162222990 Unnamed tribu- tary [a] (No.2)	Middle River	Lat 38°07'58", long 79°13'30", Augusta County, 150 ft down- stream from Camp Shenandoah Lake, 0.4 mi upstream from mouth, and 2.0 mi southwest of Swoope.	0.99	1996-98	5-19-99 7- 9-99	1.99 .810
01622468 Jennings Branch [a]	Middle River	Lat 38°16'57", long 79°13'47", Augusta County, at Whites Store, 200 ft upstream from Stoutameyer Branch, and 3.5 mi northwest of Lone Fountain.	9.2	1996-98	6-29-99 8- 9-99	.038 0
01624350 Middle River [a]	North River	Lat 38°11'25", long 78°58'27", Augusta County, 500 ft up- stream from Staunton/Verona sewage treatment plant discharge, 1,500 ft upstream from Lewis Creek, and 2.0 mi southwest of Verona.	-	1991-93, 1995, 1997-98	8- 9-99	28.7
01624660 Christians Creek	Middle River	Lat 38°02'38", long 79°05'17", Augusta County, 200 ft up- stream from US Highway 340, .1 mi west of State Highway 652, 3.0 mi west of Stuarts Draft.	-	-	3-25-99 7-27-99	15.3 3.77
01624700 Christians Creek	Middle River	Lat 38°05'35", long 79°01'54", Augusta County, below State Highway 635, 3.5 mi north of Stuarts Draft.	-	-	3-25-99 7-27-99	56.0 11.1
01624620 Christians Creek	Middle River	Lat 38°08'14", long 79°10'05", Augusta County, 75 ft up- stream of State Highway 604, 1.0 mi south of State Highway 701, and 1.25 mi northeast of Greenville.	-	-	3-25-99 7-27-99	2.40 .60
01624615 Christians Creek	Middle River	Lat 38°02'09", long 79°10'06", Augusta County, below spring house, .25 mi above State Highway 693, 1.25 mi southwest of Middlebrook, and 3 mi north- east of Greenville.	-	-	3-25-99 7-27-99	.08 .03
01624800 Christians Creek	Middle River	Lat 38°07'42", long 78°59'41", Augusta County, at State Highway 794, 2.2 mi north- west of Fishersville, and 12 mi upstream from mouth.	70.1	1967-97	3-25-99 5- 5-99 7-27-99	72.8 22.6 13.2
01624880 Meadow Run [a]	Christians Creek	Lat 38°09'17", long 78°55'24", Augusta County, 0.2 mi down- stream from bridge on State Highway 254, 0.4 mi upstream from Coleytown Run, and 1.0 mi northwest of Hermitage.	11.83	1995-98	5-19-99 8- 9-99	4.14 2.03

a Provided by the Virginia Department of Environmental Quality - Water Division.

## DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Discharge measurements made at special study and miscellaneous sites during water year 1999--Continued

Stream	Tributary to	Location	Drainage area (mi <sup>2</sup> )	Measured previously (water years)	Measurements	
					Date	Discharge (ft <sup>3</sup> /s)
POTOMAC RIVER BASIN--Continued						
01624900 Christians Creek	Middle River	Lat 38°11'35", long 78°56'07", Augusta County, below State Highway 612, 100 ft above mouth, and 3.5 mi east of Verona.	-	-	3-25-99	102
					7-27-99	13.6
01624940 Unnamed tribu- tary [a] (No.3)	Middle River	Lat 38°14'54", long 78°57'37", Augusta County, at Mt. Sidney/ Fort Defiance sewage treatment plant, 100 ft upstream from Railroad bridge, 0.3 mi downstream from culvert on U.S. Highway 11, and 0.7 mi south of Mount Sidney.	0.25	1996-98	5-19-99	.191
					7- 9-99	.090
01625847 South River [a]	South Fork Shenandoah River	Lat 38°01'07", long 79°01'08", Augusta County, at Stuarts Draft sewage treatment plant, 0.8 mi downstream from bridge on State Highway 608, and 1.2 mi southeast of Stuarts Draft.	52.47	1997-98	6-29-99	5.12
01626575 Jones Hollow Run [a]	South River	Lat 38°03'45", long 78°52'24", Waynesboro City at culverts on Hunter Street in Waynesboro, 0.6 mi upstream from mouth, and 0.8 mi downstream from Jones Hollow Dam.	2.6	1997-98	8- 9-99	0
01626952 Porter- field Run [a]	South River	Lat 38°08'04", long 78°52'00", Augusta County, 0.3 mi up- stream from mouth, 0.5 mi downstream from culvert on State Highway 865, and 0.8 mi east of Madrid.	4.79	1998	5- 7-99 7- 9-99	.667 .230
01628590 Unnamed tribu- tary [a] (No.2)	Cub Run	Lat 38°22'43", long 78°48'21", Rockingham County, at Lawyer Road sewage treatment plant, 0.4 mi upstream from mouth, and 0.5 mi south of Penn Laird.	0.687	1994-98	7- 9-99	0
01629945 Chub Run	Hawksbill Creek	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.	3.16	1994, 1998	7-20-99	0
North Fork Shenandoah River [a]	Shenandoah River	Lat 38°38'07", long 78°46'43", Rockingham County, 0.3 mi up- stream from bridge on State Highway 42, 0.4 mi southwest of Timberville.	-	1980-81	7-23-99	3.85
					7-28-99	3.89
North Fork Shenandoah River [a]	Shenandoah River	Lat 38°39'07", long 78°41'54", Shenandoah County, at bridge on State Highway 728, 1.5 mi west of New Market.	-	1979	7-28-99	9.84
01632700 Holmans Creek [a]	North Fork Shenandoah River	Lat 38°42'57", long 78°45'37", Shenandoah County, 100 ft downstream from Lake Wunder, 0.2 mi upstream from State Highway 728 and 1.4 mi west of Forestville.	4.96	1994-98	7-20-99	.121

a Provided by the Virginia Department of Environmental Quality - Water Division.

Discharge measurements made at special study and miscellaneous sites during water year 1999--Continued

Stream	Tributary to	Location	Drainage area (mi <sup>2</sup> )	Measured previously (water years)	Measurements	
					Date	Discharge (ft <sup>3</sup> /s)
POTOMAC RIVER BASIN--Continued						
01633100 Unnamed tributary [a]	Stony Creek	Lat 38°47'47", long 78°48'43", Shenandoah County, at Orkney Springs, 60 ft downstream from bridge on State Highway 263, and 0.95 mi upstream from mouth.	1.19	1991-96	7-20-99	.025
01633570 North Fork Shenandoah River [a]	Shenandoah River	Lat 38°49'34", long 78°32'03", Shenandoah County, upstream from Aileen, Inc. water intake, 1.5 mi downstream from Stony Creek, and 1.7 mi east of Edinburg.	644	1993-95, 1997-98	7-20-99	62.7
01633730 Toms Brook [a]	North Fork Shenandoah River	Lat 38°56'42", long 78°26'32", Shenandoah County, at bridge on U.S. Highway 11, at Toms Brook.	9.35	1952-54, 1969-70, 1994-98	7-20-99	.412
01636228 Crooked Run [a]	Shenandoah River	Lat 38°59'14", long 78°11'00", Warren County, 0.7 mi upstream from bridge on State Highway 627, 0.7 mi north of Cedarville.	29.88	1997-98	5-18-99 7-14-99	2.93 1.14
01636240 Crooked Run [a]	Shenandoah River	Lat 38°57'22", long 78°11'53", Warren County, 100 ft downstream from bridge on U.S. Highways 340 and 522, 0.6 mi north of Riverton, and 0.9 mi upstream from mouth.	-	1991-98	5-18-99 7-14-99	5.80 2.00
01636266 Manassas Run [a]	Shenandoah River	Lat 38°54'49", long 78°05'58", Warren County, 100 ft upstream from bridge on State Highway 79, 1.3 mi west of Linden.	5.25	1991-98	5-18-99 7-14-99	.971 .121
01636295 Roseville Run [a]	Spout Run	Lat 39°05'18", long 78°03'51", Clarke County, at Boyce sewage treatment plant discharge, at Boyce town boundary, and 100 ft downstream from bridge on U.S. Highway 340.	2.47	1995-98	5- 4-99 6-30-99	.468 .105
01644110 Sycolin Creek [a]	Goose Creek	Lat 39°04'20", long 77°31'09", Loudoun County, upstream from Goose Creek Industrial Park wastewater treatment plant discharge, 0.2 mi upstream from mouth, and 3.8 mi southeast of Leesburg.	-	1993-97	8-17-99	.854
1653900 Accotink Creek	Potomac River	Lat 38°51'39", long 77°16'17", Fairfax City, 300 ft upstream of Pickett Road, .25 mi south of Fairfax Circle.	-	-	3-18-99 8-11-99	5.84 0
01653985 Accotink Creek	Potomac River	Lat 38°50'46", long 77°14'16", Fairfax City, 200 ft upstream of Woodburn Road, .5 mi north of Little River Turnpike, and 1.0 mi west of I-495.	-	-	3-18-99 8-11-99	15.7 0
01653995 Accotink Creek	Potomac River	Lat 38°49'32", long 77°13'29", in Wakefield Park, .25 mi west of I-495, and .5 mi south of Little River Turnpike.	-	-	3-18-99 8-11-99	19.4 0

a Provided by the Virginia Department of Environmental Quality - Water Division.

## DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Discharge measurements made at special study and miscellaneous sites during water year 1999--Continued

Stream	Tributary to	Location	Drainage area (mi <sup>2</sup> )	Measured previously (water years)	Measurements	
					Date	Discharge (ft <sup>3</sup> /s)
POTOMAC RIVER BASIN--Continued						
01654520 Accotink Creek	Potomac River	Lat 38°48'15", long 77°16'02", at mouth of Lake Accotink, .5 mi south of Braddock Road.	-	-	3-18-99	25.6
					8-11-99	0
01660860 Bridges Creek at Mouth	Potomac River	Lat 38°12'08", long 76°56'01", Westmoreland County, at mouth, 1.25 mi north north- west of entrance to George Washington Birthplace National Monument, and 3.75 mi north- east of Oak Grove, VA.	3.06	-	10- 6-98	0
					12-15-98	0
					2- 3-99	2.91
					6-15-99	4.95
0166087770 Dancing Marsh	Popes Creek	Lat 38°11'09", long 76°55'11", Westmoreland County, at George Washington Birthplace National Monument, 500 ft downstream from Ice Pond, 1,000 ft upstream from mouth, and 4 mi northeast of Oak Grove, VA.	-	-	10- 6-98	-.06
					2- 3-99	.17
					6-15-99	.05
GREAT WICOMICO RIVER BASIN						
01661800 Bush Mill Stream [b]	Great Wicomico River	Lat 37°52'36", long 76°29'40", Northumberland County, at bridge on State Highway 601, 2.2 mi northwest of Howland, 3.0 mi southwest of Heathsville, and 3.5 mi upstream from mouth.	6.82	1964-69†, 1970-86†, 1987-93, 1996-98	5- 4-99	2.43
RAPPAHANNOCK RIVER BASIN						
01661835 Unnamed tribu- tary [a]	Hickman Run	Lat 38°45'14", long 78°06'24", Rappahannock County, 50 ft upstream from culvert on State Highway 641, 0.8 mi southwest of Flint Hill.	0.125	1994-98	7-14-99	0
01662010 Unnamed tribu- tary [a] (No.8)	Rappahannock River	Lat 38°39'50", long 77°54'50", Culpeper County, at South Wales sewage treatment plant discharge, 0.7 mi upstream from confluence with Rappahannock River, and 1.9 mi north of Jeffersonton.	1.21	1995-98	5-17-99 7-15-99	.250 <.001
01662050 Unnamed tribu- tary [a]	Great Run	Lat 38°43'00", long 77°48'57", Fauquier County, upstream from Warrenton sewage treat- ment plant discharge, at Warrenton, and 300 ft up- stream from bridge on U.S. Highway 211.	1.24	1993-98	7-15-99	.096
01662320 Thornton River [a]	Hazel River	Lat 38°39'29", long 78°13'13", Rappahannock County, at Sperry- ville, 0.25 mi upstream from con- fluence with N.F. Thornton River and 0.3 mi downstream from bridge on U.S. Highway 522.	10.4	1995-98	5-17-99 7-15-99	4.59 .713

† Operated as a continuous-record gaging station.

&lt; Less than.

a Provided by the Virginia Department of Environmental Quality - Water Division.

b Provided by both the U.S. Geological Survey and Virginia Department of Environmental Quality - Water Division.

## DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

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Discharge measurements made at special study and miscellaneous sites during water year 1999--Continued

Stream	Tributary to	Location	Drainage area (mi <sup>2</sup> )	Measured previously (water years)	Measurements	
					Date	Discharge (ft <sup>3</sup> /s)
RAPPAHANNOCK RIVER BASIN--Continued						
0166504850 Mountain Run [a]	Rappahannock River	Lat 38°27'45", long 77°58'09", Culpeper County, at Culpeper sewage treatment plant, 800 ft upstream from bridge on U.S. Highway 29, and 1.6 mi southeast of Culpeper.	-	-	10-15-98	.789
					5-17-99	5.34
					7-15-99	.368
01665050 Pony Mountain Branch	Mountain Run	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	1983, 1994, 1998	4-29-99	0
01668300 Farmers Hall Creek	Rappahannock River	Lat 38°00'05", long 76°58'40", Essex County, at culvert on U.S. Highway 17, 1.2 mi southeast of Champlain.	2.18	1969, 1991, 1996-98	4-29-99	.551
PIANKATANK RIVER BASIN						
01669800 My Ladys Swamp	Piankatank River	Lat 37°34'34", long 76°31'30", Middlesex County, at culvert on State Highway 629, 4.4 mi southeast of Saluda, and 1.45 upstream from mouth.	4.81	1996-98	5-4-99	3.08
YORK RIVER BASIN						
01670300 Contrary Creek [b]	North Anna River	Lat 38°03'53", long 77°52'45", Louisa County, at bridge on U.S. Highway 522, 1.2 mi up- stream from Lake Anna, 4.0 mi northeast of Mineral, and 5.1 mi upstream from former mouth.	5.53	1976-87† 1989-98	*10- 9-97	.969
					*6-30-98	2.32
					*9- 1-98	.568
					5- 6-99	2.03
					7-16-99	.419
01670320 Freshwater Creek [a]	Contrary Creek	Lat 38°00'33", long 77°53'56", Louisa County, 20 ft upstream from Mineral sewage treatment plant, 600 ft upstream from culvert on State Highway 618, and 0.5 mi east of Mineral.	-	1991-98	7-16-99	0
01671270 Licking- hole Creek [a]	South Anna River	Lat 38°04'33", long 78°08'55", Louisa County, 700 ft down- stream from Izac Lake, 0.5 mi upstream from mouth, and 2.1 mi east of Boswells Tavern.	2.73	1998	5- 6-99	.703
					7-16-99	.010
01674160 Polecat Creek [a]	Mattaponi River	Lat 37°58'09", long 77°32'20", Caroline County, 150 ft down- stream from culvert on State Highway 601, 0.7 mi northeast of Cedar Fork, and 2.1 mi west of Golansville.	1.15	1994-98	10- 7-98	.002
					11- 2-98	.001
					12- 3-98	.002
					1-11-99	.062
					2-17-99	.088
					3-15-99	12.4
					4- 7-99	.418
					5- 5-99	.088
					6- 3-99	.002
					7- 6-99	<.001
					8- 5-99	0
9- 7-99	<.001					

\* Not previously published.

&lt; Less than.

† Operated as a continuous-record gaging station.

a Provided by the Virginia Department of Environmental Quality - Water Division.

b Provided by both the U.S. Geological Survey and Virginia Department of Environmental Quality - Water Division.

## DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Discharge measurements made at special study and miscellaneous sites during water year 1999--Continued

Stream	Tributary to	Location	Drainage area (mi <sup>2</sup> )	Measured previously (water years)	Measurements	
					Date	Discharge (ft <sup>3</sup> /s)
YORK RIVER BASIN--Continued						
01674171	Polecat Creek	Lat 37°57'56", long 77°29'17", Caroline County, 200 ft up- stream from mouth, 1.2 mi south of Golansville, and 2.4 mi north of Carmel Church.	3.94	1994-98	10- 7-98	0
	Unnamed tribu- tary [a]				11- 2-98	.002
					12- 3-98	.095
					1-11-99	.888
					2-17-99	.757
					3-15-99	28.4
					4- 7-99	2.27
					5- 5-99	.605
					6- 3-99	.002
					7- 6-99	.026
					8- 5-99	0
					9- 7-99	3.21
01674172	Mattaponi River	Lat 37°58'13", long 77°29'13", Caroline County, 150 ft upstream from bridge on State Highway 652, 0.5 mi upstream from Stevens Mill Run, and 1.1 mi southeast of Golansville.	10.8	1994-98	10- 7-98	0
	Polecat Creek [a]				11- 2-98	.002
					12- 3-98	.312
					1-11-99	1.58
					2-17-99	2.15
					3-15-99	116
					4- 7-99	6.15
					5- 5-99	1.53
					6- 3-99	.004
					7- 6-99	.015
					8- 5-99	0
					9- 7-99	3.00
01674174	Polecat Creek	Lat 37°59'20", long 77°29'50", Caroline County, 100 ft downstream from bridge on State Highway 601, 0.6 mi north of Golansville, 0.8 mi downstream from Lake Caroline, and 1.6 mi upstream from mouth.	9.50	1994-98	10- 7-98	.103
	Stevens Mill Run [a]				11- 2-98	.389
					12- 3-98	.775
					1-11-99	.219
					2-17-99	1.00
					3-15-99	37.4
					4- 7-99	4.82
					5- 5-99	.659
					6- 3-99	.110
					7- 6-99	.063
					8- 5-99	.051
					9- 7-99	.711
01674180	Mattaponi River	Lat 37°57'20", long 77°22'08", Caroline County, 200 ft upstream from bridge on State Highway 601, 0.25 mi southeast of Penola, and 2.2 mi upstream from mouth.	48.3	1994-98	10- 7-98	0
	Polecat Creek [a]				11- 2-98	.666
					12- 3-98	3.48
					1-11-99	10.5
					2-17-99	13.9
					3-15-99	156
					4- 7-99	35.7
					5- 5-99	9.54
					6- 3-99	.700
					7- 6-99	1.35
					8- 5-99	0
					9- 7-99	13.8
01674200	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	1950, 1952-53, 1955-57, 1961, 1969, 1973-75, 1990-93, 1996-98	4-29-99	6.29
	Reedy Creek					
JAMES RIVER BASIN						
02011010	James River	Lat 38°02'57", long 79°47'43", Bath County, 100 ft upstream from Warm Springs sewage treatment plant, 0.2 mi down- stream from unnamed tributary, and 0.3 mi northwest of Warm Springs.	2.96	1991-98	7- 2-99	2.79
	Warm Springs Run [a]					

a Provided by the Virginia Department of Environmental Quality - Water Division.

Discharge measurements made at special study and miscellaneous sites during water year 1999--Continued

Stream	Tributary to	Location	Drainage area (mi <sup>2</sup> )	Measured previously (water years)	Measurements	
					Date	Discharge (ft <sup>3</sup> /s)
JAMES RIVER BASIN--Continued						
02011830 Hot Springs Run [a]	Cedar Creek	Lat 38°00'33", long 79°51'47", Bath County, 50 ft upstream from Hot Springs Regional sewage treatment plant, 0.5 mi east of Bacova Junction, and 0.7 mi downstream from bridge on State Highway 615.	4.32	1993-98	7- 2-99	2.93
02012500 Jackson River	James River	Lat 37°52'36", long 79°58'39", Alleghany County, at Smith Bridge, 0.8 mi south of Falling Spring, and 1.6 mi downstream from Falling Spring Creek.	411	1925-98	10- 5-98 4- 7-99 7-28-99 8-17-99	194 301 317 298
02015300 Wilson Creek [a]	Jackson River	Lat 37°50'37", long 79°48'01", Alleghany County, at Tukes Trailer Court discharge, 1.5 mi northwest of Longdale, and 2.5 mi upstream from mouth.	28.34	1995-98	10-27-98 5-21-99 7-19-99 8-18-99	.921 21.2 .204 .083
02015600 Cowpasture River	James River	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.	11.3	1995-98	4-28-99	4.71
02018810 Crooked Run [a]	North Fork	Lat 37°30'44", long 79°55'40", Botetourt County, at Camp Fincastle Lake outfall, 0.3 mi downstream from Woodville Spring, and 2.8 mi northwest of Fincastle.	-	1998	5-21-99 8-18-99	.663 .316
02018850 Borden Creek [a]	Catawba Creek	Lat 37°32'17", long 79°54'24", Botetourt County, 0.7 mi downstream from culvert on State Highway 666, 1.0 mi upstream from confluence with Sukey Johnson Branch, and 1.6 mi west of Flatwoods.	-	1997-98	5-21-99 8-18-99	1.33 .220
02021110 Brattons Run [a]	Calfpasture River	Lat 37°58'07", long 79°30'17", Rockbridge County, 200 ft upstream from bridge on State Highway 39, 0.7 mi southwest of Goshen, and 1.0 mi downstream from bridge on State Highway 780.	28.86	1991-98	10-27-98	1.08
02021400 Unnamed tributary [a]	Byrd Spring Creek tributary	Lat 38°02'26", long 79°23'12", Augusta County, at Castaline Trout Farm - Craigsville, 0.3 mi upstream from State Highway 683, and 2.7 mi south of Craigville.	0.38	1994-98	10-27-98	1.42
02021670 Cedar Creek [a]	Cedar Grove Branch	Lat 37°53'32", long 79°18'49", Rockbridge County, 1.6 mi northwest of Fairfield, 1.9 mi upstream from culverts on State Highway 712, and 3.3 mi upstream from mouth.	1.75	1998	5- 7-99 6-29-99	.493 .250
02023390 Moores Creek [a]	South River	Lat 37°55'57", long 79°13'52", Rockbridge County, at Wilco Travel Plaza, 200 ft upstream from State Highway 917 and 0.3 mi south of Raphine.	0.70	1994-98	7-21-99	.191

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## DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Discharge measurements made at special study and miscellaneous sites during water year 1999--Continued

Stream	Tributary to	Location	Drainage area (mi <sup>2</sup> )	Measured previously (water years)	Measurements	
					Date	Discharge (ft <sup>3</sup> /s)
JAMES RIVER BASIN--Continued						
02023395 Moore's Creek [a]	South River	Lat 37°54'57", long 79°14'10", Rockbridge County, at Raphine Motel sewage treatment plant, 0.6 mi upstream from bridge on U. S. Highway 11, and 1.5 mi south of Raphine.	2.46	1994-98	7-21-99	1.11
02023410 Marl- brook Creek [a]	South River	Lat 37°52'59", long 79°16'57", Rockbridge County, 30 ft up- stream from culvert on U.S. Highway 11, 500 ft downstream from culvert on State Highway 613, and at Fairfield.	1.38	1998	5- 7-99 6-29-99	.717 .282
02024208 Indian Gap Run [a]	Maury River	Lat 37°43'38", long 79°21'38", Rockbridge County, at Buena Vista City 600 ft upstream from mouth, and 0.2 mi downstream from culvert on U.S. Highway 501.	4.57	1995-98	5- 7-99 7-21-99	.471 .210
02025610 Harris Creek [a]	James River	Lat 37°32'53", long 79°08'30", Amherst County, at Old Dominion Job Corps discharge, 0.9 mi up- stream from confluence with Fall- ing Rock Creek, and 2.5 mi north- west of Faulconerville.	11.4	1995-98	10- 1-98 5-20-99 8-10-99	2.09 4.51 .379
02025680 Unnamed tribu- tary [a]	Harris Creek	Lat 37°28'43", long 79°08'11", Amherst County, at bridge on private road, 100 ft upstream from Ivanhoe Forest Subdivision sewage treatment plant, and 1.4 mi south of Monroe.	0.50	1993-98	10- 1-99 5-20-99 8-10-99	.113 .146 .077
02025850 Ivy Creek [a]	Blackwater Creek	Lat 37°23'36", long 79°18'35", Bedford County, 100 ft down- stream from Ivy Hill Lake, 2.1 mi upstream from State Highway 662, and 2.7 mi northeast of Norwood.	9.68	1994-98	10- 1-98 5-20-99 8-12-99	1.46 5.33 .040
02025890 Unnamed tribu- tary [a]	Tussocky Creek	Lat 37°17'55", long 79°09'04", Campbell County, at Evergreen Mobile Home Park, 1.0 mi up- stream from confluence with tributary from Willow Lake, and 2.8 mi southeast of City Farm.	0.20	1996-98	5- 5-99 7- 7-99 8-24-99	.046 0 0
02025970 Wreck Island Creek [a]	James River	Lat 37°28'52", long 78°53'43", Appomattox County, 50 ft up- stream from Appomattox Line Company discharge, 2.0 mi downstream from bridge on State Highway 683, and 3.0 mi south of Riverville.	56.11	1993-98	5- 5-99 7- 7-99 8-24-99	28.8 8.98 7.49
02028480 Unnamed tribu- tary [a]	South Fork Rockfish River	Lat 37°54'16", long 78°57'51", Nelson County, 200 ft upstream from Wintergreen Mountain sewage treatment plant, 2.8 mi northeast of Love.	0.34	1993-98	7-19-99	.030

a Provided by the Virginia Department of Environmental Quality - Water Division.



## DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

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Discharge measurements made at special study and miscellaneous sites during water year 1999--Continued

Stream	Tributary to	Location	Drainage area (mi <sup>2</sup> )	Measured previously (water years)	Measurements	
					Date	Discharge (ft <sup>3</sup> /s)
JAMES RIVER BASIN--Continued						
02030400 Turpin Creek [a]	Slate River	Lat 37°14'19", long 78°28'50", Buckingham County, at Bucking- ham Medium Security Institute #3 discharge, 1.5 mi upstream from Peyton Creek, and 2.0 mi northwest of Dillwyn.	1.32	1994-98	6- 4-99	.417
02030755 Unnamed tribu- tary [a]	North Creek	Lat 37°45'28", long 78°15'38", Fluvanna County, at Village Nursing Center discharge, 0.2 mi south of Fork Union, and 0.5 mi upstream from mouth.	0.08	1994-98	8- 6-99	<.001
02030760 North Creek [a]	South Creek	Lat 37°45'27", long 78°15'02", Fluvanna County, 100 ft upstream from Fork Union Military Academy sewage treatment plant, at bridge on State Highway 652, and 0.8 mi southeast of Fork Union.	2.0	1990-98	6- 4-99 8- 6-99	.193 .070
02033495 Moores Creek [a]	Rivanna River	Lat 38°01'07", long 78°27'39", Albemarle County, at Regional sewage treatment plant, 0.4 mi upstream from mouth, and 0.6 mi downstream from Charlottesville city boundary.	34.64	-	8-24-99	2.43
02033390 Biscuit Run [a]	Moores Creek	Lat 37°59'57", long 78°31'09", Albemarle County, at Southwood Mobile Home Park discharge, 1.1 mi upstream from Inter- state Highway 64, 0.8 mi south of Charlottesville City limits and 1.3 mi upstream from mouth.	12.56	1994-98	10-23-98 8- 6-99	2.32 0
02033570 Shadwell Creek[a]	Rivanna River	Lat 38°01'13", long 78°25'27", Albemarle County, at Ramada Inn discharge, 0.3 mi upstream from bridge on U.S. Highway 250, and 1.6 mi west of Shadwell.	0.624	1998	5- 6-99 7-16-99 8- 6-99	.090 .021 .010
02033670 Rivanna River[a]	James River	Lat 38°00'24", long 78°24'02", Albemarle County, at bridge on State Highway 729, 0.4 mi upstream from Camp Branch, and 0.5 mi southwest of Shadwell.	-	1993, 1995, 1997-98	6- 4-99 8- 6-99	107 24.4
02033800 Mechunk Creek [a]	Rivanna River	Lat 38°59'03", long 78°18'44", Fluvanna County, at bridge on U.S. Highway 250, 5.0 mi west of Zion Crossroads.	-	1941, 1951, 1953-54, 1964, 1994-98	6- 4-99 8- 6-99	2.98 .259
02038000 Falling Creek	James River	Lat 37°26'37", long 77°31'21", Chesterfield County, at bridge on State Highway 651, 2.8 mi upstream from Pocoshock Creek and 4.7 mi northwest of Ches- terfield.	32.8	1955-94†, 1996-98	4-30-99	9.79

† Operated as a continuous-record gaging station.

&lt; Less than.

a Provided by the Virginia Department of Environmental Quality - Water Division.

## DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Discharge measurements made at special study and miscellaneous sites during water year 1999--Continued

Stream	Tributary to	Location	Drainage area (mi <sup>2</sup> )	Measured previously (water years)	Measurements	
					Date	Discharge (ft <sup>3</sup> /s)
JAMES RIVER BASIN--Continued						
0203879450 Appomattox River	James River	Lat 37°22'45", long 78°49'27", Appomattox County, at bridge on State Highway 656, .5 mi south of Bobcock Cemetery, and 1.25 mi north of Appomattox.	-	-	3- 1-99	1.38
					6-29-99	.43
					9-29-99	2.97
0203880090 Plain Run Branch	Appomattox River	Lat 37°22'03", long 78°48'58", Appomattox County, .5 mi south of State Highway 24, and .75 mi northwest of Appomattox.	-	-	3- 2-99	.14
					6-29-99	.08
					9-30-99	2.72
0203880175 Plain Run Branch	Appomattox River	Lat 37°22'50", long 78°47'21", Appomattox County, .05 mi east of State Highway 24, 2.25 mi northeast of Appo- mattox, and 2.5 mi south southeast of Vera.	-	-	3- 2-99	1.28
					6-29-99	.36
					9-30-99	14.8
0203880250 Appomattox River	James River	Lat 37°23'01", long 78°46'52", Appomattox County, .5 mi downstream of State Highway 24, 2.0 mi south southwest of Vera, and 2.5 mi northeast of Appomattox.	-	-	3- 1-99	6.76
					6-29-99	1.92
					9-29-99	16.1
02040500 Flat Creek	Appomattox River	Lat 37°23'37", 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	1947-78, 1952-54, 1971-72, 1977, 1981-85, 1987-89, 1992, 1996-98	5- 5-99	.73
02040590 Nibbs Creek [a]	Flat Creek	Lat 37°22'02", long 77°59'33", Amelia County, 150 ft upstream from Courthouse Branch, 0.2 mi downstream from bridge on State Highway 681, and 1.8 mi north of Amelia Courthouse.	15.51	1997-98	5-13-99	3.00
					6- 8-99	1.46
					8-10-99	.040
02041630 Upper Appomattox Canal [a]	Appomattox River	Lat 37°13'18", long 77°30'12", Dinwiddie County, downstream of Lake Chesdin dam, 1.5 mi west of Matoaca, 1.7 mi up- stream from State Highway 600, and 5.2 mi west of Peters- burg.	-	1971-79	6-29-99	38.1
					8-23-99	7.86
02041700 Cattail Run [a]	Appomattox River	Lat 37°12'58", long 77°26'39", Dinwiddie County, at Peters- burg, 500 ft upstream from U.S. Highway 1 and 460, and 0.7 mi upstream from mouth.	8.61	1993-98	5-21-99	1.22
02041745 Poor Creek	Appomattox River	Lat 37°12'56", long 77°22'29", Petersburg City, 100 ft up- stream from Siege Road, 2.8 mi southwest of entrance to Petersburg National Battle- field, and 1.5 mi west of Fort Lee.	-	1998	12- 9-98	1.21
					2-10-99	.13
					6-23-99	.03

a Provided by the Virginia Department of Environmental Quality - Water Division.

Discharge measurements made at special study and miscellaneous sites during water year 1999--Continued

Stream	Tributary to	Location	Drainage area (mi <sup>2</sup> )	Measured previously (water years)	Measurements	
					Date	Discharge (ft <sup>3</sup> /s)
JAMES RIVER BASIN--Continued						
02041748 Poor Creek	Appomattox River	Lat 37°13'49", long 77°22'32", Petersburg City, 0.5 mi west of Siege Road, 2.0 mi south- west of entrance to Petersburg National Battlefield, and 2.0 mi west of Fort Lee.	-	1998	12- 8-98	.07
					12-10-98	.65
					6-23-99	.13
02041758 Harrison Creek	Appomattox River	Lat 37°13'58", long 77°21'50", Petersburg City, 75 ft down- stream from Siege Road, 1.3 mi southwest of entrance to Petersburg National Battle- field, and 1.0 mi west of Fort Lee.	-	1998	12- 8-98	.02
					12- 9-98	.33
					6-22-99	.12
02041760 Harrison Creek	Appomattox River	Lat 37°14'25", long 77°21'50", Petersburg City, 100 ft down- stream of State Highway 36, 0.5 mi west of entrance to Petersburg National Battle- field, and 1.0 mi west of Fort Lee	-	1998	12- 8-98	.14
					12- 9-98	.58
					6-22-99	.18
02041790 Harrison Branch [a]	Appomattox River	Lat 37°15'45", long 77°21'22", Prince George County, at Red Hill Mobil Home Park, 1.1 mi upstream from mouth, 1.8 mi west of Jefferson Park, and 3.0 mi east of Colonial Heights.	1.28	1996-98	5-13-99	.125
					8-16-99	.046
02042075 Bailey Creek [a]	James River	Lat 37°14'43", long 77°19'34", Prince George County, at Fort Lee Military Reservation, 0.7 mi upstream from bridge on State Highway 630, and 1.2 mi south of Jefferson Park.	-	1995-98	5-21-99	.492
					8-16-99	.193
02042250 Bailey Branch tributary	Bailey Branch	Lat 37°10'29", long 76°59'13", Surry County, at culvert on State Highway 10, 1.0 mi northwest of Sring Grove.	0.71	1968-70, 1992, 1996-98	4-26-99	.482
02042400 Jordans Branch	Upham Brook	Lat 37°35'10", long 77°29'55", Henrico County, at bridge on U.S. Highway 250 (Broad Street) at Richmond, and 2.0 mi upstream from mouth.	2.53	1984-85, 1989-90, 1996-98	4-28-99	.607
CHOWAN RIVER BASIN						
02044200 Falls Creek tribu- tary	Falls Creek	Lat 37°02'04", long 78°10'26", Lunenburg County, at culvert on State Highway 49, 3.6 mi upstream from Timber Swamp.	0.34	1962, 1969-71, 1991, 1996-97	5- 5-99	1.86
02045275 Unnamed tribu- tary [a]	Sturgeon Creek	Lat 36°51'35", long 77°50'05", Brunswick County, 0.7 mi up- stream from culvert on State Highway 642, 2.4 mi upstream from mouth and 2.8 mi east of Alberta.	1.68	1998	5-19-99	.203
					8-16-99	.175

a Provided by the Virginia Department of Environmental Quality - Water Division.

## DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Discharge measurements made at special study and miscellaneous sites during water year 1999--Continued

Stream	Tributary to	Location	Drainage area (mi <sup>2</sup> )	Measured previously (water years)	Measurements	
					Date	Discharge (ft <sup>3</sup> /s)
CHOWAN RIVER BASIN--Continued						
02046265 Hatcher Run	Rowanty Creek	Lat 37°09'20", long 77°37'32", Dinwiddie County, 25 ft up- stream from State Highway 627, 1.0 mi north of Five Forks, and 12.0 mi southwest of Petersburg.	-	1998	12- 9-98	.54
					2- 9-99	3.50
					6-22-99	3.68
02050050	Blackwater River tributary	Lat 36°38'44", long 76°51'29", Suffolk City, at culvert on State Highway 272, 4.9 mi southwest of Holland, and 3.0 mi upstream from mouth.	2.76	1968-70, 1996-98	4-26-99	.307
ROANOKE RIVER BASIN						
02054660 Mason Creek [a]	Roanoke River	Lat 37°21'55", long 80°03'05", Roanoke County, at Roanoke Moose Lodge sewage treatment plant, 50 ft west of State Highway 311, and 0.9 mi west of Bennett Springs.	29.7	1993	10- 5-98	<.001
					6- 2-99	1.02
					8-11-99	<.001
02055515 Lick Run [a]	Tinker Creek	Lat 37°16'20", long 79°56'08", Roanoke City, at Roanoke, along Norfolk Avenue, 300 ft downstream from U.S. High- way 220, and 1.0 mi upstream from mouth.	5.0	1994-98	6- 2-99	7.36
					8-11-99	7.37
02056800 South Fork Blackwater River [a]	Blackwater River	Lat 37°00'39", long 80°02'53", Franklin County, at Callaway, at Callaway Elem. School sewage treatment plant discharge, and 400 ft downstream from bridge on State Highway 641.	22.17	1995, 1997-98	5-25-99	12.9
					8-17-99	1.20
02057060 Gills Creek	Blackwater River	Lat 39°06'25", long 79°43'51", Franklin County, 0.8 mi south on Jack-O-Lantern Branch Trail in Booker T. Washington National Monument, 35 ft upstream of confluence with Jack-O-Lantern Branch, 5.5 mi southeast of Burnt Chimney, and 8.0 mi south- west of Moneta.	-	1998	12- 2-98	10.8
					3- 3-99	14.1
					6-30-99	3.89
0205706010 Jack-O- Lantern Branch	Gills Creek	Lat 37°06'54", long 79°43'50", Franklin County, 0.5 mi south on Farm Trail Loop in Booker T. Washington Monument, 5.0 mi southeast of Burnt Chimney, and 7.5 mi southwest of Moneta.	-	1998	12- 1-98	.04
					3- 3-99	.08
					7- 1-99	.06
0205706020 Jack-O- Lantern tribu- tary (No.1)	Jack-O-Lantern Branch	Lat 37°06'42", long 79°43'45", Franklin County, 0.5 mi south on Jack-O-Lantern Branch Trail in Booker T. Washington National Monument, 1.0 mi south of State Highway 122, 5.0 mi southeast of Burnt Chimney, and 7.0 mi southwest of Moneta.	-	1998	12- 1-98	.10
					3- 3-99	.25
					7- 1-99	.14
0205706030 Jack-O- Lantern Branch	Gills Creek	Lat 37°06'24", long 79°43'50", Franklin County, 0.8 mi south on Jack-O-Lantern Branch Trail in Booker T. Washington National Monument, 40 ft upstram of con- fluence with Gills Creek, 5.5 mi southwest of Burnt Chimney, and 8.0 mi southwest of Moneta.	-	1998	12- 1-98	.35
					3- 3-99	.56
					7- 1-99	.25

&lt; Less than.

a Provided by the Virginia Department of Environmental Quality - Water Division.

Discharge measurements made at special study and miscellaneous sites during water year 1999--Continued

Stream	Tributary to	Location	Drainage area (mi <sup>2</sup> )	Measured previously (water years)	Measurements	
					Date	Discharge (ft <sup>3</sup> /s)
ROANOKE RIVER BASIN--Continued						
02057650 Pigg River [a]	Roanoke River	Lat 36°59'01", long 79°52'53", Franklin County, 500 ft upstream from Ronile Incorporated discharge, 0.4 mi downstream from bridge on Business Route 220, and 0.9 mi south of Rocky Mount.	68.8	1993-97	8-17-99	7.06
02057695 Unnamed tributary [a]	Powder Mill Creek	Lat 37°00'32", long 79°53'29", Franklin County, at Rocky Mount, 800 ft east of Main Street, and 0.25 mi upstream from culvert on State Street.	-	1998	5-25-99 8-17-99	.013 0
02059440 Unnamed tributary [a] (No.1)	South Fork Goose Creek	Lat 37°23'52", long 79°45'08", Bedford County, at Woodhaven discharge, 200 ft upstream from culvert on State Highway 697, and 1.5 mi east of Villamont.	0.31	1996-98	8-12-99	.386
02060900 Roaring Run [a]	Big Otter River	Lat 37°24'28", long 79°24'11", Bedford County, at Gunnoe Sausage discharge, 500 ft upstream from bridge on State Highway 643, and 0.3 mi south of Cifax.	0.70	1994-98	10- 1-98 8-12-99	.090 .021
02061460 Buffalo Creek [a]	Big Otter River	Lat 37°18'18", long 79°17'24", Campbell County, 300 ft upstream from bridge on U.S. Highway 460, and 0.5 mi northwest of New London.	5.86	1993-98	10- 1-98 5-20-99 8-10-99	1.66 2.27 .409
02063780 Mollys Creek [a]	Falling River	Lat 37°16'24", long 79°05'58", Campbell County, at Rustburg sewage treatment plant, 0.28 mi south of intersection of U.S. Highway 501 and State Highway 24, and at Rustburg.	.158	-	5- 5-99 7- 7-99 8-24-99	.121 .046 .040
02063800 Mollys Creek [a]	Falling River	Lat 37°12'05", long 79°03'18", at Thousand Trails sewage treatment plant discharge, 0.7 mi upstream from bridge on State Highway 654, and 2.7 mi southeast of Winfall.	13.92	1995-98	*9-21-98 5-20-99 8-10-99	2.64 4.36 .212
02065010 Phelps Creek [a]	Falling River	Lat 37°04'06", long 78°57'06", Campbell County, 500 ft downstream from Brookneal Reservoir, 0.3 mi upstream from mouth, and 1.5 mi north of Brookneal.	3.95	1995, 1997-98	*9-21-98 5-20-99 8-10-99	.972 1.81 .497
02072530 Blackberry Creek [a]	Smith River	Lat 36°44'42", long 80°04'48", Henry County, at Fairway Acres discharge, 500 ft upstream from bridge on State Highway 687, and 2.0 mi northeast of Sandville.	3.94	1997-98	5-25-99 8-17-99	2.55 .696
02075091.25 Unnamed tributary [a]	Hogans Creek	Lat 36°32'30", long 79°22'22", Pittsylvania County, at Goodyear Tire and Rubber plant discharge, 0.4 mi upstream from bridge on State Highway 736, 1.1 mi southeast of Danville City limits, and 1.5 mi upstream from mouth.	0.89	1994-98	5-26-99 8-18-99	.316 .018

\* Not previously published.

a Provided by the Virginia Department of Environmental Quality - Water Division.

## DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Discharge measurements made at special study and miscellaneous sites during water year 1999--Continued

Stream	Tributary to	Location	Drainage area (mi <sup>2</sup> )	Measured previously (water years)	Measurements	
					Date	Discharge (ft <sup>3</sup> /s)
ROANOKE RIVER BASIN--Continued						
02075191	Dan River	Lat 36°36'00", long 79°19'34", Pittsylvania County, 0.3 mi downstream from bridge on State Highway 730, and 1.7 mi west of Ringgold.	3.94	1997-98	5-26-99 8-18-99	1.66 .436
02075350	Dan River	Lat 36°34'50", long 79°11'20", Halifax County, at culvert on U.S. Highway 58, 1.1 mi east of Halifax-Pittsylvania county line, 8.8 mi southwest of Turbeville, and 0.8 mi up- stream from mouth.	0.28	1993, 1996, 1998	10- 7-98	.03
02076100	Banister River	Lat 36°46'18", long 79°32'52", Pittsylvania County, 0.4 mi downstream from bridge on State Highway 815, 1.3 mi upstream from mouth, and 2.8 mi northeast of Swan- sonville.	3.75	1993-95, 1997-98	5-26-99 8-18-99	1.22 .184
02076280	White Oak Creek	Lat 36°44'40", long 79°23'48", Pittsylvania County, at Vulcan Materials Company discharge, 0.6 mi south of Dry Fork, and 0.7 mi upstream from bridge on State Highway 718.	2.42	1994-95, 1997-98	5-26-99 8-18-99	.361 0
02076340	Banister River	Lat 36°48'21", long 79°22'44", Pittsylvania County, 50 ft upstream from Tanyard Branch 0.8 mi downstream from bridge on U.S. Highway 29, and 1.7 mi southeast of Chatham.	36.18	1993-95, 1997	8-18-99	3.11
02076350	Cherrystone Creek	Lat 36°48'23", long 79°22'44", Pittsylvania County, at mouth, 0.8 mi downstream from culvert on U.S. Highway 29, and 1.7 mi southeast of Chatham.	2.11	1993-95, 1997	8-18-99	.125
02076700	Allen Creek	Lat 36°56'40", long 79°09'56", Pittsylvania County, at cul- vert on State Highway 40, 1.5 mi east of Mt. Airy, and 3.5 mi upstream from mouth.	3.44	1968, 1970-72, 1987, 1990, 1996-97	2- 2-99	1.57
YADKIN RIVER BASIN						
02113540	Birds Branch	Lat 36°38'18", long 80°32'05", Patrick County, at Doe Run Lodge discharge, 0.25 mi south of Pilot Mtn. Overlook, and 3.0 mi north- west of Ararat.	.04	1995-98	8- 5-99	.059
02113541	Birds Branch	Lat 36°38'16", long 80°32'30", Patrick County, at Groundhog Mtn. Resort discharge, 0.45 mi southwest of Pilot Mtn. Overlook, and 3.1 mi north- west of Ararat.	-	1995-98	8- 5-99	.035

a Provided by the Virginia Department of Environmental Quality - Water Division.

Discharge measurements made at special study and miscellaneous sites during water year 1999--Continued

Stream	Tributary to	Location	Drainage area (mi <sup>2</sup> )	Measured previously (water years)	Measurements	
					Date	Discharge (ft <sup>3</sup> /s)
KANAWHA RIVER BASIN						
03162705	New River	Lat 36°36'08", long 81°20'22", Grayson County, 0.2 mi downstream from bridge on State Highway 728, 0.3 mi north of Oak Hill, and 1.6 mi upstream from mouth.	1.54	1995, 1997-98	10- 6-98 6- 8-99	.250 .200
03162852	New River	Lat 36°36'01" long 81°06'41", Grayson County, at Independence sewage treatment plant, 200 ft upstream from State Highway 697, and 2.7 mi southeast of Independence.	-	1993-95, 1997-98	10- 6-98	3.64
03163480	Elk Creek	Lat 36°43'27", long 81°10'45", Grayson County, at Perry Manufacturing sewage treatment plant, 0.2 mi north of Elk Creek, and 0.3 mi upstream from bridge on State Highway 659.	2.31	1994-95, 1997-98	10- 6-98	.912
03164100	New River	Lat 36°42'28", long 81°02'11", Grayson County, 0.5 mi upstream from bridge on State Highway 648, 1.3 mi northwest of Providence, and 2.5 mi southwest of Stevens Creek.	0.32	1995, 1997-98	10- 6-98 6- 8-99	.240 .191
03166100	New River	Lat 36°50'17", long 80°55'00", Wythe County, 100 ft east of State Highway 636, 0.6 mi upstream from culvert on State Highway 69, and 0.9 mi south of Austinville.	-	1993-98	10- 7-98 6- 9-99	.083 .271
0316612010	Buddle Unnamed tributary [a] (No.1)	Lat 36°51'21", long 80°54'18", Wythe County, 10 ft upstream from confluence with Buddle Branch, 0.6 mi northeast of Austinville.	-	1997-98	10- 7-98 6- 9-99	.696 .693
03167100	Reed Creek	Lat 36°57'58", long 80°51'07", Wythe County, at I-81 Auto & Truck Stop sewage treatment plant discharge, at exit 86, and 2.8 mi northeast of Grahams Forge.	0.12	1995-98	10- 5-98 7-27-99	.002 .001
03167150	New River	Lat 36°41'20", long 80°31'42", Carroll County, at Olde Mill Golf Resort, 0.2 mi downstream from bridge on State Highway 618, and 2.1 mi south of Laurel Fork.	20.2	1994-98	10- 6-98 6- 8-99 9- 2-99	13.7 14.2 13.0
03167300	Mira Fork tributary	Lat 36°50'16", long 80°35'47", Carroll County, at culvert on U.S. Highway 221, 1.3 mi upstream from mouth, and 2.2 mi northeast of Dugspur.	.62	1968-71, 1992, 1993	6- 4-99	.671
03167600	East Fork Unnamed tributary [a] (No.1)	Lat 36°40'00", long 80°41'43", Carroll County, at Lakeview Motel sewage treatment plant discharge, at Fancy Gap, and 1.1 mi upstream from mouth.	0.13	1995-98	10- 6-98 6- 9-99 8- 5-99	.035 .030 .030

a Provided by the Virginia Department of Environmental Quality - Water Division.

b Provided by both the U.S. Geological Survey and Virginia Department of Environmental Quality - Water Division.

## DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Discharge measurements made at special study and miscellaneous sites during water year 1999--Continued

Stream	Tributary to	Location	Drainage area (mi <sup>2</sup> )	Measured previously (water years)	Measurements		
					Date	Discharge (ft <sup>3</sup> /s)	
KANAWHA RIVER BASIN--Continued							
03167608	Reed Island East Fork Little Reed Island Creek [a]	Lat 36°40'27", long 80°42'42", Carroll County, at Days Inn discharge, 200 ft upstream from I-77, and 1.2 mi north east of Fancy Gap.	3.21	1996-98	10- 6-98 6- 9-99	2.58 3.98	
03167610	East Fork Unnamed tribu- tary [a]	Little Reed Island Creek Tributary (No.2)	Lat 36°40'26", long 80°41'42", Carroll County, at Utts Campground discharge, at culvert on U.S. Highway 52, and 0.5 mi north of Fancy Gap.	0.15	1995-98	10- 6-98 6- 9-99 8- 5-99	.035 .030 .024
03168450	New River Peak Creek [a]	Lat 37°02'50", long 80°47'32", Pulaski County, at Pulaski, 600 ft downstream from bridge on State Highway 610, and 0.4 mi upstream from Tract Fork.	-	1995, 1997-98	8-11-99 8-31-99	.034 2.30	
03168480	Peak Creek Tract Fork [a]	Lat 37°02'50", long 80°47'14", Pulaski County, at Pulaski, 100 ft upstream from mouth, and 1.9 mi downstream from Harbison Branch.	25.55	1994-95, 1998	8-11-99 8-31-99	.370 .983	
03168750	Peak Creek Thorne Springs Branch	Lat 37°05'30", long 80°44'34", Pulaski County, at pond dam, just upstream from U.S. High- way 11, and 3.3 mi southwest of Dublin.	4.77	-	6- 4-99	.304	
03169220	West Fork Dodd Creek [a]	Lat 36°54'38", long 80°20'20", Floyd County, at Floyd sewage treatment plant, 900 ft down- stream from bridge on U.S. Highway 221, and 0.8 mi west of Floyd.	19.25	1996-98	10- 5-98 6- 8-99 9- 2-99	14.8 11.4 6.63	
03171170	New River Crab Creek [a]	Lat 37°09'26", long 80°28'15", Montgomery County, at Town of Christiansburg discharge, 200 ft upstream from culvert on State Highway 660, and 3.9 mi northwest of Christiansburg.	13.79	1995, 1997-98	10- 5-98 6- 8-99 9- 2-99	4.97 5.54 3.96	
03171690	Crab Orchard Unnamed tribu- tary [a]	Crab Creek	Lat 37°06'08", long 81°06'45", Bland County, at Bland Com- bined School sewage treatment plant, 0.3 mi upstream from bridge on State Highway 605, and 0.3 mi east of Bland.	1.56	1994-97	8-31-99	<.001
03171700	Walker Creek Crab Orchard Creek [a]	Lat 37°05'36", long 81°06'37", Bland County, 0.4 mi down- stream from bridge on State Highway 605, 0.7 mi southeast of Bland.	15.91	1993-98	8-31-99	1.16	
03171950	Walker Creek Kimberling Creek [a]	Lat 37°09'55", long 80°54'00", Bland County, at bridge on State Highway 42, 0.8 mi downstream from Dismal Creek, and 2.4 mi northeast of Mechanicsburg.	57.54	1941-42, 1951-55, 1993-97	8-31-99	3.63	
03174580	Wolf Creek Hunting Camp Creek [a]	Lat 37°09'25", long 81°08'55", Bland County, at GIV Inc. dis- charge, 0.3 mi north of Bastian, and 1.1 mi upstream from mouth.	29.8	1995, 1997-98	10- 5-98 8-31-99	.888 .077	

&lt; Less than.

a Provided by the Virginia Department of Environmental Quality - Water Division.



Discharge measurements made at special study and miscellaneous sites during water year 1999--Continued

Stream	Tributary to	Location	Drainage area (mi <sup>2</sup> )	Measured previously (water years)	Measurements	
					Date	Discharge (ft <sup>3</sup> /s)
KANAWHA RIVER BASIN--Continued						
03174600	New River	Lat 37°10'38", long 81°09'10", Bland County, at Kegley Manor sewage treatment plant dis- charge, 0.4 mi upstream from U.S. Highway 21 and 52, 0.8 mi upstream from Hunting Camp Creek, and 1.7 mi north of Bastian.	99.0	1994-95, 1997-98	10- 5-98 8-31-99	8.44 3.33
03174600	Wolf Creek [a]					
BIG SANDY RIVER BASIN						
03207227	Garden Creek	Lat 37°10'02", long 82°00'53", Buchanan County, at Skeggs, 600 ft upstream from Skeggs Branch, and 1.5 mi south of Mount Heron.	12.0	1995-98	10-28-98	1.02
03207227	Right Fork [a]					
03207350	Big Sandy River	Lat 37°14'21", long 82°04'02", Buchanan County, at Oakwood sewage treatment plant, 0.1 mi downstream from Laurel Branch, and 1.8 mi east of Vansant.	177	1993-98	10-28-98	20.0
03207350	Levisa Fork [b]					
03208040	Levisa Fork	Lat 37°04'41", long 82°03'56", Buchanan County, at 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, 1992, 1994	5-26-99	6.59
03208040	Russell Fork					
03208340	McClure River	Lat 37°01'03", long 82°17'46", Dickenson County, 100 ft west of State Highway 63, 0.2 mi downstream from Trammel Branch, and 0.3 mi northwest of Trammel.	4.02	1994-98	10-29-98	.534
03208340	McClure Creek [a]					
03208364	McClure River	Lat 37°04'04", long 82°20'40", Dickenson County, at Ervinton Elementary School sewage treat- ment plant, 0.2 mi upstream from bridge on State Highway 652, 0.2 mi upstream from Open Fork, and 0.3 mi southeast of Nora.	22.0	1994-98	10-29-98	4.53
03208364	McClure Creek [a]					
03208368	Open Fork	Lat 37°02'59", long 82°21'36", Dickenson County, 400 ft up- stream from confluence with Open Fork, 1.6 mi southeast of Nora.	5.18	1998	10-29-98 8- 3-99	.774 .677
03208368	Spring Fork [a]					
03208700	Pound River	Lat 37°07'32", long 82°37'36", Wise County 700 ft down- stream from Stacy Branch, 1,600 ft downstream from North Fork Pound River dam, and at Pound.	18.5	1963-98	10- 7-98 11-18-98 6-29-99	9.62 7.84 1.17
03208700	North Fork Pound River					
03208800	Russell Fork	Lat 37°07'26", long 82°36'29", Wise County, 1,600 ft down- stream from confluence of North and South Forks, 0.5 mi upstream from U.S. Highway 23, 0.7 mi upstream from Indian Creek, and at Pound.	36.7	1966-81, 1984-98	10- 7-98 11-18-98 6-29-99 8-18-99	18.3 20.1 13.2 5.81
03208800	Pound River					

a Provided by the Virginia Department of Environmental Quality - Water Division.

b Provided by both the U.S. Geological Survey and Virginia Department of Environmental Quality - Water Division.

## DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Discharge measurements made at special study and miscellaneous sites during water year 1999--Continued

Stream	Tributary to	Location	Drainage area (mi <sup>2</sup> )	Measured previously (water years)	Measurements	
					Date	Discharge (ft <sup>3</sup> /s)
BIG SANDY RIVER BASIN--Continued						
03208900 Pound River	Russell Fork	Lat 37°09'51", long 82°31'30", Dickenson County, 50 ft up- stream from State Highway 624, 150 ft upstream from Camp Creek, and 2.6 mi northwest of Georges Fork.	82.5	1964-98	10- 7-98	30.7
					2-23-99	84.5
					6-29-99	24.3
					8-19-99	12.0
0320890475 Laurel Creek [a]	Georges Fork	Lat 37°08'02", long 82°29'25", Dickenson County, 1.1 mi south of Georges Fork, 1.4 mi upstream from mouth.	0.189	1997-98	10-28-98	.021
					8- 3-99	<.001
0320890485 Georges Fork [a]	Pound River	Lat 37°09'01", long 82°29'25", Dickenson County, 50 ft down- stream from Laurel Creek, 300 ft downstream from bridge on State Highway 83, and 0.2 mi northwest of Georges Fork.	5.57	1994-98	10-28-98	1.58
					8- 3-99	.960
03209200 Russell Fork	Levisa Fork	Lat 37°14'45", long 82°19'25", Dickenson County, at bridge on State Highway 611, 0.2 mi downstream from Pound River, and at Bartlick.	526	1963-98	10- 7-98	94.7
					6-29-99	126
					8-19-99	128
03213590 Knox Creek	Tug Fork	Lat 37°27'02", long 82°03'34", Buchanan County, on State Highway 697, 0.3 mi down- stream from Pawpaw Creek, and 0.8 mi northwest of Kelsa.	84.3	1980-81, 1989, 1992-94	6-28-99	35.1
TENNESSEE RIVER BASIN						
03472200 Big Laurel Creek [a]	Whitetop Laurel Creek	Lat 36°41'15", long 81°32'54", Smyth County, at Grindstone Recreation Area sewage treat- ment plant, 0.1 mi upstream from bridge on State Highway 603, and 1.9 mi north of Mt. Rogers.	0.53	1994-95, 1997-98	10- 6-98	.025
					6- 8-99	.217
03473840 Unnamed tribu- tary [a]	Hungry Mother Creek	Lat 36°52'20", long 81°30'42", Smyth County, at Hungry Mother State Park Campground D sewage treatment plant, 400 ft down- stream from bridge on park road, and 2.7 mi north of Marion.	2.17	1993-95, 1998	10- 7-98	.129
					8- 2-99	.546
03475595 East Fork Cedar Creek [a]	Cedar Creek	Lat 36°44'58", long 81°51'26", Washington County, at Meadowview Elem. School sewage treatment plant, 0.1 mi north of Cedarville.	--	1995, 1997-98	10- 7-98	.659
					8- 2-99	.902
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, 1990, 1992-94, 1998	5-27-99	2.58
03475605 Greenway Creek [a]	Middle Fork Holston River	Lat 36°44'51", long 81°53'13", Washington County, at Washington County Industrial Park sewage treatment plant, 400 ft down- stream from bridge on State Highway 694, and 5.9 mi north east of Abingdon.	1.75	1993-95, 1997	9- 1-99	.868

&lt; Less than.

a Provided by the Virginia Department of Environmental Quality - Water Division.

Discharge measurements made at special study and miscellaneous sites during water year 1999--Continued

Stream	Tributary to	Location	Drainage area (mi <sup>2</sup> )	Measured previously (water years)	Measurements	
					Date	Discharge (ft <sup>3</sup> /s)
TENNESSEE RIVER BASIN--Continued						
03487800 Lick Creek	North Fork Holston River	Lat 36°57'44", long 81°28'21", Smyth County, 270 ft upstream from bridge on State Highway 42, 1.6 mi upstream from mouth, and 2.9 mi northeast of Chatham Hill.	25.5	1966-68 1990, 1992, 1994, 1998	2-11-99	19.2
03488450 Brumley Creek	North Fork Holston River	Lat 36°47'30", long 82°01'10", Washington County, at 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.	21.1	1979-81, 1982-85, 1992, 1994, 1998	1-21-99 1-21-99	61.8 54.1
03488490 Canoe Branch[a]	North Fork Holston River	Lat 36°45'12", long 82°02'42", Washington County, at Greendale Elementary School discharge, 2.4 mi upstream from mouth, and 2.4 mi southeast of Holston.	0.05	1997-98	10-30-98 9- 1-99	<.001 .001
03489860 Hilton Creek [a]	North Fork Holston River	Lat 36°39'12", long 82°27'50", Scott County, at Hilton Elementary School sewage treatment plant, 0.2 mi south- east of Hilton, and 0.4 mi upstream from mouth.	1.05	1993-95, 1997-98	10- 7-98 8- 3-99	.181 .639
03489867 Unnamed tribu- tary [a] (No.8)	North Fork Holston River	Lat 36°38'24", long 82°29'33", Scott County, at Brickyard Gap, 300 ft upstream from bridge on State Highway 896, 0.3 mi upstream from mouth, and 1.7 mi southwest of Hilton.	2.95	1998	10- 7-98 8- 3-99	0 2.51
03489950 Unnamed tribu- tary [a] (No.1)	Little Moccasin Creek	Lat 36°38'13", long 82°40'00", Scott County, 400 ft upstream from culvert on State Highway 870, 600 ft upstream from mouth, and 3.1 mi northeast of Kermit.	0.20	1997-98	10-28-98 8- 3-99	.037 .071
03490020 Cate Branch [a]	Possum Creek	Lat 36°36'58", long 82°37'47", Scott County, at Yuma Elementary School sewage treatment plant, 300 ft upstream from culvert on State Highway 713, and 0.9 mi west of Yuma.	0.42	1993-95, 1997	10- 7-98 8- 3-99	.030 .070
03521500 Clinch River	Tennessee River	Lat 37°05'10", long 81°46'52", Tazewell County, 1.0 mi south- east of Richlands, 1.7 mi downstream from Indian Creek.	137	1945-98	5-27-99	83.0
03521550 Big Creek [a]	Clinch River	Lat 37°09'14", long 81°47'02", Tazewell County at Seaboard No.2 Mine discharge, at mouth of Wildcat Hollow, and 0.6 mi southeast of Coalidan.	3.86	1997-98	10-29-98 8- 4-99	.083 .142
03523000 Big Cedar Creek [b]	Clinch River	Lat 36°54'29", long 82°02'20", Russell County, 800 ft upstream from Roaring Spring Creek, 1.3 mi downstream from Burgess Creek, 1.9 mi upstream from Little Cedar Creek, and 2.3 mi east of Lebanon.	51.5	1953-59† 1991	9- 1-99	5.19

† Operated as a continuous-record gaging station.  
< Less than.

a Provided by the Virginia Department of Environmental Quality - Water Division.

b Provided by both the U.S. Geological Survey and Virginia Department of Environmental Quality - Water Division.

## DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Discharge measurements made at special study and miscellaneous sites during water year 1999--Continued

Stream	Tributary to	Location	Drainage area (mi <sup>2</sup> )	Measured previously (water years)	Measurements	
					Date	Discharge (ft <sup>3</sup> /s)
TENNESSEE RIVER BASIN--Continued						
03523050 Big Cedar Creek [a]	Clinch River	Lat 36°55'19", long 82°03'10", Russell County, at Lebanon sewage treatment plant, 200 ft downstream from Little Cedar Creek, and 2.1 mi north-east of Lebanon.	-	1993-95, 1997-98	9- 1-99	8.90
03524018 Hurricane Fork [a]	Dumps Creek	Lat 36°59'06", long 82°10'58", Russell County, 0.6 mi downstream from Laurel Branch, 1.1 mi upstream from the mouth, and 1.6 mi north of South Clinchfield.	10.3	1995-98	10-30-98 8- 4-99	.230 .396
03524025 Dumps Creek [a]	Clinch River	Lat 36°57'23", long 82°10'46", Russell County, 300 ft downstream from Millstone Branch, 0.5 mi south of South Clinchfield, and 2.0 mi upstream from mouth.	20.9	1995-98	10-30-98 8- 4-99	9.28 3.13
03524596 Corder Branch [a]	Little Stony Creek	Lat 36°53'04", long 82°27'51", Wise County, 100 ft downstream from Ramey Branch, 0.6 mi upstream from mouth, and 4.1 mi south of Coeburn.	3.55	1995, 1997-98	9- 1-99	0
03524900 Stony Creek	Clinch River	Lat 36°48'57", long 82°37'02", Scott County, at Ka, 300 ft upstream from bridge on State Highway 619, 600 ft downstream from Straight Fork, and 4.2 mi upstream from mouth.	30.9	1979-85, 1994	6-24-99	2.04
03526000 Copper Creek	Clinch River	Lat 36°40'26", long 82°33'57", Scott County, at old bridge abutment 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.	106	1948-72, 1983-84, 1994	10- 2-98 10- 2-98	25.1 24.7
03527505 Unnamed tributary [a] (No.7)	North Fork Clinch River	Lat 36°42'40", long 82°47'15", Scott County, at Empire Mobile Home Park sewage treatment plant discharge, 0.6 mi upstream from mouth, and 0.7 mi southeast of Duffield.	1.91	1995, 1997-98	10-28-98 8- 3-99	.051 .220
03529420 Callahan Creek [a]	Powell River	Lat 36°55'03", long 82°47'29", Wise County, at Interstate R/R discharge, 0.6 mi southeast of Andover, 0.6 mi downstream from Preacher Creek, and 1.0 mi upstream from mouth.	27.4	1995, 1997-98	10-30-98 8- 3-99	2.85 5.78
03529430 Lick Branch [a]	Pigeon Creek	Lat 36°52'55", long 82°50'00", Wise County, at confluence with Pigeon Creek, at Lower Exeter, 500 ft north of State Highway 68, and 1.5 mi west of Imbodem.	-	1997-98	10-30-98 8- 3-99	.113 .484
03531200 Station Creek [a]	Powell River	Lat 36°41'58", long 83°00'02", Lee County, at Lee County Industrial Park discharge, 1.3 mi upstream from mouth, and 2.4 mi west of Dot.	7.55	1994-95, 1997-98	10-28-98	.628

a Provided by the Virginia Department of Environmental Quality - Water Division.

ANALYSES OF SAMPLES COLLECTED AT PARTIAL-RECORD, SPECIAL STUDY,  
AND MISCELLANEOUS SITES

POTOMAC RIVER BASIN

WATER-QUALITY DATA, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DATE	TIME	SAMPLE TYPE	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND-ARD UNITS) (00400)	BARO-METRIC PRES-SURE (MM OF HG) (00025)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	TUR-BID-ITY (NTU) (00076)	OXYGEN, DIS-SOLVED (MG/L) (00300)	COLI-FORM, FECAL, UM-MF (COLS. / 100 ML) (31625)
01621395 BLACKS RUN AT RT 753 AT HARRISONBURG, VA (LAT 38 27 47N LONG 078 51 55W)											
MAR 1999 22...	1645	ENVIRONMENTAL	2.39	652	7.68	722	7.0	11.9	22	8.03	290000
SEP 16...	1645	ENVIRONMENTAL	--	473	7.96	717	16.5	16.1	--	9.12	12000
01621397 BLACKS RUN AT WATER STREET AT HARRISONBURG, VA (LAT 38 26 56N LONG 078 52 16W)											
JUL 1999 22...	1230	ENVIRONMENTAL	--	724	7.56	724	30.0	19.3	10.20	3.94	23000
AUG 19...	1424	ENVIRONMENTAL	.317	712	7.32	725	28.5	16.3	1.64	6.78	760
01621410 BLACKS RUN AT RT 726 AT HARRISONBURG, VA (LAT 38 25 18N LONG 078 53 18W)											
MAR 1999 22...	1520	ENVIRONMENTAL	13.6	744	8.18	720	12.5	12.2	12	12.71	K100
JUL 22...	1050	ENVIRONMENTAL	--	363	7.61	724	28.5	24.3	23	5.37	54000
AUG 19...	1315	ENVIRONMENTAL	.841	605	8.23	725	28.5	24.2	4	6.78	610
01621425 BLACKS RUN AT RT 679 NEAR HARRISONBURG, VA (LAT 38 24 07N LONG 078 54 04W)											
MAR 1999 22...	1345	ENVIRONMENTAL	21.00	687	8.01	720	12.0	9.4	19	12.33	400
JUL 22...	1005	ENVIRONMENTAL	--	309	7.10	725	28.5	23.6	72	5.28	K81000
AUG 19...	1215	ENVIRONMENTAL	2.34	554	8.24	725	27.0	21.5	6	7.76	820

K Results based on colony count outside optimal range.

ANALYSES OF SAMPLES COLLECTED AT PARTIAL-RECORD, SPECIAL STUDY,  
AND MISCELLANEOUS SITES

## POTOMAC RIVER BASIN--Continued

## WATER-QUALITY DATA, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DATE	TIME	SAMPLE TYPE	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	TEMPER- ATURE AIR (DEG C) (00020)	TEMPER- ATURE WATER (DEG C) (00010)	TUR- BID- ITY (NTU) (00076)	OXYGEN, DIS- SOLVED (MG/L) (00300)	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)
01621440 BLACKS RUN AT RT 988 NEAR HARRISONBURG, VA (LAT 38 23 23N LONG 078 54 49W)											
MAR 1999 22...	1210	ENVIRONMENTAL	22.7	664	8.04	720	11.0	9.3	29	12.23	2000
JUL 22...	0910	ENVIRONMENTAL	--	344	7.75	726	26.5	24.0	72	5.17	39000
AUG 19...	1110	ENVIRONMENTAL	2.00	524	8.33	725	27.0	23.1	10	8.74	K94
01624615 CHRISTIANS CREEK AT SPRING NEAR MIDDLEBROOK, VA (LAT 38 02 09N LONG 079 10 06W)											
MAR 1999 25...	1020	ENVIRONMENTAL	.08	228	7.25	703	11.0	11.4	3	8.10	<5
JUL 27...	1115	ENVIRONMENTAL	.03	263	7.48	711	33.0	13.9	3	7.92	K71
01624620 CHRISTIANS CREEK AT RT 604 NEAR GREENVILLE, VA (LAT 38 08 14N LONG 079 10 05W)											
MAR 1999 25...	0850	ENVIRONMENTAL	2.40	397	8.33	711	11.0	7.9	4	11.55	K87
JUL 27...	1000	ENVIRONMENTAL	.60	397	8.09	711	29.0	21.3	9	8.64	K1400
01624660 CHRISTIANS CREEK NEAR STUARTS DRAFT, VA (LAT 38 02 38N LONG 079 05 17W)											
MAR 1999 25...	1210	ENVIRONMENTAL	15.30	461	8.18	719	16.0	10.1	13.1	13.72	230
JUL 27...	1230	ENVIRONMENTAL	3.77	435	8.23	711	32.5	22.6	13.1	9.34	K2000
01624700 CHRISTIANS CREEK AT RT 635 NEAR JOLIVUE, VA (LAT 38 05 35N LONG 079 01 54W)											
MAR 1999 25...	1350	ENVIRONMENTAL	56.00	489	8.40	721	14.0	10.3	14	12.42	K23
JUL 27...	1345	ENVIRONMENTAL	11.10	436	8.11	711	31.0	24.2	23	7.83	K6400

< Actual value is known to be less than the value shown.  
K Results based on colony count outside optimal range.

ANALYSES OF SAMPLES COLLECTED AT PARTIAL-RECORD, SPECIAL STUDY,  
AND MISCELLANEOUS SITES

POTOMAC RIVER BASIN--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DATE	TIME	SAMPLE TYPE	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND-ARD UNITS) (00400)	BARO-METRIC PRES-SURE (MM OF HG) (00025)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	TUR-BID-ITY (NTU) (00076)	OXYGEN, DIS-SOLVED (MG/L) (00300)	COLI-FORM, FECAL, UM-MF (COLS. / 100 ML) (31625)
01624800 CHRISTIANS CREEK NEAR FISHERVILLE, VA (LAT 38 07 42N LONG 078 59 41W)											
MAR 1999											
25...	1610	ENVIRONMENTAL	72.8	511	8.27	722	11.5	10.7	12	11.35	K15
MAY											
05...	0910	ENVIRONMENTAL	22.6	462	7.45	721	21.0	16.6	10	8.53	2000
05...	0915	ENVIRONMENTAL	22.6	--	--	--	--	--	--	--	K1300
05...	0920	ENVIRONMENTAL	22.6	--	--	--	--	--	--	--	K1300
05...	0925	ENVIRONMENTAL	22.6	--	--	--	--	--	--	--	K1300
05...	0930	ENVIRONMENTAL	22.6	--	--	--	--	--	--	--	K800
05...	0935	ENVIRONMENTAL	22.6	--	--	--	--	--	--	--	K720
05...	0940	ENVIRONMENTAL	22.6	--	--	--	--	--	--	--	K730
05...	0945	ENVIRONMENTAL	22.6	--	--	--	--	--	--	--	K860
JUN											
16...	1515	ENVIRONMENTAL	16.6	506	6.96	725	25.0	20.8	21	7.80	340
17...	0715	ENVIRONMENTAL	19.7	488	7.31	724	18.5	18.8	48	7.83	620
17...	0830	ENVIRONMENTAL	23.1	481	8.12	724	20.0	18.7	54	7.45	1000
17...	0935	ENVIRONMENTAL	23.1	489	8.11	724	20.5	18.7	47	8.10	1200
17...	0945	ENVIRONMENTAL	23.1	491	8.08	723	18.5	18.8	52	7.83	E1100
17...	1000	ENVIRONMENTAL	24.0	493	8.09	723	18.0	18.7	46	7.81	1100
17...	1005	ENVIRONMENTAL	24.0	495	8.07	723	18.0	18.7	49	7.79	K1300
17...	1010	ENVIRONMENTAL	24.0	489	8.07	723	18.0	18.7	56	7.74	1200
JUL											
27...	1515	ENVIRONMENTAL	13.2	459	8.04	711	34.0	26.2	16	7.97	K790
28...	0845	ENVIRONMENTAL	13.2	451	7.97	723	30.5	23.6	32	6.59	1500
28...	0850	ENVIRONMENTAL	13.2	--	--	--	--	--	--	--	1200
28...	0855	ENVIRONMENTAL	13.2	--	--	--	--	--	--	--	900
28...	0900	ENVIRONMENTAL	13.2	--	--	--	--	--	--	--	1500
28...	0905	ENVIRONMENTAL	13.2	--	--	--	--	--	--	--	1700
28...	0910	ENVIRONMENTAL	13.2	--	--	--	--	--	--	--	1200
28...	0915	ENVIRONMENTAL	13.2	--	--	--	--	--	--	--	1100
28...	0920	ENVIRONMENTAL	13.2	--	--	--	--	--	--	--	1300
28...	0920	REPLICATE	13.6	--	--	--	--	--	--	--	1100
28...	0921	REPLICATE	13.6	--	--	--	--	--	--	--	1300
29...	1215	ENVIRONMENTAL	28.6	442	7.96	718	26.5	23.2	62	6.94	K7300
AUG											
25...	0220	ENVIRONMENTAL	15.2	460	8.00	725	19.0	21.5	25	6.08	1100
SEP											
05...	0410	ENVIRONMENTAL	32.7	402	7.93	721	20.5	20.4	415	7.45	6200
05...	0825	ENVIRONMENTAL	81.3	407	8.08	721	21.5	20.1	224	7.47	5200
05...	1220	ENVIRONMENTAL	110	360	8.09	721	23.5	20.6	219	7.42	14000
05...	1650	ENVIRONMENTAL	132	361	8.06	720	22.0	20.9	292	7.25	K240000
05...	1815	ENVIRONMENTAL	135	392	8.00	721	21.5	21.0	330	6.98	530000
05...	1900	ENVIRONMENTAL	143	400	8.00	721	21.0	20.9	355	6.90	E520000
05...	1940	ENVIRONMENTAL	139	393	8.02	722	20.5	21.0	319	6.93	K730000
05...	2215	ENVIRONMENTAL	102	404	8.06	722	20.5	20.8	207	7.03	330000
06...	0050	ENVIRONMENTAL	81.3	397	8.05	722	21.0	20.6	150	7.18	250000
06...	0835	ENVIRONMENTAL	56.9	411	8.02	721	20.5	20.2	111	7.48	210000
13...	1110	ENVIRONMENTAL	19.7	525	8.18	731	22.5	17.7	18	7.76	K1500
13...	1115	ENVIRONMENTAL	19.7	--	--	--	--	--	--	--	K1300
13...	1120	ENVIRONMENTAL	19.7	--	--	--	--	--	--	--	2200
13...	1125	ENVIRONMENTAL	19.7	--	--	--	--	--	--	--	K1400
13...	1130	ENVIRONMENTAL	19.7	--	--	--	--	--	--	--	K1200
13...	1135	ENVIRONMENTAL	19.7	--	--	--	--	--	--	--	1100
13...	1140	ENVIRONMENTAL	19.7	--	--	--	--	--	--	--	2100
13...	1145	ENVIRONMENTAL	19.7	--	--	--	--	--	--	--	1100
13...	1145	REPLICATE	19.7	--	--	--	--	--	--	--	1200
13...	1146	REPLICATE	19.7	--	--	--	--	--	--	--	1100

DATE	TIME	SAMPLE TYPE	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND-ARD UNITS) (00400)	BARO-METRIC PRES-SURE (MM OF HG) (00025)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	TUR-BID-ITY (NTU) (00076)	OXYGEN, DIS-SOLVED (MG/L) (00300)	COLI-FORM, FECAL, UM-MF (COLS. / 100 ML) (31625)
01624900 CHRISTIANS CREEK NEAR VERONA, VA (LAT 38 11 35N LONG 078 56 07W)											
MAR 1999											
25...	1750	ENVIRONMENTAL	102.00	--	8.32	724	11.0	10.5	9	10.89	K9
JUL											
27...	1645	ENVIRONMENTAL	13.60	422	8.31	711	34.5	27.7	11	7.76	140

E Estimated.  
K Results based on colony count outside optimal range.

ANALYSES OF SAMPLES COLLECTED AT PARTIAL-RECORD, SPECIAL STUDY,  
AND MISCELLANEOUS SITES

## POTOMAC RIVER BASIN--Continued

## WATER-QUALITY DATA, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DATE	TIME	SAMPLE TYPE	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	TEMPER- ATURE AIR (DEG C) (00020)	TEMPER- ATURE WATER (DEG C) (00010)	TUR- BID- ITY (NTU) (00076)	OXYGEN, DIS- SOLVED (MG/L) (00300)	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)
01653900 ACCOTINK CREEK AT FAIRFAX, VA (LAT 38 51 39N LONG 077 16 17W)											
MAR 1999 18...	1000	ENVIRONMENTAL	5.84	748	7.03	743	21.0	10.9	17	11.88	320
AUG 11...	0940	ENVIRONMENTAL	.00	219	7.22	744	29.5	24.8	13	6.36	190
01653985 ACCOTINK CREEK AT WOODBURN RD NR ANNANDALE, VA (LAT 38 50 46N LONG 077 14 16W)											
MAR 1999 18...	1200	ENVIRONMENTAL	15.7	676	7.07	744	23.0	11.2	9	11.14	200
AUG 11...	1050	ENVIRONMENTAL	.00	270	6.5	744	26.0	21.9	20	2.91	K25
01653995 ACCOTINK CREEK BELOW MILL CREEK NR ANNANDALE, VA (LAT 38 49 32N LONG 077 13 29W)											
MAR 1999 18...	1345	ENVIRONMENTAL	19.4	660	7.26	745	19.5	12.5	7	11.79	K50
AUG 11...	1155	ENVIRONMENTAL	.00	228	7.04	744	31	22.9	4	5.97	K54
01654520 ACCOTINK CREEK BELOW LONG BR NR ANNANDALE, VA (LAT 38 48 15N LONG 077 14 58W)											
MAR 1999 18...	1645	ENVIRONMENTAL	26	623	7.66	746	16.5	13.0	9	10.77	K64
AUG 11...	1355	ENVIRONMENTAL	.00	230	7.03	744	32.0	24.3	11	5.96	K42
11...	1355	REPLICATE	.00	230	7.03	744	32.0	24.3	11	5.96	K35
11...	1356	REPLICATE	.00	230	7.03	744	32.0	24.3	11	5.96	K26

K Results based on colony count outside optimal range.



ANALYSES OF SAMPLES COLLECTED AT PARTIAL-RECORD, SPECIAL STUDY,  
AND MISCELLANEOUS SITES

POTOMAC RIVER BASIN--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DATE	TIME	SAMPLE TYPE	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND-ARD UNITS) (00400)	BARO-METRIC PRES-SURE (MM OF HG) (00025)	TEMPER-ATURE (DEG C) (00020)	TEMPER-ATURE (DEG C) (00010)	OXYGEN DIS-SOLVED (MG/L) (00300)	COLI-FORM, TOTAL, IMMED. PER 100 ML (31501)
01660860 BRIDGES CREEK AT MOUTH NEAR WAKEFIELD, VA (LAT 38 12 05N LONG 076 56 01W)										
DEC 1998										
15...	1000	ENVIRONMENTAL	--	1210	7.4	766	6.2	5.8	9.1	4000
15...	1001	REPLICATE	--	1210	7.4	766	6.2	5.8	9.2	--
FEB 1999										
03...	0820	ENVIRONMENTAL	2.9	4000	6.9	755	7.5	6.2	5.0	1700
03...	0830	REPLICATE	2.9	4000	6.9	755	7.5	6.2	5.1	--
JUN										
15...	0935	ENVIRONMENTAL	4.95	16300	6.6	756	22.0	23.0	2.5	1500

DATE	COLI-FORM, FECAL, UM-MF (COLS./100 ML) (31625)	STREP-TOCOCCI, FECAL, KF AGAR (COLS. PER 100 ML) (31673)	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 WAT DIS TOT IT (MG/L AS CACO3) (39086)	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)
01660860 BRIDGES CREEK AT MOUTH NEAR WAKEFIELD, VA (LAT 38 12 05N LONG 076 56 01W)										
DEC 1998										
15...	2700	1800	--	--	--	--	159	--	--	--
15...	--	--	--	--	--	--	--	--	--	--
FEB 1999										
03...	660	740	37	76	620	26	109	150	1100	.2
03...	--	--	40	81	650	27	--	150	1100	.2
JUN										
15...	1080	1440	--	--	--	--	89	--	--	--

DATE	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	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)	NITRO-GEN, AM-MONIA + ORGANIC TOTAL (MG/L AS N) (00623)	PHOS-PHORUS DIS-SOLVED (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, TOTAL RECOV-ERABLE (UG/L AS AL) (01105)
01660860 BRIDGES CREEK AT MOUTH NEAR WAKEFIELD, VA (LAT 38 12 05N LONG 076 56 01W)										
DEC 1998										
15...	--	.01	.05	.04	2.6	1.3	1.4	.85	.78	--
15...	--	.01	.06	.04	2.7	1.4	1.3	.86	.77	--
FEB 1999										
03...	13	.01	.12	.56	2.2	1.5	.69	.56	.51	--
03...	13	--	--	--	--	--	--	--	--	--
JUN										
15...	--	<.01	<.05	<.02	.8	.4	.19	.13	.01	<140

DATE	ARSENIC TOTAL (UG/L AS AS) (01002)	BARIUM, TOTAL RECOV-ERABLE (UG/L AS BA) (01007)	BERYL-LIUM, TOTAL RECOV-ERABLE (UG/L AS BE) (01012)	BORON, DIS-SOLVED (UG/L AS B) (01020)	CADMIUM WATER UNFLTRD TOTAL (UG/L AS CD) (01027)	CHRO-MIUM, TOTAL RECOV-ERABLE (UG/L AS CR) (01034)	COBALT, TOTAL RECOV-ERABLE (UG/L AS CO) (01037)	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)
01660860 BRIDGES CREEK AT MOUTH NEAR WAKEFIELD, VA (LAT 38 12 05N LONG 076 56 01W)										
DEC 1998										
15...	--	--	--	--	--	--	--	--	--	--
15...	--	--	--	--	--	--	--	--	--	--
FEB 1999										
03...	--	--	--	232	--	--	--	--	--	550
03...	--	--	--	241	--	--	--	--	--	590
JUN										
15...	1	72.5	<20.0	--	<4	<1.0	<4	<4	651	--

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

ANALYSES OF SAMPLES COLLECTED AT PARTIAL-RECORD, SPECIAL STUDY,  
AND MISCELLANEOUS SITES

POTOMAC RIVER BASIN--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DATE	LEAD, TOTAL RECOV- ERABLE (UG/L AS PB) (01051)	LITHIUM TOTAL RECOV- ERABLE (UG/L AS LI) (01132)	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)	MOLYB- DENUM, TOTAL RECOV- ERABLE (UG/L AS MO) (01062)	NICKEL, TOTAL RECOV- ERABLE (UG/L AS NI) (01067)	SELE- NIUM, TOTAL RECOV- ERABLE (UG/L AS SE) (01147)	SILVER, TOTAL RECOV- ERABLE (UG/L AS AG) (01077)	ZINC, TOTAL RECOV- ERABLE (UG/L AS ZN) (01092)
01660860 BRIDGES CREEK AT MOUTH NEAR WAKEFIELD, VA (LAT 38 12 05N LONG 076 56 01W)										
DEC 1998										
15...	--	--	--	--	--	--	--	--	--	--
15...	--	--	--	--	--	--	--	--	--	--
FEB 1999										
03...	--	--	--	610	--	--	--	--	--	--
03...	--	--	--	670	--	--	--	--	--	--
JUN 15...	<4	E54.9	295	--	<.1	4.0	<4	<1	<4	<200

DATE	TIME	SAMPLE TYPE	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	BARO- METRIC PRES- SURE OF HG) (00025)	TEMPER- ATURE AIR (DEG C) (00020)	TEMPER- ATURE WATER (DEG C) (00010)	OXYGEN, DIS- SOLVED (MG/L) (00300)	COLI- FORM, TOTAL, IMMED. PER (COLS. 100 ML) (31501)
0166087750 POCES CREEK AT POINT OF PT NEAR WAKEFIELD, VA (LAT 38 10 35N LONG 076 55 16W)									
OCT 1998									
07...	1100	ENVIRONMENTAL	17100	7.4	764	19.5	18.4	6.0	>1300
DEC 16...	1215	ENVIRONMENTAL	18800	7.3	754	13.9	6.7	9.4	180
FEB 1999									
02...	0920	ENVIRONMENTAL	15000	7.2	754	11.0	6.1	10.8	>250
JUN 14...	1145	ENVIRONMENTAL	15700	7.4	756	29.8	26.8	--	500

DATE	COLI- FORM, PECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	STREP- TOCOCCHI FECAL, KF AGAR PER (COLS. 100 ML) (31673)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS NA) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	ALKA- LINITY WAT DIS TOT IT FIELD (MG/L AS CACO3 (39086)	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)
0166087750 POCES CREEK AT POINT OF PT NEAR WAKEFIELD, VA (LAT 38 10 35N LONG 076 55 16W)										
OCT 1998										
07...	1100	580	130	370	3100	110	84	720	5500	.5
DEC 16...	K67	K94	--	--	--	--	61	--	--	--
FEB 1999										
02...	200	220	--	--	--	--	48	--	--	--
JUN 14...	260	100	--	--	--	--	66	--	--	--

DATE	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	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 + DIS- ORGANIC TOTAL (MG/L AS N) (00625)	NITRO- GEN, AM- MONIA + DIS- ORGANIC DIS. (MG/L AS N) (00623)	PHOS- PHORUS ORGANIC 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, TOTAL RECOV- ERABLE (UG/L AS AL) (01105)
0166087750 POCES CREEK AT POINT OF PT NEAR WAKEFIELD, VA (LAT 38 10 35N LONG 076 55 16W)										
OCT 1998										
07...	3.9	<.01	.05	.03	.6	.3	.09	<.05	.03	--
DEC 16...	--	<.01	.06	.03	.4	.3	E.04	<.05	.01	--
FEB 1999										
02...	--	.01	.22	.09	.5	.3	.034	.011	.01	--
JUN 14...	--	<.01	<.05	<.02	.8	.1	.097	.012	.01	502

> Actual value is known to be greater than the value shown.  
< Actual value is known to be less than the value shown.  
E Estimated.  
K Results based on colony count outside optimal range.

POTOMAC RIVER BASIN--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DATE	ARSENIC TOTAL (UG/L AS AS) (01002)	BARIUM, TOTAL RECOV- ERABLE (UG/L AS BA) (01007)	BERYL- LIUM, TOTAL RECOV- ERABLE (UG/L AS BE) (01012)	BORON, DIS- SOLVED (UG/L AS B) (01020)	CADMIUM WATER UNFLTRD TOTAL (UG/L AS CD) (01027)	CHRO- MIUM, TOTAL RECOV- ERABLE (UG/L AS CR) (01034)	COBALT, TOTAL RECOV- ERABLE (UG/L AS CO) (01037)	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)
0166087750 POPES CREEK AT POINT OF PT NEAR WAKEFIELD, VA (LAT 38 10 35N LONG 076 55 16W)										
OCT 1998										
07...	--	--	--	1210	--	--	--	--	--	<200
DEC 16...	--	--	--	--	--	--	--	--	--	--
FEB 1999										
02...	--	--	--	--	--	--	--	--	--	--
JUN 14...	<1	60.1	<20.0	--	<4	<1.0	<4	10	1390	--

DATE	LEAD, TOTAL RECOV- ERABLE (UG/L AS PB) (01051)	LITHIUM TOTAL RECOV- ERABLE (UG/L AS LI) (01132)	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)	MOLYB- DENUM, TOTAL RECOV- ERABLE (UG/L AS MO) (01062)	NICKEL, TOTAL RECOV- ERABLE (UG/L AS NI) (01067)	SELE- NIUM, TOTAL RECOV- ERABLE (UG/L AS SE) (01147)	SILVER, TOTAL RECOV- ERABLE (UG/L AS AG) (01077)	ZINC, TOTAL RECOV- ERABLE (UG/L AS ZN) (01092)
0166087750 POPES CREEK AT POINT OF PT NEAR WAKEFIELD, VA (LAT 38 10 35N LONG 076 55 16W)										
OCT 1998										
07...	--	--	--	E55	--	--	--	--	--	--
DEC 16...	--	--	--	--	--	--	--	--	--	--
FEB 1999										
02...	--	--	--	--	--	--	--	--	--	--
JUN 14...	<4	E41.9	94.6	--	<.1	4.0	<4	<1	<4	<200

DATE	TIME	SAMPLE TYPE	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	TEMPER- ATURE OF AIR (DEG C) (00020)	TEMPER- ATURE WATER (DEG C) (00010)	OXYGEN, DIS- SOLVED (MG/L) (00300)	COLI- FORM, TOTAL, IMMED. (COLS. PER 100 ML) (31501)
0166087760 POPES CREEK AT BURNT HOUSE PT NEAR WAKEFIELD, VA (LAT 38 10 59N LONG 076 54 44W)									
OCT 1998									
07...	0805	ENVIRONMENTAL	17400	7.1	764	17.0	18.8	7.0	310
DEC 16...	0900	ENVIRONMENTAL	20000	7.4	754	7.9	6.7	7.5	K160
FEB 1999									
02...	0830	ENVIRONMENTAL	16800	7.4	754	11.0	5.9	11.4	K100
JUN 14...	1030	ENVIRONMENTAL	14300	7.8	756	30.8	25.1	--	300

DATE	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	STREP- TOCOCCI FECAL, KF AGAR (COLS. PER (31673)	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 WAT DIS TOT IT FIELD MG/L AS CACO3 (39086)	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)
0166087760 POPES CREEK AT BURNT HOUSE PT NEAR WAKEFIELD, VA (LAT 38 10 59N LONG 076 54 44W)										
OCT 1998										
07...	K150	170	130	380	3100	110	83	740	5500	.5
DEC 16...	K76	K97	--	--	--	--	56	--	--	--
FEB 1999										
02...	K20	K67	--	--	--	--	67	--	--	--
JUN 14...	130	K16	--	--	--	--	68	--	--	--

< Actual value is known to be less than the value shown.  
E Estimated.  
K Results based on colony count outside optimal range.

ANALYSES OF SAMPLES COLLECTED AT PARTIAL-RECORD, SPECIAL STUDY,  
AND MISCELLANEOUS SITES

POTOMAC RIVER BASIN--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DATE	SILICA, DIS- SOLVED (MG/L AS (SIO2) (00955)	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)	NITRO- GEN,AM- MONIA + ORGANIC DIS- TOTAL (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, DIS- SOLVED (MG/L AS P) (00671)	ALUM- INUM, TOTAL RECOV- ERABLE (UG/L AS AL) (01105)
0166087760 POPES CREEK AT BURNT HOUSE PT NEAR WAKEFIELD, VA (LAT 38 10 59N LONG 076 54 44W)										
OCT 1998 07...	4.1	<.01	<.05	.02	1	.3	.17	E.03	.03	--
DEC 16...	--	.01	.05	.03	.5	.3	.05	<.05	.01	--
FEB 1999 02...	--	.01	.36	.12	.5	.4	.028	.012	<.01	--
JUN 14...	--	<.01	<.05	<.02	.7	.2	.076	.011	.01	322
DATE	ARSENIC TOTAL (UG/L AS AS) (01002)	BARIUM, TOTAL RECOV- ERABLE (UG/L AS BA) (01007)	BERYL- LIUM, TOTAL RECOV- ERABLE (UG/L AS BE) (01012)	BORON, DIS- SOLVED (UG/L AS B) (01020)	CADMIUM WATER UNFLTRD TOTAL (UG/L AS CD) (01027)	CHRO- MIUM, TOTAL RECOV- ERABLE (UG/L AS CR) (01034)	COBALT, TOTAL RECOV- ERABLE (UG/L AS CO) (01037)	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)
0166087760 POPES CREEK AT BURNT HOUSE PT NEAR WAKEFIELD, VA (LAT 38 10 59N LONG 076 54 44W)										
OCT 1998 07...	--	--	--	1330	--	--	--	--	--	<200
DEC 16...	--	--	--	--	--	--	--	--	--	--
FEB 1999 02...	--	--	--	--	--	--	--	--	--	--
JUN 14...	<1	51.7	<20.0	--	<4	<1.0	<4	5	766	--
DATE	LEAD, TOTAL RECOV- ERABLE (UG/L AS PB) (01051)	LITHIUM TOTAL RECOV- ERABLE (UG/L AS LI) (01132)	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)	MOLYB- DENUM, TOTAL RECOV- ERABLE (UG/L AS MO) (01062)	NICKEL, TOTAL RECOV- ERABLE (UG/L AS NI) (01067)	SELE- NIUM, TOTAL RECOV- ERABLE (UG/L AS SE) (01147)	SILVER, TOTAL RECOV- ERABLE (UG/L AS AG) (01077)	ZINC, TOTAL RECOV- ERABLE (UG/L AS ZN) (01092)
0166087760 POPES CREEK AT BURNT HOUSE PT NEAR WAKEFIELD, VA (LAT 38 10 59N LONG 076 54 44W)										
OCT 1998 07...	--	--	--	E30	--	--	--	--	--	--
DEC 16...	--	--	--	--	--	--	--	--	--	--
FEB 1999 02...	--	--	--	--	--	--	--	--	--	--
JUN 14...	<4	60.5	37.5	--	<.1	4.0	<4	<1	<4	<200
DATE	TIME	SAMPLE TYPE	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH WATER FIELD (STAND- ARD UNITS) (00400)	BARO- METRIC PRES- SURE OF HG (00025)	TEMPER- ATURE AIR (DEG C) (00020)	TEMPER- ATURE WATER (DEG C) (00010)	OXYGEN, DIS- SOLVED (MG/L) (00300)	COLI- FORM, TOTAL, IMMED. (COLS. PER 100 ML) (31501)
0166087770 DANCING MARSH NEAR WAKEFIELD, VA (LAT 38 11 09N LONG 076 55 11W)										
OCT 1998 06...	1300	ENVIRONMENTAL	.07	655	6.8	766	24.5	18.7	9.3	2800
DEC 15...	1300	ENVIRONMENTAL	-.063	2050	7.1	762	12.0	7.4	9.9	380
FEB 1999 03...	1045	ENVIRONMENTAL	.17	550	6.7	757	10.0	8.0	10.6	310
JUN 15...	1045	ENVIRONMENTAL	.046	3000	6.5	756	23.0	21.4	4.7	10000

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

ANALYSES OF SAMPLES COLLECTED AT PARTIAL-RECORD, SPECIAL STUDY,  
AND MISCELLANEOUS SITES

POTOMAC RIVER BASIN--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DATE	COLI-FORM, FECAL, 0.7 UM-MF (COLS./100 ML) (31625)	STREP-TOCOCCI, FECAL, KF AGAR (COLS./100 ML) (31673)	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, WAT DIS-TOT IT (MG/L AS CACO3) (39086)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLORIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUORIDE, DIS-SOLVED (MG/L AS F) (00950)
0166087770 DANCING MARSH NEAR WAKEFIELD, VA (LAT 38 11 09N LONG 076 55 11W)										
OCT 1998 06...	1200	1300	11	16	120	5.5	26	23	220	<.1
DEC 15...	200	460	--	--	--	--	60	--	--	--
FEB 1999 03...	K73	K170	--	--	--	--	13	--	--	--
JUN 15...	2200	4600	--	--	--	--	39	--	--	--
DATE	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	NITROGEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)	NITROGEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	NITROGEN, AMMONIA DIS-SOLVED (MG/L AS N) (00608)	NITROGEN, AMMONIA + ORGANIC DIS-TOTAL (MG/L AS N) (00625)	NITROGEN, AMMONIA + ORGANIC DIS-TOTAL (MG/L AS N) (00623)	PHOSPHORUS, PHOSPHORUS TOTAL (MG/L AS P) (00665)	PHOSPHORUS, DIS-SOLVED (MG/L AS P) (00666)	PHOSPHORUS, ORTHO, DIS-SOLVED (MG/L AS P) (00671)	ALUMINUM, TOTAL RECOVERABLE (UG/L AS AL) (01105)
0166087770 DANCING MARSH NEAR WAKEFIELD, VA (LAT 38 11 09N LONG 076 55 11W)										
OCT 1998 06...	11	<.01	.39	.18	.8	.4	.10	E.05	.05	--
DEC 15...	--	.01	.07	.07	.6	.4	.06	E.04	.02	--
FEB 1999 03...	--	.01	.32	.06	.5	.4	.045	.021	.02	--
JUN 15...	--	<.01	<.05	<.02	1.1	1.1	.18	.091	.01	99.8
DATE	ARSENIC TOTAL (UG/L AS AS) (01002)	BARIUM, TOTAL RECOVERABLE (UG/L AS BA) (01007)	BERYLLIUM, TOTAL RECOVERABLE (UG/L AS BE) (01012)	BORON, DIS-SOLVED (UG/L AS B) (01020)	CADMIUM, WATER UNFLTRD TOTAL (UG/L AS CD) (01027)	CHROMIUM, TOTAL RECOVERABLE (UG/L AS CR) (01034)	COBALT, TOTAL RECOVERABLE (UG/L AS CO) (01037)	COPPER, TOTAL RECOVERABLE (UG/L AS CU) (01042)	IRON, TOTAL RECOVERABLE (UG/L AS FE) (01045)	IRON, DIS-SOLVED (UG/L AS FE) (01046)
0166087770 DANCING MARSH NEAR WAKEFIELD, VA (LAT 38 11 09N LONG 076 55 11W)										
OCT 1998 06...	--	--	--	64.1	--	--	--	--	--	190
DEC 15...	--	--	--	--	--	--	--	--	--	--
FEB 1999 03...	--	--	--	--	--	--	--	--	--	--
JUN 15...	<1	51.7	<4	--	<1	<1.0	<1	<1	2230	--
DATE	LEAD, TOTAL RECOVERABLE (UG/L AS PB) (01051)	LITHIUM, TOTAL RECOVERABLE (UG/L AS LI) (01132)	MANGANESE, TOTAL RECOVERABLE (UG/L AS MN) (01055)	MANGANESE, DIS-SOLVED (UG/L AS MN) (01056)	MERCURY, TOTAL RECOVERABLE (UG/L AS HG) (71900)	MOLYBDENUM, TOTAL RECOVERABLE (UG/L AS MO) (01062)	NICKEL, TOTAL RECOVERABLE (UG/L AS NI) (01067)	SELENIUM, TOTAL RECOVERABLE (UG/L AS SE) (01147)	SILVER, TOTAL RECOVERABLE (UG/L AS AG) (01077)	ZINC, TOTAL RECOVERABLE (UG/L AS ZN) (01092)
0166087770 DANCING MARSH NEAR WAKEFIELD, VA (LAT 38 11 09N LONG 076 55 11W)										
OCT 1998 06...	--	--	--	65	--	--	--	--	--	--
DEC 15...	--	--	--	--	--	--	--	--	--	--
FEB 1999 03...	--	--	--	--	--	--	--	--	--	--
JUN 15...	<1	E6.2	219	--	<.1	<1.0	<1	<1	<1	<40

< Actual value is known to be less than the value shown.  
E Estimated.  
K Results based on colony count outside optimal range.

ANALYSES OF SAMPLES COLLECTED AT PARTIAL-RECORD, SPECIAL STUDY,  
AND MISCELLANEOUS SITES

POTOMAC RIVER BASIN--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DATE	TIME	SAMPLE TYPE	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND-ARD UNITS) (00400)	BARO-METRIC PRES-SURE (MM OF HG) (00025)	TEMPER-ATURE (DEG C) (00020)	TEMPER-ATURE (DEG C) (00010)	OXYGEN, DIS-SOLVED (MG/L) (00300)	COLI-FORM, TOTAL, IMMED. PER 100 ML (31501)	
381108076551101 55PS 1 (LAT 38 11 08N LONG 076 55 11W)*											
OCT 1998	06...	1100	ENVIRONMENTAL	.05	311	6.6	766	19.5	17.0	8.7	>10000
FEB 1999	03...	1230	ENVIRONMENTAL	.00	240	6.5	755	12.5	12.6	3.2	>10000
JUN	15...	1330	ENVIRONMENTAL	.002	220	6.5	756	23.0	16.5	2.5	310

DATE	COLI-FORM, FECAL, 0.7 UM-MF (COLS./100 ML) (31625)	STREP-TOCOCCI, FECAL, KF AGAR (COLS. PER 100 ML) (31673)	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 WAT DIS TOT IT FIELD (MG/L AS CACO3 AS SO4 AS CL) (39086)	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)	
381108076551101 55PS 1 (LAT 38 11 08N LONG 076 55 11W)											
OCT 1998	06...	>10000	>10000	42	3.1	11	1.2	65	22	25	<.1
FEB 1999	03...	>10000	>10000	33	2.6	8.1	1.0	44	22	20	<.1
JUN	15...	K26	K64	--	--	--	--	36	--	--	--

DATE	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	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)	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, DIS-SOLVED (MG/L AS P) (00671)	ALUM-INUM, TOTAL RECOV-ERABLE (UG/L AS AL) (01105)	
381108076551101 55PS 1 (LAT 38 11 08N LONG 076 55 11W)											
OCT 1998	06...	13	.04	4.9	.03	.7	.2	.09	<.05	.04	--
FEB 1999	03...	14	.01	3.0	.03	.6	.2	.06	.02	.02	--
JUN	15...	--	--	--	--	--	--	--	--	--	113

DATE	ARSENIC TOTAL (UG/L AS AS) (01002)	BARIUM, TOTAL RECOV-ERABLE (UG/L AS BA) (01007)	BERYL-LIUM, TOTAL RECOV-ERABLE (UG/L AS BE) (01012)	BORON, DIS-SOLVED (UG/L AS B) (01020)	CADMIUM WATER UNFLTRD (UG/L AS CD) (01027)	CHRO-MIUM, TOTAL RECOV-ERABLE (UG/L AS CR) (01034)	COBALT, TOTAL RECOV-ERABLE (UG/L AS CO) (01037)	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)
381108076551101 55PS 1 (LAT 38 11 08N LONG 076 55 11W)										
OCT 1998	06...	--	--	E13.6	--	--	--	--	--	<10
FEB 1999	03...	--	--	E14.3	--	--	--	--	--	<10
JUN	15...	<1	12.6	<4	--	<1	<1.0	<1	5	152

\* Spring.  
> Actual value is known to be greater than the value shown.  
< Actual value is known to be less than the value shown.  
E Estimated.  
K Results based on colony count outside optimal range.

ANALYSES OF SAMPLES COLLECTED AT PARTIAL-RECORD, SPECIAL STUDY,  
AND MISCELLANEOUS SITES

POTOMAC RIVER BASIN--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DATE	LEAD, TOTAL RECOV- ERABLE (UG/L AS PB) (01051)	LITHIUM TOTAL RECOV- ERABLE (UG/L AS LI) (01132)	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)	MOLYB- DENUM, TOTAL RECOV- ERABLE (UG/L AS MO) (01062)	NICKEL, TOTAL RECOV- ERABLE (UG/L AS NI) (01067)	SELE- NIUM, TOTAL RECOV- ERABLE (UG/L AS SE) (01147)	SILVER, TOTAL RECOV- ERABLE (UG/L AS AG) (01077)	ZINC, TOTAL RECOV- ERABLE (UG/L AS ZN) (01092)
	381108076551101 55PS 1 (LAT 38 11 08N LONG 076 55 11W)*									
OCT 1998										
06...	--	--	--	9	--	--	--	--	--	--
FEB 1999										
03...	--	--	--	4	--	--	--	--	--	--
JUN										
15...	<1	<12	3.6	--	<.1	<1.0	3	<1	<1	<40

\* Spring

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

ANALYSES OF SAMPLES COLLECTED AT PARTIAL-RECORD, SPECIAL STUDY,  
AND MISCELLANEOUS SITES

## POTOMAC RIVER BASIN--Continued

The following water-quality samples were collected as part of the North Fork Shenandoah Minimum Instream Flow (MIF) Study.

## WATER-QUALITY DATA (North Fork SHENANDOAH MIF STUDY), WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DATE	TIME	SPE- CIFIC CON- DUCT- ANCE (US/CM (00095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	OXYGEN, DIS- SOLVED OXYGEN, DIS- SOLVED (MG/L) (00300)	(PER- CENT SATUR- ATION) (00301)	TEMPER- ATURE AIR (DEG C) (00020)	TEMPER- ATURE WATER (DEG C) (00010)
01632000 N F SHENANDOAH RIVER AT COOTES STORE, VA (LAT 38 38 13N LONG 078 51 11W)							
JUL 1999							
27...	0420	185	7.7	5.10	62.8	22.0	25.8
27...	1449	178	8.2	9.85	126.9	33.0	28.5
N F SHENANDOAH RIVER AT EVANS FORD NEAR COOTES STORE, VA (LAT 38 38 00N LONG 078 50 32W)							
JUL 1999							
27...	0426	278	7.7	6.03	71.9	22.0	24.1
27...	1455	307	8.2	9.92	129.5	--	29.1
N F SHENANDOAH RIVER ALONG ROUTE 789 NEAR COOTES STORE, VA (LAT 38 37 28N LONG 078 49 15W)							
JUL 1999							
27...	0459	301	7.6	4.40	54.1	22.0	25.8
27...	1508	255	7.8	4.95	61.7	33.0	26.5
01632070 N F SHENANDOAH RIVER AT ROUTE 617 AT BROADWAY, VA (LAT 38 37 16N LONG 078 48 07W)							
JUL 1999							
27...	0515	274	7.9	5.73	70.5	22.0	25.2
27...	1517	244	8.8	9.32	122.0	33.0	29.4
N F SHENANDOAH RIVER AT ROUTE 411 AT BROADWAY, VA (LAT 38 37 11N LONG 078 47 44W)							
JUL 1999							
27...	0525	284	7.8	3.64	44.3	21.0	25.0
27...	1523	281	8.3	8.66	111.0	33.0	28.1
*29...	1800	316	8.5	12.69	162.6	--	28.1
*30...	0730	295	7.7	3.65	43.7	--	24.4
N F SHENANDOAH RIVER BELOW LINVILLE CREEK AT BROADWAY, VA (LAT 38 37 15N LONG 078 47 28W)							
JUL 1999							
27...	0546	365	7.8	3.48	41.8	21.5	24.6
27...	1528	360	8.4	11.75	149.6	33.0	27.8
N F SHENANDOAH RIVER AT DAM AT TIMBERVILLE, VA (LAT 38 37 38N LONG 078 47 00W)							
JUL 1999							
27...	0607	308	7.9	6.68	82.0	22.0	25.7
27...	1552	343	8.5	11.76	150.7	33.0	27.8
N F SHENANDOAH RIVER BELOW DAM AT TIMBERVILLE, VA (LAT 38 37 40N LONG 078 47 03W)							
JUL 1999							
27...	0615	426	7.9	5.89	72.3	22.0	25.7
N F SHENANDOAH RIVER AT MEMORIAL PARK AT TIMBERVILLE, VA (LAT 38 38 10N LONG 078 46 51W)							
JUL 1999							
27...	0632	778	7.8	3.55	43.0	21.0	25.2
27...	1613	856	8.5	13.95	184.5	32.0	29.8
N F SHENANDOAH RIVER AT ROUTE 42 AT TIMBERVILLE, VA (LAT 38 38 15N LONG 078 46 26W)							
JUL 1999							
27...	0644	669	8.1	8.39	103.5	--	26.0
27...	1626	648	8.5	10.30	132.7	32.0	28.4
28...	0412	663	8.2	7.82	97.1	23.0	26.5

\* Data are from continual water-quality monitors that were operated for one to eight days. Data shown are those associated with the maximum or minimum dissolved oxygen values during the monitored period.



ANALYSES OF SAMPLES COLLECTED AT PARTIAL-RECORD, SPECIAL STUDY,  
AND MISCELLANEOUS SITES

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POTOMAC RIVER BASIN--Continued

WATER-QUALITY DATA (North Fork SHENANDOAH MIF STUDY), WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

N F SHENANDOAH RIVER ABOVE SHENVILLE FARM AT TIMBERVILLE, VA (LAT 38 38 20N LONG 078 45 11W)

JUL 1999								
27...	0705	780	7.8	2.58	30.9	--	24.1	
27...	1640	780	8.5	9.75	126.8	--	29.4	

N F SHENANDOAH RIVER BELOW SHENVILLE FARM AT TIMBERVILLE, VA (LAT 38 38 33N LONG 078 45 08W)

JUL 1999								
*29...	1430	713	--	16.42	203.5	--	26.2	
*30...	0300	800	--	2.72	32.9	--	24.8	

N F SHENANDOAH RIVER BELOW SHENVILLE FARM AT TIMBERVILLE, VA (LAT 38 38 35N LONG 078 45 08W)

JUL 1999								
27...	0717	756	7.7	2.12	25.1	22.0	23.8	
27...	1646	730	8.2	6.30	80.8	32.0	28.1	

N F SHENANDOAH RIVER AT ROUTE 617 AT NEW MARKET, VA (LAT 38 39 07N LONG 078 41 53W)

JUL 1999								
27...	0740	528	7.9	4.96	56.7	22.0	21.3	
27...	1704	510	8.4	12.30	150.8	33.5	25.6	
28...	0421	544	7.8	4.28	49.2	23.0	22.7	

N F SHENANDOAH RIVER ALONG ROUTE 617 AT NEW MARKET, VA (LAT 38 39 38N LONG 078 41 14W)

JUL 1999								
27...	1714	510	8.4	11.02	139.0	33.5	27.3	
28...	0430	462	7.7	3.99	47.7	33.0	24.3	

N F SHENANDOAH RIVER ALONG ROUTE 736 AT QUICKSBURG, VA (LAT 38 40 44N LONG 078 40 38W)

JUL 1999								
27...	1732	516	8.4	10.78	137.6	33.0	27.9	
28...	0440	514	7.9	5.32	65.0	23.0	25.5	

N F SHENANDOAH RIVER ALONG ROUTE 767 AT QUICKSBURG, VA (LAT 38 41 14N LONG 078 39 50W)

JUL 1999								
28...	0450	482	7.8	3.85	47.1	23.0	25.6	
29...	1430	496	8.3	9.75	120.8	31.5	24.3	

N F SHENANDOAH RIVER ABOVE HOLMANS CREEK NEAR QUICKSBURG, VA (LAT 38 41 59N LONG 078 39 23W)

JUL 1999								
*18...	1330	429	8.8	15.01	192.9	--	28.3	
*20...	0600	457	7.6	2.19	26.2	--	24.3	

N F SHENANDOAH RIVER BELOW HOLMANS CREEK NEAR QUICKSBURG, VA (LAT 38 42 00N LONG 078 39 21W)

JUL 1999								
*18...	1330	--	8.9	15.29	198.0	--	28.7	
*20...	0600	425	7.7	3.07	36.8	--	24.3	

N F SHENANDOAH RIVER AT ROUTE 720 NEAR MT JACKSON, VA (LAT 38 43 15N LONG 078 39 21W)

JUL 1999								
28...	0508	458	7.7	2.73	33.3	23.0	25.4	
29...	1442	432	8.3	8.99	112.1	31.5	26.6	

N F SHENANDOAH RIVER AT ROUTE 11 AT MT JACKSON, VA (LAT 38 43 49N LONG 078 38 43W)

JUL 1999								
*28...	1730	423	8.0	6.49	79.7	--	25.7	
*29...	0930	446	7.6	2.48	29.6	--	24.2	

01633000 N F SHENANDOAH RIVER AT MOUNT JACKSON, VA (LAT 38 44 44N LONG 078 38 21W)

JUL 1999								
28...	0528	447	7.8	3.40	41.0	22.0	24.6	
*28...	1500	442	8.4	10.27	127.8	--	26.5	
29...	1455	430	8.4	12.06	150.9	32.5	26.4	
*30...	0700	432	7.8	4.26	50.5	--	23.9	

\* Data are from continual water-quality monitors that were operated for one to eight days. Data shown are those associated with the maximum or minimum dissolved oxygen values during the monitored period.

ANALYSES OF SAMPLES COLLECTED AT PARTIAL-RECORD, SPECIAL STUDY,  
AND MISCELLANEOUS SITES

## POTOMAC RIVER BASIN--Continued

WATER-QUALITY DATA (North Fork SHENANDOAH MIF STUDY), WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

01633050 N F SHENANDOAH RIVER AT ROUTE 707 NEAR MT JACKSON, VA (LAT 38 46 56N LONG 078 36 03W)

JUL 1999

28...	0546	444	7.8	2.27	27.7	22.0	25.3
29...	1510	422	8.3	7.93	98.3	32.5	26.8

N F SHENANDOAH RIVER AT ROUTE 698 AT EDINBURG, VA (LAT 38 48 30N LONG 078 33 58W)

JUL 1999

28...	0550	464	7.7	3.83	39.7	22.0	17.0
29...	1526	232	8.3	13.33	149.9	32.5	21.1

N F SHENANDOAH RIVER ABOVE STONEY CREEK AT EDINBURG, VA (LAT 38 49 20N LONG 078 32 55W)

JUL 1999

*26...	1800	354	8.6	15.68	196.1	--	26.8
*27...	0800	390	7.7	4.98	57.7	--	22.7

N F SHENANDOAH RIVER BELOW STONEY CREEK AT EDINBURG, VA (LAT 38 49 29N LONG 078 34 00W)

JUL 1999

*27...	0730	419	7.8	4.69	53.9	--	22.2
*27...	1530	398	8.7	14.29	176.3	--	26.0

N F SHENANDOAH RIVER ABOVE DAM AT EDINBURG, VA (LAT 38 49 51N LONG 078 32 43W)

JUL 1999

*27...	1700	449	7.9	5.74	68.1	--	23.9
*27...	2200	436	8.5	13.08	157.5	--	24.7

N F SHENANDOAH RIVER BELOW DAM AT EDINBURG, VA (LAT 38 49 50N LONG 078 32 41W)

JUL 1999

*27...	0730	438	8.0	7.11	83.3	--	23.2
*27...	1500	438	8.1	9.00	105.4	--	23.2

N F SHENANDOAH RIVER ALONG ROUTE 673 NEAR EDINBURG, VA (LAT 38 49 42N LONG 078 31 26W)

JUL 1999

28...	0618	456	7.8	5.53	64.4	22.0	22.9
29...	1538	448	8.6	12.10	152.0	32.5	27.0

N F SHENANDOAH RIVER AT ROUTE 672 NEAR EDINBURG, VA (LAT 38 50 41N LONG 078 31 56W)

JUL 1999

14...	0730	471	8.3	3.20	36.7	--	22.1
19...	1730	451	8.8	14.43	181.6	--	27.1

N F SHENANDOAH RIVER ABOVE LITTLE PASSAGE CREEK NEAR EDINBURG, VA (LAT 38 50 43N LONG 078 31 48W)

JUL 1999

28...	0629	452	8.1	3.73	45.5	22.0	25.4
29...	1602	440	8.6	12.28	154.9	33.0	27.1

N F SHENANDOAH RIVER BELOW LITTLE PASSAGE CREEK NEAR EDINBURG, VA (LAT 38 50 48N LONG 078 31 42W)

JUL 1999

*16...	1730	455	8.8	13.44	168.0	--	26.7
*20...	0800	470	8.2	4.75	57.6	--	25.1

N F SHENANDOAH RIVER AT ROUTE 609 NEAR WOODSTOCK, VA (LAT 38 51 36N LONG 078 30 03W)

JUL 1999

28...	0550	427	7.9	4.18	51.4	26.0	25.8
29...	1620	413	8.9	12.62	166.4	33.5	29.8

N F SHENANDOAH RIVER AT LUPTON ROAD AT WOODSTOCK, VA (LAT 38 52 17N LONG 078 29 35W)

JUL 1999

28...	0540	419	8.5	5.87	73.6	25.5	26.9
29...	1635	409	8.8	11.86	151.6	33.0	28.0

N F SHENANDOAH RIVER ABOVE SPRING HOLLOW CREEK AT WOODSTOCK, VA (LAT 38 53 07N LONG 078 28 48W)

JUL 1999

26...	0700	438	8.4	4.74	59.4	--	26.9
26...	1830	425	8.8	10.01	132.9	--	30.1

\* Data are from continual water-quality monitors that were operated for one to eight days. Data shown are those associated with the maximum or minimum dissolved oxygen values during the monitored period.

POTOMAC RIVER BASIN--Continued

WATER-QUALITY DATA (North Fork SHENANDOAH MIF STUDY), WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

N F SHENANDOAH RIVER BELOW SPRING HOLLOW CREEK AT WOODSTOCK, VA (LAT 38 53 13N LONG 078 28 46W)

JUL 1999								
*24...	0400	431	8.4	4.92	62.4	--	27.5	
*26...	1800	433	8.7	9.42	124.0	--	29.7	

N F SHENANDOAH RIVER AT ROUTE 663 AT WOODSTOCK, VA (LAT 38 54 10N LONG 078 28 52W)

JUL 1999								
28...	0510	437	8.9	7.50	95.2	25.0	27.6	
29...	1600	434	8.8	9.73	124.1	34.0	27.9	

N F SHENANDOAH RIVER ALONG RITTENOUR RIDGE NEAR WOODSTOCK, VA (LAT 38 54 12N LONG 078 27 15W)

JUL 1999								
28...	0440	440	8.9	4.87	60.5	25.5	26.4	
29...	1545	426	9.1	14.49	189.1	32.5	29.2	

N F SHENANDOAH RIVER AT ROUTE 661 NEAR WOODSTOCK, VA (LAT 38 54 43N LONG 078 27 39W)

JUL 1999								
28...	0415	455	8.6	4.68	58.0	24.5	26.2	
29...	1535	416	9.3	15.33	202.2	33.0	29.7	

N F SHENANDOAH RIVER AT ROUTE 654 NEAR MAURERTOWN, VA (LAT 38 54 35N LONG 078 25 35W)

JUL 1999								
27...	0640	412	9.3	6.06	76.0	24.5	26.9	
27...	1740	445	9.0	10.32	132.4	35.0	28.2	
28...	0400	417	9.2	7.36	93.7	25.0	27.7	

N F SHENANDOAH RIVER ALONG ROUTE 648 NEAR FISHERS HILL, VA (LAT 38 57 06N LONG 078 23 00W)

JUL 1999								
27...	0550	425	8.9	5.58	68.8	23.5	26.0	
27...	1710	390	9.6	11.39	149.5	35.0	29.5	

N F SHENANDOAH RIVER ALONG ROUTE 644 NEAR FISHERS HILL, VA (LAT 38 57 26N LONG 078 23 00W)

JUL 1999								
27...	0558	417	9.0	4.54	56.4	23.5	26.5	
27...	1715	392	9.5	12.47	163.2	34.5	29.5	

N F SHENANDOAH RIVER AT ROUTE 744 NEAR FISHERS HILL, VA (LAT 38 57 15N LONG 078 22 32W)

JUL 1999								
27...	0530	415	9.0	4.40	55.1	23.0	26.8	
27...	1700	392	9.5	14.56	193.2	37.0	30.1	

N F SHENANDOAH RIVER AT ROUTE 648 AT STRASBURG, VA (LAT 38 59 04N LONG 078 22 03W)

JUL 1999								
27...	0505	397	9.3	6.95	87.9	22.5	27.4	
27...	1640	400	9.3	10.26	132.2	33.0	28.5	

01634000 N F SHENANDOAH RIVER NEAR STRASBURG, VA (LAT 38 58 36N LONG 078 20 11W)

JUL 1999								
27...	0440	413	9.1	4.74	58.7	22.0	26.4	
27...	1621	405	9.5	14.01	184.2	34.5	29.6	

N F SHENANDOAH RIVER ABOVE CEDAR CREEK NEAR STRASBURG, VA (LAT 38 58 58N LONG 078 19 04W)

JUL 1999								
*28...	1300	410	9.3	8.57	111.4	--	28.9	
*29...	0730	406	9.2	5.70	69.6	--	25.5	

N F SHENANDOAH RIVER BELOW CEDAR CREEK NEAR STRASBURG, VA (LAT 38 59 01N LONG 078 18 57W)

JUL 1999								
*28...	1300	397	9.2	8.78	113.1	--	28.4	
*29...	0730	395	9.1	5.94	71.9	--	25.0	

\* Data are from continual water-quality monitors that were operated for one to eight days. Data shown are those associated with the maximum or minimum dissolved oxygen values during the monitored period.

ANALYSES OF SAMPLES COLLECTED AT PARTIAL-RECORD, SPECIAL STUDY,  
AND MISCELLANEOUS SITES

POTOMAC RIVER BASIN--Continued

WATER-QUALITY DATA (North Fork SHENANDOAH MIF STUDY), WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

N F SHENANDOAH RIVER ABOVE WINCHESTER DAM AT WATERLICK, VA (LAT 38 58 53N LONG 078 17 26W)

JUL 1999							
*29...	1000	403	8.9	5.48	66.8	--	25.4
*29...	2130	390	9.1	9.65	123.0	--	27.8

N F SHENANDOAH RIVER BELOW WINCHESTER DAM AT WATERLICK, VA (LAT 38 58 49N LONG 078 17 24W)

JUL 1999							
*29...	0700	403	8.9	6.11	74.9	--	25.6
*29...	2230	392	9.1	8.92	113.5	--	27.7

N F SHENANDOAH RIVER ABOVE PASSAGE CREEK AT WATERLICK, VA (LAT 38 58 36N LONG 078 16 13W)

JUL 1999							
27...	0420	403	8.9	5.83	73.6	21.5	27.2
27...	1605	414	9.0	8.58	111.2	33.5	28.8

\* Data are from continual water-quality monitors that were operated for one to eight days. Data shown are those associated with the maximum or minimum dissolved oxygen values during the monitored period.

ANALYSES OF SAMPLES COLLECTED AT PARTIAL-RECORD, SPECIAL STUDY,  
AND MISCELLANEOUS SITES

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JAMES RIVER BASIN

WATER-QUALITY DATA, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DATE	TIME	SAMPLE TYPE	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND-ARDS) (00400)	BARO-METRIC PRES-SURE (MM OF HG) (00025)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	OXYGEN, DIS-SOLVED (MG/L) (00300)		
0203880090 PLAIN RUN BRANCH AT APPOMATTOX, VA (LAT 37 22 03N LONG 078 48 58W)											
MAR 1999	02...	ENVIRONMENTAL	.14	94	6.9	732	6.0	5.5	10.6		
JUN	29...	ENVIRONMENTAL	.081	123	6.6	730	34.0	26.8	7.3		
SEP	30...	ENVIRONMENTAL	2.72	111	7.1	734	19.0	16.4	8.8		
DATE		COLI-FORM, TOTAL, IMMED. (COLS. PER 100 ML) (31501)	COLI-FORM, FECAL, UM-MF (COLS./100 ML) (31625)	STREP-TOCOCCI, FECAL, KF AGAR (COLS. PER 100 ML) (31673)	ALKA-LINITY WAT DIS TOT IT FIELD (MG/L AS CACO3) (39086)	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)	NITRO-GEN, AM-MONIA + ORGANIC DIS. TOTAL (MG/L AS P) (00623)	PHOS-PHORUS TOTAL (MG/L AS P) (00665)
0203880090 PLAIN RUN BRANCH AT APPOMATTOX, VA (LAT 37 22 03N LONG 078 48 58W)											
MAR 1999	02...	220	K20	K37	20	.01	.89	<.02	E.06	E.06	.007
JUN	29...	260	67	>100	33.5	<.01	.65	.04	.2	.2	.017
SEP	30...	5800	1200	2200	36.9	<.01	.49	<.02	.5	.4	.043
DATE		PHOS-PHORUS DIS-SOLVED (MG/L AS P) (00666)	PHOS-PHORUS ORTHO, DIS-SOLVED (MG/L AS P) (00671)	ALUM-INUM, TOTAL RECOV-ERABLE (UG/L AS AL) (01105)	ARSENIC TOTAL (UG/L AS AS) (01002)	BARIUM, TOTAL RECOV-ERABLE (UG/L AS BA) (01007)	BERYL-LIUM, TOTAL RECOV-ERABLE (UG/L AS BE) (01012)	CADMIUM, WATER UNFLTRD TOTAL (UG/L AS CD) (01027)	CHRO-MIUM, TOTAL RECOV-ERABLE (UG/L AS CR) (01034)	COBALT, TOTAL RECOV-ERABLE (UG/L AS CO) (01037)	COPPER, TOTAL RECOV-ERABLE (UG/L AS CU) (01042)
0203880090 PLAIN RUN BRANCH AT APPOMATTOX, VA (LAT 37 22 03N LONG 078 48 58W)											
MAR 1999	02...	<.004	<.01	--	--	--	--	--	--	--	--
JUN	29...	<.004	<.01	217	<1	24.5	<4	<1	<1.0	<1	2
SEP	30...	.013	<.01	--	--	--	--	--	--	--	--
DATE		IRON, TOTAL RECOV-ERABLE (UG/L AS FE) (01045)	LEAD, TOTAL RECOV-ERABLE (UG/L AS PB) (01051)	LITHIUM, TOTAL RECOV-ERABLE (UG/L AS LI) (01132)	MANGA-NESE, TOTAL RECOV-ERABLE (UG/L AS MN) (01055)	MERCURY, TOTAL RECOV-ERABLE (UG/L AS HG) (71900)	MOLYB-DENUM, TOTAL RECOV-ERABLE (UG/L AS MO) (01062)	NICKEL, TOTAL RECOV-ERABLE (UG/L AS NI) (01067)	SELE-NIUM, TOTAL RECOV-ERABLE (UG/L AS SE) (01147)	SILVER, TOTAL RECOV-ERABLE (UG/L AS AG) (01077)	ZINC, TOTAL RECOV-ERABLE (UG/L AS ZN) (01092)
0203880090 PLAIN RUN BRANCH AT APPOMATTOX, VA (LAT 37 22 03N LONG 078 48 58W)											
MAR 1999	02...	--	--	--	--	--	--	--	--	--	--
JUN	29...	879	<1	<12	92.1	<.1	<1.0	<1	<1	<1	<40
SEP	30...	--	--	--	--	--	--	--	--	--	--

> Actual value is known to be greater than the value shown.  
 < Actual value is known to be less than the value shown.  
 E Estimated.  
 K Results based on colony count outside optimal range.

ANALYSES OF SAMPLES COLLECTED AT PARTIAL-RECORD, SPECIAL STUDY,  
AND MISCELLANEOUS SITES

JAMES RIVER BASIN--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DATE	TIME	SAMPLE TYPE	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND-ARD UNITS) (00400)	BARO-METRIC PRES-SURE (MM OF HG) (00025)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	OXYGEN, DIS-SOLVED (MG/L) (00300)		
0203880250 APPOMATTOX AT EAST PARK BNDRY NR APPOMATTOX, VA (LAT 37 23 01N LONG 078 46 52W)											
MAR 1999											
01...	1500	ENVIRONMENTAL	6.8	76	7.5	727	7.5	6.9	13.9		
JUN 29...	1255	ENVIRONMENTAL	1.97	93	7.4	730	--	24.5	6.5		
SEP 29...	1430	ENVIRONMENTAL	16.1	86	6.9	739	21.0	19.0	8.2		
DATE		COLI-FORM, TOTAL, IMMED. (COLS. PER 100 ML) (31501)	COLI-FORM, FECAL, KF AGAR (COLS./100 ML) (31625)	STREP-TOCOCCHI, FECAL, KF AGAR (COLS. PER 100 ML) (31673)	ALKA-LINITY WAT DIS TOT IT FIELD (MG/L AS CAC03) (39086)	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 + ORGAMONIA + DIS. (MG/L AS N) (00625)	NITRO-GEN, AM-MONIA + ORGAMONIA + DIS. (MG/L AS N) (00623)	PHOS-PHORUS TOTAL (MG/L AS P) (00665)
0203880250 APPOMATTOX AT EAST PARK BNDRY NR APPOMATTOX, VA (LAT 37 23 01N LONG 078 46 52W)											
MAR 1999											
01...	240	190	100	21	.02	.28	<.02	.2	.1	.018	
JUN 29...	1300	K190	230	35.1	<.01	.48	.02	.2	.1	.027	
SEP 29...	5300	850	2700	23.5	<.01	.26	<.02	.4	.3	.053	
DATE		PHOS-PHORUS DIS-SOLVED (MG/L AS P) (00666)	PHOS-PHORUS ORTHO, DIS-SOLVED (MG/L AS P) (00671)	ALUM-INUM, TOTAL RECOV-ERABLE (UG/L AS AL) (01105)	ARSENIC TOTAL (UG/L AS AS) (01002)	BARIUM, TOTAL RECOV-ERABLE (UG/L AS BA) (01007)	BERYL-LIUM, TOTAL RECOV-ERABLE (UG/L AS BE) (01012)	CADMIUM, WATER UNFLTRD TOTAL RECOV-ERABLE (UG/L AS CD) (01027)	CHRO-MIUM, TOTAL RECOV-ERABLE (UG/L AS CR) (01034)	COBALT, TOTAL RECOV-ERABLE (UG/L AS CO) (01037)	COPPER, TOTAL RECOV-ERABLE (UG/L AS CU) (01042)
0203880250 APPOMATTOX AT EAST PARK BNDRY NR APPOMATTOX, VA (LAT 37 23 01N LONG 078 46 52W)											
MAR 1999											
01...	.006	<.01	--	--	--	--	--	--	--	--	
JUN 29...	.01	.01	84.1	<1	21.1	<4	<1	<1.0	<1	2	
SEP 29...	.017	.01	--	--	--	--	--	--	--	--	
DATE		IRON, TOTAL RECOV-ERABLE (UG/L AS FE) (01045)	LEAD, TOTAL RECOV-ERABLE (UG/L AS PB) (01051)	LITHIUM, TOTAL RECOV-ERABLE (UG/L AS LI) (01132)	MANGA-NESE, TOTAL RECOV-ERABLE (UG/L AS MN) (01055)	MERCURY, TOTAL RECOV-ERABLE (UG/L AS HG) (71900)	MOLYB-DENUM, TOTAL RECOV-ERABLE (UG/L AS MO) (01062)	NICKEL, TOTAL RECOV-ERABLE (UG/L AS NI) (01067)	SELE-NIUM, TOTAL RECOV-ERABLE (UG/L AS SE) (01147)	SILVER, TOTAL RECOV-ERABLE (UG/L AS AG) (01077)	ZINC, TOTAL RECOV-ERABLE (UG/L AS ZN) (01092)
0203880250 APPOMATTOX AT EAST PARK BNDRY NR APPOMATTOX, VA (LAT 37 23 01N LONG 078 46 52W)											
MAR 1999											
01...	--	--	--	--	--	--	--	--	--	--	
JUN 29...	754	<1	<12	41.4	<.1	<1.0	<1	<1	<1	<40	
SEP 29...	--	--	--	--	--	--	--	--	--	--	

< Actual value is known to be less than the value shown.  
K Results based on colony count outside optimal range.

ANALYSES OF SAMPLES COLLECTED AT PARTIAL-RECORD, SPECIAL STUDY,  
AND MISCELLANEOUS SITES

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JAMES RIVER BASIN--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DATE	TIME	SAMPLE TYPE	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND-ARD UNITS) (00400)	BARO-METRIC PRES-SURE (MM OF HG) (00025)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	OXYGEN, DIS-SOLVED (MG/L) (00300)		
0203880175 PLAIN RUN BRANCH AT MOUTH NEAR APPOMATTOX, VA (LAT 37 22 50N LONG 078 47 21W)											
MAR 1999											
02...	1145	ENVIRONMENTAL	1.3	93	7.5	736	12.0	5.8	13.1		
JUN 29...	1725	ENVIRONMENTAL	.357	106	7.5	730	31.0	23.9	5.4		
SEP 30...	1140	ENVIRONMENTAL	14.8	73	7.0	739	16.5	16.8	9.0		
DATE		COLI-FORM, TOTAL, IMMED. (COLS. PER 100 ML) (31501)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./100 ML) (31625)	STREP-TOCOCCHI FECAL, KF AGAR (COLS. PER 100 ML) (31673)	ALKA-LINITY WAT DIS TOT IT FIELD (MG/L AS CAC03) (39086)	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 DIS. (MG/L AS N) (00625)	NITRO-GEN, AM-MONIA + ORGANIC TOTAL DIS. (MG/L AS N) (00623)	PHOS-PHORUS TOTAL (MG/L AS P) (00665)
0203880175 PLAIN RUN BRANCH AT MOUTH NEAR APPOMATTOX, VA (LAT 37 22 50N LONG 078 47 21W)											
MAR 1999											
02...	K110	K43	K10	26	.01	.14	<.02	.1	E.08	.01	
JUN 29...	920	170	260	39.6	<.01	.38	.02	.1	E.07	.012	
SEP 30...	6200	850	2100	20.0	<.01	.14	<.02	.4	.3	.042	
DATE		PHOS-PHORUS DIS-SOLVED (MG/L AS P) (00666)	PHOS-PHORUS ORTHO, DIS-SOLVED (MG/L AS P) (00671)	ALUM-INUM, TOTAL RECOV-ERABLE (UG/L AS AL) (01105)	ARSENIC TOTAL (UG/L AS AS) (01002)	BARIUM, TOTAL RECOV-ERABLE (UG/L AS BA) (01007)	BERYL-LIUM, TOTAL RECOV-ERABLE (UG/L AS BE) (01012)	CADMIUM, WATER UNFLTRD TOTAL (UG/L AS CD) (01027)	CHRO-MIUM, TOTAL RECOV-ERABLE (UG/L AS CR) (01034)	COBALT, TOTAL RECOV-ERABLE (UG/L AS CO) (01037)	COPPER, TOTAL RECOV-ERABLE (UG/L AS CU) (01042)
0203880175 PLAIN RUN BRANCH AT MOUTH NEAR APPOMATTOX, VA (LAT 37 22 50N LONG 078 47 21W)											
MAR 1999											
02...	<.004	<.01	--	--	--	--	--	--	--	--	
JUN 29...	.008	.01	55.6	<1	20.0	<4	<1	<1.0	<1	3	
SEP 30...	.011	.02	--	--	--	--	--	--	--	--	
DATE		IRON, TOTAL RECOV-ERABLE (UG/L AS FE) (01045)	LEAD, TOTAL RECOV-ERABLE (UG/L AS PB) (01051)	LITHIUM, TOTAL RECOV-ERABLE (UG/L AS LI) (01132)	MANGA-NESE, TOTAL RECOV-ERABLE (UG/L AS MN) (01055)	MERCURY, TOTAL RECOV-ERABLE (UG/L AS HG) (71900)	MOLYB-DENUM, TOTAL RECOV-ERABLE (UG/L AS MO) (01062)	NICKEL, TOTAL RECOV-ERABLE (UG/L AS NI) (01067)	SELE-NIUM, TOTAL RECOV-ERABLE (UG/L AS SE) (01147)	SILVER, TOTAL RECOV-ERABLE (UG/L AS AG) (01077)	ZINC, TOTAL RECOV-ERABLE (UG/L AS ZN) (01092)
0203880175 PLAIN RUN BRANCH AT MOUTH NEAR APPOMATTOX, VA (LAT 37 22 50N LONG 078 47 21W)											
MAR 1999											
02...	--	--	--	--	--	--	--	--	--	--	
JUN 29...	235	<1	<12	17.7	<.1	<1.0	<1	<1	<1	<40	
SEP 30...	--	--	--	--	--	--	--	--	--	--	

< Actual value is known to be less than the value shown.  
E Estimated.  
K Results based on colony count outside optimal range.

ANALYSES OF SAMPLES COLLECTED AT PARTIAL-RECORD, SPECIAL STUDY,  
AND MISCELLANEOUS SITES

JAMES RIVER BASIN--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DATE	TIME	SAMPLE TYPE	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND-ARDS) (00400)	BARO-METRIC PRES-SURE (MM OF HG) (00025)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	OXYGEN, DIS-SOLVED (MG/L) (00300)		
0203879450 APPOMATTOX RIVER AT SR 656 NEAR APPOMATTOX, VA (LAT 37 22 45N LONG 078 49 27W)											
MAR 1999											
01...	1230	ENVIRONMENTAL	1.4	56	7.3	725	7.0	7.0	11.2		
JUN 29...	1005	ENVIRONMENTAL	.426	68	6.8	730	28.5	20.8	5.8		
SEP 29...	1120	ENVIRONMENTAL	2.97	70	6.7	739	20.5	19.2	7.7		
DATE		COLI-FORM, TOTAL, IMMED. (COLS. PER 100 ML) (31501)	COLI-FORM, FECAL, KF AGAR (COLS./100 ML) (31625)	STREP-TOCOCCHI FECAL, KF AGAR (COLS. PER 100 ML) (31673)	ALKA-LINITY WAT DIS TOT IT FIELD (MG/L AS CAC03) (39086)	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 + ORGAMONIC TOTAL DIS. (MG/L AS N) (00625)	NITRO-GEN, AM-MONIA + ORGAMONIC TOTAL DIS. (MG/L AS N) (00623)	PHOS-PHORUS TOTAL (MG/L AS P) (00665)
0203879450 APPOMATTOX RIVER AT SR 656 NEAR APPOMATTOX, VA (LAT 37 22 45N LONG 078 49 27W)											
MAR 1999											
01...	410	330	340	16	.01	.35	<.02	.3	.2	.027	
JUN 29...	2900	K1500	2500	21.0	<.01	.52	.05	.3	<.1	.028	
SEP 29...	3200	1900	K3200	20.9	<.01	.22	.05	.7	.4	.085	
DATE		PHOS-PHORUS DIS-SOLVED (MG/L AS P) (00666)	PHOS-PHORUS ORTHO, DIS-SOLVED (MG/L AS P) (00671)	ALUM-INUM, TOTAL RECOV-ERABLE (UG/L AS AL) (01105)	ARSENIC TOTAL (UG/L AS AS) (01002)	BARIUM, TOTAL RECOV-ERABLE (UG/L AS BA) (01007)	BERYL-LIUM, TOTAL RECOV-ERABLE (UG/L AS BE) (01012)	CADMIUM, WATER UNFLTRD TOTAL (UG/L AS CD) (01027)	CHRO-MIUM, TOTAL RECOV-ERABLE (UG/L AS CR) (01034)	COBALT, TOTAL RECOV-ERABLE (UG/L AS CO) (01037)	COPPER, TOTAL RECOV-ERABLE (UG/L AS CU) (01042)
0203879450 APPOMATTOX RIVER AT SR 656 NEAR APPOMATTOX, VA (LAT 37 22 45N LONG 078 49 27W)											
MAR 1999											
01...	.009	<.01	--	--	--	--	--	--	--	--	
JUN 29...	.01	.01	45.4	<1	20.1	<4	<1	<1.0	<1	2	
SEP 29...	.029	.02	--	--	--	--	--	--	--	--	
DATE		IRON, TOTAL RECOV-ERABLE (UG/L AS FE) (01045)	LEAD, TOTAL RECOV-ERABLE (UG/L AS PB) (01051)	LITHIUM, TOTAL RECOV-ERABLE (UG/L AS LI) (01132)	MANGA-NESE, TOTAL RECOV-ERABLE (UG/L AS MN) (01055)	MERCURY, TOTAL RECOV-ERABLE (UG/L AS HG) (71900)	MOLYB-DENUM, TOTAL RECOV-ERABLE (UG/L AS MO) (01062)	NICKEL, TOTAL RECOV-ERABLE (UG/L AS NI) (01067)	SELE-NIUM, TOTAL RECOV-ERABLE (UG/L AS SE) (01147)	SILVER, TOTAL RECOV-ERABLE (UG/L AS AG) (01077)	ZINC, TOTAL RECOV-ERABLE (UG/L AS ZN) (01092)
0203879450 APPOMATTOX RIVER AT SR 656 NEAR APPOMATTOX, VA (LAT 37 22 45N LONG 078 49 27W)											
MAR 1999											
01...	--	--	--	--	--	--	--	--	--	--	
JUN 29...	1070	<1	<12	75.4	<.1	<1.0	<1	<1	<1	<40	
SEP 29...	--	--	--	--	--	--	--	--	--	--	

< Actual value is known to be less than the value shown.  
K Results based on colony count outside optimal range.



ANALYSES OF SAMPLES COLLECTED AT PARTIAL-RECORD, SPECIAL STUDY,  
AND MISCELLANEOUS SITES

JAMES RIVER BASIN--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DATE	TIME	SAMPLE TYPE	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	TEMPER- ATURE AIR (DEG C) (00020)	TEMPER- ATURE WATER (DEG C) (00010)	OXYGEN, DIS- SOLVED (MG/L) (00300)		
02041745 POOR CREEK AT HWY 460 AT PETERSBURG, VA (LAT 37 12 56N LONG 077 22 29W)											
DEC 1998	09...	ENVIRONMENTAL	1.2	84	6.9	760	18.5	13.0	9.3		
FEB 1999	10...	ENVIRONMENTAL	.14	305	7.6	757	10.0	7.5	11.3		
JUN	23...	ENVIRONMENTAL	.026	217	7.2	758	22.0	17.9	6.9		
DATE		COLI- FORM, TOTAL, IMMED. (COLS. PER (31501)	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	STREP- TOCOCCI FECAL, KF AGAR (COLS. PER (31673)	ALKA- LINITY WAT DIS TOT IT FIELD MG/L AS (39086)	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)	NITRO- GEN,AM- MONIA + ORGANIC DIS. TOTAL (MG/L AS N) (00623)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)
02041745 POOR CREEK AT HWY 460 AT PETERSBURG, VA (LAT 37 12 56N LONG 077 22 29W)											
DEC 1998	09...	K20000	K20000	10000	12	.01	.27	.07	.5	.5	.08
FEB 1999	10...	1300	>180	690	44	<.01	.2	.04	.3	.2	.0219
JUN	23...	4300	K1475	1120	51.0	.01	.22	.04	.4	.3	.064
DATE		PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	ALUM- INUM, TOTAL RECOV- ERABLE (UG/L AS AL) (01105)	ARSENIC TOTAL (UG/L AS AS) (01002)	BARIUM, TOTAL RECOV- ERABLE (UG/L AS BA) (01007)	BERYL- LIUM, TOTAL RECOV- ERABLE (UG/L AS BE) (01012)	CADMIUM WATER UNFLTRD TOTAL ERABLE (UG/L AS CD) (01027)	CHRO- MIUM, TOTAL RECOV- ERABLE (UG/L AS CR) (01034)	COBALT, TOTAL RECOV- ERABLE (UG/L AS CO) (01037)	COPPER, TOTAL RECOV- ERABLE (UG/L AS CU) (01042)
02041745 POOR CREEK AT HWY 460 AT PETERSBURG, VA (LAT 37 12 56N LONG 077 22 29W)											
DEC 1998	09...	.07	.08	--	--	--	--	--	--	--	--
FEB 1999	10...	.0054	<.01	--	--	--	--	--	--	--	--
JUN	23...	.015	.02	69.8	<1	39.5	<4	<1	<1.0	1	1
DATE		IRON, TOTAL RECOV- ERABLE (UG/L AS FE) (01045)	LEAD, TOTAL RECOV- ERABLE (UG/L AS PB) (01051)	LITHIUM TOTAL RECOV- ERABLE (UG/L AS LI) (01132)	MANGA- NESE, TOTAL RECOV- ERABLE (UG/L AS MN) (01055)	MERCURY TOTAL RECOV- ERABLE (UG/L AS HG) (71900)	MOLYB- DENUM, TOTAL RECOV- ERABLE (UG/L AS MO) (01062)	NICKEL, TOTAL RECOV- ERABLE (UG/L AS NI) (01067)	SELE- NIUM, TOTAL RECOV- ERABLE (UG/L AS SE) (01147)	SILVER, TOTAL RECOV- ERABLE (UG/L AS AG) (01077)	ZINC, TOTAL RECOV- ERABLE (UG/L AS ZN) (01092)
02041745 POOR CREEK AT HWY 460 AT PETERSBURG, VA (LAT 37 12 56N LONG 077 22 29W)											
DEC 1998	09...	--	--	--	--	--	--	--	--	--	--
FEB 1999	10...	--	--	--	--	--	--	--	--	--	--
JUN	23...	926	<1	<12	64.9	<.1	<1.0	2	<1	<1	<40

> 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 optimal range.

ANALYSES OF SAMPLES COLLECTED AT PARTIAL-RECORD, SPECIAL STUDY,  
AND MISCELLANEOUS SITES

JAMES RIVER BASIN--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DATE	TIME	SAMPLE TYPE	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND-ARDS UNITS) (00400)	BARO-METRIC PRES-SURE (MM OF HG) (00025)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	OXYGEN, DIS-SOLVED (MG/L) (00300)		
02041748 POOR CR NR BLANDFORD CEMETARY AT PETERSBURG , VA (LAT 37 13 49N LONG 077 22 32W)											
DEC 1998 08...	1330	ENVIRONMENTAL	.07	240	7.5	753	22.5	16.1	7.8		
FEB 1999 10...	1225	ENVIRONMENTAL	.65	241	7.5	760	16.0	9.1	11.8		
JUN 23...	1300	ENVIRONMENTAL	.133	183	7.6	758	24.0	19.4	7.0		
DATE		COLI-FORM, TOTAL, IMMED. (COLS. PER 100 ML) (31501)	COLI-FORM, FECAL, UM-MF (COLS./100 ML) (31625)	STREP-TOCOCCI, FECAL, KF AGAR (COLS. PER 100 ML) (31673)	ALKA-LINITY WAT DIS TOT IT FIELD (MG/L AS) (39086)	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)	NITRO-GEN, AM-MONIA + ORGANIC DIS. TOTAL (MG/L AS N) (00623)	PHOS-PHORUS TOTAL (MG/L AS P) (00665)
02041748 POOR CR NR BLANDFORD CEMETARY AT PETERSBURG , VA (LAT 37 13 49N LONG 077 22 32W)											
DEC 1998 08...	3000	K110	300	62	<.01	<.05	<.02	.2	.2	E.05	
FEB 1999 10...	450	K39	K35	27	<.01	.11	.03	.2	.1	.018	
JUN 23...	3100	260	350	44	<.01	.12	.03	.3	.2	.04	
DATE		PHOS-PHORUS ORTHO, DIS-SOLVED (MG/L AS P) (00666)	PHOS-PHORUS DIS-SOLVED (MG/L AS P) (00671)	ALUM-INUM, TOTAL RECOV-ERABLE (UG/L AS AL) (01105)	ARSENIC TOTAL (UG/L AS AS) (01002)	BARIUM, TOTAL RECOV-ERABLE (UG/L AS BA) (01007)	BERYL-LIUM, TOTAL RECOV-ERABLE (UG/L AS BE) (01012)	CADMIUM, WATER UNFLTRD TOTAL (UG/L AS CD) (01027)	CHRO-MIUM, TOTAL RECOV-ERABLE (UG/L AS CR) (01034)	COBALT, TOTAL RECOV-ERABLE (UG/L AS CO) (01037)	COPPER, TOTAL RECOV-ERABLE (UG/L AS CU) (01042)
02041748 POOR CR NR BLANDFORD CEMETARY AT PETERSBURG , VA (LAT 37 13 49N LONG 077 22 32W)											
DEC 1998 08...	<.05	.02	--	--	--	--	--	--	--	--	
FEB 1999 10...	<.004	<.01	--	--	--	--	--	--	--	--	
JUN 23...	.015	.02	67.2	1	39.4	<4	<1	<1.0	<1	1	
DATE		IRON, TOTAL RECOV-ERABLE (UG/L AS FE) (01045)	LEAD, TOTAL RECOV-ERABLE (UG/L AS PB) (01051)	LITHIUM, TOTAL RECOV-ERABLE (UG/L AS LI) (01132)	MANGA-NESE, TOTAL RECOV-ERABLE (UG/L AS MN) (01055)	MERCURY, TOTAL RECOV-ERABLE (UG/L AS HG) (71900)	MOLYB-DENUM, TOTAL RECOV-ERABLE (UG/L AS MO) (01062)	NICKEL, TOTAL RECOV-ERABLE (UG/L AS NI) (01067)	SELE-NIUM, TOTAL RECOV-ERABLE (UG/L AS SE) (01147)	SILVER, TOTAL RECOV-ERABLE (UG/L AS AG) (01077)	ZINC, TOTAL RECOV-ERABLE (UG/L AS ZN) (01092)
02041748 POOR CR NR BLANDFORD CEMETARY AT PETERSBURG , VA (LAT 37 13 49N LONG 077 22 32W)											
DEC 1998 08...	--	--	--	--	--	--	--	--	--	--	
FEB 1999 10...	--	--	--	--	--	--	--	--	--	--	
JUN 23...	739	<1	<12	39.7	<.1	1.0	2	<1	<1	<40	

< Actual value is known to be less than the value shown.  
E Estimated.  
K Results based on colony count outside optimal range.

JAMES RIVER BASIN--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DATE	TIME	SAMPLE TYPE	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND-ARD UNITS) (00400)	BARO-METRIC PRES-SURE (MM OF HG) (00025)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	OXYGEN, DIS-SOLVED (MG/L) (00300)		
02041758 HARRISON CREEK AT SIEGE RD AT PETERSBURG, VA (LAT 37 13 57N LONG 077 21 50W)											
DEC 1998 08...	1115	ENVIRONMENTAL	.02	180	7.5	755	19.5	15.7	7.7		
FEB 1999 09...	1135	ENVIRONMENTAL	.33	184	7.8	759	13.0	6.3	12.4		
JUN 22...	0935	ENVIRONMENTAL	.120	149	6.8	759	20.5	17.8	8.2		
DATE		COLI-FORM, TOTAL, IMMED. (COLS. PER 100 ML) (31501)	COLI-FORM, FECAL, UM-MF (COLS./ 100 ML) (31625)	STREP-TOCOCCHI, FECAL, KF AGAR (COLS. PER 100 ML) (31673)	ALKA-LINITY WAT DIS TOT IT FIELD (MG/L AS) (39086)	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)	NITRO-GEN, AM-MONIA + ORGANIC DIS. TOTAL (MG/L AS N) (00623)	PHOS-PHORUS TOTAL (MG/L AS P) (00665)
02041758 HARRISON CREEK AT SIEGE RD AT PETERSBURG, VA (LAT 37 13 57N LONG 077 21 50W)											
DEC 1998 08...	770	430	1000	53	<.01	<.05	<.02	.2	.2	E.05	
FEB 1999 09...	190	K23	K85	38	<.01	<.05	<.02	.2	.1	.013	
JUN 22...	620	620	2500	50.2	<.01	.08	.03	.3	.2	.037	
DATE		PHOS-PHORUS DIS-SOLVED (MG/L AS P) (00666)	PHOS-PHORUS ORTHO, DIS-SOLVED (MG/L AS P) (00671)	ALUM-INUM, TOTAL RECOV-ERABLE (UG/L AS AL) (01105)	ARSENIC TOTAL (UG/L AS AS) (01002)	BARIUM, TOTAL RECOV-ERABLE (UG/L AS BA) (01007)	BERYL-LIUM, TOTAL RECOV-ERABLE (UG/L AS BE) (01012)	CADMIUM, WATER UNFLTRD TOTAL (UG/L AS CD) (01027)	CHRO-MIUM, TOTAL RECOV-ERABLE (UG/L AS CR) (01034)	COBALT, TOTAL RECOV-ERABLE (UG/L AS CO) (01037)	COPPER, TOTAL RECOV-ERABLE (UG/L AS CU) (01042)
02041758 HARRISON CREEK AT SIEGE RD AT PETERSBURG, VA (LAT 37 13 57N LONG 077 21 50W)											
DEC 1998 08...	E.03	.03	--	--	--	--	--	--	--	--	
FEB 1999 09...	.005	<.01	--	--	--	--	--	--	--	--	
JUN 22...	.02	.02	84.3	1	46.0	<4	<1	<1.0	<1	1	
DATE		IRON, TOTAL RECOV-ERABLE (UG/L AS FE) (01045)	LEAD, TOTAL RECOV-ERABLE (UG/L AS PB) (01051)	LITHIUM, TOTAL RECOV-ERABLE (UG/L AS LI) (01132)	MANGA-NESE, TOTAL RECOV-ERABLE (UG/L AS MN) (01055)	MERCURY, TOTAL RECOV-ERABLE (UG/L AS HG) (71900)	MOLYB-DENUM, TOTAL RECOV-ERABLE (UG/L AS MO) (01062)	NICKEL, TOTAL RECOV-ERABLE (UG/L AS NI) (01067)	SELE-NIUM, TOTAL RECOV-ERABLE (UG/L AS SE) (01147)	SILVER, TOTAL RECOV-ERABLE (UG/L AS AG) (01077)	ZINC, TOTAL RECOV-ERABLE (UG/L AS ZN) (01092)
02041758 HARRISON CREEK AT SIEGE RD AT PETERSBURG, VA (LAT 37 13 57N LONG 077 21 50W)											
DEC 1998 08...	--	--	--	--	--	--	--	--	--	--	
FEB 1999 09...	--	--	--	--	--	--	--	--	--	--	
JUN 22...	783	<1	<12	37.9	<.1	1.2	<1	<1	<1	<40	

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E Estimated.  
K Results based on colony count outside optimal range.

ANALYSES OF SAMPLES COLLECTED AT PARTIAL-RECORD, SPECIAL STUDY,  
AND MISCELLANEOUS SITES

JAMES RIVER BASIN--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DATE	TIME	SAMPLE TYPE	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND-ARDS UNITS) (00400)	BARO-METRIC PRES-SURE (MM OF HG) (00025)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	OXYGEN, DIS-SOLVED (MG/L) (00300)		
02041760 HARRISON CREEK AT HWY 36 AT PETERSBURG, VA (LAT 37 14 25N LONG 077 21 50W)											
DEC 1998											
08...	0845	ENVIRONMENTAL	.14	81	6.7	756	19.0	16.1	6.7		
08...	0846	REPLICATE	.14	81	6.7	756	19.0	16.1	6.7		
FEB 1999											
09...	1350	ENVIRONMENTAL	.58	138	7.3	757	19.0	9.5	10.6		
JUN 22...	1200	ENVIRONMENTAL	.179	103	6.8	760	20.5	18.2	6.6		
DATE		COLI-FORM, TOTAL, IMMED. (COLS. PER 100 ML) (31501)	COLI-FORM, FECAL, UM-MF (COLS./100 ML) (31625)	STREP-TOCOCOCI, KF AGAR (COLS. PER 100 ML) (31673)	ALKA-LINITY WAT DIS TOT IT FIELD (MG/L AS CACO3) (39086)	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 + ORGANIC DIS. (MG/L AS N) (00625)	PHOS-PHORUS TOTAL (MG/L AS P) (00665)	
02041760 HARRISON CREEK AT HWY 36 AT PETERSBURG, VA (LAT 37 14 25N LONG 077 21 50W)											
DEC 1998											
08...	K140	K65	630	20	<.01	.06	.03	.2	.1	.08	
08...	--	--	--	--	<.01	.06	.04	.2	.1	.08	
FEB 1999											
09...	1200	K40	K48	29	<.01	<.05	.04	.2	.1	.024	
JUN 22...	1600	400	940	30.5	<.01	.08	.06	.3	.2	.053	
DATE		PHOS-PHORUS DIS-SOLVED (MG/L AS P) (00666)	PHOS-PHORUS ORTHO, DIS-SOLVED (MG/L AS P) (00671)	ALUM-INUM, TOTAL RECOV-ERABLE (UG/L AS AL) (01105)	ARSENIC TOTAL (UG/L AS AS) (01002)	BARIUM, TOTAL RECOV-ERABLE (UG/L AS BA) (01007)	BERYL-LIUM, TOTAL RECOV-ERABLE (UG/L AS BE) (01012)	CADMIUM, WATER UNFLTRD TOTAL (UG/L AS CD) (01027)	CHRO-MIUM, TOTAL RECOV-ERABLE (UG/L AS CR) (01034)	COBALT, TOTAL RECOV-ERABLE (UG/L AS CO) (01037)	COPPER, TOTAL RECOV-ERABLE (UG/L AS CU) (01042)
02041760 HARRISON CREEK AT HWY 36 AT PETERSBURG, VA (LAT 37 14 25N LONG 077 21 50W)											
DEC 1998											
08...	<.05	.02	--	--	--	--	--	--	--	--	
08...	<.05	.02	--	--	--	--	--	--	--	--	
FEB 1999											
09...	.015	.02	--	--	--	--	--	--	--	--	
JUN 22...	.022	.03	47.9	1	38.3	<4	<1	<1.0	1	2	
DATE		IRON, TOTAL RECOV-ERABLE (UG/L AS FE) (01045)	LEAD, TOTAL RECOV-ERABLE (UG/L AS PB) (01051)	LITHIUM, TOTAL RECOV-ERABLE (UG/L AS LI) (01132)	MANGA-NESE, TOTAL RECOV-ERABLE (UG/L AS MN) (01055)	MERCURY, TOTAL RECOV-ERABLE (UG/L AS HG) (71900)	MOLYB-DENUM, TOTAL RECOV-ERABLE (UG/L AS MO) (01062)	NICKEL, TOTAL RECOV-ERABLE (UG/L AS NI) (01067)	SELE-NIUM, TOTAL RECOV-ERABLE (UG/L AS SE) (01147)	SILVER, TOTAL RECOV-ERABLE (UG/L AS AG) (01077)	ZINC, TOTAL RECOV-ERABLE (UG/L AS ZN) (01092)
02041760 HARRISON CREEK AT HWY 36 AT PETERSBURG, VA (LAT 37 14 25N LONG 077 21 50W)											
DEC 1998											
08...	--	--	--	--	--	--	--	--	--	--	
08...	--	--	--	--	--	--	--	--	--	--	
FEB 1999											
09...	--	--	--	--	--	--	--	--	--	--	
JUN 22...	975	<1	<12	105	<.1	<1.0	1	1	<1	<40	

< Actual value is known to be less than the value shown.  
K Results based on colony count outside optimal range.

JAMES RIVER BASIN--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DATE	TIME	SAMPLE TYPE	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND-ARDS) (00400)	BARO-METRIC PRES-SURE (MM OF HG) (00025)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	OXYGEN, DIS-SOLVED (MG/L) (00300)		
02046265 HATCHER RUN AT RT 627 NEAR FIVE FORKS, VA (LAT 37 09 20N LONG 077 37 32W)											
DEC 1998	09...	ENVIRONMENTAL	.54	117	6.2	758	13.0	13.4	5.4		
FEB 1999	09...	ENVIRONMENTAL	3.5	51	6.3	755	3.0	5.9	8.3		
JUN 22...	1445	ENVIRONMENTAL	3.68	53	6.2	755	25.0	21.0	3.6		
DATE		COLI-FORM, TOTAL, IMMED. (COLS. PER 100 ML) (31501)	COLI-FORM, FECAL, KF AGAR UM-MF (COLS./100 ML) (31625)	STREP-TOCOCCHI, FECAL, KF AGAR (COLS. PER 100 ML) (31673)	ALKA-LINITY WAT DIS TOT IT FIELD CACO3 (MG/L AS) (39086)	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 DIS. (MG/L AS N) (00625)	NITRO-GEN, AM-MONIA + ORGANIC TOTAL DIS. (MG/L AS N) (00623)	PHOS-PHORUS TOTAL (MG/L AS P) (00665)
02046265 HATCHER RUN AT RT 627 NEAR FIVE FORKS, VA (LAT 37 09 20N LONG 077 37 32W)											
DEC 1998	09...	7500	5800	2500	10	<.01	.09	<.02	.4	.4	E.03
FEB 1999	09...	940	K30	K36	6	<.01	<.05	<.02	.3	.3	.015
JUN 22...	6100	177	1060	13.2	<.01	<.05	<.02	.7	.5	.063	
DATE		PHOS-PHORUS DIS-SOLVED (MG/L AS P) (00666)	PHOS-PHORUS ORTHO, DIS-SOLVED (MG/L AS P) (00671)	ALUM-INUM, TOTAL RECOV-ERABLE (UG/L AS AL) (01105)	ARSENIC TOTAL (UG/L AS AS) (01002)	BARIUM, TOTAL RECOV-ERABLE (UG/L AS BA) (01007)	BERYL-LIUM, TOTAL RECOV-ERABLE (UG/L AS BE) (01012)	CADMIUM, WATER UNFLTRD TOTAL RECOV-ERABLE (UG/L AS CD) (01027)	CHRO-MIUM, TOTAL RECOV-ERABLE (UG/L AS CR) (01034)	COBALT, TOTAL RECOV-ERABLE (UG/L AS CO) (01037)	COPPER, TOTAL RECOV-ERABLE (UG/L AS CU) (01042)
02046265 HATCHER RUN AT RT 627 NEAR FIVE FORKS, VA (LAT 37 09 20N LONG 077 37 32W)											
DEC 1998	09...	<.05	.01	--	--	--	--	--	--	--	
FEB 1999	09...	.006	<.01	--	--	--	--	--	--	--	
JUN 22...	.009	<.01	137	2	44.0	<4	1	1.5	2	3	
DATE		IRON, TOTAL RECOV-ERABLE (UG/L AS FE) (01045)	LEAD, TOTAL RECOV-ERABLE (UG/L AS PB) (01051)	LITHIUM, TOTAL RECOV-ERABLE (UG/L AS LI) (01132)	MANGA-NESE, TOTAL RECOV-ERABLE (UG/L AS MN) (01055)	MERCURY, TOTAL RECOV-ERABLE (UG/L AS HG) (71900)	MOLYB-DENUM, TOTAL RECOV-ERABLE (UG/L AS MO) (01062)	NICKEL, TOTAL RECOV-ERABLE (UG/L AS NI) (01067)	SELE-NIUM, TOTAL RECOV-ERABLE (UG/L AS SE) (01147)	SILVER, TOTAL RECOV-ERABLE (UG/L AS AG) (01077)	ZINC, TOTAL RECOV-ERABLE (UG/L AS ZN) (01092)
02046265 HATCHER RUN AT RT 627 NEAR FIVE FORKS, VA (LAT 37 09 20N LONG 077 37 32W)											
DEC 1998	09...	--	--	--	--	--	--	--	--	--	
FEB 1999	09...	--	--	--	--	--	--	--	--	--	
JUN 22...	6690	<1	<12	421	<.1	<1.0	<1	<1	<1	<40	

< Actual value is known to be less than the value shown.  
E Estimated.  
K Results based on colony count outside optimal range.

ANALYSES OF SAMPLES COLLECTED AT PARTIAL-RECORD, SPECIAL STUDY,  
AND MISCELLANEOUS SITES

## CHOWAN RIVER BASIN

## WATER-QUALITY DATA, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	TEMPER- ATURE AIR (DEG C) (00020)	TEMPER- ATURE WATER (DEG C) (00010)	OXYGEN, DIS- SOLVED (MG/L) (00300)	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)
02047000		NOTTOWAY RIVER NEAR SEBRELL, VA (LAT 36 46 13N LONG 077 09 59W)							
SEP 1999									
22...	1300	19600	35	5.9	749	17.5	19.3	3.5	K67
22...	1345	19300	89	5.7	749	17.5	18.7	.85	K210
02049500		BLACKWATER RIVER NEAR FRANKLIN, VA (LAT 36 45 45N LONG 076 53 55W)							
SEP 1999									
22...	0930	12800	54	5.6	749	16.5	18.9	.52	210
22...	1030	12800	33	5.4	749	16.0	19.1	2.9	K111

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)	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, DIS- SOLVED (MG/L AS P) (00671)
02047000		NOTTOWAY RIVER NEAR SEBRELL, VA (LAT 36 46 13N LONG 077 09 59W)						
SEP 1999								
22...	<.01	<.05	<.02	.6	.6	.067	.032	.02
22...	.01	.20	.08	.8	.7	.13	.045	.04
02049500		BLACKWATER RIVER NEAR FRANKLIN, VA (LAT 36 45 45N LONG 076 53 55W)						
SEP 1999								
22...	<.01	.06	<.02	.7	.6	.1	.029	.02
22...	<.01	<.05	<.02	.6	.6	.067	.032	.02

< Actual value is known to be less than the value shown.  
K Results based on colony count outside optimal range.

ANALYSES OF SAMPLES COLLECTED AT PARTIAL-RECORD, SPECIAL STUDY,  
AND MISCELLANEOUS SITES

## ROANOKE RIVER BASIN

WATER-QUALITY DATA, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DATE	TIME	SAMPLE TYPE	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	BARO- METRIC PRES- SURE OF HG (00025)	TEMPER- ATURE AIR (DEG C) (00020)	TEMPER- ATURE WATER (DEG C) (00010)	OXYGEN, DIS- SOLVED (MG/L) (00300)		
02057060 GILLS CR AB JACK-O-LANTERN BR NR BURNT CHIMNEY, V(LAT 37 06 25N LONG 079 43 51W)											
DEC 1998	02...	ENVIRONMENTAL	11	64	7.2	740	5.0	5.3	11.9		
MAR 1999	03...	ENVIRONMENTAL	14	61	7.6	718	14.5	8.6	11.7		
JUN	30...	ENVIRONMENTAL	3.89	74	7.2	732	24.0	23.5	7.2		
DATE		COLI- FORM, TOTAL, IMMED. (COLS. PER 100 ML) (31501)	COLI- FORM, FECAL, UM-MF (COLS./ PER 100 ML) (31625)	STREP- TOCOCCI KF AGAR (COLS. PER 100 ML) (31673)	ALKA- LINITY WAT DIS TOT IT FIELD MG/L AS CACO3 (39086)	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)	NITRO- GEN,AM- MONIA + ORGANIC DIS. (MG/L AS N) (00623)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)
02057060 GILLS CR AB JACK-O-LANTERN BR NR BURNT CHIMNEY, V(LAT 37 06 25N LONG 079 43 51W)											
DEC 1998	02...	K520	280	390	22	<.01	<.05	<.02	.1	.1	<.05
MAR 1999	03...	K410	K330	>840	21	<.01	.14	.03	.1	E.10	.029
JUN	30...	190	K69	173	24.5	.06	.54	.08	.4	.4	.096
DATE		PHOS- PHORUS ORTHODIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	ALUM- INUM, TOTAL RECOV- ERABLE (UG/L AS AL) (01105)	ARSENIC TOTAL (UG/L AS AS) (01002)	BARIUM, TOTAL RECOV- ERABLE (UG/L AS BA) (01007)	BERYL- LIUM, TOTAL RECOV- ERABLE (UG/L AS BE) (01012)	CADMIUM WATER UNFLTRD RECOV- ERABLE (UG/L AS CD) (01027)	CHRO- MIUM, TOTAL RECOV- ERABLE (UG/L AS CR) (01034)	COBALT, TOTAL RECOV- ERABLE (UG/L AS CO) (01037)	COPPER, TOTAL RECOV- ERABLE (UG/L AS CU) (01042)
02057060 GILLS CR AB JACK-O-LANTERN BR NR BURNT CHIMNEY, V(LAT 37 06 25N LONG 079 43 51W)											
DEC 1998	02...	<.05	.01	--	--	--	--	--	--	--	--
MAR 1999	03...	.011	.02	--	--	--	--	--	--	--	--
JUN	30...	.051	.05	187	<1	22.2	<4	<1	<1.0	<1	4
DATE		IRON, TOTAL RECOV- ERABLE (UG/L AS FE) (01045)	LEAD, TOTAL RECOV- ERABLE (UG/L AS PB) (01051)	LITHIUM TOTAL RECOV- ERABLE (UG/L AS LI) (01132)	MANGA- NESE, TOTAL RECOV- ERABLE (UG/L AS MN) (01055)	MERCURY TOTAL RECOV- ERABLE (UG/L AS HG) (71900)	MOLYB- DENUM, TOTAL RECOV- ERABLE (UG/L AS MO) (01062)	NICKEL, TOTAL RECOV- ERABLE (UG/L AS NI) (01067)	SELE- NIUM, TOTAL RECOV- ERABLE (UG/L AS SE) (01147)	SILVER, TOTAL RECOV- ERABLE (UG/L AS AG) (01077)	ZINC, TOTAL RECOV- ERABLE (UG/L AS ZN) (01092)
02057060 GILLS CR AB JACK-O-LANTERN BR NR BURNT CHIMNEY, V(LAT 37 06 25N LONG 079 43 51W)											
DEC 1998	02...	--	--	--	--	--	--	--	--	--	--
MAR 1999	03...	--	--	--	--	--	--	--	--	--	--
JUN	30...	754	<1	<12	54.6	<.01	<1.0	<1	<1	<1	<40

&gt; Actual value is known to be greater than the value shown.

&lt; Actual value is known to be less than the value shown.

E Estimated.

K Results based on colony count outside optimal range.

ANALYSES OF SAMPLES COLLECTED AT PARTIAL-RECORD, SPECIAL STUDY,  
AND MISCELLANEOUS SITES

ROANOKE RIVER BASIN--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DATE	TIME	SAMPLE TYPE	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND-ARDS) (00400)	BARO-METRIC PRES-SURE (MM OF HG) (00025)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	OXYGEN, DIS-SOLVED (MG/L) (00300)		
0205706010 JACK-O-LANTERN BR NR HALEFORD CH NR SCRUGGS, VA (LAT 37 06 57N LONG 079 43 50W)											
DEC 1998 01...	0900	ENVIRONMENTAL	.04	77	7.2	725	12.0	10.1	9.8		
MAR 1999 03...	0800	ENVIRONMENTAL	.08	76	7.4	721	8.5	7.8	10.5		
JUL 01...	0845	ENVIRONMENTAL	.060	84	7.1	733	21.5	17.9	7.9		
DATE		COLI-FORM, TOTAL, IMMED. (COLS. PER 100 ML) (31501)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./100 ML) (31625)	STREP-TOCOCCI, FECAL, KF AGAR (COLS. PER 100 ML) (31673)	ALKA-LINITY WAT DIS TOT IT FIELD (MG/L AS) (39086)	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)	NITRO-GEN, AM-MONIA + ORGANIC DIS. TOTAL (MG/L AS N) (00623)	PHOS-PHORUS TOTAL (MG/L AS P) (00665)
0205706010 JACK-O-LANTERN BR NR HALEFORD CH NR SCRUGGS, VA (LAT 37 06 57N LONG 079 43 50W)											
DEC 1998 01...	180	K130	390	25	<.01	.46	<.02	.3	<.1	.06	
MAR 1999 03...	260	K29	K51	24	<.01	.64	<.02	E.06	<.1	.019	
JUL 01...	>8000	>6000	>10000	24.7	.02	.60	.03	.7	.3	.14	
DATE		PHOS-PHORUS DIS-SOLVED (MG/L AS P) (00666)	PHOS-PHORUS ORTHO, DIS-SOLVED (MG/L AS P) (00671)	ALUM-INUM, TOTAL RECOV-ERABLE (UG/L AS AL) (01105)	ARSENIC TOTAL (UG/L AS AS) (01002)	BARIUM, TOTAL RECOV-ERABLE (UG/L AS BA) (01007)	BERYL-LIUM, TOTAL RECOV-ERABLE (UG/L AS BE) (01012)	CADMIUM, WATER UNFLTRD TOTAL (UG/L AS CD) (01027)	CHRO-MIUM, TOTAL RECOV-ERABLE (UG/L AS CR) (01034)	COBALT, TOTAL RECOV-ERABLE (UG/L AS CO) (01037)	COPPER, TOTAL RECOV-ERABLE (UG/L AS CU) (01042)
0205706010 JACK-O-LANTERN BR NR HALEFORD CH NR SCRUGGS, VA (LAT 37 06 57N LONG 079 43 50W)											
DEC 1998 01...	<.05	.01	--	--	--	--	--	--	--	--	
MAR 1999 03...	.004	<.01	--	--	--	--	--	--	--	--	
JUL 01...	.02	.02	1360	<1	67.7	<4	<1	8.3	3	27	
DATE		IRON, TOTAL RECOV-ERABLE (UG/L AS FE) (01045)	LEAD, TOTAL RECOV-ERABLE (UG/L AS PB) (01051)	LITHIUM, TOTAL RECOV-ERABLE (UG/L AS LI) (01132)	MANGA-NESE, TOTAL RECOV-ERABLE (UG/L AS MN) (01055)	MERCURY, TOTAL RECOV-ERABLE (UG/L AS HG) (71900)	MOLYB-DENUM, TOTAL RECOV-ERABLE (UG/L AS MO) (01062)	NICKEL, TOTAL RECOV-ERABLE (UG/L AS NI) (01067)	SELE-NIUM, TOTAL RECOV-ERABLE (UG/L AS SE) (01147)	SILVER, TOTAL RECOV-ERABLE (UG/L AS AG) (01077)	ZINC, TOTAL RECOV-ERABLE (UG/L AS ZN) (01092)
0205706010 JACK-O-LANTERN BR NR HALEFORD CH NR SCRUGGS, VA (LAT 37 06 57N LONG 079 43 50W)											
DEC 1998 01...	--	--	--	--	--	--	--	--	--	--	
MAR 1999 03...	--	--	--	--	--	--	--	--	--	--	
JUL 01...	2570	3	<12	120	<.01	<1.0	3	<1	<1	E31.2	

> Actual value is known to be greater than the value shown.  
 < Actual value is known to be less than the value shown.  
 E Estimated.  
 K Results based on colony count outside optimal range.



ROANOKE RIVER BASIN--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DATE	TIME	SAMPLE TYPE	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	BARO- METRIC PRES- SURE OF HG (00025)	TEMPER- ATURE AIR (DEG C) (00020)	TEMPER- ATURE WATER (DEG C) (00010)	OXYGEN, DIS- SOLVED (MG/L) (00300)		
0205706020 JACK-O-LANTERN TRIB 1 AT MOUTH NR SCRUGGS, VA (LAT 37 06 42N LONG 079 43 45W)											
DEC 1998											
01...	1130	ENVIRONMENTAL	.10	68	7.3	737	18.5	9.6	10.7		
MAR 1999											
03...	1000	ENVIRONMENTAL	.25	66	7.5	721	13.0	6.8	11.4		
03...	1005	REPLICATE	.25	66	7.5	721	13.0	6.8	11.4		
JUL											
01...	1040	ENVIRONMENTAL	.138	72	7.3	733	24.0	20.8	7.6		
		COLI- FORM, TOTAL, IMMED. (COLS. PER 100 ML) (31501)	COLI- FORM, FECAL, UM-MF (COLS./ PER 100 ML) (31625)	STREP- TOCOCCCI KF AGAR (COLS. PER 100 ML) (31673)	ALKA- LINITY WAT DIS TOT IT FIELD MG/L AS CACO3 (39086)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AM- MONIA 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)	
0205706020 JACK-O-LANTERN TRIB 1 AT MOUTH NR SCRUGGS, VA (LAT 37 06 42N LONG 079 43 45W)											
DEC 1998											
01...	360	K27	310	29	<.01	<.05	<.02	<.1	<.1	<.05	
MAR 1999											
03...	160	K31	K11	26	<.01	.05	<.02	E.06	E.05	.011	
03...	--	--	--	--	<.01	.06	<.02	E.08	E.07	.009	
JUL											
01...	5200	3400	5900	28.2	.01	.10	<.02	.2	.1	.03	
		PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	ALUM- INUM, TOTAL RECOV- ERABLE (UG/L AS AL) (01105)	ARSENIC TOTAL (UG/L AS AS) (01002)	BARIUM, TOTAL RECOV- ERABLE (UG/L AS BA) (01007)	BERYL- LIUM, TOTAL RECOV- ERABLE (UG/L AS BE) (01012)	CADMIUM, WATER UNFLTRD TOTAL (UG/L AS CD) (01027)	CHRO- MIUM, TOTAL RECOV- ERABLE (UG/L AS CR) (01034)	COBALT, TOTAL RECOV- ERABLE (UG/L AS CO) (01037)	COPPER, TOTAL RECOV- ERABLE (UG/L AS CU) (01042)
0205706020 JACK-O-LANTERN TRIB 1 AT MOUTH NR SCRUGGS, VA (LAT 37 06 42N LONG 079 43 45W)											
DEC 1998											
01...	<.05	<.01	--	--	--	--	--	--	--	--	
MAR 1999											
03...	<.004	<.01	--	--	--	--	--	--	--	--	
03...	<.004	<.01	--	--	--	--	--	--	--	--	
JUL											
01...	.007	.02	198	<1	40.1	<4	<1	1.2	<1	2	
		IRON, TOTAL RECOV- ERABLE (UG/L AS FE) (01045)	LEAD, TOTAL RECOV- ERABLE (UG/L AS PB) (01051)	LITHIUM TOTAL RECOV- ERABLE (UG/L AS LI) (01132)	MANGA- NESE, TOTAL RECOV- ERABLE (UG/L AS MN) (01055)	MERCURY TOTAL RECOV- ERABLE (UG/L AS HG) (71900)	MOLYB- DENUM, TOTAL RECOV- ERABLE (UG/L AS MO) (01062)	NICKEL, TOTAL RECOV- ERABLE (UG/L AS NI) (01067)	SELE- NIUM, TOTAL RECOV- ERABLE (UG/L AS SE) (01147)	SILVER, TOTAL RECOV- ERABLE (UG/L AS AG) (01077)	ZINC, TOTAL RECOV- ERABLE (UG/L AS ZN) (01092)
0205706020 JACK-O-LANTERN TRIB 1 AT MOUTH NR SCRUGGS, VA (LAT 37 06 42N LONG 079 43 45W)											
DEC 1998											
01...	--	--	--	--	--	--	--	--	--	--	
MAR 1999											
03...	--	--	--	--	--	--	--	--	--	--	
03...	--	--	--	--	--	--	--	--	--	--	
JUL											
01...	698	<1	<12	17.8	<.01	<1.0	<1	<1	<1	<40	

< Actual value is known to be less than the value shown.  
E Estimated.  
K Results based on colony count outside optimal range.

ANALYSES OF SAMPLES COLLECTED AT PARTIAL-RECORD, SPECIAL STUDY,  
AND MISCELLANEOUS SITES

## ROANOKE RIVER BASIN--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999

DATE	TIME	SAMPLE TYPE	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	TEMPER- ATURE AIR (DEG C) (00020)	TEMPER- ATURE WATER (DEG C) (00010)	OXYGEN, DIS- SOLVED (MG/L) (00300)	
0205706030 JACK-O-LANTERN BR AT MOUTH NEAR SCRUGGS, VA (LAT 37 06 24N LONG 079 43 50W)										
DEC 1998										
01...	1345	ENVIRONMENTAL	.35	73	7.6	738	20.0	10.9	9.6	
MAR 1999										
03...	1145	ENVIRONMENTAL	.56	71	7.4	721	10.5	7.9	11.4	
JUL										
01...	1305	ENVIRONMENTAL	.246	74	7.2	733	25.5	21.4	7.2	
COLI-FORM, TOTAL, IMMEDIATE (COLS. PER 100 ML) (31501) COLI-FORM, FECAL, UM-MF (COLS./100 ML) (31625) STREPTOCOCCI, FECAL, KF AGAR (COLS. PER 100 ML) (31673) ALKALINITY, WAT DIS TOT IT FIELD (MG/L AS) (39086) NITROGEN, NITRITE, DIS-SOLVED (MG/L AS N) (00613) NITROGEN, NO2+NO3, DIS-SOLVED (MG/L AS N) (00631) NITROGEN, AMMONIA, DIS-SOLVED (MG/L AS N) (00608) NITROGEN, AMMONIA + ORGANIC, TOTAL (MG/L AS N) (00625) NITROGEN, AMMONIA + ORGANIC, DIS. TOTAL (MG/L AS N) (00623) PHOSPHORUS, TOTAL (MG/L AS P) (00665)										
0205706030 JACK-O-LANTERN BR AT MOUTH NEAR SCRUGGS, VA (LAT 37 06 24N LONG 079 43 50W)										
DEC 1998										
01...	270	K30	K42	29	<.01	<.05	<.02	<.1	<.1	<.05
MAR 1999										
03...	390	220	K34	25	<.01	.10	.03	E.09	E.08	.008
JUL										
01...	K15000	K7100	4000	27.3	.01	.19	<.02	.4	.1	.11
PHOSPHORUS, DIS-SOLVED (MG/L AS P) (00666) PHOSPHORUS, ORTHO, DIS-SOLVED (MG/L AS P) (00671) ALUMINUM, TOTAL RECOVERABLE (UG/L AS AL) (01105) ARSENIC, TOTAL RECOVERABLE (UG/L AS AS) (01002) BARIUM, TOTAL RECOVERABLE (UG/L AS BA) (01007) BERYLLIUM, TOTAL RECOVERABLE (UG/L AS BE) (01012) CADMIUM, WATER UNFLTRD, TOTAL RECOVERABLE (UG/L AS CD) (01027) CHROMIUM, TOTAL RECOVERABLE (UG/L AS CR) (01034) COBALT, TOTAL RECOVERABLE (UG/L AS CO) (01037) COPPER, TOTAL RECOVERABLE (UG/L AS CU) (01042)										
0205706030 JACK-O-LANTERN BR AT MOUTH NEAR SCRUGGS, VA (LAT 37 06 24N LONG 079 43 50W)										
DEC 1998										
01...	<.05	.01	--	--	--	--	--	--	--	--
MAR 1999										
03...	<.004	<.01	--	--	--	--	--	--	--	--
JUL										
01...	.005	.01	1270	<1	57.2	<4	<1	5.2	3	4
IRON, TOTAL RECOVERABLE (UG/L AS FE) (01045) LEAD, TOTAL RECOVERABLE (UG/L AS PB) (01051) LITHIUM, TOTAL RECOVERABLE (UG/L AS LI) (01132) MANGANESE, TOTAL RECOVERABLE (UG/L AS MN) (01055) MERCURY, TOTAL RECOVERABLE (UG/L AS HG) (71900) MOLYBDENUM, TOTAL RECOVERABLE (UG/L AS MO) (01062) NICKEL, TOTAL RECOVERABLE (UG/L AS NI) (01067) SELENIUM, TOTAL RECOVERABLE (UG/L AS SE) (01147) SILVER, TOTAL RECOVERABLE (UG/L AS AG) (01077) ZINC, TOTAL RECOVERABLE (UG/L AS ZN) (01092)										
0205706030 JACK-O-LANTERN BR AT MOUTH NEAR SCRUGGS, VA (LAT 37 06 24N LONG 079 43 50W)										
DEC 1998										
01...	--	--	--	--	--	--	--	--	--	--
MAR 1999										
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&lt; Actual value is known to be less than the value shown.

E Estimated.

K Results based on colony count outside optimal range.

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